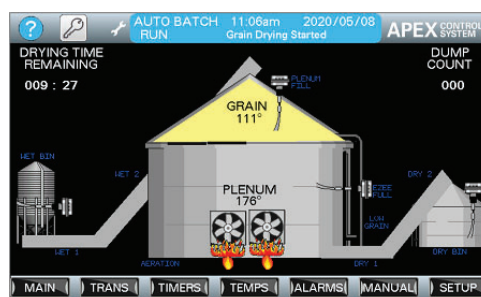
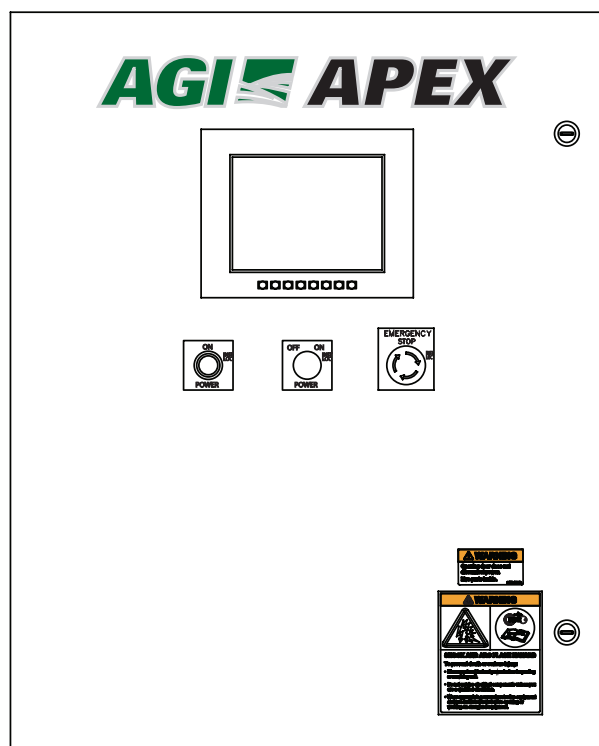




# EasyDry®

## EasyDry® Apex Controls Operation Manual



Read this manual before using product. Failure to follow instructions and safety precautions can result in serious injury, death, or property damage. Keep manual for future reference.

Part Number: 250054 R2

Revised: May 7, 2021

Original Instructions

This product has been designed and manufactured to meet general engineering standards. Other local regulations may apply and must be followed by the operator. All personnel must be trained in the correct operational and safety procedures for this product. Use the sign-off sheet below to record initial and periodic reviews of this manual with all personnel.

[illegible]

**New in this Manual**

The following changes have been made in this revision of the manual:

Description	Section
Minor corrections were made.	Multiple sections.





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# 1. Introduction

Thank you for your purchase. Follow the instructions in this manual for safe use of this bin dryer controls. Following proper operation and maintenance will help to keep the bin dryer controls running in optimal condition.

Keep this manual handy for frequent reference and to review with new personnel. A sign-off form is provided on the inside front cover for your convenience. If any information in this manual is not understood or if you need additional information, please contact AGI or your representative for assistance.

This manual should be regarded as part of the equipment.

## 1.1. Intended Use

---

The bin dryer controls is intended for use as listed below and described throughout this manual. Use in any other way is considered contrary to the intended use and is not covered by the warranty.

### **Intended use for the bin dryer controls:**

- Designed for automatic control of dryer components such as fans, burners, fill and unload equipment.

## 1.2. Read All bin dryer controls Manuals

---

### **WARNING**

- Dryer bin and Apex Controls owners, installers, and maintenance must read all dryer bin and Apex Controls installation manuals pertaining to this equipment before starting dryer bin and Apex Controls assembly or maintenance work.
- Dryer bin and Apex Controls owners, operators, and users must read all dryer bin and Apex Controls operation manuals before operating or using the dryer bin or Apex Controls.

# 2. Safety


## 2.1. Safety Alert Symbol and Signal Words


---





This safety alert symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury or death, carefully read the message that follows, and inform others.

**Signal Words:** Note the use of the signal words **DANGER**, **WARNING**, **CAUTION**, and **NOTICE** with the safety messages. The appropriate signal word for each message has been selected using the definitions below as a guideline.

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

 **WARNING** Indicates a hazardous situation that, if not avoided, could result in serious injury or death.

 **CAUTION** Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.

 **NOTICE** Indicates a potentially hazardous situation that, if not avoided, may result in property damage.

## 2.2. Follow Safety Instructions

---

Read and understand all safety instructions, safety decals, and manuals and follow them when operating or maintaining the equipment.

- Owners must give instructions and review the information initially and annually with all personnel before allowing them in the work area. Untrained users/operators expose themselves and bystanders to possible serious injury or death.
- Use for intended purposes only.
- Do not modify the bin dryer controls in any way without written permission from the manufacturer and is not covered by the warranty.
- Follow a health and safety program for your worksite. Contact your local occupational health and safety organization for information.
- Follow applicable local codes and regulations.



# 3. Features

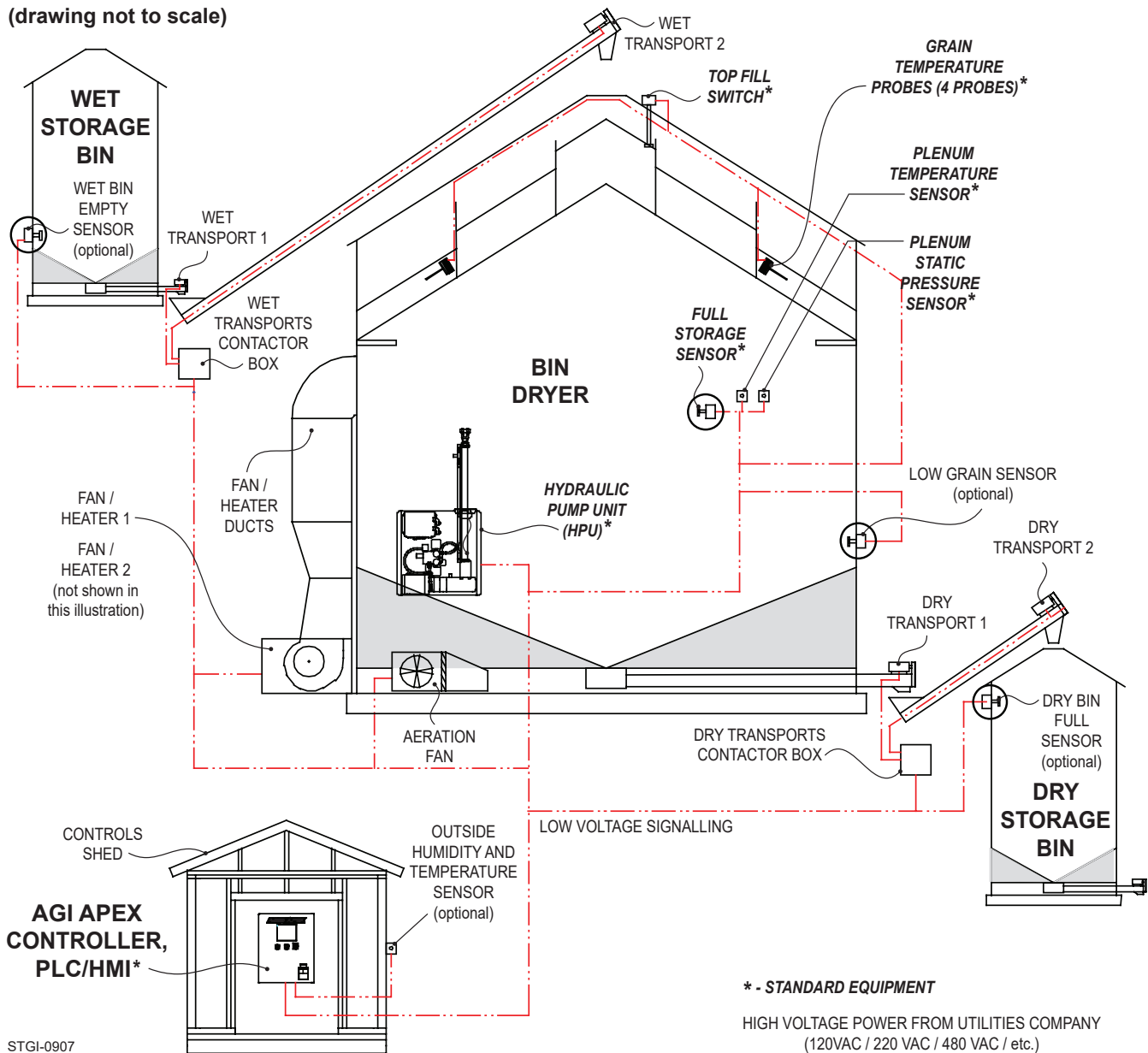
This section covers the main features of the bin dryer controls.

bin dryer controls Control Systems are built for use in either Continuous Flow Drying or Batch Drying.

## 3.1. Bin Dryer Control Systems and Sensors Overview Drawing

Figure 1. bin dryer controls Dryer Bin Example System Layout

(drawing not to scale)



## 3.2. Batch Drying

---

**Batch Drying** (Auto or Manual Mode) is used for relatively small or intermittent volumes of grain.

- A single batch of grain is loaded into the bin dryer controls Bin drying chamber located in the upper part of the bin.
- Fans and heaters force hot air through an even layer of wet grain in the drying chamber.
- When a batch of grain is dried to a specified temperature, fans and heaters stop operating.
- Dump chutes are opened either manually or automatically to allow the hot dried batch of grain to fall into the bin dryer controls Bin cooling dry grain area.
- The drying chamber is refilled with grain manually or automatically to begin drying the next batch.

**Note**

An bin dryer controls Batch Drying System can be upgraded to a Continuous Flow Drying System.

## 3.3. Continuous Flow Drying

---

Continuous Flow **Auto Mode Drying** provides 24-hour continuous and automatic operation. An electric motor with hydraulic cylinder is controlled by temperature sensors in the grain column to automatically open and close dump chutes. Continuous Flow system sensors monitor grain levels to help you keep the bin dryer controls operating continuously.

- A steady supply of grain is continuously dumped into the drying chamber located in the upper part of the bin.
- Fans and heaters force hot air through layers of grain in varying depths in the drying chamber.
- When the grain is dried to a specified temperature, dump chutes open to let a set amount of hot dried grain fall into the cooling dry grain area of the bin.
- The drying chamber is automatically refilled and the process continues until there is no more wet grain to supply.

# 4. Operation



Before continuing, ensure you have completely read and understood this manual's Safety section, in addition to the safety information in the section(s) below.

## 4.1. Operation Safety

---

### **WARNING**

- Ensure appropriate safety accessories are installed. Selection and use of safety accessories for the specific installation is the responsibility of the customer.
- Ensure maintenance has been performed and is up to date.
- Have another trained person nearby who can shut down the equipment in case of accident.
- Ensure that electrical cords are in good condition; replace if necessary.
- Ensure the heater is connected to the appropriate gas supply and the gas selector valve is properly set.
- The area around the heater should be kept clear and free from combustible materials and other flammable liquids.
- Ensure the fan inlet, outlet, bin floor ductwork and roof vents are not plugged with any foreign material.
- Do not operate the fan if there is excessive vibration or noise.
- Keep away from fan impeller/blade; high suction can pull a person toward the inlet. Contact with an unguarded impeller/blade will cause severe injury.
- Always operate with guards, covers, and shields in place.
- Always work safely around automated equipment. Such equipment can start automatically at any time.
- Keep away from rotating and moving parts.
- Never allow anyone to enter the grain bin when a fan and heater is operating. Gases given off by the burner (including carbon monoxide and carbon dioxide) could cause death.
- Keep the work area clear of bystanders.
- Keep the work area clean and free of debris.
- When heater is not in use, shut off gas valve on heater and at gas source.



## 4.2. EMERGENCY STOP Control

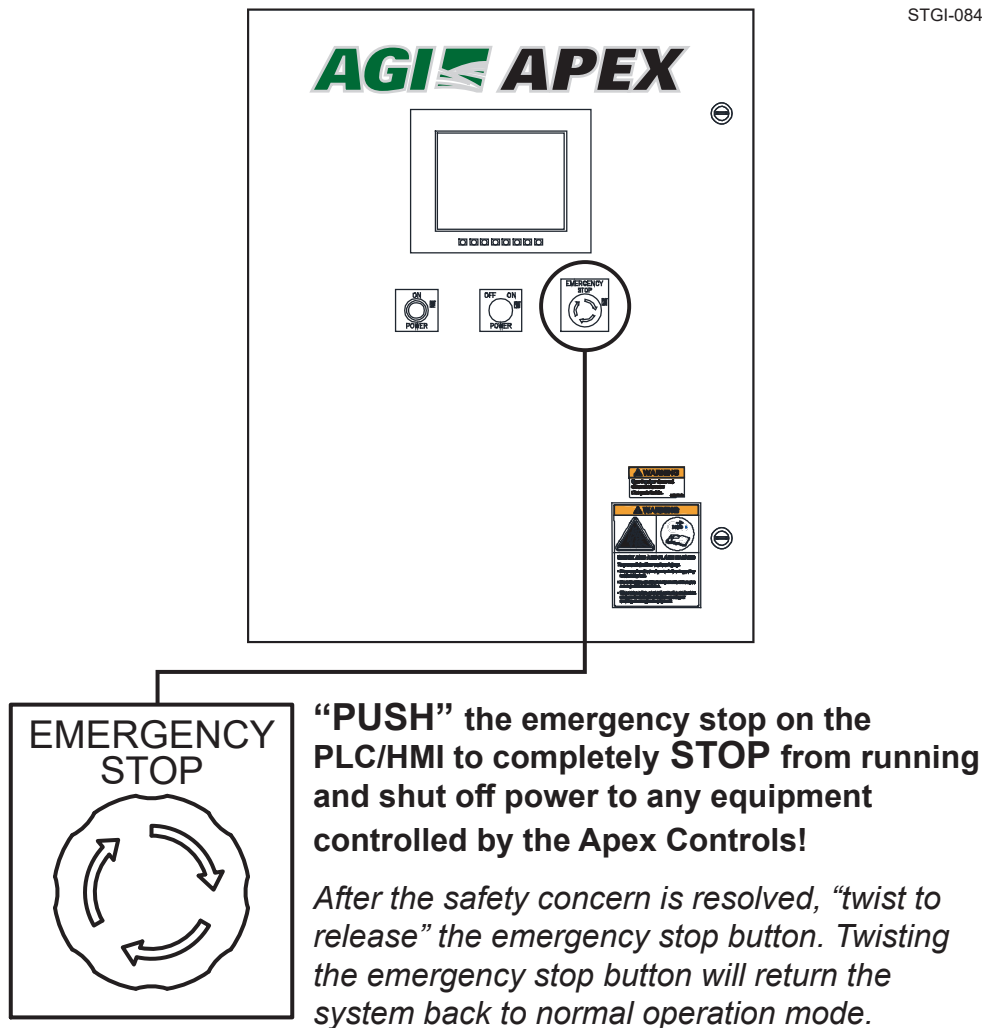
The EasyDry® Control System is equipped with an EMERGENCY STOP button that, when pushed, immediately initiates the EMERGENCY STOP sequence.

**WARNING** The equipment and power equipment connected to the EasyDry® Control System includes moving parts, rotating fans, extreme heat, and electrical power, all of which can cause death or injury when the appropriate safety procedures are not followed.

Activate the EMERGENCY STOP if necessary to limit or avert danger to persons or damage to equipment.

To activate the EMERGENCY STOP, push the emergency stop button on the PLC/HMI.

Figure 2. Emergency Stop Button Location

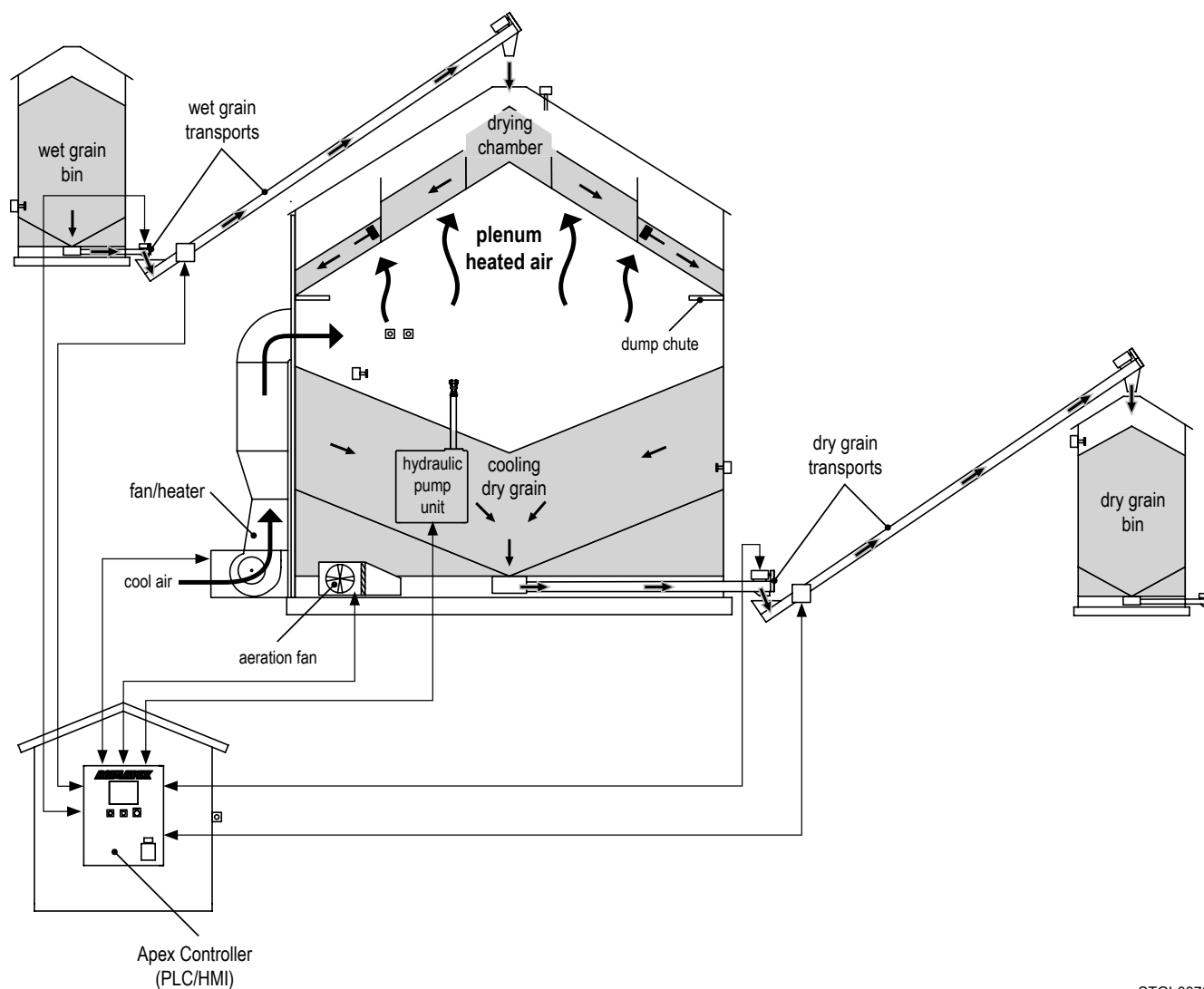


After the safety concern is resolved, reset the emergency stop by twisting the EMERGENCY STOP button. Twisting the button will return the system to normal operating mode.

