QUICK MANUALS

– Most of the answers right at hand

Sukup EUROPE®

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We are both proud and pleased that you have chosen a Sukup product/ plant.

We offer flexible and proven solutions based on more than 60 years of experience in producing and developing solutions for grain –drying, -storage and –handling.

We hope that you will be satisfied with your new product/ plant and that you will consider a Sukup product if you should be in need of additional capacity or an update of existing products.

Strong European dealer network

At Sukup Europe we have a clear focus on our European export market. Over the years, we have established a strong dealer network in a number of European countries.

Your local Sukup Europe dealer is always ready to advise you in relation to your Sukup products and does also offer you the necessary service when you are in need of assistance.

These Quick Manuals are thought as a simple reference book, where you find most answers - right at hand!

Kind Regards

Sukup Europe A/S & your local Sukup Europe dealer

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Operation

This is a short version of the owner manual, for more details use the owner manual

Calibrating Discharge Moisture Sensor

IMPORTANT: Calibrating discharge moisture sensor to desired output moisture will help ensure proper drying of grain. It works best to calibrate sensor when actual grain moisture is as close to desired target moisture as possible. For instance, if 16% corn is desired, sensor should be calibrated when actual grain moisture is 16%.

It may be necessary to do an initial calibration when actual grain moisture is wetter or dryer than desired target, then another calibration when grain is at or near target moisture. Do this by running dryer in Continuous Flow for 30 minutes (or after Stabilization period) and then taking a sample from spout and checking it with an external moisture sensor known to be accurate. If readout is more than half a percentage point different than what dryer is showing (for instance, 17.5% moisture vs. 16.5%), dryer's sensor must be recalibrated. See recalibration steps under Tools Menu heading in Software Manual (Appendix G).

Take samples and check dryer's moisture sensor a few times a day. If it's off by .5% or more, put unload on pause, remove sensor from dryer and check for any dust or debris buildup on sensor or metal tube around sensor. Replace sensor and resume unloading. Check moisture again. If it's still off by .5% or more, calibrate sensor again.

Manual Operation

Manual operation serves many purposes. If operator wants complete control of dryer, manual operation fulfills this need. After pressing "Start" on main screen, user can select "Manual Operation" to run dryer as desired. User can turn on fan(s), heater(s), load and unload motors. **Dryer uses paddle switches to automatically load dryer during manual operation while user has control of meter roll speeds and plenum temperature.**

Final Dry

In "Final Dry" mode, dry time and unload time are set by operator to finish drying grain. Temperature is based on previous settings. When wet bin is empty and dryer can no longer be filled with wet grain, Final Dry is used to dry last batch of grain through drying system. Dryer will heat the last batch and then shut fans and heaters off and unload the grain.

Dry Fire

"Dry Fire" mode provides a way to run dryer when there is no grain. It is recommended this mode is used to test dryer at start of **EVERY SEASON**. "Dry Fire" allows use of burner without need for air switch to confirm air pressure. This mode is NOT to be used for drying grain; only as a means of inspecting pipe train for leaks and component integrity and confirming overall heater operation.

CAUTION: If vaporizer is not adjusted correctly, piping could be hot. Ensure proper adjustment to avoid burn resulting in minor or moderate injury.

Image 3-1 - Vaporizer adjustment bracket on axial-fan dryer

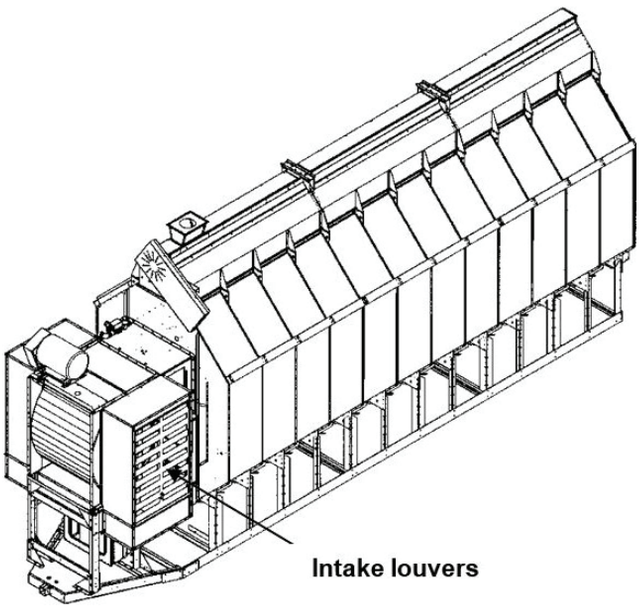
Select Dry Fire mode to operate fan and heater when there is no grain in dryer. After dryer has been allowed to run and plenum temperature has stabilized, vaporizer outlet (top) should be warm but not hot to touch.

If vapor side of pipe train is hot, or if dryer has shut down due to a "Vapor Over-Temp" fault, vaporizer may need to be moved away from flame. To adjust vaporizer, loosen both pivot bracket bolts (top and bottom) and then pivot vaporizer out of flame as necessary to regulate temperature at vaporizer outlet. U-bolts that hold vaporizer to adjustment bracket can also be loosened and vaporizer can be moved in or out. If vaporizer is freezing up, loosen bolts as described above and move vaporizer toward flame.

Fault Condition
Vapor Over-Temp

Image 3-2 - Vaporizer adjustment bracket on centrifugal-fan dryer

Adjusting Louvers & Doors on Centrifugal-Fan Dryers



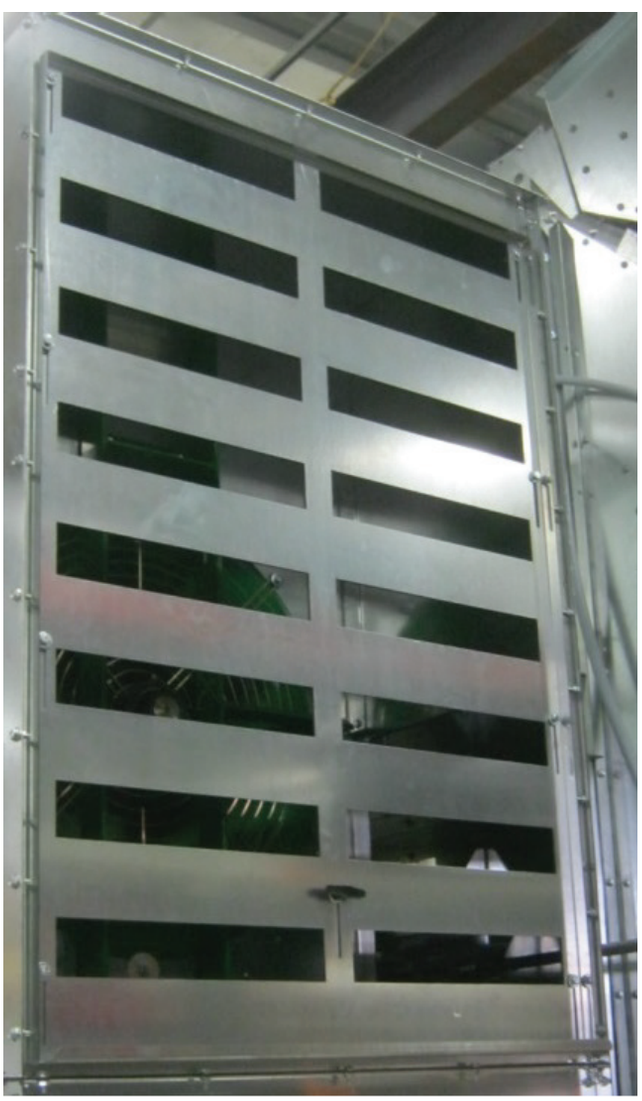


Image 3-3 - Adjustable louvers

Operation

Suction Cool Mode

Louver slots should be narrow to create more suction in bottom cooling plenum, but slots should not be fully closed. Start with a 3/4“ to 1“ opening and adjust from there. Closing louvers more will increase efficiency and pull more heated air into fan, but will decrease capacity. Opening louvers more will increase capacity, but will decrease efficiency. Less-heated air will be pulled into fan.

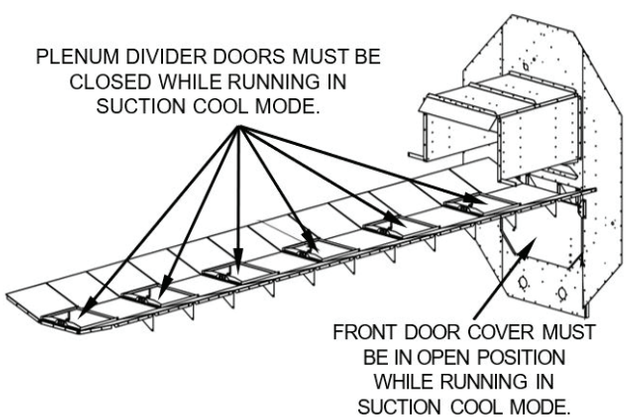
As shown below, all plenum divider doors must be closed and front door cover must be open.

