ARNOLD AUTOMATION

GXO

Auto-Bagging System

User's Manual

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INTRODUCTION

Overview

This system is a human-operated and machine-assisted garment bagging productivity solution. The system is designed to transfer incoming garments in totes from an inbound conveyor to an outbound conveyor, with each garment individually sealed in a labeled polyethylene (“poly”) bag.

The system includes three independent bagging stations; the layout is such that two operators (labeled A and B in Figure 1) load garments individually into poly bags with an Autobag 850S machine. The Autobag machine prints shipping labels directly onto the bags, seals the bags upon operator input, and drops the bags onto a takeaway conveyor where a 3-axis gantry machine transfers the bags to outbound conveyors. The intention of the system is to ensure bags are dropped consistently within the maximum outbound conveyor belt width and with their shipping labels facing up for later scanning downstream.

There are two separate bag sizes: small (12” x 16”) and large (17” x 24”). In terms of bag size and operator assignment, the three Autobag stations are arranged as follows:

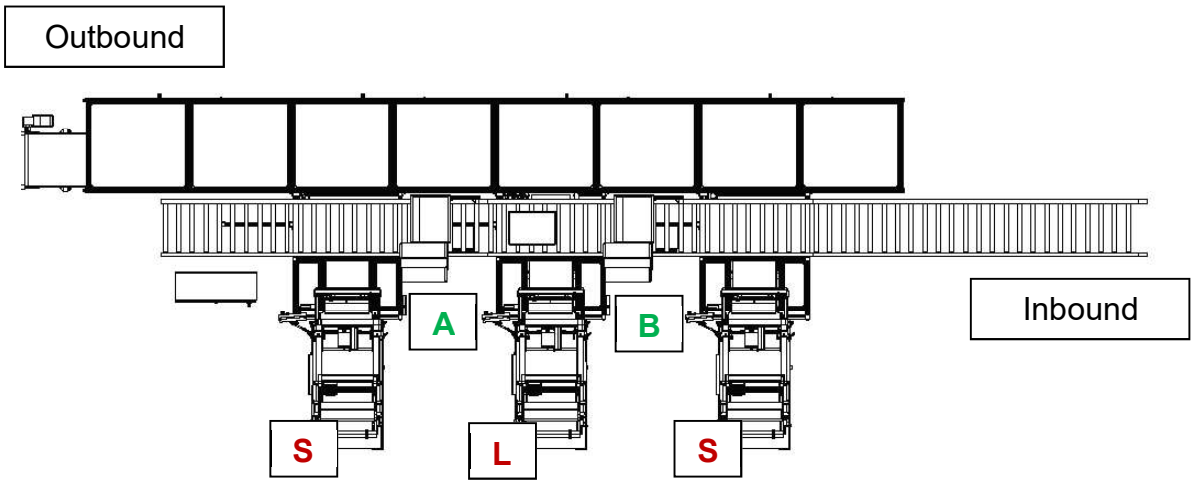


Figure 1. Layout of bag sizes at each station: “S” for “small” and “L” for “large.” Operator A handles left S and middle L stations; Operator B handles right S station.

Safety Circuits

The system has a Keyence safety controller that monitors its safety circuits. There are three emergency stop (e-stop) buttons: one located at the main electrical panel and two

at either end of the main enclosure tunnel. These e-stop buttons shut down the entire system (all bagger stations and all conveyors) when pressed.

Figure 2. E-stop (red and yellow button) on main electrical enclosure.

Figure 4. Inbound E-stop on main enclosure.

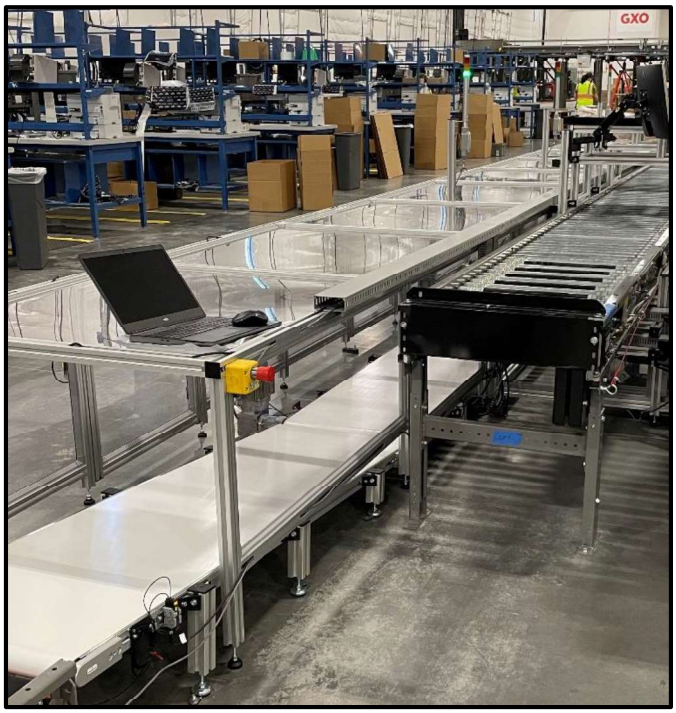


Figure 3. Outbound E-stop on main enclosure.

Each bagger station has a station-specific e-stop button on the bagger HMI, which stops the bagger, the bagger takeaway conveyor, and the three actuators for the bag transfer tray.

Figure 5. Bagger station showing (1) Bagger E-stop and (2) Bagger RESET.

The main enclosure “tunnel” has four doors on the side opposite to the Autobag machines, where each door has a locking safety switch.

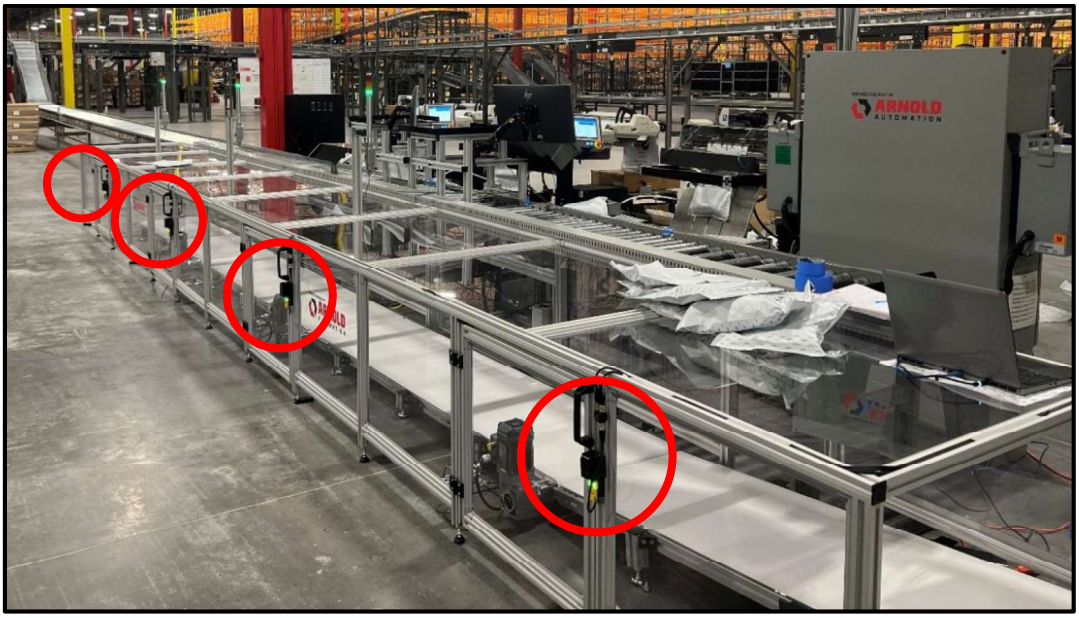


Figure 6. Keyence locking door switches on main enclosure access doors.

BAG TRANSFER SYSTEM

Loading Autobag 850S

NOTE: If there is already a bag being held open by the Autobag 850S, then proceed to next sub-section "Operation of Autobag 850S."

1. See "Operation" in Autobag 850S user's manual for detailed instructions on threading bags into the Autobag machine.
2. In addition to following setup instructions from the Autobag manual, operator should check the following:
    a. Box of bags is centered on platform at rear of the machine.
    b. Bags are centered along rollers on the machine.
    c. Autobag machine should be set to "Single Mode" (set upon installation), which causes the machine to cycle one bag at a time upon operator input.
    d. "Print Cycle" is enabled upon installation. This setting controls whether or not the bagger will wait for a print signal (received from the SKU scanning).
    e. When loading new bags, it is often necessary to cycle one to three bags to give the machine a chance to adjust to new bags. If loading new bags:
        i. Disable "Print Cycle." This will stop the bagger from waiting for a print signal before feeding bags.
        ii. Cycle bags as needed until machine consistently seals and drops bags.
        iii. Reenable "Print Cycle" before resuming normal scan and bag operation.

Operation of Autobag 850S

The normal sequence of operation is as follows:

1. Inbound tote arrives at operator station.
2. Operator scans SKU label from a single garment, which queues the garment's shipping label on the Autobag 850S printer.
3. Operator loads garment and any other applicable accessories into the bag opening of the Autobag machine, ensuring that the garment (and or any other contents) drop(s) to the bottom of the bag.
4. After the garment reaches the bottom of the bag, operator presses foot-pedal to close the bagger opening, sealing the bag and dropping it onto takeaway conveyor.
    a. CAUTION: If operator catches part of the garment in the seal bar area (perhaps operator does not push down garment all the way in the bag), then the Autobag machine may not complete seal.
    b. CAUTION: If operator catches part of garment's clear bag in the seal bar area, then the poly bag may experience a seal failure.

5. Before feeding the next bag, the machine waits on the printer to receive a signal from the next SKU scan.
6. Once the operator scans the next SKU, the machine feeds forward the next bag, which has that SKU's shipping label printed onto the bag.
7. The machine holds the bag open, and operator repeats steps (3) – (6).

3-Axis Bag Transfer Machine

Each Autobag machine feeds the poly bags onto a bagger takeaway conveyor, which drops the bags onto a tray. The tray is attached to two rotating shafts that are connected to a carriage on a linear axis. Each of these three connected axes has a powered electric linear actuator, allowing the tray to perform 3-axis motion.

After a bag drops onto the bagger takeaway conveyor, a sensor indicates the linear axis actuator to move the tray forward and "catch" the poly bag, matching the speed of the bagger takeaway conveyor. An electric linear cylinder actuator pulls on the vertical shaft, rotating the tray (and the bag on the tray) 90 degrees. Another electric linear cylinder actuator pushes on the horizontal shaft to tilt the tray forward, allowing the bag to slide off the tray and onto a transition conveyor. A sensor located at the leading edge of the tray indicates the system when the bag has left the tray to then reverse each of the actuators to its "home" position under the bagger takeaway conveyor.

Bagger Station Status – Tower Lights

Each bagger station has a tower light on top of the main enclosure (three total); this light indicates the status of the actuators performing the bag transfer. The status lights have four possible states:

1) SOLID GREEN – normal operation
2) BLINKING YELLOW – bagger cycle is "inhibited"
    a. Bag transfer tray is in cycle and there is another bag waiting on the bagger takeaway conveyor
        i. Wait for the bags to clear the transfer tray – yellow light will turn off.
3) BLINKING RED – bag transfer tray requires recovery to home position
    a. Press bagger station "RESET" button
4) SOLID RED – bag transfer tray actuator fault
    a. Press bagger station "RESET" button
        i. If this fails, then see main electrical panel HMI for fault messages

Figure 7. Tower lights lit GREEN during normal operation.

Bagger Station Reset Button

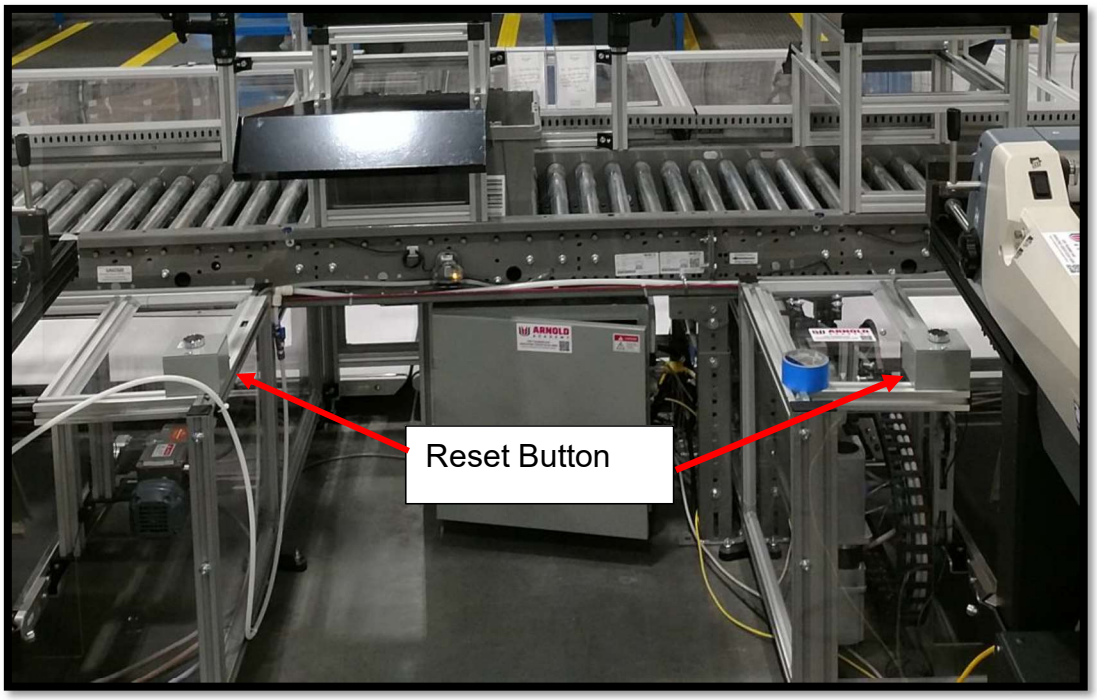


Figure 8. Bagger Station Reset Button.

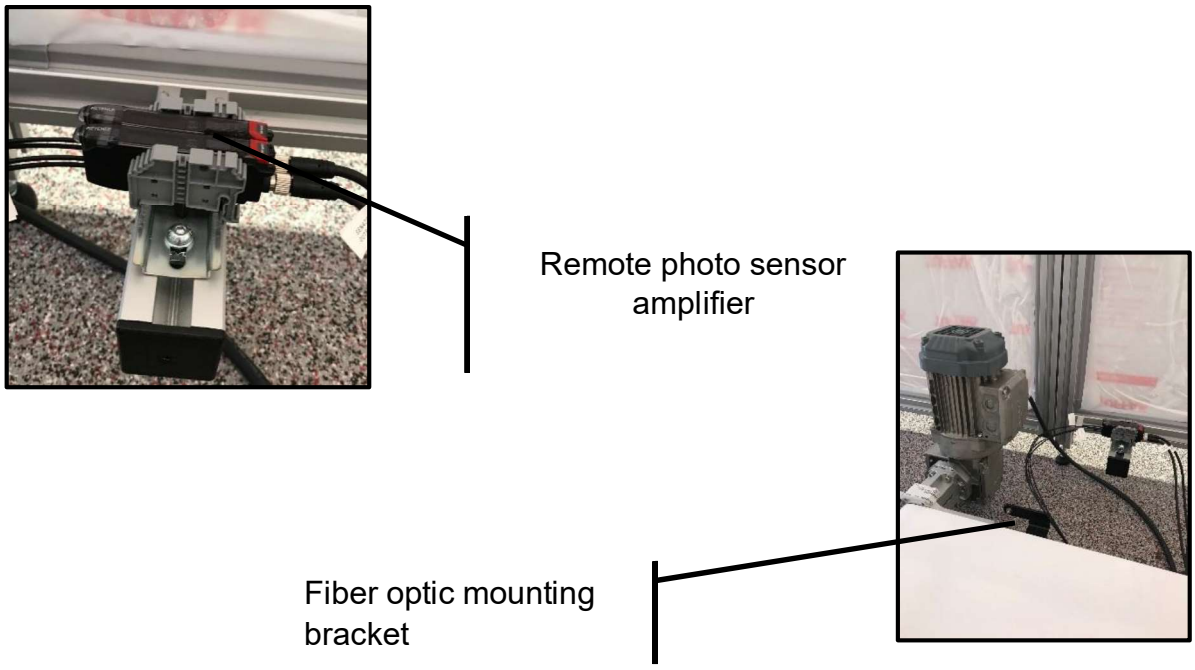
Each bagger station has a recovery button labeled “RESET,” which returns the tray to its home position when pressed. Note that this button can be pressed regardless of

whether or not a bag is already on the tray. If a bag is on the tray and the “RESET” button is pressed, then the tray will complete its transfer for the current bag before returning to the home position. In case an empty bag is dropped onto the tray, the bag will most likely remain on the tray during the tilt operation. The reset button can be used to bring back the tray and retrieve the empty bag.

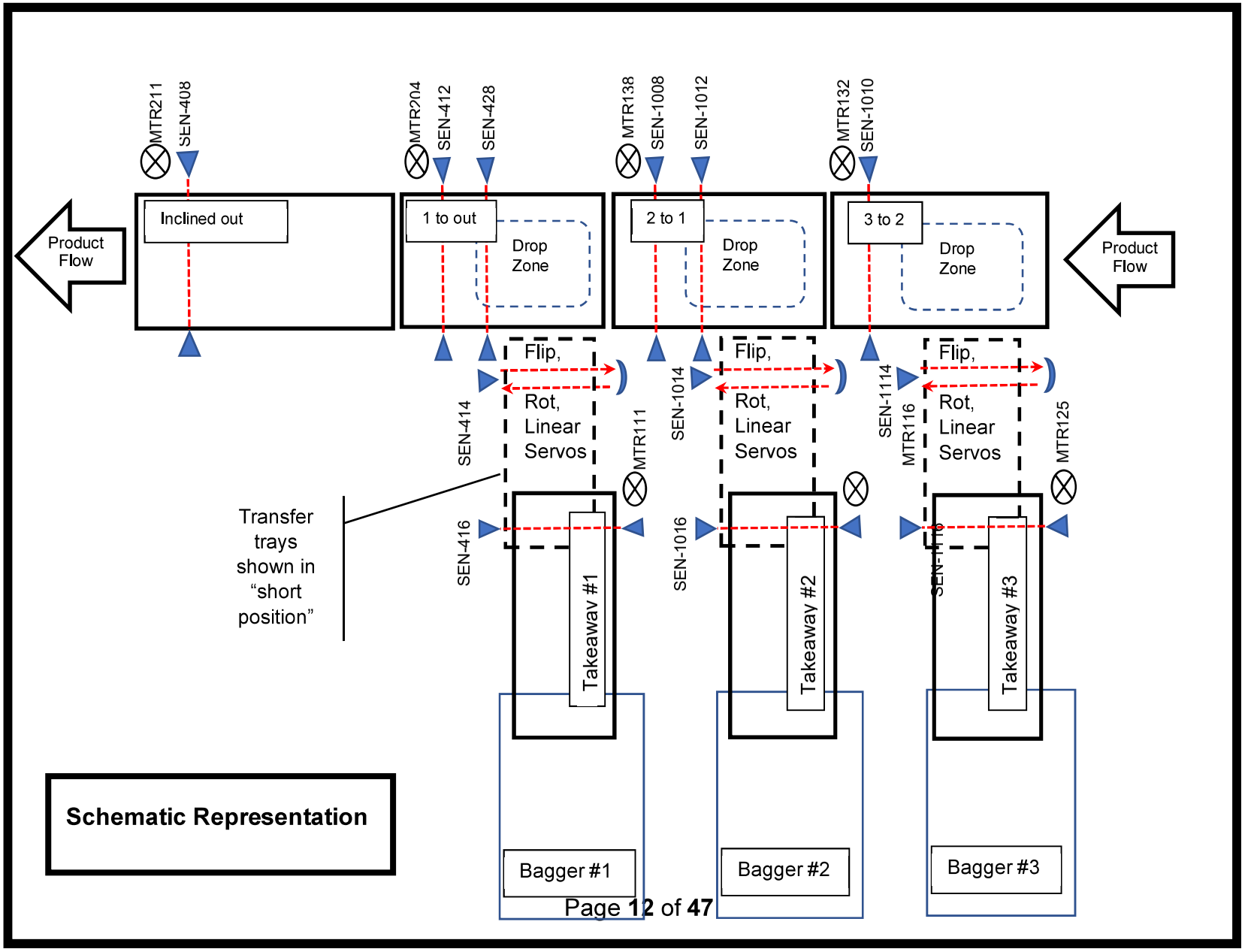
Understanding the Conveyor Traffic Control System

The conveyor system for this assembly consists of 4 transition belt conveyors which run the length of the main enclosure “tunnel,” and 3 takeaway belt conveyors (1 associated with each bagger). Each takeaway conveyor runs in conjunction with the 3 servo motors that form the transfer section for each bagger. “Traffic” control for these conveyors is performed by a series of photoelectric sensors that monitor processed bags on the conveyors. This traffic control keeps processed bags flowing and prevents collisions between processed bags and moving transfer components. Additionally, the traffic control will prevent the baggers from discharging processed product until the conveying system is capable of moving it correctly.

Photoelectric sensors used on the conveyors are Keyence fiber optic, through beam type sensors with remote amplifiers. Each bag transfer tray has a Keyence Retroreflective type photosensor.



Refer to the schematic representation of the assembly on the next page. Further description of the system follows.



Schematic Representation

Transfer operation is defined as the operation of the tray assembly, including: extending the tray (Linear Axis servo), rotating the table 90 degrees (Rotational Axis servo) and tilting the table (Tilt or Flip Axis servo).

