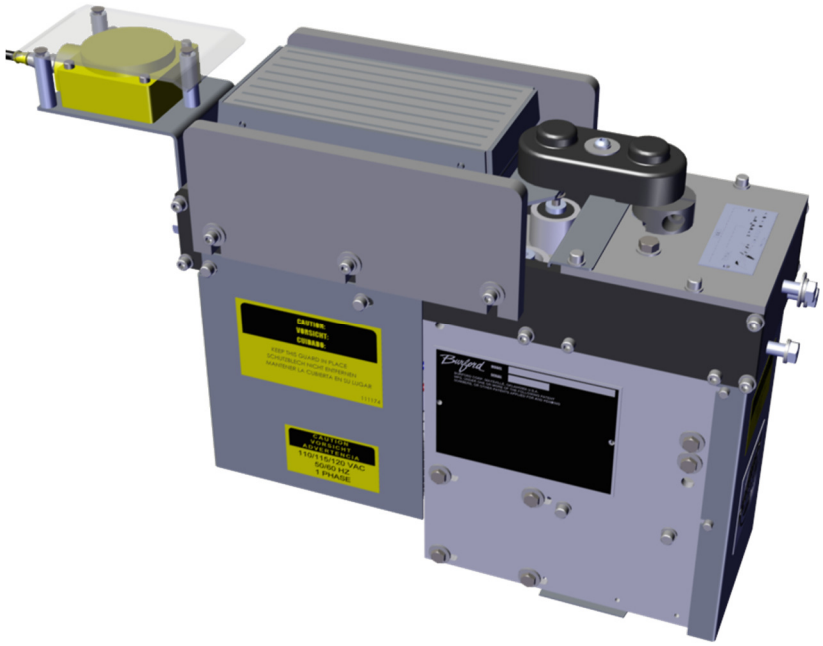
LINEAR PAN SHAKER

MODEL 576/577-CUL EP/LE



Second Edition- Date: May 2017
Manual Part No._____
Serial # _____

SAFETY PRECAUTIONS

As Burford® Corp. strives to promote safety in the maintenance and operation of Burford® equipment; we request that the following safety procedures be followed, along with any additional safety procedures set by the customer's in-plant safety officers or local codes.

1. Read the manual completely before attempting installation or operation of this unit.
2. This machine may contain programs that are password protected. Contact your supervisor or Burford® Corp. for password.
3. Incoming electrical power must be properly shielded, routed, and grounded. All safety codes should be followed. Study wiring diagrams before attempting installation.
4. Disconnect power to equipment before removing any guards or covers. Replace guards or covers before resuming operation of the unit.
5. Loose clothing, jewelry, and long hair should be considered a safety hazard around mechanical equipment. Ensure that they will not be entangled in the equipment.
6. Keep clear of moving machine parts. Bodily harm and/or serious injury may result from contact with moving gears, sprockets, chains or pneumatically controlled machine components.
7. Do not bypass safety switches.
8. Do not attempt repairs while equipment is running.
9. Use only original equipment parts designed for safe operation of the equipment.
10. Only authorized personnel should be allowed to operate or perform maintenance on the unit.
11. This unit is not wash-down ready. Do not wash the unit or any of its electrical or mechanical components, with any form of high pressure or running liquids.

Caution symbol indicates bodily harm may incur if instructions are not followed.

Stop symbol indicates important instructions to prevent unit damage or adverse effects.

Info symbol indicates useful information to assist in installation and operation of the unit.

DISCLAIMER

The descriptions and specifications contained in this Service Manual were in effect when this manual was approved for printing. Our policy is one of continuous improvements, and we do hereby reserve the right to discontinue models at any time, or to change specifications, prices, or design without notice and without incurring obligations.

Burford® Corp. expressly disclaims any liability for damages and/or injuries caused because of negligence or misuse of its product. Such negligence or misuse includes, but is not limited to, software/program alteration, removal of guards, faulty wiring due to improper installation, subjecting the unit to wash-down environments or any physical or mechanical changes made to a Burford® unit, by anyone other than a qualified Burford® Technician.

Burford® equipment should only be used for the purpose for which it was sold, and should not be modified in any way without notifying the General Manager of Burford® Corp. in writing of the modification.

The original language for this document is English. Translations to other languages may not be accurate.

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Chapter 1

Introduction

CHAPTER 1: INTRODUCTION

Congratulations on the purchase of your new Burford® Pan Shaker. We are confident that you will enjoy many years of dependable service from your new unit.

The Burford® Shaker is a proven Burford® design, backed by over 50 years of manufacturing experience. It is designed to work with your existing product line.

The name Burford® is synonymous with innovation. Since the beginning with the first twist tyer machine, Burford® has been focused on bringing innovation to the baking industry. Our passion is developing equipment that increases productivity and uniformity while decreasing production costs.

The Burford® Linear Pan Shaker is designed to help correct panning errors at the Pan-O-Mat, by positioning the dough in the cup and creating more uniformly proofed buns. It also enhances the appeal of the finished product by decreasing the cripple rate.

The following pages contain installation, operation, and maintenance instructions. To ensure maximum performance, these instructions should be followed with care. All operators should be trained to set up for your specific application and product.

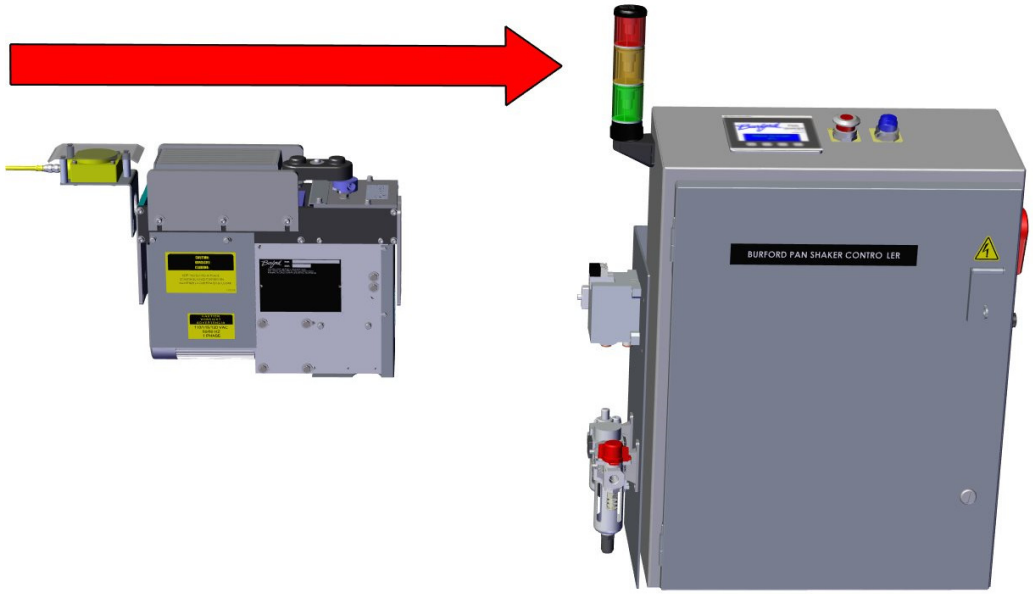
Burford® offers a large lineup of bakery solutions from oilers to topper. We invite you to visit our website at **www.burford.com** to see the other innovative equipment that we can offer to benefit your bakery today.

Specifications

ELECTRICAL
110 V_{AC}, 50/60 H_Z, 1 Φ, 15 A
220 V_{AC}, 50/60 H_Z, 1 Φ, 15 A
220 V_{AC}, 50/60 H_Z, 3 Φ, 15 A
380/460 V_{AC}, 50/60 H_Z, 1 Φ, 15 A
380/460 V_{AC}, 50/60 H_Z, 3 Φ, 15 A
AIR REQUIREMENTS
.370 CFM@80 psi maximum
OPERATING PARAMETERS
25 pans per minute maximum

Models

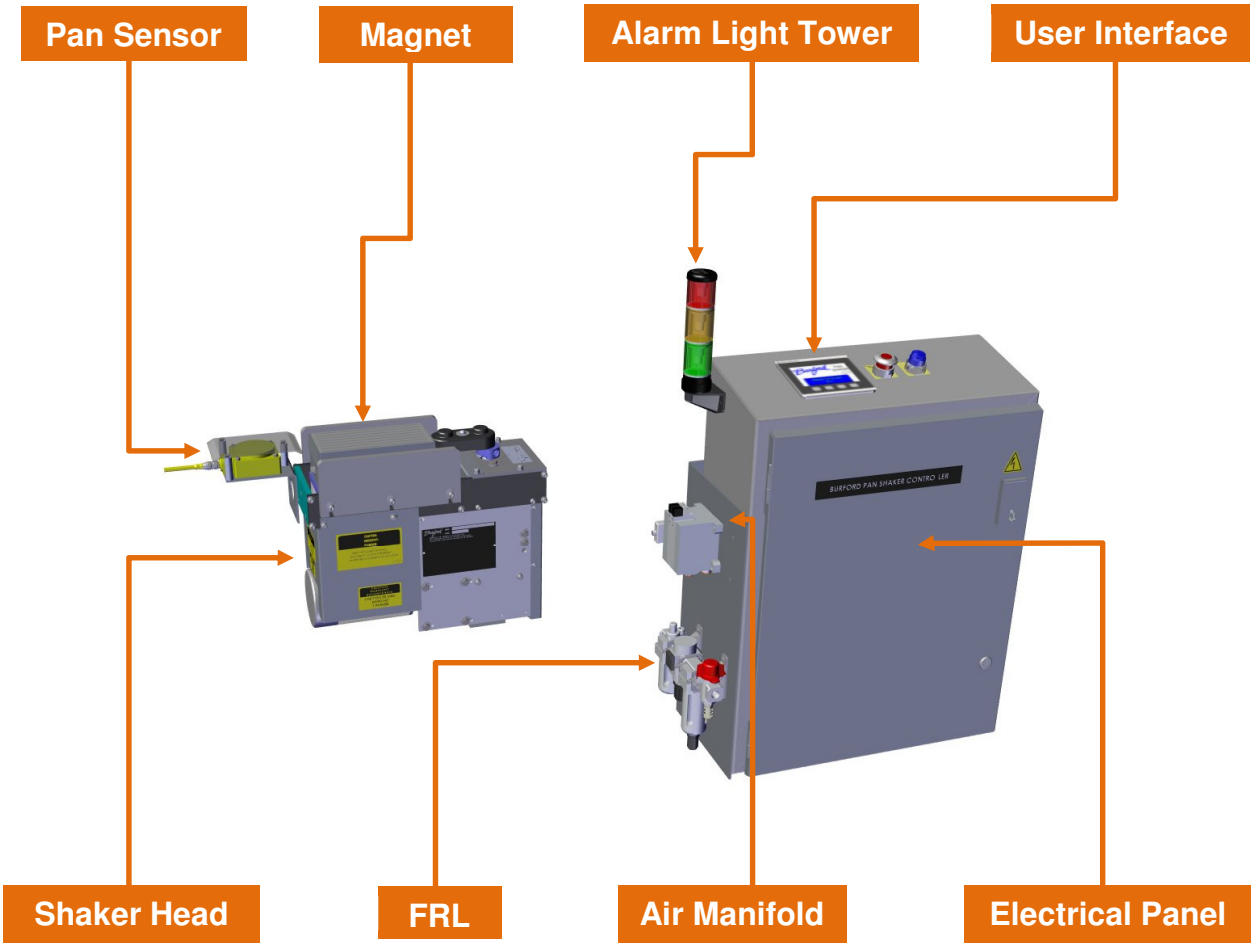
MODELS
576 Product flow moves left to right when viewing from operator's side
577 Product flow moves right to left when viewing from operator's side.



Model 576 Shown

Pan Shaker Identification

The Burford Linear Pan Shakers may be supplied with a conveyor if arranged prior to the installation.



Chapter 2

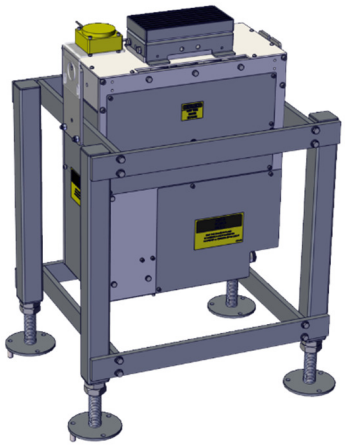
Key Components

CHAPTER 2: KEY COMPONENTS

Below is a list of key components that you must familiarize yourself with to gain a better understanding of how the Shaker functions.

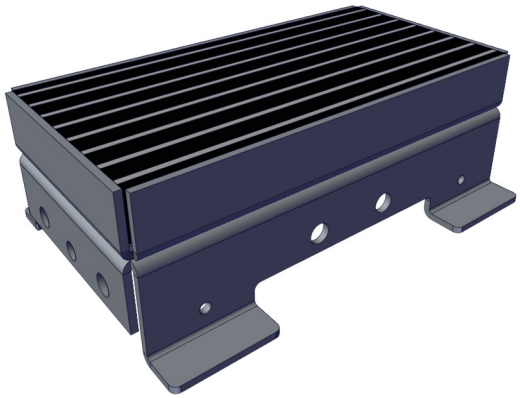
■ Shaker Head

The Shaker Head houses the magnet, sensor and the magnet location encoder. The encoder sends a signal to the PLC during operations. The PLC uses the information to determine when to raise and lower the magnet for Dough Position. This allows the product placement to be the same on every pan.



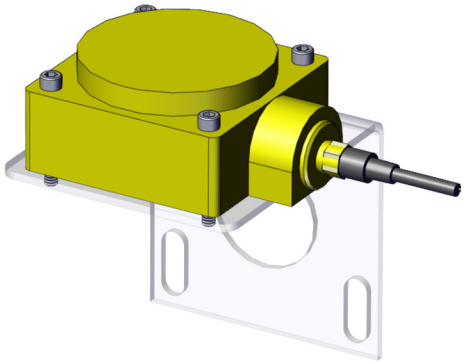
■ Magnet

The Magnet secures the bottom of the pan and then shakes the product by moving the pan in a linear motion. The position the magnet attaches to the pan can be adjusted using the Operator Interface.



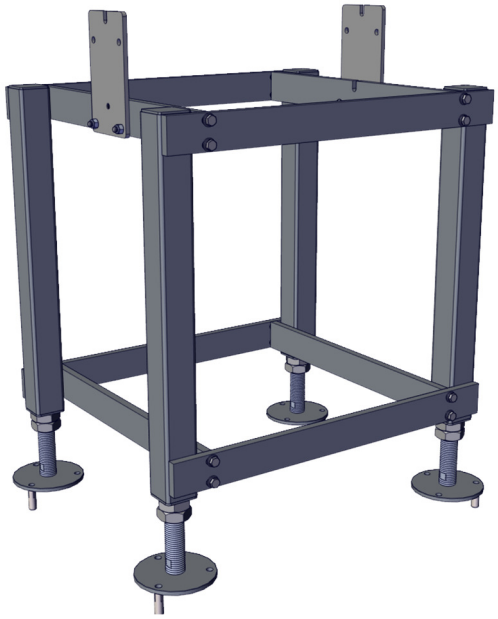
Sensor

The 80mm proximity sensor is used to detect the pan and begin the shake cycle. The mounting bracket is slotted for vertical adjustment.



Floor Stand

The Floor Stand holds the Shaker Head. It must be securely anchored to the ground. It is designed to be set between the conveyor belts. An install kit can be ordered to secure the stand to an existing conveyor.



Electrical Panel

The Electrical Panel contains the Operator Interface, the E-Stop, main disconnect and the light tower.

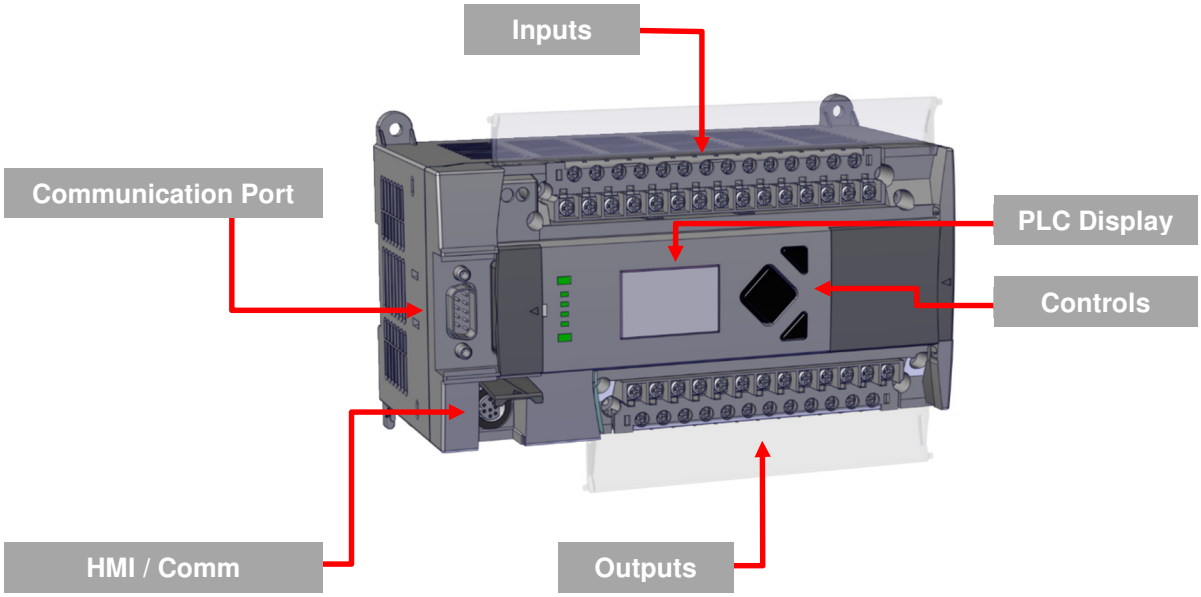
HMI

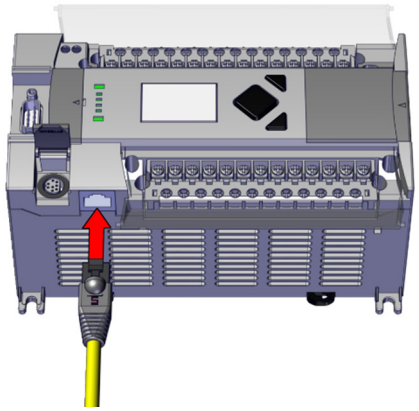
The HMI, (Human Machine Interface), is where the interactions between the unit and software occur. It allows the operator to input parameters that controls the unit.

Allen Bradley PanelView 800 Shown

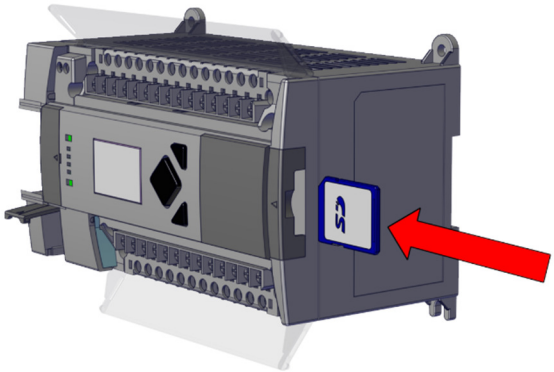
PLC

The PLC (Programmable Logic Controller) is a digital computer used for the automation of the unit. The PLC contains proprietary Burford® software that executes the operations of the unit. The pan shaker comes standard with the Allen Bradley MircoLogix 1400 PLC.





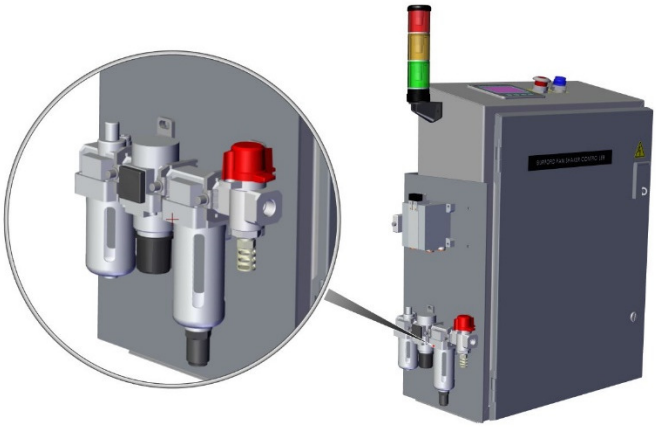
Ethernet
HMI / Comm



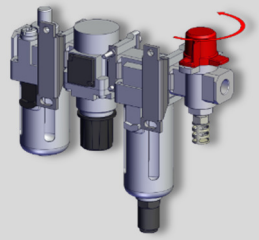
SD Card Slot

F.R.L. On / Off

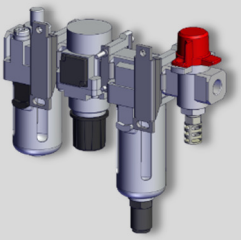
The F.R.L. (Filter, Regulator, and Lubricator) controls the amount of air pressure to the unit. The Shaker uses the air to raise and cycle the magnet. It also controls the pan stop, if equipped.



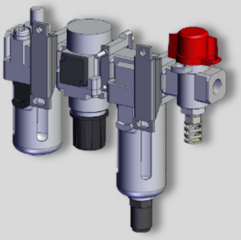
Turn handle clockwise to allow the flow of air.



Shown is the shut-off valve in the off position.

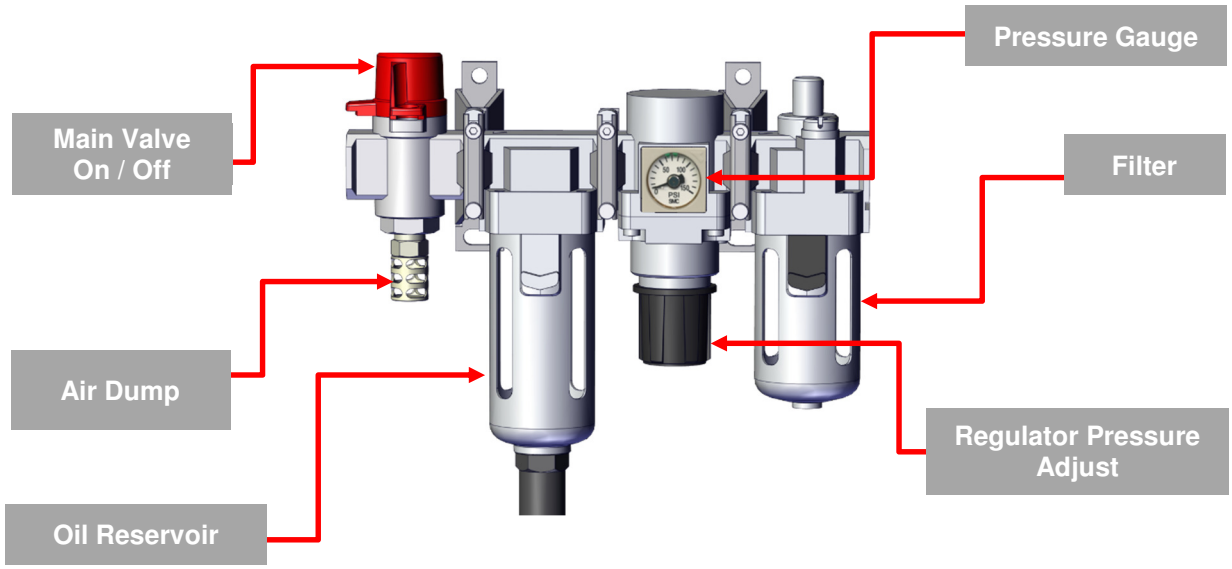


Shown is the shut-off valve in the on position.

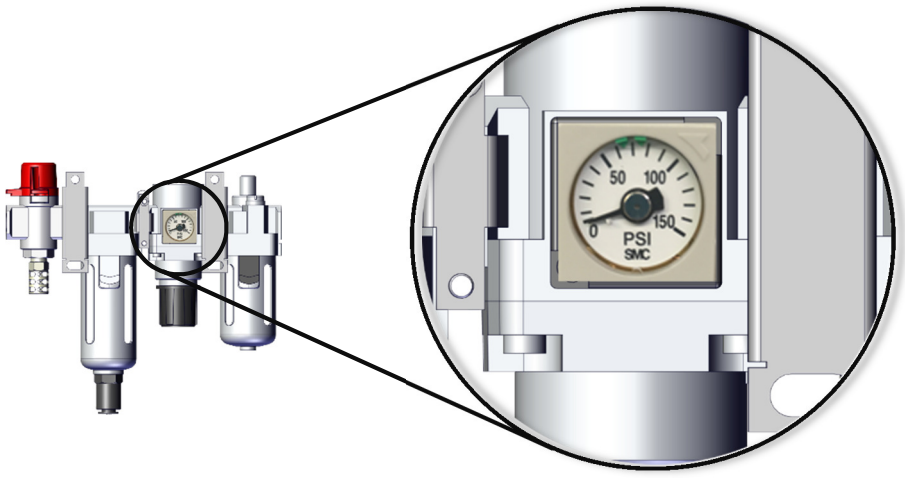


F.R.L. Description

F.R.L. Burford Part # C00404



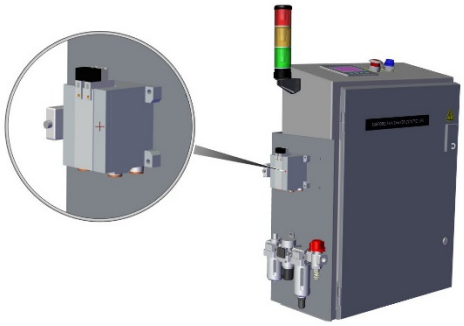
A pressure gauge indicates the output pressure of the F.R.L. The normal operating pressure is 60 psi.

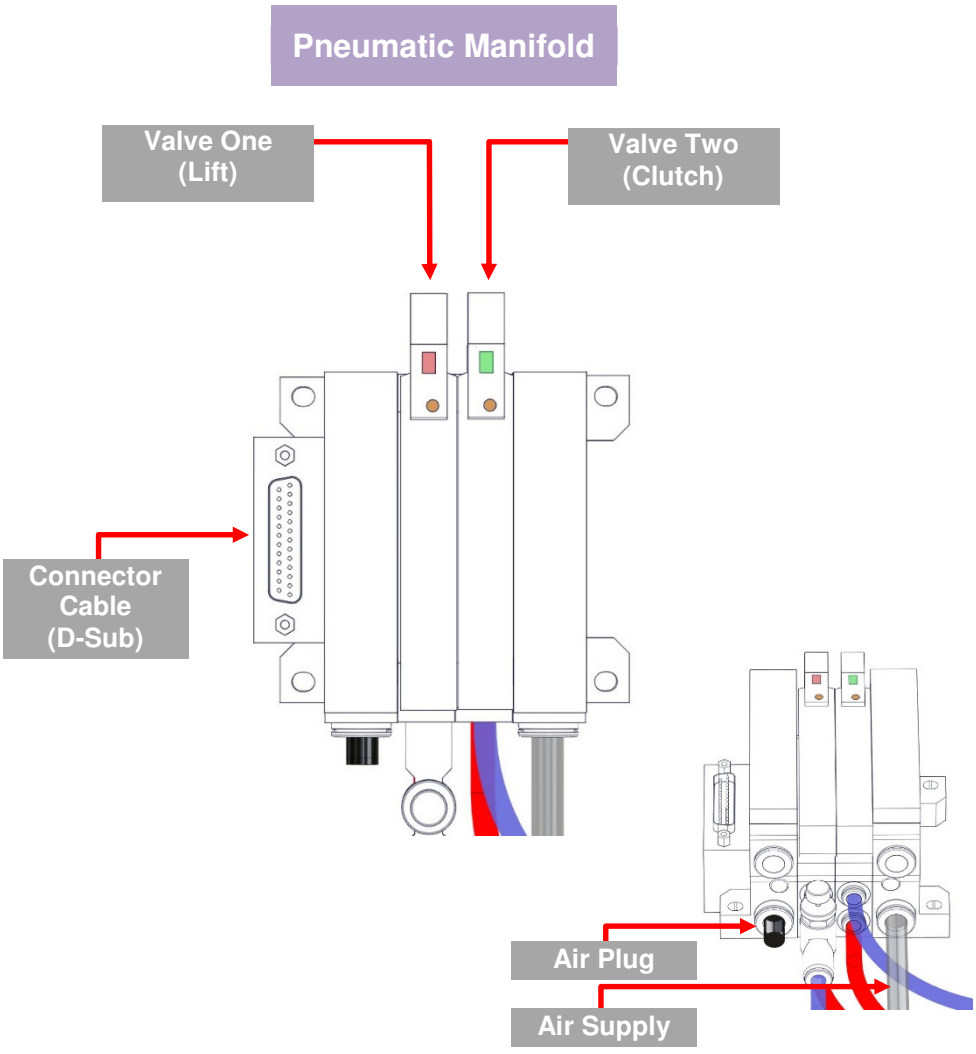


Pneumatic oil must be kept in the Oil Reservoir at all times. Burford® recommends Parker Pneumatic Oil F442.

Pneumatic Manifold

Pneumatic manifolds are juncture points that serve as centralized locations for multiple valves and channels. They are made to sustain the high differential pressure necessary to supply pneumatic energy to the components of the Shaker. The Shaker requires two valves per head. Valve one supplies air to the magnet lift cylinder. Valve two supplies air to the clutch for the linear motion of the shake process. The valves are controlled by the PLC via the D-Sub connector located on the Manifold housing.

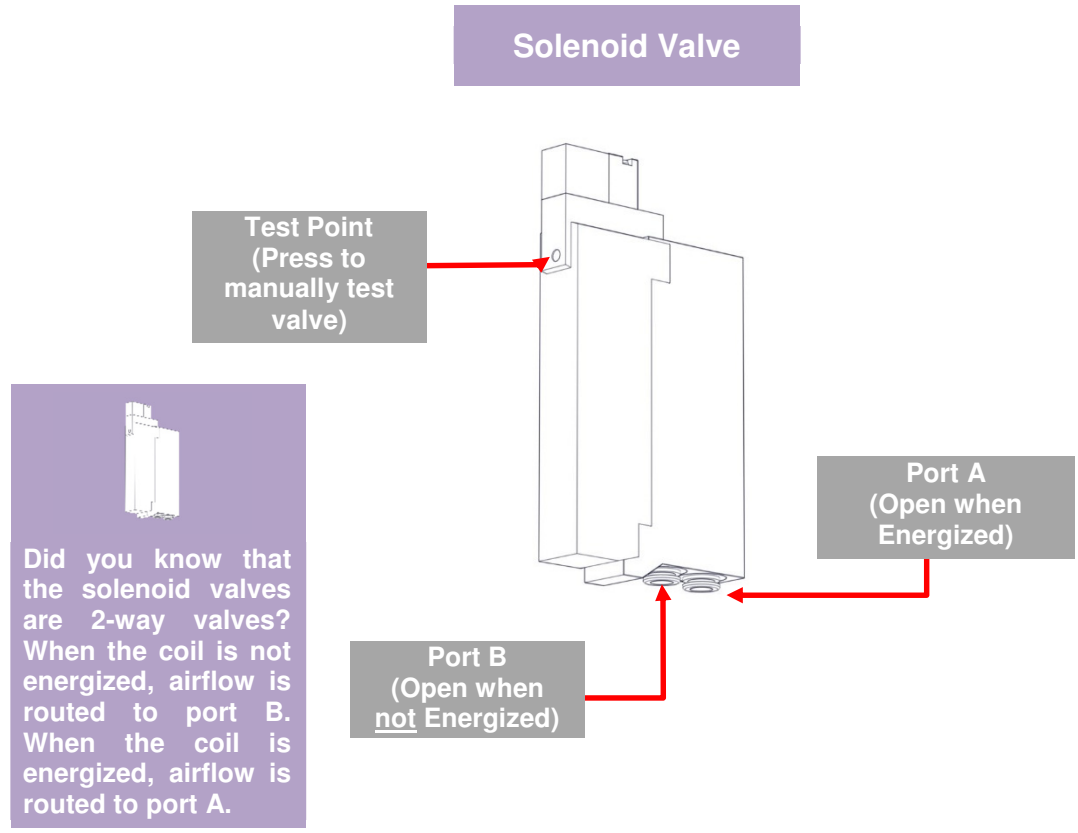




Solenoid Valve

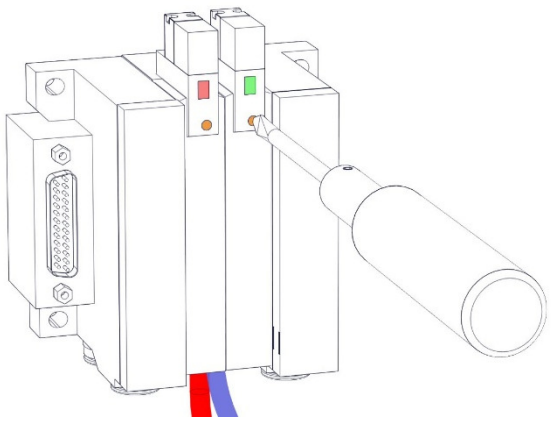
The Solenoid valves provided are ideal for applications requiring high speed, frequent operation, stable response time and long service life. The Innovative mounting method allows the valves to be changed without entirely disassembling the manifold.

Each valve has two outputs, A and B. When the valve is energized, output A will open and output B will be closed. When the valve is not energized, output B will open and A will be closed. In our Clutch application, we use one output to enable the clutch (B) and the other output to enable the brake (A). This way, whenever the clutch is not enabled, the brake is automatically applied.



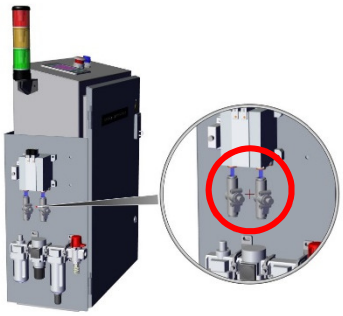
Each valve has a manual test port that opens the valve without the unit being in run mode. This allows for testing the pneumatic circuit.

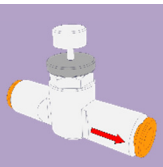
To test if a valve is working properly, depress the button on the desired valve, this should cause the magnet assembly to move in relationship to the valve being tested. If the magnet assembly does not actuate, then the valve and/or air hose may be damaged and should be replaced.



Air Flow Controls

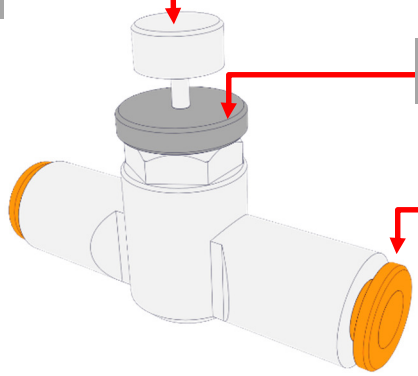
The rise and fall speed of the magnet is controlled by the two Air Flow Control valves located on the lift solenoid valve. The speed should be set for the desired cycle rate, but to avoid premature wear, they should be adjusted so that the magnet assembly will travel smoothly through a cycle, not hitting too hard or too fast in any direction.





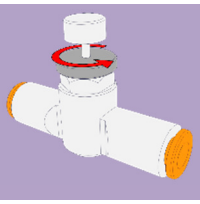
Did you know that Flow Control Valves must be installed in a particular direction of airflow travel to function properly? An arrow on the valve will indicate the correct installation.