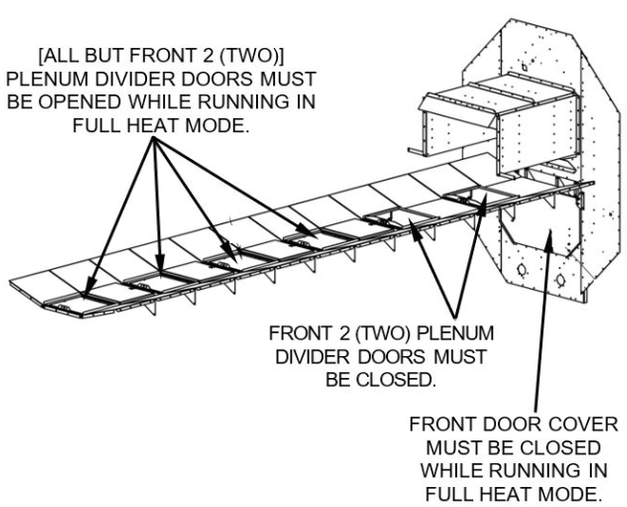
See additional instructions on next page.

Full Heat Mode

Louvers should be fully open as shown in Image 3-3. As shown below, front 2 (two) plenum divider doors should be closed. All other plenum divider doors must be opened. Front door cover must be closed.

See additional instructions on next page.





Adjusting Louvers & Doors on Centrifugal-Fan Dryers - continued

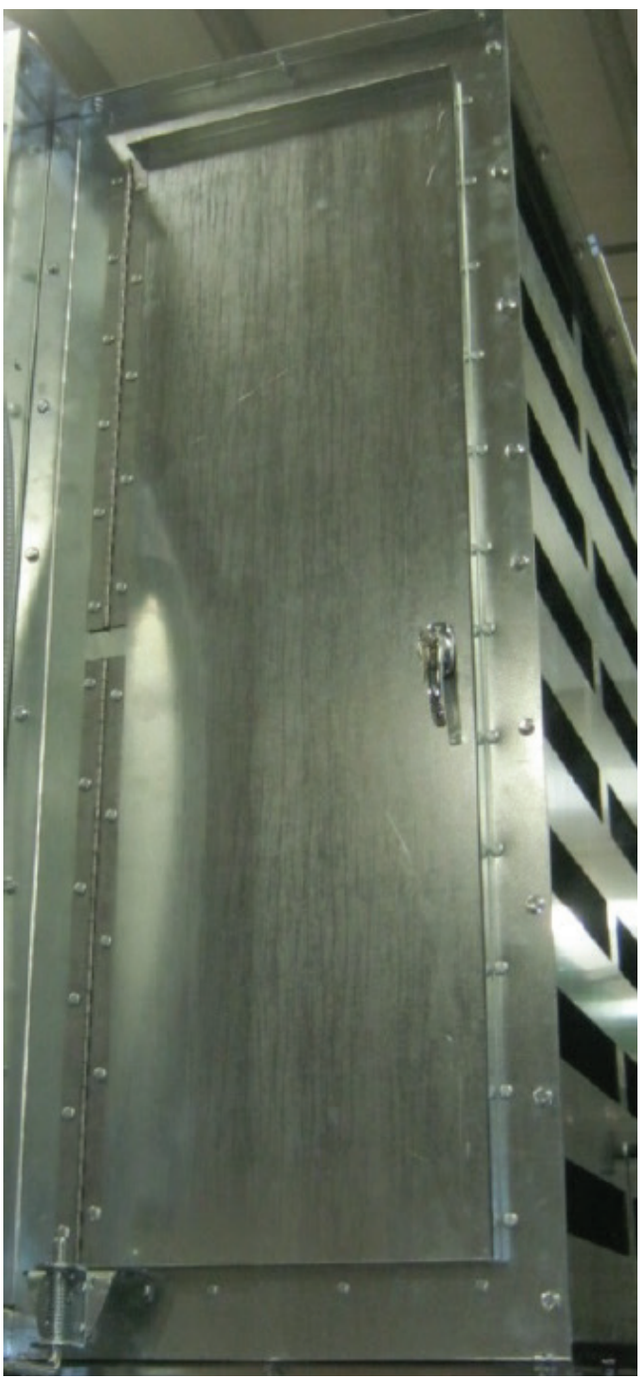


Image 3-4 - Intake door

Image 3-5 - Spring pin on intake door

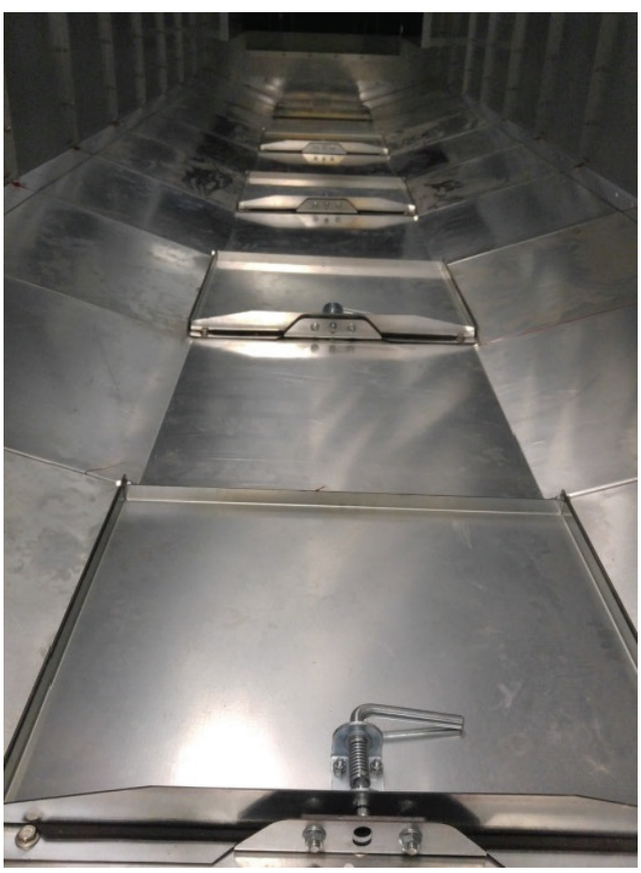
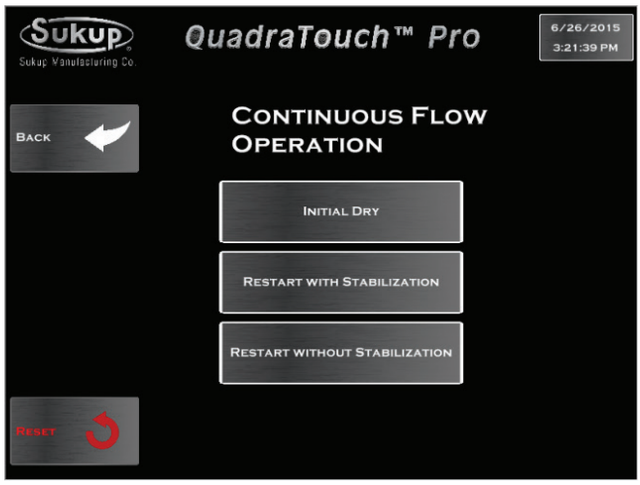


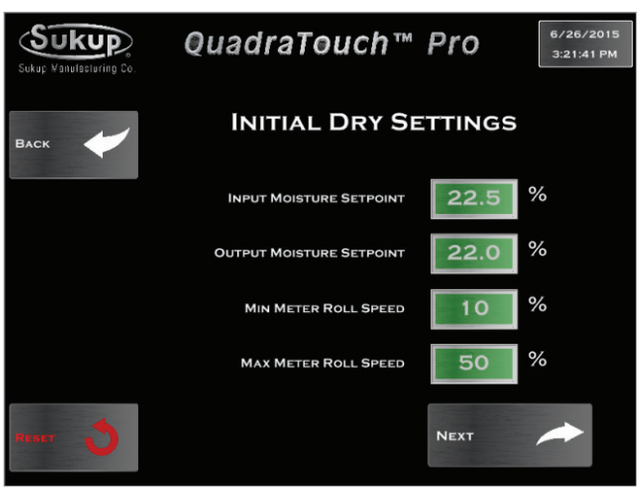
Image 3-6 - Plenum divider doors

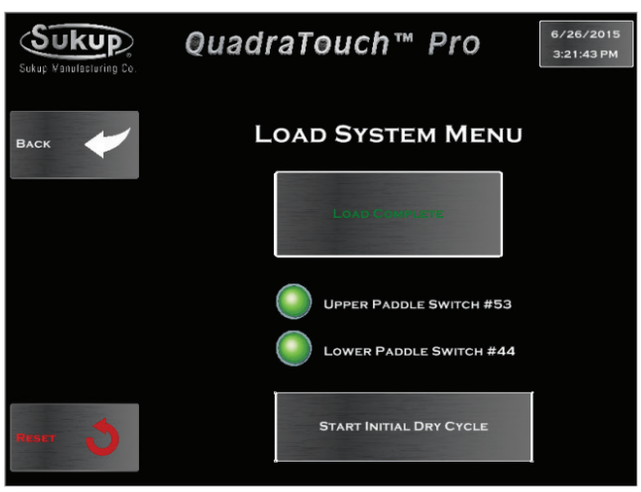
For **suction cool mode**, close plenum divider doors (Image 3-6).
Louver slots are narrow.

