

Series 2000 Autoflow Operation

PNEG-696



a division of
THE GSI GROUP



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Roof Damage Warning and Disclaimer



GSI DOES NOT WARRANT ANY ROOF DAMAGE CAUSED BY EXCESSIVE VACUUM OR INTERNAL PRESSURE FROM FANS OR OTHER AIR MOVING SYSTEMS. ADEQUATE VENTILATION AND/OR "MAKEUP AIR" DEVICES SHOULD BE PROVIDED FOR ALL POWERED AIR HANDLING SYSTEMS. GSI DOES NOT RECOMMEND THE USE OF DOWNWARD FLOW SYSTEMS (SUCTION). SEVERE ROOF DAMAGE CAN RESULT FROM ANY BLOCKAGE OF AIR PASSAGES. RUNNING FANS DURING HIGH HUMIDITY/COLD WEATHER CONDITIONS CAN CAUSE AIR EXHAUST OR INTAKE PORTS TO FREEZE.

Fan/Heater Installation & Operating Instructions

Thank you for choosing a Top Dry Series Autoflow. It is designed to give excellent performance and service for many years.

This manual describes the installation for all standard production Top Dry Series 2000 single fan, multi-fan and 2000 Series Heater Control units. Different models are available for liquid propane or natural gas fuel supply, with either single phase 230 volt, or three phase 208, 220, 380, 460 or 575 volt electrical power.

The principal concern of the GSI Group, Inc. ("GSI") is your safety and the safety of others asso-

ciated with grain handling equipment. This manual is written to help you understand safe operating procedures, and some of the problems that may be encountered by the operator or 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 who are in the fan area. Avoid any alterations to the equipment. Such alterations may produce a very dangerous situation, where serious injury or death may occur.

Safety Alert Symbol

The symbol shown is used to call your attention to instructions concerning your personal safety. Watch for this symbol; it points out important safety precautions. It means "ATTENTION", "WARNING", "CAUTION", and "DANGER". Read the message and be cautious to the possibility of personal injury or death.



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.

Grain Systems, Inc. recommends contacting your local power company, and having a representative survey your installation so the wiring is compatible with their system, and adequate power is supplied to your unit.

Safety decals should be read and understood by all people in the grain handling area. The rotating blade, fire warning decals and voltage danger decal must be displayed on the fan can. The bottom right decal should be present on the inside bin door cover of the two ring door, 24" porthole door cover and the roof manway cover.

If a decal is damaged or is missing contact:

Grain Systems, Inc.
1004 E. Illinois St.
Assumption, IL 62510
217-226-4421

A free replacement will be sent to you.



! WARNING

Stay clear of rotating blade. Blade could start automatically. Can cause serious injury. Disconnect power before servicing.

DC-1225



! WARNING

Flame and pressure beyond door. Do not operate with service door removed. Keep head and hands clear. Can cause serious injury.

DC-1227

! DANGER!



High voltage. Will cause serious injury or death. Lockout power before servicing.

DC-1224

! DANGER!



Automatic equipment can start at anytime. Do not enter until fuel is shut off and electrical power is locked in off position. Failure to do so will result in serious injury or death.

DC-973

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

1. Read and understand the operating manual before trying to operate the dryer.
2. Power supply should be OFF for service of electrical components. Use CAUTION in checking voltage or other procedures requiring power to be ON.
3. Check for gas leaks at all gas pipe connections. If any leaks are detected, do not operate the dryer. Shut down and repair before further operation.
4. Never attempt to operate the dryer by jumping or otherwise bypassing any safety devices on the unit.
5. Set pressure regulator to avoid excessive gas pressure applied to burner during ignition and when burner is in operation. Do not exceed maximum recommended drying temperature.
6. Keep the dryer clean. Do not allow fine material to accumulate in the plenum or drying chamber.
7. Use CAUTION in working around high speed fans, gas burners, augers and auxiliary conveyors which START AUTOMATICALLY.
8. Do not operate in any area where combustible material will be drawn into the fan.
9. Before attempting to remove and reinstall any propellor, make certain to read the recommended procedure listed within the servicing section of the manual.
10. Clean grain is easier to dry. Fine material increases resistance to airflow and requires removal of extra moisture.

This product is intended for the use of grain handling only. Any other use is considered a misuse of the product.

Some edges of the product components can be sharp. It is recommended that each component of this product be examined to determine if there are any safety considerations to be taken. Any and all necessary personal protective equipment should be worn at all times when handling, assembling, installing and operation of the product and/or components.

Guards are removed for illustration purpose only. All guards must be in place before/during operation.

**Use Caution in the
Operation of this
Equipment**

The design and manufacture of this dryer is directed toward operator safety. However, the very nature of a grain dryer having a gas burner, high voltage electrical equipment and high speed rotating parts, does present a hazard to personnel, which can not be completely safeguarded against, without interfering with efficient operation and reasonable access to 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.

KEEP THE DRYER CLEAN
DO NOT ALLOW FINE
MATERIAL TO ACCUMULATE
IN THE PLENUM CHAMBER
OR SURROUNDING THE
OUTSIDE OF THE DRYER

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 this manual, and make it a practice to regularly inspect the operation of the unit for any developing problems or unsafe conditions.

Take special note of the safety precautions listed above before attempting to operate the dryer.

Power Supply

An adequate power supply and proper wiring are important factors for maximum performance and long life of the dryer. Electrical service must be adequate enough to prevent low voltage damage to motors and control circuits (see Electrical Load Information). **In 220V 1 phase and 220V 3 phase systems, a separate neutral wire is required for the 120V heater circuit, and should be connected to terminal #1 in the master heater. Do not run in conduit with motor power lines.**

Transformer and Wiring Voltage Drop

It is necessary to know the distance from the unit to the available transformer, and the horsepower of your fan unit. Advise the service representative of your local power supplier that an additional load will be placed on the line. Each fan motor should be wired through a fused or circuit breaker disconnect switch. Check on KVA rating of transformers, considering total horsepower load. The power supply wiring, main switch equipment and transformers must provide adequate motor starting and operating voltage. Voltage drop during motor starting should not exceed 14% of normal voltage, and after motor is running at full speed it should be within 8% of normal voltage. Check Electrical Load Information for HP ratings and maximum amp loads to properly size wire and fusing elements. Standard electrical safety practices and codes should be used. (Refer to National Electrical Code Standard Handbook by National Fire Protection Association).

Machine to Earth Grounding

It is very important that a *Machine To Earth Ground Rod* be installed at the fan. This is true even if there is a ground at the pole 15 feet away. Place the ground rod that comes standard, within 8 feet of the dryer and attach it to the dryer control panel with at least a #6 solid, bare, copper ground wire and the clamp provided. The grounding rod located at the power pole will not provide adequate grounding for the dryer. The proper grounding will provide additional safety in case of any short and will ensure long life of all circuit

boards, and the ignition system. The ground rod must be in accordance with local requirements.

Proper Installation of Ground Rod

It is not recommended that the rod be driven into dry ground.

