



# Vision for Portable Dryers

Operation Manual

PNEG-1739

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**All information, illustrations, photos and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.**

## Contents

<b>Chapter 1 Safety</b> .....	<b>5</b>
Safety Guidelines .....	5
Cautionary Symbols Definitions .....	6
Safety Cautions .....	7
Safety Sign-Off Sheet .....	11
Emergency Stop Switch .....	12
<b>Chapter 2 Decals</b> .....	<b>13</b>
<b>Chapter 3 Vision Control Panel</b> .....	<b>16</b>
Control Power Switch .....	16
Stop Button .....	16
Outside Light Switch .....	17
Start Button .....	17
Unload Switch .....	17
Meter Roll Adjustment .....	17
Load Switch .....	18
Fan Switch .....	18
Heater Switch .....	18
<b>Chapter 4 Boot Screen</b> .....	<b>19</b>
Boot Screen Description and Button Explanations .....	19
Software Update Procedure .....	20
<b>Chapter 5 Operations</b> .....	<b>24</b>
Default Operation Screen .....	24
Timers Button .....	25
Load Delay .....	25
Out Of Grain (OOG) Timer .....	25
Fan Delay .....	25
Unload Delay .....	25
Cool Down .....	25
Temp Button .....	26
Plenum Temperature Setpoint .....	27
Grain Temperature Setpoint .....	27
Setup Button .....	28
Drying Mode .....	28
Moisture Control Setup .....	29
Auto-Start Setup .....	29
Unload Parameters .....	33
Plenum Temp Manager .....	33
Burner Mode .....	34
Calibrate Moisture Sensor .....	34
Extended Setup Screen .....	35
Diagnostics .....	35
Differential .....	36
Printer Setup .....	36
Meter Roll Reverse .....	36
BPH Calibration .....	36
Set Time/Date .....	37
Temp Scale .....	37
Dryer Model .....	37
Data Logger Setup .....	38
User Saved Defaults .....	39
Batches .....	39
Language .....	39

# Table of Contents

---

View Button .....	40
Table View .....	40
Select Data Log Sample Time .....	41
Graph View .....	41
Owner's Manual .....	42
Error History .....	42
System Information .....	42
Software Version Info .....	43
M/C Button .....	43
Modifying Temperature Setpoint .....	43
Modifying Moisture Setpoint .....	44
Resetting Factory Defaults .....	44
<b>Chapter 6 Moisture Control Options .....</b>	<b>45</b>
Continuous Flow Drying .....	45
Temperature Controlled Schemes .....	45
Moisture Controlled Schemes .....	49
Staged Batch Drying .....	52
Time Controlled Scheme .....	52
Temperature Controlled Scheme .....	53
Time and Temperature Controlled Scheme .....	54
Moisture Controlled Scheme .....	55
<b>Chapter 7 Initial Settings Check .....</b>	<b>58</b>
Dealer Suggested Initial Settings Check .....	58
Owner Suggested Initial Settings Check .....	58
<b>Chapter 8 Safety Circuit Shutdown Messages .....</b>	<b>59</b>
Fan/Heater Shutdown Messages .....	59
Main I/O Shutdown Messages .....	62
Moisture Control Shutdown Messages .....	64
<b>Chapter 9 Vision Schematics and Wiring Diagrams .....</b>	<b>65</b>
Fan/Heater Standard .....	65
Front Panel .....	66
Upper Control Box .....	88
220 VAC 1 Phase .....	91
220 VAC 3 Phase .....	92
440 VAC 3 Phase .....	93
575 VAC 3 Phase .....	94
Ladder Diagram .....	95
<b>Chapter 10 Warranty .....</b>	<b>99</b>

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## **Safety Guidelines**

Safety guidelines are general-to-specific safety rules that must be followed at all times. This manual is written to help you understand safe operating procedures and problems that can be encountered by the operator and other personnel when using this equipment. Save these safety guidelines for future reference.

As owner or operator, you are responsible for understanding the requirements, hazards, and precautions that exist and to inform others as required. Unqualified persons must stay out of the work area at all times.

Alterations must not be made to the equipment. Alterations can produce dangerous situations resulting in **SERIOUS INJURY** or **DEATH**.

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

When necessary, you must consider the installation location relative to electrical, fuel and water utilities.

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

**ST-0001-3**

### Cautionary Symbols Definitions

Cautionary symbols appear in this manual and on product decals. The symbols alert the user of potential safety hazards, prohibited activities and mandatory actions. To help you recognize this information, we use the symbols that are defined below.



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



This symbol indicates a potentially hazardous situation which, if not avoided, **can result in serious injury or death.**



This symbol indicates a potentially hazardous situation which, if not avoided, **can result in minor or moderate injury.**



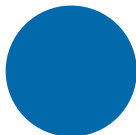
This symbol is used to address practices not related to personal injury.



This symbol indicates a general hazard.



This symbol indicates a prohibited activity.



This symbol indicates a mandatory action.

ST-0005-2

## Safety Cautions

### Use Personal Protective Equipment

- Use appropriate personal protective equipment:

**Eye Protection**



**Respiratory Protection**



**Foot Protection**



**Hearing Protection**



**Head Protection**



**Fall Protection**



**Hand Protection**



- Wear clothing appropriate to the job.
- Remove all jewelry.
- Tie long hair up and back.

ST-0004-1

### Install and Operate Gas-Fired Equipment Properly

- Gas-fired equipment should be installed by a qualified pipe fitter and must conform with local codes.
- For Canada: The equipment shall be installed in accordance with the *Natural Gas and Propane Installation Code, CSA B149.1*, or the *Propane Storage and Handling Code, CSA B149.2*, or applicable provincial regulations, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.
- For the United States: The equipment shall be installed in accordance with the National Fuel Gas Code *ANSI Z223.1/NFPA 54*.



ST-0016-2

### Install and Operate Equipment Properly

- Before attempting to remove and reinstall the fan blade, contact GSI for the recommended procedure.



ST-0033-2

# 1. Safety

## For Your Safety

- If you smell gas:
  - Do not try to light any appliance.
  - Extinguish any open flames.
  - Do not touch any electrical switch.
  - Immediately call your gas supplier. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
- The use and storage of gasoline and other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.
- Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment. Installation and service must be performed by a qualified installer, service agency or the gas supplier.



ST-0024-1

## Stay Clear of Hoisted Equipment

- Always use proper lifting or hoisting equipment when assembling or disassembling equipment.
- Do not walk or stand under hoisted equipment.
- Always use sturdy and stable supports when needed for installation. Not following these safety precautions creates the risk of falling equipment, which can crush personnel and cause serious injury or death.



ST-0047-1

## Follow Safety Instructions

- Warning: If the information in the manual is not followed exactly, a fire or explosion can result, causing property damage, personal injury or loss of life.
- Carefully read all safety messages in this manual and safety signs on your machine. Keep signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from the manufacturer.
- Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.
- If you do not understand any part of this manual or need assistance, contact your dealer.



ST-0025-2



### Install and Operate Electrical Equipment Properly

- Electrical controls must be installed by a qualified electrician and must meet the standards set by the National Electric Code, Canadian Electrical Code, and all local and state codes.
- Lock-out power source before making adjustments, cleaning, or maintaining equipment.



ST-0027-2

### Maintain Equipment and Work Area

- Understand service procedures before doing work.
- Keep area clean and dry.
- Do not service equipment while it is operating. Disconnect and lock-out power and fuel supply before entering equipment or before performing maintenance.
- Keep your equipment in proper working condition. Replace worn or broken parts immediately.
- Depressurize the fuel train before disassembling for service.
- Allow the fan to run for 20 minutes with the burner off to purge products of combustion and to cool the components before entering.
- Check regularly for any developing gas plumbing leaks. Do not operate the dryer if any gas leak is detected. Shut down and repair before further operation.



ST-0030-2

### Rotating Auger Hazard

- Keep clear of rotating augers and moving parts.
- Do not remove or modify guards or covers.
- Lock-out power source before making adjustments, cleaning, or maintaining equipment.
- Failure to follow these precautions will result in serious injury or death.



ST-0037-1

## 1. Safety

### Exercise Caution When Drying Flammable Grains

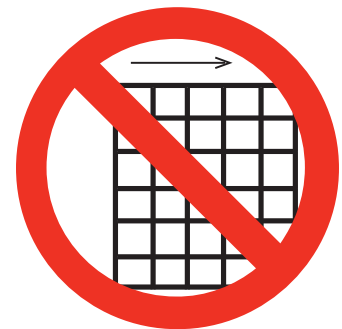
- Be aware that some grains are highly flammable including, but not limited to, rapeseed, canola, linseed, sunflower and milo.
- All grain and seed must be whole (minimal cracking or crushing), clean, and dust free before drying.
- Avoid dust and chaff from being drawn into the fan and heater.
- To reduce risk of fire, keep the fan, heater, drying plenum, and ducts clean at all times.
- In the event of a fire (or suspected fire):
  1. Shutdown the entire dryer.
  2. Turn off the fuel at the tank or supply valve.
  3. Shut off and lock electrical power.
  4. Evacuate the area.
  5. Call the fire department.



ST-0032-1

### Maintain Equipment and Work Area

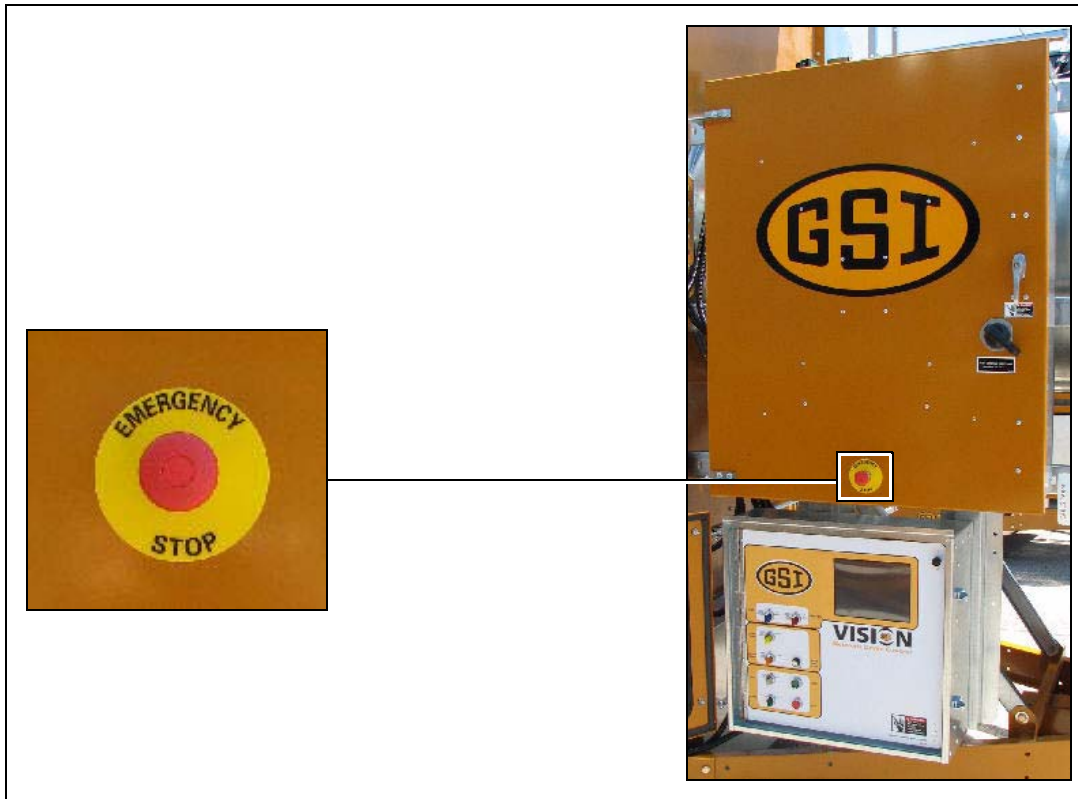
- Equipment is intended for the use of grain drying only. Any other use is a misuse of this equipment.
- The operating instructions in this manual pertain to the common cereal grains as indicated. When drying any other grain, contact GSI for additional recommendations.
- Be certain that capacities of auxiliary conveyors are matched to dryer metering capacities.
- On LP fired units, set pressure regulator to avoid excessive gas pressure applied to the burner during ignition and operation. Do not exceed maximum recommended drying temperatures.
- Equipment has sharp edges that can cause serious injury. To avoid injury, handle sharp edges with caution and use proper protective clothing and equipment at all times.
- All guards must be in place before and during operation. Images of guards removed in this manual are for illustration purposes only.
- Use caution when working around high-speed fans, gas burners, augers and auxiliary conveyors which can start automatically.
- Keep hands, feet, and clothing away from moving parts.
- Do not bypass any safety device or interlock.
- Do not enter the dryer or bin while it is operating.
- Do not operate in an area where combustible material will be drawn into the dryer.



ST-0034-2



## Emergency Stop Switch



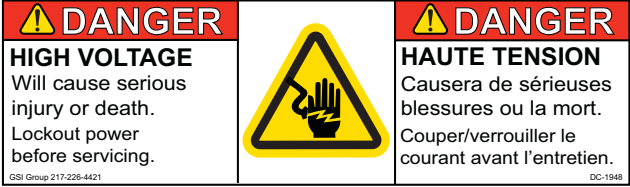
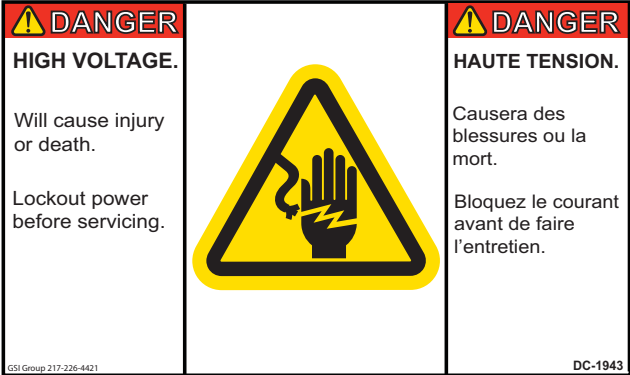

The Emergency Stop switch is located on the upper control box door. Pushing the Emergency Stop switch will interrupt the control power and stop all dryer functions.








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





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

A free replacement will be sent to you.

Decal #	Decals	Location
DC-1948		<p>This decal appears:</p> <ul style="list-style-type: none"> <li>• On the lid of the fan/heater control box.</li> <li>• On the front of the fan/heater control box.</li> <li>• Inside the dryer's upper control box.</li> </ul>
DC-1943		<p>This decal appears:</p> <ul style="list-style-type: none"> <li>• Inside the fan/heater control box.</li> <li>• On the door of the dryer's upper control box.</li> </ul>
DC-1947		<p>This decal appears:</p> <ul style="list-style-type: none"> <li>• Twice on the front end panel, below the fan/heater.</li> <li>• Twice on the rear end panel, below the rear access door.</li> <li>• On the auger discharge box.</li> <li>• On the inside of the auger discharge box's flapper lid (next to the discharge mercury switch).</li> <li>• Inside the rear access door, on the rear plenum closure door (inside the plenum).</li> </ul>

## 2. Decals

Decal #	Decals	Location
DC-1945	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <p><b>⚠ WARNING</b></p> <p>Moving parts can crush and cut. Keep hands clear. Do not operate without guards in place. Failure to do so could result in serious injury.</p> <p style="font-size: small;">GSI Group 217-226-4421</p> </div> <div style="width: 35%; text-align: center;">  </div> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <p><b>⚠ AVERTISSEMENT</b></p> <p>Déplacer des pièces peut écraser et couper. Gardez les mains éloignées. Ne pas faire fonctionner sans avoir de gardes en place. L'omission de faire ceci pourra résulter à de sérieuses blessures.</p> <p style="text-align: right;">DC-1945</p> </div> </div>	<p>This decal appears:</p> <ul style="list-style-type: none"> <li>• On the bottom auger belt guard.</li> <li>• On the front bearing plate (visible when the bottom auger belt guard is removed).</li> <li>• At the rear of the dryer (for dryer equipped with the front discharge option).</li> </ul>
DC-1944	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <p><b>⚠ WARNING</b></p> <p>Automatically controlled belt drive can start at anytime. Keep hands clear. Failure to do so could result in serious injury.</p> <p style="font-size: small;">GSI Group 217-226-4421</p> </div> <div style="width: 35%; text-align: center;">  </div> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <p><b>⚠ AVERTISSEMENT</b></p> <p>La conduite automatiquement contrôlée de la courroie peut démarrer à tout moment. Gardez les mains éloignées. L'omission de faire ceci pourra résulter à de sérieuses blessures.</p> <p style="text-align: right;">DC-1944</p> </div> </div>	<p>This decal appears:</p> <ul style="list-style-type: none"> <li>• On the bottom auger belt guard.</li> <li>• On the front bearing plate (visible when the bottom auger belt guard is removed).</li> <li>• At the rear of the dryer (for dryer equipped with the front discharge option).</li> <li>• On the top auger belt guard.</li> <li>• On the inside belt guard body (visible when the top auger belt guard is removed).</li> </ul>
DC-1946	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <p><b>⚠ DANGER</b></p> <p><b>Automatic burner equipment can start at anytime.</b></p> <p><b>Do not enter until fuel is shut off and electrical power is locked in off position.</b></p> <p><b>Failure to do so will result in serious injury or death.</b></p> <p style="font-size: small;">GSI Group 217-226-4421</p> </div> <div style="width: 35%; text-align: center;">   </div> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <p><b>⚠ DANGER</b></p> <p><b>L'équipement automatique de brûleur peut démarrer en tout temps.</b></p> <p><b>Ne pas entrer avant d'avoir fermé le combustible et d'avoir mis le courant électrique en position d'arrêt.</b></p> <p><b>L'omission de faire ceci résultera à des blessures sérieuses ou la mort.</b></p> <p style="text-align: right;">DC-1946</p> </div> </div>	<p>This decal appears:</p> <ul style="list-style-type: none"> <li>• On the inside of the rear plenum access door.</li> <li>• On the outside of the rear plenum access door.</li> </ul>
DC-1959	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <p><b>⚠ WARNING</b></p> <p>Flame and pressure beyond door can cause serious injury. Do not operate with service door removed. Keep head and hands clear.</p> <p style="font-size: small;">GSI Group 217-226-4421</p> </div> <div style="width: 35%; text-align: center;">  </div> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <p><b>⚠ AVERTISSEMENT</b></p> <p>La flamme et la pression au-delà de la porte peuvent causer des dommages sérieux. Ne pas faire fonctionner si la porte de service est enlevée. Gardez les mains et la tête éloignés.</p> <p style="text-align: right;">DC-1959</p> </div> </div>	<p>This decal appears on the fan/heater access door.</p>

Decal #	Decals	Location
DC-1950	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p><b>⚠ WARNING</b></p> <p>Rotating metering roll. Equipment can start automatically. Keep hands clear. Can cause serious injury. Disconnect power before servicing.</p> <p><small>GSI Group Inc. 217-226-4421</small></p> </div> <div style="width: 35%; text-align: center;">  </div> <div style="width: 30%;"> <p><b>⚠ AVERTISSEMENT</b></p> <p>Compteur de roulement tournant. L'équipement automatique peut se mettre en marche en tout temps. - Gardez les mains éloignées. Débranchez le courant avant l'entretien.</p> <p><small>DC-1950</small></p> </div> </div>	<p>This decal appears on each of the metering roll access doors.</p>
DC-1949	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p><b>⚠ WARNING</b></p> <p>Stay clear of rotating blade. Blade could start automatically. Can cause serious injury. Disconnect power before servicing.</p> <p><small>GSI Group Inc. 217-226-4421</small></p> </div> <div style="width: 35%; text-align: center;">  </div> <div style="width: 30%;"> <p><b>⚠ AVERTISSEMENT</b></p> <p>Restez éloigné de la lame tournante. La lame peut se mettre en marche automatiquement. Peut causer de sérieuses blessures. Vérifiez le courant avant l'entretien.</p> <p><small>DC-1949</small></p> </div> </div>	<p>This decal appears on the fan/heater access door.</p>
DC-1954	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p><b>⚠ CAUTION</b></p> <p>Follow Hitch Pin Safety Instructions to avoid equipment damage or personal injury.</p> <p><b>HITCH PIN SAFETY INSTRUCTIONS</b></p> <ul style="list-style-type: none"> <li>Hitch pin must be securely fastened and no less than 3/4 inches (19 mm) in diameter</li> <li>Hitch must be positioned 16 to 17 inches (41 to 43 cm) above road surface</li> <li>Maximum speed when towing is 45 mph (72 km/h)</li> </ul> <p><small>GSI Group 217-226-4421</small></p> </div> <div style="width: 35%; text-align: center;">  </div> <div style="width: 30%;"> <p><b>⚠ ATTENTION</b></p> <p>Suivez les instructions de sécurité pour la goupille d'attelage pour éviter des dommages matériels ou des blessures corporelles.</p> <p><b>INSTRUCTIONS DE SÉCURITÉ POUR LA GOUPILLE D'ATTELAGE</b></p> <ul style="list-style-type: none"> <li>La goupille d'attelage doit être solidement fixée et pas moins de 0,75 pouce (19 mm) de diamètre</li> <li>Attelage doit être positionné de 16 à 17 pouces (41 à 43 cm) au-dessus de la chaussée</li> <li>Vitesse maximale lors du remorquage est de 45 mi/h (72 km/h)</li> </ul> <p><small>DC-1954</small></p> </div> </div>	<p>This decal appears on the hitch tongue.</p>
DC-1956	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p><b>⚠ CAUTION</b></p> <p>Follow Towing Safety Instructions to avoid equipment damage or personal injury.</p> <p><b>TOWING SAFETY INSTRUCTIONS</b></p> <ul style="list-style-type: none"> <li>Dryer must be towed empty and in accordance with state and provincial regulations</li> <li>Hub temperature must not exceed 150 F (65.6 C)</li> <li>Tire lugs must be tightened to 90 ft-lbs</li> <li>Tire pressure must be between 55 and 60 PSI cold</li> <li>Check after 50 miles (81 km) and every 200 miles (322 km)</li> </ul> <p><small>GSI Group 217-226-4421</small></p> </div> <div style="width: 35%; text-align: center;">  </div> <div style="width: 30%;"> <p><b>⚠ ATTENTION</b></p> <p>Suivez les consignes de sécurité de remorquage pour éviter des dommages matériels ou des blessures corporelles.</p> <p><b>CONSIGNES DE SÉCURITÉ POUR LE REMORQUAGE</b></p> <ul style="list-style-type: none"> <li>Séchoiseur doit être remorqué vide et en conformité avec les règlements nationaux et provinciaux</li> <li>La température du moyeu ne doit pas excéder 150°F (65,6°C)</li> <li>Les écrous des roues doivent être serrés à 90 lb-pi</li> <li>La pression des pneus doit être entre 55 et 60 lb-po froid</li> <li>Vérifiez après les 50 premiers milles (81 km) et ensuite à tous les 200 milles (322 km)</li> </ul> <p><small>DC-1956</small></p> </div> </div>	<p>This decal appears on the hitch tongue.</p>

## Replacing Decals

All decals located on your grain dryer must remain legible and clearly visible at all times. To replace a damaged or missing decal, contact us to receive a free replacement.

### GSI Decals

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

### 3. Vision Control Panel

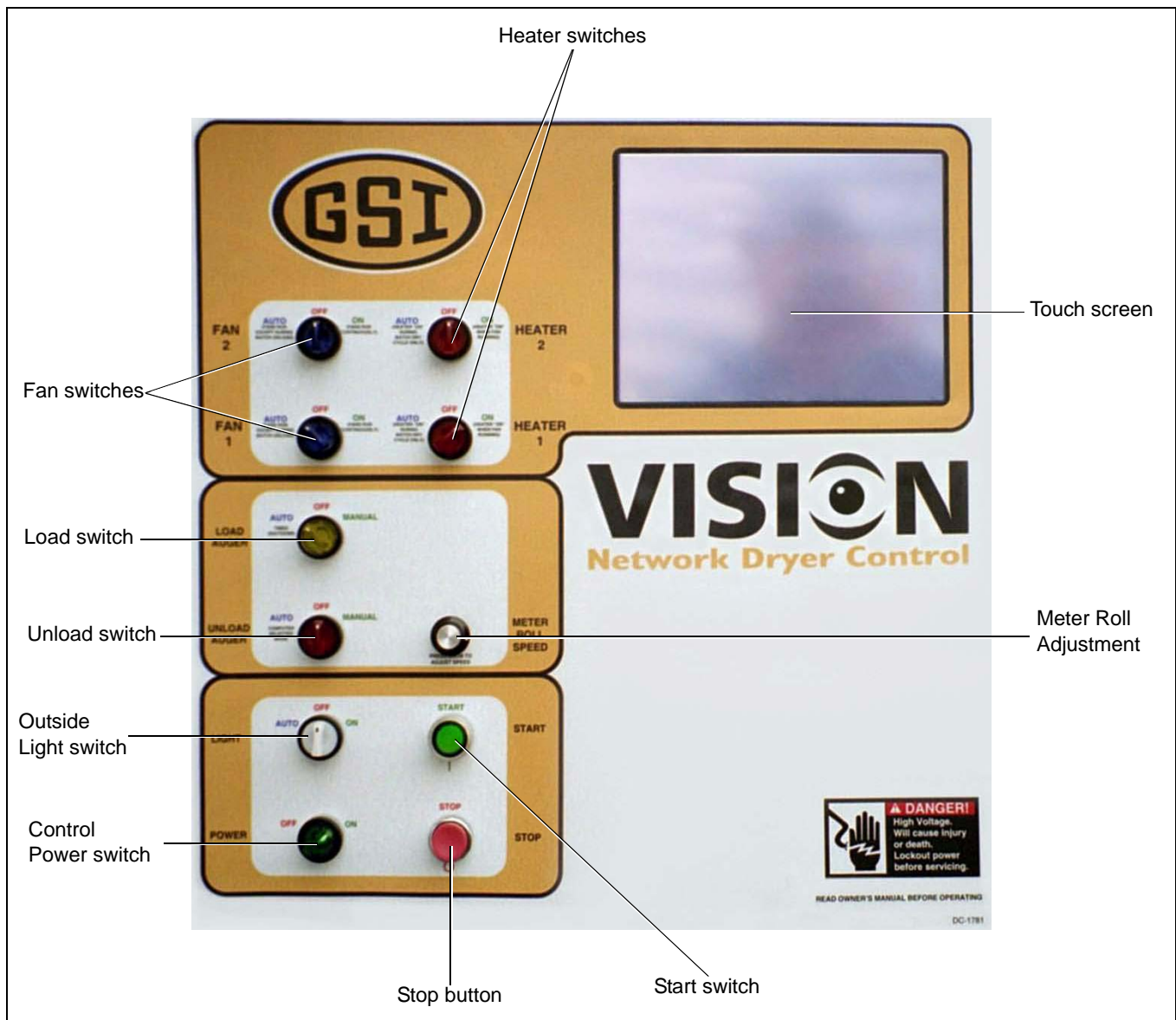


Figure 3A

### Control Power Switch

The Vision control system is turned ON or OFF with this switch.

**NOTE:** This switch does not 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 position prior to servicing any of the installed components.

### Stop Button

This button stops all dryer functions. If an automatic dryer shutdown occurs, first determine and correct the cause of the shutdown. Then, press the Stop button to reset the dryer before restarting.



## Outside Light Switch

The dryers outside service light is turned ON or OFF here. It also can be set on AUTO, which turns the light ON while the dryer is running and OFF if a shutdown occurs.

## Start Button

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

## 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 MANUAL position, the meter rolls will operate in one Speed only. In the AUTO position, the meter rolls switch to a multi-speed mode for moisture control operation. The switch will illuminate whenever the load auger is operating.

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

## Meter Roll Adjustment

This knob allows the user to adjust the meter roll setpoint(s). Pressing the knob will bring up the “Modifying Meter Roll Speed Setpoints” screen. [\(See Figure 3B.\)](#)

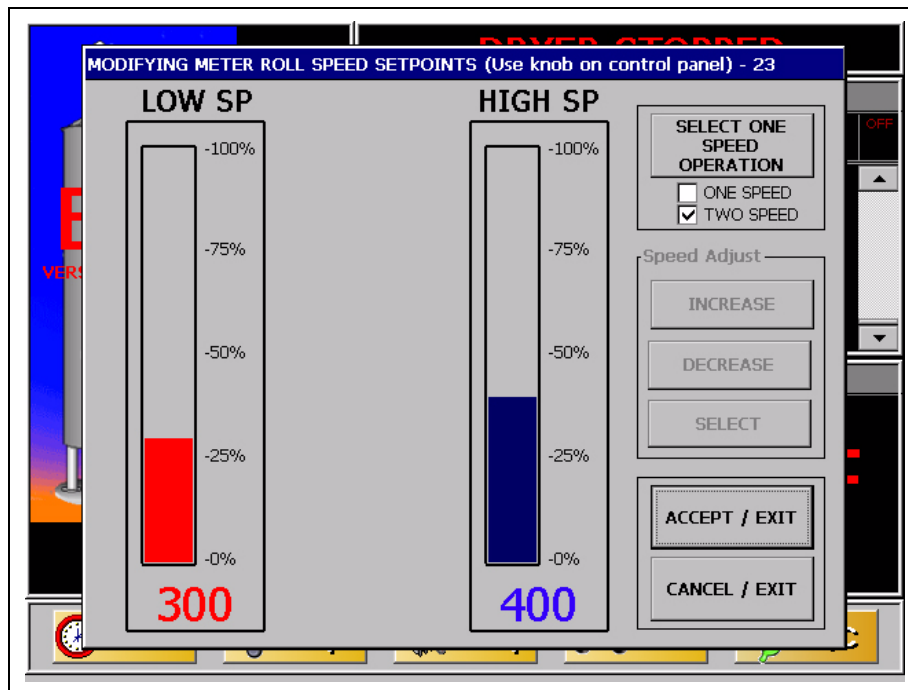


Figure 3B

**NOTE:** *Screen may vary depending on the moisture control scheme selected.*

Turning the knob clockwise will adjust the selected (red color) setpoint in a positive direction and vice versa. Pressing the knob will switch between setpoints.

### 3. Vision Control Panel

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Here, you will find the following options:

**Speed Adjust buttons:** These are used to adjust the setpoints if the Meter Roll Knob is disabled by the software. For instructions on doing this, see [Operations Chapter on Page 24](#).

**Accept/Exit:** To store the parameters and exit the screen.

**Cancel/Exit:** To disregard the changes and exit the screen.

### Load Switch

This is used to select the operation of the fill auger. In both the AUTO and MANUAL positions, 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, the dryer will shutdown if the out of grain timer expires. The load delay is disabled when the Load switch is in the MANUAL position. The switch will illuminate whenever the load auger is operating.

### Fan Switch

Each fan can be selected as ON, OFF or AUTO. 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 turn OFF during the unload cycle. This switch will illuminate whenever the Air Pressure switch, located in the proper plenum chamber, is sensing air pressure.

**NOTE:** *The bottom fan on the dryer is always Fan one.*

### Heater Switch

Each heater can be selected as ON, OFF or AUTO with this switch. The AUTO position activates the burner in staged batch during the dry cycle only. The ON position will activate the burner when the fan is running and if air pressure is detected. The switch will illuminate only when the flame sensor detects the flame.

**NOTE:** *The bottom heater on the dryer is always Heater one.*

## Boot Screen Description and Button Explanations

Turning the Control Power switch to the ON position, will start the Vision computer. The first screen to appear will be the Boot Screen. Notice that there are four (4) buttons on the Boot Screen. (See Figure 4A.)



Figure 4A

1. **Start Dryer:** This button accesses the dryer program.
2. **Install Software:** This button is used in updating the Vision software, which is described further in this chapter.
3. **Get Software:** This button is used in updating the Vision software, which is described further in this chapter.
4. **Windows:** This button should NOT be used in normal operation. Only the GSI Group employees should press this button. Turn the Control Power switch OFF, then ON if this button is inadvertently pushed to return to the regular Boot Screen.

## Software Update Procedure

1. Cycle the Control Power switch. The Vision computer will start. (See Figure 4B.)



Figure 4B

2. When the “Boot Screen” appears, touch the “Get Software” button. (See Figure 4C.)

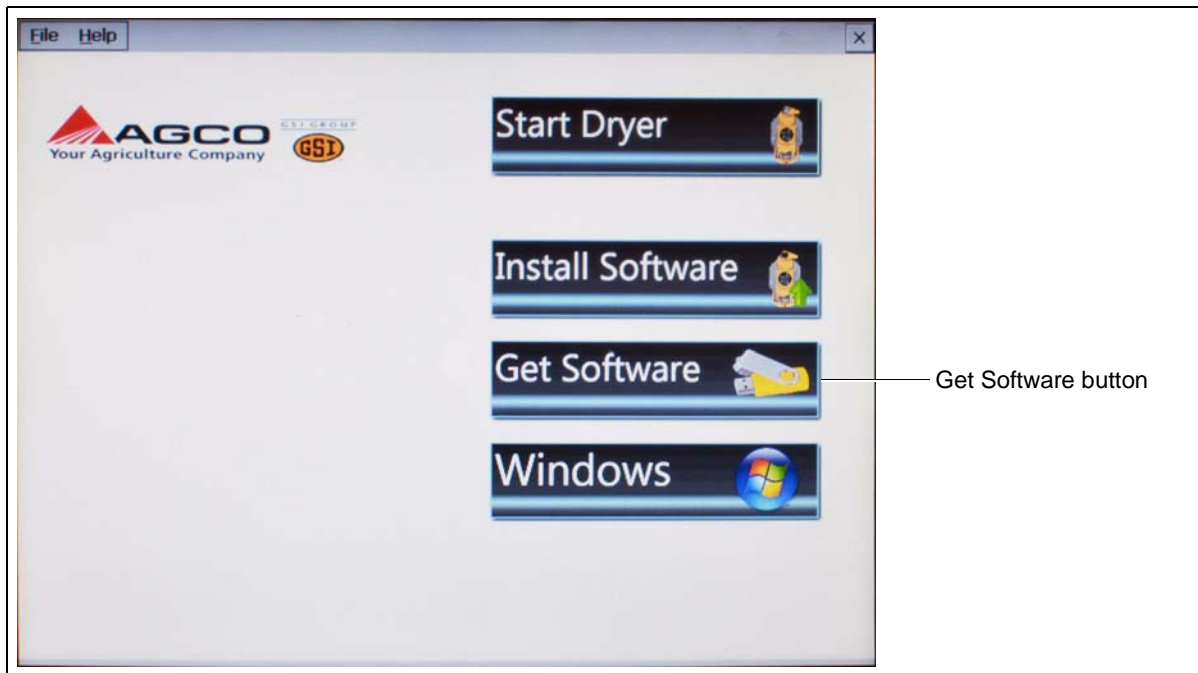


Figure 4C

3. Insert USB flash drive into USB port.
4. The display will now confirm that program files were found.

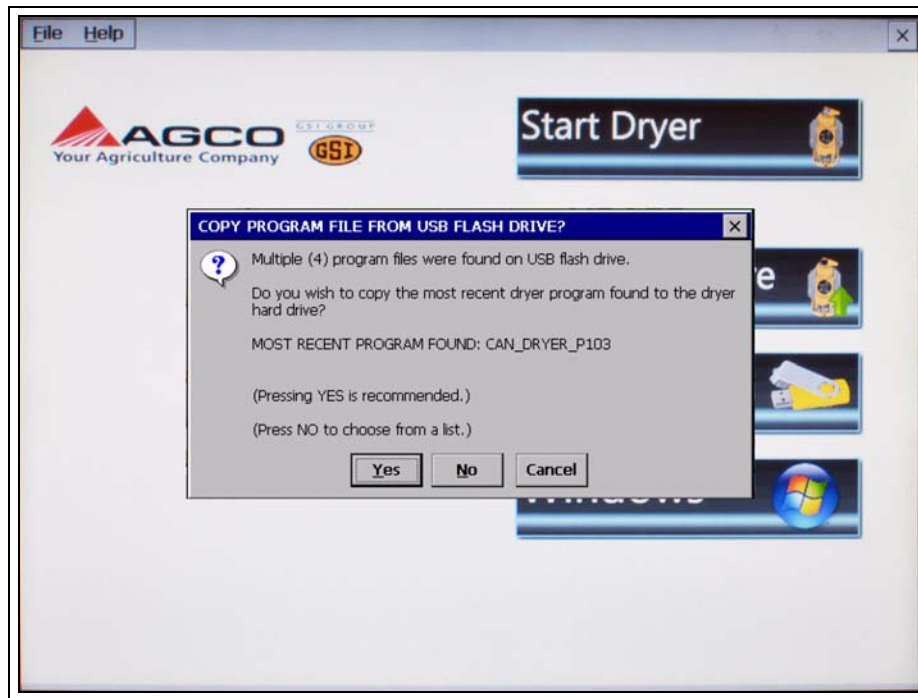


Figure 4D

Press "Yes" to copy.