When operating in **full heat mode**, the 2 (two) front plenum divider doors must be closed, and the others opened. Louver slots are fully open (Image 3-3).

Operation







Pressing the "Start" button on the main screen will bring up the start menu. From here, the dryer can be used in many different drying modes, the most common of which will be continuous flow. This section will describe each mode and how it's accessed.

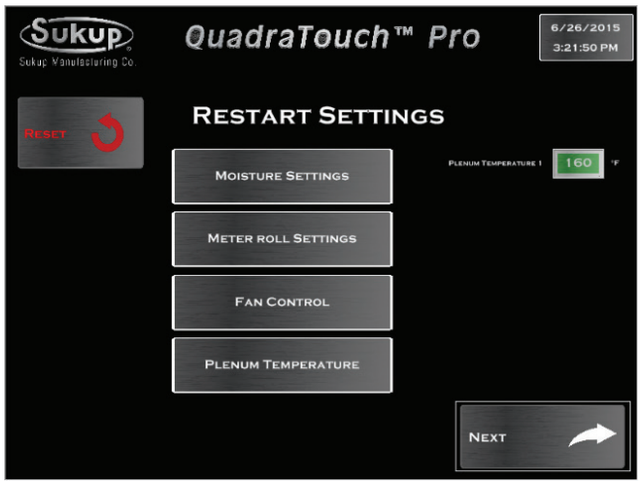
Start → Continuous Flow

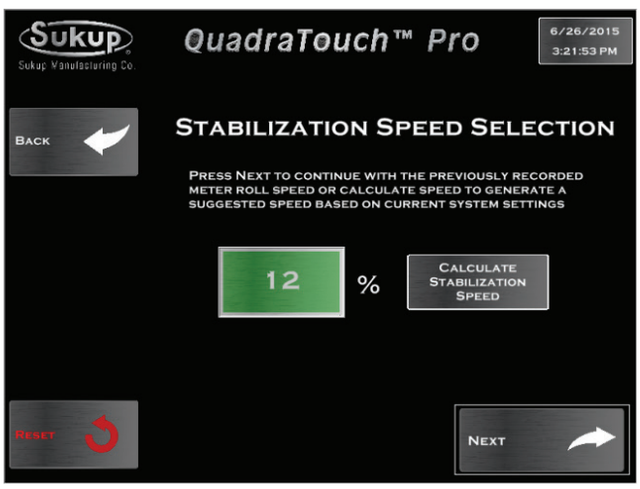
Continuous Flow is divided into 3 smaller processes when grain is loaded into the dryer for the first time. Initial dry essentially warms up the grain for a set period of time depending on the user input. The fans and heaters will turn on, and a timer will appear on the screen. This is essential for creating a steady flow of grain through the next step of stabilization.

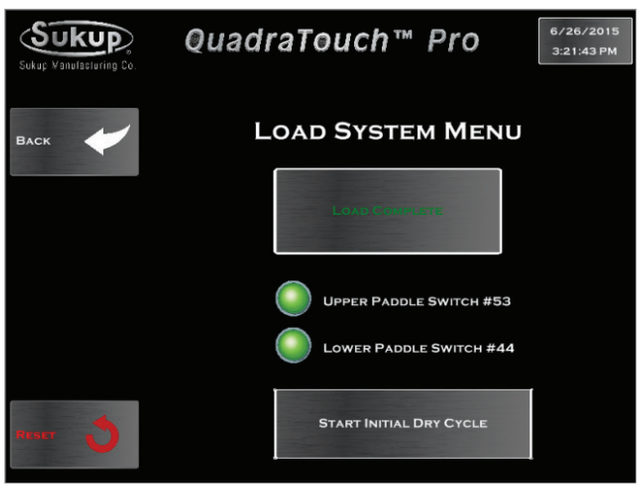
To begin initial dry, the dryer needs some information to get started for the first time. To give it an idea of how long to heat the first batch of grain, enter in the values of the incoming and desired output moisture. Press "Next" to continue on to the loading phase.

Now that the dryer has been programmed with a few basic settings, we are ready to load the dryer with grain and start initial dry. After the dryer has been loaded with grain, a button will appear to start initial dry cycle.

Operation







Start → Stabilization

After Initial Dry is finished, Stabilization is the next phase of Continuous Flow Mode. Stabilization is designed to go through 1 full cycle of grain, discharging at a calculated roll speed. The first step of stabilization is to select which fans and heaters should be utilized. Heaters will not be enabled unless its corresponding fan is used.

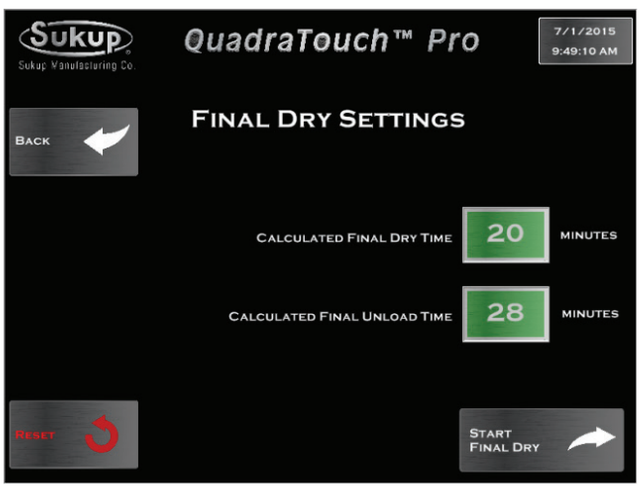
Stabilization/Restart

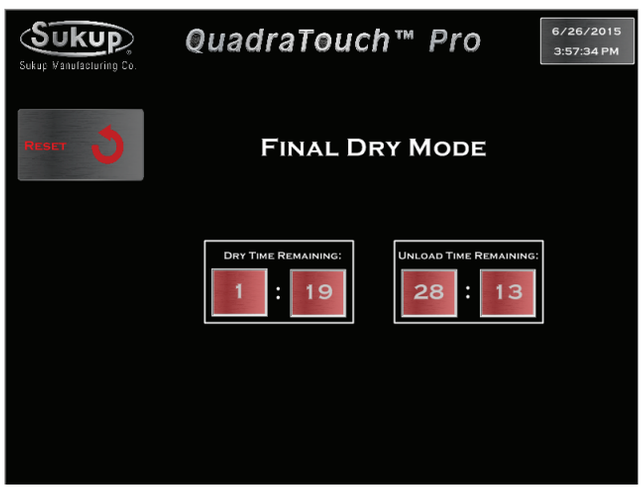
All previous settings will be stored from the last time the dryer was running, so make any changes necessary on this page before calculating the stabilization speed.

The stabilization speed in the green box is the last recorded speed when the dryer was running in continuous flow mode. If the dryer was running well the last time it was used, using this value for Stabilization is recommended.

If you are currently coming out of Initial Dry, the screen will automatically switch to Stabilization mode. If you have not performed Initial Dry, the load menu will appear. After the dryer has been loaded with grain, a button will appear to start Stabilization.

Operation





Start → Dry Fire

Dry Fire mode allows the dryer to turn its fan(s) and heater(s) on when the dryer is empty. This mode should be run every year before operation to test for functionality. Be sure to inspect each heater and pipe train for component integrity and functionality.

Dry Fire mode lasts for 10 minutes and that status of the signals will be displayed. When the dryer is empty, the air switch will most likely not be closed.

Final Dry mode is used to finish off the last “batch” when there is no more grain to dry in continuous flow. The dryer will batch dry the last grain in the dryer, then turn its fan(s) and heater(s) off and unload the dryer for a set period of time.

Final Dry mode will automatically exit when the timers have expired.

