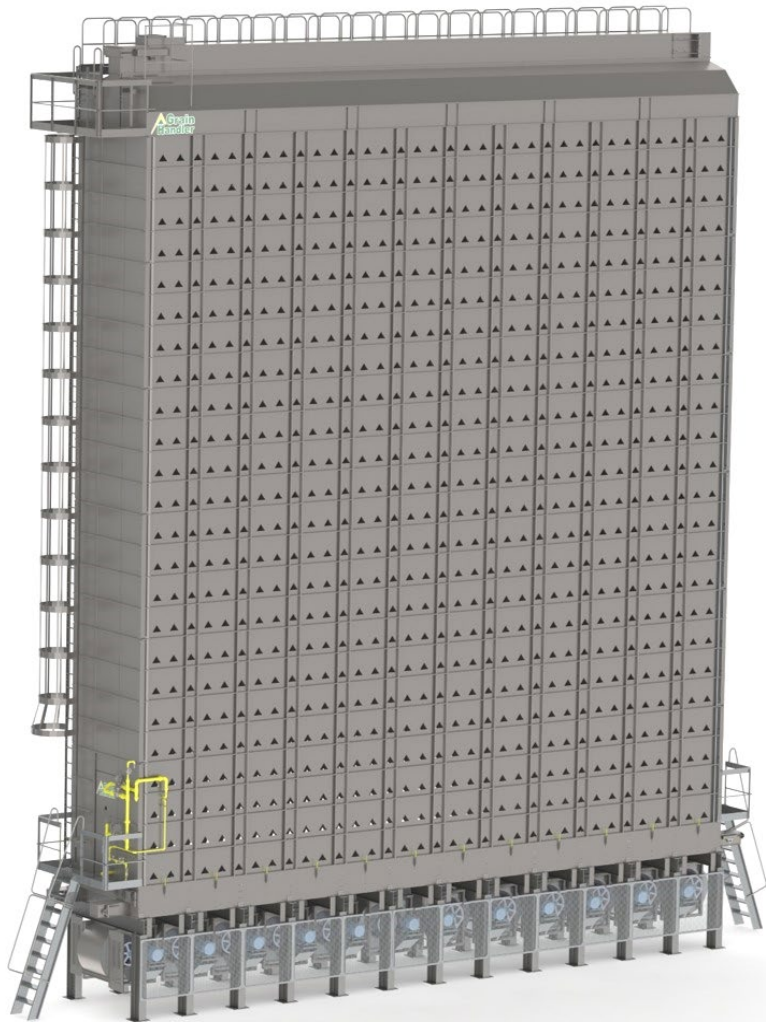




2024

Dryer Service Manual



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New Features included in this version that were not in 2020:	
Fan Motor Mount	Solid platform with slots to adjust tension. Eliminated turnbuckles.
Garner Handrail	Solid handrail. Eliminated curved sections.
Actuator	Now using Eclipse valve

Revisions:

Feb 2018 – Modified language on VFD Parameter 80; Added picture and information re fan clean outdoor.

Mar 2020 – Added notation re burner air flow adjustable panels.

Mar 2021 – Added pictures of revised fan motor mount and Eclipse Actuator valve.

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Look over the dryer:

After the dryer has been erected and the gas and electric have been completed, take some time to look over the dryer. During shipping there can be some fasteners that loosen up and need to be tightened.

First, all the fan belts need to be checked and adjusted to a moderate tension (approx. 1/2" to 3/4" give). The tool needed to adjust fan motor belts is a 3/4" wrench. Loosen the 1/2" bolts, slide upper motor platform to proper tension and tighten bolts into place.

