1999

TOWER DRYER

OPERATION AND SERVICE MANUAL

PNEG-526
12′, 18′, 24′ & 30′
DIAMETER DRYER
MODELS

GSI
a division of
THE GSI GROUP

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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 guidlines.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 it's 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.

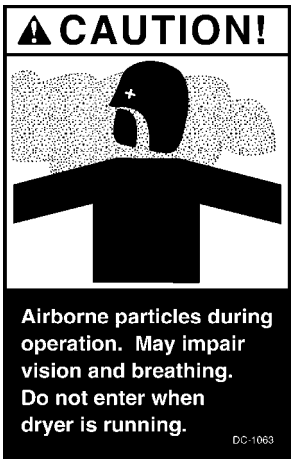
CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

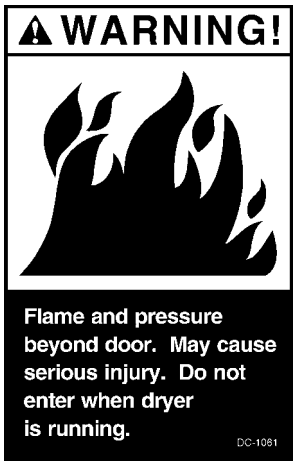
NOTE indicates information about the equipment that you should pay special attention to.

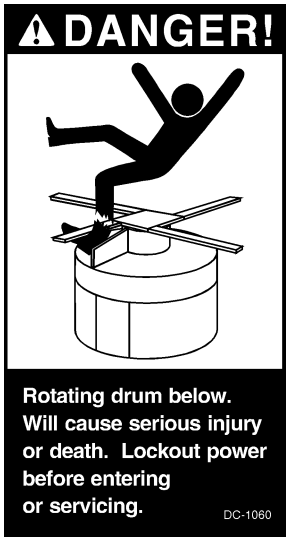
SAFETY FIRST

The GSI Group, Inc.'s principle concern is your safety and the safety of others associated with grain handling equipment. This manual was written with that thought in mind. We want to keep you as a customer by helping you understand safeoperating proceedures, and some of the problems that may be encountered by the dryer 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 dryer area. Avoid any alterations to the equipment. Such alterations may produce a very dangerous situation, where serious injury or death may occur.







The GSI Group, Inc. recommends you contact your local power company and have a representative survey your dryer installation, so your wiring will be compatible with their system and you will have adequate power supplied to your unit.

Safety decals should be read and understood by all people in and around the dryer area. If the following safety decals are not displayed on your dryer, or if they are damaged, contact The GSI Group, Inc. for replacement:

The GSI Group, Inc.
1004 E. Illinois St.
Assumption, Illinois 62510
phone: 217-226-4421 • fax: 800-800-5329

1. Read and understand the operating manual before trying to operate the dryer.

2. Never operate the dryer while any guards are removed.

3. Power supply should be OFF for service of electrical components. Use CAUTION in checking voltage or other procedures requiring power to be ON.

4. Check for gas leaks at all gas pipe connections. If any leaks are detected, do not operate dryer. Shut down and repair before further operation.

5. Never attempt to operate the dryer by jumping or otherwise bypassing any safety devices on the unit.

6. Do not exceed maximum recommended drying temperatures.

7. Keep the dryer clean. Do not allow fine material to accumulate in the plenum chamber.

8. Keep blower drive belts tight enough to prevent slippage.

9. Use CAUTION in working around high speed fans, gas burners, augers and auxiliary conveyors which START AUTOMATICALLY.

10. Do not operate in any area where combustible material will be drawn into the fan.

11. Be certain that capacities of auxiliary conveyors are matched to dryer metering capacities.

12. Clean grain is easier to dry. Fine material increases resistance to airflow and requires removal of extra moisture.

13. Do not adjust any moving part on the dryer while it is running.

READ THESE INSTRUCTIONS BEFORE OPERATION AND SERVICE

SAVE FOR FUTURE REFERENCE

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.

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.

GSI TOWER DRYER CUTAWAY

Large wet holding garner bin is sealed to help retain grain dust and bees wings

Stainless steel, roll formed, exterior sheeting promotes long dryer life and improved dryer appearance

Heavy-duty overall construction results in an extra rigid structure in a minimum of ground space

Inside and outside safety ladders, cages and catwalks provide safe and easy access to all areas of the dryer

Reducer cone equalizes air velocity past burners for optimum combustion and provides step-in access to burner assembly