Component Identification

Start checklist

1. Finish all the manual installation in accorders with the manual
2. Power to dryer and make sure that the phase I right
3. Power the Quadra touch (QT) and install internet cable
4. Open gas shutoff valve (also on the dryer)
5. Check that the burner box is ready to start (small box on the side)
6. On the QT push the start button for the start menu
7. Push the button continues flow and the menu will open
8. Push initial drying
9. Insert data which the dryer need
10. Push the button “next” to load with grain
11. After the dryer has been loaded with grain, a button will appear to start initial dry cycle. Push the button
12. Check the vaporizer that it is not to hot or too cold, you must be able to hold it with your hand
13. After Initial Dry is finished, Stabilization is the next phase of Continuous Flow Mode. Stabilization is designed to go through 1 full cycle of grain, discharging at a calculated roll speed
14. Now dryer is running in auto mode

Mobiledryer component identification

Axial Fan Dryer Component Identification

Images 4 and 5 identify components on front (below) and back (next page) of a single fan dryer.

Image 4 - Front of single-fan axial dryer

1. Main power box (Manual controls are inside)
2. Emergency Stop & System Control switches
3. Auxiliary box
4. Grain column over-temp switch
5. Air switch, plenum high limit capillary switch
6. RTD (plenum thermometer) box

Component Identification

Mobiledryer component identification

Image 5 - Back of single-fan axial dryer

7. Wet bin (in transport position)
8. Rear door switch (EU shown - inset)
9. Plenum access door with viewing port
10. Column over-temp switch
11. Meter roll proximity switch
12. Rear junction box
13. Unload proximity switch
14. Discharge chute switch
15. Discharge moisture sensor

Centrifugal Dryer Component Identification, Front and Back Views

Images 6 and 7 identify components on front (below) and back (next page) of Centrifugal Dryer.

Image 6 - Front of centrifugal dryer

1. Main power box (E-stop & System Control Switch are on left side of box; manual controls are inside)
2. Service door
3. Auxiliary box
4. Heater box
5. Fan motor
6. Louvers

Component Identification

Centrifugal Dryer Component Identification, Front and Back Views

Image 7 - Back of centrifugal dryer

7. Wet bin (in transport position)
8. Plenum access door with viewing port
9. Rear door switch (inset shows EU switch)
10. Column over-temp switch
11. Rear junction box
12. Meter roll proximity switch
13. Discharge chute switch
14. Unload proximity switch
15. Discharge chute
16. Access ladder
17. Discharge moisture sensor (Bottom of discharge tube)

Power Box Component Location

Image 8 identifies major components of the main power box.

Image 8 - Power box components

1. Variable frequency drive
2. Control transformer
3. Load contacter
4. Unload contacter
5. Hour meter
6. 24V power supply
7. Control/Heatercircuit breakers (1- or 2-pole)
8. 24V DC relays
9. Fan starter protector
10. Programmable logic control (PLC)
11. Soft start w/ built-in bypass contactor
12. Feed-through terminals (AC or DC)
13. 5-port Ethernet switch
14. Main switch
15. Power distribution block
16. RTD transmitter
17. Meter roll starter protector
18. Load starter protector
19. Unload starter protector
20. Load, unload and meter roll connections

IMPORTANT

During initial setup or after relocation of dryer, it is highly recommended that ALL main power wiring connections are inspected for security and tight connections. Wires are tightened at factory; but connections should be checked after transport.

Component Identification

Pipe Train Component Identification

Image 9 identifies components of liquid pipe train (1-6) and vapor pipe train (8-13). (Components will vary for natural gas pipe trains.)

Image 9 - Pipe train components

1. LP inlet
2. Shut-off valve
3. Wye strainer
4. High-pressure pop-off valve
5. Liquid solenoid valve
6. Liquid vaporizer hose
7. LP vaporizer inlet (lower) and outlet (upper)
8. Vapor hose
9. Vapor over-temp switch location
10. Main (upstream) gas valve and actuatorr
11. Blocking (downstream) gas valve and actuator
12. High-pressure gas switch fitting
13. Electronic actuator (under cover) and butterfly valve
14. Pressure gauge
15. Pressure gauge
16. Valve-proving switch fitting location

Axial Fan Dryer Heater Component Identification

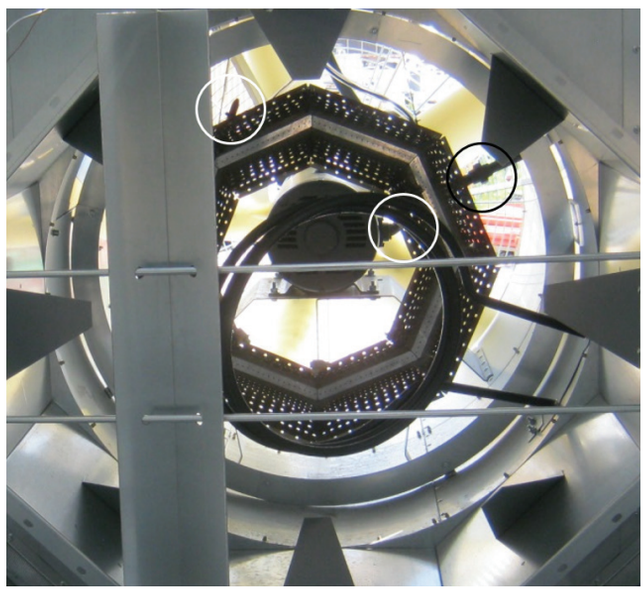


Image 10 - Burner, vaporizer coil and flame sensor rods

Image 10 shows octagon burner and vaporizer coil in axial-fan dryer. Also shown are flame sensor rod, spark plug/igniter and orifice location, all circled, and vane for side-to-side air flow/temperature adjustment.

Image 11 shows starfire burner and vaporizer coil for a 28" axial fan (flame sensor in oval).

NOTE: Difficulties may arise if heater on dryer is operated at low temperatures (60°F temperature rise or less). If there are rumbling sounds and/or flames are burning yellow instead of blue, pressure is too low and flame is burning back into port cup. If sustained operation at lower temperature range is desired, orifice and port cup on heater must be changed. Contact your Sukup dealer and see instructions in Service & Maintenance section of this manual.

Image 11 - Starfire burner for 28" fan

Component Identification

Centrifugal Fan Dryer Heater Component Identification

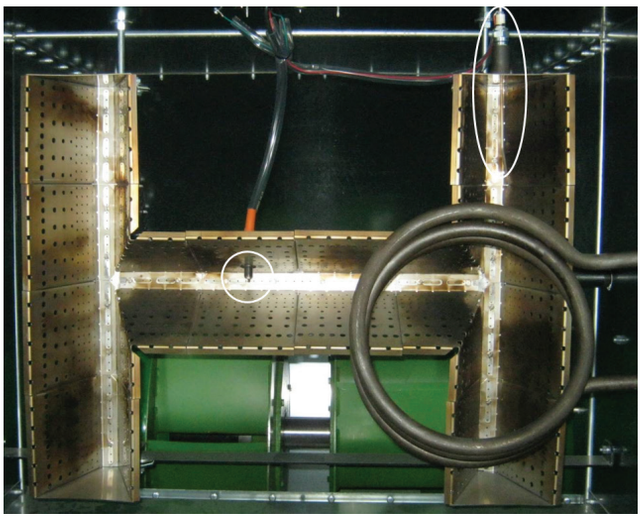


Image 12 - Burner, vaporizer coil, spark plug and flame sensor

Image 12 shows burner in centrifugal dryer. Vaporizer coil, spark plug/igniter (circled) and flame sensor rod (in oval) are shown.
NOTE: Spark plug may be in different location depending on burner.

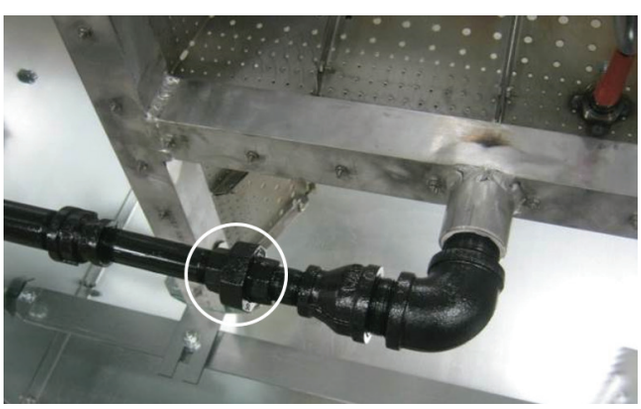


Image 13 - Orifice lcation

Image 13 shows location of orifice used to restrict flow and build pressure. Open circled union to access orifice.

