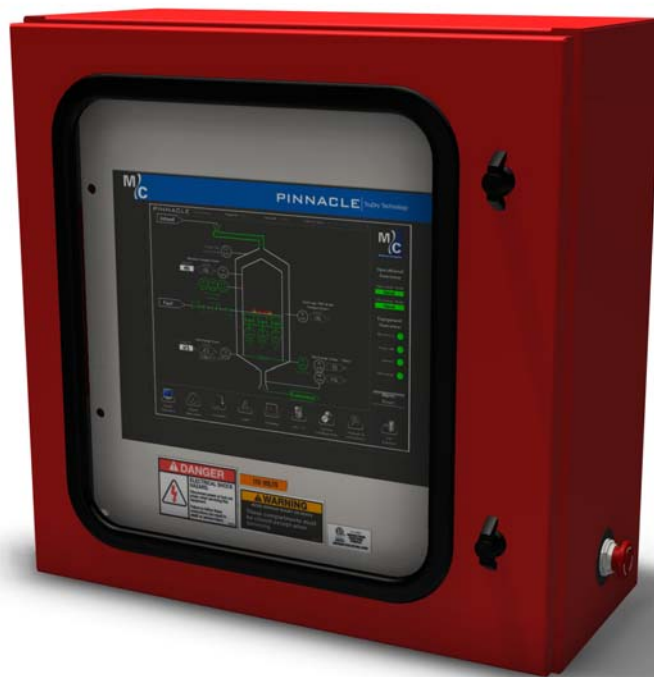


Volume **2**



MATHEWS COMPANY

Pinnacle



© 2011 Mathews Company
500 Industrial Avenue
Crystal Lake, IL 60012 USA
Toll Free Number: (800) 323-7045
www.mathewscompany.com



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Controls Manual



CONTROLS MANUAL - PINNACLE

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Section 1: Introduction

User Interface

The side bar gives an operational overview showing the *Operation* and *Discharge* modes (*MANUAL* or *AUTOMATIC*). Green colored lights indicate what components are operating. There is a button to reset alarms and, at the bottom, an icon to exit the Pinnacle runtime application, taking the user back to the Windows®-based desktop.

On the bottom of the screen, there is a navigation bar to move through the menu options referred to as chapters. When one of the icons is selected, it will appear in color; whereas the other icons appear in black and white.

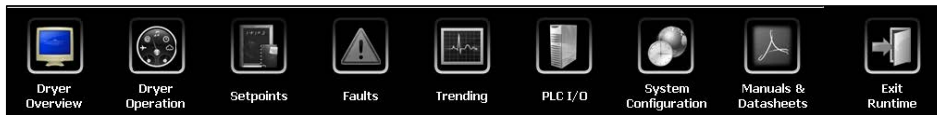
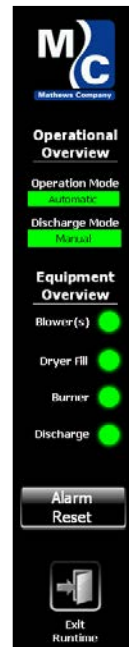


Figure 1: "Navigation Bar"



The *Alarm Rest* button will allow you to reset a current alarm, by pushing this button.

Change the numerical value by pressing inside any white field. This will bring up a number keypad.

Enter the desired value and press "**Enter**" to return to the previous screen. If you do not wish to change the value, press "**Esc**" to return to the previous screen without making a change. If the text turns red during entry, the value is outside the acceptable range of values permitted for that variable.

The minimum and maximum values are shown below the entry field.

The [**←**] button will delete one digit and [**Clr**] will delete the whole number.



Figure 2: "Numerical Keypad"

While navigating through the system, remember that fields with gray backgrounds refer to actual values and cannot be modified. Fields with white backgrounds are set points, which can be modified using the keypad.

Press the “?” icon to activate the full-screen pop-up help screens. Each screen provides additional information about the adjacent field or button.

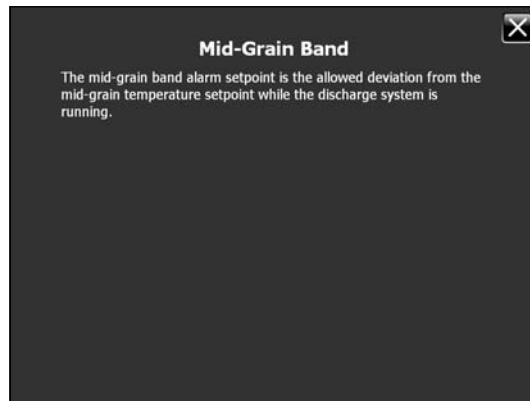


Figure 3: "Mid-Grain Band Help Screen"

After a lapse of time, the screen saver will appear. Simply touch anywhere on the screen to make the screen saver disappear and revert to the screen most recently displayed.

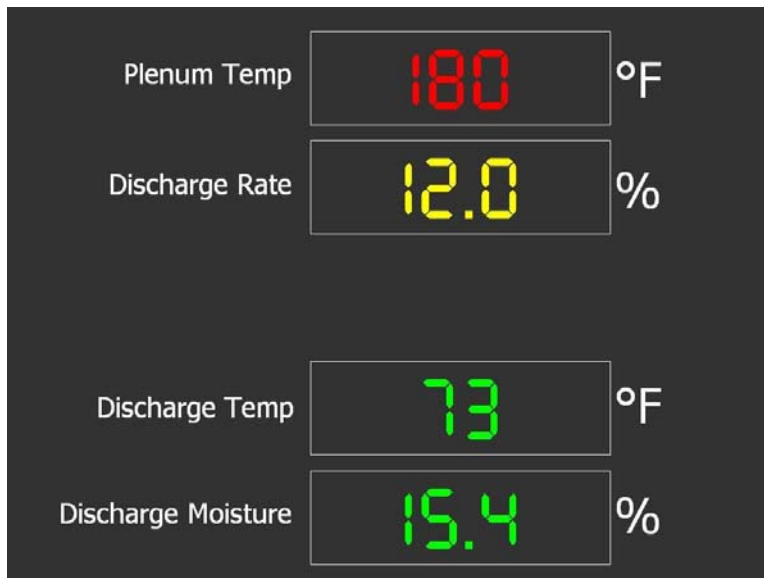


Figure 4: "Screen Saver"



Overview Screen

Change the plenum temperature set point by touching the white set point field.

Turns green when the customer fill equipment is energized.

Turns green when enabled and the auger moves when the grain fill is occurring.

Average of the readings from the four mid-grain temperature probes (RTDs).

Discharge temperature and moisture percentages are displayed.

Valves turn green as gas train is energized. Animation shows position of gas control valve.

Change the discharge rate in manual mode by touching the white set point field.

Animation shows the center dump or discharge auger action and turns green when activated.

Dryer overview screen (shown) is an animated visualization of the drying process.

Set operation and discharge modes and monitor the operational timers as the dryer runs. Also used for starting/stopping the dryer in manual or automatic mode.

Change any of the operational or alarm set points for the various parts of the system.

View and address faults and fault history.

View current and past data in a chartable graph format.

See values of analog inputs/outputs or status of digital inputs/outputs.

Configure system options and view factory settings.

View dryer manuals and electrical schematics.

Operational Overview
 Operation Mode: Manual
 Discharge Mode: Manual

Equipment Overview
 Blower(s):
 Dryer Fill:
 Burner:
 Discharge:

Alarm Reset

Navigation Menu:
 Dryer Overview | Dryer Operation | Setpoints | Faults | Trending | PLC I/O | System Configuration | Manuals & Datasheets | Exit Runtime



Section 2: Operation

Operation Screen

From the dryer operation screen, you can select *MANUAL* or *AUTOMATIC* mode for the dryer operation and the discharge. Attempting to change the operation mode while the dryer is running is not possible as the button is grayed out.

To override the blower restart delay, click the box "**OK to Restart Blower (s).**" You will be prompted to enter your maintenance password. If a soft starter is installed, this option is not available and it is necessary to wait for the time to elapse.

The discharge mode and operational timers are shown in both *MANUAL* and *AUTOMATIC* modes. The discharge mode can be changed from manual to automatic by simply checking the corresponding box. Readings from the operational timers include: Fill start and stop delays, takeaway delay, grain flow and cool-down timers, and blower confirmation delay.

When a timer is counting down, the digits in that field turn green to show that it is active.

Manual Operation Mode

The options in *MANUAL* mode are comprised of two buttons each for blower(s), fill, burner and discharge. To start a component, press the button in the left hand column with the green lettering. To stop that particular component, press the opposite red-lettered button in the right hand column.

If a component is currently operating, the green button will have dimmed and the red button will be highlighted, showing the option to stop the operating component.

Discharge Mode

Choose between *MANUAL* or *AUTOMATIC* (*TruDry*) technology discharge mode. *MANUAL* mode shows the percentage unload. *TruDry* (*AUTOMATIC*) mode uses an average mid-grain temperature and shows the set point and actual values.



Automatic Operation Mode

In **AUTOMATIC** mode, there is a checklist to confirm that the start-up conditions are met.

OK To Restart Blowers: The delay is used to prevent immediate restarting of the blower(s) after they have stopped. Pressing the *OK to Restart* button will override the timer after entering a password.

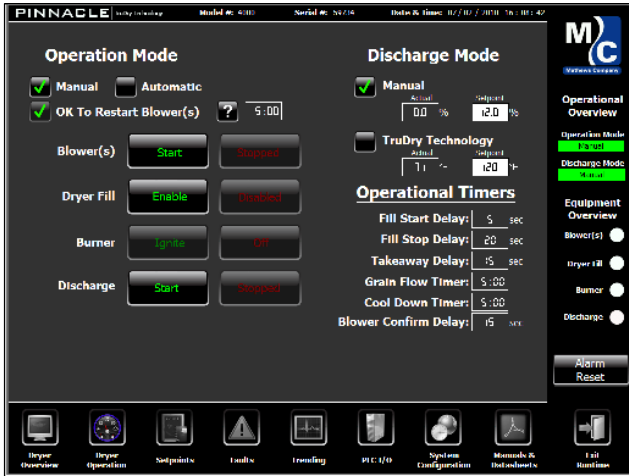


Figure 5: "Dryer Operation Screen MANUAL Mode"



Figure 6: "Dryer Operation Screen AUTOMATIC Mode"

Once the startup conditions have been met, the green **Start-Up** button will be illuminated and the dryer can be started. When the *Start-Up* button has been pressed, the dryer will sequentially start the blowers and enable the fill equipment. As the blower(s) are starting, a blower confirmation delay timer will elapse to allow air pressure to build up. If the dryer is empty, the fill equipment will operate and grain will be introduced to the dryer until the fill level is sufficient to actuate the fill switch, which indicates to the system that the dryer has completed a first-time fill. Provided that sufficient air pressure has been developed, the ignition process will be initiated and a popup window will appear, advising the operator of the status of the ignition process.

A series of pop-up screens will guide you through the ignition process. Open the manual gas valves at this point, if not already open.

