

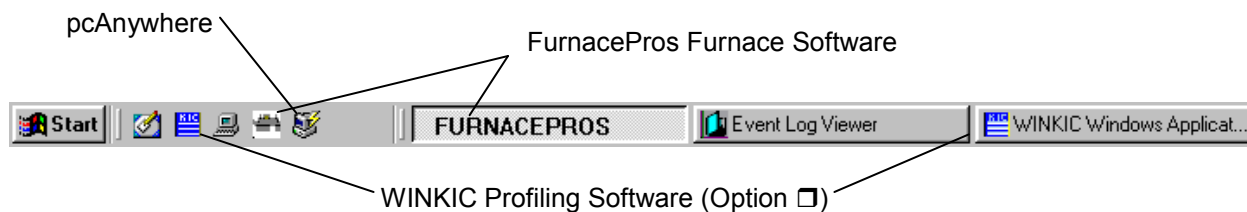
## 5.1 Windows Interface

Process parameters are entered and viewed on a computer workstation (PC) using a Microsoft Windows® operating system. If the operator is not familiar with basic Windows techniques, run a Windows training tutorial before trying to run a process.



The ALT+TAB key combination is convenient for cycling through loaded application windows. The ProControl™ furnace software application screens cannot be minimized or maximized so this shortcut is particularly useful for switching away from or to the furnace software screen.

The following figure shows the Windows start bar with the furnace software running. The quick start buttons on the left will launch the software with one click of the mouse. WINKIC will only appear if the furnace is equipped with profiling software.



**Figure 5-1: FurnacePros Furnace Windows Start Bar**

The following icons should also appear on the desktop.

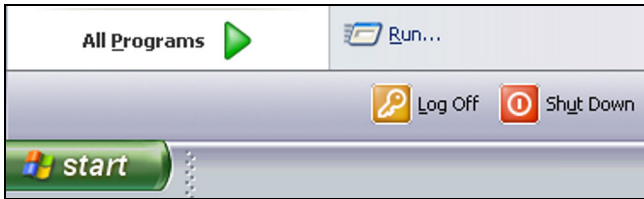


## 5.2 Startup Screen



When the furnace is started using Power On button to the left of the keyboard, the furnace software will automatically boot.

If the user does not want the furnace software to boot automatically, remove the furnace shortcut from the start menu. (See Windows help topic “Starting Programs at startup”). The furnace program can be accessed from the desktop by pressing the [Furnace](#) button or by selecting Windows [start\All Programs\Furnace](#).



Windows Start menu

When the furnace software boots the following screen will appear.



Figure 5-2: FurnacePros Furnace Software Startup screen

## 5.3 Security Screen



Before you can begin furnace operation, the user must log-on. Move to the security screen by clicking on the [Security](#) button at the bottom of the Startup screen.