5. After the program files are transferred, the "Boot Loader" screen will appear. (See Figure 4E.)



Figure 4E

## 4. Boot Screen

Select the “Scan Network” button. This scan will check the dryer to make sure all parts of the control system are communicating directly.

6. After the scan is complete, the Display I/O, Main I/O, Moisture Control and the Fan/Heater(s) should be shown as “Nothing to Report”. (See Figure 4F.)

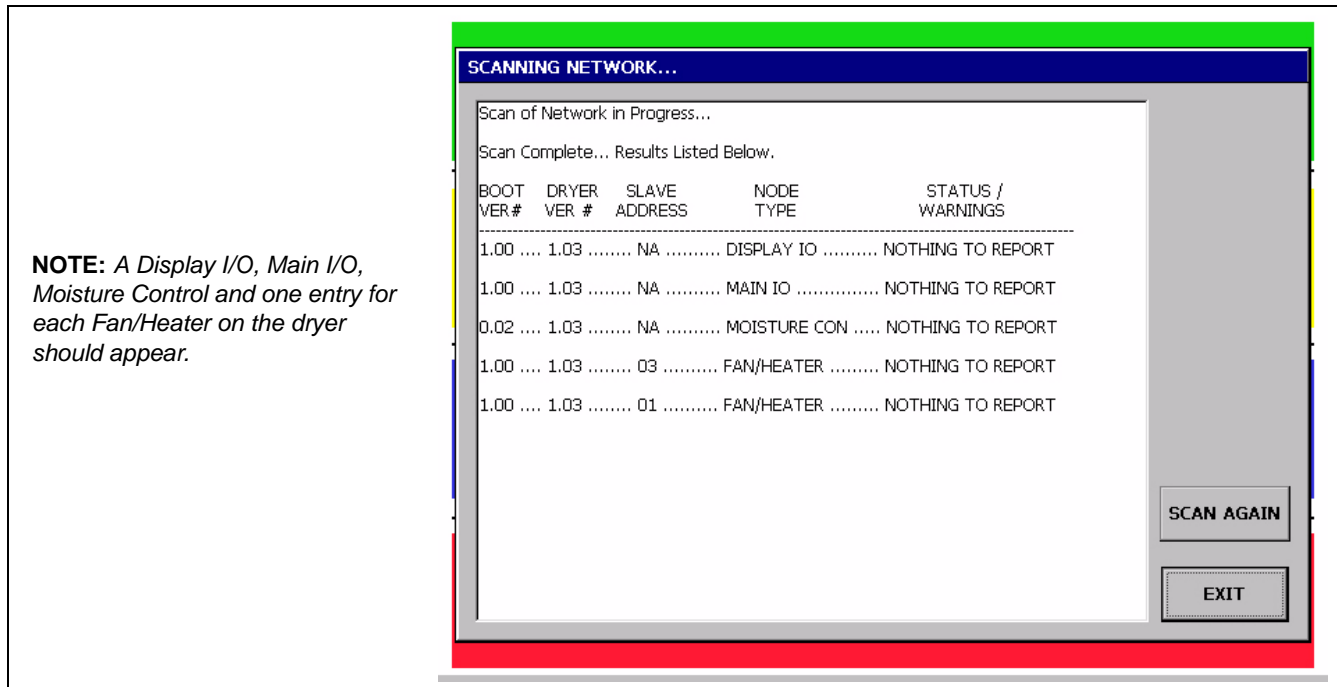


Figure 4F

Touch the “Exit” button.

7. Choose the “Select Program” button from the “Boot Loader” screen. (See Figure 4G.)

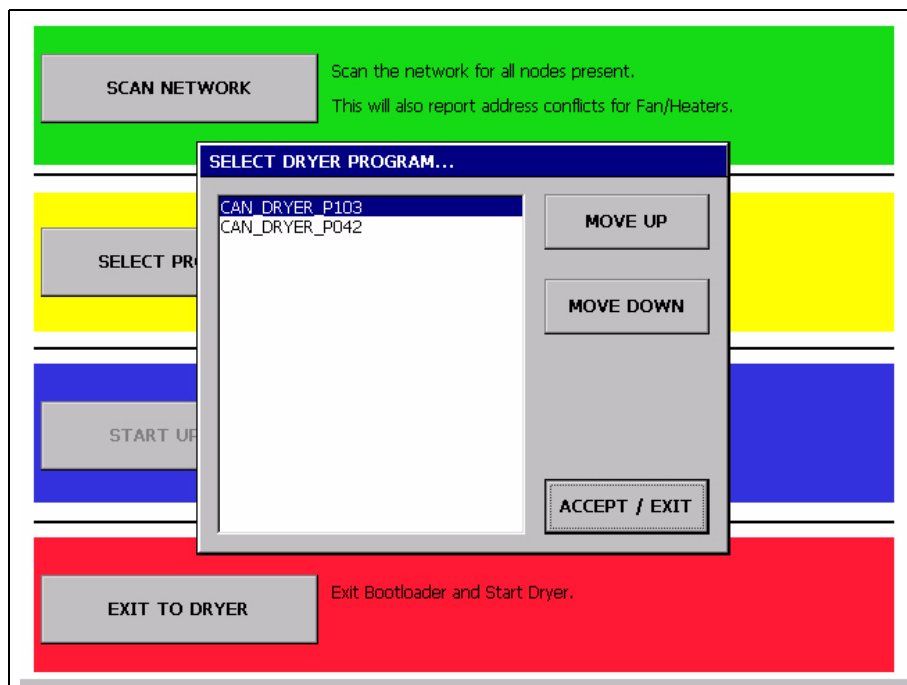


Figure 4G

8. Select the program file you wish to upload by touching the “Move Up” and “Move Down” buttons until the desired program file is highlighted. Then, choose the “Accept/Exit” button.
9. Touch the “Start Upload” button.
10. When the “Upload Progress” screen appears, select the “Start Upload” button. *(See Figure 4H.)*

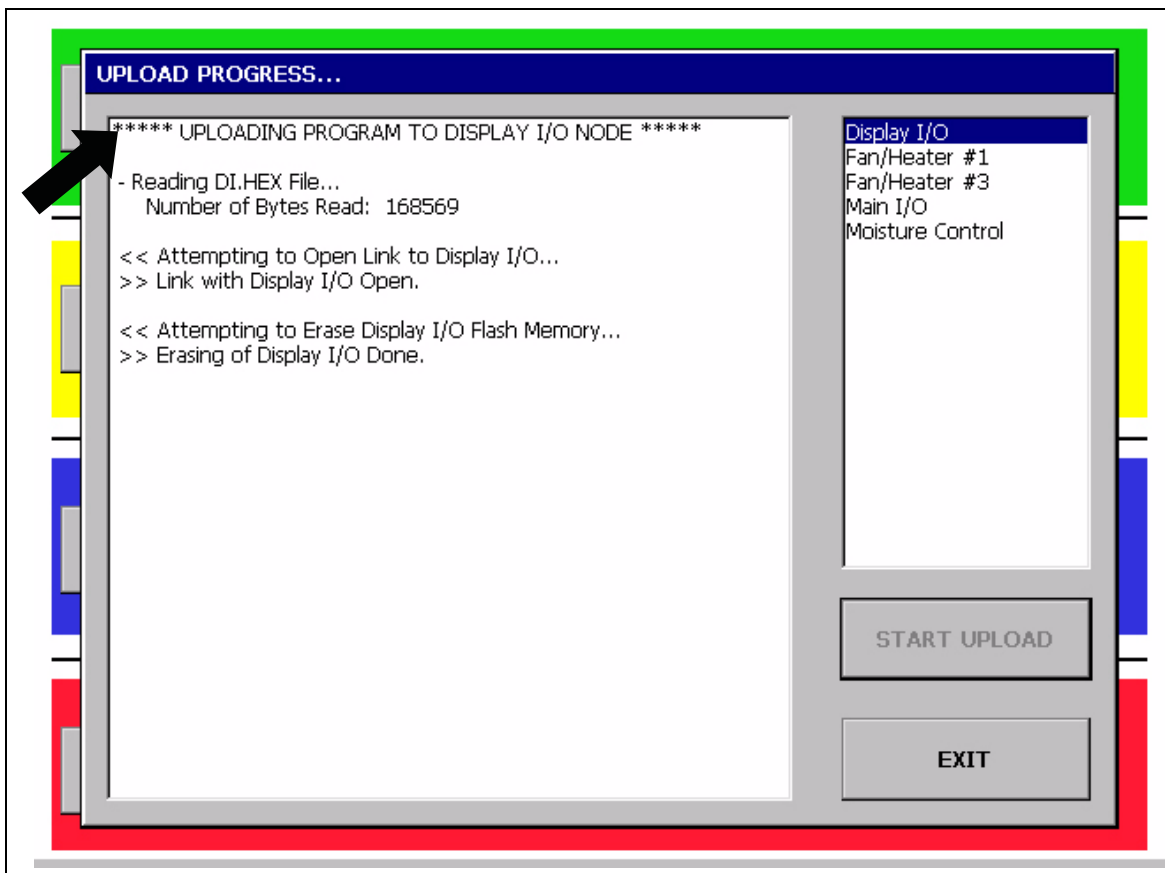


Figure 4H

11. The Vision computer will now begin programming each of the network circuit boards on the dryer. The box on the right of the screen lists the network circuit boards detected in the scan. Each circuit board listed will have to be reprogrammed, so this may take a few minutes. File upload progress for the circuit board that is highlighted is displayed in the box on the left. *(See Figure 4H.)*
12. Once the upload is complete, choose the “Exit to Dryer” button to leave the “Boot Loader” screen and start the dryer.
13. The dryer will begin running the program that was just installed.
14. The dryer control is now ready to operate the dryer.
15. In the event it is determined that reversion to the previous software version is necessary, go back to the Boot Screen and select “Install Software” and follow the instructions above to re-install the previous software.

### Operations

**NOTE:** The following screenshots are taken from various models of portable dryers, explaining why the picture on the screen in this manual, may be different than that of the display.

### Default Operation Screen

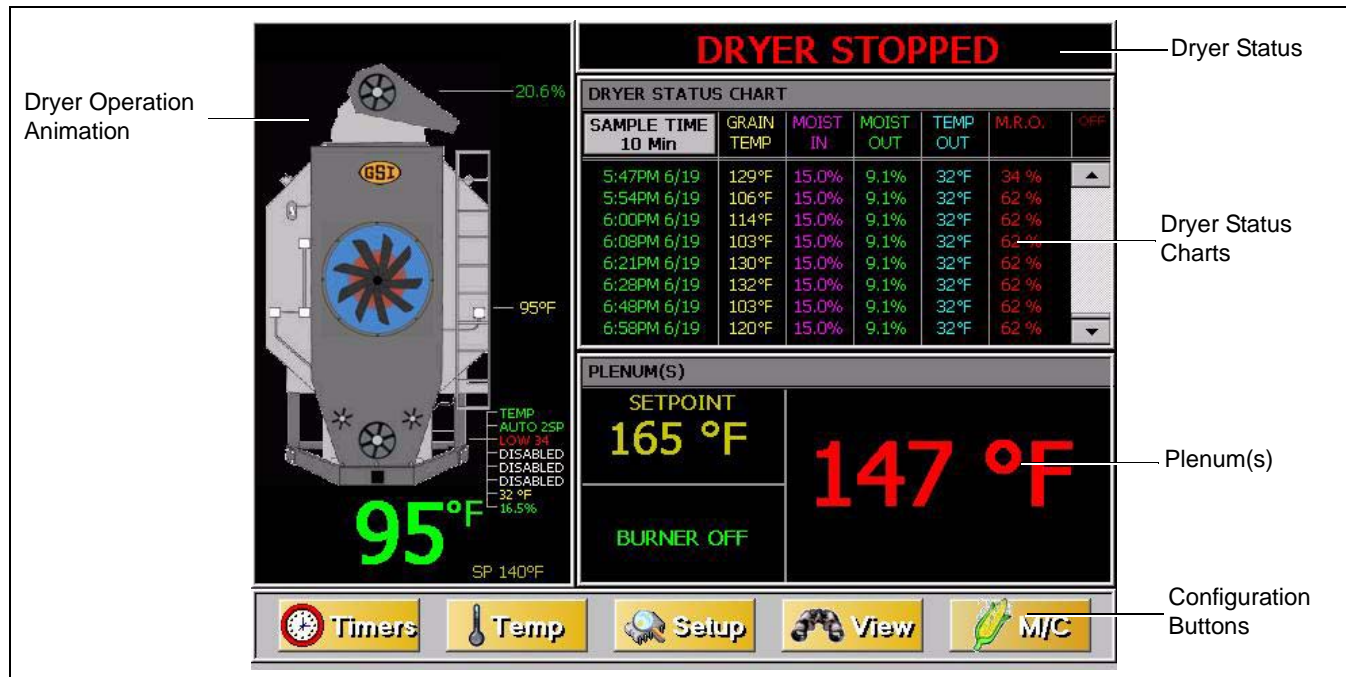



Figure 5A

The “Operation Screen” is divided into five (5) sections. (See Figure 5A.)

- Dryer Operation Animation:** Located on the left side of the “Operation Screen”, the dryer operation animation shows the status of the fans/heaters, load and unload augers and meter rolls. It will also display the grain temperature, moisture content, moisture control setpoint and the bushel counter.
- Dryer Status:** Located at the very top of the right side of the “Operation Screen”, the dryer status will tell the user if the dryer is stopped, started, loading or unloading.
- Dryer Status Chart:** This chart, located directly under dryer status, will show the grain temperature, moisture in/out, temperature out and meter roll output (M.R.O) over a period of time.
- Plenum(s):** Located directly below dryer status chart, the plenum section will show temperature setpoint, actual plenum temperature and burner status.
- Configuration Buttons:** Select from “Timers”, “Temp”, “Setup”, “View” and “M/C” buttons.



## Timers Button

Select the  **Timers** button. A new screen will appear called the “Select Timer to Modify” screen. (See [Figure 5B.](#)) There are five (5) timers that can be modified.

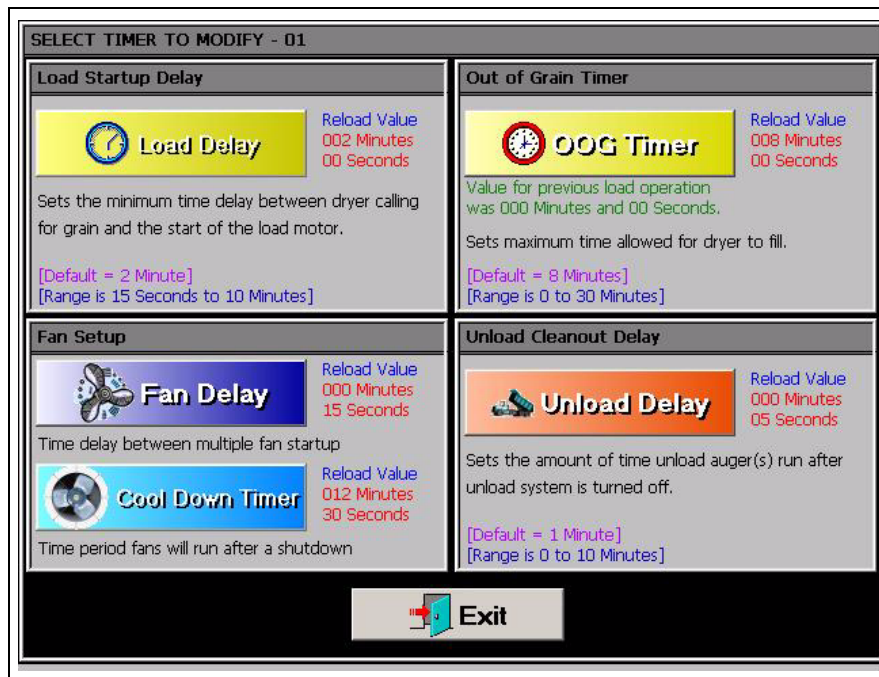


Figure 5B

1. **Load Delay:** (Default setting - 2 minutes) This delay is used to prevent the load auger from over-cycling. The load delay is active only when the Load switch is in the AUTO position. The timer starts when the dryer calls for grain.
2. **Out Of Grain (OOG) Timer:** (Default setting - 8 minutes) The “OOG” timer should be set to the maximum time it takes for the dryer to refill during continuous or batch drying modes. The computer will display the time required to fill the dryer on the previous load, aiding you in setting an accurate time. If the dryer runs out of grain while the Load switch is in the AUTO position, the “OOG” timer automatically shuts off the dryer after the period of time preset on the timer.
3. **Fan Delay:** (Default setting - 3 seconds) The “Fan Delay” timer controls the amount of time between each fan startup to reduce the dryer inrush amperage.
4. **Unload Delay:** (Default setting - 1 minute) The “Unload Delay” timer is used to regulate the amount of time the unload auger runs after the metering rolls stop.
5. **Cool Down:** (Default setting - zero seconds) The dryer fans will operate for a “Cool Down” period in the event that the dryer experiences a shutdown, other than that of a plenum, grain high temperature or fan motor overload situation. The dryer can also be restarted by pressing the “Start” button on the front of the Vision control panel. This prevents the fans from shutting down because of nuisance warnings.

To change a timer setpoint, touch the button of the timer you wish to modify. The “Modifying Timer Setpoint” screen will then be displayed, which is shown in [Figure 5C on Page 26.](#) The left number pad is used to modify the minutes and the right number pad will modify the seconds. Touching the “Default” button will automatically set the timer to the default setpoint for that timer. The “Accept” button will save the displayed time as the setpoint. Choosing “Cancel” will exit the “Modifying Timer Setpoint” screen without saving any changes and the timer will stay at the currently saved setpoint.

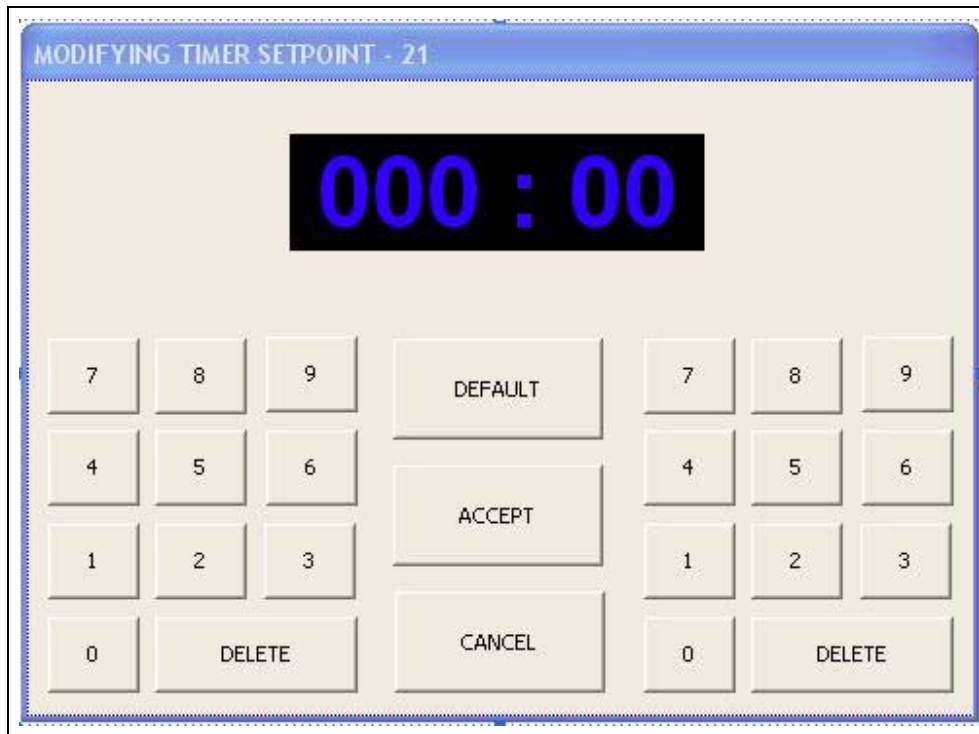



Figure 5C

## Temp Button

To adjust the temperature setpoints, touch the  **Temp** button at the bottom of the “Operation Screen”. A new screen will appear called the “Select Temperature Setpoint to Modify” screen. (See [Figure 5D.](#))

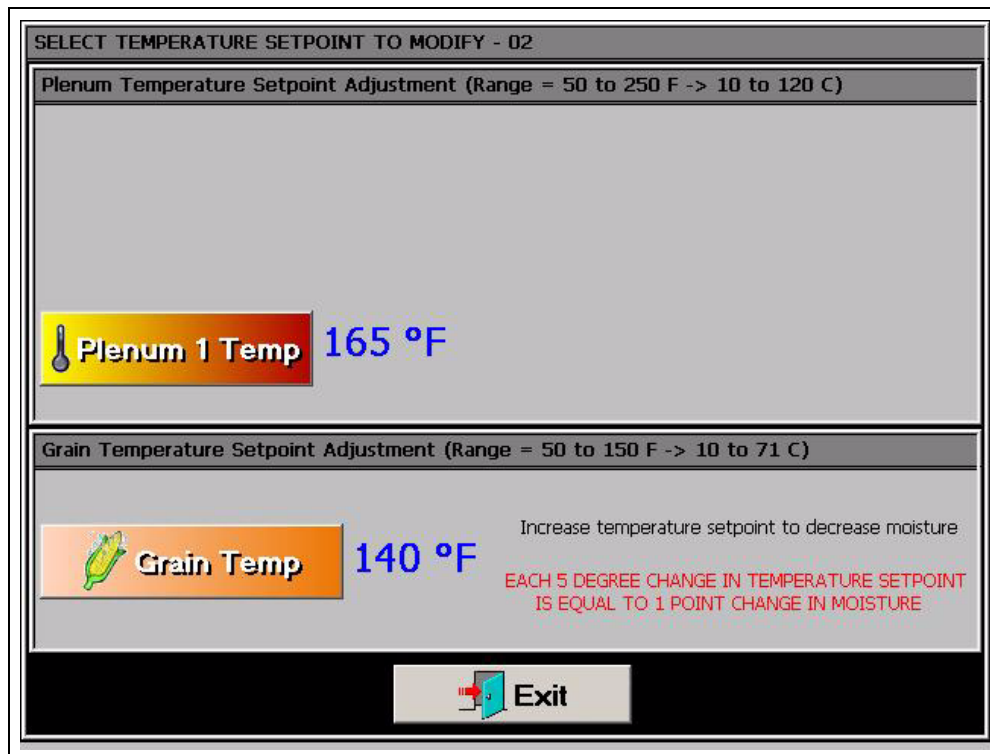


Figure 5D

Modify the setpoint for each of the temperatures by selecting the corresponding button.

**Plenum Temperature Setpoint** - Press the “Plenum X Temp” button to change the individual plenum setpoints. The “X” refers to a number between 1 and 6. Plenum #1 refers to the heater closest to the ground.

**Grain Temperature Setpoint** - This setpoint is used for all temperature based moisture control schemes. For more information, see the [Moisture Control Options Chapter on Page 45](#).

The plenum temperature setpoint range is 50 F-250 F. The current temperature setpoint is displayed next to the corresponding “Plenum” button.

The grain temperature setpoint range is 50 F-160 F. The current temperature setpoint is displayed next to the “Grain Temperature” button.

Touch the desired plenum button of the setpoint you wish to change. The “Modifying Temperature Setpoint” screen will appear. (See [Figure 5E](#).)

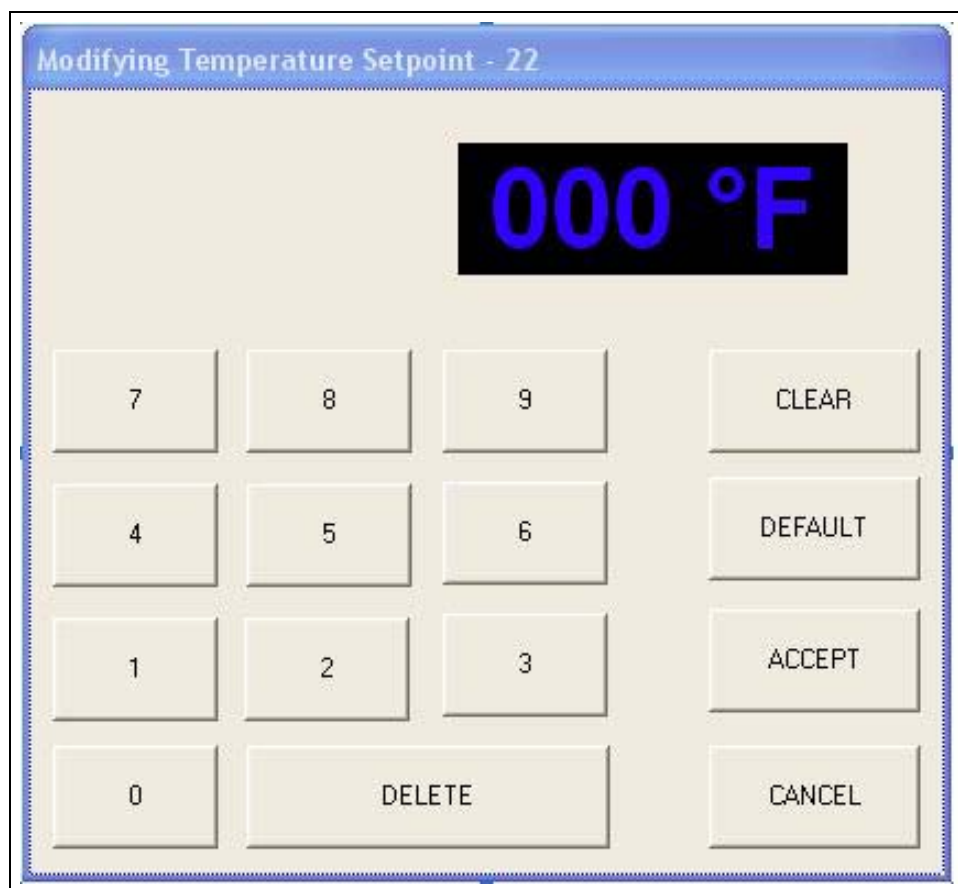


Figure 5E

Enter the desired temperature using the displayed number pad, then touch the “Accept” button. Touching the “Cancel” button will return you to the “Select Temperature Setpoint to Modify” screen without saving changes.

### Setup Button



The Setup screen will allow you to configure other parameters of the dryer. To access the “Select Hardware Setup Parameter to Modify” screen, also known as the “Setup Screen”, touch the  Setup button. (See Figure 5F.)



Figure 5F

The following list can be modified:

1. **Drying Mode:** The  Drying Mode button will display the “Drying Mode Selection” window. Select continuous flow or staged batch. A check mark is displayed next to the currently selected drying mode. (See Figure 5G.)

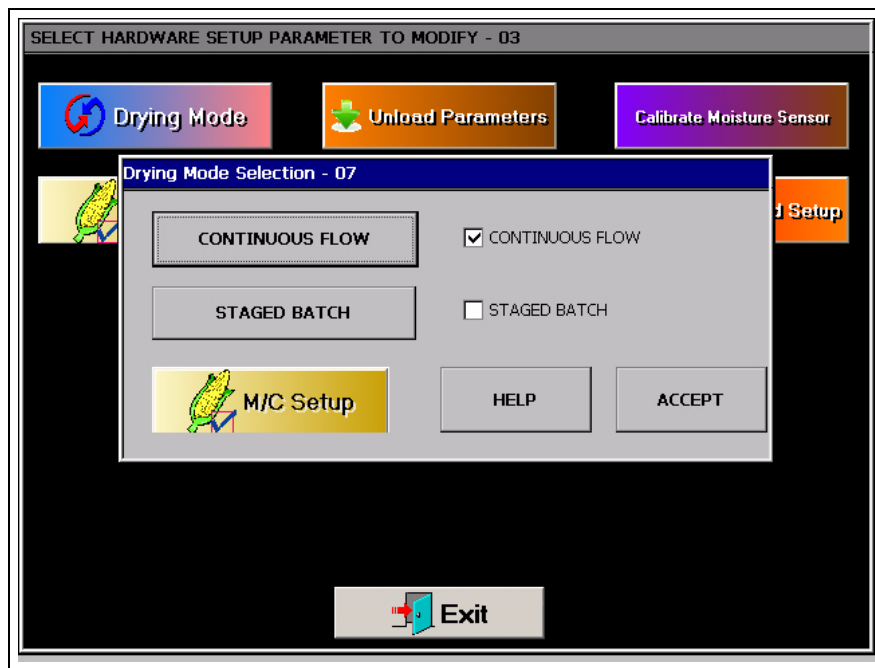


Figure 5G


2. **Moisture Control Setup:**  The moisture control setup operations are described in greater detail in the [Moisture Control Options Chapter on Page 45](#).

Figure 5H

Figure 5I

3. **Auto-Start Setup:** 

**NOTE:** Auto-Start and Languages require software versions V2.02 or greater.

**NOTE:** Auto-Start requires the new MC board D03-1212.

### Auto-Start Status Screen

If the Auto-Start is already in progress, you will be taken to the Auto-Start status screen. ([See Figure 5J on Page 30.](#)) This screen will display the progress of the current drying process.

The Auto-Start Operational States:

1. **Auto-Start Paused** - Indicates the dryer is stopped or shutdown.
2. **Auto-Start in Progress** - Auto-Start is active.
3. **Auto-Start Finished** - Auto-Start is complete.

The Auto-Start Screen descriptions:

1. **Yellow Point** - The Yellow point that traverses the screen to the right as the Auto-Start progresses from start to finish. The time since initiation is indicated in white to the left of the progress point stem.
2. **Blue** - The Blue indicates the fan is active, but not the heater.
3. **Red** - The Red indicates the fan is ON and the heater is ON.
4. **Gray** - Gray indicates the unload system is OFF.
5. **Orange** - Orange indicates the unload system is actively unloading the grain.

## 5. Operations

6. The timeline shows the total Auto-Start process time to the far right.

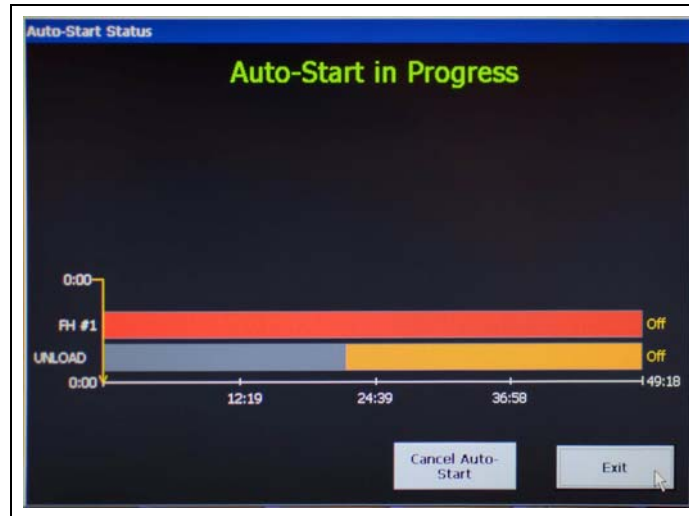


Figure 5J Auto-Start Status Screen

### Setting the Control Panel Switches for Auto-Start

**IMPORTANT:** Before you can select your Auto-Start options, you must setup the control panel switches. An "Auto-Start Control Panel Switch Requirements" screen will pop-up as a reminder before you can access the configuration screen. (See Figure 5K.)

**NOTE:** Dry and cool mode is assumed anytime a given Heater Switch is in the OFF position.

#### To set up the control panel for Auto-Start:

1. Cooling fans must have their respective HEATER switches in the OFF position.
2. All other panel control switches should be in the AUTO position (fan, heater, load and unload).
3. When using cooling fans they must be below active burners, not above. For example, the heater #1 switch cannot be in either the ON or AUTO position when the heater #2 switch is in the OFF position.

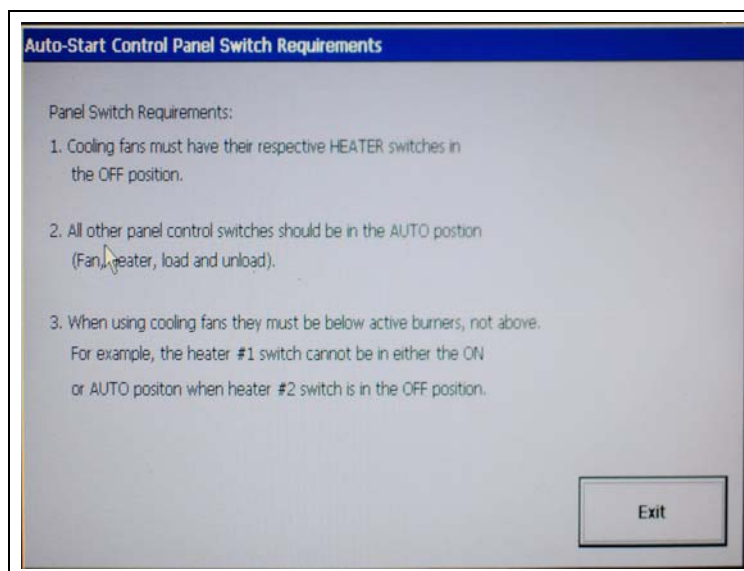


Figure 5K Auto-Start Control Panel Switch Requirements Screen

## Configuring Auto-Start

1. Press the Grain Select button to display and select the desired grain to dry. (See Figure 5L.)

**NOTE:** The red circle indicates selection and corn is the default.



Figure 5L Grain Selection Screen

2. Press the Moisture Settings button to enter the average incoming moisture and the moisture setpoint. (See Figure 5M.)
  - a. **Enter Average Incoming Moisture** - This is the average moisture of the grain used to fill the dryer as determined by the user.
  - b. **Moisture Setpoint** - The moisture setpoint is the desired moisture content for the exiting grain.

