SILGAN EQUIPMENT

CSE
Cap Sorting Elevator
Operating Manual

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SILGAN EQUIPMENT

1301 DUGDALE ROAD

WAUKEGAN, IL 60085

847-336-0552

847-336-0562 FAX

WWW.SILGANEQUIPMENT.COM

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1. INTRODUCTION

1.1 Installation

1.1.1 Mechanical Installation

1. Remove the CSE from the crate and visibly check the condition of all parts. Report any damage that may have been caused during shipping, to Silgan Equipment.
2. Check all fasteners that may have loosened during transportation and retighten as necessary.
3. Position the main base of the cap feeder in the general location shown on the layout drawing.
4. Install the leveling feet provided. Be sure to allow adjustment in both directions.
5. Fasten the upper mast section to the lower mast section of the main base using the splice plates provided.
6. Slide the cap discharge conveyor belt over the top pulley. Check for adequate tension. Adjust the tension using the take-up screws at the driven pulley location.
7. Move the hopper bin into position. The two short legs must rest on the foot supports of the cap feeder main frame.
8. Verify the position of the cap feeder per the layout drawing. Level both the cap feeder mast and the hopper bin. Use the leveling feet provided.
9. Connect all cap chutes and air conveyors between the capper and the cap feeder. The capper head and the tele-scopic cap chute (if used) should be positioned at the midpoint of travel for the range of cap sizes to be run. When possible, start at the capper, then work toward the cap feeder. Usually the capper position is a fixed constraint. Therefore allow the cap feeder position to vary slightly to accommodate field inconsistencies. If the cap feeder posi-tion changes, verify that the cap feeder mast and the hopper bin are still level.
10. Weld or bolt clip angles (not provided) to the cap feeder main frame. Anchor to the floor using concrete fasteners (not provided) after step 7 has been completed.
11. Connect the main compressed air supply line (1/2 inch minimum) to the filter-regulator unit on the cap feeder. Adjust the regulator to 90 psi.
12. Remove the vent plug on each belt conveyor gearbox and check the oil level.

12. Check all bearings for proper lubrication. Lubricate as necessary.
13. Check the cap supply and cap sorter belts for adequate tension. Adjust the belts using the take up screws necessary.
14. Check the timing belts for adequate tension and proper alignment. Adjust the tension using the belt tensioner with idler bearing as necessary.
15. Connect the 230VAC or 460VAC power supply to the main disconnect feed in the control panel. Perform field wiring, referencing the electrical schematic included with the equipment and also the Electrical Installation section of this manual.
16. Turn the main disconnect switch to the on position. Verify that the control panel has power.
17. Turn the hopper control and the speed control selector switches to the manual position.
18. Turn the speed potentiometer to the fully counter-clockwise position (zero speed). Verify that the emergency stop button is not engaged. Press the hopper start button.
19. While running at its slow speed, verify the direction of each belt travel. If any of the belts are running the wrong direction, change the polarity of the motor. Verify the belt travel direction again *(Figure 1-1)*.
20. While running, check the tracking of each belt. Verify each belt is centered on its tension pulleys. Adjust as necessary.
21. Perform necessary adjustments for the caps *(Section 2)*.

1. INTRODUCTION

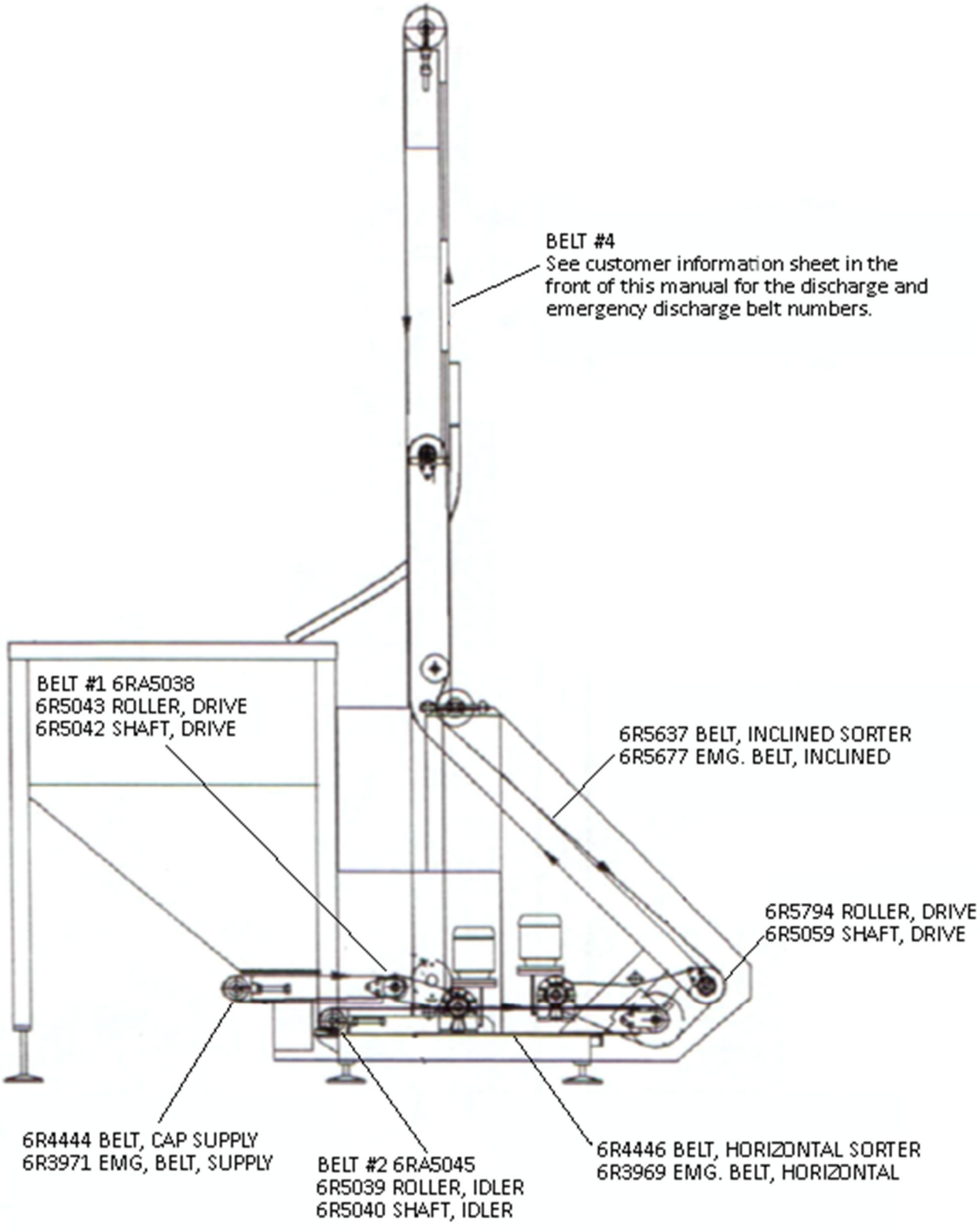

Figure 1-1: Belt Locations

1.1.2 Electrical Installation

For clarification of installation issues, refer to the electrical schematic supplied with the equipment. The drawing number appears on the nameplate on the inside of the control panel door.

1.2 Interface

1.2.1 Emergency Stop Interface

If required, connect emergency stop contacts from other machines or locations between terminals 011 and 012. If not used, install jumpers between terminals. If required, connect emergency stop circuit from other machines or equipment between terminals El and E2.

1.2.2 Capper Interface

Where required, connect terminals Cl and C2 to the capper circuit to provide the capper with a contact closure signal when the hopper is on/armed. Corresponding terminals on the following cappers are: WC500, and WC600 terminals 24V to H12.

To provide remote start of the cap feeder from the capper pushbutton station, connect feeder terminals H1 and H2 to the normally open pushbutton contact on the capper. On the WC500 and WC600 cappers, this corresponds to terminals H1 and H2 on the capper.

To provide remote stop of the cap feeder from the capper pushbutton station, connect feeder terminals H3 and H4 to the normally closed pushbutton contact on the capper. On the WC500 and WC600 cappers, this corresponds to terminals H3 and H4 on the capper.

1.3 Air Conveyors

The cap feeder has the capability to operate any number from one to six optional air conveyor blower motors when used at 460V. Each motor must be rated at no more than 3 HP and must have its own manual motor starter/overload unit. The manual motor starter/overload unit must be rated for group motor installations, such as Allen Bradley series 140M or 140MT motor protector.