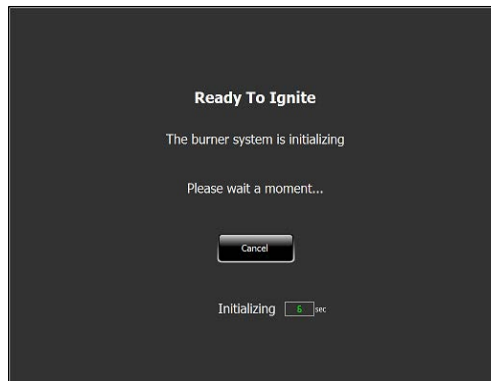


Figure 7: "Ignition Pop-Up Screen"



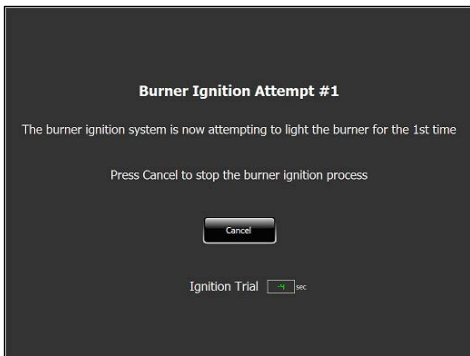
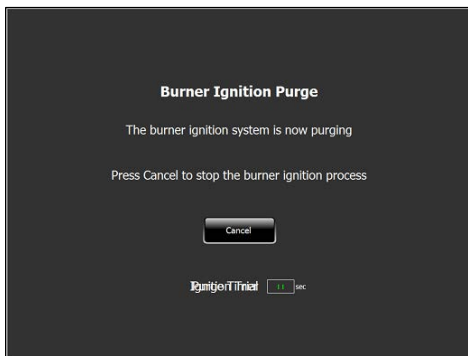
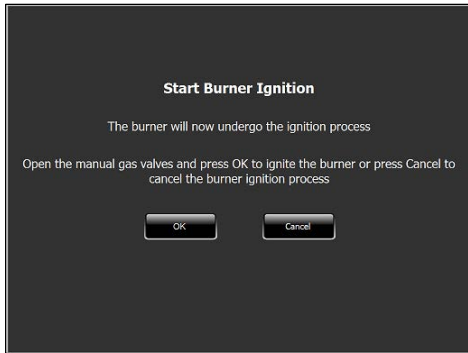


Figure 8: "Burner Sequence"

The ignition sequence is started, followed by an ignition purge and then up to three attempts to ignite the burner.

Press the **"COOL DOWN"** button to stop the fill, discharge and burner. The fan(s) will continue to run until the cool down timer is finished. Press **"YES"** to confirm cool-down.

Press the **"NO"** button to return to the *Dryer Operation* screen and continue operating in *AUTOMATIC* mode.



Figure 9: "Dryer Cool Down Screen"

Once the dryer is running, the green *Start-Up* button at the bottom of the *"Dryer Operation"* screen will go dim.

If the dryer is in cool down mode, pressing the *Restart* button generates a pop-up that reiterates the current state of the fill, blower(s), burner and discharge outlined on the *Dryer Operation* screen.

The option is given to restart the dryer or to cancel and go back to the *Dryer Operation* screen.

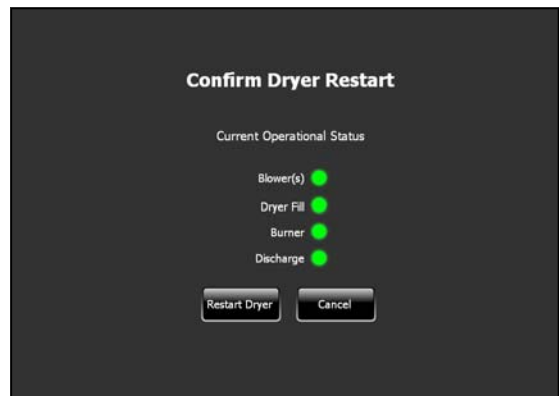


Figure 10: "Dryer Restart Screen"



Press the **“Shut Down Dryer”** button to stop the fill, discharge, and burner. Note that pressing this button will also stop the fan(s), which will leave hot grain in the dryer. Press **“YES”** to confirm shutdown.

Press the **“NO”** button to return to the *Dryer Operation* screen and continue operating in *AUTOMATIC* mode.



Figure 11: "Dryer Shut Down Screen"

Alarm Set Points



Figure 12: "Alarm Set Point Screen"



The first in the sequence of setpoint screens is the *Alarm Set Point* screen. From here, the operator can change six different alarm set points and toggle one alarm:

Mid-Grain Band

The *Alarm Set Point* is the allowed deviation from the *mid-grain temperature* set point while the *discharge system* is running.

Mid-Grain Band Delay

The *Mid-Grain Band* delay is a user-defined time duration that will delay the cool down of the dryer after the *Mid-Grain Band* warning alarm has occurred.

Discharge Moisture Low Limit

The *Discharge Moisture Low Limit* alarm set point is a discharge moisture value that will trigger an alarm when the value drops below the *discharge moisture low limit* set point for duration of 5-minutes while the discharge is running.

Discharge Moisture High Limit

This *Discharge Moisture High Limit* alarm set point is a discharge moisture value that will trigger an alarm when the value exceeds the *discharge moisture high limit* set point for duration of 5-minutes while the discharge is running.

Grain Flow Timeout

The *Grain Flow Timeout* set point is the time delay allowed once the grain level has dropped below the *bin level* switch. Once the grain flow timeout set point has been reached, an alarm will be triggered that will place the dryer into *COOL-DOWN* mode.

Plenum Temperature Band

The *Plenum Temperature* band is the maximum allowed deviation between the actual plenum temperature and the plenum temperature set point.



Operational Setpoints



Figure 13: "Operational Set Point Screen"

Plenum Temp Control

Plenum Temperature

The *Plenum Temperature* set point is used to control the plenum temperature when the burner is lit. The PLC will control plenum temperature by adjusting the *burner control* valve to increase or decrease the amount of fuel flowing to the burner.

Control Valve Initial Opening

The *Control Valve Initial Opening* is the position of the fuel control valve commanded as the burner is undergoing the initial ignition sequence.

Control Valve Min Opening

The *Fuel Control Valve Minimum Opening %* set point is the lowest possible control valve output allowed by the dryer.



Control Valve Max Opening

The *Fuel Control Valve Maximum Opening %* set point is the highest possible control valve output allowed by the dryer.

Auto Temp Adjust Jump

The *Auto Temp Adjust Jump* set point refers to the automatic temperature decrease of the plenum temperature set point when the *VFD back off speed* set point has been reached.

Auto Temp Adjust Max

The *Auto Temp Adjust Max* set point refers to the total allowed adjustment to the plenum temperature as a result of multiple auto temp adjustments.

Auto Adjust Timer

The *Auto Adjust Timer* refers to the time before an automatic temperature adjustment is made to the plenum temperature set point.

VFD Back off Speed

The *VFD Back-off Speed* refers to the VFD speed at which the automatic plenum temperature set point adjustment feature will become enabled.

Dryer Operation

Cool-Down Timer

The *Cool-Down Timer* refers to the length of time that the dryer will be placed in **COOL-DOWN** mode following a type-B fault or when the dryer is placed in **COOL-DOWN** mode.

Mid-Grain Temp

The *Mid-Grain Temperature* set point refers to the target mid-grain temperature that the dryer will attempt to maintain during automatic discharge control.



Dryer Discharge

Minimum Discharge Speed

The *Minimum Discharge Speed* setpoint is the lowest possible discharge speed allowed by the dryer. When the discharge speed is manually adjusted, the lowest possible value allowed is the *Minimum Discharge Speed* set point.

Maximum Discharge Speed

The *Maximum Discharge Speed* setpoint is the highest possible discharge speed allowed by the dryer. When the discharge speed is manually adjusted, the highest possible value allowed is the *Maximum Discharge Speed* set point.

Discharge Speed

The *Discharge Speed* setpoint is the commanded speed sent to the discharge VFD (%) when the dryer is in the *MANUAL* discharge mode.

Fill & Takeaway Equipment

Fill Start Delay

The *Fill Start Delay* set point refers to the time between when the grain level has dropped below the *Bin Level* switch and when the *Dryer Fill System* is activated.

Fill Stop Delay

The *Fill Stop Delay* set point refers to the time between when the grain level has risen above the *Bin Level* switch and when the *Dryer Fill System* is deactivated.

Takeaway Cleanout Delay

The *Takeaway Cleanout Delay* setpoint refers to the amount of time that the dryer takeaway system will be commanded to operate after the *Dryer Discharge* system has stopped.

Press the next arrow button to move on to the final setpoint screen, which includes control temperature and moisture calibration and PID set points for plenum and mid-grain temperatures.



Sensor Calibration

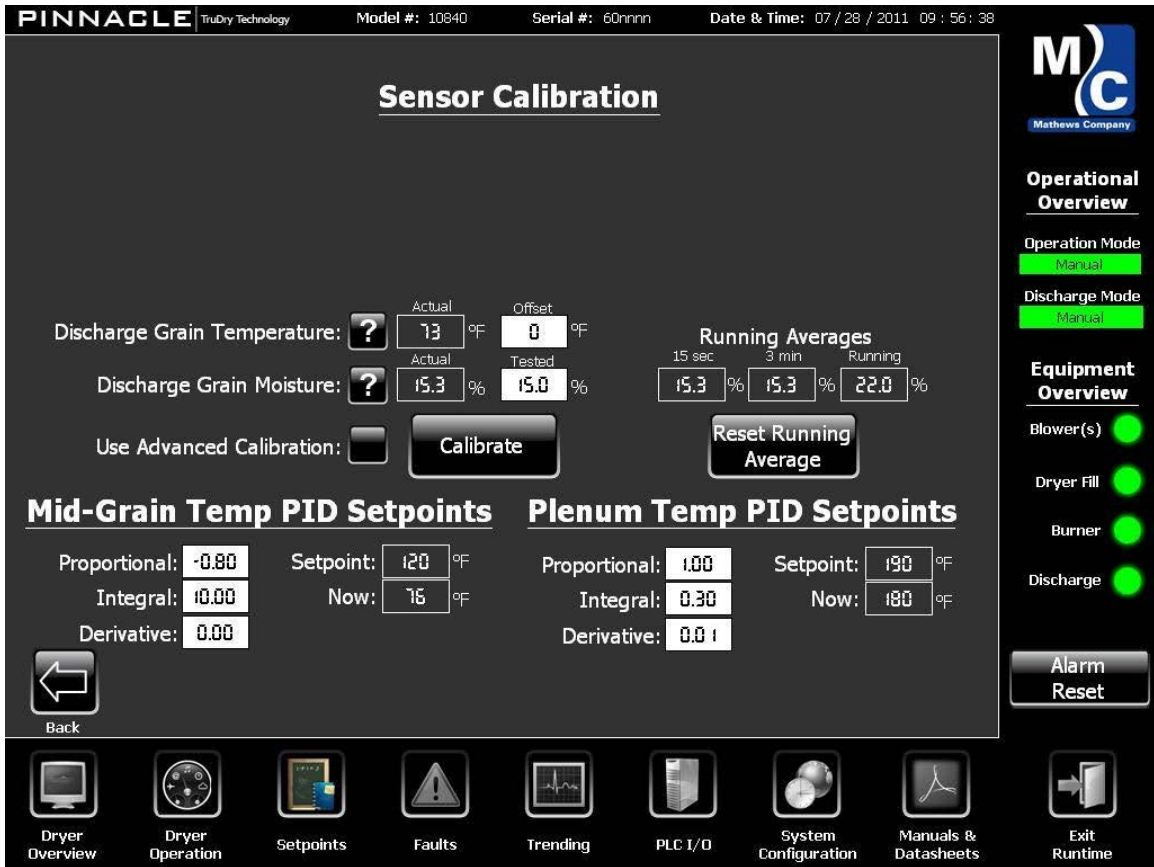


Figure 14: "Sensor Calibration Screen"

Discharge Grain Temperature

The *Discharge Temperature* is the reading from the moisture sensor. In order to calibrate the discharge temperature, the user must enter an offset value from the actual sensor temperature.