Example of Normal Sequence

Following the product flow from right to left in the Schematic Representation diagram:

1) Bagger #3 dispenses a bag (Bag 1) onto the takeaway conveyor (Takeaway #3),
2) The transfer assembly (Linear, Rotation, and Tilt servos) move and discharge the bag onto Transition Conveyor 3 to 2,
3) As Transition Conveyor 3 to 2 moves the bag downstream to the left, the bag will activate photosensor SEN 1010; this will trigger a "latch" to indicate the next downstream section (Bagger #2) that a bag is coming into its zone of control ("incoming bag" signal).

Now, several reactions are possible in Bagger #2 zone of control:

1) If Transition Conveyor 2 to 1 is stopped, then Transition Conveyor 3 to 2 will stop until Transition Conveyor 2 to 1 restarts. Briefly after Transition Conveyor 2 to 1 restarts, Transition Conveyor 3 to 2 will start back up, delivering Bag 1 onto Transition Conveyor 2 to 1; then,

    a. If a bag *HAS NOT* been discharged by Bagger #2, then Bag 1 will continue to be moved to the left by Transition Conveyor 2 to 1, eventually reaching photosensor SEN 1012. When SEN 1012 is activated by Bag 1, it will "unlatch" the incoming bag signal for Bagger #2 (tells Bagger #2 that it is clear of upstream bags).

    b. If a bag *HAS* been discharged by Bagger #2 onto the takeaway conveyor (Takeaway #2), then as the discharged bag (Bag 2) activates photosensor SEN 1016, the transfer operation for Bagger #2 will be started. The transfer operation will continue until the Linear Axis servo has reached the "short position" (shown in Schematic Representation diagram – this is the position at the end of linear axis travel, just before 90-degree rotation over the transition conveyor). At this point, the transfer operation will be paused until Bag 1 activates photosensor SEN 1012, which indicates that Bag 1 is clear of the "Drop Zone" and the transfer operation for Bagger #2 can resume. This will "unlatch" the incoming bag signal for Bagger #2 (tells Bagger #2 that it is clear of upstream bags).

The above description follows forth for Bagger # 1 zone of control. Note that whenever a bagger zone receives an “incoming bag” signal, regardless of which zone the bag originated, the above sequences will occur. Since it has no upstream bags, Bagger #3 will have no “incoming bag” signal to contend with; its transfer operation is only controlled by Transition Conveyor 3 to 2.

HUMAN MACHINE INTERFACE (HMI)

The C-More operator interface is the main method for the operator to interact with the machine controls. The device allows the operator to start and stop all machine functions. The display will also show WARNING and FAULT conditions. The interface will display running conditions of the machine. Overall machine status is available for the operator’s information. Important machine software file identifications are also available to the operator.

This device is suitable for the industrial environment; however, it is meant only to be touched with fingers – **DO NOT USE POINTED OR HARD DEVICES TO OPERATE THE TOUCH SCREEN.**

The following figures and descriptions will describe all of the screens that may be presented to the operator.

Certain screens will be displayed automatically depending on machine status. Others will be available on operator request. Some screens are not accessible during certain portions of machine operation. These display conditions will be explained in the following screen descriptions.

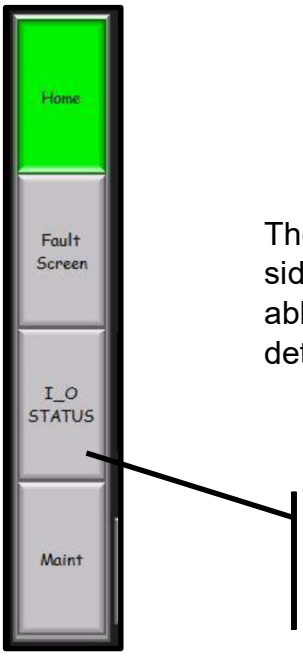
The following typical icons are used throughout all of the screens developed for the C-MORE HMI.

The word “icon” will appear throughout this manual. Icon refers to any visual object that is displayed on the HMI (human machine interface) screens.

Icons used to move to different screens (screen navigation icons are located at the left-hand side of every screen (except the WARNING HISTORY screen).

Typical Icon Conventions

Screen navigation Icons are used to move to different screens are as shown in the example below:



These are the screen navigation icons. They appear on the left hand side of each screen. By touching one of the icons, the operator is able to access the needed screen (see the screen map following for details on avalable screens

Touch one of these icons to display the needed screen

Figure 8. SCREEN NAVIGATION Icons.

Pushbutton Icons

Pushbutton icons appear as rectangles with labels designating the function of the icon. Normally, the icon will have two states: the 'unpressed state'. and the 'pressed state' which will allow the operator to verify operation of the icon.

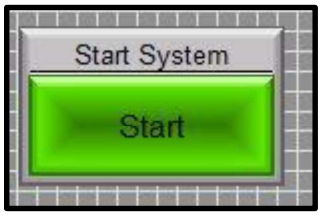


Figure 10. "Unpressed" pushbutton icon.

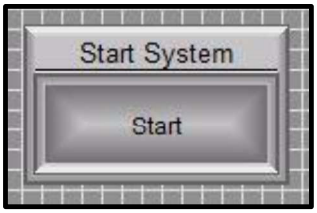


Figure 9. "Pressed" pushbutton icon.

Typical Icon Conventions, cont'd

Display icons

Display icons require no operator action. They are meant to provided pertinent information on the machine process, and guidance to operator activity. Shown below is the Home Screen Display Icon. Notice the nine different states that will be indicated automatically by machine logic through this same icon.

This state advises the operator to press the Control On pushbutton on the main electrical control panel door to begin start-up

Once control power has been established, the operator is advised of the next required step/

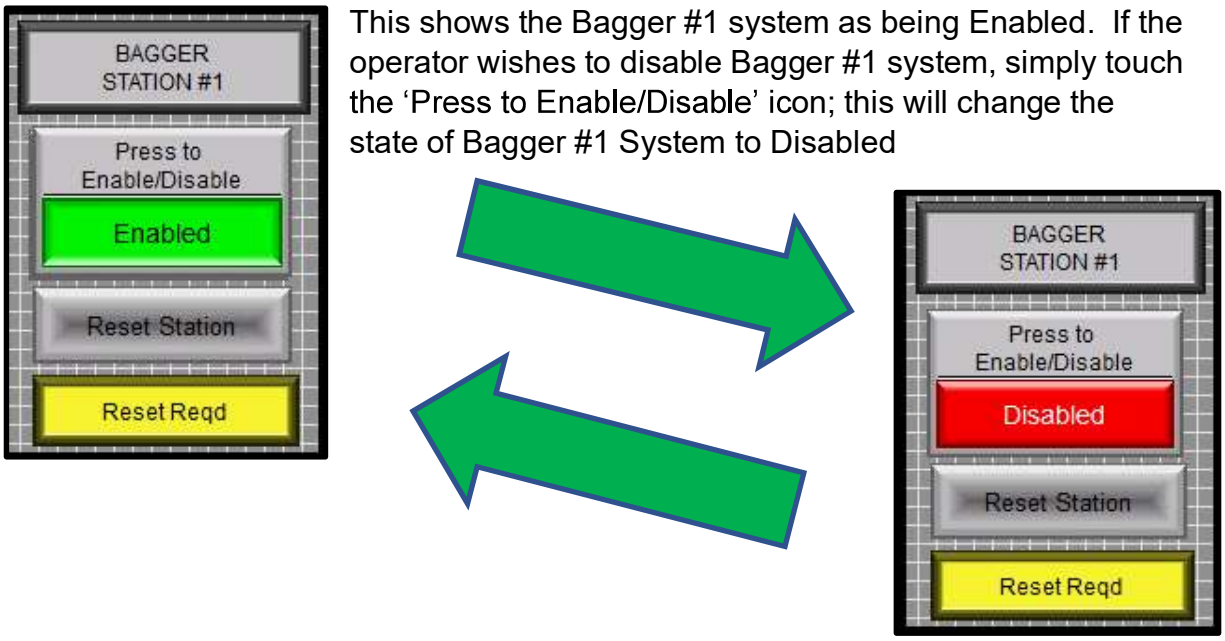
Now, the display is indicating the condition of the machine

Certain 'abnormal' conditions will advise the operator of the next steps to take to continue machine processing.

Typical Icon Conventions, cont'd

Toggle icons

Toggle icons appear similar to pushbutton icons. However, once operated, the icon will remain in the new state until the operator again presses the icon.



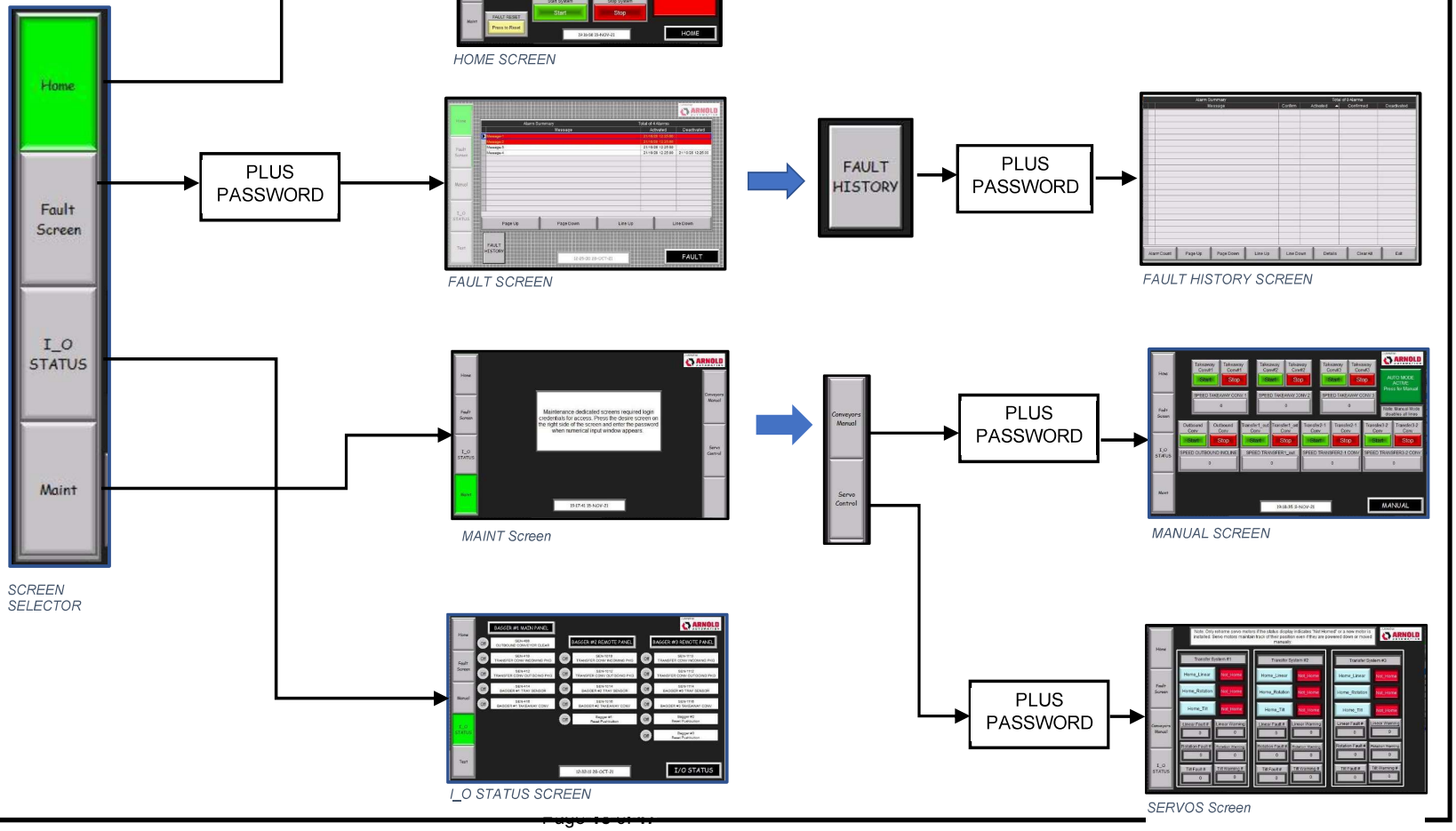
This shows the Bagger #1 system as being Enabled. If the operator wishes to disable Bagger #1 system, simply touch the 'Press to Enable/Disable' icon; this will change the state of Bagger #1 System to Disabled

The 'Reset Station' pushbutton icon is used to restore the bagger system to its "Home" position. Note that in order to restore the system, all the active faults need to be cleared by pressing the "Fault Reset" pushbutton. The display icon will prompt you when the reset is required.

Screen Map

The following page will provide the Screen Map for this project. It provides the operator with directions for moving between the various screens, including those 'paths' which will require security to enter.

Screen Map


Home
Fault Screen
I_O STATUS
Maint
SCREEN SELECTOR
PLUS PASSWORD
HOME SCREEN
FAULT SCREEN
FAULT HISTORY
PLUS PASSWORD
FAULT HISTORY SCREEN
MAINT Screen
Conveyors Manual
Servo Control
PLUS PASSWORD
MANUAL SCREEN
PLUS PASSWORD
I_O STATUS SCREEN
SERVOS Screen

Initial Power Up – Screen Navigation

Upon initial power up, after both the PLC and the HMI have finished their self-test routines, the following screen will be displayed:

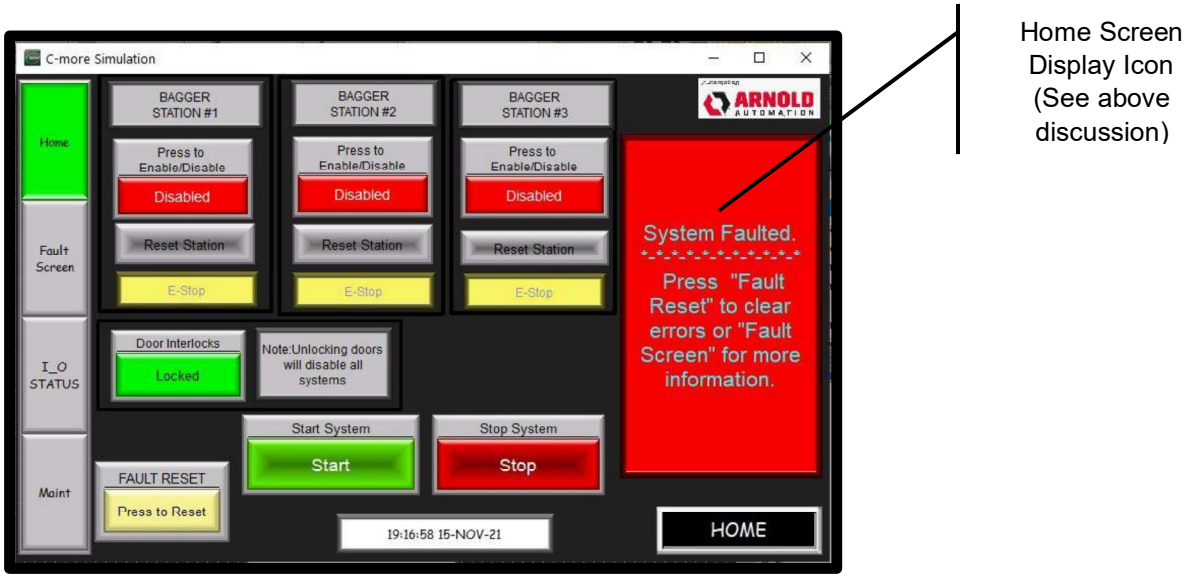


Figure 11. HOME Screen 1.

This screen will provide the operator with all of the functions necessary to run the machine. At the top of the screen are three icons that relate to each of the three bagging stations. The operator should choose the condition of each of the baggers before starting the system: Many times, all three baggers will not be necessary for production needs. For those baggers that are not needed, the operator should press the ENABLE/DISABLE icon to toggle the needed bagger condition.

Home Screen Display Icon

The Home Screen Display Icon (shown above on the HOME Screen) will provide a number of messages to guide the operator.

If any system faults are active, they should be cleared by pressing the FAULT RESET button. Additionally, all of the access doors into transition conveyor area (if they are indicating an UNLOCKED state) should locked by pressing the DOOR INTERLOCKS icon. This may require proper positioning of the door locks prior to attempting to lock the doors.

The HOME SCREEN DISPLAY icon will display this indication when the system is running. It will also indicate which stations are running.

Should an E-Stop be pressed anywhere on the system, the HOME SCREEN DISPLAY icon will be displaying the message shown to the left.

Once the E-Stop has been reset, the following message will be displayed on the HOME SCREEN DISPLAY icon.

Operator is advised to select the baggers that will be on line in the running system prior to starting the system.

HOME Screen Display Icon, cont'd

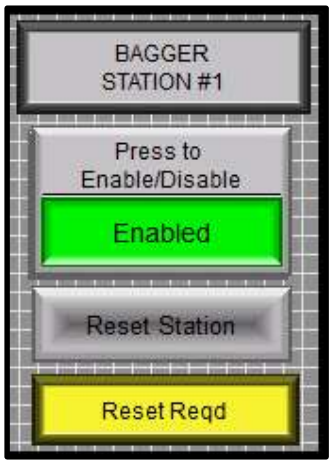
If a problem has occurred, the operator is guided to what steps are necessary to restart the system

If the outbound conveyor stops, this message will be displayed when a bag reaches the discharge part of the transition conveyors.

This message will display if the system is switched to "Manual Mode". An orange button will display to switch the system back to Auto Mode and process bags.

Finally, to restart the system, the following message will be displayed

Bagger Station Controls



Enable Button

Reset Station Button

Station Status Display

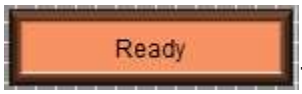
Enable Button: If the operator wishes to enable or disable the Bagger Station, simply touch the 'Press to Enable/Disable' icon; this will toggle between the two states.

Reset Station Button: if the Station Status Displays indicates "Reset Reqd", press this button to restore the tray back to its "Home" position. Note that in order to restore the system, all the active faults need to be cleared by pressing the "Fault Reset" pushbutton, and the system needs to enabled.

Station Status Display: this icon displays the status for each bagger station as follows:

The bagger E-Stop is pressed or required reset. Check Autobagger display to restore it. Note that if the Autobagger is disconnected from the system, it will also display this message as the E-Stop signal is missing.

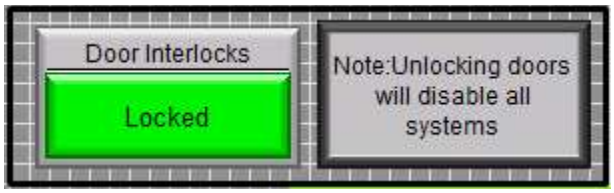
The bagger station is disabled. Make sure no faults are active, E-Stops are satisfied, and safety interlocks are closed and locked prior to attempt to enable the station.



The bagger station is ready and enabled to process bags, however, the main system has not been started. Press "Start System" button.

The bagger station is operating normally.

Door Interlocks Control



The “Door Interlocks” button toggles between “Locked” and “Unlocked”. By unlocking the door interlock, you will gain access to the conveyor transition system. Make sure to close all doors firmly after opening any door. The interlocks status lights will also indicate its status as follows.

Solid Green: door is closed and locked.

Blinking Green: door is either closed and unlocked or open with the lock signal enabled.

Red: door is open

Important Note: Door Interlocks disable all bagging stations and will stop them when pressed.

SCREEN Security

Certain Screens are only available to the operator with the necessary security credentials. This limits access to screens containing WARNING and FAULT data that are of limited operational data, but contain important historical data. Also, Screens necessary only to Maintenance operations are also secured. The FAULT SCREEN is typically available to operators within the MAINT and ADMIN groups. The FAULT HISTORY is only available to operators within the ADMIN group. When attempting to access these screens, the operator will be presented with the following security keypad:

Screen Security, cont'd

The operator should use the numeric portion to enter the proper 4-digit security code for the appropriate level of clearance. The code for the MAINT group is 2222. Please note that the only difference between MAINT group and ADMIN group is that the ADMIN group can read and edit fault history, while MAINT group can read (but not edit) fault history. Once the correct code has been entered, the desired screen will be displayed.

Maintenance Screens

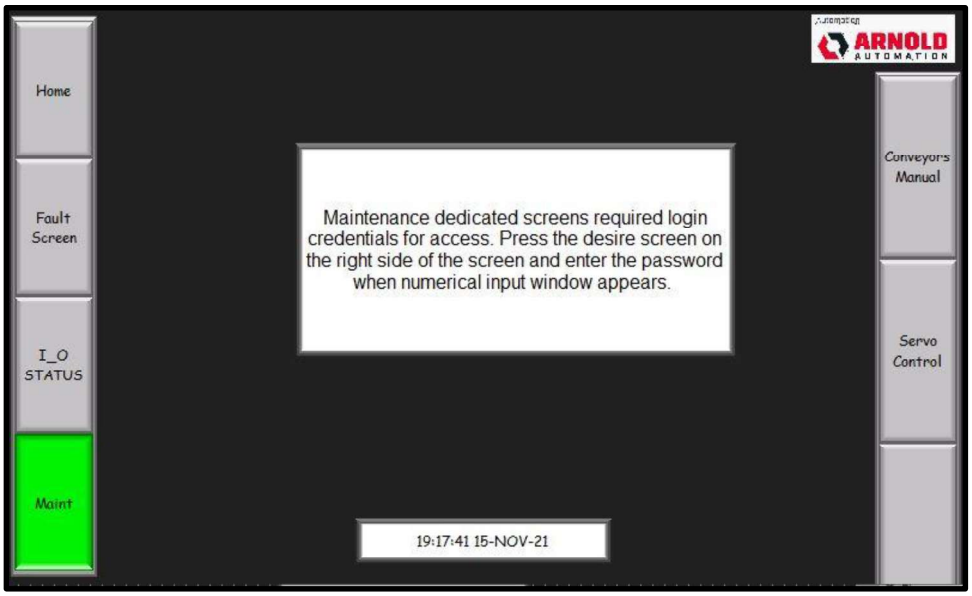


Figure 12. Maint Screen.