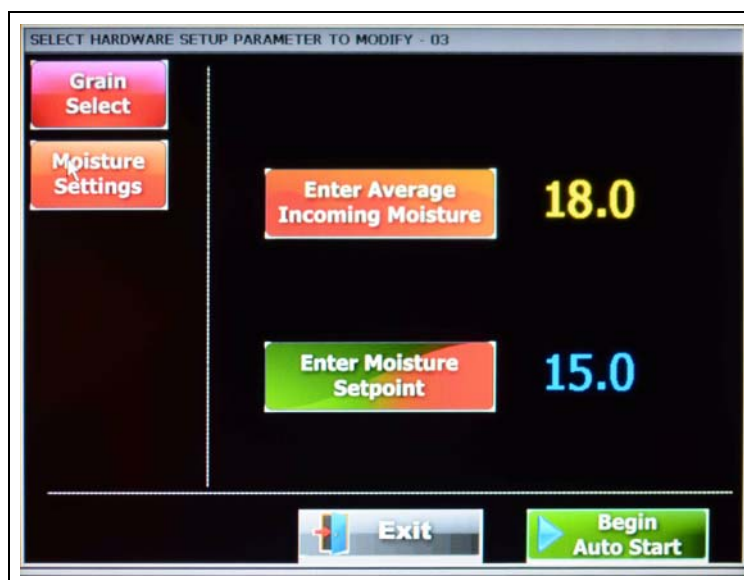


Figure 5M Moisture Setting Screen

## 5. Operations

3. Press the “Begin Auto-Start” button and confirm initiation of Auto-Start by pressing “YES” on the pop-up dialog. (See Figure 5N.)



Figure 5N Confirmation Screen

### Canceling the Auto-Start Process

1. Press “Setup” on the main screen and then press “Auto-Start Setup” on the next screen.
2. Press the “Cancel Auto-Start” button at a lower middle of Auto-Start status screen.
3. Confirm the intent to cancel Auto-Start by pressing “Yes” on the pop-up dialog. (See Figure 5O.)

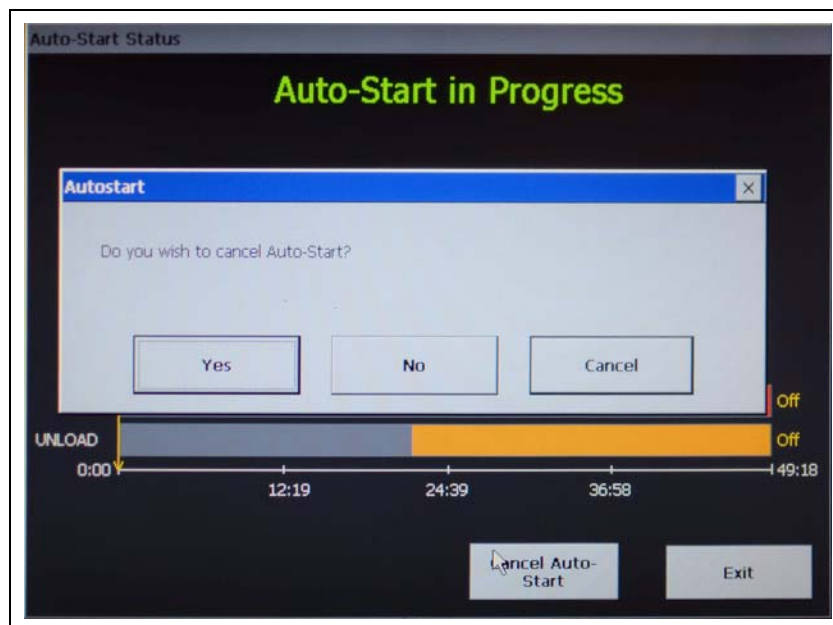


Figure 5O Confirm Cancellation of Auto-Start



#### 4. Unload Parameters:

- Set Maximum Unload Rate:** The meter roll speed setpoint cannot be set higher than this value. This prevents choking downstream augers.
- Set Minimum Unload Rate:** The meter roll speed setpoint cannot be set lower than this value. (See Figure 5P.)

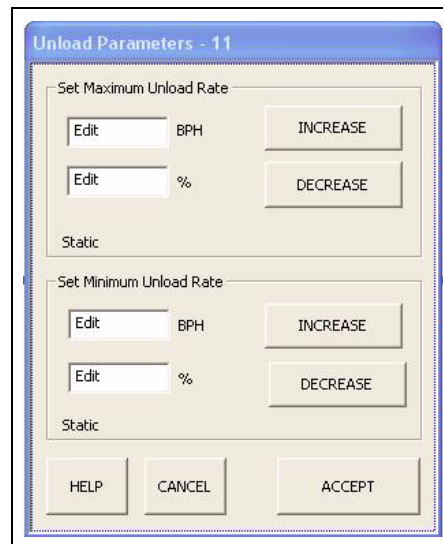



Figure 5P

- Plenum Temp Manager:**  This will reduce the plenum temperature setpoint(s) if the unload rate reaches its maximum allowable value for the time specified by the “Time Between Steps” menu. Once the time has been exceeded, the dryer will reduce the temperature setpoint(s) by the value given in the “Size of Temperature Step”. If the unload rate falls below the maximum allowable value for the “Time Between Steps” period, the temperature setpoint(s) will be increased by the “Size of Temperature Steps” until the original setpoints are met. (See Figure 5Q.)

**NOTE:** Default setting is “OFF”.

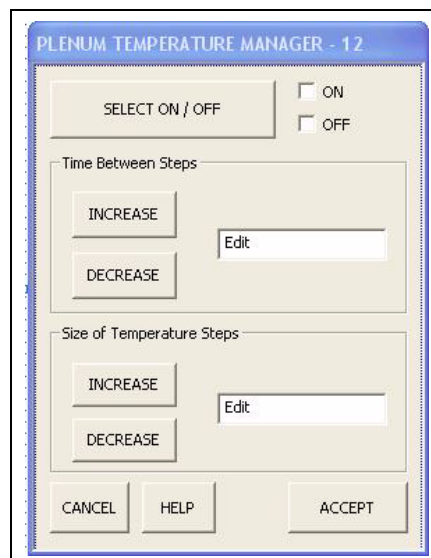


Figure 5Q

## 5. Operations

6. **Burner Mode:** The  button will display the “Select Burner Mode” screen. (See Figure 5R.)

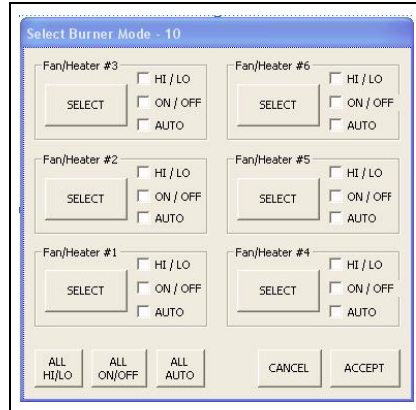


Figure 5R

**NOTE:** The bottom heater is always Heater one.

The “Select Burner Mode” screen will allow the operator to select the type of burner operation for each burner. The user has three (3) options: HI/LO, ON/OFF and AUTO modes.


- a. **HI/LO Mode (Default Setting):** The burner will switch from high heat to low heat when the plenum temperature setpoint has been reached.
- b. **ON/OFF Mode:** The burner will shut OFF when the upper temperature setpoint has been reached and turn back on when the lower temperature setpoint has been met.

**NOTE:** Useful for low plenum temperature settings in warm conditions.

- c. **AUTO Mode:** All burners in HI/LO will be started. If the burner stays in “Low-Fire” for 60 seconds or the plenum temperature exceeds the setpoint plus 20° for 10 seconds, that burner will switch to ON/OFF operation.

**NOTE:** Useful in very warm ambient temperature conditions.

To select modes, touch the “Select” button for the fan/heater you wish to change. Touching the “ALL HI/LO” button will set all burners to HI/LO and the same procedure can be duplicated for the “ALL ON/OFF” and “ALL AUTO” buttons. Choose the “ACCEPT” button to save any changes and return to the “Setup Screen” or choose “CANCEL” to return to the “Setup Screen” without saving any changes.

7. **Calibrate Moisture Sensor:**  There are two (2) moisture/temperature sensors per dryer - one for incoming grain (wet) and another for outgoing (dry). Each device has one moisture and one temperature sensor included. (See Figure 5S.)

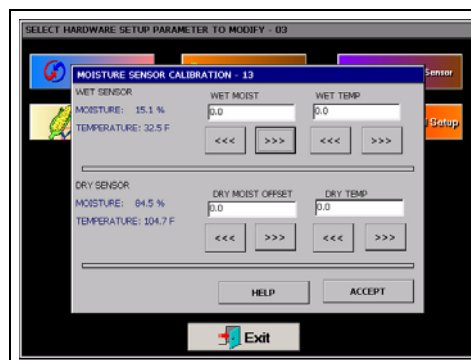


Figure 5S

**Calibrating moisture:** Take several moisture samples of the grain over an extended period of time, average these values and calibrate the sensors accordingly.

**Example:** If the dryer's exiting moisture (dry) is reported at 15.5% on the Vision screen and the averaged samples yielded a value of 15%, then the calibration screen would be used to enter -0.5% as the "Dry Moist Offset".

**Calibrating temperature:** Take several temperature samples of the grain over an extended period of time, average these values and calibrate the sensor accordingly.

**Example:** If the dryer's incoming temperature (wet) is reported to be 105°F on the Vision screen and the average samples yield a value of 100°F, adjust the "Dry Temp" to -5.

## 8. Extended Setup Screen

The following list can be modified here:

### 1. Diagnostics:

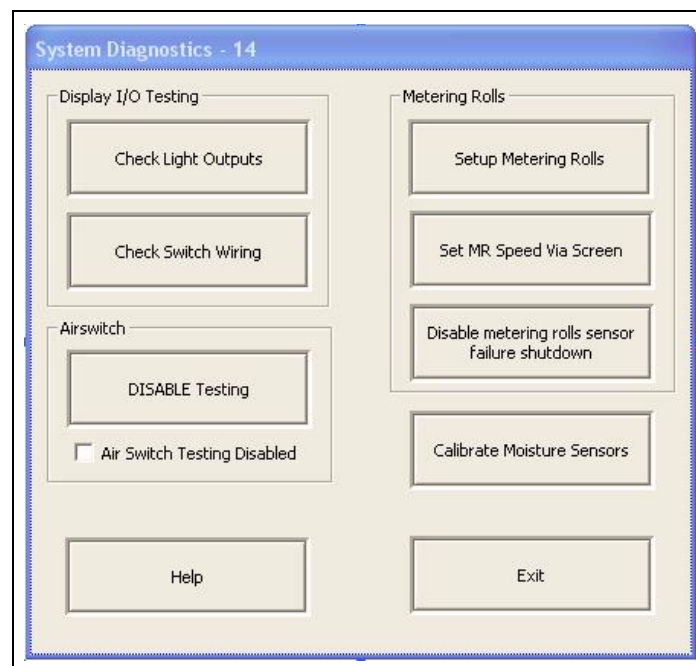


Figure 5T

**Check Light Outputs:** Allow the user to verify the controller is attempting to illuminate each individual switch. If there is a check mark present on the Vision screen, the corresponding switch should be lit. If not, there is a wiring issue.


**Check Switch Wiring:** Allows user to verify the controller is recognizing switch positions correctly. If the "Fan 1" switch is in the "AUTO" position, the "FAN 1 AUTO" box should be checked. If not, there is a wiring issue.

**Setup Metering Rolls:** This option can be used to calibrate the SCR board.

**Set MR Speed Via Screen:** Normally, the meter roll adjustment knob on the control panel is used to set the metering roll setpoint. In the event of a knob malfunction, the metering roll setpoint can be adjusted by this screen.

**Calibrate Moisture Sensors:** Previously mentioned in the preceding "Setup Screen" section [on Page 28](#). This is just another way to access those settings.

## 5. Operations

2. **Differential:** The  button will display the “Modifying Burner Differential Settings” screen. (See Figure 5U.) Adjusting the burner differential settings allows the operator to keep the plenum temperature within a certain range.

**NOTE:** 1° is the default and preferred setting.

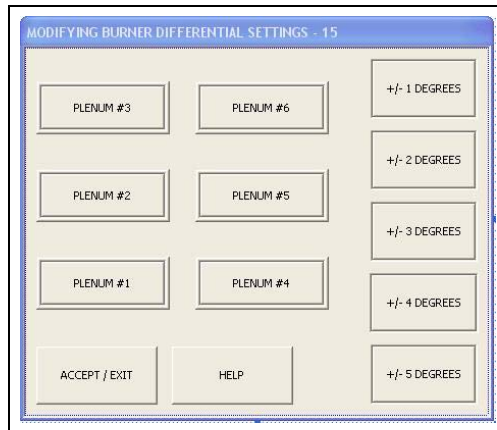





Figure 5U

**Example:** If you have the temperature setpoint at 180°F and you select +/- 3° as the burner differential, then the burner will switch to low heat at 183°F and back to high heat at 177°F.

To modify a burner differential setting, touch the plenum button you wish to modify, then select one of the five (5) differential setting buttons on the right side of the screen. The “Accept/Exit” button will save the settings and return to the “Setup Screen”.

3. **Printer Setup:** The  option was available on select portable dryers from 2006-2009. The option was taken away in 2009 and is no longer available. However, printer setup is still available for those previously installed printers.
4. **Meter Roll Reverse (GSI dryers only):** The  button aids in cleaning out the fine material that builds up over the course of a drying season. This button will toggle between normal meter roll operation and reversed. If the option is checked, the meter roll moves forward for 55 minutes and in reverse for 5 minutes before the cycle is started again.
5. **BPH Calibration:** The  button will display the “Unload Bushels Setup” screen. (See Figure 5V.) The bushel counter can be cleared by touching the “Clear” button. The bushel counter can be calibrated by touching the “Increase” and “Decrease” buttons.

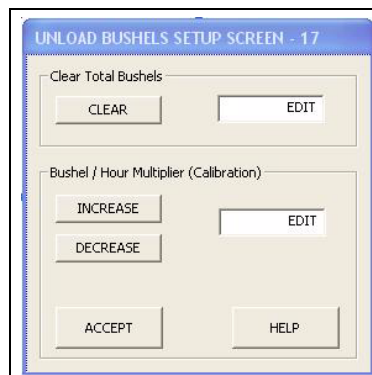



Figure 5V

6. **Set Time/Date:** The  button will display the “Set Time/Date” window. (See Figure 5W.)

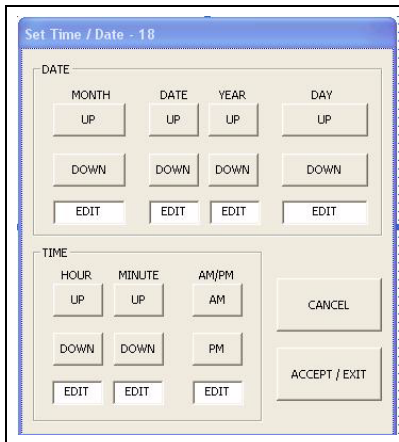




Figure 5W

Use the “Up” and “Down” buttons to change each of the parameters. “Accept/Exit” will save settings and return to the “Setup Screen”.

7. **Temp Scale:** The  button allows the user to select either English units or SI units. Depending on what temperature scale you are now operating, this button will display a pop-up window asking if you want to switch to SI (Celsius, metric tons, etc.) or English units (Fahrenheit, bushels, etc.).
8. **Dryer Model:** This  button will display the “Dryer Hardware Setup” window. The following items must be entered correctly:
- Number of Modules
  - Number of Fan/Heaters
  - Load System
  - Fuel
  - Dryer Length
  - Meter Roll Size: (See Figure 5X.)

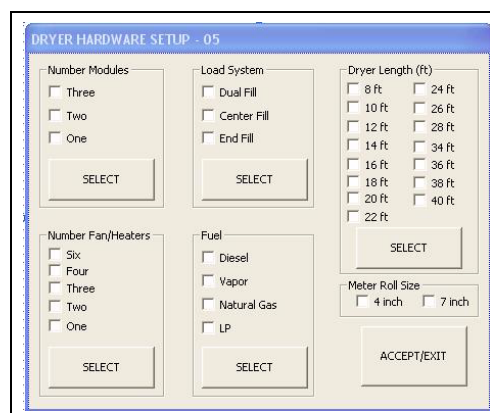


Figure 5X

To edit these parameters, touch the “Select” button until a check mark appears next to the corresponding detail specific to the dryer model.

## 5. Operations

9. **Data Logger Setup:** Data Logger Setup By turning the data logger on, it records the following parameters of the dryer every 5 minutes.

- a. Dryer grain temperature
- b. Incoming grain temperature
- c. Incoming grain moisture
- d. Outgoing grain temperature
- e. Outgoing grain moisture
- f. Meter roll speed
- g. Bin number
- h. Hour
- i. Minute

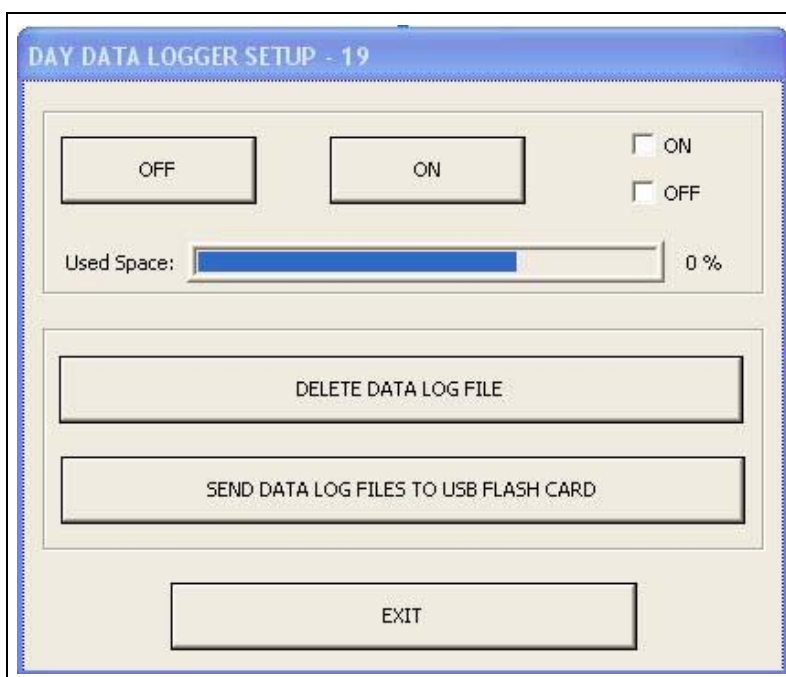


Figure 5Y


### Looking Up Data Logger Records

1. Go to our website ([www.grainsystems.com](http://www.grainsystems.com)) and click on the “GRAIN DRYER VISION CONTROL” link at the right side of the page.
2. Download the “LOGVIEWER INSTALLER” at the top right of the page to the desktop.
3. Execute the “LOGVIEWER SETUP” file and install the program.
4. Open the “Dryer Data Logviewer” program.
5. Navigate the menu to “File” -> “Open”. Select the log file that was downloaded from Vision.
6. Data can be exported to an Excel spreadsheet by “File” -> “Export to spreadsheet file”.


10. **User Saved Defaults:**  Here, you have the following options:

**Save Settings:** Allows user to store the current setup of the dryer for retrieval later.

**Restore Settings:** Restores the system to the settings last saved by pressing the “Save Settings” button.

11. **Batches:**  This option allows the user to clear the batch counter.

**NOTE:** *This option will only appear if the system’s moisture control is set in stage batch mode.*

12. **Language:**  Press the language button to change the default language for the software.


Press the desired language. Note, you must select a language button to exit this screen.



Figure 5Z

## 5. Operations

### View Button

Choose the  **View** button to open the “View Selection Window”. (See Figure 5AA.) The following six (6) options are displayed:

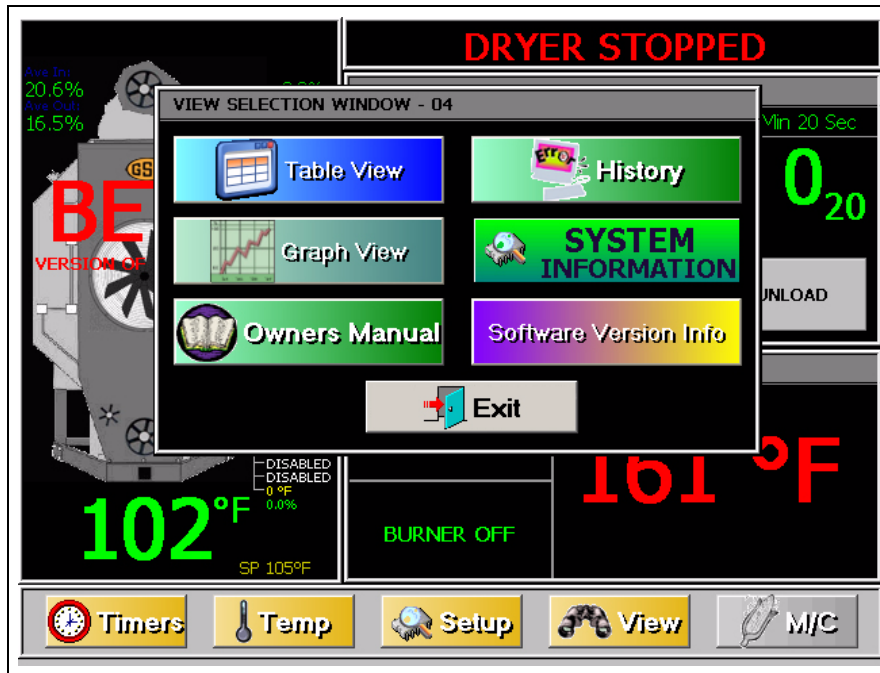


Figure 5AA

1. **Table View:**  This is the “Default Operation Screen”. (See Figure 5AB.)

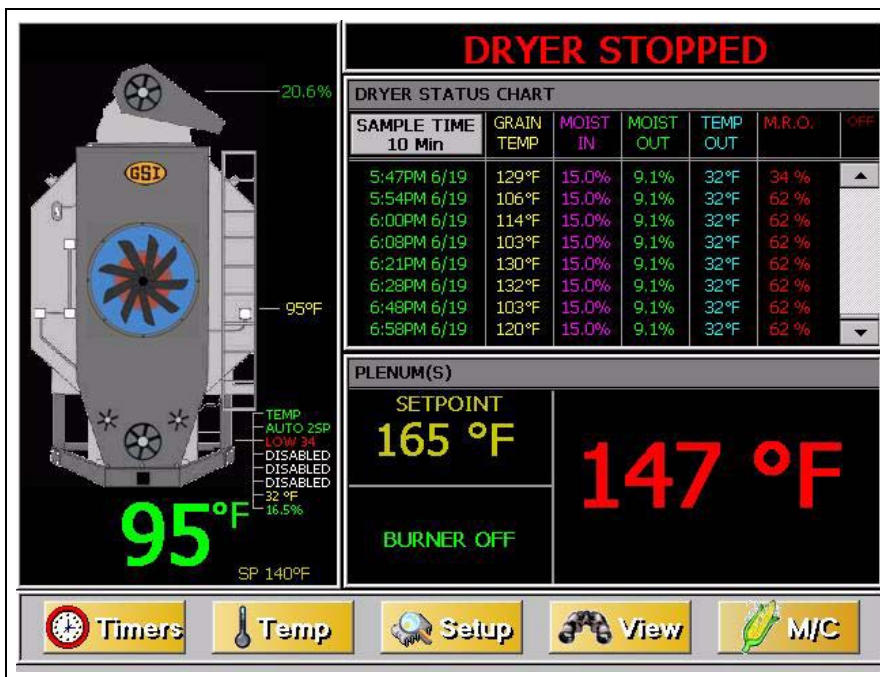


Figure 5AB



## Select Data Log Sample Time

Notice the “Sample Time” button in the upper left hand side of the dryer status chart. By touching this button, the sample time can be changed from the default (1 minute) to 5, 10 or 15 minutes. Select the desired sample time and touch “Accept/Exit” to exit. Also, notice that the chart can be cleared by selecting the “Clear Table” button at the bottom. (See [Figure 5AC.](#))

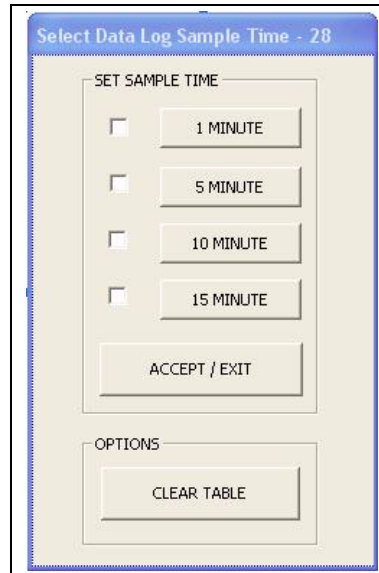


Figure 5AC

2. **Graph View:**  This is the “Optional Operation Screen”. (See [Figure 5AD.](#))

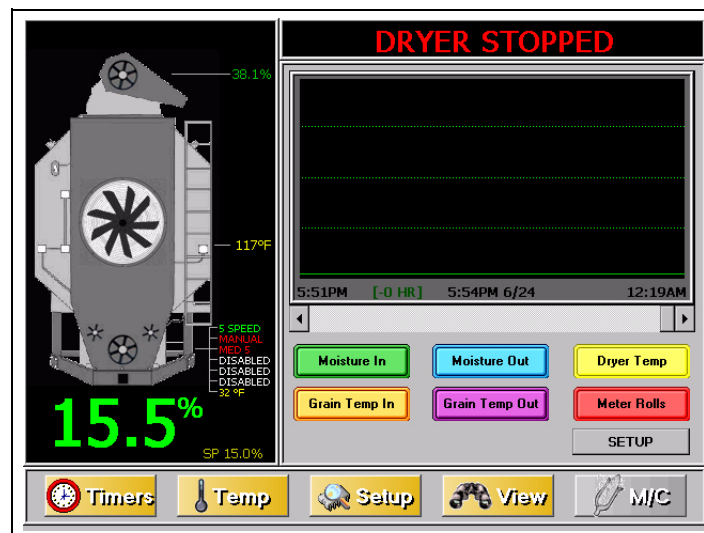


Figure 5AD

To initiate this option, press the “Graph View” button, then touch the “Exit” button. Notice that the Dryer Status Chart and Plenum(s) sections have been replaced by the graph view. You can choose what the graph will display by touching any of the colored buttons under the graph (i.e. moisture in, moisture out, dryer temperature, grain temperature in, grain temperature out and meter rolls). Touching these buttons once will display them on the graph and touching them again will remove them. The “Setup” button will bring up the “Graph Setup” window and allow you to choose the length of time (1, 2, 4 or 8 hours) for the horizontal scale.

## 5. Operations

### 3. Owner's Manual: Owners Manual

This manual can be viewed on the Vision display screen. To view a manual, touch the “View” button. When the “View Selection Window” appears, choose the “Owner’s Manual” button. A new display will appear called an “Explorer Window”. The “Explorer Window” will show the manuals that are stored in the computer memory. To select a desired manual, “Double Tap” the corresponding manual icon, much like double clicking a mouse on the computer. Once selected, it may take a few seconds for the manual to be displayed. Once the manual is displayed, use the scroll bars on the right to scroll through the pages. To exit the manual and return to the Default Operation Screen, touch the “X” button in the upper right hand corner of the screen.

### 4. Error History: History shows the Dryer Shutdown History.

#### Viewing the Dryer Shutdown History

The dryer will keep track of all safety shutdown warnings. To view the “Shutdown History”, select the “View” button. When the “View Selection Window” appears, touch the “History” button. A new window called “Shutdown History” will appear. (See Figure 5AE.) A list of all shutdown warnings are listed. This list can be sorted by:

- Warning
- Date/Time
- Node

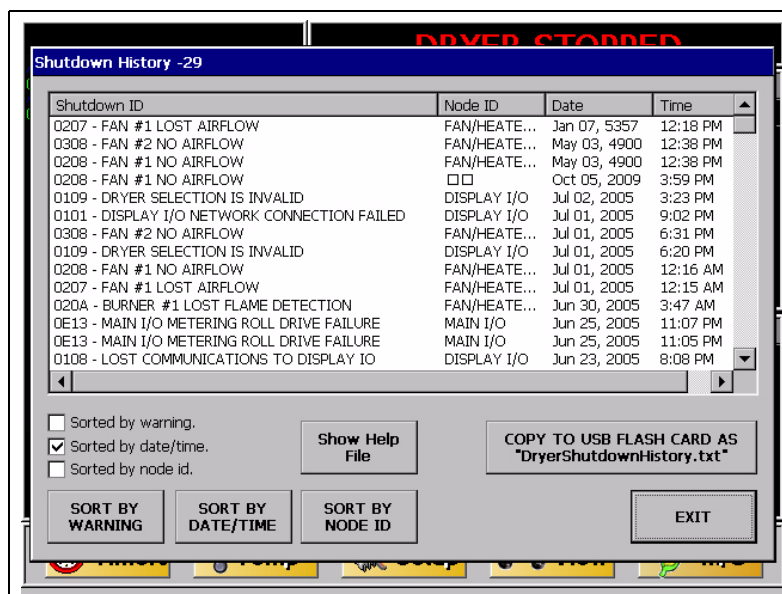



Figure 5AE

The whole list can be copied to a USB flash drive and transferred to a personal computer as a text file by pressing the “Copy To USB Flash Card” button.

The list can also be cleared to start a new list by selecting the “Clear History” button.

To return to the “Default Operations Screen”, touch the “Exit” button.

### 5. System Information: Touching SYSTEM INFORMATION button will display the current software version the dryer is running and the time and date.

6. **Software Version Info:**  This option will list the major software changes and additions in relation to the last software release.

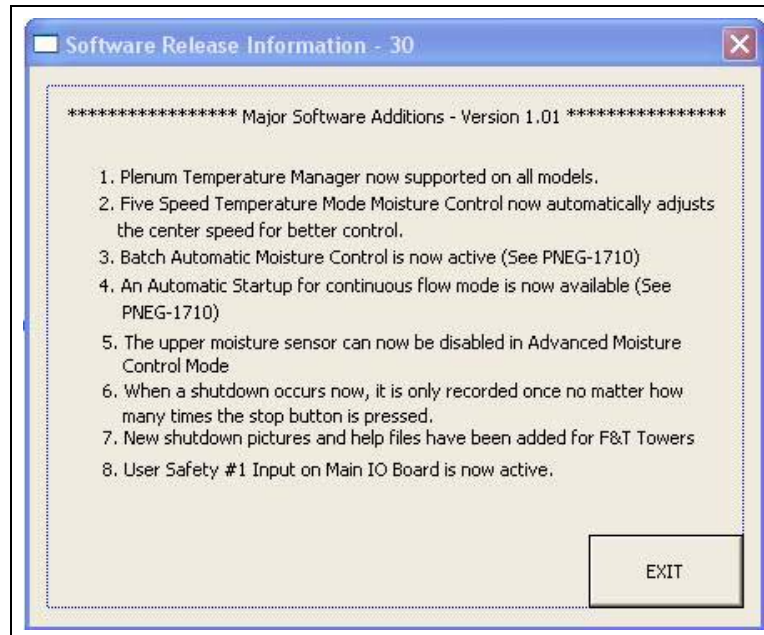



Figure 5AF

## M/C Button

The  button is used to change setpoints for the moisture controls. Pressing the button will access one of the following two (2) screens, depending on the drying scheme selected.

## Modifying Temperature Setpoint

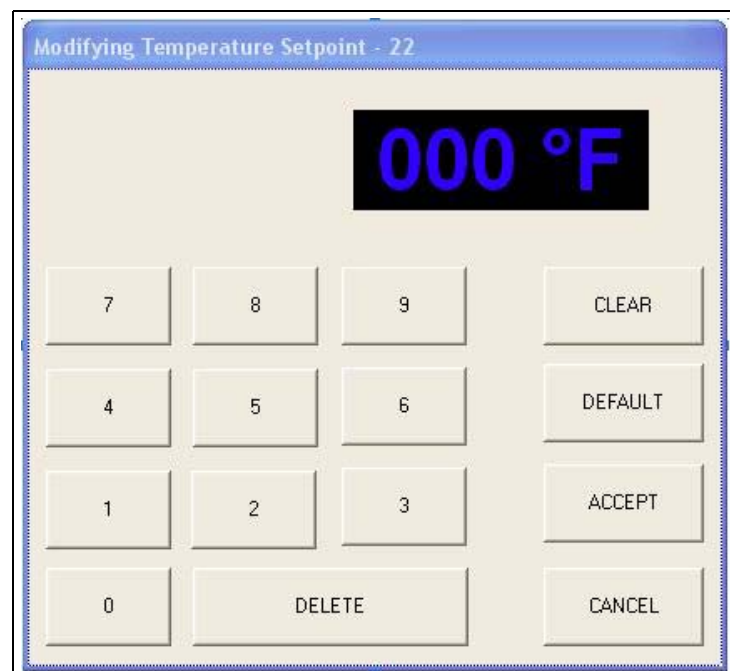


Figure 5AG

### Modifying Moisture Setpoint

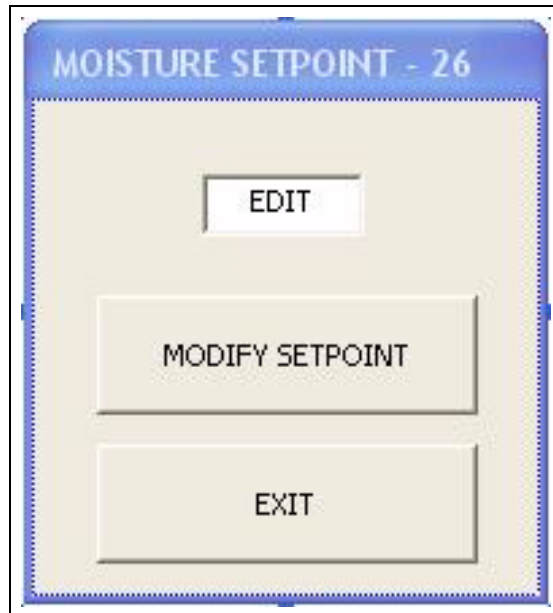


Figure 5AH

### Resetting Factory Defaults

If the Vision system starts malfunctioning, sometimes restoring the factory defaults will alleviate the problem.