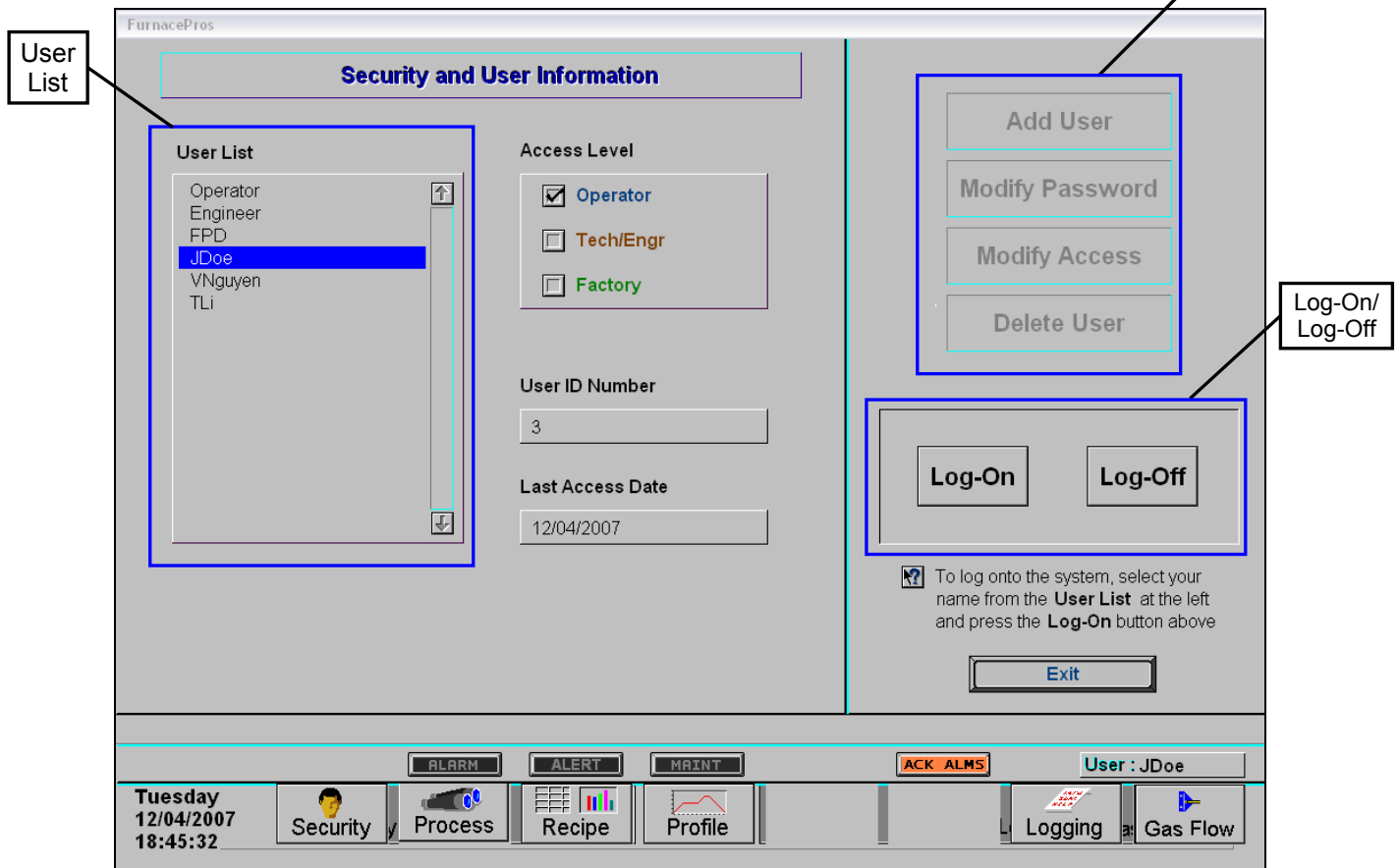


Figure 5-3: Security screen

The security screen contains the following field groups (see Figure 5-3).

Fields and Field Groups	Description
User List	A list of Users appears in the <a href="#">User List</a> group. Operator, Engineer and FPD are the default settings. Change this list using <a href="#">Manage User Accounts</a> .
Access Level	When a User ID is highlighted, a check-box will automatically be selected in the <a href="#">Access Level</a> group indicating the level of access permitted to that user. User ID Access level control prohibits operator level access users from adjusting process recipes or making other changes to important furnace operations.
User ID Number	The software assigns a integer to each User. The logging screens track user activity by User ID Number including time of log-on and log-off.
Last Access Date	Displays date the highlighted user last accessed the software.
Manage User Accounts	Users, passwords, and access levels are modified by the User Accounts group using the <a href="#">Add User</a> , <a href="#">Modify Password</a> , <a href="#">Modify Access</a> and <a href="#">Delete User</a> buttons.
Log-On, Log Off group	<a href="#">Log-On</a> to gain access to the other screens and to exit the furnace control software using the <a href="#">Log-Off</a> button.
Exit	Press <a href="#">Exit</a> to close the furnace program. You must first <a href="#">Log-Off</a> or the program will Log-On the last user upon reboot of the furnace software.

### 5.3.1 Log-On & Log Off

To **log on**, highlight a user name in the User List and click the **Log-On** button.

The **Enter Password** pop-up window will appear.

Type in the correct User ID password and press **OK** to complete the login process.

To **Log-Off** a user: navigate to the Security screen and click the **Log-Off** button.

To **Close** the furnace program: navigate to the Security screen, Log-Off and click the **Exit** button.

Note: you can restart the furnace program and bypass Log-On if you do log off. In this case, the last user will be automatically be logged on.