The MAINT Screen has secured access. It is primarily to allow maintenance personnel to use certain controls of the assembly not necessary for normal operations, typically as part of routine troubleshooting the equipment.

MAINT Screen, cont'd

The MAINT Screen, shown above, is the access point for the secured screens. The screen navigation buttons for these screens are located on the right-hand side of the screen.

By touching the Conveyors Manual pushbutton icon, the following screen will be displayed:

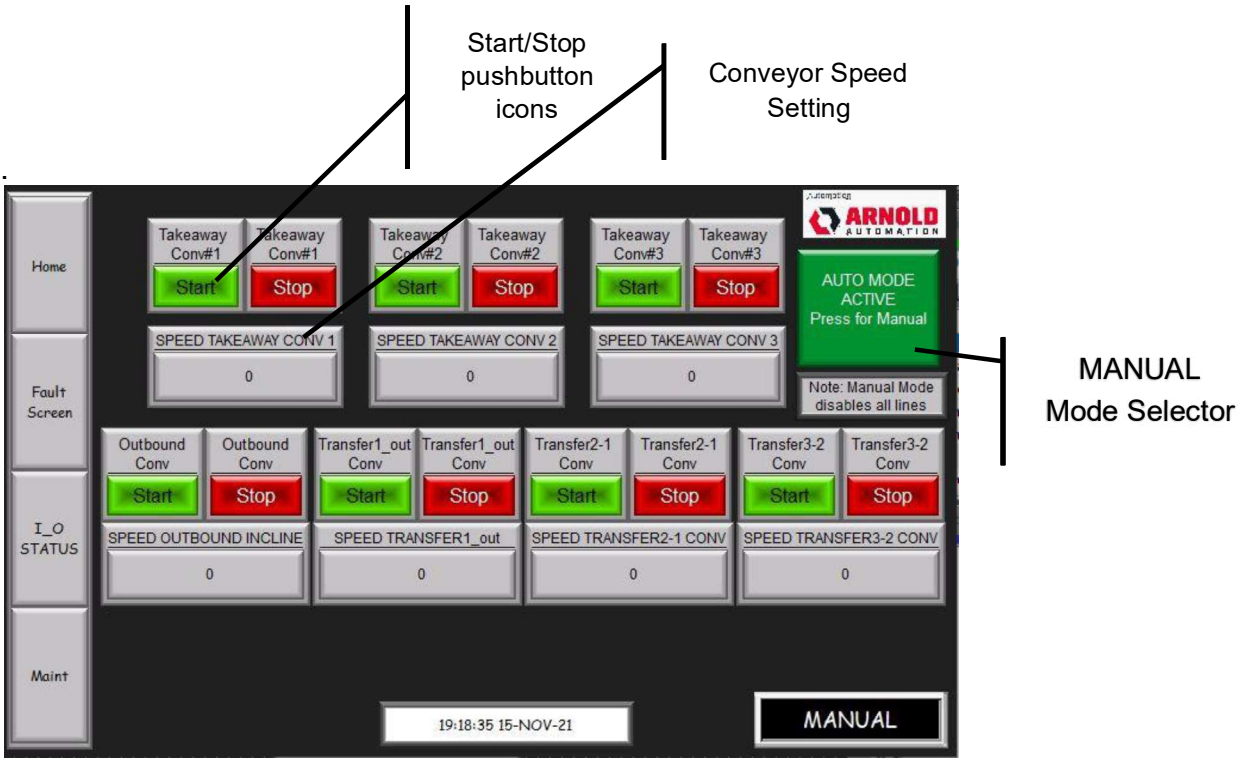


Figure 13. Manual Screen.

The MANUAL Screen provides the operator with the ability to check each of the system main conveyor components manually. Start and Stop commands are implemented with the pushbutton icons. Additionally, motor speed settings can be modified as needed. These controls work in conjunction with the variable frequency drives used on all of the conveyors.

In order to utilize the manual operator icons, the machine mode must be changed from AUTOMATIC to MANUAL by touching the MANUAL MODE SELECTOR at the upper right of the screen.

MAINT Screen, cont'd

Once in the MANUAL MODE, when the CONVEYOR SPEED icon is touched, the operator will be presented with a numeric keypad which will be used to make the desired speed setting. Speed settings are based on a 0-60 hertz basis (representing the frequency at which the associated motor will run).

This keypad will indicate which conveyor speed is being adjusted, the current speed setting, the minimum available speed setting, and the maximum speed setting.

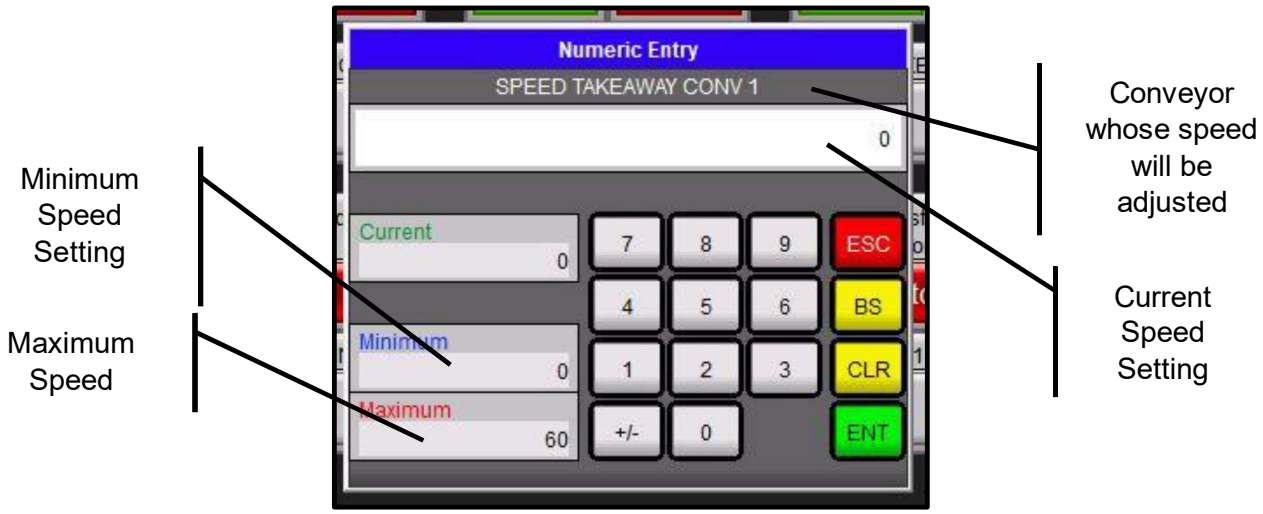


Figure 14. Numeric Entry Keypad.

The operator will use the numeric entry keys to select the desired speed and then touch the ENT key to establish the setting. **Note: the equipment is designed to operate at a 60 Hz. Setting. Be sure to return the drive to a 60 Hz setting before leaving he manual screen.**

MAINT Screen, cont'd

By touching the Servo Control pushbutton icon, the following screen will be displayed.

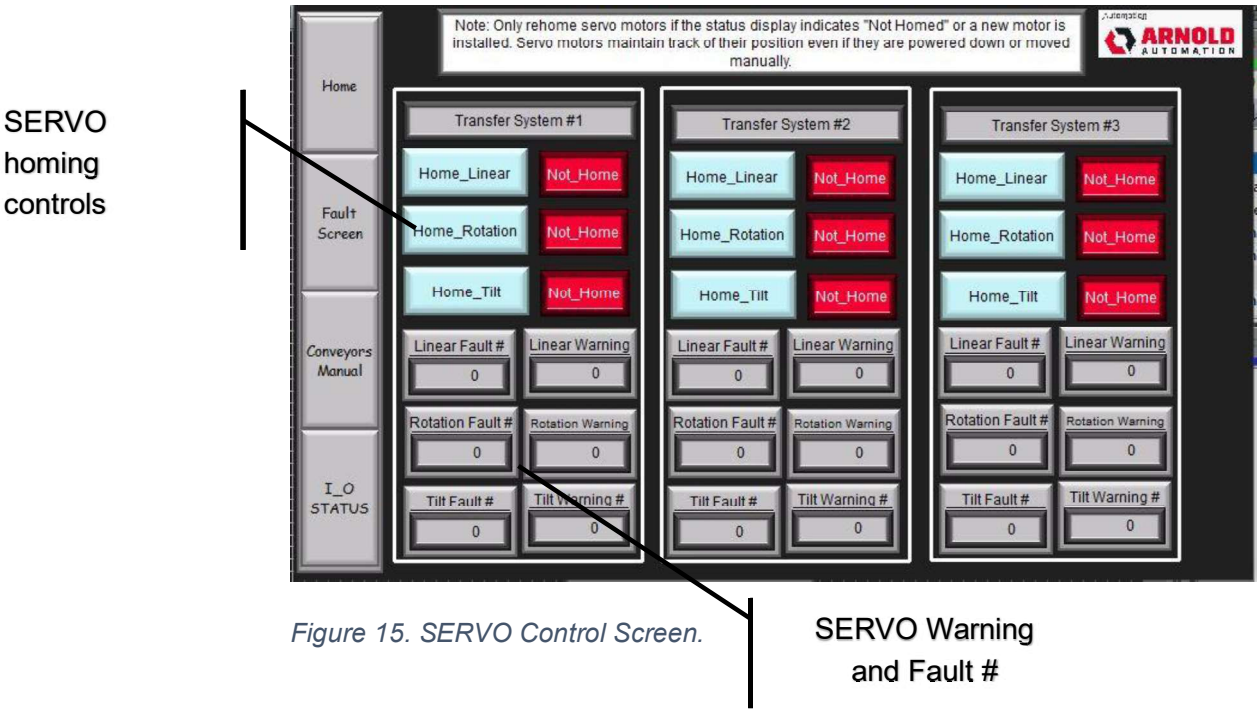


Figure 15. SERVO Control Screen.

The SERVO control screen provides the operator with information regarding the 9 servo drives incorporated in this assembly. Each of the baggers utilizes three (3) servo motors and drives to perform the transfer function that moves the bagged item from the takeaway conveyor to the transition conveyor.

The Linear Axis is the servo motor that moves the table assembly from the drop off of the bagger takeaway conveyor to the transfer conveyor system. The Rotation axis is the servo motor that rotates the table 90 degrees, while it is moving towards the transition conveyor. Finally, the Tilt Axis is the servo motor that will tilt the discharge end of the table towards the transfer conveyor, allowing the bagged item to slide onto the transfer conveyor.

MAINT Screen, cont'd

For each transfer system, the above screen provides push-button icons that will allow maintenance personnel set the home or reference position of each axis. Rehoming is not required unless the reference point is lost or a new motor is installed. Axis motors keep track of their position even if they are powered down and moved manually.

At the bottom portion of the screen, for each transfer system, there is a WARNING and FAULT number numerical icon. This section may be used by maintenance personnel to access the appropriate remedial action, based on the WARNING or FAULT number being displayed for a particular axis. Utilizing these numbers, the operator can refer to detailed trouble shooting guides within the FESTO Manual (CMMT-AS-SW-Manual-2020, Section 9.4.6, page 150) to proceed.

I/O Status Screen

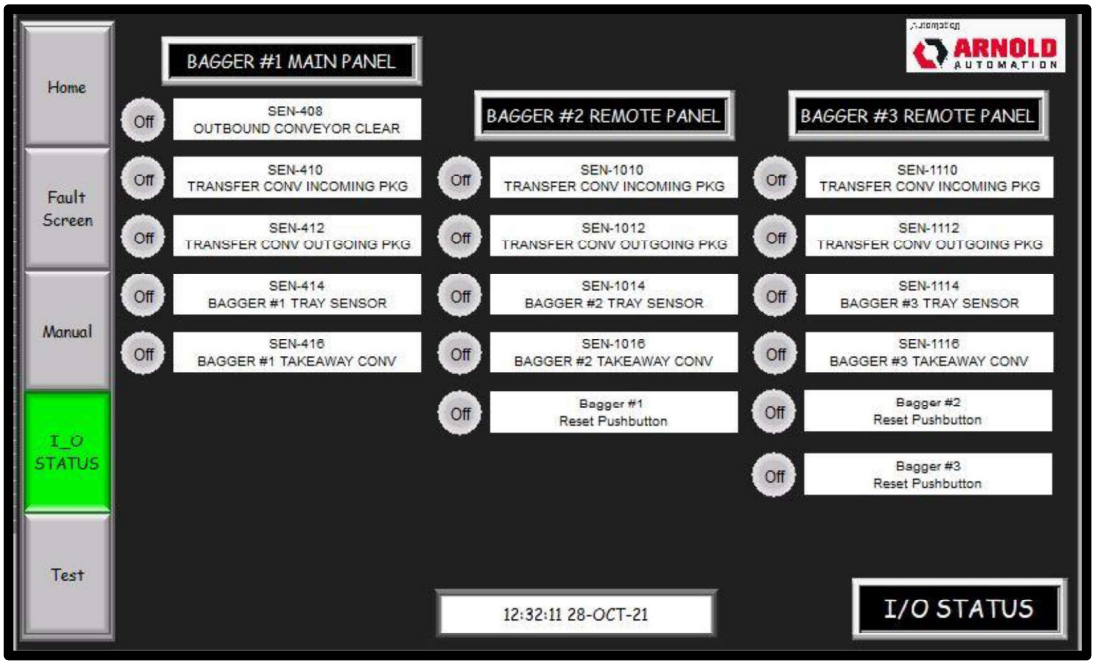


Figure 16. I/O Status Screen.

I/O Status Screen, cont'd

The I/O Status screen is provided primarily as a maintenance tool. Since the controlled flow of product through the assembly is, by a large part, determined by photo-electric sensors, this screen provides and easy means to verify the operation of 16 sensors.

On this screen, when the photo-sensor is not sensing a product, it will appear as shown to the left.

When the photo-sensor detects an object, it will appear as shown at the right.

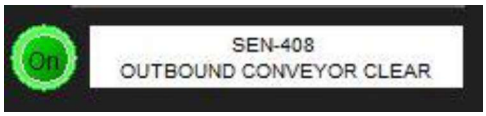
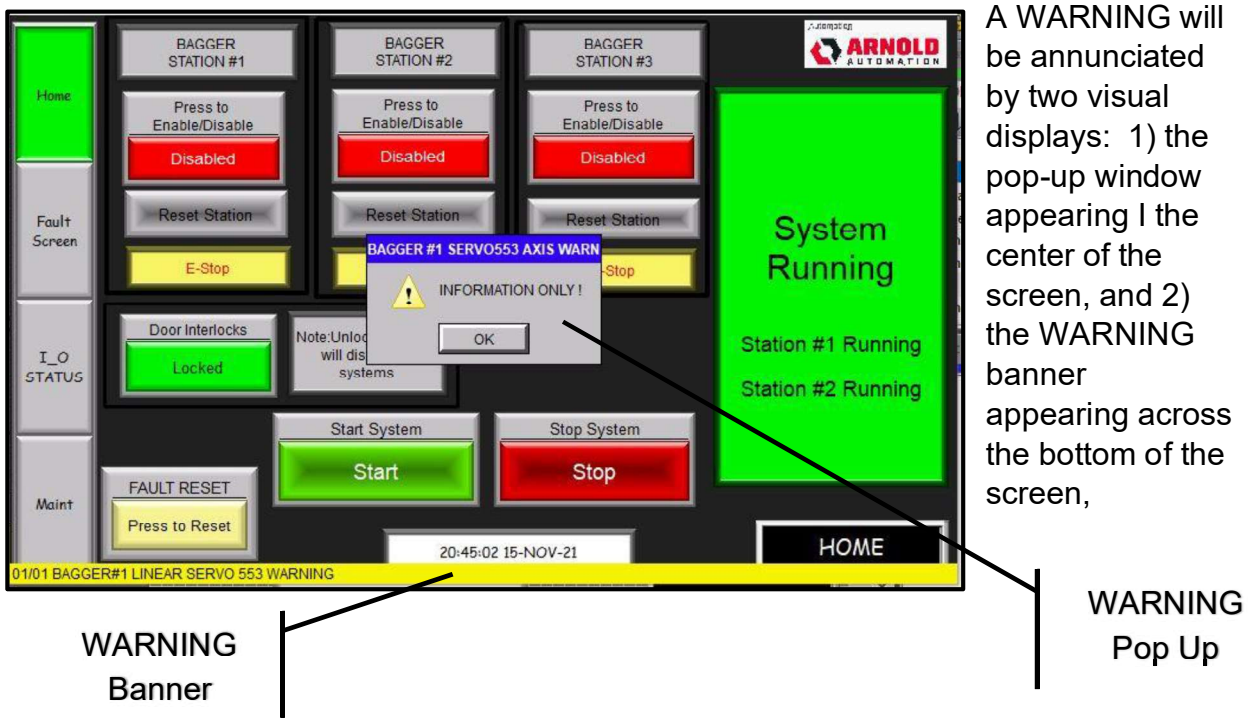


Photo electric sensors used on this assembly are fiber optic, through beam type sensors, with remote amplifiers. The operator is referred to the Keyence Manual (Appendix) for detailed operations, setting and troubleshooting.

TROUBLESHOOTING – WARNINGS and FAULTS

During the normal operation of this equipment, there will be occasional occurrences that will require operator intervention, to re-start, or continue machine operation. Pre-programmed logic will provide WARNING and FAULT activations in response to abnormal machine conditions. Each of the three subsystems (Bagger, Transfer mechanisms, and Transition Conveyors) have their own fault monitoring algorithms. All three subsystems are monitored by the main PLC (programmable logic controller) and annunciated through the HMI on the main electrical control panel.

All FAULT and WARNING conditions are immediately annunciated on whichever screen may be currently displayed.



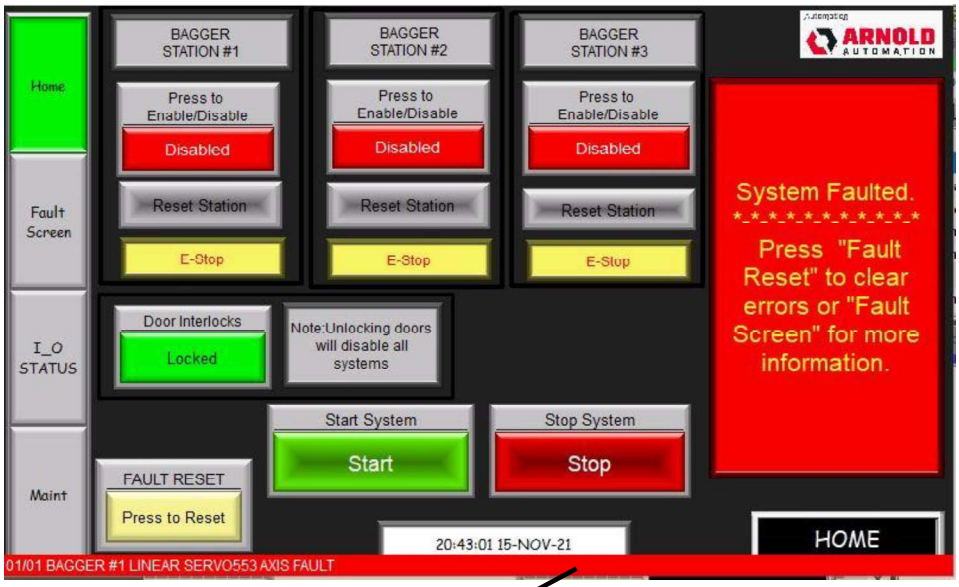
A WARNING will be annunciated by two visual displays: 1) the pop-up window appearing I the center of the screen, and 2) the WARNING banner appearing across the bottom of the screen,

Typically, the WARNING is generated for operator information and will not cause the processing to be stopped. It typically does not require operator intervention; simply acknowledge the WARNING by pressing the OK button icon at the lower center of the pop-up window.

TROUBLESHOOTING – WARNINGS and FAULTS, cont'd

The banner will remain until the WARNING condition has cleared. The WARNING condition will be recorded in the table on the FAULT Screen for reference (refer to FAULT Screen information, following).

FAULTS are conditions that will result in the end of processing, and will require operator intervention in order to restore the assembly to running condition.



FAULT Banner- indicating exactly which component caused the FAULT

A FAULT will be annunciated by a FAULT banner displayed along the bottom edge of whichever screen is currently displayed. On returning to the HOME Screen, the Home Screen Display icon will be indicating a SYSTEM FAULT. The particular condition creating the FAULT will be contained in the FAULT Banner.

The operator should take the necessary actions to address the cause of the fault, then press the FAULT RESET icon to clear the condition. The FAULT condition will be recorded in the table on the FAULT Screen for reference (refer to FAULT Screen information, following).