Two Modes of Sensor Calibration

Two modes are available which are selectable by pressing the "**Use Advanced Calibration**" button.

Using the simple method, the *Use Advanced Calibration* button is NOT checked and the *Actual* discharge moisture is the reading from the moisture sensor. The *Tested* value is a user defined input that is based on a tested grain sample. The operator will take a sample of grain and test the moisture content using a suitable grain moisture testing instrument. The moisture value determined is then entered in the field marked "*Enter Sample*" and pressing the "*Calibrate*" button will update the calibration being used. The operator will see the *Discharge Moisture* value adjust to align with the sampled grain. There are limitations with this method of calibration:



1. Only one data point is being used to determine the scaling used by the Pinnacle system.
2. It is assumed that the sensor has a linear relationship over the range of moisture being sampled and that a zero value signal from the moisture sensor means the moisture value is 0%.

Also shown are running averages of moisture percentages after 15 seconds, 3 minutes and a running average percentage. Press the **“Reset Running Average”** button to reset the running averages.

Pressing the *Use Advanced Calibration* button will take the operator to the advanced calibration screen.

Advanced Moisture Sensor Calibration

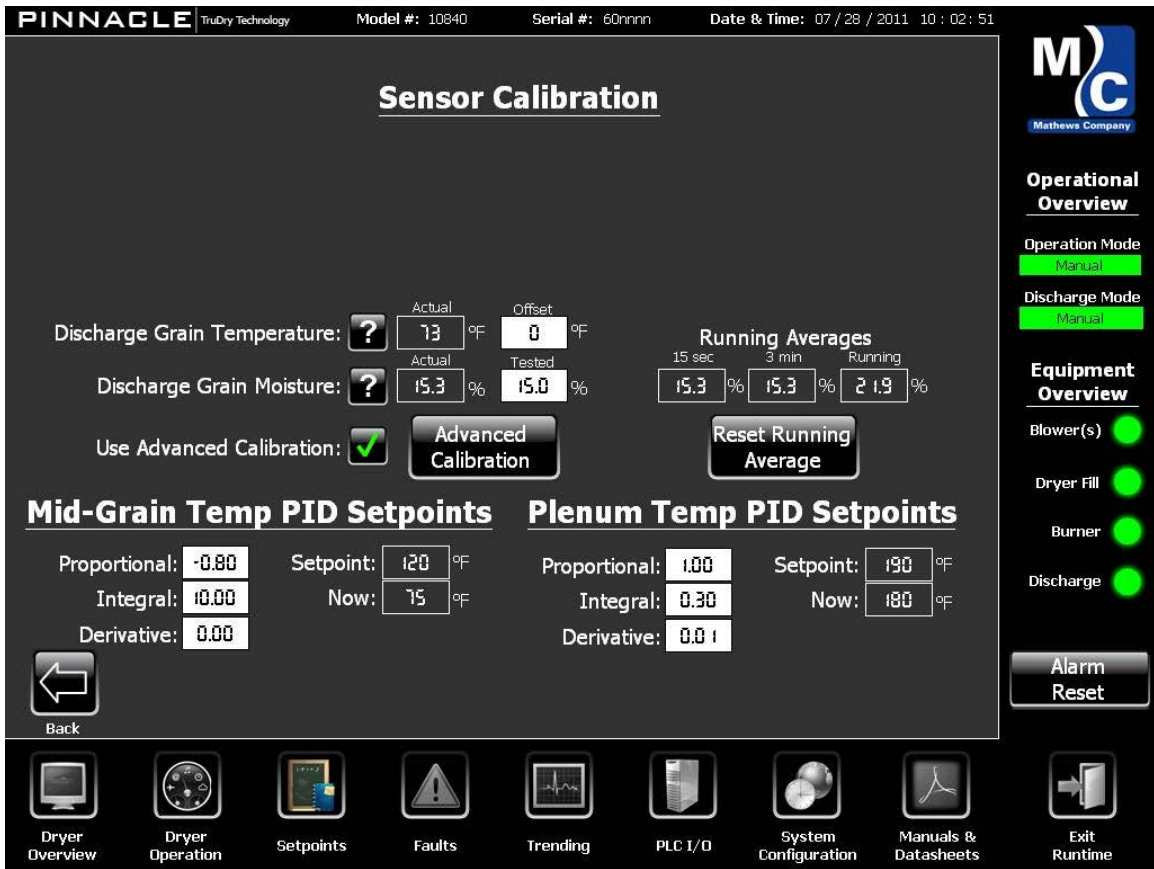


Figure 15: "Sensor Calibration Screen (Advanced Mode Selected)"



By selecting the *Use Advanced Calibration* button, an enhanced moisture sensor calibration is provided. The operator is able to accumulate multiple sample points and determine a calibration which includes an offset value. Note there are two entries, Slope and Intercept. This permits the calibration to properly reflect the characteristic of the moisture sensor. Pressing the *Advanced Calibration* button will take the operator to the following screen:




Figure 16: "Advanced Sensor Calibration Screen"



The operator may enter up to ten (10) sample points which are displayed in a table on the left of the calibration screen; note that there is a time stamp field for each data point.

The two fields *Slope* and *Int* refer to the calibration slope and intercept. The white fields are the proposed values. Each time a data point is added or removed the “*Proposed*” values can be updated.

The procedure is as follows:

1. Note the *Current Slope* and *Intercept* values. If you are changing the grain type and wish to return to a previous calibration; you can use these values to quickly restore the calibration.
2. Make sure that grain is moving past the grain sensor.
3. Take a sample of grain from the sampling point by the moisture sensor and using a suitable grain moisture tester, determine the actual moisture of the grain. It is assumed that the temperature of the grain being sampled is not too hot for the moisture tester.
4. Enter the actual moisture value in the “*Moisture Sample*” field on the screen.
5. Add the sample by pressing the “+” button next to one of the table entries which you have not yet entered a value.
6. You can delete a calibration point by pressing the  next to the table entry.
7. Each time you add or delete a calibration point, press the “**Re-Scale Data Points**” button, you will see the graph rescale to reflect the changed data points
8. Press the “**Re Calculate Proposed**” button and you will see the *Proposed Slope* and *Int.* values change.
9. Once you are satisfied with the calibration points you have recorded; pressing the **Apply Calibration** button will update the calibration being used.

Note that if you wish to return to the previous calibration you can re-enter the values that you recorded in step number one.

Mid-Grain Temperature PID Set Points

The *Mid-Grain Temperature PID* setpoints allow the operator to adjust the settings of the *Proportional-Integral-Derivative (PID)* controller. Each of the three fields provides a value in the control loop feedback. The PID loop is used to automatically regulate the discharge speed, based on the mid-grain temperature reported by the four mid-grain temperature probes (RTDs). These values are password protected and the values for these set points will drastically impact the operation of the dryer and should be changed with caution. It is recommended that you do not change these settings without the assistance of M-C engineering personnel.



Plenum Temperature PID Set Points

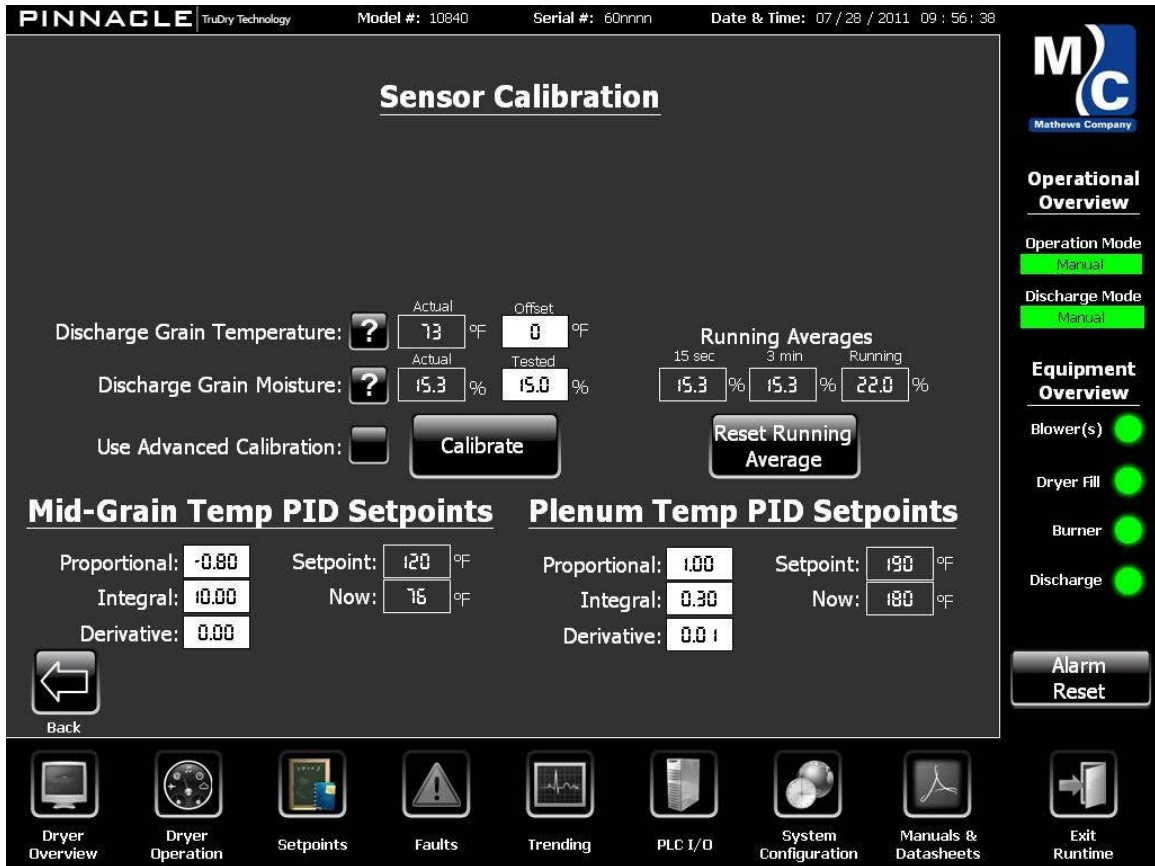


Figure 17: "Plenum Temp PID Setpoints"

The *Plenum PID* setpoint allows the operator to adjust the settings of the *Proportional-Integral-Derivative (PID)* controller. Each of these three fields is used to automatically control the plenum temperature by increasing or decreasing the fuel flow rate to the burner. These values are password protected and the values for these set points will drastically impact the operation of the dryer and should be changed with caution. It is recommended that you do not change these settings without the assistance of M-C engineering personnel.