### 4.3. Simplified System Operation Description

1. Operate the bin dryer controls Bin system power equipment using the Apex Controller (PLC/HMI).
2. Use the wet grain transports to unload the wet grain bin and fill the EasyDry® drying chamber.
3. Start the bin dryer controls Fan/Heaters and dry the grain in the drying chamber.
4. Run the hydraulic pump or operate the winch unit to control the EasyDry® drying chamber grain-flow (or exit-grain-flow) into the bin dryer controls lower cooling dry grain area.
5. Use the dry grain transports to unload the bin dryer controls Bin and fill the dry grain bin.

**Figure 3. Simplified bin dryer controls Operation Illustration**



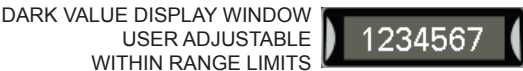
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## 4.4. HMI Buttons, Icons, and Features Identification

**Note**

In every case, buttons appear BLUE when turned On and appear BLACK when turned Off.

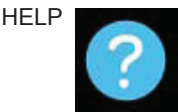
**Inactive Buttons, Switches, or Sensors**



**Active Buttons, Switches, or Sensors**



**Icon Identification**



**Menus**



## 4.5. The Human Machine Interface (HMI)

---

For EasyDry® Systems that use an AGI APEX Control System, the system will utilize a Human Machine Interface (HMI) to setup, operate, and monitor system operation. The HMI consists of a graphical, touch-sensitive display that allows the operator to access a variety of “screens”, each of which provides access to information and control of the system.

HMI screens include:

- MAIN
- STATUS
- TRANS (transports)
- TIMERS
- ADVANCED TIMERS 1
- ADVANCED TIMERS 2
- TEMPS
- TEMPERATURE LIMITS
- TEMPERATURE TREND GRAPHS
- STATIC PRESSURE TRENDS
- ALARMS
- ALARM HISTORY
- MANUAL
- SETUP
- ADVANCED SETUP
- RECIPES
- TECHNICIAN
- HELP MENU
- ALARM CODES
- SERVICE CONTACT (APEX CONTROL SYSTEM)

By tapping the appropriate on-screen “button”, display box, or other feature on the HMI’s touch-sensitive screen, the operator can open other screens, turn equipment On and Off, select boxes to enter values or change parameters, and perform other setup and control functions.

To operate any item of equipment in the system, tap the button (on the screen) for that equipment to turn it On. Tap the button for that equipment again to turn it Off.

The following pages provide information on each of these screens.

4.5.1 The Popup Keypad

During the setup and operation process alpha-numeric information must be entered into the HMI. An alpha-numeric keypad is displayed whenever a number or text field that requires input is selected.

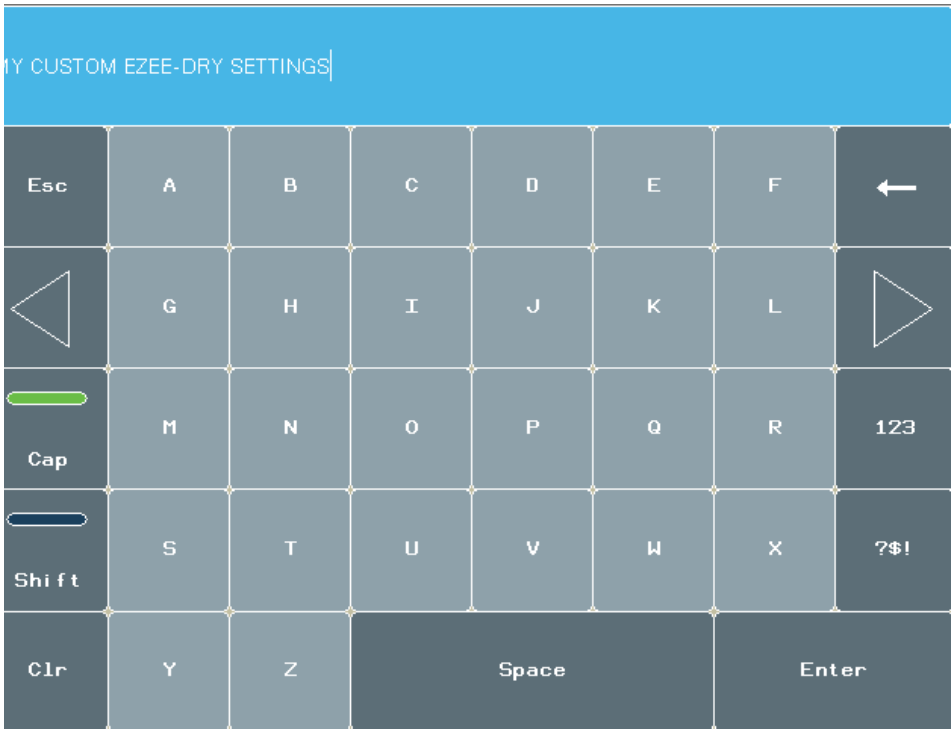
To use the keypad:

- 1. Select a field that requires text or numeric input.  
The alphabetic keypad appears.
- 2. Enter the text as required.
- 3. To enter a numeric value, tap the 123 button.  
The keypad changes to a numeric keypad.
- 4. To enter a symbol, tap the ?\$! button.  
The keypad changes to a symbol keypad.
- 5. After entering a value, tap ENTER to return to the previous screen.

**Note**

To exit the keypad tap the ESC (escape) button.

**Figure 4. The Popup Keypad**

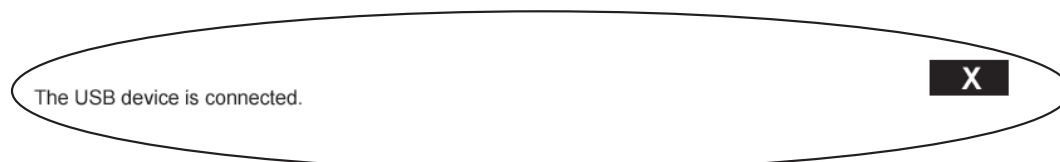


### 4.5.2 The MAIN Screen

The MAIN screen is the starting point for operation of the EasyDry® Apex Controls. From this screen the operator can select the type and mode of operation, START and STOP the system, monitor pressure, temperatures, remaining drying time, dump count and the operational status of the system. Pressing buttons on the menu bar across the bottom of the screen allows the operator to navigate to other screens to access additional information and setup/control functions.

When power is applied to the system after it has been off, the first screen to appear will be the MAIN screen. However, during the power on process the following notification may appear first

**Figure 5. “The USB Device is Connected” Notification**



1. Tap the X icon to clear this message.

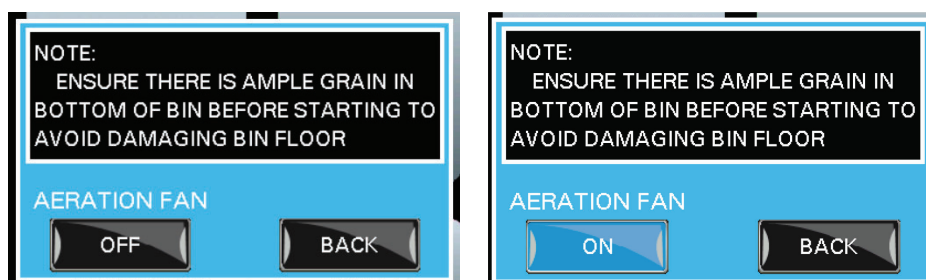
The MAIN screen should appear.

**Figure 6. The MAIN Screen**



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**Figure 7. Main Screen Aeration Fan On/Off Flyout**



STGI-0929

**Table 1. MAIN Screen Options and Descriptions**

Cal- lout #	Item	Description
1	BATCH	Tapping this button selects BATCH operation. To operate the unit in BATCH mode, first tap AUTO, and then tap BATCH.
2	AUTO	Tapping this button selects Auto Mode of operation. Selecting AUTO will immediately switch the system out of Manual Mode, and the MANUAL button will become deselected.
3	START	Tapping this button Starts the dryer.
4	STOP	Tapping this button Stops the dryer.
5	RUN STATUS	This indicator is lit when the system is running.
6	STATIC PRESSURE	This indicator displays the STATIC PRESSURE measured by a system pressure sensor.
7	PLENUM TEMP	This indicator displays the temperature of the plenum as measured by the plenum temperature sensor.
8	GRAIN TEMP	This indicator displays the temperature of the grain as measured by the grain temperature sensors.
9	DRYING TIME REMAINING	This indicator displays the calculated DRYING TIME REMAINING in the current operation.
10	DUMP COUNT	This displays the current number of dumps. To reset this numeric value, tap this counter display. A popup window will be displayed asking if you want to reset the dump counter. Tap YES on the popup window to complete the reset operation.
11	AERATION FAN	Tapping this button turns ON or OFF the AERATION FAN. Ensure there is grain covering the bin floor to prevent possible damage to the bin floor.
12	SHUT- DOWN AFTER NEXT BATCH	This feature is only usable in Auto Batch Mode. Tapping this button once will turn this feature ON. When this feature is on it will cause the equipment to shut down after the current batch is completely dried and dumped.
13	STATUS	Tapping this button takes you to the STATUS screen.
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

### 4.5.3 *The STATUS Screen*

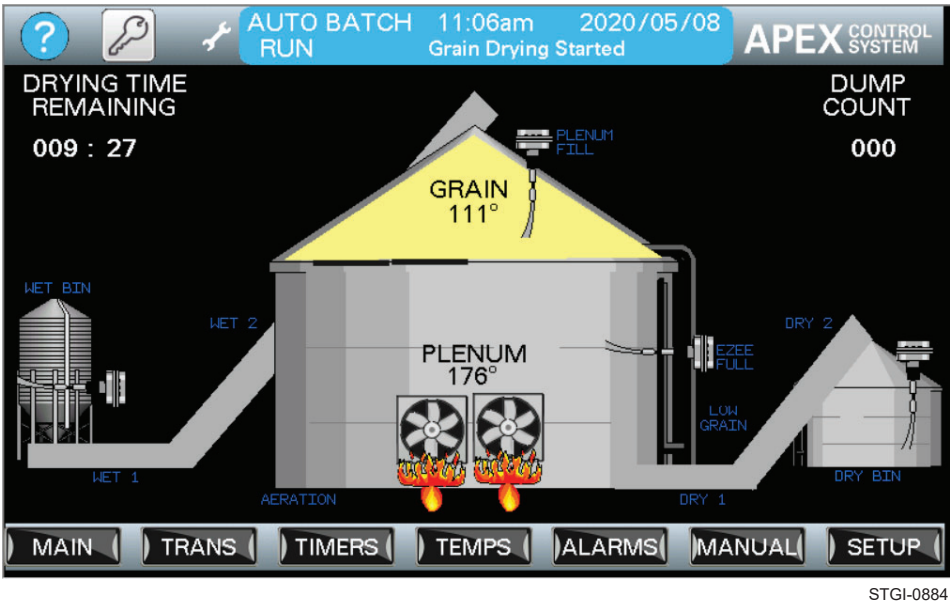
The STATUS screen provides multiple points of continuously updated information on a graphical display representing your system.

More specifically, the STATUS screen:

- Shows you where the grain is at within the system.
- Shows you when the transports are running.
- Shows the current GRAIN and PLENUM temperatures and the DRYING TIME REMAINING.
- Indicates if the drying chamber and the bottom of the bin are full or empty.
- Indicates if the fan/heaters are running or shut off.

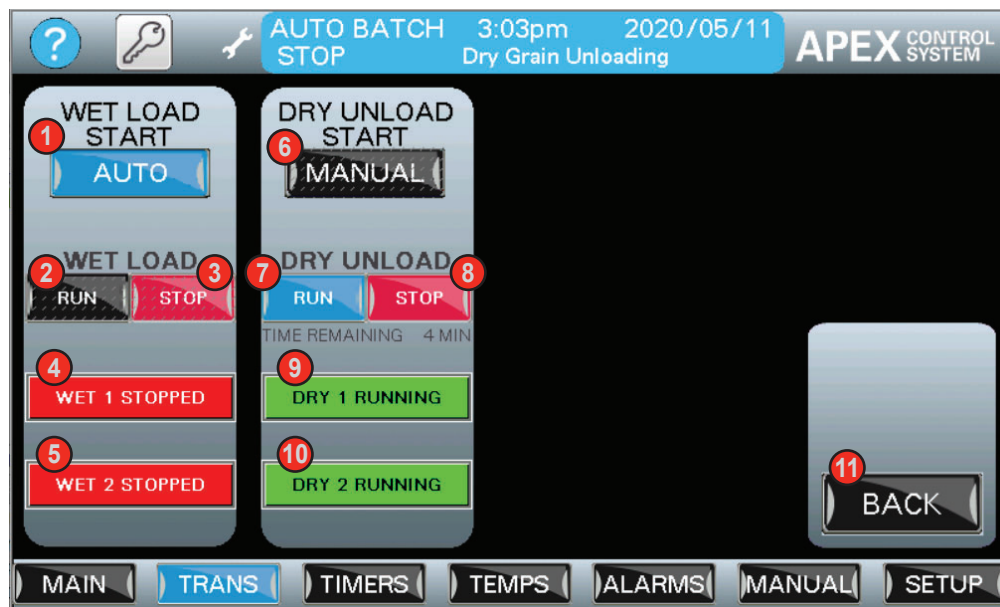


Figure 8. The STATUS Screen



### 4.5.4 The TRANSPORTS Screen

Figure 9. The TRANSPORTS Screen



STGI-0889

Table 2. The TRANSPORTS screen options and descriptions

Callout #	Item	Description
1	WET LOAD START	<p>This button toggles between WET LOAD START Auto Mode and Manual Mode.</p> <p>In manual wet load mode, the wet load RUN button must be pressed to start the transports. After the plenum is full, the wet transports shut off. The wet load RUN button must be pressed again to start the wet transports to start plenum refill.</p> <p>In auto wet load mode, after the plenum is full, the wet transports shut off. Wet transports will start automatically when the grain level is low. For Continuous Flow and Auto Batch operation the wet transports must be in Auto Mode.</p>
2	WET LOAD RUN	The wet load RUN button only works in Manual Mode. Press this button to run whichever wet transports are selected.
3	WET LOAD STOP	The wet load STOP button will stop all wet transports. Wet transports will obey the stop delay timers.
4	WET 1 indicator	This indicator will either indicate the wet 1 transport is stopped or is running.
5	WET 2 indicator	This indicator will either indicate the wet 2 transport is stopped or is running.
6	DRY UNLOAD START	<p>This button toggles between dry transports Auto Mode and Manual Mode.</p> <p>In Manual Mode, when the full storage sensor is tripped it will shut down the system equipment. Dry transports ONLY start when manually turned on. Dry transports will start when</p>

**Table 2 The TRANSPORTS screen options and descriptions (continued)**

Callout #	Item	Description
		<p>the dry unload button is pressed. They will then run for the length of time in the DRY TRANSPORT RUN TIME (which is set in the TIMERS screen).</p> <p>In Auto Mode, when the full storage sensor is tripped, the dry unload equipment will start running. They will then run for the length of time in the DRY TRANSPORT RUN TIME (which is set in the TIMERS screen) or until the dry bin full storage sensor is tripped. A dry bin full storage sensor is required to run Auto Mode.</p>
7	DRY UNLOAD RUN	The dry unload RUN button only works in Manual Mode. Press this button to run whichever dry transports are selected.
8	DRY UNLOAD STOP	The dry unload STOP button will stop all dry transports. Dry transports will obey the stop delay timers.
9	DRY 1 indicator	This indicator will either indicate the dry 1 transport is stopped or is running.
10	DRY 2 indicator	This indicator will either indicate the dry 2 transport is stopped or is running.
11	BACK button	Tap this button to return to the previous screen.
<p>Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.</p>		

### 4.5.5 The TIMERS Screen

On the timers screen you can set up the drying time, the length of time the dump chutes are lowered, and other important timer settings. From this screen, you can also access the Advance Timers 1 and 2 screens.

**Figure 10. The TIMERS Screen**



STGI-0879

**Table 3. TIMERS Screen Options and Descriptions**

Callout #	Item	Description
1	DRYING TIME	<p>This value determines the length of time the system will dry the grain (the time from when the heater fan(s) turn on until the timer expires). This timer works in tandem with the GRAIN TEMP SETPOINT (found on the TEMP LIMITS screen). The DRYING TIME must end AND the GRAIN TEMP SETPOINT must be reached before the dump chutes will start to lower.</p> <p>Set the DRYING TIME to a value that will ensure the grain is dried adequately.</p> <p>If the grain is too wet, increase the DRYING TIME; if it is too dry, decrease the DRYING TIME. Set this field per recommendation or user experimentation. Drying time is based on the grain type, grain and air temperatures, fan/heater settings, humidity, and customer experience.</p>
2	Drying Time RESET	<p>If you enter a new DRYING TIME value while the drier is running, you must tap this RESET button to make the new value active.</p>
3	DUMP CHUTES LOWERED TIME	<p>This is the time the chutes are in the lowered position.</p> <p>For BATCH use, this is the time required for the plenum to fully unload.</p> <p>For Continuous Flow use, this is the time required for 1/3 of the plenum grain to unload. The default time for this timer is 30 seconds. Increase or decrease the CHUTES LOWERED time in order to achieve the desired amount of grain unloaded from the plenum (typically 1/3 of the plenum grain).</p>

**Table 3 TIMERS Screen Options and Descriptions (continued)**

Callout #	Item	Description
4	OUT OF WET GRAIN TIMER	<p>This timer starts when the wet transport 2 starts. It ends when either the plenum is full, or when this timer expires. If this timer expires before the plenum full sensor is tripped, an alarm will be triggered and the system equipment will shut down.</p> <p>This timer is used to notify the operator of a potential clog in the wet grain supply, when the wet bin is empty, when no wet bin sensor is installed. and/or to prevent excessive wear on the wet loading equipment. The time should be set 1 to 2 minutes longer than it normally takes to fill the completely empty plenum.</p>
5	FINAL LOAD DRYING TIME	If the system includes a WET BIN EMPTY sensor, this timer sets a drying time for the last load of grain to enter the plenum during a drying cycle. The last load of grain will normally not fill the plenum, so this shorter drying cycle is used for drying the last batch of grain.
6	DRY TRANSPORT RUN TIME	When this timer has finished running the dry transports shut off. The dry bin full sensor and the EasyDry® low grain sensor also have the ability to shut off the dry transports. These two sensors take priority over the DRY TRANSPORT RUN TIME timer and will shut off the dry transports even if the timer is not finished running.
7	BATCH SHRINK REFILL TIME, time value	<p>This is a timer. The value set for this timer will be the time allowed for the wet transports to refill the drying chamber when the grain shrinks below the fill switch during BATCH Mode.</p> <p>This keeps the drying chamber full and it also helps prevent wet grain from being dumped when the batch is being dumped.</p> <p>Set the value for this timer to be approximately one half the total drying time.</p>
8	RESET, BATCH SHRINK REFILL	If you enter a new BATCH SHRINK REFILL TIME value while the drier is running, you must tap this RESET button to make the new value active.
9	ON/OFF, BATCH SHRINK REFILL	This button turns ON/OFF the BATCH SHRINK REFILL TIME.
10	BATCH COOL TIME	This timer turns the burners off but continues to run the fans allowing the grain batch to cool in the drying chamber until the timer is done and the grain batch is dumped.
11	ON/OFF, BATCH COOL TIME	This button turns ON/OFF the BATCH COOL TIME.
12	FAN TIME	This is the total amount of master drying fan machine hours. Only a trained technician may reset this value. (If there are 2 drying fans, only the machine hours for the master fan are recorded here.)
13	BURNER TIME	This is the total amount of master burner machine hours. Only a trained technician may reset this value. (If there are 2 burners, only the machine hours for the master burner are recorded here.)
14	RECIPES	Tap this button to open the RECIPES screen.
15	ADVANCED TIMERS 1	Tap this button to open the ADVANCED TIMERS 1 screen.
16	ADVANCED TIMERS 2	Tap this button to open the ADVANCED TIMERS 2 screen.