TROUBLESHOOTING – WARNINGS and FAULTS, cont'd

WARNINGS and FAULTS to which this equipment responds are shown in the table below:

ITEM#	WARNINGS
1	BAGGER#1 LINEAR SERVO 553 WARNING
2	BAGGER #1 TILT AXIS SERVO WARNING
3	BAGGER #2 ROTATIONSERVO504 WARNING
4	BAGGER #2 LINEAR SERVO 704 WARNING
5	BAGGER#2 TILT SERVO 753 WARNING
6	BAGGER #3 ROTATION SERVO 804 AXIS WARNING
7	BAGGER#3 LINEAR ERVO 553 WARNING
8	BAGGER #3 TILT SERVO904 AXIS WARNING
	FAULTS
9	TRANSITION CONVEYOR 3->2 VFD132 FAULT
10	TRANSITION 2->1 CONVEYOR VFD138 FAULT
11	TRANSITION 1->OUT CONVEYOR VFD204 FAULT
12	OUTBOUND CONVEYOR VFD211 FAULT
13	TRANSFER CONVEYOR #3 VFD111 FAULT
14	TRANSFER CONVEYOR #2 VFD118 FAULT
15	TRANSFER CONVEYOR #1 VFD125 FAULT
16	BAGGER #3 TAKEAWAY CONVEYOR VFD111 FAULT
17	BAGGE #2 TAKEAWAY CONVEYOR VFD118 FAULT
18	BAGGER #1 TAKEAWAY CONVEYOR VFD125 FAULT
19	BAGGER #1 ROTATION SERVO504 AXIS FAULT
20	BAGGER #1 SERVO504 COMMUNICATION FAULT
21	BAGGER #1 LINEAR SERVO553 AXIS FAULT
22	BAGGER #1 SERVO553 COMMUNICATION FAULT
23	BAGGER #1 TILT SERVO604 AXIS FAULT
24	BAGGER #1 SERVO604 COMMUNICATION FAULT
25	BAGGER #2 ROTATION SERVO504 AXIS FAULT
26	BAGGER #2 SERVO653 COMMUNICATION FAULT
27	BAGGER #2 LINEAR SERVO704 AXIS FAULT
28	BAGGER #2 SERVO704 COMMUNICATION FAULT
29	BAGGER #2 LINEAR SERVO753 AXIS FAULT
30	BAGGER #2 SERVO753 COMMUNICATION FAULT
31	BAGGER #3 ROTATION SERVO804 AXIS FAULT
32	BAGGER #3 SERVO804 COMMUNICATION FAULT
33	BAGGER #3 LINEAR SERVO853 AXIS FAULT
34	BAGGER #3 SERVO853 COMMUNICATION FAULT
35	BAGGER #3 TILT SERVO804 AXIS FAULT
36	BAGGER #3 SERVO904 COMMUNICATION FAULT
37	BAGGER #1 LINEAR ACTUATOR DID NOT REACH POSITION FAULT
38	BAGGER #1 LINEAR ACTUATOR DID NOT REACH SHORT POSITION FAULT
39	BAGGER #1 ROTATION ACTUATOR DID NOT REACH POSITION FAULT

40	BAGGER # 1 - TILT ACTUATOR DID NOT REACH POSITION FAULT
41	BAGGER #1 TILT ACUATOR DID NOT REACH INITIAL POSITION FAULT
42	BAGGER # 1 ROTATION ACTUATOR DID NOT REACH INTIAL POSITION FAULT
43	BAGGER #1 LINEAR ACTUATOR DID NOT RETURN TO INITIAL POSITON FUAL
44	BAGGER #2 LINEAR ACTUATOR DID NOT REACH POSITION FAULT
45	BAGGER #2 LINEAR ACTUATOR DID NOT REACH SHORT POSITION FAULT
46	BAGGER #2 ROTATION ACTUATOR DID NOT REACH POSITION FAULT
47	BAGGER # 2 - TILT ACTUATOR DID NOT REACH POSITION FAULT
48	BAGGER #2 TILT ACUATOR DID NOT REACH INITIAL POSITION FAULT
49	BAGGER # 2 ROTATION ACTUATOR DID NOT REAH INITIAL POSITION FAULT
50	BAGGER #2 LINEAR ACTUATOR DID NOT RETURN TO INITIAL POSITON FAULT
51	BAGGER #3 LINEAR ACTUATOR DID NOT REACH POSITION FAULT
52	BAGGER #3 LINEAR ACTUATOR DID NOT REACH SHORT POSITION FAULT
53	BAGGER #3 ROTATION ACTUATOR DID NOT REACH POSITION FAULT
54	BAGGER # 3 TILT ACTUATOR DID NOT REACH POSITION FAULT
55	BAGGER #3 TILT ACUATOR DID NOT REACH INITIAL POSITION FAULT
56	BAGGER #3 ROTATION ACTUATOR DID NOT REAH INITIAL POSITION FAULT
57	BAGGER #3 LINEAR ACTUATOR DID NOT RETURN TO INITIAL POSITON FAULT

Figure 17. WARNINGS and FAULT Table.

Fault Screen

Whenever a WARNING or FAULT occurs, as mentioned previously, an entry will automatically be made in the FAULT table which is contained on the FAULT SCREEN.

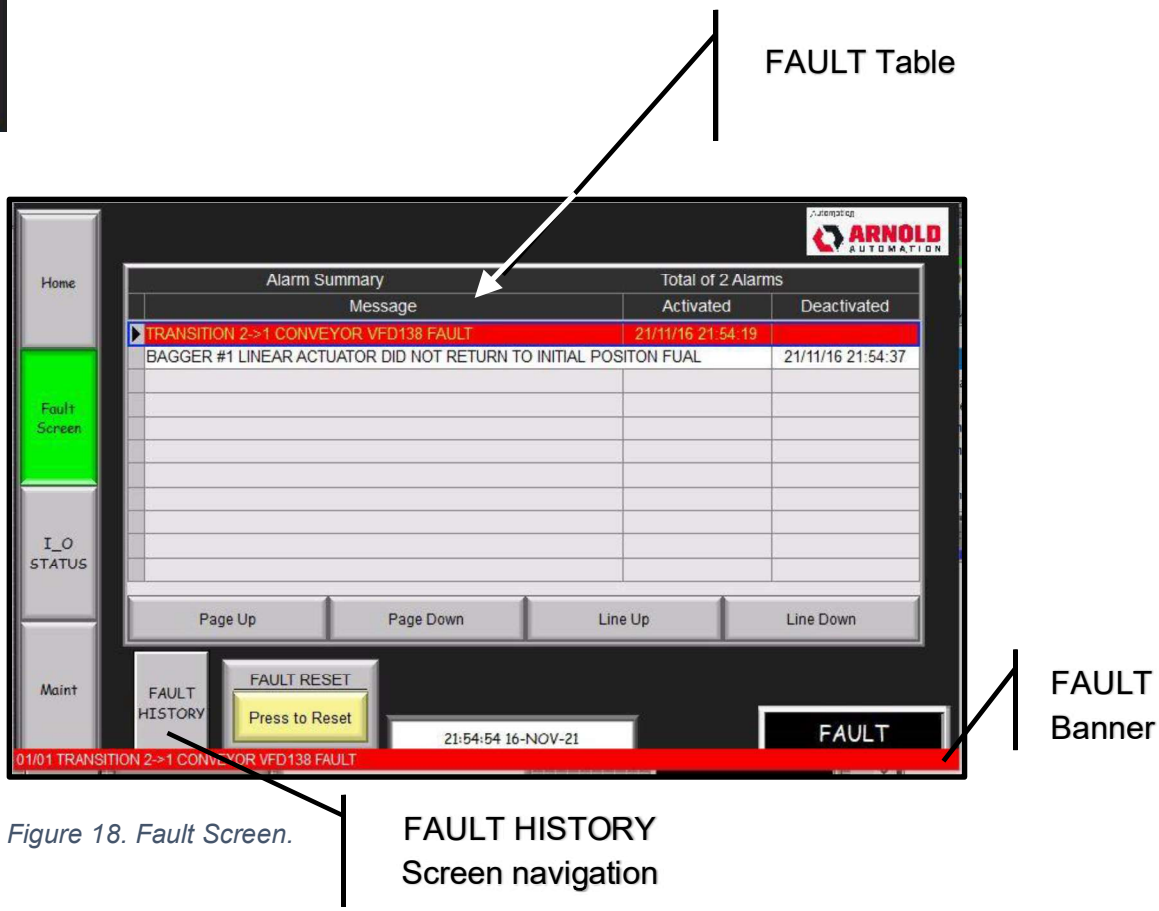


Figure 18. Fault Screen.

Active WARNINGS and FAULT entries appear with a color banner; reset entries show with a white banner. Use the UP/DOWN pushbutton icons at the bottom of the table to view through the FAULT Table. The operator may use the FAULT RESET pushbutton icon at the lower left of the screen to reset the fault condition. Note: the FAULT banner is visible at the bottom of this screen as well for active FAULTS.

At the lower left portion of this screen is the FAULT HISTORY Screen navigation icon. By touching this icon, the FAULT HISTORY Screen will be displayed.

Fault Screen, cont'd

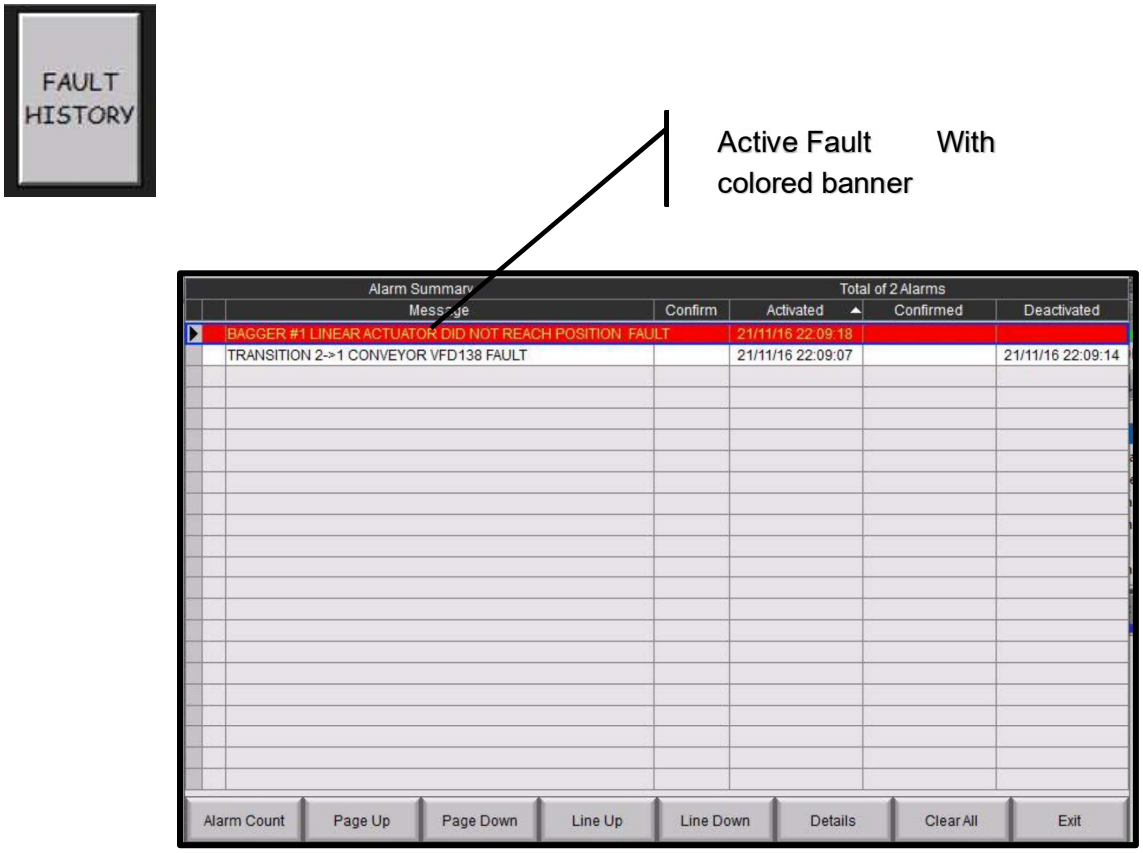


Figure 19. FAULT HISTORY Screen.

The FAULT HISTORY Screen contains the same data as contained on the FAULT Screen. However, the lower portion of the screen provides several more pushbutton icons that will be useful.

The CLEAR ALL pushbutton icon may be used to clear all inactive items from the list. **NOTE: THIS WILL ALSO CLEAR ALL ITEMS IN THE FAULT TABLE.**

The Alarm Count pushbutton icon, when touched, will display alarm count information. This table contains a list of all of the WARNINGS and FAULTS to which the assembly is responsive. It also contains a COUNT showing the number of times that particular item has occurred since the last time a reset of the count occurred.

Fault Screen, cont'd

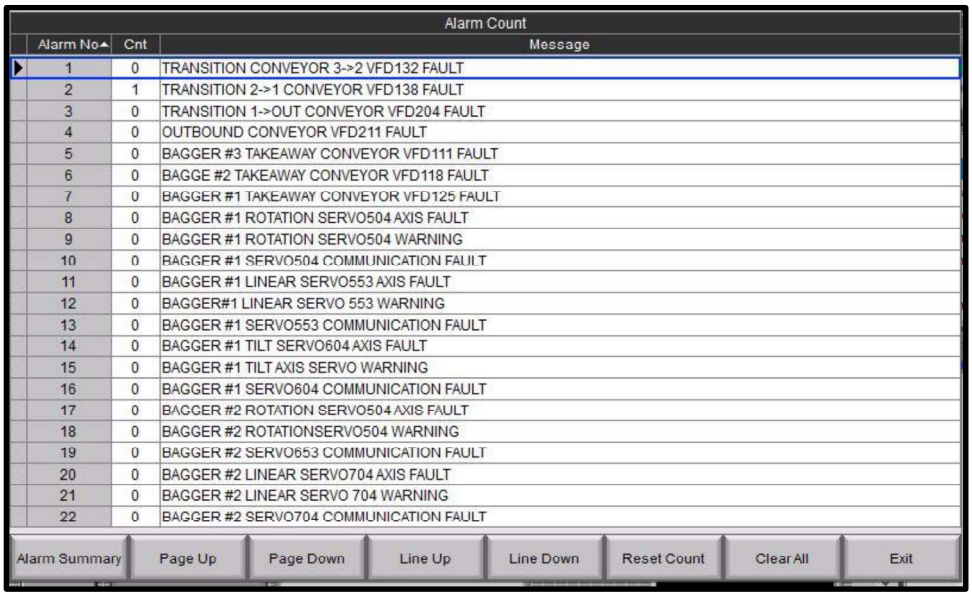


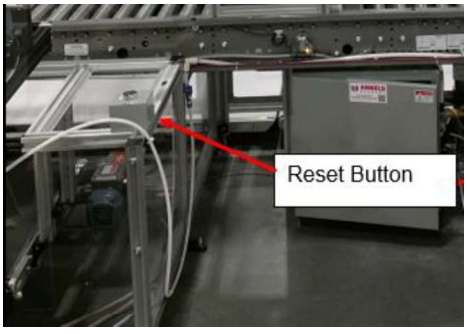
Figure 20. ALARM COUNT Screen.

The operator may use the UP/DOWN pushbutton icons to move around the list as needed. Touch the ALARM SUMMARY pushbutton icon to return to the ALARM HISTORY Screen. As required, the RESET COUNT pushbutton icon will return the count for SELECTED items to ZERO (0). The CLEAR ALL pushbutton icon on this screen will return ALL counts to ZERO (0).

The EXIT pushbutton icon, when touched, will return the operator to the FAULT Screen.

Responding to FAULTS

The normal first response to a FAULT will be to reset the condition. Some of the FAULT conditions monitored are self-clearing, and by simply pressing the FAULT RESET pushbutton icon on the HOME SCREEN, or pressing the RESET pushbutton at the rear of one of bagger systems will allow the assembly to return to normal operations.



Should a more intensive procedure be required, see the following table.

Responding to Faults, cont'd

ITEM # (from WARNINGS and FAULTS Table -see above)	DESCRIPTION	CORRECTIVE ACTION
1,2,3,4,5,6,7,8	Various Warnings for SERVOS	Items are informative only. Operator should touch the OK pushbutton on the WARNNG pop-up window to close the window
9,10,11,12,13,14,15	Transition conveyor VFD FAULTS	In main Electrical panel, check the faulted VFD and note he FAULT number. Refer to the Rockwell Automation Publication (520-um001_-en-e(2).pdf Chapter 4, Pages 157-164) for detailed listing of FAULT CODES and remedial actions
17-36	Various FAULTS for SERVOs	Using the FAULT # from the SERVO Control Screen (see page# above) Refer to FESTO Publication (CMMT-AS-SW-Manual-2020, Section 9.4.6, page 150) for detailed description of the FAULT and remedial action to be taken.
37-57	Sequence Operation Faults	Disable station, Verify Servo motor assembly and make sure motor is free of obstruction. Verify all sensors are powered up and operating correctly.

Figure 21. Fault Correction Table.

For more support, please visit the following links:

https://arnoldacademy.com/

https://arnoldacademy.com/gxoabercrombiefat

SYSTEM SENSORS & SWITCHES

Keyence Digital Fiberoptic Sensor FS-N40

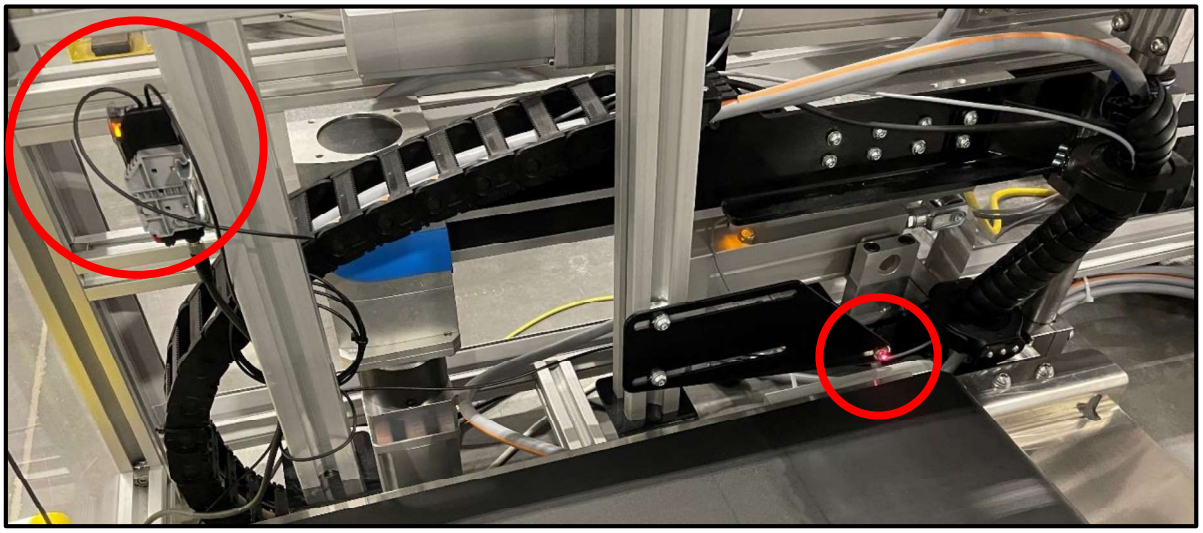


Figure 22. Keyence fiberoptic thru-beam sensor detects bags along conveyors, providing signals to properly control the flow of bags in the system.

The Keyence digital fiberoptic sensor and the Thrubeam Active Receiver Fibers are used to detect the presence and absence of a package on the conveyors. The receivers are pointed at one another approximately ¼ inch above the surface of the conveyor belt, generating a photo "beam." As bags travel along the conveyors, they "break" this beam, signaling that a package has reached a sensor's position along the conveyors. Depending on the presence of upstream bags, logic in the PLC can stop and start the conveyors accordingly to avoid bag collisions based on the position signals.

Keyence Photoelectric Sensor PZ-G61CP

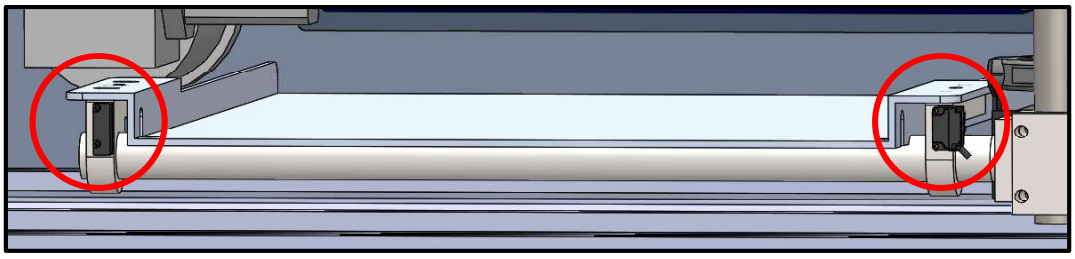


Figure 23. Keyence retro-reflective photoelectric sensor detects bags on product transfer tray.

The Keyence retro-reflective photoelectric sensor is used along with the micro-reflector R-5 to generate a photoelectric beam that detects the presence of a bag near the front

edge of the transfer tray. As the tray tilts and a bag slides down the tray, it breaks the beam, signaling that it is falling off the tray. When the bag clears the tray and lands on the transition conveyor, the thru-beam makes, signaling that the bag is off the tray, which allows the tray to return to its “home” position.

Keyence Locking Door Switch

Figure 24. Keyence door locking switch lit solid GREEN indicating that the door is locked.

Each of the four access doors on the main enclosure tunnel has a Keyence locking door switch. When the access doors are closed and locked, these switches display a solid GREEN LED color, which indicates that the doors are properly closed with a locking force of 2000 Newtons. When the doors are open, these switches display a solid RED LED color. When the doors are properly closed but not yet locked, the switch displays a blinking GREEN LED color, indicating that the locking force is not yet acting on the door (i.e., the doors can still be pulled open).

SYSTEM MAINTENANCE

Shaft and Bearing Maintenance

Both the vertical shaft, responsible for 90-degree rotation, and the horizontal shaft, responsible for 45-degree tilt, are raw steel shafts. Consequently, both shafts require application of linseed oil to mitigate onset of oxidation.

In addition, both the vertical and horizontal shafts are supported by two needle-roller bearings. These bearings require routine application of grease with a grease gun via the grease fittings on the bearing blocks (see below). Bearing grease should be replenished once every three months. Grease should be applied through the fitting until grease begins to become visible just outside of the bearings.

NOTE: Shafts are oiled and bearings are greased upon installation.