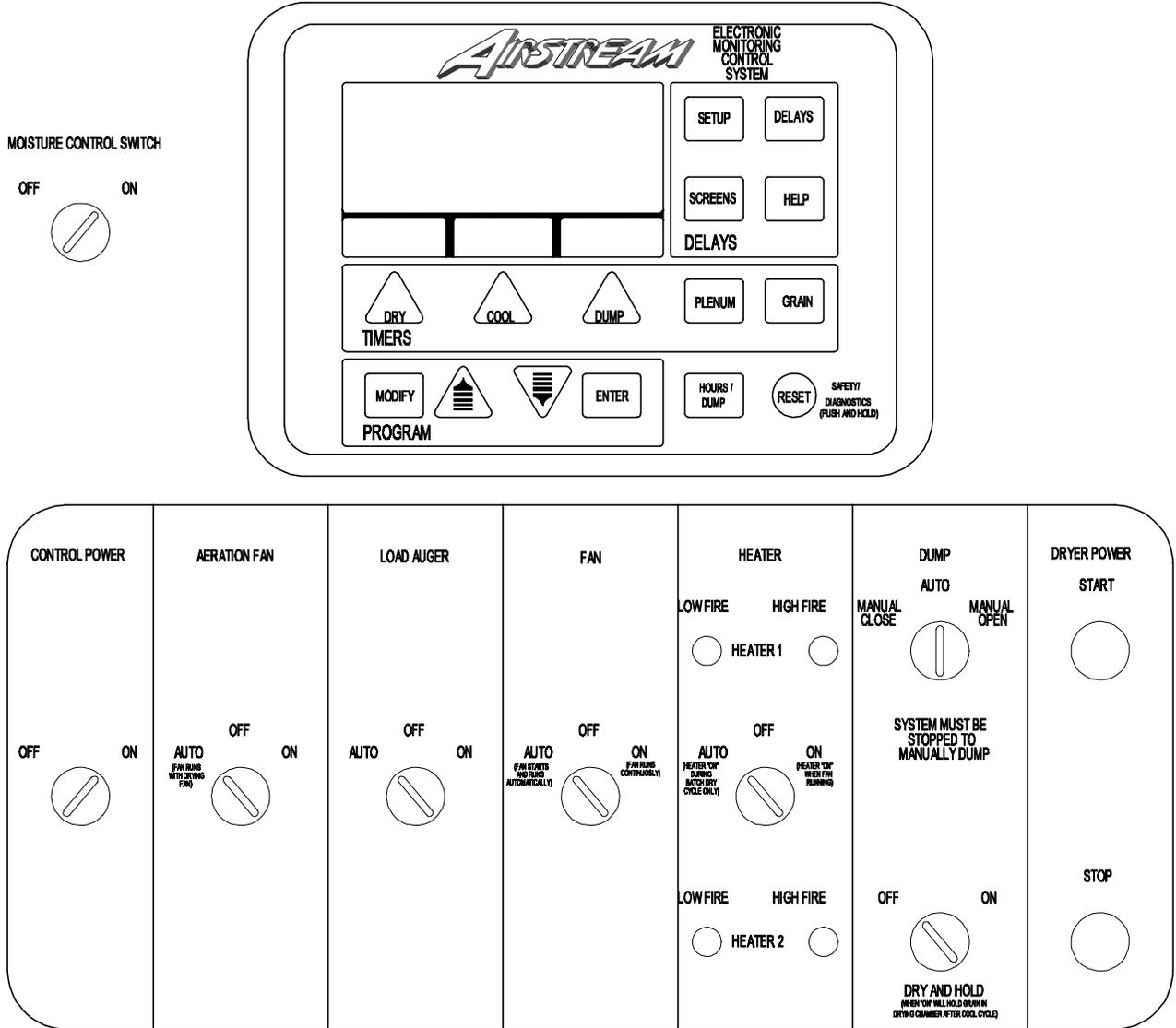
Follow these instructions for proper installation:

1. Dig a hole large enough to hold 1 to 2 gallons of water.
2. Fill hole with water.
3. Insert rod through water and jab it into the ground.
4. Continue jabbing the rod up and down. The water will work its way down the hole, making it possible to work the rod completely into the ground. This method of installing the rod gives a good conductive bond with the surrounding soil.
5. Connect the bare, copper ground wire to the rod with the proper ground rod clamp. See Figure 8.
6. Connect the bare copper ground wire to the fan control boxes with a grounding lug.
7. Ground wire must not have any breaks or splices.



Dig a hole large enough to hold 1 or 2 gallons of water. Work the ground rod into the earth until it is completely in the ground.

Electronic Monitoring Control System



Dryer Control Panel Featuring the Electronic Monitoring Control System

The control panel provides easy access to gauges and controls, and the illuminated switches provide a quick reference for every operating function. The patent pending Electronic Monitoring Control System is a computerized control system that gives instant information regarding dryer operation.

Moisture Control Switch

This switch determines if the grain temperature setpoint is used in the operation of the dryer. When placed in the “on” position the dryer will not enter the dump cycle until the grain temperature has reached the grain temperature setpoint and the dry timer has reached zero. When placed in the “on” position the moisture control switch lights up when the grain temperature is below the grain temperature setpoint. When placed in the “off” position the dryer ignores the grain temperature and operates strictly off of the dry timer. When placed in the “off” position the moisture control switch does not light up.

Control Power Switch

The power to the Electronic Monitoring Control System is turned on or off with the control power switch. The switch lights up when placed in the “on” position. If the switch is placed in the “on” position and the light does not light up make sure that the emergency stop switches located on the Autoflow control box, and Fill System control box are pulled out.

Aeration Fan Switch

This switch controls the operation of the aeration fan located at the bottom of the bin. The switch lights up when the aeration fan comes on. When placed in the “auto” position the aeration fan starts and stops with the main drying fans. When placed in the “off” position the aeration fan will not run. When placed in

the “on” position the aeration fan comes on when the dryer is running.

If the Aeration Fan Bypass is enabled in the Set-up, the aeration fan remains running when the aeration fan switch on the dryer control panel is placed in the “on” position. With the aeration fan switch placed in the “auto” position the aeration fan will stop any time the dryer stops.

Load Auger Switch

This switch controls the operation of the fill system(s) that load grain into the drying chamber. The switch lights up when the fill system(s) are running. When placed in the “auto” position the fill system(s) start and stop automatically depending on the level of grain relative to the drying chamber high level rotary switch. When operating in the Autobatch mode the fill system(s) will shut off 2/3 of the way through the dry cycle even if grain has not reached the drying chamber high level rotary switch. When placed in the “off” position the fill system(s) will not run. When placed in the “on” position the fill system(s) come on and stay on when the dryer is running.

Fan Switch

This switch controls the operation of the main drying fan(s). The switch lights up when the airswitch located in the sidewall next to the master drying fan senses an increase in static pressure and closes. In the Autoflow mode, when placed in the “auto” position the main drying fan(s) start when grain reaches the drying chamber low level rotary switch and do not stop until the dryer shuts down or is stopped manually by pressing the stop switch. In the Autobatch mode the main drying fan(s) shut off automatically in the dump cycle. When placed in the “off” position the main drying fan(s) will not run. When placed in the “on” position the main drying fan(s) come on and stay on when the dryer is running.

Heater Switch

This switch controls the operation of the burner(s). The switch lights up when the burner is on. When the burner is on small lights above and below the heater switch indicate if the burner(s) are in high fire or low fire. In the Autoflow mode, when placed in the “auto” position, the burner(s) fire when grain reaches the drying chamber low level rotary switch and do not stop until the dryer shuts down or is stopped manually by pressing the stop switch. In the Autobatch mode the burner(s) shut off automatically in the cool and dump cycle. When placed in the “off” position the burner(s) will not fire. When placed in the “on” position the burner(s) fire anytime the main drying fan(s) are running.

Dump Switch

This switch controls the operation of the linear actuator housed in the actuator control box. The switch lights up when the linear actuator is moving. When placed in the “manual close position” the linear actuator in the actuator control box retracts- raising the dump chutes. When placed in the “auto” position the linear actuator extends at the beginning of the dump cycle- lowering the dump chutes, and retracts at the end of the dump cycle- raising the dump chutes. When placed in

the “manual open” position the linear actuator extends- lowering the dump chutes.

Dry And Hold Switch

When placed in the “on” position the grain in the drying chamber will not be dumped into the storage chamber at the end of the dry cycle, and the dryer will stop. This switch can be used to hold the last batch of grain in the drying chamber and stop the dryer. When placed in the “off” position the dryer will operate normally. The switch lights up when placed in the “on” position.

