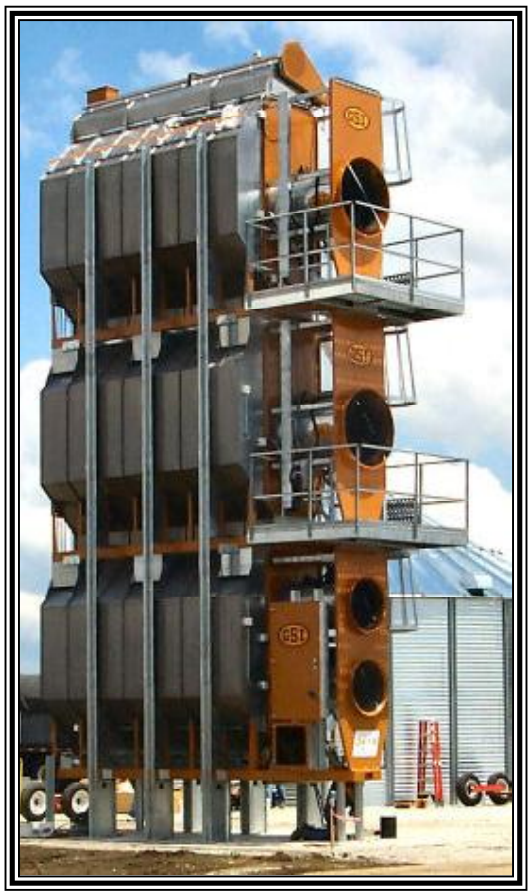
2 and 3 Module Network Portable Dryer Models



Operators Manual

PNEG-951

Date: 2-22-2006

a division of
THE GSI GROUP

PNEG-951

Table of Contents

2 & 3 Module Network Dryer Manual

GSI Group, Inc.

Printed: May 2006 in (Assumption, Illinois)

History

1988
Portable Dryer line introduced
15 models produced

1989
71 dryers produced

1990
102 dryers produced

1991
94 dryers produced

1992
116 dryers produced

1993
Computerized controls introduced
220 dryers produced
34 were old style controls

1995
Competitor dryer introduced

1999
Network dryer introduced
EMCS controller discontinued

Introduction

GSI Network Portable Dryers

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

This manual describes the operation and service for all standard 2000 & 3000 series two fan grain dryers. These models are available for liquid propane, natural gas, or fuel oil fuel supply, with either single phase 230 volt, three phase 220, 380, 440, or 575 volt electrical power.

The principal concern of GSI Group, Inc. ("GSI") is your safety and the safety of others associated 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 operator or other personel.

As owner and/or operator, it is your responsibility to know what requirements, hazards and precautions exist, ant 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.

This dryer is designed solely for the purpose of drying agricultural corn, grain, and seeds. Use of this dryer in any ways or under configurations other than those indicated in this manual is a misuse of the machine, will invalidate the warranty, and may lead to serious injury or death. If in any doubt, contact GSI or your dealer.

Section 1

Warranty

THE GSI GROUP, INC. WARRANTY

THE GSI GROUP, INC. (“GSI”) WARRANTS ALL PRODUCTS WHICH IT MANUFACTURES TO BE FREE OF DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USAGE AND CONDITIONS FOR A PERIOD OF 12 MONTHS AFTER RETAIL SALE TO THE ORIGINAL END USER. THE PURCHASER’S SOLE REMEDY AND GSI’S ONLY OBLIGATION SHALL BE TO REPAIR OR REPLACE, AT GSI’S OPTION AND EXPENSE, PRODUCTS THAT, IN GSI’S SOLE JUDGMENT, CONTAIN A MATERIAL DEFECT DUE TO MATERIALS OR WORKMANSHIP. ALL DELIVERY AND SHIPMENT CHARGES TO AND FROM GSI’S FACTORY WILL BE PURCHASER’S RESPONSIBILITY. EXPENSES INCURRED BY OR ON BEHALF OF THE PURCHASER WITHOUT PRIOR WRITTEN AUTHORIZATION FROM AN AUTHORIZED EMPLOYEE OF GSI SHALL BE THE SOLE RESPONSIBILITY OF THE PURCHASER.

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

GSI SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOSS OF ANTICIPATED PROFITS OR BENEFITS. PURCHASER’S SOLE AND EXCLUSIVE REMEDY IS AS SET FORTH IN THE LIMITED WARRANTY EXPRESSED ABOVE, WHICH SHALL NOT EXCEED THE AMOUNT PAID FOR THE PRODUCT PURCHASED. THIS WARRANTY IS NOT TRANSFERABLE AND APPLIES ONLY TO THE ORIGINAL PURCHASER. GSI SHALL HAVE NO OBLIGATION OR RESPONSIBILITY FOR ANY REPRESENTATIONS OR WARRANTIES MADE BY OR ON BEHALF OF ANY DEALER, AGENT OR DISTRIBUTOR OF GSI.

GSI ASSUMES NO RESPONSIBILITY FOR CLAIMS RESULTING FROM ERECTION DEFECTS OR UNAUTHORIZED MODIFICATIONS TO PRODUCTS WHICH IT MANUFACTURED. MODIFICATIONS TO PRODUCTS NOT SPECIFICALLY DELINEATED IN THE MANUAL ACCOMPANYING THE EQUIPMENT AT INITIAL SALE WILL NULLIFY THE PRODUCT WARRANTY THAT MIGHT HAVE BEEN OTHERWISE AVAILABLE.

THE FOREGOING WARRANTY SHALL NOT EXTEND TO PRODUCTS OR PARTS WHICH HAVE BEEN DAMAGED BY NEGLIGENT USE, MISUSE, ALTERATION OR ACCIDENT. THIS WARRANTY EXTENDS SOLELY TO ONLY PRODUCTS MANUFACTURED BY GSI. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. GSI RESERVES THE RIGHT TO MAKE DESIGN OR SPECIFICATION CHANGES AT ANY TIME.

PRIOR TO INSTALLATION, PURCHASER HAS THE RESPONSIBILITY TO COMPLY WITH ALL FEDERAL, STATE AND LOCAL CODES WHICH MAY APPLY TO THE LOCATION AND INSTALLATION OF PRODUCTS MANUFACTURED OR SOLD BY GSI.

Section 2

Safety First

DRYER OPERATION

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

This manual describes the operation and service for all standard Network grain dryers. These models are available for liquid propane or natural gas fuel supply, with either single phase 230 volt, or three phase 220 or 440 volt electrical power.

The principal concern of the GSI Group, Inc. ("GSI") is your safety and the safety of others associated 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 dryer 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!

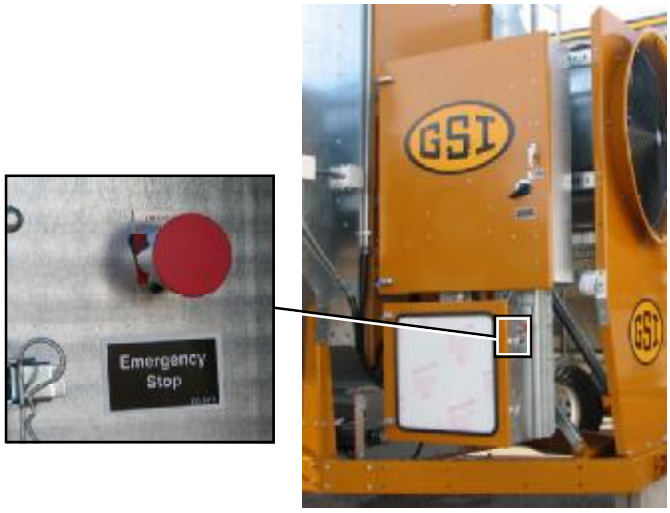
Personnel operating or working around electric fans should read this manual. This manual must be delivered with the equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

EMERGENCY STOP

Decal: DC-1317

The emergency stop switch is located on the lower control box on the upper right hand side and is labeled with decal DC-1317. Pushing the emergency stop switch will interrupt the control power and stop all dryer functions.

WARNING: Pushing the emergency stop switch does not interrupt the main power to the upper control box panel.



The GSI Group, 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.

If a decal is damaged or is missing contact:

The GSI Group, Inc.
1004 E. Illinois St.
Assumption, IL 62510
217-226-4421

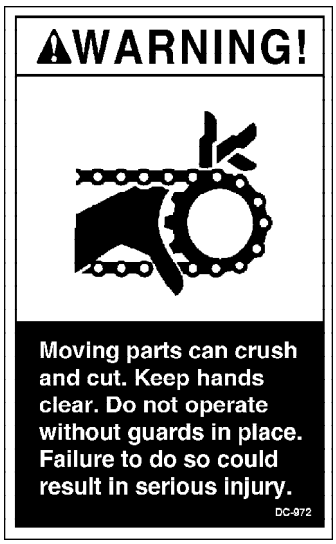
A free replacement will be sent to you.

Decal: DC-1224

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

Decal: DC-889

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



Decal: DC-972

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

Decal: DC-971

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

Another location for decal DC-971 is the top auger belt guard (one on the belt guard cover and one inside on the belt guard body visible when the belt guard cover is remove).

Decal: DC-974

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

Decal: DC-1227

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

Decal: DC-1225

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

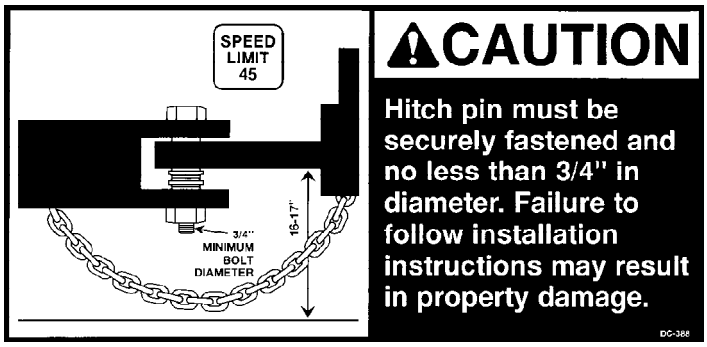
Decal: DC-1229

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

Decal: DC-973

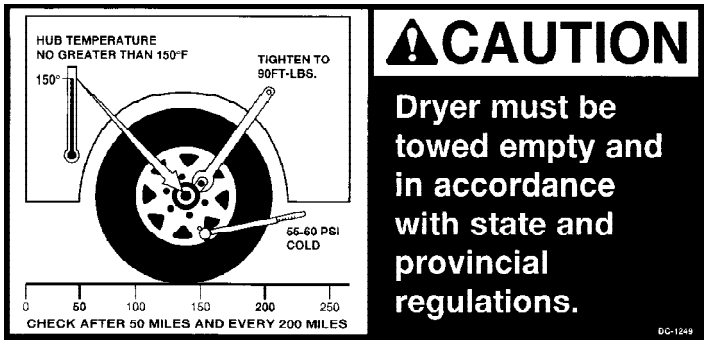
Decal DC-973 is located on the rear plenum access door (inside and outside).

Decal: DC-388



Decal DC-388 is located on the hitch tongue.

Decal: DC-1249



Decal DC-1249 is located on the hitch tongue.

READ THESE INSTRUCTIONS
BEFORE OPERATION AND SERVICE
SAVE FOR FUTURE REFERENCE

1. Read and understand the operating manual before trying to operate the dryer. This manual contains important guide-lines and sequence of events to help you install and operate your dryer safely and successfully. Follow the guide lines closely.

2. After towing the dryer, ensure it is parked on a level surface and that suitable precautions have been taken to prevent it from rolling, i.e. block the wheels in both directions.

3. Never operate the dryer while the guards are removed.

4. BEFORE any maintenance switch the dryer OFF at the mains electricity and lock off. This should include all associated conveyers, augers and other associated equipment. Maintenance requiring the power to be ON, such as testing electrical circuits, must be done by qualified personnel.

5. 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.

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

7. Set pressure regulator to avoid excessive gas pressure applied to burner during ignition and when burner is in operation. Do not exceed maximum ended drying temperature.

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

9. Keep auger drive belts tight enough to prevent slippage.

10. Never work in or on the dryer while it is on or when the electrical supply is on as the fans, augers and burners may start automatically.

11. Keep the air inlet to the fan clear of any obstructions and free from combustible materials.

12. Before attempting to remove and re install any blade, make certain to read the recommended procedure listed within the servicing section of the manual.

13. Be certain that capacities of auxiliary conveyers are matched to dryer auger capacities.

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

15. Never enter the dryer plenum chamber unless:
a) The electrical power is locked off and the key is in your possession.
b) The gas is shut off from the gas supply.
c) The dryer has stopped operating and is cool.

16. Dust and noise are inherent hazards with this type of machine, which can be harmful to your health. To reduce risks:
a) Avoid working around the dryer.
b) When around the dryer, wear suitable ear defenders and a dust mask suited to protection against grain dust.

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 conveyers, which may start without warning when the dryer is operating on automatic control.

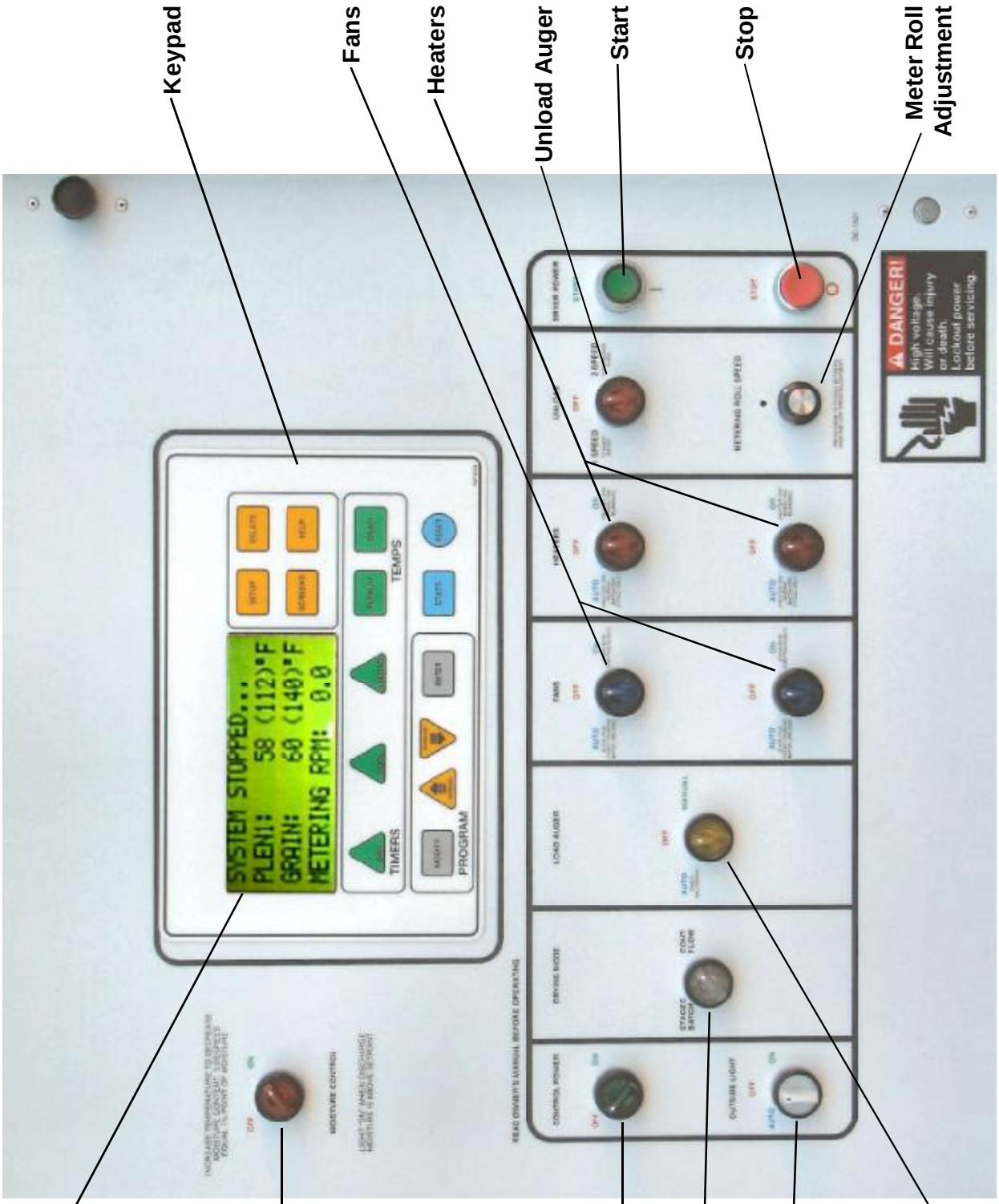
Continued safe, dependable operation of automatic equipment depends, to a great degree, upon the owner. For a safe and dependable drying system, follow the recommendations within this manual, and make it a practice to regularly inspect the operation of the unit for any developing problems or unsafe conditions.

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

Section 3

Control Panel

SWITCH PANEL LAYOUT



CONTROL POWER SWITCH

The control power to energize the Network Control System is turned on or off with this switch.

Note: This switch does <u>not</u> disconnect the power that is present at the breakers, contactors, transformer(s), fuses or other electrical components found in the upper and lower control boxes. Turn the Main Disconnect Handle to the OFF posistion prior to servicing any of the installed components.

DRYING MODE SWITCH

This is used to select staged batch or continuous flow drying. The switch will light only after the Network Control System has been turned on, the safety circuit is okay and the 

button on the control panel has been pressed.

LOAD AUGER SWITCH

This is used to select the operation of the fill auger. In both the auto and manual position the load auger will operate if the dryer is low on grain and will automatically shut off when the dryer is full. In the auto position only, the dryer will shut down after a preset period of time set on the out of grain timer, or if grain flow is interrupted to the dryer. The switch will light whenever the load auger is operating.

Note: If the load auxiliary controls are being used, this switch will also control the operation of the auxiliary equipment.

FAN SWITCH

Each fan is turned on or off with this switch. The on position operates the fan continuously during staged batch and continuous flow modes. The auto position operates the fan in staged batch during the dry and cool cycle but the fan will not operate during the unload cycle. The switch will light up whenever the air pressure switch is sensing air pressure and the dryer is full of grain.

Note: The bottom fan on your dryer is always Fan 1.

HEATER SWITCH

Each burner is turned on or off with this switch. The auto position operates the burner in staged batch during the dry cycle only. The on position will operate the burner only when the fan is running. The switch will light up only when the flame sensor detects the flame.

Note: The bottom burner on your dryer is always Burner 1.

UNLOAD SWITCH

The unload switch turns the metering rolls and discharge auger on or off, and selects the operation of the metering rolls.

- In the 2 speed position if the moisture control switch is on, and the drying mode switch is turned to cont. flow, the metering roll speed will alternate between the high speed metering roll potentiometer setting and the low speed metering roll potentiometer setting depending on whether the grain temperature is above or below the grain temperature setpoint. The discharge auger will operate continuously.

- In the 1 speed position, if the moisture control switch is on, and the drying mode switch is turned to cont. flow, the metering roll speed will discharge grain at the high speed metering roll potentiometer setting or turn off the meter rolls depending on whether the grain temperature is above or below the grain temperature setpoint. The discharge auger will operate whenever the metering rolls are operating.

- In both the 1 speed or the 2 speed position, if the moisture control switch is off, and the drying mode switch is turned to cont. flow, the metering roll speed can be manually controlled by adjusting the high speed metering roll potentiometer. The discharge auger will operate continuously.

- If the drying mode switch is turned to staged batch, the unload switch should be set to the 1 speed position. The discharge auger and metering rolls will only operate during the unload cycle of the staged batch operation, and the speed of the metering rolls is adjusted using the high speed metering roll potentiometer.

Note: If the unload auxiliary controls are being used, this switch will also control the operation of the auxiliary equipment.