Flow Control Valve

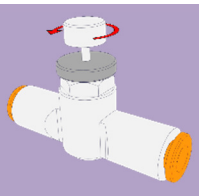


Adjustment

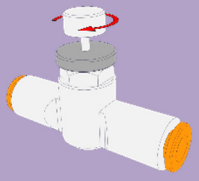
Release the locking dial by turning it anti-clockwise. This will allow the adjustment knob to turn freely.



Rotate the adjustment knob until desired flow is achieved.

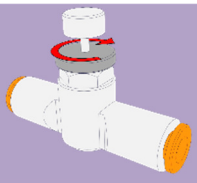


Anti-Clockwise to increase flow.



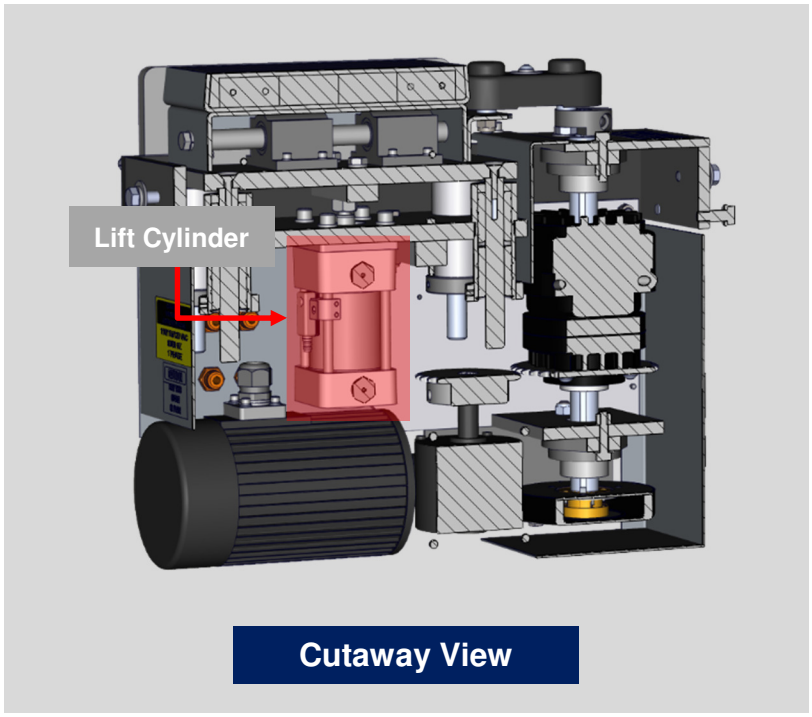
Clockwise to decrease flow.

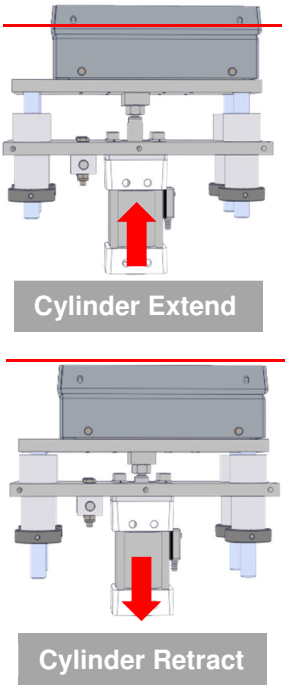
Lock the valve by turning the Locking Dial clockwise until firmly seated.

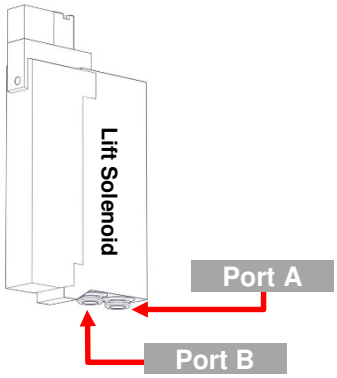


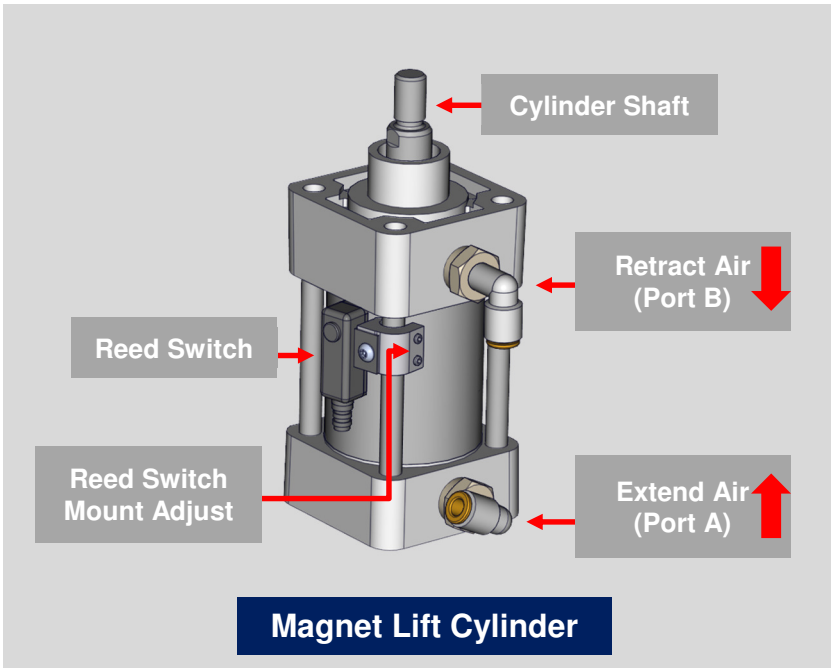
Lift Cylinder

The Lift Cylinder raises the pan off the conveyor during a shake cycle. A pneumatic solenoid, controlled by the PLC, sends compressed air to the cylinder to either extend or retract the magnet. A reed switch is attached to the cylinder to detect its current position.

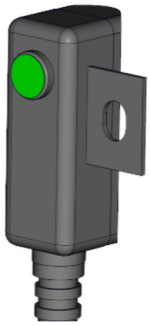






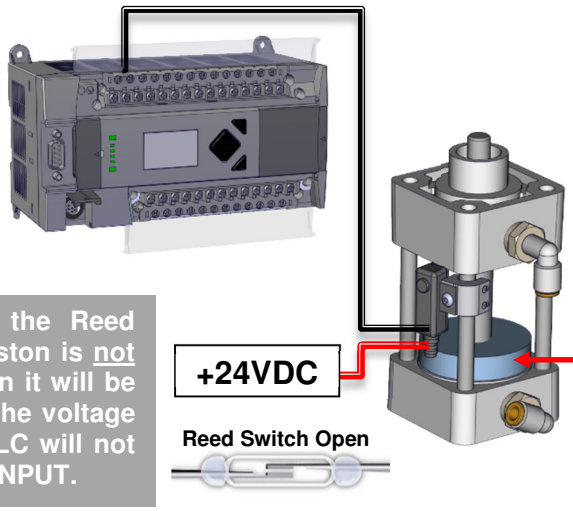


Reed Switch

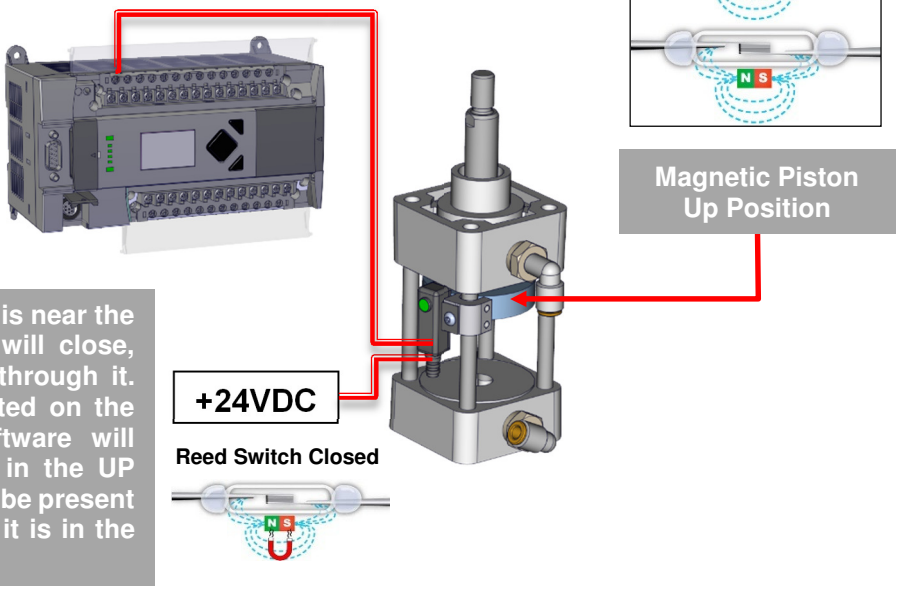


The reed switch is an electrical switch operated by an applied magnetic field. It was invented at Bell Telephone Laboratories in 1936 by W. B. Ellwood. They consist of a pair of contacts on ferrous metal reeds in a hermetically, (airtight) sealed envelope. The contacts in our application are normally open, closing when a magnetic field is present. The switch is actuated by bringing a magnet near it. Once the magnet is pulled away from the switch, the reed switch will go back to its original position, the open state.

The reed switch is mounted to the Lift Cylinder. Inside the cylinder is a magnetic piston. The reed switch is positioned so that it will detect when the piston is at its uppermost point. When the cylinder reaches this point, it will cause the reed switch to close and complete the electrical circuit to the PLC, indicating that the Magnet has been completely lifted.



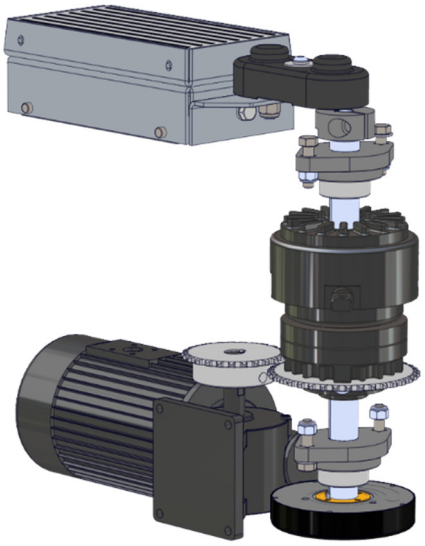
24 volts DC is sent to the Reed Switch. If the magnetic piston is not near the Reed Switch, then it will be 'open' and will not allow the voltage to pass through it. The PLC will not detect any voltage on the INPUT.



When the magnetic piston is near the Reed Switch, the switch will close, allowing voltage to pass through it. The voltage will be detected on the PLC INPUT and the software will know that the magnet is in the UP position. An indicator may be present on the Reed Switch when it is in the closed position.

Drive System

The main components for the Drive System consists of the Encoder, Pneumatic Clutch, and AC Motor. With the unit in run mode, and the Shaker Enabled, the AC motor is energized, thus spinning.



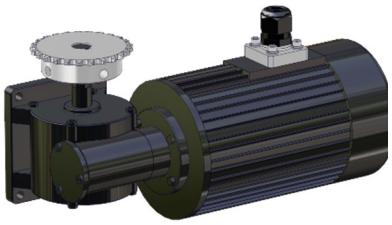
When a pan is present, the Clutch air solenoid is energized and supplies air pressure to the Clutch. The Clutch engages and couples the output of the motor to the drive shaft causing the Magnet assembly to oscillate back and forth on its linear path.

An encoder attached to the drive shaft supplies a signal to the PLC that is directly proportional to the angular rotational speed of the shaft. The Software in the PLC is able to use this information to ascertain position, revolutions, and speed.

The Software in the PLC computes the precise moment to apply the brake for the clutch according to the setup parameters for the variety selected. The PLC de-energizes the clutch air solenoid. De-energizing the clutch solenoid applies the brake to the clutch. The air solenoid is a 2-position valve meaning that it has two outputs. When energized, the output to disengage the clutch is supplied. When de-energized the output to brake the clutch is supplied with air. This allows the drive system to stop abruptly.

Drive Motor

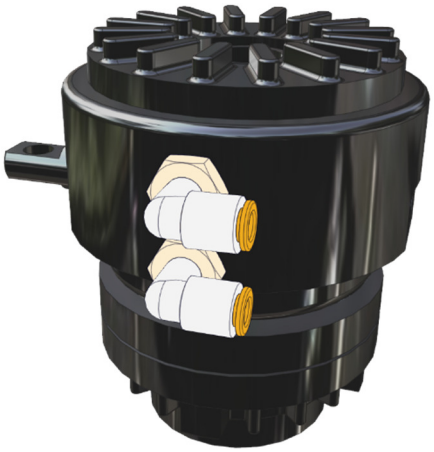
The Drive motor is an AC motor with a gear reducer attached. It supplies 3/8th HP (280 watts) of power. The motor is rated for 230 VAC, three phase. An Inverter is used to derive the necessary power requirements for the motor from the 110 VAC, single-phase voltage that is supplied to the unit.



Motor

Inverter

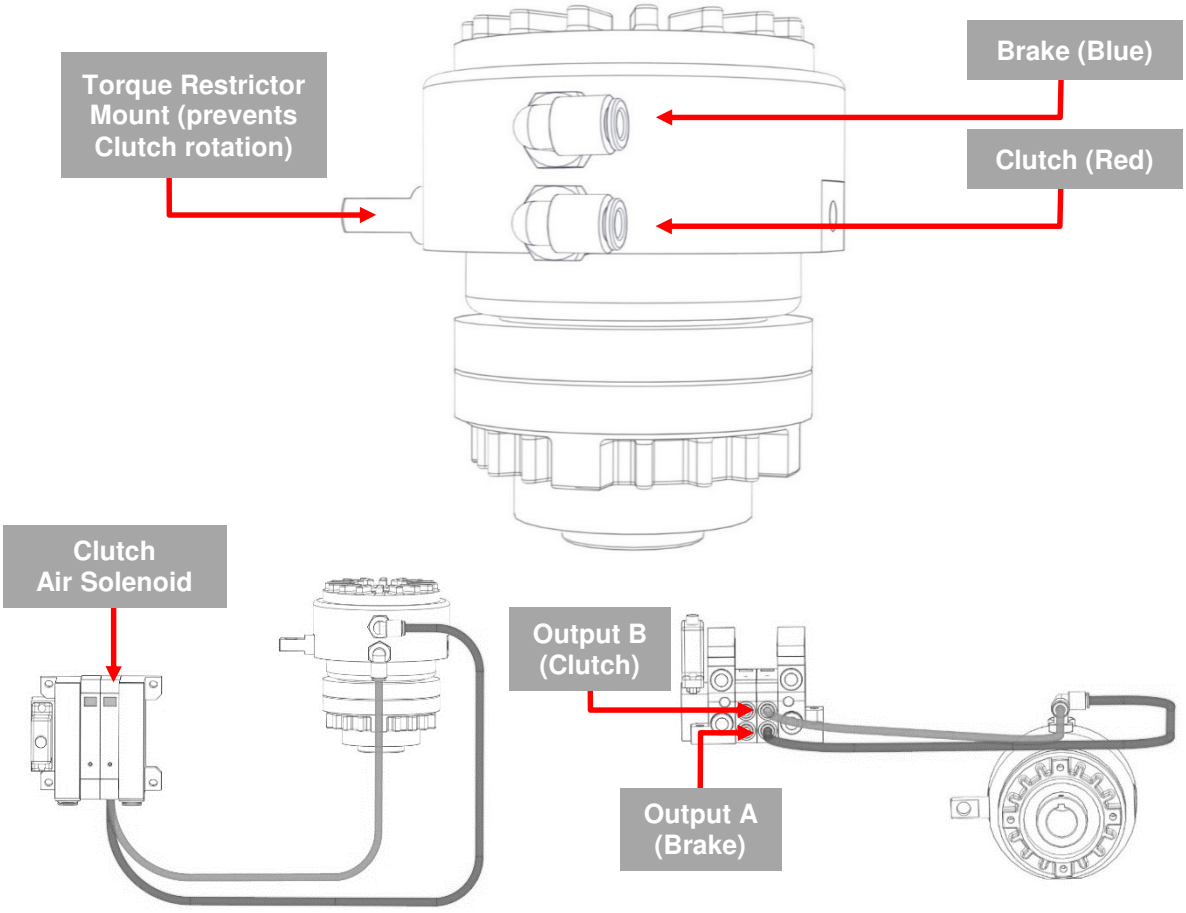
Clutch



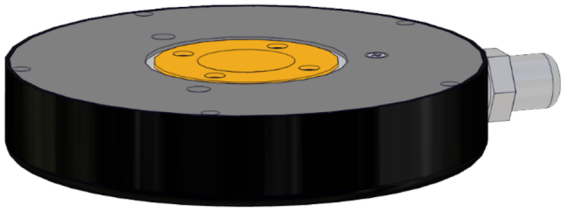
The Clutch synchronizes two rotating shafts that are at different speeds. The Clutch connects the two shafts, locking them together, to spin simultaneously, or decouples them so they are independent of each other.

In our application, we use a Pneumatic Clutch to control the movement of the Magnet assembly. To quickly cycle the unit during production, the motor is constantly spinning and the Clutch is used to transfer the power when needed to the Magnet head assembly.

When a cycle occurs, the PLC will engage the Clutch by activating the Clutch air solenoid. This will quickly connect the drive motor to the Magnet head linkage, thus oscillating the Magnet on its linear path. When the cycle is completed, the PLC will de-activate the Clutch air solenoid. When de-activated, the Clutch air solenoid routes air to the Brake, quickly stopping the magnet and preventing any further movement.



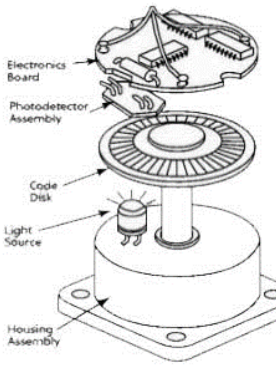
Encoder



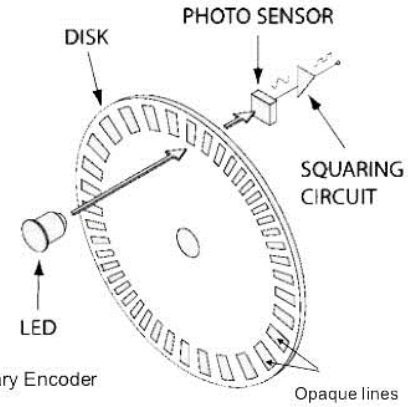
The simplest definition of an Encoder is the process of converting information from one format to another. In our application we use a device called a Rotary Encoder. A Rotary Encoder, also called a shaft encoder, is an electro-mechanical device that converts the angular position, or motion, of a shaft or axle to an analog or digital code. There are two main types: absolute and incremental (relative). The Pan Shaker utilizes a digital, incremental Rotary Encoder that is fixed to the drive shaft. This allows the software in the PLC to calculate the speed, revolutions, and position of the shaft in real time. The software uses this data to calculate precisely when to stop the movement of the Magnet assembly according to the setup parameters for the selected variety.

The Encoder is primarily used for the Dough Position and the number of Revolutions settings. The Dough Position is used to select a general location of the cavity in which to leave the dough pieces. It causes the shake cycle to end abruptly at a particular point of the shaker magnet stroke. The resulting deceleration gives more consistent positioning than is possible with a timed shake cycle. The number of Revolutions setting determines how many times the Magnet assembly will cycle.

How They Work



Components inside Incremental Rotary Encoder

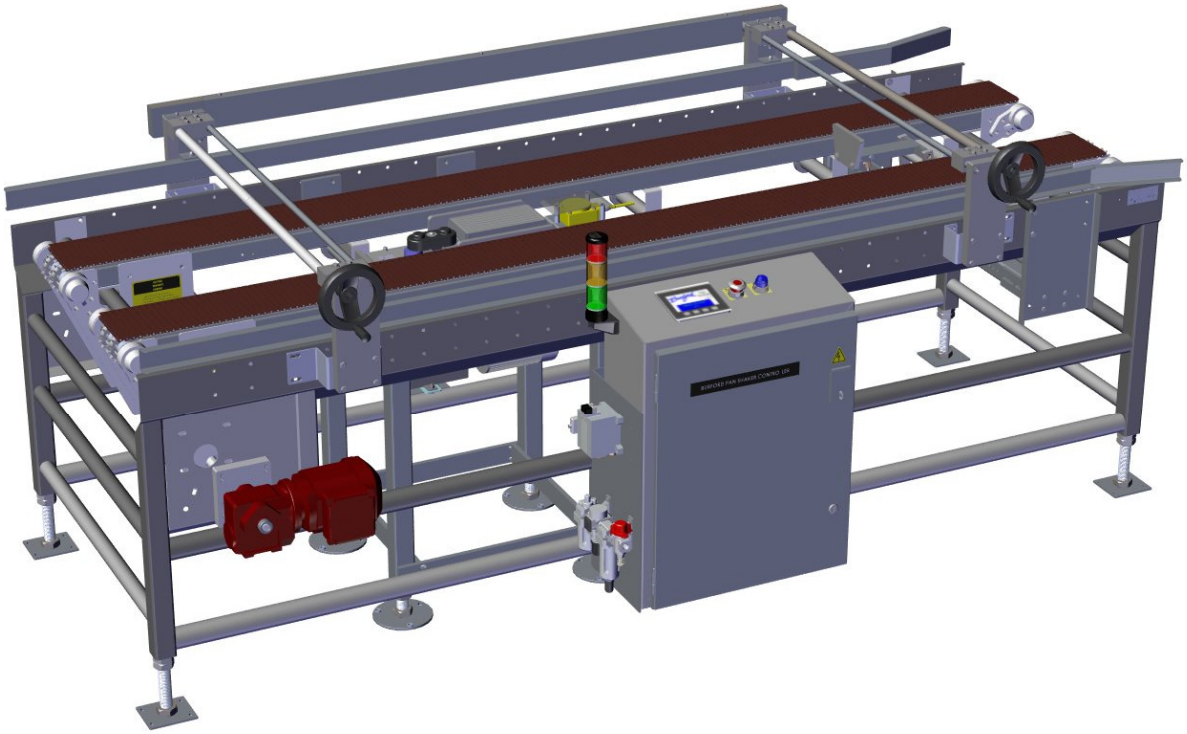


To the left is a simplified view of an Optical, Incremental Rotary Encoder. The LED emits a light beam, which passes through the transparent slits in the opaque disk. When the photo sensor receives the light, it produces a sinusoidal waveform, which is transformed into a square wave or pulse train. The pulse signal is then sent to the PLC controller, which will then use the data according to the programmed software.

By using the data in relation to time, we are able to gather a lot of information about our shaft. Since the encoder has a fixed resolution, (the number of slits), the controller can simply count the pulses and know when a revolution is made. Since each pulse is a certain distance, the controller can calculate speed by counting the number of pulses within a time interval.

Conveyor (Optional)

An optional conveyor is available for your Pan Shaker. The conveyer transfers product through the unit. Contact Burford® today to inquire about the great benefits of our conveyor systems.



Chapter 3

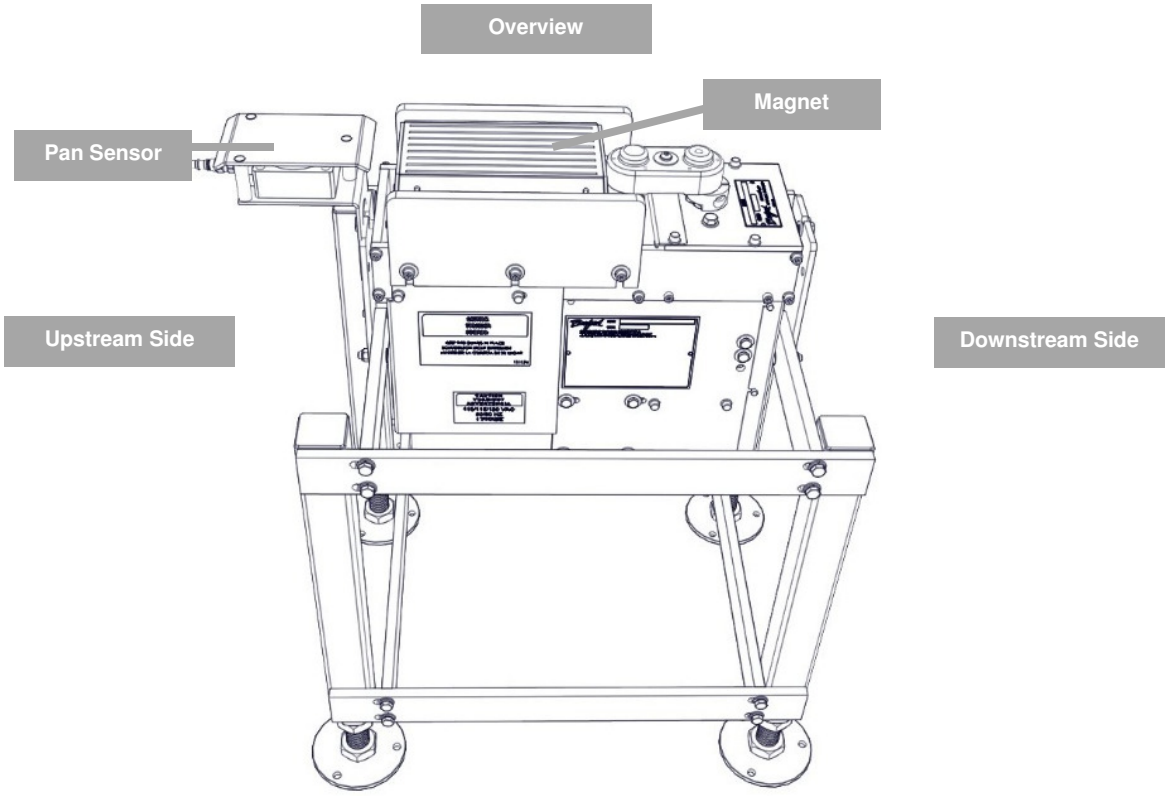
Installation

CHAPTER 3: INSTALLATION

This unit is shipped completely assembled and ready to install on your existing conveyor system. When installing this unit on your conveyor system the following precautions must be taken:

1. Clearances in area of conveyor where the pan shaker is to be installed.
2. Pan guides should be provided in the area of the pan shaker to keep pans straight.
3. The conveyor must not allow pans to backup, turn, or interfere with other pans entering or leaving the pan shaker area.
4. The area chosen must have a minimum clearance of 9.5 inches between tabletop chains.
5. The dimension from the top of the magnet to the top surface of the conveyor belts or carrier must be ¼" and is extremely critical.
6. Conveyor must have flat tracks, with reference to earth ground.

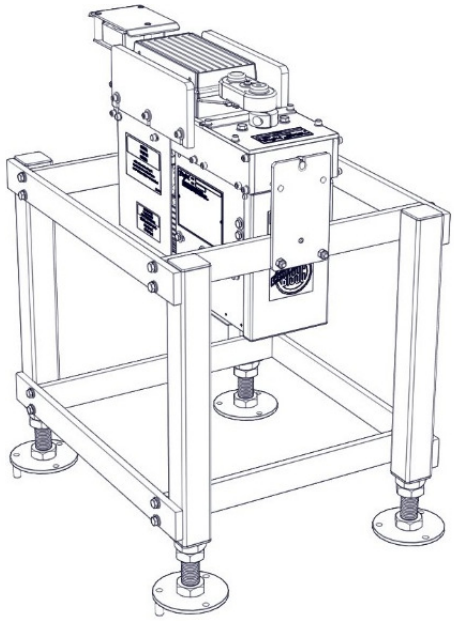
Unit Overview



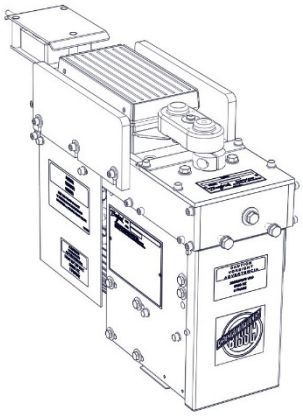
Separate Shaker Head from Stand 1 of 4

Ensure all electrical and pneumatics are disconnected from Shaker Head. Remove Shaker Head from stand.

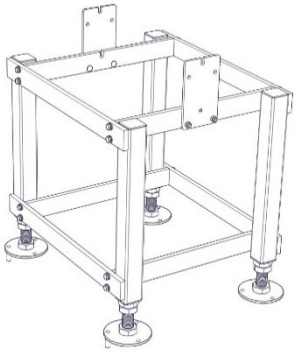
Front View

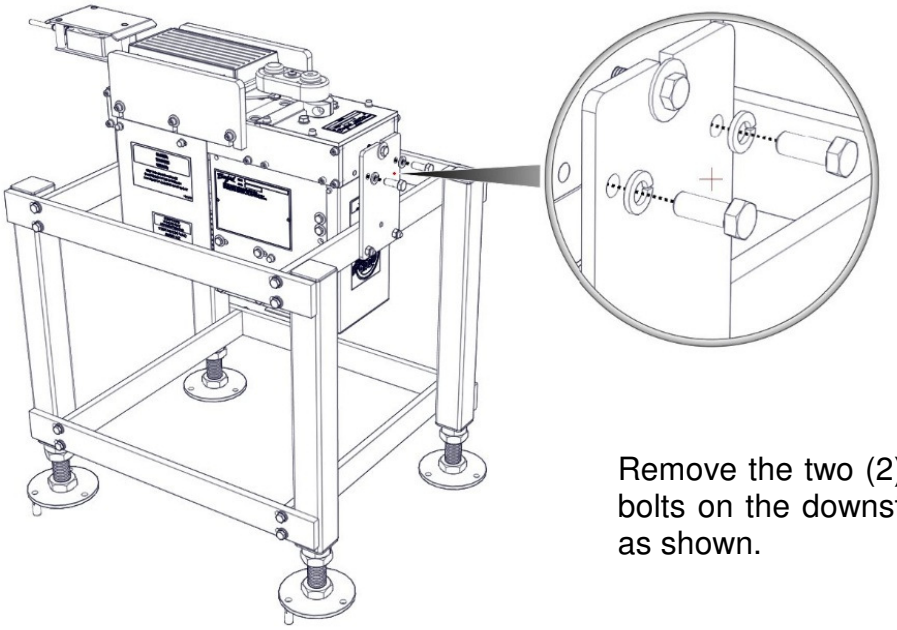


Head



Stand

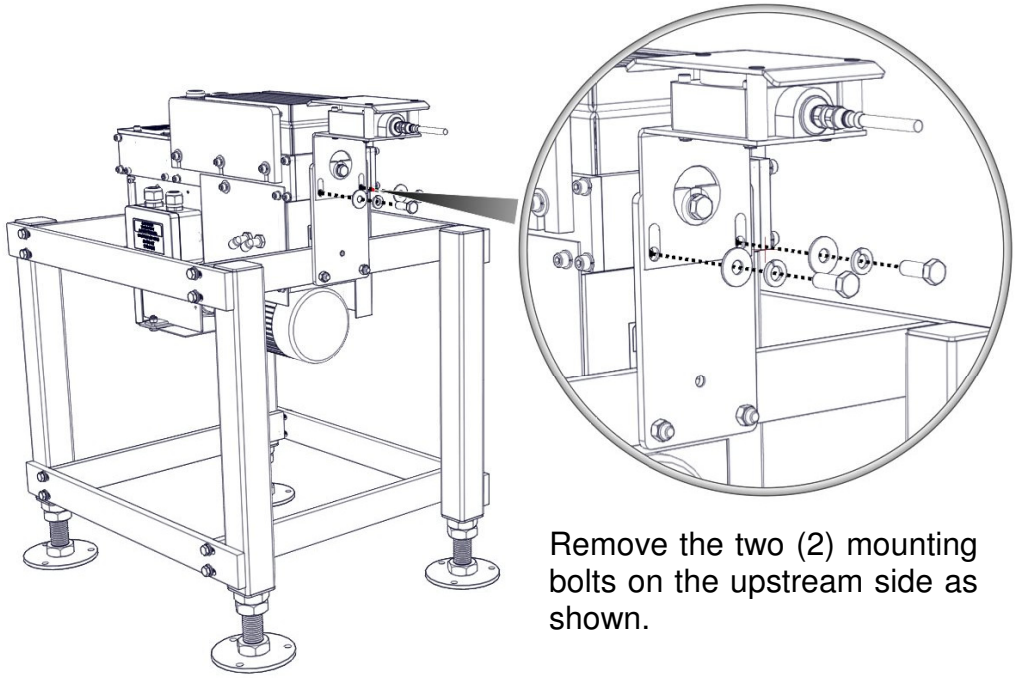




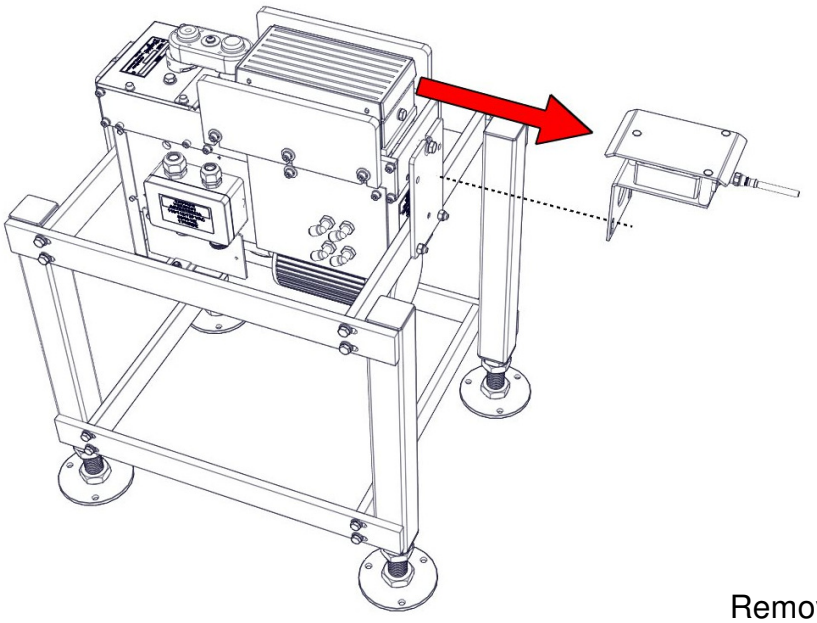
Remove the two (2) mounting bolts on the downstream side as shown.

Separate Shaker Head from Stand 2 of 4

Remove the upstream stand mounting bolts. When removed, the pan sensor will be free. Disconnect the cable to the pan sensor and set the pan sensor aside.



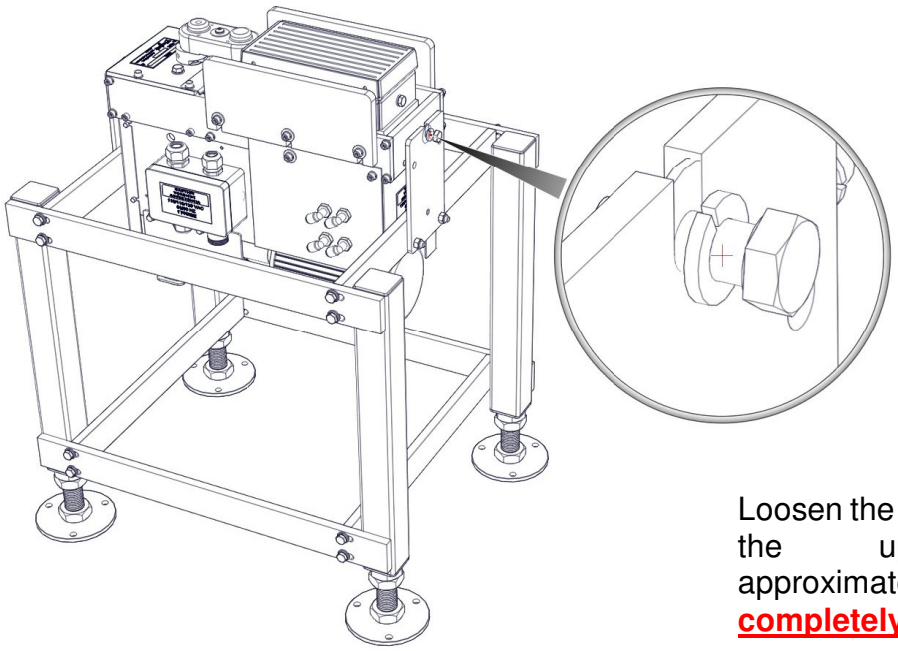
Remove the two (2) mounting bolts on the upstream side as shown.