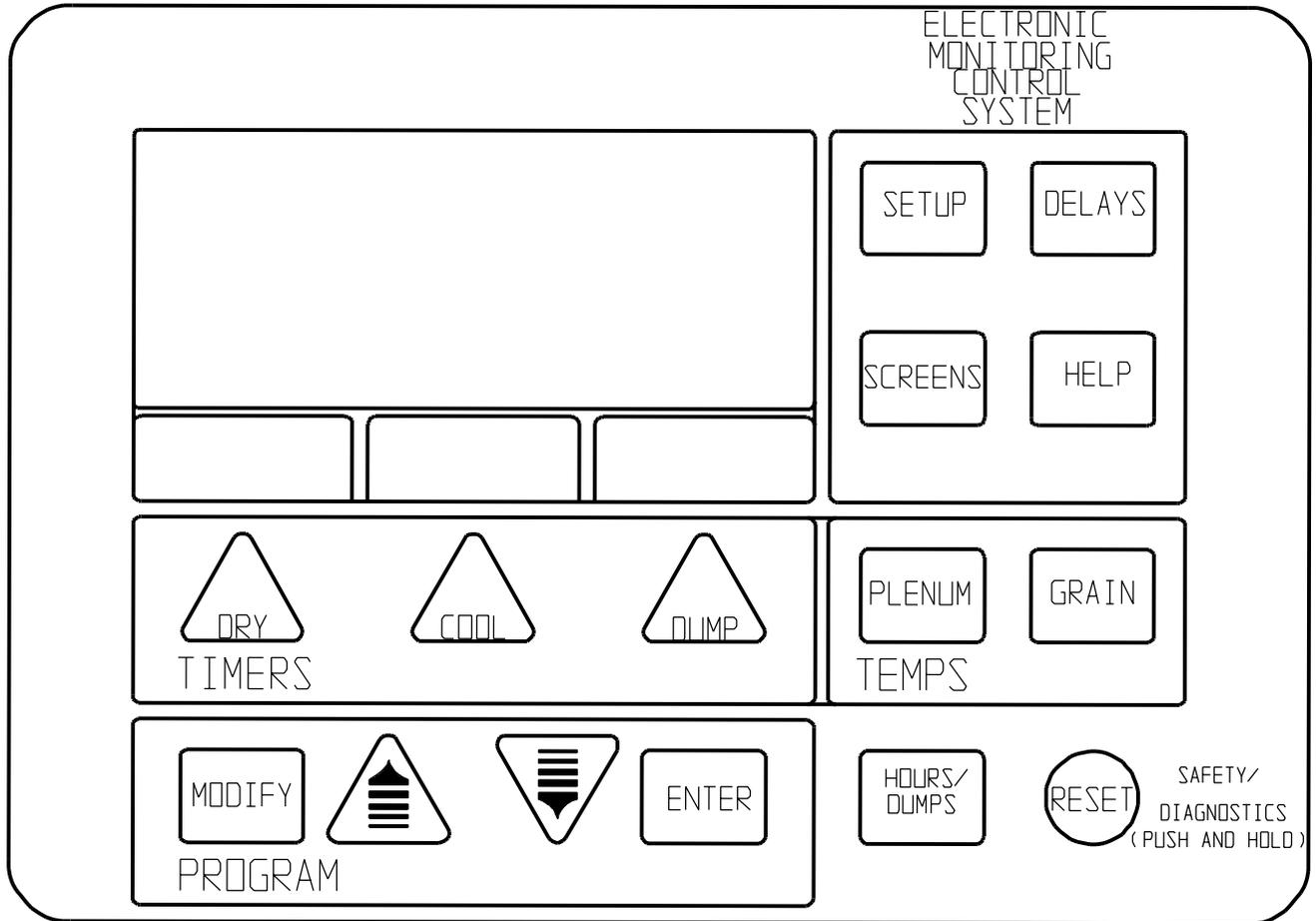
Dryer Power Start Switch

This switch starts and operates the dryer based on switch settings. The switch lights up when the dryer is running. The dump switch is disabled after this switch has been pushed.

Dryer Power Stop Switch

This switch stops all dryer functions. If an automatic dryer shutdown occurs, first determine and correct the cause of the shutdown. Then, press the dryer power stop switch to reset the dryer before starting.

Electronic Monitoring Control System



Electronic Monitoring Control System

The Electronic Monitoring Control System controls all timing functions and safety circuit checks. It is designed to simplify dryer operation by providing printed messages and warnings on its liquid crystal display (LCD).

Turning On The Electronic Monitoring Control System

Turn the control power switch to the “on” position. The monitor will display a copyright message, software version number and will enter the main drying screen.

Setting The Dry, Cool And Unload Timers

These switches are used to set the dry, cool and dump cycle times. The current settings on these timers are displayed directly above their timer button. To change the setting of these timers do the following:

- 1) Press the dry, cool or unload timer button.
- 2) Press the modify button.
- 3) Press the increase or decrease button to adjust the settings.
- 4) Press the enter button.
- 5) To enter the new value into memory immediately, press the reset button.

During operation the remaining time on each timer is displayed on the screen. If the power goes out or the dryer is stopped these times are saved by the controller. When the dryer is restarted the timers will continue timing down. The timers will return to their initial settings by pressing the reset button. The cool timer is not used in an Autoflow system.

Setting The Delays

AUX. 1 DELAY - The AUX. 1 DELAY is not used.

REFILL DELAY - The REFILL DELAY is used only on batch units. It is the amount of time that the unit has to refill after the dump cycle. If the unit does not refill before the time on the refill delay is at zero the unit will give a “dry chamber empty” error.

FILL 1 DELAY - In units that the Autoflow controls one fill system, the value set on the fill 1 delay is the amount of time that fill system number one runs after grain reaches the drying chamber high level rotary switch. The fill 1 delay should be set long enough so that the drying chamber high level rotary switch is covered with enough grain that the fill system does not start and stop frequently in the dry cycle due to settling or shrinkage; but, the fill 1 delay should be set short enough so that grain does not reach the drying chamber overflow rotary switch.

In units that the Autoflow controls two fill systems, the value set on the fill 1 delay is the amount of time that fill system number one runs after fill system number two shuts off. Fill system number one is the fill system that directly puts grain in the drying chamber. The fill 1 delay should be set long enough so that all grain present in fill system number one is loaded into the drying chamber before it shuts off. This will decrease the current required to start fill system number one the next time the dryer calls for grain. The fill 1 delay is set using the same procedure as the dry and unload timers, but the reset button does not need to be pressed to enter the new values into memory immediately.

FILL 2 DELAY - The value set on the fill 2 delay is the amount of time that fill system number two runs after grain reaches the drying chamber high level rotary switch. This delay is not used in units with only one fill system controlled by the Autoflow. The fill 2 delay should be set long enough so that the drying chamber high level rotary switch is covered with enough grain that the fill systems do not start and stop frequently in the dry cycle due to settling or shrinkage; but, the fill 2 delay should be set short enough so that grain does not reach the drying chamber overflow rotary switch. The fill 2 delay is set using the same procedure as the dry and unload timers, but the reset button does not need to be pressed to enter the new values into memory immediately.

OUT OF GRAIN DELAY - The value set on the out of grain delay acts as a buffer to allow grain to fall away from the drying chamber low level rotary switch after the drying fans start without giving an error. When grain reaches the drying chamber low level rotary switch the drying cycle starts (if the fan switch is placed in the "auto" or "on" position) and the out of grain delay begins to time down. If grain falls away from the drying chamber low level rotary switch before the time on the out of grain reaches zero no error is given and the dryer continues in the drying cycle. If grain falls away from the drying chamber low level rotary switch after the out of grain delay reaches zero a drying chamber no grain error is given and the dryer shuts down. The out of grain delay should be set long enough so that the fill system(s) have sufficient time to make up the grain that falls away from the drying chamber low level rotary switch when the fan(s) and heater(s) start; but, should not be set too long. If the linear actuator fails to retract the dump chutes and grain runs directly from the drying chamber to the storage chamber without being dried, the grain would fall away from the drying chamber low level rotary switch and a drying chamber no grain error would be given. If the out of grain delay is set too long and the linear actuator failed to retract, an unacceptable amount of wet grain could flow from the drying chamber to the storage chamber before a drying

chamber no grain error is given and the dryer shuts down. The out of grain delay is set using the same procedure as the dry and unload timers, but the reset button does not need to be pressed to enter the new values into memory immediately.

FAN DELAY - The fan delay is the delay in seconds between the starting of the master fan unit and the slave fan unit. In systems with 220v1ph electrical power the fan delay should be set at small value - less than 3 seconds. If the fan delay is set too long the slave fan could rotate fast enough backwards to start in a reverse rotation. Use the increase and decrease buttons to select the fan delay. Press the enter button when the correct fan delay is displayed to continue to the main drying screen. In single fan units the fan delay is not applicable.

FANS OFF DELAY - The fans off delay allows the fan and heater unit(s) to be shut down during the dump cycle. This will prevent the drying floor from becoming excessively dirty when there is a large amount of foreign material present in the grain being dried. There are two values that the fans off delay can be set at presently: 1:00 and 0:00. Use the increase and decrease buttons to select the value. When set at 1:00 the fan and heater units will shut off during the dump cycle. When CONTROL SYSTEM set at 0:00 the fan and heater unit(s) will not shut off and the unit will operate normally.

Set-up : Standard

CLEAR TOTAL BATCHES - Press the reset button to clear the total batches. Press the enter button to continue.

CLEAR WARNING HISTORY - Press the reset button to clear the warning history. Press the enter button to continue.

TINE UNTIL LOAD OFF - In Autobatch mode is the percentage of time through the dry cycle that the fill systems will be shut off regardless if the dryer is full or not. Press the enter button to return to the main drying screen.

Set-up : Extended

The set-up mode is used to program the computer with different variables that influence how the dryer will operate.