**NOTE:** *This will completely change the system setup, so this procedure is encouraged to be performed by a service technician.*

1. Turn control power "OFF".
2. Locate the "DEF" dipswitch on the Display I/O board.
3. Push the switch to the left.
4. Turn control power "ON" and make sure the red light next to the "DEF" switch is lit.
5. At the "Boot Screen", press "Start Dryer".
6. Once a message appears instructing you to push the switch back to the left, the setting has been reset.
7. Turn control power "OFF".
8. Push the "DEF" dipswitch to the right.
9. The Vision system is now ready to operate normally.

## Moisture Control Options

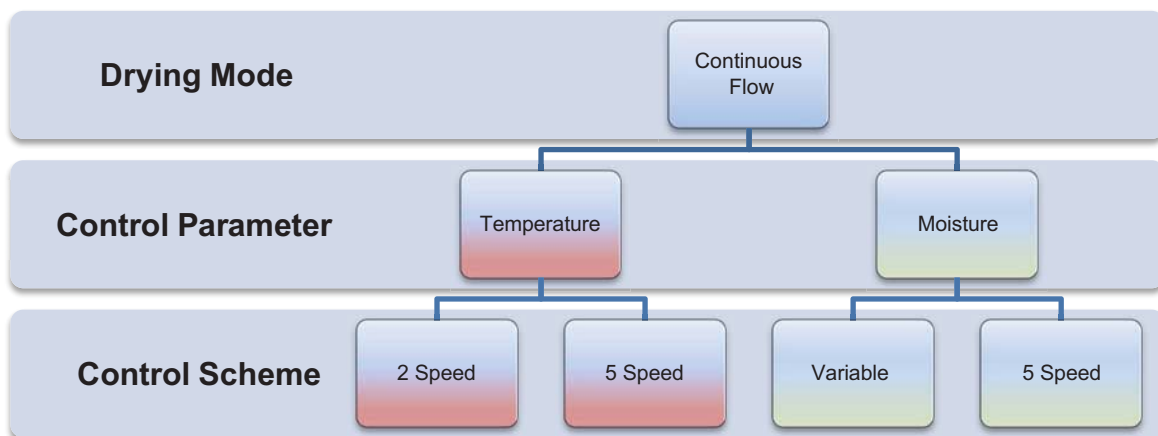
Moisture Control is used to regulate the moisture of the outgoing grain. For example, if a user is drying corn, the desired moisture content of the dried corn is usually around fifteen percent (15%). The moisture control schemes are designed to achieve that value with minimal effort from the user.

These controls can be split into two (2) distinct modes of operation: Continuous Flow and Stage Batch. Continuous Flow runs the metering rolls continuously, whereas Stage Batch unloads a portion of the dryer at a time.

## Continuous Flow Drying

There are two (2) parameters the dryer can monitor to adjust Continuous Flow operation in an attempt to have consistent outgoing moisture: Temperature and Moisture. When we say “Adjust Continuous Flow Operation”, this means changing the unload rate of the dryer. By varying the unload rate, this changes the amount of time the grain stays in the drying chamber. This results in heating the grain more or less, depending on whether the unload rate is increased or decreased.

The following is a depiction of how the Continuous Flow modes break down.



## Temperature Controlled Schemes

The temperature controlled schemes use the grain temperature sensors as a reference parameter. As the grain temperature varies, the controls adjust the unload rate accordingly.

For example, we will assume a grain temperature setpoint of 105°. If the grain temperature sensor on the dryer is reporting 110°, the grain is 5° hotter than we would like it to be. To adjust the operation, the control scheme would realize the grain is getting too hot and increase the speed of the unload to lessen the amount of time the grain is exposed to the heating chamber. The opposite is true if the grain temperature sensor on the dryer reports lower than the setpoint. The unload rate would decrease. This means the grain temperature is directly proportional to the unload rate. If the grain temperature rises, the unload rate should increase.

The temperature controlled schemes have an exclusive option available for drying rice. This option is available in the two (2) temperature modes by switching the “COMP” dipswitch on the Display I/O board. The only change in the 2 Speed and 5 Speed temperature modes when drying rice is instead of monitoring the four (4) temperature sensors located at the 60% point of the column, it monitors the temperature sensor at the discharge. This allows the kernel temperature to stay at or below a set temperature with a kernel temp shutdown alarm during multiple pass drying common in rice. This is an exclusive GSI Group feature.

## 6. Moisture Control Options

### 2 Speed Temperature

#### When to Use:

For use when good management is available and a quick reacting time is desired in all heat or dry and cool operation.

#### How it Works:

The user should stabilize the dryer with the Unload switch in the “MANUAL” position. It is imperative that the dryer is outputting the desired moisture content grain before switching the unload to the “AUTO” position.

The user specifies two (2) desired meter roll speeds (Low and High) and a grain temperature setpoint for this scheme. If the grain temperature sensors on the dryer report a temperature 1° above the setpoint, the dryer will select the fastest unload rate (High). If the sensor reads 1° below the setpoint, the controller will run at the slower speed (Low).

There is also an “ON/OFF” option associated with the 2 Speed. The user only specifies one unload rate (ON) and the controller knows the other speed is zero (OFF). If the temperature sensor reads 1° above the setpoint, the metering rolls will run at the “ON” speed. The metering rolls are turned OFF if the temperature falls below the setpoint.

**NOTE:** A “Max Grain Temp” is available for this scheme. By enabling this feature, the dryer will shutdown and issue a warning if the grain temperature exceeds the “Max Grain Temp” value.

#### Setup Procedure

1. Press the “Stop” button on the control panel if the dryer is running.
2. From the “Setup” screen, select “Drying Mode”, then “Continuous Flow”.
3. From the “Drying Mode Selection” screen, select “M/C Setup” to access “Continuous Flow Setup”.
4. Select “Temperature” from the “Continuous Flow Control Schemes” group.
5. If desired, enable the “Max Grain Temp” safety.
6. Select “2 Speed” from the “Temp Based Options” group.
7. Press the “Accept” button and return to the “Default Operation Screen”.
8. Press the “Meter Roll Speed” adjustment knob to access the “Modifying Meter Roll Speed Setpoints” screen.
9. If the “ON/OFF” option is desired, verify the “ON/OFF” check box at the top right of the window is selected. If “ON/OFF” is not desired, make sure the “2 Speed” check box is selected.
10. Press the “Meter Roll Speed” adjustment knob until the “HIGH SP” bar is colored red. Adjust the “HIGH SP” by turning the knob until the desired setpoint is reached.
11. If “ON/OFF” is selected, skip to the next step. Depress the knob until the “LOW SP” bar is colored red. Turn the knob until the setpoint is attained.
12. Press “Accept/Exit”.
13. From the “Default Operation Screen”, press the “M/C” button and enter a grain temperature setpoint.
14. Turn the “Unload” switch to the “AUTO” position.
15. Press the “Start” button on the control panel.

## 5 Speed Temperature

### When to Use:

For use with a wider moisture variation spread and for when a close and quick reacting moisture control is desired in all heat or dry and cool operation.

### How it Works:

The user should stabilize the dryer with the Unload switch in the “MANUAL” position. It is imperative that the dryer is outputting the desired moisture content grain before switching the unload to the “AUTO” position.

There are five Speeds associated with this drying scheme, but the user only selects one unload rate. The meter roll setpoint is used as the middle or medium speed. The other four Speeds are offsets of the medium speed, two higher and two lower. These offsets are labeled as follows: **Low (LO)**, **Medium-Low (M-LO)**, **Medium (MED)**, **Medium-High (M-HI)** and **High (HI)**. The unload rate is determined by the difference between the grain temperature setpoint and the actual temperature sensor reading. If the reading is exactly that of our temperature setpoint (a zero offset), MED would be selected, because we must be at the correct speed.

When setting up the 5 Speed Temperature scheme, there are two (2) sets of parameters: “Inner” and “Outer”. Both have a temperature and a meter roll speed associated with them. “Inner” refers to the M-LO and M-HI speeds, while “Outer” refers to LO and HI.

Let’s pretend we have the parameters set as they are presented in the following table.

	Inner (M-LO and M-HI)	Outer (LO and HI)
Temperature	1°	3°
Meter Speed Offset	3%	12%

We will set the meter roll setpoint to 50% and grain temperature setpoint to 100° for convenience. If the grain temperature actually is 100°, the MED unload would be selected (50% in our example). Should the grain temperature climb to 101°, the controller will change to M-HI, which increases the unload rate by 3%. Now the dryer’s unload is running at 53% (50% + 3% = 53%). If the grain temperature continues to climb, reaching 103°, HI will be selected which increases the unload rate by 12%. This 12% increase is in relation to the MED speed, NOT the M-HI, so the unload rate is now at 62% (50% + 12% = 62%). If the grain temperature falls back below 105°, the controller changes back to M-HI.

The same is true for grain temperatures below the setpoint, only the values are subtracted rather than added. If the grain temperature falls to 99°, the controller will select M-LO, changing the unload rate to 47% (50% - 3% = 47%).

The following table depicts how the controller would act when setup as the example above.

	LO (Outer)	M-LO (Inner)	MED	M-HI (Inner)	HI (Outer)
Grain Temperature	Less than or equal to 97°	Between 98° and 99°	At 100°	Between 101° and 102°	Greater than or equal to 103°
Unload Rate	38%	47%	50%	53%	62%

**NOTE:** *These are not necessarily the values that should be used with this scheme; these numbers were chosen strictly for explanation purposes.*

## 6. Moisture Control Options

This scheme also has a feature called “Auto-Centering”. If the controller is staying in HI the majority of the time, it probably means the metering roll setpoint (MED) is set too low. To alleviate this problem, the unload rate is continually averaged. Once an hour, the controller changes the metering roll setpoint (MED) to the averaged value. So in the example above, if the controller stayed in HI for an entire hour, it would change the metering roll setpoint to 62% and would now act according to the table below.

	LO (Outer)	M-LO (Inner)	MED	M-HI (Inner)	HI (Outer)
Grain Temperature	Less than or equal to 97°	Between 98° and 99°	At 100°	Between 101° and 102°	Greater than or equal to 103°
Unload Rate	50%	59%	62%	65%	74%

**NOTE:** A “Max Grain Temp” safety is available for this scheme. By enabling this feature, the dryer will shutdown and issue a warning if the grain temperature exceeds the “Max Grain Temp” value.

### Setup procedure

1. Press the “Stop” button on the control panel if the dryer is running.
2. From the “Setup” screen, select “Drying Mode”, then “Continuous Flow”.
3. From the “Drying Mode Selection” screen, select “M/C Setup” to access “Continuous Flow Setup”.
4. Select “Temperature” from the “Continuous Flow Control Schemes” group.
5. If desired, enable the “Max Grain Temp” safety.
6. Select “5 Speed” from the “Temp Based Options” group.
7. If Auto-Centering is desired, select “Auto-Centering” from the “5 Speed Setup” group until the “Enabled” box is checked.
8. Select “5 Speed Setup” from the “5 Speed Setup” group.
9. Press the “Select” button until “Positive Inner Limit” is circled in red.
10. Use the “Inc” and “Dec” buttons on the left to adjust the “Temperature” offset for the “Inner” set.
11. Use the “Inc” and “Dec” buttons on the right to adjust the “Metering Speed” offset of the “Inner” set.
12. Press the “Select” button until the “Positive Outer Limit” is circled in red.
13. Use the “Inc” and “Dec” buttons on the left to adjust the “Temperature” offset for the “Outer” set.
14. Use the “Inc” and “Dec” buttons on the right to adjust the “Metering Speed” offset of the “Outer” set.
15. Return to the “Default Operation Screen”.
16. Press the “Meter Roll Speed” adjustment knob to access the “Modifying Meter Roll Speed Setpoints” screen.
17. Adjust the meter roll speed to the desired setpoint and press “Accept/Exit”.
18. Return to the “Default Operation Screen”.
19. Press the “M/C” button and enter a grain temperature setpoint.
20. Turn the “Unload” switch to the “AUTO” position.
21. Press the “Start” button on the control panel.



## Moisture Controlled Schemes

The moisture controlled schemes use the exiting moisture sensor as a reference parameter. As the grain moisture content varies, the controls adjust the unload rate accordingly.

For example, our outgoing (dry) moisture setpoint will be set at 15%. If the outgoing moisture sensor reports a reading of 16%, the grain is 1% wetter than we desire. To account for this, we decrease the unload rate, therefore increasing the amount of time the grain is in the heating chamber. The relationship between moisture and unload rate is inversely proportional. As the exiting moisture increases, the unload rate should decrease.

### 5 Speed Moisture

#### When to Use:

For use with a wider moisture variation spread and for when a moderate reacting moisture control is desired in all heat operation. **Not recommended for dry and cool operation.**

#### How it Works:

The user should stabilize the dryer with the Unload switch in the “MANUAL” position. It is imperative that the dryer is outputting the desired moisture content grain before switching the unload to the “AUTO” position.

There are five Speeds associated with this drying scheme, but the user only selects one unload rate. The meter roll setpoint is used as the middle or medium speed. The other four Speeds are offsets of the medium speed, two higher and two lower. These offsets are labeled as follows: **Low (LO), Medium-Low (M-LO), Medium (MED), Medium-High (M-HI) and High (HI)**. The unload rate is determined by the difference between the moisture setpoint and the actual moisture sensor reading. If the reading is exactly that of our moisture setpoint (a zero offset), MED would be selected, because we must be at the correct speed.

When setting up the 5 Speed Moisture scheme, there are two (2) sets of parameters: “Inner” and “Outer”. Both have a moisture and meter roll speed associated with them. “Inner” refers to the M-LO and M-HI speeds, while “Outer” refers to LO and HI.

Let’s pretend we have the parameters set as they are presented in the following table.

	Inner (M-LO and M-HI)	Outer (LO and HI)
Moisture	0.2%	0.5%
Meter Speed Offset	3%	12%

We will set the meter roll setpoint to 50% and the dry grain moisture setpoint to 15% for convenience. If the dry grain moisture is actually 15%, the MED unload would be selected (50% in our example). Should the dry grain moisture climb to 15.2%, the controller would change to M-HI, which increases the unload rate by 3%. Now the dryer’s unload is running at 53% ( $50\% + 3\% = 53\%$ ). If the dry grain moisture continues to climb, reaching 15.5%, HI will be selected which increases the unload rate by 12%. This 12% increase is in relation to the MED speed, NOT the M-HI, so the unload rate is now at 62% ( $50\% + 12\% = 62\%$ ). If the dry grain moisture falls back below 15.5%, the controller changes back to LO-HI.

The same is true for dry grain moistures below the setpoint, only the values are subtracted rather than added. If the dry grain moisture falls to 14.8%, the controller will select M-LO, changing the unload rate to 47% ( $50\% - 3\% = 47\%$ ).

The following table depicts how the controller would act when setup as the example above.

	LO (Outer)	M-LO (Inner)	MED	M-HI (Inner)	HI (Outer)
Grain Temperature	Less than or equal to 14.5%	Between 14.6% and 14.8%	Between 14.9% and 15.1%	Between 15.2% and 15.4%	Greater than or equal to 15.5%
Unload Rate	38%	47%	50%	53%	62%

**NOTE:** *These are not necessarily the values that should be used with this scheme; these numbers were chosen strictly for explanation purposes.*

## 6. Moisture Control Options

This scheme also has a feature called “Auto-Centering”. If the controller is staying in HI the majority of the time, it probably means the metering roll setpoint (MED) is set too low. To alleviate this problem, the unload rate is continually averaged. Once an hour, the controller changes the metering roll setpoint (MED) to the averaged value. So in the example above, if the controller stayed in HI for an entire hour, it would change the metering roll setpoint to 62% and would now act according to the table below.

	LO (Outer)	M-LO (Inner)	MED	M-HI (Inner)	HI (Outer)
Grain Temperature	Less than or equal to 14.5%	Between 14.6% and 14.8%	Between 14.9% and 15.1%	Between 15.2% and 15.4%	Greater than or equal to 15.5%
Unload Rate	50%	59%	62%	65%	74%

**NOTE:** A “Max Grain Temp” safety is available for this scheme. By enabling this feature, the dryer will shutdown and issue a warning if the grain temperature exceeds the “Max Grain Temp” value.

### Setup Procedure

1. Press the “Stop” button on the control panel if the dryer is running.
2. From the “Setup” screen, select “Drying Mode”, then “Continuous Flow”.
3. From the “Drying Mode Selection” screen, select “M/C Setup” to access “Continuous Flow Setup”.
4. Select “Moisture” from the “Continuous Flow Control Schemes” group.
5. If desired, enable the “Max Grain Temp” safety.
6. Select “5 Speed” from the “Moisture Based Options” group.
7. If Auto-Centering is desired, select “Auto-Centering” from the “5 Speed Setup” group until the “Enabled” box is checked.
8. Select “5 Speed Setup” from the “5 Speed Setup” group.
9. Press the “Select” button until “Positive Inner Limit” is circled in red.
10. Use the “Inc” and “Dec” buttons on the left to adjust the “Moisture” offset for the “Inner” set.
11. Use the “Inc” and “Dec” buttons on the right to adjust the “Metering Speed” offset of the “Inner” set.
12. Press the “Select” button until the “Positive Outer Limit” is circled in red.
13. Use the “Inc” and “Dec” buttons on the left to adjust the “Moisture” offset for the “Outer” set.
14. Use the “Inc” and “Dec” buttons on the right to adjust the “Metering Speed” offset of the “Outer” set.
15. Return to the “Default Operation Screen”.
16. Press the “Meter Roll Speed” adjustment knob to access the “Modifying Meter Roll Speed Setpoints” screen.
17. Adjust the meter roll speed to the desired setpoint and press “Accept/Exit”.
18. Return to the “Default Operation Screen”.
19. Press the “M/C” button and enter a dry grain moisture setpoint.
20. Turn the “Unload” switch to the “AUTO” position.
21. Press the “Start” button on the control panel.

### Variable Moisture

#### When to Use:

For use when minimum moisture management is available and when large, quick changes in moisture are not expected. Can be used during all heat and dry and cool operation.

#### How it Works:

The user should stabilize the dryer with the Unload switch in the “MANUAL” position. It is imperative that the dryer is outputting the desired moisture content grain before switching the unload to the “AUTO” position. Within one minute of switching the unload to “AUTO”, the dryer uses the current state of the sensors as a reference for future adjustments. The dryer will then run through a 30 minutes learning period and controller adjustments will begin after.

The controller continuously monitors the moisture coming in and out of the dryer and the column grain temperature 2/3 of the way down the dryer. The control action is mainly based on the dry moisture sensor at the outlet of the dryer. If the moisture coming out of the dryer is not right at the target, the controller will speed up or slow down the unload rate accordingly. The wet moisture sensor and the grain temperature sensor are intended to detect moisture spikes coming into the dryer so that the moisture controller can react ahead of time. For example, if the wet sensor detects a jump of moisture coming into the dryer, the controller will start slowing down the unload speed immediately. However, the controller does not act to the full scale right away. Instead, it slows down the dryer gradually so that the grain currently in the dryer will not be over-dried.

**NOTE:** *The wet moisture sensor can be disabled in this scheme. The wet moisture reading reported will be ignored by the calculations.*

**NOTE:** *A “Max Grain Temp” safety is available for this scheme. By enabling this feature, the dryer will shutdown and issue a warning if the grain temperature exceeds the “Max Grain Temp” value.*

#### Setup Procedure

1. Press the “Stop” button on the control panel if the dryer is running.
2. From the “Setup” screen, select “Drying Mode”, then “Continuous Flow”.
3. From the “Drying Mode Selection” screen, select “M/C Setup” to access “Continuous Flow Setup”.
4. Select “Moisture” from the “Continuous Flow Control Schemes” group.
5. If desired, enable the “Max Grain Temp” safety.
6. Select “Variable” from the “Moisture Based Options” group.
7. If desired, enable/disable the “Upper Moisture Sensor”.
8. Return to the “Default Operation Screen”.
9. Turn the “Unload” switch to the “MANUAL” position.
10. Press the “Start” button on the control panel.
11. Press the “Meter Roll Speed” adjustment knob to access the “Modifying Meter Roll Speed Setpoints” screen.
12. Adjust to desired speed and press “Accept/Exit”.
13. Wait at least 30 minutes, depending on the size of the dryer and check for consistent dry moisture. If moisture is not consistent, repeat [Steps 11 and 12](#).
14. If you have made it here, the grain must be exiting consistently. If not, return to [Step 11](#).
15. Turn the “Unload” switch to the “AUTO” position.

## 6. Moisture Control Options

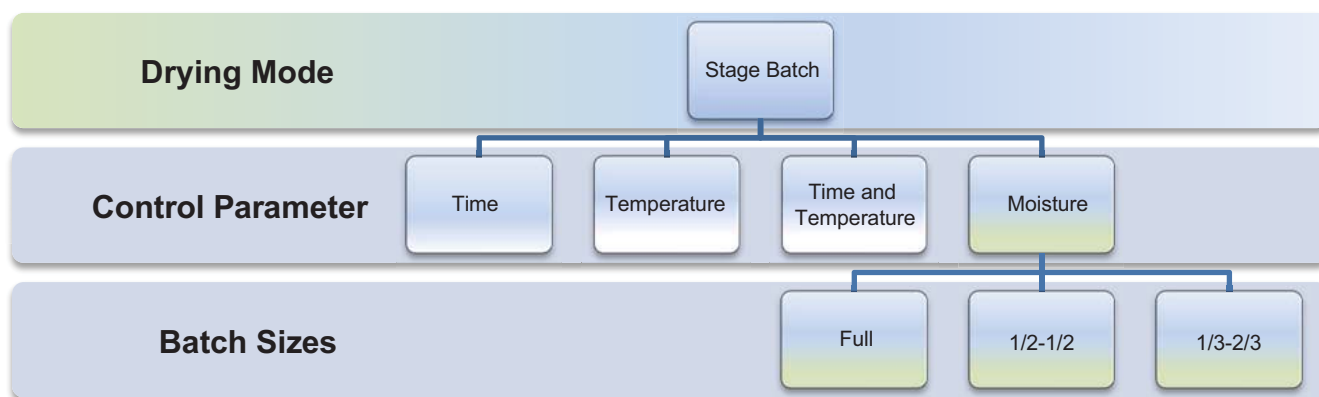
### Staged Batch Drying

Stage batch drying is comprised of three (3) phases: Drying, Cooling and Unloading.

1. **Drying Phase** - All fans and burners are on during this phase. Unload is OFF.
2. **Cooling Phase** - All fans are on during this phase. Any burner in the “AUTO” position is turned OFF during this phase. If the burner is in the “ON” position, it will remain on for this period. The unload is OFF.
3. **Unloading Phase** - All fans and burners in the “AUTO” position are turned OFF during this phase. Any fan or burner in the “ON” position will remain on for this period. The unload is ON.

A batch is defined as some portion of the drying basket’s capacity. A full batch refers to 100% of the basket’s capacity, one-half batch refers to 50%, etc. The different batch sizes are determined by the unloading phase of the cycle. If it takes 20 minutes for the dryer to fully unload and the “Unload” timer is set to 10 minutes, this would be considered a 1/2-1/2 batch (50/50).

The drying phase is considered the variable phase of the three. The cooling and unloading are timers set by the user and usually do not change. The moisture control portion only manipulates the length of the drying phase. There are three (3) control parameters that are used to establish the length of the drying period: Time, Temperature and Moisture.



If the dryer is an 1100 series, while in one of the Time or Temperature schemes, the user can choose between single or dual plenums. With “Single Plenum” selected, the plenum setpoint remains the same for the entire drying phase. If “Dual Plenum” is chosen, the plenum setpoint will be at one value for an amount of time and change to another setpoint for the remainder of the drying phase. When the switch between plenum setpoints occurs depends on which control parameter is being used (Time or Temperature).

### Time Controlled Scheme

#### When to Use:

This scheme is used when the user would like to expose the grain to heat for no longer than a given amount of time.

### How it Works:

The user should stabilize the dryer with the Unload switch in the “MANUAL” position. It is imperative that the dryer is outputting the desired moisture content grain before switching the unload to the “AUTO” position.

**Single Plenum:** The user enters two (2) parameters: Dry Timer and Plenum Setpoint(s). The drying phase consists of heating the plenum to the setpoints for the dry timer period. Once the dry timer expires, the controller moves on to cooling.

**Dual Plenum:** The user enters four (4) parameters: Hi-Heat timer, Lo-Heat timer, Plenum Hi-Temp and Plenum Lo-Temp. The drying phase begins by using the Plenum Hi-Temp setpoint until the Hi-Heat timer has expired. The controller then changes to the Plenum Lo-Temp for the Lo-Heat timer period. Once the Lo-Heat timer expires, the controller moves on to cooling.

**Single and Dual Plenum:** A “Max Grain Temp” safety is available for this scheme. By enabling this feature, the dryer will shutdown and issue a warning if the grain temperature exceeds the “Max Grain Temp” value.

### Setup Procedure

1. Press the “Stop” button on the control panel if the dryer is running.
2. From the “Setup” screen, select “Drying Mode”, then “Staged Batch”.
3. From the “Drying Mode Selection” screen, select “M/C Setup” to access “Staged Batch Setup”.
4. Select “Time” from the “Staged Batch Drying Criteria”. Make sure only the “Time” check box is selected, as it is possible to have “Time” and “Temperature” selected at the same time. If “Temperature” is selected, press the “Temperature” button to de-select it.
5. If desired, enable the “Max Grain Temp” safety.
6. Select “Single” or “Dual” plenum.
7. Return to the “Default Operation Screen”.
8. Set the Dry Timer(s), Cool Timer and Unload Timer to the desired time.
9. Press the “Temp” button and set the plenum(s) to the preferred temperature(s).
10. Position “Unload” switch in the “AUTO” position.
11. Press the “Start” button on the control panel.

## Temperature Controlled Scheme

### When to Use:

This scheme is used when the user would like to heat the grain to a specific temperature.

### How it Works:

The user should stabilize the dryer with the Unload switch in the “MANUAL” position. It is imperative that the dryer is outputting the desired moisture content grain before switching the unload to the “AUTO” position.

**Single Plenum:** The user enters two (2) parameters: Grain Temperature Setpoint and Plenum Setpoint(s). Until the Grain Temperature sensor reading is above the Grain Temperature setpoint, the plenum(s) will be heated to their respective temperatures. Once the Grain Temperature setpoint has been met, the controller will move on to cooling.

**Dual Plenum:** The user enters four (4) parameters: Hi-Temp, Lo-Temp, Plenum Hi-Temp and Plenum Lo-Temp. The drying phase begins by using the Plenum Hi-Temp setpoint until the grain temperature reaches the grain “Hi-Temp” setpoint. The controller then changes to the plenum “Lo-Temp”. Once the grain Lo-Temp setpoint is met, the controller moves on to cooling.

**Single and Dual Plenum:** A “Max Time” safety is available for this scheme. By enabling this feature, the dryer will shutdown and issue a warning if the drying phase lasts longer than the “Max Time” specified.

## 6. Moisture Control Options

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### Setup Procedure

1. Press the “Stop” button on the control panel if the dryer is running.
2. From the “Setup” screen, select “Drying Mode”, then “Staged Batch”.
3. From the “Drying Mode Selection” screen, select “M/C Setup” to access “Staged Batch Setup”.
4. Select “Temperature” from the “Staged Batch Drying Criteria”. Make sure only the “Temperature” check box is selected, as it is possible to have “Time” and “Temperature” selected at the same time. If “Time” is selected, press the “Time” button to de-select it.
5. If desired, enable the “Max Time” safety.
6. Select “Single” or “Dual” plenum.
7. Return to the “Default Operation Screen”.
8. Press the “Temp” button.
9. Set the plenum(s) and grain temperature setpoint(s) to the preferred temperature(s).
10. Return to the “Default Operation Screen”.
11. Set the Cool Timer and Unload Timer to the desired time.
12. Position the “Unload” switch in the “AUTO” position.
13. Press the “Start” button on the control panel.

### Time and Temperature Controlled Scheme

#### When to Use:

This scheme is used when the grain must heat for a minimum amount of time and must reach a desired grain temperature.

#### How it Works:

The user should stabilize the dryer with the Unload switch in the “MANUAL” position. It is imperative that the dryer is outputting the desired moisture content grain before switching the unload to the “AUTO” position.

**Single Plenum:** The user enters three (3) parameters: Dry Timer, Grain Temperature Setpoint and Plenum Setpoint(s). The controller will remain in the drying phase at least as long as the Dry Timer. Once the Dry Timer has expired, the controller will check the grain temperature sensor. It will remain in the drying phase until the grain temperature setpoint is reached.

**Dual Plenum:** The user enters six (6) parameters: Hi-Heat timer, Lo-Heat timer, Hi-Temp, Lo-Temp, Plenum Hi-Temp and Plenum Lo-Temp. The controller begins with the Plenum Hi-Temp as the plenum setpoint and will remain there until both the Hi-Heat timer and grain Hi-Temp conditions are met. Plenum Lo-Temp is then used for the remainder of the drying phase. The drying phase ends when the Lo-Heat timer expires and the grain temperature exceeds the grain Lo-Temp setpoint.

**Single and Dual Plenum:** Two (2) safeties are available for this scheme: “Max Time” and “Max Grain Temp”. By enabling this feature, the dryer will shutdown and issue a warning if the drying phase runs longer than the “Max Time” period, or if the grain temperature exceeds the “Max Grain Temp” value.

## Setup Procedure

1. Press the “Stop” button on the control panel if the dryer is running.
2. From the “Setup” screen, select “Drying Mode”, then “Staged Batch”.
3. From the “Drying Mode Selection” screen, select “M/C Setup” to access “Staged Batch Setup”.
4. Select “Time” and “Temp” from the “Staged Batch Drying Criteria”. Make sure both the “Time” and “Temperature” check boxes are selected.
5. If desired, enable the “Max Time” and “Max Grain Temp” safety.
6. Select “Single” or “Dual” plenum.
7. Return to the “Default Operation Screen”.
8. Set the Dry Timer(s), Cool Timer and Unload Timer to the desired time.
9. Press the “Temp” button.
10. Set the plenum(s) and grain temperature setpoint(s) to the preferred temperature(s).
11. Return to the “Default Operation Screen”.
12. Position “Unload” switch in the “AUTO” position.
13. Press the “Start” button on the control panel.

## Moisture Controlled Scheme

### When to Use:

This scheme is used when the user would like the controller to vary the length of the drying phase.

### How it Works:

The user should stabilize the dryer with the Unload switch in the “MANUAL” position. It is imperative that the dryer is outputting the desired moisture content grain before switching the unload to the “AUTO” position.

Once the user is ready to start the Stage Batch Moisture scheme, a small calculation needs to be done. The user will have to estimate an initial Minutes Per Point (MPP) for the grain that is to be dried. For demonstration purposes, we will set this value to five (5), which is normally a good starting point for most grains. The calculation is used to set the Dry Time for the first batch. After the first batch, the controller uses the initial Dry Timer as a starting place and it will adjust from there to acquire the best MPP.

Below is the equation that is used to calculate the Dry Time.

$$\text{Dry Time} = \frac{(\Delta\text{MC} * \text{MPP}) - \text{Cool Time} - \text{Unload Time}}{N}$$

$\Delta\text{MC}$  = Incoming moisture (grain entering the dryer) minus the moisture setpoint.

MPP = The initial MPP guess.

N = The number of unloads it takes for the grain to fully pass through the dryer.

1. Full batch: N = 1
2. 1/2 - 1/2: N = 2
3. 2/3 - 1/3: N = 3

## 6. Moisture Control Options

Here is an example of how to calculate the Dry Time:

Let's say we have a 1/2-1/2 split dryer, so N will equal two. The wet grain has a moisture content of 21% and we want to dry it to 15%. We will use 5 minutes as our initial guess for the MPP. The Cool Time is set for 20 minutes and the Unload Time is set for 10 minutes. So our variables are as follows:

$$\Delta MC = \text{Incoming M/C} - \text{M/C setpoint} = 21 - 15 = 6$$

$$\text{MPP} = 5 \text{ minutes}$$

$$N = 2$$

$$\text{Cool Time} = 20 \text{ minutes}$$

$$\text{Unload Time} = 5 \text{ minutes}$$

Now let's put the values into the equation:

$$\text{Dry Time} = \frac{(\Delta MC * \text{MPP}) - \text{Cool Time} - \text{Unload Time}}{N}$$

$$\text{Dry Time} = \frac{(6 * 5) - 20 - 5}{2}$$

$$\text{Dry Time} = \frac{5}{2} = 2 \text{ minutes } 30 \text{ seconds}$$

Now that we have calculated the initial Dry Time, let's use it. Stop the dryer if it is running. Once the dryer is stopped, press and hold the Stop button on the control panel for 10 seconds. This tells the dryer to calculate the MPP using the Dry Time that is entered by the user, rather than calculating normally. This should be done the first time you run this process or when you are changing grains and know that the MPP is not the same.

The MPP is constantly being changed to narrow down the ideal MPP value. By holding the "Stop" button as mentioned above, it resets the MPP variable. So say you run the dryer for an entire day and shut it off for the night. This day you calculated the Dry Time using the calculation above to give the control a starting point. The next day you come out to the dryer, the MPP value will carry over from the day before and start at that value, unless you press and hold the "Stop" button.

Enter the Dry Time that you calculated (2:30 minutes in our example above), Cool Time and Unload Time. Press the Start button to begin the process. Keep in mind the controller will not adjust the Dry Time for the first couple of batches. The number of batches it takes before it assumes control depends on the number of plenum splits. If you have a 1/3-2/3 split, it will not start changing until the fourth batch.

A "Max Grain Temp" safety is available for this scheme. By enabling this feature, the dryer will shutdown and issue a warning if the grain temperature exceeds the "Max Grain Temp" value.



### Setup Procedure

1. Press the “Stop” button on the control panel if the dryer is running.
2. From the “Setup” screen, select “Drying Mode”, then “Staged Batch”.
3. From the “Drying Mode Selection” screen, select “M/C Setup” to access “Staged Batch Setup”.
4. Select “Moisture” from the “Staged Batch Drying Criteria”.
5. If desired, enable the “Max Grain Temp” safety.
6. Return to the “Default Operation Screen”.
7. Execute the equation above to determine the initial Dry Time value.
8. Set the Dry Timer, Cool Timer and Unload Timer to the desired time.
9. Press the “Temp” button.
10. Set the plenum setpoint to the preferred temperature(s).
11. Return to the “Default Operation Screen”.
12. Press the “M/C” button and set the desired moisture output.
13. Return to the “Default Operation Screen”.
14. Position “Unload” switch in the “AUTO” position.
15. Press the “Start” button on the control panel.

## 7. Initial Settings Check

---

### Dealer Suggested Initial Settings Check

1. Power on using the Control Power switch. Wait approximately 30 seconds.
2. Now viewing the “Boot Screen”, select “Start Dryer”.
3. Setup timers.
4. Using the “Extended Setup Screen”, select the following options to configure the dryer. Please use [Operations Chapter on Page 24](#) as a reference guide.
  - a. “Dryer Model” and check and verify the following parameters:
    - Dryer model
    - Load system
    - Fuel selection
    - Number of fans and heaters
    - Meter roll size
    - Length
  - b. Set date and time settings.
  - c. Set temp scale settings.
  - d. Set data logger settings.
5. Using the Setup screen, select the following options to configure the dryer. Please use [Operations Chapter on Page 24](#) as a reference guide.
  - a. Set unload parameters settings.
  - b. Check burner mode settings.
  - c. Moisture control setup. (Refer to [Moisture Control Options Chapter on Page 45](#) for detailed operation descriptions.)