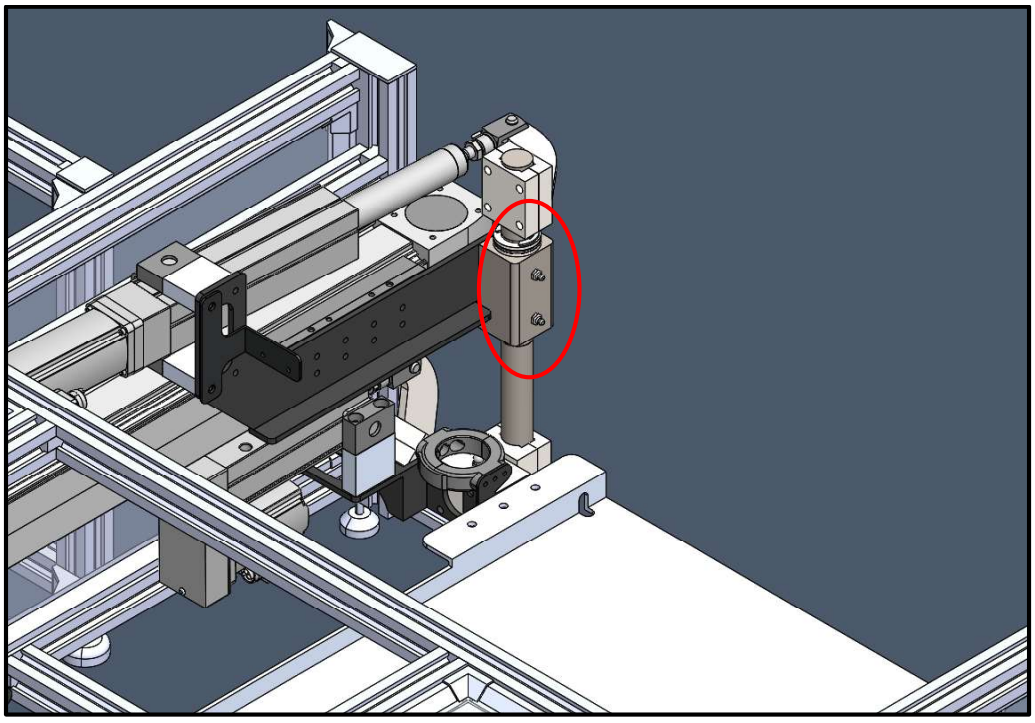


Figure 25. Location of vertical bearing block grease fittings: 1/8" NPT threads.

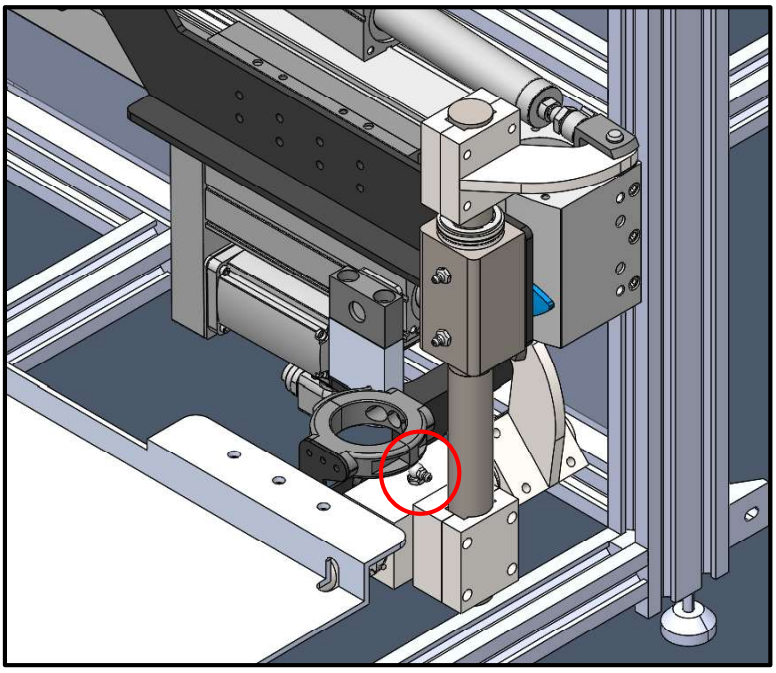


Figure 26. Location of horizontal bearing block grease fitting (right-angled): 1/8 NPT threads.

Robotunits Conveyor Belt Tracking

On an as-needed basis, it may be necessary to track the Robotunits C5N conveyor belts by adjusting tension of the belts. If the belts seem to be “drifting” toward one side or the other, then follow the instructions on Page 26 of the included Robotunits conveyor manual under section “4.4 Tracking the belt” in order to adjust belt tension. Allen keys will be needed for this adjustment.

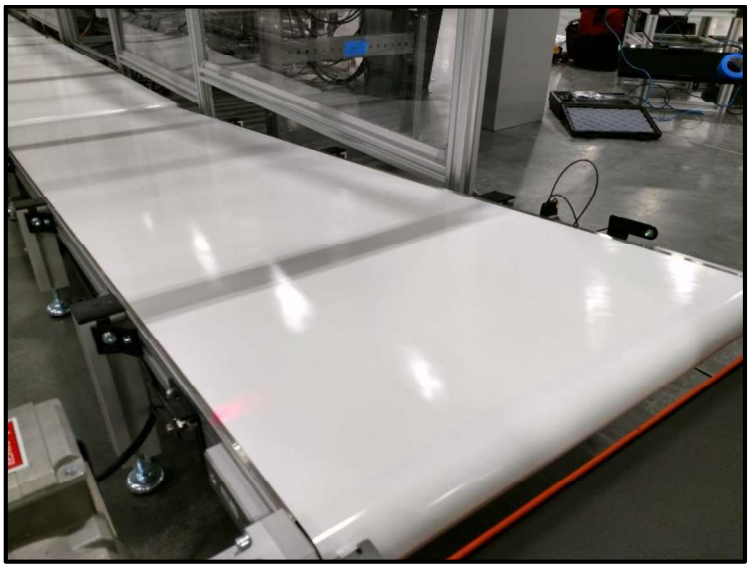
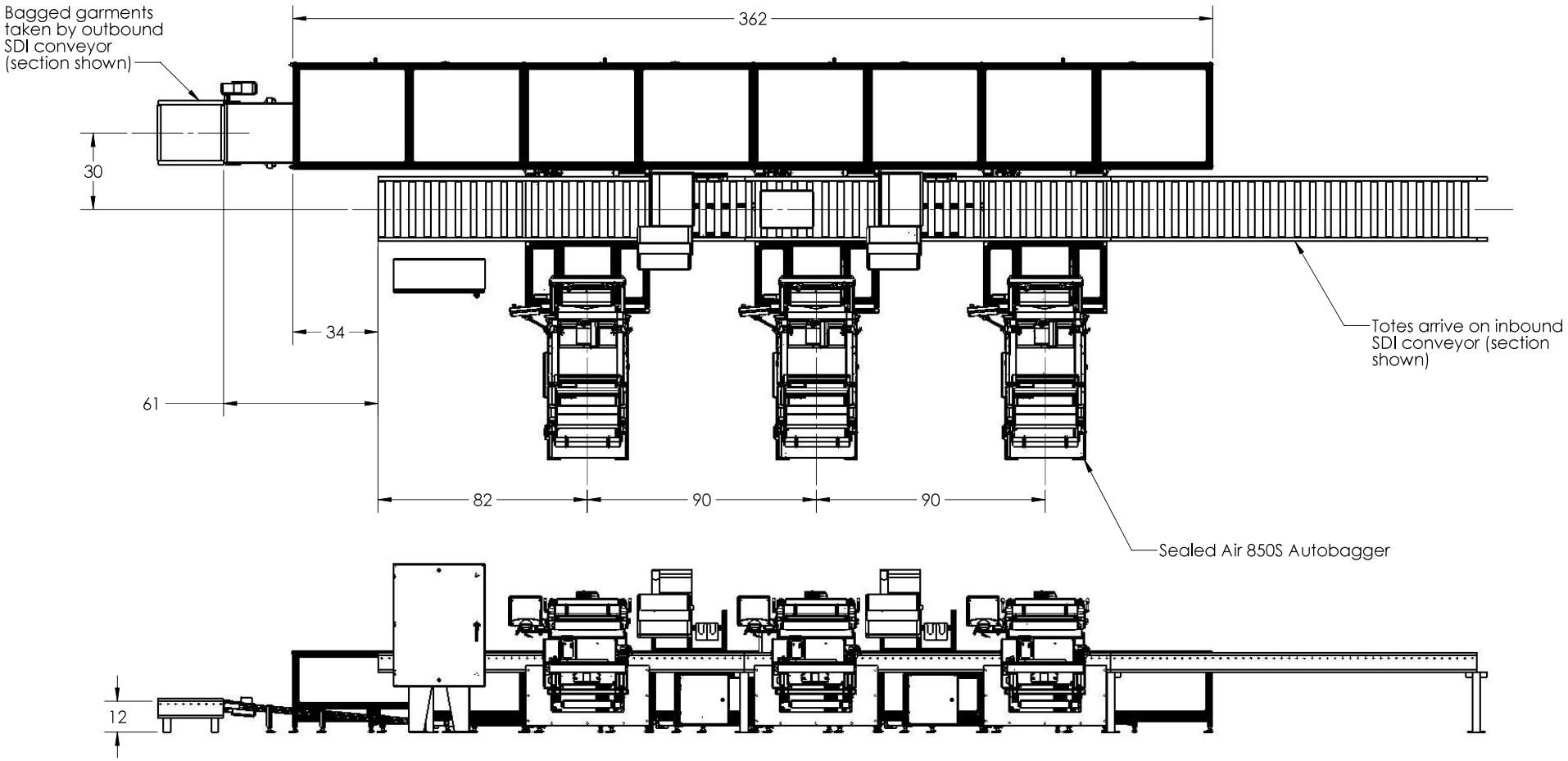


Figure 27. Robotunits C5N conveyor belt outbound.

MECHANICAL DRAWINGS



NOTES:

1. System allows (2)-(3) human operators to process garments individually from inbound totes with an autobagging machine.
2. Bags are then transferred through a 90 degree turn and dropped onto an outbound takeaway conveyor.

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NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/16
ANGULAR: MACH ± 1° BEND ± 3°
TWO PLACE DECIMAL ±0.030
THREE PLACE DECIMAL ±0.005
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL N/A
FINISH N/A
DO NOT SCALE DRAWING

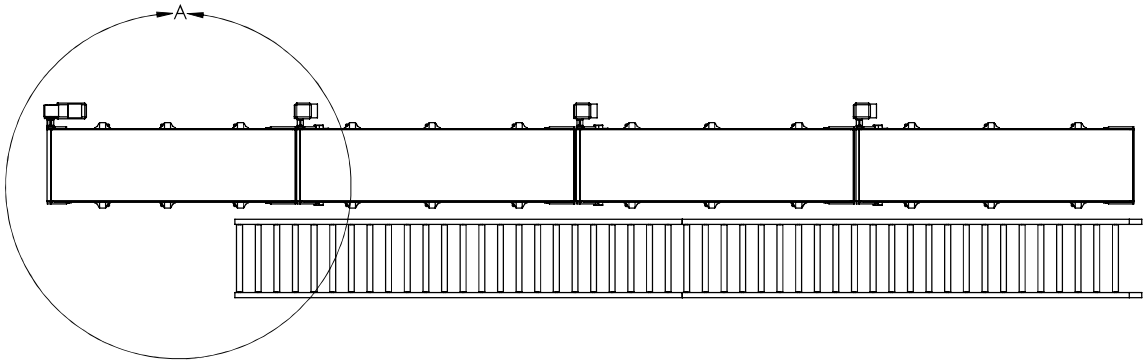
	NAME	DATE
DRAWN	L. Greco	9/20/2021
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

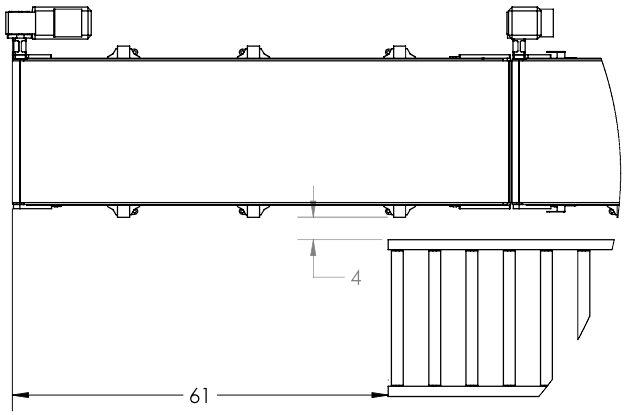
COMMENTS:

TITLE: System, Garment bagging

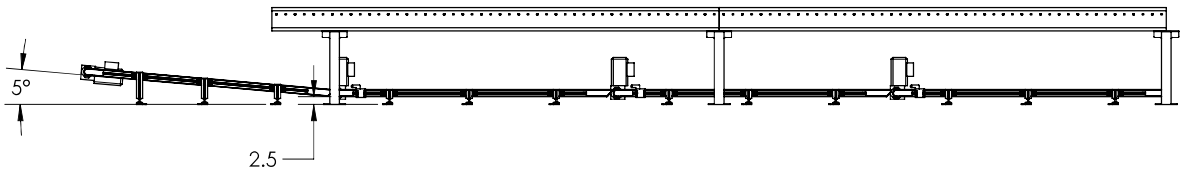
SIZE	DWG. NO.	REV
B	AA1023	A

SCALE: 1:40 WEIGHT: - SHEET 1 OF 3





DETAIL A
SCALE 1 : 20



NOTES:

1. Some system components omitted for clarity.

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NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/16
ANGULAR: MACH ± 1° BEND ± 3°
TWO PLACE DECIMAL ±0.030
THREE PLACE DECIMAL ±0.005
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL N/A
FINISH N/A
DO NOT SCALE DRAWING

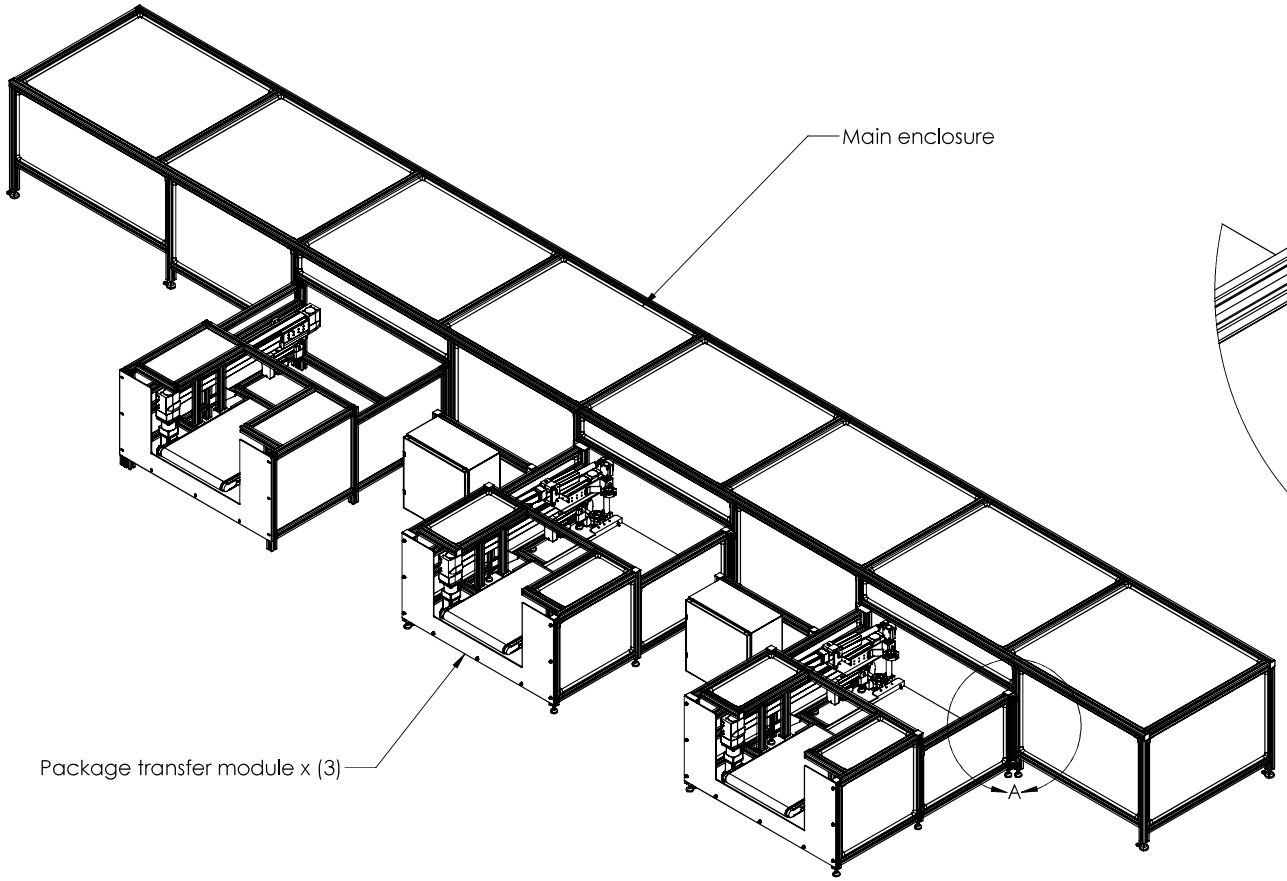
	NAME	DATE
DRAWN	L. Greco	9/20/2021
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

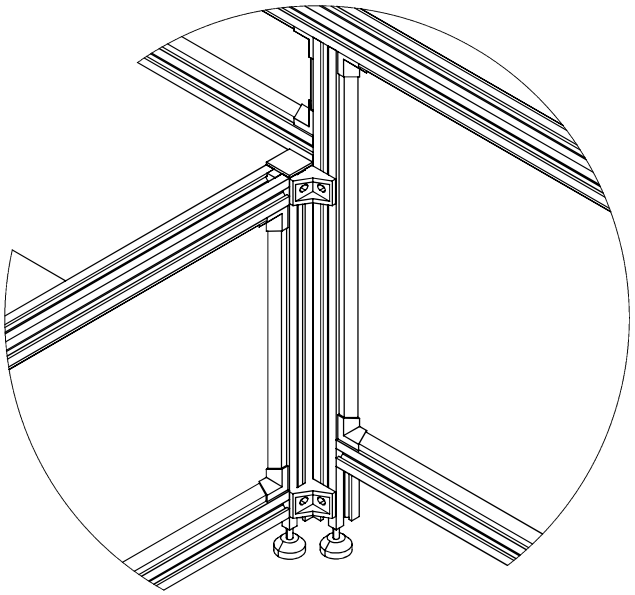
COMMENTS:

TITLE:
System, Garment bagging

SIZE	DWG. NO.	REV
B	AA1023	A

SCALE: 1:40 WEIGHT: - SHEET 2 OF 3





DETAIL A
SCALE 1 : 6
Gusset connection
Between frames

NOTES:

1. Package transfer frame modules connect to main enclosure with two gusset brackets on each side (Detail A).

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APPLICATION		

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/16
ANGULAR: MACH ± 1° BEND ± 3°
TWO PLACE DECIMAL ±0.030
THREE PLACE DECIMAL ±0.005
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL N/A
FINISH N/A
DO NOT SCALE DRAWING

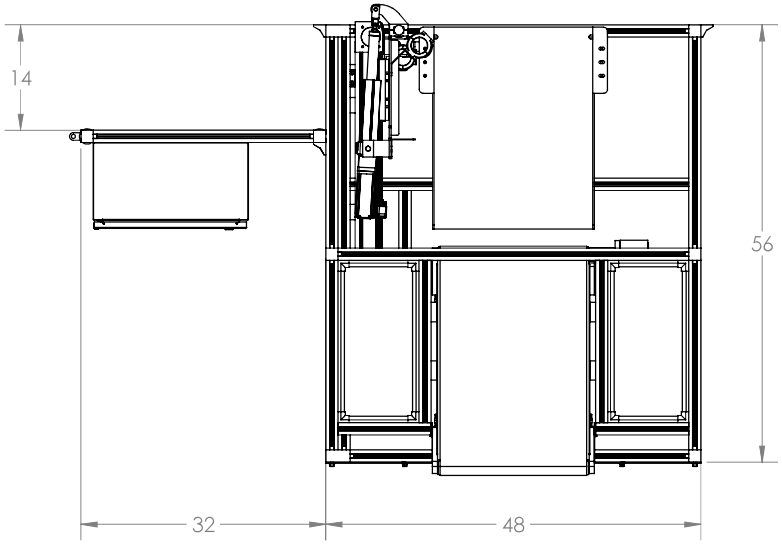
	NAME	DATE
DRAWN	L. Greco	9/20/2021
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

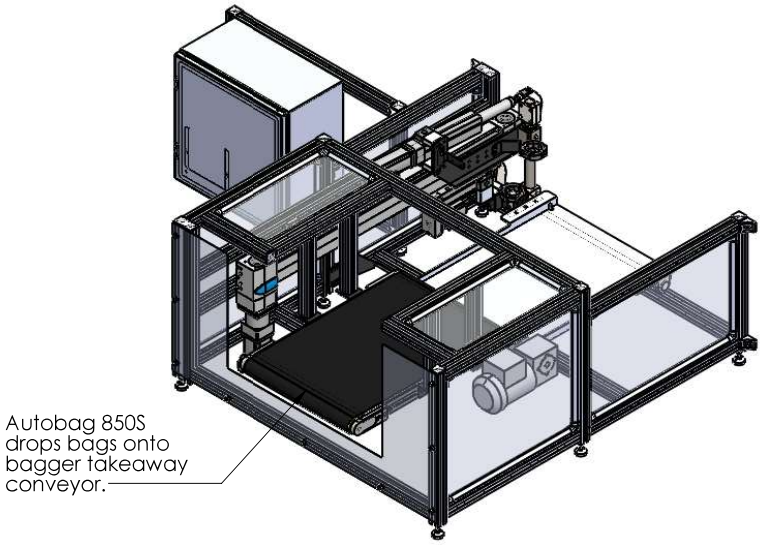
COMMENTS:

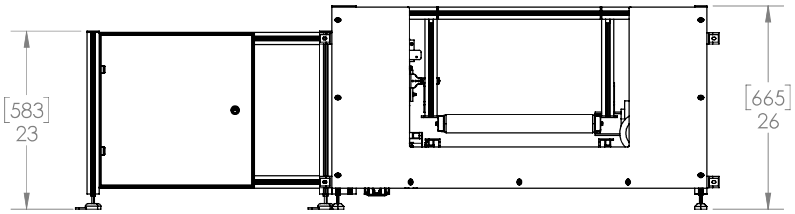
TITLE:
System, Garment bagging

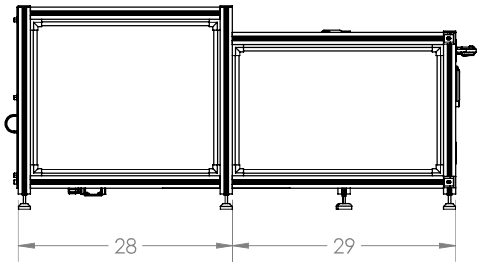
SIZE	DWG. NO.	REV
B	AA1023	A

SCALE: 1:28 WEIGHT: - SHEET 3 OF 3









NOTES:

1. Package transfer station houses (3) electric linear actuators and their controls.
2. Enclosing polycarbonate panels are removable for access to actuators and other machine components.
3. Some components not shown for clarity.