If used at 460V, connect from one to three air conveyor motors across 4TI, 4T2, 4T3, and connect another one to three air conveyor motors across 5T1, 5T2, and 5T3.

1. INTRODUCTION

CS4 must be open if password protection is not used on the HMI screen. Close the switch to require the password before any of the screen adjustment parameters can be changed. The factory setup is to login as user **TECH** with the password **1qaz**. The password can be changed by the user, as long as the old password is known.

CS5 should only be closed if the CSE is ethernet connected to the WC600 capper, and where capper status would be displayed on the hopper HMI.

CS6 should only be closed if a non-standard retroreflective optical sensor (with reflector) is provided for the hopper bin level (PS1). Keep CS6 open when the standard diffuse reflective sensor is used.

Connect auxiliary contacts from the motor overloads to wires 24V and 111, and also 24V and 112.

If the auxiliary contacts are open in the tripped condition, set configuration switch CS3 to the open (off) position. If the auxiliary contacts are closed in the tripped condition, they must be connected in parallel instead of in series, and set configuration switch CS3 to the closed (on) position.

1.4 Cap Chute Level Sensors

Mount the chute level control (prox5) sensor to the cap chute, and connect to cable 206. This sensor should be positioned at least a few feet before the capper's cap runout sensor. The precise position will vary due to the cap chute layout, cap types, and running speed of the line.

Mount the chute level backup (prox4) sensor to the cap chute, and connect to cable 205. This sensor should be positioned typically a few feet before the chute level control sensor. The precise position may vary due to the cap chute layout, cap types, and running speed of line.

1.5 Cap Feeder Bin Auto Fill Control

The cap feeder control circuit provides an isolated contact closure. It can be used to control a bulk cap conveyor to automatically deliver caps to the cap feeder supply bin. If this function is used, connect conveyor control circuit to terminals Y1 and Y2. Also, close configuration switch CS1 to enable this function.

1.6 Control Panel Configuration Switches

Configuration switches CS1 through CS6 are knife-switch type terminal blocks which the user must place in the proper position for the intended operation of the cap feeder. With the center lever pushed in, switch is closed. With the center lever pulled out, switch is open.

CS1 must be open if cap feeder bin will be fed manually and must be closed if bin will be fed automatically by a bulk cap delivery conveyor.

CS3 must normally be open when auxiliary contacts for air conveyors are "open when tripped." This is the normal position. If only "closed when tripped" auxiliary contacts are available, connect them in parallel instead of series and close switch CS3.

CS2 is a spare, and may be allocated a use in the future.

2. SETUP

2.1 Set-Up

The cap feeder setup instructions should be followed every time there is a change in the cap size.

2.1.1 Sorter O-Ring

Caps may end up stacked on each other. These stacked caps may also be known as 'piggybacked' or 'shingled' caps. The sorter o-ring prevents this from happening. Any stacked caps are kept from traveling up the incline belt to the accumulator area. The counterweight should be adjusted so stacked caps will push through the o-ring.

Too much counterweight will cause stacked caps to stop in front of the sorter o-ring. They will block a portion of the belt preventing other caps from passing. Too little counterweight will allow stacked caps to travel through the sorter o-ring creating the opportunity for jams to occur downstream.

2.1.2 Sorter Flap

The sorter flap is used to detect stacked caps prior to entering the accumulator area. Adjust the counterweight so that stacked caps will push through the sorter flap and actuate the proximity sensor. Too much counterweight will prevent the stacked caps from actuating the proximity sensor.

2.1.3 Accumulator

The cover of the accumulator must be adjusted from the inside wall to accommodate different size cap heights. Using the four adjustment knobs allow for 3/16" clearance between the cover and the inner wall of the accumulator for the cap to be run.

2.1.4 Accumulator Cap Diverter Arm

The cap diverter arm prevents side by side caps from traveling up the discharge belt at the same time. The diverter arm should be adjusted until it sweeps the inner caps back into the accumulator while allowing the outer caps to travel up the discharge belt in a single row. Typically 1/8" of clearance between the diverter arm and the accumulator cover side wall is sufficient.

2.1.5 Discharge Belt

Tension adjustments to the discharge belt may be required. In the event of an increased load on the discharge belt, or running larger cap sizes, the discharge belt could slip. This occurs when there are continual overfills in the accumulator area. Adjust the belt tension using the take-up screws located at the top of the cap feeder mast.

2.1.6 Upside Down Cap (Blow-Off Reject)

Position the cap along the discharge belt. Ensure it lines up with the blow off centerline intersection. Adjust the air tube nozzle 1/4" away from the cap *(Figure 2-1)*. While running, the cap position will slightly vary from the discharge belt centerline.

Ensure the caps do not hit the air tube nozzle. Adjust the proximity sensor to approximately 1/8" from the top of the cap. Place two caps right side up in line with each other and directly underneath the proximity sensor. If the caps have lugs, orient the caps so that the lugs are directly underneath the sensor. Adjust the sensor away from the caps so that the two lugs are not seen by the sensor. Ensure the adjustment can allow the sensor to see the panel of an upside down cap. Locate the center of the proximity sensor approximately 2" upstream from the centerline of the blow off.

Turn on the conveyor belts. Switch the speed to manual. Switch the speed potentiometer to maximum. Verify that an upside down cap will reliably be blown off the discharge belt. Adjust the sensor position as needed. Turn the speed potentiometer down to minimum. Verify that any upside down caps are reliably blown off the discharge belt.

2.1.7 Cap Chutes and Air Conveyors

Some system may have adjustable cap chutes and air conveyors. It may be necessary to adjust these items according to cap size.