### 4.5.6 The ADVANCED TIMERS 1 Screen

On the ADVANCED TIMERS 1 screen you can set time delays that ensure the system operates safely, and prevents high startup current surges, and start & stop equipment in a manner that ensures effective drying.

To open the ADVANCED TIMERS 1 screen:

1. At the bottom of any screen, tap TIMERS to open the TIMERS screen.
2. On the TIMERS screen, tap ADVANCED TIMERS 1 to open the ADVANCED TIMERS 1 screen.

**Note**

If you are on the ADVANCED TIMERS 2 screen, tap ADVANCED TIMERS 1 to open the ADVANCED TIMERS 1 screen.

**Figure 11. The ADVANCED TIMERS 1 Screen**



STGI-0881

**Table 4. ADVANCED TIMERS 1 Screen Options and Descriptions**

Callout #	Item	Description
1	TRANSPORTS SAFETY TIME	This is the time allotment for the transports to start after the transports are signaled to start. If the transports do not start running in this allotted time the equipment is shut off and an alarm is displayed on the HMI. The purpose of this is to protect the transport equipment from damage.
2	FANS SAFETY TIME	This is the time allotment for the fans to start after the fans are signaled to start. If the fans do not start running in this allotted time the equipment is shut off and an alarm is displayed on the HMI. The purpose of this is to protect the equipment from damage.
3	WET 1 START DELAY	This delay occurs before each wet transport starts. It helps prevent multiple pieces of power equipment from starting at the same time, which could cause an excessive current draw on the system.
4	WET 1 STOP DELAY	This delay is set up to stop the wet transport 1 before wet transport 2 is stopped. This delay, and the WET 2 STOP DELAY, allow topping off the plenum grain above the plenum full sensor. These delays allow for plenum fill adjustment without relocating the full grain sensor.

**Table 4 ADVANCED TIMERS 1 Screen Options and Descriptions (continued)**

Callout #	Item	Description
5	WET 2 START DELAY	This delay occurs before each wet transport starts. It helps prevent multiple pieces of power equipment from starting at the same time, which could cause an excessive current draw on the system.
6	WET 2 STOP DELAY	This delay is set up to stop the wet transport 2 when this timer is finished running. It allows the wet transport 2 to clear out before stopping.  This delay, and the WET 1 STOP DELAY, allow topping off the plenum grain above the plenum full sensor. These delays allow for plenum fill adjustment without relocating the full grain sensor.
7	DRY 1 START DELAY	This delay occurs before each dry transport starts. It helps prevent multiple pieces of power equipment from starting at the same time, which could cause an excessive current draw on the system.
8	DRY 1 STOP DELAY	This delay allows the dry transport to continue running for an additional allotted time before stopping.
9	DRY 2 START DELAY	This delay occurs before each dry transport starts. It helps prevent multiple pieces of power equipment from starting at the same time, which could cause an excessive current draw on the system.
10	DRY 2 STOP DELAY	This delay allows the dry transport 2 to clear out before stopping.
11	RECIPES	Tapping this button opens the Recipes screen.
12	ADVANCED TIMERS 2	Tap this button to navigate to the ADVANCED TIMERS 2 screen.
13	BACK	Tap this button to return to the previous screen.
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

**Note**

When a condition of any safety timer (such as the TRANSPORTS SAFETY TIME) is not met within the timer allotted time, an alarm will be triggered.

**Note**

Stop delays allow equipment to continue running for the delay time allotted after the stop is sent.

### 4.5.7 The ADVANCED TIMERS 2 Screen

On the ADVANCED TIMERS 2 screen you can set time delays that ensure the system operates safely, and prevents high startup current surges, and start & stop equipment in a manner that ensures effective drying.

To open the ADVANCED TIMERS 2 screen:

1. At the bottom of any screen, tap TIMERS to open the TIMERS screen.
2. On the TIMERS screen, tap ADVANCED TIMERS 2 to open the ADVANCED TIMERS 2 screen.

**Note**

If you are on the ADVANCED TIMERS 1 screen, tap ADVANCED TIMERS 2 to open the ADVANCED TIMERS 2 screen.

**Figure 12. The ADVANCED TIMERS 2 Screen**



STGI-0882



**Table 5. ADVANCED TIMERS 2 Screen Options and Descriptions**

Callout #	Item	Description
1	MASTER FAN 1 START DELAY	This is the time allotted before fan 1 will attempt to start. Set this delay differently than the delay for other fans to prevent multiple pieces of equipment from starting at once, causing too much current draw on the system.
2	SLAVE FAN 2 START DELAY	This is the time allotted before fan 2 will attempt to start. Set this delay differently than the delay for other fans to prevent multiple pieces of equipment from starting at once, causing too much current draw on the system.
3	FANS STOP DELAY	This is the time allotted before drier fans will shut off. This timer allows for any excess gas to burn off.
4	BURNERS START DELAY	This is the delay time from when fans are started until gas is turned on. It allows the fans to come up to full speed and the static pressure to reach proper levels before starting the burners.
5	BURNERS LOW SAFETY TIME	This delay is a safety timer that allows the heater controller to go through its startup, purge, and ignition sequence. If this timer expires before the burner is started, an alarm is set.
6	BURNERS HIGH SAFETY TIME	This safety time occurs after the signal is sent to turn the burners to HIGH. If the HIGH valve does not turn on within this allotted safety time, an alarm message is triggered and the EasyDry® system equipment will shut down.
7	AIR SWITCH SAFETY TIME	This safety time occurs after the fan starter(s) are engaged and power is sent to the burner control box. If the Air Switch does not close within this allotted safety time, an alarm message is triggered and the EasyDry® system equipment will shut down.
8	RECIPES	Tapping this button opens the Recipes screen.
9	ADVANCED TIMERS 1	Tap this button to open the ADVANCED TIMERS 1 screen.
10	BACK	Tap this button to return to the previous screen.
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

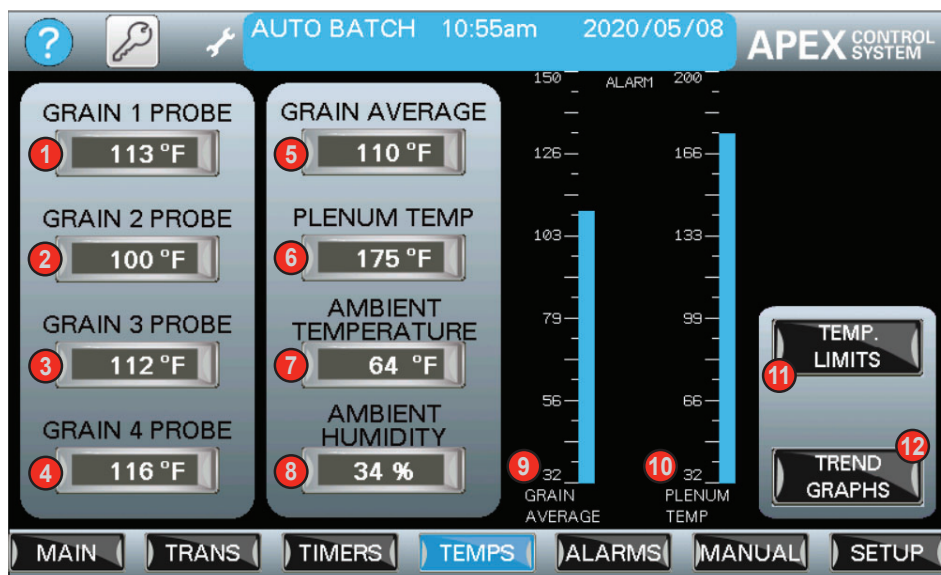
### 4.5.8 The TEMPS Screen

The TEMPS screen displays several temperature values, and one humidity value, as measured by several sensors in the system.

#### Note

To open the TEMPERATURE LIMITS or the TREND GRAPHS screens, you must open the TEMPS screen first, and select the appropriate button.

**Figure 13. The TEMPS Screen**



STGI-0888

**Table 6. TEMPS Screen Options and Descriptions**

Callout #	Item	Description
1	GRAIN 1 PROBE	This display indicates the temperature of GRAIN 1 PROBE (sensor).
2	GRAIN 2 PROBE	This display indicates the temperature of GRAIN 2 PROBE (sensor).
3	GRAIN 3 PROBE	This display indicates the temperature of GRAIN 3 PROBE (sensor).
4	GRAIN 4 PROBE	This display indicates the temperature of GRAIN 4 PROBE (sensor).
5	GRAIN AVERAGE	This indicates the average grain temperature averaged from the active grain temperature sensors.
6	PLENUM TEMP	This display shows a bar graph of the plenum temperature.
7	AMBIENT TEMPERATURE	This display indicates the ambient air temperature.
8	AMBIENT HUMIDITY	This display indicates the ambient air humidity.

**Table 6 TEMPS Screen Options and Descriptions (continued)**

Callout #	Item	Description
9	GRAIN AVERAGE GRAPH	This display shows a bar graph of the average grain temperature (which is an average of the four grain temperature sensors).
10	PLENUM TEMP	This display shows a bar graph of the plenum temperature.
11	TEMP LIMITS	Select to open the TEMPERATURE LIMITS screen.
12	TREND GRAPHS	Select to open the TEMPERATURE TRENDS GRAPHS screen.
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

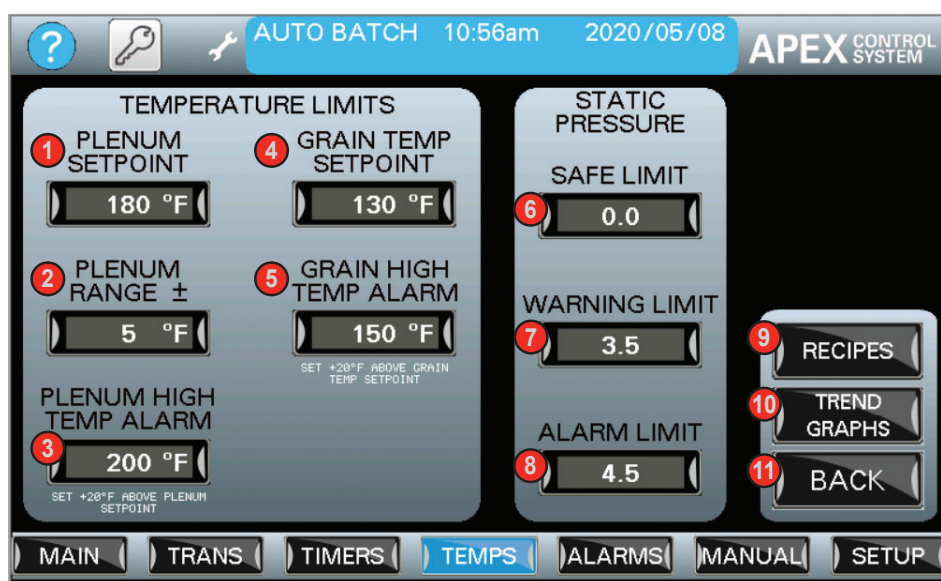
### 4.5.9 The TEMPERATURE LIMITS Screen

On the TEMPERATURE LIMITS screen you can set the TEMPERATURE LIMITS (alarm and shutdown) and STATIC PRESSURE limits.

To open the TEMPERATURE LIMITS screen:

1. At the bottom of any screen, tap TEMPS to open the TEMPS screen.
2. On the TEMPS screen, tap TEMP LIMITS to open the TEMPERATURE LIMITS screen.

**Figure 14. The TEMPERATURE LIMITS Screen**



STGI-0880

**Table 7. TEMPERATURE LIMITS Screen Options and Descriptions**

Callout #	Item	Description
1	PLENUM SETPOINT	This is the target temperature for the below-plenum-air.
2	PLENUM RANGE ±	This is the range (±) that the plenum temperature can vary without triggering the ON/OFF or HIGH/LOW switching of the heater. Set this to a value that prevents fans and heaters from constantly alternating between ON/OFF or HIGH/LOW. Minimum setting is 5°F (3°C).
3	PLENUM HIGH TEMP ALARM	This is the <u>plenum temperature</u> at which fans and heaters will automatically shut off. Typically set this to: PLENUM SETPOINT plus PLENUM RANGE ± plus at least 20°F (11°C). This setting is dependent on the grain type and is used to prevent grain damage or fire.
4	GRAIN TEMP SETPOINT	This is the target temperature for the grain in the plenum.
5	GRAIN HIGH TEMP ALARM	This is the <u>grain temperature</u> at which the fans and heaters will automatically shut off. Set this at least 20°F (11°C) higher than the GRAIN TEMP SETPOINT. This setting is dependent on the grain type and is used to prevent grain damage or fire.
6	SAFE LIMIT	This is the minimum level of STATIC PRESSURE required for the burners to start. This value must be exceeded for the heaters to fire. If this value is not reached then the system will alarm and shut down.

**Table 7 TEMPERATURE LIMITS Screen Options and Descriptions (continued)**

Callout #	Item	Description
7	WARNING LIMIT	This is a warning to the operator only. If the below-plenum air static pressure is too high, the HMI will trigger an alarm. The system operation will continue to function as normal. This limit indicates the plenum floor (screens) are becoming plugged and static pressure is getting too high, which will result in the grain not drying as intended.
8	ALARM LIMIT	This is the static pressure at which the fans and heaters are shut down. When this value is reached, the alarm is activated and the system shuts down.
9	RECIPES	Tap on this button to enter the RECIPES screen.
10	TREND GRAPHS	Tap this button to navigate to the TREND GRAPHS screen.
11	BACK	Tap this button to return to the previous screen.
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

**Note**

The GRAIN TEMP SETPOINT and the GRAIN HIGH TEMP ALARM are measured by the four grain temperature probes. These are used to prevent over-dried or damaged grain and to prevent a fire.

### 4.5.10 The Temperature Trends Graph Screen

The TEMPERATURE TREND GRAPHS screen provides a running graphical representation of system temperatures versus time. It can display in real time or allow review of recorded data. It provides insight into dryer performance over time.

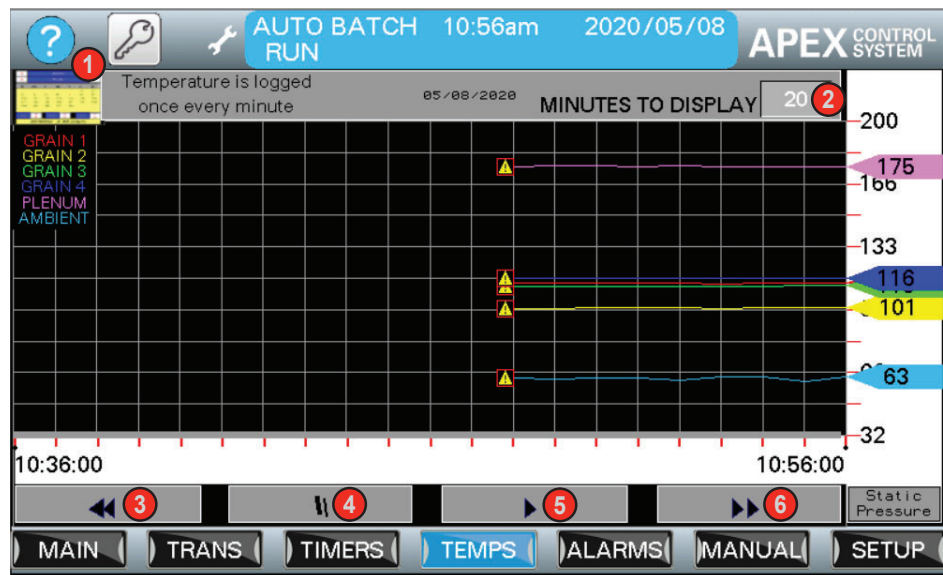
Data displayed on the TREND GRAPHS screen includes temperature readings from:

- GRAIN 1, 2, 3 and 4 sensors
- Plenum temperature
- Ambient temperature

To open the TREND GRAPHS screen:

1. At the bottom of any screen, tap TEMPS to open the TEMPS screen.
2. On the TEMPS screen, tap TEMPERATURE LIMITS to open the TEMPERATURE LIMITS screen.
3. On the TEMPERATURE LIMITS screen, tap TREND GRAPHS to open the TREND GRAPHS screen.

**Figure 15. The Temperature TREND GRAPHS Screen**



STGI-0885

**Table 8. TREND GRAPHS Screen Options and Descriptions**

Callout #	Item	Description
1	Calendar	This button will bring up a calendar that allows the user to select previous dates and view the temperatures from those times.
2	X-axis time base	Adjust this value to change how many minutes are displayed on the X-axis. This will allow the display on this screen of anywhere from a few minutes of temperature readings in one view, up to a few hours of temperature in one view.
3	Move Left	This button moves the graph to the left.
4	Freeze	This button “freezes” the graph in one position. It stops the graph motion.
5	Play	This button sets the graph in motion at the typical recording speed.

**Table 8 TREND GRAPHS Screen Options and Descriptions (continued)**

Callout #	Item	Description
6	Move Right	This button moves the graph to the right.
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

#### 4.5.11 The STATIC PRESSURE TRENDS Graph Screen

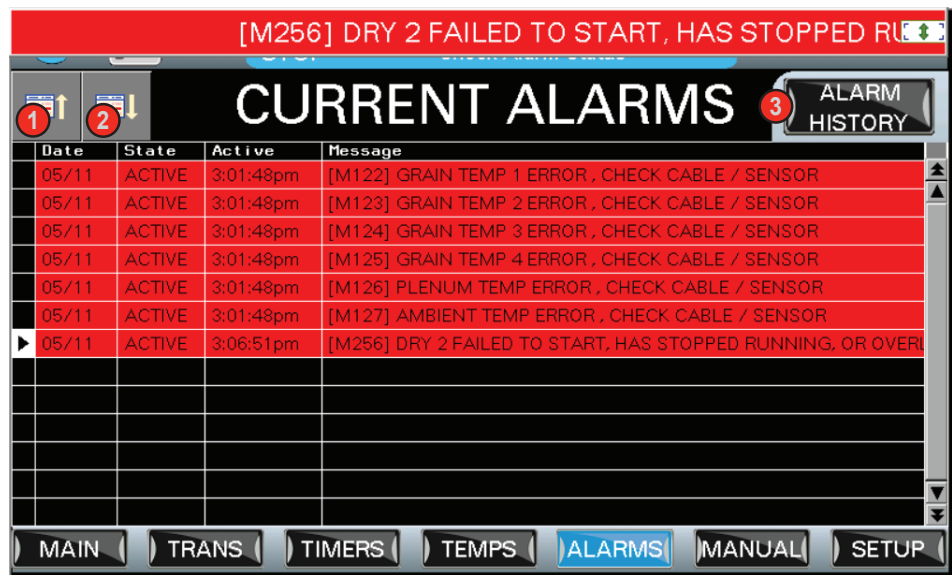
The STATIC PRESSURE TRENDS screen provides a running graphical representation of the static pressure versus time. It can display in real time or allow review of the recorded data. It provides insight into dryer performance over time.

**Figure 16. The STATIC PRESSURE TRENDS Graph Screen**

STGI-0890

4.5.12 The ALARMS Screen

The ALARMS screen displays a list of only the currently active alarms. (This screen is also referred to as the Current ALARMS screen.)