Heater Component Identification

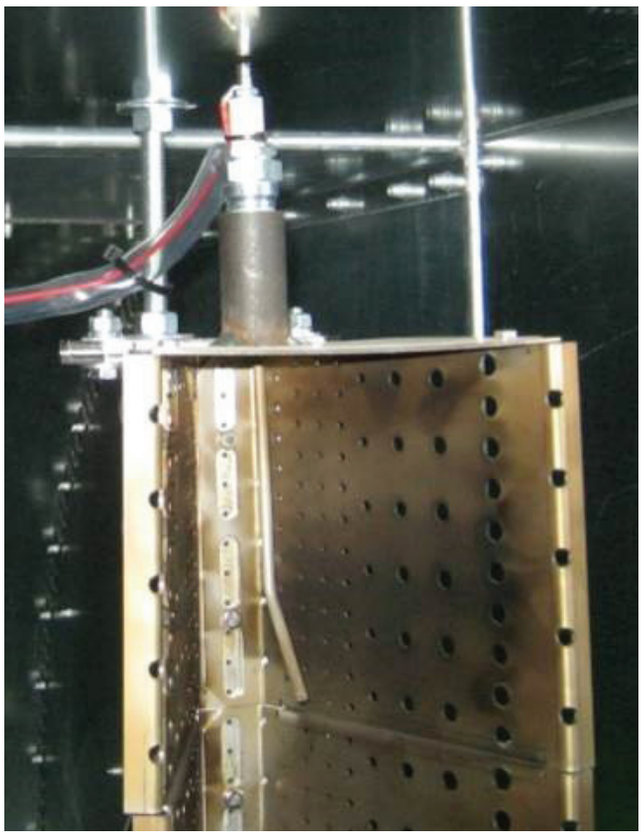


Image 14 - Flame sensor

Image 14 shows flame sensor in H burner (on centrifugal dryer)

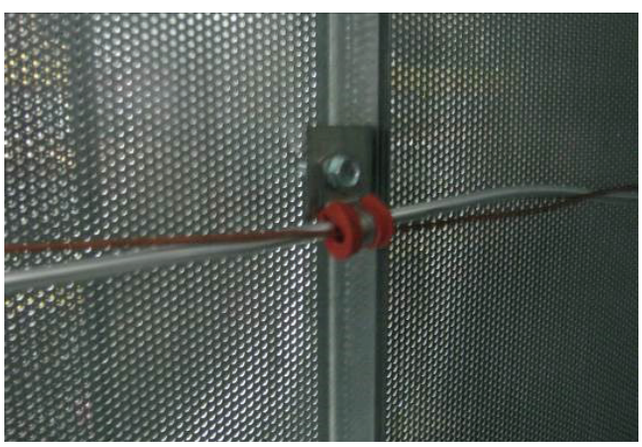


Image 15 - Plenum RTD and over-temp capillary

Image 15 shows plenum RTD (Resistance Temperature Detector) aluminum tube and plenum over-temp capillary (copper)

Component Identification

Heater Component Identification

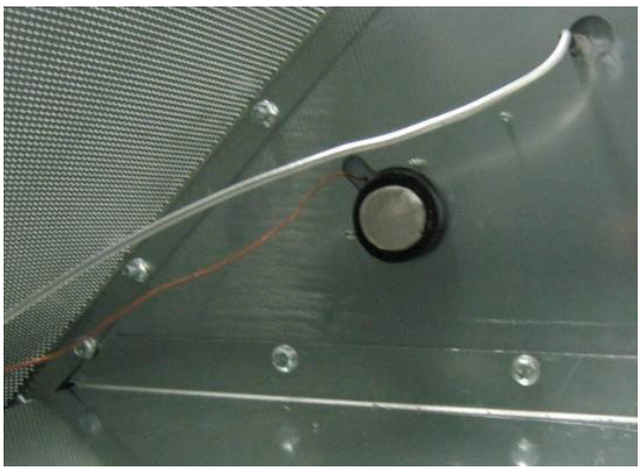


Image 16 - Plenum RTD tube and static air pressure switch

Image 16 shows plenum RTD tube and static air pressure switch.

Door Switch & Unload Auger Proximity Switch

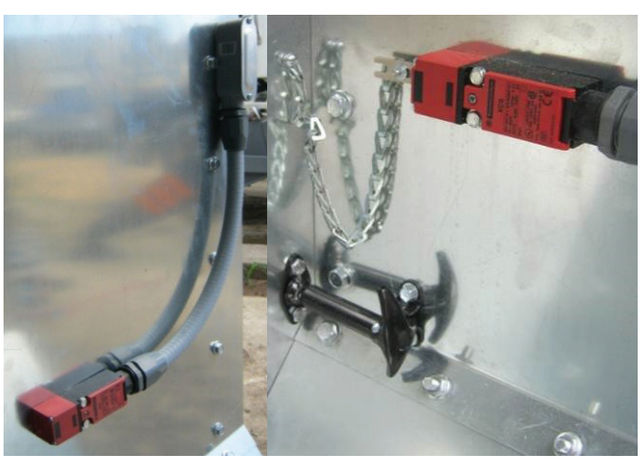


Image 17 - Rear door switch

Image 17 shows rear door switch

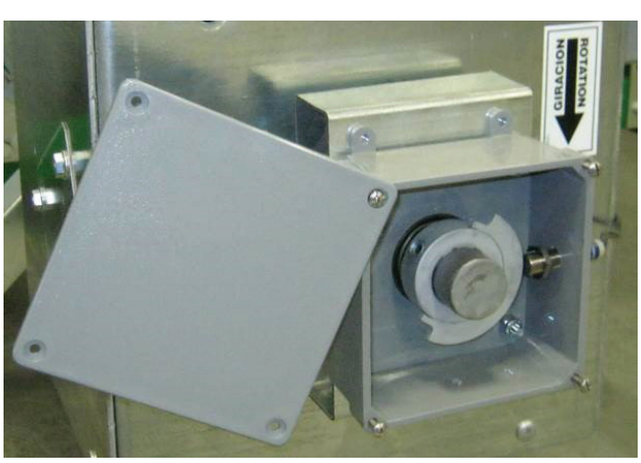


Image 18 - Unload proximity switch

Image 18 shows unload auger proximity switch (at right in box) and rotating target.

Image 19 - Unload proximity switch mounted on jump auger

Image 19 shows unload auger proximity switch and rotating target mounted on jump auger

Moisture Sensor, Paddle Switch Box

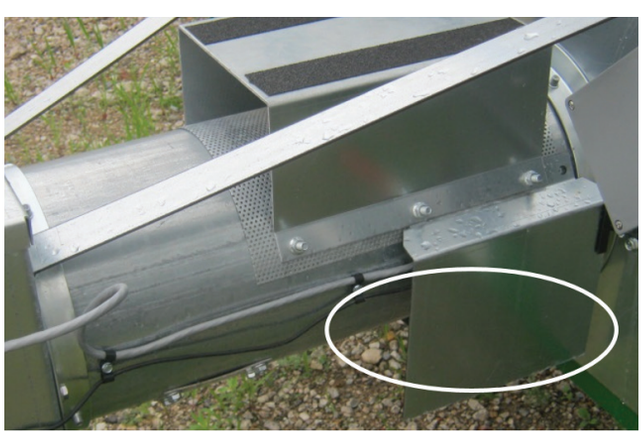


Image 20 - Discharge moisture sensor location

Image 20 shows moisture sensor mounted on bottom of discharge chute. It may also be mounted on optional jump auger assembly during dryer operation.

Image 21 - Paddle switch box in shipping position

Image 21 shows paddle switch box in shipping position.

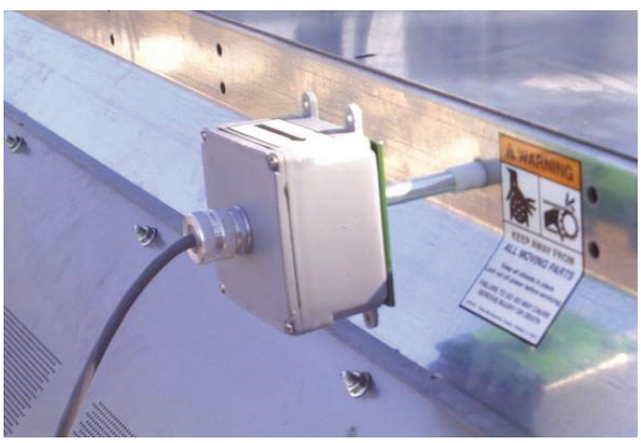


Image 22 - Paddle switch box in operating position

Image 22 shows paddle switch box installed. It is placed on end of dryer opposite from fill hopper.