SET DATE - Use the increase and decrease buttons to select the correct day of month. Press the enter button when the correct day of month is displayed.

SET MONTH - Use the increase and decrease buttons to select the correct year. Press the enter button when the correct month is displayed.

SET YEAR - Use the increase and decrease buttons to select the correct year. Press the enter button when the correct year is displayed.

SET HOUR - Use the increase and decrease buttons to select the correct hour. Press the enter button when the correct hour is displayed.

SET MINUTE - Use the increase and decrease buttons to select the correct minute. Press the enter button when the correct minute is displayed.

AIR SWITCH - Use the increase and decrease buttons to toggle between enabled or disabled. If disabled is selected the dryer does not require proof of airflow before the burner lights. If enabled is selected the dryer requires proof of airflow to light the burner. Each time the dryer control power is shut off the airswitch test defaults to enabled.

LOW LEVEL TEST MODE - Use the increase and decrease buttons to toggle between enabled and disabled. If the enabled the computer will ignore the status of the drying chamber low level rotary switch. If disabled the dryer will monitor the status of the drying chamber low level rotary switch.

WET TANK TEST MODE - Use the increase and decrease buttons to toggle between enabled and disabled. If the enabled the computer will ignore the status of the wet supply rotary switch. If disabled the dryer will monitor the status of the wet supply rotary switch.

START FANS WITH HIGH - Determines whether the drying fan(s) will start with the drying chamber high level or drying chamber low level rotary switch. Use the increase and decrease buttons to toggle between enabled or disabled. In most situations the fan(s) should be started with the drying chamber low level rotary switch. If the drying chamber high level rotary switch is selected to control the starting of the main drying fan(s) the dry cycle and main drying fan(s) will not start until grain reaches the drying chamber high level rotary switch. Again, this mode of operation is not recommended.

AERATION FAN BYPASS - Allows the aeration fan to remain running after the dryer has shut down. Use the increase and decrease buttons to toggle between enabled and disabled. When the aeration fan bypass is enabled the aeration fan will remain running after the dryer has stopped if the aeration switch on the dryer front panel is placed in the "on" position. When the aeration fan bypass is disabled the aeration fan stops with the dryer.

OF FILL SYSTEMS - Use the increase and decrease buttons to toggle between one or two fill systems. Press the enter button when the number of fill systems displayed on the screen equals the number of fill systems that the computer will be controlling. If one fill system is selected only one fill system will be controlled by the computer. The Fill 1 delay will be used to delay the shut off of the fill system after the drying chamber is full. The Fill 2 delay will have no effect on the operation of the fill system. If two fill systems are selected two fill systems will be controlled by the computer. Both the Fill 1 delay and the Fill 2 delay are used by the computer to delay the shut-off of the fill systems after the drying chamber is full.

SELECT DRYER TYPE - Use the increase and decrease buttons to select one of the six model types that fits your system. The six models are as follows:

AF3 - Autoflow with three main drying fans

AF2 - Autoflow with two main drying fans

AF1 - Autoflow with one main drying fan

AB3 - Autobatch with three main drying fans

AB2 - Autobatch with two main drying fans

AB1 - Autobatch with one main drying fan

Most systems will be either an Autoflow with one fan or an Autoflow with two fans. Press the enter button when the correct model number is displayed.

SELECT TEMP SCALE - Use the increase and decrease buttons to toggle between Fahrenheit or Celsius. Press the enter button when the correct scale is displayed.

MODEM INIT STRING - Not used. Press the enter button to return to the main drying screen

BURNER DIFFENTIAL - Use the increase and the decrease buttons to change the burner differential. The burner differential is the span in degrees between high fire and low fire. When the temperature in the dryer reaches the plenum temperature setpoint plus the differential the burner will cycle from high fire to low fire. When the temperature in the dryer falls to the plenum temperature setpoint minus the differential the burner will cycle from low fire to high fire. Example: Plenum temperature setpoint = 180 degrees, temperature differential set to 5 degrees. The burner will cycle from high fire to low fire at 185 degrees and will cycle from low fire to high fire at 175 degrees.

Help

Currently not used.

Plenum

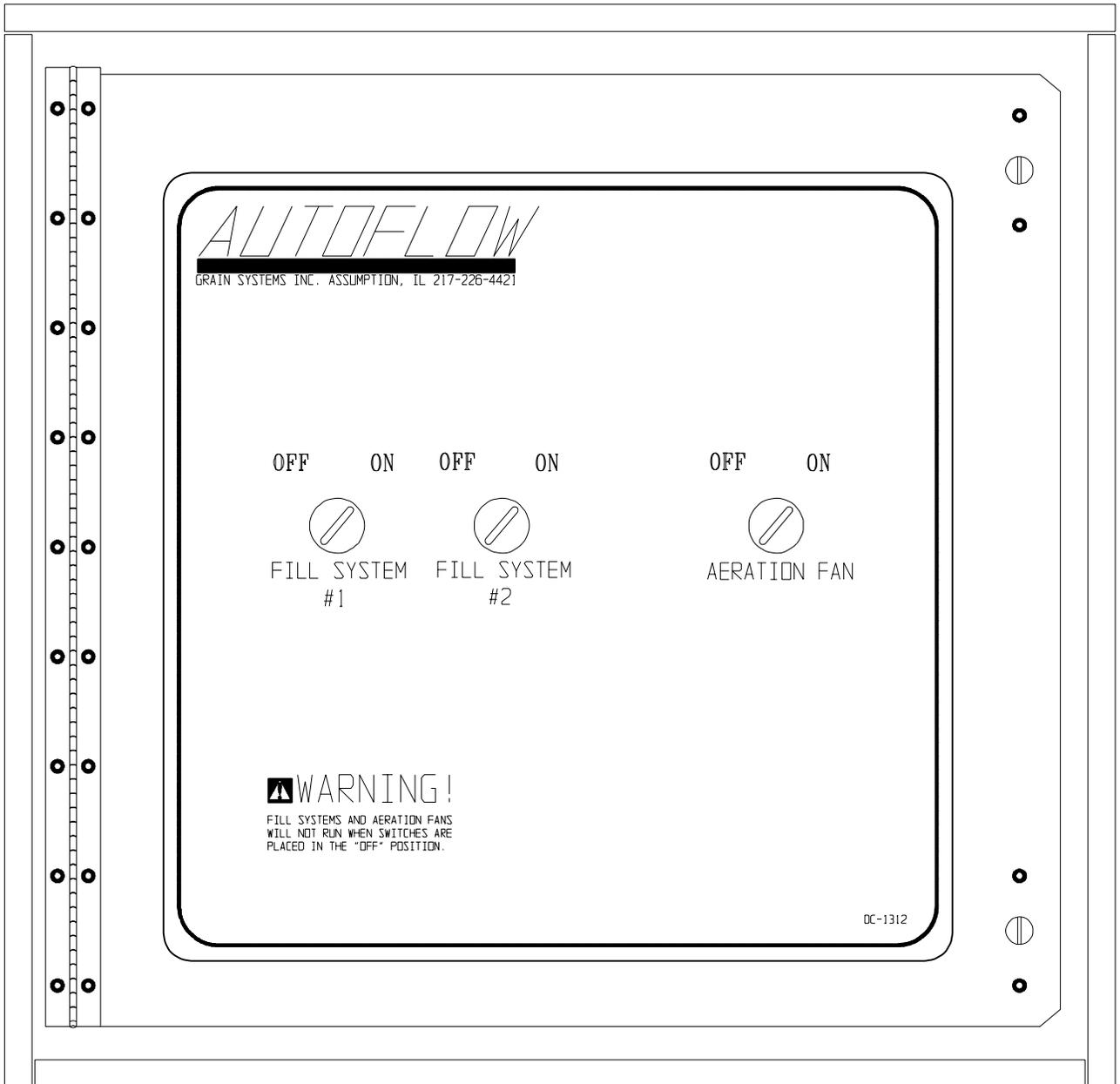
The temperature that the burner cycles from high fire to low fire is set here. Use the increase and decrease to change the value. Press enter when done.

Grain

The grain temperature set-point is set here. Use the increase and decrease buttons to change the grain temperature setpoint. Press the enter button when done.

Screens

By pressing the screens button you can toggle between two screens. Screen #1 displays the current plenum and grain temperatures and their setpoints in parenthesis. Screen #2 displays the status of the drying chamber rotary switches and the total number of batches. In all screens the dry time and dump time are displayed at the bottom of the screen.



Fill System Control Box

The fill system control box houses the motor starters for fill system #1, fill system #2 and the aeration fan. Switches are located on the front of the fill system control box, and an emergency stop switch is located on the side of the control box.