### Owner Suggested Initial Settings Check

1. Power on using the Control Power switch. Wait approximately 30 seconds.
2. Now viewing the “Boot Screen”, select “Start Dryer”.
3. Using the “Setup Screen”, select the following options to configure the dryer. Please use [Operations Chapter on Page 24](#) as a reference guide.
  - a. Set drying mode settings.
  - b. Select moisture control setup. (Refer to [Moisture Control Options Chapter on Page 45](#) for detailed operation descriptions.)
4. Set switches appropriately on the control panel.
5. Push the “Start” button on the control panel.

In the event of a dryer malfunction, the following error screen will appear:

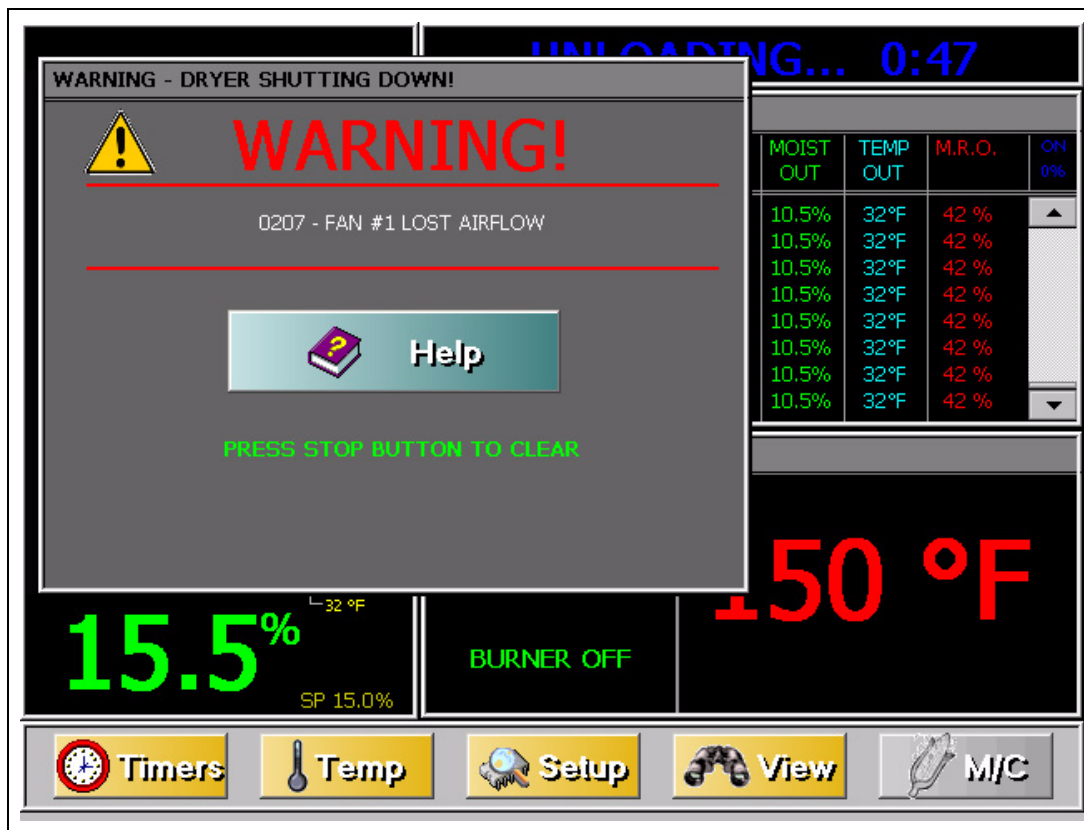


Figure 8A

After you press the “Help” button, the “Shutdown Help File”, shown in [Figure 8A](#), is displayed. It will display a picture of the part that may have caused the shutdown, along with a reason for the error.

### Fan/Heater Shutdown Messages

“X” represents a number between 1 and 6 in the following message names. Fan/Heater #1 is closest to the ground and the numbers increase as you move upwards.

#### 0201 - Fan #X Motor Overload

This message indicates that the thermal overloads on either the fan, load, unload or auxiliary motors have opened, indicating an over current condition. The overloads must be manually reset. The message will identify which fan overload caused the shutdown.

#### 0202 - Burner #X Housing Temp High-Limit

This error indicates that the temperature high-limit locate on the fan/burner housing opened, indicating an over temperature condition occurred towards the rear of the fan/heater housing. This control is set at 210°F (99°C) and automatically resets itself when cooled. This can be caused by a grain column plugged with trash or the meter rolls may be adjusted to run too slowly. Feel the grain columns to determine which one may be causing the problems. If all the columns are hot to the touch, check the meter roll settings. If all columns are not hot, examine the column that feels the hottest. Make sure you can see the grain moving down the column screens.

## 8. Safety Circuit Shutdown Messages

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### **0203 - Burner #X Vapor Temp High-Limit**

This message indicates that the LP gas vapor temperature sensor located in the gas pipe train downstream from the vaporizer has opened, indicating that the vaporizer is running too hot and must be readjusted. This sensor is set at 200°F (93°C) and automatically resets itself when cooled. The message will identify which burner caused the shutdown. Try adjusting the vaporizer coils farther away from the burner's flame. You may also want to try switching the burner mode from High/Low to ON/OFF, especially on warmer days.

### **0204 - Burner #X Plenum Overheat**

This message indicates that an over-temperature condition occurred inside the dryer plenum. This control is a 300°F (149°C) limit and automatically resets itself when cooled. The message will identify which plenum caused the shutdown.

### **0205 - Burner #X Grain Overheat**

A grain high-limit sensor runs through the center of the columns of each module. The safety is tied to the lowest fan/heater on that module. If the sensor reaches 210°F, it will open, shutting down the dryer. There could possibly be a plugged column.

### **0206 - Burner #X Gas Pressure High-Limit**

A gas over-pressure switch is placed on the high side of the gas regulator. If the gas pressure exceeds a certain value, the dryer will shutdown. This is not standard on all dryers.

### **0207 - Burner #X Lost Airflow**

This error message is displayed when airflow (air pressure) has been established but was subsequently lost. This could happen if, during the dryer's operation, the grain settled or if grain shrinkage occurred in the grain columns, thereby causing a loss of air pressure in the plenum chamber.

### **0208 - Burner #X No Airflow**

Contacts in the air switch failed to open due to the fan not turning or the air switch may need adjustment. The message will identify which fan caused the shutdown.

### **0209 - Burner #X Ignition Failure**

This condition occurs during the initial ignition of the burner. If the burner fails to light, check to make sure that the gas has been turned ON and/or the Maxon valve has been turned ON.

### **020A - Burner #X Lost Flame Detection**

The flame sensor failed to detect a burner flame which had been established but was lost subsequently and there is a problem with the flame sensing circuitry or the dryer is not getting burner fuel. The message will identify which burner caused the shutdown.

### **020B - Burner #X Plenum Overheat (Thermistor)**

This message indicates that an over-temperature condition occurred inside the dryer plenum. This control is a 300°F (149°C) limit and automatically resets itself when cooled. The message will identify which plenum caused the shutdown.

### **020C - Burner #X Grain Overheat (Thermistor)**

This error indicates that 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 cooled. This can be caused by a grain column plugged with trash or the meter rolls may be adjusted to run too slowly. Feel the grain columns to determine which one may be causing the malfunction. If all the columns are hot to the touch, check the meter roll settings. If all columns are not hot, examine the column that feels the hottest. Make sure you can see the grain moving down the column screens.

### **020D - Plenum #X Temperature Sensor Shorted**

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.

### **020E - Plenum #X Temperature Sensor Open**

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

### **020F - Grain #X Temperature Sensor Shorted**

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.

### **0210 - Grain #X Temperature Sensor Open**

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

### **0211 - Fan #X Contactor did not Close**

The auxiliary contactor on the fan contactor did not close when the fans were supposed to be started. Could possibly be a bad contactor or some wiring is loose.

### **0212 - Fan #X had Airflow Before Fan Power**

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 identify which fan caused the shutdown. This indicates that 12 VDC has been lost to terminal J4-04 on the fan/heater board.

### **0213 - Fan #X Network Connection Failed**

This error is generated whenever the fan/heater board has lost its communications link with the Input/Output board (upper control panel) and the master display board (lower control panel). Check the Ethernet cable jacks to make sure they are plugged in tightly.

## 8. Safety Circuit Shutdown Messages

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### Main I/O Shutdown Messages

#### **0E01 - Main I/O - Primary Unload Motor Overload**

This message indicates that the unload motor overload has been tripped in the upper control box. This indicates that 12 VDC has been lost to terminal J1-02 on the Input/Output board. Push the red button on the overload to reset this error. This is caused by the motor operating under too much load, which uses more current (amperage). If the problem continues, then check the motor to make sure it is not being overworked. You may need to call an electrician to measure the motor's full load amps (FLA).

#### **0E02 - Main I/O - Primary Load Motor Overload**

This message indicates that the motor overload has tripped on the load motor overload located in the upper control box. This can occur if the safety 12 VDC to terminal J1-03 on the Input/Output board is loose. Push the red button on the overload to reset this error. This is caused by the motor operating under too much load, which uses more current (amperage). If the problem continues, then check the motor to make sure it is not being overworked. You may need to call an electrician to measure the motor's full load amps (FLA).

#### **0E03 - Main I/O - Auxiliary Unload Motor Overload**

This message indicates that the motor overload relay has been tripped on the auxiliary unload motor circuit located in the upper control box. This can occur if safety 12 VDC to terminal J1-04 on the Input/output board is loose. Push the red button on the overload to reset this error. This is caused by the motor operating under too much load, which 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 motor's full load amps (FLA).

#### **0E04 - Main I/O - Auxiliary Load Motor Overload**

This message indicates that the motor overload relay has tripped on the auxiliary load motor circuit located in the upper control box. This can occur if safety 12 VDC to terminal J1-05 on the Input/Output board is loose. Push the red button on the overload to reset this error. This is caused by the motor operating under too much load, which 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 motor's full load amps (FLA).

#### **0E05 - Main I/O - Rear Discharge Door Open**

This message indicates that the lid on the grain discharge box has opened, indicating that either the grain is not being taken away fast enough or the take away auger system connected to the dryer may be causing the problem. This can also occur if this safety loses 12 VDC to terminal J1-08 on the Input/Output board.

#### **0E06 - Main I/O - Air System Failure**

This message indicates that a shutdown has occurred due to an air system that was installed with an integral 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 safety 12 VDC to terminal J1-10 on the Input/Output board is loose. This input is on the terminal strip when it leaves the factory and is usually installed in the field by a qualified electrician.

### **0E08 - Main I/O - Out of Grain Timer (OOG) Expired**

This message indicates that 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.

### **0E09 - Main I/O - Network Connection Failed**

This error is generated whenever the 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 Ethernet cable jacks to make sure they are plugged in tightly.

### **0E13 - Main I/O - Metering Roll Drive Failure**

This message indicates that the meter rolls are not turning, possibly due to the meter roll speed adjustment being set too low. It also could indicate that there is a defective meter roll sensor, the metering roll drive system has failed to turn, or there is a broken chain or a component has jammed the metering roll. This message can occur if the input is not receiving a 5 volt pulse on terminal J4-04 on the Input/Output board.

### **0E14 - Main I/O - Out of Grain Timer (OOG) Expired**

This message indicates that 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.

### **0E16 - Main I/O - J2-04 - User Safety 2 Open**

If a user would like to add a safety device to the Vision system, a normally closed contactor/relay can be attached to this input and the dryer will shutdown if it opens. This is normally jumped out if not in use.

### **0E17 - Main I/O - J2-05 - User Safety 3 Open**

If a user would like to add a safety device to the Vision system, a normally closed contactor/relay can be attached to this input and the dryer will shutdown if it opens. This is normally jumped out if not in use.

### **0E18 - Main I/O - J2-02 - Metering Motor Overload**

If an overload device is monitoring the meter system, this input is used to shutdown the dryer if there is a problem. Possibly a plugged meter system would trip this safety.

### **0E19 - Main I/O - J2-06 - User Safety 4 Open**

If a user would like to add a safety device to the Vision system, a normally closed contactor/relay can be attached to this input and the dryer will shutdown if it opens. This is normally jumped out if not in use.

### Moisture Control Shutdown Messages

#### **0F01 - MC - Network Connection Failed**

This error is generated whenever the master display board (lower control panel) has lost its communications link with the moisture board (lower control panel or separate enclosure). Check the Ethernet cable jacks to make sure they are plugged in tightly.

#### **0F02 - Max Drying Time Exceeded**

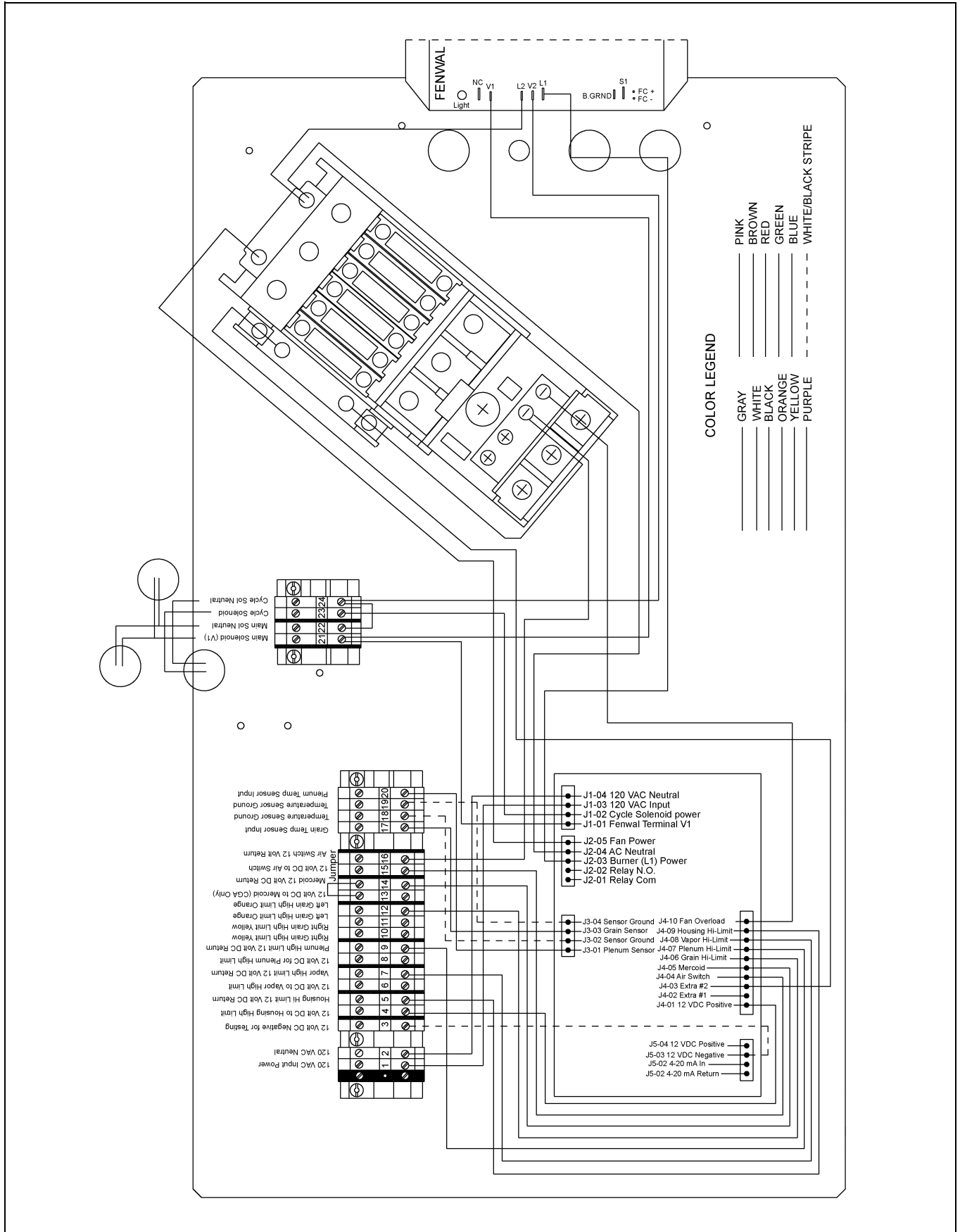
This safety can be used when drying in stage batch mode. See [Moisture Control Options Chapter on Page 45](#) for a detailed explanation.

#### **0F03 - Max Grain Temperature Exceeded**

This safety can be used when drying in continuous flow or stage batch mode. See [Moisture Control Options Chapter on Page 45](#) for a detailed explanation.

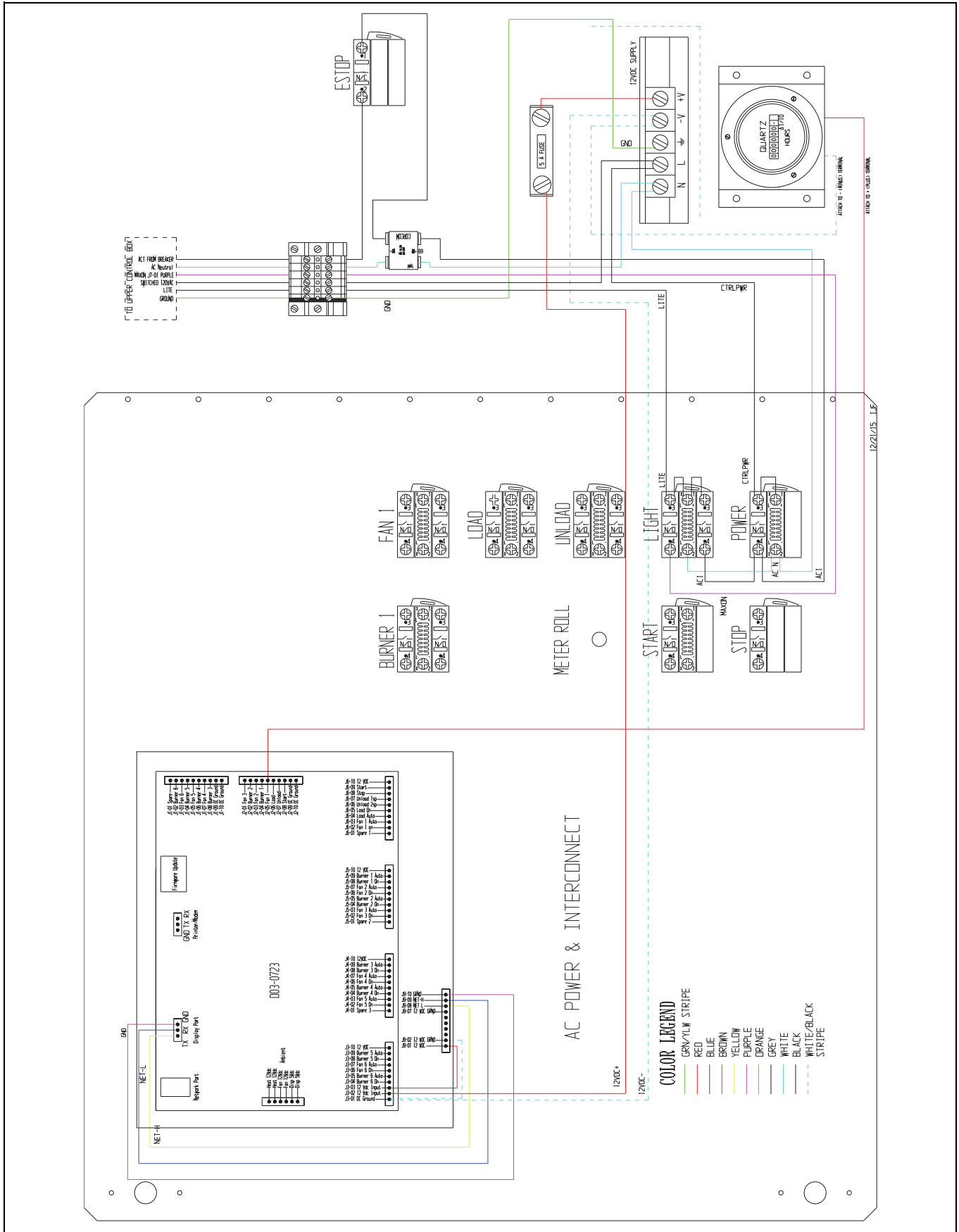


# Fan/Heater Standard

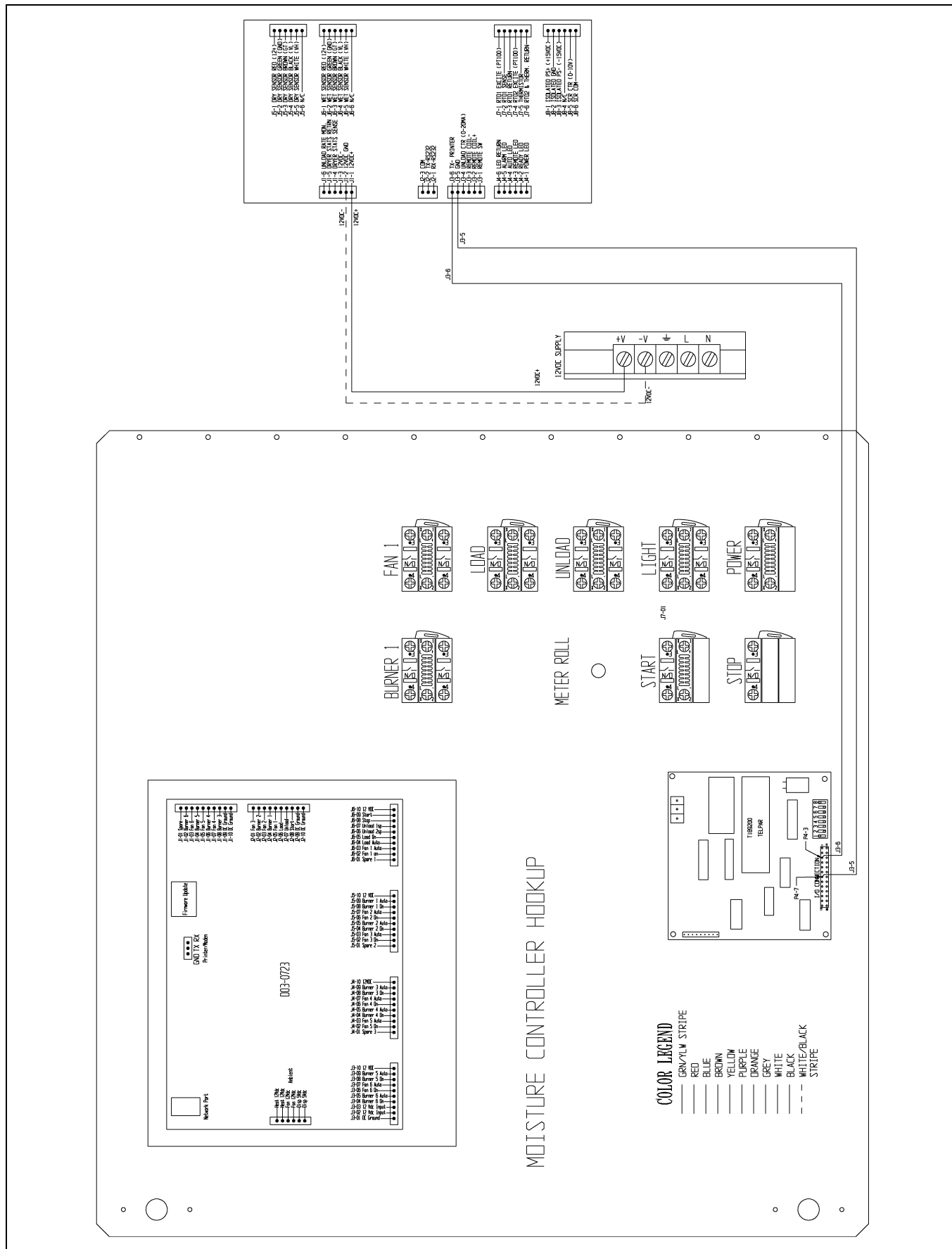


# 9. Vision Schematics and Wiring Diagrams

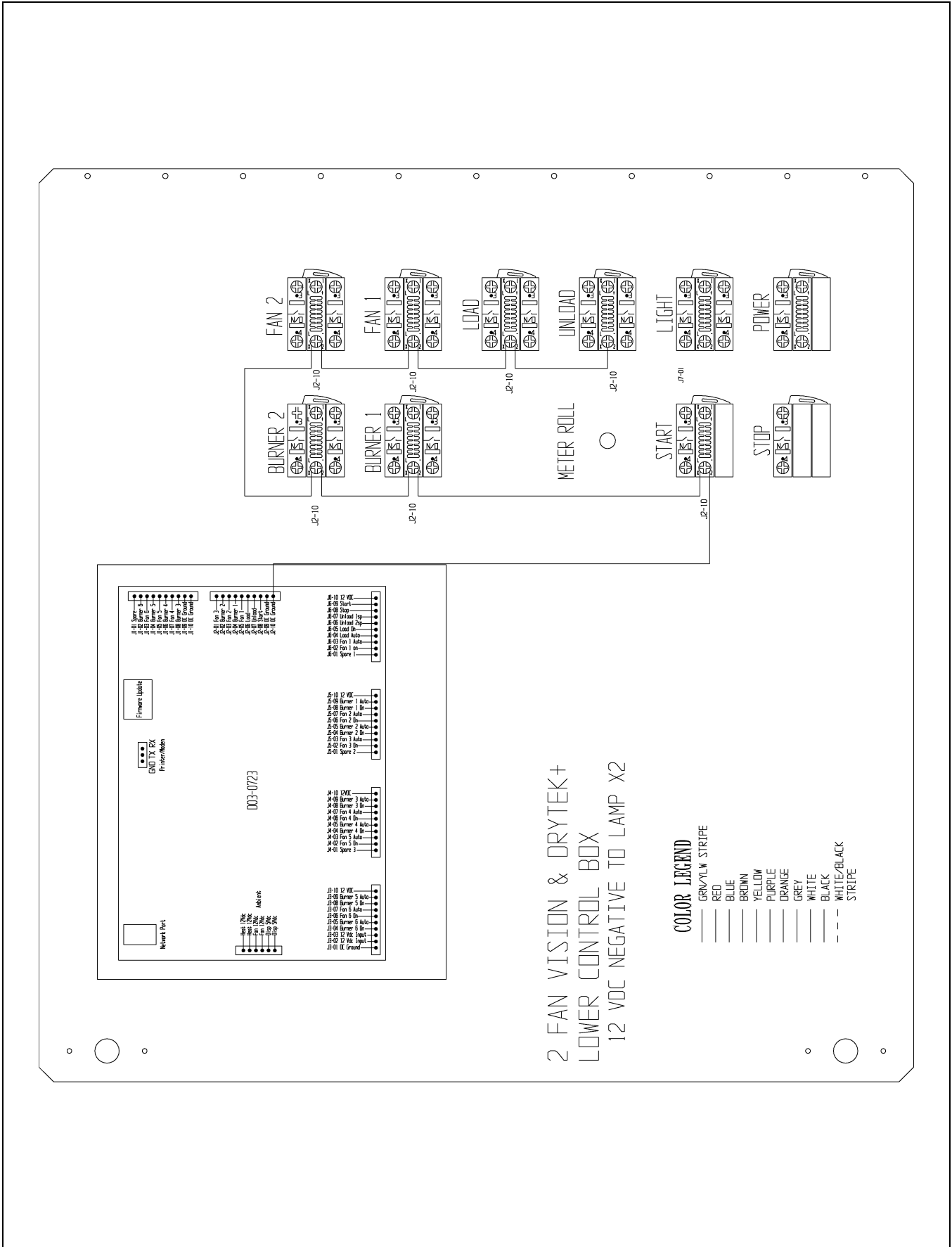
## Front Panel



# Front Panel (Continued)

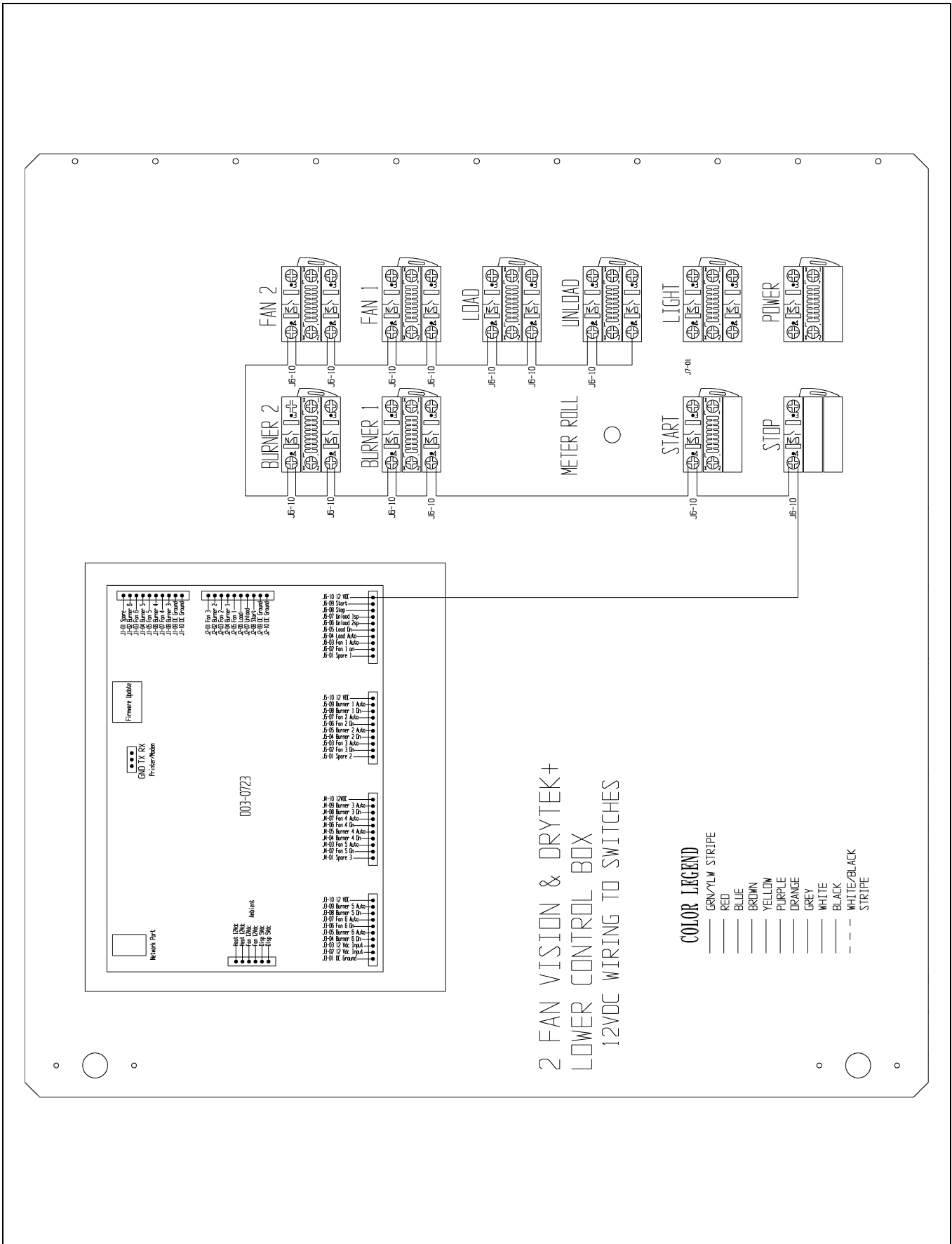


# Front Panel (Continued)

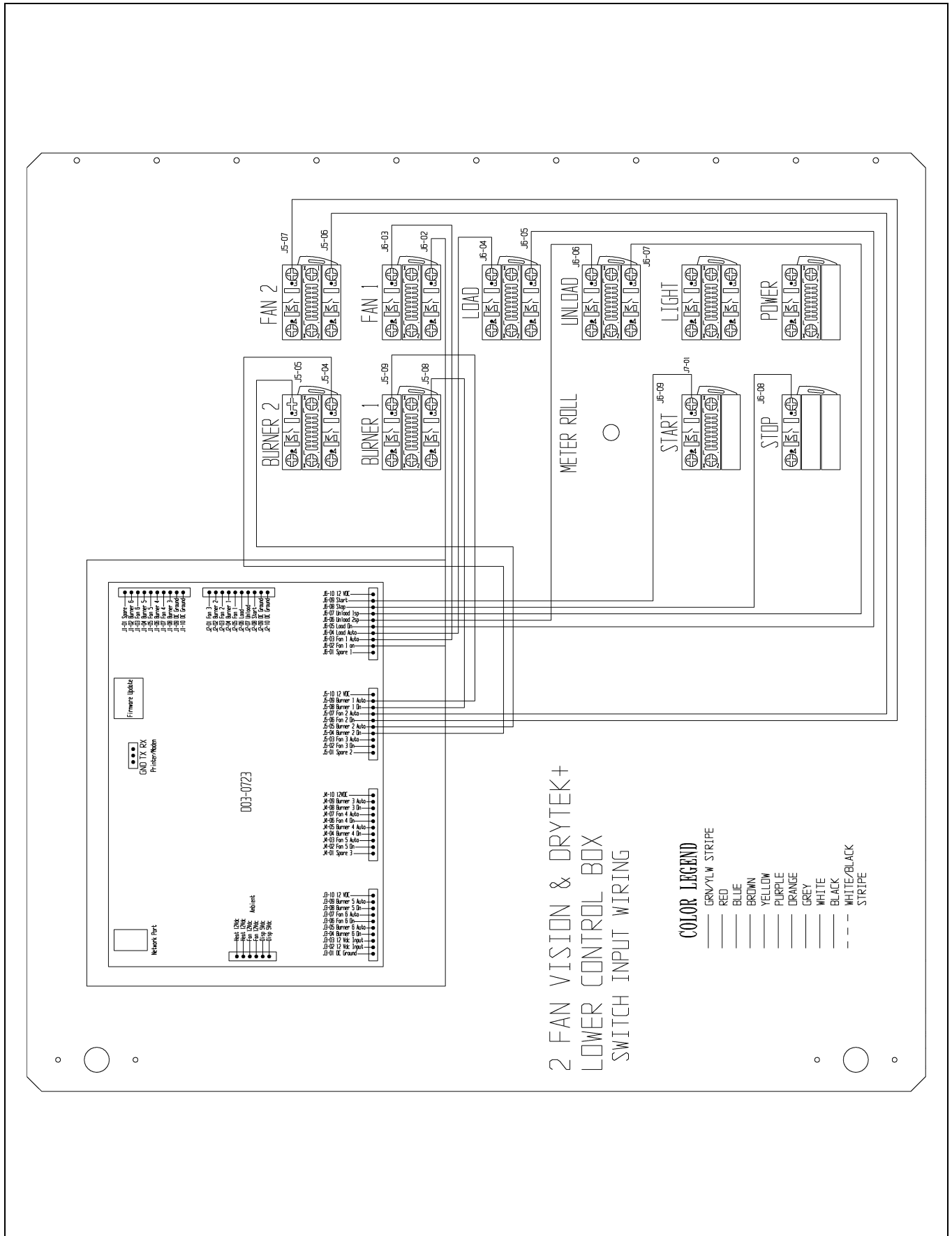




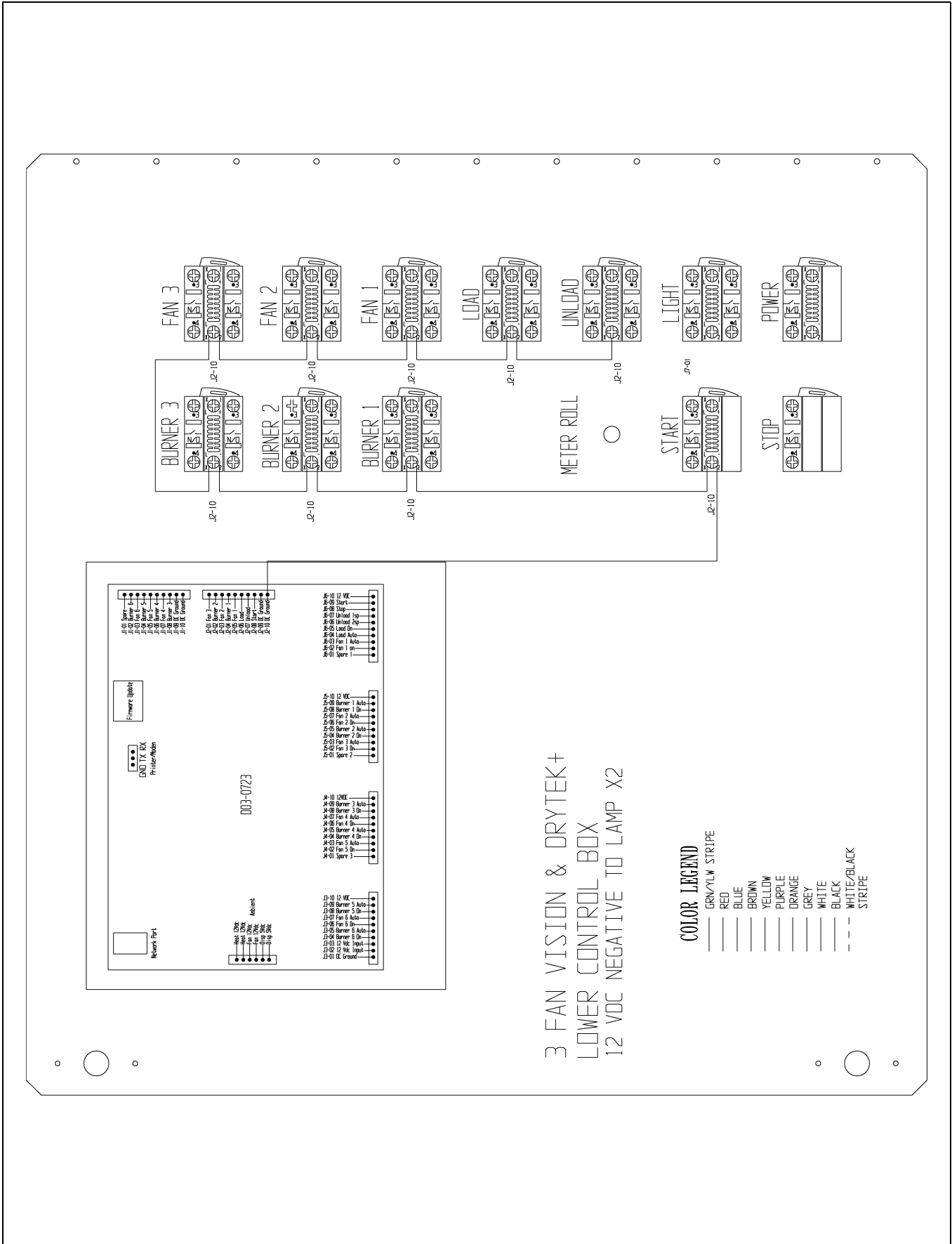
Front Panel (Continued)