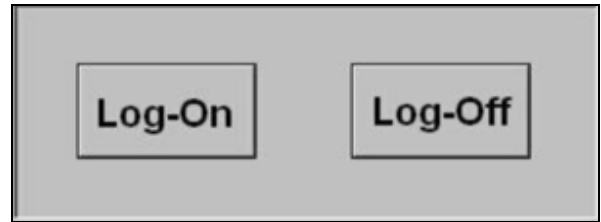


Figure 5-4: Log-On Log-Off group

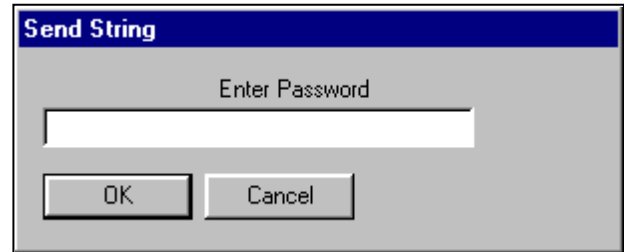


Figure 5-5: Exit button



Figure 5-6: Exit button

### 5.3.2 User List

When the furnace software is installed, the following default user names and passwords are installed and listed in the User List.

User Name	Password	Access Level
OPERATOR	1 or 0000	1: Operator
TECH/ENGR	2 or 0000	2: Tech/Engr
Factory	***FP access only***	3: Factory

Engr/Tech Access Level can add additional users (see following example).

User Name	Password	Access Level
JDoe	user config	1: Operator
VNguyen	user config	1: Operator
TLi	user config	2: Tech/Engr

Use the User Account group buttons to manage changes to user names, passwords and access levels.

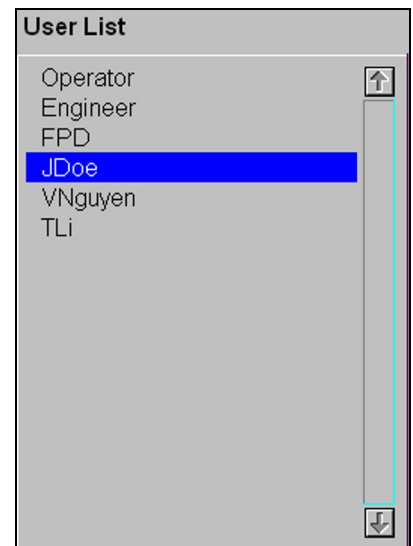


Figure 5-7: User List

### 5.3.3 Manage User Accounts

To access User Accounts, a User with access level 2 Tech/Engr must be logged on. The Manage User Accounts menu on the top right of the screen will appear shaded while an Operator is logged on. Through this menu, access level 2 users can designate other user names for login and recording purposes, modify passwords and access levels, and delete users.



Figure 5-8: Manage User Accounts

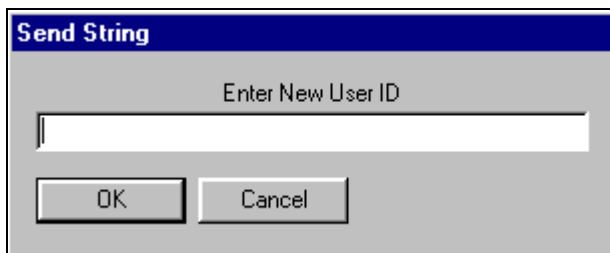


Figure 5-9: New User ID pop-up window

New user names are added by selecting the [Add User](#) button.

The [Enter New User ID](#) pop-up window will appear.

Enter the User ID (user name) and click [OK](#). The system will then assign a User ID number.

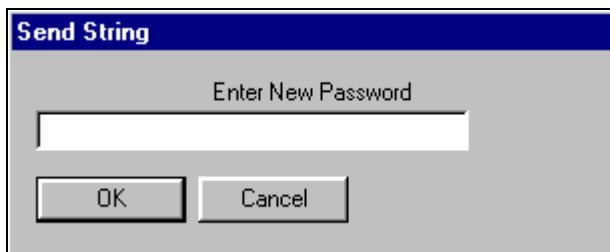


Figure 5-10: New User Password pop-up

**Note:** After a new user is added, the new user's password and access level must be entered.

Click [Modify Password](#) and the [Enter New Password](#) pop-up window will appear.