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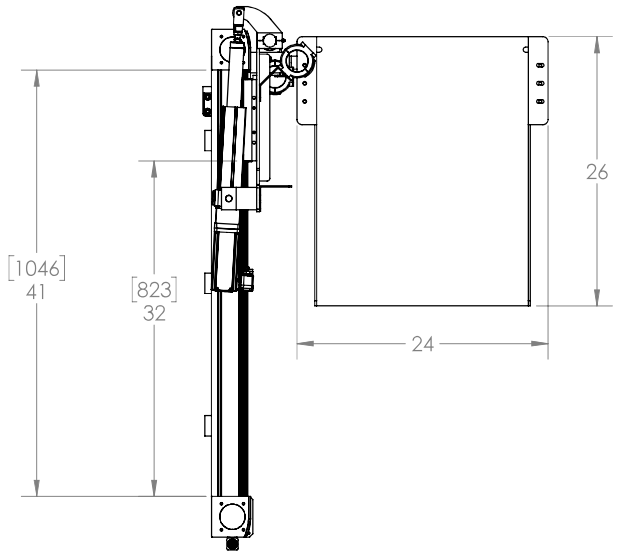
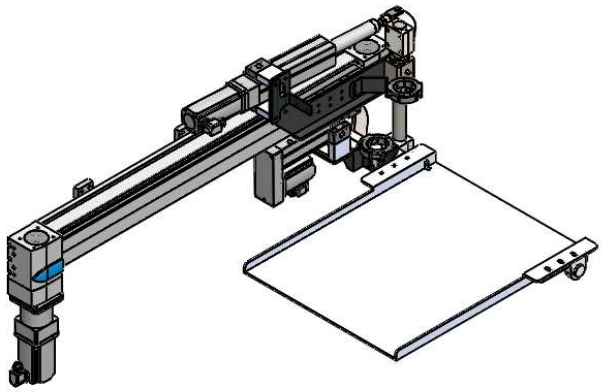
UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/16 ANGULAR: MACH ± 1° BEND ± 3° TWO PLACE DECIMAL ±0.030 THREE PLACE DECIMAL ±0.005	DRAWN: L. Greco	9/20/2021
	CHECKED:	
	ENG APPR.:	
	MFG APPR.:	
	Q.A.:	
INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:	
MATERIAL: N/A		
FINISH: N/A		
NEXT ASSY / USED ON		
APPLICATION / DO NOT SCALE DRAWING		

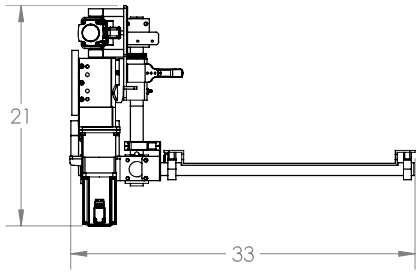
TITLE: SA, Package transfer system

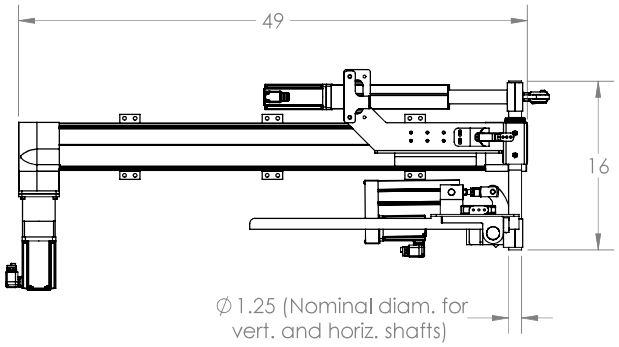
SIZE	DWG. NO.	REV
B	AA1001064	A

SCALE: 1:16 | WEIGHT: - | SHEET 1 OF 4









NOTES:

1. Package transfer tray performs 3-axis motion.
2. Translates linearly via carriage on linear axis.
3. Rotates 90 degrees to the left via electric cylinder pivoting the vertical shaft.
4. Tilts up to 60 degrees via an electric cylinder pivoting the horizontal shaft.

ARNOLD AUTOMATION

PROPRIETARY AND CONFIDENTIAL

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NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/16
ANGULAR: MACH ± 1° BEND ± 3°
TWO PLACE DECIMAL ±0.030
THREE PLACE DECIMAL ±0.005

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL: N/A

FINISH: N/A

DO NOT SCALE DRAWING

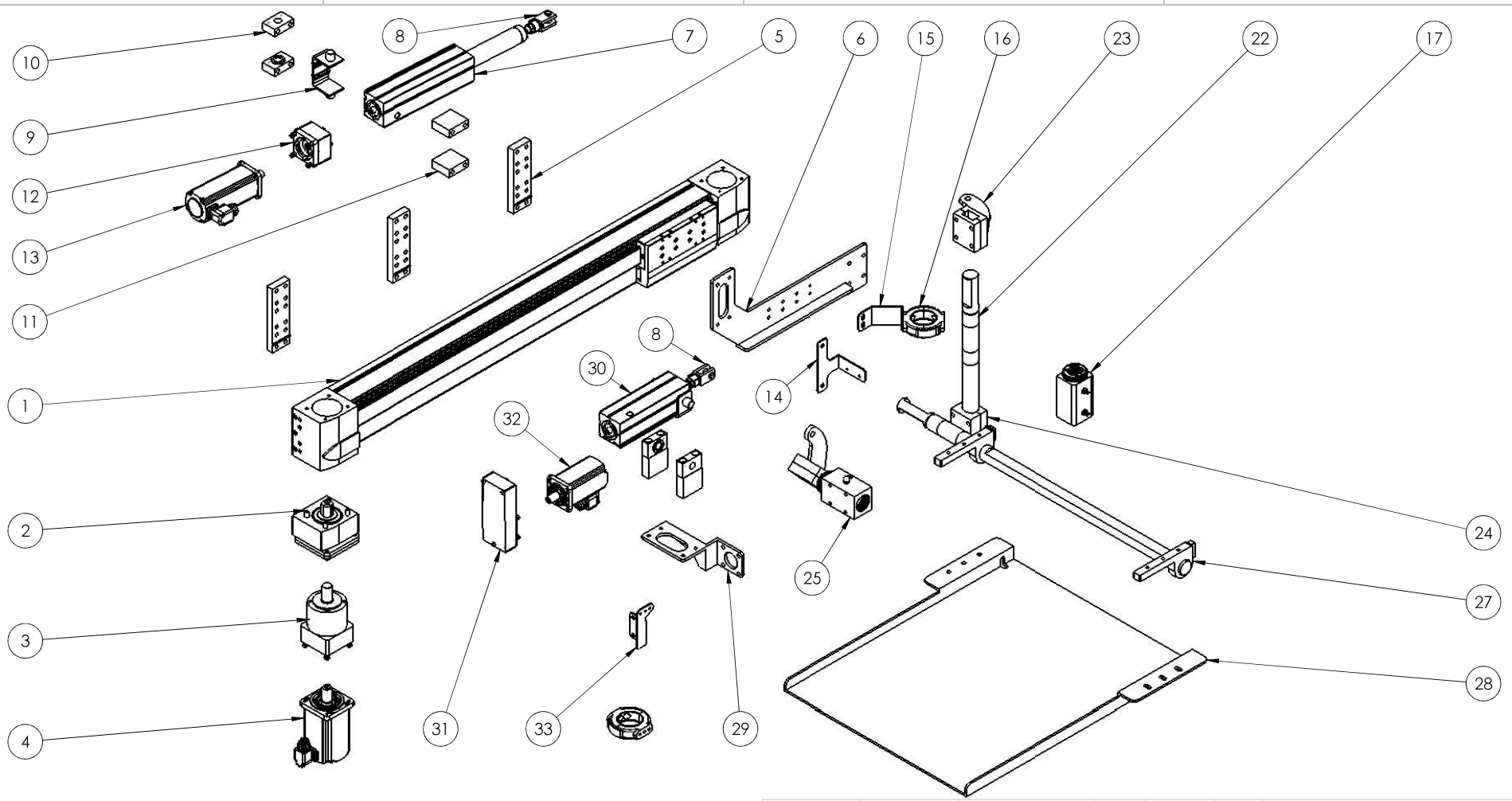
	NAME	DATE
DRAWN	L. Greco	9/20/2021
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

TITLE:
SA, Package transfer system

SIZE	DWG. NO.	REV
B	AA1001064	A

SCALE: 1:12 | WEIGHT: - | SHEET 2 OF 4



NOTES:

1. See next sheet for BOM.
2. Minor components (bearings, retaining rings, etc.) are not labeled here, but are in BOM.

ARNOLD AUTOMATION

PROPRIETARY AND CONFIDENTIAL
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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/16 ANGULAR: MACH ± 1° BEND ± 3° TWO PLACE DECIMAL ±0.030 THREE PLACE DECIMAL ±0.005	DRAWN	L. Greco	9/20/2021
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL N/A	COMMENTS:		
NEXT ASSY	USED ON	FINISH N/A			
APPLICATION		DO NOT SCALE DRAWING			

TITLE: SA, Package transfer system

SIZE	DWG. NO.	REV
B	AA1001064	A

SCALE: 1:8 | WEIGHT: - | SHEET 3 OF 4

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	SUPPLIER
1	3013367 EGC-120-800-TB-KF-0H-GK---(0)	Linear axis, tooth belt	1	FESTO
2	557989 EAMM-A-L62-80G	Axial mounting kit	1	FESTO
3	2297691 EMGA-80-P-G5-EAS-80	Gearbox unit	1	FESTO
4	5255426 EMMT-AS-80-S-LS-RM---(high)	Servomotor, 80 mm square flange	1	FESTO
5	2410274 EAHF-L5-120-P---(L3)	Mounting support	3	FESTO
6	AA1001058	Bracket, actuator connection	1	Arnold
7	5428906 EPCC-BS-60-150-12P-A---(0 high)	Linear cylinder, ball screw 150 mm	1	FESTO
8	6145 SG-M12x1,25	Clevis rod end	2	FESTO
9	5125281 EAHS-P2-60---(high)	Swivel mounting kit	2	FESTO
10	32960 LNZG-40_50---(40)	Trunnion support	2	FESTO
11	AA1001070	Trunnion extensions	2	Arnold
12	4133487 EAMM-A-T42-60P	Mounting kit, axial cylinder	1	FESTO
13	5242213 EMMT-AS-60-L-LS-RM---(high)	Servomotor, 60 mm square flange, long	1	FESTO
14	AA1001066	Bracket, Upper flat e-chain	1	Arnold
15	AA1001067	Bracket, Upper flex e-chain	1	Arnold
16	TR_50_02_6	PART-TR-50-02-DESC	2	igus
17	AA1001071	Bearing block, Vertical shaft	1	Arnold
18	1293K11	303 Stainless Steel Grease Fitting	2	McMaster-Carr
19	6655K24	Thrust Ball Bearing	2	McMaster-Carr
20	98543A222	Retaining ring, External	2	McMaster-Carr
21	5905K518	Needle-Roller Bearing	4	McMaster-Carr
22	AA1001072	Shaft, Vertical rotation	1	Arnold
23	Rotation actuator bracket	Connection arm, clevis rod end	2	Arnold
24	AA1001075 & AA1001076	Lower connection block	1	Arnold
25	AA1001077	Bearing block, Horizontal tilt	1	Arnold

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	SUPPLIER
26	1095K27	Zinc-Plated Steel Grease Fitting	1	McMaster-Carr
27	AA1001080	Horizontal shaft, tilt	1	Arnold
28	AA1001059	Tray, product transfer	1	Arnold
29	AA1001060 - alternate	Bracket, tilt actuator mounting	1	Arnold
30	5428904 EPCC-BS-60-100-12P-A---(0 high)	Electric linear cylinder, 100 mm	1	FESTO
31	4784301 EAMM-U-65-T42-60P-87	Mounting kit, Parallel cylinder	1	FESTO
32	5242197 EMMT-AS-60-S-LS-RM---(high)	Servomotor, 60 mm square flange, short	1	FESTO
33	AA1001068	Bracket, lower flex e-chain	1	Arnold
34	PZ-G61_62	Retro-reflective sensor	1	Keyence
35	R-5	Reflector	1	Keyence

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NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/16
ANGULAR: MACH ± 1° BEND ± 3°
TWO PLACE DECIMAL ±0.030
THREE PLACE DECIMAL ±0.005

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL N/A

FINISH N/A

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	L. Greco	9/20/2021
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

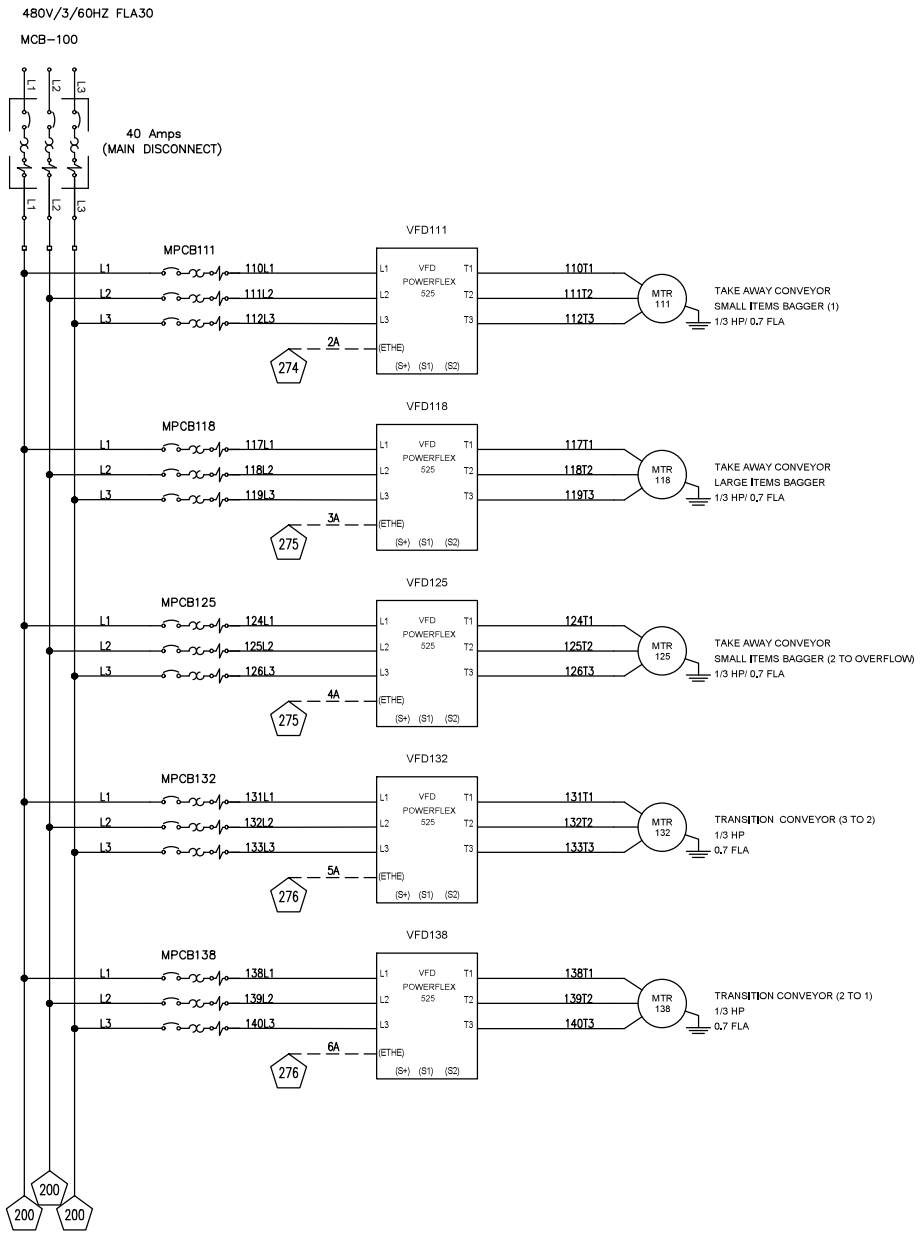
COMMENTS:

TITLE:
SA, Package transfer system

SIZE	DWG. NO.	REV
B	AA1001064	A

SCALE: 1:8 | WEIGHT: - | SHEET 4 OF 4

ELECTRICAL DRAWINGS



NOTES:

1) ALL 200V AND UP POWER WIRING SHALL BE COLORED BLACK.
2) ALL 120V CONTROL WIRING SHALL HAVE THE UNGROUNDED CONDUCTOR COLORED RED; THE NEUTRAL CONDUCTOR SHALL BE COLORED WHITE.
3) ALL 24 VDC CONTROL WIRING SHALL HAVE THE POSITIVE CONDUCTOR COLORED BLUE; THE NEGATIVE CONDUCTOR SHALL BE COLORED BLUE/WHITE.
4) ALL GROUNDING CONDUCTORS SHALL BE COLORED GREEN.