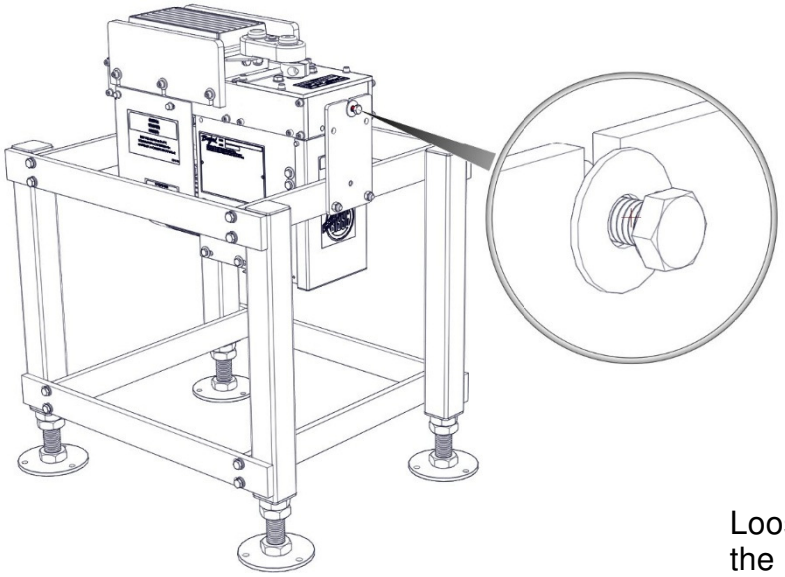
Remove mount and proximity sensor and set aside.

Separate Shaker Head from Stand 3 of 4

Loosen the two remaining center pivot bolts. **Do not completely remove**. The bolts will remain in the head. The stand has slots that allow the head to rest on these bolts. Loosen approximately ¼".



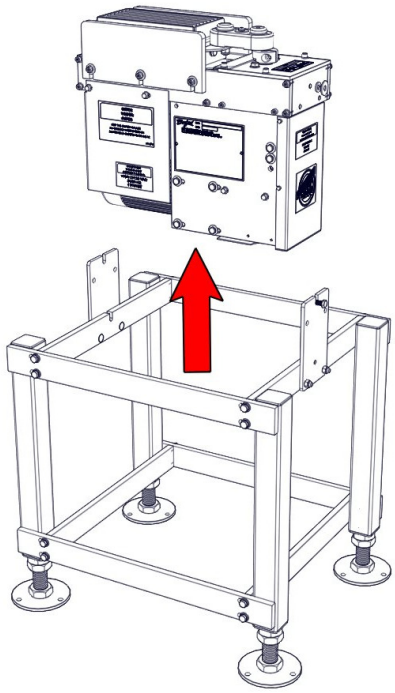
Loosen the center pivot bolt on the upstream side approximately ¼". **Do not completely remove.**



Loosen the center pivot bolt on the downstream side approximately ¼". **Do not completely remove.**

Separate Shaker Head from Stand 4 of 4

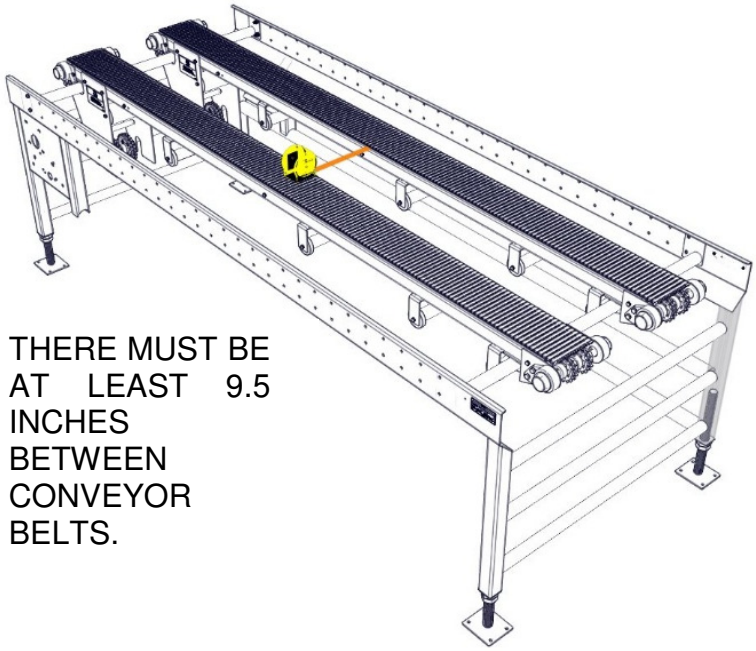
The Shaker Head will now be free from the stand. With at least two people, separate the Shaker Head from the stand by lifting up on the Shaker Head. Place the Shaker Head in a secure place, upright.



The Shaker Head is heavy. Two people are required when lifting.

Remove the Shaker Head from the Stand by lifting the Head. Place the Head in a secure location, keeping it upright.

Determine where the unit will be installed.



THERE MUST BE AT LEAST 9.5 INCHES BETWEEN CONVEYOR BELTS.

CONVEYOR REQUIREMENTS

Clearances in area of conveyor where the pan shaker is to be installed.

Pan guides should be provided in the area of the pan shaker to keep pans straight.

The conveyor must not allow pans to backup, turn, or interfere with other pans entering or leaving the pan shaker area.

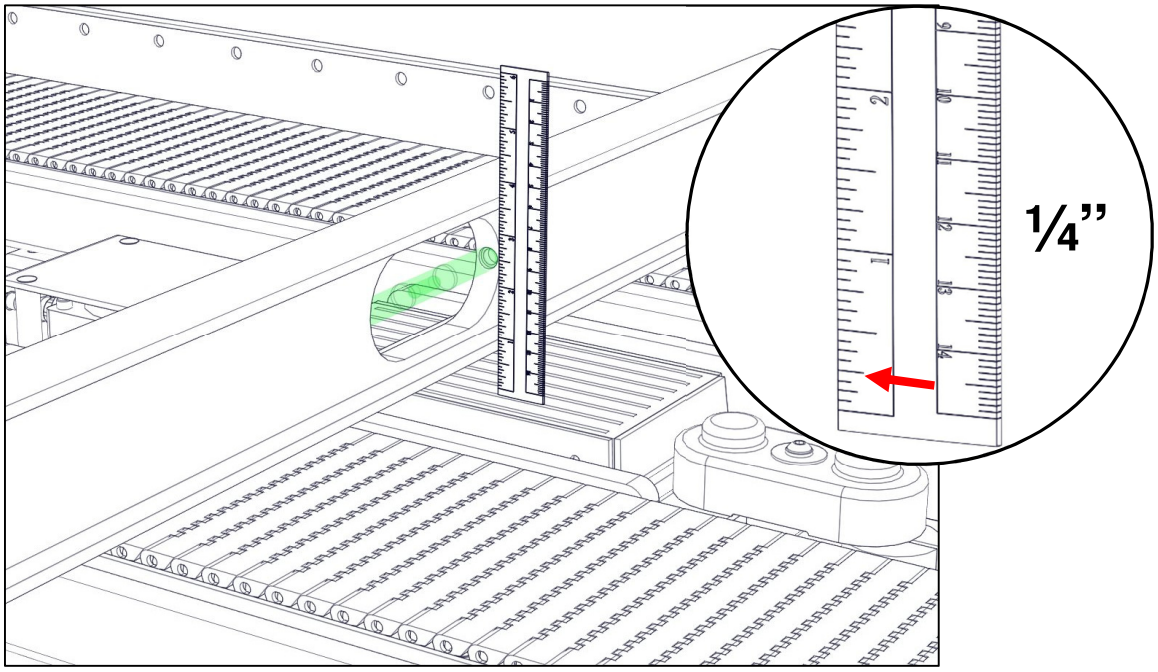
The area chosen must have a minimum clearance of 9.5 inches between tabletop chains.

The dimension from the top of the magnet to the top surface of the conveyor belt or carrier must be ¼" and is extremely critical.

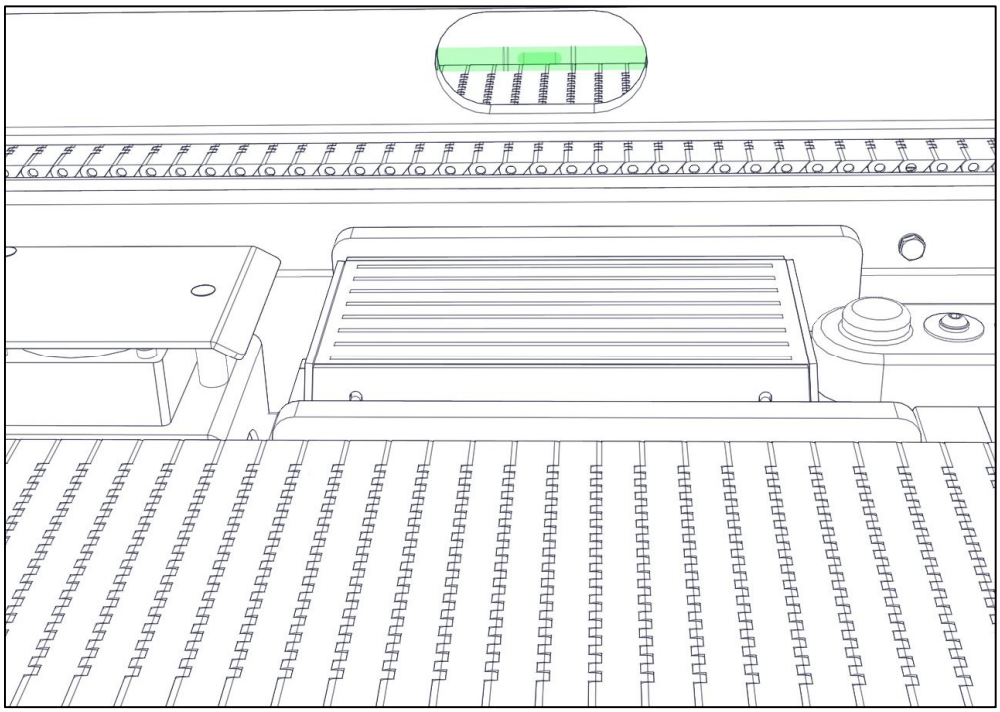
Conveyor must have flat tracks, with reference to earth ground.

Position Requirements

The top of the magnet must be ¼” below the conveyor belt when in down position. This measurement is critical for the proper operation of the unit.

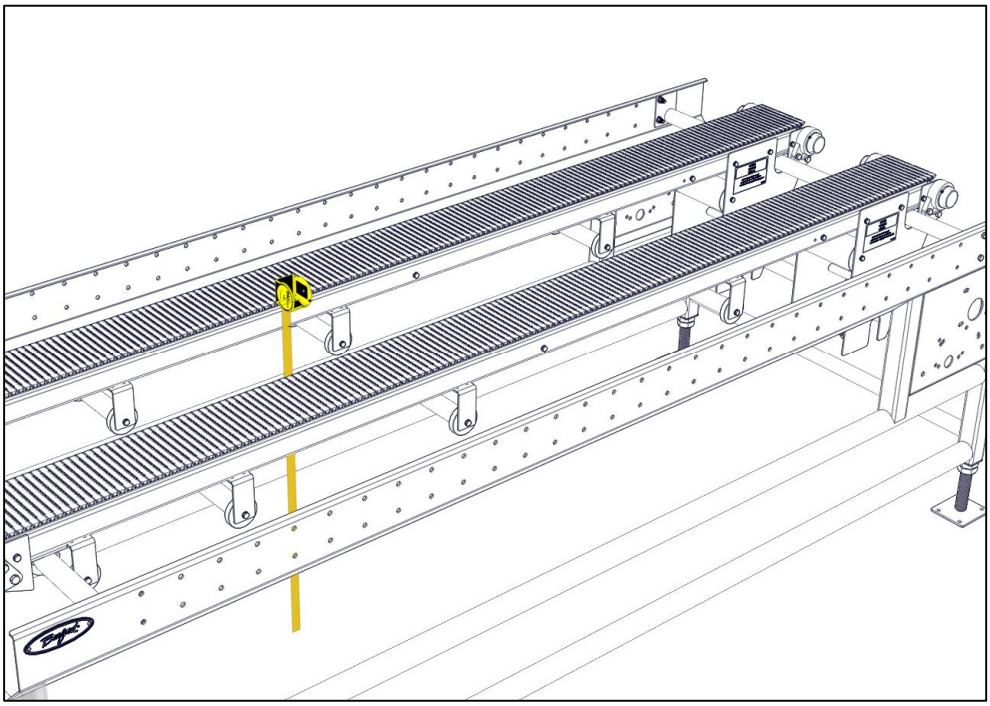


The magnet must be parallel with the conveyor belts.

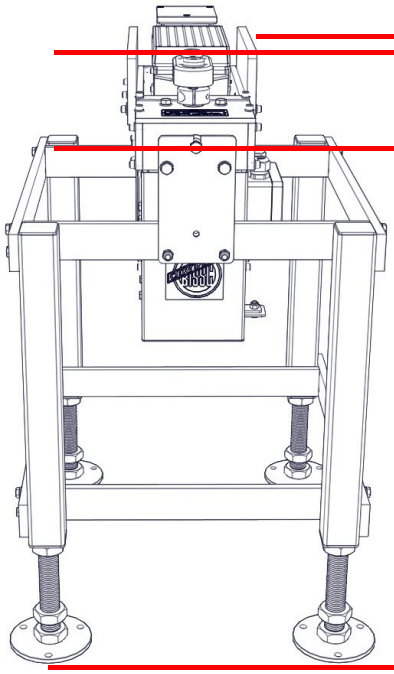


Determine Stand Height

Measure the height from the top of the conveyor belts to the floor.

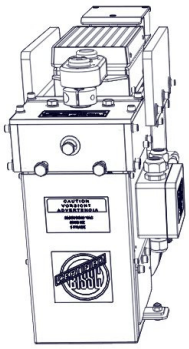


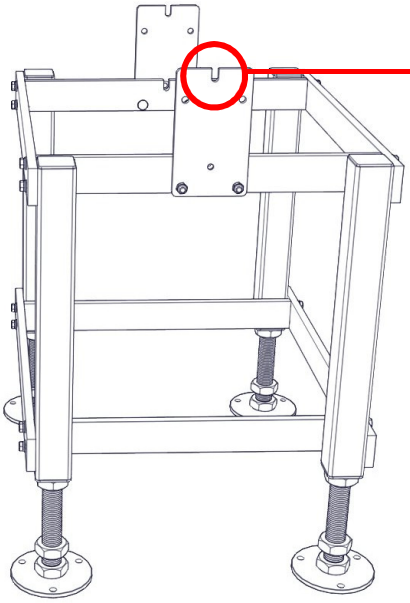
The height of the magnet will need to be positioned the measured height of the conveyor belts to the floor minus ¼". The magnet needs to ¼" below the top of the conveyor belts to function properly.



Determine Stand Height

To determine the height to set the stand we will use the slot at the center of the stand as a reference.

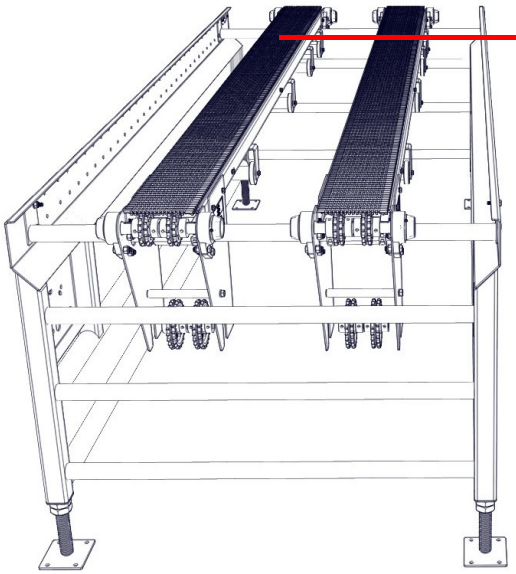


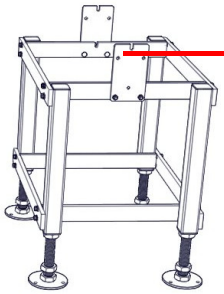


The height of the center slot on the stand from the floor will be the height of the conveyor belts minus ¼" (magnet recess), minus 8 ½" (top of magnet to center slot).

Example

Conveyor Height is 34" Magnet will need to be positioned at 33 ¾".



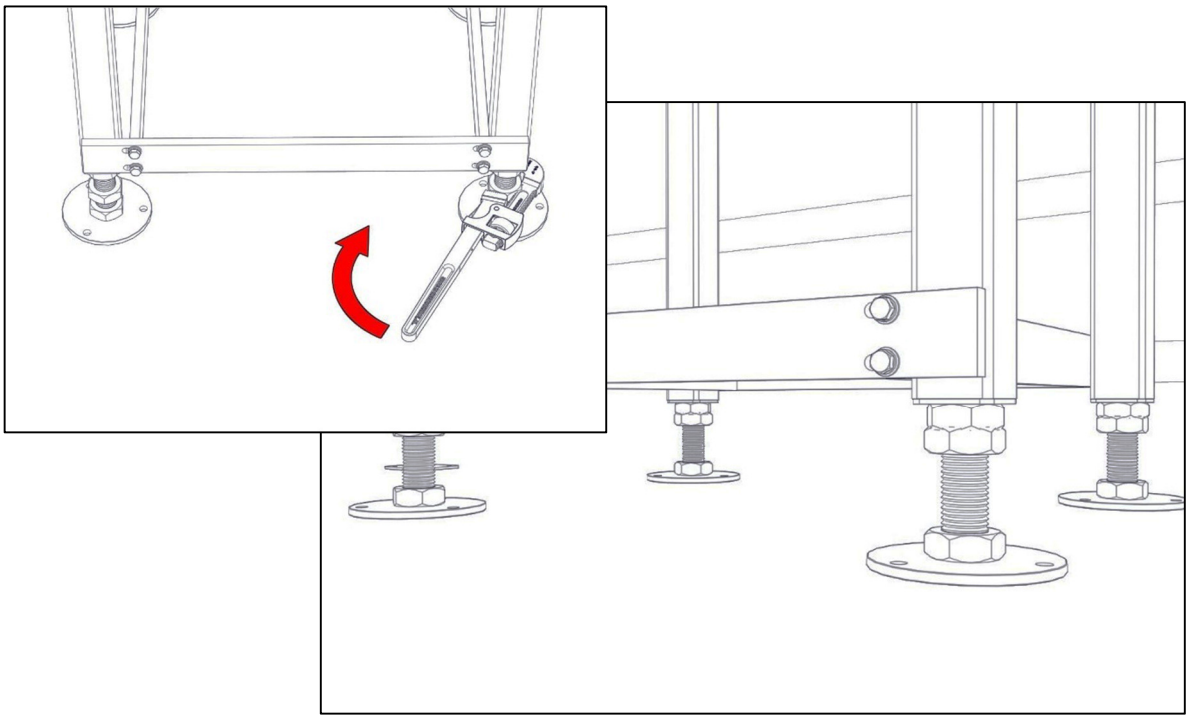


The center slot is approximately 8 ½" below the top of the magnet. Subtract 8 ½" from 33 ¾". The slot should be set to a height of 25 ¼".

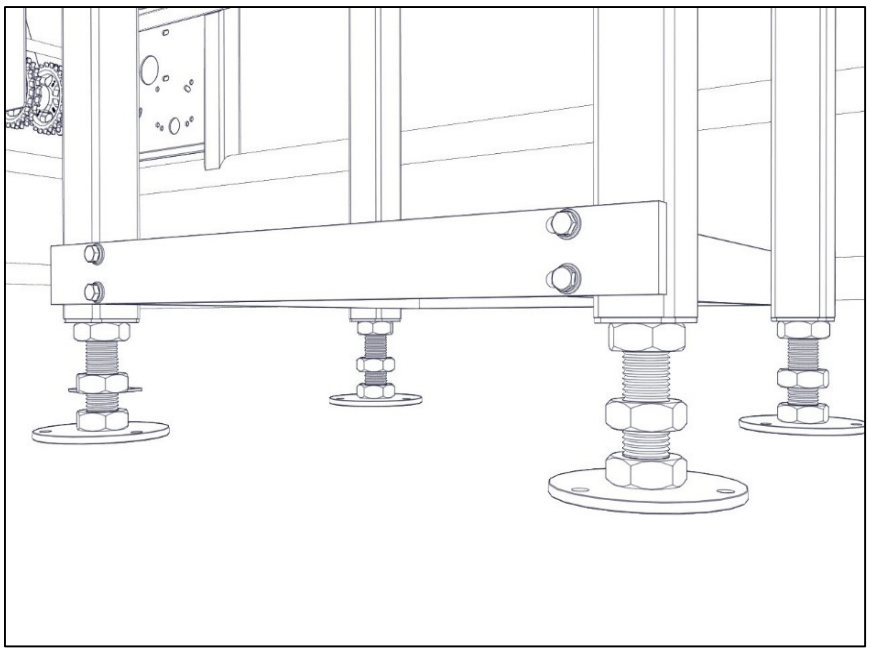
This will get the stand close to the needed height. Final adjustments will be made after the Head is in place.

Adjust the Height of Stand

Using a pipe wrench, loosen the four (4) locking jam nuts on the all-thread leg shafts. This will allow the shaft to rotate to adjust the height.

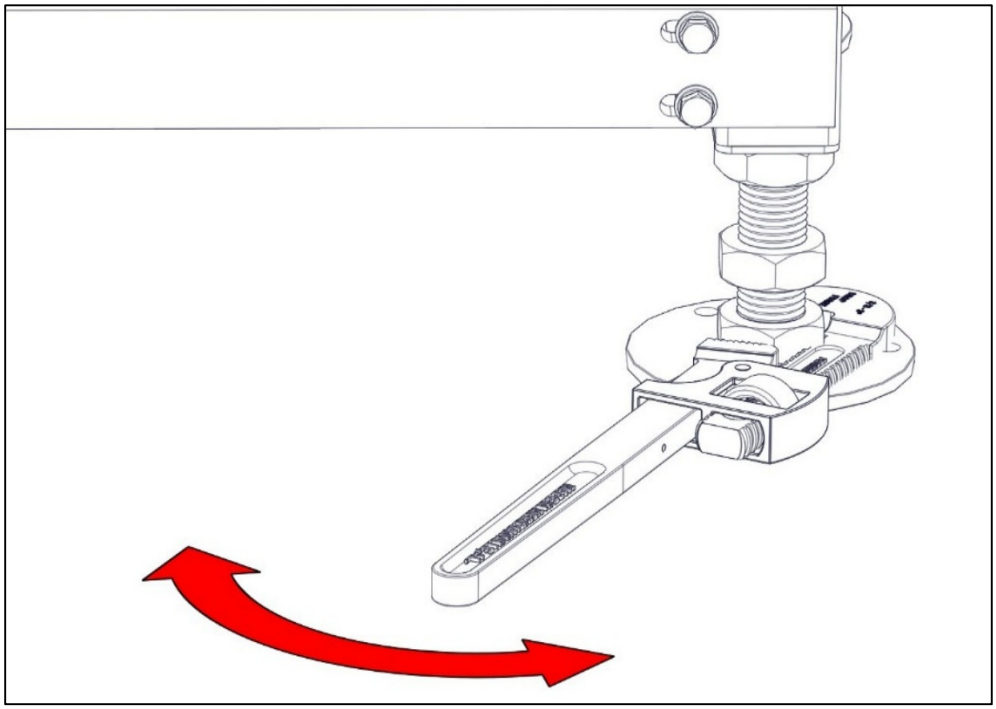


With all locking jam nuts loosened, the height of the stand can be adjusted.

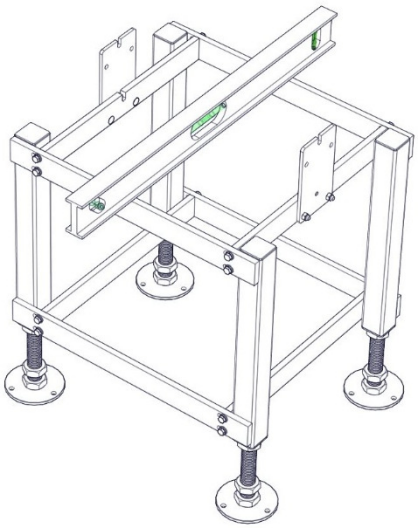


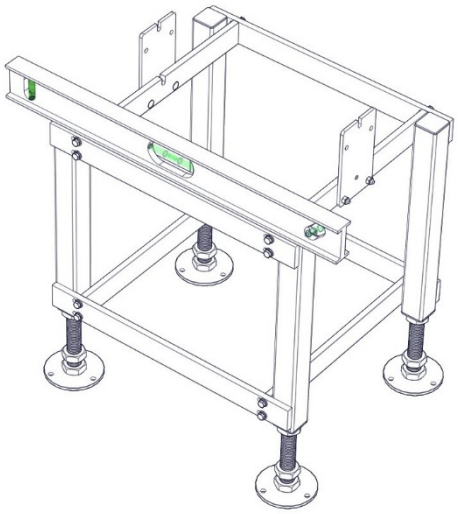
Adjust the Height of Stand

With the locking jam nuts loosened, use a pipe wrench to set the height of the stand according to the measurements calculated in *Determine Stand Height* in this chapter.



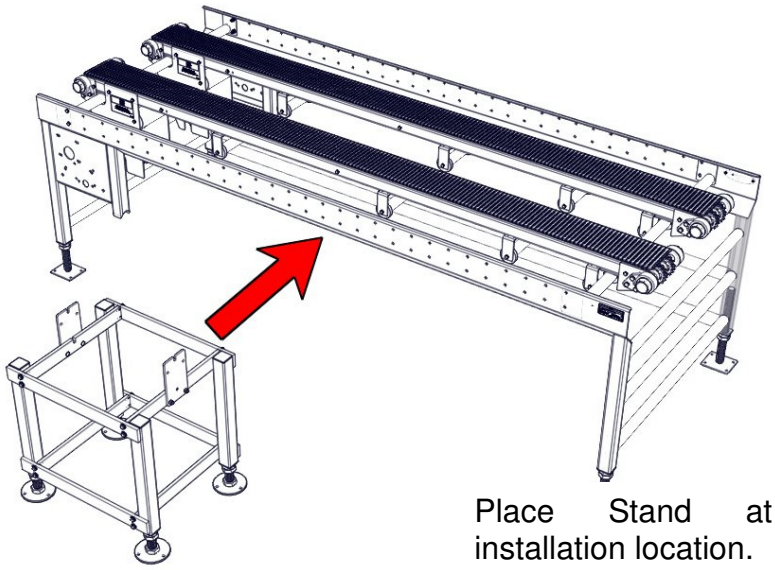
Verify that the stand is level after making height adjustments.





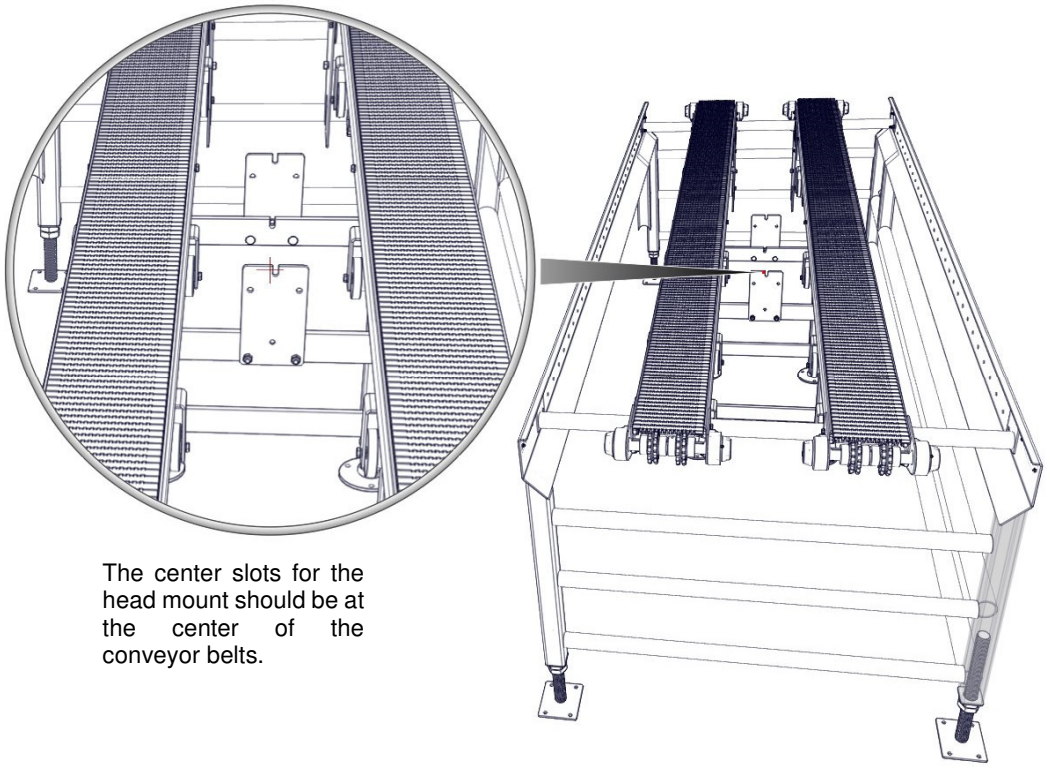
Place Stand at Desired Location

Place the stand at the desired location of installation.



Place Stand at installation location.

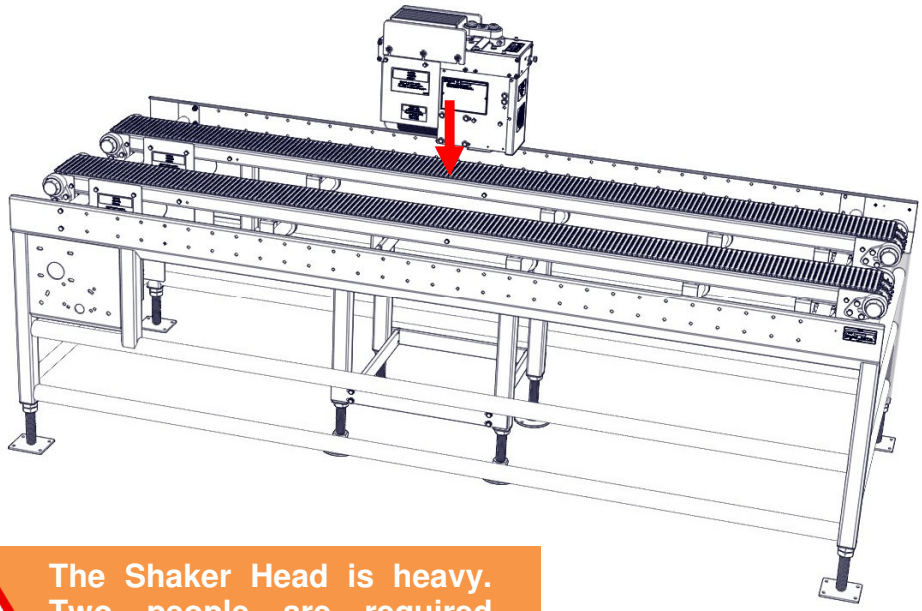
Place the stand at the center of the conveyor belts.



The center slots for the head mount should be at the center of the conveyor belts.

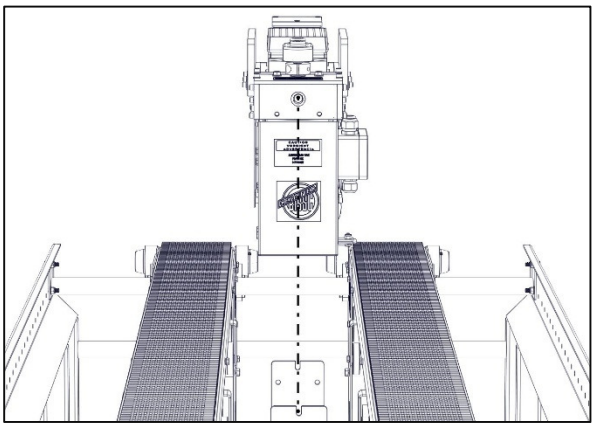
Place Stand at Desired Location

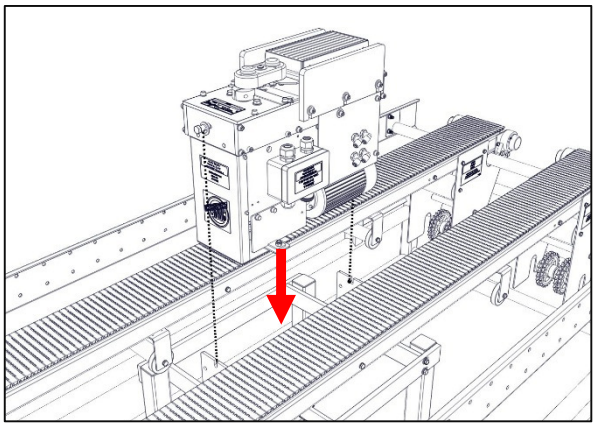
With the stand set in position, lower the Shaker Head onto the stand.



The Shaker Head is heavy. Two people are required when lifting.

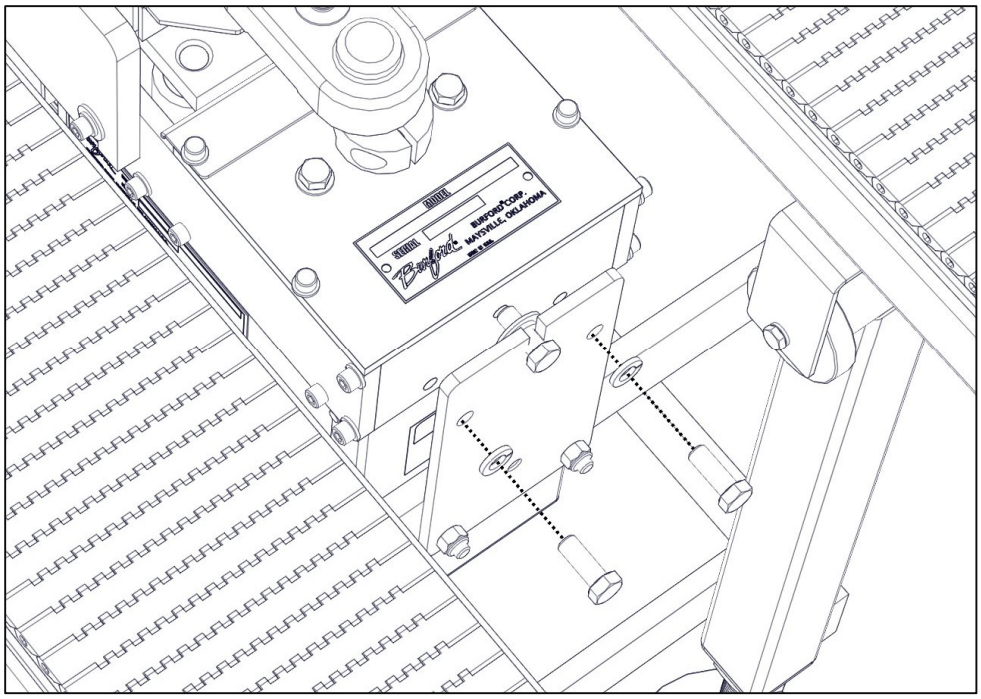
The center mount bolts will align with the slots on the stand.