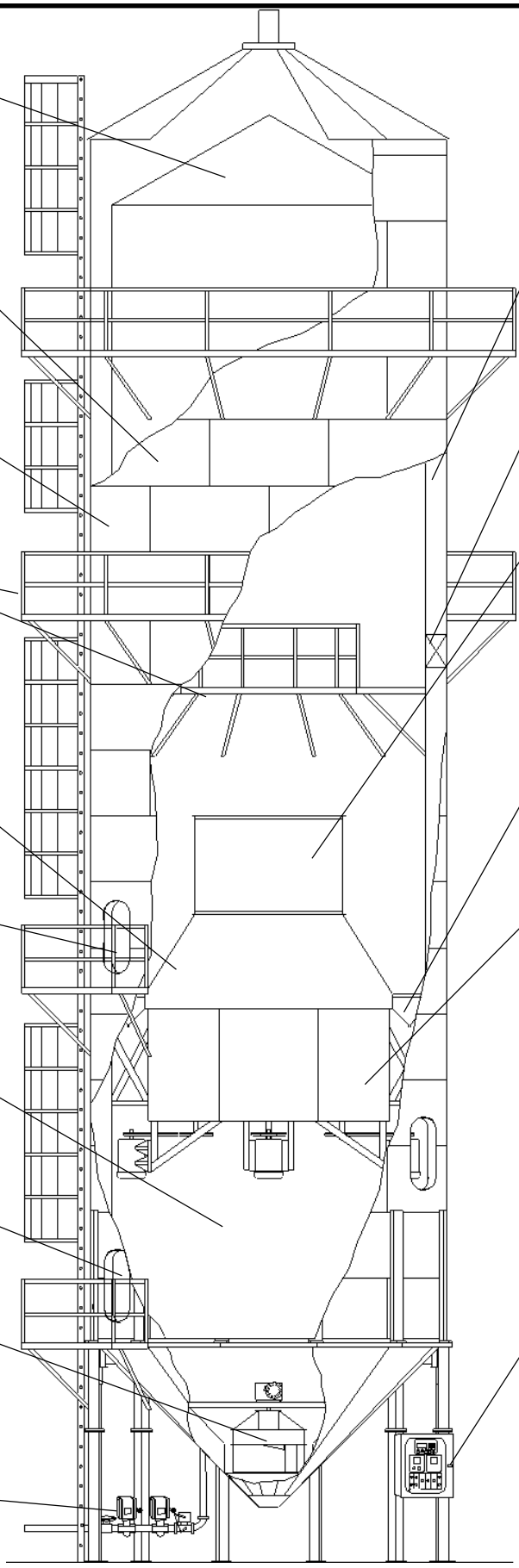
Walk-in heat section provides easy access for interior cleaning

Recycling heat from the cooling grain results in significant fuel savings

Walk-in cool section provides easy access to blowers and metering system

"Patented" discharge system provides simple, uniform metering and quick dryer clean out

Industrial quality components (including Maxon valves and burners) ensure years of reliable service



12" wide grain columns and long grain retention times result in high quality, efficiently dried grain

Grain turners in each column ensure even drying

In-line Maxon NP1 series burners provide even heat and efficient combustion from either natural gas or LP vapor (fuel oil burners are optional)

Divider hopper separates the heating and cooling sections while preventing build-up of particulate matter

Internally mounted tubular centrifugal blowers deliver high volumetric airflow to the pressure heat and suction cool sections

Internal mounting provides the added benefit of ultra quiet operation as the surrounding grain creates a natural noise barrier

"Patented" Electronic Monitoring Control System provides the most advanced and reliable dryer control on the market

Weather-proof NEMA IV cabinets and NEMA rated electrical components ensure safe and reliable operation in all conditions