2. SETUP

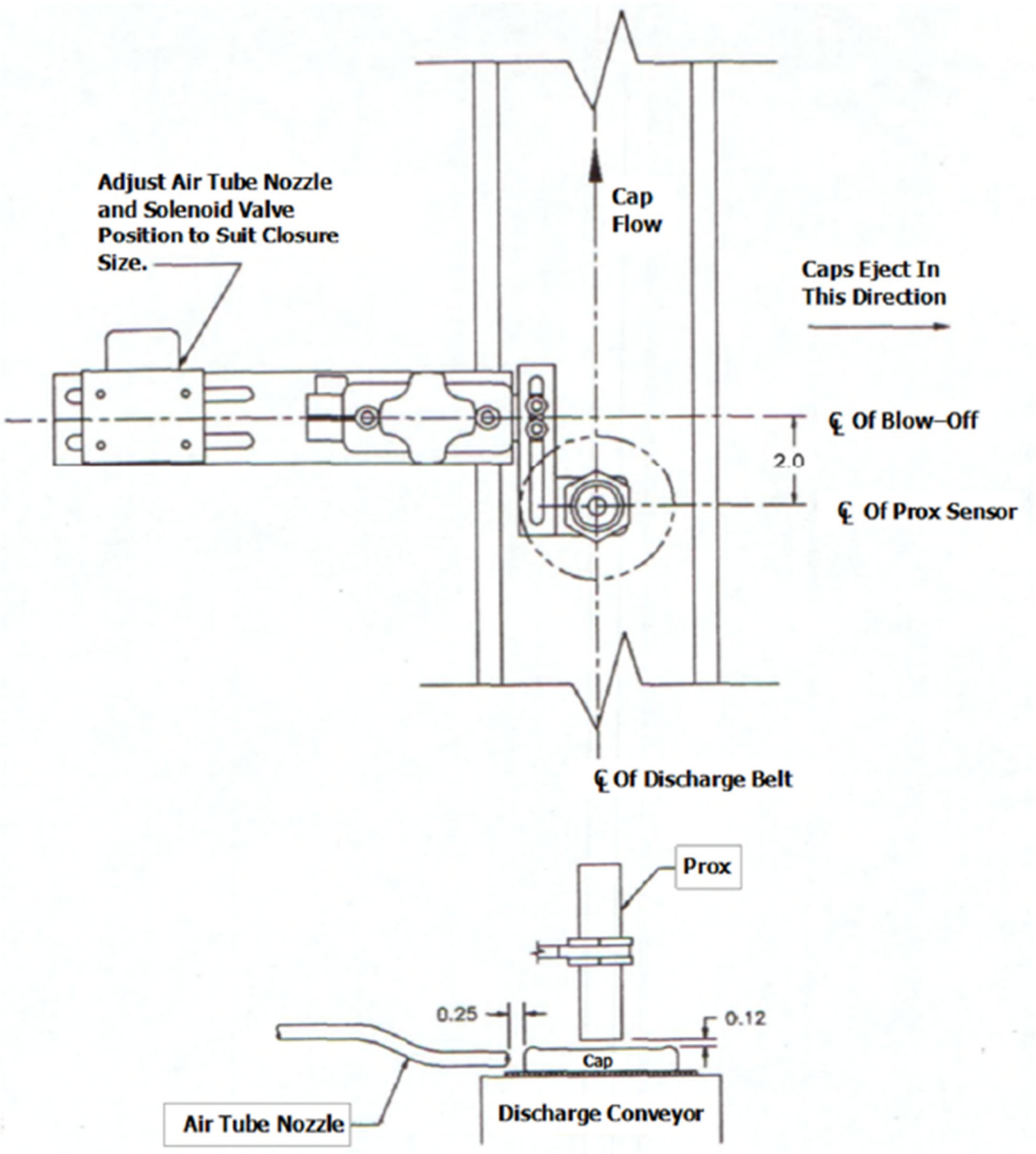

Figure 2-1: Discharge Belt and Blow Off

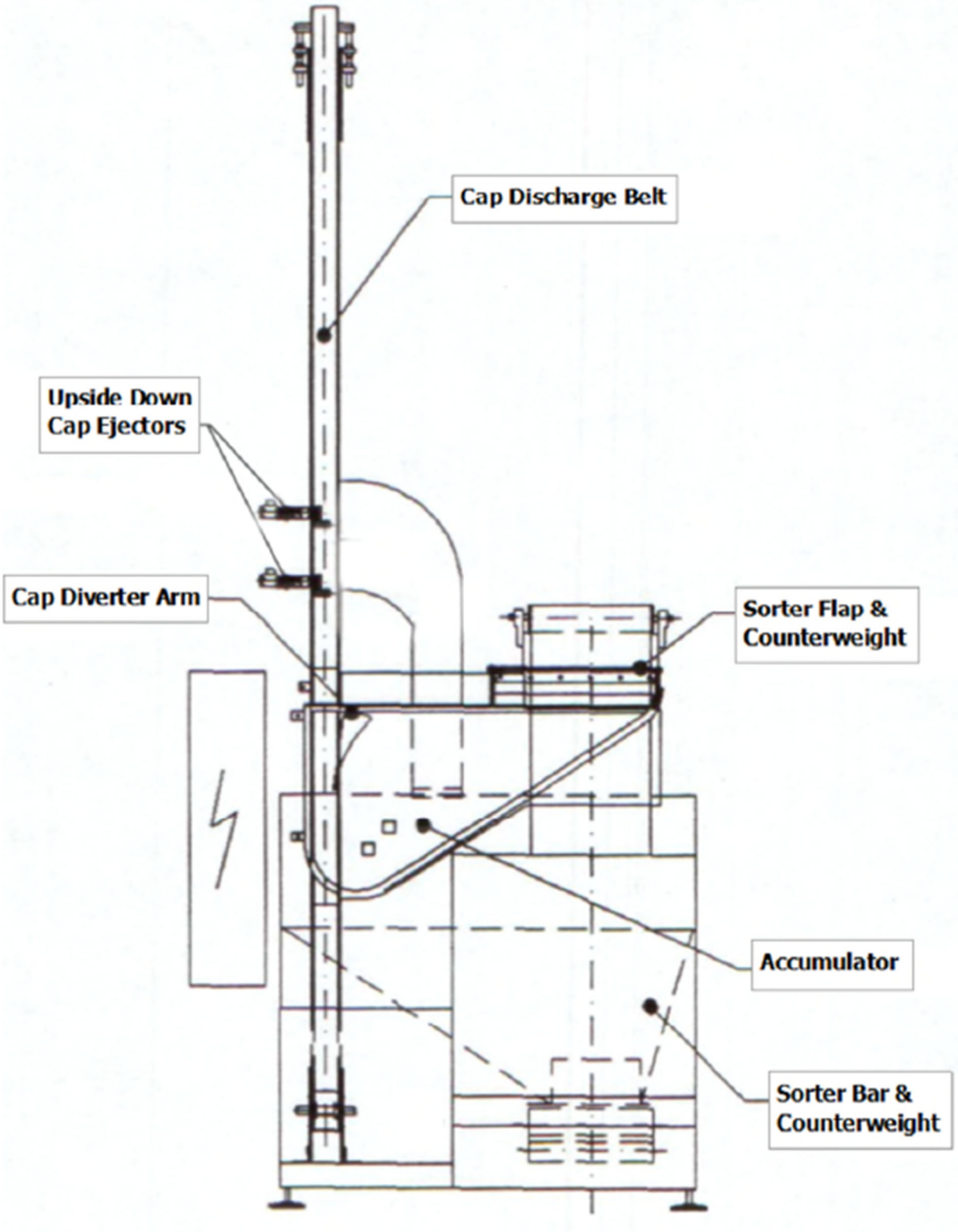

Figure 2-2: Device Locations

3. OPERATION

3.1 Control Operation

3.1.1 Safety

Lockable Main Power Switch: When in the off position, all voltage is removed from the control panel. In compliance with OSHA regulations, lockout this switch when servicing the cap feeder.

Emergency Stop: When pressed, all motors and controlling circuits are de-energized. This button stops the cap feeder immediately, but does not replace the function of the lockable disconnect switch.

3.1.2 Stack Light

Ready Light: This lights when AC motor drives are powered and ready to start. This also indicates no other fault conditions are present.

Fault Light: This lights when a fault condition has occurred. Fault conditions may or may not stop the cap feeder from running.

Yellow Beacon Light: On manually filled hopper bins, this flashing light indicates the supply bin is low. A manual bin refill is required. On automatically filled hopper bins, this flashing light also indicates the supply bin is low. This is usually due to the in-feed conveyer failing to refill the bin in an appropriate amount of time.

3.1.3 Hopper Controls

Hopper Start Button: This button places the cap feeder in an armed state. Conveyor belts can be turned on and off according to the conditions of their controlling sensors and operating logic. A green light will be lit when the cap feeder is in an armed state. The light will flash when armed and when either the discharge or sorter belts are not running.

Hopper Stop Button: This button stops the cap feeder and removes it from the armed state. The operation will not resume until the hopper start button is pressed.

Speed Control Potentiometer: This adjusts the speed of the discharge and sorter conveyor belts. This only does this in manual speed control mode. Adjust clockwise to increase speed.

Speed Control Manual/Auto/Initialize Selector Switch: When in the auto position, the discharge and the sorter conveyor belt speeds will automatically vary. They will match the cap feeder delivery rate to the capper's capping rate. The speed of the discharge belt is governed by the chute level control sensor. It is also controlled by the chute level backup sensor. The speed of the sorter belt is governed by the accumulator control sensors A and B. It is also controlled by the speed status of the discharge belt.

When in manual position, speeds of the discharge and sorter belts are controlled by the speed control potentiometer. The speed will not automatically vary.

When in the Initialize position, the current speeds of the discharge and sorter motors are set to their maximums. This function will typically only be used at the start of a new run when a different type of cap is run. This function will also be used when the production speed has been increased significantly. The maximum motor speeds will prevent the possibility of the capper running out of caps. The auto speed functions of the hopper adjust the two motor speeds down to their optimal running conditions.

Hopper Control Manual/Auto Selector Switch: When in the auto position, the discharge belt will automatically turn on or off. This is in response to the state of the chute level backup sensor. This governs the cap fill level of the cap chute. When in the manual position, the discharge belt will run regardless of the state of the chute level backup sensor.

Note: Manual mode is provided for purposes of running the belts in a setup situation only.

3. OPERATION

3.2 Operational Logic

3.2.1 Air Conveyors

Air conveyors will run whenever the hopper is in its armed state. The hopper start light will be lit or flashing green.

3.2.2 Discharge Conveyor

In the auto position, the discharge belt will run. It will continue to run until the backup sensor *(prox4)* identifies a cap backup. When the backup clears, the discharge belt will resume running. Also in the auto position, the speed of the discharge belt is governed by the chute level control and backup sensors *(prox4 and prox5)*.