STGI-0918

Table 9. The Alarms Screen Options and Descriptions

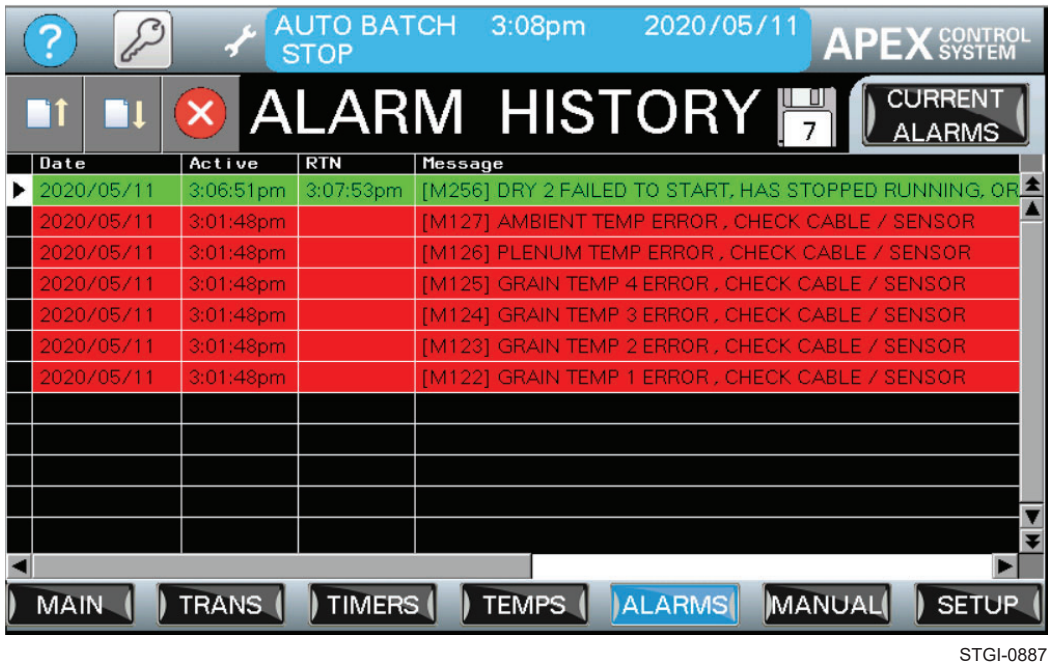
Callout #	Item	Description
1	Move Up	Press this button to scroll up towards the top of the current alarms list.
2	Move Down	Press this button to scroll down towards the bottom of the current alarms list.
3	ALARM HISTORY	Tap this button to open the ALARM HISTORY screen.
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		



4.5.13 The ALARM HISTORY Screen

The ALARM HISTORY screen records all system-detectable alarms and errors. Use this list of alarms and errors to determine and aid in resolving any operation problems that result in a system-detectable error or alarm.

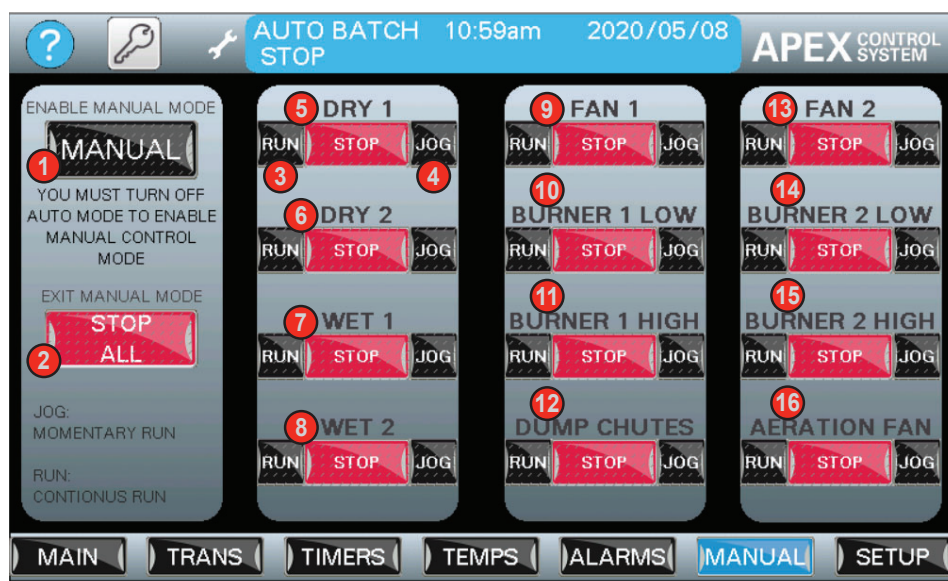
Figure 17. The ALARM HISTORY Screen



### 4.5.14 The MANUAL Screen

(for burners with HIGH/LOW control)

**Figure 18. The MANUAL Screen (for burners with HIGH/LOW control)**



STGI-0878

**Table 10. MANUAL Screen Options and Descriptions**

Callout #	Item	Description
1	MANUAL	Tapping this button toggles between Manual and Auto Modes of operation.
2	STOP ALL	Tapping this button stops all equipment controlled by the system.
3	RUN	Tapping the "RUN" button will continuously run the equipment until you tap the STOP button to turn it off.
4	JOG	Pressing the "JOG" button will cause the equipment to run only while you have the JOG button depressed.
5	DRY 1	These buttons run or jog the DRY 1 transport
6	DRY 2	These buttons run or jog the DRY 2 transport
7	WET 1	These buttons run or jog the DRY 1 transport
8	WET 2	These buttons run or jog the DRY 2 transport
9	FAN 1	These buttons run or jog FAN 1
10	BURNER 1 LOW	BURNER 1 LOW buttons are selected to turn this burner on and off. After the RUN button is pressed the burners low safety time (found on the advance timers 2 screen) will delay for 15 seconds before attempting to ignite the burner for 10 seconds. If the burner fails to ignite after 10 seconds, the unit will wait another 15 seconds before trying a second ignition attempt. If the burner fails to ignite after three attempts, you must reset the burner by tapping the STOP button. This will turn it off and reset the sequence. Selecting RUN again restarts the sequence of three more attempts to ignite. If ignition fails after the second series of attempts, see the troubleshooting section of this manual.

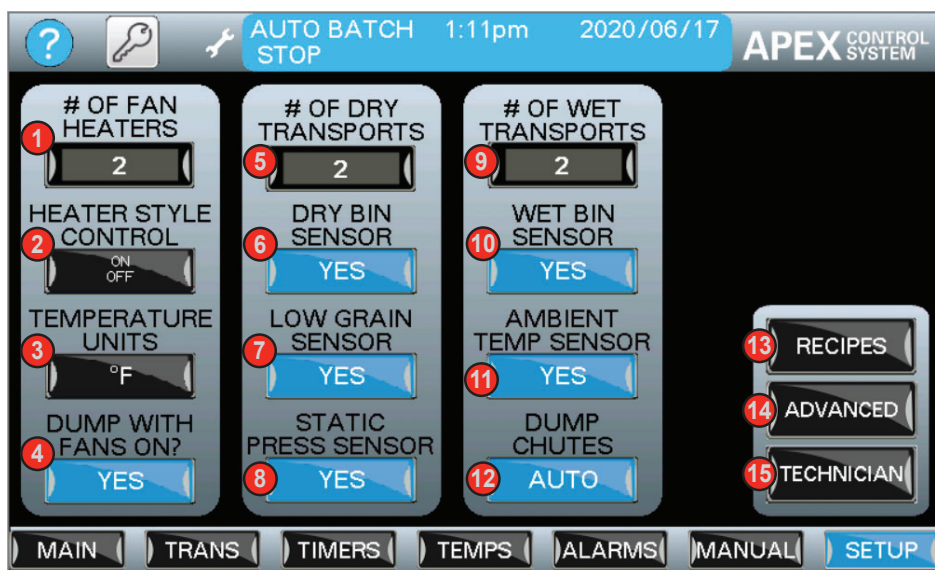
**Table 10 MANUAL Screen Options and Descriptions (continued)**

Callout #	Item	Description
11	BURNER 1 HIGH	Tapping the RUN button turns on BURNER 1 HIGH. After the burner ignites (on BURNER 1 LOW) continue to leave BURNER 1 LOW on, then tap BURNER 1 HIGH RUN to increase the flame to the HIGH FLAME setting. With both BURNER 1 LOW and BURNER 1 HIGH RUN selected at the same time, BURNER 1 will continue to operate at the BURNER 1 HIGH setting.
12	DUMP CHUTES	These buttons run or jog the DUMP CHUTES.
13	FAN 2	These buttons run or jog FAN 2
14	BURNER 2 LOW	BURNER 2 LOW buttons are selected to turn this burner on and off. After the RUN button is pressed the pre-purge timer will delay for 15 seconds before attempting to ignite the burner for 10 seconds. If the burner fails to ignite after 10 seconds, the unit will wait another 15 seconds before trying a second ignition attempt. If the burner fails to ignite after three attempts, you must reset the burner by tapping the STOP button. This will turn it off and reset the sequence. Selecting RUN again restarts the sequence of three more attempts to ignite. If ignition fails after the second series of attempts, see the troubleshooting section of this manual.
15	BURNER 2 HIGH	Tapping the RUN button turns on BURNER 2 HIGH. After the burner ignites (on BURNER 2 LOW) continue to leave BURNER 2 LOW on, then tap BURNER 2 HIGH RUN to increase the flame to the HIGH FLAME setting. With both BURNER 2 LOW and BURNER 2 HIGH RUN selected at the same time, BURNER 2 will continue to operate at the BURNER 2 HIGH setting.
16	AERATION FAN	These buttons run or jog the AERATION FAN
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

### 4.5.15 The SETUP Screen

On the SETUP screen you can configure the HMI with the equipment and sensors that you have in your system.

**Figure 19. The SETUP Screen**



STGI-0891

**Table 11. SETUP Screen Options and Descriptions**

Callout #	Item	Description
1	# OF FAN HEATERS	Enter the number of FAN/HEATER units installed (1 or 2)
2	HEATER STYLE CONTROL	This selection is based on the style of heater and heater controls the system is equipped with. The heater control style HIGH/LOW operates the heater using HIGH and LOW gas valves. The ON/OFF style operates the heater by turning the heater ON and OFF.
3	TEMPERATURE UNITS	Select the preferred temperature units (°F or °C)
4	DUMP WITH FANS ON?	Select NO for Continuous Flow Operation. Select YES for BATCH Operation.
5	# OF DRY TRANSPORTS	Select the number of dry transports (2, 1 or 0)
6	DRY BIN SENSOR	Select YES if the system includes a DRY BIN SENSOR.
7	LOW GRAIN SENSOR	Select YES if the system includes a LOW GRAIN SENSOR. After the EasyDry® is unloaded this sensor will shut off the dry transports.
8	STATIC PRESS(URE) SENSOR	Select YES if the system includes a STATIC PRESSURE SENSOR.
9	# OF WET TRANSPORTS	Select the number of wet transports (2, 1 or 0).
11	WET BIN SENSOR	Select YES if the system includes a WET BIN SENSOR
12	DUMP CHUTES	Tap this button to toggle between AUTO and MANUAL dump chutes operation.

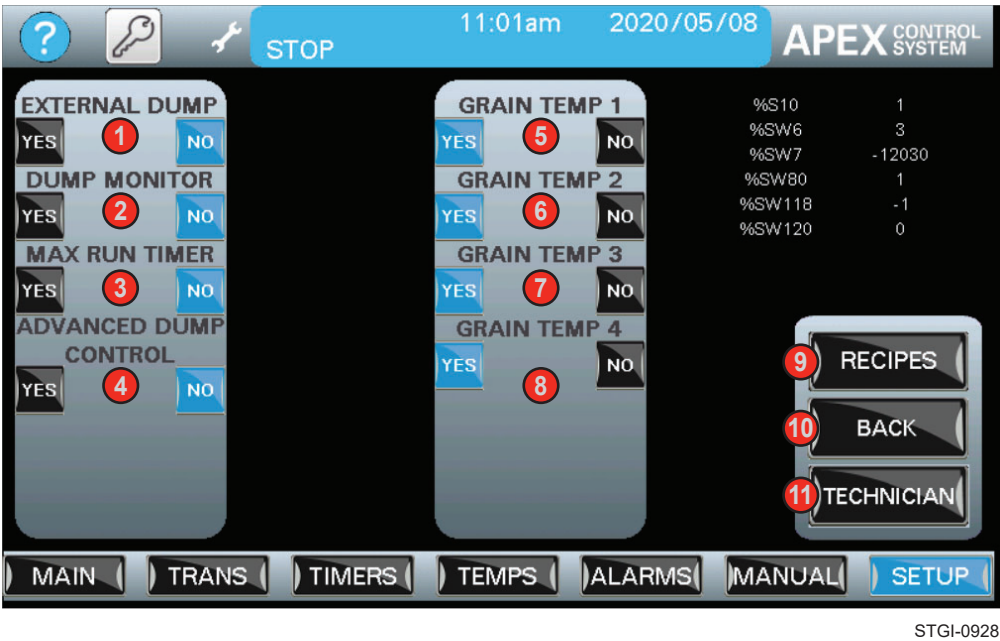
**Table 11 SETUP Screen Options and Descriptions (continued)**

Callout #	Item	Description
13	RECIPES	Tap to open the RECIPES screen.
14	ADVANCED	Tap to open the ADVANCED SETUP screen.
15	TECHNICIAN	Technician use only (Main access to Control parameters)
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

4.5.16 The ADVANCED Setup Screen

On the ADVANCED Setup Screen you can configure the HMI with sensors and controls you have in your system.

Figure 20. The ADVANCED Setup Screen



STGI-0928

**Table 12. SETUP Screen Options and Descriptions**

Callout #	Item	Description
1	EXTERNAL DUMP	YES / NO — System does or doesn't have an external dump
2	DUMP MONITOR	YES / NO — System does or doesn't have a dump monitor
3	MAX RUN TIMER	YES / NO — System does or doesn't have a max run timer
4	ADVANCED DUMP CONTROL	YES / NO — System does or doesn't have an advanced dump control
5	GRAIN TEMP 1	YES / NO — To toggle on/off the grain temp 1 sensor.
6	GRAIN TEMP 2	YES / NO — To toggle on/off the grain temp 2 sensor.
7	GRAIN TEMP 3	YES / NO — To toggle on/off the grain temp 3 sensor.
8	GRAIN TEMP 4	YES / NO — To toggle on/off the grain temp 4 sensor.
9	RECIPES	Tap this button to enter the RECIPES screen.
10	BACK	Tap this button to retrain to the previous screen.
11	TECHNICIAN	Technician use only (Main access to Control parameters)
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

### 4.5.17 The RECIPES Screen

A recipe is a set of settings that have been saved for later use. On the RECIPES screen you can load, create, modify, rename, save, and delete recipes.

Recipes are stored in recipe group folders, similar to a computer file folder.

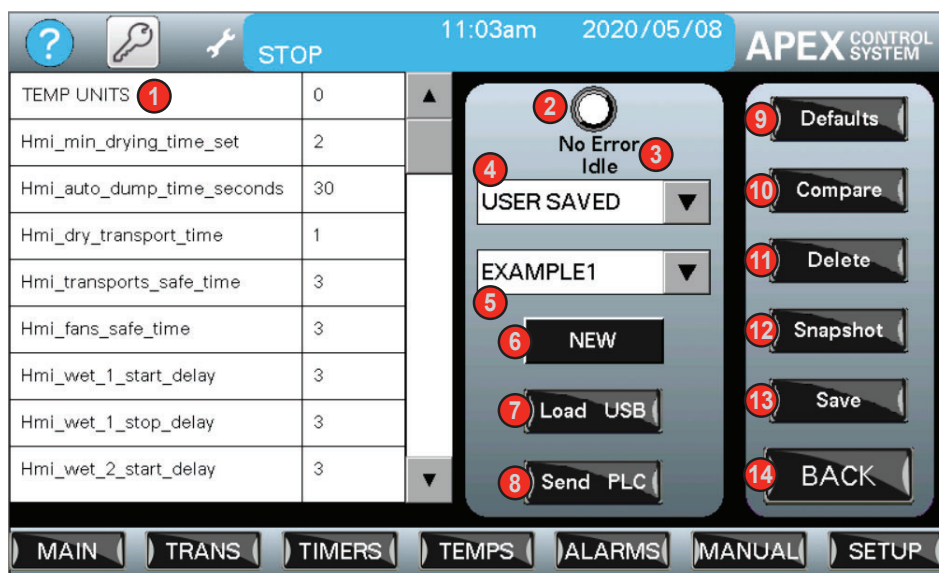
**The Defaults recipe group-folder** contains recipes preset at the factory, which cannot be deleted, modified, or renamed, but which can be used as templates.

**The USER SAVED recipe group-folder** contains recipes that can be created, modified, renamed and deleted by the user.

To open the RECIPES screen:

1. At the bottom of any screen, tap SETUP to open the SETUP screen.
2. On the SETUP screen, tap RECIPES to open the RECIPES screen.