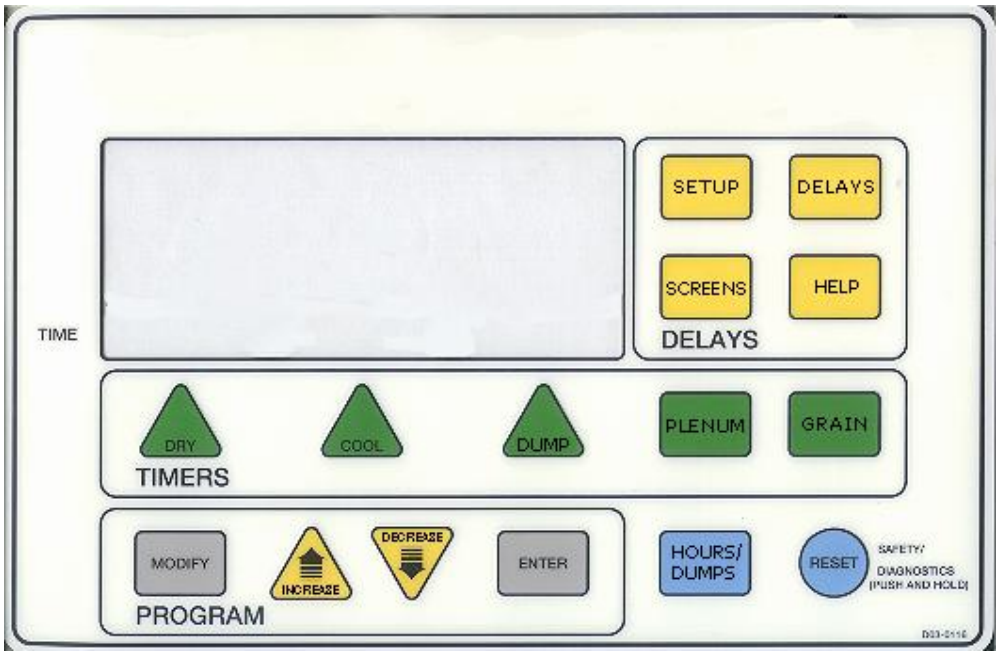
MOISTURE CONTROL SWITCH
This switch activates the moisture control circuit. It lights up when the grain column temperature is below the moisture control (grain temperature) set point.

OUTSIDE LIGHT SWITCH
The dryers outside service light is turned on or off here. It also may be set on auto, which turns the light on while the dryer is running and off if a shutdown occurs.

RUN SWITCH
This switch starts and operates the dryer based on switch settings. If other switch settings are in the off position, individual dryer components can be operated by turning the drying mode switch to continuous flow, pressing the dryer power run button and then turning on the desired dryer component.

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 button to reset the dryer before restarting.

KEYPAD LAYOUT
All of the timer settings, delays and operational dryer parameters are setup with the keypad.



Listed below is a description of the buttons used on the keypad.

RESET BUTTON
On this screen is information on the version of software that is installed on your dryer.

Press the 

button to intialize the dryer. The computer will run a series of tests on its internal components. The dryer controls will not operate until this button has been pressed.

SETUP BUTTON

Pressing the 

button while the system is stopped, will give you four setup screens. These are:

This screen is used to clear your batch counter. You may want to do this at the start of the drying season to keep an accurate count of the batches ran through your dryer during the drying season. Press the 

button to clear it or just press the 

button to keep your total batch count.

The next screen allows you to clear the total amount of bushels that your dryer has recorded. Press the 

button to clear it or just press the 

button to keep your total bushels count.

This screen is used to customize your dryer with the name of your farm or company. This message will contain the serial number of the dryer when it leaves the factory but can be changed to anything message you like. Use the 

to change the character above the flashing cursor. To move the cursor, press the 

button to advance to the next character or the 

button to back up to the previous character on the line. When you have finished entering your custom message press 

to accept the changes.

Press the 

button to accept the new setting.

DELAY BUTTON

The DELAYS button will display four different setup screens.

The screens will display in the following order:

Load On Delay - amount of time before fill auger starts once fill switch has been activated see

Out of Grain Timer - amount of time fill auger will run until fill switch has been activated

Fan Sequencing Delay - minimum amount of time between each fan startup

Unload Cleanout Delay - amount of time unload continues to run once meter rolls have stopped

SCREENS BUTTON

Press the SCREENS button and the display will then show a menu selection screen.

This allows you to select between 3 different choices.

- **Out of Grain Time -** allows you to view or change the Out of Grain Timer, or view how long it took for your dryer to fill.
- **View Grain Temps -** allows you to view your grain temperatures on different modules (if so equipped).
- **Meter Roll SP Avg** - shows you the percentage of time that the speed of the meter rolls system has spent on HI or Low speed.

Press the INCREASE DECREASE buttons to move the pointer and allow you to select any of the three choices and then press the ENTER button to jump to the next menu selection.

Out of Grain Time

Press the INCREASE DECREASE button and move the pointer to change your selection or just press the ENTER button on the **Out of Grain Time** selection gives you an additional 3 choices relating to your Out of Grain Timer.

- **Set Out of Grain** - will allow you to change your Out of Grain Timer settings
- **Out of Grain Tmr -** view the Out of Grain timer
- **Last Load Time -** displays the amount of time it took for the fill paddle switch to become activated or the dryer filled.

Pressing the ENTER button again on the Set Out of Grain allows you to adjust the time it takes for your dryer to run whenthe load paddle switch has not been activated. If this timer expires, your dryer will shut down giving you a out of grain warning. If you have a slow fill auger system, you would probably want to set this setting to a high value.

Set Out of Grain

The Out of Grain timer should be set to the maximum time it takes for your dryer to refill during continious or batch mode drying.

If the dryer runs out of grain while the load auger switch is in the auto position, the out of grain timer automatically shuts off the dryer after the period of time preset on the timer.

Press the 

button to edit the timer settings. Press the 

button to adjust the timer value.

Press the 

button to accept the changes.

Out of Grain Timer

From this screen, you can view the amount of time left on your Out of Grain timer and view the amount of time it took to load your dryer the time before.

See Out of Grain Timer for more information.

Last Load Timer

This screen shows you how much time the load or fill auger operated until being deactivated by the fill auger mercury switch. This information can be useful for determining the amount of time you need to place into your setting.

See Out of Grain Timer for more information.

View Grain Temps

Press the 

button and move the pointer to change your selection to View Grain Temps.

Then press the ENTER button to accept the selection.

Grain Temperatures

This allows you to look at detailed temperature information on each fan and heater that is installed on your dryer. Press the 

button to toggle between the fan/heaters or press the ENTER to exit out of this screen.

Meter Roll SP Avg

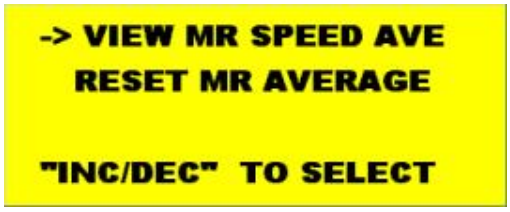
Press the 

button and move the pointer to change your selection to Meter Roll SP Avg.

Then press the ENTER button to accept the selection.

Meter Roll Speed Ave Selection

Press the ENTER button to accept the View MR Speed Ave selection.



View MR Speed Average

On this screen is information showing you how much time the metering roll system has spent on HI speed and LOW speed. The ideal values of course is at 50% each, although in real world situations this is very difficult to obtain. Having a 30% - 70% reading is not uncommon but anything over this may indicate that meter roll speed settings may need adjusting. This can vary throughout the day due to a number of conditions including drying wetter grain or ambient temperature changes of 10º or more.

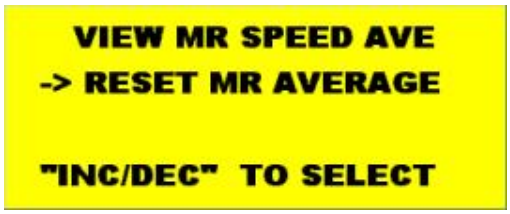
Reset MR Average

Press the 

button and move the pointer to change your selection to Reset MR Average

and press the 

button.



You can reset the speed average by pressing the 

button or you can exit out of this function by

pressing the 

button and goto the User Hour Meter screens.

User Hour Meter

The User Hour Meter is a custom timer which can be used for several different scenarios. For instance, if you wanted to monitor the amount of time used between different hybrids of corn or if you have more then one user of the dryer.

Press the 

button to exit back to the main drying screen.

Reset User Hour Meter

Pressing the 

button at this point will cause the to be reset back to 0.

If this is not the desire action then press the 

button to exit back to the main drying screen.

HELP BUTTON

The 

button currently has no function.

DRY BUTTON

The 

button is used to change the Dry timer settings when you operate your dryer in the Batch mode. This button has no effect in the continous drying mode. Please refer to the Staged Batch section.

COOL BUTTON

The 

button is used to change the Cool timer settings when you operate your dryer in the Batch mode. This button has no effect in the continous drying mode. Please refer to the Staged Batch section for Batch operation.

UNLOAD BUTTON

The 

button is used to change the Unload timer settings when you operate your dryer in the Batch mode. This button has no effect in the continous drying mode. Please refer to the Staged Batch section for Batch operation.

PLENUM BUTTON

The 

button allows you to view the plenum temperature of all the burners on your dryer. Press ing the 

button allows you to change the plenum set point of the burner being viewed. Press 

to advance to the next screen (burner) or to accept any changes you may have made.

GRAIN BUTTON

The 

button allows you to view or modify the moisture control (grain temperature) set point which determines the final moisture content of the grain being discharged from the dryer. Press the 

button to make any changes. Press 

to advance to the next screen or to accept any changes you may have made.

MODIFY BUTTON

When viewing a screen with settings that can be changed, the 

button will allow you to edit the values on this screen. Otherwise this button will have no function available.

INCREASE and DECREASE BUTTONS

The 

are used when you are editing temperature, time values or for scrolling up and down the different screen selections.

ENTER BUTTON

Use the 

button to accept any changes you may have made to timer, delay or setup screens. It is also used to advance to the next screen.

STATS BUTTON

Pressing the HOURS/ DUMPS button will toggle the last line of the main display screen to 3 different views relating to the dryers approximated output rate.

This screen shows the actual turning speed of the meter rolls in RPM.

Pressing the HOURS/ DUMPS button again shows an approximated Bushel per hour that have passed through the dryer using the above RPM readings as a reference. This can vary depending on the cleanliness and test weight of the grain and/or the position of the slide gates located directly above the turning metering rolls.

Pressing the HOURS/ DUMPS button again shows an approximated Total Bushels that have passed through the dryer using the above RPM readings as a reference.

Section 4

Dryer Pre Season Checks

This section gives a series of checks to be carried out on the dryer before starting for the first time in the drying season. If any of the checks fail to produce the stated result, you should consult your dealer.

YOU SHOULD NOT ATTEMPT TO USE THE DRYER UNLESS ALL THE PRE-START CHECKS HAVE BEEN SUCCESSFULLY COMPLETED.

BEFORE ATTEMPTING TO OPERATE THE DRYER MAKE SURE ALL SAFETY SHIELDS ARE IN PLACE, ALL BOTTOM CLEANOUT AND REAR ACCESS DOORS ARE CLOSED AND ALL PERSONNEL ARE CLEAR OF THE DRYER

INSPECT THE METERING ROLLS

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

ELECTRICAL POWER

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

CONTROL POWER SWITCH

Turn the control power switch to on. The switch will light up. A copyright message, model number, total running time in hours and minutes, current date and time will appear. At this point the controller will lock out all other dryer functions. Once the date and time appear, press the 

button and the dryer will perform a safety circuit check. If a fault is found, the cause will be displayed on the LCD. If all are found safe, the controller will supply power to the electronic fuel shut-off valve (Maxon), if so equipped, and the drying mode switch will light up, indicating that the dryer is ready to be started.

RUN BUTTON

Push the dryer run button, and all the selector switches on the control panel will be activated.

FUEL CHECK

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

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

Any gas leaks must be fixed immediately!

LOAD AUGER

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

Turn the load auger switch to the auto position. The top auger and wet grain supply auxiliary should run for eight (8) minutes, and then the dryer will shutdown leaving the safety shutdown message (out of grain warning) displayed. Press the dryer power stop button to reset the panel, then press the start button.

UNLOAD ONE SPEED OPERATION

To check one speed operation place the unload switch in the one speed setting. Turn the metering roll dial until the metering rolls start rotating. The bottom auger should rotate counterclockwise as viewed from the drive end. The metering roll drive motor should rotate clockwise as viewed from the drive end of the gear box. If the dry grain take away auxiliary is wired to the dryer, it should start and rotate in the proper direction.

UNLOAD TWO SPEED OPERATION

To check two speed operation move the unload switch to the two speed position, change the low speed reading to 200 and high speed on 600. Adjust the moisture control (grain temperature) setpoint to a value **lower** then the ambient temperature or until the moisture control switch light comes on. The metering roll speed is now controlled by the low speed setting. Adjust the moisture control (grain temperature) setpoint to a value **higher** then the ambient temperature or until the light goes out leaves the metering rolls controlled by the high speed setting.

METERING ROLL OPERATION

To check the metering roll operation turn the knob clockwise, and the metering roll speed should increase. Turning either knob counterclockwise will decrease the speed. Make sure the drive chain tension is properly adjusted and all sections of the metering rolls rotate. Turn the unload switch off after these checks are complete. The bottom auger will continue to run for 60 seconds (default cleanout delay setting) after the switch is turned off to allow for cleanout.

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

Meter Roll 1 Speed Display

This is used to adjust the speed of the metering roll when the single speed automatic moisture control feature of the dryer is in use.
This is used to:

- Set the speed of the metering rolls when the one speed automatic moisture control feature of the dryer is utilized.
- Set the speed of the metering rolls during continuous flow operation or .

Just turn the meter roll adjustment knob and put the is in the **single** speed position, your display will now show the following:

If you are finished with your adjustments, press the 

button. The screen will also return to the main display if you don't turn or press the knob for about 8 seconds.

Meter Roll 2 Speed Display

• Set the speed of the metering roll when the two speed automatic moisture control feature of the dryer is utilized.

If you turn the meter roll adjustment knob and the unload switch is in the **two** speed position, you can adjust your 2 speed settings. Notice that the numbers next to Low is flashing. This indicates that any adjustment you make with the meter roll know will only affect this setting. To change the High setting, press the meter roll adjusment knob until it clicks. You screen should now flash the numbers next to the High setting. Any adjustment made at this point will only affect this setting.

If you are finished with your adjustments, press the 

button. The screen will also return to the main display if you don't turn or press the knob for about 8 seconds.

Note: This screen is only available if the moisture control switch is on and the unload switch is in the 2 speed position.

FAN SWITCHES

Momentarily turn each fan switch to on and observe the fan rotation. The fan should run counterclockwise. Sometimes on three phase models all motors will run backwards. They can easily be reversed by interchanging two of the three power supply wires. All power should be switched and locked off before attempting to reverse the connections. Reverse the two outside wires, L1 and L3, and leave the middle one in the same position.

Note: The bottom fan on your dryer is always refered to as Fan 1.

BURNER SAFETY

To check the burner safety function, first make sure the main gas valve is off. Turn the fan switch on and allow the fan to start. Then, turn the heater switch on for that fan. The dryer will shut down after 20 seconds. The safety message, "Ignition Failure x" will appear. Reset the dryer and repeat for the other fan/heater(s).

BURNER TEST FIRE

Test fire each burner by starting the fan. Then, turn the burner switch to on. Turn on the fuel supply, and the burner should ignite after a short purge delay of approximately 10 seconds. Gas pressure should be shown on the gauge. At this time adjust the plenum set point to 200°F (93°C), causing the burner to operate on hi-fire. Observe the gas pressure on gauge, and lower the plenum set point until it causes the burner to cycle into lo-fire. When the plenum temperature set point is met, the gas pressure should show a noticeable drop, indicating that the cycling solenoid is closed and the burner is being supplied with less gas through the bypass valve. At this time set the hi-fire and lo-fire pressure settings. Use the pressure regulator for hi-fire and the cycling solenoid needle valve for lo-fire. The computer should cycle the burners between high and low, approximately 4 to 5 times per minute.

Only use pressure required to obtain desired temperature.

Approximate settings should be:

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

If the burner remains on hi-fire and does not cycle, increase the regulator setting on the propane models, or the supply valve on the natural gas models in order to reach the plenum set point. If the burner remains in lo-fire and does not cycle, slightly decease gas pressure with the cycling solenoid needle valve. If the gas pressure is

decreased too much a popping or fluttering sound will be heard. Also, anytime the high pressure side is adjusted, the low pressure side needs to be checked. Repeat the test for each fan/heater unit.

DRYER SHUTDOWN

To shut down the dryer,

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

EMERGENCY DRYER SHUTDOWN

In case of emergency push the dryer stop button or the emergency stop button. This will interupt power to the control panel and the fan, burner and all augers will stop immediately.

Section 5

Dryer Startup and Operation

FULL HEAT DRYING

Full Heat Operation

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

Dryeration Process

The full heat process is called “DRYERATION”. Recommended procedure is to temper the hot grain for 4 to 10 hours in a cooling bin or storage bin, then cool by an aeration fan at an air flow rate of 1/2 to 1 CFM per bushel of grain in the hot batch being cooled. The process of tempering and slow cooling provides higher quality in shelled corn because of less stress cracking of kernels and less breakage during subsequent handling of the grain.

Final Moisture

From 1 to 3% apparant moisture is usually removed in the cooling process, so hot shelled corn is removed from the dryer at about 17% moisture if the final desired moisture content is 15%.

DRYING TEMPERATURES

Shelled Corn

For shelled corn with an initial moisture content of 25-30%, the recommended maximum drying temperature is 220-240° F (104-116° C) for the top fan and 170-190° F (7788° C) for the bottom fan. For lower initial moisture content, lower drying temperatures are recommended.

Small Grain

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

Rice, Soybeans

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

Drying Efficiency

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

Dryer Shutdown

Cooling Hot Grain

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

INITIAL SETUP PARAMETERS

Timer and Delay Settings

Turn the control power switch to on. The monitor will display a copyright message and model number, total running time in hours and minutes and the current time and date. To activate the controller press

the 

button.

Fan and Auger Delays

The 

button will display four different setup screens. Press the 

button to bypass each setup screen or the 

button to edit the delay currently on display.

The screens will display in the following order:

Load On Delay
Out of Grain Timer
Fan Sequencing Delay
Unload Cleanout Delay

Load Delay

The load delay is used to delay the starting of the load auger when the dryer is unloading to prevent the load auger from cycling to often. To change the setting of this delay follow these instructions:

1. Press the DELAYS button.

2. Press the MODIFY button.

3. Press the INCREASE DECREASE button to adjust the settings.

4. Press the ENTER button to accept the changes.

Out of Grain Timer

The Out of Grain timer should be set to the maximum time it takes for your dryer to refill during continious or batch mode drying.

If the dryer runs out of grain while the load auger switch is in the **auto** position, the out of grain timer automatically shuts off the dryer after the period of time preset on the timer.

1. Press the DELAYS button. Press ENTER to bypass the first screen.

2. Press the MODIFY button.

3. Press the 

button to adjust the settings.

4. Press the 

button to accept the changes.

If you want to view the out of grain timer while the dryer is running, perform the following steps:

1. Press the 

button the display will then show this selection screen:

2. Press the 

to view the **OUT OF GRAIN TIME** selection screen.

3. Press the 

button and move the pointer from the **SET OUT OF GRAIN** to the **OUT OF GRAIN TMR** position.

4. Press the 

to view the remaining time of the **Out of Grain timer** while the Load Auger is running.

The **TIME LEFT** is a countdown of time from the Out of Grain timer setting you have entered above and will decrement if your fill auger is running and the Load Auger switch is in the AUTO position.

The **LAST LOAD TIME** is the amount of time the load or fill auger operated until the fill auger mercury switch was activated indicating the dryer is full.

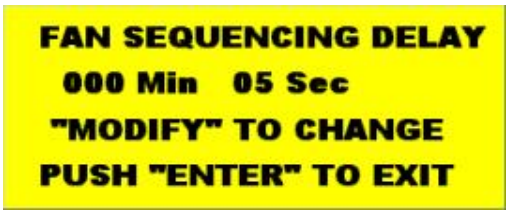
NOTE: Anytime your TIME LEFT counter reaches zero, your dryer will shut down with a "Out of Grain" warning.