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REVISIONS

REV	E.C.N.#	APPROVAL	DATE
A			

ENGR:	A. Deschamps
LINE VOLTAGE:	480VAC
CONTROL VOLTAGE:	110V/24VDC
PHASE:	3
FREQUENCY	60HZ
DATE:	11/03/2021

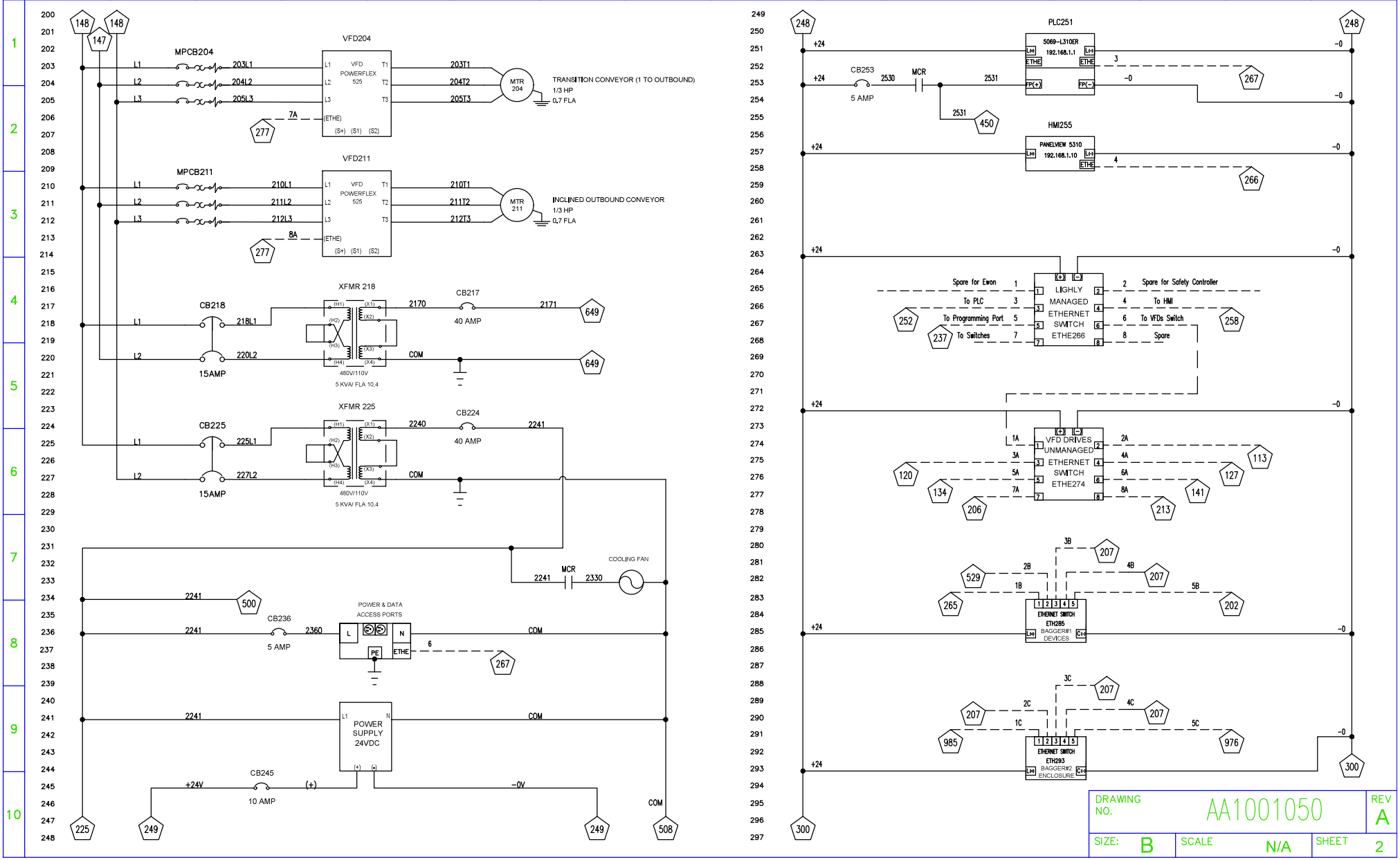
SERIAL NO. AA1023

Automation ARNOLD AUTOMATION

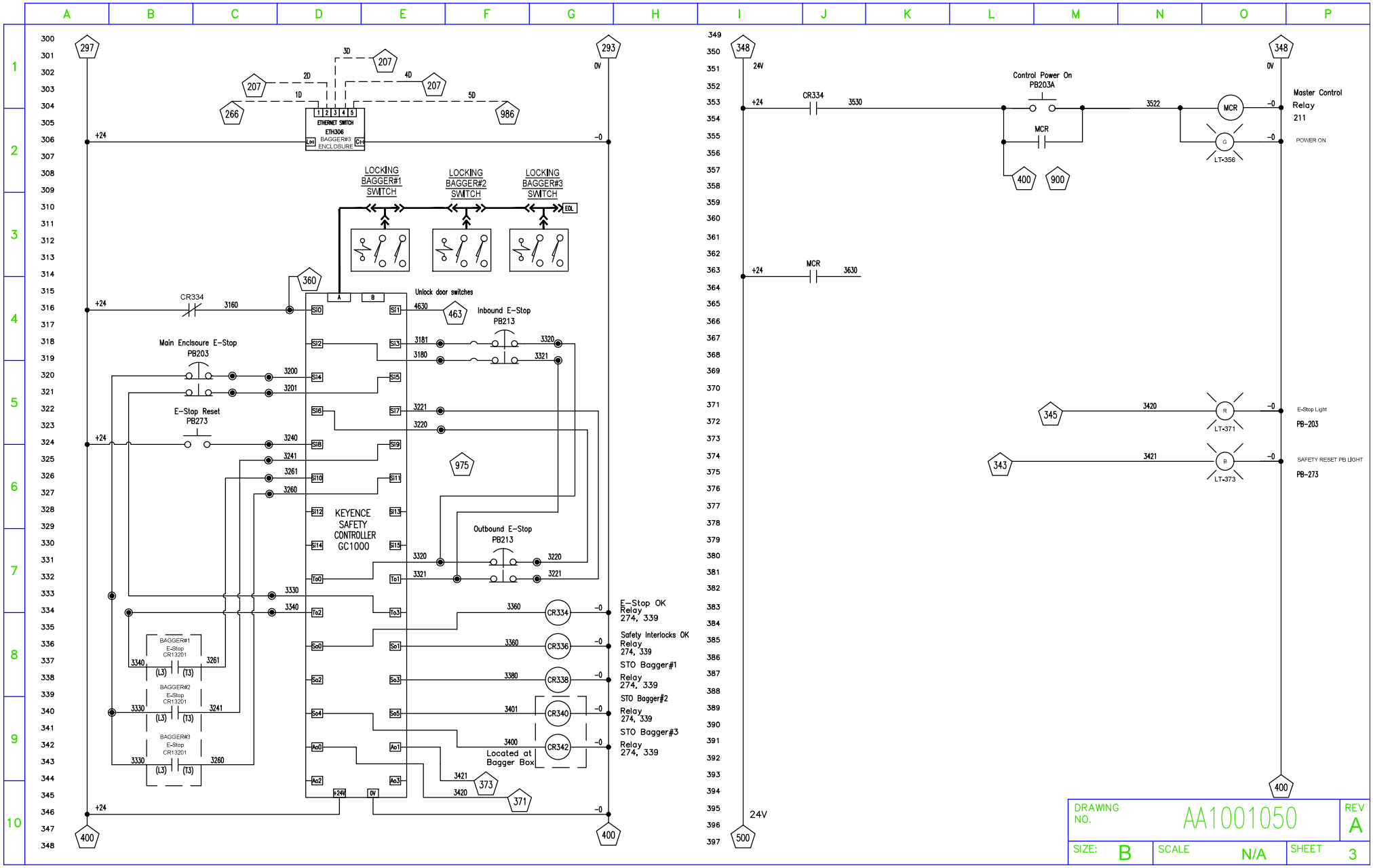
ELECTRICAL SCHEMATIC
XPO / GXO
AUTO BAGGING SYSTEM

DWG. NO. AA1001050 REV A

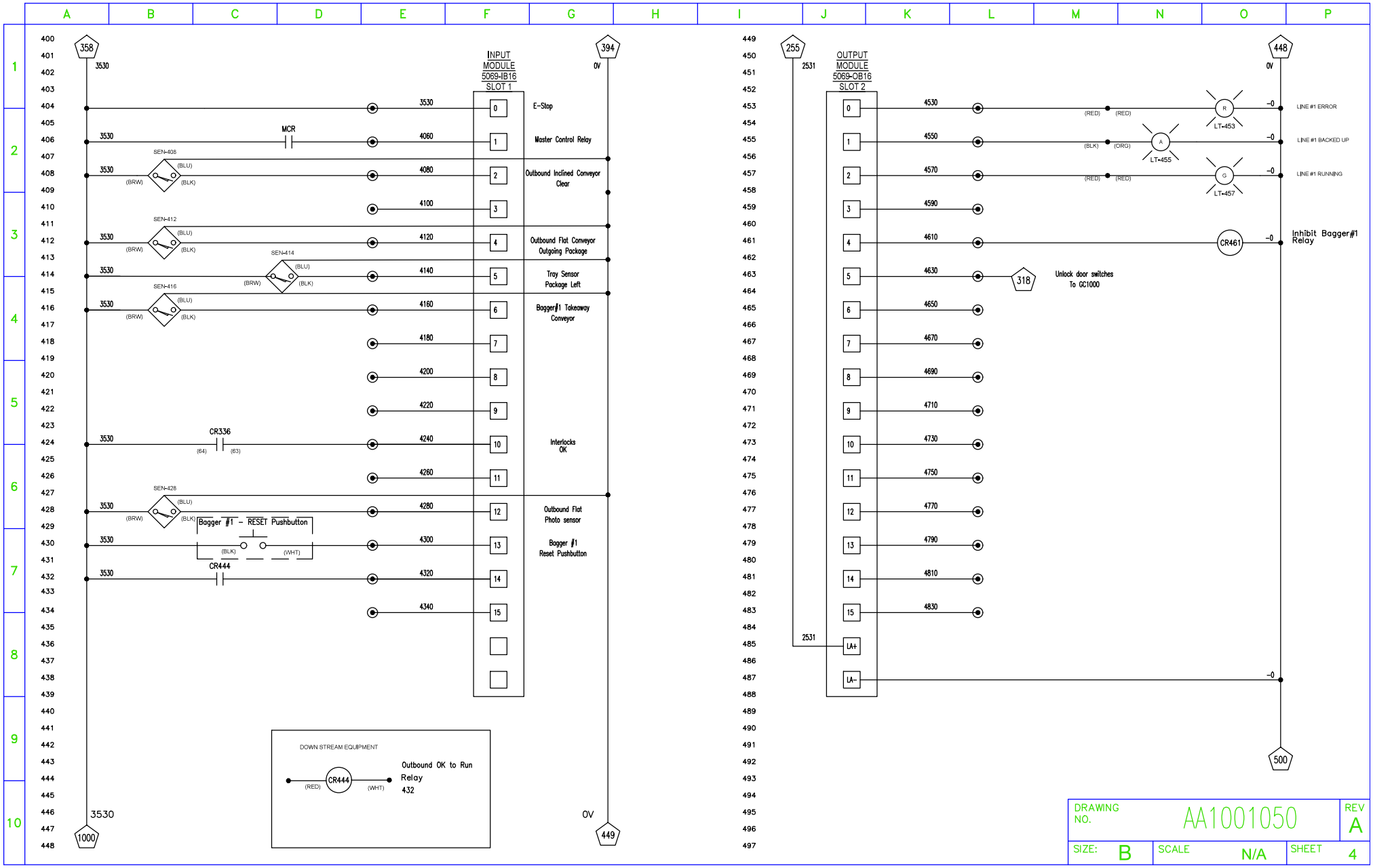
SIZE: B | SHEET 1 OF 11



DRAWING NO.	AA1001050
REV	A
SIZE:	B
SCALE	N/A
SHEET	2



DRAWING NO.	AA1001050
REV	A
SIZE:	B
SCALE	N/A
SHEET	3



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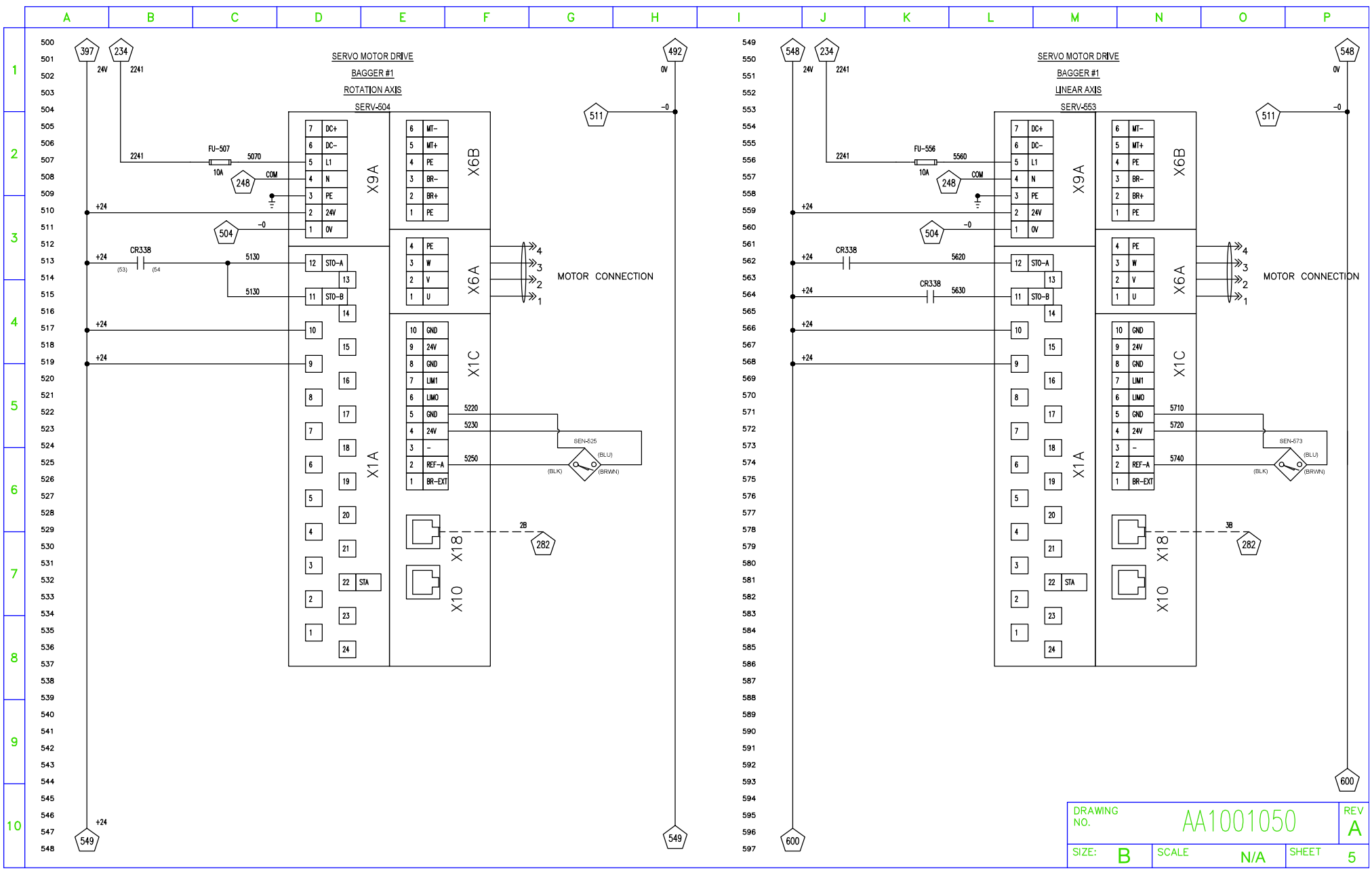
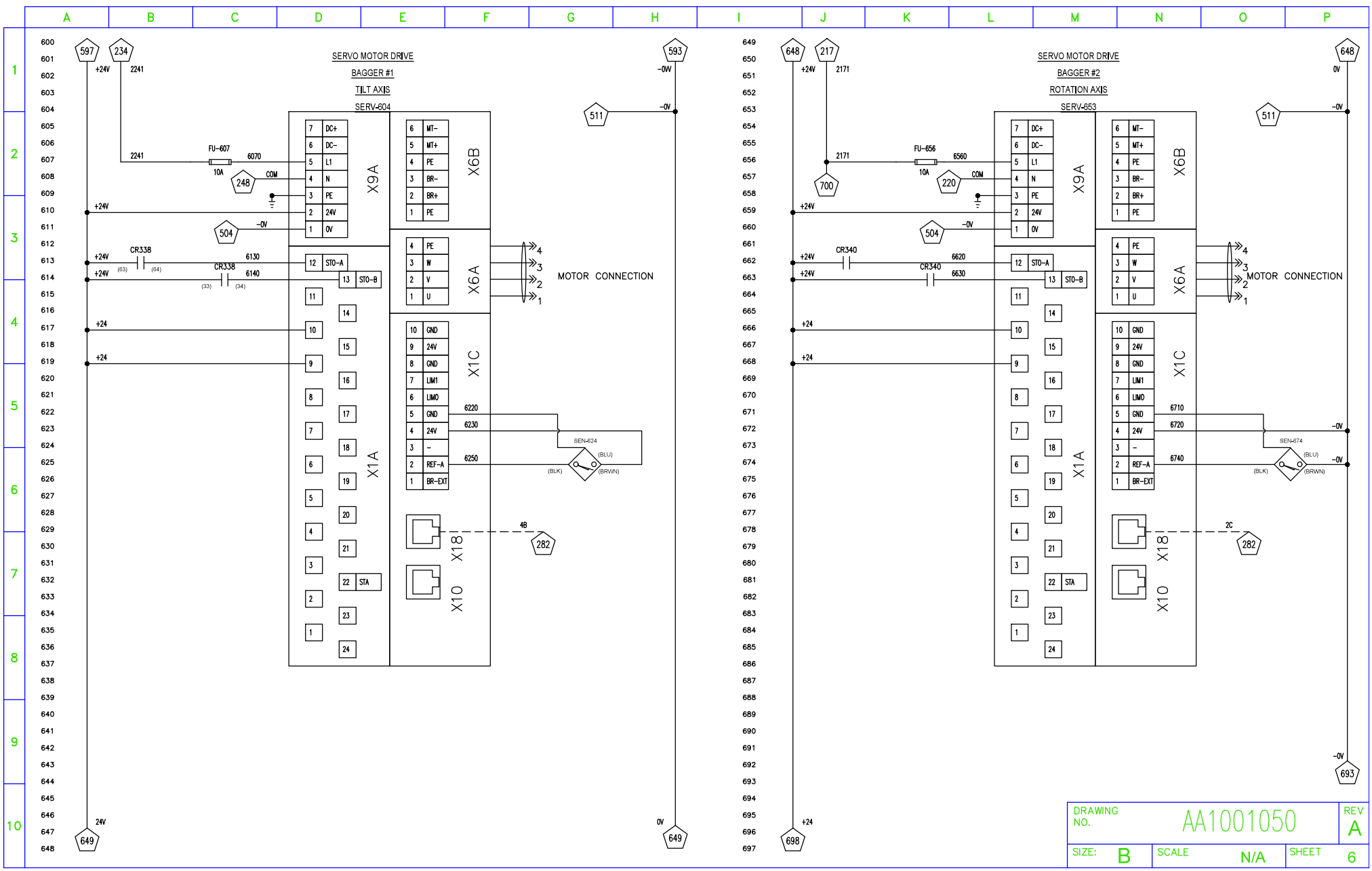
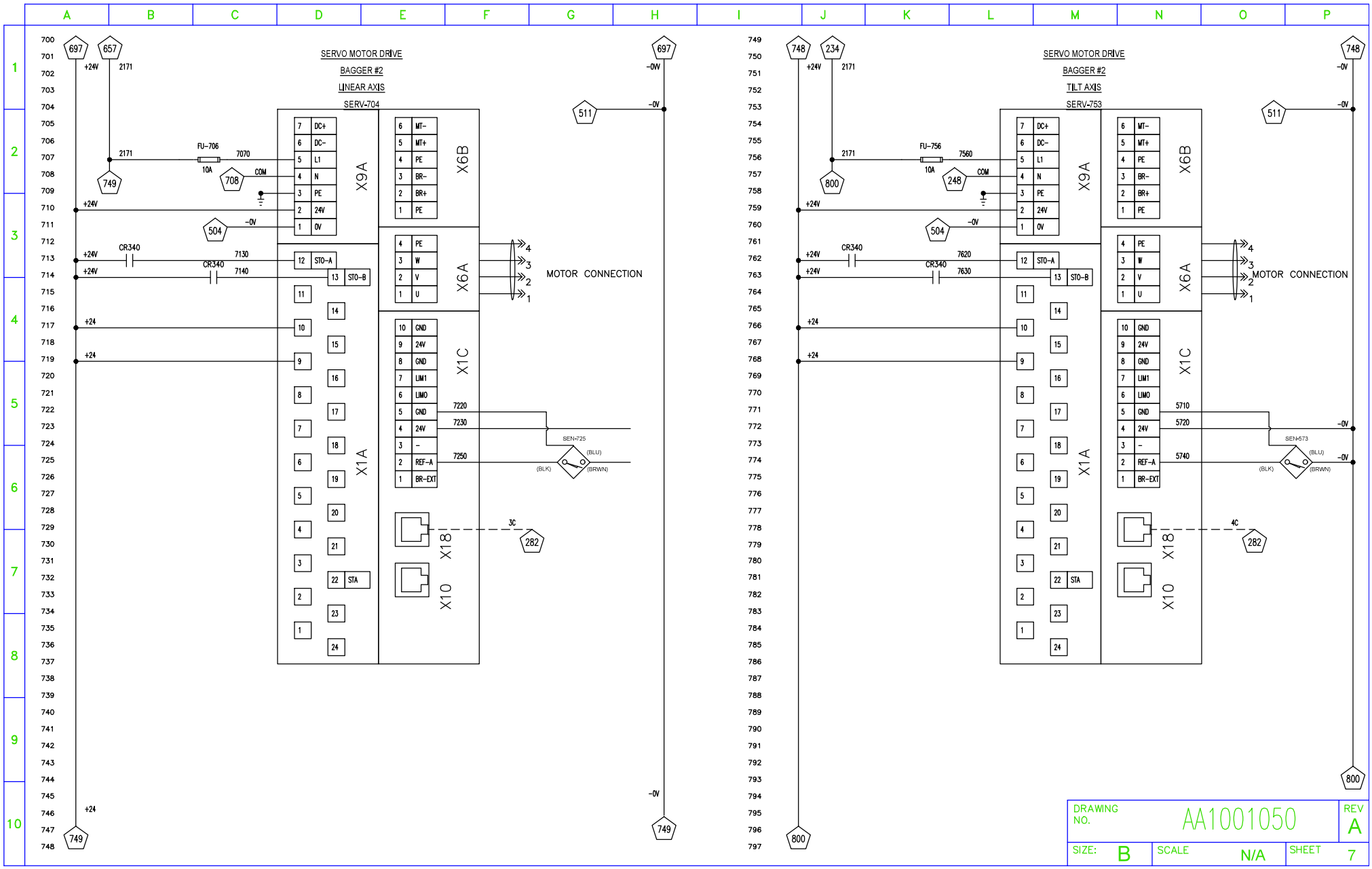
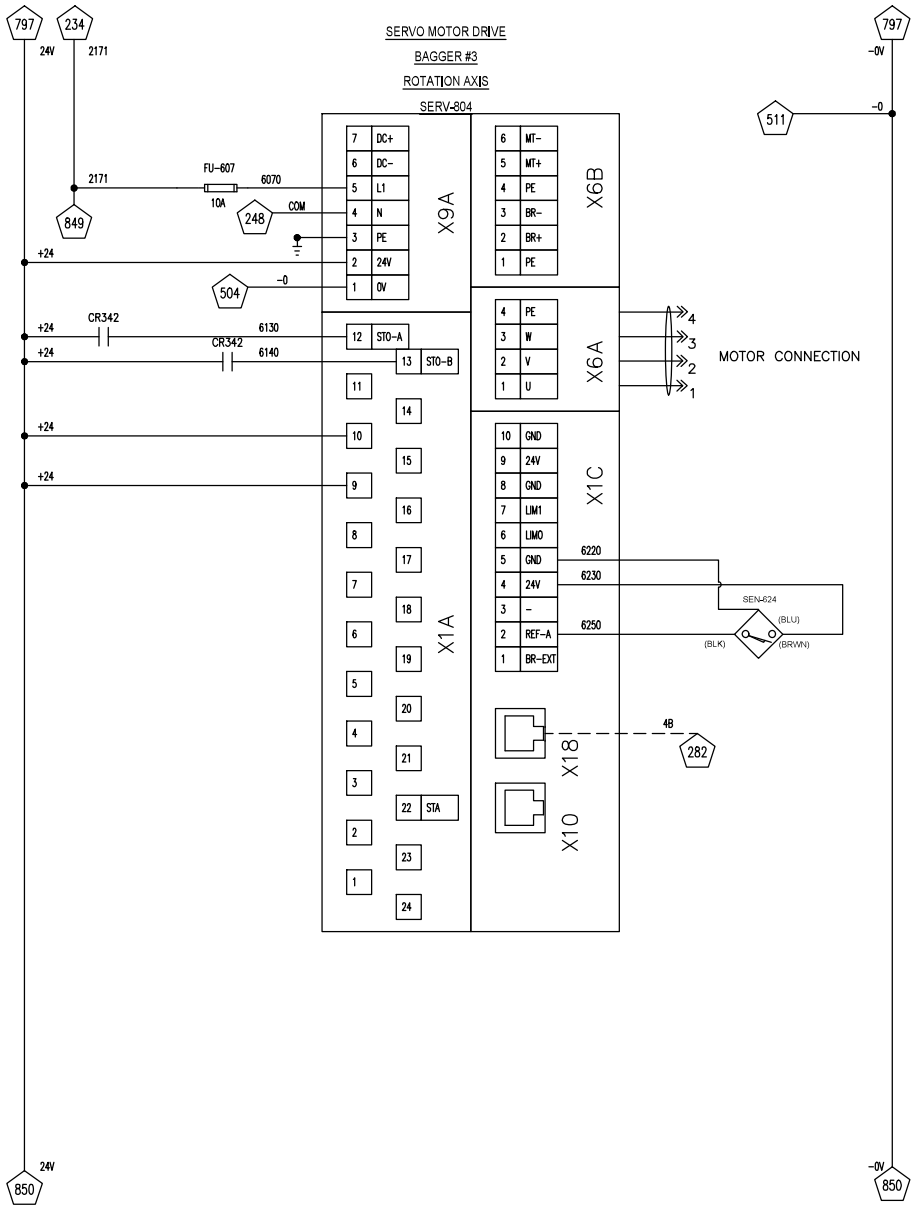
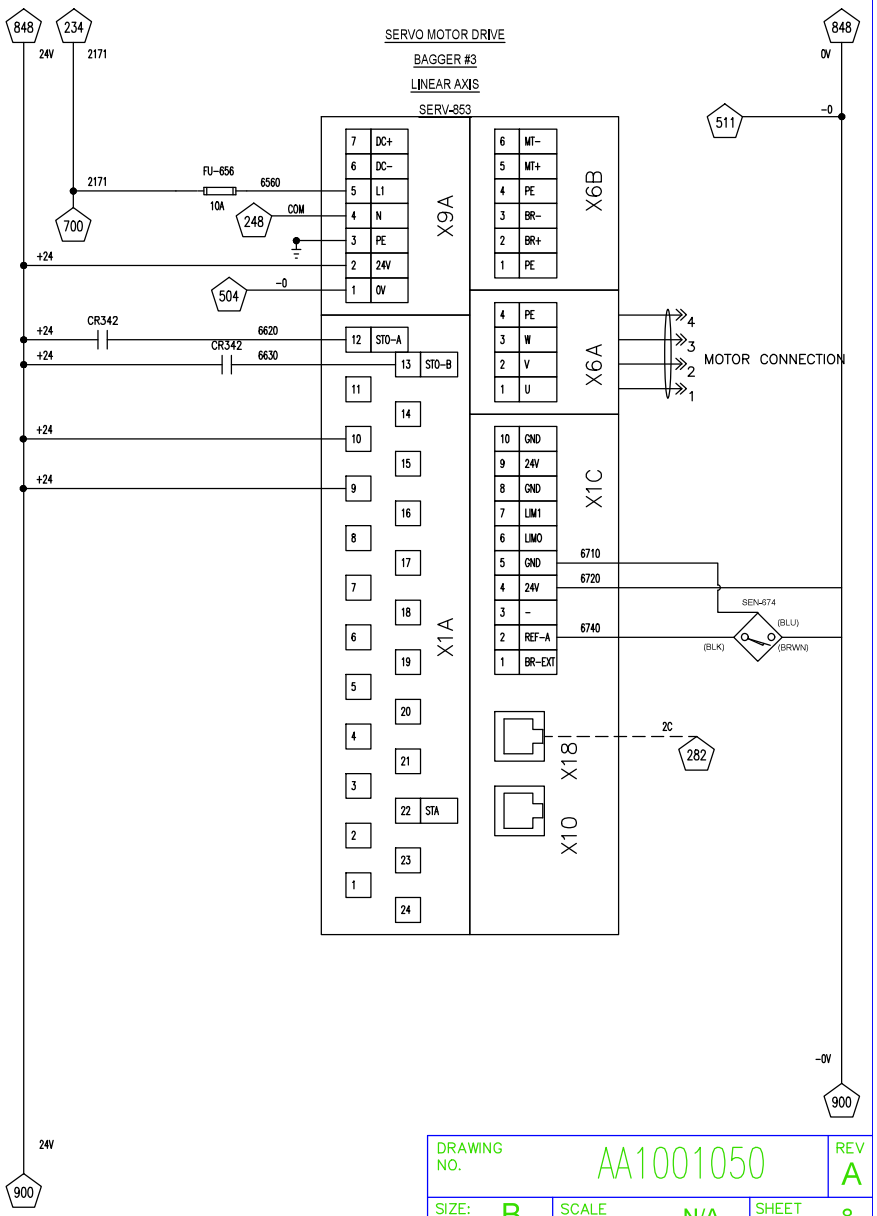
REV	A
SIZE:	B
SCALE	N/A
SHEET	4