In the manual position, the discharge belt will run regardless of the sensor's *(prox4)* state. Also in the manual position, the speed of the discharge belt is controlled by the manual speed potentiometer. At the maximum setting, full clockwise rotation, the potentiometer runs the AC drive VFD3 at its programmed maximum hertz.

Condition	Response
Control sensor identifies a cap backup but the backup sensor does not.	This is a good running condition. No adjustments to base speed are performed.
Backup identifies a cap backup.	Cap backup length in the chute is too long. The discharge belt is running too fast. Action 1) An incremental reduction is made to the base speed. Action 2) The discharge belt stops immediately to avoid overfilling the cap chute. When a cap backup at the backup sensor ceases, the discharge belt will resume running at its newly adjusted base speed. Action 3) If a solid cap backup is seen at the backup sensor for a long period of time, the container flow through the capper has been interrupted. The adjustment to base speed is cancelled.
Control sensor ceases to identify cap backups	Cap backup length in the chute is too short. The discharge belt is running too slow. Action 1) An incremental increase is made to the base speed. Action 2) The discharge belt speed ramps up beyond the base speed level in an attempt to replenish the cap supply quickly. When the control sensor again sees a solid cap backup, the discharge belt will return to the new base speed.

Table 3-1: Discharge Conveyor Cap Backup Behavior

3. OPERATION

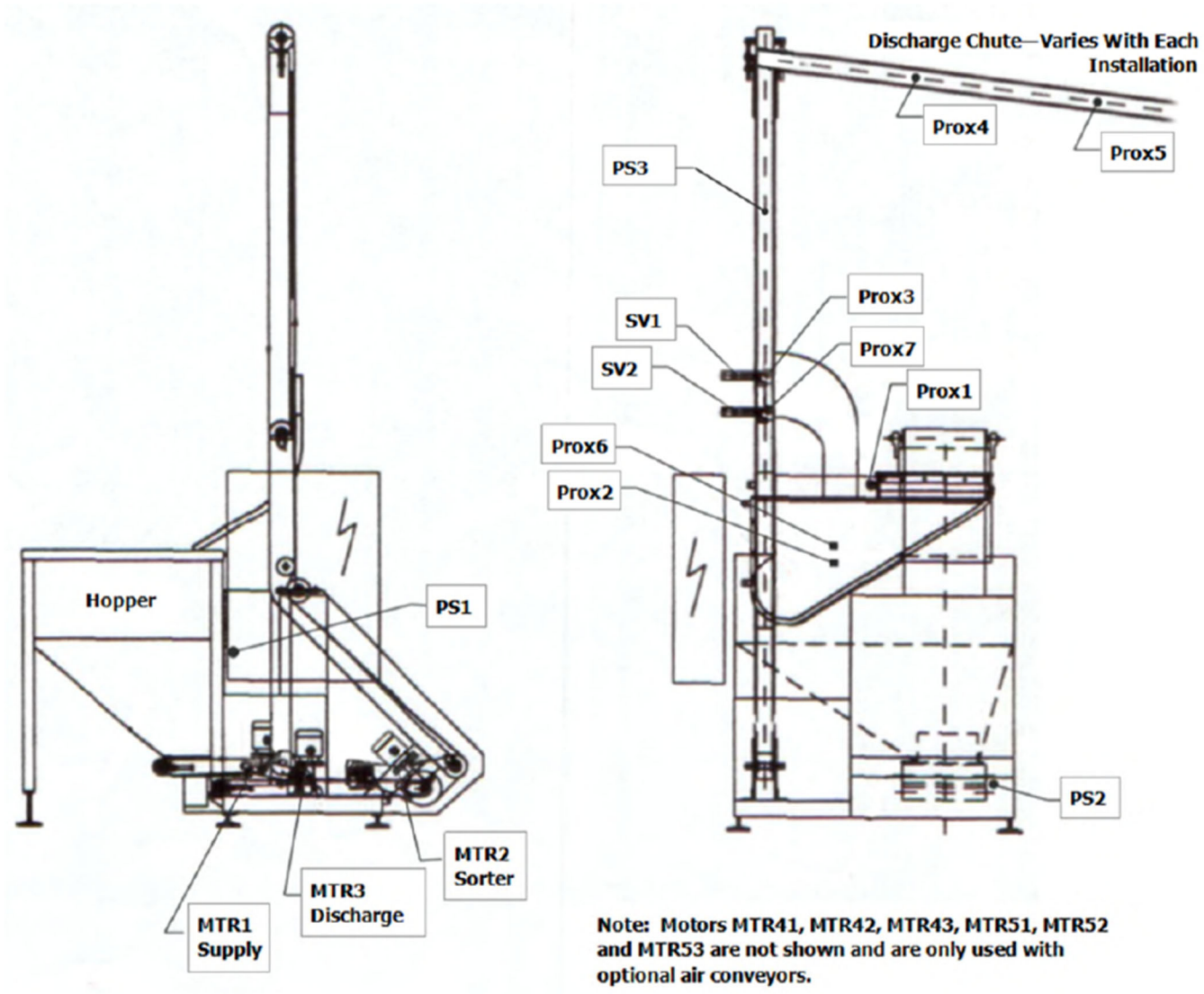

Figure 3-2: Electrical Device Locations

3.2.3 Sorter Conveyor

When the speed control switch is in the manual position, the speed of the sorter belt is controlled by the manual speed potentiometer. The sorter belt will run at a percentage of the discharge belt speed. This percentage is a parameter that is adjustable from the display screen on the pushbutton box. To change this value, sequence through the display screens until ***Manual Speed Sorter to Discharge Ratio*** is displayed. Use the up and down arrows to adjust the value.

When the speed control switch is in the auto position, the speed of the sorter belt is governed by three sensor conditions. The governing sensors are, **PROX2**, **PROX6**, and **PS3**. The sorter belt always runs at a ratio of the speed of the discharge belt. That ratio is increased or decreased according to the cap flow conditions sensed at the three sensors.

3.2.4 PROX2

PROX2 is the lower sensor in the accumulator table. A logic algorithm accumulates a measurement of the number of caps passing within a continuously shifting window of the previous five seconds. The sorter belt speed is then increased or decreased in an attempt to maintain the measured value within an optimum range. If **PROX2** sees a solid cap backup, too many caps have accumulated in the accumulator. The sorter belt stops and the base speed decreases. When the backup ceases, the sorter belt will resume moving at its newly adjusted base speed.

3.2.5 PROX6

PROX6 is the upper sensor in the accumulator table. It detects cap backup conditions in the event backed up caps position themselves around the face of **PROX2** but are not actually detected. When **PROX6** detects a solid cap backup, the reaction is the same as with **PROX2** above.

3.2.6 PS3

If the discharge belt is not traveling fast enough, poor cap flow and jams may result. As caps travel up the discharge belt, **PS3** detects when they are not spaced, or are packed together. When a lack of cap spacing is detected, the sorter belt speed is decreased. If the condition persists after several seconds, the sorter belt is decreased further. This process is repeated until **PS3** detects proper cap spacing.

Note: The goal is to match the rate of cap delivery from the feeder to the average container throughput of the capper. The cap feeder belt speeds will likely oscillate around some nominal values. These continual changes in speed are appropriate due to the random nature of cap delivery from the cap feeder. These speed changes are not detrimental to the mechanical or electrical systems.

The display screen displays two auto speed control parameters; the auto speed sorter cap level, and the discharge and sorter belt speeds. This value represents a relative measurement of the number of caps present in the accumulator.

The auto speed sorter cap level set point is displayed and is adjustable. When the cap level exceeds the set point, the sorter base speed is incrementally reduced. To adjust the auto speed sorter cap level set point, use the up and down arrows.

3.2.7 Cap Supply Conveyor

The cap supply conveyor will turn on and deliver caps from the bin to the sorter belt. This occurs when a low level of caps is detected by the supply belt control photo sensor **PS2**. The cap supply belt will turn off about two seconds after the photo sensor **PS2** detects an accumulation of caps.

3.2.8 Upside Down Cap Ejector

The blow off operates when the proximity sensors **PROX3** or **PROX7** energizes. These are triggered by the panel of an upside down cap passing under the sensor. The blow off will only operate when the discharge belt is running. This prevents the possibility of the blow off remaining engaged if an upside down cap is stopped under the sensor *(Figure 2-2)*.