Fan Sequence Delay

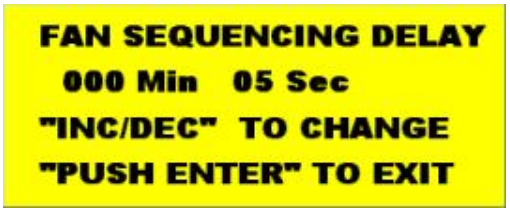
The Fan Sequence Delay controls the amount of time between each fan startup to reduce the dryer startup amps. Default setting is 5 seconds.

To change the setting of this delay follow these instructions:

1. Press the DELAYS button. Press ENTER ENTER (enter twice) to bypass the other screens.



2. Press the MODIFY button.



3. Press the INCREASE DECREASE button to adjust the settings.

4. Press the ENTER button to accept the changes.

Unload Delay

The unload delay is used to control the amount of time the unload auger runs after the metering rolls stop to allow the unload auger to clean itself out.

To change the setting of this delay follow these instructions:

1. Press the DELAYS button. Press ENTER ENTER ENTER (enter three times) to bypass the other screens.

2. Press the MODIFY button.

3. Press the INCREASE DECREASE button to adjust the settings.

4. Press the ENTER button to accept the changes.

Setting Up The Temperature Set Points

These set points are monitored by the computer to control certain features of the dryer. These can be adjusted from the keypad of the Dryer control panel using the 

button or the 

button.

Moisture Control Setpoint

Drying mode switch is in the Continuous position:

If the moisture control temperature is **below** this set point and you have your unload switch set to two speed position then meter rolls will discharge the grain using the **low** speed meter roll setting.

If the moisture control temperature is **above** this set point and you have your unload switch set to two speed position then meter rolls will discharge the grain using the **high** speed meter roll setting.

It is normal for the meter rolls to switch back and forth between high and low speed during the drying process. This regulates the speed of the grain being discharged from the dryer.

Drying mode switch is in the Batch position:

If the moisture control temperature is below this set point and the Dry Timer has reached zero, the heater will continue to fire until the moisture control set point has been reached. During this cycle the moisture control light will flash and a message on the display will read **TEMPERATURE HOLD.**

To change the setting of the moisture control temperature follow these instructions:

1. Press the 

temp button.

2. Press the 

button.

3. Press the 

button to adjust the settings.

4. Press the 

button to accept the changes.

Plenum Temperature Setpoint

The plenum temperature set point will determine the average temperature of air entering the grain columns. To change the burner cycling mode, please refer to Fan/Heater Select topic section of the Initial Setup Parameters chapter.

To change the setting of the plenum temperature follow these instructions:

1. Press the PLENUM temps button.

2. Press ENTER to advance to the next plenum screen or MODIFY to change the set point.

3. Press the INCREASE DECREASE button to adjust the settings.

4. Press the ENTER button to accept the changes.

STARTUP

Startup Procedure

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

1. Before attempting to operate the dryer make sure that all safety shields are in place, all plenum bottom closure panel doors are closed, all rear access doors are closed and all personnel are clear of the grain dryer and grain handling machinery.

2. Turn all selector switches on the control panel to the off position.

3. Turn on the electrical power supply to the dryer, and move the safety disconnect handle mounted on the dryer's upper power box to on.

4. Turn the control power switch to on. The switch will light up. A copyright message, model number, total running time in hours and minutes, current date and time will appear. At this point the controller will lock out all other dryer functions. Once the time and date screen appears, press the RESET button and the dryer will perform its safety circuit checks. If a fault is found the cause will be displayed on the LCD. If all safeties do not detect a problem the controller will allow the electronic fuel shutoff valve (Maxon) to be manually opened, if so equipped, and the drying mode switch will light up, indicating that the dryer is ready to be started.

5. Move the load auger switch to manual, and push the dryer power start switch. The top auger will immedi-

ately start, and the load auger switch will light up. If additional loading equipment is wired to the dryer it will also start immediately.

6. When the dryer is full of grain the top auger will stop automatically, and any auxiliary loading equipment wired to the dryer will also stop.

CONTINUOUS FLOW DRYING MODE

Full Heat-Continuous Flow Operation

1. Turn the **CONTORL POWER** switch to on.

2. After the date and time appear on screen, press the 

button.

3. Turn the DRYING MODE switch to **CONT. FLOW**.

4. Make sure the UNLOAD switch is **OFF**.

5. Make sure the MOISTURE CONTROL switch is **OFF**.

6. Open the main fuel supply valve on the tank if using LP gas, or open the fuel supply line if using natural gas. Turn on the Maxon electric shut off valve, if so equipped, or open the manual shut off valve to allow fuel flow to the dryer.

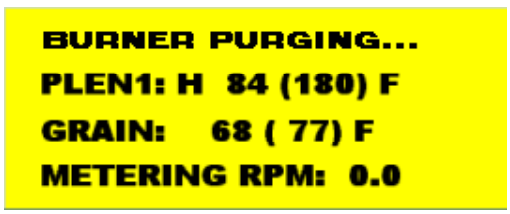
7. Push the DRYER POWER START switch.

8. The dryer should already be filled with grain. Turn the LOAD AUGER switch to the **AUTO** position. In both the auto and manual positions, the dryer grain level switch will automatically keep the dryer full of grain. In the auto position the dryer will shut down after a preset time period using the out of grain timer.

9. Look in the Drying Charts section in the back of this manual for the FULL HEAT chart settings that correspond to your model of dryer. You will see the settings for (Initial Moisture) (Moisture Removed) (Approx. Dry Time) (1 Speed) (2 Speed Low) (2 Speed High) pick the line that has your initial starting moisture. These are the settings we will be referring to during this start up procedure.

10. Turn each FAN switch to **ON**. The fan will start, and the switch will light up when air pressure is detected.

11. Start each burner by turning the HEATER switch to **ON**. After purging for approximately 10 seconds the burner will fire, and the heater switch will light up. This indicates that the flame sensing circuit is sensing burner flame. For information concerning burner adjustment see the Dryer pre start checks section of this manual.



12. Run the fan(s) and heater(s) for about 10% longer than the (APPROX. DRYING TIME) required for the moisture you are trying to dry.

13. Example: 10% removal would be about 54 minutes, 15% removal would be about 76 minutes and 20% removal would be about 100 minutes. Add 10 minutes to insure that the grain is dry.

14. After the time in step 12 turn the UNLOAD to **1 SPEED** and set the METER ROLL SPEED, (HIGH SPEED). to the setting for 1 SPEED operation. Grain should begin to run at this time. Run time for this is about 10% longer than the (APPROX. DRYING TIME) required for the moisture you are trying to dry. This allows the moisture in the dryer to reach an even gradient top to bottom without having any highs or lows in it. It will however, over dry some of the corn a little.

15. Increase the drying temperature to 190 deg. for single fans or for multiple fan dryers set the heat chambers 30 to 60 degrees apart. Hottest at the top, most cool at the bottom.

16. DO NOT TRY TO ADJUST THE DRYER FOR MOISTURE DURING THIS PROCESS OR YOU WILL ESTABLISH HIGH AND LOW SWINGS IN THE MOISTURE CONTROL. IT WILL TAKE SEVERAL HOURS TO WORK ITSELF OUT.

17. After the run time in step 14 you are ready to set up the moisture control. Now turn the MOISTURE CONTROL to the **ON** position. Set the temperature to about 100 deg.

18. Turn the UNLOAD to 2 SPEED. Set the METER ROLL SPEED, LOW SPEED and HIGH SPEED. to the settings listed for them. Let the dryer run on these settings before trying to adjust moisture or meter roll settings. These settings will not have your grain moisture adjusted exactly where you want it, but will be a good place to start initially. A little different moisture at the bottom of the storage bin is not usually a problem as long as you have full floor aeration.

19. After the run time in step 18 you are ready to adjust the moisture control, and the meter roll speeds if required. Each time you make an adjustment to the moisture control it will take about the time shown in the drying charts to see the results of this adjustment.

Dry and Cool-Continuous Flow Operation

1. Turn the control power switch to on.

2. After the date and time appear on screen, press the 

button.

3. Turn the DRYING MODE switch to **CONT. FLOW**.

4. Make sure the UNLOAD switch is **OFF**.

5. Make sure the MOISTURE CONTROL switch is **OFF**.

6. Open the main fuel supply valve on the tank if using LP gas, or open the fuel supply line if using natural gas. Turn on the Maxon electric shut off valve, if so equipped, or open the manual shut off valve to allow fuel flow to the dryer.

7. Push the DRYER POWER START switch.

8. The dryer should already be filled with grain. Turn the LOAD AUGER switch to the **AUTO** position. In both the auto and manual positions, the dryer grain level switch will automatically keep the dryer full of grain. In the auto position the dryer will shut down after a preset time period on the out of grain timer.

9. Look in the Drying Charts section in the back of this manual for the DRY AND COOL chart settings that correspond to your model of dryer. You will see the settings for (Initial Moisture) (Moisture Removed) (Approx. Dry Time) (1 Speed) (2 Speed Low) (2 Speed High) pick the line that has your initial starting moisture. These are the settings we will be referring to during this start up procedure.

10. Run the bottom fan(s) and heater(s) (to be used for cooling later) for about 20 minutes. This will start the bottom drying so we can cool it before we begin to discharge grain.

11. Take the remaining number of burners to be started, divide that into the total drying time required, working up, start each burner that many minutes apart. Run them about 10% longer than the (APPROX. DRYING TIME) total required for the moisture you are trying to dry.

12. Example: 10% removal would be about 60 minutes, 15% removal would be about 85 minutes, and 20% removal would be about 110 minutes. Add 10 minutes to insure that the grain is dry.

13. After the required drying time turn the bottom heater (OFF) cool this section for about 20 minutes. Set the upper plenum thermostats to the decreed temperature (190°-230°F)

14. Turn the UNLOAD to **1 SPEED** and set the METER ROLL SPEED (HIGH SPEED). to the setting for 1 SPEED operation. Run time for this is about 10% longer than the (APPROX. DRYING TIME) required for the moisture you are trying to dry. This allows the moisture in the dryer to reach an even gradient top to bottom without having any highs or lows in it. It will however, over dry some of the corn a little.

15. DO NOT TRY TO ADJUST THE DRYER FOR MOISTURE DURING THIS PROCESS OR YOU WILL ESTABLISH HIGH AND LOW SWINGS IN THE MOISTURE CONTROL. IT WILL TAKE SEVERAL HOURS TO WORK ITSELF OUT.

16. After the run time in step 14 you are ready to set up the moisture control. Now turn the MOISTURE CONTROL to the **ON** position. Set the temperature to about 130 deg.

17. Turn the UNLOAD to 2 SPEED. Set the METERING ROLL SPEED, LOW SPEED and HIGH SPEED. to the settings listed for them. Let the dryer run on these settings before trying to adjust moisture or meter roll settings. These settings will not have your grain moisture adjusted to exactly where you want it, but it will be a good starting place to adjust from. A little different moisture at the bottom of the storage bin is not usually a problem as long as you have full floor aeration.

18. After the run time in step 17, you are ready to adjust the moisture control and the meter roll speeds if required. Each time you make an adjustment to the moisture control it will take about the time shown in drying charts to see the results of this adjustment.

STAGED BATCH DRYING MODE

Continuous-Batch Operation

1. Turn the control power switch to on.

2. Make sure the DRYING MODE switch is turned to **STAGED BATCH**.
3. After the date and time appear, press the button.

4. Open the main fuel supply valve on the tank if using LP gas, or the valve in the fuel supply line if using natural gas. Turn on the Maxon electric shut off valve, if so equipped, or open the manual shut off valve to allow fuel flow to the dryer.

5. The dryer should already be filled with grain. Turn the LOAD AUGER switch to **AUTO**. In both the auto and manual position, the grain level switch will automatically keep the dryer full of grain. In the auto position the dryer will shut down after the preset time period on the out of grain timer, or if the grain flow to the dryer is interrupted.

6. Turn each FAN switch to **AUTO**. The fan will start, and the switch will light up when air pressure is detected.

7. Start each burner by turning the HEATER switch to **AUTO**. After purging for approximately 10 seconds the burner will fire, and the heater switch will light up indicating that the flame sensing circuit is sensing burner flame. For information concerning burner adjustment see the pre start section of this manual.

8. To properly set the correct DRY, COOL and UNLOAD time for various moisture content grains, see the drying charts for your size of dryer.

9. If the dryer is being operated in all heat, turn each FAN switch to **ON**. In this position the fan will run continuously during both the dry and unload stages of the staged batch operation. If the dryer is being operated in the dry and cool mode, the preferred position for the FAN switch is the **ON** position, so the fan will run continuously. If desired, the fan can be turned off during the unload cycle of the dry-cool-unload sequence by turning the fan switch to auto.

10. If the dryer is being operated in all heat, turn each HEATER switch to **ON**. The burner will operate whenever the fan is operating. If the dryer is being used in dry and cool, turn the HEATER switches to **AUTO** and the burner will automatically shut down during the cooling and unloading cycles.

11. Turn the UNLOAD switch to the **ONE SPEED** position. The bottom auger and metering rolls will start automatically during the unload cycle of the dry-cool-unload mode, along with any grain handling equipment that is wired to the dryer. The speed at which the metering rolls operate during the unload cycle is adjusted by using the high speed metering roll knob. Turning the dial clockwise will increase the grain discharge rate, and counterclockwise will decrease the discharge rate.

12. To control the length of the dry cycle using only the dry time setting programmed into the system, turn the moisture control setting to off. To use the automatic moisture control so that the dry time is determined, not only by the dry time setting, but also by the moisture content of the drying grain, turn the MOISTURE CONTROL switch to **ON**, and set the grain temperature set point to a setting of 135°F (57°C).

13. To start the drying operation push the dryer POWER START button. The controller will start all the dryer components in their proper order.

14. To shutdown the dryer, close the fuel supply valve at the fuel tank or fuel source. If the burners are operating, let the dryer run out of fuel causing an automatic shutdown due to a loss of flame. Close the fuel valve at the dryer, and press the dryer power stop button. Turn off the dryer's main circuit breaker located on the front of the power panel. Turn off the main power supply to the dryer.

15. In case of an emergency, press the dryer power stop button. The burners, fans and all augers will stop immediately.

Fan Setting	Heater Setting	Fan Function	Heater Function
Auto	Auto	Fans stay on during dry and cool cycle only	Burners stay on during dry timer cycle only
Auto	On	Fans stay on during dry and cool cycle only	Burners stay on during dry and cool
On	On	Fans are on continuously	Burners are on continuously
On	Auto	Fans are on continuously	Burners shut down at the end of the dry cycle

At the end of the dry cycle in staged batch, the fans and heaters will continue running if in the Auto-Auto setting, until the preset temperature for the moisture control is reached.

Continuous-Batch Operation

If you are going to operate your dryer in continuous flow drying mode then you can skip this section and jump to Special Setup Screens.

These switches are used to set the cycle times in the staged batch drying mode only. The drying mode switch must be in the staged batch position. The current setting on these three timers is displayed directly above each timer button.

During operation the remaining time on each timer is displayed on the screen. If the power goes out or if 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 setting if the reset button is pushed.

Use the dryer charts in the back of this manual for reference of a suggested timer settings.

Dry Timer

This timer controls how long the burner will operate. If the moisture control switch is turned on and the dry time reaches zero, then the burner will continue to burn as long as the grain temperature has not reached the moisture control set point.

To change the setting of this timer follow these instructions:

Press the 

timer button, press the 

button to edit the amount of dry time.

Press the 

button to adjust the dry timer settings.

Press the 

button to accept the new setting.

During dryer operation the remaining time on each timer is displayed on the screen unless reset to their stored values by pressing the 

button.

Cool Timer

This timer controls how long the fan will operate after the dry timer has expired.

To change the setting of this timer follow these instructions:

Press the 

timer button, press the 

button to edit the amount of cool time.

Press the 

button to adjust the settings.

Press the 

button to accept the new setting.

During dryer operation the remaining time on each timer is displayed on the screen unless reset to their stored values by pressing the 

button.

Unload Timer
This timer controls how long the unload auger will operate after the cool timer has expired.

Use the dryer charts in the back of this manual for reference of a suggested timer settings.

To change the setting of this timer follow these instructions:

Press the 

timer button, press the 

button to edit the amount of cool time.

Press the 

button to adjust the settings.

Press the 

button to accept the new setting.

During dryer operation the remaining time on each timer is displayed on the screen unless reset to their stored values by pressing the 

button.

OPERATING DISPLAY SCREENS

Main Display Screen
This is the normal operating screen you will be viewing after you press the start button. The top line on the screen indicates your system has been started by pressing the green run button is running. The next two lines represents the current plenum temperature and the current grain temperature. The bottom line indicates the speed of the meter roll.

Notice the **PLEN1** line has 2 numbers listed. The first one is the actual temperature of Plenum 1 and the second one in parenthesis is the plenum set point. In this case the actual plenum temperature is 84º F and the set point is 180º F. Notice the "**H**", this indicates that the burner is currently in high fire mode. This will switch to an "**L**" whenever the burner switches to low fire mode. The plenum set point can be adjusted by pressing the 

button. The next line indicates the grain temperature is at 68º F and the grain set point is at 77º F.

The grain set point can be adjusted by pressing the 

button.

During the drying process you may want to view the plenum temperatures of the different burners.

Pressing the 

buttons will toggle between the available plenum temperatures on your main screen.

If your dryer shuts down with a Grain Discharge or the Unload Motor Overload the unload auger will continue to run until the Unload Cleanout Delay has expired. This allows the unload auger to empty itself and prevent unnecessary load on the unload auger if you were to start it when its full of grain.

Section 6

Safety Circuit Shutdown Messages

FAN AND HEATER GENERATED ERRORS

The following is a list of errors that are generated with the fan and heater controller. Each fan and heater has there own set of safeties which are listed below. You will need to inspect the controller associated with the error. Example: If you get this error

it is telling you the problem is with Housing 1 (bottom most fan) High Limit.

Air Switch x Stuck

The air switch contacts have closed prior to the fan starting, indicating a freewheeling blade or improper setting of the air switch. The message will distinguish between which fan caused the shutdown. This indicates that 12VDC has been lost to terminal **J7-09** on the Fan/Heater board.

Fan x Loss of Airflow

This error message is displayed when airflow (air pressure) has been established but was lost for some reason. This could happen if while during the dryers operation the grain has settled or shrinkage in the grain columns causing a loss of air pressure in the plenum chamber.

Fan x No Airflow

Contacts in the air switch have never opened due to the fan not turning, or the air switch may need adjustment. The message will distinguish between which fan caused the shutdown.

Flame Loss x

The flame sensor has failed to detect a burner flame which had been established but was lost for some reason and there is a problem with the flame sensing circuitry or the dryer is not getting burner fuel. The message will

distinguish between which burner caused the shutdown. The reference to the number one (1) is telling you that it is burner number 1 which is the bottom most fan.

Grain Temp Short x

This error indicates there is a shorted condition with one of the grain temperature sensors located inside the left or right grain columns. This could be a shorted sensor or the sensor wires could be shorted.

Grain x Overheat

An over temperature condition has occurred in one of the grain columns causing the control to shutdown the dryer. This control is set at 210°F (99°C) and automatically resets itself when cool. This can be caused from a grain column plugged with trash or your meter rolls may be adjusted to slow. Feel the grain columns to determine which one may be causing the problems. If all the columns are hot to the touch then you will probably need to check your meter roll settings. If not, then examine the column that feels hot, make sure you can see the grain moving down the column screens. For more information on service see Meter Roll Servicing.

Housing x High Limit

The temperature high limit located on the fan/burner housing has opened, indicating an over temperature condition has occurred towards the rear of the fan/heater housing. This control is set at 200°F (93°C) and must be manually reset. The message will distinguish between which fan housing caused the shutdown. The reference to the number one (1) is telling you that it is fan number 1 which is the bottom most fan.