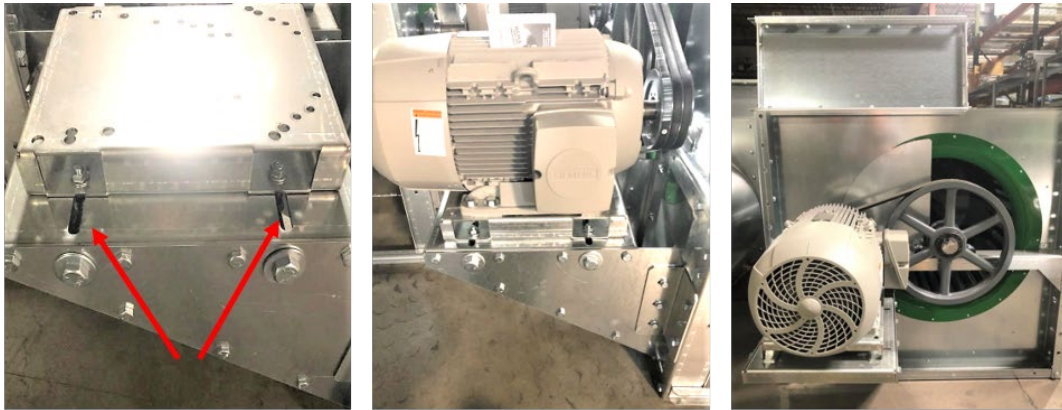


Figure 2 – Fan Motor Mount and Belt Adjustment

Also, remove covers on the tub drag conveyor head and tail and check to assure the tub drag chain sprocket is centered.

To do this, use a tape measure and center the sprocket in the opening. Do the same on the other side of the conveyor. Check the tension on the drag chain by pulling up on it. It should have approximately 3/4" of give in the chain. If this is too tight, you will hear a binding-up sound while the conveyor is moving. Quickly shut down the dryer and loosen the drag chains to proper tension. To adjust the tub drag chain first loosen the 1- 1/8" locking nuts located on the side of the tub.

Next, using a 1-1/8" wrench loosen or tighten the nuts located on the front of the tub. Make sure you adjust the two sides equally to ensure the smooth operation of the chain.



Fig 3 Tub Drag Conveyor

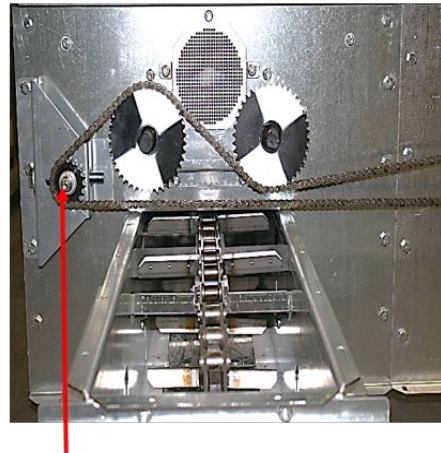


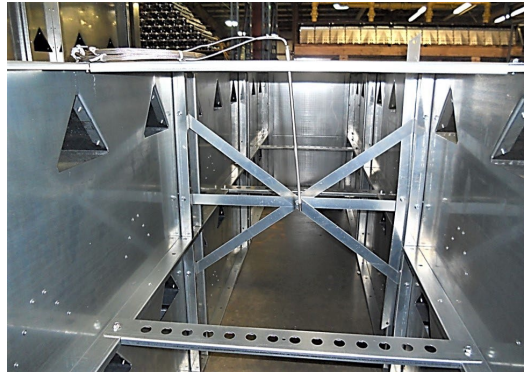
Fig 4 Chain Tension Adjuster

Also, in Figure 4 above, you will see the chain tension adjuster for the metering rolls. To adjust the chain, you will need to loosen the 3/4" bolt on the smallest sprocket. Next, tighten or loosen the bolt on the side of the tensioning bracket to achieve the appropriate tension. Lastly, re-tighten the 3/4" sprocket nut to retain tension.

Dry Fire Preparation:

A few things need to be done before you can dry fire the Grain Handler.

1. The thermocouple probe needs to be installed two tiers down from top of dryer plenum and approximately 8 feet in. Insert through the small hole in the center of the tier tie. (NOTE: On conventional side fan models, the probe should be mounted 2 feet in from the side furthest away from the burner and two tiers down from the top.)



The leads need to go through the plenum wall and then fed into the junction box (or control panel on conventional dryers, when the panel is located on dryer platform) and landed in the thermocouple terminal blocks.