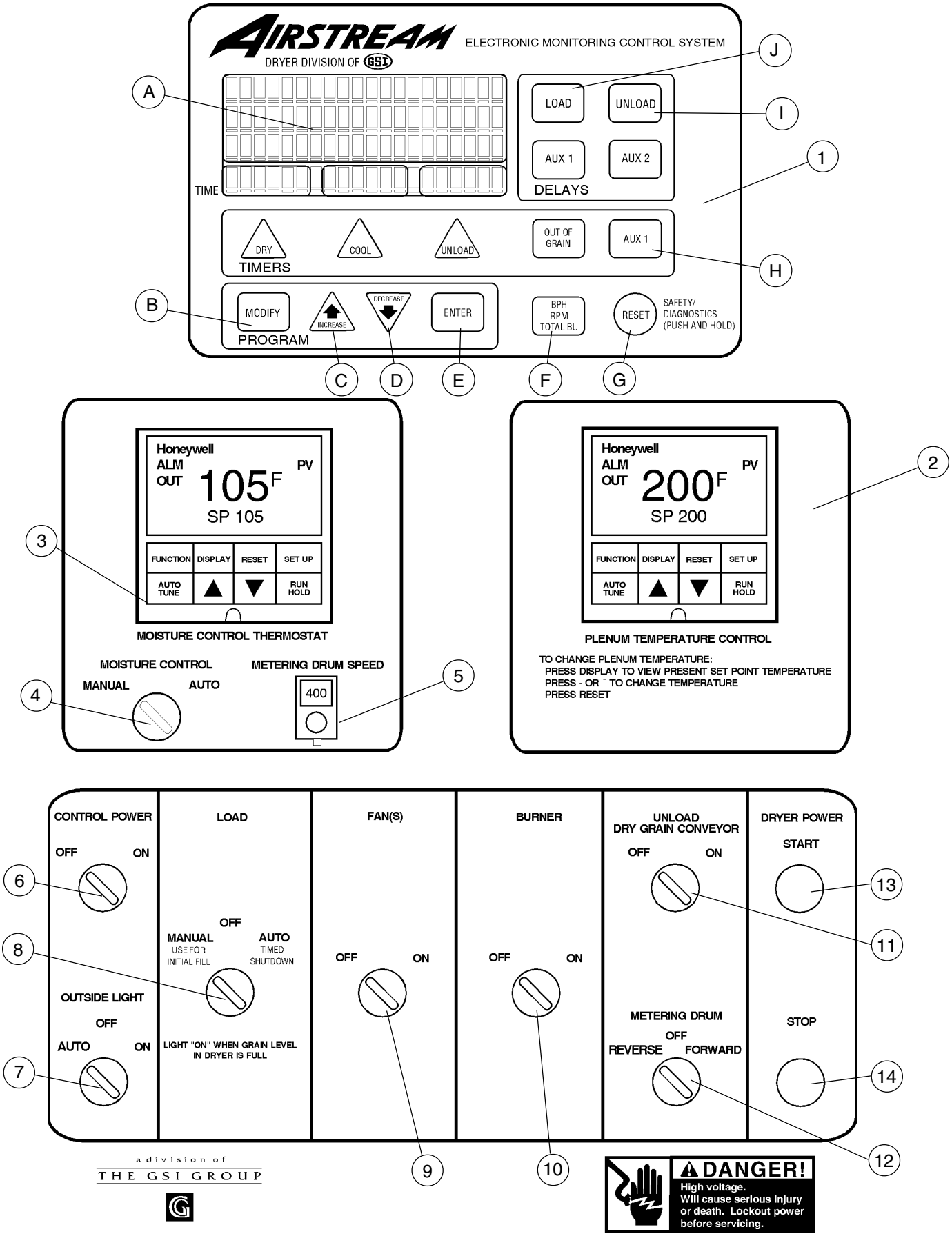


Figure 1: The grain dryer control panel with the Electronic Monitoring Control System in the upper panel.

Dryer Control Panel Featuring The Electronic Monitoring Control System

1. Electronic Monitoring Control System controls all the dryer's timing functions and safety circuit checks. It provides messages and warnings on its liquid crystal display (LCD).

2. Plenum Temperature Control controls and indicates drying temperature.

3. Moisture Control Thermostat controls the metering drum discharge speed automatically when the MOISTURE CONTROL switch is set to "AUTO".

4. Moisture Control Switch selects automatic or manual control of the metering drum speed.

5. Metering Drum Speed controls the metering drum discharge speed when the MOISTURE CONTROL switch is set to "MANUAL".

6. Control Power Switch energizes the control panel and the Electronic Monitoring Control System.

7. Outside Light Switch turns the dryer service light on or off. On "AUTO", the light turns on when the dryer is running and off when a shutdown occurs.

8. Load Switch controls the filling of the dryer. The "MANUAL" position initially fills the dryer. The "OFF" position turns the conveyor off/shuts the slide gate. The "AUTO" position enables automatic fill control and the OUT OF GRAIN TIMER.

On dryers filled on demand with a conveyor:
In the "MANUAL" or "AUTO" position the fill conveyor turns on when the dryer is low on grain and off when the dryer is full.
In the "AUTO" position only, the dryer will automatically shut down when the dryer is low on grain and the OUT OF GRAIN TIMER expires.

On dryers filled on demand with a slide gate:
In the "MANUAL" and "AUTO" position the fill slide gate opens when the dryer is low on grain and shuts when the dryer is full.
In the "AUTO" position only, the dryer will automatically shut down when the dryer is low on grain and the OUT OF GRAIN TIMER expires.

On choke filled dryers:
In the "AUTO" position only, the dryer will automatically shut down when the dryer is low on grain and the OUT OF GRAIN TIMER expires. *In the "MANUAL" or "OFF" position the OUT OF GRAIN TIMER is disabled.*

The LOAD switch is illuminated whenever the lower grain level indicator senses grain.

9. Fan(s) Switch turns the blower(s) on or off. On multifan dryers, the blower run through a staggered startup. The switch is illuminated when all of the blower airflow switches close indicating that the blowers are operating correctly.

10. Burner Switch turns the burner on or off. When the switch is turned on, the dryer automatically goes through a 60 second purge cycle followed by the automatic lighting of the burner pilot. The switch illuminates when flame is sensed at the pilot. After the pilot flame is established, the Maxon shut off valves are energized and must be openned manually to supply gas to the main burner.

11. Unload Dry Grain Conveyor Switch turns the unload conveyor on or off. The switch illuminates when the conveyor is operating.

12. Metering Drum Switch turns the metering drum on or off in forward or reverse. The drum will not run forward unless the unload conveyor is on. The switch illuminates when the metering drum is discharging grain.

13. Dryer Power Start Button initiates automatic operation of the dryer. When depressed, the dryer begins the startup cycle and operates based on the positions of the selector switches on the control panel.