3. OPERATION

3.3 HMI Screen Controls

3.3.1 Main Screens

There are two versions of the **Main Screen**, one for use while in **Manual Mode**, and another for use while in **Auto Speed** mode. The screen corresponding to the mode currently selected will normally display automatically. But you can use the **Menu** screen to manually display either screen.

The **Manual Speed Control** main screen displays the two settings governing the speeds of the **Sorter** and **Discharge** belt motors *(Figure 3-3)*.

Manual Speed POT: This setting displays the setting from the potentiometer, from 12 to 100. Both **Sorter** and **Discharge** belts will increase and decrease speeds according to the setting of this potentiometer.

Sorter/ Discharge Speed Ratio: This governs the speed of the **Sorter** belt motor, proportional to the **Discharge** belt motor speed. It is changed manually on the HMI screen, and usually falls somewhere between 30% and 50%.

The pictorial diagram to the right on the screen shows the cap flow status on the air conveyor, as read by the sensors **PROX4** (backup sensor) and **PROX5** (control sensor) *(Figure 3-3)*. The direction of cap flow is shown by the arrow. The small sensor rectangles turn yellow when they sense a solid signal (no pulsing) indicating caps are backed up to that sensor.

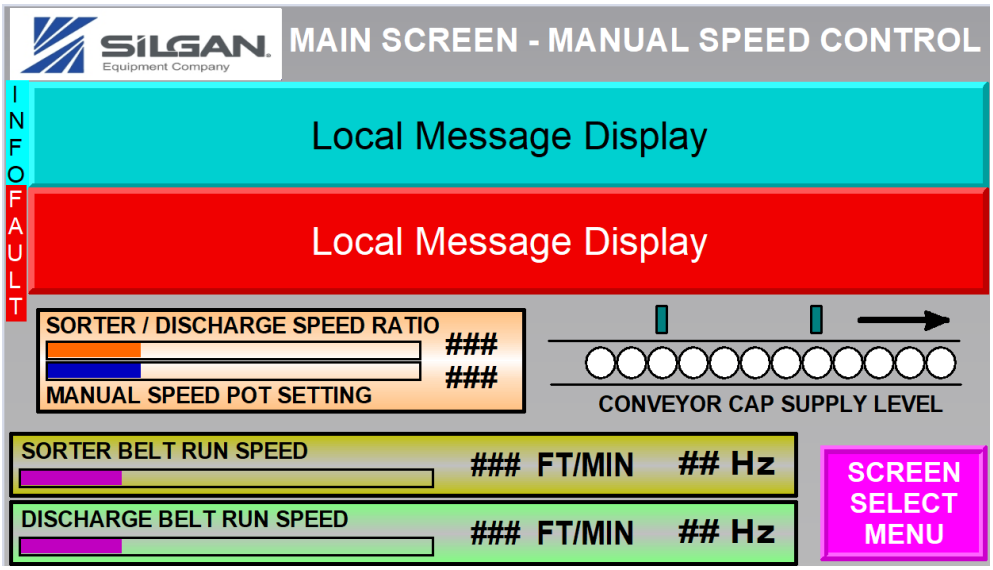

Figure 3-3: Manual Speed Control

3. OPERATION

The **Auto Speed Control** main screen displays the four parameters governing the speeds of the **Sorter** and **Discharge** belt motors *(Figure 3-4)*.

Actual Sorter Cap Level: This displays a value from 0 to about 30, representing the amount of caps travelling through the accumulating table, measured by lower sensor **PROX2**.

Sorter Cap Level Setpoint: This is compared against the **Cap Level** to increase or decrease the **Delivery Ratio**, which is the speed of the **Sorter** belt motor, proportional to the **Discharge** belt motor speed. The **Sorter Cap Level Setpoint** is changed manually on the HMI screen between the range of 6 to 30.

Base Speed: This displays from 12 to 100%, and represents the belt speeds of both **Discharge** and **Sorter**, consequently regulating the cap output.

Delivery Ratio: This is the sorter / discharge speed ratio, operating in the **Auto Speed** mode. This ratio increases or decreases in response to the **Sorter Cap Level**, comparing to the **Cap Level Setpoint**.

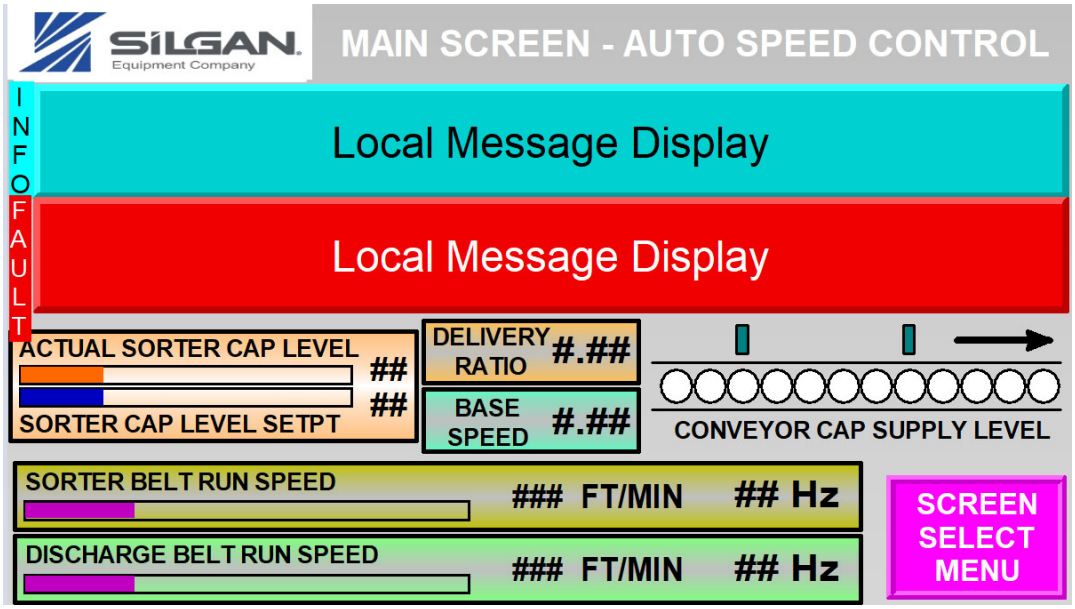

Figure 3-4: Auto Speed Control

3.3.2 Main Menu

The main **Menu** screen to either view, or view and change parameters that can be set to optimize cap delivery. This screenshot shows when password protection is selected. If password protection is not selected, the screen is simplified to indicate no login requirements.