- Red = neg. on thermo block & S1 on temp controller
- White = pos. on thermo block & R1 temp controller

2. There should be two “type J” thermocouple wires going between the junction box and control panel (on remote panels).
3. You will need to run the copper air line from the air switch located in the junction box (DO NOT KINK), to closest fan. This should be wired to be the LAST fan to turn on. The air proving switch confirms all fans are in operation. These are dual rated switched capable of detecting pressure and vacuum. The connector fitting will be factory installed on the suction side. Secure the air line to the fan housing as close to the squirrel cage as possible. This will allow airflow to travel through the copper line and trigger the air switch.

Dry Fire the Dryer:

BEFORE STARTING THE DRYER, ALWAYS REMEMBER TO

REMOVE THE BURNER MAT.

Failing to do this will destroy your burner.

Once the area is clear and you have assured the doors are shut, turn the *Main Interlock* switch to **START**. The Start feature will allow the dryer to run without lighting the burner.

Turn Hot Fan switch (also the Cool Fan switch on a Conventional model) to the "ON" position and check the rotation on the fan motors.

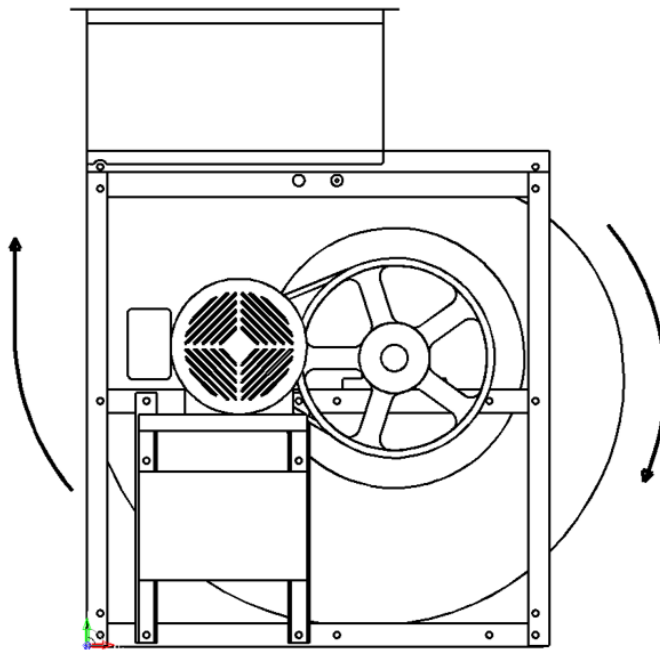


Fig 5 Fan Rotation

If the rotation is incorrect, switch two of the three wires on the load side of the motor starter, found in the control cabinet. On single phase motors, the change needs to be done in the motor wiring compartment as per diagram.

To check the Tub conveyor rotation, press the “**Push to Unload**” button to start the Dry Conveyors. If they are incorrect, change the leads on the VFD. Each set of metering roll sprockets will turn towards each other over the top when rotation is correct.

To change rotation, change two of the three wires on the load side of the Over-Load, located below the VFD in the control cabinet.

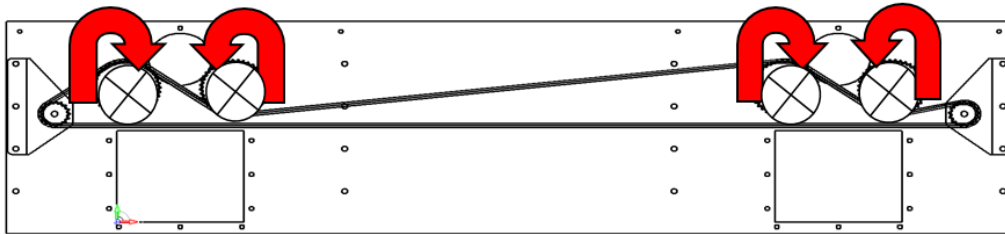


Fig 6 Metering Roll Rotation

For Models with scalper or level drags, use the same tensioning adjustment method as the tub drag conveyors. Be sure rotation is carrying the grain away from the fill spout. To change rotation, change wire on the VFD (Scalper) and at starter for (Level).