To control the operation of individual components, first depress the DRYER POWER START button, then turn on the individual dryer components as desired.

14. Dryer Power Stop Switch manually stops all dryer functions and automatic equipment.
Important: *In case of an automatic dryer shutdown, the DRYER POWER STOP button must be depressed to reset the dryer control circuit before the dryer can be restarted.*

1. **Prepare dryer for start up**
   Perform preseason inspection and service as outlined in the Maintenance Section before attempting to operate the dryer.

> ⚠ The dryer must have all Pre-Season and Post-Season maintenance to ensure reliable operation

   Make sure all discharge doors, grain exchanger cleanout doors, heat section door, louvered cooling section doors, etc. are closed. Make sure that all personnel are clear of the dryer and any grain handling machinery.

2. **Open main gas valve** to dryer.

3. **Switch on main breaker** to provide electrical power to the dryer by placing the main circuit breaker handle located on the dryer power panel to the "ON" position.

4. **Switch on the control panel** by turning the CONTROL POWER selector switch to the "ON" position. The switch will illuminate indicating that the control panel has power. The LCD display screen on the Electronic Monitoring Control System will light up and display a copyright message followed a few seconds later by a second display screen giving the date and time.

5. **Press the RESET button** on the Electronic Monitoring Control System touch panel.

> ⚠ The RESET button MUST ALWAYS be pressed anytime the Electronic Control System is initially powered up.

   Once the RESET button is pressed, the Electronic Monitoring Control System performs a dryer safety check. If a fault is found, the cause of the fault will be displayed on the LCD screen. Refer to the Troubleshooting Section for error diagnosis. If no faults are found, the dryer can be started and the LCD will display dryer status.

6. **Press the DRYER POWER "START" button** to activate the LOAD, FAN(S), BURNER, UNLOAD and METERING DRUM selector switches on the control panel.

7. **Start auxiliary equipment** needed for filling dryer. (ie. wet legs, conveyors, etc.)

> ⚠ The burner should be covered before filling the dryer to prevent accumulation of foreign material on the Ignitor, Flame Sensor, and Burner Ports. Foreign material may interfere with burner operation.

8. **Fill the dryer** by turning the LOAD selector switch to the "MANUAL" position. On a demand fill dryer, the wet conveyor will turn on / slide gate will open and the dryer will start filling with grain. Once the dryer is full, a horn will sound and the wet conveyor will stop / slide gate will shut. Turn the LOAD selector switch to the "AUTO" position to silence the alarm and begin normal dryer operation. In the "AUTO" position, the dryer automatically controls the conveyor / slide gate and the OUT OF GRAIN TIMER is enabled, allowing automatic shutdown if the dryer remains low on grain after a preset period of time. See Electronic Monitoring Control Section to modify OUT OF GRAIN TIMER. The LOAD selector switch illuminates whenever the grain level in the dryer reaches the lower Bindicator, indicating that the dryer is at operating level.

9. **Set drying / plenum temperature** on the PLENUM TEMPERATURE CONTROL. The upper display indicates the actual plenum temperature and the lower display indicates the set point / desired drying temperature. To

change the drying temperature press the up or down keys then press the reset key on the controller.

Recommended Drying Temperatures

Corn.....180° to 210°F
Soybeans.....140° to 160°F
Wheat.....140° to 160°F
Milo.....160° to 180°F
Barley.....140° to 160°F
Oats.....140° to 160°F

10. **Start the blower(s)** by turning the FAN(S) selector switch to the "ON" position. The blower(s) will automatically start. On multiblower units the Electronic Monitoring Control System will automatically, start the blowers sequentially. Once the blower(s) are up to speed

11. **Start the burner** by turning the BURNER selector switch to the "ON" position. The dryer will automatically go through a 60 second purge period. The amount of time remaining on the purge cycle will be displayed on the LCD display screen. After the purge period the burner pilot will automatically light. Once the flame sensing circuit on the dryer senses flame, the light in the BURNER selector switch will illuminate. If the pilot fails to light in 60 seconds the dryer will shut down.

12. **Cock and open the Maxon valves.** After the pilot is ignited, the main burner can be lit by cocking and opening the two Maxon gas shutoff valves. The main burner will light and the dryer's plenum temperature will be automatically controlled by the modulating motor and maintained at the selected temperature.

12.1 **Open firing valve** (Canadian dryers only)

13. **Let plenum come up to temperature and begin drying**. Depending upon ambient conditions, the dryer may take 10 - 20 minutes to reach the drying temperature

14. **Start unload system.** Before discharging grain from the dryer, first make sure all dry legs and conveyors are operating ahead of the dryer.

> ⚠ On dryers using the "Proof of Auxiliary Unload Running" terminal, the unload conveyor will not operate unless the auxiliary equipment is running.

Turn the UNLOAD DRY GRAIN CONVEYOR selector switch to the "ON" position to operate the conveyor leading from the dryer.