Take-Away Auger, Meter Roll Motor

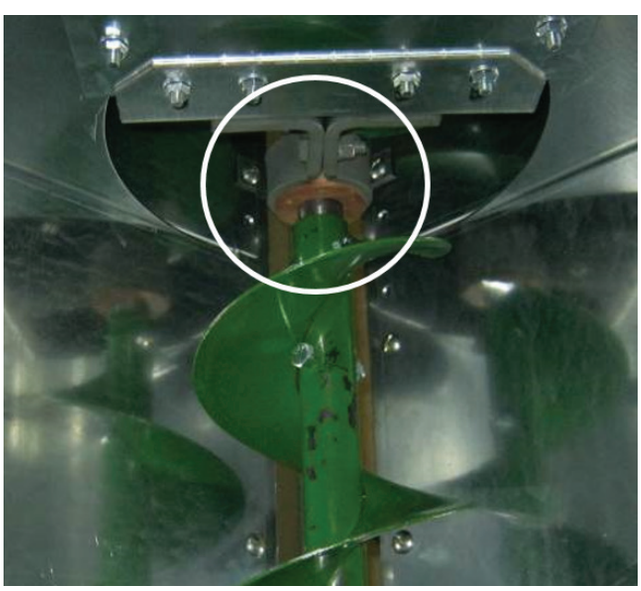


Image 23 - Take-away auger

Image 23 shows take-away auger with hanger bearing (circled).

Image 24 - Meter roll motor

Image 24 shows meter roll motor with gear reducer.

Image 25 - Meter roll proximity switch

Image 25 shows meter roll proximity switch.

Service Doors, Shields

Image 26 - Unload auger/meter roll drive service door

Image 26 shows unload auger/meter roll drive service door. It is located at lower front of dryer, shielding belts for unload auger and chains for meter rolls.

Image 27 - Unload auger service door

Image 27 shows unload auger rear service door. It is located at rear of dryer and also serves as a step (note traction tape) for accessing plenum doors and view ports. Hinged door opens upward.

Image 28 - Load auger shield

Image 28 shows load auger shield. It is installed in field after motor is installed.

Lower Plenum Vacuum Cool Fan Inlet Door, Opening Handle

Image 29 - Vacuum door closed

Image 29 shows lower plenum vacuum-cool fan inlet door in closed position. Image 30 shows it in open position. (Centrifugal dryer)

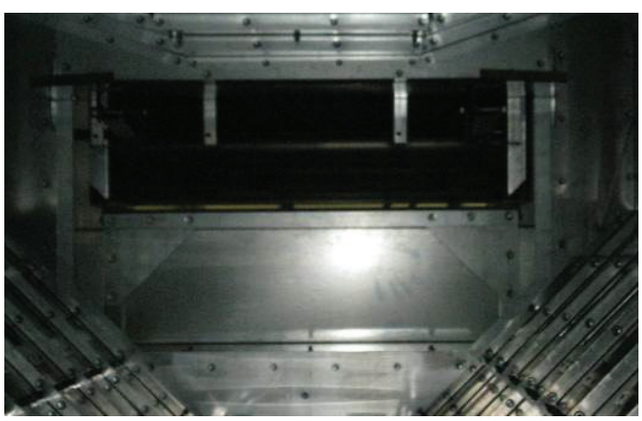


Image 29 - Vacuum door open

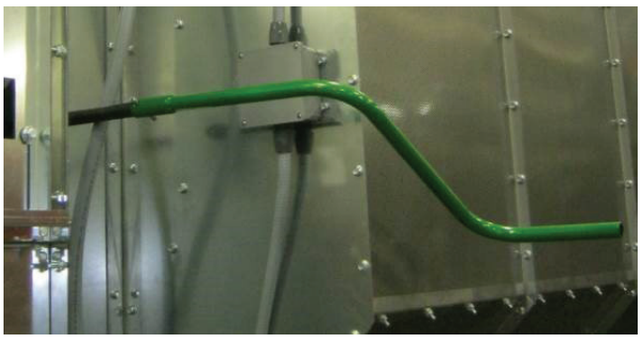


Image 31 - Vacuum door opener

Image 31 shows lower plenum vacuum-cool inlet door opening/closing handle.

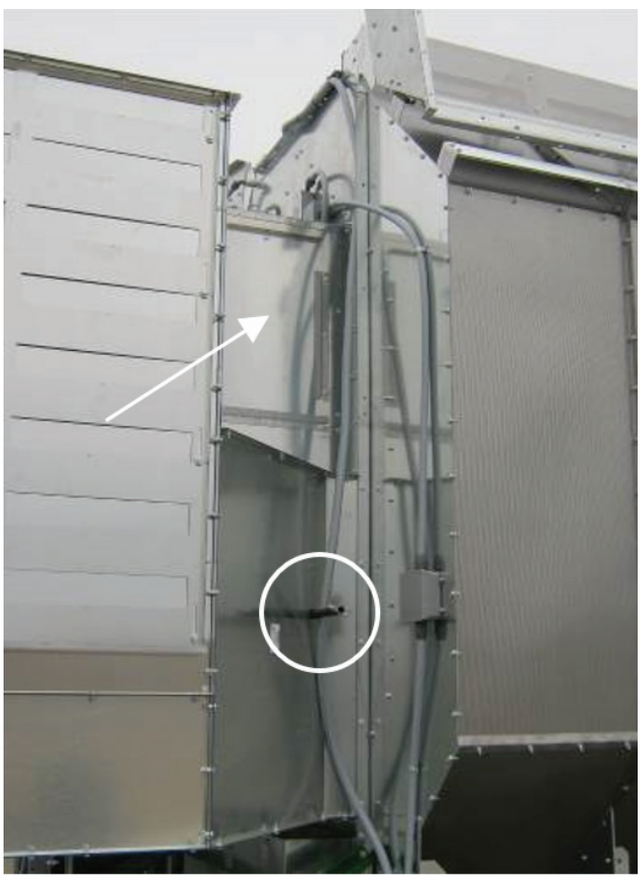


Image 32 Vacuum door

Image 32 shows location outside of dryer (circled) where removable handle is attached. Image 19 also shows removable heater service door. See arrow.

Cleanouts

Image 33 - Cleanout/inspection door

Image 33 shows lower plenum cleanout/inspection door.

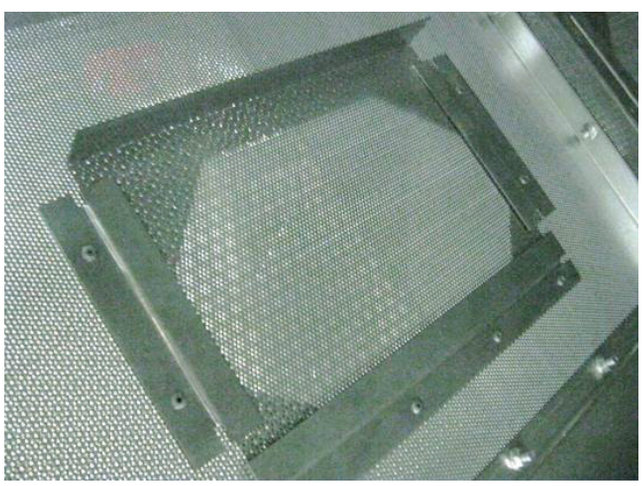


Image 34 - Inner plenum cleanout slide gate

Image 34 shows inner plenum cleanout slide gate.

Image 35 - Unload auger cleanout door cam lock

Image 35 shows handle for unload auger cleanout door cam lock.

Image 36

Image 36 shows partially open rear door for plenum cleanout/blowout.

Cleanout, Plenum Divider Door

Image 37 - Cleanout door under vacuum-cool duct

Image 37 shows cleanout door under vacuum-cool duct.

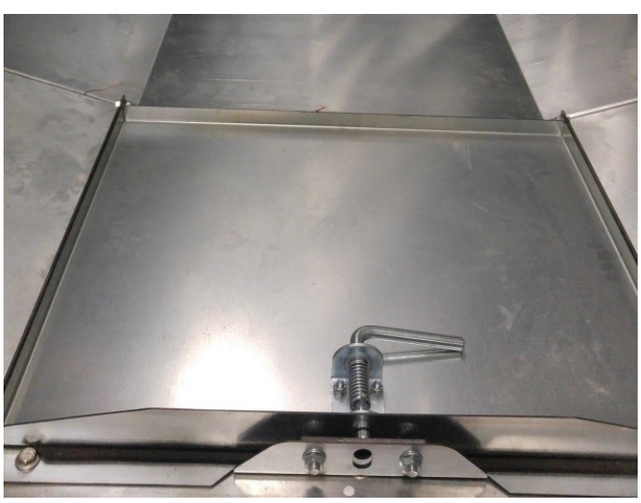


Image 38 Plenum divider door

Image 38 shows plenum divider door in place.
Image 39 shows door removed.