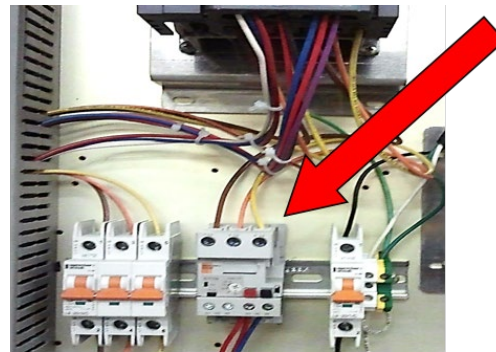


Fig 7 Control Panel

Models 32' and longer will have a belt driven gearbox. To adjust belts, you will need to use the threaded rod posts to move the motor base up and down by turning the nuts to the desired tension. Make sure the fill switch is properly functioning. This is done with the dryer in Start mode. This takes two people to do. One person climbs to the top and opens the hatch on the garner, and physically pushes the button in and out. The person on the ground will have to verify the wet grain loading light turns on and off and any wet starters engage.

Ready to light the burner:

1. First be sure your fuel source is on.

- The pressure coming into the dryer on LP gas should be between 80-120 psi.
- The pressure coming into the dryer on Natural gas should be between 3-7 psi.

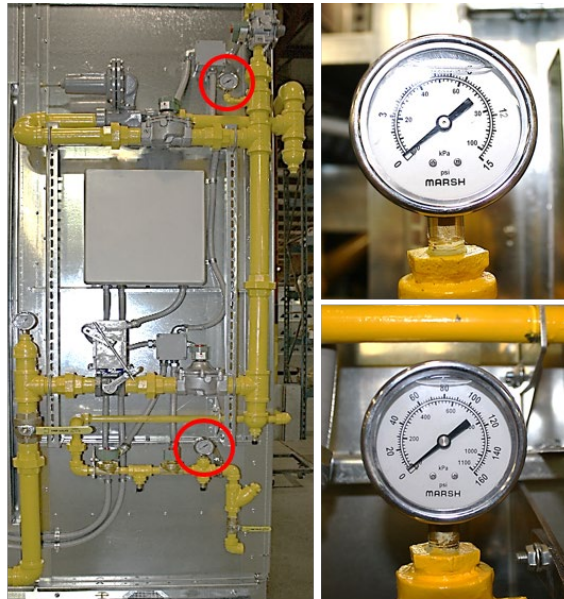


Fig 8 Pressure Gages

To light the dryer:

- a. Turn the **Fuel** switch on.
- b. Turn the **Hot Fans** Switch on
- c. Turn the Main Interlock switch to **Run**.

The fans should start two at a time and the Honeywell burner control will start its purge cycle.

The purge cycle will last 30 seconds and 10 seconds for the ignition sequence. Your dryer should be lit now, and the Honeywell should read 5 volts.



Fig 9 Honeywell Burner Control

2. Press the “Push to Unload” button within 2 minutes, or the dryer will shut down as a safety feature. If you do not push to unload in time you will have to recycle the fuel switch.

Ready to start filling the dryer:

1. **FIRST use burner mat to cover burner**, this will greatly reduce the amount of grain that falls in the burner during filling process. This is only necessary when filling an empty dryer.

Note: when filling dryer for the first time of the year its best to use dry grain, recycle first half of dryer.

2. To fill the dryer:
 - a. Turn your fans off and switch the Main Interlock to **Start**.
 - b. Next, turn the Wet Fill Switch on and Wet Leg, if applicable.

Note: Your dryer is equipped with a zero-speed sensor on your metering rolls.

This feature will shut down the dryer after 4 minutes of not sensing movement of the metering rolls.



The filling process time depends on size of dryer and capacity/speed of fill device. The filling will stop when the grain level reaches the fill switch. After filling is complete,

**PULL THE BURNER MAT OUT AND
CLEAN OUT ANY GRAIN THAT MAY HAVE BOUNCED INTO THE PLENUM.**

You're now ready to start drying:

Now that the dryer is full, begin the start up process. Once the dryer is lit, auto tune the temp control. After the auto tune process is done, and all the parameters are set, you are done.