**Figure 21. The RECIPES Screen**



STGI-0883

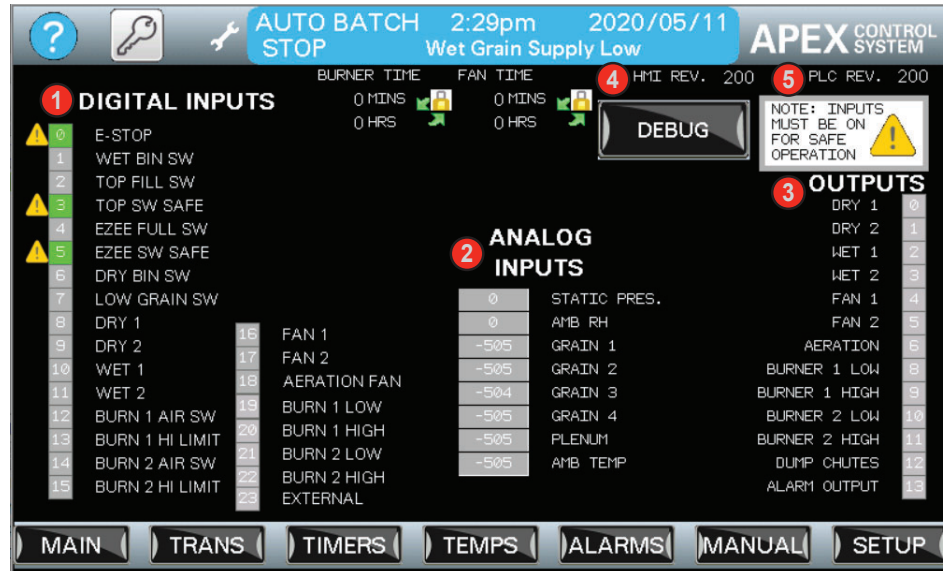


**Table 13. RECIPES Screen Options and Descriptions**

Callout #	Item	Description
1	Recipe List	Displays all values in the recipe and allows the user to edit those values.
2	Status indicator	This indicator displays various colors to indicate the current status. E.g. blue during Compare operations; green during Snapshot operations, etc.
3	Message Area	This area displays various text messages about recipe creation, compare, etc.
4	Folder List	Provides a dropdown list of recipe group-folders.
5	Recipe name	Provides a dropdown list of the recipe names in the current folder.
6	NEW	Tap this button to open the popup keypad and to allow you to enter a new name for a recipe.
7	Load USB	Tap this button to load a recipe from the USB drive and display the recipe values in the Recipe list.
8	Send PLC	Tap this button to send the currently displayed recipe to the PLC.
9	Defaults	Tap this button to load the default recipe.
10	Compare	Tap this button after Sending a recipe to the PLC, to verify that it loaded. If the settings match, the Status indicator light will turn blue and the Message Area will display “Compare Match”. If the settings are different, the Status indicator will turn yellow, and the Message Area will display “Compare Mismatch” and differences between settings will be displayed.
11	Delete	Tap this button to delete the current recipe.
12	Snapshot	Tap this button to transfer values into the Recipe List, making them ready to load and save. The Status indicators above the Folder List dropdown will temporarily turn green and then back to white.
13	Save	This will save the recipe to the HMI for future use. Up to 20 recipes can be saved to the HMI. Recipes may also be saved to a USB flash drive. If an error message appears while saving, read the message and proceed based on the contents of the message.
14	BACK	Tap this button to return to the previous screen.
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

### 4.5.18 The TECHNICIAN Screen

Figure 22. The TECHNICIAN Screen



STGI-0904

Table 14. TECHNICIAN Screen Options and Descriptions

Callout #	Item	Description
1	DIGITAL INPUTS	The DIGITAL INPUTS are digital signals from various sensors and equipment.
2	ANALOG INPUTS	The ANALOG INPUTS are analog signals from temperature and static pressure sensors.
3	OUTPUTS	These are the PLC Run-Signals to the equipment.
4	HMI REV.	HMI REVISION is the software revision currently being used by this HMI unit. (The HMI and PLC revision numbers must match.)
5	PLC REV.	PLC REVISION is the software revision currently being used by this PLC unit. (The HMI and PLC revision numbers must match.)
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

4.5.19 The HELP MENU Screen

Figure 23. The HELP MENU Screen

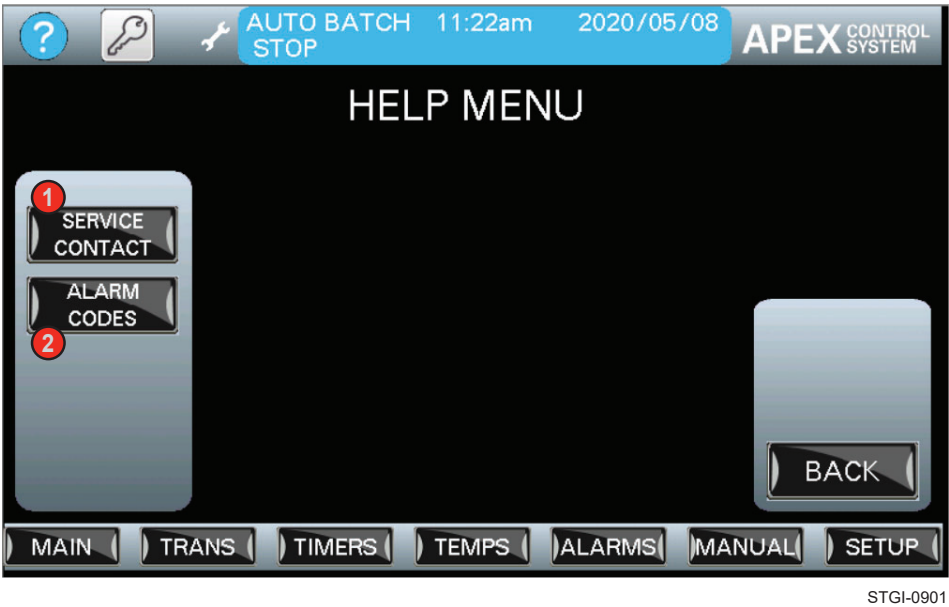


Table 15. HELP MENU Screen Options and Descriptions

Callout #	Item	Description
1	SERVICE CONTACT	Tap this button to open the SERVICE CONTACT screen.
2	ALARM CODES	Tap this button to open the ALARM CODES screen.
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

4.5.20 The ALARM CODES Screen

Figure 24. The ALARM CODES Screen

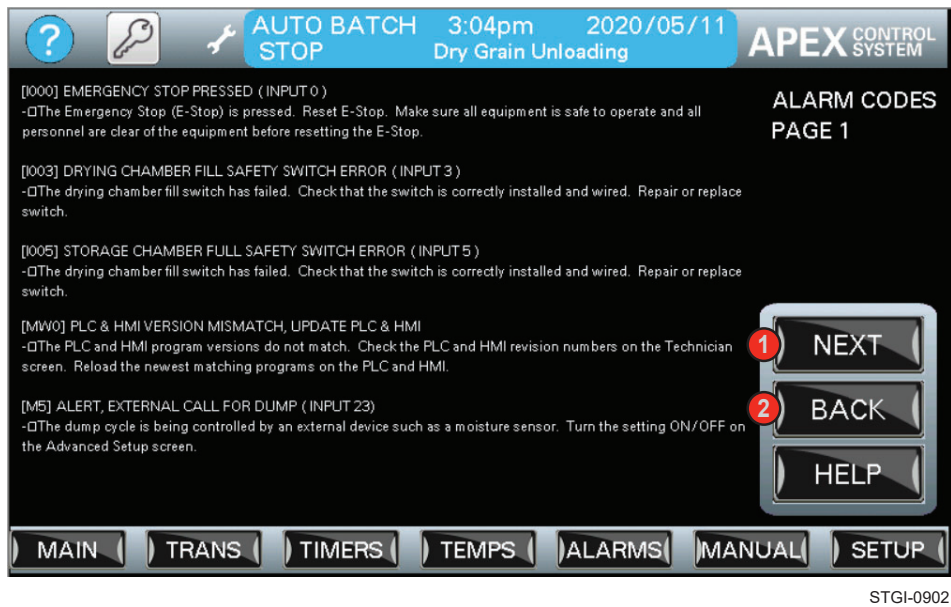
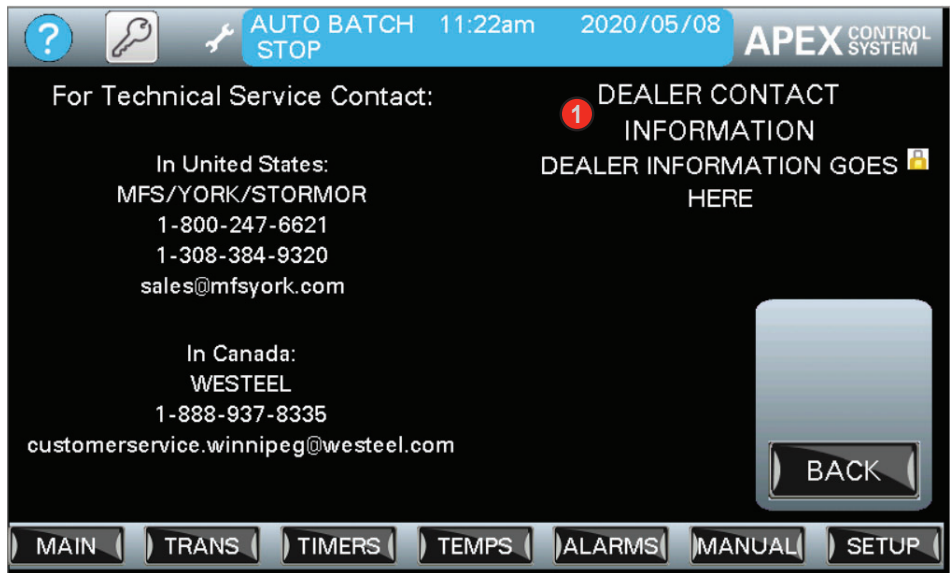


Table 16. ALARM CODES Screen Options and Descriptions

Callout #	Item	Description
1	NEXT	Tap this button to move to the next page of alarm code entries.
2	BACK	Tap this button to move to the previous page of alarm code entries.
<p>Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.</p>		

4.5.21 The Service Contact Screen

Figure 25. The SERVICE CONTACT (or Dealer Contact) Screen



STGI-0903

Table 17. Service Contact Screen Options and Descriptions

Callout #	Item	Description
1	DEALER CONTACT INFO	The dealer may enter his/her contact info here by tapping on this text, entering a password, and filling in the contact info fields.
Similar to all other screens, the bottom menu bar provides buttons to access the screens most often used for system operation (MAIN, TRANS, TIMERS, TEMPS, ALARMS, MANUAL, SETUP). The button for the current screen is highlighted.		

## 4.6. First Time System Setup

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### 4.6.1 *Make a Recipe*

Before operating your EasyDry® Apex Controls for the first time you must create a “recipe”—a set of parameters specific to your installation and requirements, and the product you will be drying. Different recipes may be required for different products, situations, and conditions. This section takes you through the process of entering a recipe into the control system via the HMI. It also covers how to save and retrieve recipes from the HMI and an external memory device.

To do so you will need to know the specifics of your system, and understand the requirements of the HMI screens. Before beginning this system setup, make sure you have carefully read and understand the information contained in [Section 4.5 – The Human Machine Interface \(HMI\) on page 16](#) of this manual.

**Note**

Normally the dealer will assist with the first time system setup and the initial system startup operation.

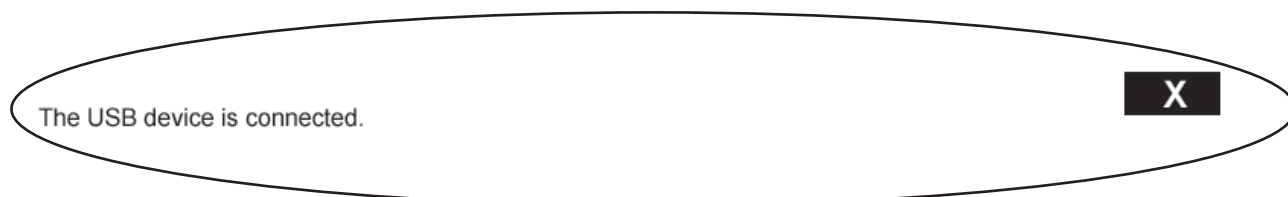
**Important**

Equipment such as fans, burners, augers, and auxiliary equipment have their own power systems. Verify that each of these power systems are functional.

### 4.6.2 Powering On the HMI

1. Make certain the system is wired correctly per the AGI APEX Control System Wiring Instructions (Part Number 009370–2).
2. Turn the power On to the system.
3. Wait for the program to load and the MAIN screen to appear.
4. If the following notification appears, tap the X icon to clear the message.

**Figure 26. “The USB Device is Connected” Notification**



The MAIN screen appears.

**Figure 27. The MAIN Screen**



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**Note**

For more information about the MAIN screen, see [Section 4.5.2 – The MAIN Screen on page 18](#) .

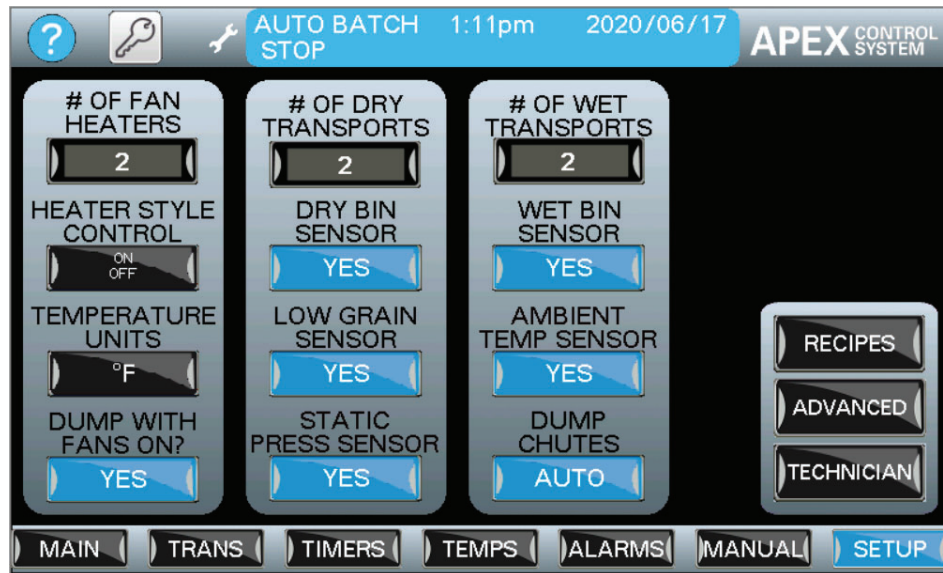
### 4.6.3 Configuring the SETUP Screen

1. On the MAIN screen, tap the SETUP button to open the SETUP screen.

**Note**

For more information, see [Section 4.5.15 – The SETUP Screen on page 40](#).

**Figure 28. The SETUP Screen**



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2. On the SETUP screen:
  - a. Enter the # OF FAN HEATERS installed: 1 or 2.
  - b. Select the HEATER STYLE CONTROL: HIGH/LOW or ON/OFF.
  - c. Select the type of TEMPERATURE UNITS: °F or °C.
  - d. Select whether to DUMP WITH FANS ON?: YES or NO.
  - e. Enter the # OF DRY TRANSPORTS: 2, 1, or 0 (controlled by the PLC/HMI).
  - f. Enter the # OF WET TRANSPORTS: 2, 1, or 0 (controlled by the PLC/HMI).
  - g. Set up the sensors that are installed:
    - DRY BIN SENSOR: YES or NO
    - WET BIN SENSOR: YES or NO
    - LOW GRAIN SENSOR: YES or NO
    - AMBIENT TEMP SENSOR: YES or NO
    - STATIC PRESS (pressure) SENSOR: YES or NO
  - h. Select DUMP CHUTES: AUTO or MANUAL. (Select AUTO for systems with hydraulic operated dump chutes. Select MANUAL for systems with hand winch operated dump chutes or for manual batch operation.)



### 4.6.4 Test the Equipment in Manual Mode Operation

#### Important

All grain system equipment controlled by the AGI APEX Control System may be operated manually if desired. The user can use the manual controls to perform a single operation, part of an operation, or all of the operation. However, using MANUAL mode operation is usually less efficient than AUTO mode operation.

#### NOTICE

“Controls intelligence” is fully removed in MANUAL mode operation. When operating in manual mode, the operator assumes full responsibility and liability for all aspects of the equipment operation. The system is in manual mode when the MANUAL button on the screen is selected.

#### Order of First Test Operation

#### Important

To operate any item of equipment in the system, select the RUN button for that equipment to turn it On and select the STOP button for that equipment to turn it Off. Pressing the JOG button will run the equipment only as long as you keep the JOG button depressed.

1. Turn On electrical power to all the system equipment.
2. On the HMI screen, tap the MANUAL button to open the MANUAL screen.
3. On the MANUAL screen, tap the MANUAL button to enter Manual Mode.
4. JOG equipment to verify the equipment is operational and the wiring installation is correct.
  - a. Press JOG for DRY 1.
  - b. Press JOG for DRY 2.
  - c. Press JOG for WET 1.
  - d. Press JOG for WET 2.
  - e. Press JOG for FAN 1.
  - f. Press JOG for FAN 2.
  - g. Press JOG for DUMP CHUTES.
  - h. Press JOG for AERATION FAN.

#### Note

Your system may not have all the equipment listed in this manual. Burners low and high will be tested at a later step.

5. Run wet transports to fill the drying chamber with wet grain.
  - a. Tap RUN for WET 2 to start running.
  - b. Tap RUN for WET 1 to start running.
  - c. Open the gate to the wet storage bin to allow the drying chamber to start filling with wet grain.
  - d. Start timing the time it takes for the wet transports to fill the drying chamber completely. This time will be entered as the value for the OUT OF GRAIN TIMER.
  - e. When the wet grain covers the top drying chamber fill switch (the switch paddle stops turning), start timing the time it takes for the wet transports to fill the drying chamber to the top while allowing enough room for the wet transports to clean out. This time will be used for the WET 1 STOP DELAY or WET 2 STOP DELAY if only one wet transport is controlled by the PLC/HMI.

- f. Tap STOP for WET 1 to stop running.
  - g. Allow the wet transport 2 to continue running until it is cleaned out while determining the clean out time. This time will be entered as the value for the WET 2 STOP DELAY.
  - h. Tap STOP for WET 2 to stop running.
6. Run fans to test the burners, temperature probes, and static pressure sensor.
- a. Tap RUN for FAN 1 to start running.
  - b. Tap RUN for FAN 2 to start running (if there are 2 fans).

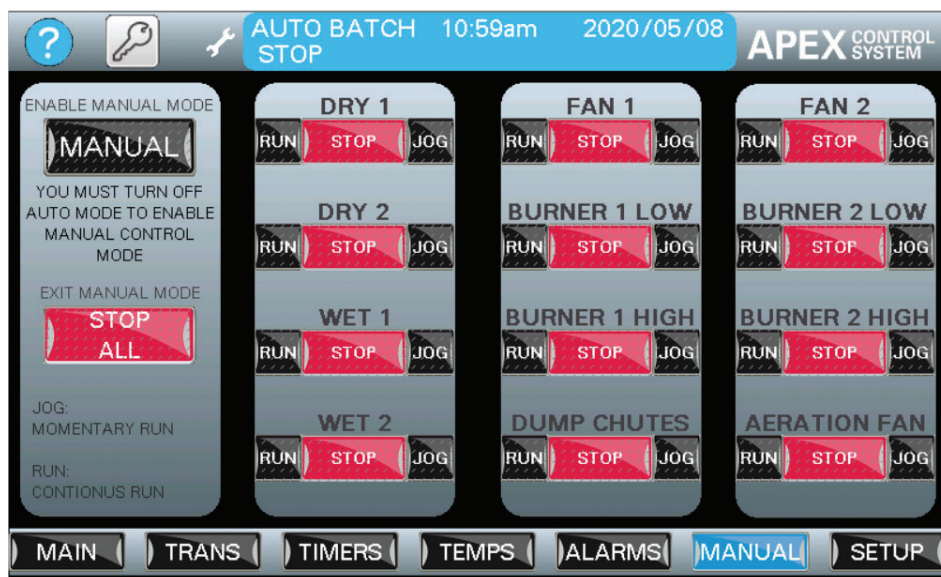
**NOTICE**

If 2 fans are installed on this bin dryer controls Bin, then ALWAYS run both fans at the same time. It is important to run both fans at the same time even while testing only one fan/heater at a time. If both fans are not made to run at the same time, the increased air pressure inside the bin will cause the fan that is not running to spin backwards at high speed. This could potentially cause damage to the motor of the fan that is not running.

- c. Press RUN for BURNER 1 LOW to start running.  
The pre-purge timer will delay for 15 seconds to allow the fan to purge the heater. Then the heater will attempt to ignite the burner for 10 seconds.  
If the burner fails to ignite after 10 seconds, the unit will wait another 15 seconds before trying a second ignition attempt. If the burner fails to ignite after 3 attempts, you must reset the burner by pressing STOP for BURNER 1 LOW. This will turn it Off and reset the sequence.  
Pressing RUN for BURNER 1 LOW again restarts the sequence of 3 more attempts to ignite. If ignition fails after the second series of attempts, see the troubleshooting section of this manual or the fan/heater manual.
- d. Initially set the pressure regulator at the necessary position to obtain between 1 and 5 psi (7 and 34 kPa) orifice pressure.  
  
A higher drying temperature requires a higher pressure setting. A lower ambient temperature also requires a higher pressure setting.
- e. After the burner ignites, continue to leave BURNER 1 LOW selected, then press RUN for BURNER 1 HIGH to increase the flame to the high flame setting.  
With both BURNER 1 LOW and BURNER 1 HIGH selected at the same time, BURNER 1 will continue to operate at the BURNER 1 HIGH setting.  
  
If the burner runs at the high fire rate continuously, and does not cycle to low flame, it probably means that insufficient gas is available to generate the heat necessary to satisfy the thermostat setting.  
  
To rectify this situation:
  - f. Gradually increase the gas pressure.  
  