Fill System #1

This switch is used to start and stop fill system #1 manually. The switch should be left in the “on” position. If the switch is placed in the “off” position the fill system will not start, and will stop if running. The dryer must be running for the fill system to be activated.

Fill System #2

This switch is used to start and stop fill system #2 manually. The switch should be left in

the “on” position. If the switch is placed in the “off” position the fill system will not start, and will stop if running. The dryer must be running for the fill system to be activated.

Aeration Fan

This switch is used to start and stop the aeration fan manually. The switch should be left in the “on” position. If the switch is placed in the “off” position the aeration fan will not start, and will stop if running. The dryer must be running for the fill system to be activated.

Emergency Stop Switch

This switch will stop the dryer when pushed, and should be used in case of emergency.

Error Messages

When the dryer shuts down the user can quickly determine what caused the shutdown by viewing the display on the dryer control panel. The Electronic Monitoring Control System displays the error message and sounds a warning signal to alert the user. The displayed error conditions and their electrical cause are as follows:

Burner 1 Loss Flame

The flame sensor in burner number one has failed to detect flame. Either the burner failed to light or the flame sensor needs to be adjusted. The flame sensor is the sensor attached to the burner, and has a single lead. If the burner is lighting but the unit is still shutting down due to loss of flame the flame sensor needs to be adjusted. The flame sensor can be adjusted by bending it so it is immersed in flame. If the burner is not lighting make sure that the dryer is getting fuel, all solenoids are opening, and the ignitor is sparking.

Burner 2 Loss Flame

The flame sensor in burner number two has failed to detect flame. Either the burner failed to light or the flame sensor needs to be adjusted. The flame sensor is the sensor attached to the burner, and has a single lead. If the burner is lighting but the unit is still shutting down due to loss of flame the flame sensor needs to be adjusted. The flame sensor can be adjusted by bending it so it is immersed in flame. If the burner is not lighting make sure that the dryer is getting fuel, all solenoids are opening, and the ignitor is sparking.

Burner 3 Loss Flame

The flame sensor in burner number three has failed to detect flame. Either the burner failed to light or the flame sensor needs to be adjusted. The flame sensor is the sensor attached to the burner, and has a single lead. If the burner is lighting but the unit is still shutting down due to loss of flame the flame sensor

needs to be adjusted. The flame sensor can be adjusted by bending it so it is immersed in flame. If the burner is not lighting make sure that the dryer is getting fuel, all solenoids are opening, and the ignitor is sparking.

Fan 1 Vapor High Limit

The LP gas vapor temperature sensor located on the gas pipe train downstream from the vaporizer coil on fan and heater number one has opened indicating that the vaporizer coil is running too hot and must be adjusted. This sensor is set at 200 degrees Fahrenheit and automatically resets itself when cool. The vaporizer is adjusted by loosening the bolt and moving the vaporizer coil away from the flame.

Fan 2 Vapor High Limit

The LP gas vapor temperature sensor located on the gas pipe train downstream from the vaporizer coil on fan and heater number two has opened indicating that the vaporizer coil is running too hot and must be adjusted. This sensor is set at 200 degrees Fahrenheit and automatically resets itself when cool. The vaporizer is adjusted by loosening the bolt and moving the vaporizer coil away from the flame.

Fan 3 Vapor High Limit

The LP gas vapor temperature sensor located on the gas pipe train downstream from the vaporizer coil on fan and heater number three has opened indicating that the vaporizer coil is running too hot and must be adjusted. This sensor is set at 200 degrees Fahrenheit and automatically resets itself when cool. The vaporizer is adjusted by loosening the bolt and moving the vaporizer coil away from the flame.

Fan 1 Housing High Limit

The temperature high limit located on the housing on fan and heater number one opened, indicating that the housing towards the bin has overheated. This high limit sensor is set at 200 degrees Fahrenheit and must be manually reset.

Fan 2 Housing High Limit

The temperature high limit located on the housing on fan and heater number two opened, indicating that the housing towards the bin has overheated. This high limit sensor is set at 200 degrees Fahrenheit and must be manually reset.

Fan 3 Housing High Limit

The temperature high limit located on the housing on fan and heater number three opened, indicating that the housing towards the bin has overheated. This high limit sensor is set at 200 degrees Fahrenheit and must be manually reset.

Plenum High Limit

An over temperature condition has occurred inside the dryer plenum. The plenum high limit is set automatically on the Hi-lo thermostat when the cycle set-point is adjusted and resets automatically when cooled. The lo-fire gas pressure needs to be lowered, or the cycle setpoint on the Hi-lo thermostat needs to be increased if the error is displayed frequently.

Fan 1 Motor Overload

The thermal overload in the control box on fan number one has tripped, indicating an overcurrent condition. The overload must be reset manually.

Fan 2 Motor Overload

The thermal overload in the control box on fan number two has tripped, indicating an overcurrent condition. The overload must be reset manually.

Fan 3 Motor Overload

The thermal overload in the control box on fan number three has tripped, indicating an overcurrent condition. The overload must be reset manually.

Fan 1 Loss Of Airflow

The contacts on the airswitch, located in the bin sidewall and attached to fan and heater number one, have opened due to the fan not turning, or the airswitch may need to be adjusted.

Drying Chamber Overflow

The grain level in the drying chamber has reached the drying chamber overflow rotary switch. Grain will have to be dumped from the drying chamber to the storage chamber before the unit can be restarted. This error indicates that either the drying chamber high level rotary switch is faulty or the time on the Load delay or Aux. 1 delay needs to be lowered.

Bin Grain High Limit Full

The grain level in the storage chamber has reached the storage chamber high level rotary switch located 3 feet below the fan and heater(s). Grain will have to be removed from the storage chamber before the unit can be restarted.

Bin High Limit Switch Bad

The storage chamber high level switch has failed. Both the normally open and the normally closed sides of the switch are in the same state.

Out Of Grain

The grain in the wet supply tank has fallen below the wet supply rotary switch. If there is grain against the drying chamber low level rotary switch the dryer can be restarted by pressing the stop switch to clear the error and then the start switch.

**Wet Supply Empty Press <Enter> To Dry
Remaining Grain**

This message is displayed when the start button is pushed and grain has fallen away from the wet supply rotary switch and there is still grain against the drying chamber low level rotary switch. If the enter button is pushed the dryer will restart, but the fill system(s) will not restart.

Cannot Start Dryer Wet Supply Empty

This message is displayed when the start button is pushed and grain has fallen away from the wet supply rotary switch and there is no grain against the drying chamber low level rotary switch. Grain will have to be put into the wet supply tank or the drying chamber to start the dryer.

Dry Chamber Empty

This message is displayed when grain falls away from the drying chamber low level rotary switch after the Aux. 1 timer has reached zero. If the error is being caused due to the settling of grain after the fans start the time on the Aux. 1 timer can be lengthened.

Fill 1 Motor Overload

The thermal overload in the fill system control box for fill system number one has tripped, indicating an overcurrent condition. The overload must be reset manually.

Fill 2 Motor Overload

The thermal overload in the fill system control box for fill system number two has tripped, indicating an overcurrent condition. The overload must be reset manually.

Aeration Overload

The thermal overload in the fill system control box for the aeration fan has tripped, indicating an overcurrent condition. The overload must be reset manually.

Grain High Limit

The grain temperature in the drying chamber is too high. The grain temperature reached a point where it was five degrees less than the plenum cycle setpoint.

Pre-Season Checks

Before the dryer is filled, thoroughly inspect the unit and check the operation of the dryer as follows. When entering the bin take great caution. Never enter a bin where grain is present.

Set Control Switches

- ◆ MOISTURE CONTROL Switch - "On"
- ◆ AERATION FAN Switch - "Off"
- ◆ LOAD AUGER Switch - "Off"
- ◆ FAN Switch - "Off"
- ◆ HEATER Switch - "Off"
- ◆ DUMP Switch - "Auto"
- ◆ DRY and HOLD Switch - "Off"
- ◆ Autoflow Emergency Stop Switch - "Out"
- ◆ Actuator Switch - "On"
- ◆ Fill System Control Box Emergency Stop Switch - "Out"

Control Power Switch

Turn the control power switch on. The switch will light up. If a fault is found an error message will be displayed on the screen. If all are found safe, the main drying screen will be displayed.