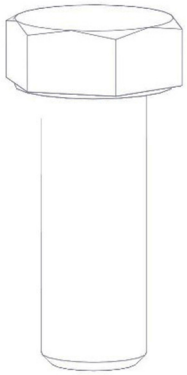




Secure Shaker to Stand

Mount the Shaker Head to the Stand. Attach the two (2) downstream bolts.

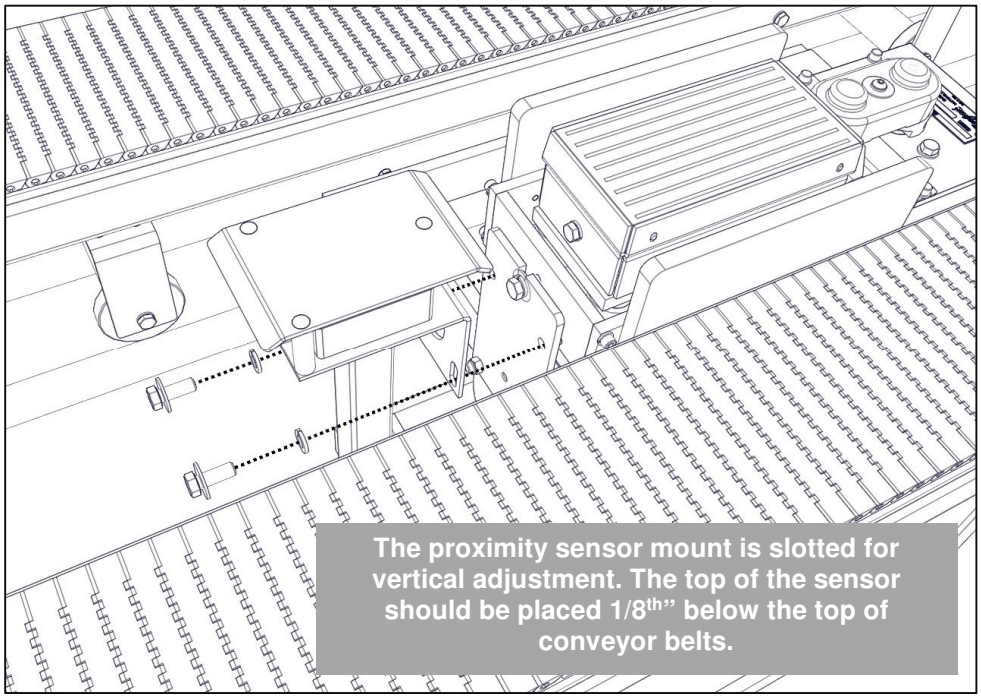




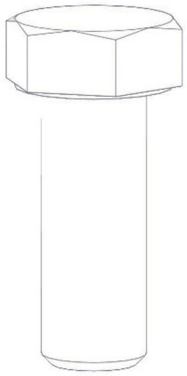
3/8th Bolt

Torque all 3/8th bolts to 44 ft-lbs

Attach the Pan Sensor assembly by attaching the mounting bolts on the upstream side.



The proximity sensor mount is slotted for vertical adjustment. The top of the sensor should be placed 1/8th" below the top of conveyor belts.

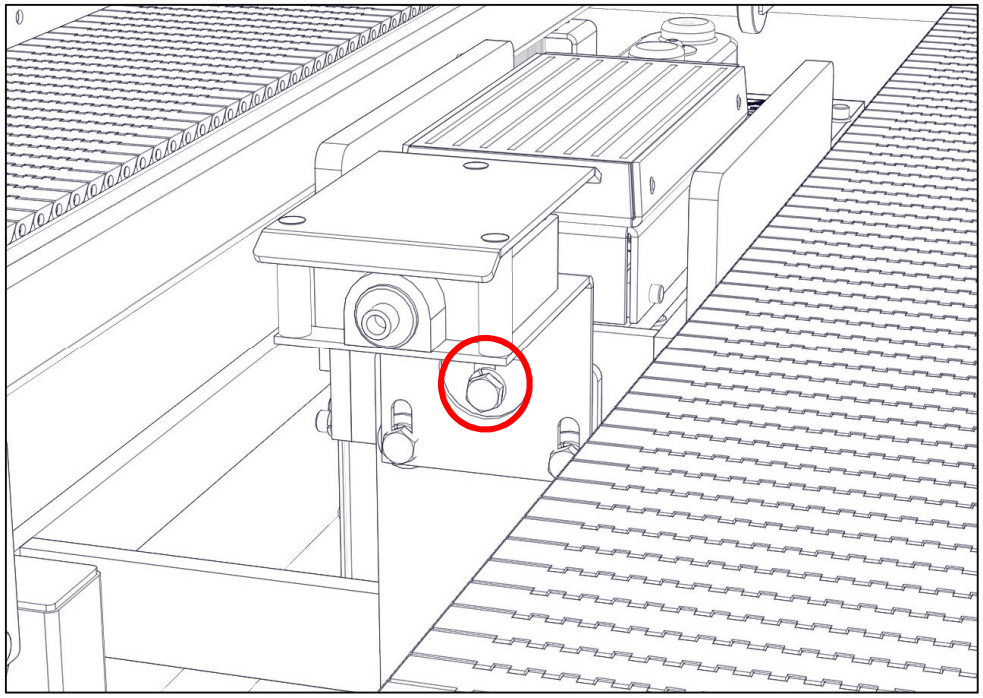


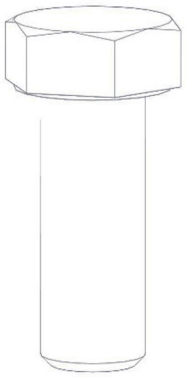
3/8th Bolt

Torque all 3/8th bolts to 44 ft-lbs

Secure Shaker to Stand

Torque the center mount bolt on the upstream side to 44 ft-lbs.

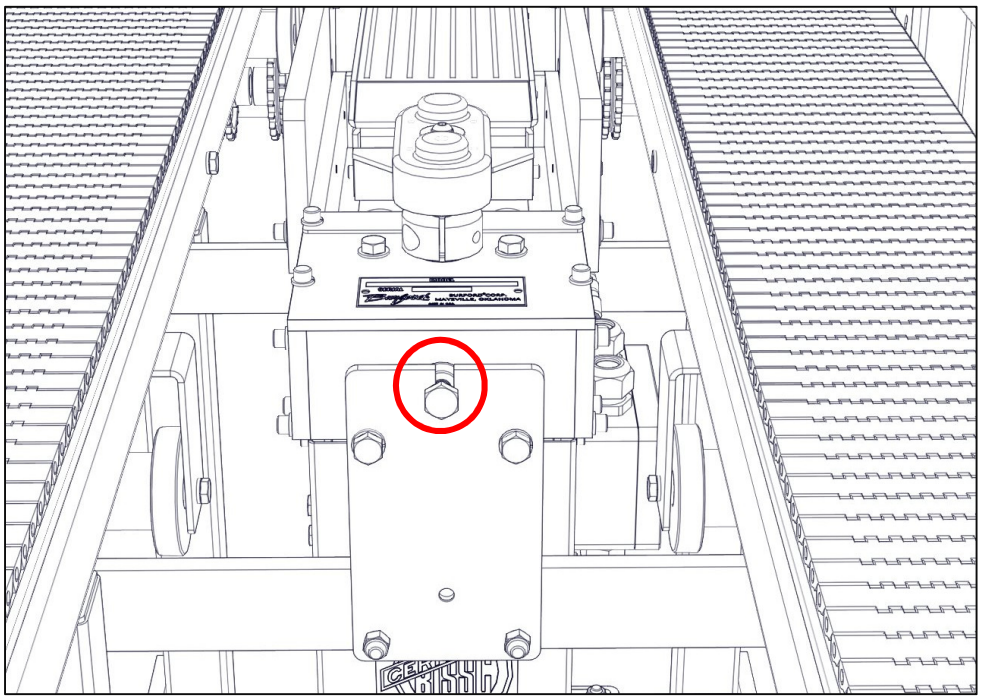


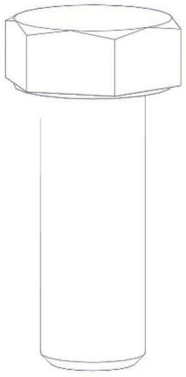


3/8th Bolt

Torque all 3/8th bolts to 44 ft-lbs

Torque the center mount bolt on the downstream side to 44 ft-lbs.



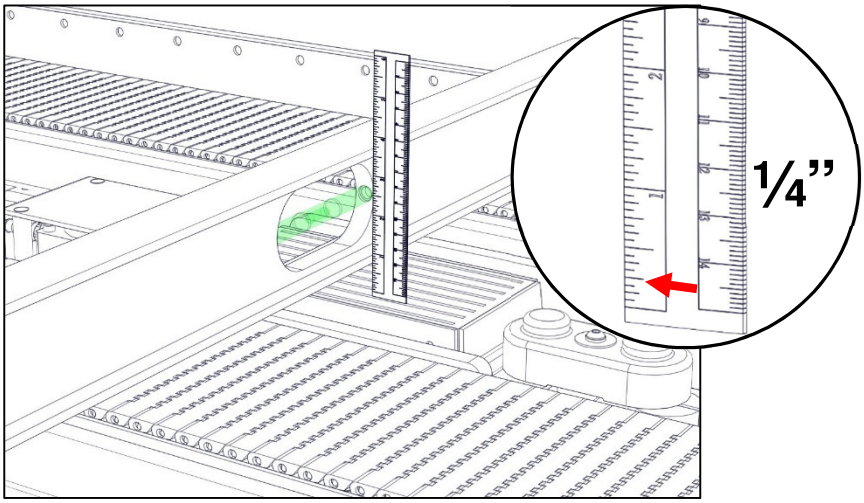


3/8th Bolt

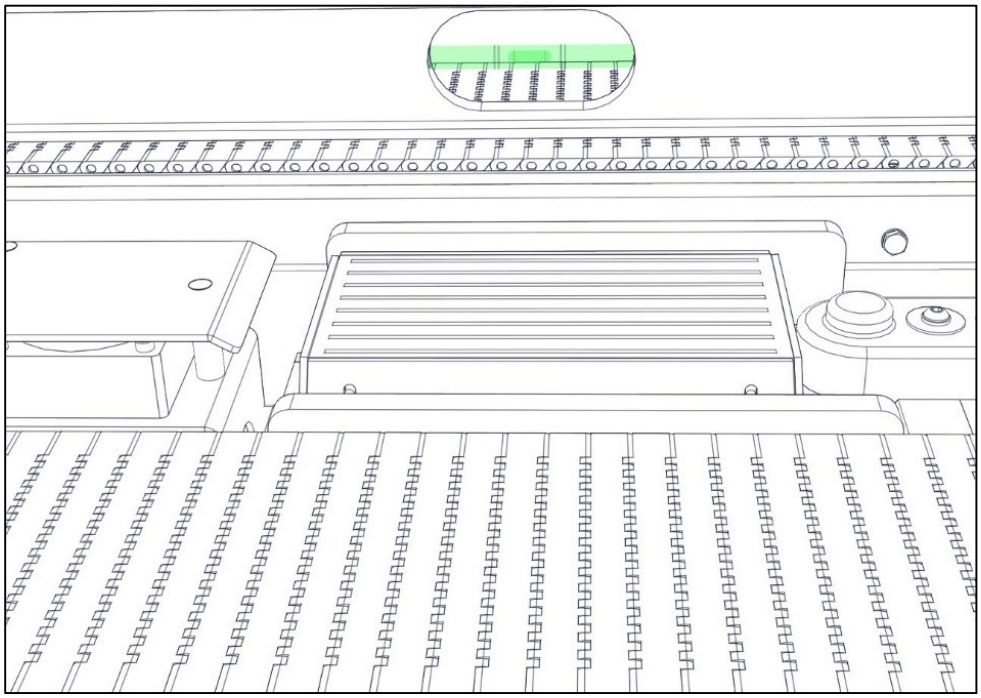
Torque all 3/8th bolts to 44 ft-lbs

Verify Magnet position

Verify that the top of the magnet is ¼” below the conveyor belt. This measurement is critical for the proper operation of the unit. Adjust the stand height if needed.



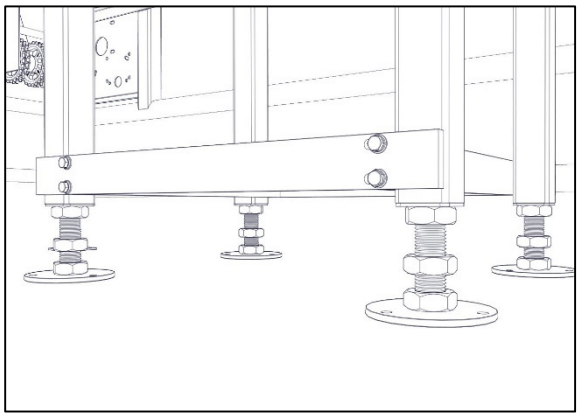
Verify that the magnet is level and parallel to the conveyor belts. Adjust the stand if needed.



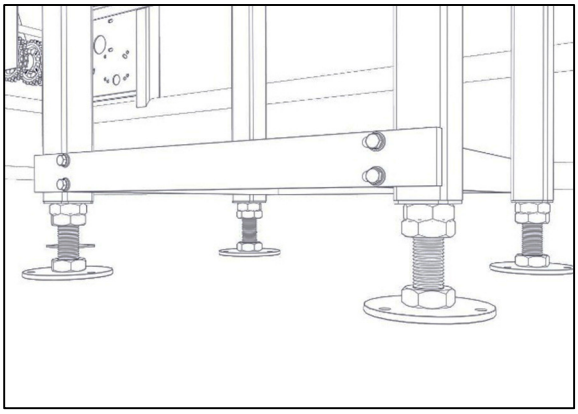
Secure Stand to Floor

When completely satisfied with the position of the unit, secure the stand to the floor.

Lock the shafts by tightening the locking jam nuts.

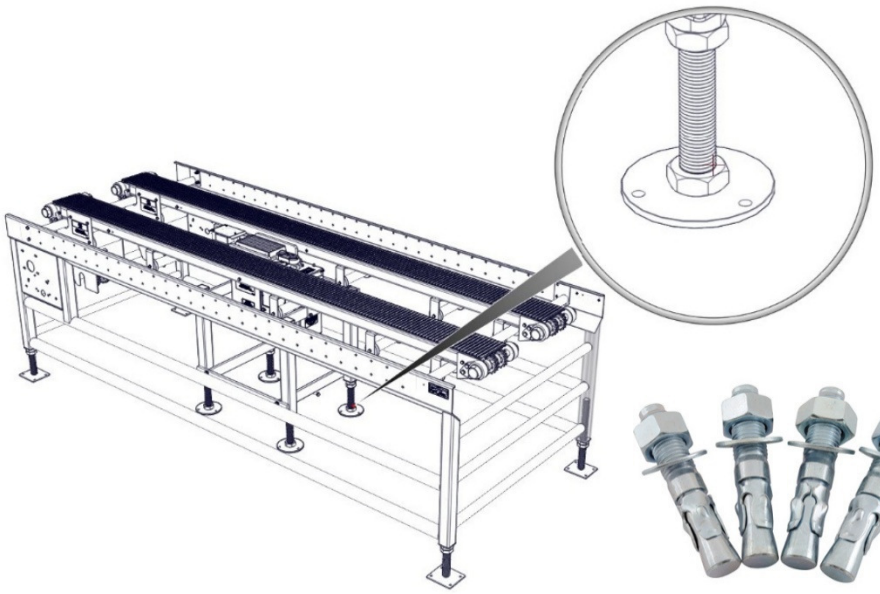


Locking Jam nuts unlocked.



Locking Jam nuts locked.

The footpads for the stand has 3 holes for the anchor bolts. Mark and drill the locations for each anchor bolt, two per footpad. Fasten the two (2) anchor bolts in each footpad.



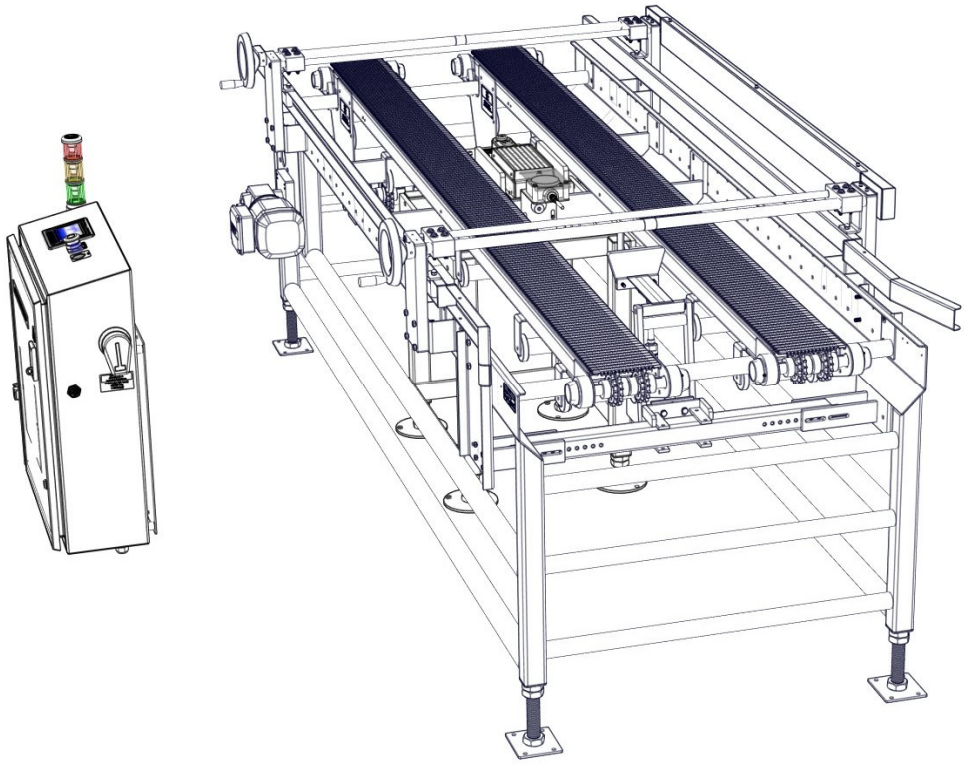
Stand Foot Pad

The unit is shipped with concrete anchor bolts. It is recommended that two (2) be fastened to each footpad of the stand.

Mount Electrical Panel

Determine the location for the Electrical Panel. The panel should be placed near the Pan Shaker. Slots are provided on the Panel Guard to mount to the conveyor side plates and frame.

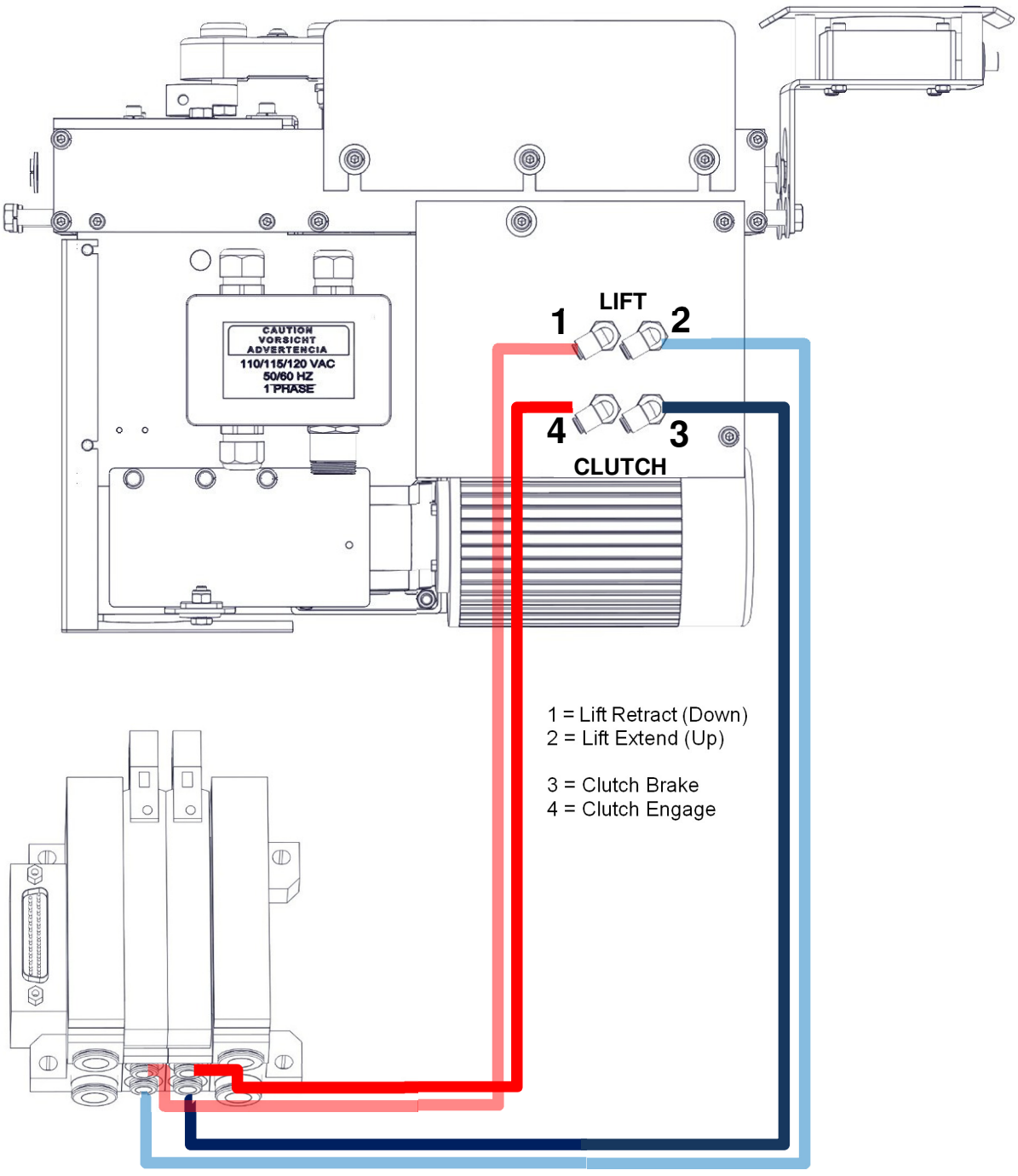
After mounting the panel, it is recommended that the air lines be cut to length from the Panel to the Shaker. This ensures a quick response time for the pneumatic components.



Find a suitable location to mount the electrical panel. It should be out of the way, close proximity to utilities, and accessible to the operators, (emergency stop is located on panel and must be accessible to the operator). Installation must meet all local electrical codes. A certified electrician is recommended to install the electrical panel.

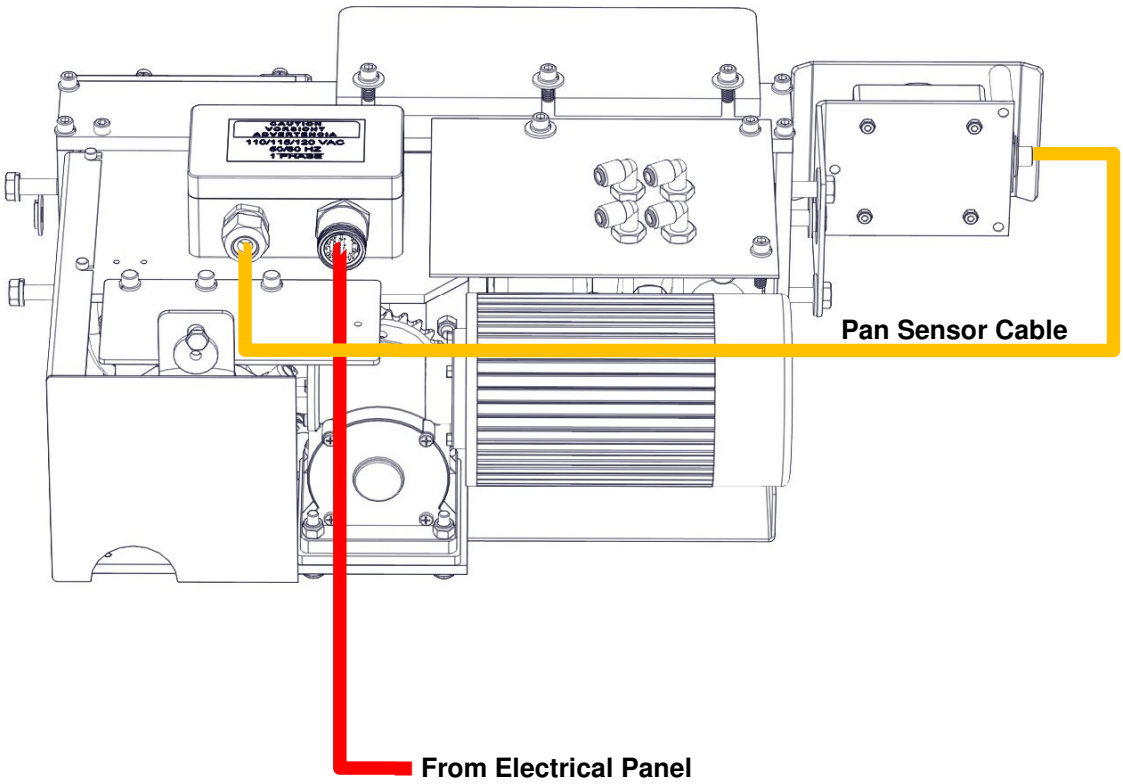
Connect Air

Connect the pneumatic lines from the solenoid manifold on the panel to the Shaker Head. The pneumatic lines are labeled 1, 2, 3, and 4. When connecting, match the numbers labeled on the lines.



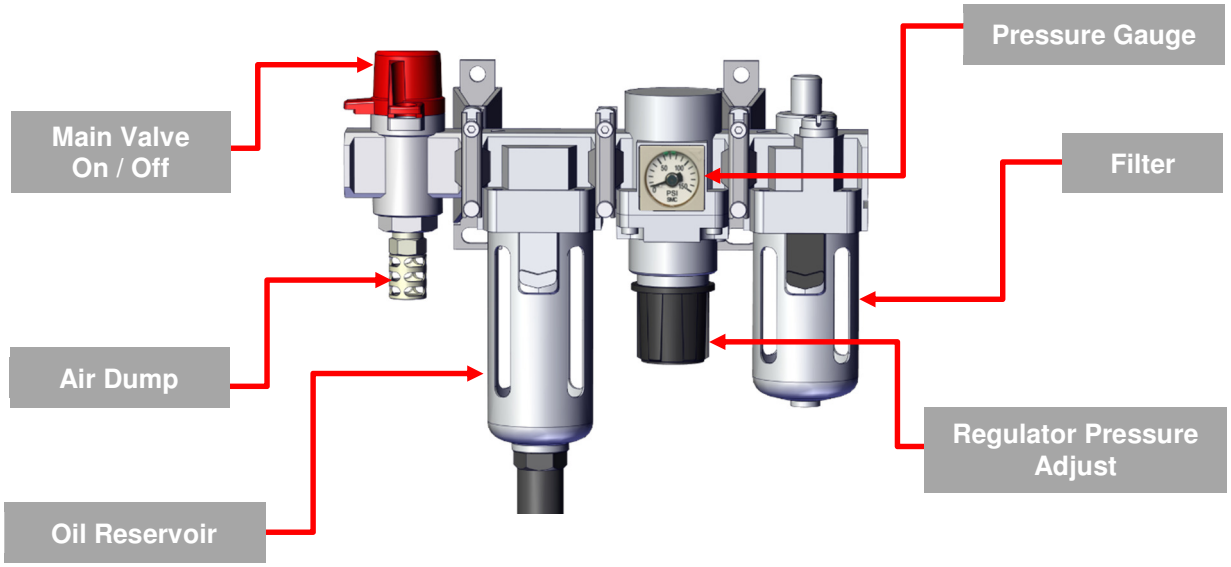
Connect Cables

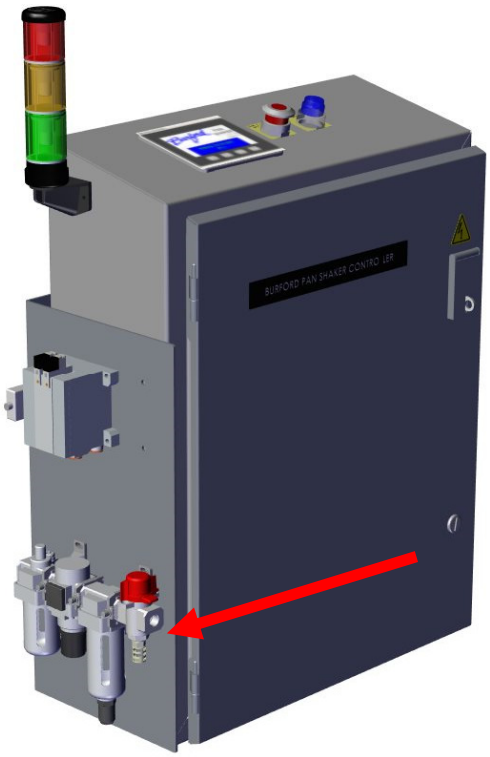
Connect the Pan Sensor cable and the main cable from the Electrical Panel to the Shaker Head.



Connect Main Air Supply

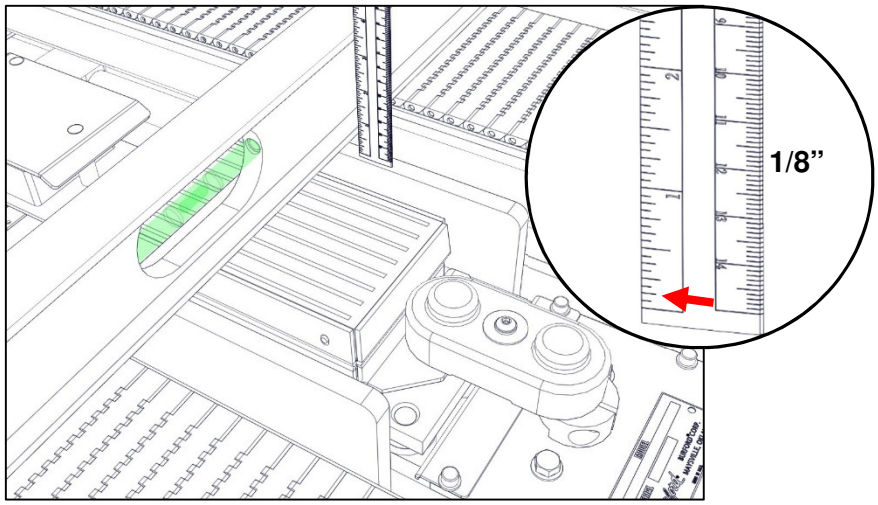
Connect the Main Air Supply to the F.R.L. The Air supply must be .370 CFM@80 psi maximum. Add lubricant to the F.R.L.

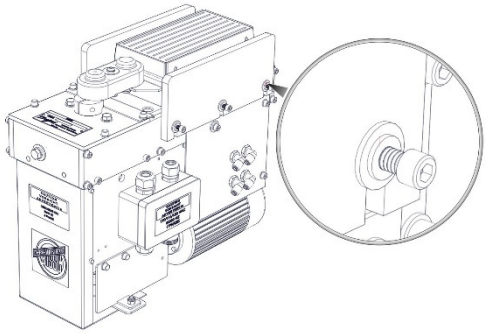




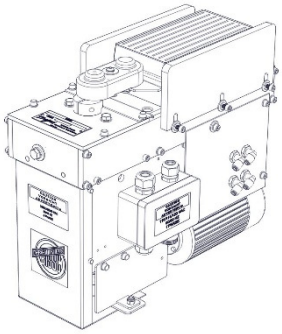
Adjust Pan Deflectors

The unit is equipped with two pan deflectors located next to the magnet. The pan deflectors release the pan form the magnet on its down stroke. They must be set at 1/8” below the belt of the conveyor.

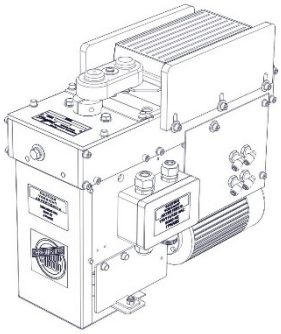




Loosen the three (3) bolts for each deflector.



When loosened, adjust the height of the deflector 1/8th” below conveyor belts.



When satisfied with the height of the deflector fasten the bolts to secure the deflector.

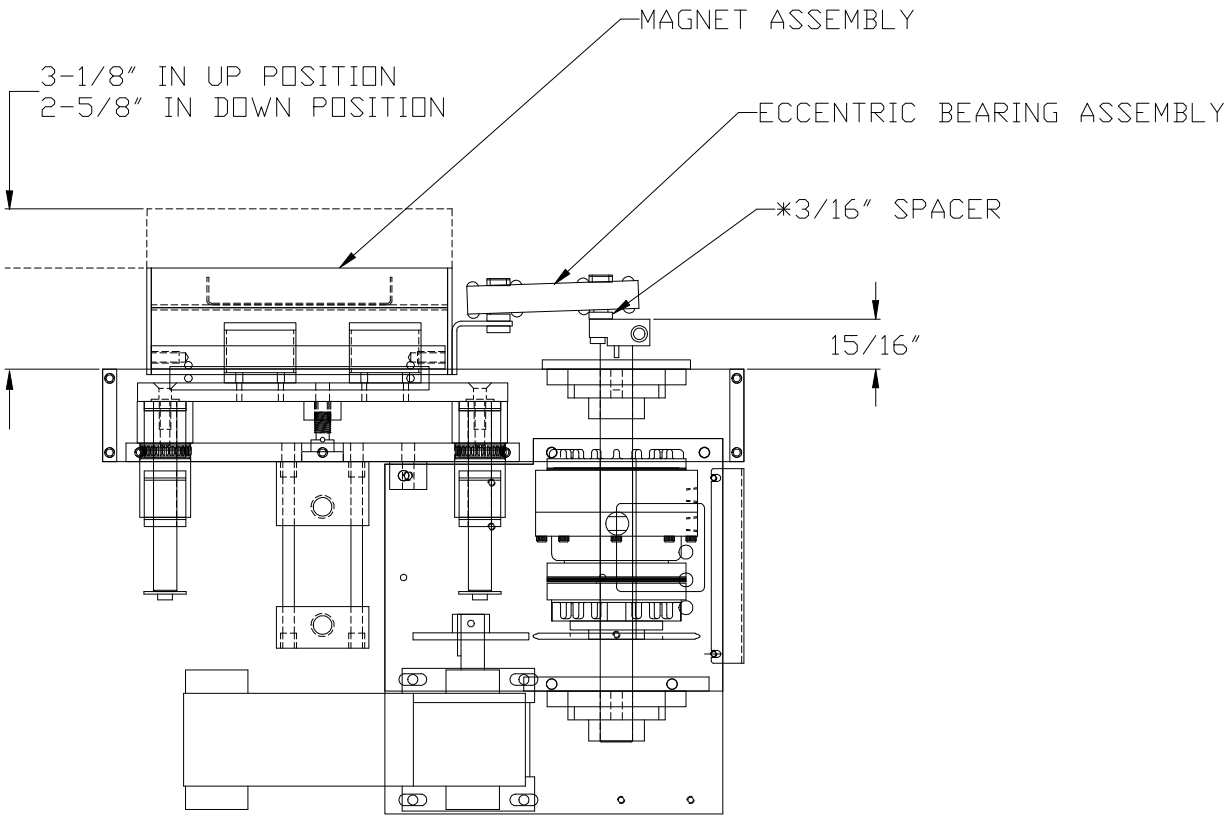
Connect Power

Have an Electrician connect power to the unit that is specified on the Electrical Schematic supplied.