Programming Temp Control:

- 1. Push the right arrow button to bring up menu**
- 2. Scroll down to "Setup" press right arrow to advance**
- 3. "Analog Input" press right arrow to advance**
- 4. "Sensor Type" press right arrow to advance**
- 5. Scroll to "Thermocouple" press right to advance**
- 6. Highlight "J" for Type J TC wire**
- 7. Press Left arrow 2 times, to get back to "Setup" menu**
- 8. Scroll down to "Control Loop" press right arrow to advance**
- 9. "Heat Algorithm" press right arrow to advance**
- 10. Highlight "PID" then press right arrow to advance**
- 11. Cool Algorithm: Highlight "PID" then press right arrow 2 times**
- 12. Heat Prop. Band: Change to 15 then press right arrow to advance**
- 13. Cool Prop. Band: Change to 15 then press right arrow to advance**
- 14. Time Integral: Change to 114 then press right arrow to advance**
- 15. Time Derivative: Change to 16 then press left arrow to go back to "Setup Control Loop 1" menu**

- 16. Scroll down to "Ramp Action" then press right to advance**
- 17. Ramp Action: Highlight "Both" then press right arrow 2 times**
- 18. Ramp Rate: Change to 30 then press right arrow 2 times**
- 19. Maximum Set Point: Change to 230 then press left arrow to go back to "Setup Control Loop 1" menu**
- 20. Scroll down to Control Mode then press right arrow to advance**
- 21. Highlight "Auto" then press left arrow 2 times to go to "Setup" menu**
- 22. Scroll down to "Output" then press right arrow to advance**
- 23. Highlight "Output 1" then press right arrow to advance**
- 24. Output 1: Highlight "Function" then press right arrow to advance**
- 25. Highlight "Cool Power" then press left arrow 2 times to go back to "Setup" menu**
- 26. Setup: Highlight "Output 2" then press right arrow to advance**
- 27. Output 2: Highlight "Function" then press right arrow to advance**
- 28. Highlight "Heat Power" then press left arrow 3 times to go back to "Setup" menu**

29. Scroll down to "Global" then press right arrow to advance

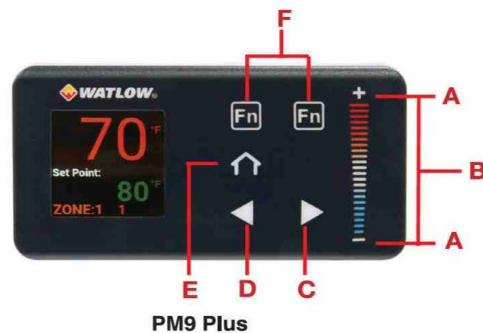
30. Global 1: Highlight "Save Settings As" then press right arrow to advance

31. Save Settings As: Highlight "User Set 1" then press left arrow 4 times to get to main screen Programming completed

Chapter 3: User Interface

Touch Keys

-  **A**-Up/Down Increment Key: Scroll up or down lists using the + or - keys.
-  **B**-Numeric Slider: Increase or decrease numeric parameters with the slider.
-  **C**-Forward Select Arrow: Return to the previous selection with the Forward arrow.
-  **D**-Back Select Arrow: Select items or move to lists using the Back arrow.
-  **E**-Home: Return to the home screen from any screen with the Home Key.
-  **F**-Function Keys: Function Key Keys can be programmed for various tasks.



Programming the HI Limit:

The HI LIMIT is a safety feature that will not allow the dryer to exceed the set temperature. If the plenum temperature of the dryer reaches its set HI LIMIT, it will automatically shut down and will have to be reset before you can restart the dryer. In most cases the dryer comes factory set to a temp of 250 degrees.



Fig 11 Hi Limit Control

Ideally, the Hi Limit should be set at 20-30 degrees above your drying temperature. Here is a step by step on how to set the HI LIMIT.