Drying Chamber

Enter the drying chamber and inspect each dump hopper for obstructions that may inhibit the flow of grain into the dump chutes. Make sure that the gap between the discharge flow plates and the floor sheets is a minimum of 1-1/2". All discharge flow plates should be adjusted evenly around the bin. Inspect each discharge flow plate and make sure that the bottom brackets on each flow plate have not collapsed due to pressure from walking around the drying chamber. Inspect the leveling bands. Make sure that all leveling

bands are installed properly and in are good shape.

Rotary Switches

View the drying chamber rotary switches from the peak hole on top of the dryer. Make sure that all three rotary switches are spinning freely. Double check the seal on each rotary switch top. The number one cause of switch failure is water. Make sure when the electrician replaced the top on the rotary switch that no creases formed in the gasket. Inspect both the storage and wet supply rotary switches for operation and proper seal.

Dump Chutes

Enter the storage chamber. Make sure that all dump chutes are adjusted evenly. When one chute is level make sure that all chutes are level. This is very critical to the correct operation of the dryer. The center plate that all the dump chute chains attach to should be no greater than 12" from the pulley when the chutes are level. If the center plate is further than 12" from the pulley when the chutes are closed the chains must be lengthened.

Linear Actuator

Turn the Dump switch on the Autoflow control box to the "manual open" position. Use a tape measure to measure the stroke on the linear actuator. The stroke should be between 12" and 14". If the stroke on the actuator is not 12" to 14" the actuator should be adjusted. Make sure that all pulleys and cables are move freely when the actuator is moving. With the actuator extended enter the storage chamber. View each dump chute individually. Make sure that each dump chute opened completely when the actuator extended. If a dump chute does not open completely the double nuts on the bolt that the chutes hinge on need to be loosened. The dump chutes should hinge smoothly. After the chutes have been inspected turn the Dump switch on the Autoflow control box to the "Auto" position and press the stop switch. The chutes should raise.

Power Start Button

Before the dryer start button is pushed make sure there is grain in the wet supply tank. If there is no grain in the wet supply tank the dryer will not start. Push the dryer start button. The screen should no longer be flashing "STOPPED".

Fuel Check

If using LP gas, make sure the tank has plenty of fuel. If using natural gas, make sure an adequate supply is available. If using LP gas, slowly open the main fuel supply valve at the tank. If using natural gas, turn on the valve along the supply line. Then open the ball valve on the fan heater unit(s). Inspect all gas lines and connections for possible leaks. Any gas leaks need to be fixed immediately!

Fan

Make sure that all toggle switches on the fan and heater units are on. Bump the fan switch on the Autoflow control box and observe the fan rotation. The fan should run counterclockwise. Sometimes on three phase models the motor will run backwards. This can easily be reversed by first turning off the power at the main disconnect, then interchanging any two of the three power supply wires coming into the motor starter in the fan control box. Reverse the two outside wires, L1 and L3, and leave the middle one in the same position. If the dryer is empty, the unit will not operate. The fans cannot create enough static pressure to engage the airswitch. You will receive a loss of airflow message.

Aeration Fan

Bump the aeration fan switch on the autoflow control box and observe the aeration fan rotation. The aeration fan should run counterclockwise. Sometimes on three phase models the motor will run backwards. This can easily be reversed by first turning off the power at the main disconnect, then interchanging any two of the three power supply wires coming into the motor starter in the fill system control box. Reverse the two outside wires, L1 and L3, and leave the middle one in the same position.

Fill System

Prepare the wet storage tank to deliver grain to the dryer. Make sure all personnel are away from any machinery that is controlled by the Autoflow. Place the load auger switch in the "Auto" position. The fill system(s) should begin to load grain from the wet supply tank to the dryer. When the display on the Autoflow control box reads "GRAIN LOW LEVEL YES" close the valve that supplies the fill system(s) with wet grain from the wet supply tank. After the fill system(s) have cleaned out place the load auger switch in the "off" position.

Airswitch

Place the fan and heater service switches on the main drying fan(s) in the "off" position. Place the fan switch on the Autoflow control box in the "on" position. Place the aeration fan switch on the Autoflow control box in the "on" position. Go to the master fan and heater unit. Place the fan service switch in the "on" position. The master fan should start. In two fan units the slave fan should start after the fan delay. In single fan units the display on the master fan will read airflow after the master fan reaches half speed. If the display reads airflow before the fan reaches half speed adjust the airswitch by turning it clockwise. If the display does not read airflow adjust the airswitch by turning it counterclockwise. In two fan units the display on the master fan should read airflow after the slave fan reaches half speed. If the display reads airflow before the fan reaches half speed adjust the airswitch by turning it clockwise. If the display does not read airflow adjust the airswitch by turning it counterclockwise.

Burner Test Fire

Place the heater switch on the Autoflow control box in the "on" position. Start the main drying

fan(s) if they are not already running. Make sure the fuel supply is on. The burner should ignite after a short purge delay. Gas pressure should be shown on the gauge. Adjust the high fire gas pressure by turning the regulator in and out on LP units; or, by opening and closing the main ball valve on natural gas units. The high fire pressure should be approximately 6-15 lbs. For LP units and 6-10 lbs. For natural gas units. While the heater is in low fire adjust the low fire gas pressure by opening or closing the ball valve located on top of the pipetrain. The low fire gas pressure should be approximately 2-6 lbs. For LP units and 1-3 lbs. For natural gas units. If the burner remains in high fire and does not cycle, increase the gas pressure in order to reach the plenum cycle setpoint. If the burner remains in low fire and does not cycle, slightly decrease the gas pressure at the low fire gas valve. Any time the high fire gas pressure is adjusted the low fire gas pressure needs to be checked. The basic rule-of-thumb for setting gas pressure is as follows: make sure that the temperature in the bin is increasing at a rapid rate when in high fire, and the temperature in the bin is falling at a rapid rate while in low fire.

Dryer Shutdown

To shut down the dryer, first close the fuel supply valve at the tank or the valve along the fuel supply line. If the burner is operating, let the dryer run out of fuel. It should shut down due to loss of flame. Press the dryer stop button to clear the error, and turn off the main power disconnect at the entrance panel.

Emergency

In case of an emergency push the emergency stop switch located on the side of the Autoflow control box and the fill system control box. This will shut everything that is controlled by the dryer off immediately.

Top Dry Autoflow Theory Of Operation:**Control Panel Switch Status:**

- ◆ Control Power: “on”
- ◆ Moisture Control Thermostat: “on”
- ◆ Aeration Fan: “auto”
- ◆ Load Auger: “auto”
- ◆ Fan: “auto”
- ◆ Heater: “auto”
- ◆ Dump: “auto”
- ◆ Dry & Hold: “off”

Emergency Stop Switch Status:

- ◆ Autoflow Control Box Emergency Stop: “pulled out”
- ◆ Fill System Control Box Emergency Stop: “pulled out”
- ◆ Actuator Control Box 24v Switch: “on”

Aeration Fan Bypass: “enabled”

When the Top Dry is in a ready state; that is, with no grain in the Drying Chamber and wet grain in the Wet Storage Tank, Fill System #1 and Fill System #2 will start to fill the Drying Chamber with wet grain when the start switch is pressed on the Dryer Control Panel. In single fill system units only Fill System #1 will start. When grain reaches the Drying Chamber Low Level Rotary Switch the Aeration Fan, and the Master Drying Fan will come on, and the Fan Delay will start to count down. When the Fan Delay reaches zero the Slave Drying Fan will start, the Airswitch will close, and the Dry

Timer will start to count down. In single fan units the Fan Delay will not count down and the Airswitch will close after the Master Drying Fan starts. After a twenty second Purge Delay the fan/heater unit(s) will ignite. When the Plenum Temperature reaches the Cycle Setpoint the fan/heater unit(s) will cycle to Low-Fire. When the Plenum Temperature falls ten degrees below the Cycle Setpoint the fan/heater unit(s) will cycle back to High-Fire. The fan/heater units will continue to cycle throughout the drying process.

When grain reaches the Chamber High Level Rotary Switch the Fill 2 Delay will begin to count down. When the Fill 2 Delay reaches zero Fill System #2 will shut off and the Fill 1 Delay will begin to count down. When the Fill 1 Delay reaches zero Fill System #1 will shut off.

If the Chamber High Level Rotary Switch becomes exposed due to shrinkage of grain in the Drying Chamber, the fill system(s) will start and refill the Drying Chamber. When grain reaches the Chamber High Level Rotary Switch the fill system(s) will shut off after the delays.