Enter the new User Password and click [OK](#).

Click [Modify Access](#) and the [Enter Access Level](#) pop-up window will appear. At the [Access? \(1,2,3\)](#) prompt enter the level of access the new User ID will possess according to the following table.

Level #	Access Level
1	Operator
2	Tech/Engr

The User ID's (user names) appearing in the [User List](#) will now reflect the added user ID.

**To Delete a user or Modify Access** level for a user press the respective button and follow the pop-up window instructions.

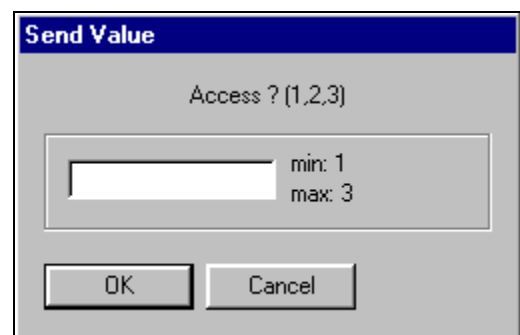


Figure 5-11: New User Security Access Level assignment window

## 5.4 Available Functions by Access Level

### 5.4.1 Operator Level Access

The following screens can be accessed with Operator level access. Operator access is restricted as noted:

<u>Screen Name</u>	<u>Restrictions</u>
Security	No user list additions allowed
Process	No changes allowed
Recipe	Loading Only
Profile	All Functions
Logging	Viewing Only
Gas Flow	Read Only

### 5.4.2 Tech/Engr Level Access

All functions are available with Tech/Engr level security access. This level of access allows the user to make several modifications to the operation of the furnace and other maintenance tasks. Furthermore, the user can add Tech/Engr and Operator user names to the “Security” screen.

The maintenance screen button does not appear when signed on with Operator level access. The Maintenance screen and the associated features will be covered later in section 7.

### 5.4.3 Factory Level Access

Factory level access is limited to the manufacturer. This level provides manufacturer’s authorized technicians access to the system initial setup screens. Factory level access by others will void the warranty.

## 5.5 Operator Level Interface

### 5.5.1 Pre-Start Purge

The Operator should always assure that the plant air compressor is operating and the valves are open and clean dry air is supplied to the furnace. The Operator should also assure that the flow valves are properly set (factory default is provided in the Owner's manual) to assure flow to the exhaust stacks and the furnace zones.

### 5.5.2 Process Screen



Access the Process Screen by clicking the [Process](#) button at the bottom of the screen. Depending upon furnace configuration, the process screen will appear like that pictured in Figure 5-12.