Front Panel (Continued)

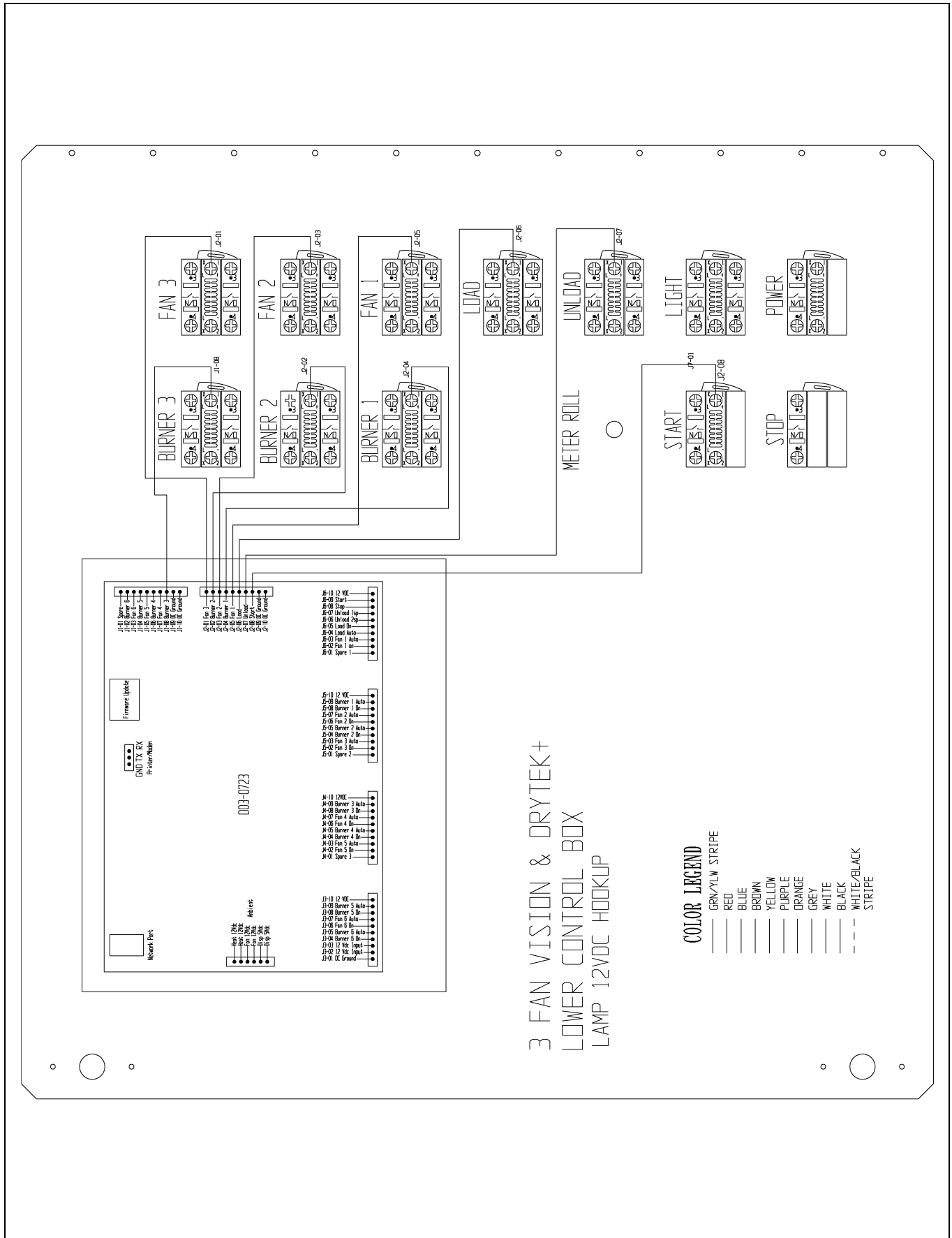


Front Panel (Continued)

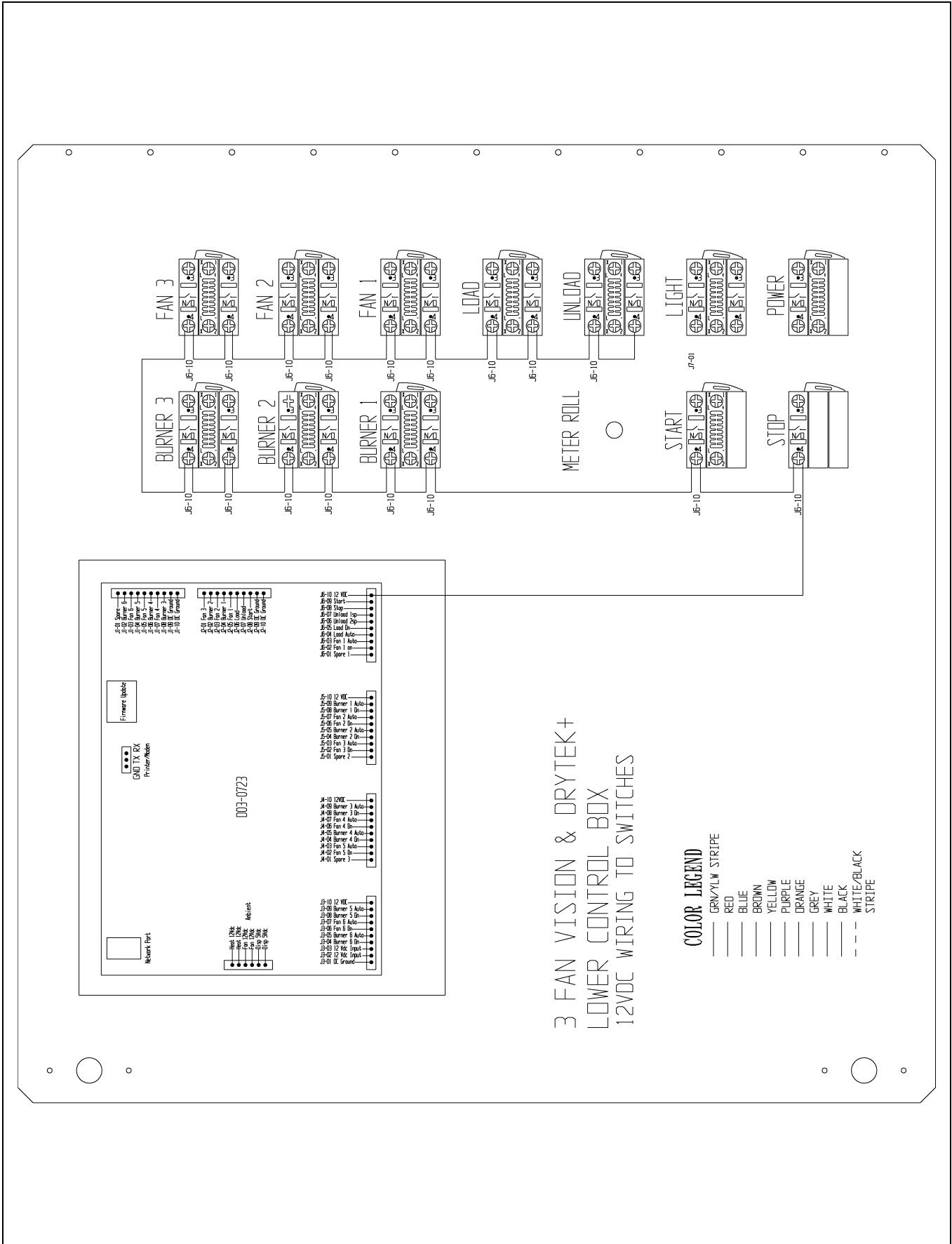




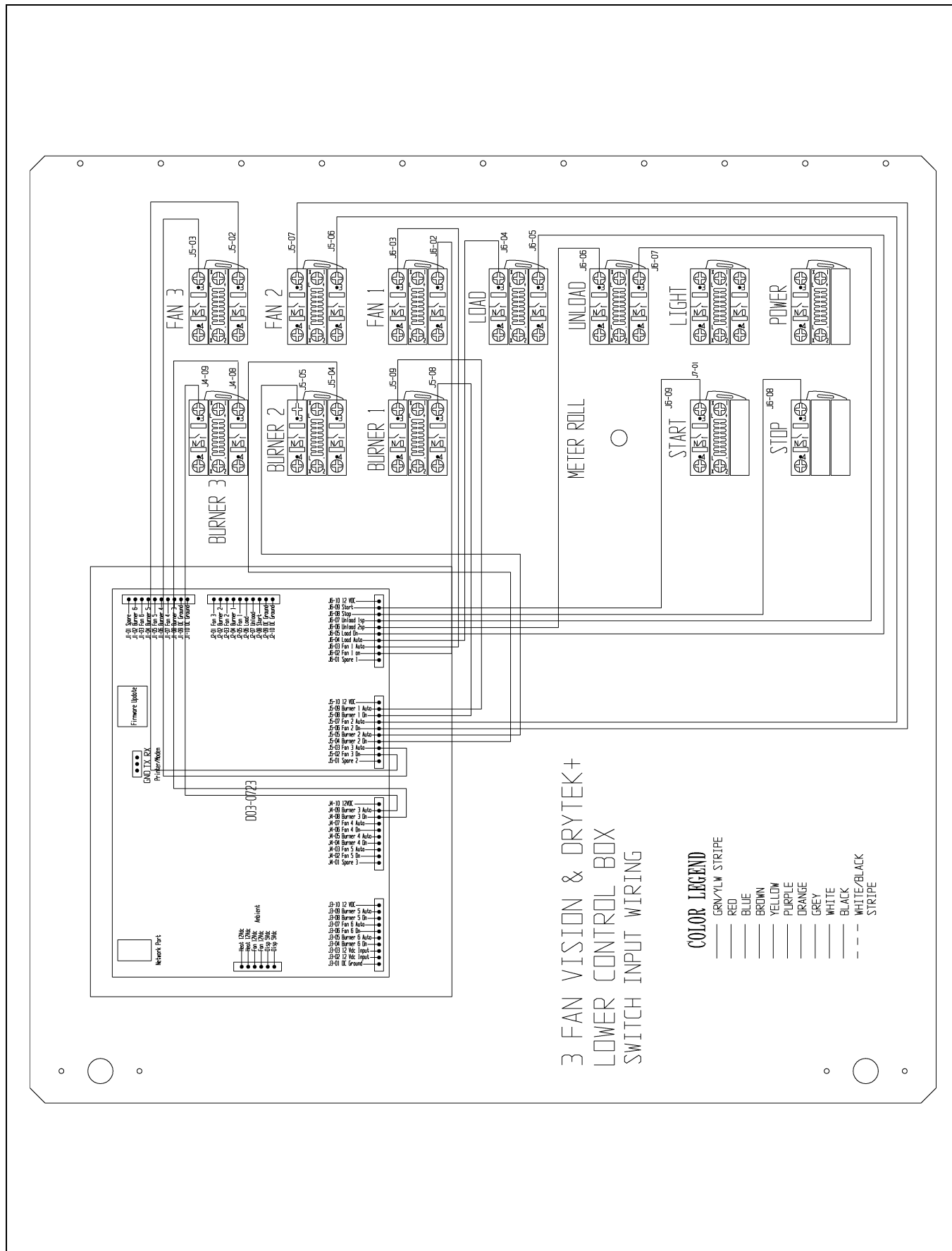
Front Panel (Continued)



Front Panel (Continued)



Front Panel (Continued)

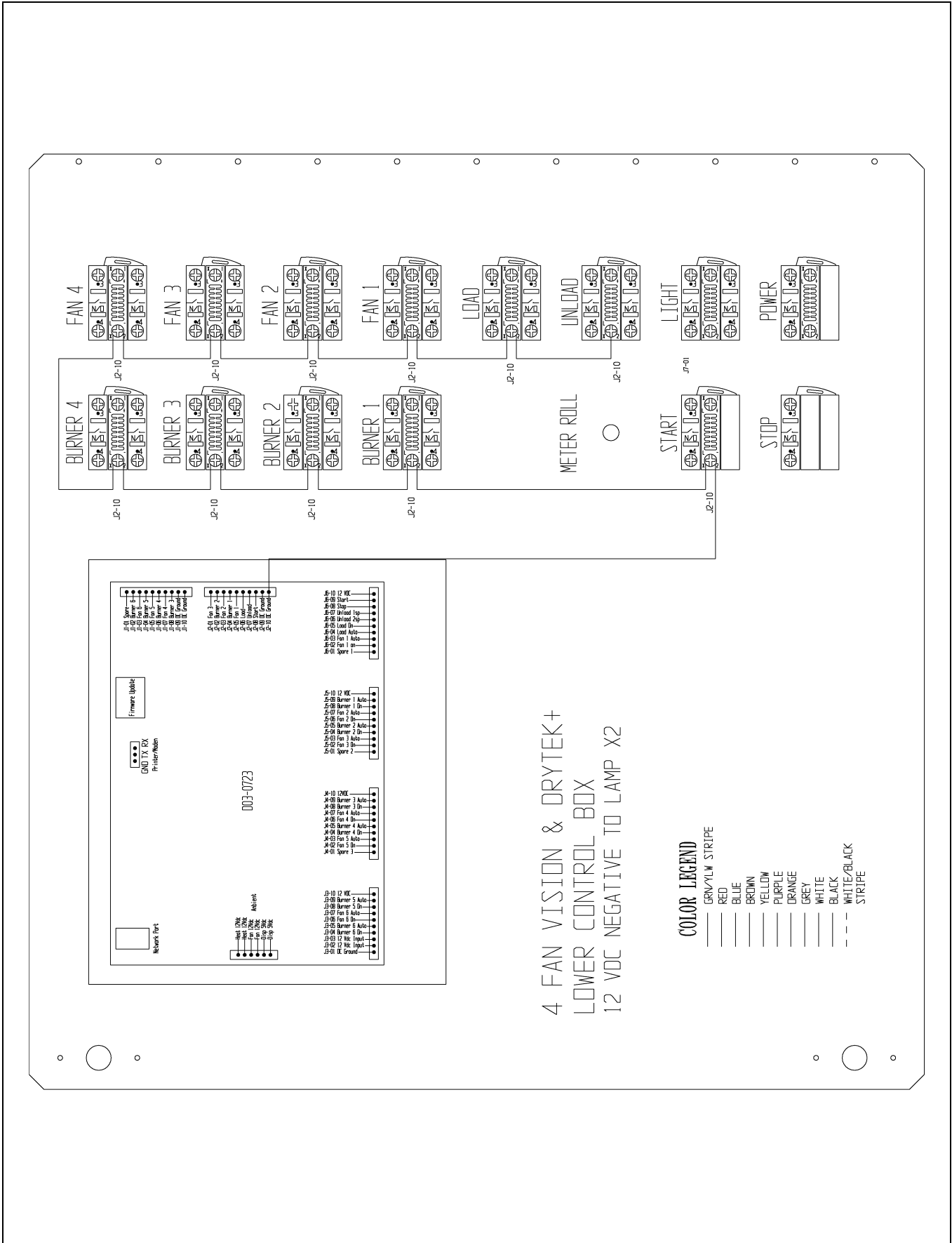


3 FAN VISION & DRYTEK+  
LOWER CONTROL BOX  
SWITCH INPUT WIRING

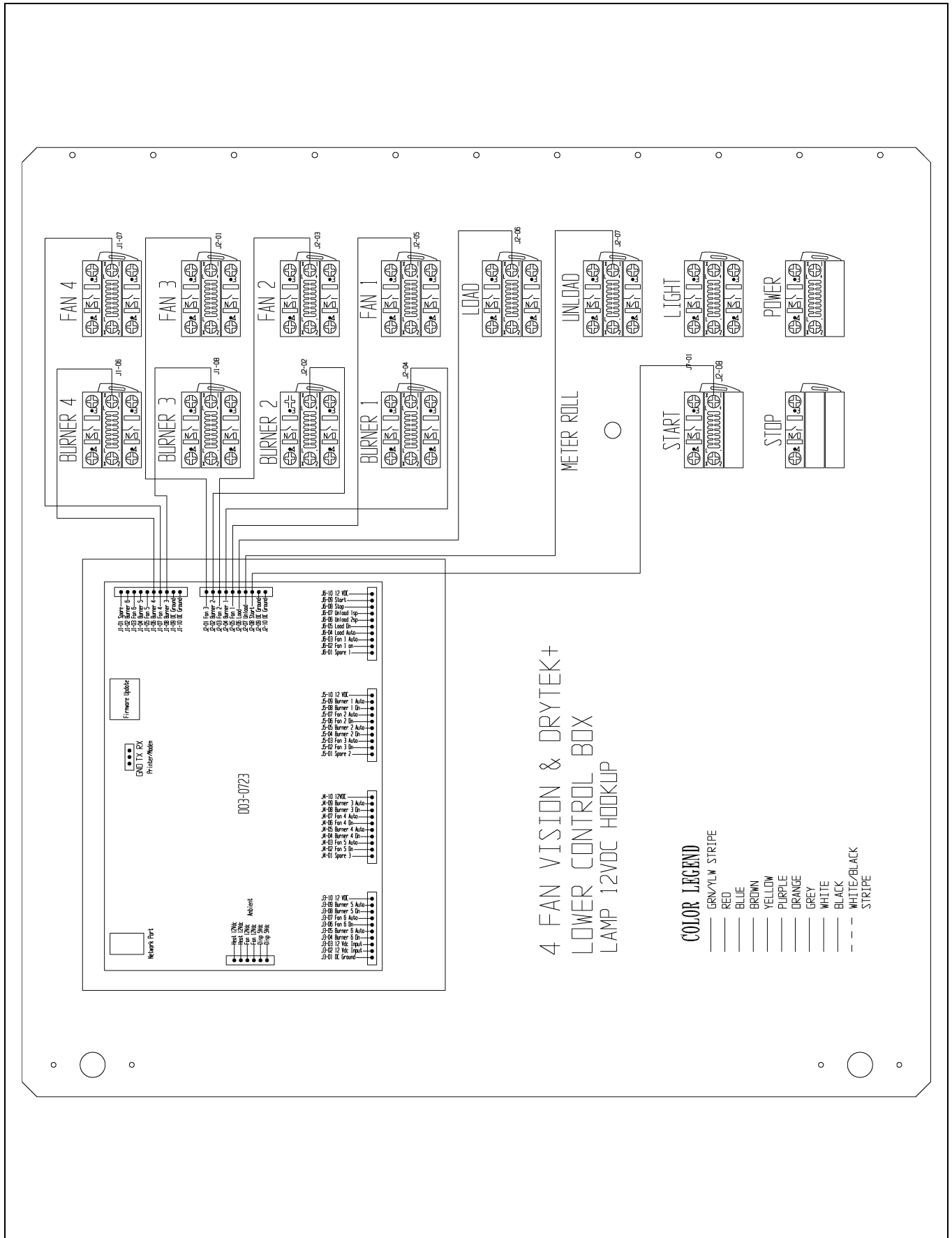
**COLOR LEGEND**

---	GRN/YLW STRIPE
---	RED
---	BLUE
---	BROWN
---	YELLOW
---	PURPLE
---	ORANGE
---	GREY
---	WHITE
---	BLACK
---	WHITE/BLACK STRIPE

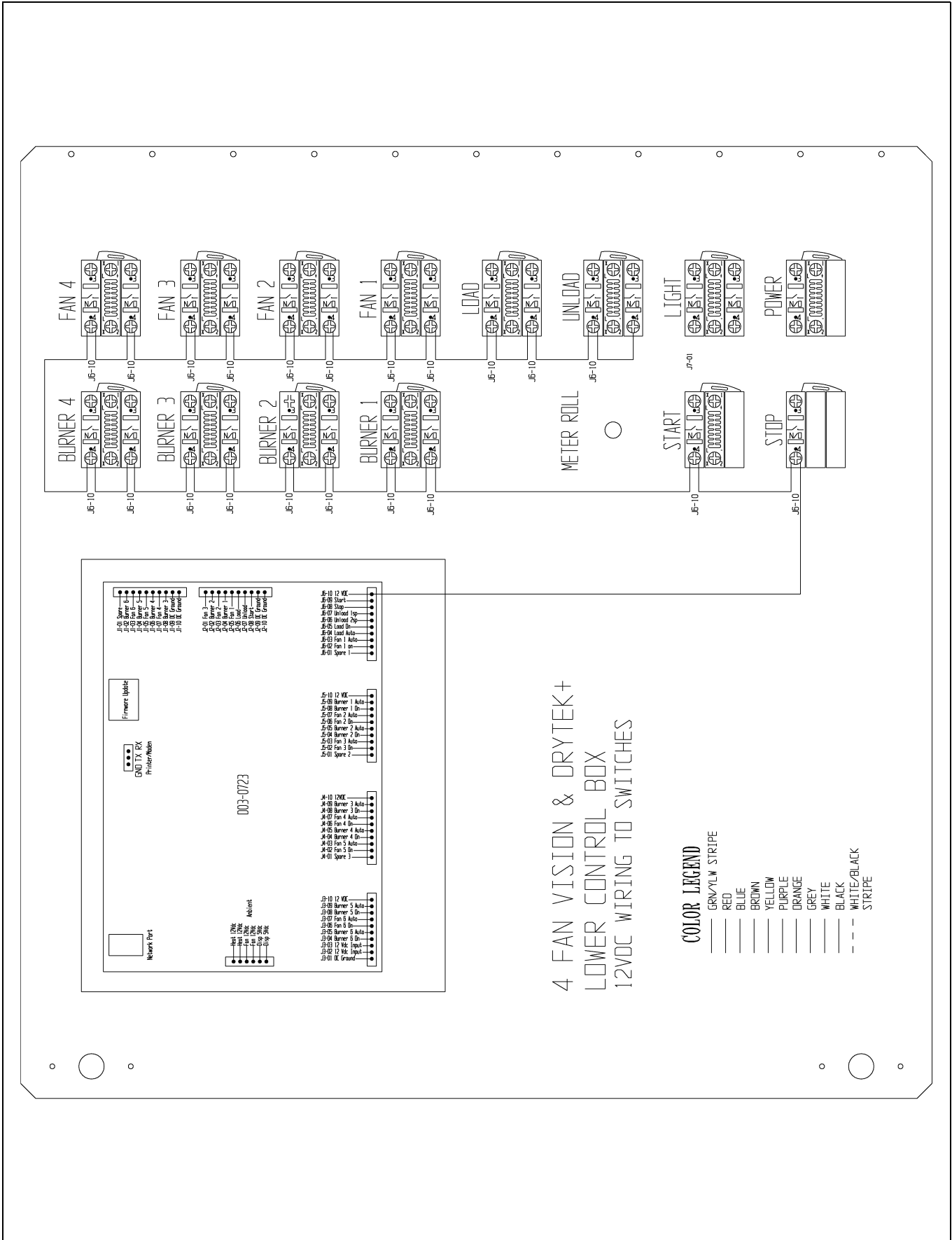
Front Panel (Continued)



Front Panel (Continued)

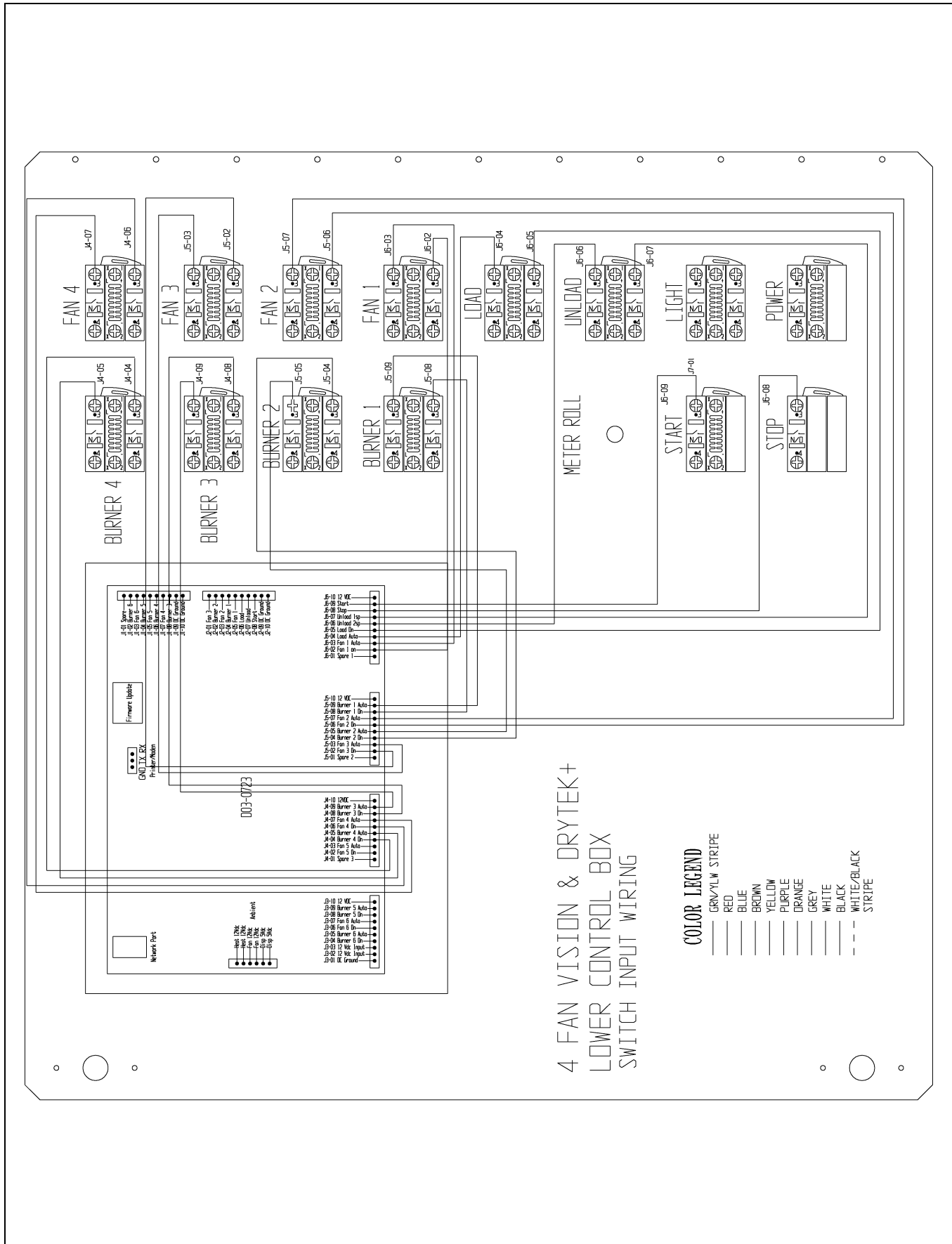


Front Panel (Continued)

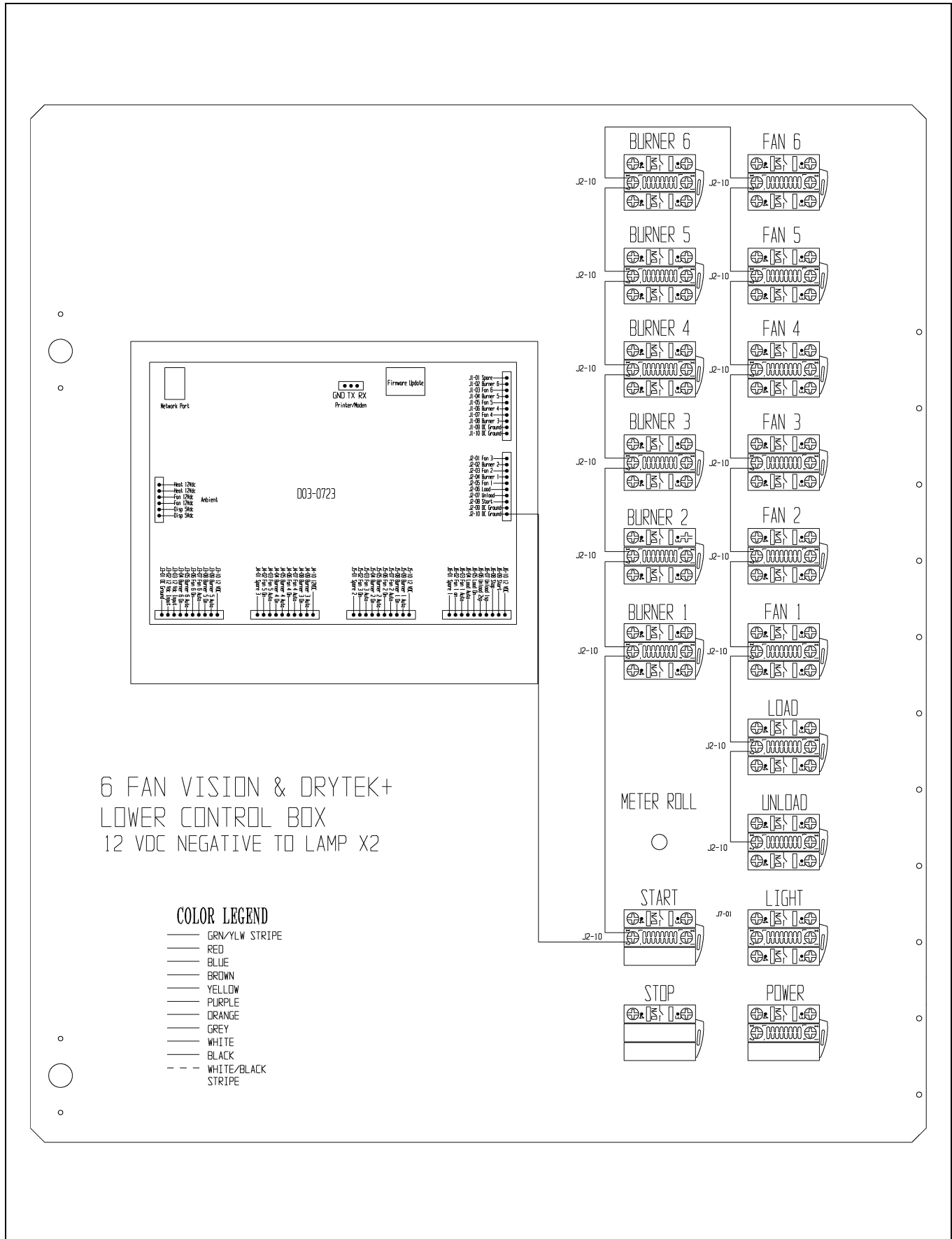


4 FAN VISION & DRYTEK+  
 LOWER CONTROL BOX  
 12VDC WIRING TO SWITCHES

Front Panel (Continued)