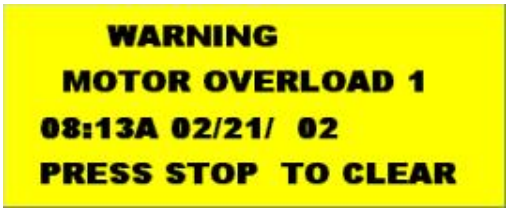
Ignition Failure x

This condition happens during the intial ignition of the burner. If the burner fails to light, check to make sure that your gas has been turned on and/or the maxon valve has been turned on. The reference to the number one (1) is telling you that it is burner number 1 which is the bottom most fan.

Illegal Flame x

This message is displayed when the flame detection circuit of your heater is sensing flame when the burner is supposed to be off. Example, if you shut down the dryer and the heater continues to burn due to a solenoid stuck in an open state, it will generate this type of error.

Motor Overload x



One of the thermal overloads on either the fan, load, unload or auxiliary motors has opened, indicating an overcurrent condition. The overloads must be manually reset. The message will distinguish between which fan overload caused the shutdown. The reference to the number one (1) is telling you that it is fan number 1 which is the bottom most fan.

Plenum Temp Open x

This error indicates there is a open condition with the plenum temperature sensor located inside the plenum chamber. This could be a open sensor or the sensor wires could have a open connection.

Plenum Temp Short x

This error indicates there is a shorted condition with the plenum temperature sensor located inside the plenum chamber. This could be a shorted sensor or the sensor wires could be shorted.

Plenum x Overheat

An over temperature condition has occurred inside the dryer plenum. This control is a 300°F (149°C) limit and automatically resets itself when cool. The message will distinguish between which plenum caused the shut-down.

Vapor x High Limit

The LP gas vapor temperature sensor located in the gas pipe train downstream from the vaporizer, has opened indicating that the vaporizor is running too hot and must be readjusted. This sensor is set at 200°F (93°C) and automatically resets itself when cool. The message will distinguish between which burner caused the shutdown. The reference to the number one (1) is telling you that it is burner number 1 which is the bottom most fan/heater unit, is where the malfunction is located.

Try adjusting the vaporizer coils farther away from the burners flame. You may also want to try switching the burner mode from Hi/Lo to On/Off, especially on warmer days.

INPUT/OUTPUT GENERATED ERRORS

The following is a list of errors that are generated with the Input/Output board located in the upper control box.

Air System Failure

A shutdown has occurred due to a air system that was installed with an intergal safety switch that was in the unit. The air system safety connections are located in the upper control box on the terminal strip. This can occur if this safety looses 12VDC to terminal **J2-13** on the I/O board. This input is jumpered on the terminal strip when it leaves the factory and is usually installed in the field by a qualified electrician.

Aux Load Overload

The motor overload relay has tripped on the Aux Load Motor circuit located in the upper control box. This can occur if this safety looses 12VDC to terminal **J2-10** on the I/O board. Push the red button on the overload to reset this error. This is caused from the motor operating with to much of a work load, which in turn uses more current (amperage). If the problem reoccurs then check the motor to make sure it is not being overworked. You may need to call an electrician to measure the motors full load amps (FLA).

Aux Unload Overload

The motor overload relay has tripped on the Aux Unload Motor circuit located in the upper control box. This can occur if this safety looses 12VDC to terminal **J2-12** on the I/O board. Push the red button on the overload

to reset this error. This is caused from the motor operating with to much of a work load, which in turn uses more current (amperage). If the problem reoccurs then check the motor to make sure it is not being over-worked. You may need to call an electrician to measure the motors full load amps (FLA).

Grain Discharge Warning

The lid on the grain discharge box has opened, indicating that either the grain is not being taken away fast enough from the discharge box or the take away auger system connected to the dryer may be causing the problem. This can also occur if this safety looses 12VDC to terminal **J2-05** on the I/O board.

Load Motor Overload

The motor overload has tripped on the Load Motor Overload located in the upper control box. This can occur if this safety looses 12VDC to terminal **J2-12** on the I/O board. Push the red button on the overload to reset this error. This is caused from the motor operating with to much of a work load, which in turn uses more current (amperage). If the problem reoccurs then check the motor to make sure it is not being overworked. You may need to call an electrician to measure the motors full load amps (FLA).

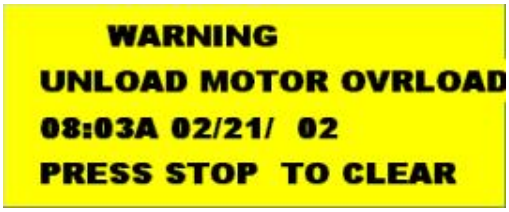
Meter Rolls Failed

If you have the meter roll speed adjustment turned too low (not turning), this will cause this error message. It also could indicate that you have a defective meter roll sensor, the metering roll drive system has failed to turn or broken chain or jammed metering roll is a possibility. This can occur if the input is not receiving a 5 volt pulse on terminal **J3-03** on the I/O board.

Out of Grain

The dryer has run low on grain, and the out of grain timer has timed out, shutting the dryer down. The unload auger will continue to run so it can clean out the remaining grain before shutting down.

Unload Motor Overload



The motor overload has tripped on the Unload Motor Overload located in the upper control box. This indicates that 12VDC has been lost to terminal **J2-08** on the I/O board. Push the red button on the overload to reset this error. This is caused from the motor operating with to much of a work load, which in turn uses more current (amperage). If the problem reoccurs then check the motor to make sure it is not being overworked. You may need to call an electrician to measure the motors full load amps (FLA).

User Safety

A shutdown has occurred due to a user installed safety switch that was installed on the dryer. The user installed safety connections are located in the upper control box on the terminal strip. This also indicates that 12VDC has been lost to terminal **J2-01** on the I/O board. This input is jumpered on the terminal strip when it leaves the factory and is usually installed in the field by a qualified electrician.

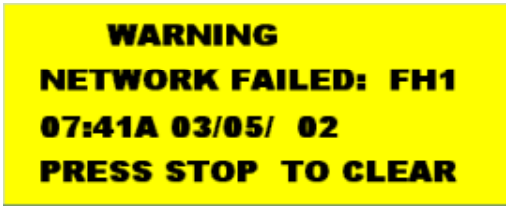
MASTER DISPLAY GENERATED ERRORS

The following is a list of errors that are generated with the Master Display board located in the lower control box.

Cont-Batch Mode Chng

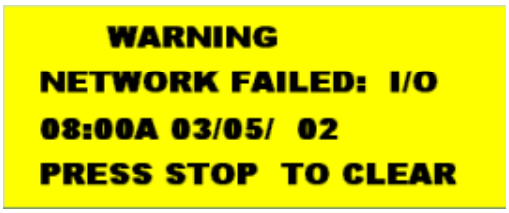
This error occurs when you switch the dryer mode switch from the Cont. Flow to the Staged Batch position while the dryer is running in the Continous Flow Mode. To avoid this shutdown, stop the dryer before switching modes. Press Stop to clear the error.

Network Failed FH x



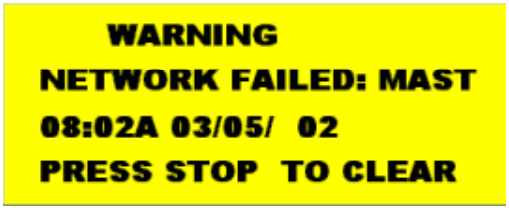
This error is generated whenever Fan/Heater board has lost its communications link with the Input/Output board (upper control panel door) and the Master Display board (lower control panel). Check the blue and yellow wires marked N1-01 and N1-02 on a 3 terminal plug to make sure they are plugged in tightly. The reference to the number one (FH1) is telling you that it is fan number 1 which is the bottom most fan.

Network Failed I/O



This error is generated whenever Input/Output board (upper control panel) has lost its communications link with the master (lower control panel door) and the fan/heater boards. Check the blue and yellow wires marked N1-01 and N1-02 on a 3 terminal plug to make sure they are plugged in tightly. There are 3 LED lights next to this plug, one indicates power and the other two indicate data being transmitted. These two labeled RXD and TXD, should be flashing randomly back and forth indicating network activity.

Network Failed Mast



This error is generated whenever Master Display board (lower control panel) has lost its communications link with the Input/Output board (upper control panel door) and the fan/heater boards. Check the blue and yellow wires marked N1-01 and N1-02 on a 3 terminal plug to make sure they are plugged in tightly.

Section 7

Service and Maintanance

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

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

SEASONAL INSPECTION AND SERVICE

The dryer is made of weather resistant material, and is designed to require a minimum of 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 accumulated foreign material. Remove any foreign material present. Inspect and tighten any loose terminal connections. Replace any damaged or deteriorated wiring.

2. Check each blade for freedom of rotation and uniform tip clearance. They should also be inspected for dirt and grain dust, especially inside the hub. Any additional weight can seriously effect the balance, and result in harmful vibrations and a short bearing life.

3. Check each blade for free play. Any side play is an indication of defective motor bearings, which should be replaced to prevent a complete motor failure. Make sure motor mount bolts are tight.

4. Motor bearings should be lubricated periodically, depending on operating conditions. Under normal usage it is desirable to have the motor cleaned, checked and bearings repacked by an authorized service station every two to three seasons. If the unit is operated continuously through most of the year, this service should be performed each year.

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

LUBRICATION PROCEDURE

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

SUGGESTED LUBRICANT's AND SCHEDULES*

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

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

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

Note: All of the auger and metering roll bearings are lifetime lubricated and do not require service relubrication.

1. Remove and clean the gas line strainers. Make certain gas valves are closed and that gas is purged from the system before attempting to disassemble anything.

2. Inspect the collector plate at the top of the burner casting and the burner cup for any accumulation of foreign material. Clean if required. Foreign material in the burner cup or casting will not burn out and will impair burner operation.

3. If required, inspect ignitor plug and clean the electrodes. Use an ignition point file to remove carbon and rust between the electrode surfaces. Ignitor gap should be about 1/4" (3 mm).

4. Inspect flame sensors for possible damage or poor connections. Flame sensor wires must be in good condition.

5. Inspect and manually rotate the top auger paddle assembly. The paddle unit must rotate freely without any indication of sticking or binding.

6. Inspect the top auger and bottom auger drive lines for proper adjustment and condition. Re adjust line tension as required.

7. Operate dryer clean out levers, and check clean out hatch mechanism for proper operation. With hatch open, inspect and remove any accumulation of dirt, fines and foreign material from the bottom auger trough area.

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

8. Inspect entire dryer for loose, worn or damaged parts. Include check of auger flighting, metering rolls and other internal parts. Check that temperature sensors within air plenum chamber are secured within insulated clamps, and do not chafe on other metal parts.

9. Make sure all dryer guards and warning decals are securely installed. Make certain guards do not interfere with moving parts. If guards or warning decals are missing, contact your dealer for a free replacement.

10. Test fire the dryer several weeks ahead of the drying season. Check for possible gas leaks. See burner test fire section.

FAN BLADE REMOVAL AND INSTALLATION

When working on or around the fan blade, be aware that it may free wheel, and could cause serious injury. It may be helpful to gently wedge the propeller to prevent this from occuring. However, do remember to remove the wedge before restarting the fan.

If at any stage the blade has become damaged, it is important that it is repaired and that the blade is in balance. Failure to do this could result in the blade running out of balance, and potentially exploding. Balancing the blade is a specialists job, if in doubt contact GSI or your dealer.

The fan blade is secured to the motor shaft by the use of a taper-lock bushing, motor shaft key and three cap screws.

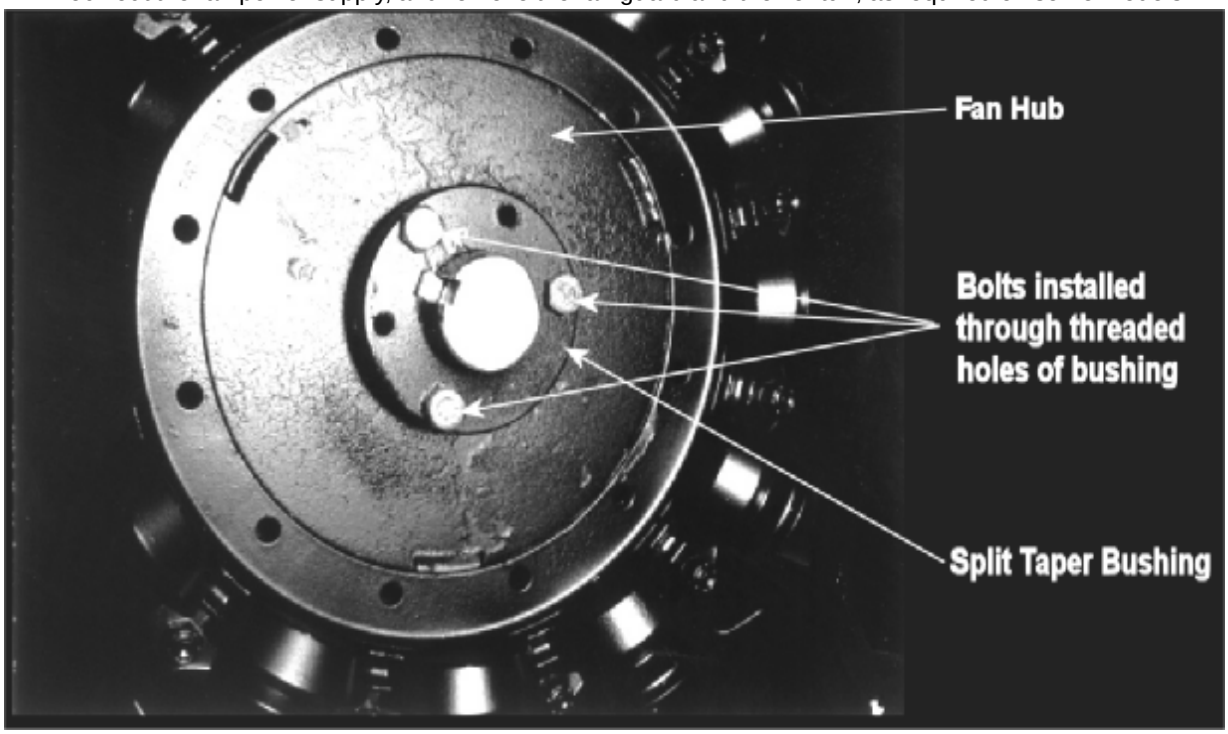
CAUTION: Although the taper-lock method of retaining the blade onto the motor shaft is simple, it is essential that the following points be read carefully and fully understood. Improper installation can cause a loose flying blade, and result in serious injury or death.

FAN REMOVAL AND INSTALLATION

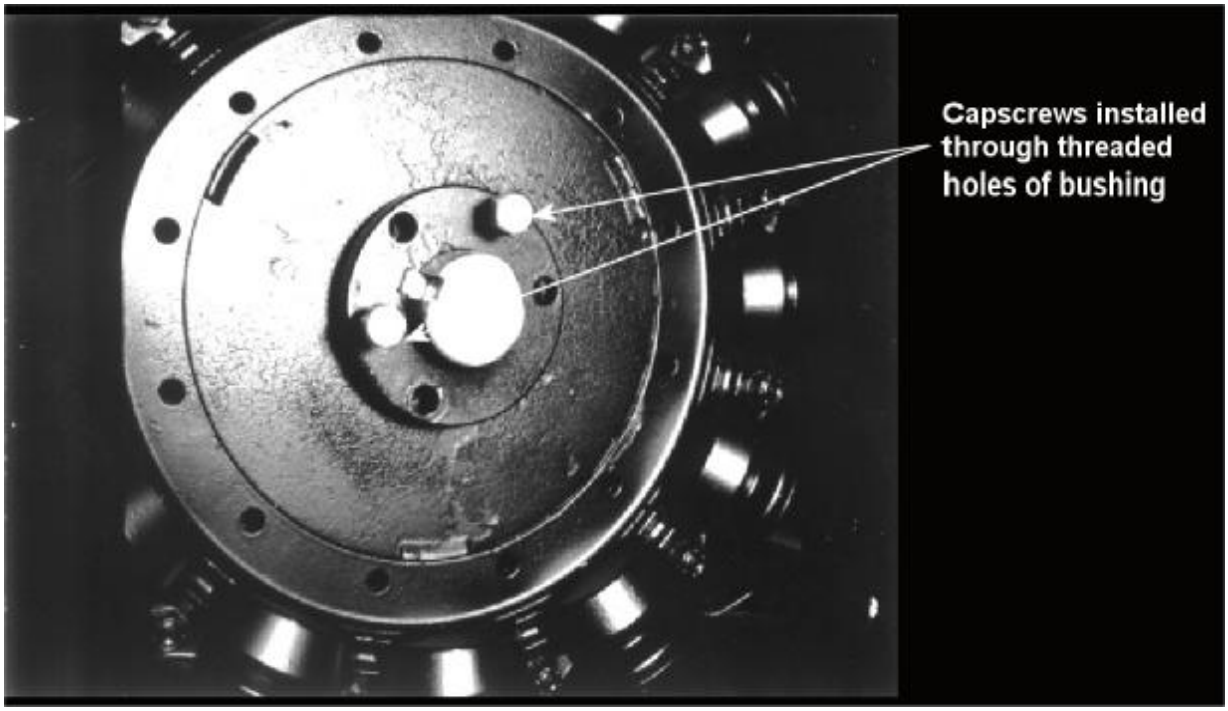
When reassembling parts, the cap screws must be installed through the untapped clearance holes as shown. This will cause the blade to be pulled forward onto the tapered bushing, thus locking the parts securely onto the motor shaft.

When fan servicing requires removal and installation of the blade, make sure the blade is removed and reinstalled properly.

1. Lock out the fan power supply, and remove the fan guard and the venturi, as required on some models.



2. Remove the three cap screws from the clearance holes in the taper-lock bushing.



3. Install two of the cap screws into the threaded holes in bushing, and turn them by hand until they bottom against the front surface of the blade. **NOTE:** The threaded holes within the bushing are provided for disassembly purposes only. Do not attempt to use these holes for reassembly. They will not allow the parts to lock onto the shaft thereby causing a hazardous operating condition.
4. Block blade to prevent it from turning, and gradually turn the cap screws (up to 1/4 turn at a time) until the blade breaks loose from the bushing and motor shaft. Carefully remove bushing and blade. With the blade free from the bushing,a wheel can be used to pull the bushing off of the motor shaft. Re-attach bushing onto blade to prevent the loss of parts.

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

FAN MOTOR REMOVAL

In the event of motor failure, remove the motor as described, and take it to the nearest service station. An authorized service station is the only place that can provide possible motor warranty. Motor service and repair at other places will be at owners expense.
If the service station determines motor failure is caused by faulty material or workmanship within the warranty period, repair will be covered under the warranty. Motor failure caused by external sources will result in a charge to the owner for repair.

1. Make certain power is shut off and locked out. Remove fan guard and blade.

2. Remove cover from fan/heater control box, and disconnect the motor lead wires from within the box.

Note: Tag or otherwise identify wires for ease of reassembly.

3. Remove motor mount bolts. If there are shims between the motor and its base, note their location so they can be properly installed during reassembly.

4. Disconnect the upper end of the motor conduit, then carefully pull the wires through the hole in the fan/heater housing. Remove motor from the fan/heater unit with the conduit still attached. If motor requires service, take it to an authorized service station.

5. To reinstall motor, slide onto motor base plate and replace shims (if required) between motor base and plate. Reinstall motor mount bolts and washer, but do not fully tighten at this time.

6. Reinstall conduit and wires through hole in fan/heater housing and carefully connect all electrical wiring.

7. Adjust position of motor by temporarily mounting fan blade on motor shaft. Rotate fan blade by hand, making the necessary adjustments, so the tip clearance between blade and housing is uniform. If required, remove the fan blade and fully tighten all four motor mount bolts.

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

HEATER PARTS REMOVAL AND INSTALLATION

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

1. **Flame sensor**: Disconnect the wire connector, and unscrew the flame sensor out of its mounting bracket.

2. **Gas Solenoid valve coil(s)**: Unsnap either the plastic cap, or the metal clip on the gas valve, and slide the housing and coil off the valve stem and body. Do not energize the coil when it is removed, as the coil may become damaged due to excessive current flow.