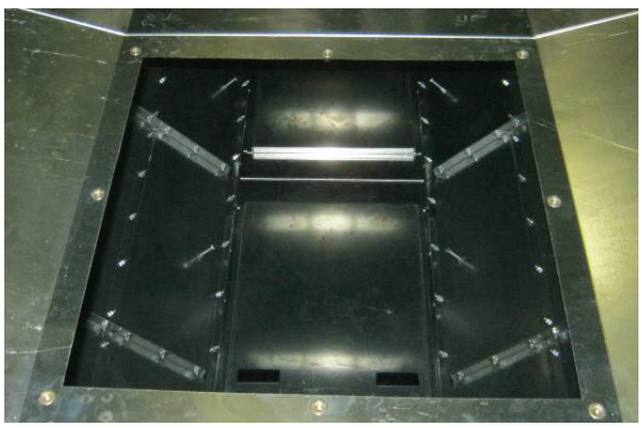


Image 39 - Plenum divider door removed

Control Boxes, Inlet Louvers, Fan Motor

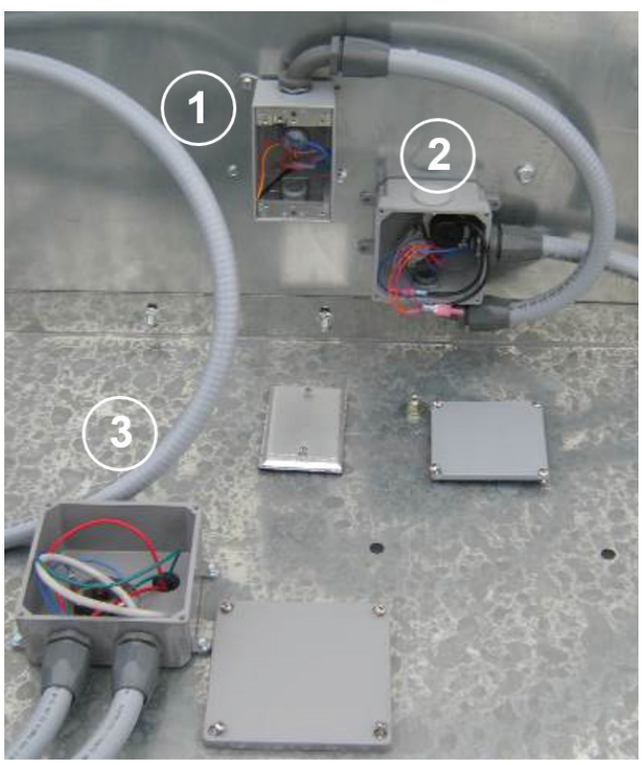


Image 40 - Control boxes on top of heater housing

Image 40 shows:
1. RTD box

2. Air switch, plenum high limit capillary switch, both inside box 2

3. Heater housing high-limit switch (manual reset)

Image 41 - Air inlet louvers

Image 41 shows centrifugal fan air inlet louvers in open (full-heat) position.

Image 42 - Fan motor and drive shield

Image 42 shows centrifugal fan motor and drive shield.

Touch Screen Controller Location

Image 43 - QuadraTouch Pro control screen

QuadraTouch Pro controller (see Image 43) should be mounted away from dryer and connected by shielded, direct-bury Ethernet cable.
Main power switch is on bottom, right-hand portion of box. See Image 43. When turned on, switch will illuminate to a green color. Panel will boot up shortly and connect with PLC inside power box.
To communicate with dryer, dryer must be powered up and system control switch on dryer should be in "COMPUTER" position.

Industrial Ethernet cable ordered with dryer is available in four (4) lengths:

Cable Length		Comp. #
Meters	Feet	
15	50'	J8720
30.5	100'	J8721
46	150'	J8722
61	200'	J8723

Table 2-6 - Ethernet cable lengths and components number

Cable length determines how far away controller can be mounted from dryer. Standard length is 50 feet.

NOTICE: If location where controller is mounted is not heated, unit must be taken into a temperature-controlled environment when not in use.

Wet Bin Assembly

Gas and Electric Hookup

Initial gas and electric hookups should be performed only by qualified gas and electrical service technicians in accordance with all applicable local and national code requirements. Please use the diagram from the English manual.

Wet Bin Assembly

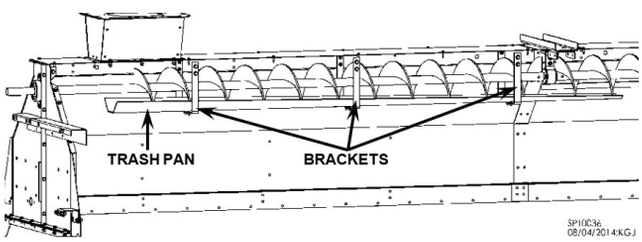


Fig. 2-15 - Trash pan and bracket installation

1. Bolt trash pan brackets into wet bin on filling end of dryer. Bolt trash pan to trash pan brackets. See Fig. 2-15.
2. Position the half of the wet bin without the auger into upright position. Then pivot the side with the auger into upright position. Bolt wet bin together at end plate seams, side seams, pivot seams, and top hanger support.
3. Attach fill auger paddle switch assembly. Locate holes for paddle switch in wet bin on end opposite of filling end. See Fig. 2-16.

NOTICE

- Holes are pre-punched for mounting paddle switch at either end. Remove desired plastic plugs. Leave plugs in end not being used.
- Any open bolt holes in wet bin should be filled with bolts and secured with nuts to prevent grain leakage.

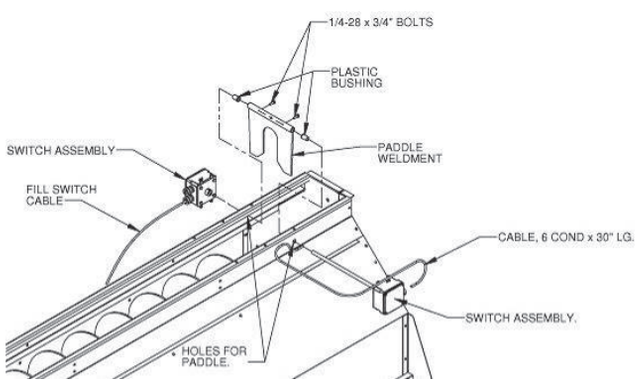


Fig. 2-16 - Paddle switch installation

4. Slide a plastic bushing on each side of wet bin from inside out. Slide shaft with tilt switch box through bushing on one side of wet bin. Position paddle weldment inside of wet bin and slide shaft through pipe of paddle weldment. Slide shaft through bushing on other side of wet bin. Tighten setscrews of paddle weldment onto shaft, making sure paddle and box on shaft are square and paddle can pivot freely. See Fig. 2-16.

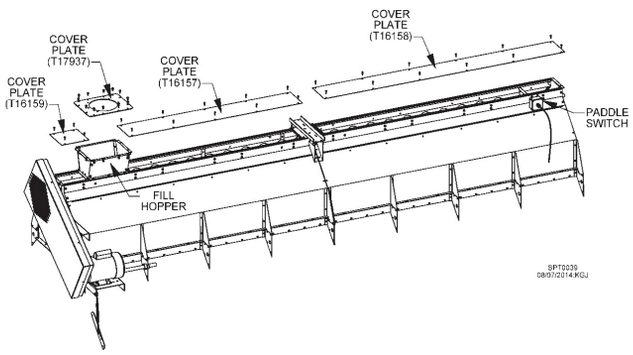


Fig. 2-17 - Fill hopper installation at front of wet bin (16' dryer shown)

5. Bolt top fill hopper to top of wet bin on filling end of dryer. Place cover plates on top and attach with 1/4 x 1" self-drill screws. See Fig. 2-17 for front-fill and Fig. 2-18 for rear-fill dryer.

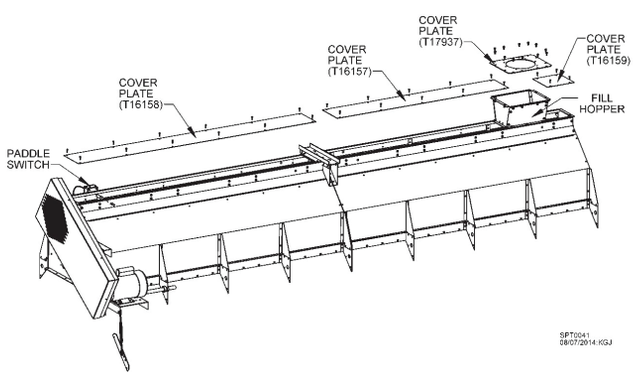


Fig. 2-20 shows components of top load auger drive assembly. Follow steps 1-12 to assemble

