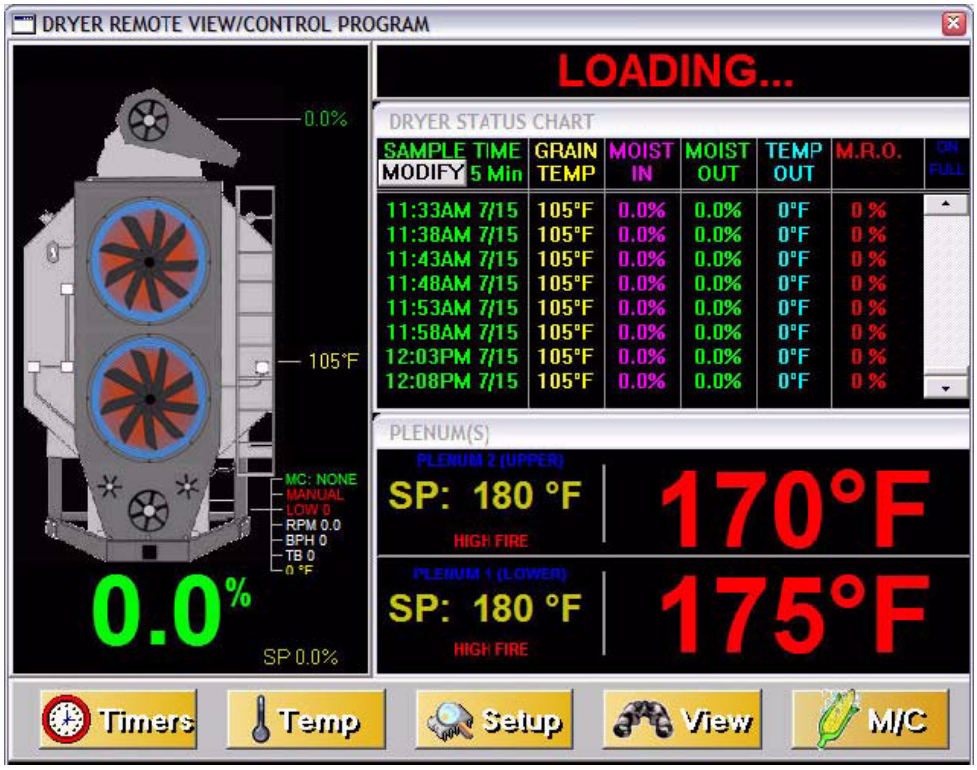



# 1 and 2 Fan Vision Series Portable Dryers

Operator's Manual

PNEG-1456

Date: 08-02-10

GSI GROUP

PNEG-1456

# Contents

## Safety Guidelines

This manual contains information that is important for you, the owner/operator, to know and understand. This information relates to protecting ***personal safety*** and ***preventing equipment problems.*** It is the responsibility of the owner/operator to inform anyone operating or working in the area of this equipment of these safety guidelines. To help you recognize this information, we use the symbols that are defined below. Please read the manual and pay attention to these sections. Failure to read this manual and its safety instructions is a misuse of the equipment and may lead to serious injury or death.

**This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.**

**DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

**CAUTION** used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

**NOTE** indicates information about the equipment that you should pay special attention.

**WARNING! BE ALERT!**

Personnel operating or working around electric fans should read this manual. This manual must be delivered with the equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

## Dryer Operation

Thank you for choosing a GSI product. It is designed to give excellent performance and service for many years.

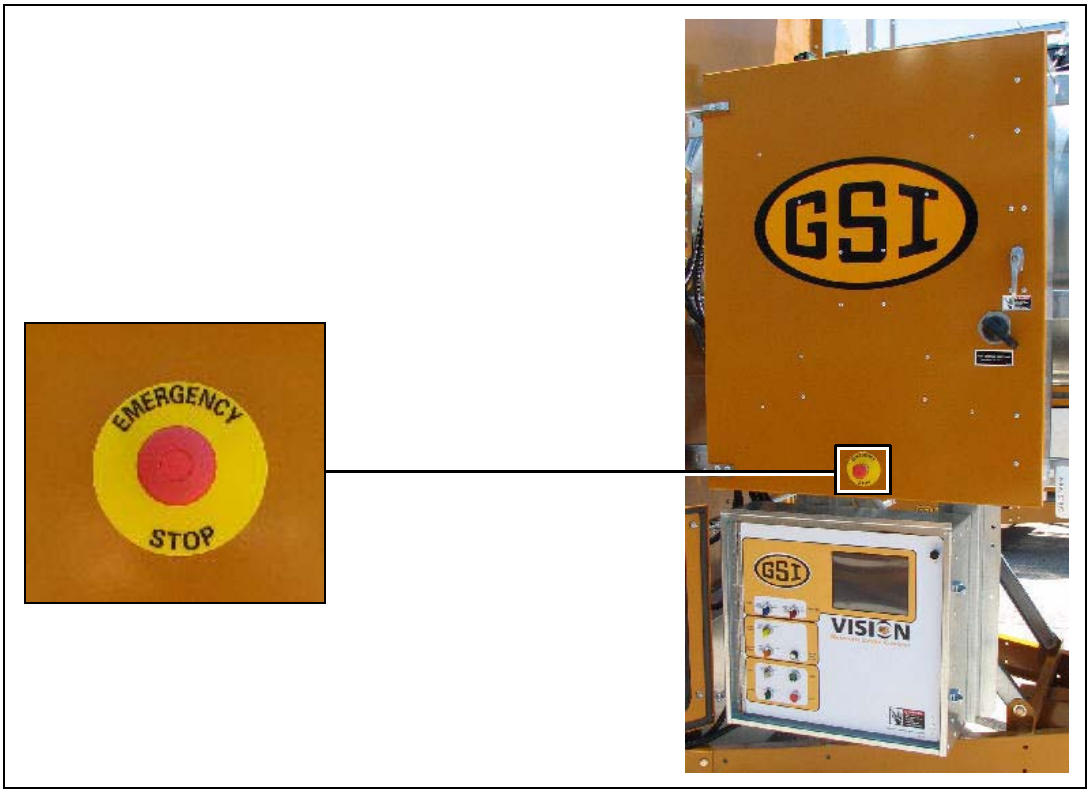
This manual describes the operation and service for all standard production model dryers. These models are available for liquid propane or natural gas fuel supply, with either 1 phase 230 volt, or 3 phase 230 or 440 volt electrical power.

Our foremost concern is your safety and the safety of others associated with this equipment. We want to keep you as a customer. This manual is to help you understand safe operating procedures and some problems which may be encountered by the operator and other personnel.

As owner and/or operator, it is your responsibility to know what requirements, hazards and precautions exist, and to inform all personnel associated with the equipment or in the area. Safety precautions may be required from the personnel. Avoid any alterations to the equipment. Such alterations may produce a very dangerous situation where SERIOUS INJURY or DEATH may occur.

This equipment shall be installed in accordance with the current installation codes and applicable regulations which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

## Emergency Stop Switch




The Emergency Stop switch is located on the upper control box door. Pushing the Emergency Stop switch will interrupt the control power and stop all dryer functions.

**WARNING**

***Pushing the Emergency Stop switch does not interrupt the main power to the upper control box panel.***

# Safety Precautions

**READ THESE INSTRUCTIONS BEFORE INSTALLATION AND OPERATION**
**SAVE FOR FUTURE REFERENCE**

1. Read and understand the operating manual before attempting to operate the dryer.
2. **NEVER** operate the dryer while the guards are removed.
3. Power supply should be OFF for service of electrical components. Use **CAUTION** in checking voltage or other procedures requiring the power to be ON.
4. Check for gas leaks at all gas pipe connections. If any leaks are detected, **DO NOT** operate dryer. Shutdown and repair before further operation.
5. **NEVER** attempt to operate the dryer by jumping or otherwise bypassing any safety devices on the unit.
6. Set pressure regulator to avoid excessive gas pressure being applied to the burner during ignition and when the burner is in operation. *See Chart on Page 18* for operating procedures. **DO NOT** exceed maximum recommended drying temperature.
7. Keep the dryer clean. **DO NOT** allow fine material to accumulate in the plenum chamber. Clean grain is easier to dry. Fine material increases resistance to airflow and requires removal of extra moisture.
8. Keep auger drive belts tight enough to prevent slippage.
9. Use **CAUTION** in working around high speed fans, gas burners, augers and auxiliary conveyors which can **START AUTOMATICALLY**.
10. Keep area around air inlet to the fan clear of any obstacles and combustible materials.
11. **BEFORE** attempting to remove and reinstall any propeller, make sure to read the recommended procedure listed in the *Service Section on Page 42* of the manual.
12. Make sure that capacities of auxiliary conveyors are matched to dryer auger capacities.
13. **DO NOT** operate in an area where combustible material will be drawn into the fan.
14. The operating and safety recommendations in this manual pertain to the common cereal grains as indicated. When drying any other grain or products, consult the factory for additional recommendations.
15. Routinely check for any developing gas plumbing leaks. Check LP vaporizer for contact with burner vanes.

## Use Caution in the Operation of this Equipment

This dryer is designed and manufactured with operator safety in mind. However, the very nature of a grain dryer having a gas burner, high voltage electrical equipment and high speed rotating parts, presents hazards to personnel which cannot be completely safeguarded against without interfering with the efficient operation of the dryer and reasonable access to its components.

Use extreme caution in working around high speed fans, gas-fired heaters, augers and auxiliary conveyors, which may start without warning when the dryer is operating on automatic control.

Continued safe, dependable operation of automatic equipment depends, to a great degree, upon the owner. For a safe and dependable drying system, follow the recommendations within the Owner's Manual and make it a practice to regularly inspect the unit for any developing problems or unsafe conditions.

Take special note of the *Safety Precautions on Page 6* before attempting to operate the dryer.

## 2. Decals

The GSI Group recommends contacting the local power company and having a representative survey the installation so the wiring is compatible with their system and adequate power is supplied to the unit. Safety decals should be read and understood by all people in the grain handling area.

If a decal is damaged or is missing, contact:

**GSI Decals**
1004 E. Illinois St.
Assumption, IL. 62510
Phone: 1-217-226-4421

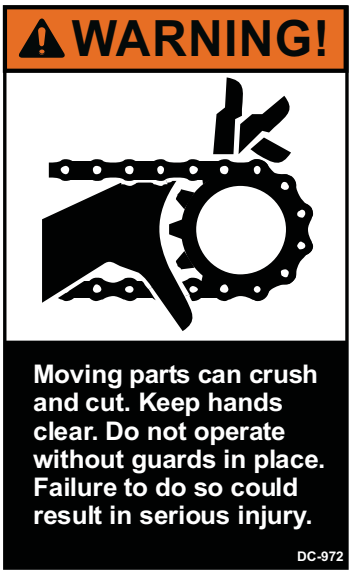
A free replacement will be sent to you.


**Decal: DC-1224**

Decal DC-1224 is located in two (2) places on the fan/heater control box. One on the lid and one on the front of the fan heater control box. Another location for this decal is inside the upper control box for the dryer.


**Decal: DC-889**

Decal DC-889 has two (2) locations. One inside the fan/heater control box and another on the dryer upper control box door next to the main power disconnect.




**Decal: DC-972**

Decal DC-972 is located on the bottom auger belt guard and the front bearing plate (which is visible when the bottom auger belt guard is removed).
An alternate location would be at the rear of the dryer for portable dryers equipped with the **Front Discharge Option**.


**Decal: DC-974**

Decal DC-974 has several different locations. Two (2) are located on the front end panel below the fan/heater. Two (2) are located on the rear end panel below the rear access door. Two (2) are located on the auger discharge box (one on the outside top and one on the inside of the flapper lid next to the discharge mercury switch). One more of these decals is located inside the plenum on the rear plenum closure door just inside the rear access door.


**Decal: DC-971**

Decal DC-971 is located on the bottom auger belt guard and the front bearing plate (which is visible when the bottom auger belt guard is removed). An alternate location would be at the rear of the dryer for portable dryers equipped with the **Front Discharge Option**.
Another location for decal DC-971 is on the top of the auger belt guard (one on the belt guard cover and one on the inside belt guard body visible when the belt guard cover is removed).


**Decal: DC-973**

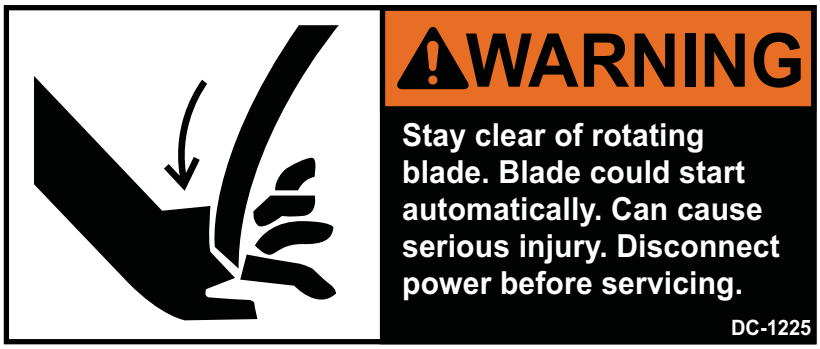
Decal DC-973 is located on the rear plenum access door (inside and outside).


**Decal: DC-1227**

Decal DC-1227 is located on the fan/heater access door.

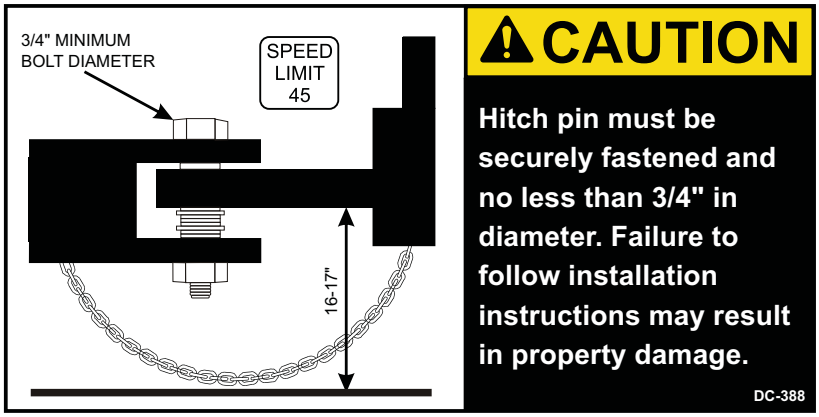

**Decal: DC-1229**

Decal DC-1229 is located on each of the meter roll access doors.



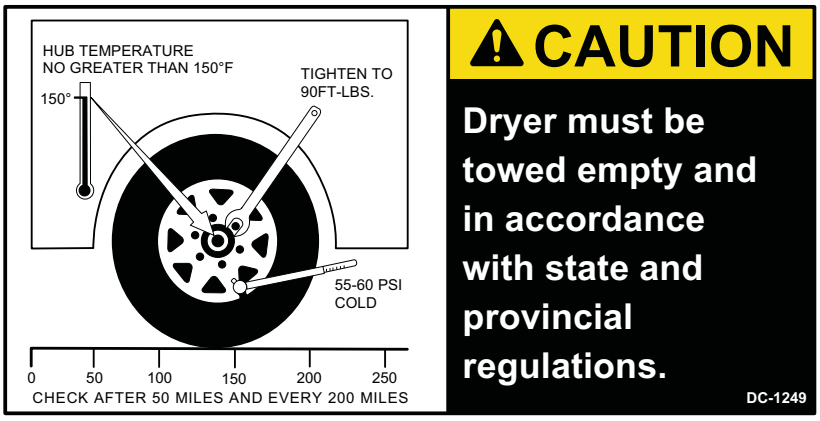

**Decal: DC-1225**

Decal DC-1225 is located on the fan/heater access door.




**Decal: DC-388**

Decal DC-388 is located on the hitch tongue.




**Decal: DC-1249**

Decal DC-1249 is located on the hitch tongue.