3. **Regulator and gas solenoid valve(s)**: The gas regulator and solenoid valve(s) are directional and must be connected as indicated by the markings near the port openings. Make sure gas is shut off and purged from the system before removing parts.

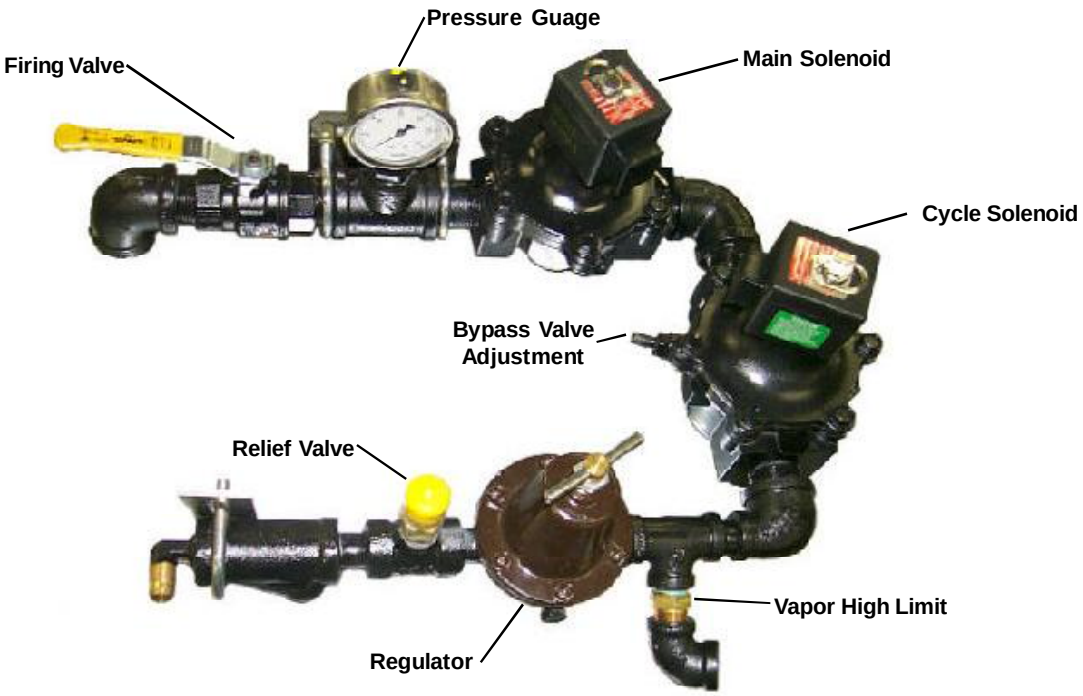
Note: When installing a liquid gas solenoid valve on LP models, do not over tighten the connection into the inlet side, as the inlet orifice may become partially blocked.

4. **Main Gas Orifice:** With fuel shut off and gas purged from system, proceed as follows:

a. Disconnect the plumbing support brackets from the pipe train.
b. Disconnect gas solenoid valve coils. Be sure to mark which one goes where.
c. Lift pipe (with orifice, solenoid valve and other parts attached), straight up and remove from fan/heater housing. Orifice and other parts can now be removed from pipe train, if desired.

5. **Reassemble**: To reassemble parts, reverse the disassembly procedure and check the following:

a. Make sure all parts are thoroughly cleaned and open.
b. Use a dependable brand of high temperature pipe caulking compound when assembling gas connections. Apply only a light coating onto male threaded end of fittings.
c. Solenoid valves and gas regulators are directional and must be properly installed. Do not attempt to connect gas solenoid valve by applying force to the valve core stem as it may ruin the unit.
d. Make sure all electrical wires are properly connected. Refer to wiring diagrams.



LP pipe train.

METER ROLL SERVICING

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

MAIN CONTROLS

1. **SCR speed control**: The metering roll speed pots on the front of the control box regulate the speed of the DC motor which drives the metering rolls.

The scale of adjustment is from 0 to 999 which represents the flow of grain past the metering rolls as a percent of the maximum grain discharge rate for the dryer. The maximum setting of 999 provides a maximum 100% discharge rate. The chart at the top of next page shows max. discharge rates for different lengths of dryers.

Length of Dryer	Max. Discharge rate in BPH	Max. Discharge rate in MT/hr	Length of Dryer	Max. Discharge rate in BPH	Max. Discharge rate in MT/hr
14 ft	1960	50	20 ft	2800	71
16 ft	2240	57	22 ft	3080	78
18 ft	2520	64	26 ft	3640	92

Note: When the control is set to the maximum discharge rate (999), the metering roll speed should be 17.5 RPM for 8" (20 cm) discharge auger.

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

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

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

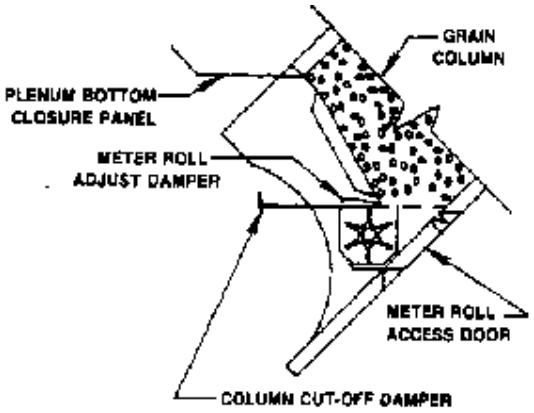
5. If a foreign object becomes lodged in the metering rolls and jams the system, the unloading auger will stay in motion. However, the metering roll drive will stop and the DC motor should stall out. The Network Control System will shut down the dryer after a two minute period.

To determine if the metering problem is from blockage, perform the following test with the power off. Remove the drive chain by loosening the motor mounting bolts. Refer to photo, and place a pipe wrench on the hub of the roller chain sprocket, on the left hand metering roll at the drive end of the dryer. Apply up to 100 ft.lbs. (136 N-m) of force, and attempt to rotate the roll toward the inside of the dryer. If the metering roll will turn, then repeat for right hand side. If the metering roll will turn, it can be assumed that no blockage exists, and the problem is from some other cause. Check for a break in the power train, chain, drive key, pin, etc.

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

HOW TO CLEAR A JAMMED METERING ROLL

Place a pipe wrench on the hub of the sprocket of the jammed metering roll and turn the roll. First, backward, and then, forward several times in an attempt to dislodge the object, and clear it through the roll. If this is not successful, have an assistant turn the metering roll, and attempt to locate the jam by sound. Shut down the fan/heater, and eliminate any other noise when making this check. Once the location is determined, the roll can be reached from the outside by opening the access door to remove the foreign object causing the jam (before opening doors see below). The service tool must be inserted before opening doors. First, swing open the plenum bottom closure panel. Insert the service tool above the metering roll.



This column cutoff damper is designed to insert through the grain column (from the inside of the dryer) immediately above the metering roll. This permits opening of the metering roll access door. For service or inspection without unloading the dryer, the plenum bottom closure panel and metering roll adjust damper must be removed prior to using service tool.

TROUBLE ANALYSIS PROCEDURE

A multimeter is required for some of the following checkout procedures. Before performing any tests, check if the dryer power supply is 1 phase, 230 volt, or 3 phase, 230, 380, 460 and 575 volt.

- The burner circuit is 120 volts AC on all standard U. S. production models.
- The control circuit to the motor starters is 120 AC volts.
- The safety circuit is 12 volts DC
- When checking these circuits, measure voltage between the circuit test location and to ground.
- DC circuits should be measured between the test location and its respective DC ground.
  Refer to wiring diagrams and the parts list for identification of parts and the electrical terminals.

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
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.
Control power light is on, reset button has been pressed, drying mode light off.	1	This indicates control power is present at input/output board, but no power is being transferred through the I/O board.
	2	Display not finished initial setup: The monitor will display a copyright message and model number, total running time in hours and minutes and then the current date and time. Press the reset button to activate the controller .
	3	Input/output board: The input/output board has developed a problem that requires its replacement.
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 AC between points J8-20 and J8-19 (AC-1).
	4	The display may have a malfunction requiring its replacement.
Control power light is on, drying mode light is on--load auger, fan, heater, unload auger 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 "12 VOLT POWER SUPPLY WARNING" message.		The fuse located on the input/output board of the Network Control System has blown.
Display shows "MOTOR OVERLOAD x" message.		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).

Problem		Possible Cause
Display shows "VAPOR x HIGH LIMIT" message.*		The LP gas vapor temperature sensor located in the gas train downstream from the vaporizor has opened, indicating that the vaporizer is running too hot and must be readjusted. (This control is a 200°F (93°C) limit which automatically resets when it cools).
Display shows "IGNITION FAILURE x" message.*		The flame sensor has failed to detect a burner 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.
Display shows "HOUSING x HIGH LIMIT" message.*		The temperature high limit located on the fan/burner housing has opened, indicating an over temperature condition has occurred towards the rear of the fan/heater housing. (This control is a 200°F (93°C) limit control that must be manually reset).
Display shows "GRAIN DISCHARGE WARNING" message.		The cover on the grain discharge box has opened, indicating that grain is backing up into the discharge box.
Display shows "ADJ. GRAIN x OVERHEAT" message.		An over temperature condition has occurred inside the grain columns. (This limit is adjustable in your parameter setup which may need to be increased if a problem is not found in the grain columns).
Display shows "GRAIN x OVERHEAT" message.		An over temperature condition has occurred inside the grain columns. (This control is a 210°F (99°C) thermal overheat switch which will reset automatically when it cools).
Display shows "OUT OF GRAIN" message. Display shows "OUT OF GRAIN-UNLOAD CLEANOUT.." message.		The dryer has run low on grain, and the out of grain timer has timed out shutting the dryer down. The unload auger will then clean out the dryer, if the unload switch is on during continuous flow operation. 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 x HIGH TEMPERATURE" message.*		An over temperature condition has occurred inside the dryer plenum. (This control is a 300°F (149°C) limit which automatically resets when it cools).
Display shows "BURNER x SHUTDOWN LOSS OF AIRFLOW" message.*		The air switch contacts have opened, indicating insufficient air pressure for the burner to operate.

Problem		Possible Cause
Display shows "FAN x NO AIRFLOW" message.*		The air switch contacts have opened, indicating the fan may not be turning or the air switch may need adjustment.
Display shows "AIR SWITCH x STUCK" message.*		The air switch contacts have closed prior to the fan starting, indicating a freewheeling blade or improper setting of air switch.
Fan motor 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, the 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 for defective points or a burned out coil.
	4	Inspect connections, and check voltage applied to the motor leads in the fan heater box to determine if the motor is defective.
	5	Check capacitors on single phase motors, and replace if defective. If motor starts slowly, check for low voltage during starting due to excessive voltage drop in power
Top auger will not start.	1	Check that the top auger circuit breaker and the load auger switch are turned on.
	2	Check position of the upper auger paddle switch. It must be down to start auger.
	3	Inspect for secure mounting and wiring of mercury switch in the terminal box on the top auger paddle switch shaft. Include check for a defective mercury switch.
	4	Verify closing of the top auger contactor. Check voltage on load side of contactor. Inspect contactor for defective points, or a burned out coil.
	5	Inspect connections, and check voltage applied to motor leads in motor junction box to determine if motor is defective.
	6	Check that the mercury switch box is in the proper position.
Bottom auger will not start.	1	Check that the bottom auger circuit breaker is on.
	2	Check that the unload switch is on (1 or 2 speed).
	3	Verify closing of bottom auger contactor; check voltage on load side of contactor.
	4	If using the moisture control, check for proper setting.

Problem		Possible Cause
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 off plates 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 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.
	2	Check for proper burner alignment (side to side). Vibration during shipment may have caused misalignment.
Display shows "METER ROLL DRIVE SYSTEM FAILURE" message.	1	The metering roll drive system has failed to turn within two minutes. A faulty D. C. motor, broken chain or jammed roll is a possible cause of this message.
	2	The Meter Roll Sensor located at the back of the dryer has failed and needs replaced.
Burner will not fire with fan operating.	1	Burner switch must be on.
Heater switch light and gas solenoids go on and off erratically-The light blinks on and off while the solenoids "chatter".	1	The blinking light indicates the flame sensor is not detecting flame.
	2	Check for loose wires on flame sensor; replace or repair wires or sensor.
Burner will not fire-No gas pressure with fan operating at least 15 seconds (gas supply or fan heater malfunction).	1	Check gas supply. Also, check gas filter and gas line for possible obstruction or closed valves. Refill tank; replace or repair parts, as required.
	2	Inspect gas solenoid valves (including liquid valve on LP units) for defective coils or improper wiring. Replace valve or coil if valve will not open with proper voltage applied (120 volts).
Burner will not fire-But gauge shows gas pressure.	1	Ignitor: Check that the ignitor is properly gapped to 1/8" (125mm) and that it has a strong spark. Inspect the porcelain and electrodes for damage or cracking. Replace or clean if necessary.

Problem		Possible Cause
Burner maintains desired drying temperature-but cycles from hi-fire to off (without going to lo-fire).	1	The burner has been setup to work as a ON-OFF burner. Change the burner setup to HI-LOW type of burner.
Burner operates-But will not cycle from hi-fire to lo-fire.	1	Check the gas pressure reading on the gauge. Problem may be due to insufficient gas regulator setting. Temporarily decrease the plenum temperature set point and cause the burner to cycle. If burner will cycle at the reduced plenum set point setting, it indicates that the problem was due to insufficient heat to satisfy the original setting. Increase the gas regulator setting for additional heat output. Do not exceed the maximum pressure listed in this manual.
Burner operates-But will not cycle from lo-fire to hi-fire.	1	Check for an excessive lo-fire gas pressure setting. Observe pressure setting shown on gauge, and compare reading with recommended low pressure settings listed in this manual. Readjust lo-fire setting on flow control valve, if necessary.
	2	Temporarily increase the plenum temperature set point setting. If the heater will still not cycle, check for problem in the control wire connections.
	3	Check for improperly connected or faulty hi-fire gas vapor solenoid valve. Correct any poor connections or defective wiring. If wiring appears proper, problem may be caused by a burned out valve coil or defective valve. Replace hi-fire solenoid valve, or its coil, if defective.

Section 8

Special Setup Screens

By pressing and **holding** the button while the power is off. Continue to hold and turn on the control power for the dryer. You will be able to access certain dryer features that rarely need to be changed and if setup incorrectly, could cause your dryer not to operate properly or not at all.

Pressing will allow you to enter the customer setup screens in the following sequential order:

Meter Roll Disable
Disable Air Switches
Meter Roll Reverse Select
Select Unload Method
Select Dryer Address
Attempt to Refill
Model Number
Temperature Scale Select
Fan and Heater Select
Set Time & Date
Adjustable Grain High Limit

Note: To bypass any or all of these screens without changing the current settings just press .

METER ROLL DISABLE

This option allows you to shut off the monitoring of the meter roll sensor located in the rear of the dryer. This should be only used in the event of a failure of the sensor itself. This sensor is used for calculation of the bushel per hour, total bushels and meter roll rpm's.

To toggle this feature on or off use the 

buttons then press the 

button to accept the changes.

AIR SWITCH TESTING

This option allows you to disable the testing of the air switch. This is useful if you are doing a pre season check on your dryer and you want to start the fan and heater with no grain in the columns or you are having air switch problems. The computer will ignore the state of the air switch if you change the selection to NO.

To toggle this feature on or off use the 

buttons then press the 

button to accept the changes.

Note: If the dryer's control power is lost, this option will toggle back to its factory state of YES.

METER ROLL REVERSE

This feature allows the meter rolls to temporarily reverse themselves for a programmed amount of time to help remove any debris that may have built up around this area. This is very useful if you are drying grain with alot of trash. This will help prevent the grain from not moving in the grain columns then causing the dryer to shutdown with grain overheat error.

To toggle this feature on or off use the 

buttons then press the ENTER button to accept the changes.

You will activate 2 additional screens by selecting yes.

Reverse time

This screen changes the amount of time you want he meter rolls to run in the reverse (backwards) mode. 5 minutes is the default setting.

Press MODIFY to change the reverse time or ENTER to jump to the next screen.

Forward time

This screen changes the amount of time you want he meter rolls to run before switching to the reverse mode. 5 minutes is the default setting.

Press MODIFY to change the reverse time or ENTER to jump to the next screen.

Note: This feature is only available on software version 1.03 or higher.

SELECT UNLOAD METHOD

This is a feature that has not been implemented yet into the dryer software, leave this setting at 2 speed. Changing it to 3 speed may cause your dryer unload system to fail.

SELECT DRYER ADDRESS

This feature is used for networking several portable grain dryers together for monitoring on a PC with special software. Changing this value will have no effect on the operation of the dryer, only the monitoring software (**Watchdog 2000**).

ATTEMPT TO REFILL

Changing this setting to yes allows your dryer to pause its drying process in the event that the Out of Grain Timer has expired. Instead of the dryer shutting down with a Out of Grain error message, the following sequence of events will happen:

- Load will continue to run
- Fan will continue to run
- Burner will stop drying
- Unload will stop

The dryer will continue in this mode until the fill switch (paddle switch on the load auger) has changed its state to indicate the dryer is full of grain again. At this point the dryer will:

- Load will stop running
- Burner will purge and relight to continue drying
- Unload will start discharging grain again
- Out of Grain timer will reset

MODEL NUMBER

This screen tells the computer in your Network dryer what model of dryer it is. Do not change any information in this screen unless you are
directed to either by a GSI service technician or engineer.

Just press the 

button to advance to the number on the line that needs to be changed or you can use

the 

button toback up to the previous number on the line.

Use the 

to change the number directly above the cursor "^". Once you are satisfied with your.

changes press the ENTER button to accept them.

Note: If the wrong selection is made, your dryer will look for other safeties that will not be present causing the dryer to be inoperable.

TEMPERATURE SCALE

This screen is used to toggle the temperature scale from Celsius to Fahrenheit. To change the scale press the INCREASE DECREASE then press the ENTER to accept the changes.

FAN/HEATER SELECT

This screen allows you to change the burner characteristics from a Hi/Lo type of burner to a On/Off type burner. The On/Off burner mode can be useful when drying on very warm days which may cause the dryer to never cycle from the Lo cycle.

Pressing the ENTER button will allow you to change the configuration of individual burners from On/Off to Hi/Lo type burners.

To change the burner mode press INCREASE DECREASE buttons to toggle the burner setting then press the ENTER button to accept the changes.

On this screen you can disable a fan and heater out of the Network loop. This would be used if you have a fan/heater computer that is malfunctioning and rather than preventing you from using the dryer at all, you can just ignore it. So you can continue to use your dryer until you can have the dryer serviced. To change the fan/heater to an inactive state, press the 

buttons to toggle between active or inactive. Then press the 

button to accept your changes.

IMPORTANT NOTE! It is possible to change all your fan and heaters to an inactive state which would cause your dryer to be unable to dry grain.

The display screen will then advance to the next fan and heater on your dryer. You can easily configure your dryer to use both On/Off burners and Hi/Lo burners at the same time. This depends on your particular drying situation.

Possible reasons for using On/Off burner:

- Low drying temperatures needed (ie. drying popcorn, rice, soybeans)
- Very warm outside ambient temperatures
- Drying grain that already has low moisture content requiring only 1 to 5 point moisture removal
- May help prevent Vapor High Limit shutdowns

Possible reasons for using Hi/Lo burner:

- Higher drying temperatures needed (ie. Hard to dry varieties of corn)
- Colder outside ambient temperatures
- High moisture content grain requiring 5-15 point removal

SET TIME & DATE

Use this screen to set the computers time and date. The time and date is preset at the factory but because of different time zones you may find the need to change it. Just press the 

button to advance to the number on the line that needs to be changed or you can use the 

button to back up to the previous number on the line. Use the 

to change the number directly above the flashing cursor. Once you are satisfied with your changes press the 

button to accept them.

CONTRAST ADJUSTMENT

Press and **hold** the 

button while the control power is **off,** then turn the control power **on,** then release the 

button. Press the 

buttons to darken or lighten the contrast. Press the 

to accept the changes.