Pan Guides

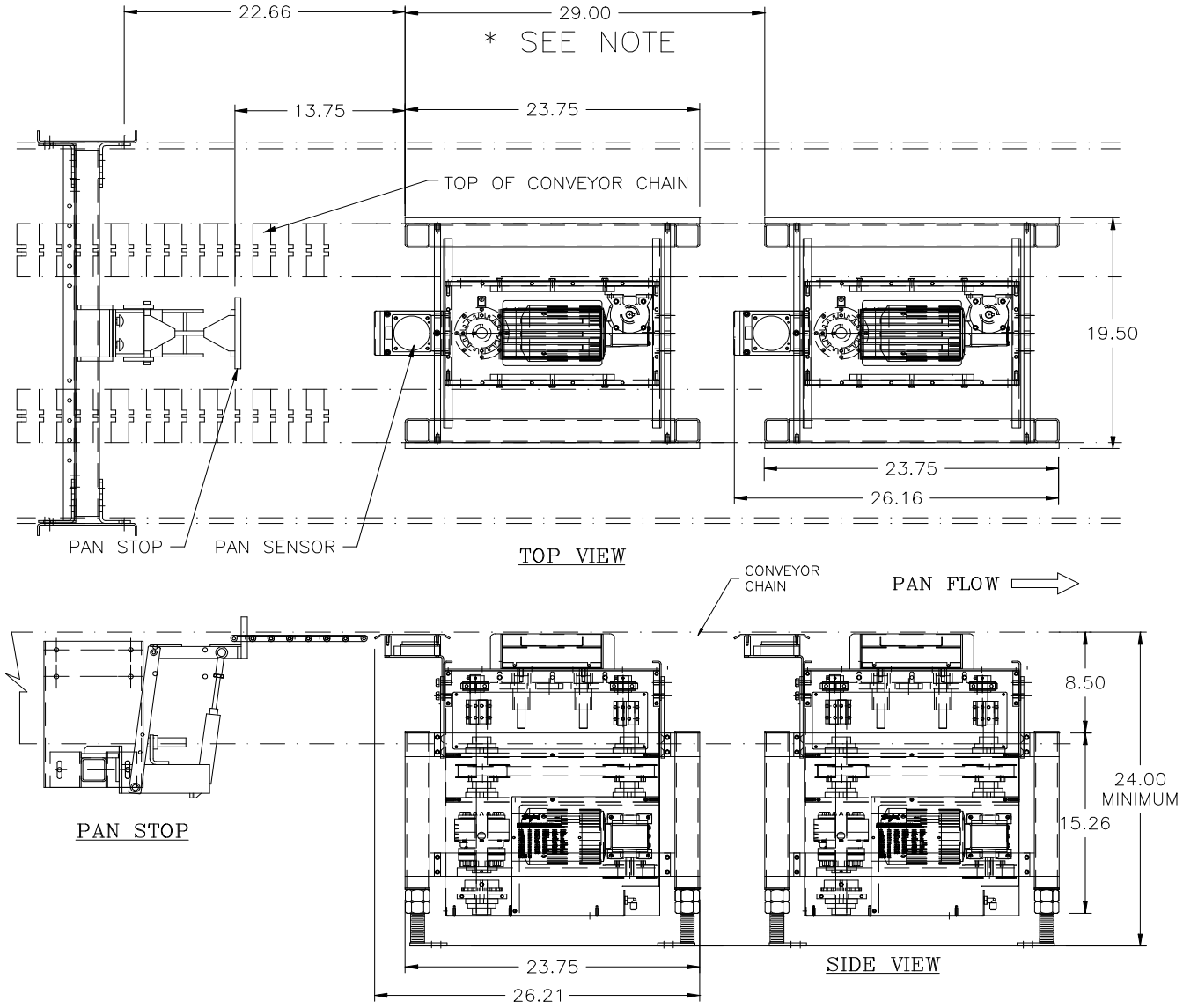
Pan guides should be used to achieve consistent dough position throughout the entire production run. The pan guides need to be adjusted to prevent the pan from turning during transfer through the Shaker. It is important that the pan travels straight over the magnet for proper dough placement. A gap must be present on the sides of the pan to prevent pans from hitting the guides.

Critical Dimensions



Installation Parameters, Dual Pan Shaker

For dual shaker installations, proper spacing between pan stop and the first shaker is very important for trouble free operation. See figure below for mounting dimensions for pan stop / shaker spacing. Shaker-to-Shaker spacing is dependent upon conveyor speed and pan width (in the direction of travel).



NOTE: 29" SPACING IS ADEQUATE FOR CONVEYOR SPEEDS UP TO 144 FEET PER MINUTE (34 PANS PER MINUTE).
CONTACT BURFORD CORPORATION FOR PANS LONGER THAN 35" AND/OR CONVEYOR SPEEDS HIGHER THAN 144 FEET PER MINUTE.

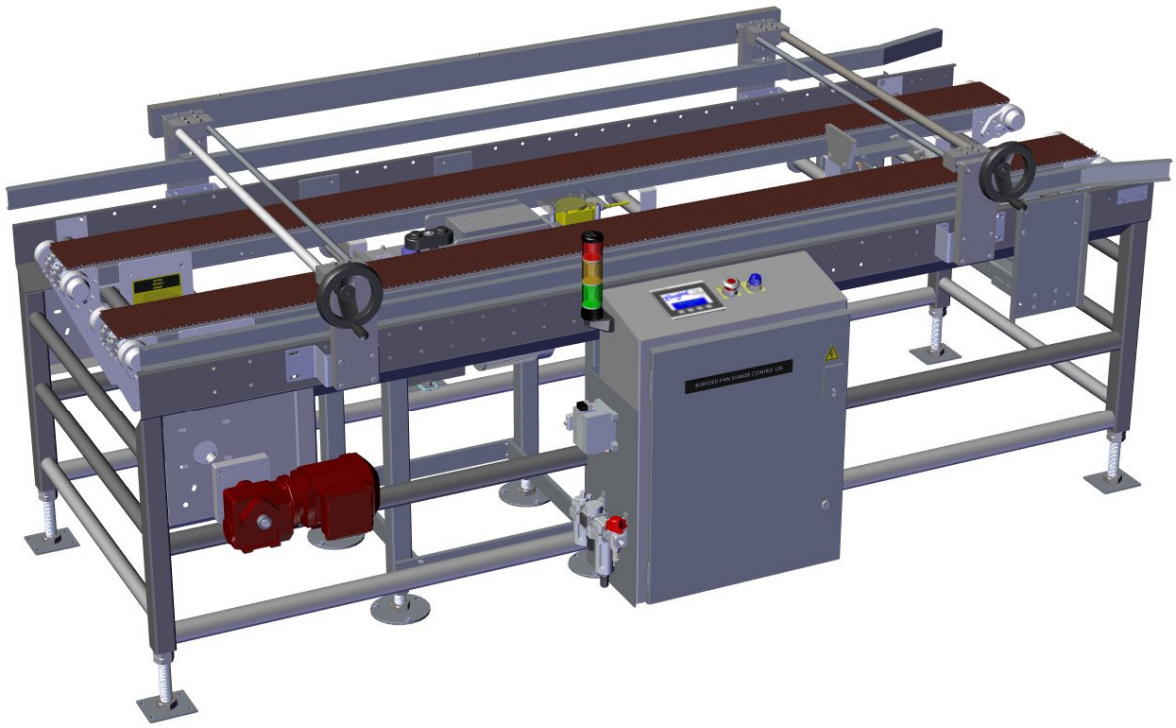
Chapter 4

Operation

CHAPTER 4: OPERATION

Theory of Operation

The pan travels downstream and passes over pan sensor where an adjustable time delay will start and then cycle the lift cylinder valve and the air clutch/brake valve simultaneously, causing the magnet to rise and contact the pan and lift the pan slightly off the conveyor. When the cycle begins the motor drives the bearing assembly, which shakes the pan in a linear motion for the set amount of revolutions. At the end of this cycle, the lift cylinder valve reverses; the brake is applied to the bearing assembly, the magnet lowers, and the pan is discharged.



Pan Settings

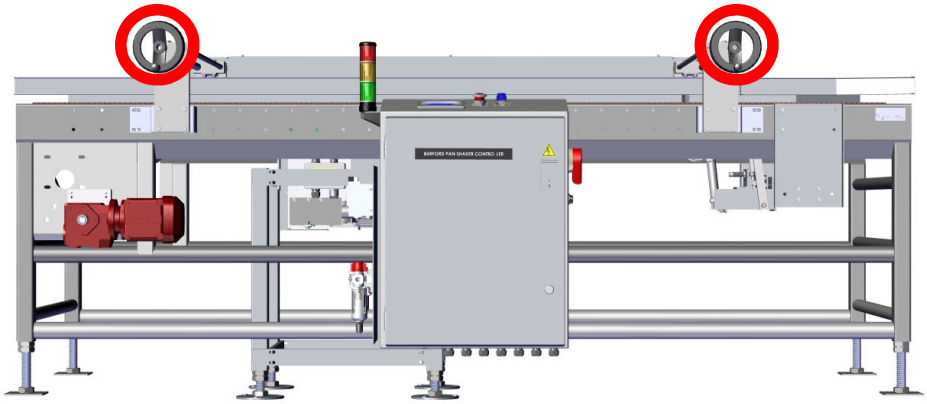
The following settings and adjustments are different from pan to pan. Pan settings for up to 10 different varieties can be stored using the Operator Interface. Due to the variety of pans and products, it is impossible to give specific settings for the Pan Shaker. However, the following guidelines should provide a good starting point. Specific settings for each application will be best found from experience in testing different setups.

Because some settings, particularly the SHAKE SPEED, can change the effect of other settings, it is generally best to establish the settings in the following order per shaker head.

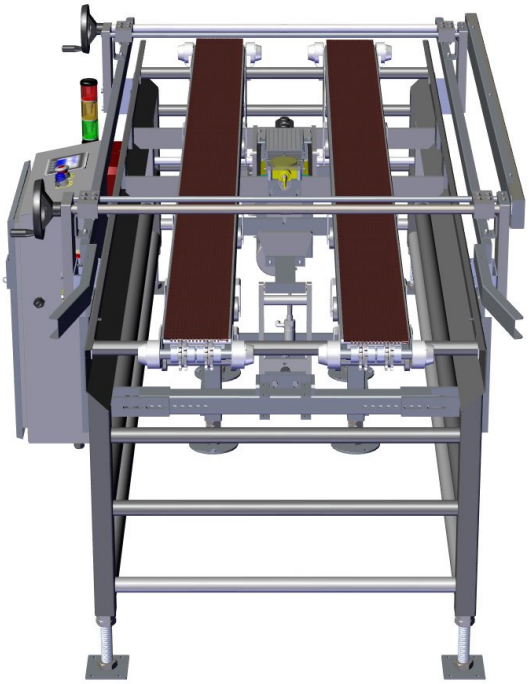
1. Pan Position
2. Shake Speed
3. Number of Shakes (Revolutions)
4. Dough Position

Pan Guide Adjustment (with Burford Conveyor)

Place your pan on the conveyor and adjust the infeed pan guide so there is no more than a ¼” gap on either side. The pan must be squared over the magnet.



The Pan Guide system has two hand cranks for adjustment.



When making adjustments, both hand cranks MUST be turned simultaneously to prevent binding of pan guide mechanism.

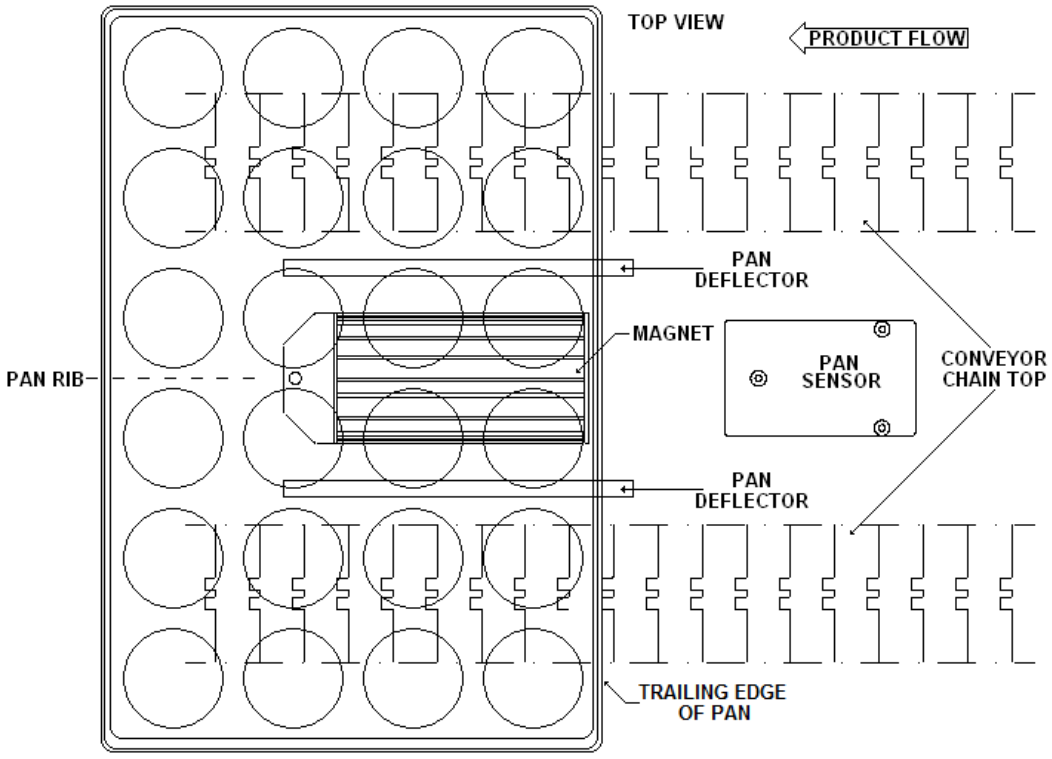
Pan position control

This control is used to adjust the location where the magnet contacts and lifts the pan. Increasing this setting causes the pan to be picked up later or toward the trailing edge. Decreasing this setting causes the pan to be picked up earlier or toward the leading edge.

Make this adjustment by placing a pan on the conveyor upstream of the pan sensor. Then, observe where the pan is picked up by the shaker magnet. Make a small change in the PAN POSITION setting (Range: 0-3 seconds) and then repeat the process until the pan is being lifted at the desired location. The best location is generally in the trailing half or back half of the pan. This will allow the magnet to release the pan more gently.

Aligning the pan and magnet for the lift cycle is important to ensure a smooth shake without popping. The magnet should catch the pan on the pan rib between the center and the trailing edge of the pan to avoid pan popping. Lifting the pan at its center may cause pan flex and popping.

The figure below gives a general location of where to catch the pan on the magnet. This drawing is only an example, many different pans may be used and each pan will need to be tested for its optimal lift zone.



Shaker speed control

This control is used to adjust the speed of the AC motor, which drives the shaker magnet. Increasing this setting causes the pan to shake at a faster rate. This results in greater accelerations, which produce stronger forces on the product in the pan. This causes the product to move in a linear motion. To make this adjustment, place dough pieces on the edges of cavities to simulate panning errors. Then, run the pan on the shaker to observe the results. Make small changes in the SHAKE SPEED setting (Range: 0-100 percent of motor speed) and observe that the dough is moving but not exiting the pan.

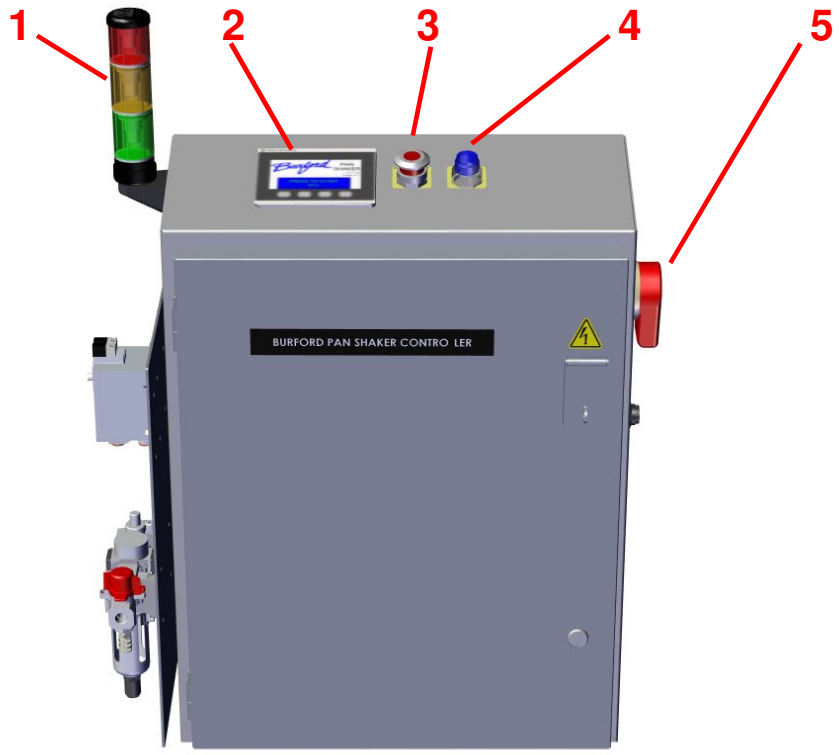
Number of shakes (revolutions) control

This control simply determines the number of strokes that the shaker magnet and, therefore, the pan will make during each cycle. Make this adjustment by observing the effects of different settings as in the SHAKE SPEED adjustment above. Correction of panning errors will be effected by both the NUMBER OF SHAKES setting (Range: 1-9 shakes) and the SHAKE SPEED setting. Therefore, different combinations of these two settings should be tried to find the best settings for any given product or application.

Dough position control

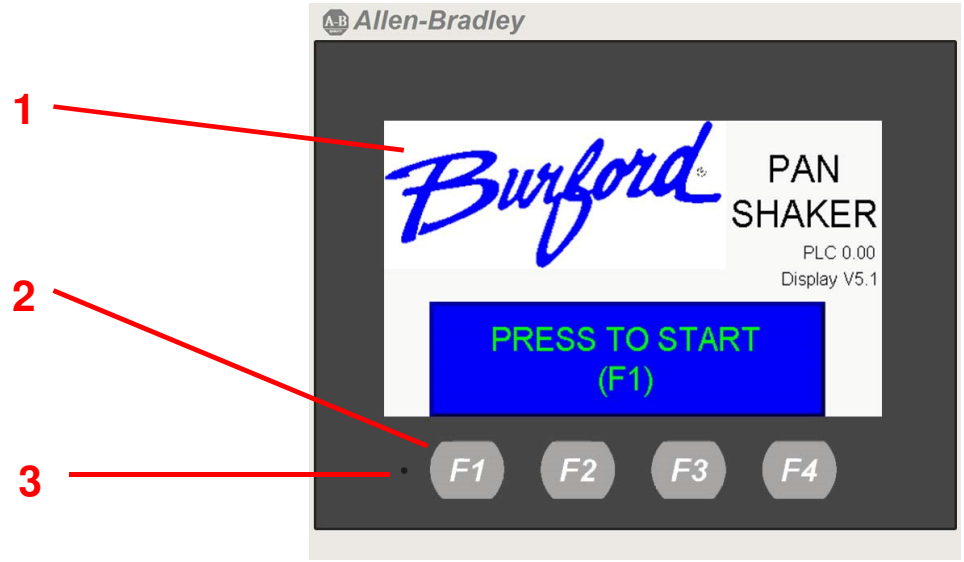
This control is used to select a general location of the cavity in which to leave the dough pieces. It causes the shake cycle to end abruptly at a particular point of the magnet stroke. Make sure that all other settings are made before trying to set the DOUGH POSITION setting (Range: 1-19 stop positions). Observe a few pans at each setting (1-19) of the control and select the setting that most nearly leaves the dough pieces in the desired location. Most users will prefer to leave the dough pieces in the middle of the cavity. However, if desired, the dough pieces can be left in the front or back of the cavity. Remember to check the position occasionally because pan conditions can change throughout a production run. Also, be certain to readjust the DOUGH POSITION CONTROL if any other control settings, particularly if SHAKE SPEED, is changed.

Control Panel



REF	FUNCTION	DESCRIPTION
1	Light Tower	Indicates what function the machine is in i.e., Normal operation, disabled, and enabled.
2	Operator Interface	This is the operator interface where all machine settings and variety setup are altered.
3	“Push to Stop Pull to Start”	When this button is pushed electrical power to the unit is turned off. When this button is pulled out the unit will have electrical power restored to the unit.
4	“Reset”	This button will light up when a fault is detected and must be depressed to resume operation.
5	Main Disconnect	Turns off or on all power to the Unit.

Operator Interface



REF	FUNCTION	DESCRIPTION
1	Touchscreen Display	The touchscreen display allows the operator to control all of the machine functions by simply touching the desired screen button.
2	Function Keys	Advances the display to the selected machine function screen or to select a function to be edited.
3	Power Lamp	Green: Display is energized ready and functioning. Red: Display is energized but not functioning. Off: Display is not energized.

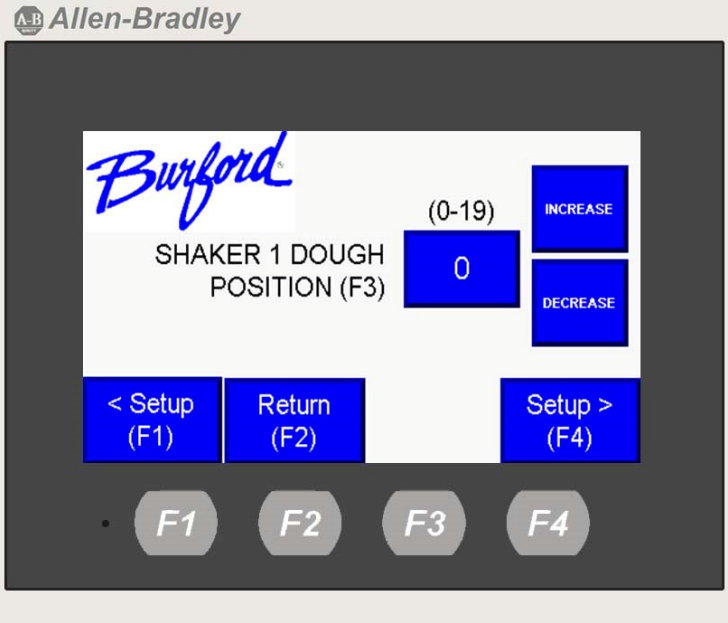
Some machine functions are accessed by either touchscreen buttons or buttons below touch screen. These settings will only affect the displayed shaker head.

Main Screen

FUNCTION	DESCRIPTION
"NEXT"	Press "NEXT" to advance to the next variety listed.
"PREV"	Press "PREV" to return to the previous variety listed.
"RESTORE DEFAULTS"	Press "RESTORE DEFAULTS" to erase all values for the current variety only and restore the factory default values.
"<Setup (F1)"	Press the box containing "<Setup (F1)" or (F1) function key to return to the previous screen.
"Shaker 1 Enabled"	Press "Shaker 1 Enabled" to disable or enable the shaker head.
"Other (F3)"	Press the box containing "Other (F3)" or (F3) function key to enter the "Other Settings" screen.
"Setup> (F4)"	Press the box containing "Setup> (F4)" or (F4) function key to advance to the next screen.

Verify that the correct "Variety Selection" description is displayed. All changes will be saved to this pan selection.

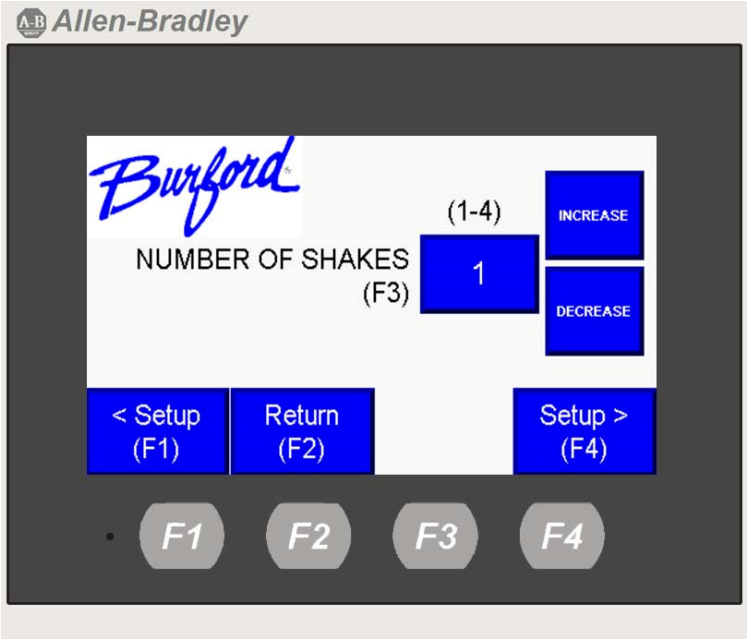
Dough Position Screen



FUNCTION	DESCRIPTION
"SHAKER 1 DOUGH POSITION (F3)"	Press the box to the right of "SHAKER 1 DOUGH POSITION" or the (F3) function key to edit the "Dough Position" using the data entry screen. Alternatively, the "INCREASE" or "DECREASE" buttons may be used to adjust this function.
"<Setup (F1)"	Press the box containing "<Setup (F1)" or the (F1) function key to return to the "Pan Position" screen.
"Return (F2)"	Press the box containing "Return (F2)" or the (F2) function key to return to the "Main" screen.
"Setup> (F4)"	Press the box containing "Setup> (F4)" or the (F4) function key advance to the "Number of Shakes" screen.

Verify that the correct "Variety Selection" description is displayed. All changes will be saved to this pan selection.

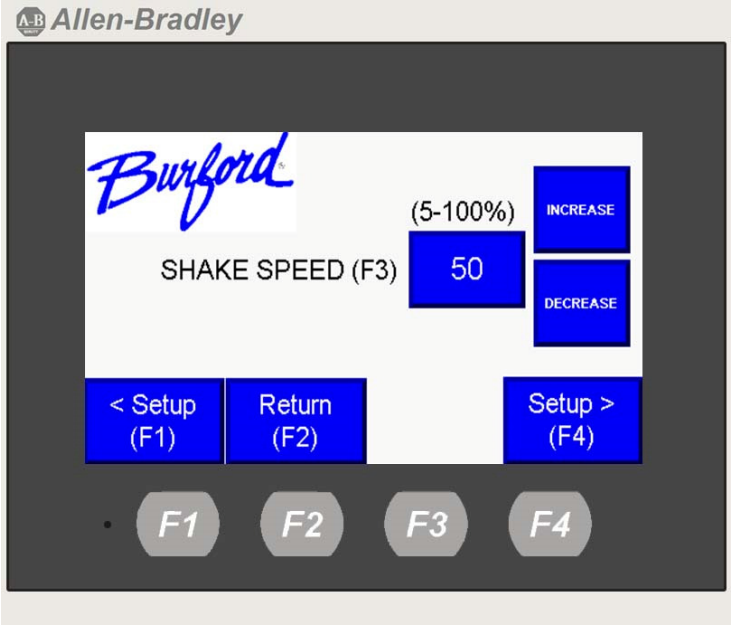
Number of Shakes Screen



FUNCTION	DESCRIPTION
"NUMBER OF SHAKES (F3)"	Press the box to the right of "NUMBER OF SHAKES (F3)" or the (F3) function key to enter the number of shakes (range 1-4 magnet revolutions) using the data entry screen. Alternatively, the "INCREASE" or "DECREASE" buttons may be used to adjust this function.
"<Setup (F1)"	Press the box containing "<Setup (F1)" or the (F1) function key to return to the "Dough Position" screen.
"Return (F2)"	Press the box containing "Return (F2)" or the (F2) function key to return to the "Main" screen.
"Setup> (F4)"	Press the box containing "Setup> (F4)" or the (F4) function key to advance to the "Shake Speed" screen.

Verify that the correct "Variety Selection" description is displayed. All changes will be saved to this pan selection.

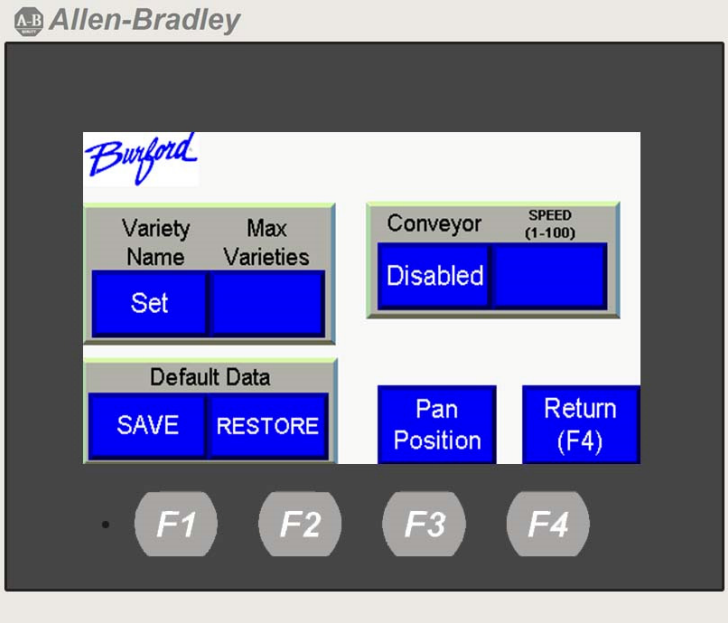
Shake Speed Screen



FUNCTION	DESCRIPTION
"SHAKE SPEED (F3)"	Press the box to the right of "SHAKE SPEED (F3)" or the (F3) function key to edit the "Shake Speed" (range 0-100 percent of motor speed) by using the data entry screen. Alternatively, the "INCREASE" or "DECREASE" buttons may be used to adjust this function.
"<Setup (F1)"	Press the box containing "<Setup (F1)" or the (F1) function key to return to the "Number of Shakes" screen.
"Return (F2)"	Press the box containing "Return (F2)" or the (F2) function key to return to the "Main" screen.
"Setup> (F4)"	Press the box containing "Setup> (F4)" or the (F4) function key to advance to the "Main" screen.

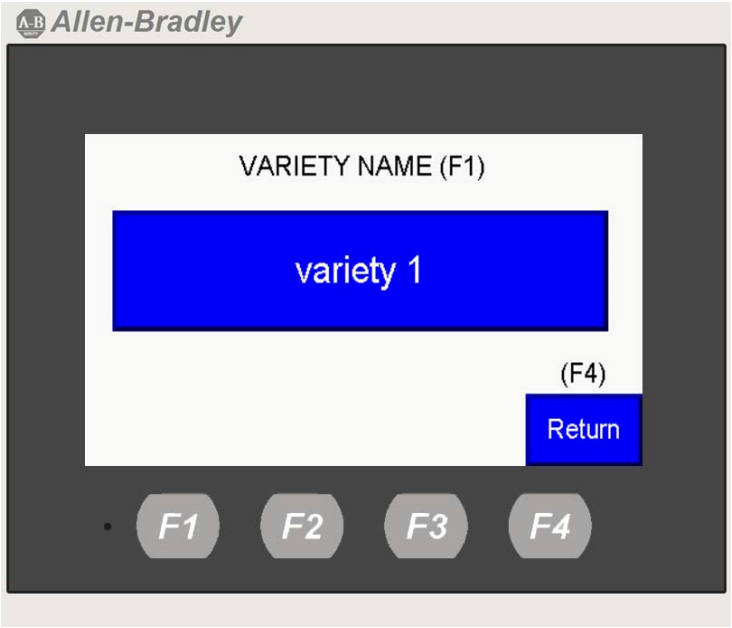
Verify that the correct "Variety Selection" description is displayed. All changes will be saved to this pan selection.

Other Settings Screen



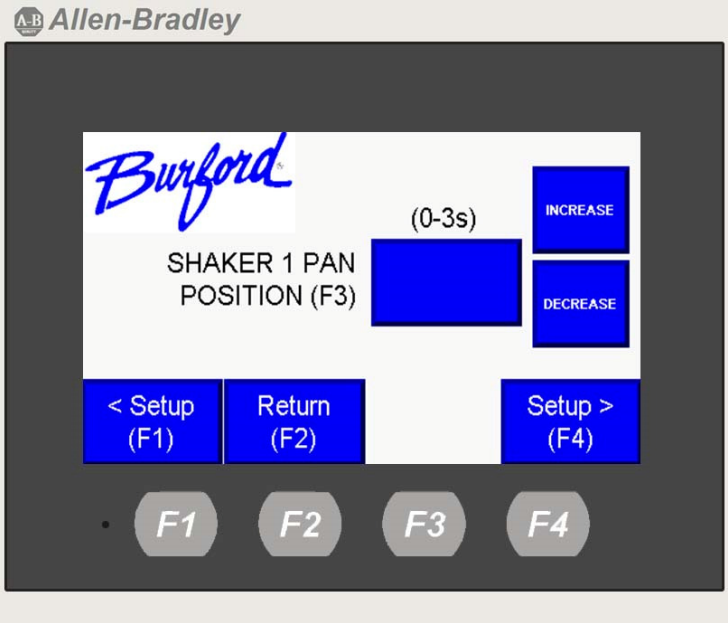
FUNCTION	DESCRIPTION
"VARIETY NAME"	Press the "SET" box below "VARIETY NAME" to enter the edit variety screen.
"MAX VARIETIES"	This button is used to set the maximum number of preset varieties that can be configured and saved for this unit. (20 varieties max)
"CONVEYOR"	If equipped, press box below "CONVEYOR SPEED" to "DISABLE" or "ENABLE" the conveyor.
"CONVEYOR SPEED"	If equipped, press the box below "CONVEYOR SPEED" to edit the conveyor speed (range 1-100).
"DEFAULT DATA"	Pressing the "SAVE" box below "DEFAULT DATA" will allow the user to save temporary changes to the machine. This procedure will require a password to be entered. Pressing the "RESTORE" button will revert the machine back to its factory default settings.
"PAN POSITION"	Pressing the "SET PAN POSITION VALUE(S)" box will access the "PAN POSITION" screen,
"(F4) Return"	Press the box containing "Return (F2)" or the (F2) function key to return to the "MAIN" screen.