> ⚠ The metering drum will not run forward unless the unload conveyor is running, but will run backward whenever the selector switch is set to "BACKWARD".

Turn the METERING DRUM selector switch to the "FORWARD" position to start discharging grain from the dryer.

15. **Set grain discharge rate/Moisture Control Temperature manually.** With the MOISTURE CONTROL selector switch in the "MANUAL" position, adjust the grain discharge rate using the METERING DRUM SPEED dial. The LCD displays the current metering drum RPM or bushels per hour by pressing the BPH/RPM/TOTAL BU button.

16. **Check discharge moisture content** after 10 minutes. Take five small samples from the discharge and mix before taking a moisture reading.

17. **Switch over to Automatic Moisture Control.** When the discharge moisture content has stabilized at the desired amount for 20 to 30

minutes, the dryer may be switched over to Automatic Moisture Control.

17.1 Note the grain temperature indicated on the MOISTURE CONTROL THERMOSTAT (typically 100°F to 120°F) Adjust the set point on the MOISTURE CONTROL THERMOSTAT to this value using the up or down keys on the thermostat, then press RESET to lock in the new set point temperature.

17.2 Turn the MOISTURE CONTROL selector switch to the "AUTO" position. The MOISTURE CONTROL THERMOSTAT will automatically adjust the metering drum speed to maintain the same grain temperature and grain moisture content.

⚠ If the discharge moisture content in consistently too high or too low, adjust the set point temperature on the MOISTURE CONTROL THERMOSTAT as follows:

5°F increase = 1 moisture point decrease

5°F decrease = 1 moisture point increase

Allow 30 minutes between adjustments.

After the *Automatic Moisture control* is initially set up using the above steps, future setups will not be required. Following an extended shutdown, manually operate the discharge rate from the dryer until the grain temperature has warmed to the set point temperature indicated on the thermostat. Then turn the MOISTURE CONTROL selector switch to the "AUTO" position for automatic operation.

18. **Shutdown dryer.** The dryer will likely have to be shutdown from time to time. The steps used to shut it down will depend upon the duration of the shutdown. If the dryer will be shutdown for 4 hours or less, follow the Short Shutdown procedure. For longer shutdowns, such as overnight, follow the Extended Shutdown procedure

Short Shutdowns - less than 4 hours

For short shutdown periods, the dryer can be shutdown by pushing the DRYER POWER STOP button. *To restart the dryer, push the DRYER POWER START button. The Electronic Monitoring Control System will restart the dryer automatically based on selector switch settings.*

Extended Shutdowns - 4 hours or more

1. **Shut off the burner.** Turn the BURNER selector switch to the "OFF" position. All gas valves will immediately close and the burner will extinguish.

2. **Cool down grain.** Continue to operate blowers for approximately 10 minutes to cool grain. To avoid overdried grain upon restarting the dryer, continue to move grain through the dryer during the cooling off period.

3. **Shut off unload equipment.** Turn METERING DRUM and UNLOAD CONVEYOR selector switches to "OFF" position.

4. **Shut off blowers.** Turn FAN(S) selector switches to "OFF" position.

5. **Shut off control panel.** Turn the CONTROL POWER selector switch to the "OFF" position.

6. **Turn off main circuit breaker** located on the power panel.

7. **Close main gas valve** to the dryer.

8. **Inspect the inside of the dryer** (heat section and cooling section) after operation to insure against the possibility of hot spots or fires.

Dryer Initiated Safety Shutdowns

The *Electronic Monitoring Control System* continuously monitors all safety circuits on the dryer and automatically shuts the dryer down if a problem occurs. The cause of the dryer shutdown will immediately be displayed on the LCD and an audible horn on the dryer will sound. To silence the horn turn the CONTROL POWER switch to the "OFF" position. To restart the dryer after a safety shutdown, first correct the reason for the shutdown and then turn the CONTROL POWER switch to the "ON" position. The dryer can be restarted by pressing the DRYER POWER "START" button.

Shutdown Error Messages

All of the possible dryer safety shutdown messages that appear on the LCD display of the Electronic Monitoring Control System are listed in the TROUBLESHOOTING section of this manual.

Dryer Safety Shutdown Log

Press the INCREASE and DECREASE buttons simultaneously to display a log of the past 25 dryer safety shutdowns on the LCD screen. Follow the instructions displayed on the screen.

Changing BPH/RPM/Total BU Display

By pressing the BPH/RPM/TOTAL BU button, the third line of the display will toggle between showing either the metering drum RPM's , give the bushel per hour rate that the metering drum is currently removing grain from the dryer at, or give the total bushels dried since the bushel counter was last reset.

Displaying the Dryer Hour Meter

By pressing the INCREASE button the total hours of dryer operation are displayed on the LCD screen. The screen will revert back to its original mode after a few seconds.

Setting the Out Of Grain Timer

The OUT OF GRAIN timer automatically shuts down the dryer if it remains low on grain for a user set period of time. *This function is only enabled during dryer operation if the LOAD switch on the control panel is in the "AUTO" position.* Follow the instructions displayed on the screen. To change the setting of this timer:

1. Press the OUT OF GRAIN button.
2. Press the MODIFY button.
3. Press the INCREASE or DECREASE buttons to change the value.
4. Press the ENTER button to accept the new value.