# Dryer Dimensions

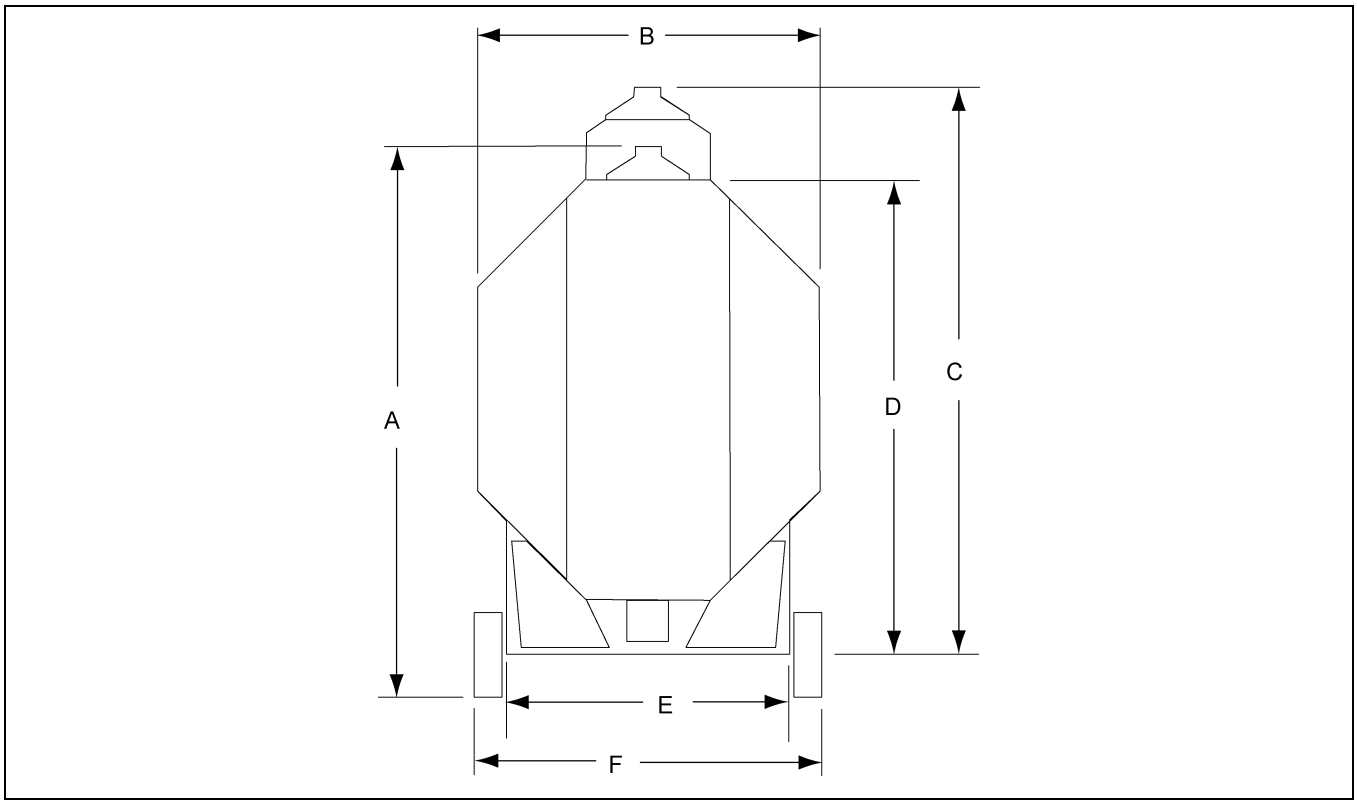



**Figure 3A**

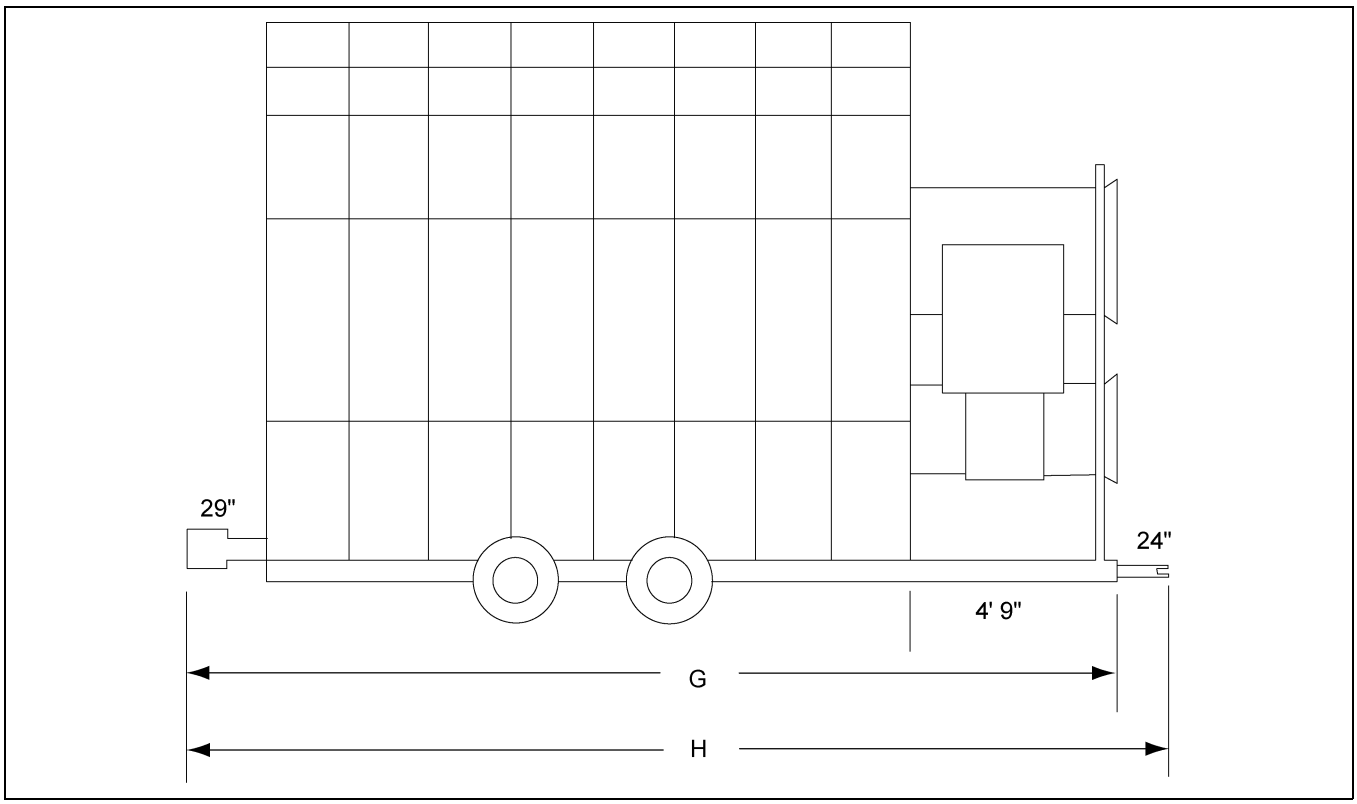
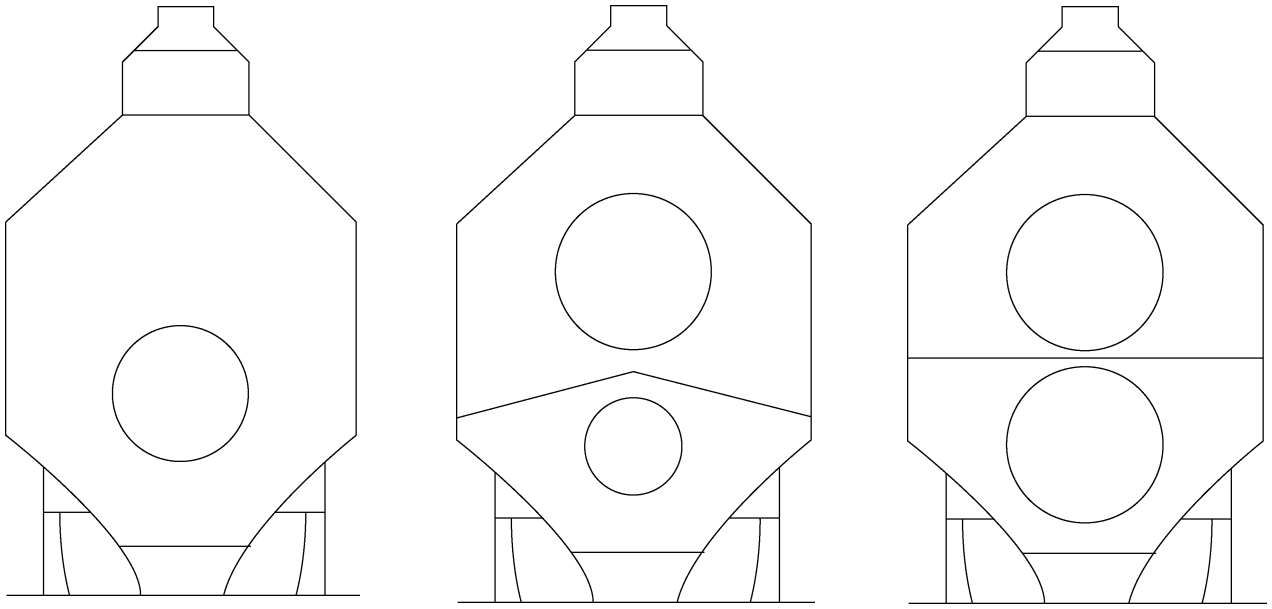



**Figure 3B**

## Single Module Transport and Installation Dimensions

**Values are Valid for Transportation of Stack Modules**

| Dryer Basket | A | B | C | | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|
| | Transport Height | Installed Width | Installed Height | | Height w/o Wet Bin | Frame Width | Transport Width | Installed Length | Transport Length |
| | | | Wet Bin | Standard Top | | | | | |
| 1108T | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 15' 2" | 17' 2" |
| 1112 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 19' 2" | 21' 2" |
| 1114 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 21' 2" | 23' 2" |
| 1116 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 23' 2" | 25' 2" |
| 1118 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 25' 2" | 27' 2" |
| 1120 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 27' 2" | 29' 2" |
| 1122 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 29' 2" | 31' 2" |
| 1126 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 33' 2" | 35' 2" |
| 1214 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 21' 2" | 23' 2" |
| 1216 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 23' 2" | 25' 2" |
| 1218 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 25' 2" | 27' 2" |
| 1220 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 27' 2" | 29' 2" |
| 1222 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 29' 2" | 31' 2" |
| 1226 | 13' 5" | 8' | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 33' 2" | 35' 2" |
| 1214S | 13' 5" | 8' 8" | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 21' 2" | 23' 2" |
| 1218S | 13' 5" | 8' 8" | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 25' 2" | 27' 2" |
| 1220S | 13' 5" | 8' 8" | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 27' 2" | 29' 2" |
| 1222S | 13' 5" | 8' 8" | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 29' 2" | 31' 2" |
| 1226S | 13' 5" | 8' 8" | 14' 6" | 13' | 11' 9" | 6' 5" | 8' | 33' 2" | 35' 2" |



1100 Series profile | 1200 Series profile | 1200S Series profile

**Figure 3C**

## 1100 Series Dryer Specifications

| | 1108T | 1112 | 1114 | 1116 | 1118 | 1120 | 1122 | 1126 |
|---|---|---|---|---|---|---|---|---|
| Total Holding Capacity (Bushels) | 190 | 327 | 381 | 436 | 490 | 544 | 599 | 708 |
| Grain Column Holding Capacity (Bushels) | 160 | 282 | 329 | 376 | 423 | 470 | 517 | 611 |
| Fan | 28" 10-13 HP | 36" 15 HP | 40" 15 HP | 40" 15 HP | 42" 20 HP | 42" 25 HP | 42" 30 HP | 42" 40 HP |
| Top Auger | 8" Dia. 1-1/2 HP | 8" Dia. 3 HP | 8" Dia. 5 HP | 8" Dia. 5 HP | 8" Dia. 5 HP | 8" Dia. 7-1/2 HP | 8" Dia. 7-1/2 HP | 8" Dia. 10 HP |
| Capacity (BHP) | 2900 | 2900 | 3800 | 3800 | 3800 | 3800 | 3800 | 3800 |
| Bottom Auger | 8" Dia. 1 HP | 8" Dia. 1-1/2 HP | 8" Dia. 3 HP | 8" Dia. 5 HP | 8" Dia. 5 HP | 8" Dia. 7-1/2 HP | 8" Dia. 7-1/2 HP | 8" Dia. 10 HP |
| Meter Roll Drive | SCR, 1/3 HP | SCR, 1/3 HP | SCR, 3/4 HP | SCR, 3/4 HP | SCR, 3/4 HP | SCR, 3/4 HP | SCR, 3/4 HP | SCR, 3/4 HP |
| Capacity - MAXIMUM Rate[1] (BHP) | 1120 | 1680 | 1960 | 2240 | 2520 | 2800 | 3080 | 3640 |
| Electrical Load (Fans, Top and Bottom Augers[2]) | | | | | | | | |
| 1 Phase, 220 Volt | 63 | 85 | 98 | 108 | - | - | - | - |
| 3 Phase, 220 Volt | 42 | 50 | 56 | 65 | 80 | 104 | 114 | 150 |
| 3 Phase, 440 Volt | 21 | 25 | 28 | 33 | 40 | 52 | 57 | 75 |
| 3 Phase, 575 Volt | 18 | 20 | 23 | 27 | 32 | 42 | 46 | 61 |
| 3 Phase, 380 Volt | 22 | 33 | 36 | 44 | 49 | 68 | 75 | 88 |

1. Actual discharge rate is controlled by meter roll speed adjustment, at 5% to 100% of maximum rate.

2. Excludes auxiliary load and unload conveyor equipment.

## 1200 Series Dryer Specifications

| | 1214 | 1216 | 1218 | 1220 | 1222 | 1226 |
|---|---|---|---|---|---|---|
| Total Holding Capacity (Bushels) | 381 | 436 | 490 | 544 | 599 | 708 |
| Grain Column Holding Capacity (Bushels) | 329 | 376 | 423 | 470 | 517 | 611 |
| Fan | 26" 10-13 HP<br>36" 10-13 HP | 26" 10-13 HP<br>36" 15 HP | 26" 10-13 HP<br>36" 15 HP | 28" 10-13 HP<br>40" 15 HP | 28" 10-13 HP<br>42" 20 HP | 28" 10-13 HP<br>42" 25 HP |
| Top Auger | 8" Dia.<br>5 HP | 8" Dia.<br>5 HP | 8" Dia.<br>5 HP | 8" Dia.<br>7-1/2 HP | 8" Dia.<br>7-1/2 HP | 8" Dia.<br>10 HP |
| Capacity (BHP) | 3800 | 3800 | 3800 | 3800 | 3800 | 3800 |
| Bottom Auger | 8" Dia.<br>5 HP | 8" Dia.<br>5 HP | 8" Dia.<br>5 HP | 8" Dia.<br>7-1/2 HP | 8" Dia.<br>7-1/2 HP | 8" Dia.<br>10 HP |
| Meter Roll Drive | SCR, 3/4 HP | SCR, 3/4 HP | SCR, 3/4 HP | SCR, 3/4 HP | SCR, 3/4 HP | SCR, 3/4 HP |
| Capacity - MAXIMUM Rate[1] BHP) | 1960 | 2240 | 2520 | 2800 | 3080 | 3640 |
| Electrical Load (Fans, Top and Bottom Augers[2]) | | | | | | |
| 1 Phase, 220 Volt | 142 | 156 | 156 | 172 | - | - |
| 3 Phase, 220 Volt | 92 | 99 | 99 | 112 | 126 | 150 |
| 3 Phase, 440 Volt | 47 | 50 | 50 | 57 | 63 | 75 |
| 3 Phase, 575 Volt | 37 | 42 | 42 | 47 | 52 | 61 |
| 3 Phase, 380 Volt | 50 | 61 | 61 | 70 | 75 | 90 |

1. Actual discharge rate is controlled by meter roll speed adjustment, at 5% to 100% of maximum rate.
2. Excludes auxiliary load and unload conveyor equipment.

## 1200S Series Dryer Specifications

| | 1214S | 1218S | 1220S | 1222S | 1226S |
|---|---|---|---|---|---|
| Total Holding Capacity (Bushels) | 381 | 490 | 544 | 599 | 708 |
| Grain Column Holding Capacity (Bushels) | 329 | 423 | 470 | 517 | 611 |
| Fan | 28" 10-13 HP<br>(2) | 36" 10-13 HP<br>(2) | 36" 15 HP<br>(2) | 36" 15 HP<br>(2) | 40" 25 HP<br>(2) |
| Top Auger | 8" Dia.<br>5 HP | 8" Dia.<br>5 HP | 8" Dia.<br>7-1/2 HP | 8" Dia.<br>7-1/2 HP | 8" Dia.<br>10 HP |
| Capacity (BHP) | 3800 | 3800 | 3800 | 3800 | 3800 |
| Bottom Auger | 8" Dia.<br>5 HP | 8" Dia.<br>5 HP | 8" Dia.<br>7-1/2 HP | 8" Dia.<br>7-1/2 HP | 8" Dia.<br>10 HP |
| Meter Roll Drive | SCR, 3/4 HP | SCR, 3/4 HP | SCR, 3/4 HP | SCR, 3/4 HP | SCR, 3/4 HP |
| Capacity - MAXIMUM Rate[1] (BHP) | 1960 | 2520 | 2800 | 3080 | 3640 |
| Electrical Load (Fans, Top and Bottom Augers[2]) | | | | | |
| 1 Phase, 220 Volt | 142 | 142 | 186 | 186 | - |
| 3 Phase, 220 Volt | 93 | 93 | 118 | 118 | 180 |
| 3 Phase, 440 Volt | 47 | 47 | 60 | 60 | 90 |
| 3 Phase, 575 Volt | 40 | 33 | 48 | 48 | 72 |
| 3 Phase, 380 Volt | 50 | 50 | 80 | 80 | 115 |

1. Actual discharge rate is controlled by meter roll speed adjustment, at 5% to 100% of maximum rate.
2. Excludes auxiliary load and unload conveyor equipment.

## Dryer Pre-Season Checks

Before staring the drying for the first time in a drying season, perform the following checks. If any of the checks fail to produce the stated result, the customer should consult your dealer.

Do not attempt to use the dryer unless all the pre-start checks have been successfully completed.

WARNING

***Before attempting to operate the dryer, make sure all safety shields are in place, all bottoms are cleaned out and rear access doors are closed and all personnel are clear of the dryer.***

## Inspect the Metering Rolls

Open all metering roll access doors and inspect each compartment for any bolts, nuts or other foreign material that may cause possible jamming of the metering rolls.

## Check Control Panel Switches

Before applying electrical power to the dryer, be sure that all switches on the dryer control panel are in the OFF position.

## Electrical Power

Turn ON the electrical power supply to the dryer, set all circuit breakers to ON, including the safety disconnect handle mounted on front of the dryer power panel.

## Control Power Switch

Turn the Control Power switch to ON. At this point, the controller will lock out all other dryer functions. Once the Boot Screen appears, touch the Start button and the dryer will perform a safety circuit check. If a fault is found, the cause will be displayed on the main screen. If all circuits are safe, the controller will supply power to the electronic fuel shut off valve (Maxon), if so equipped and the Start switch will illuminate, indicating that the dryer is ready to be started.

## Start Switch

Push the Start switch and all the selector switches on the control panel will be activated.

## Fuel Check

If using LP gas, make sure the tank has plenty of fuel and that the tank **does not** have a regulator mounted on the liquid line. Slowly open the main fuel supply valve at the tank. Then, open the electronic shut off valve (Maxon valve), if so equipped, or open the manual shut off valve on the dryer to allow fuel flow to the dryer.

If using natural gas, make sure an adequate supply is available. Turn ON the valve along the supply line. Then, open the electronic shut off valve (Maxon valve). Inspect all gas lines and connections for possible leaks.

WARNING

***Any gas leaks must be fixed immediately.***

## Load Auger

With the grain supply shut off, quickly flip the Load Auger switch to MANUAL and see if the load auger rotates clockwise as viewed from the drive end, or counterclockwise if the dryer is a front load model. If the wet grain supply auxiliary is wired to the dryer, it should also rotate in the correct direction at this time.

Turn the Load Auger switch to the AUTO position. The top auger and wet grain supply auxiliary should run for 8 minutes and then the dryer will shutdown and the safety shutdown message (out of grain warning) will be displayed. Press the Stop button to reset the panel, then press the Start button.

## Unload Auto Operation

To check Auto operation, place the Unload switch in the AUTO position. Push then turn the meter roll dial to a setting of 500 and touch ACCEPT/EXIT to start the meter roll rotation. The bottom auger should rotate counterclockwise as viewed from the drive end. The meter roll drive motor should rotate clockwise as viewed from the drive end of the gear box. If the dry grain take away auxiliary is wired to the dryer, it should start and rotate in the proper direction.

## Unload Manual Operation

To check Manual operation, move the Unload switch in the MANUAL position. Push then turn the meter roll dial to a setting of 500 and touch ACCEPT/EXIT to start the meter roll rotation. The bottom auger should rotate counterclockwise as viewed from the drive end. The meter roll drive motor should rotate clockwise as viewed from the drive end of the gear box. If the dry grain take away auxiliary is wired to the dryer, it should start and rotate in the proper direction.

## Meter Roll Operation

When the meter rolls are set to maximum (1000), the meter roll speed should be 17.5 RPM for 8" (20 cm) discharge augers. Make sure the drive chain tension is properly adjusted and all sections of the meter rolls rotate. Turn the Unload switch OFF after these checks are complete. The bottom auger will continue to run for 60 seconds (the default clean out delay setting) after the switch is turned OFF to allow for clean out.