If the burner stays on low, never cycling to high flame, the gas pressure is probably set too high and should be reduced gradually.
  - g. After adjustments are made to the regulator, the ball valve may need to be repositioned so that a frequency of 50% high and 50% low fire is achieved.
  - h. Test BURNER 2 using the same steps used to test BURNER 1.
  - i. While the fans and heaters are running check the plenum temperature and grain probe temperatures on the TEMP SCREEN to verify they are reading correctly. Verify the static pressure reading on the MAIN SCREEN. Use this pressure reading for the Static Pressure SAFE LIMIT value.
  - j. Tap STOP for BURNER 2 HIGH to stop it from running.
  - k. Tap STOP for BURNER 1 HIGH to stop it from running.

- l. Tap STOP for BURNER 2 LOW to stop it from running.
- m. Tap STOP for BURNER 1 LOW to stop it from running.
- n. Tap STOP for FAN 2 to stop it from running.
- o. Tap STOP for FAN 1 to stop it from running.

**Figure 29. The MANUAL Screen**



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### Important

Regardless of the mode the equipment is running in (Manual or Auto Mode), to immediately Stop the equipment, push in the EMERGENCY STOP button on the HMI or the PLC.  
(See [Section 4.2 – EMERGENCY STOP Control on page 13.](#))

### 4.6.5 Configuring Timers

- At the bottom of any screen, tap TIMERS to open the TIMERS screen.

**Note**

For more information, see [Section 4.5.5 – The TIMERS Screen on page 24](#).

**Figure 30. The TIMERS Screen**



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- On the TIMERS screen:
  - Set the DRYING TIME to a value that ensures the grain will dry adequately. For Continuous Flow, this timer should be at least 2 minutes longer than the time it takes for the wet transports to refill the top of the drying chamber.
  - Set the DUMP CHUTES LOWERED time. This time can vary notably depending on bin size, grain type, and grain condition. The following table is a starting point for systems with 4" x 8" (102 mm x 203 mm) dump chute openings. Adjust dump times based on your system.

**Table 18. Dump Chutes Lowered Time**

Diameter	Batch	Continuous Flow
36' (10.97 m)	200 seconds	15 seconds
30' (9.14 m)	180 seconds	15 seconds
27' (8.23 m)	175 seconds	15 seconds
24' (7.31 m)	150 seconds	15 seconds

- Set the DRY TRANSPORT RUN TIME. Set this time based on how long it takes the dry transports to empty the bin dryer controls storage chamber.
- Set the OUT OF WET GRAIN TIMER to 1 to 2 minutes longer than it takes to completely fill the drying chamber with wet grain.
- If your system has a wet bin empty sensor, set the FINAL LOAD DRYING TIME.
- If you are using BATCH Mode you may set the BATCH SHRINK REFILL TIME.

- g. If you are using BATCH Mode you may set the BATCH COOL TIME.
- 3. On the TIMERS screen, tap ADVANCED TIMERS 1 to open the ADVANCED TIMERS 1 screen.

**Note**

For more information, see [Section 4.5.6 – The ADVANCED TIMERS 1 Screen on page 26](#).

**Figure 31. The ADVANCED TIMERS 1 Screen**

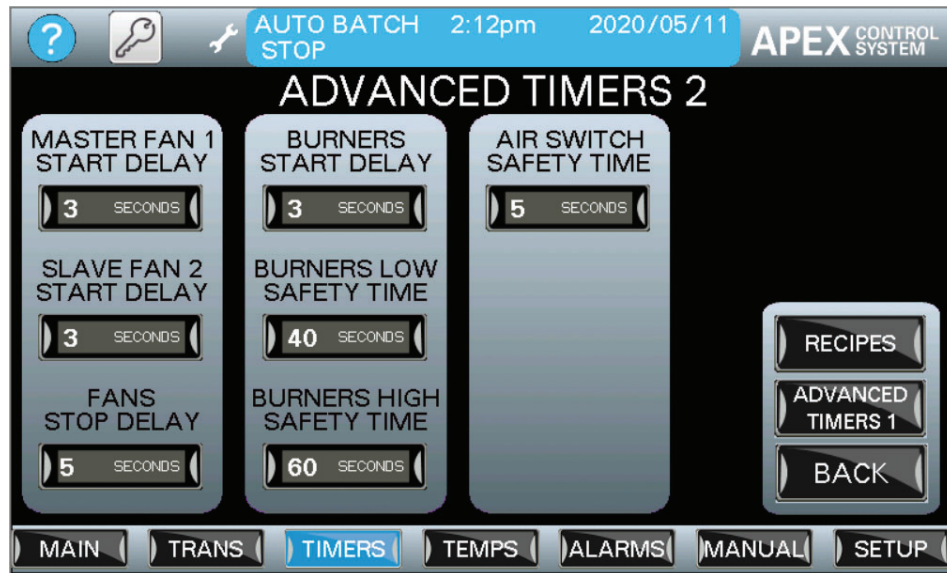


STGI-0897

- 4. On the ADVANCED TIMERS 1 screen:
  - a. Set the TRANSPORTS SAFETY TIME.
  - b. Set the FANS SAFETY TIME.
  - c. Set the WET 1 START DELAY. (In Continuous Flow, set this delay long enough to prevent the wet transports from running while the grain is dumping.
  - d. Set the WET 1 STOP DELAY.
  - e. Set the WET 2 START DELAY.
  - f. Set the WET 2 STOP DELAY.
  - g. Set the DRY 1 START DELAY
  - h. Set the DRY 1 STOP DELAY
  - i. Set the DRY 2 START DELAY
  - j. Set the DRY 2 STOP DELAY
- 5. On the ADVANCED TIMERS 1 screen, tap ADVANCED TIMERS 2 to open the ADVANCED TIMERS 2 screen.

**Note**

For more information, see [Section 4.5.7 – The ADVANCED TIMERS 2 Screen on page 28](#).

**Figure 32. The ADVANCED TIMERS 2 screen**

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6. On the ADVANCED TIMERS 2 screen:
  - a. Set the MASTER FAN 1 START DELAY.
  - b. Set the SLAVE FAN 2 START DELAY.
  - c. Set the FANS STOP DELAY.
  - d. Set the BURNERS START DELAY.
  - e. Set the BURNERS LOW SAFETY TIME.
  - f. Set the BURNERS HIGH SAFETY TIME.
  - g. Set the AIR SWITCH SAFETY TIME.



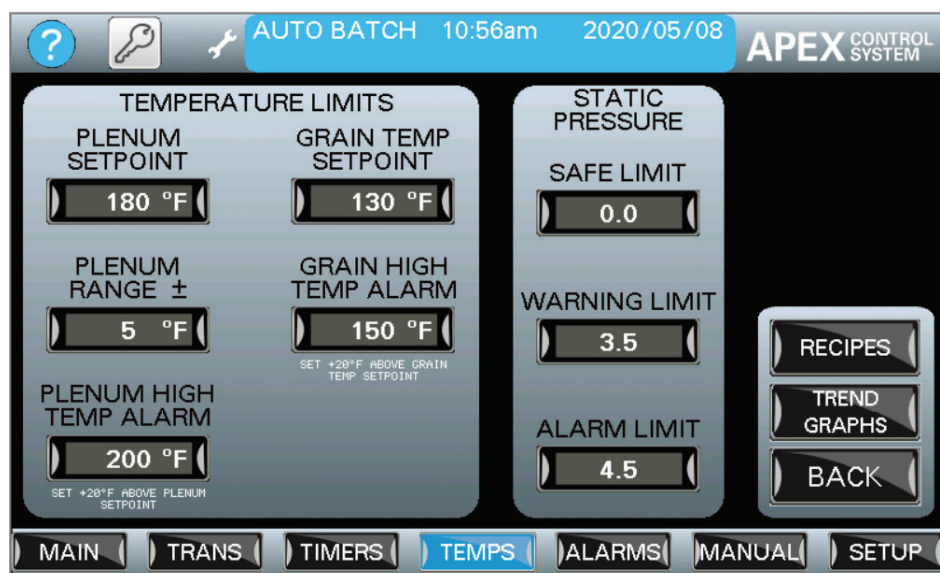
### 4.6.6 Configuring Temperature Settings

1. At the bottom of any screen, tap the TEMPS button to open the TEMPS screen.
2. On the TEMPS screen, tap the TEMPERATURE LIMITS button to open the TEMPERATURE LIMITS screen.

**Note**

For more information, see [Section 4.5.9 – The TEMPERATURE LIMITS Screen on page 32](#).

**Figure 33. The TEMPERATURE LIMITS Screen**



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3. On the TEMPERATURE LIMITS screen:
  - a. Set the PLENUM SETPOINT (the heater target temperature for below-plenum air).
  - b. Set the PLENUM RANGE  $\pm$ . Set this to a value that prevents fans and heaters from constantly alternating between ON/OFF or HIGH/LOW. Minimum setting is 5°F (3°C).
  - c. Set the PLENUM HIGH TEMP ALARM. Typically set this to: PLENUM SETPOINT plus PLENUM RANGE  $\pm$  plus at least 20°F (11°C).
  - d. Set the GRAIN TEMP SETPOINT. (This is the target temperature for the grain in the plenum.)
  - e. Set the GRAIN HIGH TEMP ALARM. Set this to a value that is at least 20°F (11°C) higher than the GRAIN TEMP SETPOINT.
  - f. Set the STATIC PRESSURE limits:
    - Set the SAFE LIMIT— the minimum level of static pressure required for the burners to start
    - Set the WARNING LIMIT— the point at which the HMI alarms indicating below-plenum air static pressure is too high
    - Set the ALARM LIMIT— the point at which the fans and heaters shut off

### 4.6.7 Saving a Recipe

1. At the bottom of any screen, tap SETUP to open the SETUP screen.
2. On the SETUP screen, tap RECIPES to open the RECIPES screen.

**Note**

For more information, see [Section 4.5.17 – The RECIPES Screen on page 44](#).

**Figure 34. The RECIPES Screen**



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3. Tap the folder list (top) dropdown box and select the recipe group-folder "USER SAVED" from the dropdown list.
4. Tap the NEW button to create a new recipe.
5. Tap the suggested name that appears in the recipe name lower dropdown box to open the popup keypad.
6. Enter a unique name for the new recipe (to replace the suggested name that appears).
7. Tap the Snapshot button.

The indicator light above the Message Area will turn green and then back to white.

All the settings you put into the HMI in the previous steps will be transferred into the Recipe List and display on the left side of the screen in a scrolling window. These values are now ready to be loaded into the PLC or saved.

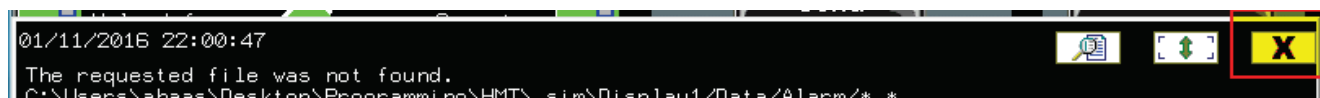
8. Scroll through the list and check to make sure all values are correct and as intended.
9. If any values are incorrect, or need to be changed, touch the desired list entry and enter corrected values.
10. Tap the Save button.

This will save the recipe to the USB drive for future use.

**Note**

If an error message appears while saving, read the message and proceed based on the contents of the message or tap X to ignore it.



**Figure 35. Example Error Message**

### 4.6.8 Loading a Previously Saved Recipe

To load a previously saved recipe:

1. Tap the folder list (top) dropdown box and select USER SAVED or DEFAULT from the dropdown list.
2. In the recipe name (lower) dropdown box, select the name of the desired recipe.
3. Tap the Load USB button.

The settings for the recipe appears in the Recipe List scrolling window at the left of the screen.

4. Tap the Send PLC button.

This sends the recipe to the PLC.

5. To verify that the recipe is loaded, tap the Compare button.

If the settings match, the Status indicator light turns blue and the Message Area displays "Compare Match".

If the settings are different, the Status indicator turns yellow, and the Message Area displays "Compare Mismatch" and differences between settings are displayed.

## 4.7. HMI Auto Mode Start-Up and Operation

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EasyDry® EasyDry® Apex Controls Auto Mode theory of operations:

1. At the MAIN screen tap the AUTO button to select Auto Mode.
2. Tap the START button to START the operation.
3. The RUN STATUS lamp flashes green.
4. After a delay time, wet 2 transport starts (if included in this system).
5. After a delay time, wet 1 transport starts (if included in this system).
  - a. Wet transports continue to run until the PLENUM FULL sensor is covered with grain, or the OUT OF WET GRAIN TIMER expires.
  - b. If the system shuts down before the plenum fills, extend the OUT OF WET GRAIN TIMER length by adding a few minutes.
6. The plenum full sensor becomes covered with grain.
7. After a delay timer fan 1 starts.
8. After a delay timer fan 2 starts.
9. Static pressure is measured to make certain it is above the minimum setting (found in TEMPS > TEMP. LIMITS > SAFE LIMIT).
10. After a delay heaters start up at low flame and then increase to high flame.
11. After the desired upper plenum temperature limit is reached, the high flame cycles off, and the heater is on low flame only.
12. The DRYING TIME begins to count down after the fans start. When this timer expires the system checks to see if the GRAIN TEMP SETPOINT has been reached.
13. Drying continues until both the GRAIN TEMP SETPOINT is satisfied and the DRYING TIME expires.
14. After both conditions are satisfied the dump chutes begin to lower, and the DUMP CHUTES LOWERED TIME begins to count down, dumping approximately 1/3 of the grain (for Continuous Flow operation) or all of the plenum grain (for BATCH operation). (The user has the option to turn the fans and heaters off during the dump cycle, if desired.)
15. After the CHUTES LOWERED timer expires the chutes raise back to normal position. (The drying timer then is automatically reset.)
16. The plenum full sensor is now uncovered and the wet transports will start loading wet grain into the plenum.

### Important

Regardless of the mode the equipment is running in (Manual or Auto Mode), to immediately Stop the equipment, push in the EMERGENCY STOP button on the HMI or the PLC. (See [Section 4.2 – EMERGENCY STOP Control on page 13.](#))

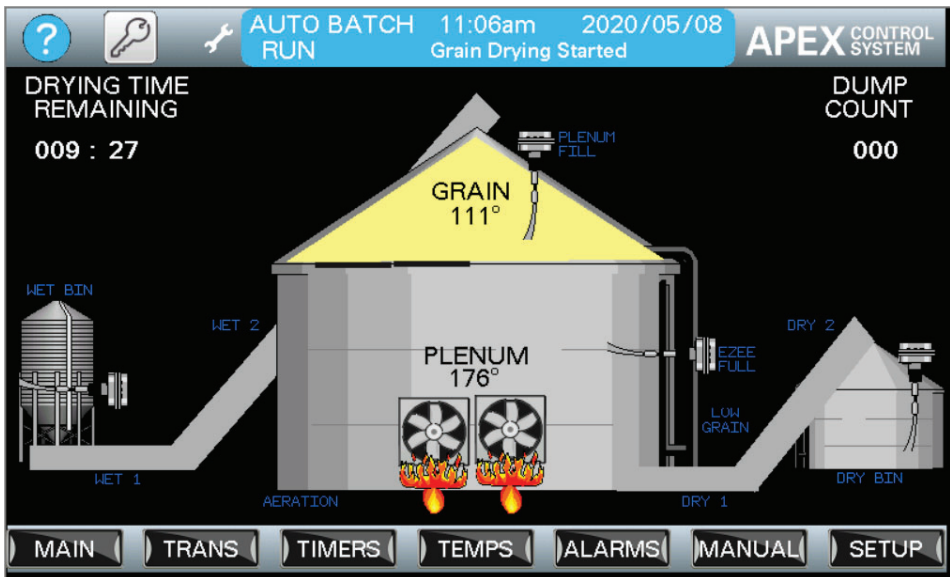
4.7.1 Frequently Visited Operation Screens

Figure 36. The MAIN Screen

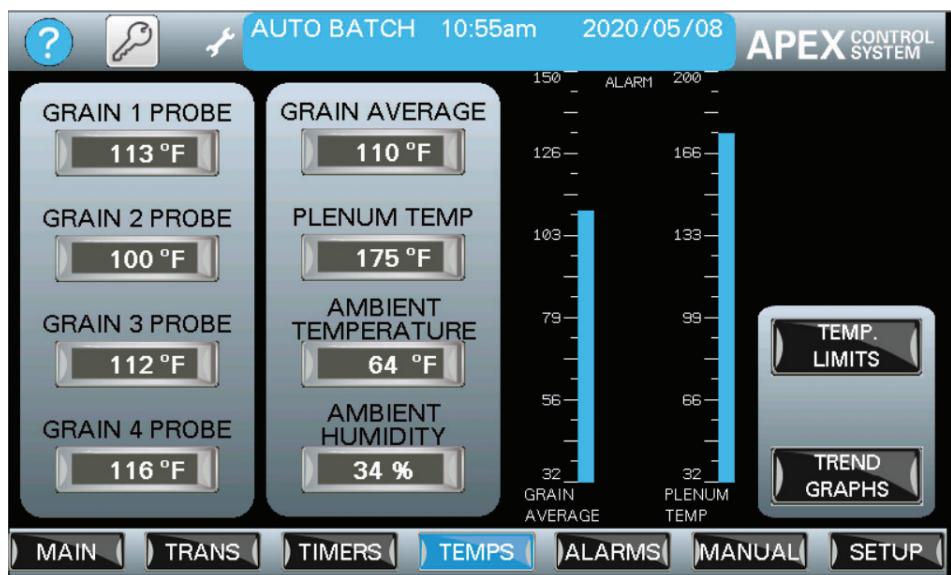


STGI-0892

Figure 37. The STATUS Screen



STGI-0884

**Figure 38. The TEMPS Screen**

STGI-0893

## 4.8. The Different Types of Bin Dryer Operation

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### 4.8.1 Continuous Flow Operation

Continuous flow operation is the type of drier operation where the drying chamber is loaded with wet grain and the grain in the drying chamber is dumped automatically by the PLC/HMI. This type of drying requires a hydraulic pump unit to raise and lower the dump chutes. In continuous flow operation only about 1/4 to 1/3 of the drying chamber is dumped at a time. Therefore, the drying chamber is continuously being filled and dumped automatically.

#### Note

An bin dryer controls bin equipped for continuous flow operation is also capable of utilizing batch drying operation.

1. Set WET LOAD START to AUTO on the TRANS screen.
2. Set DUMP CHUTES to AUTO on the SETUP screen.
3. Set the temperatures and timers on the TEMP LIMITS screen and TIMERS screen.
4. Select the AUTO button on the MAIN screen.
5. Tap the START button on the MAIN screen to start the drying operation.
6. The wet transports automatically start and fill the drying chamber with wet grain.
7. When the drying chamber is full the drying fans and burners start to run.
8. The first load (when the drying chamber is completely full of wet grain) must be staged to help prevent bridging or channeling of the grain in the drying chamber.
  - a. Set the GRAIN TEMP SETPOINT about 20°F below the normal GRAIN TEMP SETPOINT. For example, if the normal is 100°F, set the GRAIN TEMP SETPOINT to 80°F.
  - b. When the grain temperature reaches 80°F and the grain dumps set the temperature to 90°F for the next dump cycle.
  - c. When the grain temperature reaches 90°F and the grain dumps set the temperature back to the normal 100°F.
9. Drying continues until both the GRAIN TEMP SETPOINT is satisfied and the DRYING TIME expires.
10. The dried grain is automatically dumped into the storage chamber.
11. After the dried grain is dumped the wet transports automatically start again.
12. The drying process continues until the wet storage bin is empty.
13. Last fill of the season.
  - a. When the last of the wet grain enters the drying chamber shut down the drying process.
  - b. Set WET LOAD START to MANUAL on the TRANS screen if wet grain is not completely covering the drying chamber fill switch.
  - c. Set WET BIN SENSOR to NO (If wet bin sensor is installed) on the SETUP screen.
  - d. Set DUMP CHUTES to MANUAL on the SETUP screen if the last of the grain is to be stored in the drying chamber.
  - e. Select the AUTO button and BATCH button on the MAIN screen.
  - f. Set the GRAIN TEMP SETPOINT 10 degrees higher than normal operation on the TEMP LIMITS screen.
  - g. Tap the START button on the MAIN screen to start the drying operation.