Note: If the display is blank, keep pressing the increase button to bring up the contrast. A new installed display board may not have had the contrast set at the factory and defaults at no contrast.

Section 9

Drying Charts

2000 Series Dryers

Continuous Full Heat

Initial Moisture	Moisture Removed	Approx. Dry Time	1 Speed	2 Speed Low	2 Speed High
17%	2 pts.	16 min.	999	670	999
18%	3 pts.	21 min.	999	571	999
19%	4 pts.	26 min.	813	509	999
20%	5 pts.	31.5 min.	670	449	999
21%	6 pts.	37 min.	571	414	999
22%	7 pts.	41.5 min.	509	391	813
23%	8 pts.	47 min.	449	364	670
24%	9 pts.	51 min.	414	341	571
25%	10 pts.	54 min.	391	318	509
26%	11 pts.	58 min.	364	295	449
27%	12 pts.	62 min.	341	278	414
28%	13 pts.	66.5 min.	318	260	391
29%	14 pts.	71.5 min.	295	245	364
30%	15 pts.	76 min.	278	232	341
31%	16 pts.	81 min.	260	220	318
32%	17 pts.	86 min.	245	211	295
33%	18 pts.	91 min.	232	200	278
34%	19 pts.	96 min.	220	190	260
35%	20 pts.	100 min.	211	180	245

2000 Series Dryers

Continuous Dry & Cool

Initial Moisture	Moisture Removed	Approx. Dry Time	1 Speed	2 Speed Low	2 Speed High
17%	2 pts.	18 min.	893	459	999
18%	3 pts.	24 min.	670	402	999
19%	4 pts.	30 min.	536	357	999
20%	5 pts.	35 min.	459	322	893
21%	6 pts.	40 min.	402	292	670
22%	7 pts.	45 min.	357	268	536
23%	8 pts.	50 min.	322	247	459
24%	9 pts.	55 min.	292	230	402
25%	10 pts.	60 min.	268	214	357
26%	11 pts.	65 min.	247	201	322
27%	12 pts.	70 min.	230	189	292
28%	13 pts.	75 min.	214	179	268
29%	14 pts.	80 min.	201	169	247
30%	15 pts.	85 min.	189	161	230
31%	16 pts.	90 min.	179	153	214
32%	17 pts.	95 min.	169	146	201
33%	18 pts.	100 min.	161	138	189
34%	19 pts.	105 min.	153	130	179
35%	20 pts.	110 min.	146	122	169

2000 Series Dryers

Staged Batch

	Full Heat						Dry & Cool		
Upper Module Fan & Burner Switches on Manual						Upper Module Fan & Burner Switches on Manual			
Lower Module Fan & Burner Switches on Auto						Lower Module Fans on Manual			
						& Burner Switches on Off			
Approx. Dry Time	Dry	Cool	Unload*	Initial Moisture	Moisture Removed	Approx. Dry Time	Dry	Cool	Unload*
16 min.	3 min.	0	10 min.	17%	2 pts.	18 min.	8 min.	0 min.	10 min.
21 min.	5.5 min.	0	10 min.	18%	3 pts.	24 min.	14 min.	0 min.	10 min.
Upper Module Fan & Burner Switches on Manual						Upper Module Fan & Burner Switches on Manual			
Lower Module Fan & Burner Switches on Manual						Lower Module Fan & Burner Switches on Auto			
26 min	3 min	0	10 min.	19%	4 pts.	30 min	1 min.	18 min.	10 min.
31.5 min.	6 min.	0	10 min.	20%	5 pts.	35 min.	3.5 min.	18 min.	10 min.
37 min.	8.5 min.	0	10 min.	21%	6 pts.	40 min.	6 min.	18 min.	10 min.
41.5 min.	11 min.	0	10 min.	22%	7 pts.	45 min.	8.5 min.	18 min.	10 min.
47 min.	13.5 min.	0	10 min.	23%	8 pts.	50 min.	11 min.	18 min.	10 min.
51 min.	15.5 min.	0	10 min.	24%	9 pts.	55 min.	13.5 min.	18 min.	10 min.
54 min.	17 min.	0	10 min.	25%	10 pts.	60 min.	16 min.	18 min.	10 min.
58 min.	19 min.	0	10 min.	26%	11 pts.	65 min.	18.5 min.	18 min.	10 min.
62 min.	21 min.	0	10 min.	27%	12 pts.	70 min.	21 min.	18 min.	10 min.
66.5 min.	23.5 min.	0	10 min.	28%	13 pts.	75 min.	23.5 min.	18 min.	10 min.
71.5 min.	26 min.	0	10 min.	29%	14 pts.	80 min.	26 min.	18 min.	10 min.
76 min.	28 min.	0	10 min.	30%	15 pts.	85 min.	28.5 min.	18 min.	10 min.
81 min.	30.5 min.	0	10 min.	31%	16 pts.	90 min.	31 min.	18 min.	10 min.
86 min.	33 min.	0	10 min.	32%	17 pts.	95 min.	33.5 min.	18 min.	10 min.
91 min.	35.5 min.	0	10 min.	33%	18 pts.	100 min.	36 min.	18 min.	10 min.
96 min.	38 min.	0	10 min.	34%	19 pts.	105 min.	38.5 min.	18 min.	10 min.
100 min.	40 min.	0	10 min.	35%	20 pts.	110 min.	41 min.	18 min.	10 min.

3000 Series Dryers

Continuous Full Heat

Initial Moisture	Moisture Removed	Approx. Dry Time	1 Speed	2 Speed Low	2 Speed High
17%	2 pts.	16 min.	999	999	999
18%	3 pts.	21 min.	999	860	999
19%	4 pts.	26 min.	999	766	999
20%	5 pts.	31.5 min.	999	677	999
21%	6 pts.	37 min.	860	624	999
22%	7 pts.	41.5 min.	766	589	999
23%	8 pts.	47 min.	677	548	999
24%	9 pts.	51 min.	624	513	860
25%	10 pts.	54 min.	589	478	766
26%	11 pts.	58 min.	548	445	677
27%	12 pts.	62 min.	513	418	624
28%	13 pts.	66.5 min.	478	393	589
29%	14 pts.	71.5 min.	445	370	548
30%	15 pts.	76 min.	418	350	513
31%	16 pts.	81 min.	393	331	478
32%	17 pts.	86 min.	370	318	445
33%	18 pts.	91 min.	350	300	418
34%	19 pts.	96 min.	331	281	393
35%	20 pts.	100 min.	318	262	370

3000 Series Dryers

Continuous Dry & Cool

Initial Moisture	Moisture Removed	Approx. Dry Time	1 Speed	2 Speed Low	2 Speed High
17%	2 pts.	18 min.	999	622	999
18%	3 pts.	24 min.	907	544	999
19%	4 pts.	30 min.	726	484	999
20%	5 pts.	35 min.	622	436	999
21%	6 pts.	40 min.	544	396	907
22%	7 pts.	45 min.	484	363	726
23%	8 pts.	50 min.	436	335	622
24%	9 pts.	55 min.	396	311	544
25%	10 pts.	60 min.	363	290	484
26%	11 pts.	65 min.	335	272	436
27%	12 pts.	70 min.	311	256	396
28%	13 pts.	75 min.	290	242	363
29%	14 pts.	80 min.	272	229	335
30%	15 pts.	85 min.	256	218	311
31%	16 pts.	90 min.	242	207	290
32%	17 pts.	95 min.	229	198	272
33%	18 pts.	100 min.	218	188	256
34%	19 pts.	105 min.	207	178	242
35%	20 pts.	110 min.	198	168	229

3000 Series Dryers

Staged Batch

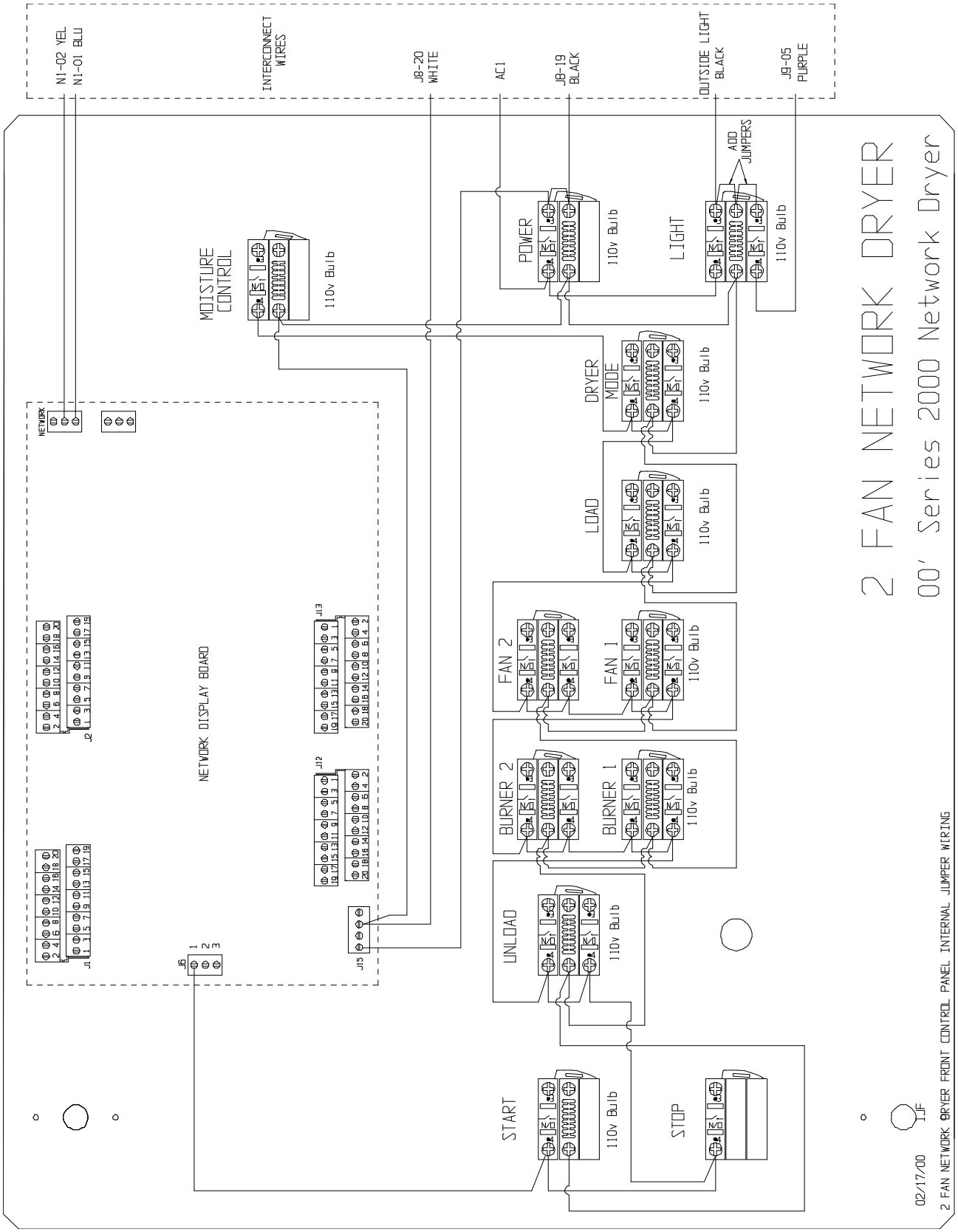
	Full Heat					Dry & Cool		
Upper Module Fan & Burner Switches on Manual					Upper Module Fan & Burner Switches on Manual			
Middle Module Fan & Burner Switches on Auto					Middle Module Fans on Manual & Burner Switchs on Auto			
Lower Module Fan & Burner Switches on Auto					Lower Module Fans on Manual & Burner Switchs on Off			
Approx. Dry Time	Dry	Cool	Unload*	Initial Moisture	Moisture Removed	Approx. Dry Time	Dry	Cool	Unload*
16 min.	2 min.	0	10 min.	17%	2 pts.	18 min.	4 min.	0 min.	10 min.
21 min.	4 min.	0	10 min.	18%	3 pts.	24 min.	7 min.	0 min.	10 min.
26 min	5.5 min	0	10 min.	19%	4 pts.	30 min	10 min.	0 min.	10 min.
31.5 min.	7.5 min.	0	10 min.	20%	5 pts.	35 min.	12.5 min.	0 min.	10 min.
37 min.	9 min.	0	10 min.	21%	6 pts.	40 min.	15 min.	0 min.	10 min.
Upper Module Fan & Burner Switches on Manual					Upper Module Fan & Burner Switches on Manual				
Middle Module Fan & Burner Switches on Manual					Middle Module Fan & Burner Switches on Manual				
Lower Module Fan & Burner Switches on Manual					Lower Module Fan & Burner Switches on Auto				
41.5 min.	4 min.	0	10 min.	22%	7 pts.	45 min.	0 min.	12.5 min	10 min.
47 min.	6 min.	0	10 min.	23%	8 pts.	50 min.	0 min.	15 min.	10 min.
51 min.	7 min.	0	10 min.	24%	9 pts.	55 min.	0 min.	18 min.	10 min.
54 min.	8 min.	0	10 min.	25%	10 pts.	60 min.	1.5 min.	18 min.	10 min.
58 min.	9.5 min.	0	10 min.	26%	11 pts.	65 min.	3 min.	18 min.	10 min.
62 min.	11 min.	0	10 min.	27%	12 pts.	70 min.	5 min.	18 min.	10 min.
66.5 min.	12 min.	0	10 min.	28%	13 pts.	75 min.	6.5 min.	18 min.	10 min.
71.5 min.	14 min.	0	10 min.	29%	14 pts.	80 min.	8 min.	18 min.	10 min.
76 min.	15.5 min.	0	10 min.	30%	15 pts.	85 min.	10 min.	18 min.	10 min.
81 min.	17 min.	0	10 min.	31%	16 pts.	90 min.	11.5 min.	18 min.	10 min.
86 min.	19 min.	0	10 min.	32%	17 pts.	95 min.	13 min.	18 min.	10 min.
91 min.	20.5 min.	0	10 min.	33%	18 pts.	100 min.	15 min.	18 min.	10 min.
96 min.	22 min.	0	10 min.	34%	19 pts.	105 min.	16.5 min.	18 min.	10 min.
100 min.	23.5 min.	0	10 min.	35%	20 pts.	110 min.	18 min.	18 min.	10 min.