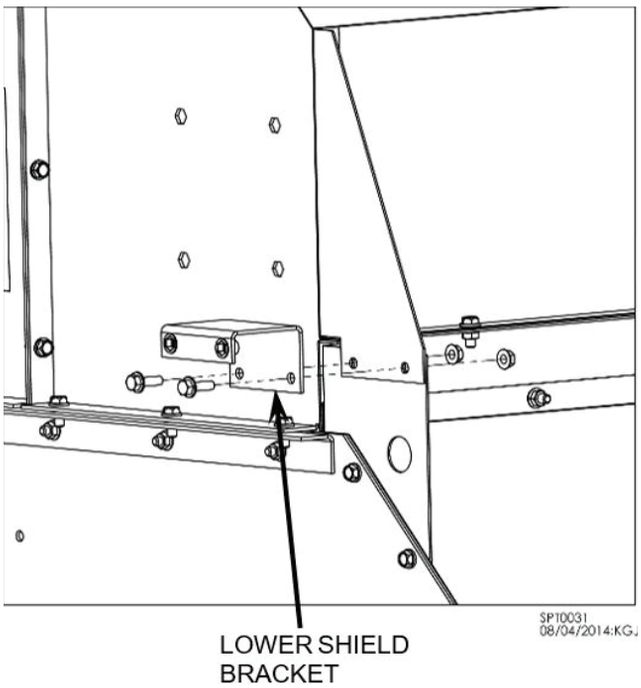


Fig. 2-19 - Lower shield bracket installation

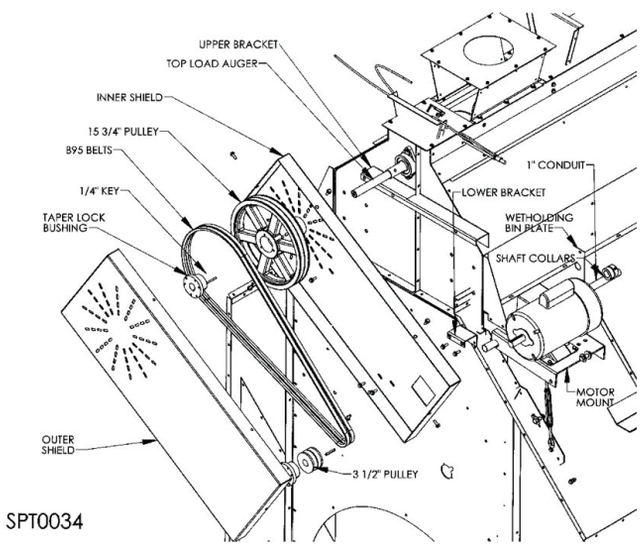


Fig. 2-20 - Top load auger components

1. Bolt lower shield bracket to end of dryer using 5/16 x 1“ bolts and 5/16 nuts. See Fig. 2-19.

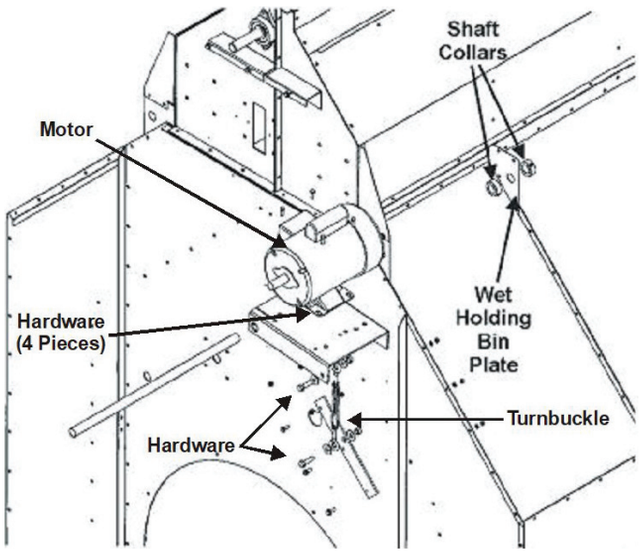


Fig. 2-21 - Motor mount components

2. Hold motor mount up to holes on side of wet holding bin. Slide a 1” conduit tube through motor mount plates and motor mount as shown in Fig. 2-21.
3. Position shaft collars on each side of motor mount plate as shown in Fig. 2-21.
4. Tighten shaft collars on each side of motor mount plate as shown in Image 2-5. Make sure motor mount can pivot. See Image 2-3.

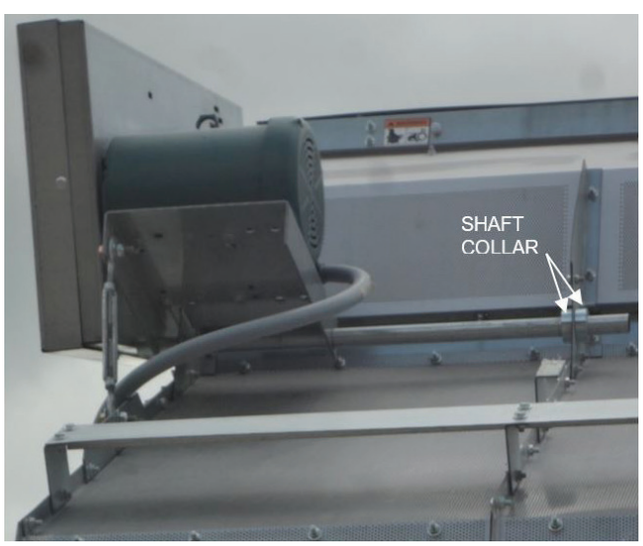


Image 2-3 - Motor mount shaft collars, installed

Wet Bin Assembly

1. Bolt turnbuckle plate to side of dryer. See Fig. 2-21.
2. Bolt turnbuckle between motor mount and turnbuckle plate using 1/2 x 1-3/4“ bolts, 1/2“ flat washers and 1/2“ lock nuts. See Fig. 2-21.
3. Bolt motor to motor mount using 5/16 x 1“ bolts and 5/16“ nuts and washers. See Fig. 2-21
4. Bolt inner shield to upper and lower brackets using 5/16“ bolts, washers and nuts. See Fig. 2-20.
5. Attach a 10.8 cm O.D. pulley to motor shaft with a key and attach pulley to top load auger with a taper lock bushing. Use straight edge to align pulleys. Attach two B95 belts between auger pulley and motor pulley. Tighten turnbuckle to tighten belts See Fig. 2-22. **Tension belts so it takes about 2.7 kg. (6 lbs.) pressure to deflect belt 1/2” at center of belt span.**
6. Final assembly should appear as in Fig. 2-22 (Shown without front shield).

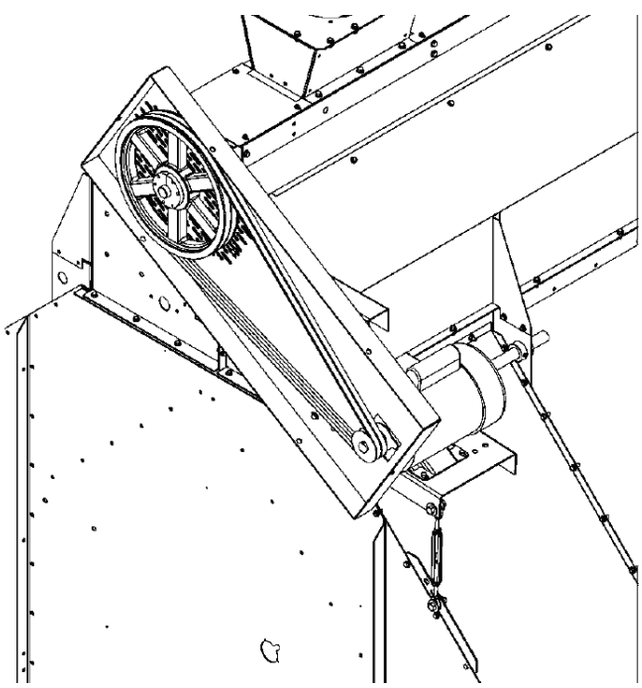


Fig. 2-22 - Final assembly (without front shield)

7. Slide outer shield around inner shield and attach with six (6) 5/16 x 1” bolts. See Fig. 2-20.
8. Check and retighten all fasteners.

Connecting Load Auger Motor

IMPORTANT: Before starting dryer, refer to Dryer Startup section in Appendix E. To follow processes step by step, consult Software Manual in appendices of this manual

Continuous Flow

Continuous Flow dryer operation requires creating a gradient of moisture from top of dryer to bottom and is accomplished by three main functions: Initial Dry, Stabilization and Continuous Flow. Before drying begins, user must enter moisture of incoming grain and desired moisture of outgoing grain into QuadraTouch Pro controller. These moistures are used to calculate the time necessary to perform initial dry at 160 degrees F. No grain is unloaded from dryer during initial dry mode.

After initial dry is complete, user will set desired plenum drying temperatures. Controller then calculates a meter roll speed corresponding to plenum drying temperatures entered. Dryer then performs a stabilization routine. During stabilization, a gradient of moisture is established in dryer by drying and unloading one full load of grain without adjusting meter roll speed.

After stabilization, dryer enters its continuous flow mode. During this phase, dryer adjusts meter roll speed for variances seen in average output moisture compared to desired output moisture.

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