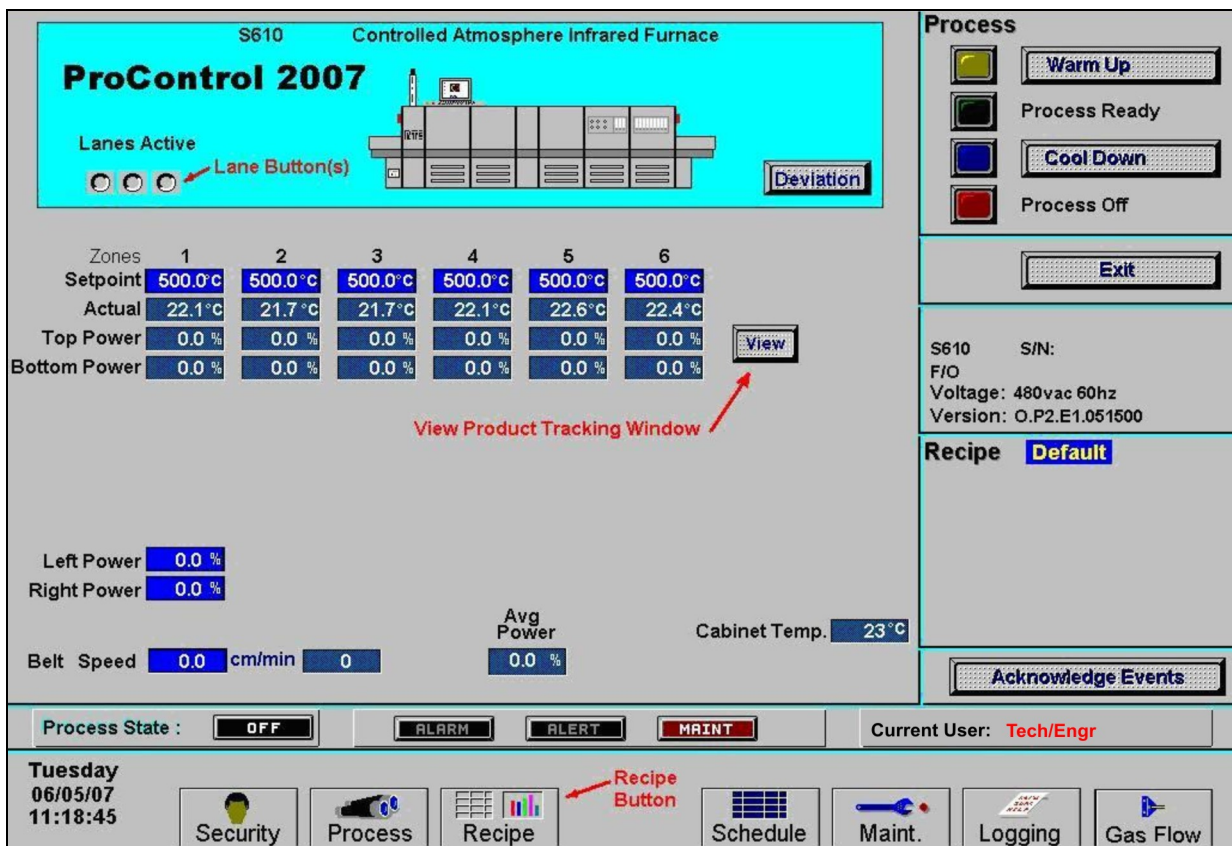


Figure 5-12: Process Screen

Operators will have the ability to start and stop the furnace operation, but will not be able to change the settings in the process screen.

### On/Off Procedures

First make sure that the correct recipe is loaded into the furnace and that the setpoint values in the blue boxes for each zone are set correctly for the process to be run. Check the recipe name near the lower right hand corner. In the example below the recipe name is [Default](#). Please refer to “Saving and Retrieving Recipes” under Section 5.5.3 if help is needed to load a recipe.



When starting furnace operations, click the [Warm Up](#) button in the [Process](#) box at the top right hand side of the Process Screen, as seen below.



The light to the left of the button should begin to blink yellow and the furnace should make an audible click. This is the power contact connecting inside the safety enclosure. The furnace will start to warm up as indicated in the [Process State](#) box in lower left hand corner.



The numbers shown below the setpoint temperature values will indicate the status of power and furnace temperature. Once the temperature has stabilized around the setpoint values, the [Process State](#) box and [Process](#) window will light up as shown below.



### Hydrogen Operation (Option )

If the furnace is equipped with H<sub>2</sub> gas, a special pop-up screen will appear listing a set of required parameters for system warm up.



## 5.5.3 Recipe Screen



Access the recipe screen by clicking the [Recipe](#) button at the bottom of the screen. Depending upon furnace configuration, the recipe screen will appear like that pictured in Figure 5-13.

FurnacePros

**Recipe Editor** Recipe Name: **LOWTEMP** **Off Line Edit**

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	
SETPOINT	298.00	184.00	167.00	167.00	170.00	160.00	224.00	275.00	°C
GAIN	20.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	
INTEGRAL	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
DERIVATIVE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
TOP POWER LIMIT	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	
BOTTOM POWER LIMIT	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	
HIGH ALARM DEV SETPOINT	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	
HIGH ALERT DEV SETPOINT	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	
LOW ALERT DEV SETPOINT	-10.00	-10.00	-10.00	-10.00	-10.00	-10.00	-10.00	-10.00	
LOW ALARM DEV SETPOINT	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	
Left Edge Heat Power	0.0	0.0	0.0					Belt Speed	14.5 IPM
Right Edge Heat Power	0.0	0.0	0.0					O2 Alarm Level	75 PPM
Atmosphere Purge Time	5	Min.		1 2 3		Water Temps		15 °C	80 °C
H2 Gas Fill Time	5	Min.		Lanes Active					
		<input checked="" type="radio"/> N2		<input type="radio"/> H2		<input type="radio"/> Forming		Recipe in Furnace: <b>LOWTEMP</b>	