1. First hold down both arrow keys until you get to set menu, then Arrow down till it reads limit and Press green button. It will then read both change this to read high, then press reset until you are back on the main screen.
2. Next,
 - a. Hold down both arrow keys, this time for three seconds only, it should read OPER.
 - b. Arrow down till it reads LIM
 - c. Press green button until it reads LHS. Set this for 250 or desired temp.
 - d. Then press the reset till it reads LIM.
 - e. Then arrow down till you get to ALM
 - f. Press green button. Screen should read 1
 - g. Press green button again. Should read LO set at 0.
 - h. Press green button one more time. Screen should read AHL. Set to 250.
 - i. To exit back to main screen press reset three times.

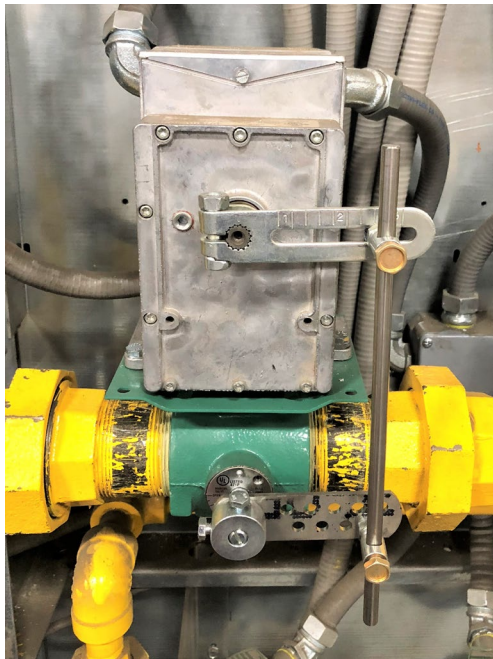
There is one more thing to do:

Take amp draws on all the fan motor starters. There could be a variance in readings. To even out motor loads, you may adjust fan shields on both sides of fans equally. Ideally, the fan shields will be as open as possible. This process will ensure the most efficient operation of the Dryer.

Trouble Shooting:

1. *Dryer not Lighting*

- Be sure the fuel source is on. The pressure coming into the dryer on LP gas should be between 80-120 psi. And after the Regulator, it should read between 3-6 psi.
- Check to see if the gas is getting through the gas trane to the burner. Slowly close the last check valve before the burner. If pressure builds on gage, gas is getting to the burner.
- If no pressure builds, check to see that all of the Asco valves are functioning. An obstruction in the line will cause the pipe to frost up at the blockage.
- Check the Actuator to be sure it is opening, and that the “Arm” is traveling counter-clockwise. The “Arm” will be in the 3 o’clock position when closed and the 12 o’clock position when open all the way. The Actuator comes factory set to a moderately aggressive setting at 2.5 on the “ARM” of the actuator.



- Clear the burner of any debris and use a pin vise to check to see if the ports are clear (especially the first ten under the spark plug electrode). These ports are approximately 1 ½” deep, be sure to penetrate all the way through.
- The UV Scanner located above the spark plug, has a glass window that needs to be clean and free from any debris.

Figure 12 – Eclipse Actuator Valve

- Make sure there is spark. Terminal 12 in the junction box feeds the spark generator.

2. Dryer won't stay lit

- Make sure the “Push to Unload” button has been pushed. If not pushed within 2 minutes the dryer will shut down, assuming it has been left unattended.
- Your dryer has a “Zero Speed Sensor” that will shut down dryer after 3-1/2 minutes if it does not sense movement. This is a safety feature in case the metering chain breaks or slips off.
- The High Limit that is located on the Control Panel door (above the Temperature control), is a safety feature that shuts the dryer down if it exceeds the high temperature set point of 250°F. If this happens, the screen will read “FAIL”. Push the reset button once the plenum temp has decreased to 80°F. The High Limit will read “SAFE” in a normal state.
- Assure the Flame Timer is set to 2 minutes. This timer gives you 2 minutes to “Push to Unload”. If timed out, the dryer will shut down.
- Check to see if the “low air flow” indicator light is lit up. If so, it could be one of two things.
 1. A Fan starter tripped, causing the loss of airflow. Check this by opening both panel doors and looking at the Fan Starters. Reset starter and proceed with start up. These starters have an adjustable thermo-overload protection. It should be set for the “FLA” of the motor name plate rating. Take amp readings to make sure the motor is not over working.
 2. The second thing it could be is an obstruction in the copper air line. Check for kinks causing blockage.
- Check the “DRY” motor starters/ metering O.L. to see if there is an overload tripped. Check for obstructions in the conveyors/metering rolls, or a possible locked up gearbox. Any tripped O.L. will cause the Dryer to shut down. One way to clear small obstructions is to reverse the motor by switching two of the three wires located on the bottom of starter and bumping the motor to free up the debris. If this does not free the obstruction, remove motor from gearbox and turn by hand to locate the problem.