Section 10

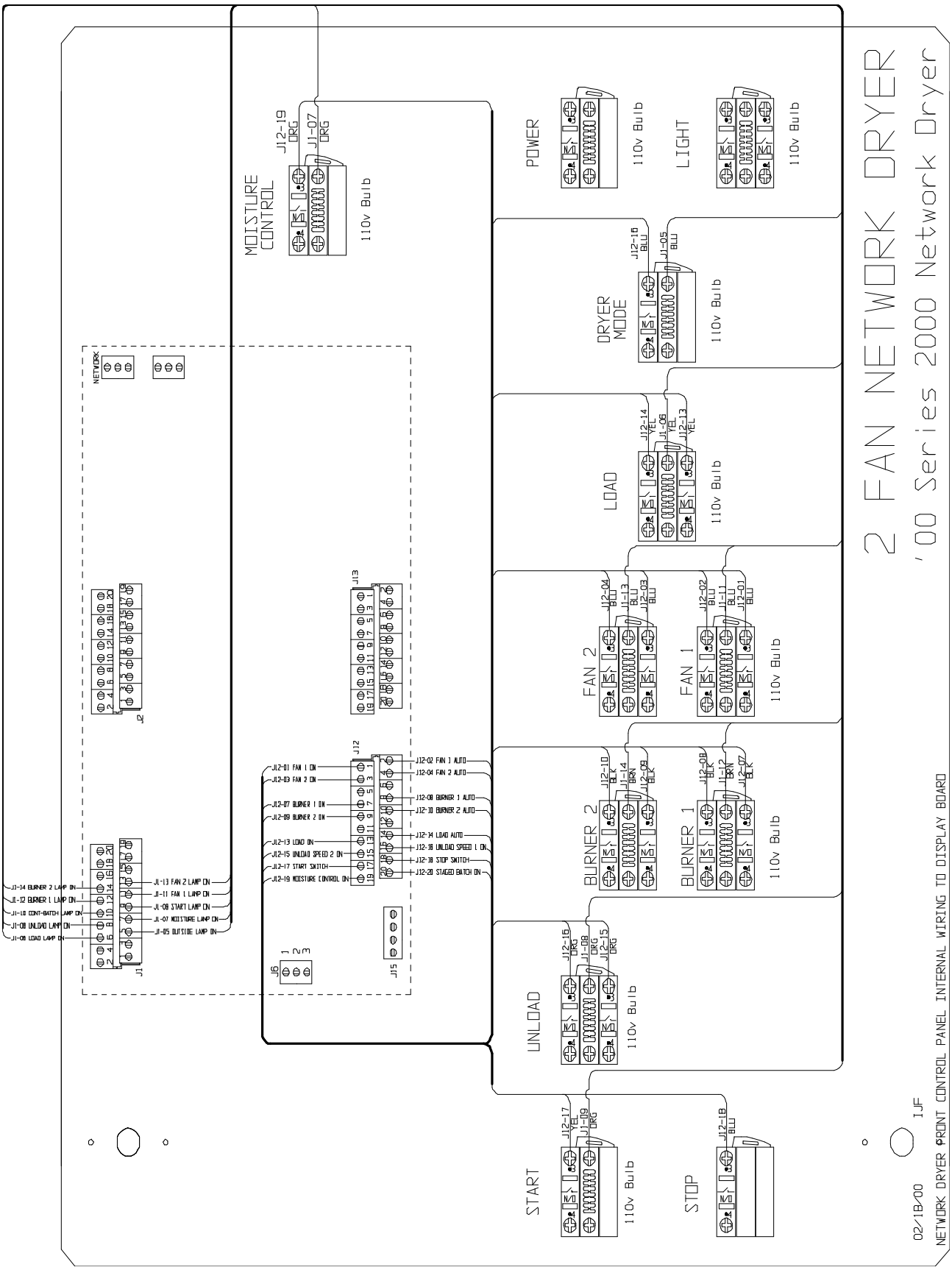
Technical Reference

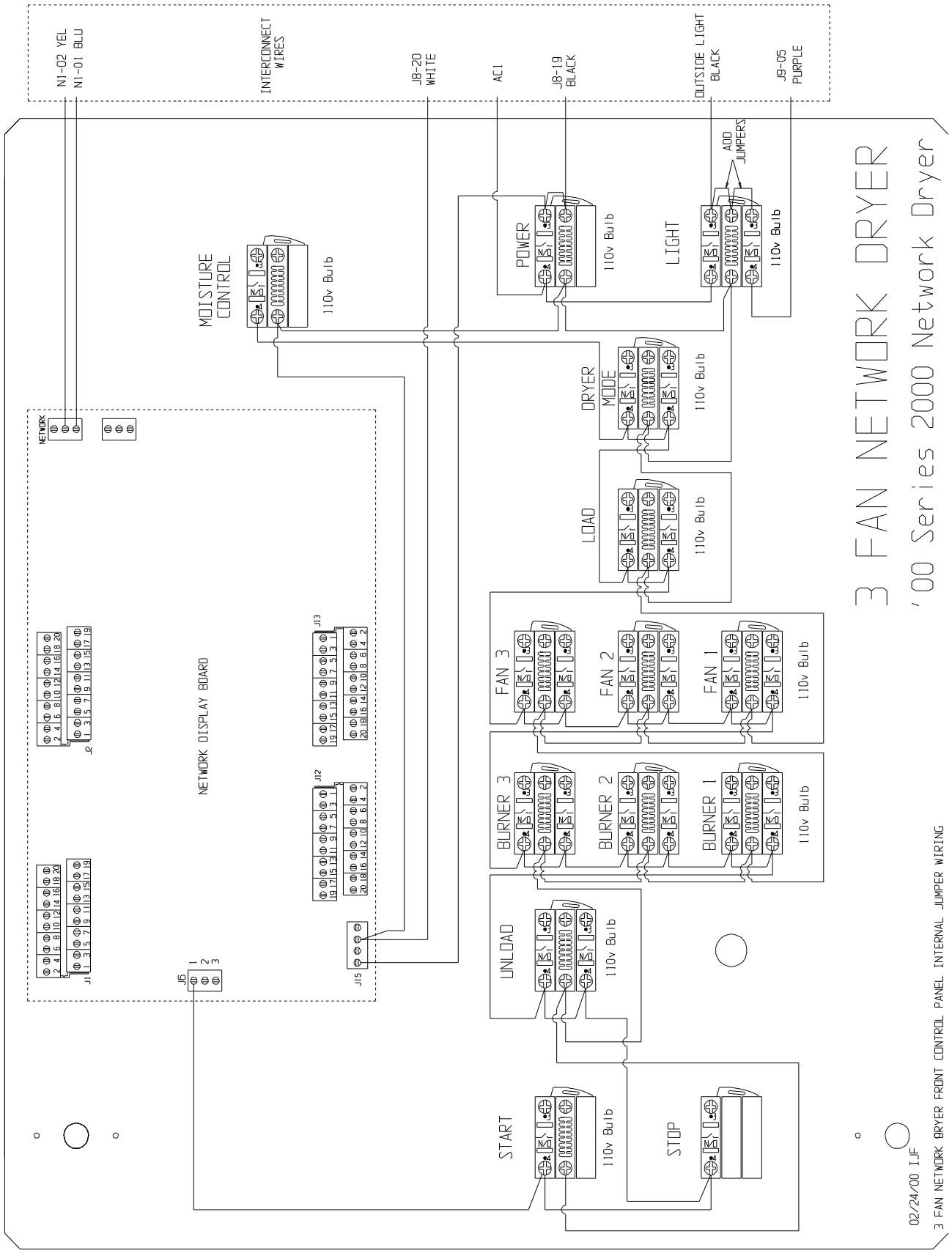
CONTROL PANEL JUMPER WIRING

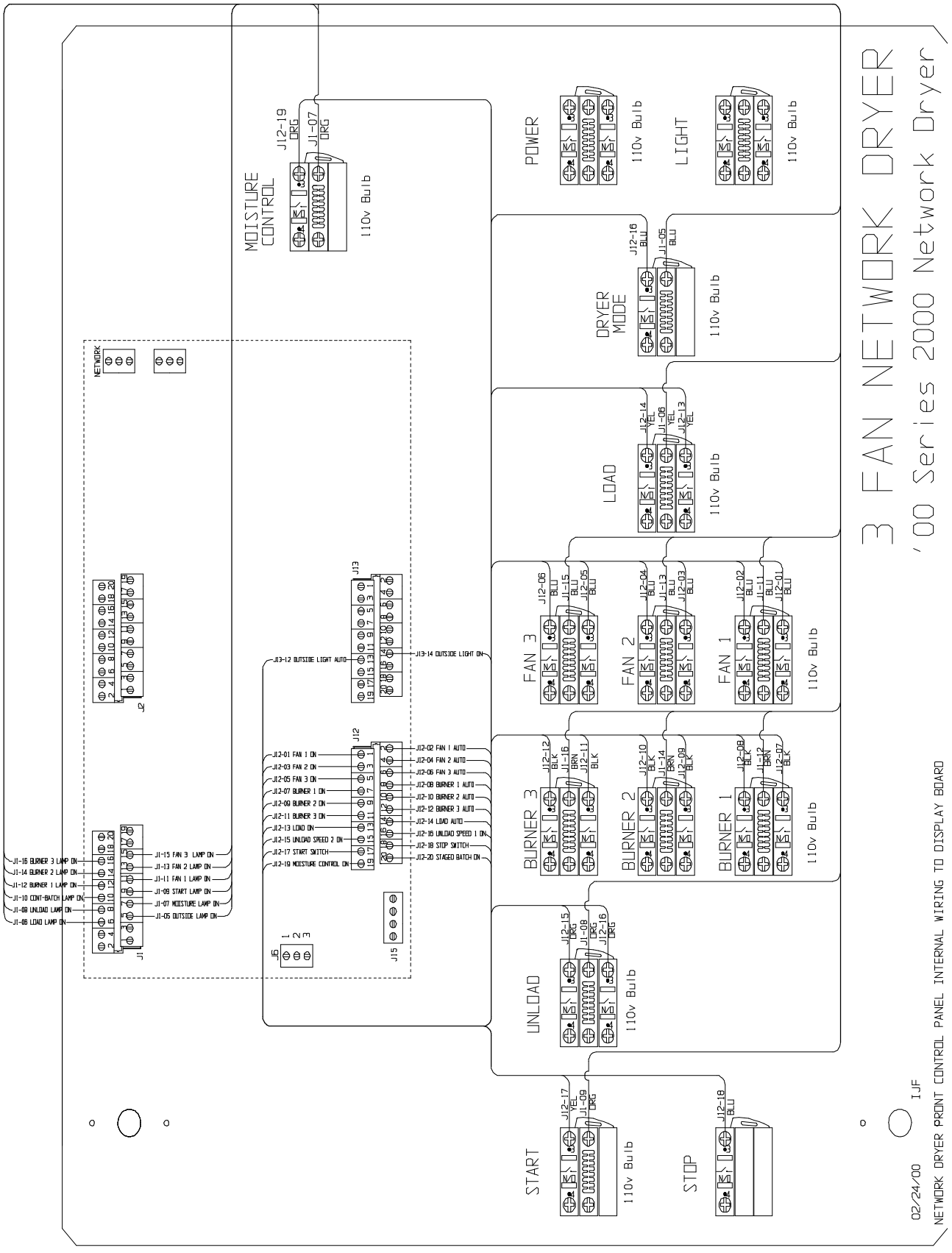
Note: Wiring specifications are subject to change without notice.