**NOTE:** *Due to the nature of the DC drive motor used on the meter rolls, it is possible for the brushes inside the motor to become corroded if the dryer has not been operated for several months. This will cause the meter rolls not to function. To fix this problem, use a rubber mallet or a piece of wood to tap the DC drive motor. The shock is usually sufficient to restart the motor and metering rolls. You should not have any more problems with this during the rest of the drying season.*

## Fan Switches

Briefly turn each Fan switch to ON and observe the fan rotation. The fan should run counterclockwise. Sometimes, on 3 phase models, all motors run backwards. They can easily be reversed by interchanging two of the three power supply wires. Reverse the two (2) outside wires, L1 and L3 and leave the middle one in the same position.


***All power should be switched OFF and locked out before attempting to reverse the connections.***

**NOTE:** *The bottom fan on the dryer is always referred to as fan 1.*

## Burner Safety

To check the burner safety function, first make sure the main gas valve is OFF. Turn the Fan switch ON and allow the fan to start. Turn the Heater switch ON for that fan. The dryer will shutdown after 20 seconds. The safety message, “Ignition Failure Fan #” will appear. Reset the dryer and repeat for the other fan/heater(s).

## Burner Test Fire

To perform this test, the dryer must be full of grain. If the dryer is empty, the air switch must be disabled. To disable, touch the Setup button at the bottom of the Default Operation Screen. When the Setup Screen appears, touch the Diagnostics button to display the System Diagnostics. To disable the air switch, select the Disable Testing button in the air switch box of the System Diagnostics Screen. The Vision computer will then display a prompt asking if you wish to disable the air switch. Choose YES to continue. Once the air switches are disabled, the Fan switches on the switch panel will illuminate and the fan/heaters on the display animation will change to blue, indicating that “airflow” is simulated.

There is only a 5 minutes period after the dryer is turned on that the air switches can be disabled. After 5 minutes, the air switches cannot be disabled and any air switches that are disabled will return to the enabled state causing an airflow shutdown if the dryer is empty. To restart the 5 minutes test period, the dryer must be shutdown and restarted. The 5 minutes test period starts when the Control Power switch is turned ON.

Test fire each burner by starting the fan. Turn on the fuel supply, then turn the Burner switch to ON. The burner should ignite after a short purge delay of approximately 10 seconds. Gas pressure should be shown on the gauge. At this time adjust the plenum setpoint to 200°F (93°C), causing the burner to operate on High-Fire. Observe the gas pressure on the gauge and lower the plenum setpoint until it causes the burner to cycle into Low-Fire. When the plenum temperature setpoint is met, the gas pressure should show a noticeable drop, indicating that the cycle solenoid is closed and the burner is being supplied with less gas through the cycle solenoid bypass port. At this time set the High-Fire and Low-Fire pressure settings. Use the pressure regulator (for LP models) or the supply line ball valve (for natural gas models) for High-Fire and the adjustment screw on the cycle solenoid for Low-Fire. The computer should cycle the burners between high and low, approximately 1 to 3 times per minute.

Use only the amount of pressure required to obtain the desired temperature.

Approximate settings are shown below:

| LP Gas | Natural Gas |
|---|---|
| High-Fire 6-15 PSI (41-102 kPa) | High-Fire 6-10 PSI (41-69 kPa) |
| Low-Fire 2-6 PSI (14-41 kPa) | Low-Fire 1-3 PSI (7-20 kPa) |

If the burner remains on High-Fire and does not cycle, increase the regulator setting on the propane models, or the supply valve on the natural gas models, in order to reach the plenum setpoint. If the burner remains in Low-Fire and does not cycle, slightly decrease gas pressure with the Low-Fire adjustment screw on the cycle solenoid. If the gas pressure is decreased too much, a popping or fluttering sound will be heard. This popping and fluttering should not be allowed to continue or damage to the burner will occur. Be sure to adjust the low pressure needle valve anytime the high pressure regulator is adjusted. Repeat the test for each fan/heater unit.

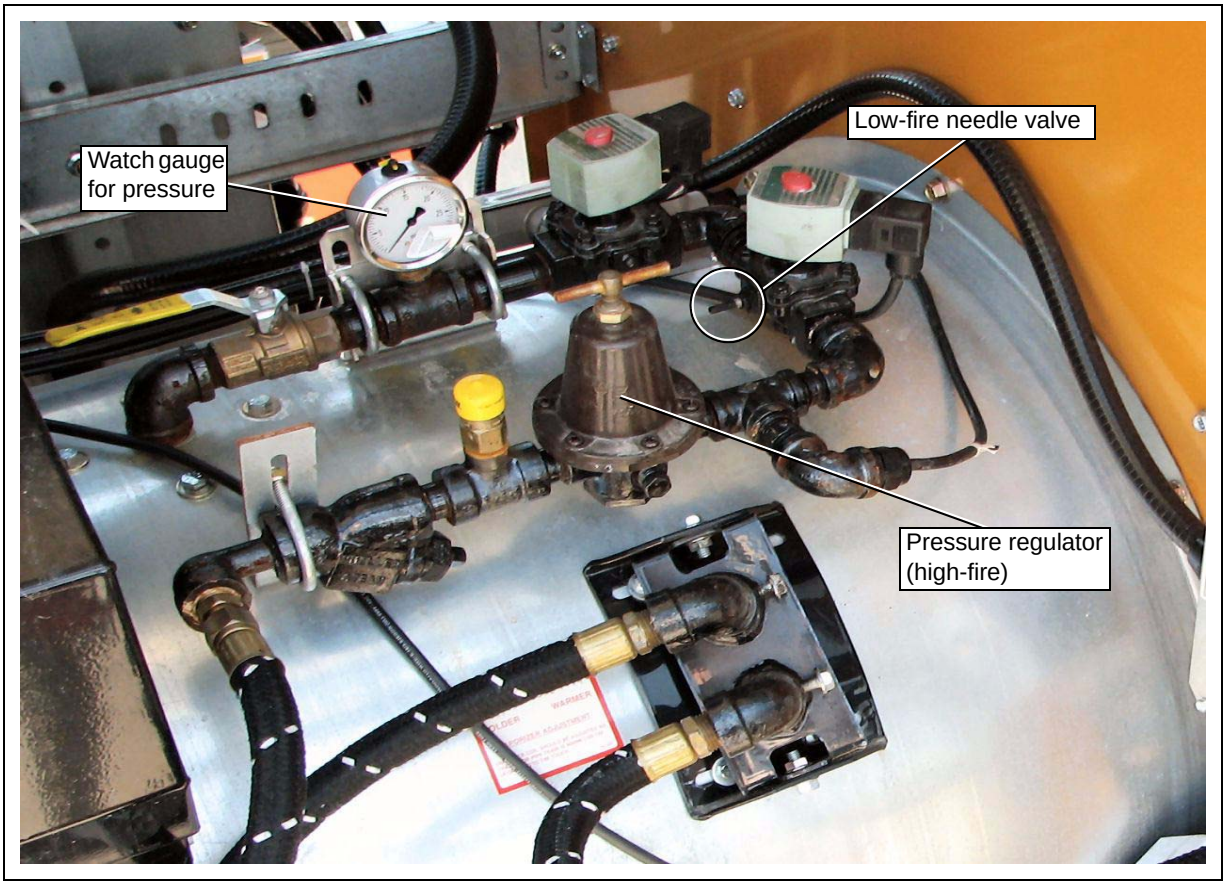



**Figure 4A** *Liquid Propane (LP) Pipe Train*

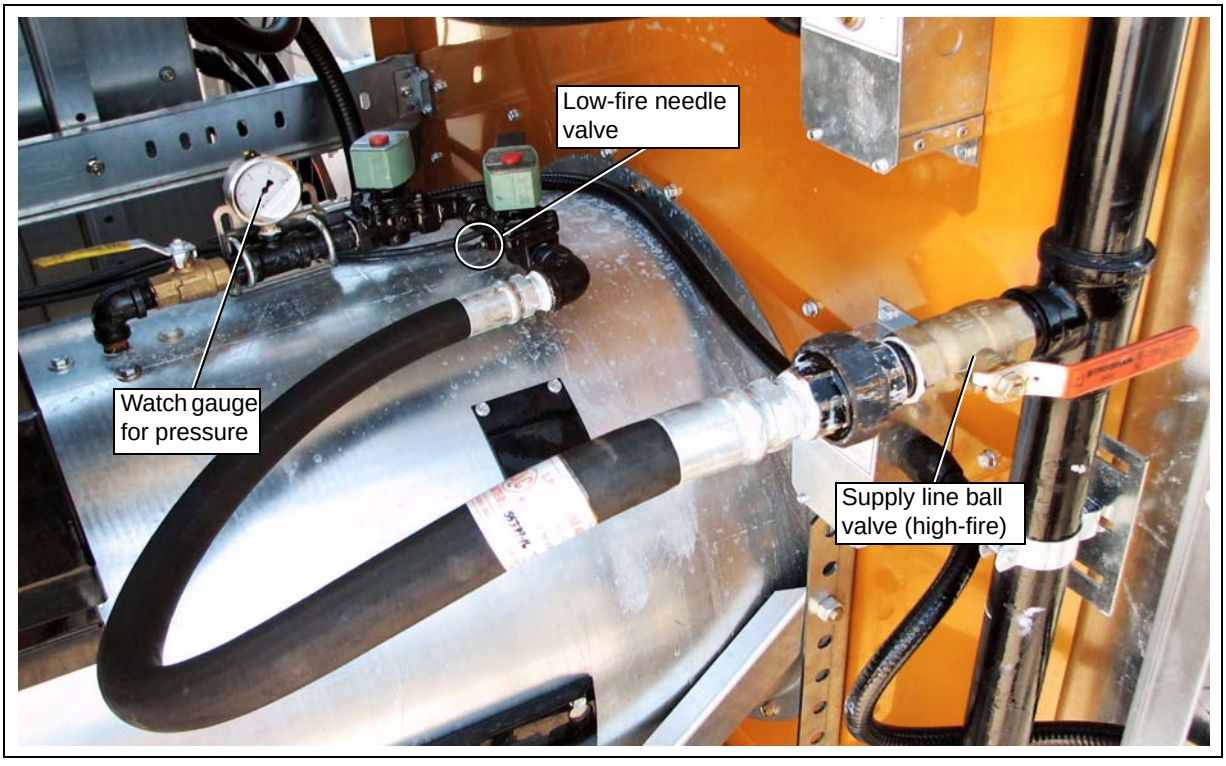



**Figure 4B** *Natural Gas (NG) Pipe Train*

## Dryer Shutdown

To shutdown the dryer:

1. Close the fuel supply valve at the tank or valve along the fuel line.
2. If the burner is operating, let the dryer run out of fuel and it will shutdown automatically due to loss of flame.
3. Close the fuel valve at the dryer and press the Stop button.
4. Turn OFF the control power.
5. Turn OFF the safety disconnect handle on the front of the power box and turn OFF the main power to the dryer.

## Emergency

In case of emergency, push the Emergency Stop button. This will interrupt power to the control panel and the fan; burner and all augers will stop immediately.

# Dryer Start-Up and Operation Full Heat Drying

## Full Heat Operation

With this type of drying, the grain is discharged hot, with no cooling. Drying capacity is substantially higher with FULL HEAT than with the DRY AND COOL process.

## Final Moisture

The cooling process usually removes 1% to 3% moisture. Therefore, hot shelled corn should be removed from the dryer at approximately 17% moisture if the final desired moisture content is 15%.

# Drying Temperatures

## Shelled Corn

For shelled corn with an initial moisture content of 25%-30%, the recommended maximum drying temperature is 220°F-240°F (104°C-116°C) for the top fan and 170°F-190°F (77°C-88°C) for the bottom fan.

## Small Grain

For drying small grain (wheat, oats, milo), 150°F (66°C) is suggested.

## Soybeans

Drying temperatures are critical in drying rice and soybeans. A temperature of 130°F (54°C) is recommended to keep grain temperature low.

## Drying Efficiency

The general rule for obtaining the highest drying efficiency is to use the highest possible drying temperatures that does not adversely affect grain quality.

# Dryer Shutdown

## Cooling Hot Grain

If the dryer is to be shutdown while filled with grain, it is recommended that hot grain be cooled for 10 to 15 minutes, especially in cold weather, to prevent water vapor condensation and possible freezing of such condensate following shutdown.

# Initial Setup Parameters

Turn the Control Power switch to ON. When the Boot Screen appears, select the Start button. The computer will run a quick check of the system network, after which the Default Operation Screen will appear.

## Timer and Delay Setting

To set the timers, select the 

button at the bottom of the Default Operation Screen. The “Select Timers to Modify” Screen will appear. See instructions in Vision Manual to set the timer and delays.

## Setting the Temperatures

To adjust the temperature setpoints, touch the 

button at the bottom of the Default Operation Screen. The “Select Temperature Setpoint to Modify” Screen will be displayed. See Vision Manual for instructions on how to set the temperatures.

## Start-Up

### Start-Up Procedure

At the beginning of each harvest and before filling the dryer with grain, make sure to inspect the dryer for rodent damage, proper belt and chain tension and missing or damaged safety shields. Test operate the dryer using the pre-start check procedures on *Page 16*.

1. Before attempting to operate the dryer, make sure that all safety shields are in place, all plenum bottom closure panel doors are closed, all rear access doors are closed and all personnel are clear of the grain dryer and grain handling machinery.
2. Turn all selector switches on the control panel to the OFF position.
3. Turn ON the electrical power supply to the dryer and move the safety disconnect handle mounted on the dryer’s upper power box to ON.
4. Turn the Control Power switch to ON. The switch will illuminate. The control computer will boot up. At this point, the controller will lock out all other dryer functions. Once the Boot Screen appears, touch the Start button and the dryer will perform its safety circuit checks. If a fault is found, the cause will be displayed on the display screen (touch screen). If all safeties do not detect a problem, the controller will allow the electronic fuel shut off valve (Maxon) to be manually opened, if so equipped. The dryer is ready to be started.
5. Move the Load Auger switch to MANUAL and push the Start switch. The top auger will immediately start and the Load Auger switch will illuminate. If additional loading equipment is wired to the dryer it will also start immediately.
6. When the dryer is full of grain, the top auger will stop automatically and any auxiliary loading equipment wired to the dryer will also stop.

The dryer is now ready to begin drying grain. There are two (2) moisture control options to use in dryer operation. The variable MR Speed option is not recommended for single module dryers.

1. Regulation of Grain Temperature on *Page 23*.
2. Regulation of Moisture: 5 MR SP on *Page 30*.
3. Regulation of Moisture: Variable MR SP (not recommended for single module dryers).

# Continuous Flow Drying Mode Using Regulation of Grain Temperature

## Full Heat Continuous Flow Operation

This section begins with *Step 7* and it is assumed that *Step 1* through *Step 6* in the start-up procedure described on *Page 22* have been completed. For demonstration purposes, this example procedure will assume that incoming grain moisture content is at 25% and a 10 point moisture removal is the goal of drying the grain.

7. Touch the Setup button at the bottom of the Default Operation Screen. Once the “Select Hardware Setup Parameter to Modify” Screen is displayed, touch the Drying Mode button. When the “Drying Mode Selection” window appears, touch the Continuous Flow button to select continuous flow drying mode. Then, touch the Accept/Exit button and return to the “Select Hardware Setup Parameter to Modify” Screen. Touch the M/C Setup button. When the “Moisture Control Selection” window appears, select the REGULATION OF GRAIN TEMPERATURE moisture control option. Do not select the 5 Speed option yet, as this will be explained later. Touch the Accept/Exit buttons and return to the Default Operation Screen.

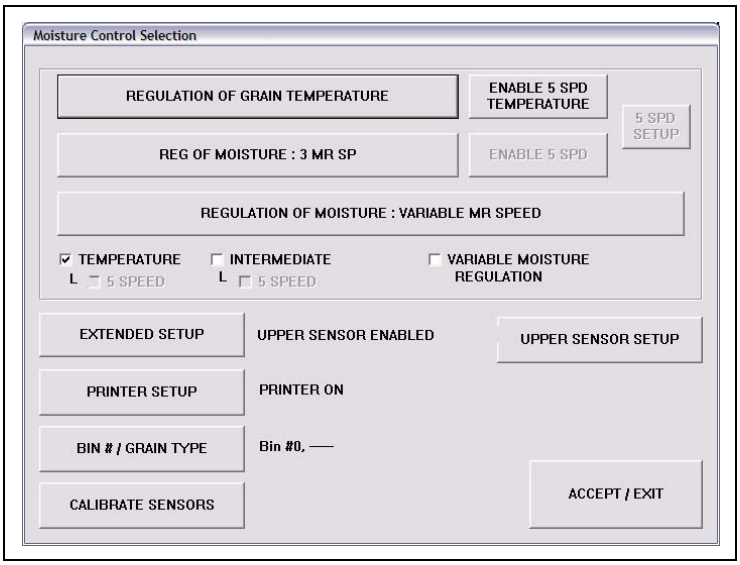



**Figure 5A**

8. Make sure the Unload switch is OFF.
9. Open the main fuel supply valve on the tank if using LP gas, or the valve in the fuel supply line if using natural gas. Turn on the Maxon electric shut off valve, if so equipped, or open the manual shut off valve to allow fuel flow to the dryer.
10. The dryer should be filled with grain. Turn the Load Auger switch to the AUTO position. In both the AUTO and MANUAL positions, the dryer grain level switch will automatically keep the dryer full of grain. In the AUTO position, the dryer will shutdown after a preset time period using the out of grain timer.
11. Turn each Fan switch to ON. The fan will start and the switch will illuminate when air pressure is detected.
12. Start each burner by turning the Heater switch ON. After purging for approximately 10 seconds, the burner will fire and the Heater switch will illuminate. This indicates that the flame sensing circuit is sensing burner flame. For information concerning burner adjustment, see the dryer pre-start check section on *Page 16* of this manual. Set the plenum temperature setpoints to 180°F.

13. Refer to the manual PNEG-1650 for the full heat chart settings that correspond to the model of dryer. Note the settings for Initial Moisture, Moisture Removed, Approximate Dry Time, 1 Speed, 2 Speed Low and 2 Speed High. Select the line that has the initial starting moisture. These are the settings that will be referred to during this start-up procedure.

14. Run the fans and burners for approximately 10% longer than the estimated dry time for the incoming moisture. **Example:** Ten points removal is approximately 54 minutes. 10% of 54 minutes is 5.4 minutes, therefore run the fan/heaters approximately 59-60 minutes.