**Get Recipe**  
 **Get from Disk**  
 **Get from Furnace**

**Save Recipe**  
 **Save from Editor**  
 **Save from Furnace**

**Send to Furnace**  
 **Send from Disk**  
 **Send from Editor**

**Edit PID Settings**

Process State: **OFF**    **ALARM**    **ALERT**    **MAINT**    Current User: **TECHENGR**

Tuesday 06/05/07 15:34:02

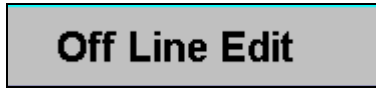
                          

Figure 5-13: Recipe Screen (Operator Level Access)

## Recipe Overview

In order to start a thermal process, an operator must load the appropriate recipe to the furnace programmable logic controller (PLC). The recipe contains all the information for operation of the furnace for a particular process or product. The computer is used to create, modify and load a recipe onto the PLC. However, once a recipe is loaded into the furnace, the computer (PC) is not critical to the operation of the furnace. The independent PLC installed inside the furnace will follow the recipe instructions, start and continue the process. If a parameter outlined in the recipe creates an alarm with shutdown condition, the furnace will automatically shut down. An alarm message is transmitted to the PC, but the furnace does not require the PC to respond for the condition response to take place.

As seen in Figure 5-13, the [PID tuning](#) and [Save Recipe](#) screen area buttons are not available. Also notice the bar across the top of the window where it shows the following.



Operators can only use the Recipe Screen in the “Off Line Edit” mode which does not allow the user to change the furnace current operating temperature setpoints.

### Saving and Retrieving Recipes

Recipes can be stored on the computer hard disk or on one of the following portable mediums: a USB jump drive, removable disk (drive A:) or compact disc (CD).

On the right side of the Recipe Screen are buttons for saving and retrieving recipes. To load a recipe, the operator must know the name of the recipe file. Furnace software recipes are listed with a Windows extension of (\*.rcp).

To view a recipe before loading it to the furnace PLC controller, click the [Get from Disk](#) button. The window in Figure 5-14 will appear.

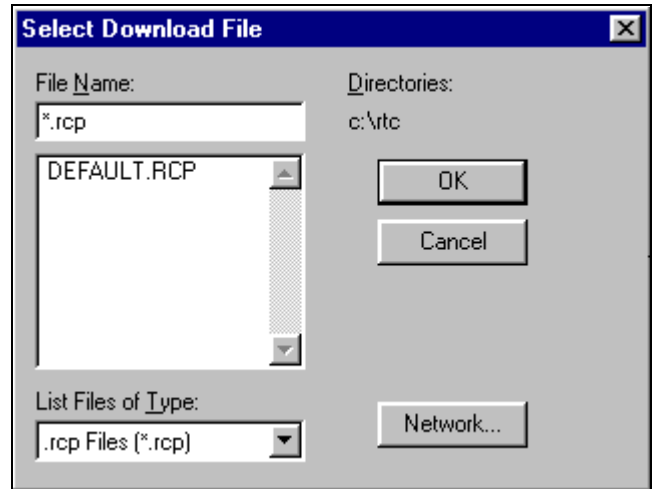


Figure 5-14: MS Windows Browsing Pop-up

Browse through the directories using standard Windows point and click methods.

Once selected, the recipe can be viewed in the Recipe Screen.

To load a recipe to the furnace without first looking at it, click the [Send from Disk](#) button. The same window pictured in Figure 5-14 above will appear.

Browse through the directories using standard Windows point and click methods.

Once selected, the recipe will be directly loaded into the furnace PLC controller.

To check what recipe is currently loaded in the furnace, click the [Get from Furnace](#) button. This action will download the current recipe in the furnace memory to the Recipe Screen for viewing.