Setting the Load and Unload Delays

The LOAD delay is used to delay the starting of a load conveyor or the opening of a slide gate when the lower Bindicator indicates a low grain level. The UNLOAD delay is used to delay the stopping of the unload conveyor after the metering drum stops to allow the unload conveyor to empty out. Both the LOAD and UNLOAD delays are set using the same procedure as the OUT OF GRAIN timer.

Modifying the Bushel Per Hour Factor

The bushel per hour reading given by the *Electronic Monitoring Control System* is a calculated value based on metering drum speed. Due to variations in grain test weight and unload system settings, the correction factor may need to be calibrated so that the calculated and actual grain flow rates agree. The bushel per hour factor is normally set at 1.0. If, for example, the actual grain flow rate is 5 percent higher than displayed, change the bushel per hour factor to 1.05. To adjust the correction factor, press the BPH/RPM/TOTAL BU button and follow the on screen instructions.

Pre-Seasonal Inspection and Service

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

1. Shut off electrical power. Open power box and control box, and inspect for moisture, rodent damage or accumu lated foreign material present. Inspect and tighten any loose terminal connec tions. Replace any damaged or deterio rated wiring.

2. Lubricate the blowers and metering system as outlined in the Lubrication Table below.

3. Check blower belts for proper tension.

4. Inspect and clean the burner. Visually check that no holes in the stainless steel air mixing plates are plugged. If burner ports are plugged, clear them with a piece of wire or a drill bit. After a period of several years, it may become necessary to drill out the burner ports to clear away accumulated rust. Use a #47 drill bit to return burner ports to their original diameter.

5. Check electrical connections at both the flame rod and spark plug. Clean spark ignitor.

6. Lubricate linkage on gas modulating valve. Make sure drain valve in the fuel train is open at all times except when the dryer is operational.

LUBRICATION TABLE

LOCATION	INSTRUCTIONS	TYPE OF LUBRICATION	LUBRICATION INTERVAL
Metering drum drive shaft bearing.	Lubricate slowly until lub shows through seal. Wipe clean.	High quality, grade #2 lithium based grease.	Beginning of season (annually).
Blower shaft bearings.	Lubricate bottom bearing slowly counting the grease gun pumps until lub shows through the seal. Wipe clean. Use same number of grease gun pumps for top bearing.	High quality, grade #2 lithium based grease.	Every 4 weeks of dryer operation.
Blower motor bearings.	See motor lubrication procedure below[1].	High quality, grade #2 lithium based grease.	Every 2 years (Normal operation, every 8-10 months continuous operaton).
Metering drum drive motor.	See motor lubrication procedure below[1].	High quality, grade #2 lithium based grease.	Every 2 years (Normal operation, every 8-10 months continuous operaton).
Metering drum gearbox.	Fill to check plug.	EP Gear Oil (Amoco Permagear (R) EP (220)) or equivalent.	Beginning of season. (Change every 2 years).

[1]**Lubrication of motors--**Operate motors for 20 minutes. Clean grease fitting. Remove grease relief plug and using a low pressure grease gun, pump in the required grease. After relubricating, allow motor to run for 10 minutes before replacing relief hardware. *Do not overgrease!*

Seasonal Inspection and Service

1. The hopper access door must be in place at all times when the dryer is in operation. Before turning blowers always make sure this door is clamped into position.

2. Follow lubrication guides as outlined in the Lubrication Table.

3. Do not let grain fines and dust accumulate inside the dryer. Bi-weekly if drying most products or daily if drying milo, clean the cooling chamber floor of fines and dust. Sweep down the cooling section sheets if necessary. Fines can be swept into the hopper. Make sure that the hopper divider that separates the heat section from the cooling section remains clean and open.

4. When cleaning dryer, check the grain discharge area around the metering drum to insure that grain is flowing freely from each column and that there is no trash build-up. Also, sweep accumulated dust off of the metering drum drive motor and gearbox.

5. If undried grain is left in the dryer for more than a week during the drying season, inspect the plenum roof to make sure that there is not wet grain sticking to the roof that could restrict grain flow.

6. When drying dirty corn in high humidity conditions, sludge may build up in the upper outside sheets of the dryer. This buildup can be removed by either washing the sheets down with a high pressure water hose, or by shutting incoming grain, dropping the grain level to below the plugged area, and then running the fans and burner to dry the affected area. Tapping or sweeping the sheets will dislodge debris. Attempting to sweep off the sheet build-up while it is still wet will usually plug the sheet more.

In Case of Fire

1. When you first detect a fire, the entire drying operation should be shut down, including grain flow into and out of the dryer. The emergency controls may have already done this. Also, shut off the electrical and fuel supply to the dryer.