Maintenance:

1. Beginning of the season Maintenance.

- a. Grease all zerk fittings
- b. Lube metering chain
- c. Drain gas line from any condensation
- d. Clean Burners
- e. Clean UV scanner
- f. Inspect spark plug
- g. Check metering roll and drag conveyor chains for proper tension
- h. Check all belts for proper tension and wear
- i. Check gas trane for leaks
- j. Disconnect all electricity and tighten all terminal connections, including control panel and junction box on dryer.
- k. Dry fire the dryer to ensure it is in good working order before drying season.

2. End of season Maintenance.

- a. Empty dryer and open tub doors
- b. Open doors and clean out fans
- c. Vacuum out burner
- d. Install burner mat
- e. Shut off all gas valves
- f. Shut off electricity
- g. Clean Control panel out from dust and debris

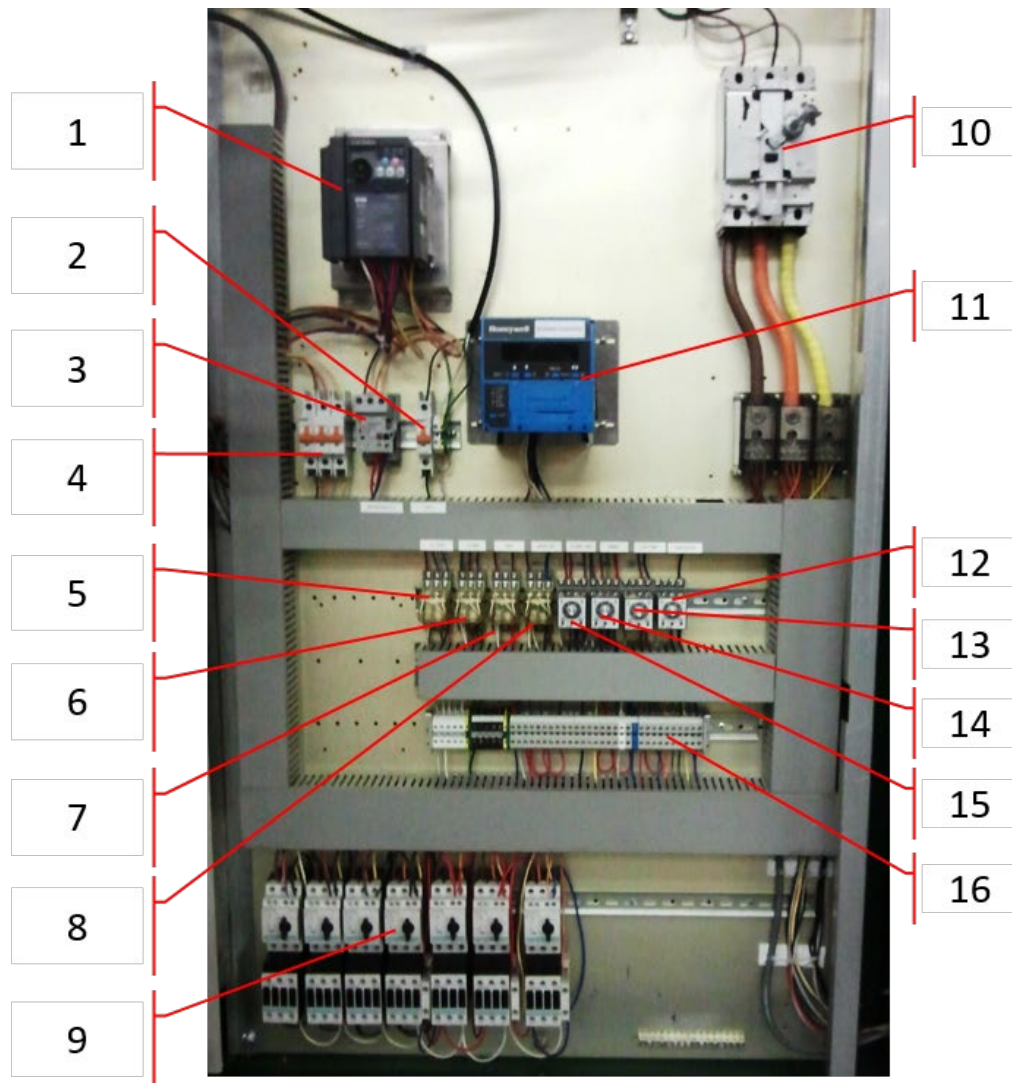
Emergency Stop:

The Emergency Stop button can be used to immediately shut the dryer down when the operator is not near the control panel if it is mounted in a location separate from the dryer. Conventional dryers will have the control panel mounted on the front of the dryer.



Fig 10 Emergency Stop Button

Control Panel:



1. VFD	2. 120 V. Breaker	3. Metering O. L.	4. VFD Disconnect
5. HI Limit Relay	6. Flame Relay	7. Dry Relay	8. Main Interlock Relay
9. Motor Starters	10. Main Breaker	11. Honeywell	12. Fan Delay (3 Sec.)
13. Fan Timer (10 Min.)	14. WBMT (10 Min.)	15. Flame Timer (2 Min.)	16. Term Strip

VFD Parameters:

The VFD comes factory set with the following parameters set. In some instances, the VFD may have to be manually set. Here is a list of the parameters and what they should read or be set at.

Parameters #	Change To:
1 PER DRYER SIZE: (16'=24 HZ) (24'=37 HZ) (32'= 48 HZ) (40'=45 HZ) (48'= 56 HZ)	
7	5 Sec.
8	5 Sec.
9	F. L. A.
12	4.0
13	0.0
18	60.00
19	Base Freq. Voltage
37 PER DRYER SIZE: (16'= 6.750) (24' =6.579) (32'=6.750) (40'=9.000) (48' =8.637)	
44	5.0
77	2
79	2
80	0.75 multiplied by motor HP
83	Rated motor Voltage 200 or 400
122	0
190	11
192	11
883	780

Tool List:

Installation Tools	
1/2 Impact Socket Set:	3/8 to 1 1/8
Alignment Punches:	Two – 3/16 point punches per install person
Allen Sets:	Large and small sets are necessary as there are many different sizes needed for set screws and electrical main breakers
Bits:	Ten 5/16 bits
Bolt & Nut Apron:	One per installer
Climbing:	Safety harnesses with three way lanyards
Cordless Impact Wrench:	1/2" with 1/2" socket (one per installer)
Drill:	5/16"bit (one per installer)
Extension Cords:	Two 100' and two 50'
Hammer Drill:	3/4" and 1/2" bits
Hammers:	One sledge and assorted smaller
Impact Socket Wrench:	3/4"
Ladders:	Two 12'
Level:	One 48"
Lifting Bar:	Two 48" bars and two lifting bar loops
Lifting Brackets:	Available for purchase from Grain Handler
Nut Driver:	Three 5/16 and three 3/8
Pipe Wrenches:	Two 36"
Power Tools:	Drill, Impact Wrench, Grinder
Rubber Mallets:	
Screw Drivers:	Phillips size #2, Flat head Small, Medium & Large; Jewelers size flat head
Shaft Tool	
Spreader Bar:	Should be requested from the crane operator (98")
Tag Lines:	Two 100'
Tape Measure	One 100' and One 25'
Tool lanyards:	Two per outside and inside installer
Vice Grips:	
Welder:	With generator and welding clamps
Winches:	Two electric winches
Wrenches / Sockets:	1-1/8", 3/4", 9/16", 1/2" (per installer), 7/16", 3/8", 1/4", 3/16", 13/16", 5/32", 1/8", 3/32, crescent