- h. When the last batch is complete the drying process will automatically shut down.

### ***4.8.2 Auto Batch Operation***

Auto batch operation is when the drying chamber is completely loaded with wet grain and all the grain in the drying chamber is dumped automatically by the PLC/HMI.

1. Set WET LOAD START to AUTO on the TRANS screen.
2. Set DUMP CHUTES to AUTO on the SETUP screen.
3. Set the temperatures and timers on the TEMP LIMITS screen and TIMERS screen.
4. Select the AUTO button and BATCH button on the MAIN screen.
5. Tap the START button on the MAIN screen to start the drying operation.
6. The wet transports automatically start and fill the drying chamber with wet grain.
7. When the drying chamber is full the drying fans and burners start to run.
8. Drying continues until both the GRAIN TEMP SETPOINT is satisfied and the DRYING TIME expires.
9. The dried grain is automatically dumped into the storage chamber.
10. After the dried grain is dumped the wet transports automatically start again.
11. The drying process continues until the wet storage bin is empty.
12. Last fill of the season. The drying chamber must be full of grain to work properly. Only dump enough grain from the previous batch to allow the last of the wet grain to fill the drying chamber.

### ***4.8.3 Manual Batch Operation***

Manual batch operation is when the drying chamber is completely loaded with wet grain manually by the operator with a portable auger or other manually operated equipment and/or all the grain in the drying chamber is dumped manually by the operator with a hand winch.

1. Fill the drying chamber completely full of wet grain.
2. Set WET LOAD START to MANUAL on the TRANS screen.
3. Set DUMP CHUTES to MANUAL on the SETUP screen.
4. Set the temperatures and timers on the TEMP LIMITS screen and TIMERS screen.
5. Select the AUTO button and BATCH button on the MAIN screen.
6. Tap the START button on the MAIN screen to start the drying operation.
7. Drying continues until both the GRAIN TEMP SETPOINT is satisfied and the DRYING TIME expires.
8. The dryer will automatically shut down.
9. Manually dump the drying chamber with the hand winch.
10. Start the process again by filling the drying chamber with wet grain.
11. Last fill of the season. The drying chamber must be full of grain to work properly. Only dump enough grain from the previous batch to allow the last of the wet grain to fill the drying chamber.

## 4.8.4 Manual Operation

### Important

All grain system equipment controlled by the AGI APEX Control System may be operated manually if desired. The user can use the manual controls to perform a single operation, part of an operation, or all of the operation. However, using MANUAL mode operation is usually less efficient than AUTO mode operation.

### NOTICE

“Controls intelligence” is fully removed in MANUAL mode operation. When operating in manual mode, the operator assumes full responsibility and liability for all aspects of the equipment operation. The system is in manual mode when the MANUAL button on the screen is selected.

### Important

To operate any item of equipment in the system, select the RUN button for that equipment to turn it On and select the STOP button for that equipment to turn it Off. Pressing the JOG button will run the equipment only as long as you keep the JOG button depressed.

### Starting Heaters with HIGH/LOW Control

1. Turn on electrical power to the system.
2. On the HMI screen:
  - a. Tap MANUAL to enter MANUAL mode. The MANUAL screen appears.
  - b. Tap RUN for FAN 1 (and FAN 2 if there are two fans) to start the fans running.

### NOTICE

If two fans are installed on this bin dryer controls Bin, then ALWAYS run both fans at the same time. It is important to run both fans at the same time even while testing only one fan/heater at a time. If both fans are not made to run at the same time, the increased air pressure inside the bin will cause the fan that is not running to spin backwards at high speed. This could potentially cause damage to the motor of the fan that is not running.

- c. Tap RUN for BURNER 1 LOW.

The pre-purge timer will delay for 15 seconds to allow the fan to purge the heater. Then the heater will attempt to ignite the burner for 10 seconds.

If the burner fails to ignite after 10 seconds, the unit will wait another 15 seconds before trying a second ignition attempt. If the burner fails to ignite after three attempts, you must reset the burner by tapping STOP for BURNER 1 LOW. This will turn it OFF and reset the sequence.

Selecting BURNER 1 LOW again restarts the sequence of three more attempts to ignite. If ignition fails after the second series of attempts, see the troubleshooting section of this manual.

3. Initially set the pressure regulator at the necessary position to obtain between 1 and 5 psi (7 and 34 kPa) orifice pressure.

A higher drying temperature requires a higher pressure setting. A lower ambient temperature also requires a higher pressure setting.

4. After the burner ignites, continue to leave BURNER 1 LOW selected, then tap RUN for BURNER 1 HIGH to increase the flame to the high flame setting.

With both BURNER 1 LOW and BURNER 1 HIGH selected at the same time, BURNER 1 will continue to operate at the BURNER 1 HIGH setting.

If the burner runs at the high fire rate continuously, and does not cycle to low flame, it probably means that insufficient gas is available to generate the heat necessary to satisfy the thermostat setting.

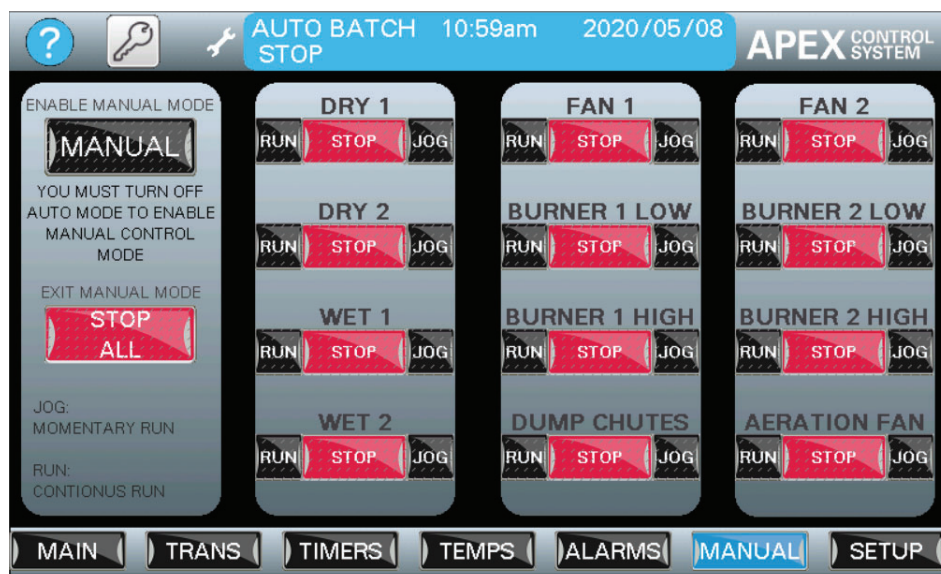
To correct this situation:

5. Gradually increase the gas pressure.

If the burner stays on low, never cycling to high flame, the gas pressure is probably set too high and should be reduced gradually.

6. After adjustments are made to the regulator, the ball valve may need to be repositioned so that a frequency of 50% high and 50% low fire is achieved.
7. Test BURNER 2 using the same steps used to test BURNER 1.

**Figure 39. MANUAL Screen**



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### Important

Regardless of the mode the equipment is in (MANUAL or AUTO mode), to immediately STOP the equipment, push in the EMERGENCY STOP button on the HMI or the PLC. (See [Section 4.2 – EMERGENCY STOP Control on page 13.](#))



## 4.9. Temperature Control Calibration

Every new bin dryer controls should have its temperature control calibrated. The bin dryer controls capacity can vary greatly depending on bin size, fan size, number of fans, plenum drying temperature, type of grain, grain variety, and grain condition. The dry hot grain moisture content should be about 2 percentage points higher than the final cool grain moisture content. When the hot grain is dumped into the storage chamber the aeration fan continues to dry the grain.


1. Set the GRAIN TEMP SETPOINT to 100°F.
2. Dry and dump a batch of grain or 3 dumps with continuous flow.
3. Shut down the dryer and retrieve several samples of hot grain from the storage chamber area. Mix the samples and test the moisture content. The samples should test in the 17.5% to 18% moisture content range. Adjust the GRAIN TEMP SETPOINT about 2°F for every percentage point of moisture content. See chart below. The below chart is an example only. Each bin dryer controls can vary several degrees up or down compared to the chart.
4. Restart the drying process and dump another batch or 3 dumps with continuous flow. Shut down the dryer and test several more samples to confirm temperature settings. Adjust the GRAIN TEMP SETPOINT if needed.
5. Collect samples of cool grain after several hours of drying to see the final moisture content. Adjust the GRAIN TEMP SETPOINT if needed.
6. After the temperature control has been calibrated, there should be no need to adjust the temperature again unless a different plenum drying temperature is being used.

**Table 19. Grain Temperature Setpoint Verses Moisture Content For Corn**


(This chart is an example ONLY! The numbers obtained during different operations may vary.)

Grain Temp Setpoint (°F)	Hot Corn % Moisture	Cool Corn % Moisture
110	13.0	11.0
108	13.5	11.5
106	14.5	12.5
104	15.5	13.5
102	16.5	14.5
100	17.5	15.5
98	18.5	16.5
96	19.5	17.5
94	20.5	18.5

# 5. Maintenance

 Before continuing, ensure you have completely read and understood this manual’s Safety section, in addition to the safety information in the section(s) below.

## 5.1. Maintenance Safety

-  **WARNING**
- Keep components in good condition. Follow the maintenance procedures.
  - Ensure the service area is clean, dry, and has sufficient lighting.
  - Do not modify any components without written authorization from the manufacturer. Modification can be dangerous and result in serious injuries.
  - Lock out power source and shut off gas valves.
  - All gas components, connections, and appliances are to be serviced or maintained by a qualified gas technician.
  - All electrical maintenance must be performed by a qualified electrician in accordance with all applicable local codes and standards.
  - When the power is locked out, fans can still be dangerous because of potential “windmilling.” Always block the impeller/blade before working on any moving parts.
  - After maintenance is complete, replace all guards, service doors, and/or covers.
  - Use only genuine AGI replacement parts or equivalent. Use of unauthorized parts will void warranty. If in doubt, contact AGI or your local dealer.

## 5.2. Maintenance Schedule

Proper maintenance habits mean a longer life, better efficiency, and safer operation. Please follow the Maintenance Schedule below. Keep good records of the hours the bin dryer controls has been operated and the maintenance performed.

<b>Daily:</b>
<a href="#">Section 5.3 – Visually Inspect the Bin Dryer on page 71</a>
<b>Annually or as needed:</b>
<a href="#">Section 5.4 – Pre Dryer Season Maintenance on page 71</a>
<b>As Required:</b>
<a href="#">Section 5.5 – Vendors and OEMs on page 71</a>

## 5.3. Visually Inspect the Bin Dryer

---

Check the following during a visual inspection:

1. Ensure all guards are in place and in good working order.
2. Examine the bin dryer controls for damage or unusual wear. Make sure the impeller is clean, undamaged, and rotates freely.
3. Be sure all safety decals are in place and are legible.
4. Inspect all moving or rotating parts to see if anything has become entangled in them. Remove any entangled material.
5. Check all components. Replace damaged or worn parts before using the bin dryer controls.
6. Check tightness of bolts/nuts, fasteners, and hardware (re-torque if necessary).

## 5.4. Pre Dryer Season Maintenance

---

**Checks to perform using the MANUAL screen:**

1. Turn on the fan(s).
2. Turn on the heater(s). Then turn them off.
3. Turn off the fan(s).
4. Lower and raise the dump chutes to make certain the hydraulic cylinder system is working.
5. Check to make certain the wet and dry transports operate properly.

**Other checks to perform:**

1. Make certain the grain level sensors are rotating and working.
2. Monitor closely the first few dryer usages.
3. Check to make certain the desired recipe is loaded and ready for use.
4. Check to make certain all recipe settings are as desired.

## 5.5. Vendors and OEMs

---

AGI takes pride in choosing quality vendors and products in association with the design and manufacture of our products:

- OEM products have a service life related to operating conditions and usage.
- Contact the OEM product manufacturer for service, replacement, or warranty concerns.

# 6. Troubleshooting

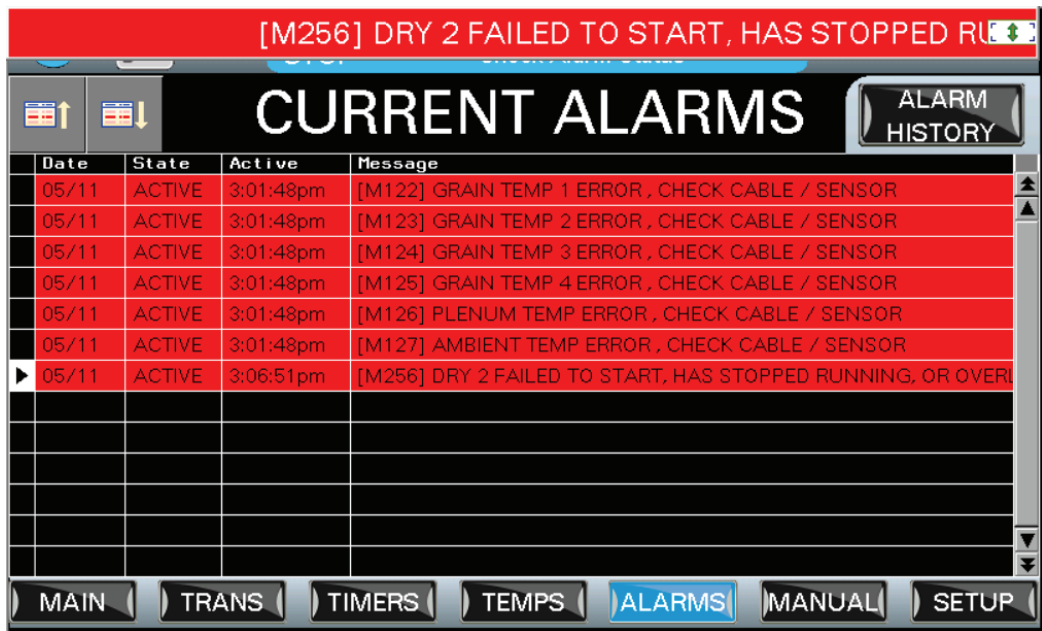
## 6.1. The Current ALARMS Screen

The Current ALARMS screen displays only the currently active alarms. Once the alarm is corrected, the alarm message disappears from the screen and will then only be found on the ALARM HISTORY screen.

**Note**

On the Current ALARMS screen, the alarm messages scroll across the top of the screen from left to right in sequence.

Figure 40. The CURRENT ALARMS Screen



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## 6.2. The ALARM HISTORY Screen

The ALARM HISTORY screen records all system-detectable alarms and errors. Use this list of alarms and errors to determine and aid in resolving any operation problems that result in a system-detectable error or alarm.

**Figure 41. The ALARM HISTORY Screen**

**STATUS BAR:** AUTO BATCH STOP 3:08pm 2020/05/11 APEX CONTROL SYSTEM

**ALARM HISTORY**

Date	Active	RTN	Message
2020/05/11	3:06:51pm	3:07:53pm	[M256] DRY 2 FAILED TO START, HAS STOPPED RUNNING. OR
2020/05/11	3:01:48pm		[M127] AMBIENT TEMP ERROR , CHECK CABLE / SENSOR
2020/05/11	3:01:48pm		[M126] PLENUM TEMP ERROR , CHECK CABLE / SENSOR
2020/05/11	3:01:48pm		[M125] GRAIN TEMP 4 ERROR , CHECK CABLE / SENSOR
2020/05/11	3:01:48pm		[M124] GRAIN TEMP 3 ERROR , CHECK CABLE / SENSOR
2020/05/11	3:01:48pm		[M123] GRAIN TEMP 2 ERROR , CHECK CABLE / SENSOR
2020/05/11	3:01:48pm		[M122] GRAIN TEMP 1 ERROR , CHECK CABLE / SENSOR

**NAVIGATION BAR:** MAIN TRANS TIMERS TEMPS **ALARMS** MANUAL SETUP

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### 6.3. Clearing an Alarm

Figure 42. Active Alarm and Alarm Reset

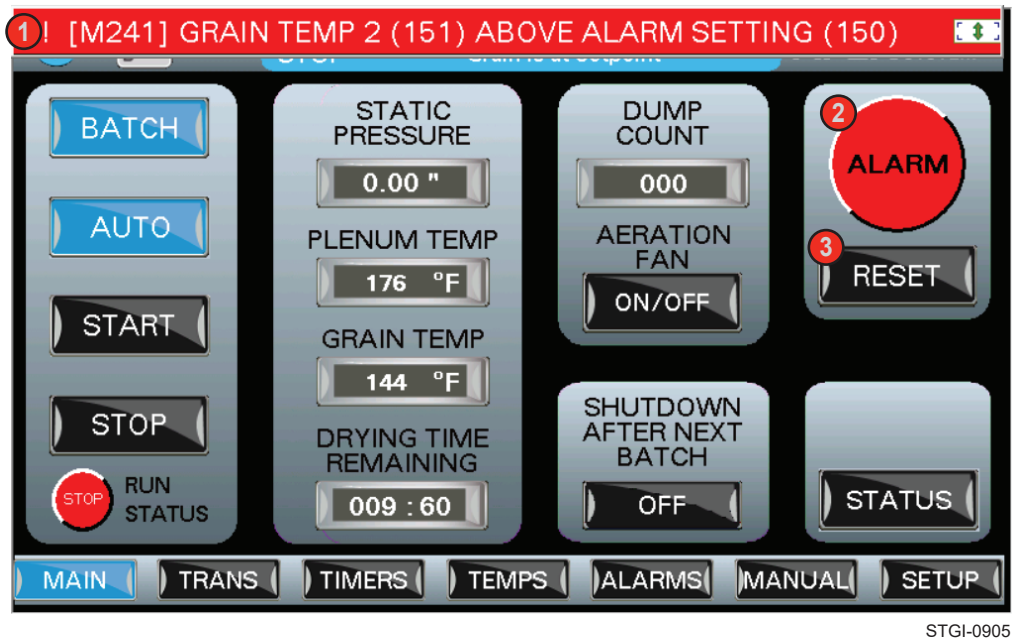


Table 20. MAIN Screen Active Alarm(s) and Alarm Reset

Cal- lout #	Item	Description
1	Scrolling Alarm Message Bar	This message bar displays the active alarm message(s).
2	ALARM Lamp	This lamp appears on the MAIN screen whenever an alarm is active. The lamp and the alarm reset box disappear after the ALARM has been resolved and the RESET button is pressed.
3	RESET button	Press this button after all alarms have been resolved to clear the alarm message(s) from the top of the screen and from the CURRENT ALARMS screen. After the alarms are resolved and the RESET button is pressed the alarm reset box will disappear.