15. After the time in *Step 14*, turn the Unload Auger switch to MANUAL and set the Meter Roll Speed, (Manual Speed). Remember that MANUAL is a true Manual operation, with no moisture control. The meter rolls will run at the speed selected on the Meter Roll Speed Encoder. To set the Meter Roll speed, press on the Meter Roll Adjustment knob. When the “Modify Meter Roll Setpoints” window appears, turn the Meter Roll Adjustment knob until the speed indicator is set to the speed suggested for 1 Speed, then touch the Accept/Exit button to set this value into the computer. Grain should begin to run at this time. Actual run time for this setting is approximately 10% longer than the Approximate Drying Time listed in the chart for the desired moisture level. This allows the moisture in the dryer to reach an even gradient top to bottom without any highs or lows in it. Please note, that it will, however, over dry some of the grain.

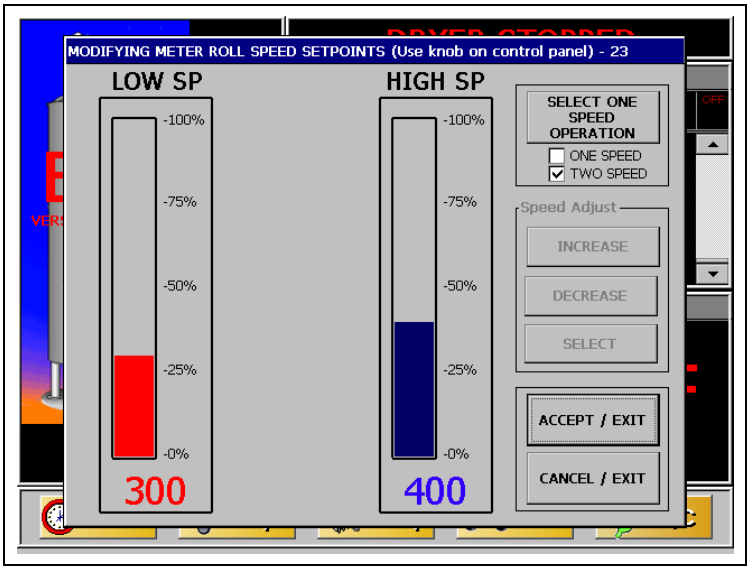



**Figure 5B**

16. Increase the drying temperature to 190°F for single fans. For multiple fan dryers, set the heat chambers 30° to 60° apart. Hottest at the top and the coolest at the bottom. See setting the temperatures in Vision Manual.

17. DO NOT ADJUST THE DRYER FOR MOISTURE DURING THIS PROCESS OR THE DRYER WILL ESTABLISH HIGH AND LOW SWINGS IN THE MOISTURE CONTROL AND WILL REQUIRE SEVERAL HOURS TO RESOLVE.

18. After the run time specified in *Step 15*, set the moisture control. Turn the Unload switch to AUTO. Press the Meter Roll Adjustment knob. When the “Modify Meter Roll Setpoints” window appears, check that 2 Speed is selected. Set the low speed by pushing the Meter Roll Speed Adjustment knob until the low speed indicator is red and then turn the knob to the desired low speed setting. When low speed is set, push the Meter Roll Adjustment knob until the high speed indicator is red, then turn the knob to the desired high speed setting. Set the high and low speed settings (as close as possible) to the values given in the drying time tables. Touch the Accept/Exit button and return to the Default Operation Screen. **IMPORTANT:** *The high speed setting must be a higher value than the low speed.*

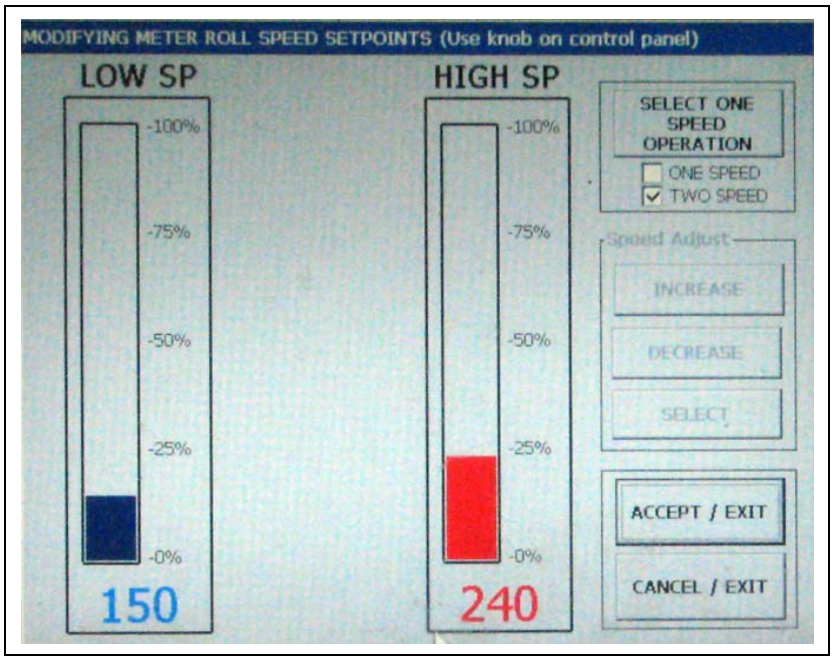



**Figure 5C**

19. With the Unload Auger switch in the AUTO position, the moisture control is active. Select the M/C button at the bottom of the Default Operation Screen. When the “Modify Temperature Setpoint” window appears, set the temperature to approximately 105°F. Let the dryer run on these settings before adjusting moisture or meter roll settings. While these settings will not dry the grain exactly as desired, they will serve as a good starting point to determine needed adjustments. A slightly different moisture at the bottom of the storage bin is not usually a problem as long as full floor aeration is present.


**Figure 5D**

20. After the run time specified in *Step 19*, adjust the moisture control and the meter roll speeds if required. Each time the moisture control is adjusted, it will take approximately the amount time shown in the PNEG-1650 to see the results of this adjustment. Note for every 5° change in temperature, moisture will changed by approximately one point.

## Dry and Cool Continuous Flow Operation

This section begins with *Step 7* and it is assumed that *Step 1* through *Step 6* in the start-up procedures described on *Page 22* have been completed. In this example, we will again assume that incoming grain moisture content is 25% and a 10 point moisture removal is the grain drying goal.

7. Touch the Setup button at the bottom of the Default Operation Screen. Once the “Select Hardware Setup Parameter to Modify” Screen is displayed, touch the Drying Mode button. When the “Drying Mode Selection” window appears, touch the Continuous Flow button to select continuous flow drying mode. Then, touch the Accept/Exit button and return to the “Select Hardware Setup Parameter to Modify” Screen. Touch the M/C Setup button. When the “Moisture Control Selection” window appears, select the REGULATION OF GRAIN TEMPERATURE moisture control option. Do not select the 5 Speed option yet, as this will be explained later. Touch the Accept/Exit button and return to the Default Operation Screen.

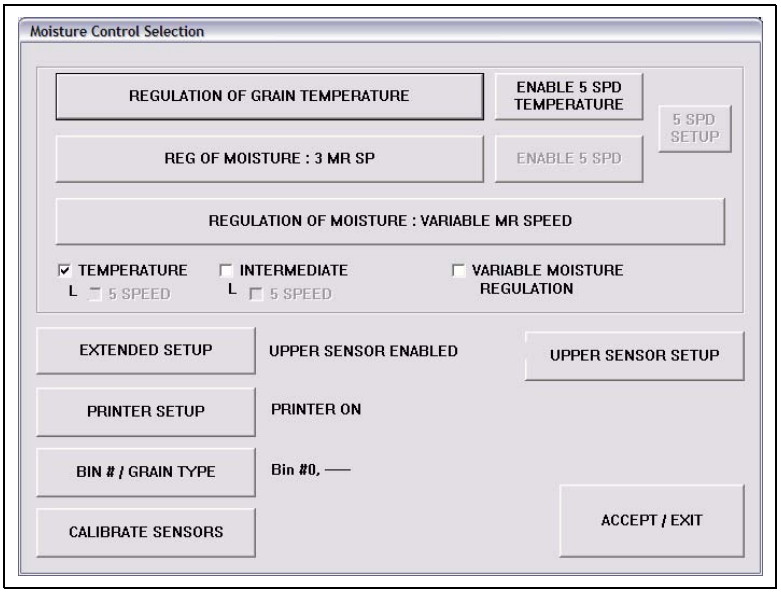



**Figure 5E**

8. Make sure the Unload switch is OFF.
9. Open the main fuel supply valve on the tank if using LP gas, or open the fuel supply line if using natural gas. Turn on the Maxon electric shut off valve, if so equipped, or open the manual shut off valve to allow fuel flow to the dryer.
10. The dryer should be filled with grain. Turn the Load Auger switch to the AUTO position. In both the AUTO and MANUAL positions, the dryer grain level switch will automatically keep the dryer full of grain. In the AUTO position, the dryer will shutdown after a preset time period on the out of grain timer.
11. Turn each Fan switch to ON. The fan will start and the switch will illuminate when air pressure is detected.
12. Start each burner by turning the Heater switch to ON. After purging for approximately 10 seconds, the burner will fire and the Heater switch will illuminate. This indicates that the flame sensing circuit is sensing burner flame. For information concerning burner adjustment, see the dryer pre-start checks section on *Page 16* of this manual. Set the plenum temperature setpoints to 180°F.
13. Refer to the manual PNEG-1650 for the dry and cool chart settings that correspond to the model of dryer being used. Note the settings for Initial Moisture, Moisture Removed, Approximate Dry Time, 1 Speed, 2 Speed Low and 2 Speed High. Select the line that has the initial starting moisture. These are the settings that will be referred to during this start-up procedure.

14. Run the bottom fan (to be used for cooling later) and heater(s) for, approximately 20 minutes. This will start the bottom drying, so it can cool before discharging grain.
15. Run the fans and burners for approximately 10% longer than the estimated dry time for the incoming moisture. **Example:** Ten points removal is approximately 60 minutes. -10% of 60 minutes is 6 minutes, therefore run the fan/heaters approximately 66 minutes.
16. Twenty minutes before the required drying time is finished, turn the bottom heater OFF but let the fan run and cool this section. Set the upper plenum thermostats to the recommended temperature (190°F-230°F).
17. Turn the Unload Auger switch to MANUAL and set the Meter Roll Speed (Manual Speed). Remember that Manual is a true Manual operation, with no moisture control. The meter rolls will run at the speed selected on the Meter Roll Speed Encoder. To set the Meter Roll speed, press the Meter Roll Adjustment knob. When the “Modify Meter Roll Setpoints” window appears, turn the Meter Roll Adjustment knob until the speed indicator is set to the speed suggested for 1 Speed. Grain should begin to run at this time. Actual run time for this setting is approximately 10% longer than the Approximate Drying Time listed in the chart for the desired moisture level. This extra time allows the moisture in the dryer to reach an even gradient top to bottom without any highs or lows in it. Please note, that it will, however, slightly over dry some of the grain.

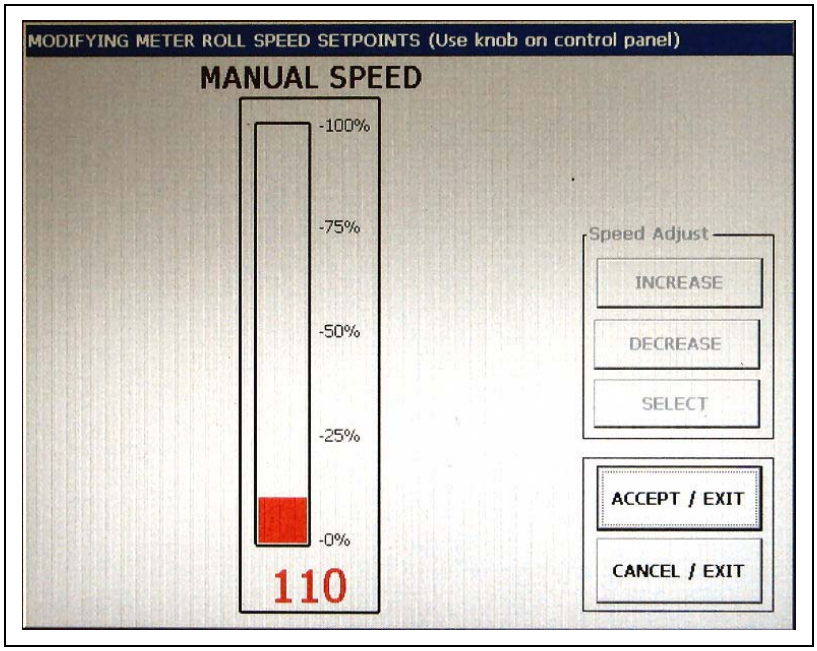



**Figure 5F**

18. DO NOT ADJUST THE DRYER FOR MOISTURE DURING THIS PROCESS OR IT WILL ESTABLISH HIGH AND LOW SWINGS IN THE MOISTURE AND WILL REQUIRE SEVERAL HOURS TO RESOLVE.
19. After the run time specified in *Step 17*, set the moisture control. Turn the Unload switch to AUTO. Push the Meter Roll Adjustment knob. When the “Modify Meter Roll Setpoints” window appears, check that 2 Speed is selected. Set the low speed by pushing the Meter Roll Speed Adjustment knob until the low speed indicator turns red and then turn the knob to the desired low speed settings. When low speed is set, push the Meter Roll Adjustment knob until the high speed indicator turns red, then turn the knob to the desired high speed setting. Set the high and low speed settings (as close as possible) to the values given in the drying time tables.Touch the Accept/Exit button and return to the Default Operation Screen. **IMPORTANT:** *The high speed setting must be a higher value than the low speed setting.*

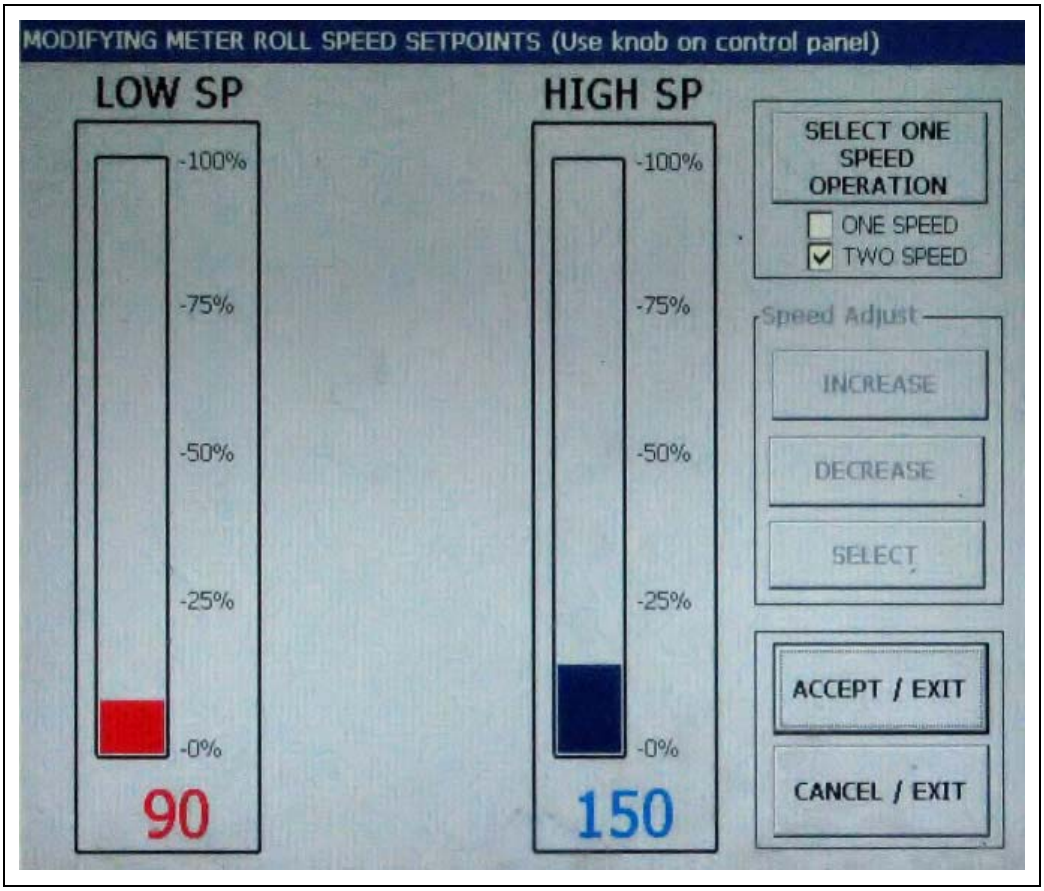



**Figure 5G**

20. With the Unload Auger switch in the AUTO position, the moisture control is active. Select the M/C button at the bottom of the Default Operation Screen. When the “Modify Temperature Setpoint” window appears, set the upper temperature to approximately 130°F. Let the dryer run on these settings for at least 30-40 minutes before making further adjustments to the moisture control or meter roll settings. While these settings will not achieve grain moisture exactly as desired, they will serve as a good starting point for adjusting the settings to reach the desired results. A slightly different moisture at the bottom of the storage bin is not usually a problem if full floor aeration is present.

21. After the run time specified in *Step 20*, adjust the moisture control and the meter roll speeds if required. Each time an adjustment is made to the moisture control, it will take approximately the amount time shown in PNEG-1650 to see the results of this adjustment. Note for every 5° change in temperature, moisture will changed by approximately one point.

The 2 Speed meter roll option works well if all or most of the grain entering the dryer has nearly the same moisture content. However, if the moisture content of the grain entering the dryer varies greatly, then the 5 Speed option may be more beneficial. The 5 Speed option allows the user to set an inner and outer limit for the high and low meter roll settings as well as an inner and outer limit for the moisture control temperature setting. When setting up the 5 Speed meter roll option, try to set it so that the dryer operates inside the inner limits as much as possible and use the outer limit setting for extreme cases of incoming moisture content.

To enable the 5 Speed option, press the Setup button at the bottom of the Default Operation Screen. When the Select “Select Hardware Setup Parameter to Modify” Screen appears, select the M/C Setup button. When the “Moisture Control Selection” Screen appears, touch the Enable 5 Speed Temperature button. Note that the 5 SPEED box is checked.