Trending Screens

These provide the operator with screens to show a graphical display of the temperatures and percentage values of the dryer.



Figure 18: "Trending Screen (Temperatures)"

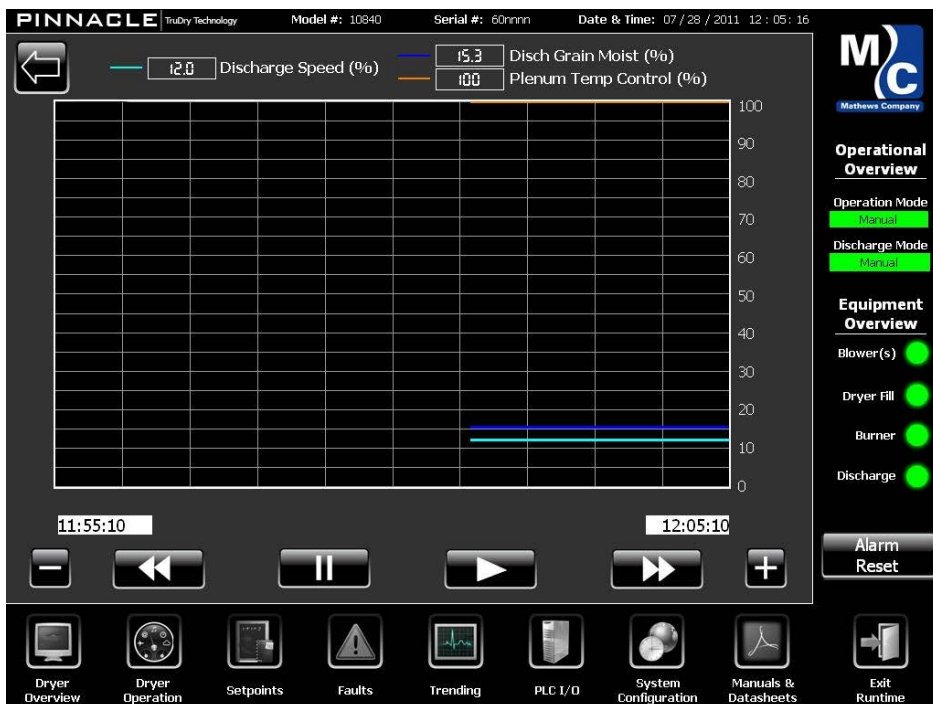


Figure 19: "Trending Screen (Percentages)"



Trending Screen Buttons

The (-) button will increase the time from the current time period to the prior time up to one day to view on the trending screen. This will give you a whole day of data to view on one screen.

The (+) button will shorten the time period from the prior to the current time. This will give you a shorter view of the data from prior time to the current time period.

The **Rewind** button will rewind time from the current time period to a later time on the screen.

The **Pause** button will stop the screen in the current time position that you are in to view the data.

The **Play** button will start the trending screen from the last position of time that you were viewing.

The **Forward** button will move you in forward up to the current time position.



PLC Inputs & Outputs

Three screens are devoted to the PLC inputs and outputs. The first is *Digital Inputs*, the second is *Digital Outputs*, and all analog inputs and outputs are covered on the third screen of the chapters.

Digital Inputs

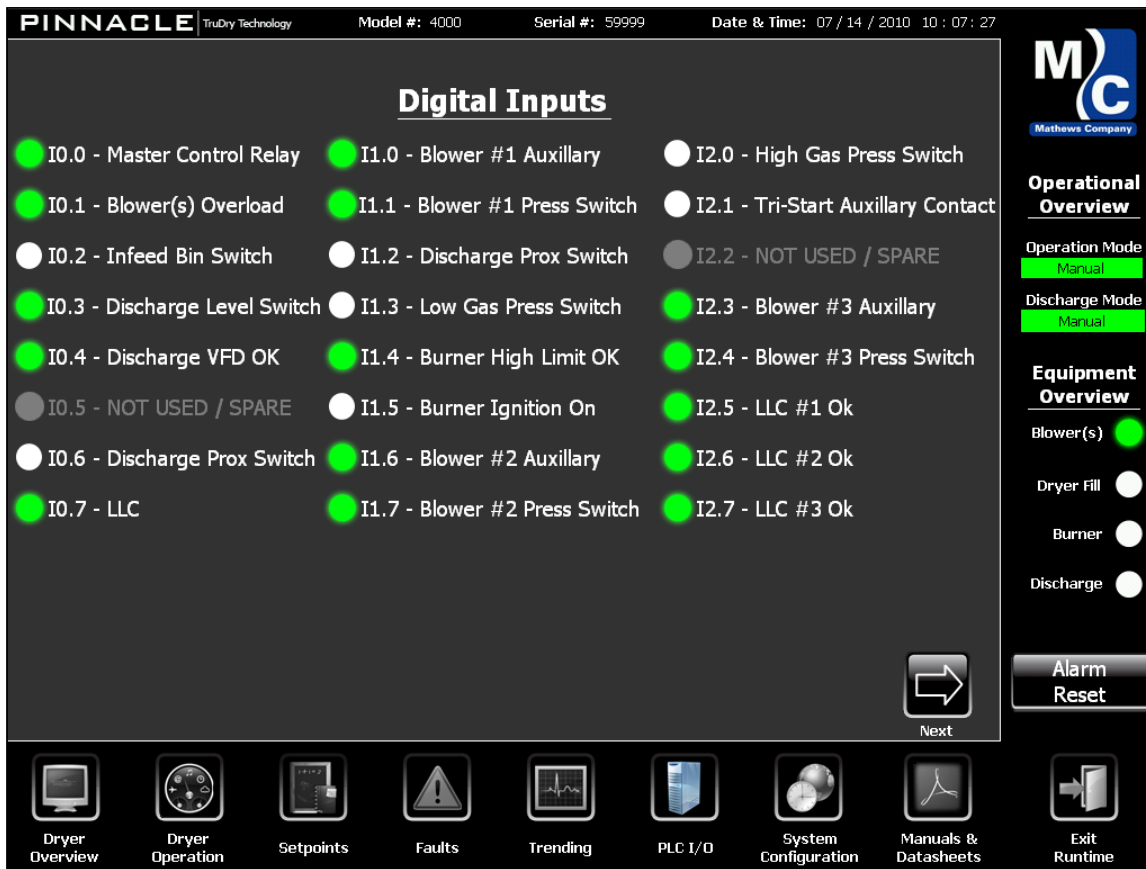


Figure 20: "Digital Inputs Screen"



10.0

Master Control Relay (MCR): A green light indicates that the control power is **ON** and the safety circuit is functioning properly. White indicates it is **OFF**.

10.1

Blower(s) Overload: Green indicates that the blower circuit is ok, white indicates overload.

10.2

In-feed Bin Switch: Green indicates the grain level has fallen low enough for the paddle in the rotary bin switch to rotate. If white, the fill level is sufficient.

10.3

Discharge Level Switch: Green indicates that the level switch is made. White indicates that the grain has overloaded the level switch and it is open.

10.4

Discharge VFD OK: If green, the VFD is functioning properly. White indicates that the VFD is sending a fault signal to the PLC.

10.6

Discharge Prox Switch: Flashes from white to green at intervals in conjunction with the state of the RPM proximity sensor. When the discharge is running, the RPM proximity sensor will change state based on the rate of discharge. If the proximity sensor does not change state within a predetermined amount of time, an alarm indicating a discharge fault will be generated.

10.7

Linear Limit Circuit (LLC): Green indicates that the linear limit circuit is complete and functioning properly. If white, the circuit is either incomplete or there is an error.

11.0

Blower #1 Auxiliary: Green indicates that the auxiliary contact for the #1 motor starter is **ON**. If white, it is **OFF**.

11.1

Blower #1 Press Switch: Green indicates that the #1 blower pressure switch has been activated and the blower is generating sufficient pressure. White indicates low or no pressure.

11.2

Discharge Prox Switch: Follows the same signal as 10.6 and is used for jam detection.



I1.3

Low Gas Press Switch (CGA Only): When white, the switch is off. When green, the switch is on. If CGA is enabled, the low gas pressure switch is monitored when the burner is ignited. If the gas pressure falls too low, the switch will be deactivated.

I1.4

Burner High Limit: Green indicates that the high limit circuit is complete and is functioning properly. White indicates that the burner high limit setpoint has been reached, tripping the high limit switch.

I1.5

Burner Ignition On: A green signal verifies that a flame is present. White signifies the absence of flame.

I1.6

Blower #2 Auxiliary: Green indicates that the auxiliary contact for the #2 motor starter is **ON**. If white, it is **OFF**.

I1.7

Blower #2 Press Switch: Green indicates that the blower pressure switch has been activated and the blower is generating sufficient pressure. White indicates low or no pressure.

I2.0

High Gas Press Switch (CGA Only): When white, the switch is **OFF**. When green, the switch is **ON**. If CGA is enabled, the high gas pressure switch is monitored when the burner is ignited. If the gas rises too high, the switch will be deactivated.

I2.1

Tri-Start Auxiliary Contact: In an 18' tower/3-blower system only, green indicates that the auxiliary contacts of start contactor A and start contactor B are closed. White indicates one or both of the auxiliary contacts are open.

I2.3

Blower #3 Auxiliary: Green indicates that the auxiliary contact for the #3 motor starter is **ON**. If white, it is **OFF**.

I2.4

Blower #3 Press Switch: Green indicates that the blower pressure switch has been activated and the blower is generating sufficient pressure. White indicates low pressure.



12.5

LLC#1 Ok: Green indicates that linear limit circuit #1 is complete and functioning properly.

12.6

LLC#2 Ok (12' and 18' tower only): Green indicates that linear limit circuit #2 is complete and functioning properly.

12.7

LLC#3 Ok (12' and 18' tower only): Green indicates that linear limit circuit #3 is complete and functioning properly.

NOT USED/SPARE—Inputs & outputs marked *Not Used/Spare* are never used.

NOT USED—Inputs & outputs marked *Not Used* are not used in a particular configuration but when that feature is active, the input/output is used.



Digital Outputs



Figure 21: "Digital Outputs Screen"

Q0.0

Customer Remote Fill Run: Green indicates that the customer's remote fill equipment is running and grain is filling the dryer. White indicates that the fill equipment is not running.

Q0.1

Customer Remote Fill Clean Out: Green indicates that the customer's remote fill equipment will continue to run to permit cleanout of the customer fill equipment. White indicates that it is not running.