2. Do not try to cool a fire by running the fan(s).

3. Never run grain from the dryer into the elevator or storage if a fire is known or suspected.

4. Locate the area of the fire.

5. If the fire can be extinguished with a fire extinguisher, water hose or by removing the burning material, this should be done right away. Watch the dryer closely for another fire after one has occurred.

6. Emergency discharge slide gates at the bottom of each column as well as easy access gates located near the hopper discharge area permit fast dumping of each individual grain column.

7. A fire extinguisher should be located at or near the dryer, if a fire seems to be getting out of control call the fire department.

End of Season Service

1. Empty the dryer at the end of the drying season. The dryer should not be used for grain storage. Grain left in there for an extended period of time can become wet, swell, and spoil. Chunks of spoiled grain can plug the metering system and swelled grain places undue stress on the interior and exterior sheeting of the dryer.

2. Clean out the plenum roof grain cushion and remove any grain that may be hanging up on the plenum roof.

3. Make sure the grain exchangers are clean.

4. Clean out the hopper that divides the heat section from the cooling section.

5. Clean the cooling chamber floor.

6. Remove all grain and trash from the metering drum floor. This grain can be raked out by hand by opening the slide gates located in the hopper bottom of the dryer.

7. Make sure gas supply is shut off to the dryer.

8. Open the gas train drain valve located on the bottom of the gas train.

9. It is a good practice to cover the burner with a tarpaulin or plastic to insure a clean burner.

Trouble Analysis Procedure

A multimeter is required for some of the following check-out procedures. Before performing any tests, make certain if the dryer power supply is 3 phase, 230 or 460 volt.

- The burner circuit is 120 volts AC on all standard U. S. production models.
- The control circuit to the motor starters is 120 volts AC.
- The safety circuit is 12 volts D. C.
- When checking these circuits, measure voltage between the circuit test location and to ground.
- D. C. circuits should be measured between the test location and its respective D. C. ground.

CAUTION: When making high voltage tests with "live" circuits, be extremely careful. Follow established safety practices. Turn power on for testing only. Do not attempt to make the dryer operate by using a jumper wire to bypass a defective safety component.

Problem	Possible Cause/Remedy
Control power switch light off.	1. Check that main power and circuit breakers are turned on. Check for tripped breaker. 2. Check for blown 5 amp fuses. 3. Defective transformer or wiring. 4. Check for a defective power switch. 5. Check wiring between fuses and input/output board. Refer to wiring diagram for test locations.
No display on LCD screen.	1. Check for a defective power switch. 2. Check wiring between fuses and input/output board. 3. Check for 120 volts A. C. between points J9-3 and AC-1. 4. The display may have a malfunction requiring its replacement.
Control power light is on, drying mode light is on--load, fan, burner, unload will not operate.	1. **Press the dryer power** start button. 2. Refer to the problem listed for load auger, fan heater and unload auger in the following sections.
Display shows **"L1 VOLTAGE LOST"** message.	The left circuit breaker located on the input/output board of the Electronic Monitoring Control System has tripped, or one of the hardware timers on the Electronic Monitoring Control System has shut down the dryer.
Display shows **"12 VOLT POWER SUPPLY WARNING"** message.	The right circuit breaker located on the input/output board of the Electronic Monitoring Control System has tripped.
Display shows **"_____ OVERLOAD or "____ ____ MOTOR OVL"** message. Indicating either a fan, unload or load motor overload is tripped.	The thermal overload on the fan motor, load motor, unload motor or an auxiliary motor has opened indicating an overloaded motor. (The overloads must be manually reset).
Blower motor(s) will not start.	1. Check that the fan circuit breaker and the fan switch are on. Also, check for defective switch or bad wiring connections. 2. If lighted switch does not light, an air switch needs adjustment, or the bulb may be burned out. 3. Verify closing of fan motor contactor. Check voltage on load side of contactor. See appropriate power wiring circuit diagram for terminal numbers. Inspect contactor for defective points or a burned out coil. 4. Inspect connections, and check voltage applied to the motor leads to determine if the motor is defective. 5. If motor starts slowly, check for low voltage during starting due to excessive voltage drop in power supply wiring.