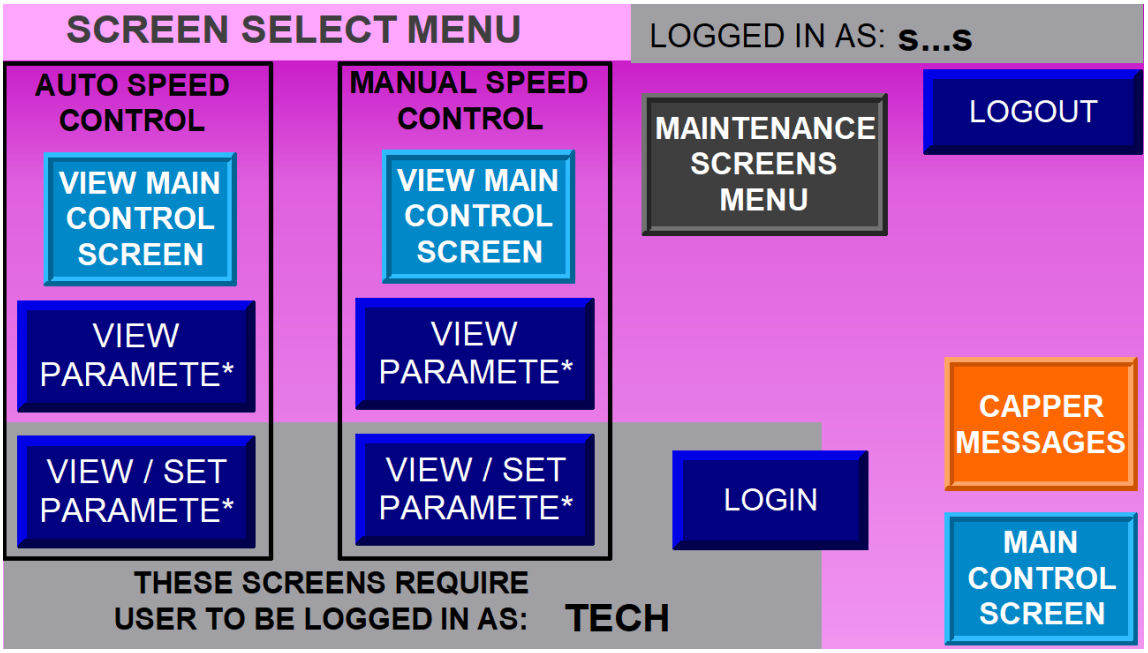

Figure 3-5: Main Menu With Password Protection

3.3.3 Manual Sorter / Discharge Ratio

Pressing the **View / Set Parameters** button under **Manual Speed Control** takes you to this next screen. This is the only adjustable parameter pertaining to the **Manual Speed Control** mode. Increase this ratio to increase cap delivery out of the hopper without increasing the **Discharge** belt speed. Decrease this ratio if too many caps are piling into the accumulator table and either causing the SORTER belt to stop because of backups in the accumulator table, or causing jams in the accumulator table due to too many caps entering the table, and not exiting fast enough.

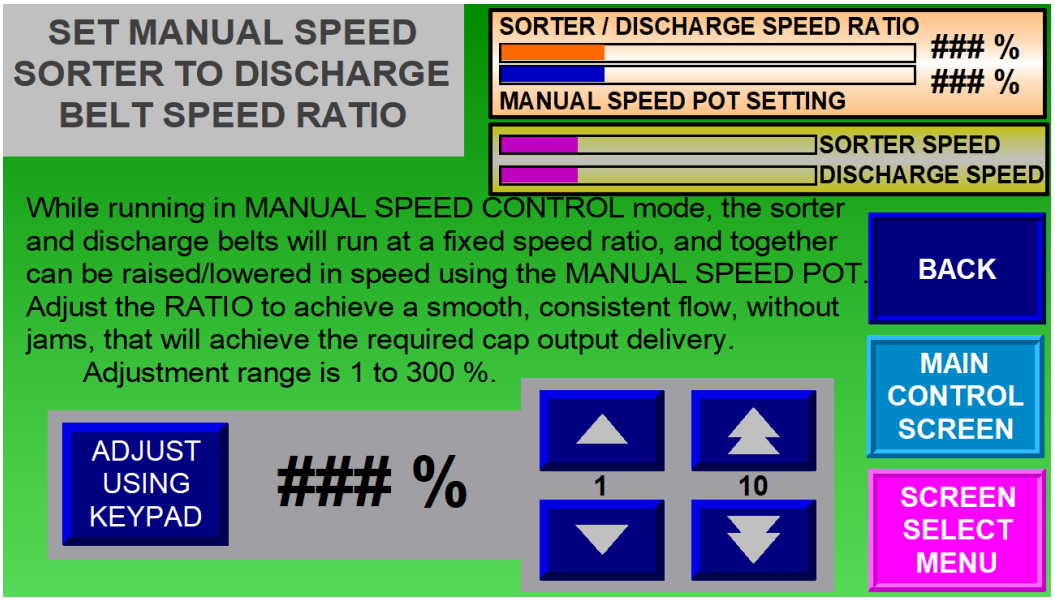

Figure 3-6: Manual Sorter / Discharge Ratio

3.3.4 Auto Sorter Cap Level Setpoint

Pressing the **View / Set Parameters** button under **Auto Speed Control** takes you to this next screen. This is the first of three adjustable parameters pertaining to the **Auto Speed Control** mode. From this screen, press **Next** to advance through the remaining parameters.

This level setpoint governs the speed of the **Sorter** in relation to the **Discharge**. Increase this level setpoint to increase cap delivery out of the hopper without increasing the **Discharge** belt speed. Decrease this level setpoint if too many caps are piling into the accumulator table and either causing the **Sorter** belt to stop because of backups in the accumulator table, or causing jams in the accumulator table due to too many caps entering the table, and not exiting fast enough.

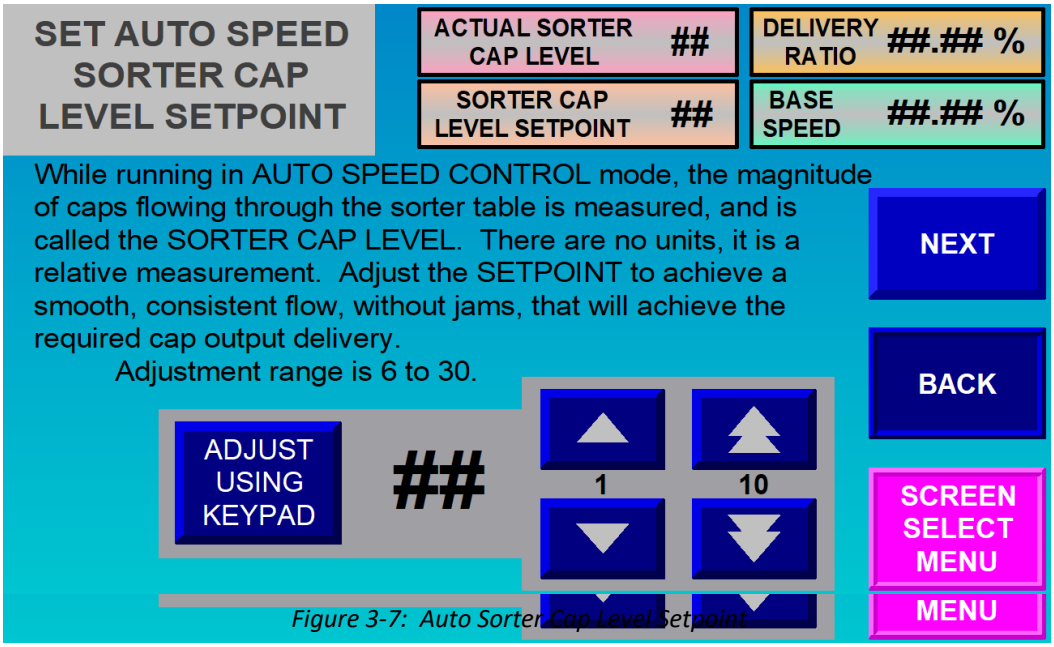

Figure 3-7: Auto Sorter Cap Level Setpoint

3.3.5 Auto Base Discharge Speed High Limit

This puts a high limit on the value of the **Base Speed**, which governs the speeds of both **Sorter** and **Discharge** motors. Typically, this value should be set to 100%. If cap handling problem, like jams happen when the **Base Speed** is at its highest values, the highest belt speeds can be limited to a reduced maximum by lowering this limit. If the capper runs out of caps too often, you may have this limit set too low.

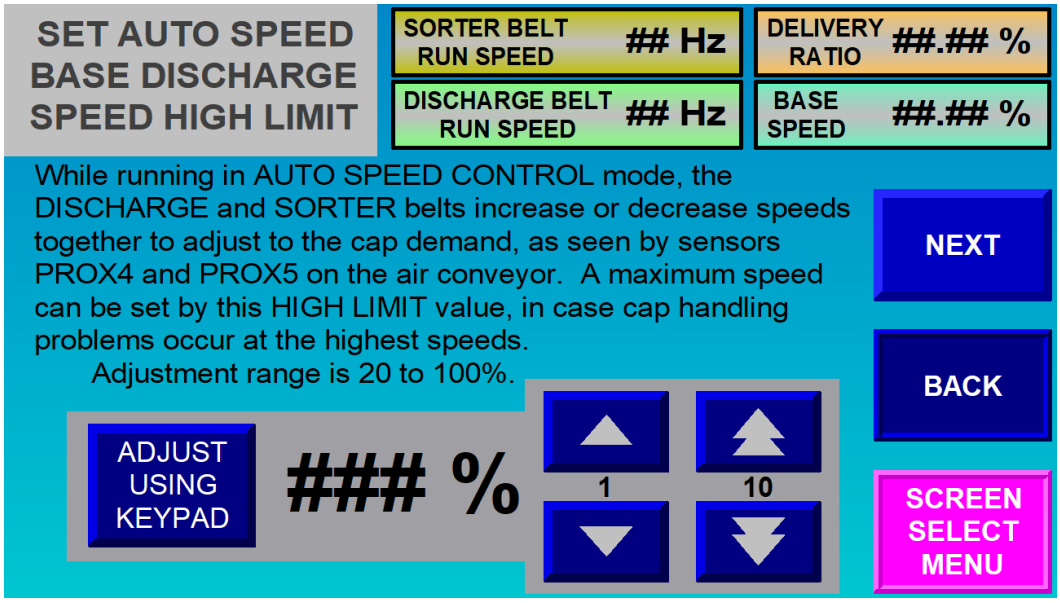

Figure 3-8: Auto Base Discharge Speed High Limit

3.3.6 Auto Delivery Ratio High Limit

This puts a high limit on the value of the **Delivery Ratio**, which governs the speed of the **Sorter** motor, in relation to the **Discharge** motor. If cap handling problems, like jams or shingled caps happen on the **Sorter** belt when the **Delivery Ratio** is at its highest values, the highest belt speeds can be limited to a reduced maximum by lowering this limit. If the capper runs out of caps too often, you may have this limit set too low.