Q0.2

Blower #1 Motor Starter: Green indicates that the blower motor has been commanded to run. White indicates that it has not been commanded to run.

Q0.3

Blower #2 Motor Starter: Green indicates that the blower motor has been commanded to run. White indicates that it has not been commanded to run.



Q0.4

Blower #3 Motor Starter: Green indicates that the blower motor has been commanded to run. White indicates that it has not been commanded to run.

Q0.6

Discharge VFD Run: Green indicates that the discharge VFD has been commanded to run. White indicates that it has not been commanded to run.

Q0.7

Customer Takeaway Run: Green indicates that the customer's takeaway system has been commanded to run. White indicates that it has not been commanded to run.

Q1.0

Burner Ignition: Green indicates that the burner has been commanded to ignite and will stay **ON** while operating. White indicates that it is **OFF**.

Q1.1

Tri-Start Contactors: Green indicates that the start contactors A and B are turned **ON**. White means they are **OFF**.

Q1.4

Discharge VFD Fault Reset: Flashes green momentarily when the PLC sends a reset request to the VFD. When white, no request is being sent.

Q1.5

Maxon Solenoid (if configured): Green indicates that the Maxon valve is energized. White indicates that it is not.

Q1.7

Fire Alarm Signal: Green indicates that the fire alarm has been activated. White indicates that it has not.



Analog Inputs

The analog inputs and outputs screen displays the raw and scaled values. These values show the voltage and scaled values going from the piece of machinery to the PLC.

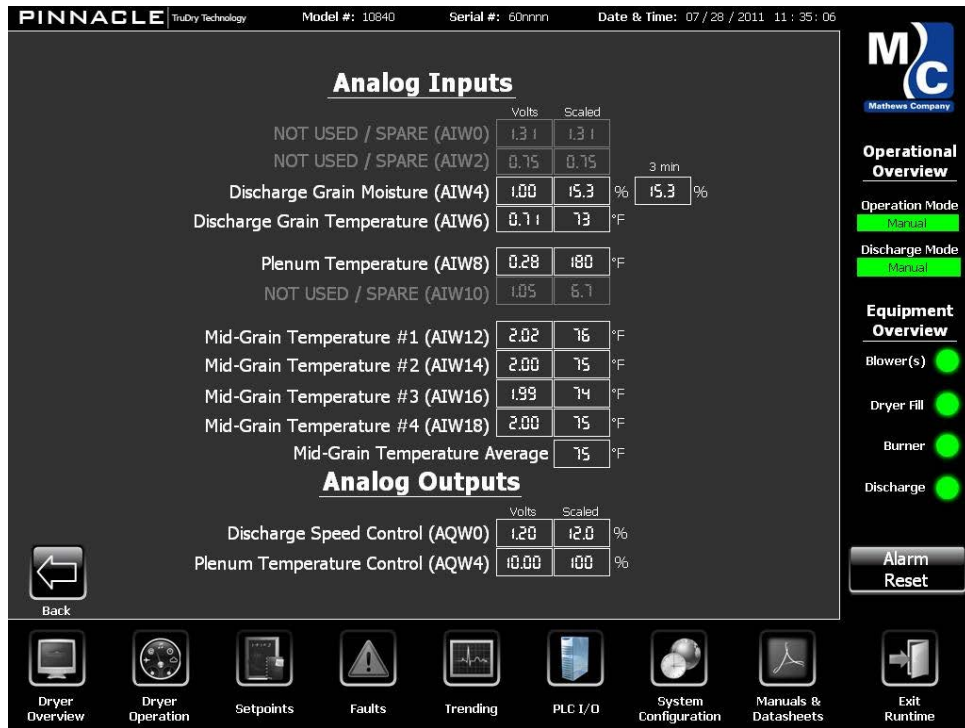


Figure 22: "Analog Inputs & Outputs Screen"

AIW4

Discharge Grain Moisture: Indicates the moisture of the grain flowing across the discharge moisture sensor.

AIW6

Discharge Grain Temperature: Indicates the temperature of the grain flowing across the discharge moisture sensor.

AIW8

Plenum Temperature: Indicates the plenum temperature from the plenum RTD.

AIW12

Mid-Grain Temperature #1: Indicates mid-grain temperature #1 from the RTD transmitter.

AIW14

Mid-Grain Temperature #2: Indicates mid-grain temperature #2 from the RTD transmitter.



AIW16

Mid-Grain Temperature #3: Indicates mid-grain temperature #3 from the RTD transmitter.

AIW18

Mid-Grain Temperature #4: Indicates mid-grain temperature #4 from the RTD transmitter.

Analog Outputs

AQW0

Discharge Speed Control: Indicates the commanded discharge speed sent to the VFD.

AQW4

Plenum Temperature Control: Indicates the commanded opening for the fuel control valve to regulate plenum temperature.



Section 3: Configuration

System Configuration

Most of the system configurations will be present at the factory and will not need to be changed by the operator. Certain parameters cannot be changed while the dryer is running.

The *System Configuration* screen shows the customer name, dryer model and serial number. Selecting the model will automatically adjust various parameters, including the number of blowers and discharge configuration.

If the dryer is CGA certified (Canadian), the *CGA Gas Train* box will be checked.

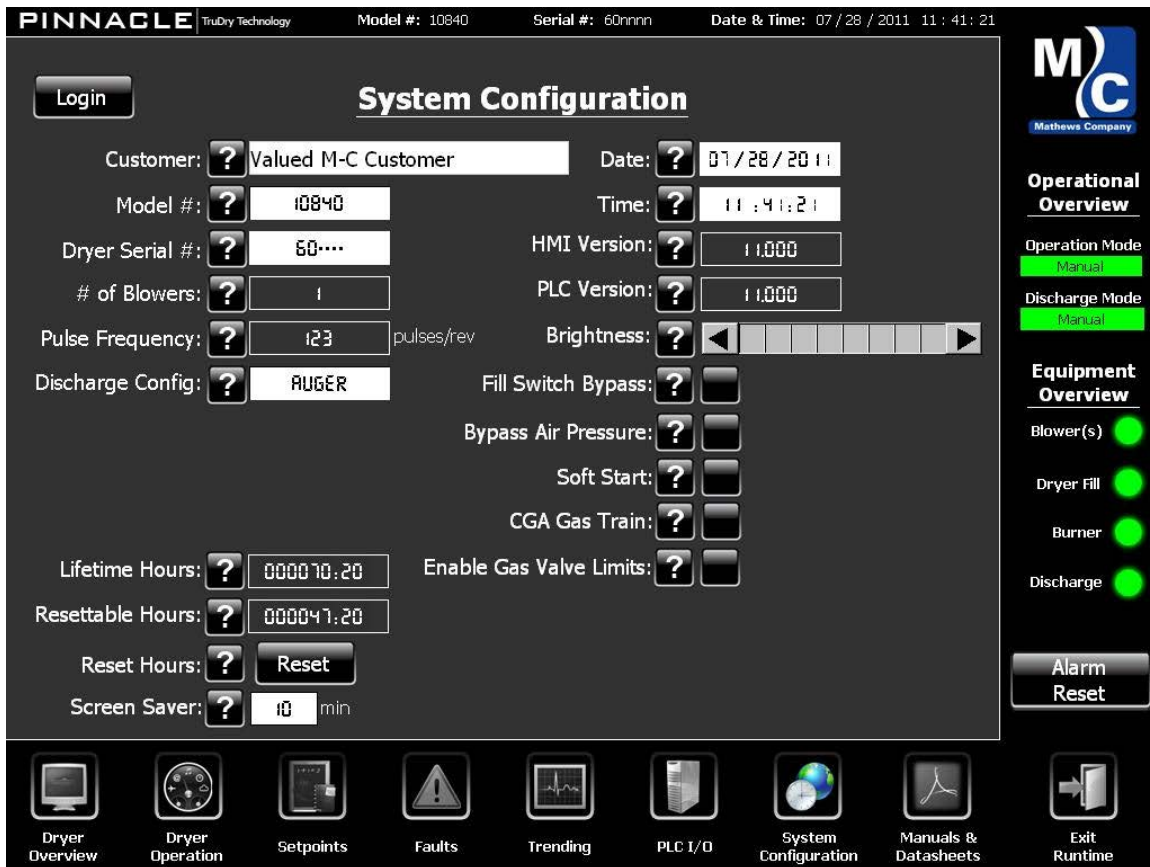


Figure 23: "System Configuration Screen"



Customer

The *Customer* name input is used for system identification and personalization throughout the program interface.

Model Number

The *Model Number* refers to the Mathews Company dryer model. This is a factory configured setting that will enable or disable features that are unique to a given dryer model.

Dryer Serial Number

The *Dryer Serial Number* is logged at the factory for system identification purposes.

Number of Blowers

The *Number of Blowers* is based on the dryer type and does not require an input. Based on the dryer model number that is selected, the corresponding number of blowers will be selected.

Pulse Frequency

The *Pulse Frequency* is a factory setup parameter that correlates the number of pulses sensed by the proximity sensor for one rotation of the discharge system.

Discharge Configuration

The *Discharge Configuration* refers to the type of dryer discharge arrangement the dryer is equipped with. Available options are "center dump" or "auger." This parameter properly displays the dryer discharge configuration on the dryer overview screen.

Lifetime Hours

The *Lifetime Hours* is an hour counter that refers to the total number of hours that the dryer has been in operation.

Resettable Hours

The *Resettable Hours* is an hour counter that refers to the number of hours that the dryer has been in operation over a defined length of time.

Reset Hours

The *Reset Hours* button will reset the resettable hours counter back to zero.



Date

The displayed *Date* is a system parameter that can be changed by the user.

Time

The displayed *Time* is a system parameter that can be changed by the user.

HMI Version

The *HMI Version* refers to the software version of the HMI (Human Machine Interface) currently installed on the system.

PLC Version

The *PLC Version* refers to the software version of the PLC (Programmable Logic Controller) currently installed on the system.

Brightness

Use the *Brightness* adjustment to increase or decrease the HMI screen brightness.

Fill switch bypass

The *Fill Switch Bypass* toggle is used to bypass the *In-feed Bin* switch. Bypassing the bin switch will remove safeties associated with lighting the burner and should only be used for testing or diagnostic purposes. Use this toggle with caution.

Bypass Air Pressure

The *Bypass Air Pressure* toggle enables or disables the *Air Pressure* switch. Bypassing the *Air Pressure* switch will remove safeties associated with lighting the burner and should only be used for testing or diagnostic purposes. Use this toggle with caution.

Soft Start

If the dryer is equipped with a *Soft Start*, this toggle will be enabled by the factory.

CGA Gas Train

If the dryer is equipped with a *CGA-Approved Gas Train*, this toggle will be enabled by the factory. A CGA approved gas train will include high and low gas pressure switches.

Enable Gas Valve Limits

The *Fuel Control Valve Opening %* set point is limited by the minimum and maximum valve opening % allowed by the dryer.