Problem	Possible Cause
Display shows **"LOSS OF FLAME"** message.	The flame sensor has failed to detect a pilot flame, indicating that the burner has failed to light, there is a problem with the flame sensing circuitry or the dryer is not getting burner fuel.
Burner pilot lights but goes out before Maxon Valves are cocked.	1. Operator is waiting too long to cock Maxon Valve to light main burner. (Maxons must be cocked within 60 seconds after establishing a pilot. 2. Pilot regulator pressure needs to be adjusted to achieve a more stable pilot flame.
Display shows **"FAN _____INTERLOCK "** message.	Check contactor-wiring on interlock. The contacts on the side of the specified fan contactor have failed to close when the fan was turned on. This may indicate a problem with the contactor.
Display shows **"NO AIRFLOW: BLOWER___"** message	Indicates the specified blower has failed to show airflow during the preset period of time. 1. Check airflow switch and tubes. 2. Check wiring to airflow switches. 3. Check belts on blowers, and blower wiring and motors.
Display shows **"LOSS OF AIRFLOW"** message.	The airflow switch contacts have opened, indicating insufficient airflow for burner to operate.
Pilot lights. Cocked and opened the main gas valve, but main burner will not come on.	1. The handle on the Maxon main gas shutoff valves should offer some resistance when they are opened. If they don't, check the latching solenoid inside the valve by removing the cover from the side of the valve opposite the handle. The solenoid should energize when a pilot is established. If it does not, check for faulty electrical connections or a faulty solenoid. 2. Check for water in the gas line by opening drain valve. 3. Check the hand valve in feed back line to the main gas regulator. It should be partially open. 4. Check for a broken or stuck butterfly in the gas butterfly valve.
Dryer will not reach operating temperature, or it reaches it slowly.	1. Low gas pressure. Increase gas pressure on main gas regulator. 2. Check for water in gas train by opening drain valve. 3. Make sure dryer is completely full of grain by entering the heat plenum and looking for daylight in one of the grain columns. 4. Gas parts in burner need to be cleaned. Clean by drilling with a #47 drill bit. 5. Make sure that the gas butterfly valve is being driven wide open by the modulating motor. If not, check motor or motor linkage.

Problem	Possible Cause
Display shows **"OUT OF GRAIN"** message.	The dryer has run low on grain, and the out of grain timer has timed out shutting the dryer down. Check the out of grain timer setting, and if necessary adjust. Also, before restarting, inspect load equipment for possible damage or adjustment.
Display shows **"PLENUM HIGH TEMP"** message. Check that columns are flowing.	An over temperature condition has occurred inside the dryer plenum. This is an adjustable high limit with the controls mounted in the cooling section.
Display shows "_____ _____ **HIGH** message indicating the upper, middle, lower or inside high limits have tripped causing a dryer shutdown.	Check for plugged column, dryer is low on grain or a column hot spot.
Display shows **"FAN _____INTERLOCK "** message.	Indicates the specified blower has failed to show airflow during the preset period of time. 1. Check airflow switch and tubes. 2. Check wiring to airflow switches. 3. Check belts on blowers, and blower wiring and motors.
Display shows **"USER UNLOAD IS OFF"** message.	1. The user supplied unload that the user has wired to the dryer component has stopped. This will shutdown the dryer after 10 minutes. Check auxiliary user supplied unload equipment.
Dry conveyor will not start.	1. Check that the dry conveyor circuit breaker is on. 2. If the switch does not light, the output power to the contractor is missing. Check connections, and check to see if the bulb is burned out. 3. Check that the dry conveyor switch is on. 4. Verify closing of dry conveyor contactor; check voltage on load side of contactor. 5. Check for any loose wire connections in dry conveyor circuits.
Display shows **"UNLOAD MOT INTERLOCK"** message.	1. Auxiliary contacts on side of unload contact failed to close when the contactor engaged. Contactor isn't getting power or has malfunctioned.
Display shows **"LOAD MOT INTERLOCK"** message.	1. Auxiliary contacts on side of unload contact failed to close when the contactor engaged. Contactor isn't getting power or has malfunctioned.
Display shows **"GATE FAILED TO OPEN"** message.	1. Check limit switch on close side of gate for malfunction. 2. Check gate motor for loss of power. 3. Check for something stuck in gate. 4. The gate may have taken too long to close.
Display shows **"GATE FAILED TO CLOSE"**	1. Check limit switch on open side for malfunction. 2. Check gate motor for loss of power. 3. Check for something stuck in gate. 4. The Gate may have taken too long to open.
Dryer starts losing during capacity.	1. Dryer not being kept full of grain. 2. Particulate matter has built up on the outside of the dryer and the dryer needs to be cleaned.

Problem	Possible Cause
Grain not moving through cloumns.	1. Check that the load breaker and the load auger switch are turned on. 2. If switch does not light, the output power to the contactor is missing. Check connections, or if the bulb is burned out. 3. Verify closing of the wet conveyor contactor. Check voltage on load side of contactor. Inspect contactor for defective points, or a burned out coil. 4. Inspect connections, and check voltage applied to motor leads in motor junction box to determine if motor is defective.
Dryer starts losing drying capacity.	1. Dryer not being kept full of grain. 2. Particulate matter has built up on the outside of the dryer and the dryer needs to be cleaned.
Grain not moving through columns.	1. Check the dryer for fine material buildup inside the columns. 2. Avoid leaving the dryer columns full for long periods at a time (2-3 days) while not operating the dryer or during rainy weather. 3. Empty the dryer. Keep the dryer clean! Do not allow fine material to gather in the plenum chamber. 4. It may be necessary to open the strike in the affected columns in half inch intervals.
Uneven drying-Some kernels appear brown while others are under dried. Uneven heat exiting from dryer columns.	1. Check plenum thermostat temperature setting. Some varieties of grain are more sensitive to higher operating temperatures. It may be necessary to lower the plenum operating temperature to accommodate this.

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