Variety Name Screen



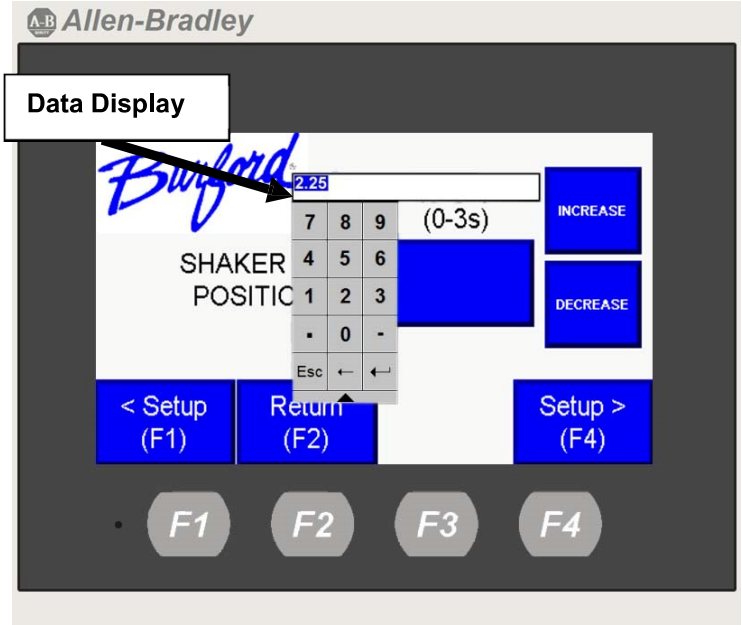
FUNCTION	DESCRIPTION
"VARIETY NAME (F1)"	Press the box below "VARIETY NAME (F1)" or the (F1) function key to edit the "Variety Name" (range 0-12 characters long). A variety can have a name that is blank (not recommended).
"(F4) Return"	Press the box containing "Return" or the (F4) function key to return to the "Other Settings" screen.

Pan Position Screen



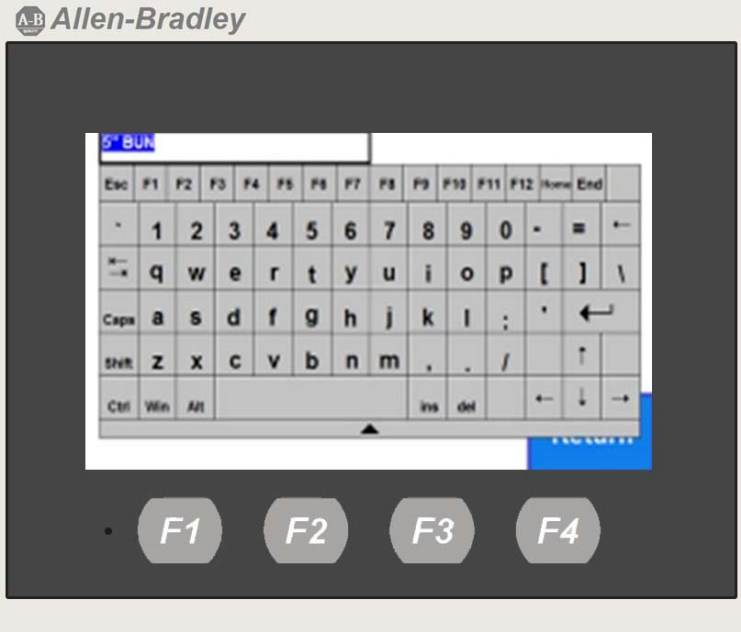
FUNCTION	DESCRIPTION
"SHAKER 1 PAN POSITION (F1)"	Press the box to the right of the "SHAKER 1 PAN POSITION (F3)" or the (F3) function key to enter the shake time (range 0-3 seconds) using the data entry screen. Alternatively, the "INCREASE" or "DECREASE" buttons may be used to adjust this function.
"<Setup (F1)"	Press the box containing "<Setup (F1)" or the (F1) function key to return to the "Main" screen.
"Return (F4)"	Press the box containing "Return (F4)" or the (F4) function key to return to the "Main" screen.
"Setup> (F4)"	Press the box containing "Setup> (F4)" or the (F4) function key to advance to the "Dough Position" screen.

Data Entry Screen



FUNCTION	DESCRIPTION
Data display	The value of the current selected function is displayed here. Values entered will travel from right to left as they are entered and will continue to enter without stopping.
-	Used to change the valued entered between positive and negative values.
Esc	Used to close data entry screen without saving any changes.
←	If pressed before entering any values, the entire value shown will be erased. If pressed after entering values one character at a time will be erased. If pressed when the current value reads “0000” the data entry screen will close.
↵	Press the return key to accept the entered value and exit the data entry screen.
▲▼	Minimizes or maximizes data entry keyboard.

Variety Names Data Entry Screen



FUNCTION	DESCRIPTION
Esc	Exits edit without saving changes.
F1 - F12	Not Used.
Home	Moves cursor to left of displayed text.
End	Moves cursor to right of displayed text.
	Not Used.
←	Deletes characters from right to left.
⇤⇥	Highlights all displayed text.
Caps	Changes keys to all capital letters.
↵	Saves the value entered and returns to “VARIETY NAME” screen.
Shift	Allows one letter to be capitalized.
Ctrl	Not Used.
Win	Not Used.
Alt	Not Used.
ins	Inserts character where cursor is located.
del	Deletes characters on right side of cursor.
← - →	Moves cursor left or right on displayed text.
↑ - ↓	Scrolls the character right of the cursor up and down.
▲▼	Minimizes or maximizes data entry keyboard.

Initial Startup

1. Turn on electrical power via the main enclosure disconnect switch. Once the unit has completed the boot up sequence, the following screen will be displayed. If the E-Stop is currently pushed in ("OFF" position) the display will read "SHAKER OFF PULL E-STOP" in this instance pull the E-Stop out ("ON" position) and the display will then read "PRESS TO START (F1)".

2. After pressing "F1" verify the correct "Variety Selection" number/name is displayed. If not, use the "NEXT" or "PREV" boxes to toggle to the correct variety selection.

3. Begin production.

Programmable Logic Controller

DOUGH POSITION: Input lamp 0 (for shaker 1), lamp 4 (for shaker 2) of the PLC indicates the encoder is sending an electrical signal, which tells the processor where to position the dough piece in the pan.

NUMBER OF SHAKES: Input lamp 1 (for shaker 1), lamp 5 (for shaker 2) of the PLC indicates the encoder is sending an electrical signal, which tells the processor where to stop the magnet.

PAN LIFT LOCATION: Input lamp 2 (for shaker 1), lamp 6 (for shaker 2) of the PLC indicates the location of the lift magnet.

PAN PROX ACTIVATED: Input lamp 3 (for shaker 1), lamp 7 (for shaker 2) of the PLC comes on when the sensor detects the pan and stays illuminated as long as a pan detected by the sensor.

PAN SHAKER OUTPUT: Shaker 1: Output lamps 4 (lift cylinder) & 5 (clutch/brake) of the PLC indicate that the processor has turned on one or both output signals.

Chapter 5

Maintenance

CHAPTER 5: MAINTENANCE

Recommended Weekly Maintenance

Drain air filter weekly.
Check and fill lubricator weekly & confirm dripping, 1 per 15 cycles.
Clean (Blow Off) magnet and frame area.
Inspect air lines and replace if defective.

Recommended Monthly Maintenance

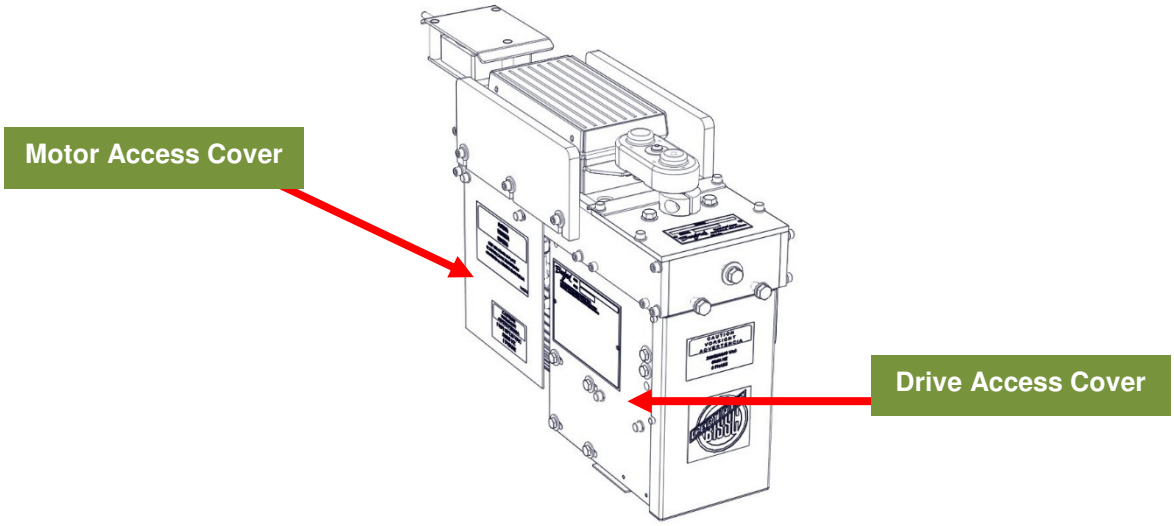
Check all mounting screws and insure that they are secure.
Check sprocket setscrews and keys for tightness.
Remove lower side cover and check belt alignment. Replace cover.
Remove upper access cover and check setscrews for tightness. Replace cover.
Check dimension of magnet lift.
Insure all flat head screws are secure in the vertical guide shafts.
Check pan sensor for proper operation.

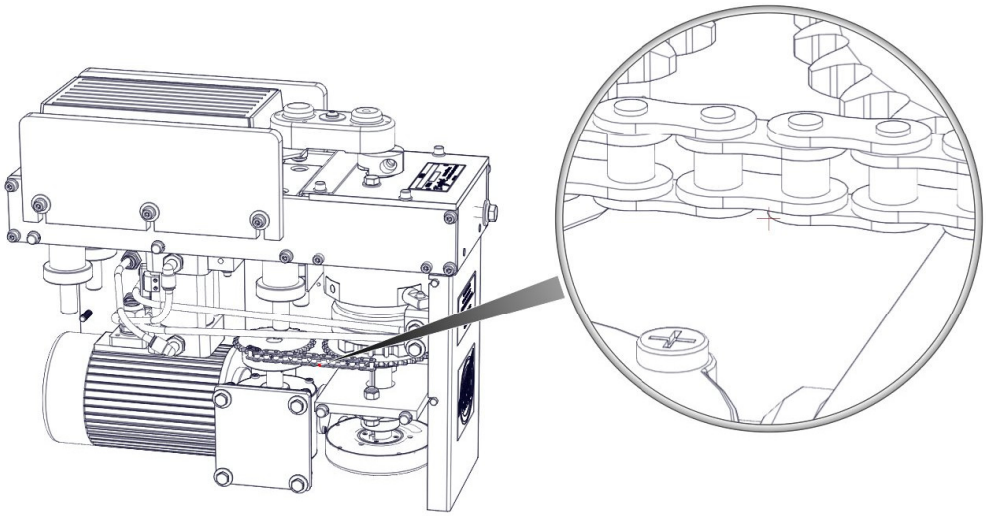
Recommended Torque of Bolts, Nuts and Cap screws:

5/16” Bolts 220 inch lbs.
1/4” Bolts 140 inch lbs.
3/8” Bolts 44 ft-lbs.

Access Covers

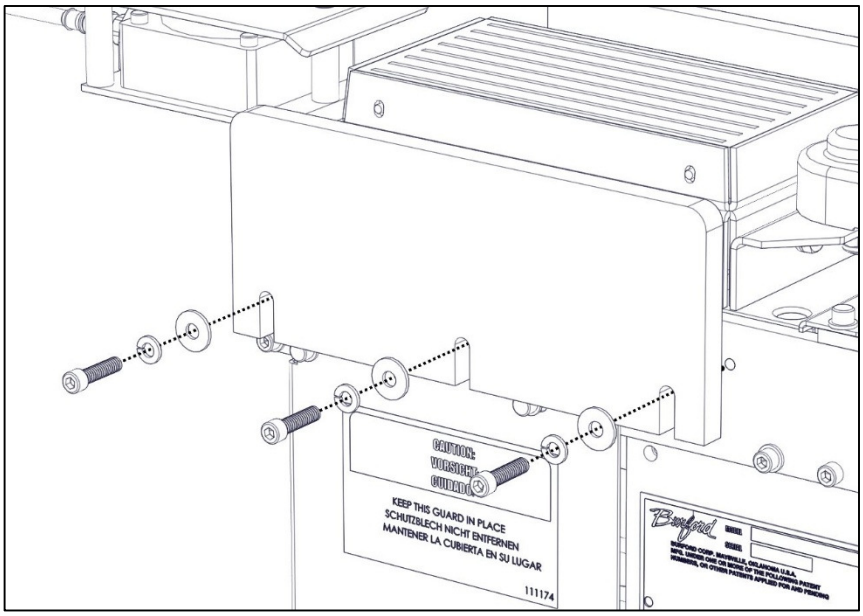
The unit has two access covers that allows accessibility to all internal components.



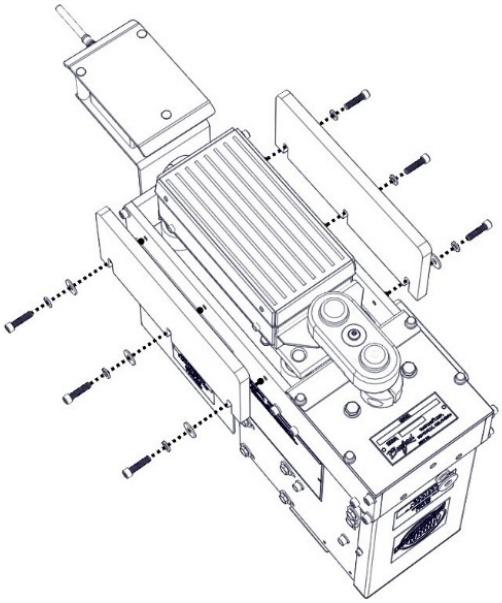


Change Linear Bearings

The unit contains linear bearings for the lift of the magnet and for the back and forth of the magnet. It may become necessary to replace the bearings due to wear. The following instructions goes through the process of replacing the linear bearings. Before beginning any maintenance on the unit, be sure to remove all energy sources, pneumatic and electrical. Follow all lock out procedures.

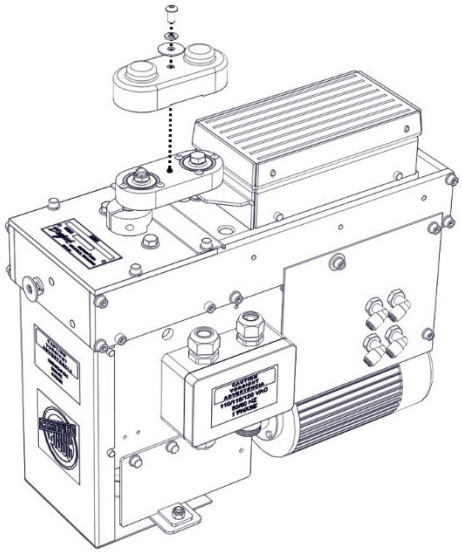


Remove the Pan Deflectors.

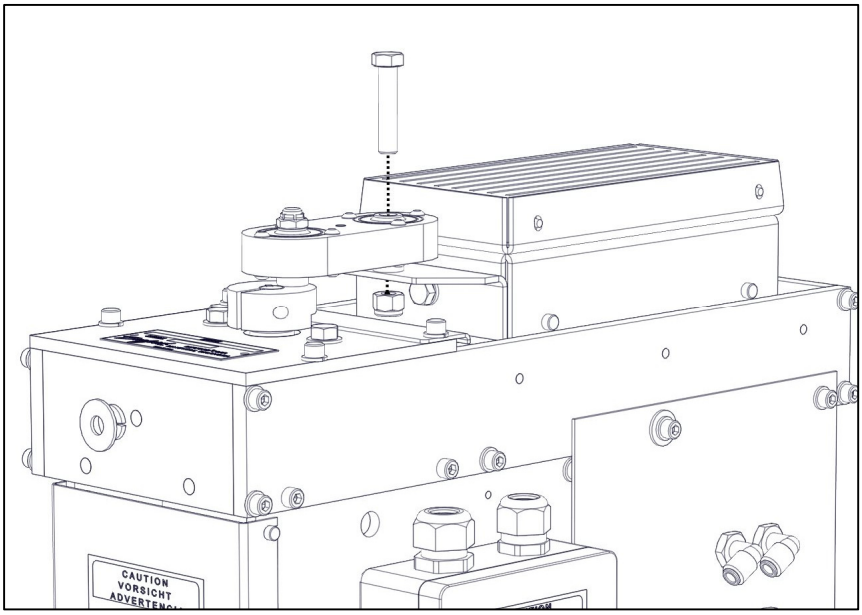


Change Linear Bearings, cont'd

Remove the Bearing Cover.

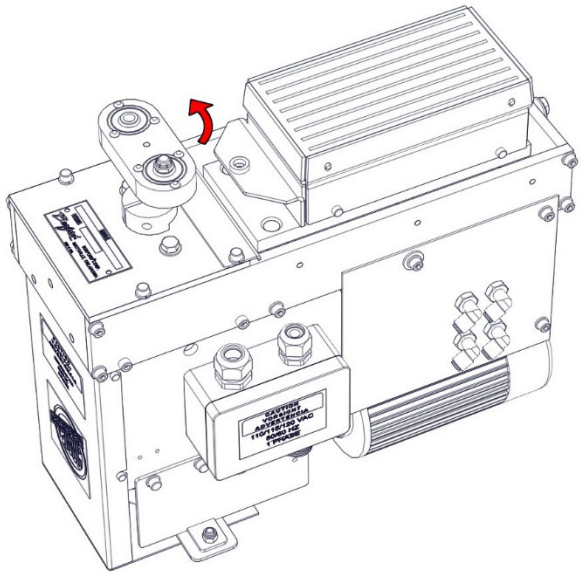


Remove the Linkage Bolt.

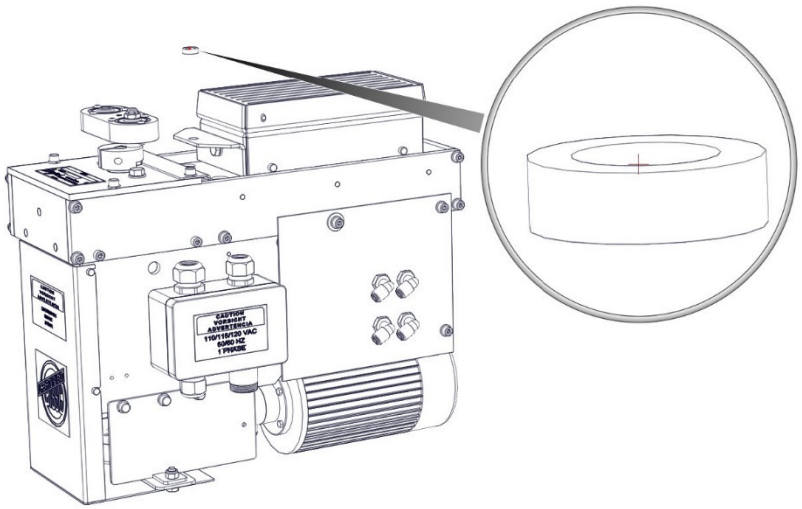


Change Linear Bearings, cont'd

Rotate Bearing Away from Magnet.

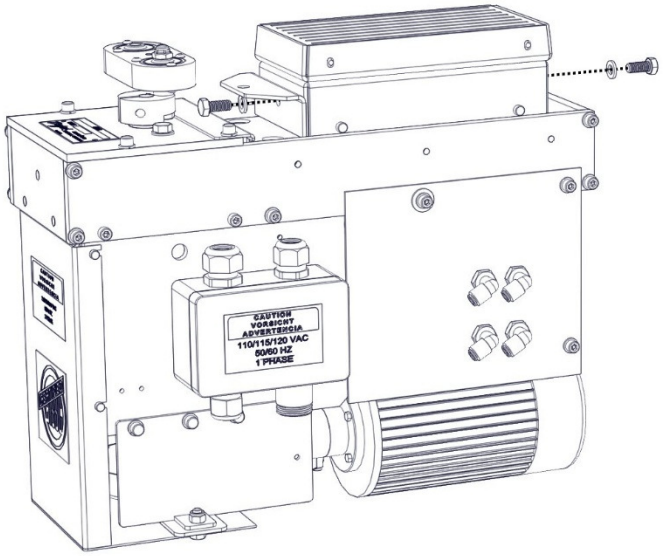


Secure Spacer.

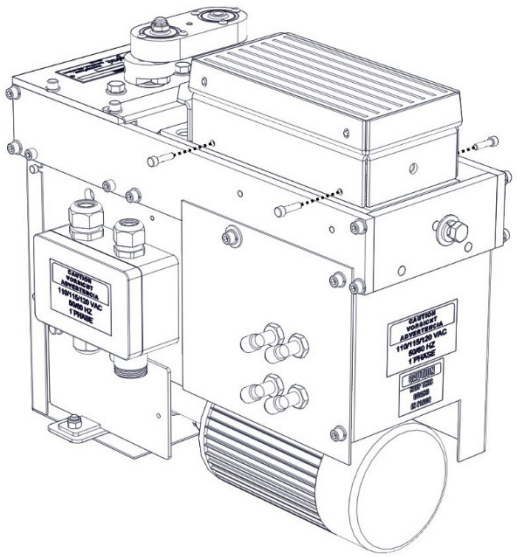


Change Linear Bearings, cont'd

Remove the Two Bolts for the Magnet.

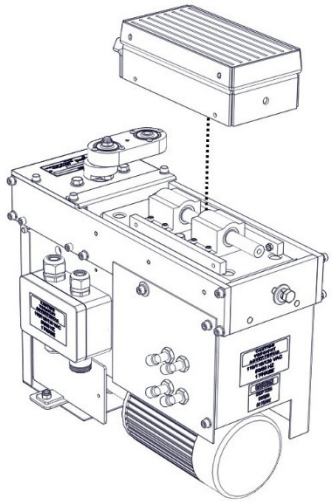


Remove the Four (4) Bolts Securing the Magnet.

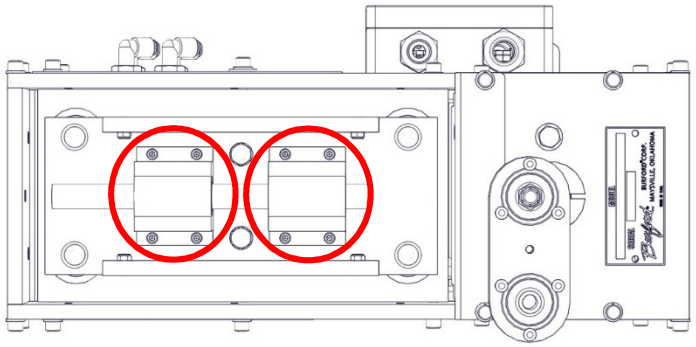


Change Linear Bearings, cont'd

Remove the Magnet.

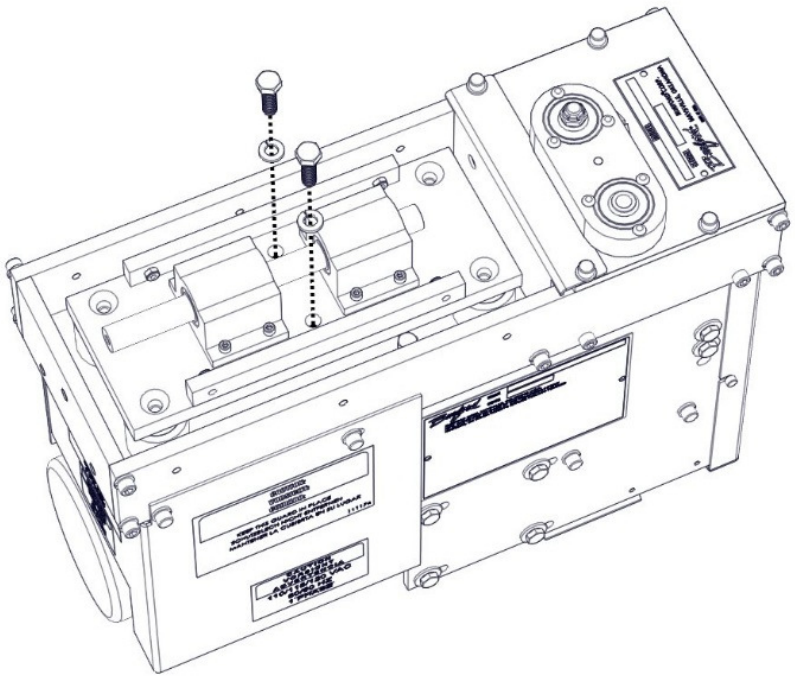


You Now Have Access to the Back and Forth Linear Bearings.



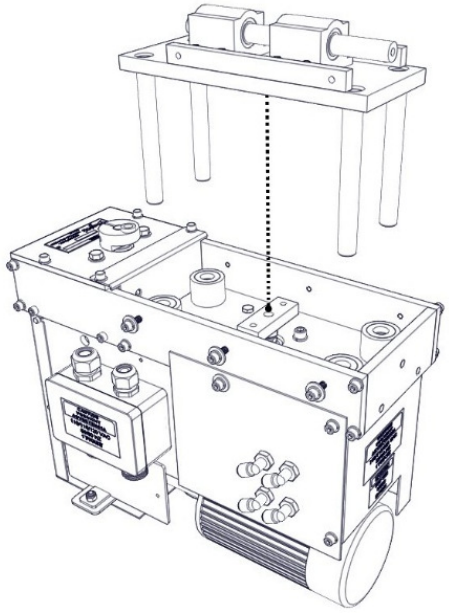
Change Linear Bearings, cont'd

Remove the Hardware for the Lift Block.

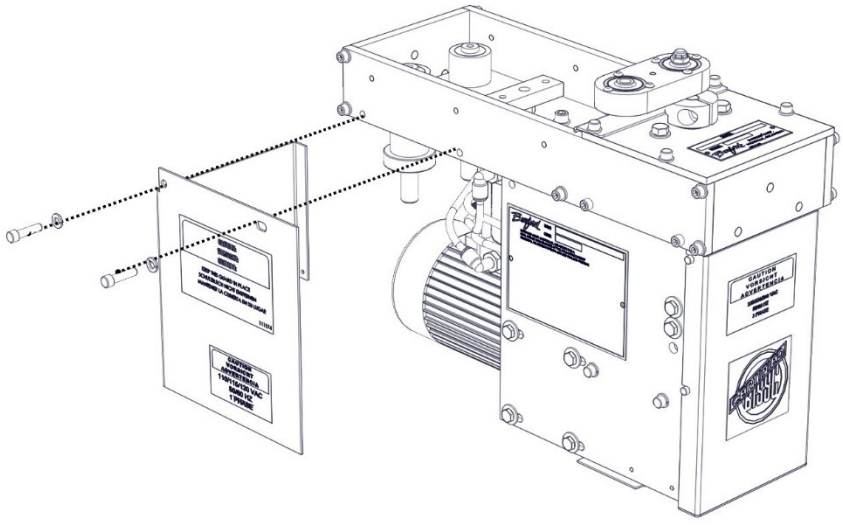


Change Linear Bearings, cont'd

Remove the Magnet Plate.

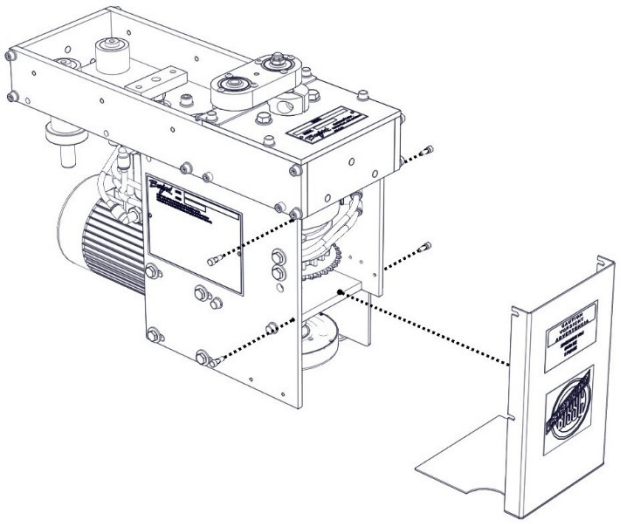


Remove the Motor Cover.

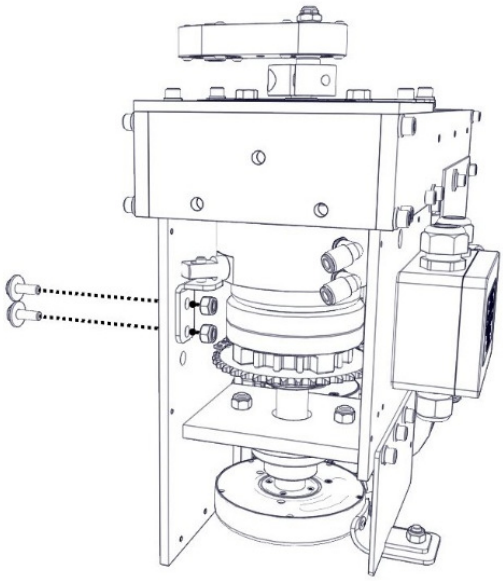


Change Linear Bearings, cont'd

Remove the Drive Shaft Cover.

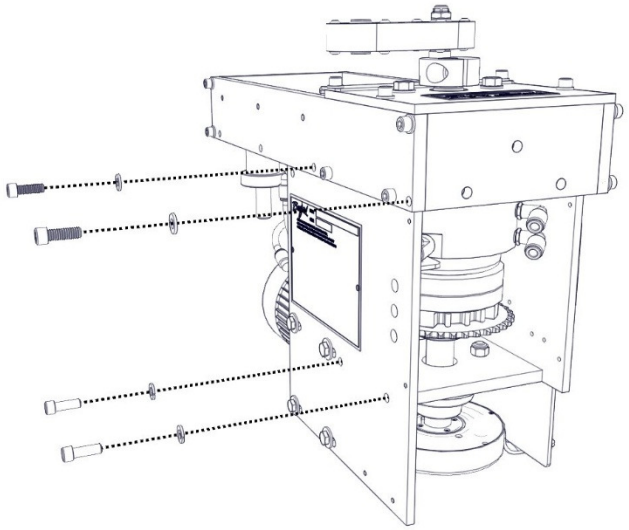


Remove the Hardware for the Clutch Torque Restrictor.

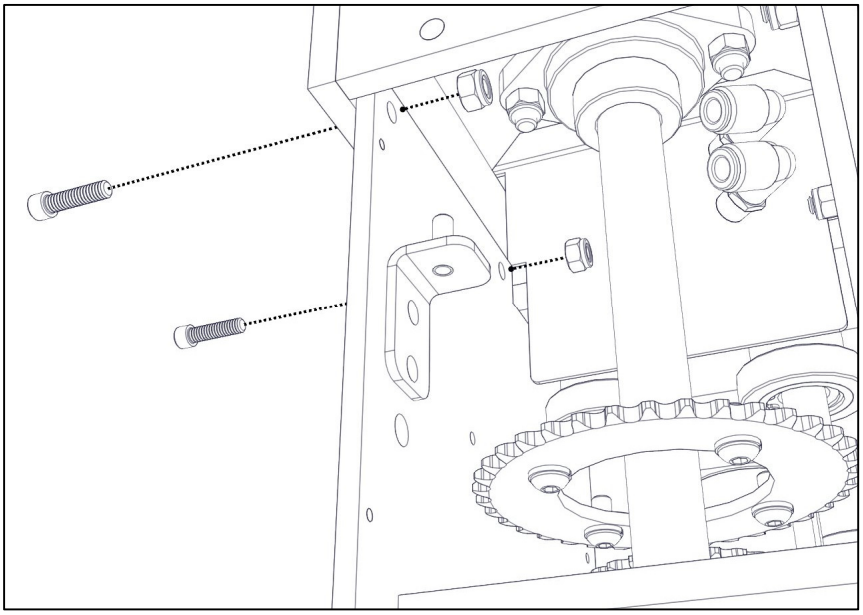


Change Linear Bearings, cont'd

Remove the Four (4) Bolts Shown (Cover Cross Plate Mounts).

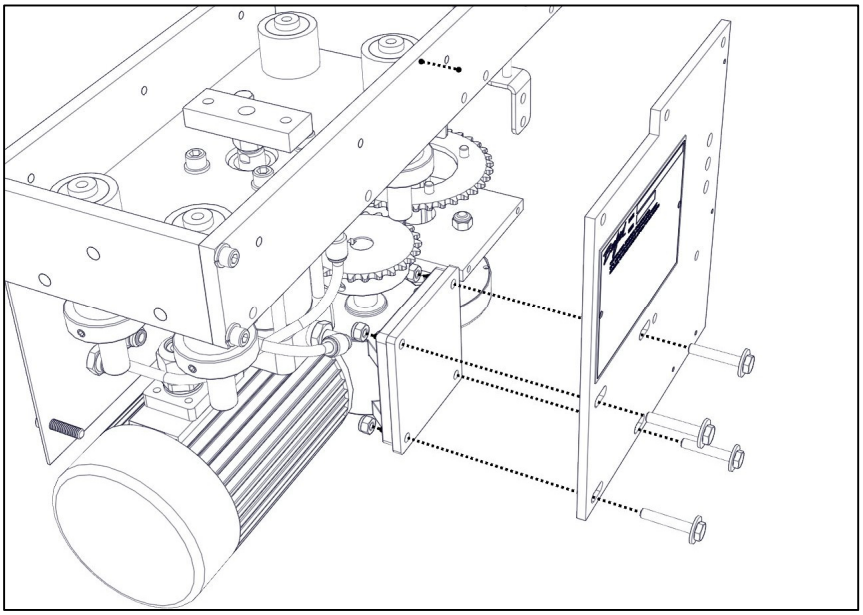


Remove the Top Two (2) Cover Mount Bolts and Nyloc Nuts.

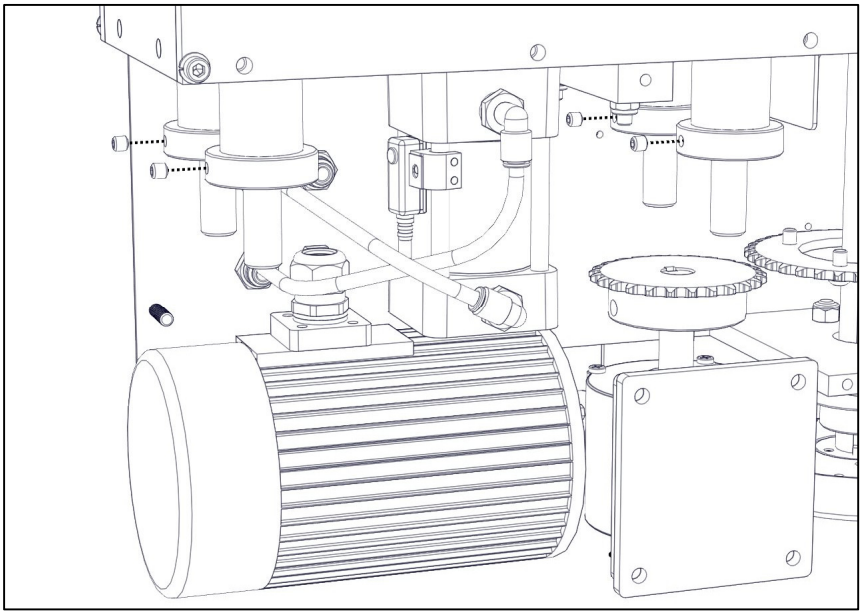


Change Linear Bearings, cont'd

Remove the Four (4) Motor Mount Bolts and Nyloc Nuts.