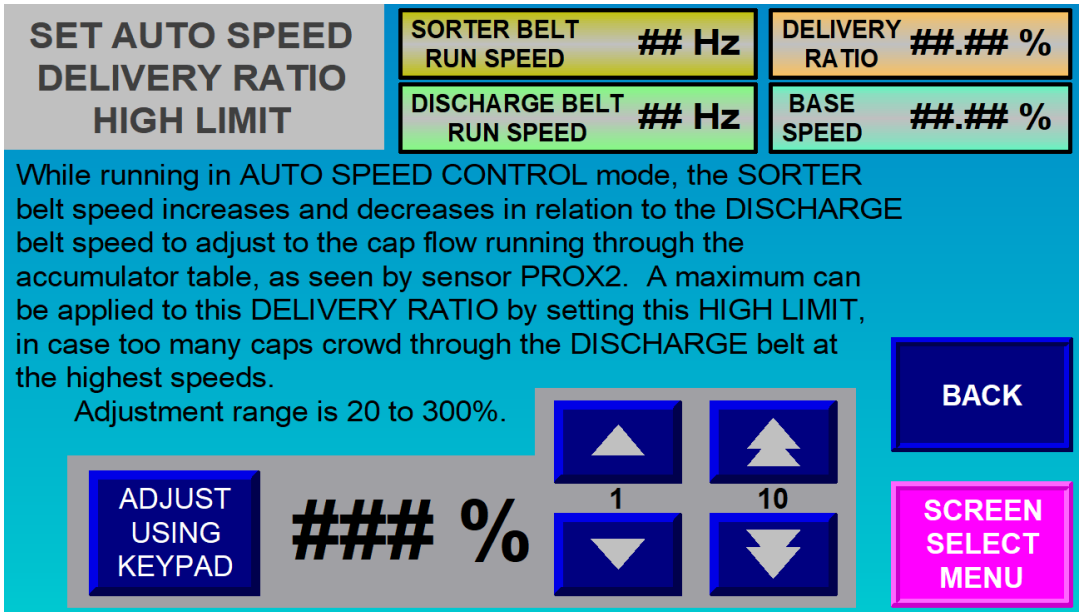

Figure 3-9: Auto Delivery Ratio High Limit

3.3.7 Maintenance Menu

This screen can be selected from the Main Menu. Special functions and advanced features are selected here.

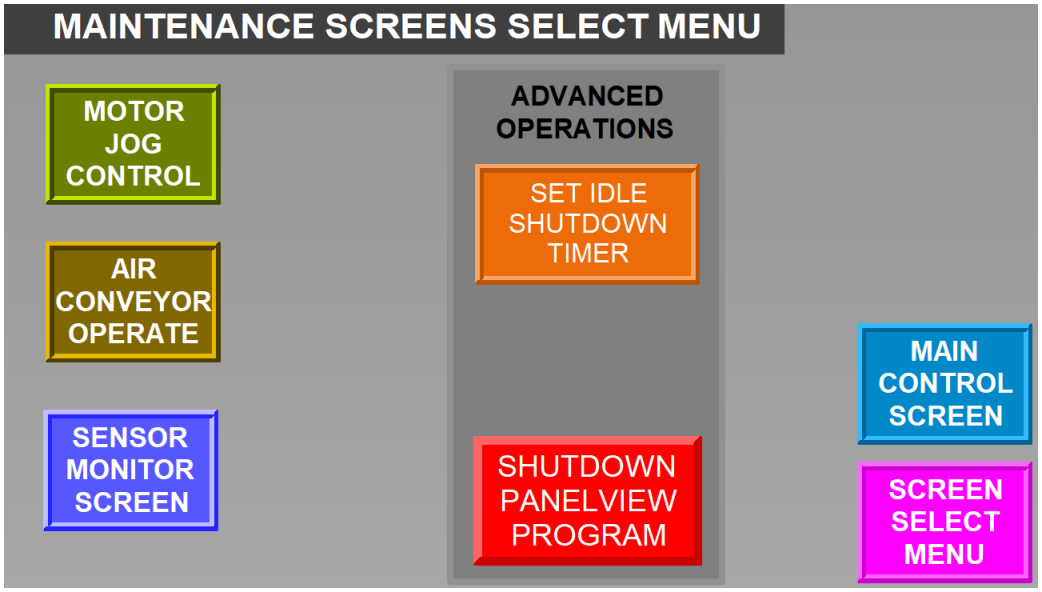

Figure 3-10: Maintenance Menu

3.3.8 Motor Jog Control

Each of the three hopper motors can be jogged individually at slow speed. Jogging can only occur if this screen is displayed, and when the hopper is not armed or running.

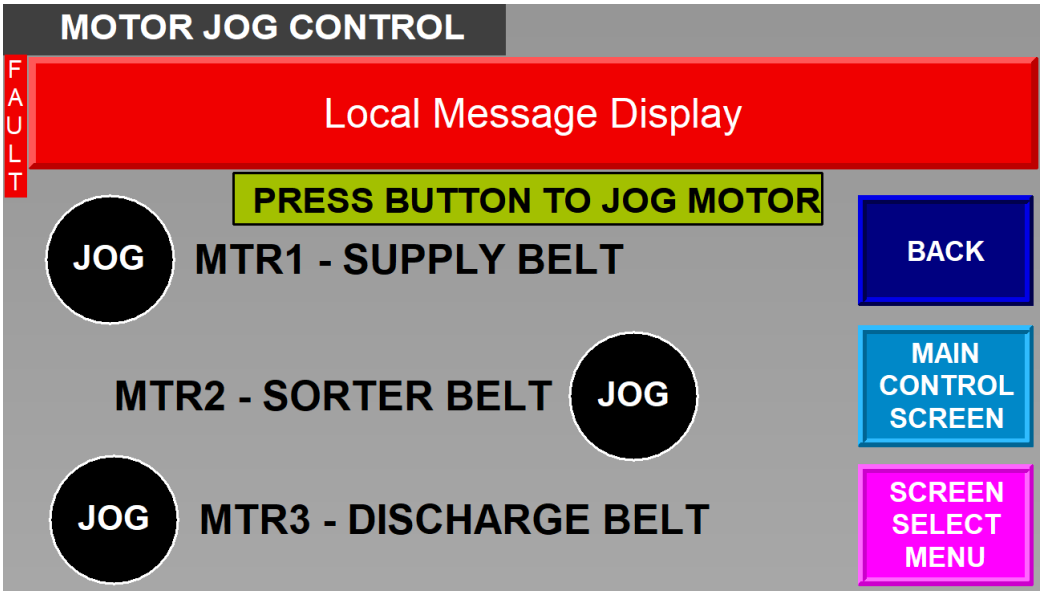

Figure 3-11: Motor Jog Control

3.3.9 Operate Air Conveyors

Manually operate each of the two groups of air conveyors. Your equipment installation may only use one group, or possibly none. This manual operation can only occur if this screen is displayed.