When the Dry Timer reaches zero and the Grain Temperature Setpoint is above the current grain temperature the dryer will go into Temperature Hold. When the grain temperature reaches the Grain Temperature Setpoint the unit will continue to the Dump Cycle. In the Dump Cycle the Linear Actuator in the Actuator Control Box extends, the dump chutes lower, and grain is dumped from the Drying Chamber into the Storage Chamber. Immediately after the dump chutes open the Dump Timer begins to count down. When the Dump Timer reaches zero the dump chutes raise and grain stops dumping from the Drying Chamber into the Storage Chamber. During the Dump Cycle 1/3 of the grain is dumped into the Storage Chamber.

After the Dump Cycle the unit returns to the beginning of the Dry Cycle, the fill system(s) refill the Drying Chamber and the process begins again. If the Dry Timer reaches zero after the grain temperature reaches the Grain Temperature Setpoint the unit does not enter Temperature Hold. It goes right to the Dump Cycle.

The unit continues with the same operation until either no grain is present against the Wet Supply Rotary Switch, or the Storage Chamber becomes full.

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If the Wet Storage Tank becomes empty while the fill systems are running, the Fill 1 and Fill 2 Delays starts to count down. When the Fill 1 and Fill 2 Delays reach zero the fill system(s) shut off along with the dryer and a Wet Supply Hopper Empty “Out of Grain” error is displayed on the Dryer Control Panel screen. If there is grain against the Drying Chamber Low Level Rotary Switch the unit can be restarted by pressing the start switch. When the start switch is pressed the screen on the Dryer Control Panel will read “Press Enter to Dry Remaining Grain”. If the enter button is pushed the dryer will restart without running the fill system(s). The dryer will remain running until the completion of the next Dump Cycle, after which an “Out of Grain” error is displayed on the Dryer Control Panel and the dryer stops.

If the Storage Chamber High-Limit Rotary Switch becomes covered with grain during the Dump Cycle the dryer will continue through the Dump Cycle and will continue to the next Dry Cycle. When the Dry Cycle is complete the unit will not continue to the Dump Cycle. A “Bin Grain Hi Limit” error will be displayed on the screen and the dryer will stop. The unit will not dump automatically until grain has been removed from the Storage Chamber.

If the dryer stops for any reason the Aeration Fan will remain running if the Aeration Fan Bypass is enabled. The Aeration Fan Bypass is set in the Set-up mode. If the Aeration Fan Bypass is disabled the Aeration Fan stops whenever the dryer stops.

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, and system integrity. Enter the drying chamber and check each dump hopper. Remove any obstructions. Test operate the dryer using the pre-season checklist.

There are two fundamental things to control with the Autoflow Top Dry (or any dryer); the drying rate and the grain flow rate. Drying rate is determined by the dryer size and shape, the grain to be dried, the airflow rate, and the drying air temperature. We consider the best temperature to be the highest one where the desired grain quality is maintained. Corn used for livestock consumption is dried at a maximum recommended temperature of 200 degrees Fahrenheit. Corn used for different applications, and other grains may require lower drying temperatures. By selecting a drying air temperature a drying rate is established. To achieve a desired final grain moisture content, the grain flow rate is adjusted to match the drying rate.

Initial Dryer Start Up

- 1) Be sure the control power switch is off. Turn on the main power supply disconnect for the Autoflow control box, fan and heaters, and all fill systems.
- 2) Pull out the emergency stop switches on the

Autoflow control box, fill systems control box, and the actuator control box.

3) Set the switches on the Autoflow control box as follows:

- ◆ MOISTURE CONTROL switch - “On”
- ◆ AERATION FAN switch - “Auto”
- ◆ LOAD AUGER switch - “Off”
- ◆ FAN switch - “Auto”
- ◆ HEATER switch - “Auto”
- ◆ DUMP switch - “Auto”
- ◆ DRY and HOLD switch - “Off”

- 4) Make sure there is wet grain in the wet supply tank.
- 5) Turn the control power switch to the “on” position.
- 6) The screen will display a copyright message and software version number.

- 7) The screen should read "STOPPED". The chamber high level and the chamber low level should both read "NO".
- 8) Set the dry timer using the following charts for the specific bin size, fan and heater size, drying temperature and grain input moisture content.
- 9) Set the dump timer as follows:
 - ◆ 18' diameter bin = 30 seconds
 - ◆ 21' diameter bin = 33 seconds
 - ◆ 24' diameter bin = 36 seconds
 - ◆ 27' diameter bin = 39 seconds
 - ◆ 30' diameter bin = 42 seconds
 - ◆ 36' diameter bin = 48 seconds
- 10) Set all other delays and timers as prescribed in the Electronic Monitoring Control section of this manual.
- 11) Press the reset button for timer changes to take effect immediately.
- 12) Set the grain temperature setpoint as follows:
 - ◆ 180 degree drying temperature = 100 degree grain temperature setpoint
 - ◆ 170 degree drying temperature = 103 degree grain temperature setpoint
 - ◆ 160 degree drying temperature = 105 degree grain temperature setpoint
 - ◆ 150 degree drying temperature = 108 degree grain temperature setpoint
 - ◆ *140 degree drying temperature = 110 degree grain temperature setpoint
 - ◆ *130 degree drying temperature = 113 degree grain temperature setpoint
 - ◆ *120 degree drying temperature = 115 degree grain temperature setpoint

*When drying at a temperature lower than 150 degrees the grain temperature setpoint on the moisture control thermostat may require a lower setting at night.
- 13) Press the start switch on the dryer control panel.
- 14) CAUTION! Be sure all personnel are clear of fill systems. Place the load auger switch on the dryer control panel to the "auto" position.
- 15) The fill system(s) should start immediately.
- 16) When the grain reaches the drying chamber low level rotary switch the fan and heater(s) should start.
- 17) When the grain reaches the drying chamber low level rotary switch reaches the drying chamber high level rotary switch the fill system(s) should stop.
- 18) When the dry timer reaches zero the display should read "TEMP HOLD"
- 19) When the grain temperature reaches the grain temperature setpoint the dryer should continue to the dump cycle.
- 20) The dump chutes should lower, grain should dump from the drying chamber into the storage chamber, and the fill system(s) should start.
- 21) After the dump cycle the dryer should continue to the beginning of the next dry cycle.
- 22) After the fourth dump stop the dryer.
- 23) Test the moisture of the dried grain.
- 24) If the moisture of the grain is too high increase the grain temperature setpoint five degrees for each additional point of moisture to be removed.
- 25) If the moisture of the grain is too low decrease the grain temperature setpoint five degrees for each additional point of moisture to be added.
- 26) After the moisture control thermostat is adjusted decrease the time on the dry timer by one-half. The dry timer should not be set lower than the amount of time it takes the dryer to refill after the dump cycle.
- 27) Restart the dryer. The time on the dry timer should expire before the grain reaches the temperature setpoint.

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28) Any time a change is made to the grain temperature setpoint the dryer must dump four times before the full effect of the change will be made on the moisture of the grain.

Normal Start Up

When the dryer is started with grain in the drying chamber that has already been partially dried, the dryer can be started without making any adjustments to time or temperature; however, the moisture of the grain should be checked after the fourth dump.

Last Fill

1) Stop the dryer when all the wet grain has been loaded into the drying chamber and turn off the moisture control switch.

2) Set the time on the dry timer for twice the recommended amount using the following charts for the specific bin size, fan and heater size, drying temperature and grain input moisture content.

3) Push the reset button.

4) Turn the dry and hold switch to the “on” position.

5) Turn the load auger switch to the “off” position.

5) Press the start switch.

5) When the dryer shuts down install the fan inlet cover(s).

6) Let the aeration fan cool in the top and store, or manually dump into the storage chamber.