Manuals & Datasheets

The Windows-based interface of Pinnacle puts all the documentation for the system right at your fingertips.

The software will be loaded with the appropriate manuals for the model/serial number.

Additionally, there will be a set of electrical schematics specific to the dryer.

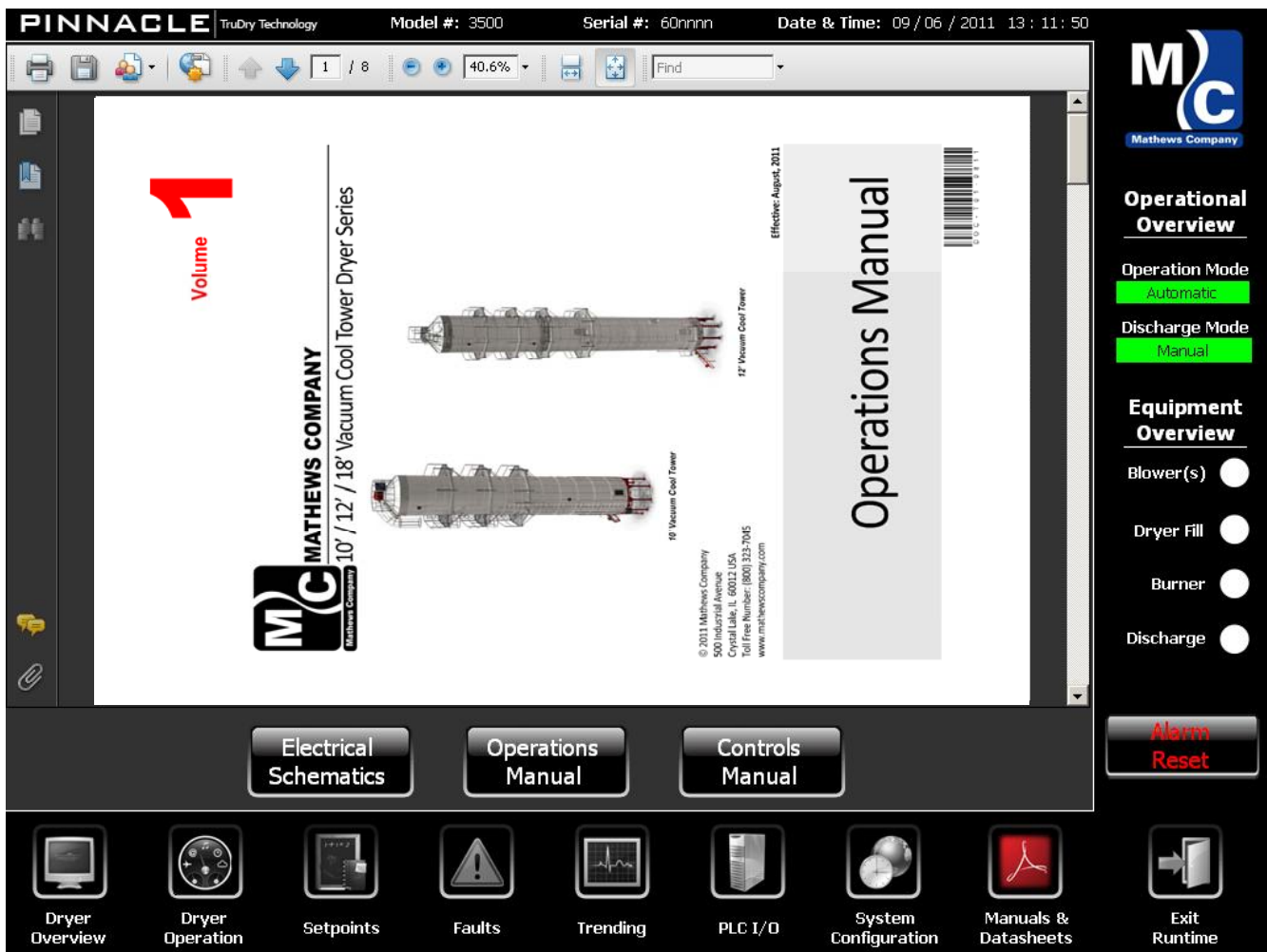


Figure 24: "Manuals & Datasheets Screen"



Loading the HMI & PLC

PLC – Siemens software installation

The PLC should be installed and wired as per the electrical schematics. The program for the PLC is loaded by using a small memory chip. Make sure that the PLC is off. (2 Amp breaker)



Figure 25: "Siemens PLC Module"

Remove the protective cover.



Figure 26: "Siemens PLC Module Chip Cover Removed"

Insert the memory chip into the PLC in the slot just below the SF/DIAG, RUN & STOP LEDs.

Re-power the PLC; the run light on the PLC should illuminate and communication to the HMI will commence.

Make sure there are 3 LEDs illuminated on the Ethernet module (adjacent to the PLC) before removing power from the PLC.

Switch **OFF** the power to the PLC and remove the programming chip; re-insert the protective cover.

Re-power the PLC again; the run light on the PLC should illuminate and communication to the HMI will commence; the three LEDs on the Ethernet module should be illuminated indicating communications to the HMI.



HMI Configuration

To do the following steps, you may find it helpful to use a soft pointing device to navigate the touch screen easily. Alternatively, a keyboard and/or mouse can be plugged into the USB ports on the back of the HMI: Open the HMI enclosure and you will find that the USB ports are located on the bottom of the HMI as shown in the following photograph:



Figure 27: "Back Of the HMI USB Ports"

The following step-by-step procedures shall be followed to update the HMI touch screen runtime software:

Unlock & Disable EWF

If the Pinnacle application is currently running, you will need to exit the program by selecting the "Exit" button on the lower right hand corner of the screen. Once that is complete and the Windows desktop is present, click on: **Start/Programs/Accessories/System Tools/EWF activator desactivator**

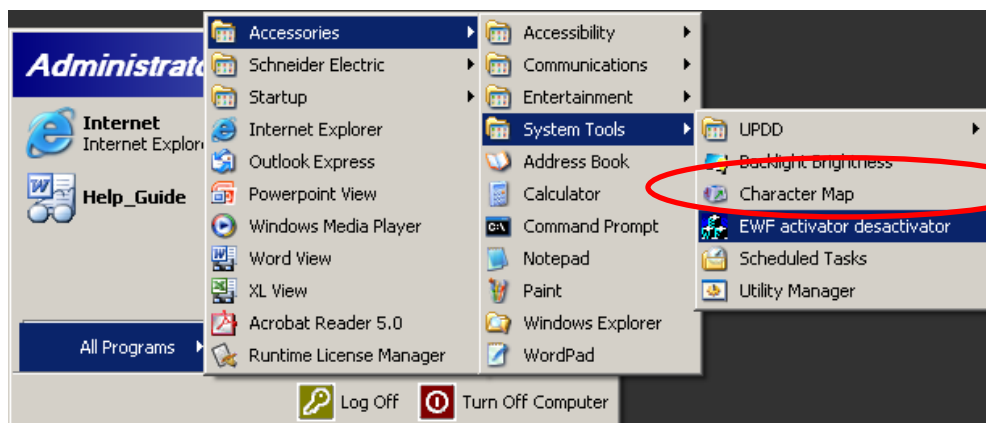


Figure 28: "Unlock & Disable EWF Screen"



When the **"ChangeEWFState"** dialog box appears, ensure that **"Reboot now"** is selected and press **"OK"**.

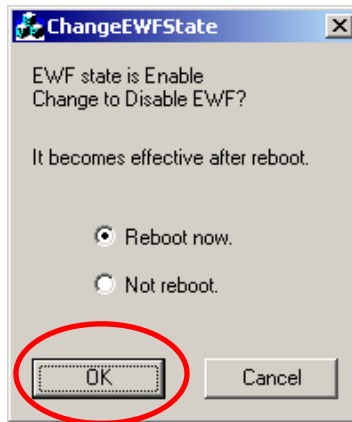


Figure 29: "Confirming the EWF Screen"

Wait for the computer to reboot and the user will be presented with the following **"Vijeo-Designer Runtime"** dialog window. Press **"Exit"** and note the red "X" through the EWF icon in the taskbar (lower right hand corner). This confirms that the EWF has been unlocked:

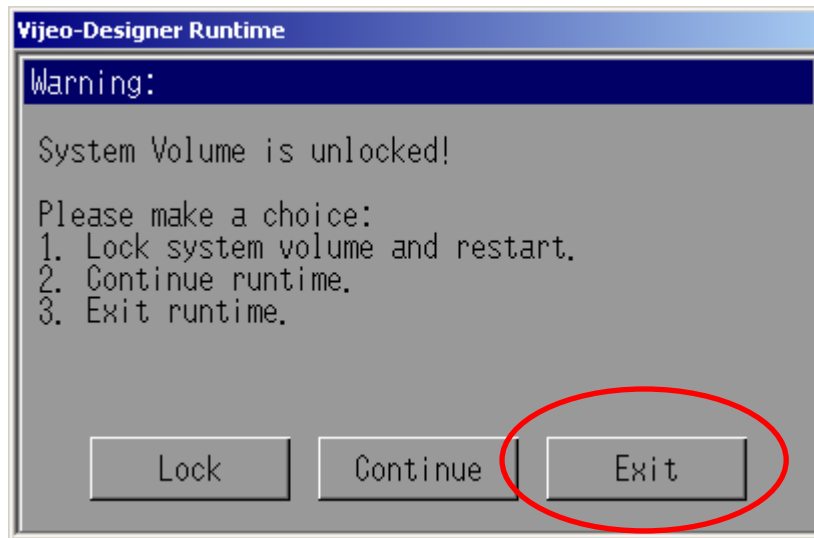


Figure 30: "Vijeo-Designer Runtime Exit Screen"

Copying & Saving the Files to the HMI Touch screen PC

Insert the flash drive into the front of the HMI by unscrewing the protective cover on the front of the HMI panel. A window should automatically open displaying the contents of the flash drive:

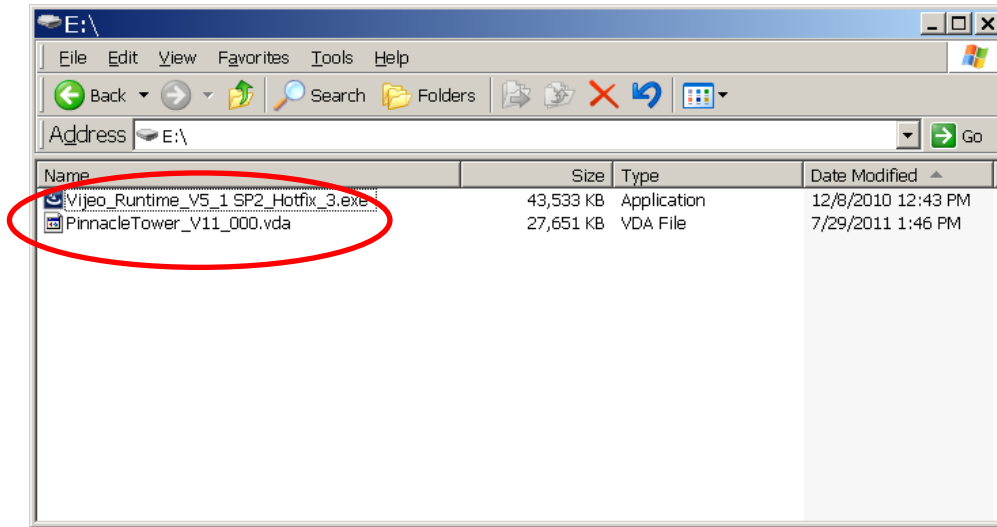


Figure 31: "Selecting the File to Upgrade Software"

Drag these files on to the Windows desktop. Once the files are copied, the USB flash drive can be removed and the access cover can be secured back to its original position.