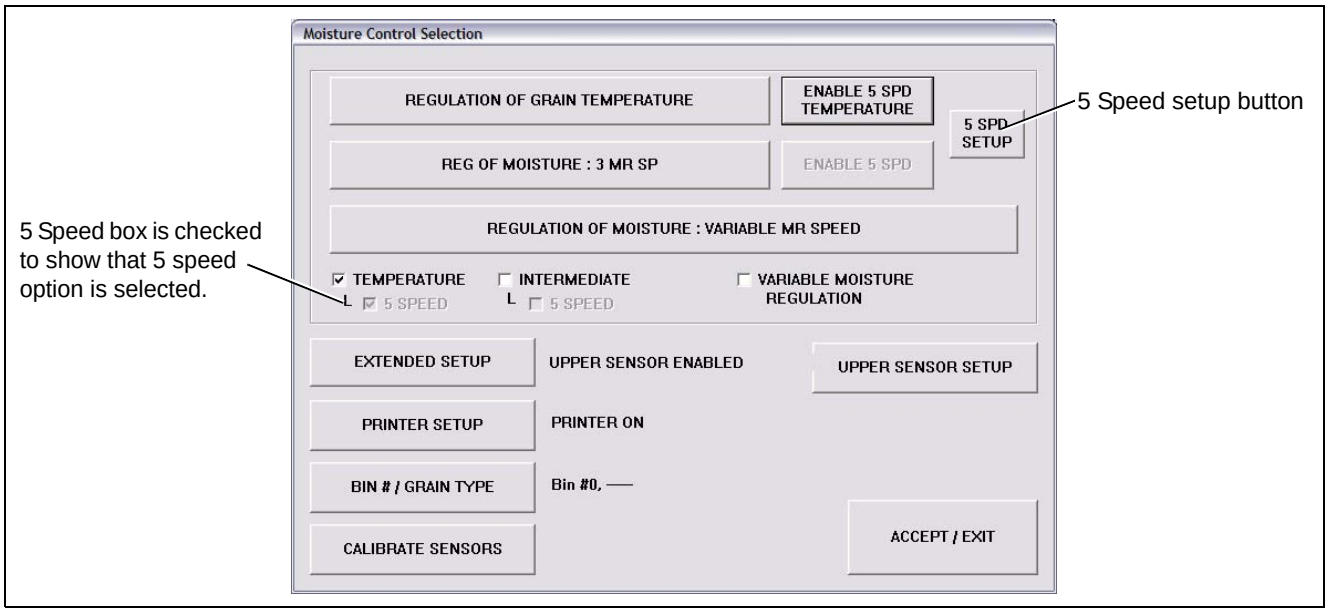



**Figure 5H**

Touch the 5 SPD Setup button to display the bracketed 5 Speed Moisture Control Setup Screen.

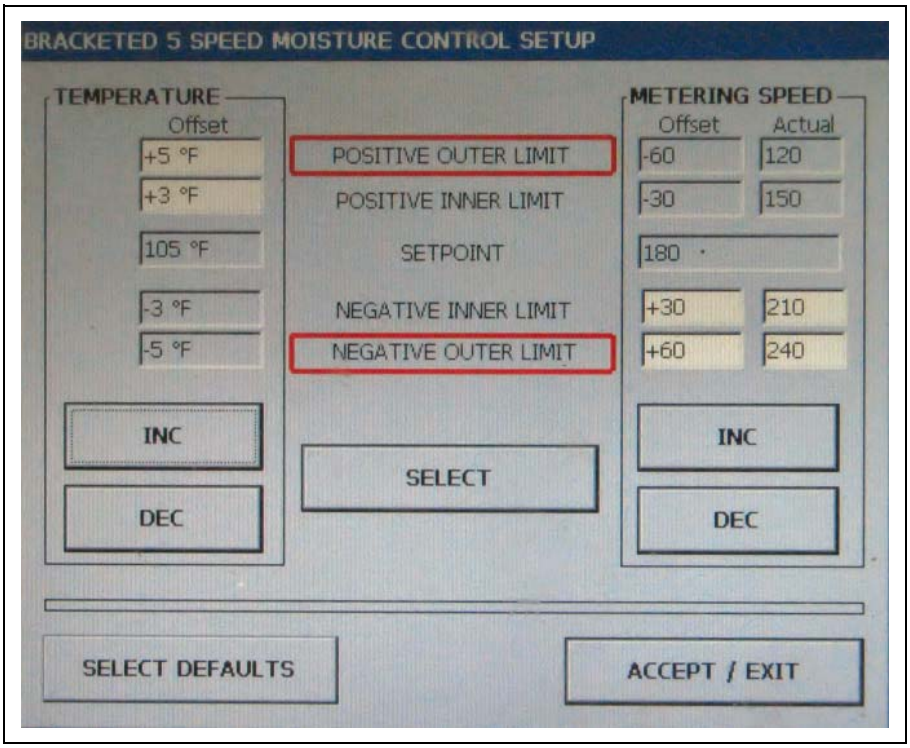



**Figure 5I**

To set the inner or outer limits, press the Select button until the desired limit is highlighted with a red square. The offset for that limit may now be adjusted by touching the INC (increase) or DEC (decrease) buttons.

If you are unsure as to what values to set for the inner and outer limits, press the Select Defaults buttons and use this as a starting point. Further adjustments can be made at a later time as the 5 Speed meter roll option becomes more familiar.

# Continuous Flow Drying Mode Using Regulation of Moisture: 5 MR SP

## Full Heat Continuous Flow Operation

This section begins with *Step 7* and it is assumed that *Step 1* through *Step 6* in the start-up procedure described on *Page 22* have been completed. In this example, we will again assume that incoming grain moisture content is 25% and a ten point moisture removal is the grain drying goal.

7. Touch the Setup button at the bottom of the Default Operation Screen. Once the “Select Hardware Setup Parameter to Modify” Screen is displayed, touch the Drying Mode button. When the “Drying Mode Selection” window appears, touch the Continuous Flow button to select continuous flow drying mode. Then, touch the Accept/Exit button and return to the “Select Hardware Setup Parameter to Modify” Screen.

8. Touch the M/C Setup button. When the “Moisture Control Selection” window appears select the REGULATION OF MOISTURE: 5 SP MR moisture control option. The 5 SP MR cannot be disabled when operating in this moisture control mode.

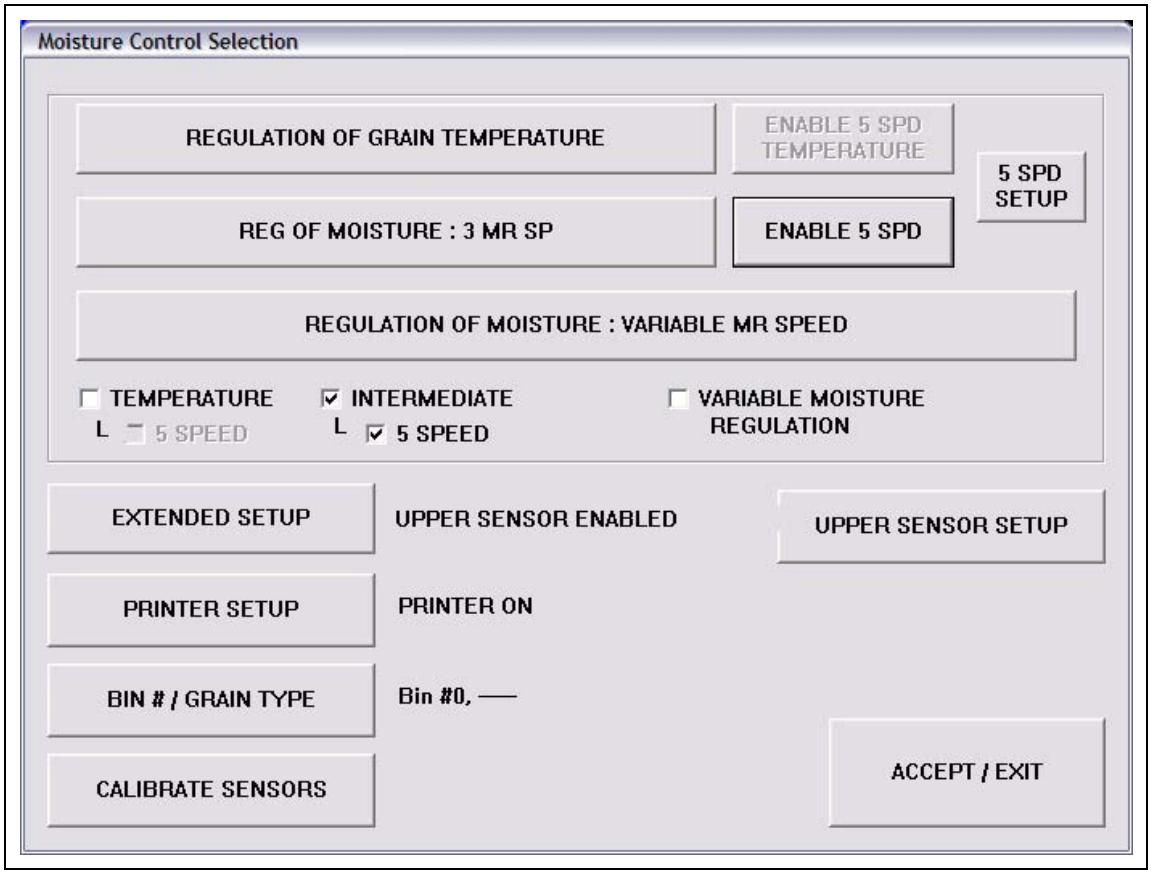



**Figure 5J**

9. Press the 5 Speed Setup button. When the bracketed 5 Speed Moisture Control Setup is displayed touch the Select Defaults button. Select the Accept/Exit button to save these settings in the computer and return to the Default Operation Screen.

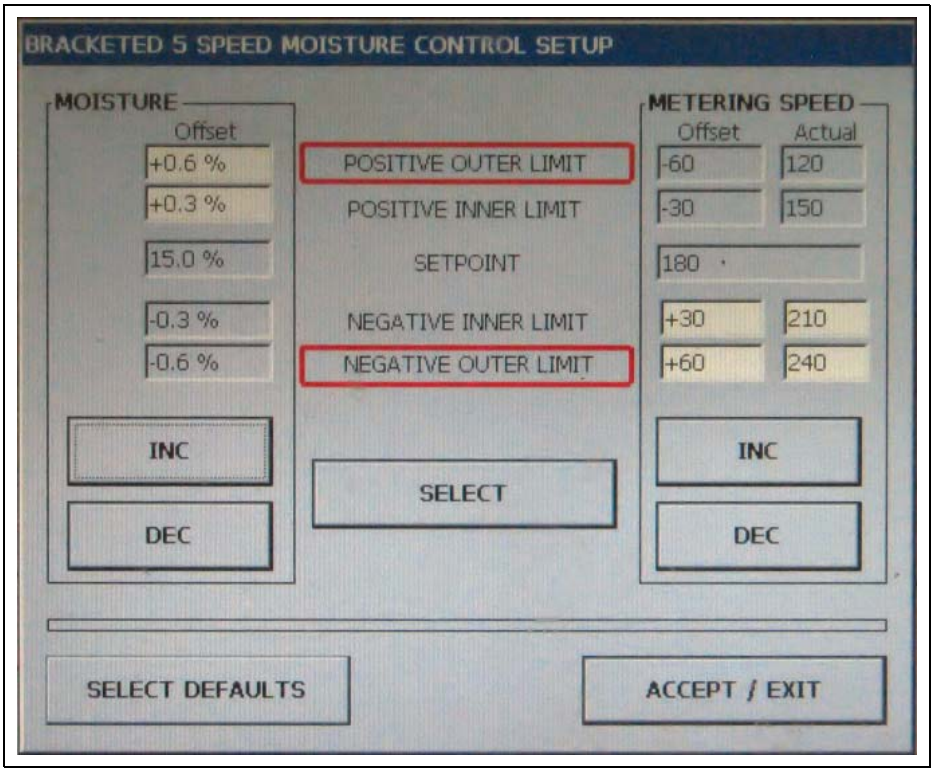



**Figure 5K**

10. Make sure the Unload switch is OFF.
11. Open the main fuel supply valve on the tank if using LP gas, or the valve in the fuel supply line if using natural gas. Turn on the Maxon electric shut off valve, if so equipped, or open the manual shut off valve to allow fuel flow to the dryer.
12. The dryer should be filled with grain. Turn the Load Auger switch to the AUTO position. In both the AUTO and MANUAL positions, the dryer grain level switch will automatically keep the dryer full of grain. In the AUTO position, the dryer will shutdown after a preset time period according to the out of grain timer.
13. Turn each Fan switch to ON. The fan will start and the switch will illuminate when air pressure is detected.
14. Start each burner by turning the Heater switch ON. After purging for approximately 10 seconds, the burner will fire and the Heater switch will illuminate. This indicates that the flame sensing circuit is sensing burner flame. For information concerning burner adjustment, see dryer pre-starts checks on *Page 16* of this manual. Set the plenum temperature setpoints to 180°F.
15. Refer to the manual PNEG-1650 for the full heat chart settings that correspond to the model of dryer being used. Note the settings for Initial Moisture, Moisture Removed, Approximate Dry Time, 1 Speed, 2 Speed Low and 2 Speed High. Select the line that has the initial starting moisture. These are the settings that will be referred to during this start-up procedure.
16. Run the fans and burners for approximately 10% longer than the estimated drying time for the incoming moisture. **Example:** Ten points removal is approximately 54 minutes. 10% of 54 Minutes is 5.4 minutes, therefore run the fan/heaters approximately 59-60 minutes. This extra time allows the moisture in the dryer to reach an even gradient from top to bottom without any highs or lows. It will, however, slightly over dry some of the grain.

17. After the time in *Step 16 on Page 31*, turn the Unload Auger switch to MANUAL and set the Meter Roll Speed (Manual Speed). Remember that Manual is a true Manual operation with no moisture control. The meter rolls will run at the speed selected using the Meter Roll Speed Encoder. To set the Meter Roll speed, press the Meter Roll Adjustment knob. When the “Modify Meter Roll Setpoints” window appears, turn the Meter Roll Adjustment knob until the speed indicator is set to the speed suggested for 1 Speed. Grain should begin to run at this time. Run time for this is approximately 10% longer than the (Approximate Drying Time) required for the target moisture. This allows the moisture in the dryer to reach an even gradient top to bottom without having any highs or lows in it. Please note, that it will, however, slightly over dry some of the grain.

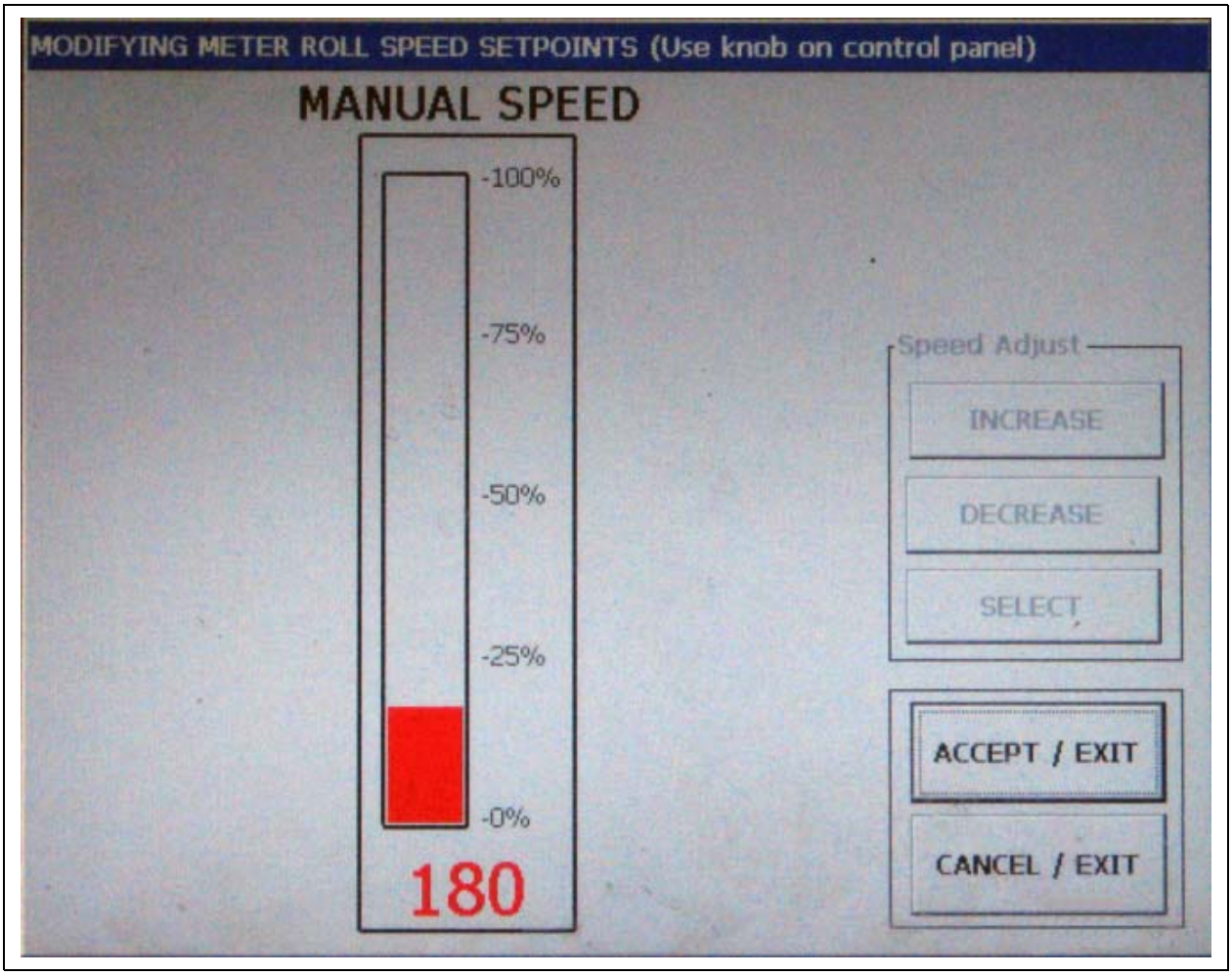



**Figure 5L**

18. After the run time specified in *Step 17*, test the moisture content. Test at least three samples and average the readings for accuracy. Having determined the average discharge moisture, calibrate the incoming and outgoing moisture sensors on the dryer. To do this, press the Setup button again and return to the “Select Hardware Setup Parameter to Modify” Screen. Press the M/C Setup button and then press the Calibrate Moisture Sensors button. The “Moisture Sensor Calibration” window will appear. Follow the example below to adjust the dryer to the moisture tester.

    **Example:** The moisture tester gives an average moisture of 17%, but the moisture sensor on the dryer reads 18.3%. Calibrate the dryer’s moisture sensor (-1.3%), thereby adjusting the dryer’s moisture screen to read 17%, matching the moisture tester. Once the calibration offset has been entered for the moisture sensors touch the Accept/Next button.