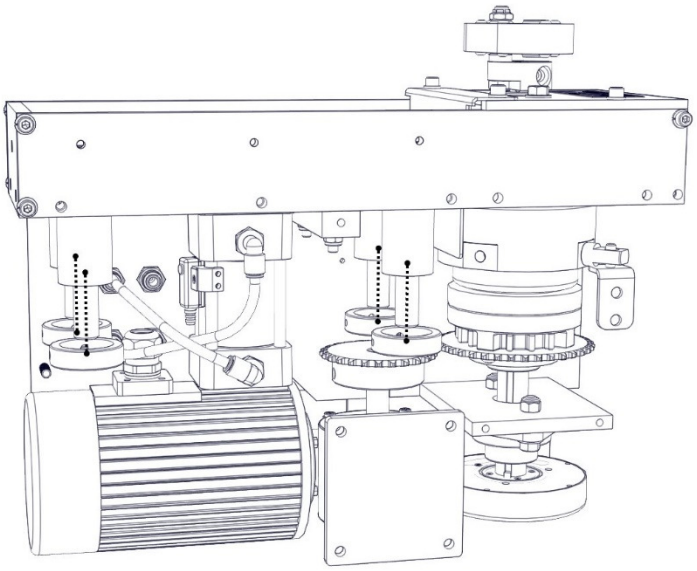


Remove the Eight (8) Lift Shaft Collar Set Screws.

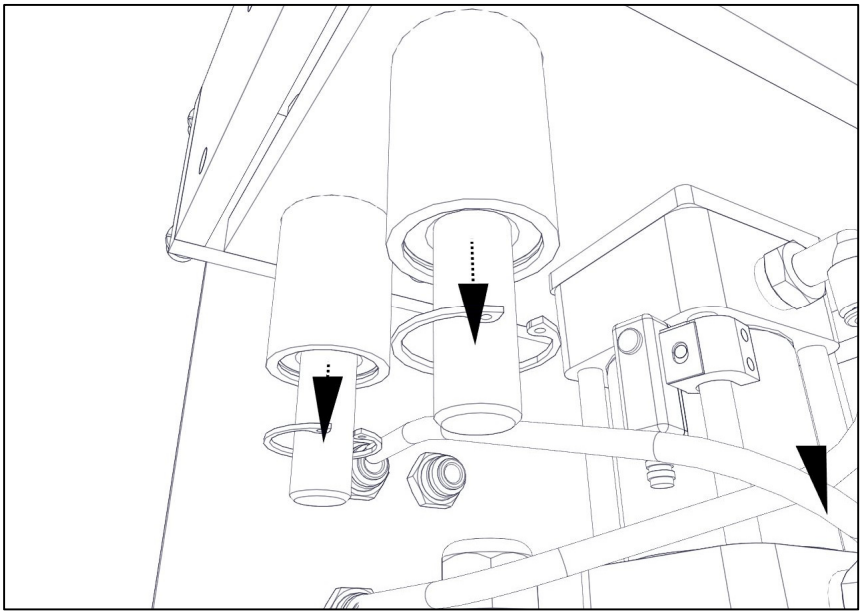


Change Linear Bearings, cont'd

Remove the Four (4) Lift Shaft Collars.

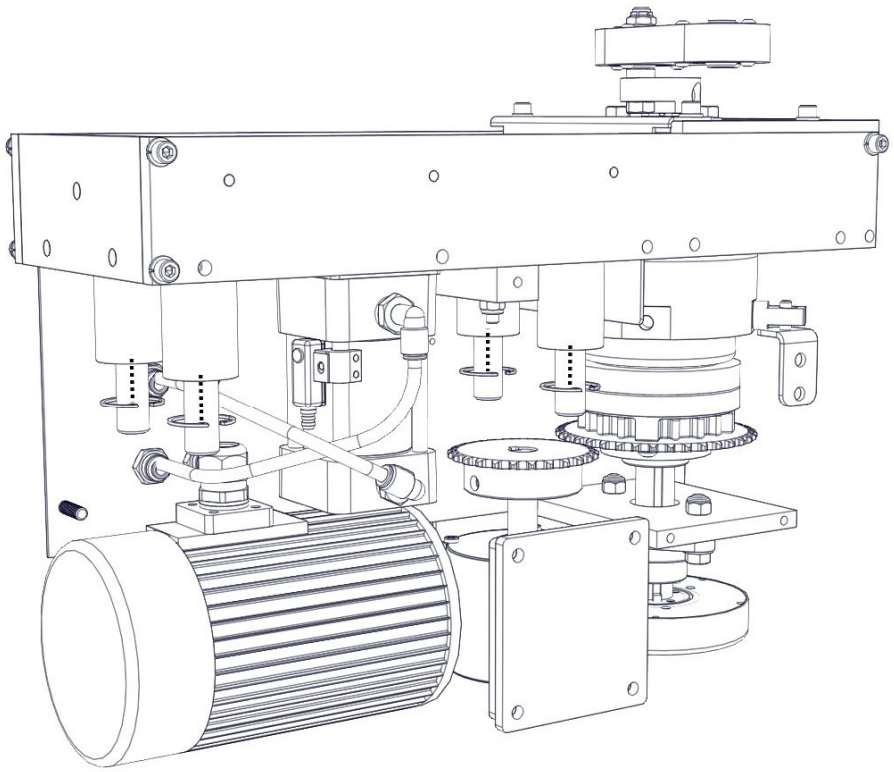


Remove the Lift Shaft Snap Rings (One (1) per Shaft – Four (4) Total).



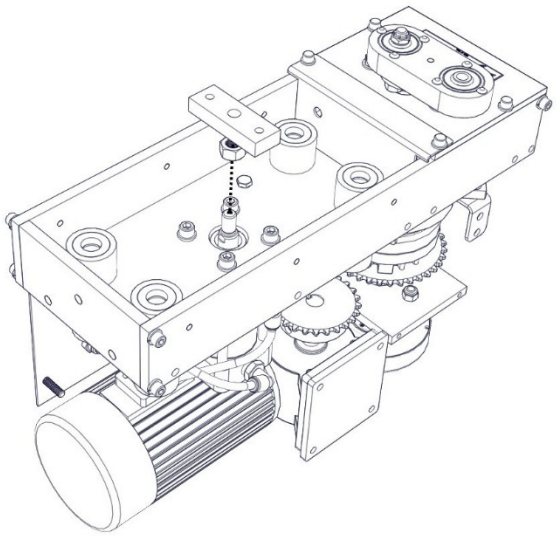
Change Linear Bearings, cont'd

Remove the Lift Shaft Snap Rings.

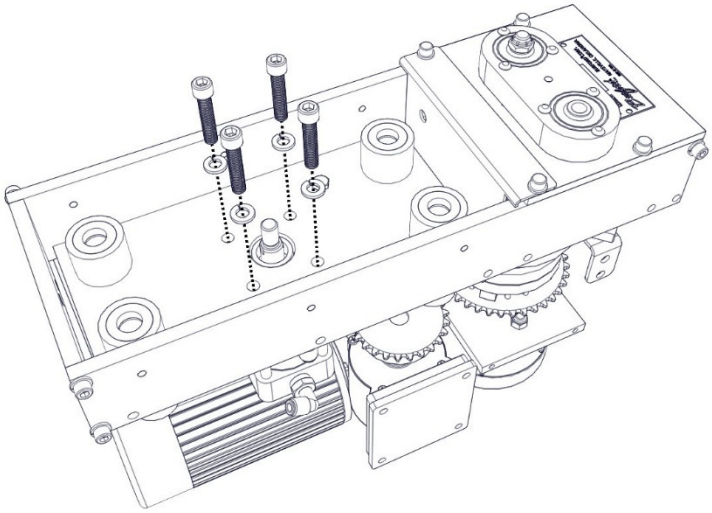


Change Linear Bearings, cont'd

Remove the Lift Cylinder Adapter.

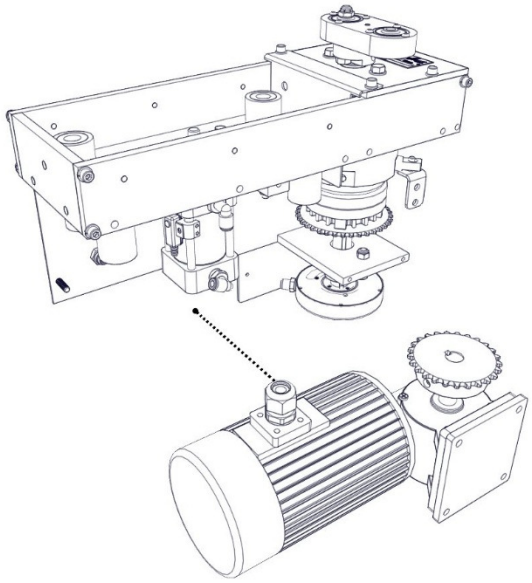


Remove the Hardware for the Lift Cylinder.

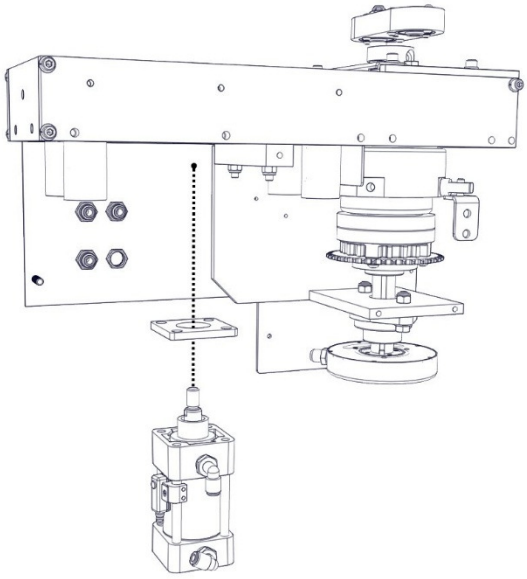


Change Linear Bearings, cont'd

Carefully Place Motor Aside. Electrical Remains Connected.

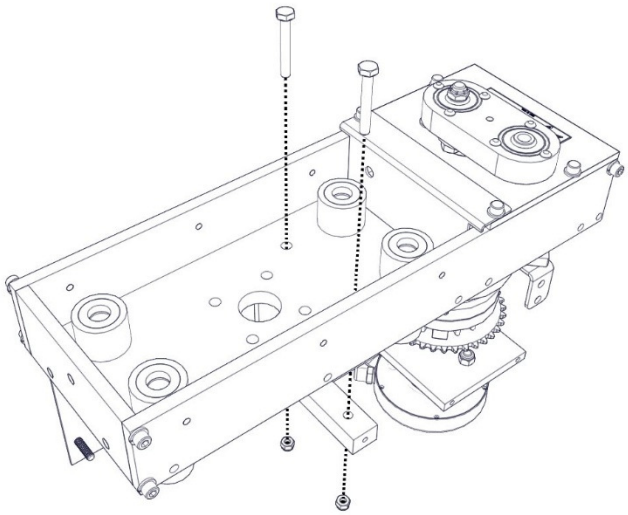


Remove Lift Cylinder and Spacer (You May Leave Connected and Set Aside).

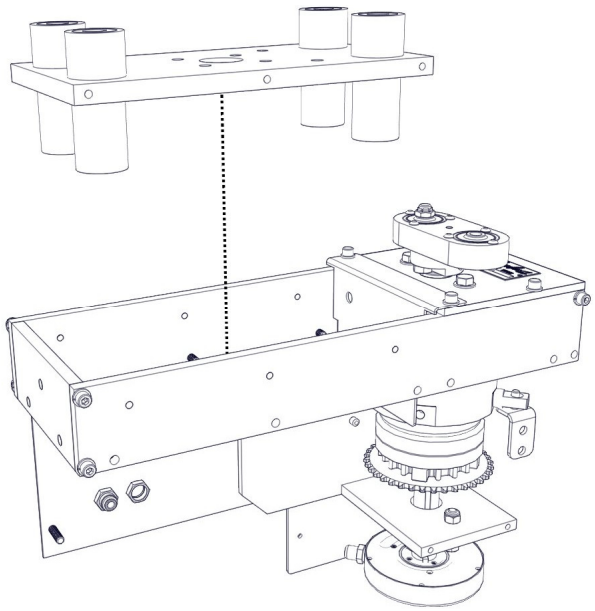


Change Linear Bearings, cont'd

Remove the Plate Support Bar.

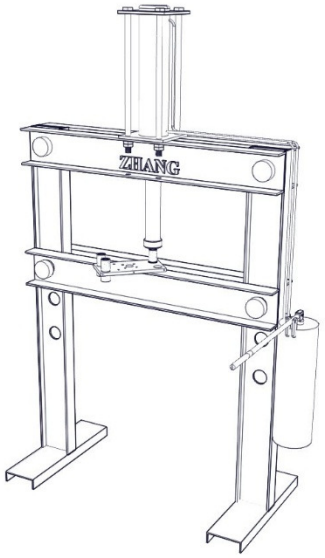


Remove the Linear Bearing Plate.

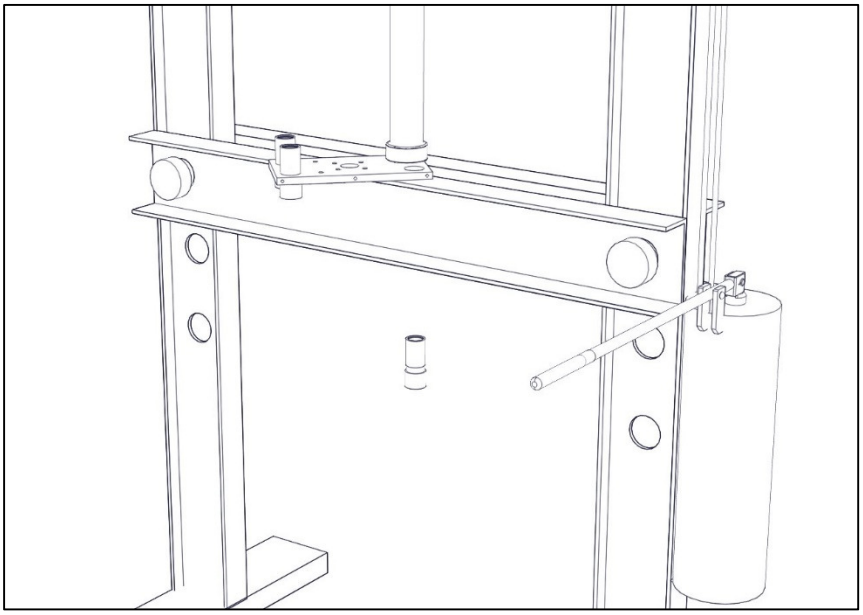


Change Linear Bearings, cont'd

Using a Hydraulic Press Remove Linear Bearings from Plate.

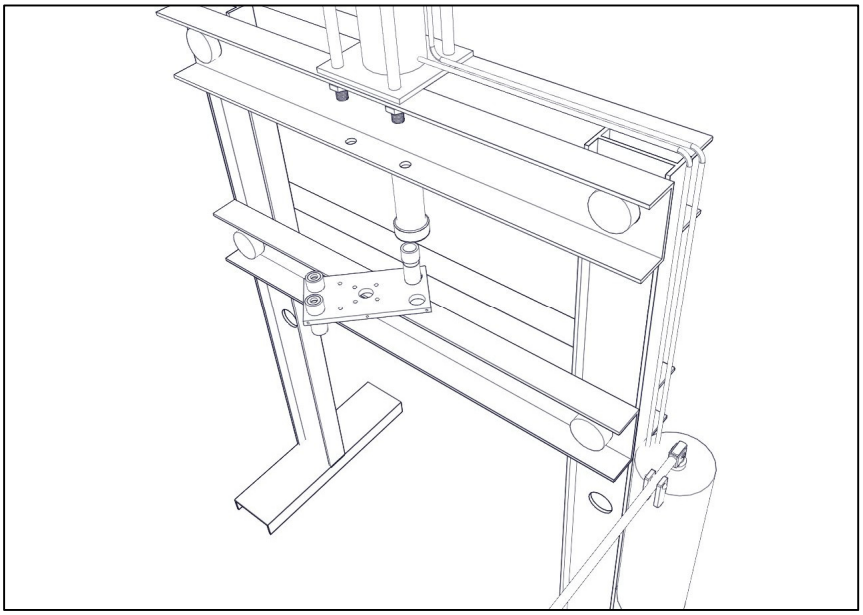


Be Careful not to Damage the Plate. Replace all Four (4) at the Same Time.



Change Linear Bearings, cont'd

Use the Press to Install the Four (4) New Linear Bearings.



Reverse the Order to Place Unit Back Together.

Chapter 6

Settings and Adjustments

CHAPTER 6: SETTINGS AND ADJUSTMENTS

Drive Descriptions

The Burford® Pan Shaker is equipped with up to (2) AC motor drives to control the operation of the unit. The above programmable motor controller is an example of the drives used in the Burford® Pan Shaker. The table below provides a brief description of the function keys. See supplied motor drive manual for additional information.

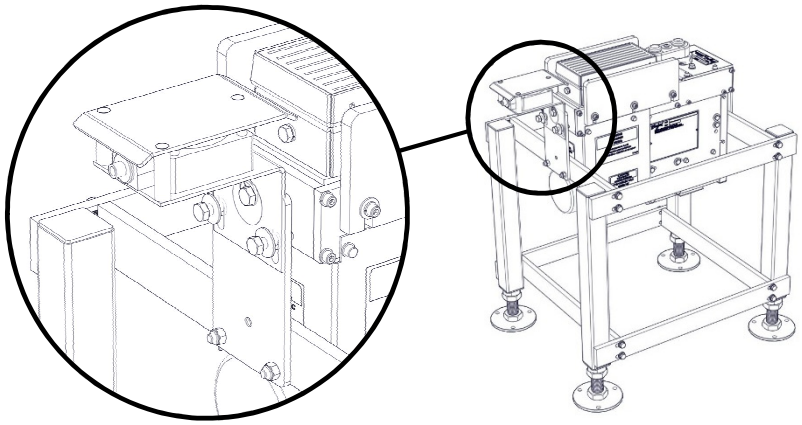
Ref	Function	Description
1	Display	Displays parameter groups and values. Also contains status LEDs. See accompanying owner manual for more information.
2	Escape	Back one step in programming menu. Cancels a change and exit programming mode.
3	Select	Advance one step in programming menu. Selects a digit when viewing parameter values.
4	Enter	Advance one step in programming menu. Save a change to a parameter value.
5	Speed	Used to control speed of drive.
6	Scroll	Used to scroll through parameters or to increase/decrease parameter values.
7	Start	Used to start the drive.
8	Stop	Used to stop the drive or clear a fault.
9	Reverse	Used to reverse direction of drive.

Drive Settings

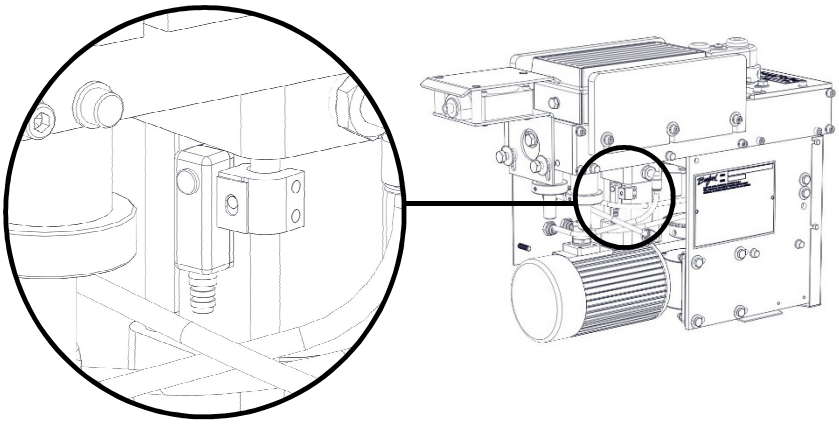
The motor controllers have been preset at Burford® Corp. for your particular application. The digital input function is used to configure the controllers for remote operation via the programmable logic controller and touch screen interface. See Drive Settings in Drawings and Parts for the settings of your unit.

Sensor Identification

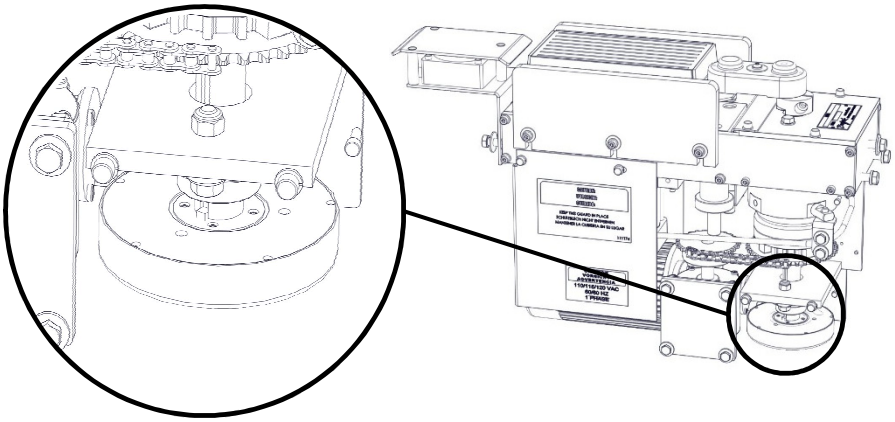
Pan Sensor: Detect the presence of a pan as the pan nears the shaker magnet. Used in conjunction with “PAN POSITION CONTROL” to initiate a machine cycle. Mount is slotted to adjust height.



Lift Reed Sensor: The Lift Reed Sensor signals the Programmable Controller when the lift magnet is in the up position.

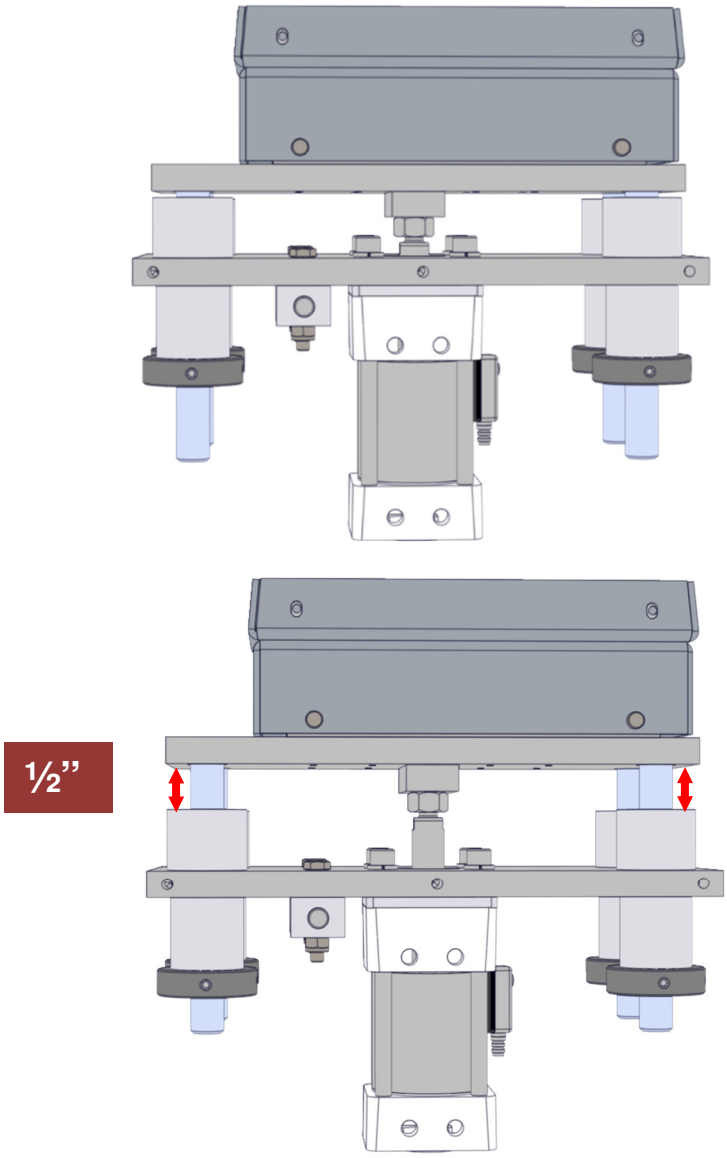


Encoder: Sends shaft information to the Programmable Controller.



Standard Magnet Assembly

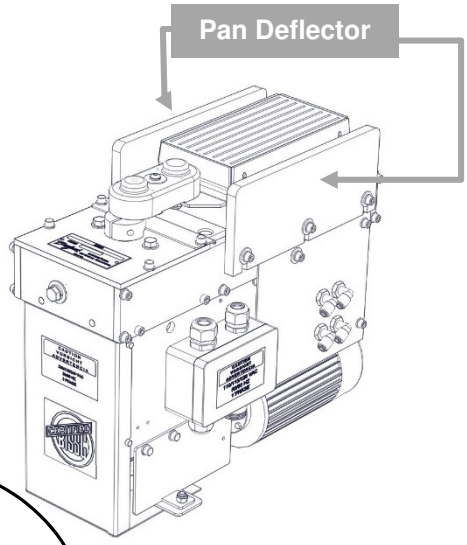
Check magnet assemblies for clearances and debris. The magnet travel in the "Up/Down position should never exceed one half inch (1/2") maximum. Keep magnet assemblies clean and free of all debris. Use valves one (1) and three (3) to actuate the magnet assemblies.

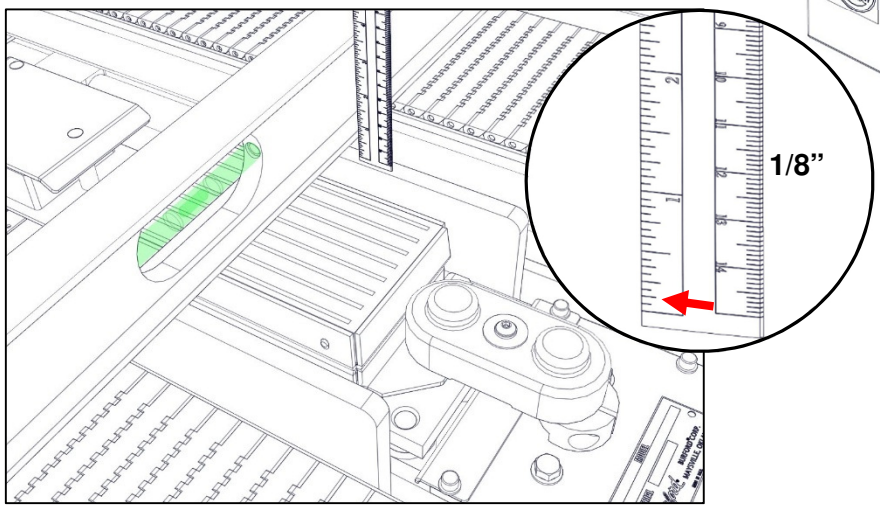


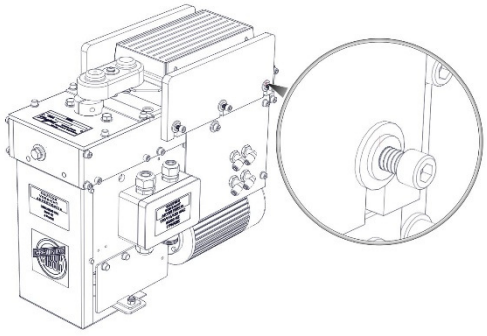
WARNING: The magnet assembly will automatically actuate after the pan sensor has been triggered. Keep all unrelated objects off the magnet assembly, personal and or property damage may occur.

Adjust Pan Deflectors

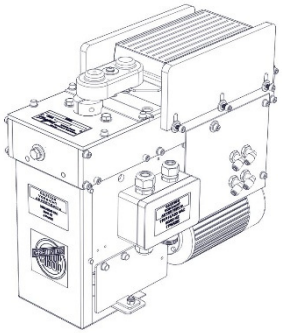
The unit is equipped with two pan deflectors located next to the magnet. The pan deflectors release the pan form the magnet on its down stroke. They must be set at 1/8” below the belt of the conveyor.



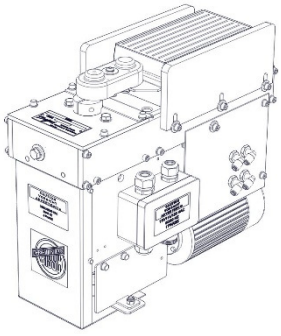




Loosen the three (3) bolts for the Deflector.



The Deflector is slotted for adjustment. Position 1/8th below conveyor belt.



Tighten the bolts to secure Deflector.

Chapter 7

Troubleshooting

CHAPTER 7: TROUBLESHOOTING

Failure to Engage (Shake)

1. Air not getting to Clutch-Brake due to control malfunction.
2. Lack of lubrication on Hub Spline or in Air Chamber.
3. Shake speed set to zero.
4. Pan sensor not sensing pan.

Failure to Disengage (Continues Shaking)

1. Control valve malfunction.
2. Friction lock due to lack of lubrication on Hub Spline or in Air Chamber.
3. Check encoder operation.

Loss of Torque

1. Air leaks.
2. Overheating (fading).

Operator Interface Not Working

1. Check cable connections, especially the right angle connector at the operator interface.

Troubleshooting

ISSUE	SOLUTION
Pan not shaking long enough.	Reset number of shakes on operator interface.
Pan passing over pan sensor, unit not cycling.	Check air supply. Check air control valves. Check Reed Switch. Check pan sensor.
Pan not shaking fast enough or slow enough.	Increase or Decrease Motor Velocity on Operator Interface.
Magnet hammering up or down too fast.	Decrease air supply 60 PSI minimum, 80 PSI maximum. Regulate speed with adjustable exhaust restrictor located on lift cylinder valve exhaust ports.
Motor/drive not running or erratic.	Check motor speed control on operator interface. Check incoming air supply. Check motor.
Magnet catching pans too early or too late.	Check pan position setting on operator interface.
Dough not toward center of cup.	Check number of shakes on operator interface. Check dough position setting on operator interface.
Magnet binding at start of cycle.	Check magnet travel; should be 1/2” total maximum.

Light Tower Description

FUNCTION	DESCRIPTION
Solid Green Light	Indicates normal machine operation.
Blinking Green Light	Indicates normal machine operation, except one or both shakers are “DISABLED”.
Blinking Yellow (Amber) Light	Indicates the shaker has been “DISABLED”.
Solid Red Light	Indicates there is a machine drive fault or the “START/STOP” button has been pushed to the “IN” position.
Blinking Blue Light	Indicates Conveyor has been remotely stopped.

Error Messages

ERROR MESSAGE	DESCRIPTION
Shaker Motor Drive Fault	Indicates an error has occurred with the shaker motor driver. See driver for error code.
Shaker 1 Overload Fault	Indicates a fault has occurred with the overload relay for this shaker.
Shaker 2 Overload Fault	Indicates a fault has occurred with the overload relay for this shaker.
Conveyor Motor Drive Fault	Indicates an error has occurred with the conveyor motor driver. See driver for error code.
Shaker 1 Rev Sensor Fault	Indicates the encoder signal (input 1) has not changed “state” within the last 10 seconds, during a shake sequence. Possible problem with encoder operation.
Shaker 1 Tooth Sensor Fault	Indicates the encoder signal (input 0) has not changed “state” within the last 10 seconds, during a shake sequence. Possible problem with encoder operation.
Shaker 2 Rev Sensor Fault	Indicates the encoder signal (input 5) has not changed “state” within the last 10 seconds, during a shake sequence. Possible problem with encoder operation.
Shaker 2 Tooth Sensor Fault	Indicates the encoder signal (input 4) has not changed “state” within the last 10 seconds, during a shake sequence. Possible problem with encoder operation.

Chapter 8

Drawings and Assemblies

RECOMMENDED SPARE PARTS LIST

In order to prevent unnecessary down time, Burford® Corp. recommends the list of parts located in the Drawings and Parts section be kept in stock.

Contents

Call 1-877-BURFORD or fax
405-867-4219 to order parts.

Drawings & Parts

Recommended Spare Parts

Please have the following machine information on hand before calling Burford®.