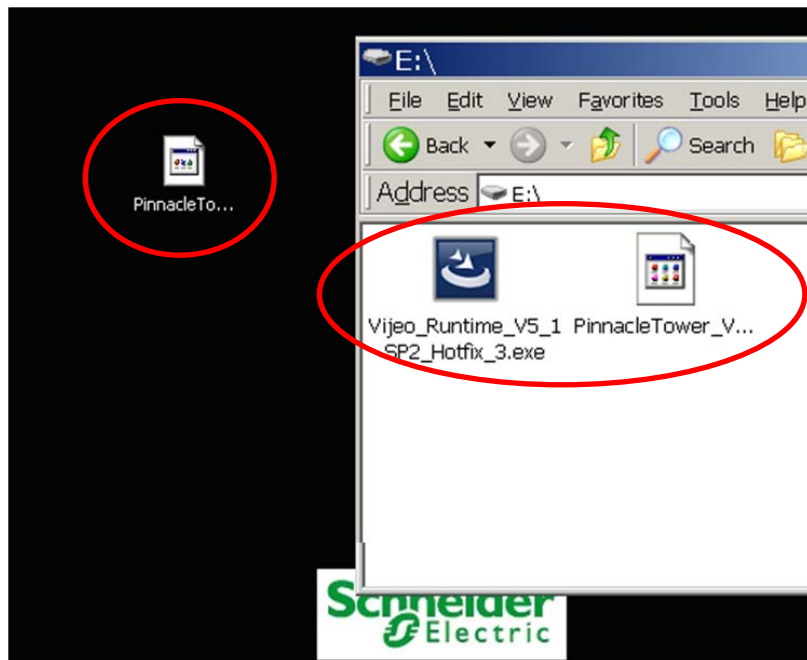


Figure 32: "Copying Files to Desktop Screen"



Installing the Updated Runtime

Next, the Runtime file has to be installed. Double click the icon for the file labeled **“Vijeo_Runtime_5_1_SP2_Hotfix_3.exe”**. The *InstallShield Wizard* will begin.

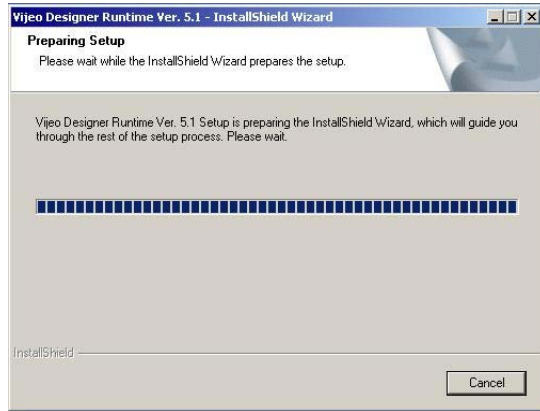


Figure 33: "Installation Progress Screen"

You may get the following message because the runtime upgrade is a subversion change, Press **“YES”**.

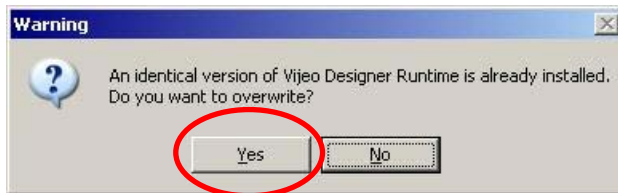


Figure 34: "Confirmation Screen"

The runtime software should now install.

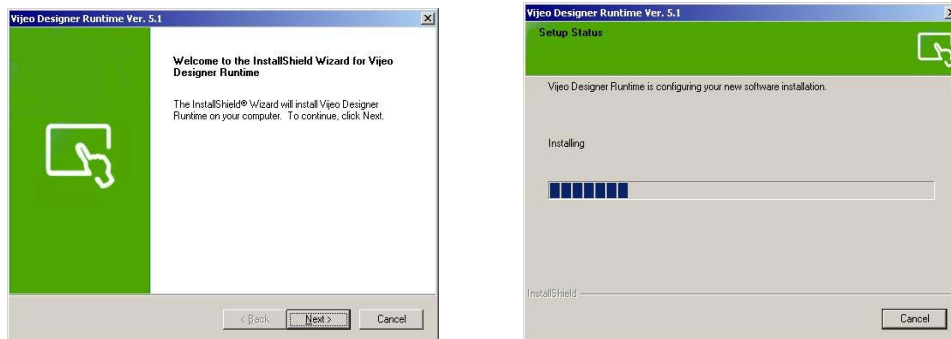


Figure 35: "Installation Progress Software Installation"

Because the version is the same but the subversion has changed, you will get the following message, press "OK".

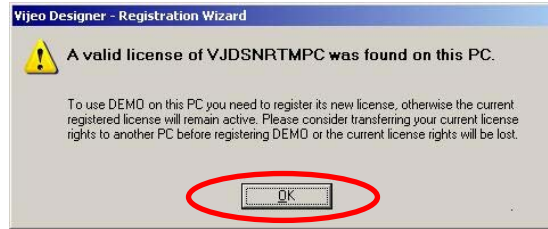


Figure 36: "Confirming Software Version Screen"

Installing the Updated Application

Click: **Start/All Programs/Schneider Electric/Vijeo-Designer/Tools/Vijeo Designer Application Installer.**

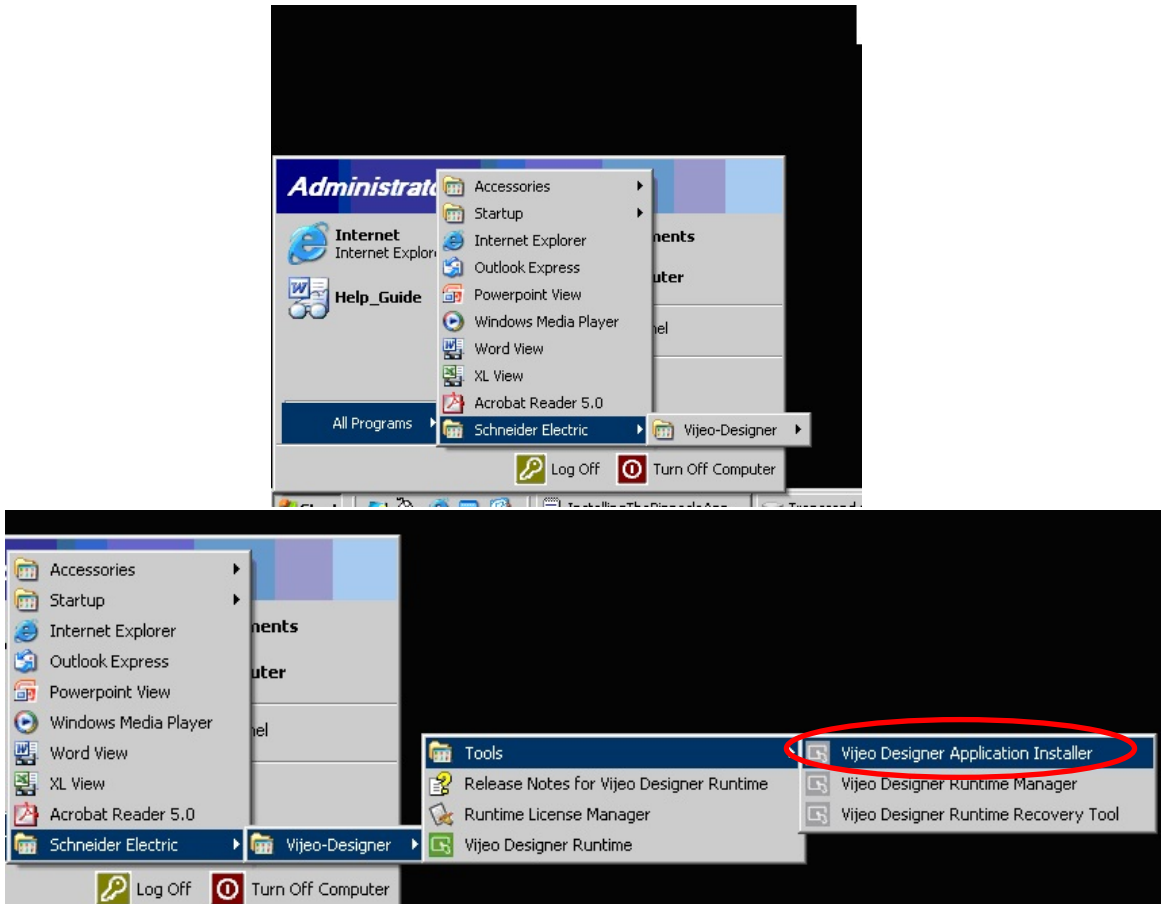


Figure 37: "Selecting Runtime Application"



Once the *Application Installer* dialog box is loaded, click "**Browse...**" to browse to the desktop where the file from the USB flash drive was copied.

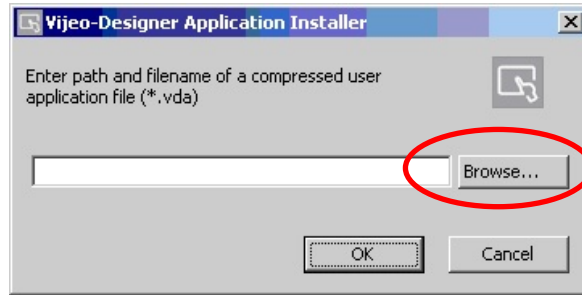


Figure 38: "Selecting the Application File Screen"

Select the file that was recently copied to the desktop and Click on the "**Open**" Button.