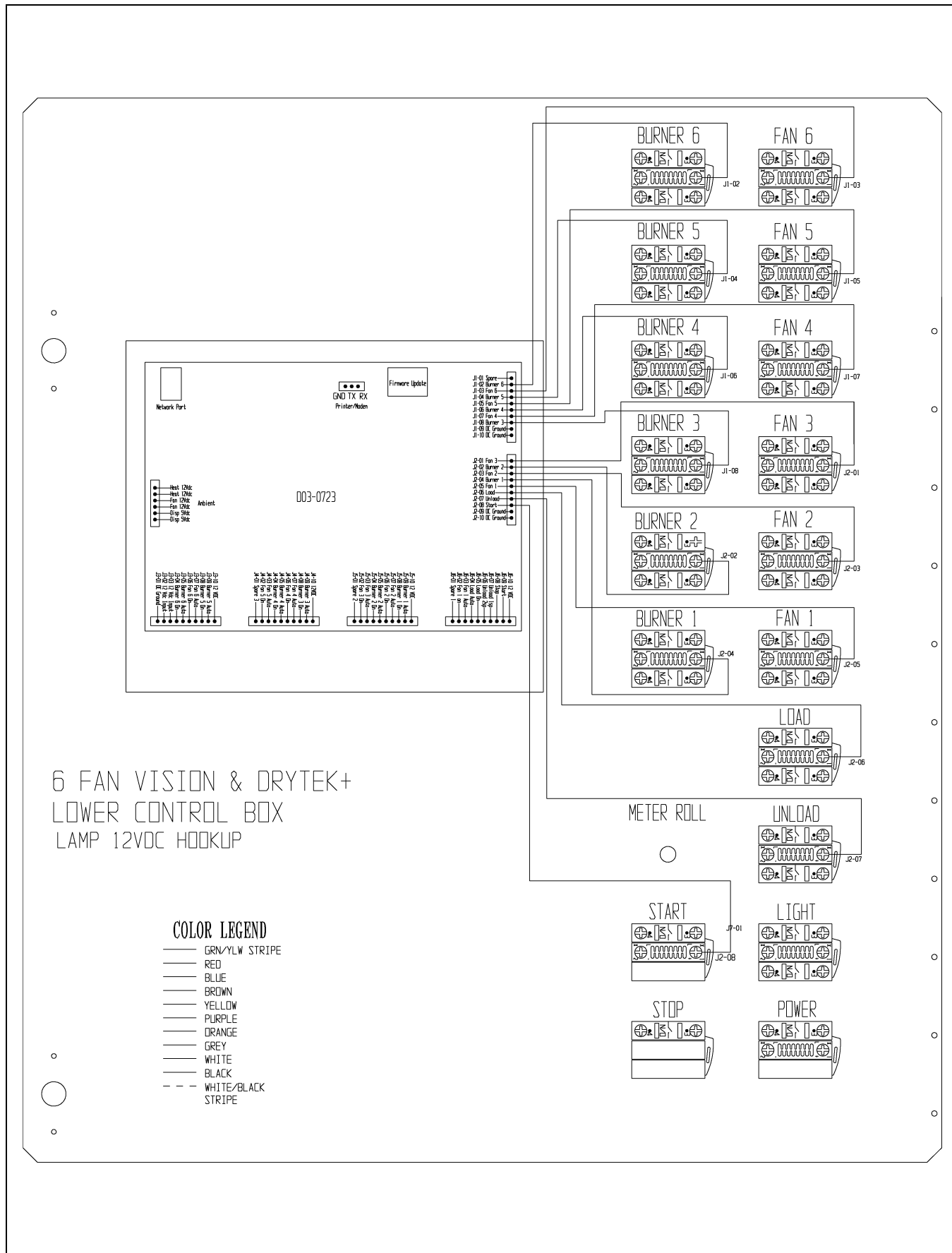


Front Panel (Continued)

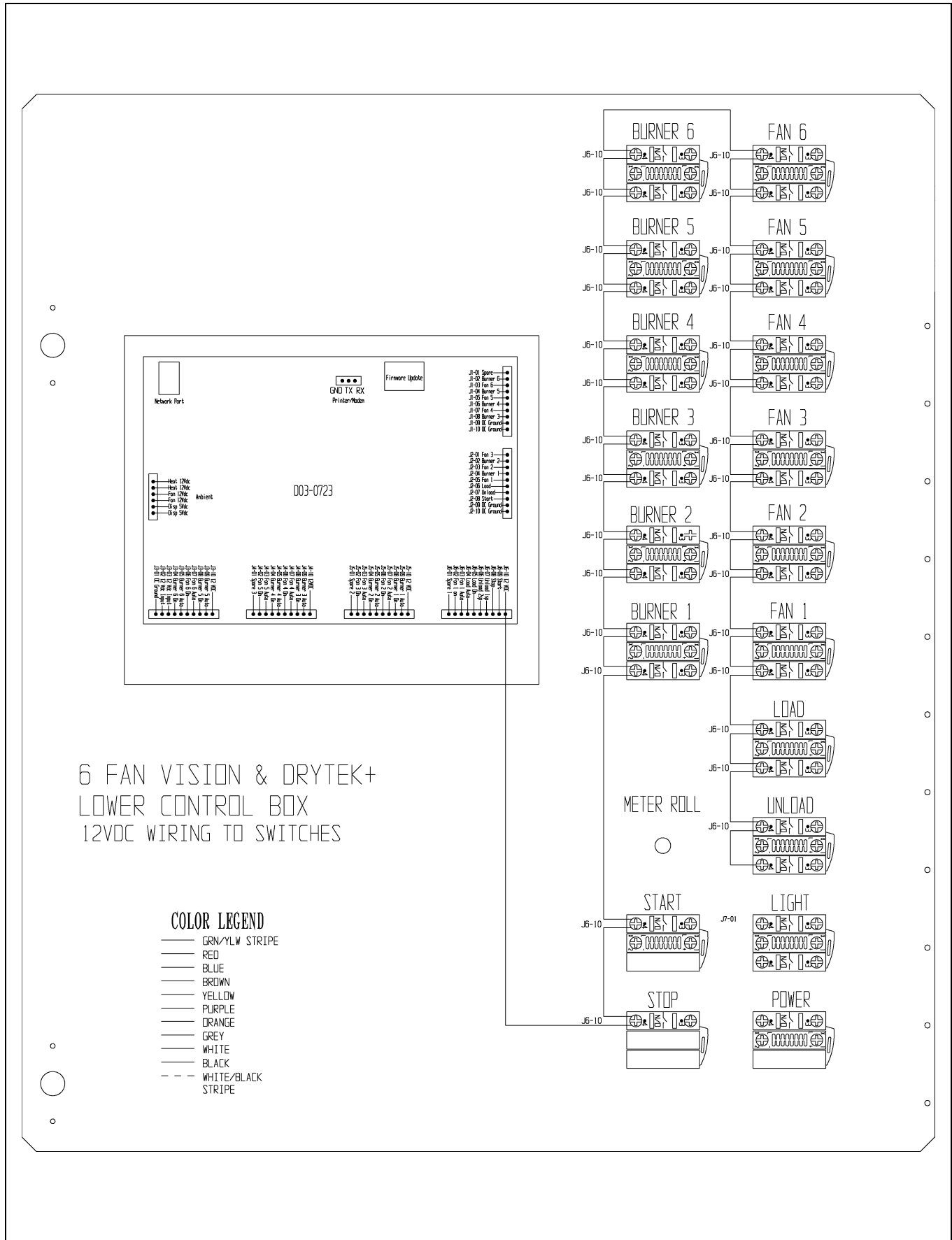




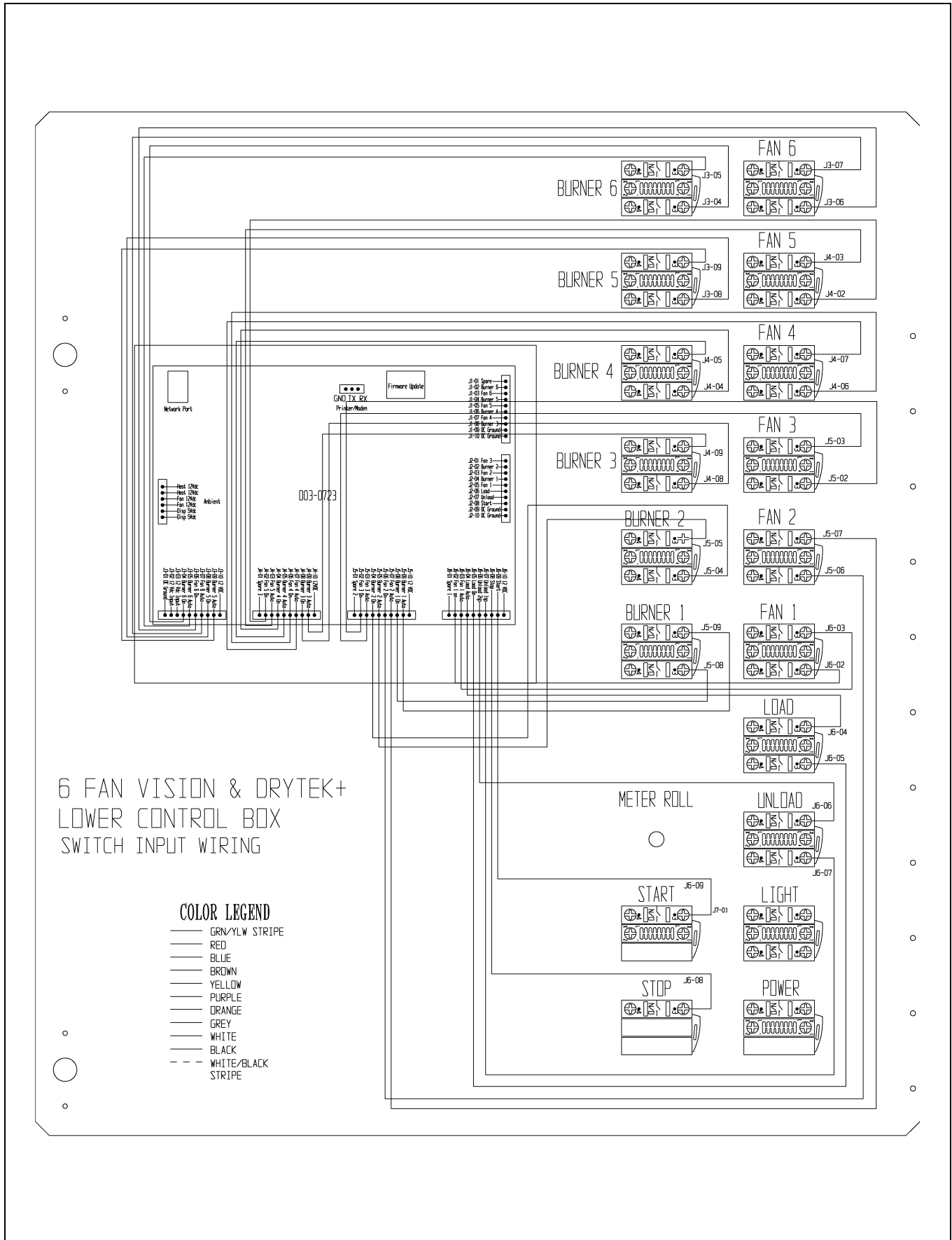
Front Panel (Continued)



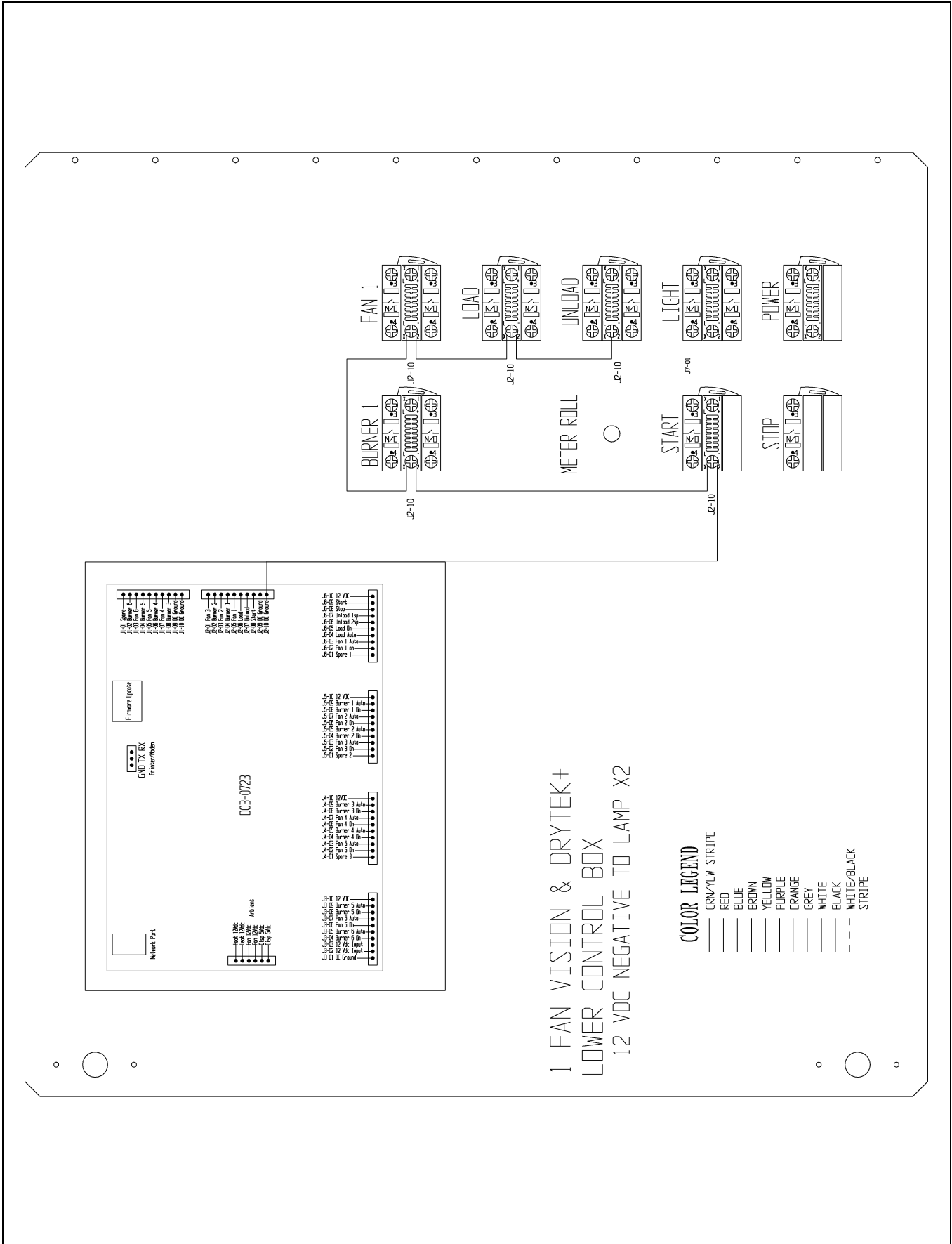
Front Panel (Continued)



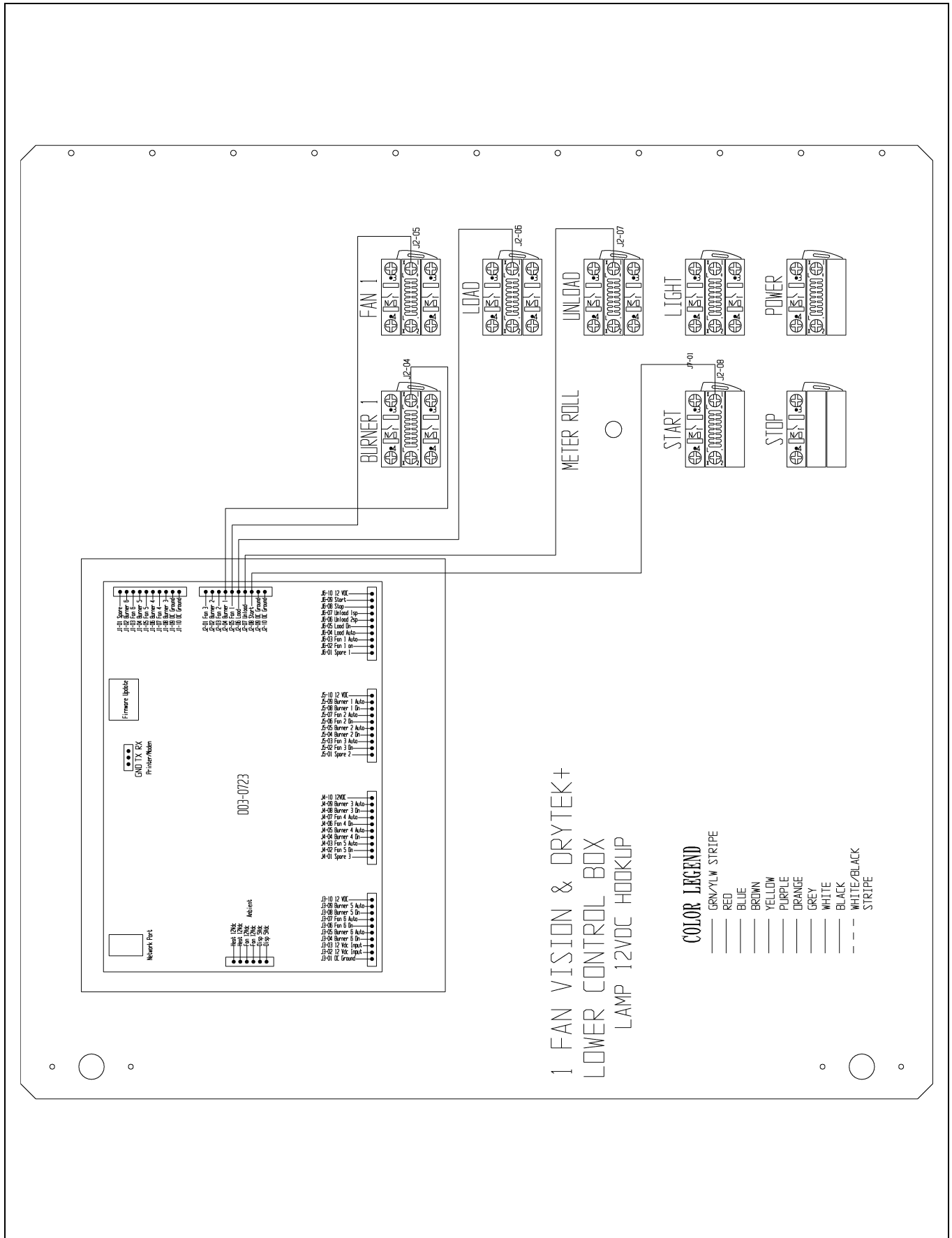
Front Panel (Continued)



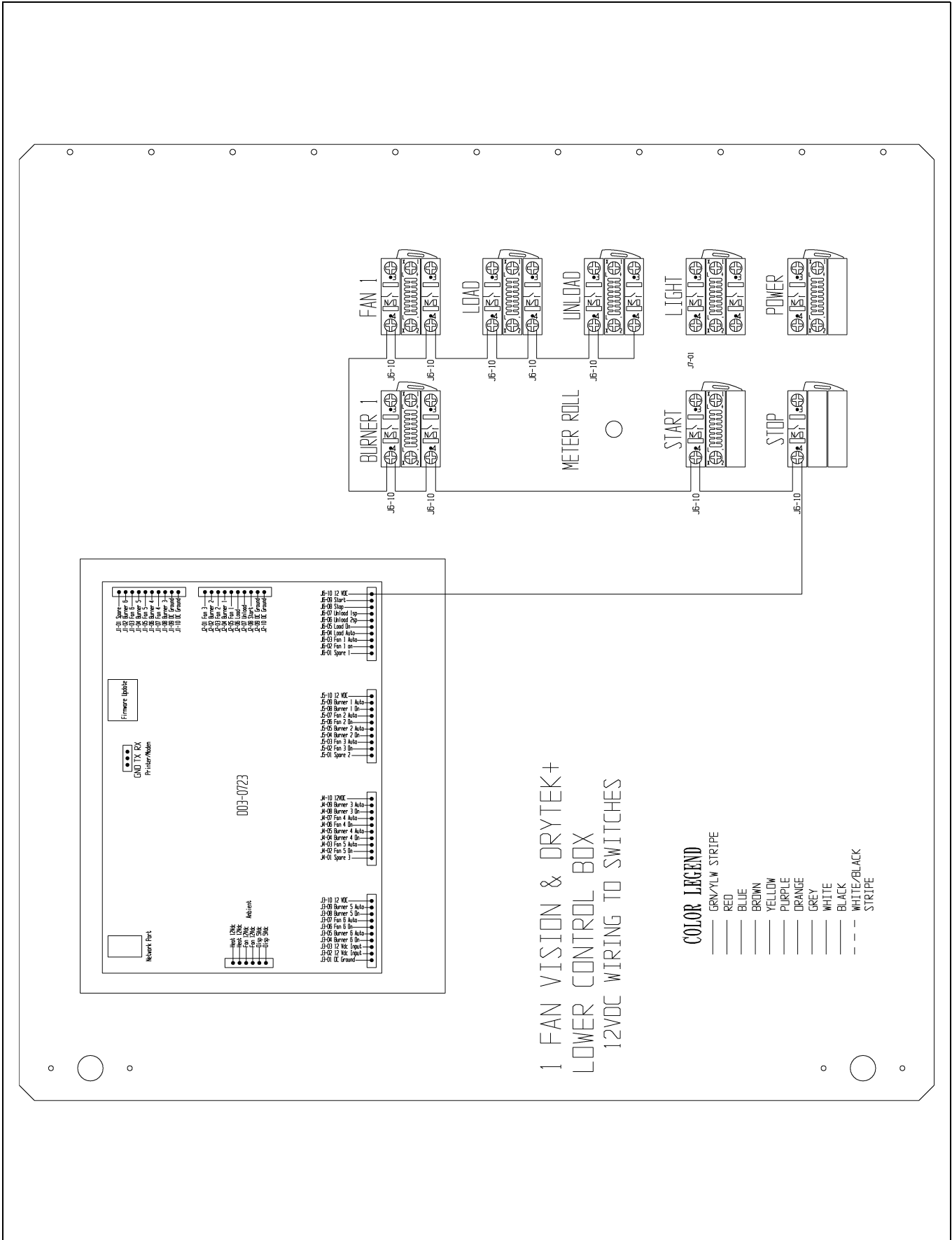
Front Panel (Continued)



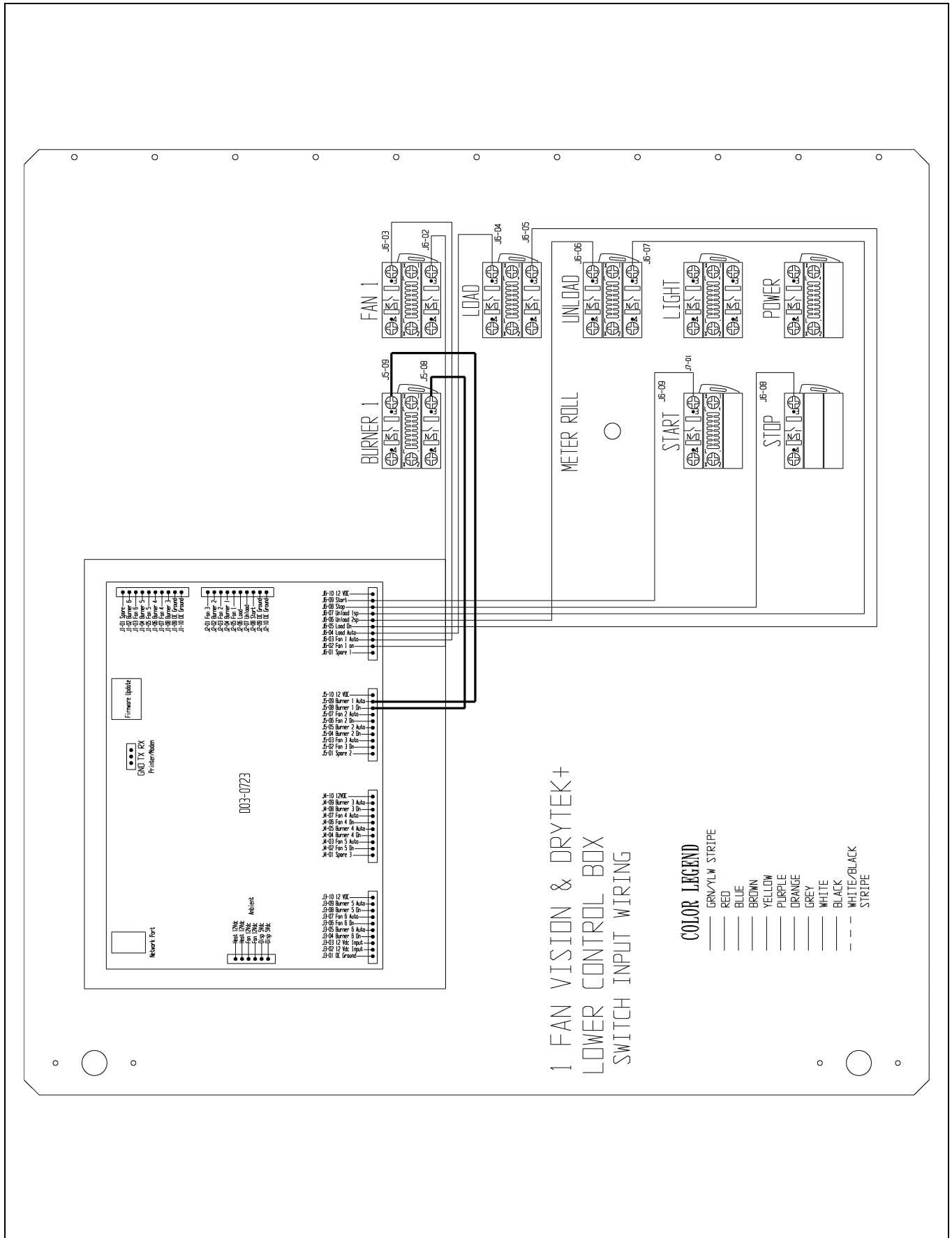
Front Panel (Continued)



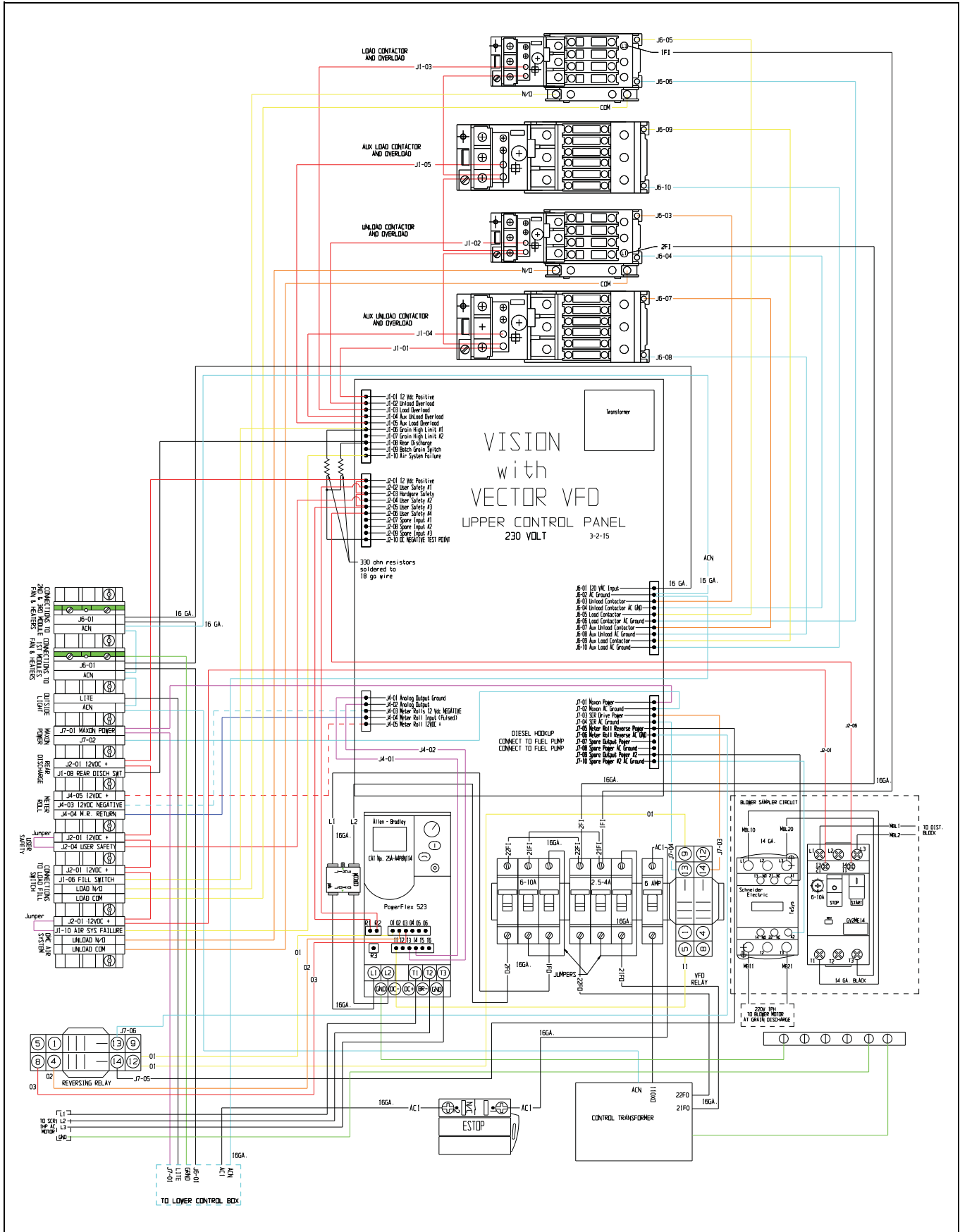
Front Panel (Continued)



Front Panel (Continued)