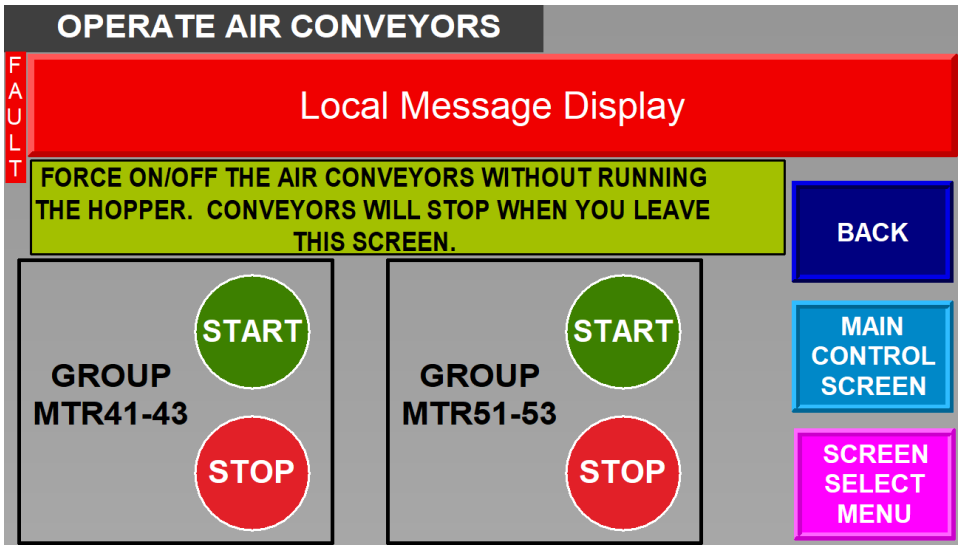

Figure 3-12: Operate Air Conveyors

3.3.10 Sensor Monitor

Verify the **On / Off** status of the sensors on the machine.

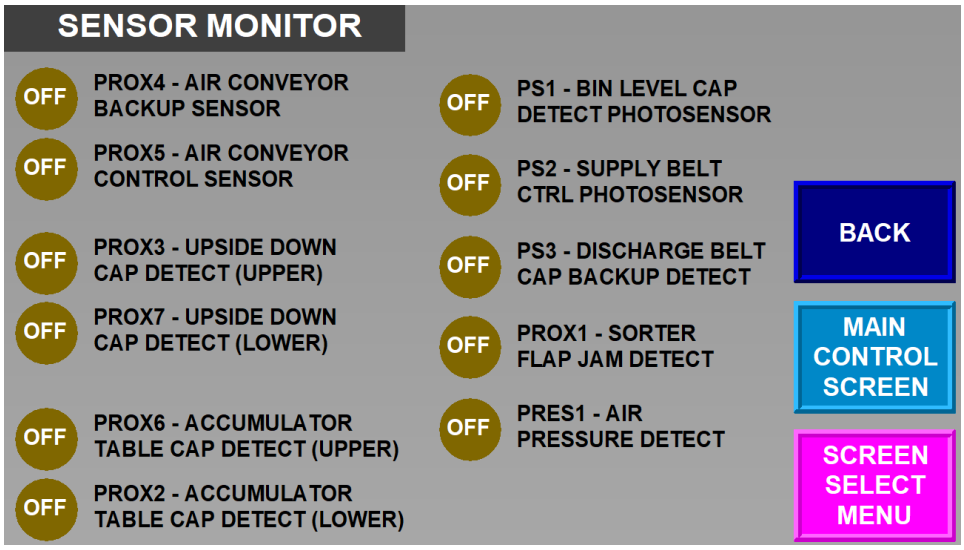

Figure 3-13: Sensor Monitor

3.3.11 Set Idle Shutdown Timer Delay

If the hopper is armed to run, but not actually running (due to no cap demand at the capper), it could be a potential hazardous situation to allow the hopper to be armed indefinitely. Unexpected automatic conveyor motion could result. After a sufficiently long delay of being armed with no motion, the hopper will shut itself off. The delay before shutoff occurs can be adjusted here, from 5 to 500 minutes.

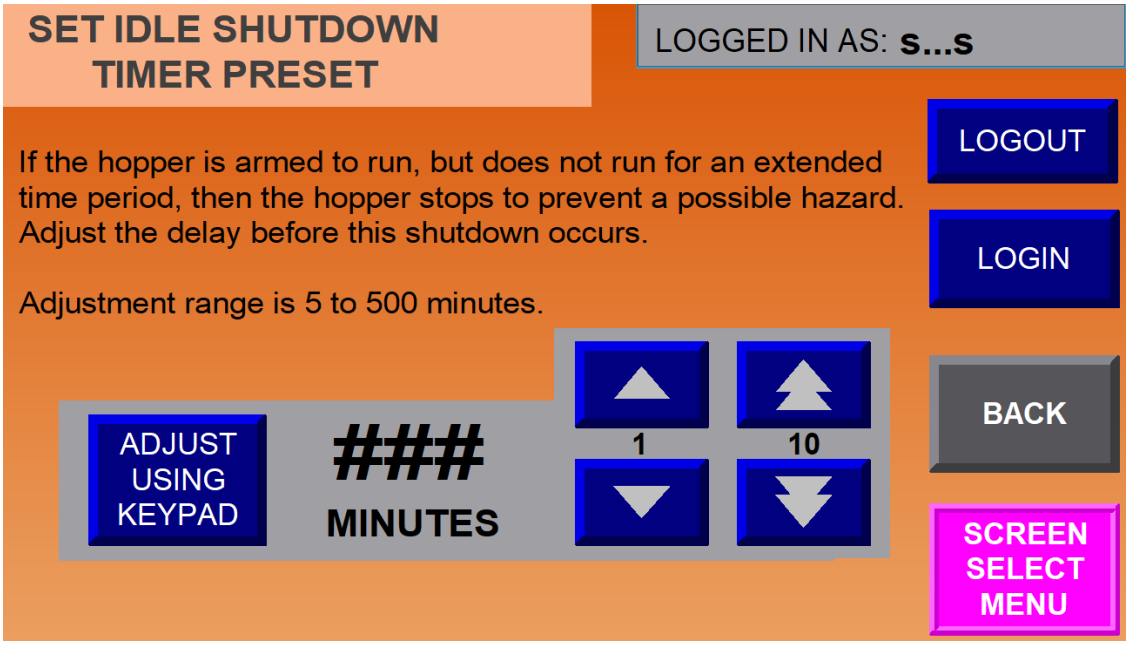

Figure 3-14: Set Idle Shutdown Timer Delay

4. TROUBLESHOOTING

4.1 Troubleshooting

Fault messages are displayed on the main screen. If any issues such as the machine failing to run or is not responding normally, check the main screen. Look for any fault messages to help troubleshoot the issue.

Condition	Cause / Action
Accumulator overfills	1) The discharge belt is slipping. Adjust the tension. 2) **PROX2** may be malfunctioning. Verify and replace if required.
Blow Off Ejector is not detecting all upside down caps	1) Low air pressure. Adjust to 90PSI. 2) Improper setup. Verify setup *(Section 2.1.6).* 3) **PROX3** or **PROX7** may be malfunctioning. Verify and replace if required.
The cap feeder fails to keep up with the capper.	1) The speed control switch is in manual mode and not tuned. Increase the cap feeder speed or switch to the auto speed control mode. 2) A cap flow obstruction is blocking the sorter belt. Clear the obstruction.
Stacked caps continually activate the sorter flap stopping the feeder.	1) The sorter bar is adjusted too high or the counterweight is adjusted too far in. Readjust the equipment.

Table 4-1: Troubleshooting Table

5. MAINTENANCE

5.1 Maintenance

This maintenance schedule is based on the number of hours the cap feeder is in service. The frequency of each maintenance item assumes normal operating conditions. Some items may require more frequent servicing in order to meet specific operating conditions.

Cap Conveyor Preventative Maintenance	**Frequency**
Conveyor Belt Inspection	Every 50 hours or once per week
Timing Belt Inspection	Every 200 hours or once per month
Lubricate Pulley Bearings	Every 100 hours or twice per month
Check Gearbox Oil Level	Every 200 hours or once per month
Change Gearbox Oil using SHC 634 Synthetic Oil	Every 2000 hours or once every 6 months
Filter/Regulator Preventative Maintenance	**Frequency**
Drain Water & Inspect Filter	Every 200 hours or once per month
Replace 40 micron metal filter	Every 2000 hours or once every 6 months

Table 5-1: Maintenance Schedule