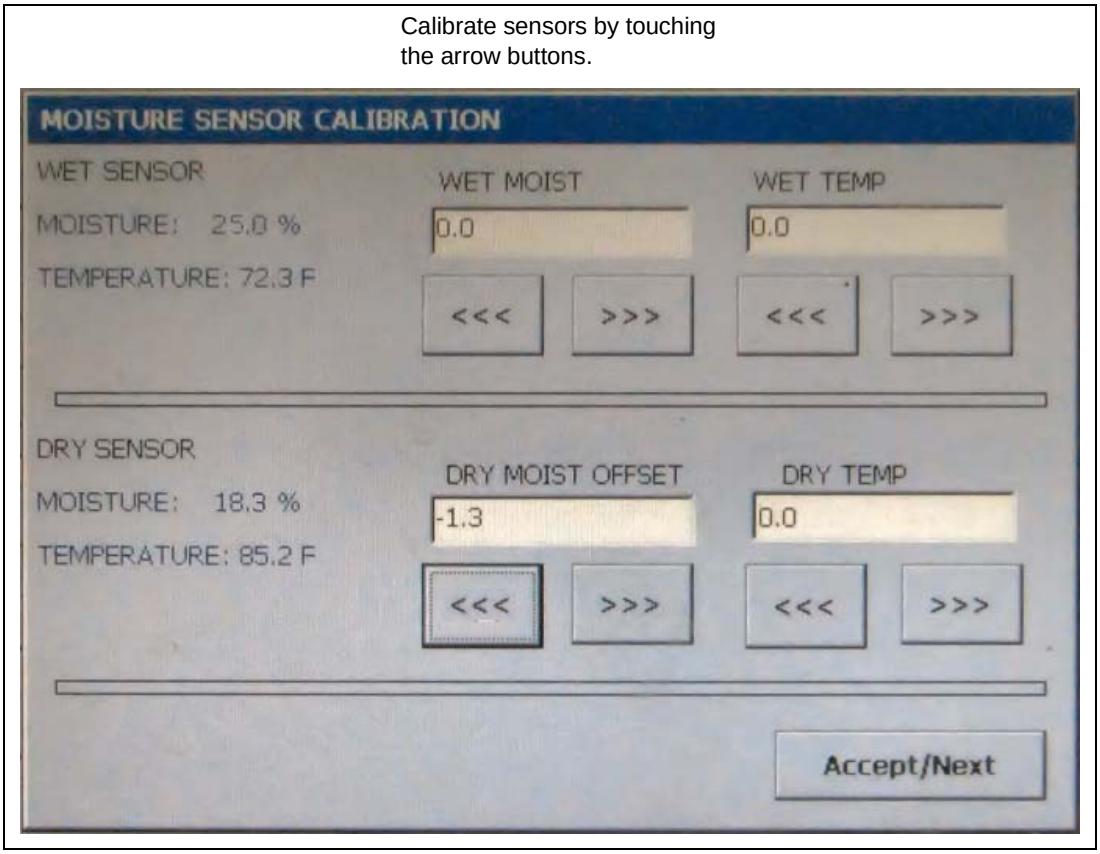



**Figure 5M**

19. Once the discharged grain has reached the desired moisture content, turn the Unload switch to AUTO.
20. With Unload Auger switch is in the AUTO position, the Moisture Control is active. Touch the M/C button at the bottom right of the Default Operation Screen. When the Moisture Setpoint window appears, set the moisture setpoint to the output moisture desired. Let the dryer run on these settings before trying to adjust moisture or meter roll settings.
21. The dryer will immediately switch to the 5 Speed moisture control. If you press the meter roll knob, you will now notice that there is one meter roll speed to adjust.

## How the Moisture Control Works

The controller continuously monitors the moisture coming in and out of the dryer, as well as the column grain temperature at the end of the drying section. However, the control action is based on the sensor at the outlet of the dryer. If the moisture coming out of the dryer is not at the target, the controller will speed up or slow down the unload accordingly. How the meter rolls react depends on the setpoint and the actual moisture coming out of the dryer. As long as the outgoing moisture is three-tenths above or below the setpoint, the meter rolls run on the middle speed. Once the moisture begins to drift from the setpoint by over three-tenths either above or below the setpoint, the speed will automatically switch between middle and low, or middle and high speed. This is a very fast response and will bring grain back towards the setpoint quickly.

The manual speed setting is responsible for the first pass of drying because the controller does not yet have enough information about the grain flowing through the dryer. Set the manual unloading speed as close as it should be for the grain currently in the dryer before switching to moisture control mode. The manual speed setting does not need to be adjusted after the moisture control is activated.