## 6.4. Alarm Codes Trouble Shooting

**Table 21. Alarm Codes Trouble Shooting Table**

HMI Screen Alarm Message	Alarm Message Cause	The Solution
[1000] Emergency Stop Pressed	The Emergency Stop (E-Stop) is pressed.	Reset the E-Stop. Make sure all equipment is safe to operate and all personnel are clear of the equipment before resetting the E-Stop.
[1003] Drying Chamber Fill Switch Error (Input 3)	The drying chamber fill switch has failed.	Check that the switch is correctly installed and wired. Repair or replace the switch.
[1005] Storage Chamber Full Safety Switch Error (Input 5)	The drying chamber fill switch has failed.	Check that the switch is correctly installed and wired. Repair or replace switch.
[MWO] PLC & HMI Version Mismatch, Update PLC & HMI	The PLC and HMI program versions do not match. Check the PLC and HMI revision numbers on the Technician screen.	Reload the newest matching programs on the PLC and HMI.
[M5] Alert, External Call for Dump (Input 23)	The dump cycle is being controlled by an external device such as a moisture sensor.	Turn the setting ON/OFF on the Advanced Setup screen.
[M19] Temperature or Static Pressure Has Reached Alarm Limits — Aeration Fan Shutting Down for Safety Reasons	The plenum high temp alarm setpoint, the grain high temp alarm setpoint, or the static pressure alarm limit setpoint entered on the Temperature Limits screen has been exceeded. The aeration fan has been shut down to prevent a fire or other damage.	Check other alarm conditions and restart the aeration fan if it is safe to do so.
[M26] Final Dry Completed — Shutting Down	The wet supply bin is out of wet grain or the out of wet grain timer has expired. The grain already in the drying chamber has been dried for the final load drying time value entered on the Timers screen.	Refill the wet supply bin and restart the system.
[M65] Dump Monitor Alarm, Maximum Dumps Before Fill Switch Uncovered. Check Fill Switch / Dump Chutes	The maximum number of dumps value set by the operator on the Advanced Setup screen has been reached before the drying chamber fill switch has been uncovered with grain. This means the dump chutes or the drying chamber fill switch are not working properly.	Check the drying chamber fill switch. Repair or replace if needed. Check the dump chutes and hydraulic pump. Repair or replace if needed.
[M68] Max Run Time Exceeded, Increase Max Run Time or Lower Grain Temp Setpoint	The max run time for a drying cycle has been reached before the grain was dried and dumped.	Increase the time for the max run timer on the Advanced Setup screen or lower the grain temp setpoint on the Temperature Limits screen.
[M102] Alert, Advanced Dump Control In Progress, User Set Temp Limit Exceeded	The advanced dump control setting has stopped the dump cycle early to prevent the dumping of wet grain. The average grain temperature is monitored during the dump cycle. If the temperature decrease is more than the user setting, the dump cycle will be stopped early.	Adjust the advanced dump control temperature setting or decrease the dump cycle time.
[M103] PLC System to IO Buss Error	The PLC has detected a communication error.	Check that the PLC expansion modules are tightly connected. Contact technical support.
[M122] Grain Temp 1 Error, Check Cable / Sensor	The PLC has detected an open or shorted electrical connection to the grain temp sensor #1.	Check the wiring or replace the temperature sensor. Turn off the grain temp sensor #1 in the Advanced Setup screen to continue drying.
[M123] Grain Temp 2 Error, Check Cable / Sensor	The PLC has detected an open or shorted electrical connection to the grain temp sensor #2.	Check the wiring or replace the temperature sensor. Turn off the grain temp sensor #2 in the Advanced Setup screen to continue drying.
[M124] Grain Temp 3 Error, Check Cable / Sensor	The PLC has detected an open or shorted electrical connection to the grain temp sensor #3.	Check the wiring or replace the temperature sensor. Turn off the grain temp sensor #3 in the Advanced Setup screen to continue drying.
[M125] Grain Temp 4 Error, Check Cable / Sensor	The PLC has detected an open or shorted electrical connection to the grain temp sensor #4.	Check the wiring or replace the temperature sensor. Turn off the grain temp sensor #4 in the Advanced Setup screen to continue drying.

**Table 21 Alarm Codes Trouble Shooting Table (continued)**

HMI Screen Alarm Message	Alarm Message Cause	The Solution
[M126] Plenum Temp Error, Check Cable / Sensor	The PLC has detected an open or shorted electrical connection to the plenum temp sensor.	Check the wiring and replace the temperature sensor.
[M127] Ambient Temperature Error, Check Cable / Sensor	The PLC has detected an open or shorted electrical connection to the ambient temp sensor.	Check the wiring or replace the temperature sensor. Turn off the ambient temperature sensor in the Setup screen.
[M140] Drying Chamber Full — Wet Load — Manual Mode	The drying chamber fill switch has been covered with grain while the wet transports are running in manual mode. The wet transports will not automatically shut off in Manual Mode.	Stop the wet transports on the Manual screen before the drying chamber is over-filled.
[M141] Out of Wet Grain — Wet Load — Manual Mode	The wet supply bin switch has become uncovered and no longer senses grain while the wet transports are running in Manual Mode. The wet supply bin is low or out of wet grain. Wet transports will not automatically shut off in Manual Mode.	Stop the wet transports on the Manual screen. Refill the wet supply bin or finish drying the remaining wet grain in the drying chamber.
[M146] Static Pressure (<var: Static_pressure_c,3.0>) is lower than safe (<var: Hmi_static_pressure_safe,3.0>)	The static pressure is lower than the static pressure limit setpoint entered on the Temperature Limits screen.	Check the grain level in the drying chamber for the proper thickness. Adjust the safe limit setpoint to a lower value. Check that the static pressure sensor is working properly. Turn the static pressure sensor off on the Setup screen.
[M147] There is Nothing to Start — Check Sensors and Configuration for Auto Mode	The PLC senses there is no grain in the wet supply bin and no grain in the drying chamber. The system will not start in Auto Mode.	Add grain to the wet supply bin or drying chamber. Check PLC configuration settings or check if grain level switches are installed and working properly.
[M149] Low Grain Switch and Storage Chamber Full Switch Do Not Agree (Inputs 7, 4)	The storage chamber full switch is detecting grain while the low grain switch is not detecting grain.	Check that the switches are installed and wired correctly. Repair or replace the switch.
[M153] Storage Chamber Low Grain — Dry Unload — Manual Mode (Input 7)	The storage chamber low grain switch has become uncovered and no longer senses grain while the dry transports are running in Manual Mode. The dry transports will not automatically shut off in Manual Mode.	Stop the dry transports on the Manual screen.
[M158] Ready to Dump But Storage Chamber Full — Waiting for Bin to Empty to Restart Auto Mode	The storage chamber switch has become covered with grain indicating the storage chamber is full.	Grain must be unloaded from the storage chamber to restart the dryer.
[M177] Batch Dump Complete — Wet Load Mode Manual — Shutting Down	The batch cycle has been completed and the system is shutting down because the wet transports are in Manual Mode and cannot restart.	Turn the wet load transports to auto on the Transports screen.
[M182] Aeration Fan Failed to Start, Has Stopped Running, Or Overload Tripped	The contacts on the aeration fan motor starter failed to close when the starter was energized, or the thermal overload has tripped indicating an overcurrent condition.	Check the aeration fan motor starter is wired and working properly when energized or if the thermal overload has tripped. Manually reset the thermal overload, or repair or replace the motor starter.
[M192] Static Pressure (<var: Static_pressure_c,2.1>) Above Alarm Setting (<var:Hmi_static_pressure_alarm,2.1>)	The plenum static pressure has exceeded the static pressure alarm limit setpoint entered on the Temperature Limits screen.	Check if the roof vents are plugged with debris or ice. Check if the drying chamber floor screens are plugged with debris. Adjust the static pressure alarm limit setpoint entered on the Temperature Limits screen.
[M201] Fan 1 Failed to Start, Has Stopped Running, or Overload Tripped (Input 16)	The contacts on the fan #1 motor starter failed to close when the starter was energized, or the thermal overload has tripped indicating an overcurrent condition.	Check the fan #1 motor starter is wired and working properly when energized or if the thermal overload has tripped. Manually reset the thermal overload, or repair or replace the motor starter.
[M204] Fan Failed to Start, Has Stopped Running, Or Overload Tripped (Input 17)	The contacts on the fan #2 motor starter failed to close when the starter was energized, or the thermal overload has tripped indicating an overcurrent condition.	Check the fan #2 motor starter is wired and working properly when energized or if the thermal overload has tripped. Manually reset the thermal overload, or repair or replace the motor starter.



**Table 21 Alarm Codes Trouble Shooting Table (continued)**

HMI Screen Alarm Message	Alarm Message Cause	The Solution
[M220] Burner 1 Failed to Start on Low (Input 19)	Burner #1 failed to light during the ignition period.	Check that fuel is getting to the burner, the solenoid gas valves are working properly, the ignitor is sparking, and the adjustment of the flame sensor. Check that the wiring for burner #1 low flame is installed correctly. Check that the burner #1 low flame relays are working properly in the PLC control box. Increase the burners low safety time value on the Advanced Timers 2 screen.
[M221] Burner 2 Failed to Start on Low (Input 21)	Burner #2 failed to light during the ignition period.	Check that fuel is getting to the burner, the solenoid gas valves are working properly, the ignitor is sparking, and the adjustment of the flame sensor. Check that the wiring for burner #1 low flame is installed correctly. Check that the burner #2 low flame relays are working properly in the PLC control box. Increase the burners low safety time value on the Advanced Timers 2 screen.
[M223] Plenum Temperature (<var:Plenum_e,3.0>) Is Above Alarm Setting (<var:Plenum_alarm_set,3.0>)	The plenum temperature has exceeded the plenum high temp alarm setpoint entered on the Temperature Limits screen.	Lower the plenum temp setpoint or increase the plenum high temp alarm setpoint.
[M224] Burners 1 or 2 No Hi Flame (Inputs 20 or 22)	Burner #1 or #2 has failed to go to high flame.	Check that the hi/low gas valve is working properly. Check that the wiring for burners #1 or #2 high flame is installed correctly. Check that the burners #1 or #2 high flame relays are working properly in the PLC control box. Increase the burners high safety time value on the Advanced Timers 2 screen.
[M230] Out of Wet Grain Timer Expired	The out of wet grain timer has expired. The wet supply bin is out of wet grain or the fill system is filling too slowly.	Refill the wet supply bin or adjust the out of wet grain timer value on the Timers screen to account for the slow fill system.
[M231] Wet Grain Switch Uncovered — Out of Wet Grain (Input 1)	The wet grain switch has become uncovered and no longer senses grain. The wet supply bin is low or out of wet grain.	Refill the wet supply bin or finish drying the remaining wet grain in the drying chamber.
[M240] Grain Temp 1 (<var:Grain1_e,3.0>) Above Alarm Setting (<var:Grain_high_alarm, 3.0>)	The grain temperature at the grain temp probe #1 has exceeded the grain high temp alarm setpoint entered on the Temperature Limits screen.	Check for over-dried grain or plugged dump chutes.
[M241] Grain Temp 2 (<var:Grain2_e,3.0>) Above Alarm Setting (<var:Grain_high_alarm,3.0>)	The grain temperature at the grain temp probe #2 has exceeded the grain high temp alarm setpoint entered on the Temperature Limits screen.	Check for over-dried grain or plugged dump chutes.
[M242] Grain Temp 3 (<var:Grain3_e,3.0>) Above Alarm Setting (<var:Grain_high_alarm,3.0>)	The grain temperature at the grain temp probe #3 has exceeded the grain high temp alarm setpoint entered on the Temperature Limits screen.	Check for over-dried grain or plugged dump chutes.
[M251] Wet 2 Failed to Start, Has Stopped Running, or Overload Tripped (Input 11)	The contacts on the wet transport #2 motor starter failed to close when the starter was energized, or the thermal overload has tripped indicating an overcurrent condition.	Check the wet transport #2 motor starter is wired and working properly when energized. Check the transport for a plugged condition or other problem. Manually reset the thermal overload, or repair or replace the motor starter.
[M254] Wet 1 Failed to Start, Has Stopped Running, or Overload Tripped (Input 10)	The contacts on the wet transport #1 motor starter failed to close when the starter was energized, or the thermal overload has tripped indicating an overcurrent condition.	Check the wet transport #1 motor starter is wired and working properly when energized. Check the transport for a plugged condition or other problem. Manually reset the thermal overload, or repair or replace the motor starter.

**Table 21 Alarm Codes Trouble Shooting Table (continued)**

<b>HMI Screen Alarm Message</b>	<b>Alarm Message Cause</b>	<b>The Solution</b>
[M256] Dry 2 Failed to Start, Has Stopped Running, Or Overload Tripped (Input 9)	The contacts on the dry transport #2 motor starter failed to close when the starter was energized, or the thermal overload has tripped indicating an overcurrent condition.	Check the dry transport #2 motor starter is wired and working properly when energized. Check the transport for a plugged condition or other problem. Manually reset the thermal overload, or repair or replace the motor starter.
[M258] Dry 1 Failed to Start, Has Stopped Running, Or Overload Tripped (Input 8)	The contacts on the dry transport #1 motor starter failed to close when the starter was energized, or the thermal overload has tripped indicating an overcurrent condition.	Check the dry transport #1 motor starter is wired and working properly when energized. Check the transport for a plugged condition or other problem. Manually reset the thermal overload, or repair or replace the motor starter.
[M277] Storage Chamber Full — Manual Dry Transports Mode — Shutting Down	The storage chamber is full of grain and the dry transports are in Manual Mode. The system is shutting down until the storage chamber is unloaded.	Start the dry transports on the Transports screen to unload the storage chamber.
[M278] Dry Bin & Storage Chamber Full — Shutting Down	The dry bin and the storage chamber are full of dry grain and the system is shutting down.	Unload the dry bin and storage chamber.
[M279] Dry Bin Full — Dry Unload — Manual Mode	The dry bin full grain switch has become covered with grain while the dry transports are running in Manual Mode. Dry transports will not automatically shut off in Manual Mode.	Stop the dry transports on the Manual screen.
[M324] Final Batch Completed — Shutting Down	The shutdown after next batch setting is selected on the Main screen. This shuts down the system in Auto Batch Mode after the next batch is dried and dumped.	Turn Off the 'shutdown after next batch' setting on the Main screen and restart the system.
[M327] Manual Batch Complete — Shutting Down	The batch of grain is dry and ready to dump. The dump chutes are set to manual.	Manually dump the grain from the drying chamber. Set the dump chutes to Auto if a hydraulic dump unit is installed.
[M328] Batch Did Not Dump — Check Hydraulic Dump Unit and Drying Chamber Fill Switch	The drying chamber fill switch did not become uncovered when the batch was dumped.	Check that the hydraulic dump unit and the drying chamber fill switch are working properly.
[M340] Burner 1 Air Switch Has Failed, Check Air Switch (Input 12)	The burner #1 air switch has failed to close and allow the burner to start.	Check that the vacuum tube is installed correctly. Check that the air switch is wired and adjusted correctly. Adjust, fix, or replace the air switch.
[M341] Burner 1 High Limit Switches Failed, Check Transition and Vapor High Limit Switches (Input 13)	The burner #1 transition high limit switch or the vapor high limit switch has tripped, and the burner cannot start. The burner is overheating.	Correct the overheating issue and manually reset limit switch.
[M342] Burner 2 Air Switch Has Failed, Check Air Switch (Input 14)	The burner #2 air switch has failed to close and allow the burner to start.	Check that the vacuum tube is installed correctly. Check that the air switch is wired and adjusted correctly. Adjust, fix, or replace the air switch.
[M343] Burner 2 High Limit Switches Failed, Check Transition and Vapor High Limit Switches (Input 15)	The burner #2 transition high limit switch or the vapor high limit switch has tripped, and the burner cannot start. the burner is overheating.	Correct the overheating issue and manually reset the limit switch.

# 7. Appendix

## 7.1. Apex Controls Select Important Concepts and Terms

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### Important Concepts

#### 1. The Apex Controls 2 main methods of drying and their types of operation:

##### A. BATCH DRYING

- Auto Batch Mode (a type of Auto Mode)
- Manual Batch Mode (a type of Batch Mode)

##### B. CONTINUOUS FLOW DRYING (also known as Continuous Flow)

- Auto Mode
- Manual Mode

#### 2. Apex Controls dryer system and equipment 2 modes of operation.

##### A. Auto Mode

##### B. Manual Mode

#### Note

See the [Section 4.3 – Simplified System Operation Description on page 14](#) which offers a simplified visual picture of bin dryer controls bin operation.

## Important Terms

### Ambient Temperature —

The ambient temperature refers to the current overall temperature of the air outside the bin dryer controls bin.

### Auto —

This word can refer to when the drying is being run automatically. This word can refer to when an item of equipment is run automatically.

### Auto Batch Operation —

See [Section 4.8.2 – Auto Batch Operation on page 66](#).

See [Section 3.3 – Continuous Flow Drying on page 11](#).

### Auto (Mode) —

This word refers to when the dryer is automatically operating using the continuous flow drying method.

See [Section 4.7 – HMI Auto Mode Start-Up and Operation on page 62](#).

### Batch Drying —

See [Section 3.2 – Batch Drying on page 11](#).

### Continuous Flow Operation (also known as Continuous Flow or Continuous Flow Drying) —

See [Section 3.3 – Continuous Flow Drying on page 11](#).

See [Section 4.8.1 – Continuous Flow Operation on page 65](#).

### Manual Batch Operation —

See [Section 4.8.3 – Manual Batch Operation on page 66](#).

### Manual (Mode) —

When the dryer or an item of equipment is set to operate and/or is operated manually and not automatically.

### Manual Operation —

See [Section 4.8.4 – Manual Operation on page 67](#).

See [Section 4.5.14 – The MANUAL Screen on page 38](#).

See [Section 4.8.3 – Manual Batch Operation on page 66](#).

### PLC —

Programmable Logic Controller

See the [Section 3.1 – Bin Dryer Control Systems and Sensors Overview Drawing on page 10](#) which is a simplified illustration of the PLC, the PLC controlled components, and the connections between the PLC and the PLC controlled components.

### Plenum —

A space, below the floor of the bin drying chamber, that serves as a receiving and distribution chamber for air that has been heated.

### Static Pressure —

This is the resistance to the airflow in the plenum.

### Wet Load Mode —

This refers to the mode the wet transports are running in which can be either Auto or Manual.

## 8. Warranty

AGI (the **Company**) makes the following warranty to the initial retail purchaser of its products (the **Customer**).

### **Materials and Workmanship**

The Company warrants products manufactured by it to be free from defects in materials and workmanship in normal use and service for a period of one (1) year after date of delivery to the Customer.

### **Company's Obligation and Customer's Exclusive Remedy**

The Company's sole obligation and the Customer's exclusive remedy under this warranty is as follows:

If within one (1) year after delivery to the customer the product fails to function properly due to a defect in either materials or workmanship, the Company will at its option, either repair the defective part or replace the defective part with a new or reconditioned part. Labor charges for removing defective parts and installing replacement parts, shipping charges with respect to such parts, and applicable sales and other taxes, if any, shall not be covered by this warranty.

### **Conditions, Limitations, and Exclusions**

There are no warranties or merchantability or fitness for a particular purpose with respect to any product manufactured or sold by the Company. Motors provided by the Company are in most instances warranted by the manufacturer thereof and are not warranted by the Company. The Company shall not be responsible under this warranty or otherwise for personal injury or for Incidental or Consequential Damages, including, without limitation, loss of use and lost profits. This warranty does not apply to defects or damages caused by misuse, improper maintenance, or improper installation of the Company's product or any equipment attached to or used in connection with the Company's product. The Company reserves the right to make changes or improvements to its products without incurring any obligation with respect to previously manufactured products. Field modification of this product without the expressed written permission of the Company constitutes a misuse of the product. The Company shall have no liability under this warranty until payment in full for the product in question has been made by the customer. The foregoing is the sole warranty made by the Company. No one is authorized to make other warranties on behalf of the Company.



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