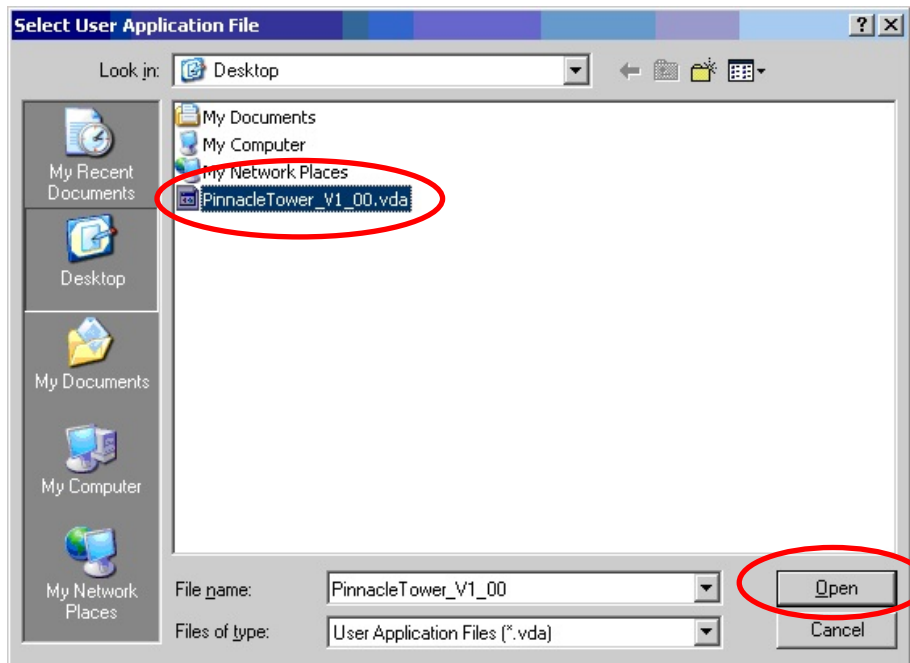


Figure 39: "Loading the Application Screen"

Now that the file has been selected by the *Application Installer*, Click "**OK**".

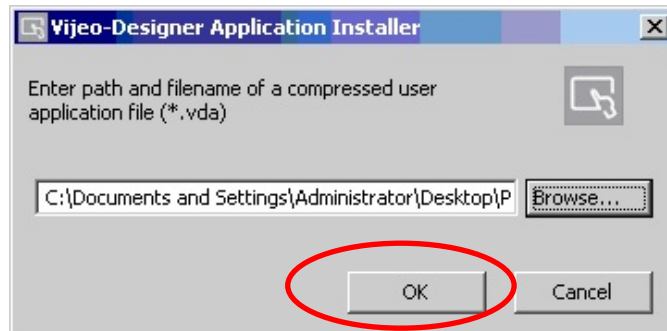


Figure 40: "Confirming Load Screen"



The following message will be displayed and clicking the **“lock and Restart”** button will finalize the installation process. The system will now restart.

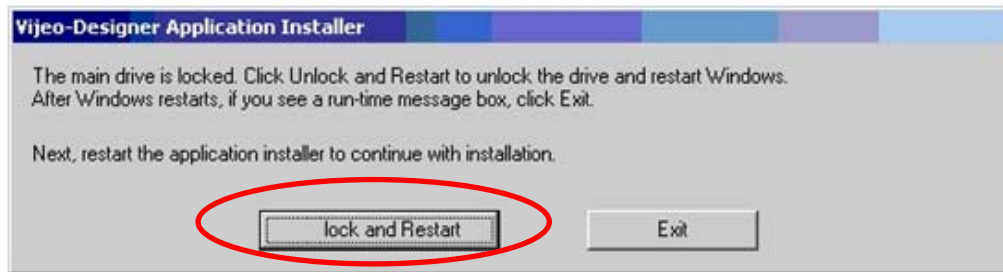


Figure 41: "Finalizing Software Screen"

Verify that the Application is Functioning Properly

If everything is properly installed, the HMI will communicate to the PLC and the displayed values observed prior to the software update. If there are a number of yellow warning triangles that appear, communications to the PLC may have been disrupted or the network configuration is not correct.

Update Electronic PDF Document (If Required)

Within the *Manuals & Datasheets* section of the HMI application, there are a set of electrical schematics and system manuals for real-time viewing on the HMI. In the event that these files need to be updated, the following procedure will explain how to perform this operation.

- These electronic documents are supplied in PDF format and can be copied to the correct location on the secondary drive.
- Insert the drive containing the PDF files into the front of the HMI by removing the screw and opening the protective cover.
- A folder should open displaying the contents of the flash drive.
- The folders are named according to the serial number and model number of the dryer
- Open the appropriate folder.
- Click "**Edit**" on the top menu and select "**Select All**" to highlight all of the documents.
- Click "**Edit**" again and select "**Copy to Folder...**"
- Navigate to the following directory structure on the secondary drive:

D:\ProgramFiles\SchneiderElectric\Vijeo-Designer\VijeoRuntime\public\Projects\PinnacleTower_V1_000\Data\Browser



- Copy the files to this location; you will be prompted to confirm overwriting the existing files.
- Restart the application by re-powering the HMI or double clicking on the green ***“Run Application”*** icon on the screen.
- Confirm that the documents are correct.



Section 4: Troubleshooting

Faults

Pressing the “**Faults**” icon on the bottom navigation bar will display a list of the faults that are color coded based on their status.

RED items on the list are in an **active state of alarm or fault**.

YELLOW alarm items are in an **acknowledged state but have not been corrected**.

Items listed in **GREEN** have been rectified and are in their **normal state**.

The list displays the descriptive name of the alarm as well as the date and time it occurred and whether and when it was accepted. Pressing a fault on the *Alarms* page will pop up an *Alarm Help* message to further describe the fault.



Figure 42: "Alarm Help Screen"

When a fault occurs, a full screen popup will be presented. There are three types of alarm popup screens.



Figure 45: "Warning Alarm Pop up Screen" **Figure 44: "Shut Down Alarm Pop up Screen"** **Figure 43: "Cool-Down Alarm Pop up Screen"**





Alarms

Alarm or fault messages pop up in full-screen warnings that are color coded based on the severity of the fault condition.

Type A faults are displayed in **YELLOW** and are **warnings only**.

Type B faults are displayed in **ORANGE** and send the dryer into **Cool-Down or Cooling** mode.

Type C faults are displayed in **RED** and are the most serious, sending the dryer into **Shut-Down** mode.

In addition to the type of fault, the popup will display the name, ID code and a description of the cause.

The alarm has been accepted/acknowledged, however, the fault is still active. Once the condition causing the fault has been rectified, the alarm reset button can be pressed on the side bar to clear the alarm from the active alarm list.

Certain alarms display differently in manual (cooling) and automatic (cool-down) operation modes. Both instances are displayed below.

Alarm Troubleshooting Message

Alarm Popup Name	Alarm ID Code	Type	Cause
Master Control Relay (MCR) De-Energized	1	Type C	The MCR has become de-energized due to lost power or a tripped safety circuit.
Linear Limit Fire Alarm	2	Type C	Linear Limits Circuit is Open - One of the LLC switches has opened due to high temperature
High Gas Pressure	3	Type B	High gas pressure detected in the gas train.
Blower(s) Overload	6	Type C	Overload detected for blowers – Check motor circuit protector or soft starter if equipped.
Blower #1 Motor Starter	7	Type C	Blower #1 motor starter has experienced a fault condition.
Blower #1 Air Pressure	8	Type A	Blower #1 is not providing adequate pressure for burner operation.
Blower #1 Air Pressure Switch	9	Type B	Blower #1 air pressure switch is indicating air pressure when the blower is not operating.
Blower(s) Tri-Start	11	Type C	One of the two contactors A or B has experienced a fault condition.
Blower #2 Motor Starter	12	Type C	Blower #2 motor starter has experienced a fault condition.
Blower #3 Motor Starter	13	Type C	Blower #3 motor starter has experienced a fault condition.
Blower #2 Air Pressure	14	Type A	Blower #2 is not providing adequate pressure for burner operation.
Grain Fill Timeout	16	Type B	Infeed grain fill is insufficient to maintain grain level.
Burner Ignition Failure	18	Type B	Burner failed to ignite after 3 trials.
Burner High Limit	19	Type C	Plenum temperature has reached high limit setpoint.
High Plenum Temperature	20	Type C	The plenum temperature has risen outside of the plenum temperature band.
False Flame	21	Type B	The flame sensing system has detected the presence of a flame with the burner off.
Low Plenum Temperature	22	Type B	Plenum temperature has dropped below the low limit setpoint.
Plenum Temperature RTD Failure	23	Type B	The plenum RTD input module on the PLC has detected a fault.
Low Gas Pressure	24	Type B	Low gas pressure detected in the gas train.



Discharge VFD	25	Type C	The Discharge VFD has detected a fault due to a possible overload of the metering system.
Discharge Level	26	Type C	The discharge level switch is open due to a possible overload of grain or a blocked discharge takeaway system.
Discharge Jam or Proximity Switch Failure	28	Type B	The Discharge metering system has stopped running. The proximity sensor is not detecting rotation of the metering system.
Discharge Moisture Low Limit	29	Type A	The discharge moisture has dropped below the discharge moisture high limit set point for a duration of 5-minutes while the discharge metering is running.
Discharge Moisture High Limit	30	Type A	The discharge moisture has exceeded the discharge moisture high limit setpoint for a 5-minute duration while the discharge metering is running.
Blower #3 Air Pressure	31	Type A	Blower #3 is not providing adequate pressure for burner operation.
Blower #2 Air Pressure Switch	33	Type B	Blower #2 air pressure switch is indicating air pressure when the blower is not operating.
Blower #3 Air Pressure Switch	34	Type B	Blower #3 air pressure switch is indicating air pressure when the blower is not operating.
Mid-Grain Band	35	Type A	The mid-grain temperature has exceeded or dropped below the mid-grain band alarm setpoint for a 30-second duration.
Mid-Grain Band Delay	36	Type B	The mid-grain temperature has exceeded or dropped below the mid-grain band alarm setpoint for the duration of the mid-grain band delay.
Mid-Grain Temperature Probe #1	37	Type A	The #1 mid-grain temperature probe has failed or become disconnected from the transmitter.
Mid-Grain Temperature Probe #2	38	Type A	The #2 mid-grain temperature probe has failed or become disconnected from the transmitter.
Mid-Grain Temperature Probe #3	39	Type A	The #3 mid-grain temperature probe has failed or become disconnected from the transmitter.
Mid-Grain Temperature Probe #4	40	Type A	The #4 mid-grain temperature probe has failed or become disconnected from the transmitter.



Mid-Grain Temperature Probe Transmitter #1	41	Type A	The #1 mid-grain temperature probe transmitter in the junction box has failed or become disconnected.
Mid-Grain Temperature Probe Transmitter #2	42	Type A	The #2 mid-grain temperature probe transmitter in the junction box has failed or become disconnected.
Mid-Grain Temperature Probe Transmitter #3	43	Type A	The #3 mid-grain temperature probe transmitter in the junction box has failed or become disconnected.
Mid-Grain Temperature Probe Transmitter #4	44	Type A	The #4 mid-grain temperature probe transmitter in the junction box has failed or become disconnected.
Linear Limit #1 Fire Alarm	45	Type C	Linear limits circuit #1 is open – One of the LLC #1 circuit switches has opened due to high temperature.
Linear Limit #2 Fire Alarm	46	Type C	Linear Limits Circuit #2 is open - One of the LLC #2 circuit switches has opened due to high temperature
Linear Limit #3 Fire Alarm	47	Type C	Linear Limits Circuit #3 is open - One of the LLC #3 circuit switches has opened due to high temperature