**TOP DRY AUTOFLOW SERIES
DRYING RATES FOR SHELLED CORN**

AUTO FLOW SERIES			18' Dia. 1-Fan	21' Dia. 1-Fan	24' Dia. 1-Fan	24' Dia. 2-Fan	27' Dia. 1-Fan	27' Dia. 2-Fan						
FAN & HEATER Unit(s)	Plenum Temperature (fahrenheit)	Moisture Content Wet Basis	Minutes Between		Minutes Between		Minutes Between		Minutes Between		Minutes Between			
			BU/HR	Dumps	BU/HR	Dumps	BU/HR	Dumps	BU/HR	Dumps	BU/HR	Dumps		
10 - 12 H.P. 36" FAN 3.5 MILLION BTU/HR 3 hp 18" Inline Centrifugal	160	20%	401	15.9			729	15.6			783	18.4		
		25%	254	25.2			462	24.6			496	29.1		
		30%	159	40.4			288	39.5			310	46.6		
	180	20%	* 513	* 12.4			933	12.2			1,002	14.4		
		25%	* 325	* 19.7			591	19.2			634	22.7		
		30%	* 203	* 31.5			369	30.9			396	36.4		
	200	20%	* 601	* 10.6			* 1,092	* 10.4			* 1,173	* 12.3		
		25%	* 381	* 16.8			* 692	* 16.4			* 743	* 19.4		
		30%	* 238	* 26.9			* 432	* 26.3			* 464	* 31.1		
10-16 H.P. 36" FAN 4.5 MILLION BTU/HR 3 hp 18" Inline Centrifugal	160	20%	428	14.9	499	17.4	528	21.6		541	26.6	882	16.3	
		25%	271	23.6	316	27.6	334	34.1		343	42.0	559	25.8	
		30%	169	37.8	197	44.2	209	54.6		214	67.4	349	41.3	
	180	20%	548	11.6	639	13.6	* 675	* 16.8		* 692	* 20.8	1,129	12.7	
		25%	347	18.4	404	21.5	* 428	* 26.6		* 439	* 32.8	715	20.1	
		30%	217	29.5	253	34.5	* 267	* 42.6		* 274	* 52.6	446	32.3	
	200	20%	642	9.9	* 748	* 11.6	* 791	* 14.4		* 811	* 17.7	1,321	10.9	
		25%	406	15.7	* 474	* 18.4	* 501	* 22.7		* 514	* 28.0	837	17.2	
		30%	254	25.2	* 296	* 29.5	* 313	* 36.4		* 321	* 44.9	523	27.6	
10-16 H.P. 42" FAN 5.75 MILLION BTU/HR 3 hp 18" Inline Centrifugal	160	20%			584	14.9	648	17.5		682	21.1			
		25%			370	23.5	411	27.7		432	33.4			
		30%			231	37.7	256	44.4		270	53.5			
	180	20%			748	11.6	* 830	* 13.7		* 872	* 16.5			
		25%			473	18.4	* 525	* 21.6		* 552	* 26.1			
		30%			296	29.5	* 328	* 34.7		* 345	* 41.8			
	200	20%			* 875	* 9.9	* 971	* 11.7		* 1,021	* 14.1			
		25%			* 554	* 15.7	* 615	* 18.5		* 647	* 22.3			
		30%			* 346	* 25.2	* 384	* 29.6		* 404	* 35.7			
20 H.P. 42" FAN 6.75 MILLION BTU/HR 3 hp 18" Inline Centrifugal	160	20%				675	16.8			710	20.3			
		25%				428	26.6			449	32.1			
		30%					267	42.6			281	51.3		
	180	20%					864	13.1			908	15.8		
		25%					547	20.8			575	25.0		
		30%					342	33.3			359	40.1		
	200	20%					1,012	11.2			* 1063	* 13.5		
		25%					641	17.7			* 673	* 21.4		
		30%					400	28.4			* 421	* 34.3		
30 H.P. 42" FAN 8.75 MILLION BTU/HR 3 hp 18" Inline Centrifugal	160	20%				740	15.4			758	19.0			
		25%				469	24.3			480	30.0			
		30%					293	38.9			300	48.0		
	180	20%					947	12.0			970	14.8		
		25%					600	19.0			615	23.4		
		30%					375	30.4			384	37.5		
	200	20%					1,109	10.2			1,136	12.6		
		25%					702	16.2			720	20.0		
		30%					439	25.9			449	32.1		
40 H.P. 42" FAN 10.25 MILLION BTU/HR 3 hp 18" Inline Centrifugal	160	20%								865	16.6			
		25%								548	26.3			
		30%								342	42.1			
	180	20%									1,107	13.0		
		25%									701	20.5		
		30%									438	32.9		
200	20%									1,296	11.1			
	25%									821	17.5			
	30%									513	28.1			

*Insufficient burner BTUs for 45 deg. ambient temp.

Est. at ambient temp 45 deg. F, rel.humidity 65%
Use only as a guide, conditions will vary capacities.

1/4 cfm cooling

TOP DRY AUTOFLOW SERIES
DRYING RATES FOR SHELLLED CORN

AUTO FLOW SERIES			30' Dia. 1-Fan	30' Dia. 2- Fan	36' Dia. 1-Fan	36' Dia. 2-Fan	
FAN & HEATER Unit(s)	Plenum Temperature (fahrenheit)	Moisture Content Wet Basis	Minutes Between BU/HR Dumps				
10 - 12 H.P. 36" FAN 3.5 MILLION BTU/HR 5-7 hp 24" Inline Centrifugal	160	20%		819 21.7			
		25%		519 34.3			
		30%		324 54.9			
	180	20%		* 1,048	* 16.9		
		25%		* 664	* 26.8		
		30%		* 415	* 42.9		
	200	20%		* 1,227	* 14.5		
		25%		* 777	* 22.9		
		30%		* 486	* 36.6		
10-16 H.P. 36" FAN 4.5 MILLION BTU/HR 5-7 hp 24" Inline Centrifugal	160	20%	557 31.9	939 18.9		993 25.8	
		25%	353 50.4	595 29.9		629 40.7	
		30%	220 80.8	371 47.9		393 65.2	
	180	20%	* 713 * 24.9	1,202 14.8		1,271 20.1	
		25%	* 451 * 39.4	761 23.4		805 31.8	
		30%	* 282 * 63.1	475 37.4		503 51.0	
	200	20%	* 835 * 21.3	* 1,407 * 12.6		* 1,488 * 17.2	
		25%	* 529 * 33.6	* 891 * 19.9		* 943 * 27.2	
		30%	* 330 * 53.9	* 557 * 32.0		* 589 * 43.5	
10-16 H.P. 42" FAN 5.75 MILLION BTU/HR 5-7 hp 24" Inline Centrifugal	160	20%	711 25.0	1,154 15.4		1,269 20.2	
		25%	450 39.5	731 24.3		803 31.9	
		30%	281 63.3	457 39.0		502 51.1	
	180	20%	* 909 * 19.5	1,477 12.0		1,623 15.8	
		25%	* 576 * 30.9	936 19.0		1,028 24.9	
		30%	* 360 * 49.5	584 30.4		642 39.9	
	200	20%	* 1,065 * 16.7	* 1,730 * 10.2		* 1,901 * 13.4	
		25%	* 674 * 26.4	* 1,096 * 16.2		* 1,204 * 21.3	
		30%	* 421 * 42.2	* 684 * 26		* 752 * 34.1	
20 H.P. 42" FAN 6.75 MILLION BTU/HR 5-7 hp 24" Inline Centrifugal	160	20%	753 23.6			1,355 18.9	
		25%	477 37.3			858 29.8	
		30%	298 59.8			536 47.8	
	180	20%	963 18.4			1,734 14.7	
		25%	610 29.1			1,098 23.3	
		30%	381 46.7			686 37.4	
	200	20%	* 1,128 * 15.7			* 2,030 * 12.6	
		25%	* 714 * 24.9			* 1,286 * 19.9	
		30%	* 446 * 39.9			* 803 * 31.9	
30 H.P. 42" FAN 8.75 MILLION BTU/HR 5-7 hp 24" Inline Centrifugal	160	20%	806 22.0		819 31.3	1,452 17.6	
		25%	511 34.8		519 49.4	920 27.8	
		30%	319 55.8		324 79.1	574 44.6	
	180	20%	1,032 17.2		1,048 24.4	1,858 13.8	
		25%	653 27.2		664 38.6	1,177 21.7	
		30%	408 43.6		415 61.8	735 34.8	
	200	20%	1,208 14.7		1,227 20.8	2,176 11.7	
		25%	765 23.2		777 32.9	1,378 18.6	
		30%	478 37.2		486 52.8	861 29.8	
40 H.P. 42" FAN 10.25 MILLION BTU/HR 5-7 hp 24" Inline Centrifugal	160	20%	920 19.3		950 26.9		
		25%	583 30.5		602 42.6		
		30%	364 48.9		376 68.2		
	180	20%	1,178 15.1		1,216 21.0		
		25%	746 23.8		770 33.3		
		30%	466 38.2		481 53.3		
	200	20%	1,379 12.9		1,424 18.0		
		25%	873 20.3		902 28.4		
		30%	545 32.6		563 45.5		

*Insufficient burner BTUs for 45 deg. ambient temp. Est. at ambient temp 45 deg. F, rel.humidity 65% 1/4 cfm cooling
 Use only as a guide, conditions will vary capacities.

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March 1998
Rev. - June 1998