**Figure 6A** *Supply Line (Liquid Propane (LP) Shown)*

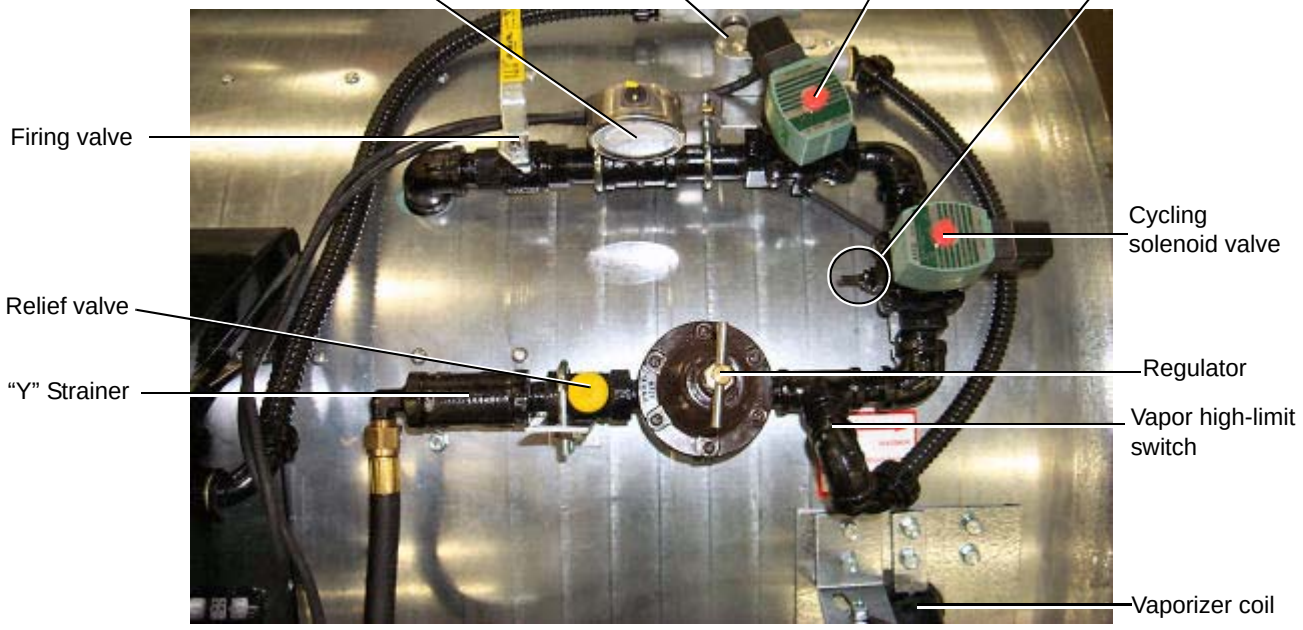



**Figure 6B** *Liquid Propane (LP) Fan/Heater Pipe Train*

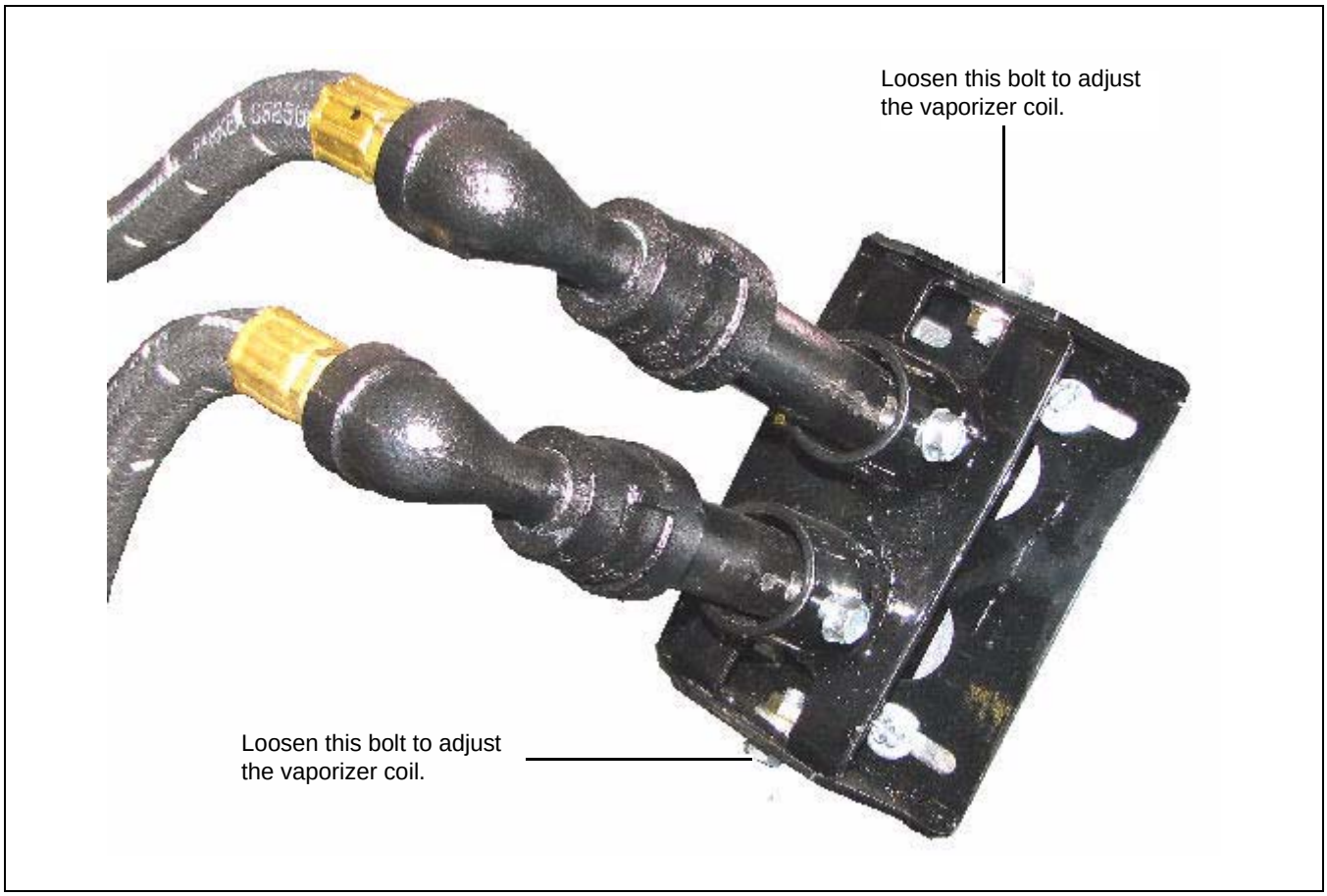



**Figure 6C** *Liquid Propane (LP) Vaporizer Coil Adjustment*

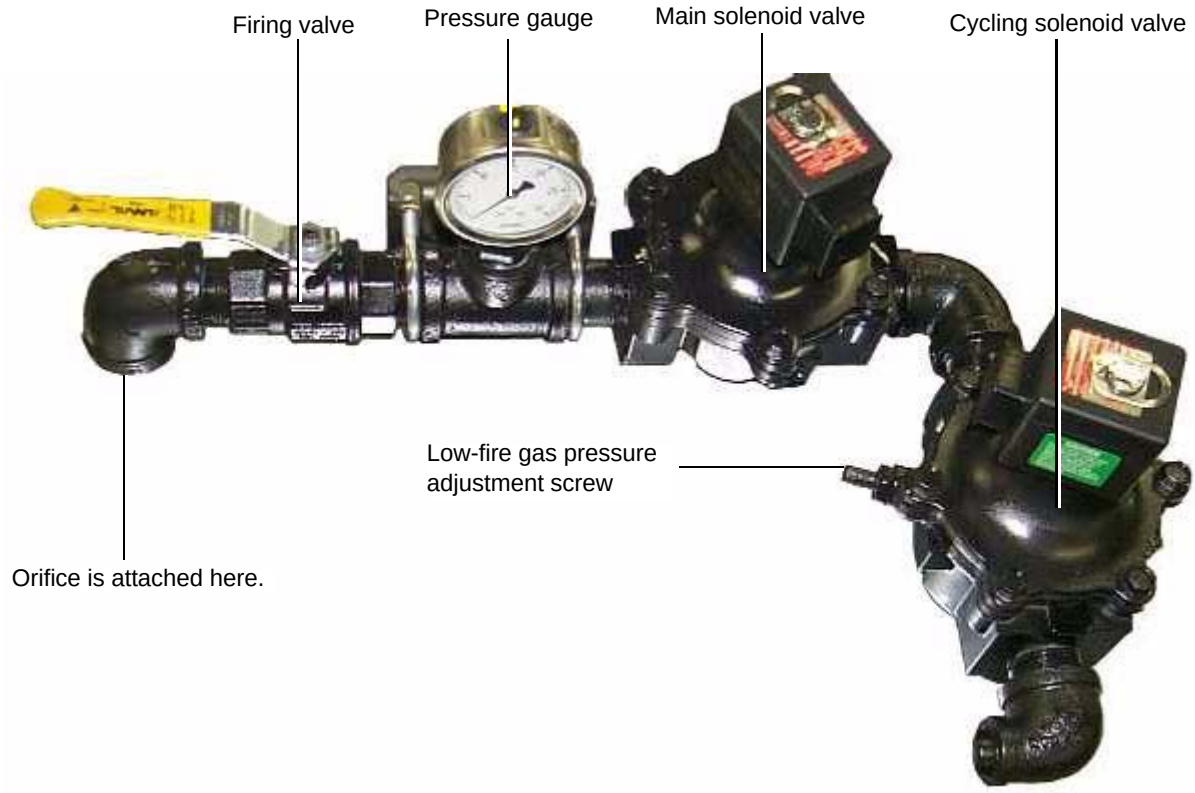



**Figure 6D** *Natural gas (NG) Fan/Heater Pipe Train*


**Figure 6E** *Natural Gas (NG) High-Fire Adjustment*

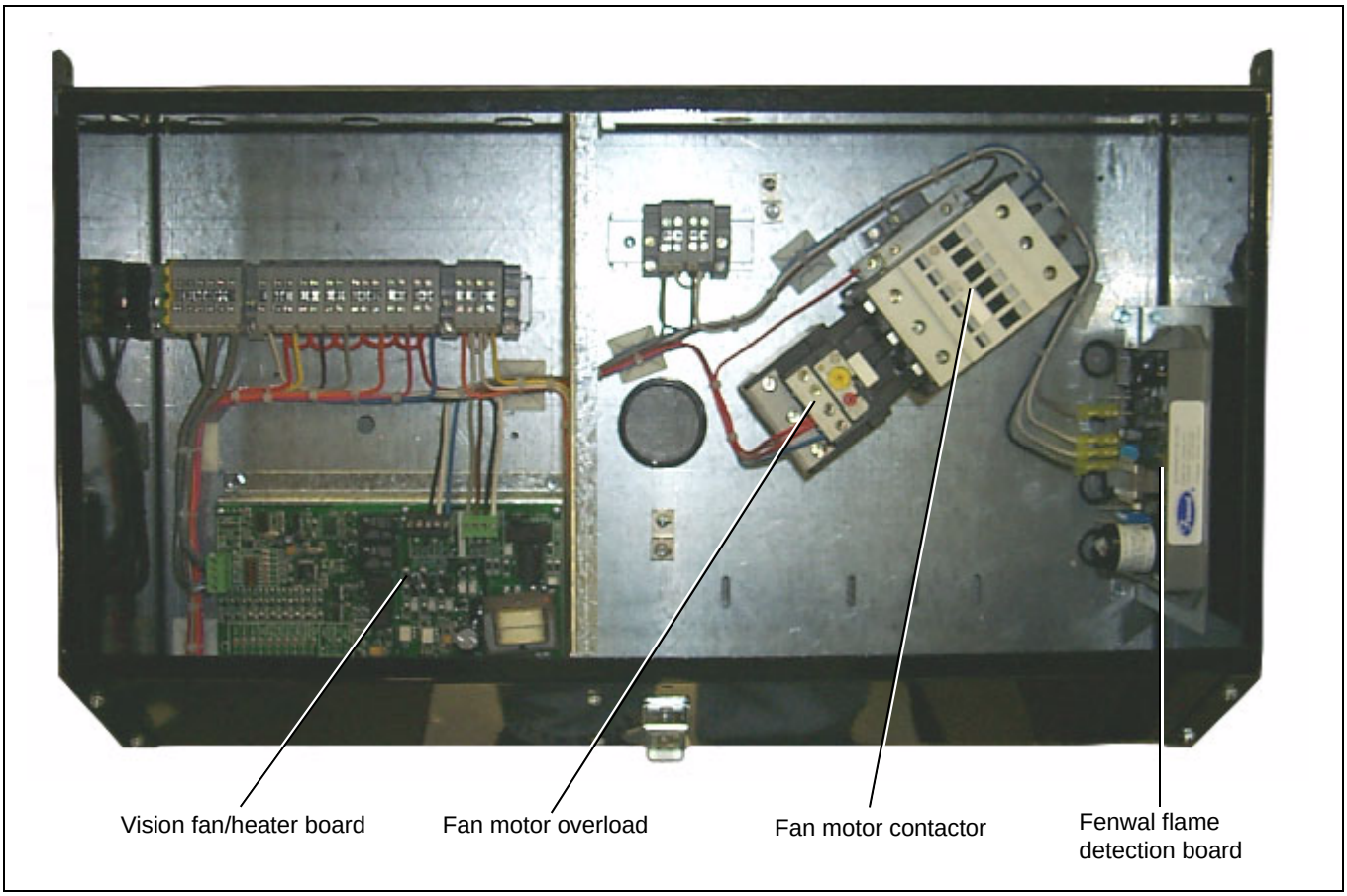



**Figure 6F** *Fan/Heater Control Box*

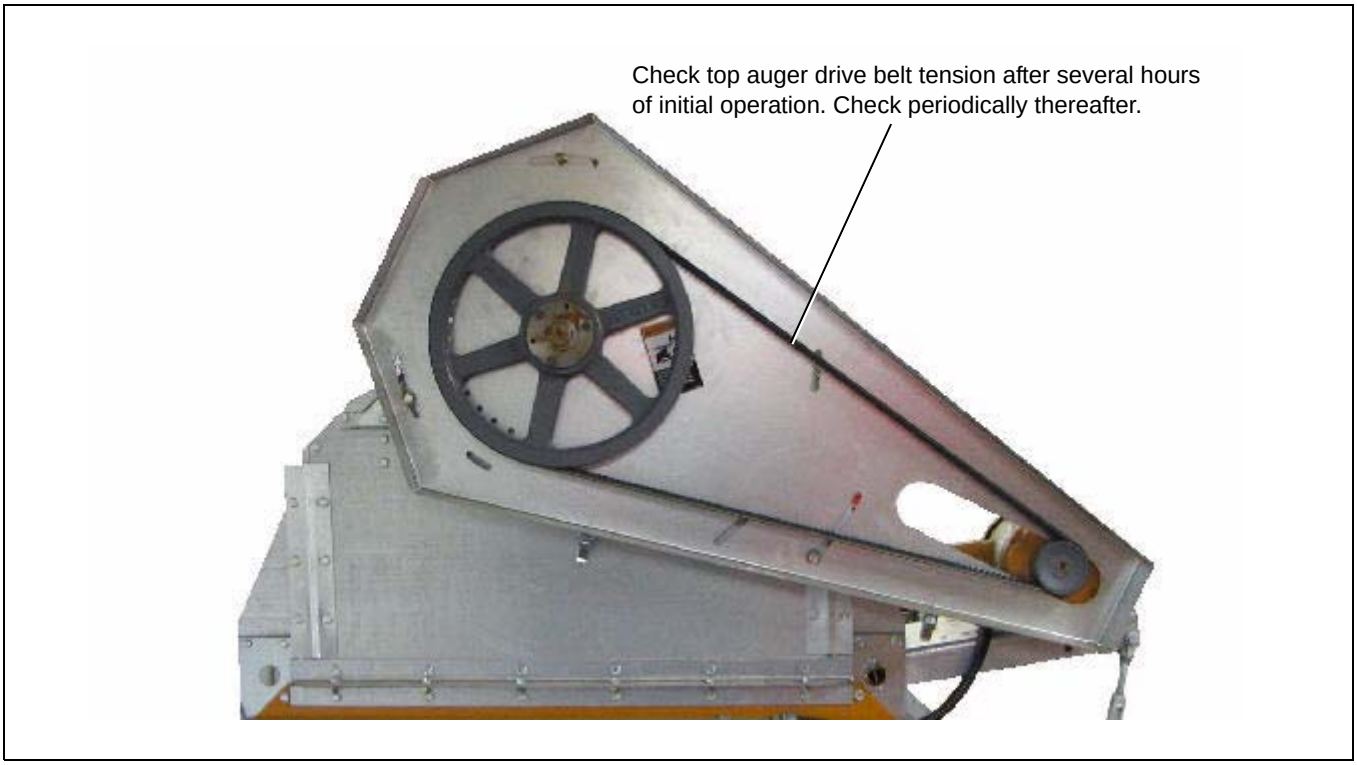



**Figure 6G** *Top Auger Drive*

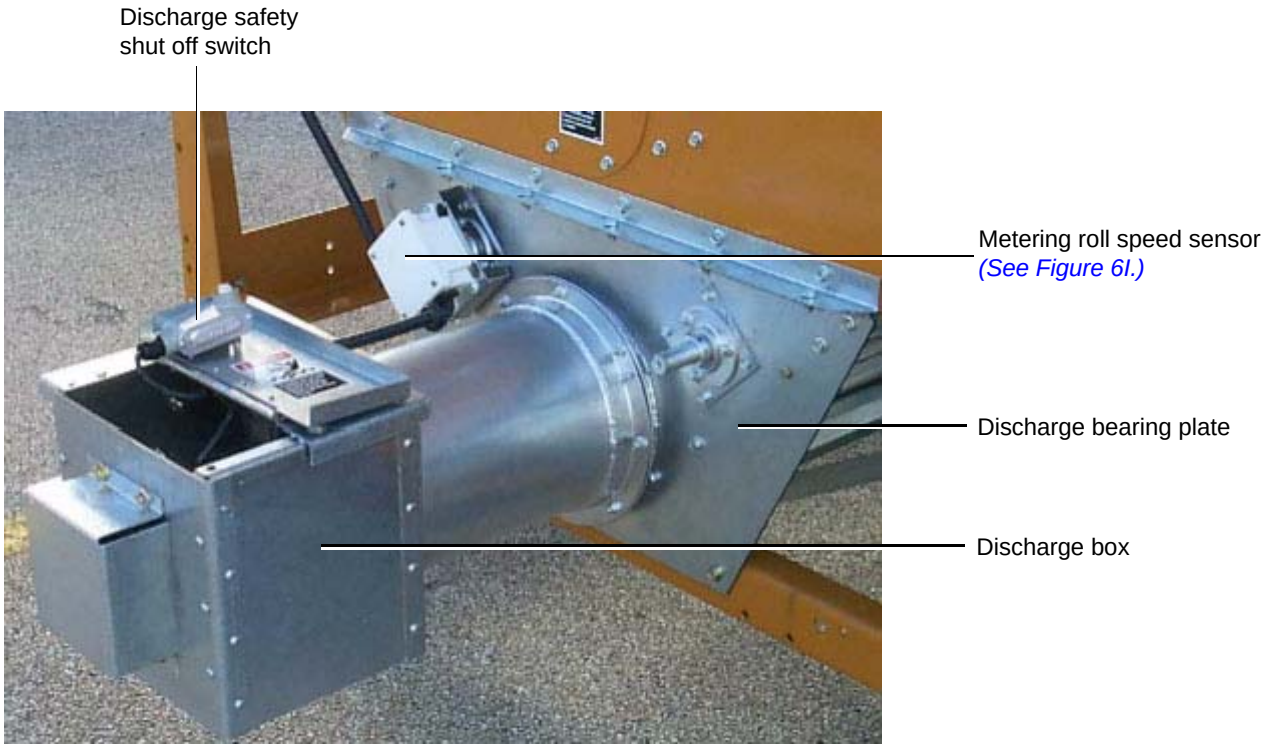



**Figure 6H** *Discharge Safety Switch*

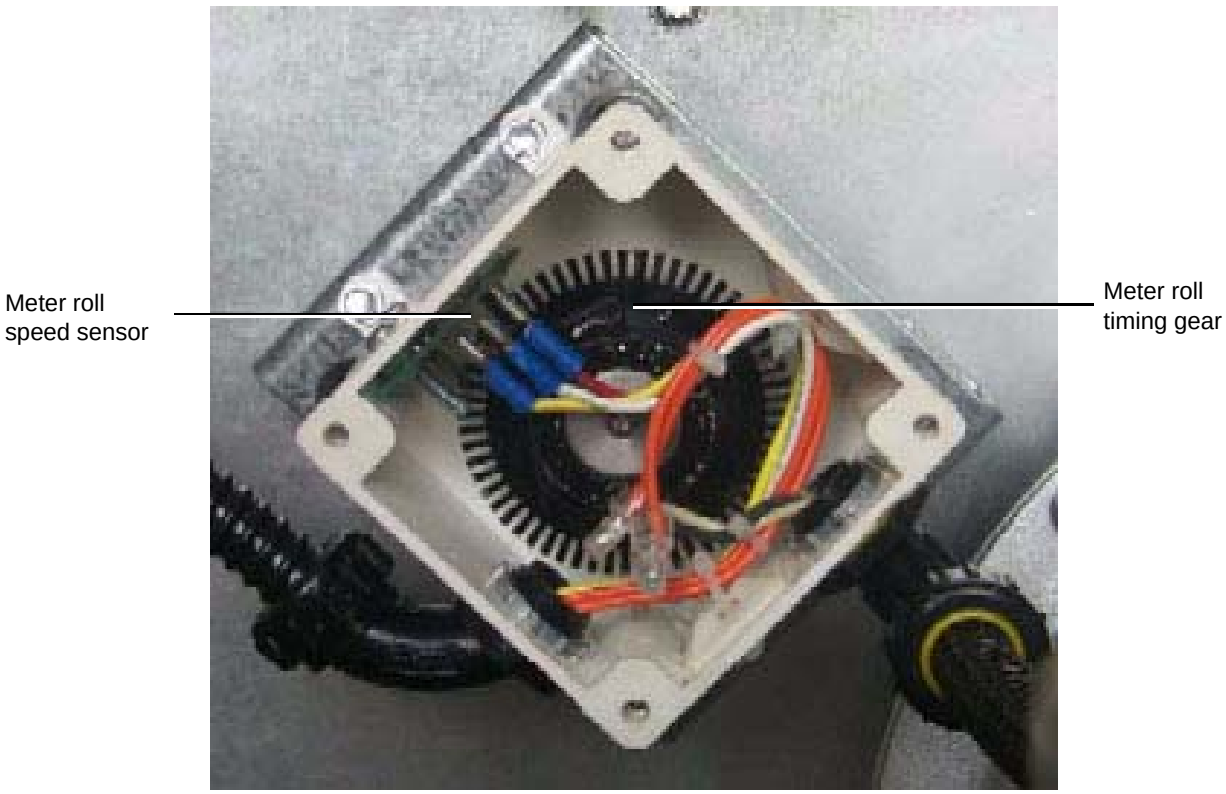



**Figure 6I** *Meter Roll Speed Sensor*

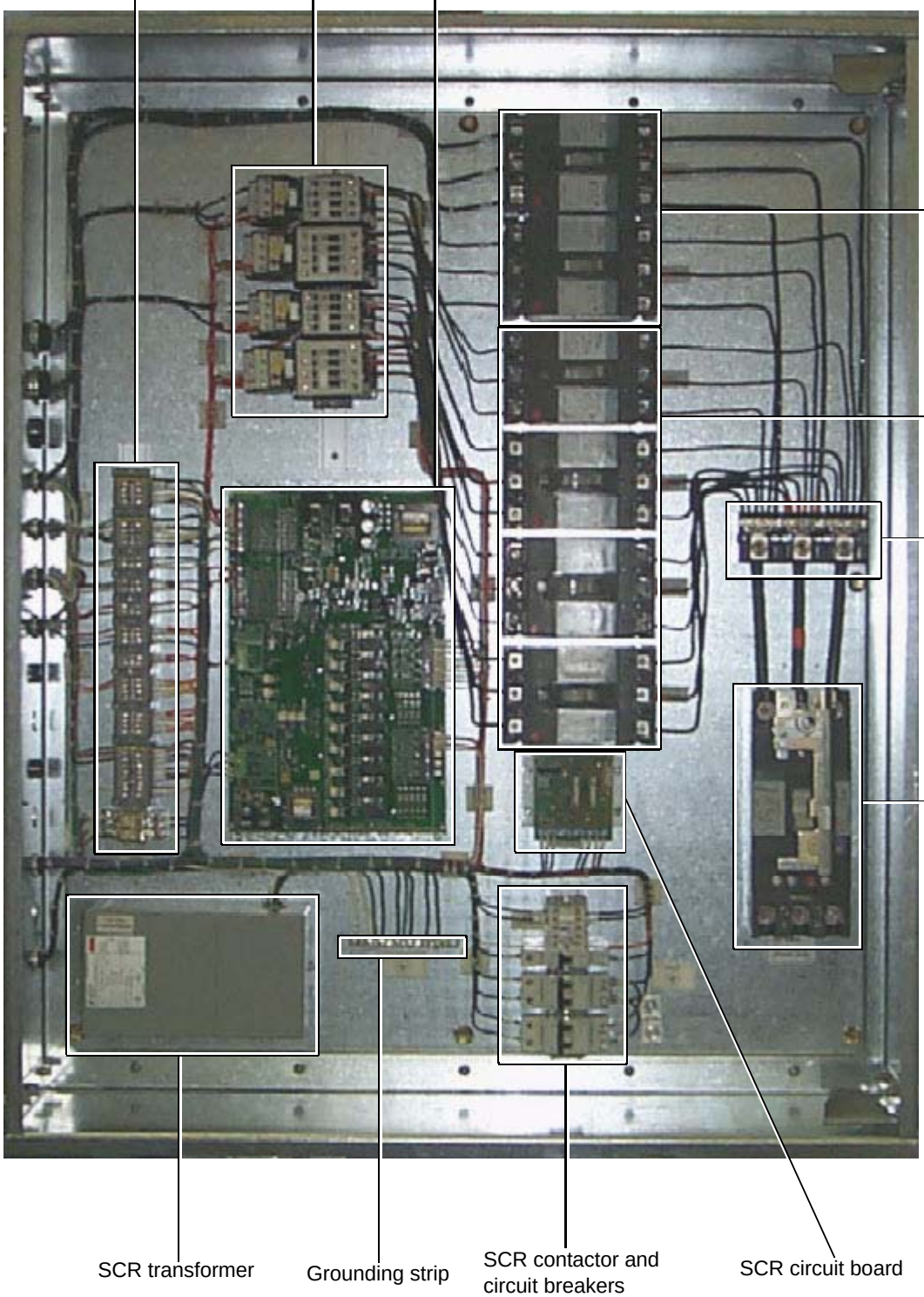



**Figure 6J** *Upper Control Box*

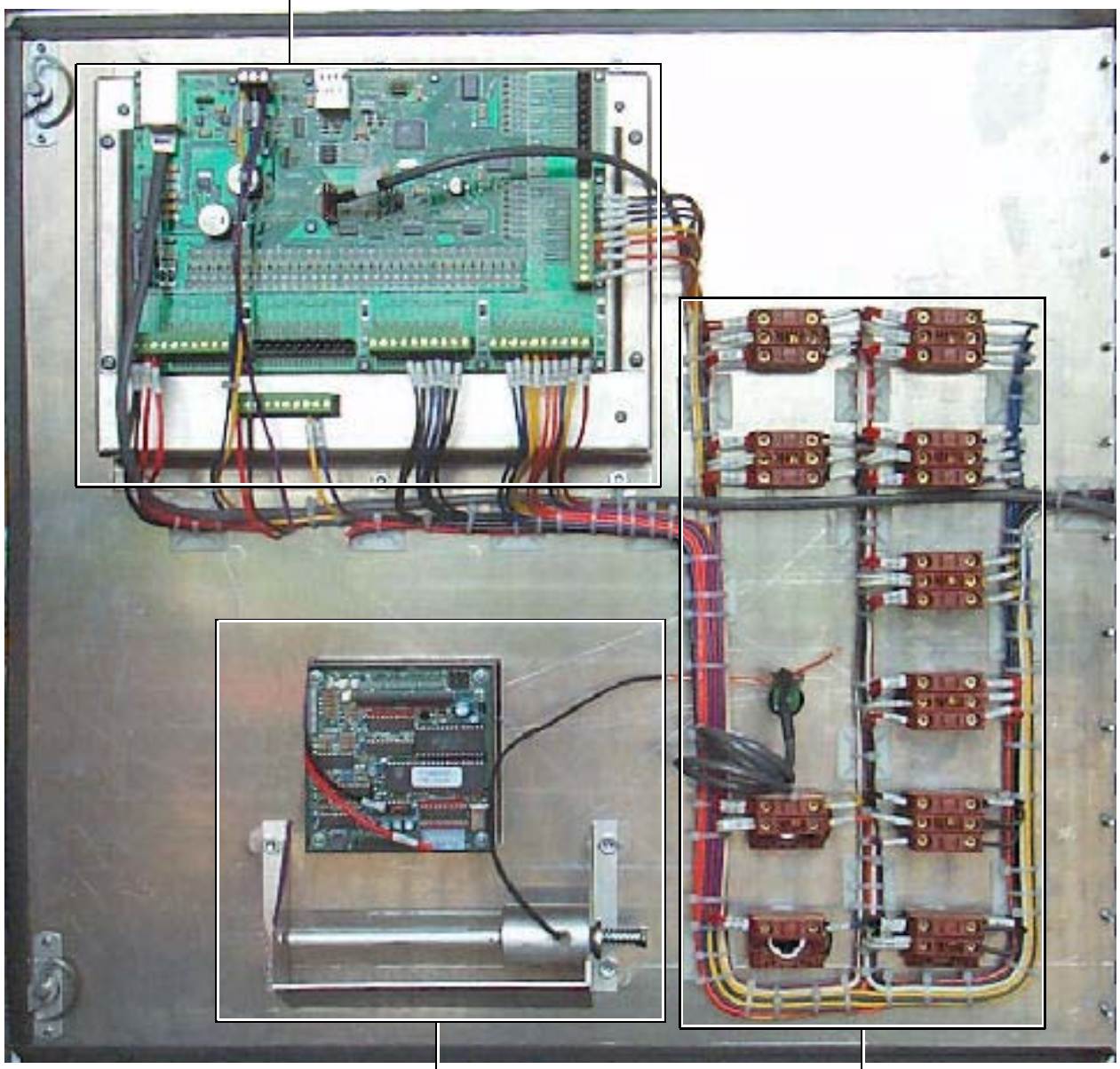



**Figure 6K** *Control Panel (Rear)*

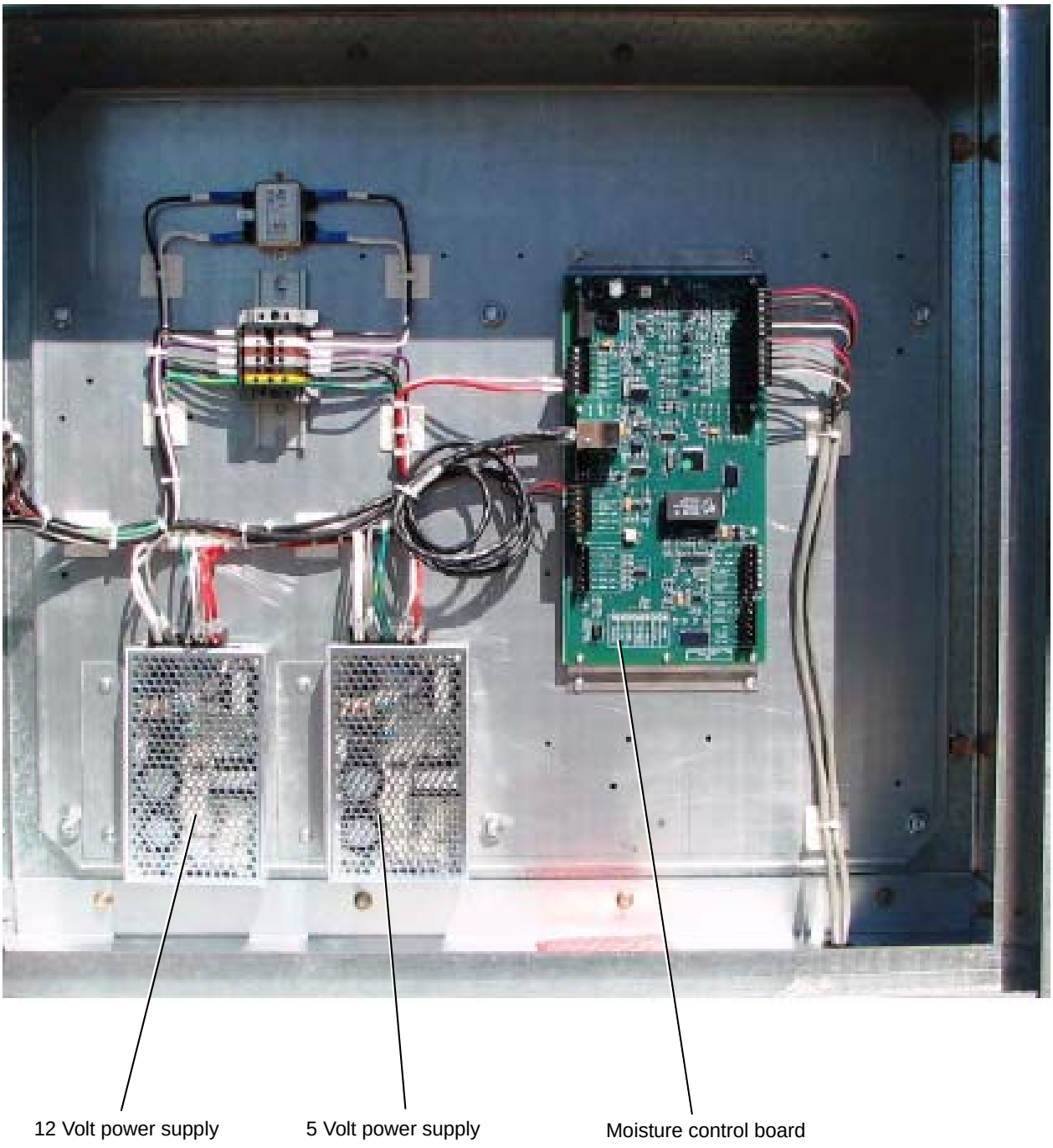



**Figure 6L** *Lower Control Box (Back Panel)*

**Before starting any repairs or maintenance on the dryer, observe the following safety steps:**

1. Isolate the entire system from the electrical supply by switching OFF the power isolator and locking it.
2. Isolate the dryer from the gas supply by shutting off the main gas valve (if necessary, lock the valve).
3. Keep the keys in your possession.
4. Augers and their drives may be under tension. Avoid touching these parts with the hands until you are sure that they are free moving.
5. Do not reconnect the power supply until all work is completed and all guards are correctly refitted.