SERVO MOTOR DRIVE
BAGGER #1
ROTATION AXIS
SERV-504
X9A
X6B
X6A
X1A
X1C
X18
X10
MOTOR CONNECTION
FU-507
10A
CR338
SEN-525
SERVO MOTOR DRIVE
BAGGER #1
LINEAR AXIS
SERV-553
FU-556
10A
CR338
SEN-573
DRAWING NO.
AA1001050
REV
A
SIZE:
B
SCALE
N/A
SHEET
5

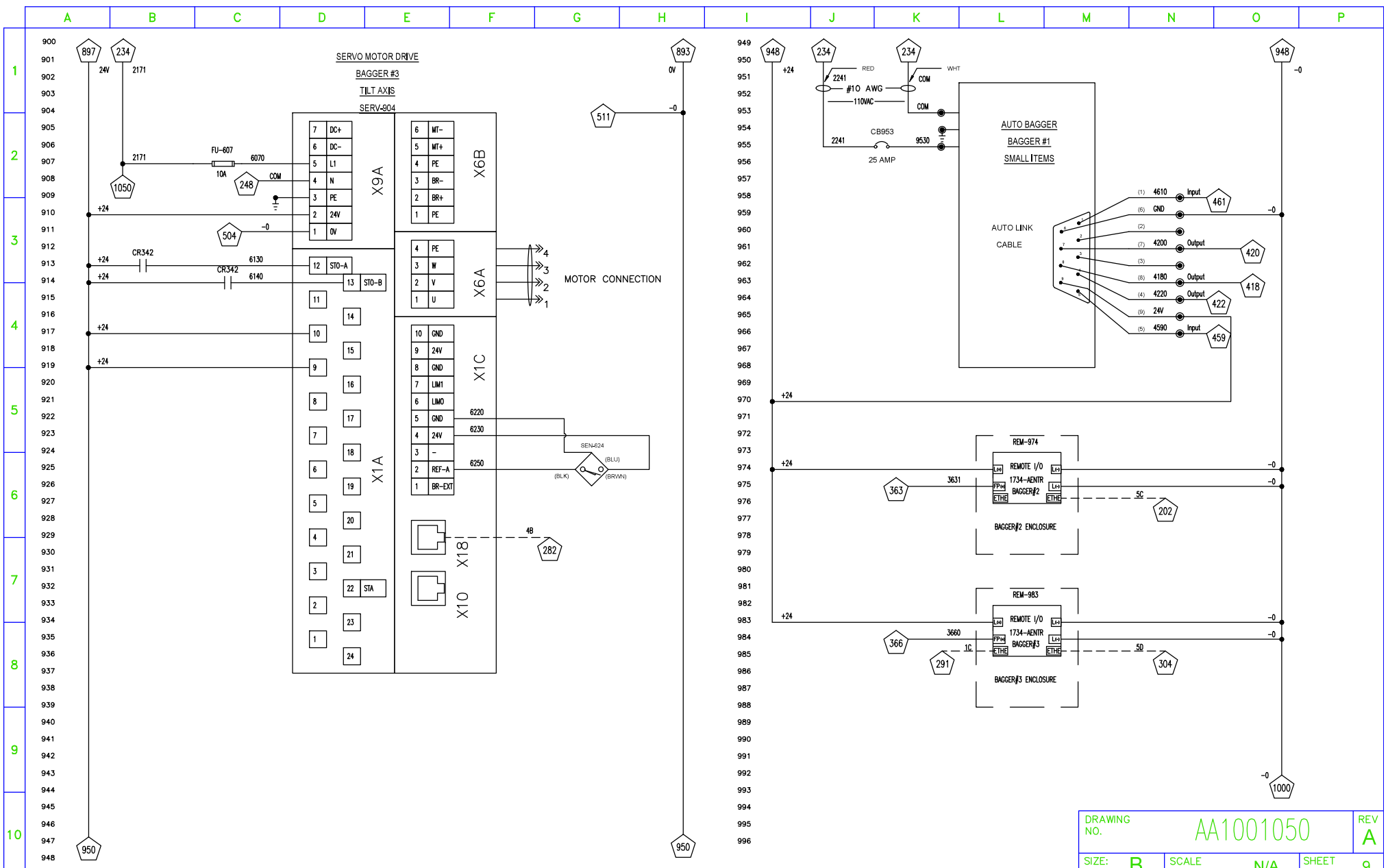

SERVO MOTOR DRIVE
BAGGER #1
TILT AXIS
SERV-604
X9A
X6B
X6A
X1C
X1A
X18
X10
MOTOR CONNECTION
SEN-624
FU-607
10A
CR338
SERV-653
BAGGER #2
ROTATION AXIS
FU-656
CR340
SEN-674
DRAWING NO.
AA1001050
REV
A
SIZE:
B
SCALE
N/A
SHEET
6


SERVO MOTOR DRIVE
BAGGER #2
LINEAR AXIS
SERV-704
SERVO MOTOR DRIVE
BAGGER #2
TILT AXIS
SERV-753
X9A
X6B
X6A
X1C
X1A
X18
X10
MOTOR CONNECTION
SEN-725
SEN-573
(BLU)
(BLK)
(BRWN)
FU-706
FU-756
10A
COM
CR340
+24V
-0V
+24
DC+
DC-
L1
N
PE
24V
0V
MT-
MT+
BR-
BR+
W
V
U
STO-A
STO-B
STA
GND
LIM1
LIMO
REF-A
BR-EXT
DRAWING NO.
AA1001050
REV
A
SIZE:
B
SCALE
N/A
SHEET
7





DRAWING NO.	AA1001050	REV	A
SIZE: B	SCALE N/A	SHEET	8



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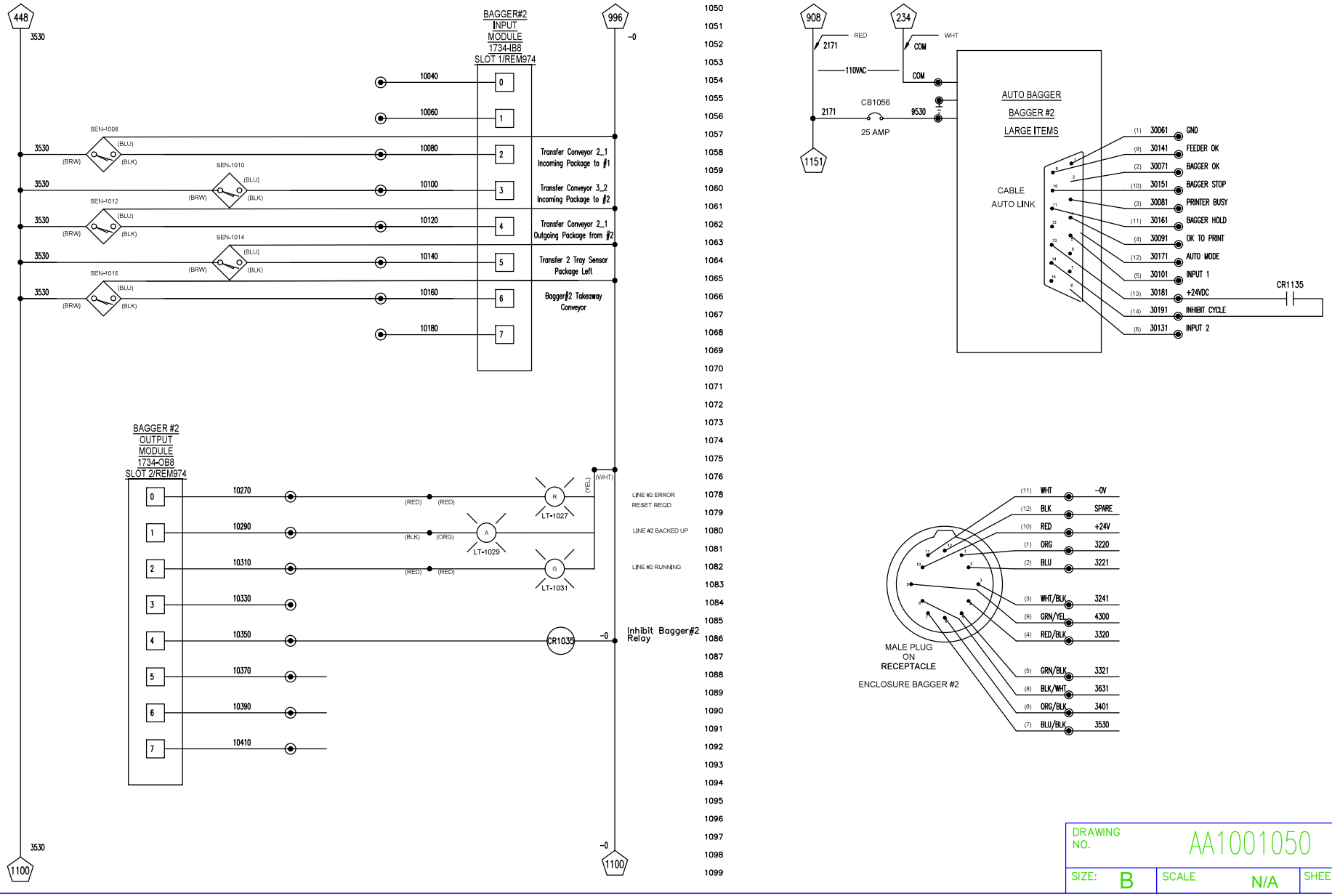
REV	A
SIZE:	B
SCALE	N/A
SHEET	9



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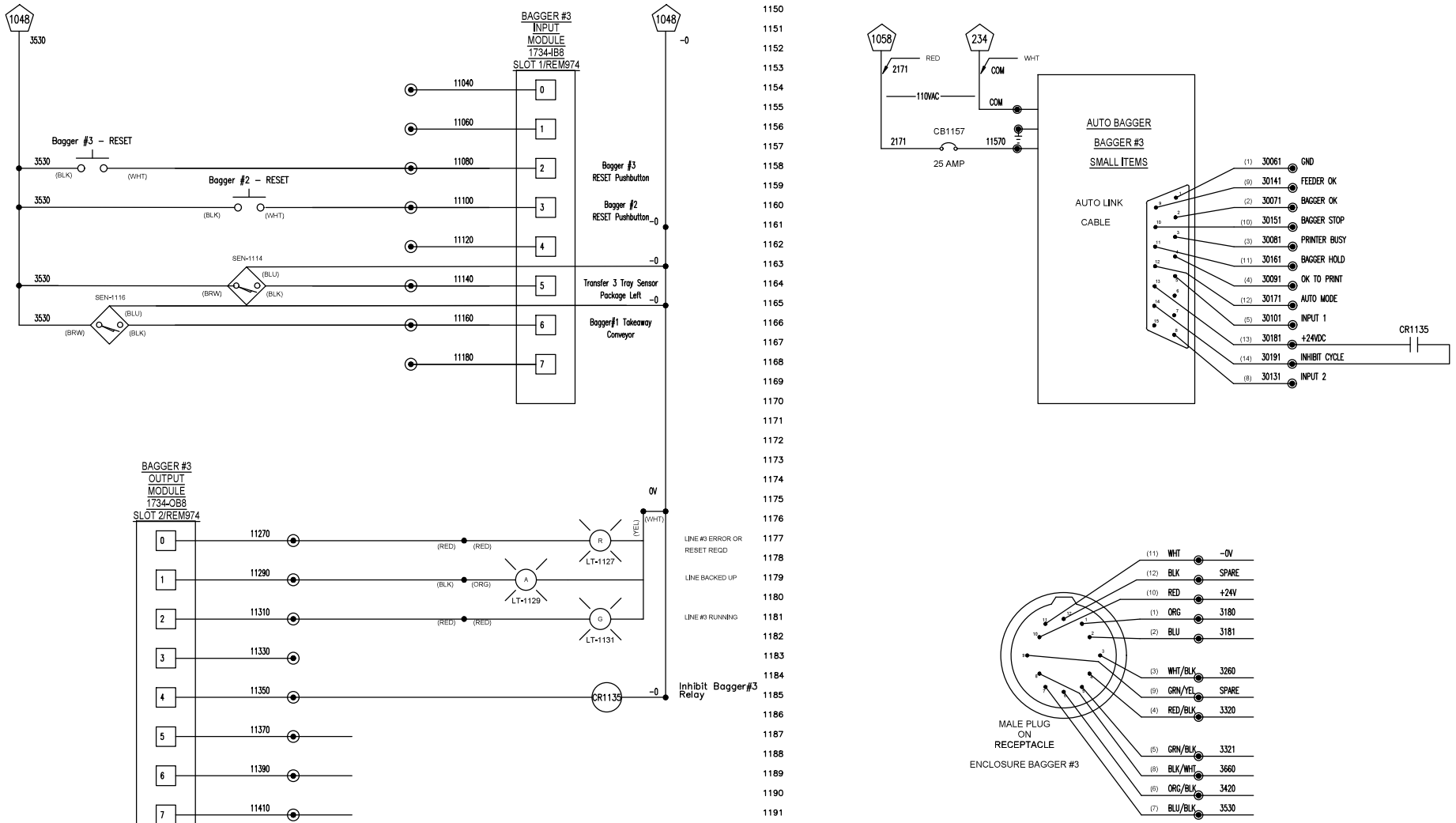
		A
SIZE: B	SCALE N/A	SHEET 10



DRAWING NO.	AA1001050	REV
		A
SIZE: B	SCALE N/A	SHEET 11

APPENDIX

Manuals and Documentation

Vendor	Part No.	Description	Document Name
Allen-Bradley (Rockwell Automation)	520 Series	Variable Frequency Drive (VFD) Manual	520-um001_-en-e
Automated Packaging Systems – (Sealed Air)	Autobag 850S	2D Drawing	850S-Footprint-Drawing-FP2161E-PDF
		User Manual	AB8-UM AB-800™, AB-850s™ User Manual
FESTO	EGC	Actuator Instructions	EGC-TB_EGC-HD-TB_instruction_2019-06d_8110940g1
	EAMM-A	Mounting Assembly Instructions - for EGC	EAMM-A-L_N_-_GH-8_-_Variante_H_2018-03e_8085804g1
	PLE	Gearbox Assembly Instructions - for EGC	Mounting_Instructions_PLE
	EPCC	Actuator Instructions	EPCC-BS_operating-instr_2021-04b_8152507g1
	EAMM-A	Axial Mounting Instructions - for EPCC	EAMM-A-T_-_A_P_R-1_assembly-instr_2021-08e_8157321g1
	EAMM-U	Parallel Mounting Instructions - for EPCC	EAMM-U-_-T_-_A_P_R-2_assembly-instr_2021-08c_8133032g1

	EAHS	Swivel Mounting Instructions - for EPCC	EAHS-P2_assembly-instr_2021-01a_8135704g1
	EMMT	Servomotor Instructions	EMMT-AS_operating-instr_2020-11b_8146164g1
	CMMT	Servo Drive Instructions	CMMT-AS-C2_C4-3A-_-S1_instruction_2019-07b_8113965g1
		Servo Drive Installation	CMMT-AS-C2_C4-3A-_-S1_instruction_2019-07b_8113965g1
		Servo Drive Manual	CMMT-AS-SW_manual_2020-11f_8146068g1
	CDSB	Operator Unit Instructions	CDSB-A1_instruction_2018-06_8088695g1
Keyence	FS Series	Fiberoptic Sensor Manual	AS_93132_FS-N40_UM_731GB_WW_GB_1098_3
	PZ Series	Photoelectric Sensor Manual	AS_124346_PZ-G_IM_96M17098_WW_GB_2111_1
	GC Series	Safety Controller Manual	AS_113215_GC_UM_978GB_WW_GB_2091_3
	GS Series	Locking Door Switch Manual	AS_115994_GS_UM_A73GB_WW_GB_2011_1
Robotunits	C5N Series	Conveyor Instructions Manual	instruction-manual_installation-instructions_belt-conveyor

Recommended Spare Parts List

Vendor	Part No.	Description	Qty.
Allen-Bradley (Rockwell Automation)	520 Series	Variable Frequency Drive (VFD) – for conveyors	1
FESTO	EGC	Linear Axis	1
	PLE	Gearbox for EGC	1
	EPCC-150	Linear Cylinder for Rotation	1
	EPCC-100	Linear Cylinder for Tilt	1
	EMMT	Servomotor linear axis	1
	EMMT	Servomotor rotation axis	1
	EMMT	Servomotor tilt axis	1
	CMMT	Servo Drive Linear/Tilt *	1
		Servo Drive Rotation *	1
	CDSB	Operator Unit	1

	NEKM	Plug Kit for Servo Drive *	1
	NEBM	Servomotor cable, 5m	1
Keyence	PZ Series	Retro-Reflective Photoelectric Sensor *	1
	R Series	Reflector *	1
	FU Series	Fiber unit, Thru-beam *	2
	FS Series	Amplifier *	2
	OP Series	Amplifier Cable, M8 Quick Disc. 5m *	2
	OP Series	Amplifier Cable, M8 Quick Disc. 10m *	1
	GS Series	Locking Door Switch *	1

* NOTE: Items on this list marked with an asterisk * are regarded as higher priority.