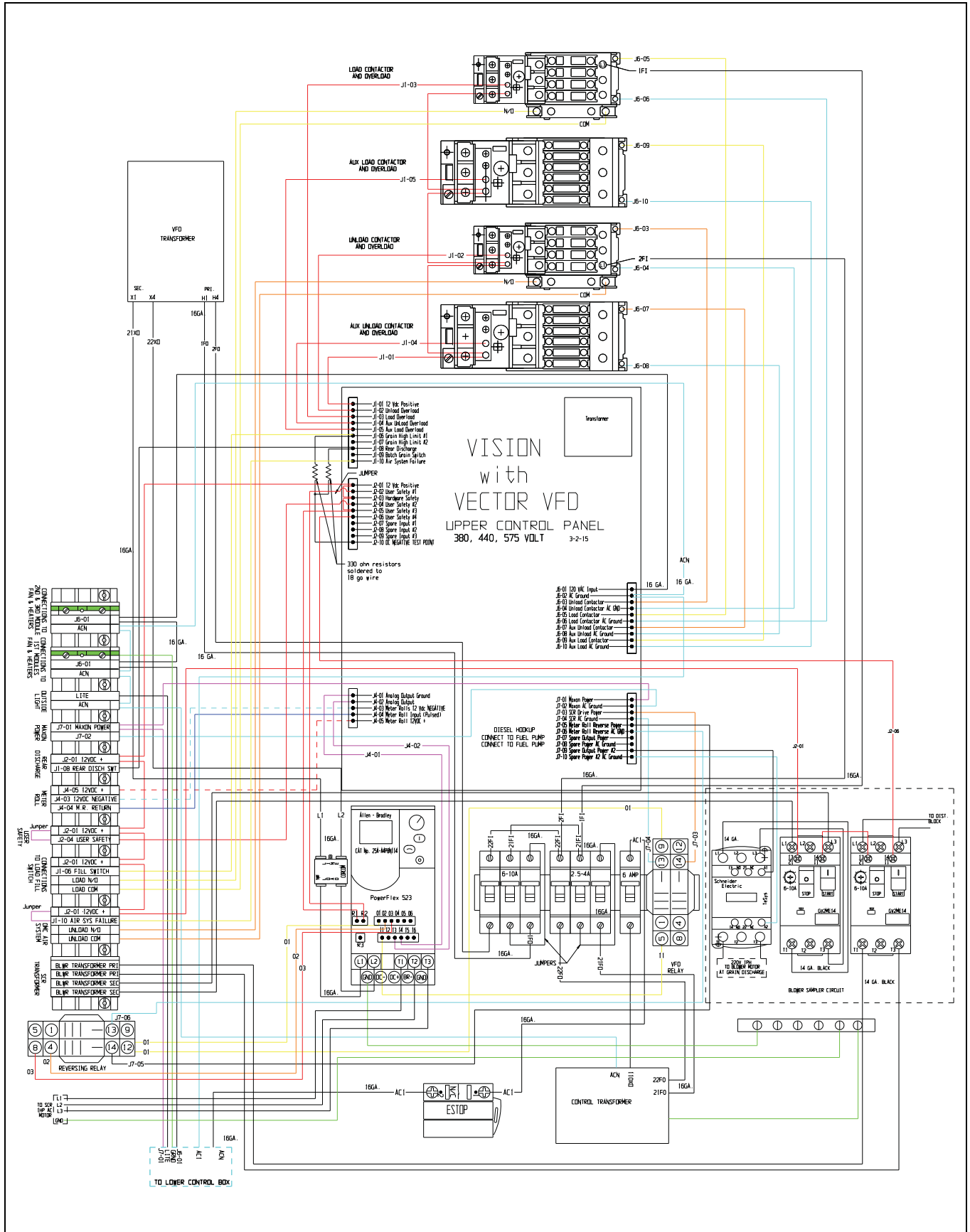


## Upper Control Box



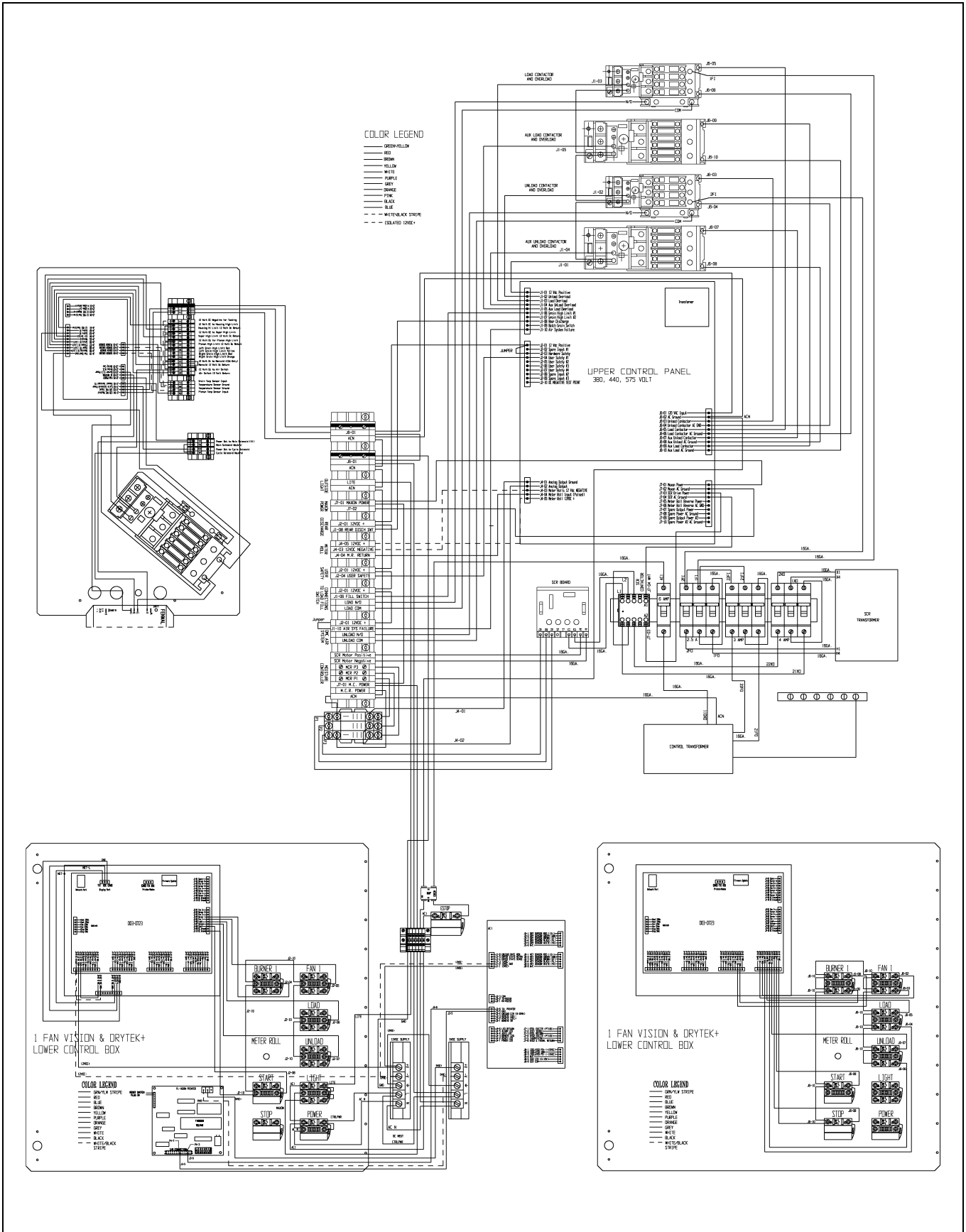


# Upper Control Box (Continued)

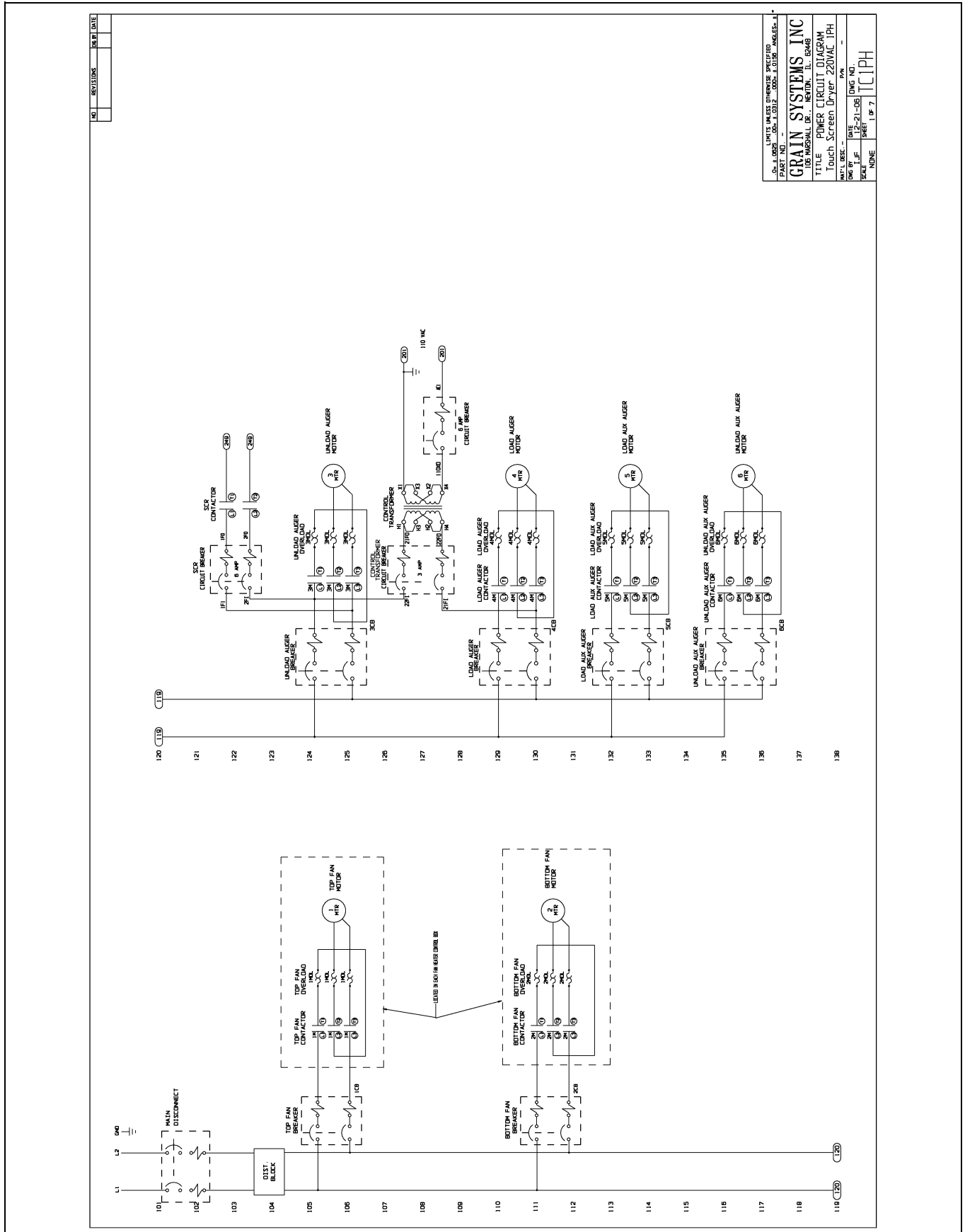


# 9. Vision Schematics and Wiring Diagrams

## Upper Control Box (Continued)



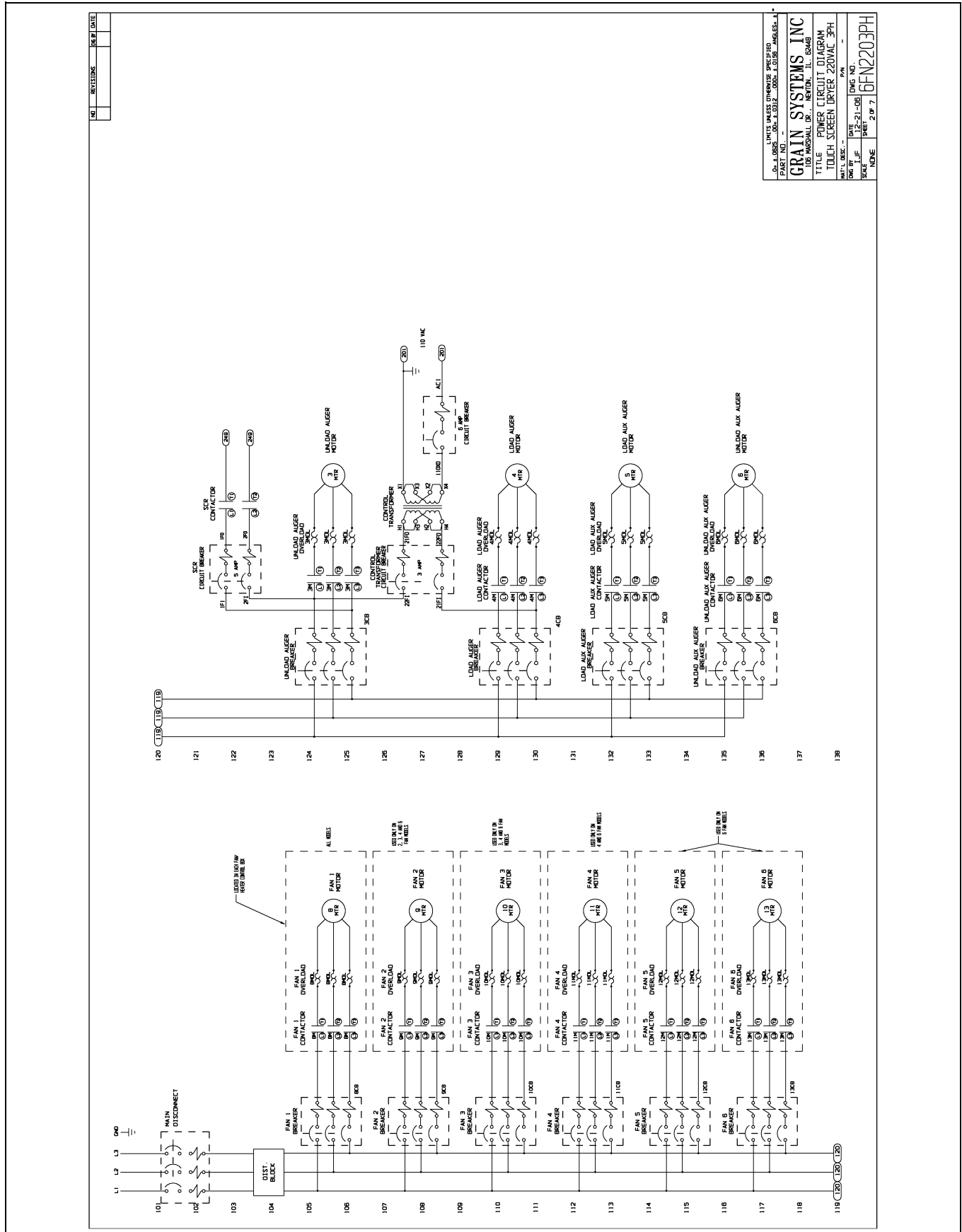
220 VAC 1 Phase



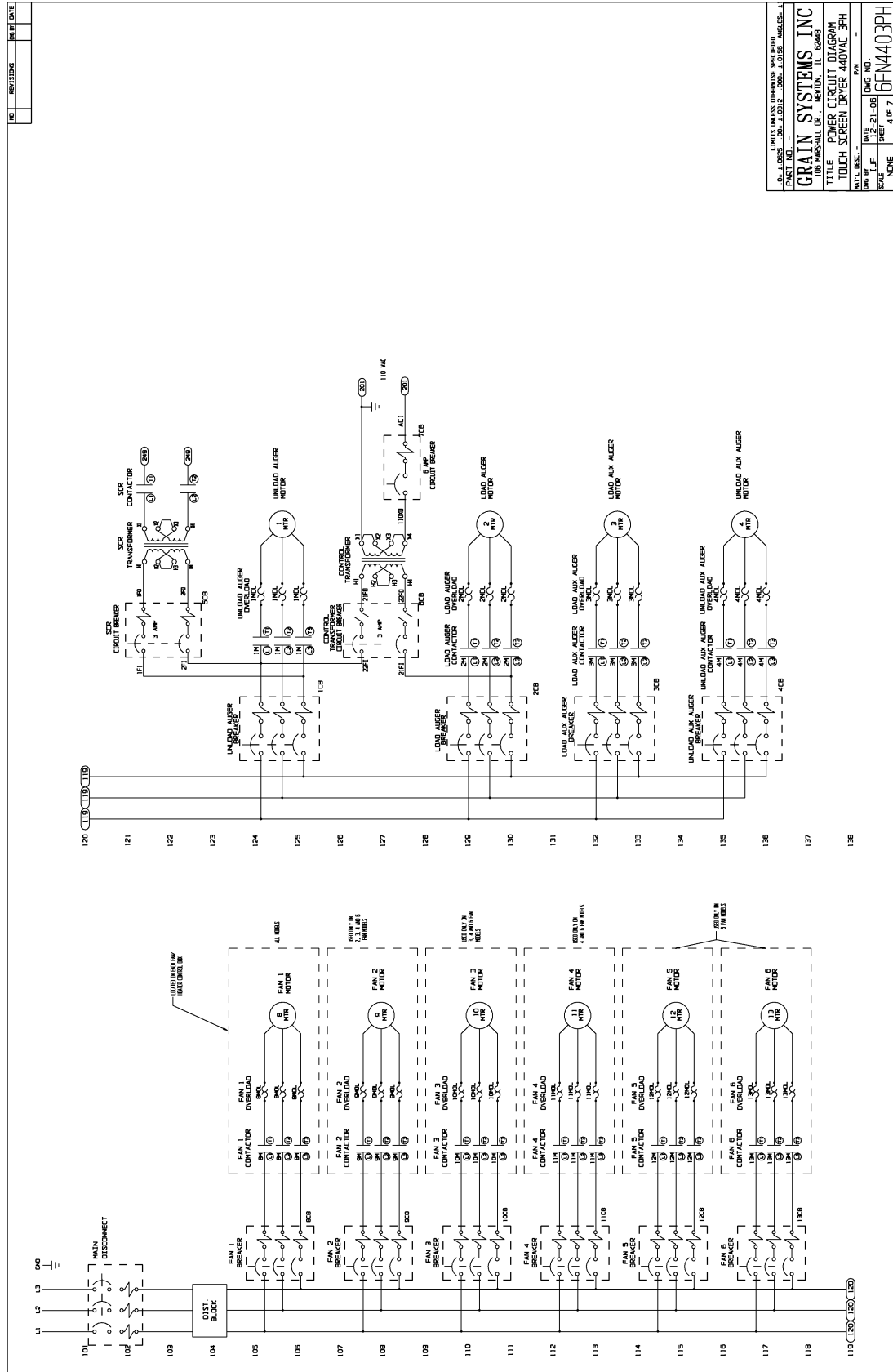
LIMITS UNLESS OTHERWISE SPECIFIED	
PART NO.	173-21-06
REV.	173-21-06
TITLE	POWER CIRCUIT DIAGRAM
DATE	12-21-06
BY	TC/PH
CHECKED BY	
SCALE	1" = 7'
DRG. NO.	
REV. NO.	

# 9. Vision Schematics and Wiring Diagrams

## 220 VAC 3 Phase



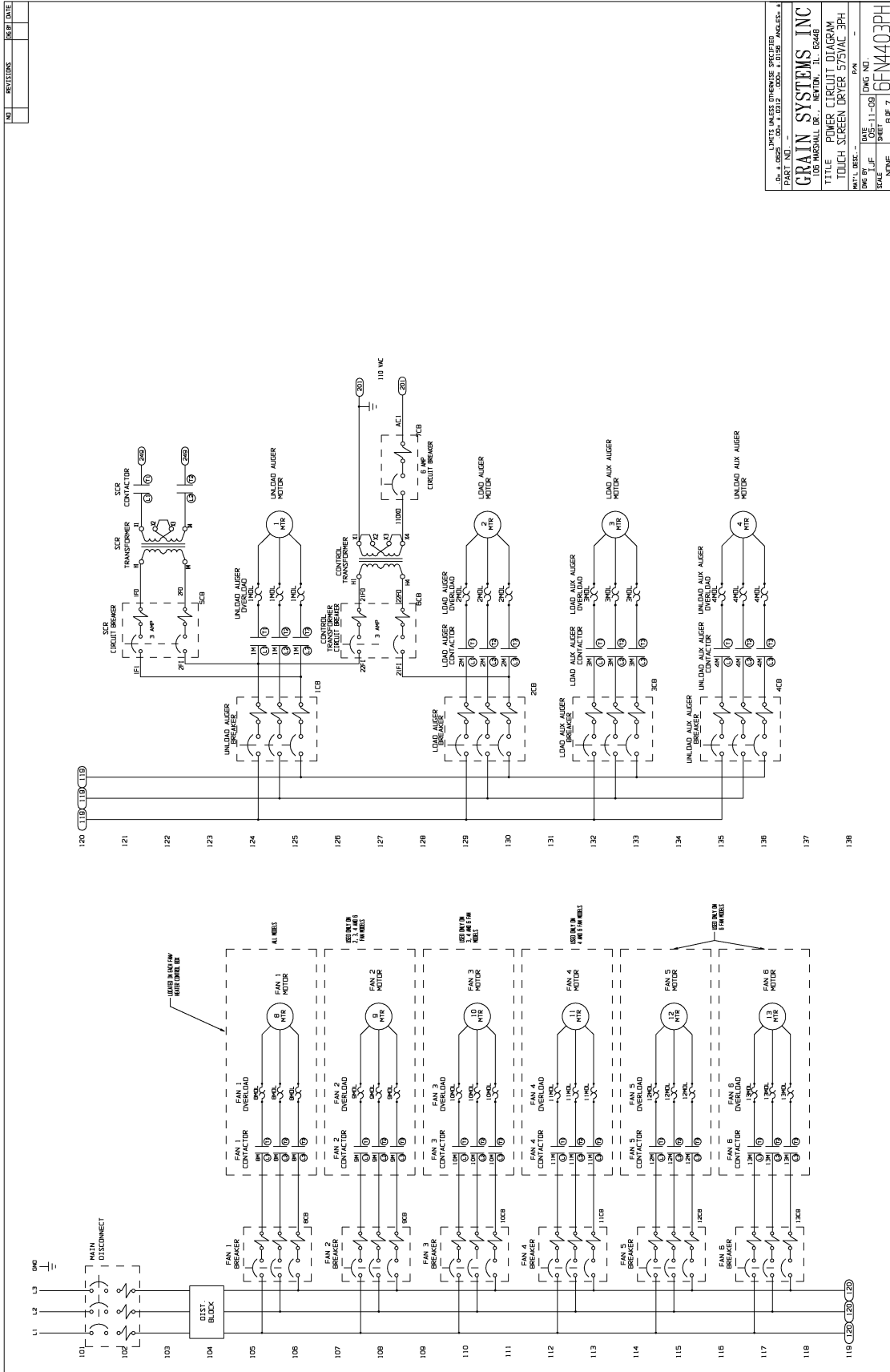
440 VAC 3 Phase



DESIGNED BY	REVISED BY	DATE
DR. J. LOEB		
CHKD BY	DATE	SCALE
<b>GRAIN SYSTEMS INC</b> 108 MARSHALL DR., NORTON, IL 62448 TITLE POWER CIRCUIT DIAGRAM TOUCH SCREEN DRYER 440VAC 3PH Dwg. No. 6FN4403PH SHEET 4 OF 7 NONE		

# 9. Vision Schematics and Wiring Diagrams

## 575 VAC 3 Phase

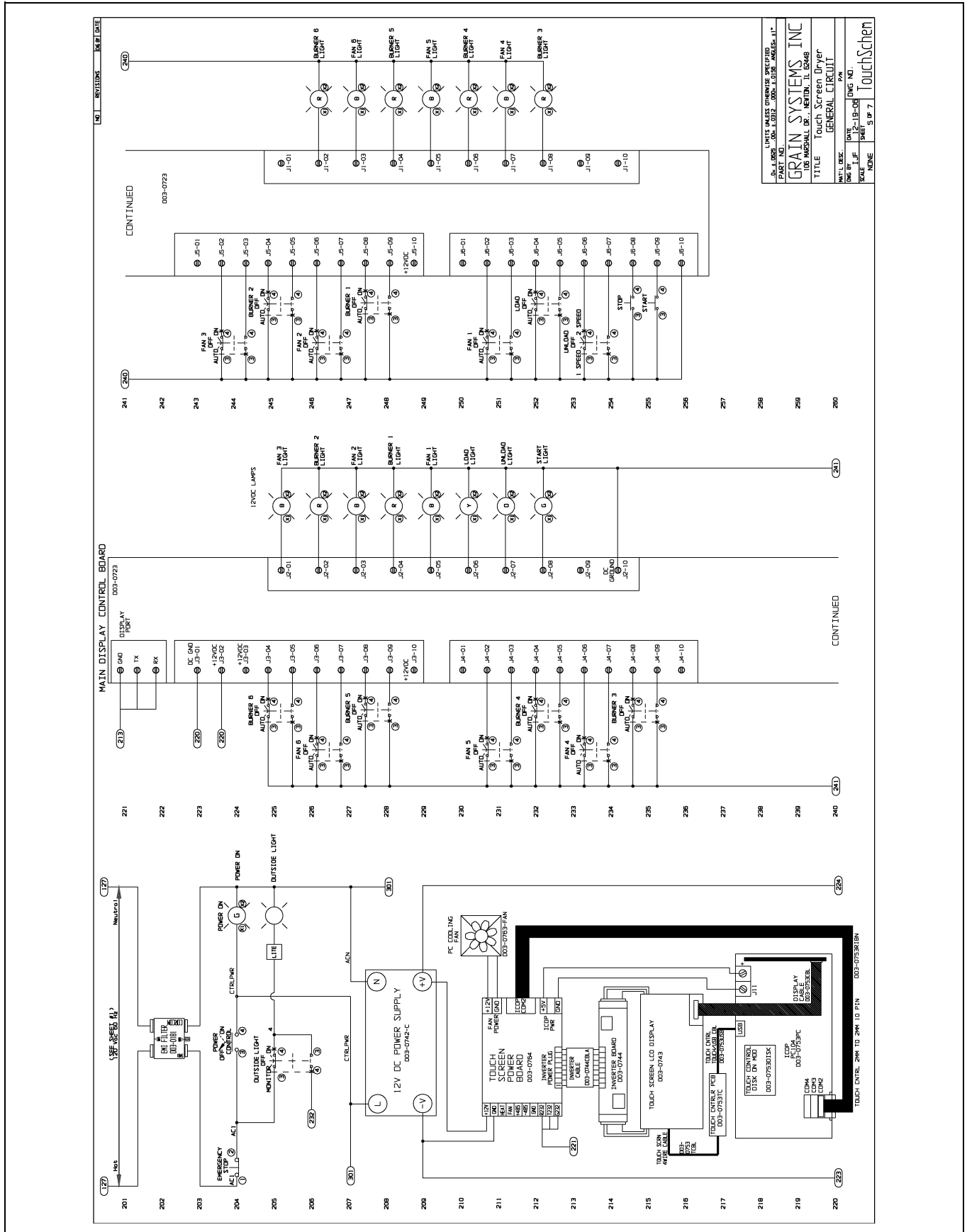


REV.	REVISIONS	DATE

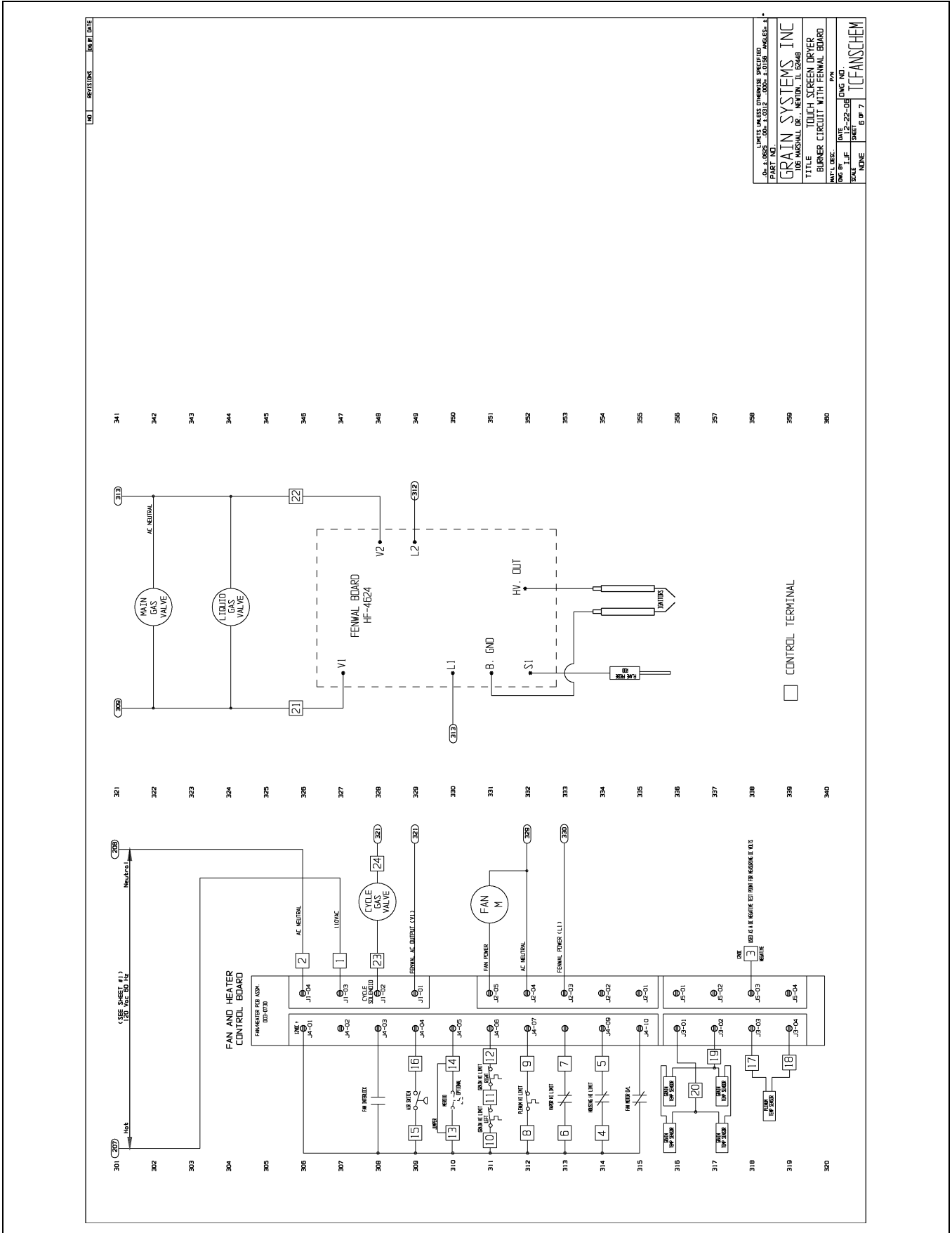
LIMITS UNLESS OTHERWISE SPECIFIED PAPER NO. — DES. J. 0202 — DES. J. 0212 — DES. J. 0129 — AMESSE. 4	<b>GRAIN SYSTEMS INC</b> 105 MARSHALL DR., NEWTON, IL 62448
TITLE POWER CIRCUIT DIAGRAM TOUCH SCREEN DRYER 575VAC 3PH	DWG. NO. 05-11-05
MTL. DES. — DWG. J.F. SCALE NONE	SHEET 8 OF 7 <b>6FN4403PH</b>

# Ladder Diagram



REV. 1.000	DATE: 03-13-08	BY: JF	SCALE: 5/8" = 1"
REV. 1.000	DATE: 03-13-08	BY: JF	SCALE: 5/8" = 1"
<b>GRAIN SYSTEMS INC</b> 105 MARSHALL DR., NORTON, IL 62448 TITLE: Touch Screen Driver GENERAL CIRCUIT MFG. BY: TOUCH SCREEN DRIVER DATE: 03-13-08 SHEET: 5 OF 7 NONE			

Ladder Diagram (Continued)

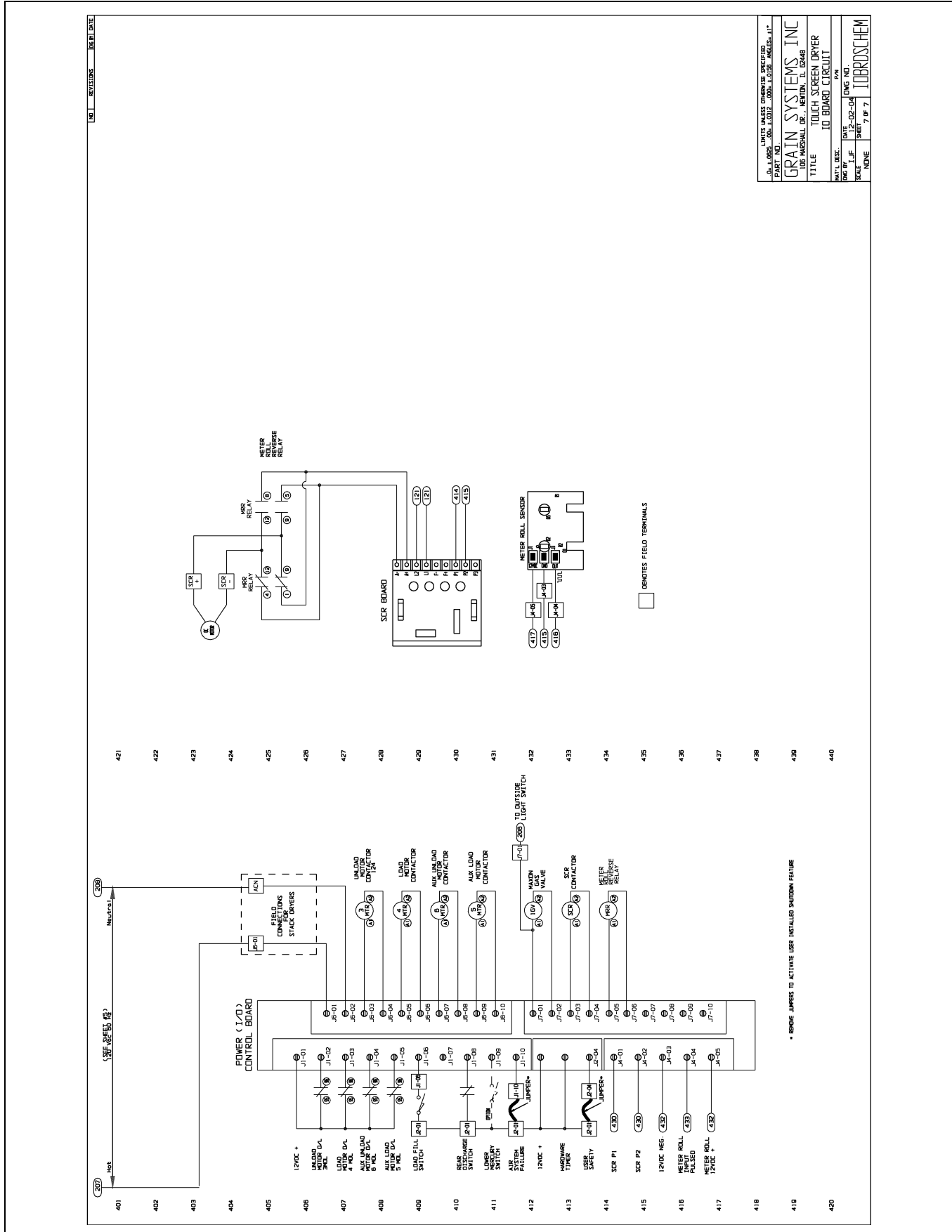


NO. REVISED		DATE
...LIMITS UNLESS OTHERWISE SPECIFIED		
DRYER NO.	001, 1, 0312	ANGEL, A
<b>GRAIN SYSTEMS, INC.</b>		
105 MARSHALL DR., NORTON, IL 62448		
TITLE		
BURNER CIRCUIT WITH FENVAL BOARD		
INT'L. SPEC.	12-22-06	INC. NO.
DRW BY: J.E.		P/W
SCALE	SHEET	OF
NONE	8 OF 7	11CFANSICHEM

□ CONTROL TERMINAL



# Ladder Diagram (Continued)



LIMIT UNLESS OTHERWISE SPECIFIED.	
PART NO.	0001-1038-1000-11
GRAIN SYSTEMS INC	
101 WINDMILL DR., HEWLETT, IL 60069	
TITLE	
TOUCH SCREEN DRYER	
TO BOARD CIRCUIT	
REV.	DATE
1	12-02-04
DESIGNED BY	DWG NO.
NONE	7 P 7
T08R0SCHEM	

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# NOTES

## Limited Warranty — N.A. Grain Products

The GSI Group, LLC. ("GSI") warrants products which it manufactures, to be free of defects in materials and workmanship under normal usage and conditions for a period of 12 months from the date of shipment (or, if shipped by vessel, 14 months from the date of arrival at the port of discharge). If, in GSI's sole judgment, a product is found to have a defect in materials and/or workmanship, GSI will, at its own option and expense, repair or replace the product or refund the purchase price. This Limited Warranty is subject to extension and other terms as set forth below.

**Warranty Enhancements:** The warranty period for the following products is enhanced as shown below and is in lieu of (and not in addition to) the above stated warranty period. (Warranty Period is from date of shipment.)

	Product	Warranty Period
<b>Storage</b>	Grain Bin Structural Design • Sidewall, roof, doors, platforms and walkarounds • Flooring (when installed using GSI specified floor support system for that floor) • Hopper tanks (BFT, GHT, NCHT, and FCHT)	5 Years
<b>Conditioning</b>	Dryer Structural Design – (Tower, Portable and TopDry) • Includes (frame, portable dryer screens, ladders, access doors and platforms)	5 Years
	All other Dryer parts including: • Electrical (controls, sensors, switches and internal wiring)	2 Years
	All Non-PTO Driven Centrifugal and Axial Fans	3 Years
	Bullseye Controllers	2 Years
<b>Material Handling</b>	Bucket Elevators Structural Design	5 Years
	Towers Structural Design	5 Years
	Catwalks Structural Design	5 Years
	Accessories (stairs, ladders and platforms) Structural Design	5 Years

### Conditions and Limitations:

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY DESCRIPTION SET FORTH HEREIN; SPECIFICALLY, GSI DISCLAIMS ANY AND ALL OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE IN CONNECTION WITH: (I) ANY 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.

The sole and exclusive remedy for any claimant is set forth in this Limited Warranty and shall not exceed the amount paid for the product purchased. This Warranty only covers the value of the warranted parts and equipment, and does not cover labor charges for removing or installing defective parts, shipping charges with respect to such parts, any applicable sales or other taxes, or any other charges or expenses not specified in this Warranty. GSI shall not be liable for any other direct, indirect, incidental or consequential damages, including, without limitation, loss of anticipated profits or benefits. Expenses incurred by or on behalf of a claimant without prior written authorization from the GSI warranty department shall not be reimbursed. This warranty is not transferable and applies only to the original end-user. GSI shall have no obligation or responsibility for any representations or warranties made by or on behalf of any dealer, agent or distributor. Prior to installation, the end-user bears all responsibility to comply with federal, state and local codes which apply to the location and installation of the products.

This Limited Warranty extends solely to products sold by GSI and does not cover any parts, components or materials used in conjunction with the product, that are not sold by GSI. GSI assumes no responsibility for claims resulting from construction defects, unauthorized modifications, corrosion or other cosmetic issues caused by storage, application or environmental conditions. Modifications to products not specifically delineated in the manual accompanying the product at initial sale will void all warranties. This Limited Warranty shall not extend to products or parts which have been damaged by negligent use, misuse, alteration, accident or which have been improperly/inadequately maintained.

#### Notice Procedure:

In order to make a valid warranty claim a written notice of the claim must be submitted, using the RMA form, within 60 days of discovery of a warrantable nonconformance. The RMA form is found on the OneGSI portal.

#### Service Parts:

GSI warrants, subject to all other conditions described in this Warranty, Service Parts which it manufactures for a period of 12 months from the date of purchase unless specified in Enhancements above.

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



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Fax: 1-217-226-4420  
[www.gsiag.com](http://www.gsiag.com)**



**GSI is a worldwide brand of AGCO Corporation.**