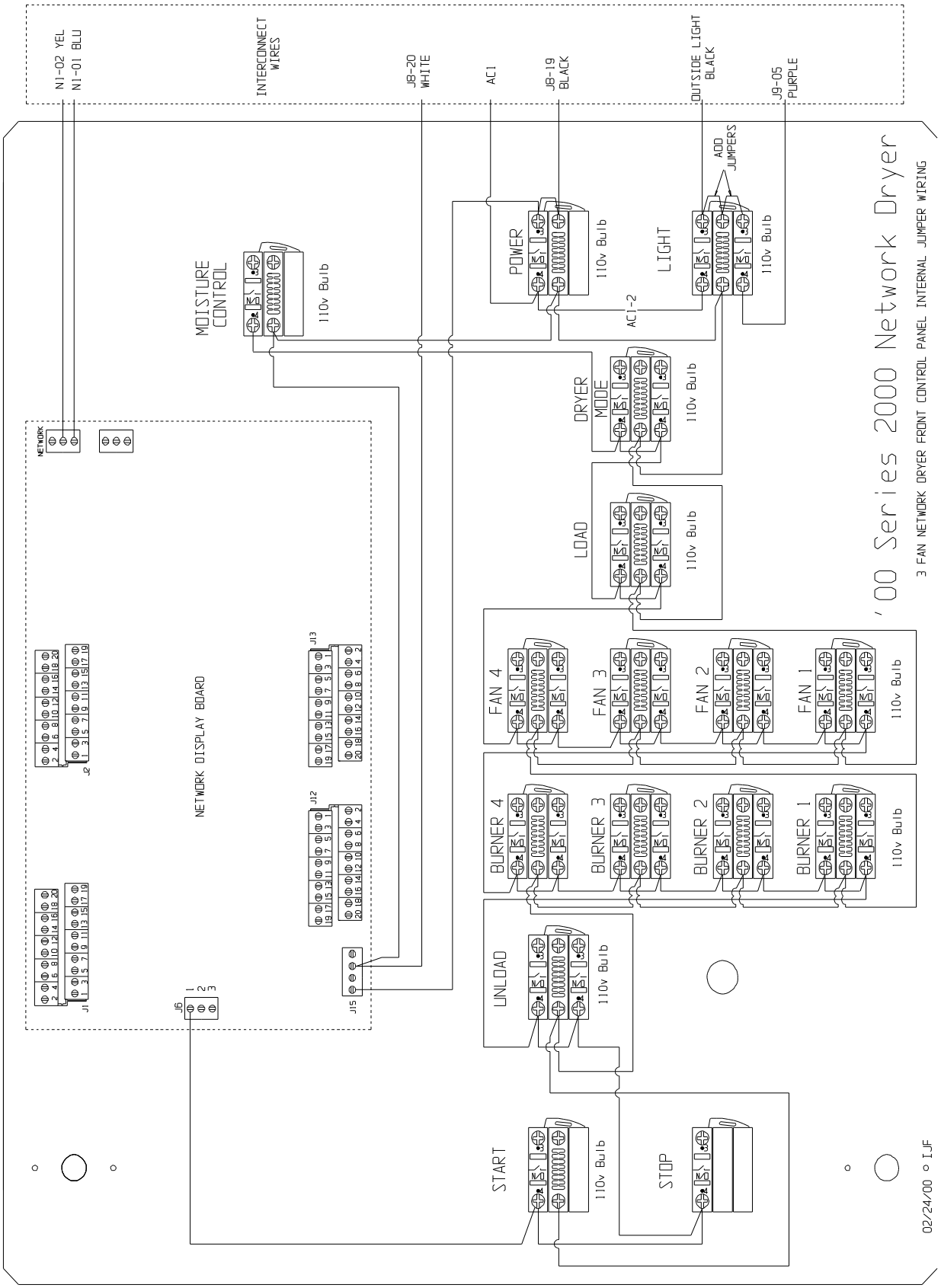


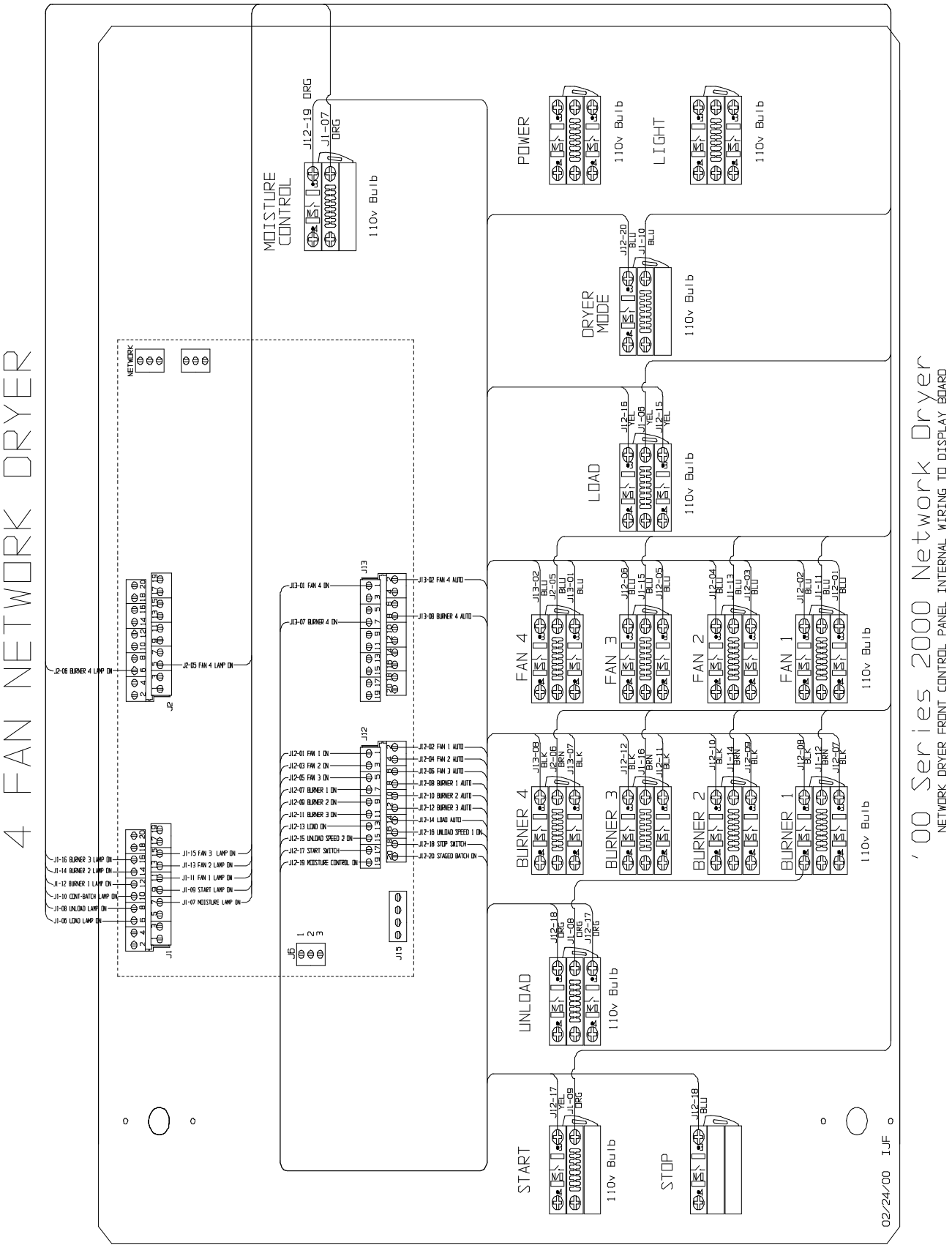
CONTROL PANEL INTERNAL WIRING

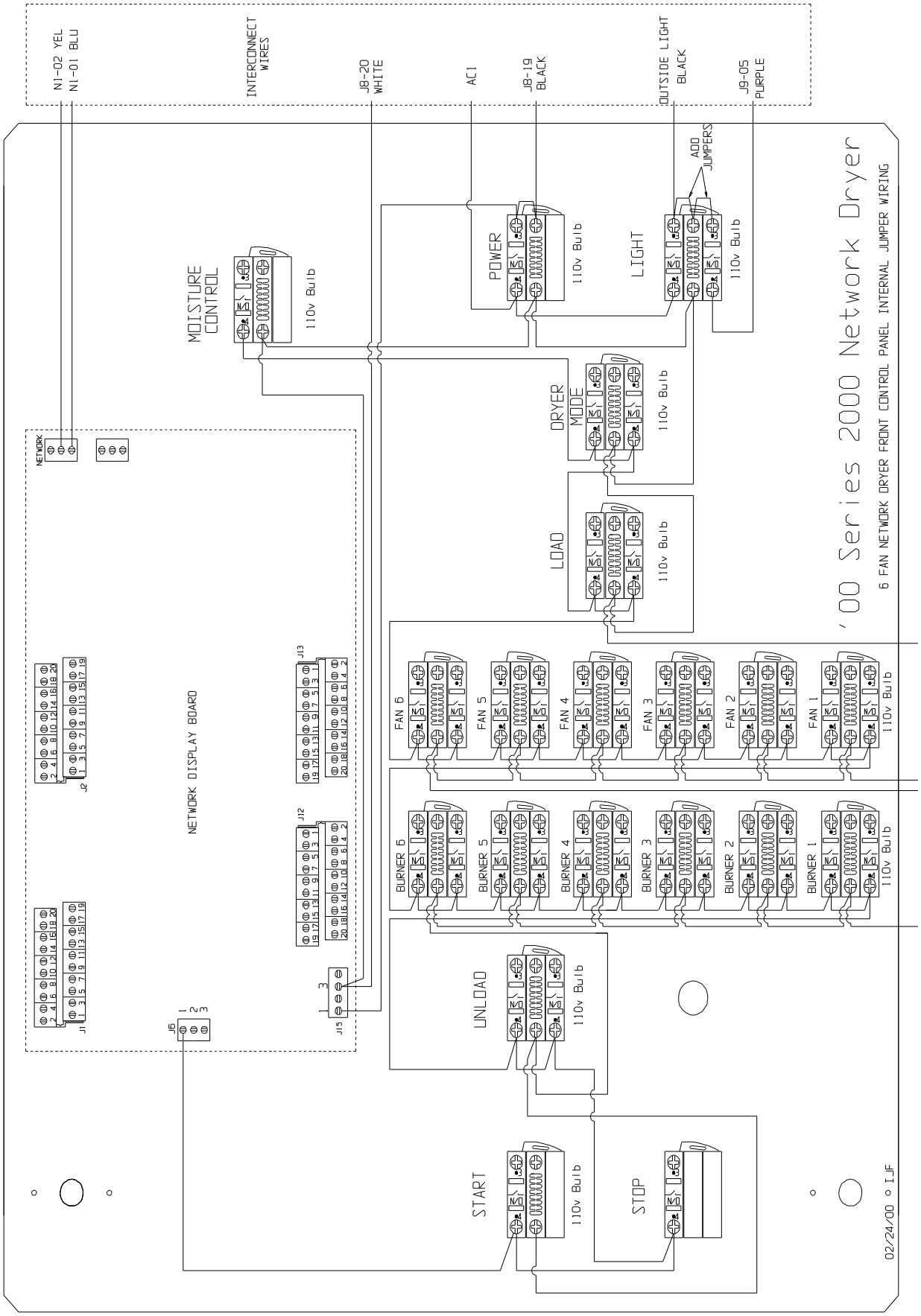




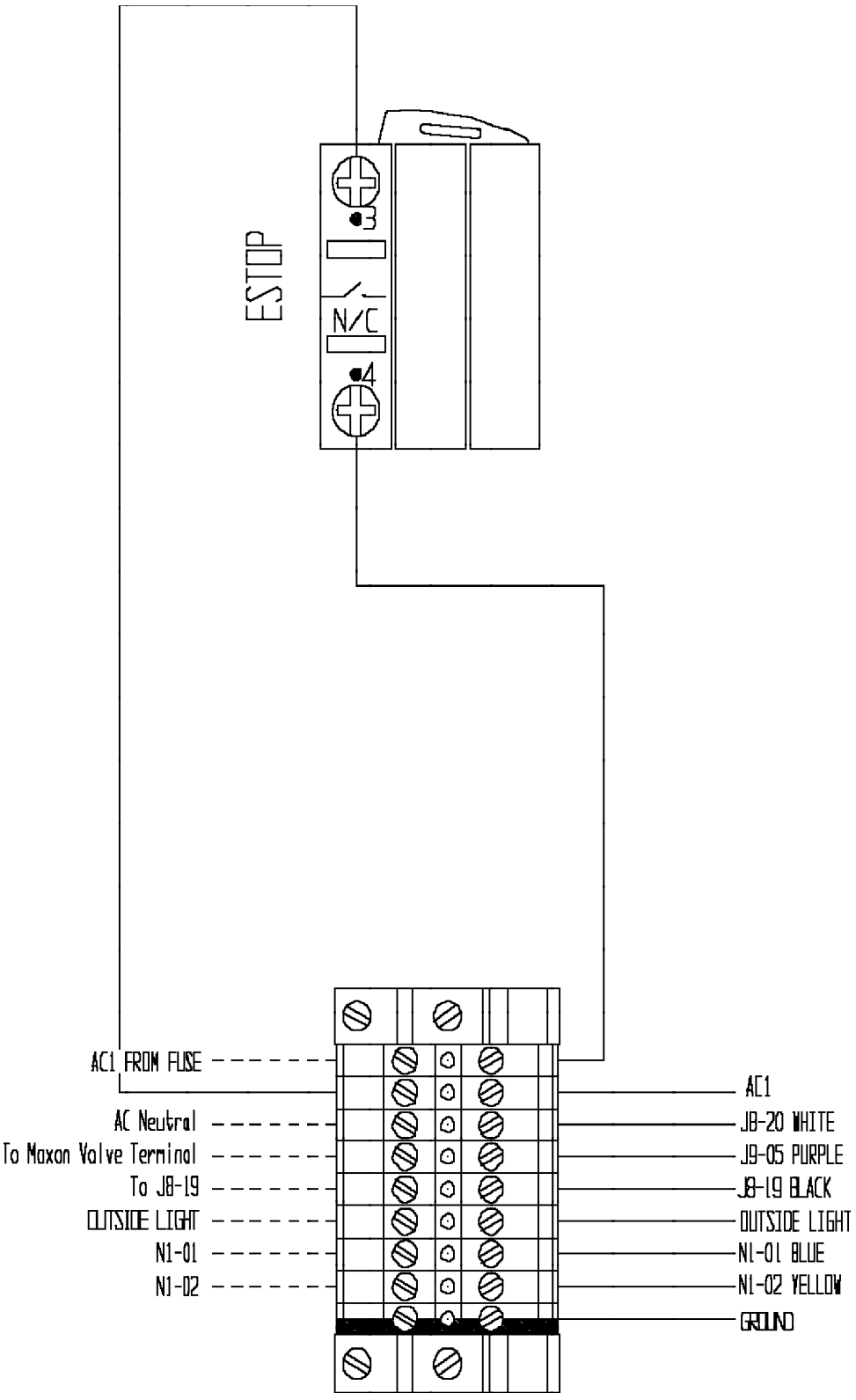




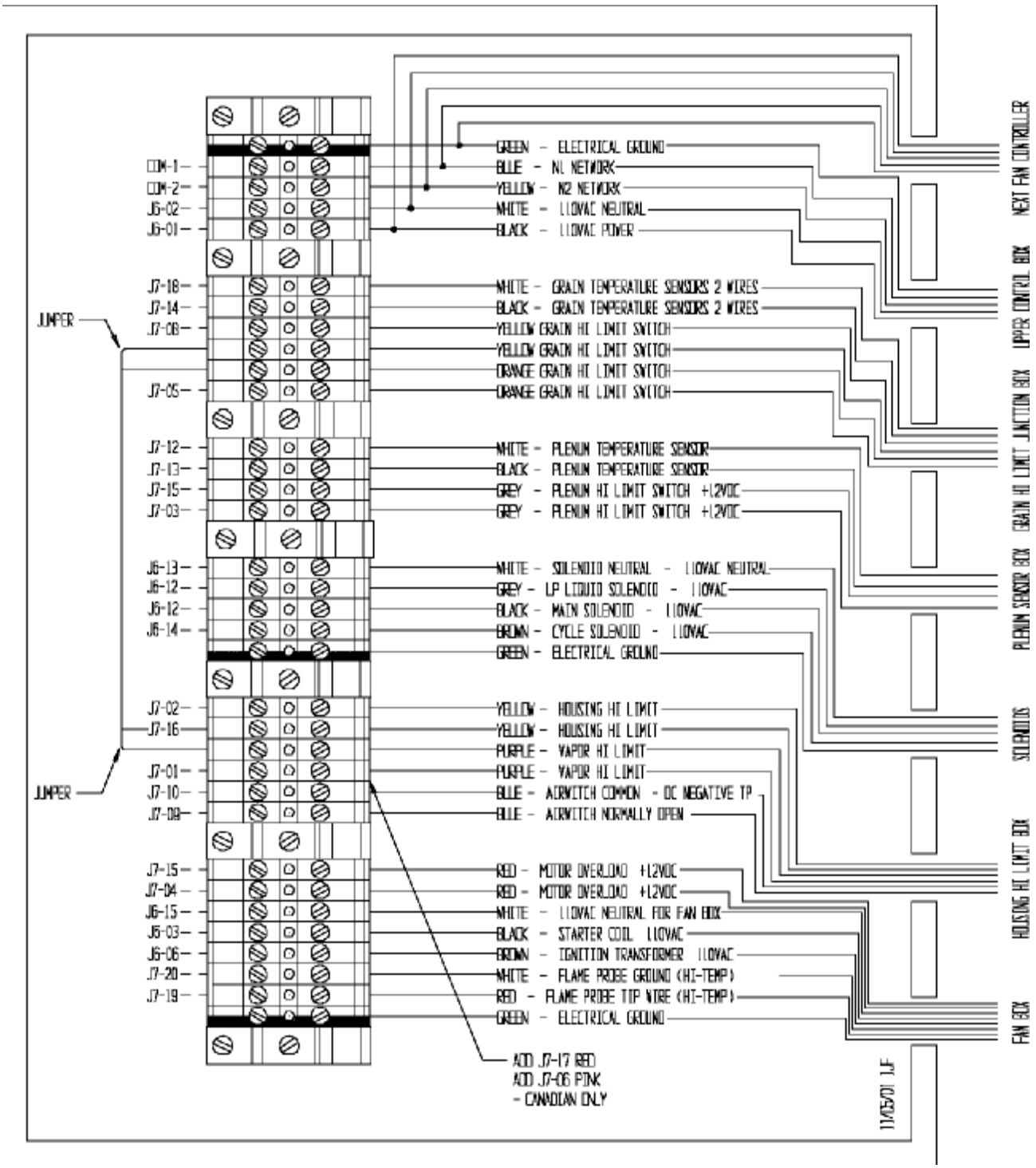




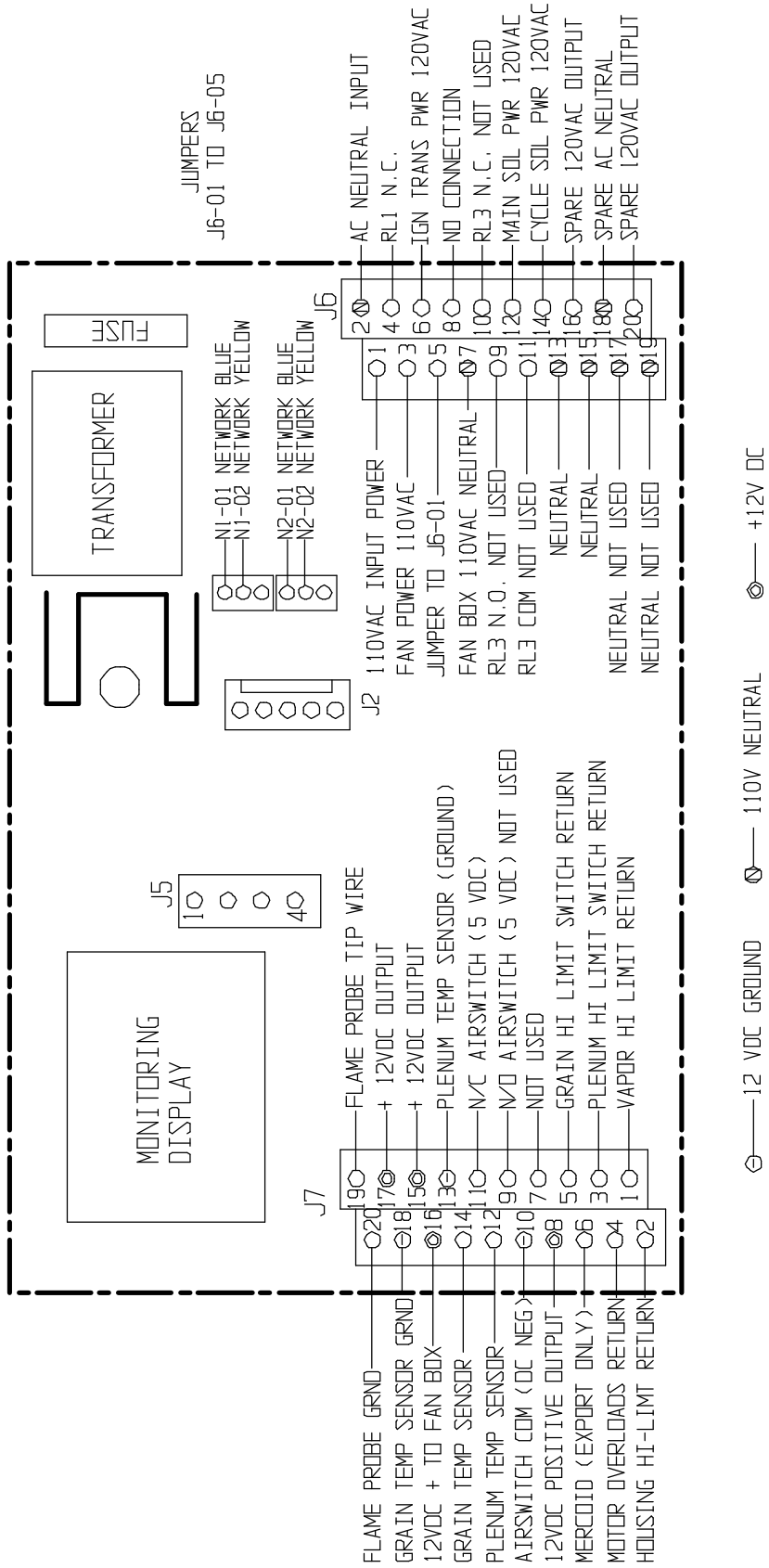
LOWER CONTROL BOX BACK PANEL WIRING



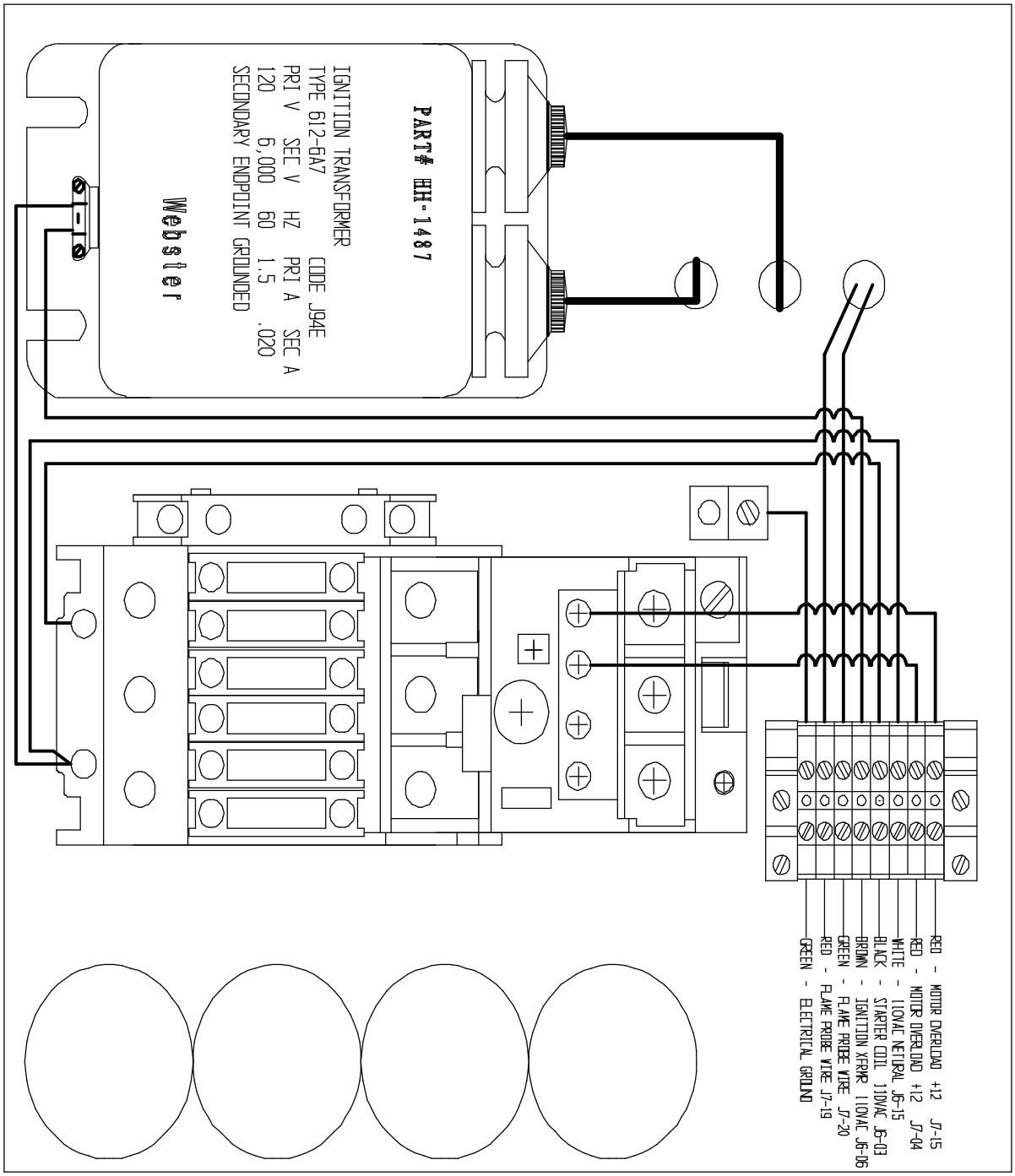
NETWORK FAN/HEATER INTERFACE



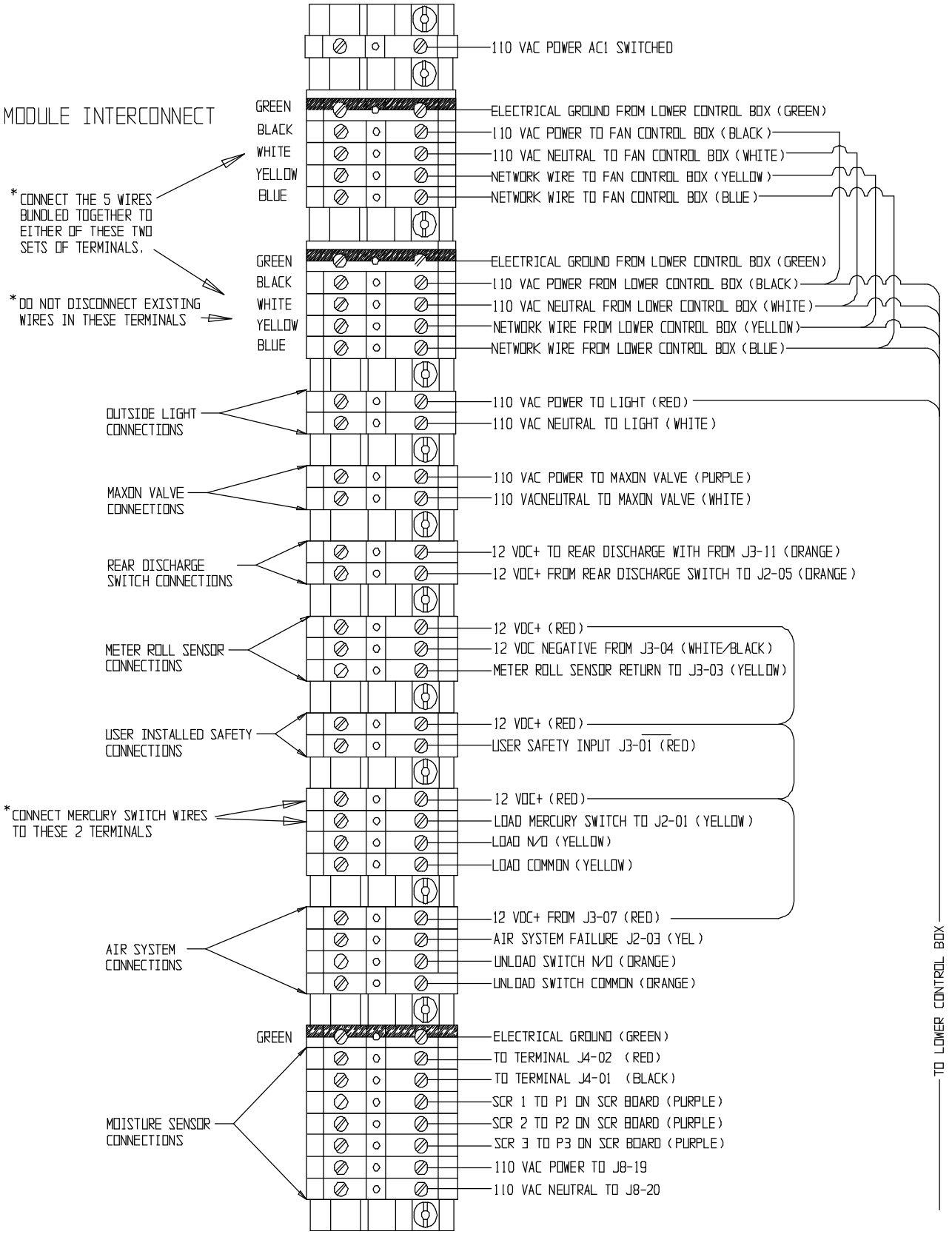
FAN COMPUTER PINOUTS



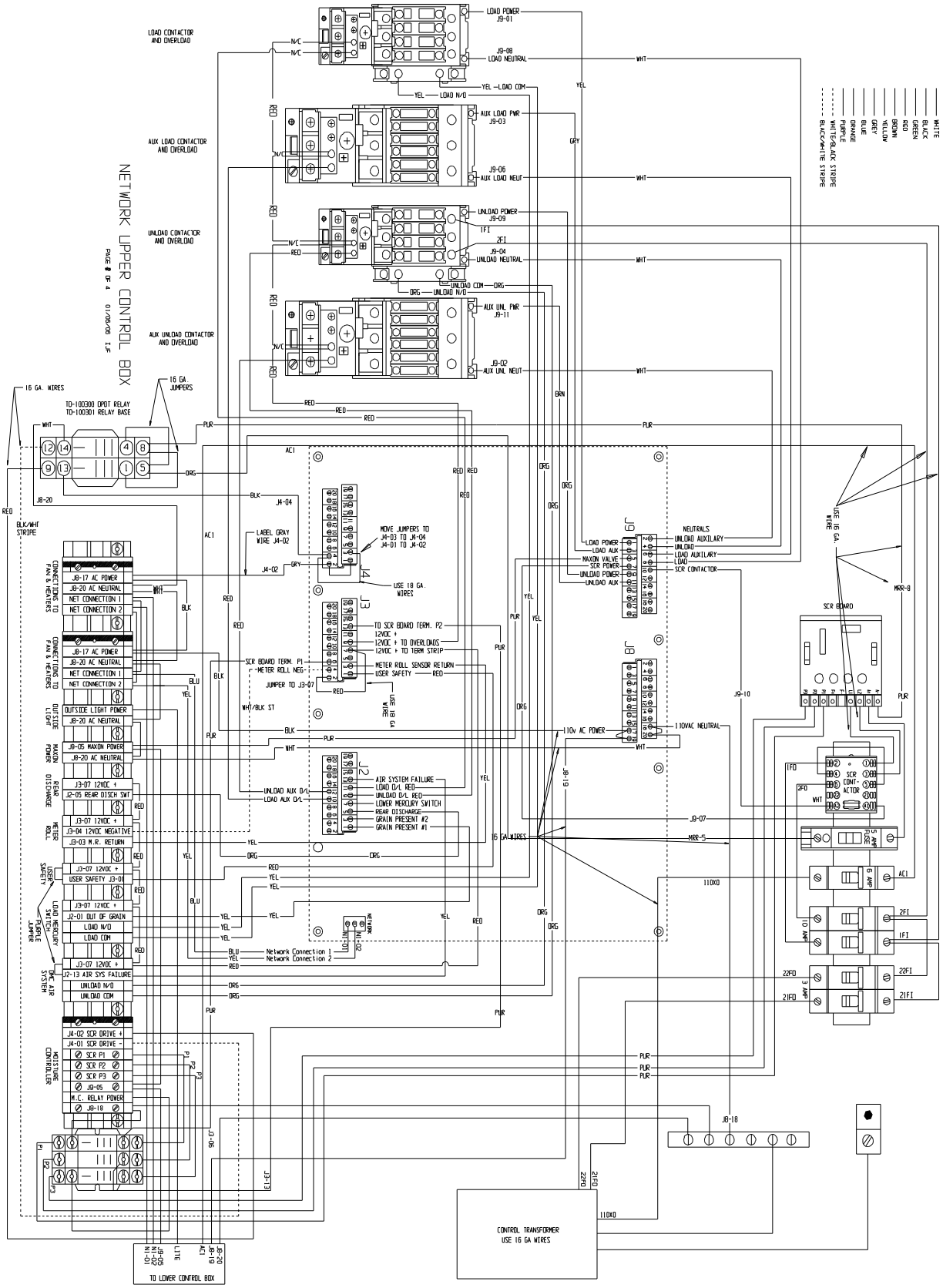
FAN CONTROL BOX



UPPER TERMINAL STRIP



UPPER BACK PANEL CONTROL WIRING



NOTES

NOTES

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

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