## Seasonal Inspection and Service

The dryer is made of weather resistant material and is designed to require minimal service. However, each season the following items should be checked before the unit is used. Any damaged or questionable parts should be replaced before the unit is used. These checks will help eliminate possible failures and assure dependable operation of the equipment.

1. Shut off electrical power. Open the power box to control box to inspect for moisture, rodent damage or accumulated foreign material. Remove any foreign material. Inspect and tighten any loose terminal connections. Replace any damaged or deteriorated wiring.
2. Check each blade for freedom of rotation and uniform tip clearance. Also inspect for dirt and grain dust, especially inside the hub. Any additional weight can seriously affect the balance and result in harmful vibrations and a short bearing life.
3. Check each blade for free play. Any side play is an indication of defective motor bearings, which should be replaced to prevent a complete motor failure. Make sure motor mount bolts are tight.
4. Motor bearings should be lubricated periodically, depending on operating conditions. Under normal usage, it is desirable to have the motor cleaned, checked and bearings repacked by an authorized service station, every two to three seasons. If the unit is operated continuously through most of the year, this service should be performed each year.
5. Remove and clean the gas line strainers. Make certain gas valves are closed and that gas is purged from the system before attempting to disassemble anything.
6. Inspect the collector plate at the top of the burner casting and the burner cup for any accumulation of foreign material and clean if required. Foreign material in the burner cup or casting will not burn out and will impair burner operation.
7. If required, inspect the ignitor plugs and clean the electrodes. Use an ignition point file to remove carbon and rust between the electrode surfaces. The ignitor gap should be about 1/4" (3 mm).
8. Inspect flame sensors for possible damage or poor connections. Flame sensor wires must be in good condition.
9. Inspect and manually rotate the top auger paddle assembly. The paddle unit must rotate freely without any sticking or binding.
10. Inspect the top and bottom auger drive lines for proper adjustment and condition. Readjust line tension as required.
11. Operate dryer clean out levers and check the clean out hatch mechanism for proper operation. With the hatch open, inspect and remove any accumulation of dirt, fines and foreign material from the bottom auger trough area.

    **NOTE:** *Do not allow high moisture material to collect within the trough area. It may adversely affect metal parts.*

12. Inspect the entire dryer for loose, worn or damaged parts. Include check of auger flighting, metering rolls and other internal parts. Check that temperature sensors within the air plenum chamber are secured within insulated clamps and do not chafe on other metal parts.
13. Make sure all dryer guards and warning decals are securely installed. Ensure that guards do not interfere with moving parts. If guards or warning decals are missing, contact your dealer for a free replacement.
14. Test fire the dryer several weeks ahead of the drying season. Check for possible gas leaks. *(See Page 18.)*

**NOTE:** *If on site bearing lubrication is to be performed, see lubrication instructions for ball bearing motors. To keep motor bearings properly lubricated and dispel any accumulation of moisture within the windings, the fan and auger motors should be operated for 15 to 30 minutes each month.*

## Lubrication Procedure

If the motors are equipped with an Alemite fitting, clean the tip of the fitting and grease with a grease gun. Use 1 or 2 full strokes on motors in NEMA 215 frame and smaller. Use 2 to 3 strokes on NEMA 254 through NEMA 365 frame. Use 3 to 4 strokes on NEMA 404 frames and larger. On motors with drain plugs, remove drain plugs and operate motor for 20 minutes before replacing drain plug. On motors equipped with slotted head grease screw, remove screw and apply grease tube to hole. Insert 5 to 8 cm length of grease string into each hole on motors in NEMA 215 frame and smaller. Insert 8 to 13 cm length on larger motors. On motors with grease drain plugs, remove plug and operate motor for 20 minutes before replacing drain plug.

**NOTE:** *All of the auger and metering roll bearings are lifetime lubricated and do not require service lubrication.*

**Suggested Lubrication Schedules***

| Hours of Service per Year | HP Range | kW Range | Suggested Lube Interval |
|---|---|---|---|
| 5000 | 1/8 to 7-1/2 | 0.1 to 5.6 | 5 Years |
| | 10 to 40 | 7.5 to 29.8 | 3 Years |
| | 50 to 150 | 37.3 to 111.9 | 1 Year |
| Continuous Normal Applications | 1/8 to 7-1/2 | 0.1 to 5.6 | 1 Year |
| | 10 to 40 | 7.5 to 29.8 | 3 Years |
| | 50 to 150 | 37.3 to 111.9 | 9 Years |
| Seasonal Service (motor is idle for 6 months or more) | All | All | 1 Year - Beginning of season |
| Continuous high ambient temperatures, dirty or moist locations, high vibrations or when shaft gets hot | 1/8 to 40 | 0.1 to 29.8 | 6 months |
| | 50 to 150 | 37.3 to 111.9 | 3 months |

* The bearings have been lubricated at the factory, thus no lubrication should be added before start-up.

**Suggested Lubricants**

| Insulation Class | Consistency | Type | Grease | Frame Type |
|---|---|---|---|---|
| A and B | Medium | Polyurea | Shell Dolium R | 215T and Smaller |
| A and B | Medium | Polyurea | Shell Dolium R | 254 and Larger |
| F and H | Medium | Polyurea | Shell Dolium R | All |

# Fan Blade Removal and Installation

When working on or around the fan blade, be aware that it may free wheel and could cause serious injury. Consider gently wedging the propeller to prevent this from occurring. However, be sure to remove the wedge before restarting the fan.

**If at any stage the blade is damaged, it is important that it be repaired and that the blade be balanced.** Failure to meet this requirement could result in the blade running out of balance and potentially exploding. **Balancing the blade is a specialist's job, if in doubt contact GSI or your dealer.**

The fan blade is secured to the motor shaft with a taper-lock bushing, motor shaft key and three (3) cap screws.

**CAUTION**

***Although the taper-lock method of retaining the blade onto the motor shaft is simple, it is essential that the following points be read carefully and fully understood. Improper installation can cause a loose flying blade and result in serious injury or death.***

When reassembling parts, the cap screws must be installed through the untapped clearance holes. This pulls the blade forward onto the tapered bushing, thus locking the parts securely onto the motor shaft. When fan servicing requires removal and installation of the blade, make sure the blade is removed and reinstalled properly.

1. Lock out the fan power supply and remove the fan guard and the venturi, as required on some models.
2. Remove the three (3) cap screws from the clearance holes in the taper-lock bushing.
3. Install two (2) of the cap screws into the threaded holes in bushing and turn them by hand until they bottom against the front surface of the blade.

   **NOTE:** *The threaded holes within the bushing are provided for disassembly purposes only. Do not attempt to use these holes for reassembly. They will not allow the parts to lock onto the shaft thereby causing a hazardous operating condition.*

4. Block the blade to prevent it from turning and gradually turn the cap screws (up to 1/4 turn at a time) until the blade breaks loose from the bushing and motor shaft. Carefully remove bushing and blade. With the blade free from the bushing, a wheel can be used to pull the bushing off of the motor shaft. Reattach bushing onto blade to prevent the loss of parts.

   **NOTE:** *During manufacturing, the blade and bushing are balanced together and are marked with two (2) small dots to identify their original alignment position. Check the bushing and propeller to make sure they have alignment marks. Mark the alignment of the propeller and bushing, if necessary.*

# Fan Motor Removal

In the event of motor failure, remove the motor as described below and take it to the nearest service station. An authorized service station is the only place that can provide motor warranty service. Motor service and repair at other locations will be at owner's expense.

If the authorized service station determines motor failure is caused by faulty material or workmanship within the warranty period, repair will be covered under the warranty. Motor failure caused by external sources will result in a charge to the owner for repair.

1. Make sure power is shut off and locked out. Remove fan guard and blade.
2. Remove cover from fan/heater control box and disconnect the motor lead wires from within the box.

   **NOTE:** *Tag or otherwise identify wires for ease of reassembly.*
3. Remove motor mount bolts. If there are shims between the motor and its base, note their location, so they can be properly installed during reassembly.
4. Disconnect the upper end of the motor conduit, then carefully pull the wires through the hole in the fan/heater housing. Remove motor from the fan/heater unit with the conduit still attached. If motor requires service, take it to an authorized service station.
5. To reinstall motor, slide onto motor base plate and replace shims (if required) between motor base and plate. Reinstall motor mount bolts and washers, but do not fully tighten at this time.
6. Reinstall conduit and wires through hole in fan/heater housing and carefully connect all electrical wiring.
7. Adjust position of motor by temporarily mounting the fan blade on the motor shaft. Rotate the fan blade by hand, making the necessary adjustments so the tip clearance between blade and housing is uniform. If required, remove the fan blade and fully tighten all four (4) motor mount bolts.

   **NOTE:** *Make sure to install and tighten the blade in accordance with previous instructions.*

## Heater Parts Removal and Installation

Most of the heater parts can be removed by simply identifying any attached wiring and then disconnecting the obvious mounting parts.

1. **Flame Sensor:** Disconnect the wire connector and unscrew the flame sensor from its mounting bracket.
2. **Gas Solenoid Valve Coil(s):** Unsnap either the plastic cap or the metal clip on the gas valve and slide the housing and coil off the valve stem and body. Do not energize the coil when it is removed, as the coil may become damaged due to excessive current flow.
3. **Regulator and Gas Solenoid Valve(s):** The gas regulator and solenoid valve(s) are directional and must be connected as indicated by the markings near the port openings. Make sure gas is shut off and purged from the system before removing parts.

   **NOTE:** *When installing a liquid gas solenoid valve on LP models, do not over tighten the connection into the inlet side, as the inlet orifice may become partially blocked.*
4. **Main Gas Orifice:** With fuel shut off and gas purged from system, proceed as follows:
   a. Disconnect the plumbing support brackets from the pipe train.
   b. Disconnect gas solenoid valve coils. Be sure to mark their original locations.
   c. Lift pipe (with orifice, solenoid valve and other parts attached), straight up and remove from fan/heater housing. Orifice and other parts can now be removed from pipe train, if desired.
5. **Reassemble:** To reassemble parts, reverse the disassembly procedure and check the following:
   a. Make sure all parts are thoroughly cleaned and open.
   b. Use a dependable brand of high temperature pipe caulking compound when assembling gas connections. Apply only a light coating onto male threaded end of fittings.
   c. Solenoid valves and gas regulations are directional and must be properly installed. Do not attempt to connect gas solenoid valves by applying force to the valve core stem as it may ruin the unit.
   d. Make sure all electrical wires are properly connected. Refer to wiring diagrams on *Pages 39 and 40.*

## Metering Roll Servicing

This dryer is equipped with an SCR metering roll drive assembly. The metering rolls are driven by a separate DC type electric motor. This is a variable speed motor controlled by an electric SCR control inside the main control box.

## Main Controls

1. **SCR Speed Control:** The metering roll speed potentiometers on the front of the control box regulate the speed of the DC motor which drives the metering rolls. The adjustment scale ranges from 0 to 999, which represents the flow of grain past the metering rolls as a percent of the maximum grain discharge rate for the dryer.

   **NOTE:** *When the control is set to the maximum discharge rate (999), the metering roll speed should be 17.5 RPM for 8" discharge auger.*

2. **DC Electric Motor:** The DC motor provides the drive for the metering roll and is located on the front left hand side of standard model dryers. The output shaft of the motor is connected directly to the gear box assembly. The DC motor requires no operational adjustment as it is completely controlled from the control box.

3. **Speed Reducer Gearbox:** The direct drive gear box provides the required speed reduction and transmits power to the metering rolls through a drive chain arrangement. The gear box does not require adjustment. The drive chain should be periodically lubricated and tightened as necessary.

4. **Unload Auger Time Delay:** The delay controls the bottom auger system and causes the unload auger (and any connected auxiliary unloading conveyors) to continue operating for a programmed amount of time, even after the metering rolls stop. This feature permits the clean-out of grain within the unloading equipment at the end of all discharge cycles.

5. If a foreign object becomes lodged in the metering rolls and jams the system, the unloading auger will stay in motion. However, the metering roll drive will stop and the DC motor should stall out. The Vision Control System will shutdown the dryer after a 2 minutes period.

To determine if the metering problem is from blockage, perform the following test with the power OFF. Remove the drive chain by loosening the motor mounting bolts. Refer to illustrations section on *Page 34* and place a pipe wrench on the hub of the roller chain sprocket, on the left hand metering roll at the drive end of the dryer. Apply up to 100 ft. lbs. of force and attempt to rotate the roll toward the inside of the dryer. If the metering roll will turn, then repeat for the right hand side. If the metering roll will turn, it can be assumed that no blockage exists and the problem is from some other cause. Check for a break in the power train, chain, drive key, pin, etc.


***Keep hands away from sprocket teeth to avoid injury from chain backlash, as a result of torsion build up in the system caused by the jam.***

## How to Clear a Jammed Metering Roll

Place a pipe wrench on the hub of the sprocket of the jammed metering roll and turn the roll. First, turn it backwards and then forward several times in an attempt to dislodge the object and clear it through the roll. If this is not successful, have an assistant turn the metering roll and attempt to locate the jam by sound. Shutdown the fan/heater and eliminate any other noise when making this check. Once the location is determined, the roll can be reached from inside the plenum by opening the access door for the column that has the jam and loosening the two (2) nuts holding the metering roll slide gate high enough to reach in and remove the object causing the jam.

# GSI Group, LLC Limited Warranty

The GSI Group, LLC ("GSI") warrants products which it manufactures to be free of defects in materials and workmanship under normal usage and conditions for a period of 12 months after sale to the original end-user or if a foreign sale, 14 months from arrival at port of discharge, whichever is earlier. The end-user's sole remedy (and GSI's only obligation) is to repair or replace, at GSI's option and expense, products that in GSI's judgment, contain a material defect in materials or workmanship. Expenses incurred by or on behalf of the end-user without prior written authorization from the GSI Warranty Group shall be the sole responsibility of the end-user.

## Warranty Extensions:

The Limited Warranty period is extended for the following products:

| | Product | Warranty Period |
|---|---|---|
| **AP Fans and Flooring** | Performer Series Direct Drive Fan Motor | 3 Years |
| | All Fiberglass Housings | Lifetime |
| | All Fiberglass Propellers | Lifetime |
| **Cumberland Feeding/Watering Systems** | Feeder System Pan Assemblies | 5 Years ** |
| | Feed Tubes (1-3/4" and 2.00") | 10 Years * |
| | Centerless Augers | 10 Years * |
| | Watering Nipples | 10 Years * |
| **Grain Systems** | Grain Bin Structural Design | 5 Years |
| **Grain Systems Farm Fans Zimmerman** | Portable and Tower Dryers | 2 Years |
| | Portable and Tower Dryer Frames and Internal Infrastructure † | 5 Years |

* Warranty prorated from list price:
0 to 3 years - no cost to end-user
3 to 5 years - end-user pays 25%
5 to 7 years - end-user pays 50%
7 to 10 years - end-user pays 75%

** Warranty prorated from list price:
0 to 3 years - no cost to end-user
3 to 5 years - end-user pays 50%

† Motors, burner components and moving parts not included. Portable dryer screens included. Tower dryer screens not included.

GSI further warrants that the portable and tower dryer frame and basket, excluding all auger and auger drive components, shall be free from defects in materials for a period of time beginning on the twelfth ($12^{th}$) month from the date of purchase and continuing until the sixtieth ($60^{th}$) month from the date of purchase (extended warranty period). During the extended warranty period, GSI will replace the frame or basket components that prove to be defective under normal conditions of use without charge, excluding the labor, transportation, and/or shipping costs incurred in the performance of this extended warranty.

## Conditions and Limitations:

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY DESCRIPTION SET FORTH ABOVE. SPECIFICALLY, GSI MAKES NO FURTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE IN CONNECTION WITH: (I) PRODUCT MANUFACTURED OR SOLD BY GSI OR (II) ANY ADVICE, INSTRUCTION, RECOMMENDATION OR SUGGESTION PROVIDED BY AN AGENT, REPRESENTATIVE OR EMPLOYEE OF GSI REGARDING OR RELATED TO THE CONFIGURATION, INSTALLATION, LAYOUT, SUITABILITY FOR A PARTICULAR PURPOSE, OR DESIGN OF SUCH PRODUCTS.

GSI shall not be liable for any direct, indirect, incidental or consequential damages, including, without limitation, loss of anticipated profits or benefits. The sole and exclusive remedy is set forth in the Limited Warranty, which shall not exceed the amount paid for the product purchased. This warranty is not transferable and applies only to the original end-user. GSI shall have no obligation or responsibility for any representations or warranties made by or on behalf of any dealer, agent or distributor.

GSI assumes no responsibility for claims resulting from construction defects or unauthorized modifications to products which it manufactured. Modifications to products not specifically delineated in the manual accompanying the equipment at initial sale will void the Limited Warranty.

This Limited Warranty shall not extend to products or parts which have been damaged by negligent use, misuse, alteration, accident or which have been improperly/inadequately maintained. This Limited Warranty extends solely to products manufactured by GSI.

Prior to installation, the end-user has the responsibility to comply with federal, state and local codes which apply to the location and installation of products manufactured or sold by GSI.

9101239_1_CR_rev7.DOC (revised July 2009)

This equipment shall be installed in accordance with the current installation codes and applicable regulations which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

GSI GROUP

**GSI Group**
**1004 E. Illinois St.**
**Assumption, IL 62510-0020**
**Phone: 1-217-226-4421**
**Fax: 1-217-226-4420**
**www.gsiag.com**