- Machine Voltage
- Model Number
- Serial Number

QTY.	PART #	DESCRIPTION
1	305490	Valve, 2 Position, 24 VDC
1	C07474	Power Supply, 110/220, 24 VDC
1	C04435	Eccentric Bearing Assembly
1	C06752-001	Proximity Sensor, 80 mm, 10-30 VDC, PNP, N.C.
1	C04449	Clutch/Brake Assembly
1	610544-001	Proximity Sensor, 8 mm, 10-30 VDC, PNP, N.C.
1	305703	Motor & Gear Reducer Assembly
1	C07656	Dust Cover, Eccentric Bearing
1	611541	Kit, Switch & Bracket Mtg
1	612045-006	Controller, Pwr Flx525,110-1

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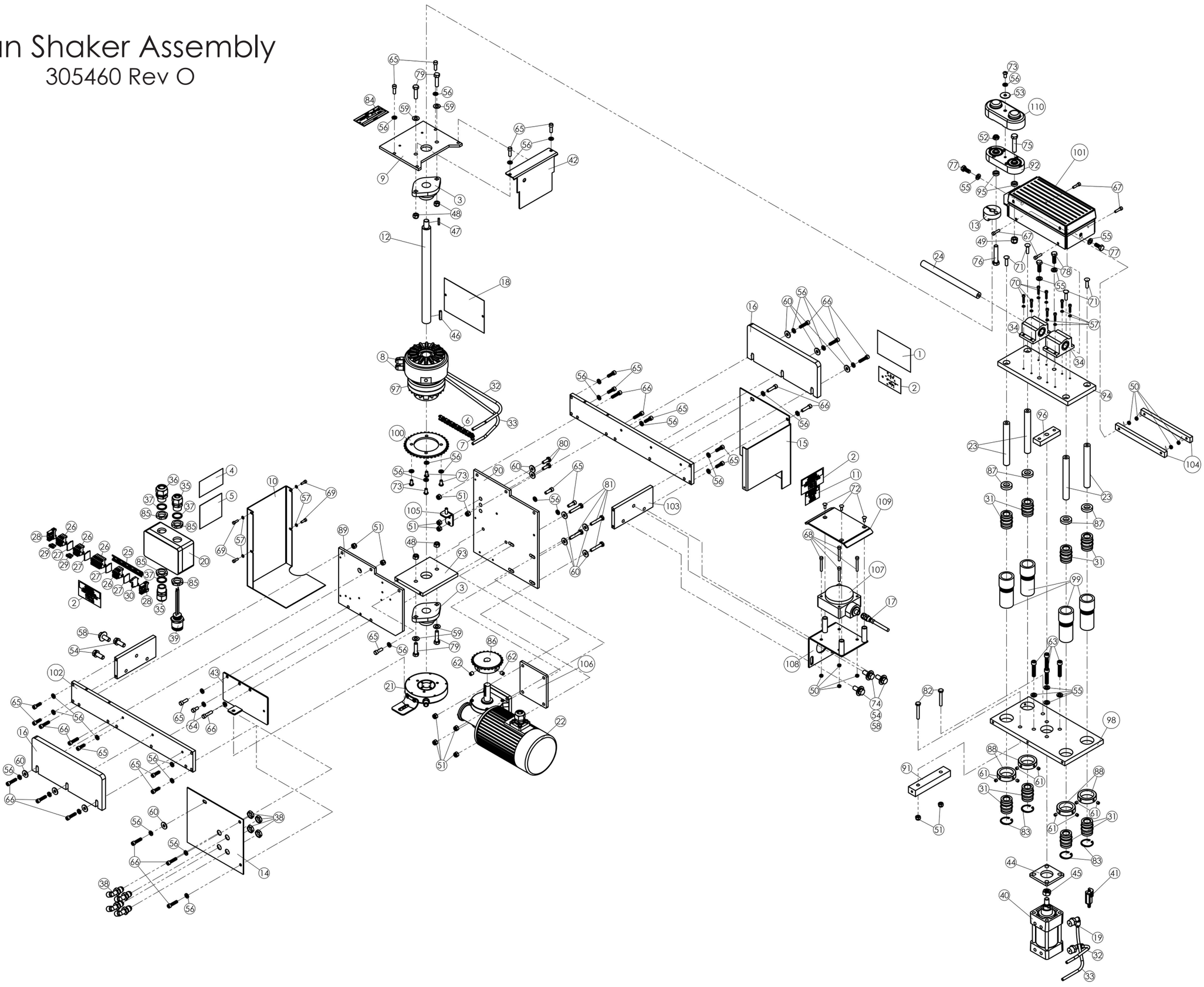
Pan Shaker Assembly
305460 Rev O

ITEM #	QTY.	PART#	DESCRIPTION
1	2	111174	DECAL, KEEP THIS GUARD IN PLACE
2	3	111177	DECAL,110/115/120 VOLTS,1 PHASE
3	2	112519	BEARING, 7/8" BORE, ENP
4	1	113317	DECAL, 220 VAC, 3 PHASE
5	1	118325	DECAL CERTIFIED BY BISSC
6	1	152169	CHAIN,ROLL,#35,NICKEL PLATED
7	1	152175	CHAIN LINK #35 CONNECTING N.P.
8	2	174049	FITTING,ELL,1/8MPT X 1/4T,Q.R,SHORT
9	1	301805	PLATE, BEARING TOP, 572D
10	1	301806	A/W, END COVER, 572D
11	1	302361	DECAL, SMALL, KEEP GUARD IN PLACE
12	1	302549	SHAFT, 573D PAN SHAKER
13	1	302551	ECCENTRIC HUB, MAGNET DRIVE
14	1	302555	GUARD L.H. - PAN SHAKER
15	1	302556	CHANNEL, PAN SHAKER GUARD, RH, CE
16	2	303412	DEFLECTOR, PAN, D572D
17	1	304430	CABLE,SENSOR,M12,5WIRE,F,QC,STR
18	1	304999	PLATE SERIAL, OILER, SPLITTER MISC
19	2	305466	FITTING ELL 3/8 NPT, 1/4 T ENP QR
20	1	305486	ENCLOSURE ALUM 125 X 80 X 57
21	1	305699	Encoder .875 bore
22	1	305703	ASSY GEARMOTOR 3/8 HP 230 V 330 RPM
23	4	305845	SHAFT, LIFT PLATE
24	1	305846	SHAFT MAGNET SLIDE (ANOD ALUM)
25	4.19"	610360	TERMINAL, DIN RAIL, MINI
26	15	610361	TERMINAL, BLOCK, MINI
27	4	610362	TERMINAL,END COVER,MINI
28	2	610363	TERMINAL,ANCHOR,END CLAMP,MINI
29	2	610533	JUMPER, TERMINAL, 3 POS, MINI
30	1	610534	TERMINAL,GROUNDING,MINI
31	8	610833	BEARING, LINEAR, 5/8 ANOD. ALUM
32	3'	610885-02	TUBING, 1/4" POLYURETHANE, BLUE
33	3'	610885-04	TUBING, 1/4" POLYURETHANE, RED
34	2	610905	BEARING, 5/8 DRYLIN PILLOW BLOCK
35	2	610953	CONNECTOR, CORD, .20-.35, DOME, NYLON
36	1	610954	CONNECTOR, CORD, .39-.56, DOME, NYLON
37	3	610955	CONNECTOR,SEAL RING,1/2NPT,POLYETH
38	4	610956	FITTING,BLKHD ELL 1/4T,ENP,Q.R.
39	1	611148-001	SENSOR,BULKHD,1-16UNC,1/2N,19WIRE M
40	1	611540	CYLINDER, AIR 2" BORE, 5/8" STROKE
41	1	611541	SWITCH & BRK MTG SW KIT
42	1	711511	BRACKET, CLUTCH GUARD, 572D
43	1	716135	A/W BRACKET ENCODER 576
44	1	716843	PLATE, CYLINDER SPACER
45	1	955372	NUT HEX FIN 7/16-20 UNF SST
46	1	955470	KEY, SQ 3/16 X 1.00 .002 UNDERSIZE
47	1	955477	KEY SQ 1/8 X 3/4 SST
48	4	955619	NUT HEX NYLOC 5/16-18 UNC SST
49	1	955620	NUT HEX NYLOC 3/8-16 UNC SST
50	8	955621	NUT HEX NYLOC #10-24 UNC SST
51	13	955661	NUT HEX NYLOC 1/4-20 UNC SST
52	1	955686	NUT THIN HEX FLEXLOC 3/8-16 SST
53	1	955877	WASHER FENDER 1" OD X .28 ID X .045, SST
54	6	955938	WASHER, LOCK 3/8" SST
55	8	955939	WASHER LOCK 5/16" SST
56	36	955940	WASHER LOCK 1/4" SST
57	12	955942	WASHER LOCK #8 SST
58	4	955975	WASHER FLAT 3/8" SST
59	4	955976	WASHER FLAT 5/16 SST
60	13	955977	WASHER FLAT 1/4" SST
61	8	971204	SCREW SET SOC 1/4-20 UNC X 1/4 SST
62	2	972006	SCREW SET SOC 5/16-18 UNC X 3/8 SST
63	4	977624	SCREW SOC HD CAP 5/16-24 X 1 1/2 SST
64	1	978308	SCREW SOC HD CAP 1/4-20 X 1/2 SST
65	18	978312	SCREW SOC HD CAP 1/4-20 X 3/4 SST
66	16	978316	SCREW SOC HD CAP 1/4-20 X 1 SST
67	4	978912	SCREW SOC HD CAP #10-24 UNC X 3/4 SST
68	4	978924	SCREW SOC HD CAP #10-24 UNC X 1 1/2 SST
69	4	979508	SCREW SOC HD CAP #8-32 UNC X 1/2 SST
70	8	979512	SCREW SOC HD CAP #8-32 UNC X 3/4 SST
71	4	981116	SCREW FLT HD SOC 1/4-28 UNF X 1 SST
72	3	982308	SCREW FLT HD SOC #10-24 X 1/2 SST
73	5	985708	SCREW BUTT HD SOC 1/4-20 X 1/2 SST
74	6	988916	SCREW FIN HEX 3/8-16 X 1 SST
75	1	988928	SCREW FIN HEX 3/8-16 X 1 3/4 SST
76	1	988932	SCREW FIN HEX 3/8-16 X 2 SST
77	2	989712	SCREW FIN HEX 5/16-18 X 3/4 SST
78	2	989716	SCREW FIN HEX 5/16-18 X 1 SST
79	4	989720	SCREW FIN HEX 5/16-18 X 1 1/4 SST
80	3	989912	SCREW FIN HEX 1/4-20 X 3/4 SST
81	4	989924	SCREW FIN HEX 1/4-20 X 1 1/2 SST
82	2	989928	SCREW FIN HEX 1/4-20 X 1 3/4 SST
83	4	A01041	RETAINING RING 1 1/8 INT
84	1	A05584	PLATE-SERIAL NUMBER
85	4	C00174	LOCKING NUT, 1/2 NPT, NYLON
86	1	C04416	SPROCKET 35-B-25F 0.625"B
87	4	C04418	SEAL, SHAFT, 572
88	4	C04422	COLLAR RETAINER
89	1	C04431	SIDE PLATE (POR)
90	1	C04432	SIDE PLATE MOTOR (POR)
91	1	C04433	BAR, LOWER PLATE
92	1	C04435	ECCENTRIC SUB ASSY
93	1	C04442	PLATE, BEARING MOUNT
94	1	C04444	PLATE, LIFT (POR)
95	2	C04445	SPACER ECCENTRIC
96	1	C04446	BLOCK, CYL. TIE
97	1	C04449	CLUTCH BRAKE FWCB PILOT
98	1	C04450	MTG. FRAME
99	4	C04451	SUB ASSY - BEARING FRAME
100	1	C04454	SPROCKET, REWORK, 35-A-36 2.5" B
101	1	C04460	ASSY MAGNET 578
102	2	C04470	BAR, SIDE SHAKER MTG
103	2	C04471	END PLATE, FRAME MT
104	2	C04497	GUIDE, BLOCK MAGNET
105	1	C04504	A/W, CLUTCH MOUNT
106	1	C04539	PLATE, MOTOR SPACER
107	1	C06752-001	SENSOR,PROX,80MM,10-55VDC,PNP,EDDY
108	1	C06840	A/W, PROX MOUNT
109	1	C06843	GUARD, PROX
110	1	C07656	COVER,ECCENTRIC BEARING,DUST,VINYL

Pan Shaker Assembly

305460 Rev O



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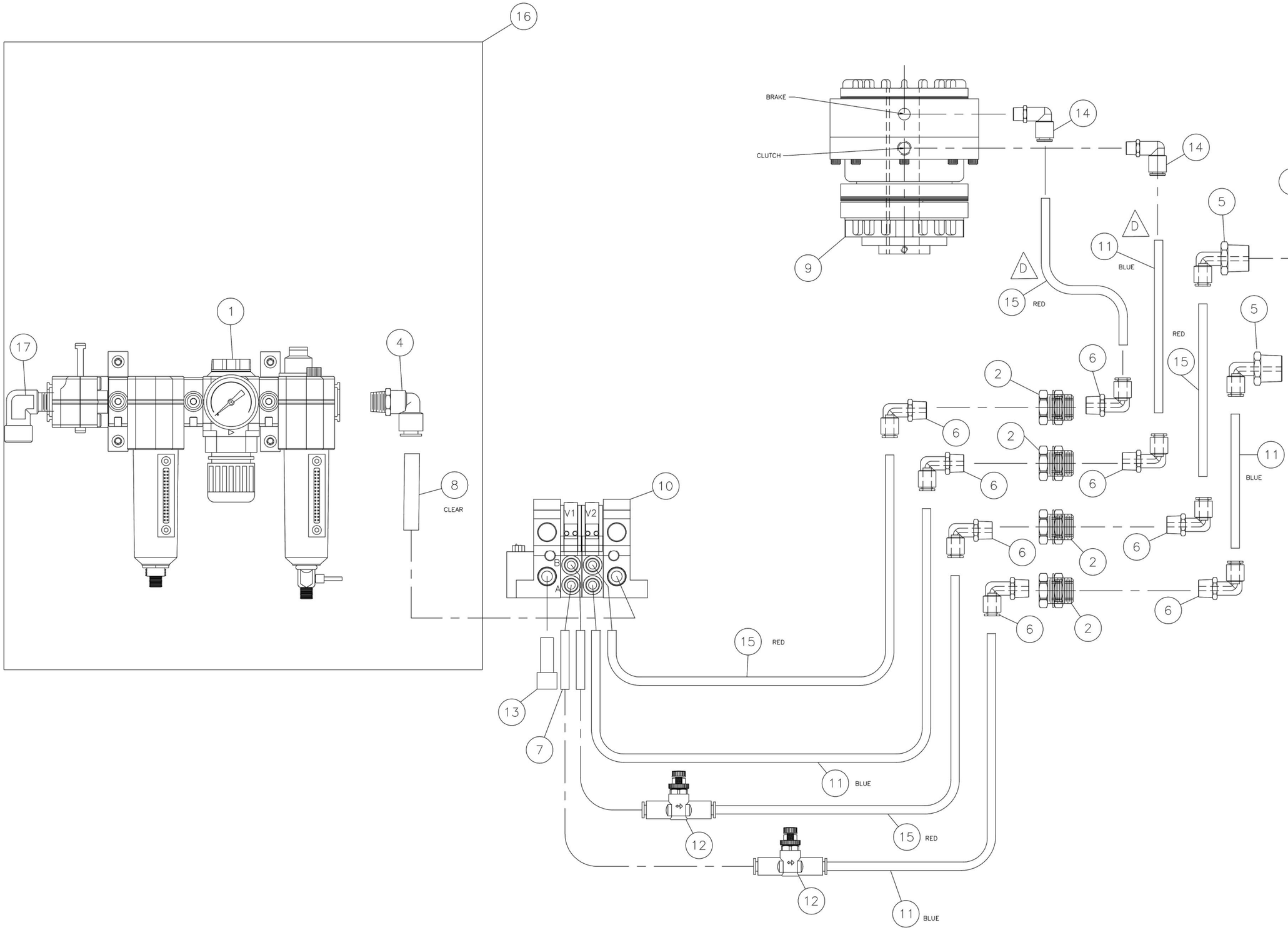
Pneumatic Assembly
305465 Rev E

ITEM #	QTY.	PART #	DESCRIPTION
1	1	C00404	F.R.L. COMBO, 1/4 NPTF, 72 SERIES
2	REF	111619	FITTING,BULKHEAD,1/4 NPTF,BRS
3	REF	301811	BLOCK, CYLINDER SPACER, 572D
4	1	610505	FITTING,ELL,1/4NPT X 3/8T,Q.R
5	REF	305466	FITTING ELL 3/8 NPT, 1/4 T ENP QR
6	REF	610602	FITTING,ELL, 1/4NPT X 1/4T,ENP,Q.R
7	2	611235	NIPPLE, 1/4" PLASTIC
8	1'	610886-07	TUBING, 3/8" POLYURETHANE, CLEAR
9	REF	C04449	CLUTCH BRAKE FWCB PILOT
10	1	305488	ASSY VALVE MANIFOLD 24 V 2 STATION
11	8'	610885-02	TUBING, 1/4" POLYURETHANE, BLUE
12	2	401302	VALVE, REG, FLOW CONTROL, ENP, Q.R.
13	1	610889	PLUG, MANIFOLD, 3/8" TUBE
14	REF	174049	FITTING,ELL,1/8MPT X 1/4T,Q.R,SHORT
15	8'	610885-04	TUBING, 1/4" POLYURETHANE, RED
16	1	717646	GUARD MTG PLATE VALVES 578/576
17	1	A06857	FITTING,STREET ELL,1/4M X 1/4F,SST

Pneumatic Assembly

305465 Rev E



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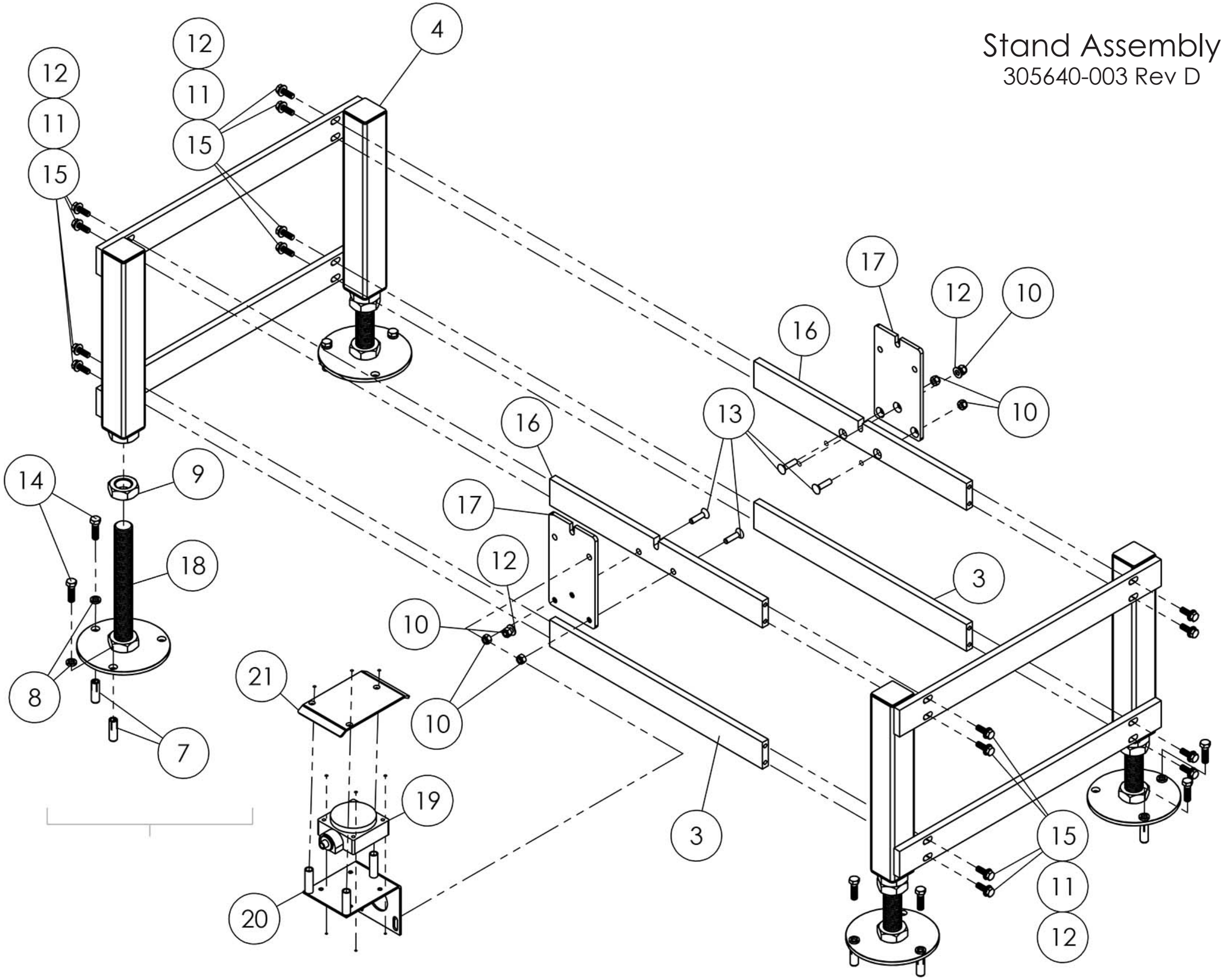
Stand Assembly
305640-003 Rev D

ITEM #	QTY.	PART#	DESCRIPTION
3	2	305645	BAR SHAKER LOWER STAND
4	2	305700	A/W FRAME SIDE 578 32-36"
7	8	611936	ANCHOR, INTERN. THRD 3/8-16
8	8	716868	SPACER, 5/8 OD X .39 ID X 1/8
9	4	955390	NUT HEX JAM 1-1/8-7 UNC SST
10	6	955619	NUT HEX NYLOC 5/16-18 UNC SST
11	16	955939	WASHER LOCK 5/16" SST
12	18	955976	WASHER FLAT 5/16 SST
13	6	981620	SCREW FLT HD SOC 5/16-18 UNC X 1 1/4 SST
14	8	988920	SCREW FIN HEX 3/8-16 X 1 1/4" SST
15	16	989716	SCREW FIN HEX 5/16-18 X 1 SST
16	2	C04350	SHAKER SUPPORT BAR
17	2	C04355	SHAKER MOUNT BAR
18	4	C04361	A/W, LEG
19	REF.	C06752	SENSOR,PROX,80MM,10-55VDC,NPN,EDDY
20	REF.	C06840	A/W, PROX MOUNT
21	REF.	C06843	GUARD, PROX

Stand Assembly

305640-003 Rev D



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Drive Settings/ Electrical Schematics

Drive Settings

Parameters not listed below should remain at the manufacturer's default values. Verify the Inverter that is installed in your unit before checking the settings below.

576 / 577, 578 / 579 PAN SHAKER		
578 UL / 579 UL PAN SHAKER		
POWER FLEX 525		
DRV1	**Shaker**	**Description**
P033	2.3 A	Motor OL Current
P041	0.10 Sec.	Accel Time 1
P042	0.10 Sec.	Decel Time 1
P046	5	Start Source 1
P047	15	Speed reference 1
C128	1	EN Addr Sel
C129	10	EN IP Addr Cfg 1
C130	10	EN IP Addr Cfg 2
C131	50	EN IP Addr Cfg 3
C132	245	EN IP Addr Cfg 4
C133	255	EN Subnet Cfg 1
C134	255	EN Subnet Cfg 2
C137	10	EN Gateway Cfg 1
C138	10	EN Gateway Cfg 2
C139	30	EN Gateway Cfg 3
C140	1	EN Gateway Cfg 4

*Power cycle inverter for any changes to take affect.

Electrical BOM
115744-WD

211435 ELECTRICS, COMMON PARTS ALL SHAKERS				
REF	SYMBOL	PART#	QTY	DESCRIPTION
1	FU7,8	110452	2	FUSE,MDL,1/2A,250V,1/4 X 1-1/4
2	CBL 1,2	304502	1	CABLE,YELLOW PATCH,2' SHIELDED
3	-	305467	1	LABEL,576 PAN SHAKER,CONTROL
4	TB1 P/O	610300	7	TERMINAL,BLOCK,TRIPLE LEVEL
5	TB1 P/O	610301	1	TERMINAL,END COVER,TRIPLE LEVEL
6	CR1-5, P/O	610387-001	3	RELAY,TERM MTG,SEPARATION PLATE A/B
7	CR1-5	610404-001	5	RELAY,TERM MTG,24VDC,6A,1PDT A/B
8	-	610953	3	CONNECTOR,CORD,.20-.35,DOME,NYLON
9	-	610954	3	CONNECTOR,CORD,.39-.56,DOME,NYLON
10	-	610955	6	CONNECTOR,SEAL RING,1/2NPT,POLYETH
11	SR1	611423	1	RELAY,SAFETY MONITORING MODULE
12	PLC 1	611634	1	PLC,ML1400,RELAY,24VDC,20IN/12OUT
13	ENCL 1 P/O	611811	1	LOCK, COVER, 1/4 TURN
14	DISP 1	612142	1	PLC,DISPLAY,PV-800,TOUCH,ETHERNET
15	ENCL 1 P/O	C00174	6	CONNECTOR,LOCKING-NUT,1/2NPT,NYLON
16	LT1	C01394	1	LIGHT,TREE,24V(RD,YL,GN)SIDE
17	ENCL 1 P/O	C03845	4	SPACER, .34 ID X .75 OD X .75L, SS
18	PB1 P/O	C05397	1	NAMEPLATE,PUSH STOP/PULL START 800T
19	TB1 P/O	C05843	72	TERMINAL,STRIP,MARKER,BLANK
20	TB1 P/O	C06411	1	TERMINAL,JUMPER,3-POLE
21	TB1 P/O	C06463	1	TERMINAL,JUMPER,10-POLE
22	TB1 P/O	C06464	39	TERMINAL,DIN RAIL
23	TB1 P/O	C06465	7	TERMINAL,ANCHOR,END CLAMP, A/B
24	TB1 P/O	C06488	1	LUG,GROUNDING,ENCLOSURE
25	TB1 P/O	C06525	5	TERMINAL,GROUNDING
26	FB7,8	C06731	2	FUSE,HOLDER,AC/DC,1/4 X 1-1/4
27	-	C06732	1	FUSE,HOLDER,END COVER
28	TB1 P/O	C07117	8	TERMINAL,BLOCK,DUAL
29	TB1 P/O	C07118	3	TERMINAL,END COVER,DUAL
30	PB2	C07205	1	SWITCH,PUSHBUTTON,BLUE W/LIGHT
31	PB2 P/O	C07208	1	NAMEPLATE,RESET (800T)
32	CB5	C07649-005	1	CIRCUIT BREAKER,250V,5AMP,DIN-MTG
33	-	C07695	1	DECAL,LIGHTNING BOLT
34	PB1 - ESTOP	C07715	1	SWITCH,PUSH/PULL.RED MUSHROOM 800T
35	PB1 - ESTOP	111659	1	SWITCH,CONTACT CARTRIDGE 800T

211526 ASSY, SINGLE HEAD PNEUMATIC				
REF	SYMBOL	PART#	QTY	DESCRIPTION
1	SOL1,2 P/O	305488	1	ASSY VALVE MANIFOLD 24 V 2 STATION
3	SOL1,2 P/O	401302	2	VALVE, REG, FLOW CONTROL, ENP, Q.R.
4	-	610505	1	FITTING,ELL,1/4NPT X 3/8T,Q.R
5	-	610885-02	8	TUBING, 1/4" POLYURETHANE, BLUE
6	-	610885-04	8	TUBING, 1/4" POLYURETHANE, RED
7	-	610886-07	1	TUBING, 3/8" POLYURETHANE, CLEAR
8	-	610889	1	PLUG, MANIFOLD, 3/8" TUBE
9	CBL 6	611149-001	1	SENSOR,CABLE,1-16UNC,19WIRE,F,QC,ST
10	-	611235	2	NIPPLE, 1/4" PLASTIC
11	-	715380	1	DECAL,AIR INTERCONNECT,578/579
12	-	717646	1	GUARD MTG PLATE VALVES 578/576
13	-	A06857	1	FITTING,STREET ELL,1/4M X 1/4F,SST
14	-	C00404	1	F.R.L. COMBO, 1/4 NPTF, 72 SERIES

115744-211428 STANDARD DISCONNECT, SHAKER				
REF	SYMBOL	PART#	QTY	DESCRIPTION
1	ENCL1	115744-900	1	ENCLOSURE,STD, DISC, RWK-GFCI
2	DISC1	C07631	1	SWITCH,DISC,CIRCUIT BREAKER,FUSIBLE
3	DISC1	C07632	1	SWITCH,DISC,CIRCUIT BREAKER,HANDLE
4	DISC1	C07633	1	SWITCH,DISC,CIRCUIT BREAKER,SHAFT

211444 KIT, ELEC, SHAKER, 110V/1				
REF	SYMBOL	PART#	QTY	DESCRIPTION
1	-	111177	2	DECAL,110/115/120 VOLTS,1 PHASE
2	CBL3	304502-003	1	CABLE,YELLOW PATCH,3' SHIELDED
3	DRV1	612045-006	1	CONTROLLER,PWR FLX525,110-1
4	-	C06465	1	TERMINAL,ANCHOR,END CLAMP, A/B
5	FU1,FU4	C07064	2	FUSE,LPCC,30A,600V,13/32 X 1-1/2
6	FB4	C07076-001	1	FUSE,HOLDER,AC,600V,13/32X1-1/2,IND
7	PSM1	C07474	1	POWER SUPPLY,110/220-24VDC,5A
8	CB2	C07650-005	1	CIRCUIT BREAKER,600V,5AMP,DIN-MTG
9	CB1	C07650-010	1	CIRCUIT BREAKER,600V,25AMP,DIN-MTG
10	FU2	C07707	1	FUSE,NEUTRAL,0A,0V 13/32X1-1/2

305460 ASSY PAN SHAKER				
REF	SYMBOL	PART #	QUANTITY	DESCRIPTION
1	CBL6	611148-001	1	SENSOR,BULKHEAD,1-16UN,1/2N,19WIRE,MALE
2	ENC01	305699	1	ENCODER,.875 BORE,SLIM BODY
3	MTR1	305703	1	MOTOR,GEAR,3/8HP,230VAC,3PH,330RPM
4	PRS1	C06752-001	1	SENSOR,PROX,80MM,10-30VDC,PNP,NC/O,QC
5	PRS1 P/O	304430	1	SENSOR,CABLE,M12,5WIRE,F,QC,STR
6	PRS2	611541	1	SENSOR,REED,5-30VDC,AND CLAMP

CUSTOMER CONVEYOR CONTROL VOLTAGE OPTIONS				
REF	SYMBOL	PART #	QUANTITY	DESCRIPTION
1	CR6	610374	1	RELAY,TERM-MTG,110VAC,6AMP,1PDT
2		610375	1	RELAY,TERM-MTG,220VAC,6AMP,1PDT

210310 ASSY, KIT ADV. COMM. UPGRADE				
REF	SYMBOL	PART#	QTY	DESCRIPTION
1	ENET1	304500	1	ETHERNET MODULE,N-TRON (8PORT)
2	LT1 P/O	611592-001	4	BULB, REPLACEMENT, LIGHT TREE, 24V
3	ACO	611662-001	1	CONNECTOR,ETHERNET,120 GFCI PLUG,3A
4	LT1 P/O	C01298-004	1	LIGHT,MODULE,BLUE
5	CBL2	304502	1	CABLE,YELLOW PATCH,2' SHIELDED
6	CBL5	304502-003	1	CABLE,YELLOW PATCH,3' SHIELDED

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Electrical Ladder

115744-WD

Electrical Ladder
115744-WD

COPPER WIRING 75C RATING
DISCONNECT TERMINAL CONNECTION
FIELD SERVICE WIRING CONNECTION
GROUNDING LUG CONNECTION
TORQ SPEC 7 IN/POUNDS

SERVICE +/- 10%

	PRIMARY VAC	CONTROL VDC
VOLTS	110	24
HERTZ	50/60	–
PHASE	1	–
AMPS	30	5

ACO
2L1
HOT
GND
NEUTRAL
PE

DISC1
DISCONNECT
L1
L2
L3
GND
PE
FU1 30AMP
FU2 0AMP
FU4 30AMP
1L1
2L1
N
CB1
10A
3L1

DRV1
L1
L2
L3
G
T1
T2
T3
R5
R6
S1
S2
1A
17
1
1 2 3 4 5 6 11 12 13 14 15 16
1
2

SHAKER UNIT #1
MTR1
1T1 (BLK)
1T2 (BLK)
1T3 (BLK)

CBL3

2L1
5A
CB2
4L1
N
(G) (L1) (L2)
PSM1
POWER SUPPLY
(+) (–)
1A1
2

CB5
5A
1A
(A1) SR1 (A2)

PB1 E–STOP
(NO) (NO)
3
CR1 (11) (12)
9
PB2 RESET
(+) B (–)
PB1 E–STOP
(+) R (–)

SR1 (Y1) 7 8 (Y2) SR1
PB2 RESET
(NO) (NO)
SR1 (S11) 4 5 (S12) SR1
PB1 E–STOP
(NO) (NO)
4 6 (S13) SR1
PB1 E–STOP
(NC) (NC)
SR1 (S21) (S23) SR1
JUMPER

CBL1
CBL2
DISP1
CBL5
ACO

PLC1
+24V
SR1 (13)
(14)
VDC
NEUT
VAC
VDC 0
VDC 1
VDC 2
VAC
VDC 3
VAC
VDC 4
VAC
VDC 5
COM2
INPUT
OUTPUT
O/0
O/1
O/2
O/3
O/4
O/5
O/6
O/7
O/8
O/9
O/10
O/11
COM 0
I/0
I/1
I/2
I/3
COM 1
I/4
I/5
I/6
I/7
COM 2
I/8
I/9
I/10
I/11
COM 3
I/12
I/13
I/14
I/15
I/16
I/17
I/18
I/19

ENCO1
(WHT) A
(RED)
(BLU) B
(BLK)
(ORN) Z
(SHLD)
VDC
COM
UNIT #1 ENCO1 ENCODER SHAKER COUNT

PB1 E–STOP
(NC) (NC)

(A2) CR1 (A1)

SOL2 33A FU7 2AMP
UNIT #1 CLUTCH
SOL1 35A FU8 2AMP
UNIT #1 PAN LIFT

(BLU) PRS2 (BRN)
PRS1 (BLK) N.O. (BRN) (BLU)
UNIT #1 LIFT UP SENSOR
UNIT #1 PAN SENSOR SENSOR

(A1) CR6 (A2) A CUSTOMER CONVEYOR CONTROL
R6 R5 DRV1
B

*NOTE: A AND B JUMPED TOGETHER IN ASSEMBLY CUSTOMER TO REMOVE FOR INTERLOCK

LT1 (0) G (1)
LT1 (0) B (2)
LT1 (0) Y (3)
LT1 (0) R (4)

CR6 (14) (11)
SR1 (24) (23)
CR2 (14) (11)
CR3 (14) (11)
CR4 (14) (11)
CR5 (14) (11)

Vcom
(A2) CR2 (A1) W
(A2) CR3 (A1) X
(A2) CR4 (A1) Y
(A2) CR5 (A1) Z
CUSTOMER PAN RECOGNITION CONTROLS

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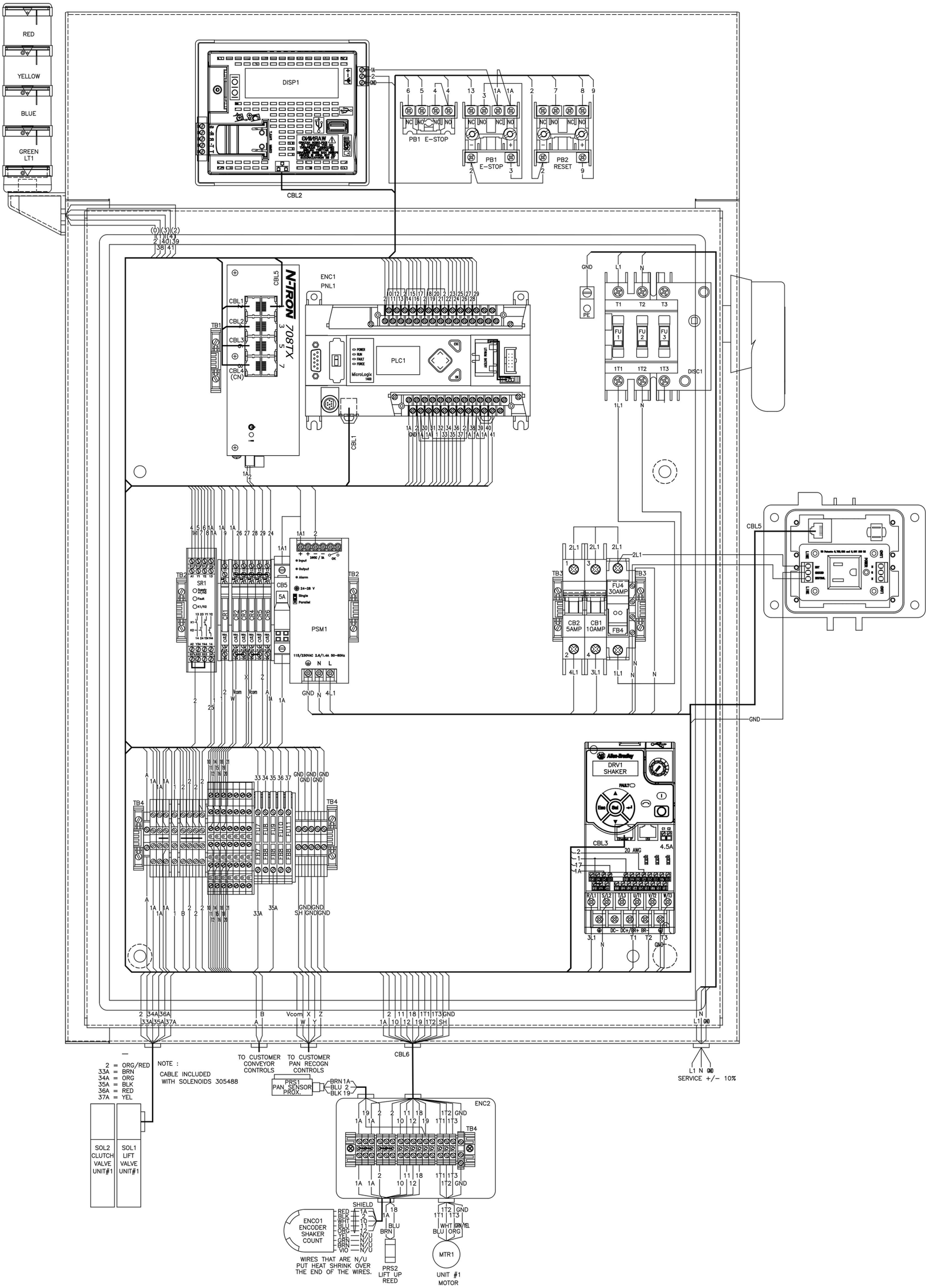
Electrical Layout
115744-WD

Electrical Layout
115744-WD



FOLD OUT TO VIEW DRAWING