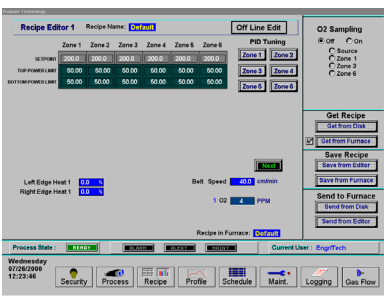

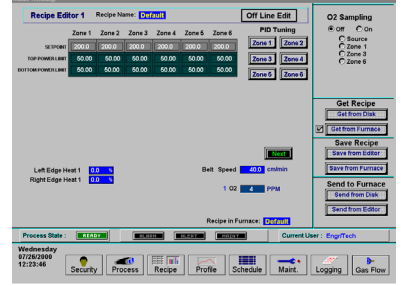

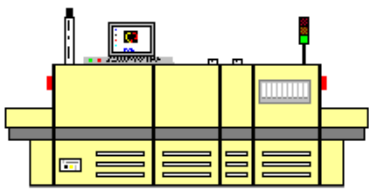


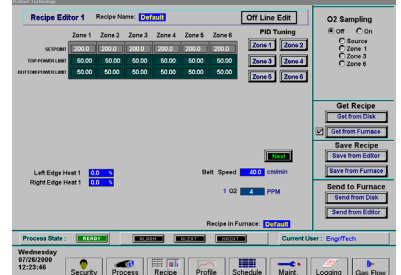
ACTION	FROM	TO
<p><b>Get Recipe</b></p> <p>To Load recipe to the editor, press:</p> <p><b>Get from Disk</b></p> <p>Loads recipe to editor from selected source. Choices include from removable disk or hard drive.</p>		 <p>Recipe Editor</p>
<p><b>Get from Furnace</b></p> <p>Loads recipe to Editor that is currently stored in the furnace PLC controller”</p>		<p>Recipe Editor</p>
<p><b>Save Recipe</b></p> <p>To Save recipe to computer:</p> <p><b>Save from Editor</b></p> <p>Saves recipe on screen to selected destination: removable disk or hard drive.</p>		 <p>Hard disk or removable disk</p>
<p><b>Save from Furnace</b></p> <p>Saves recipe running on furnace PLC controller to selected removable disk or hard drive.</p>		<p>Hard disk or removable disk</p>
<p><b>Send to Furnace</b></p> <p>To load a recipe into the Furnace controller:</p> <p><b>Send from Disk</b></p> <p>Copies a user selected recipe from the hard drive or portable medium directly to the furnace PLC controller.</p>		 <p>Furnace PLC Controller</p>
<p><b>Send from Editor</b></p> <p>Copies the recipe currently displayed in the Editor to the furnace PLC controller.</p>		<p>Furnace PLC Controller</p>

Figure 5-15: Recipe Storage and Retrieval


### 5.5.4 Logging Screen



The furnace is supplied with logging software. The Logging function allows the owner to keep a detailed record of furnace events. The following is a list of the events that are recorded in the “Event” file.

<u>Item Recorded</u>	<u>Other Information Noted with Item</u>
User log on	User ID
User log off	User ID
System Alert:	“Alert Condition Description”
System Alarm:	“Alarm Condition Description”
System Ready	
Recipe Loaded:	“Recipe Name”
Alert/Alarm Acknowledgment:	“User ID”
Furnace Activity	“Activity Description” (e.g. Change belt speed)

The logging screen allows any operator to view the last 40 recorded log items. Access the Logging Screen by clicking the [Logging](#) button at the bottom of the screen. The Logging Screen will appear like that pictured in Figure 5-16.

The most recent event is listed at the top of the screen. To view an additional screen of recorded events, click the [NEXT](#) down arrow to the right.  The color legend at the bottom helps determine the event type.

### 5.5.5 Viewing Logged Data

Each day a furnace is in full operation, the interface PC creates two files, and places them in the C:\FP directory. The files follow the following naming format:

yymmdd.h01  
yyddmm.evt

The first file, called the “History” file, includes a status of the furnace every three seconds. The following data are recorded:

- Thermocouple temperature readings, PID input values
- PID output levels as a function of available power
- Process State, warming, process ready, cool down, process off
- Belt Speed, inches per minute
- Current user
- Date
- Time

The second file, called the “Event” file, records furnace event data as seen in the Logging Screen.

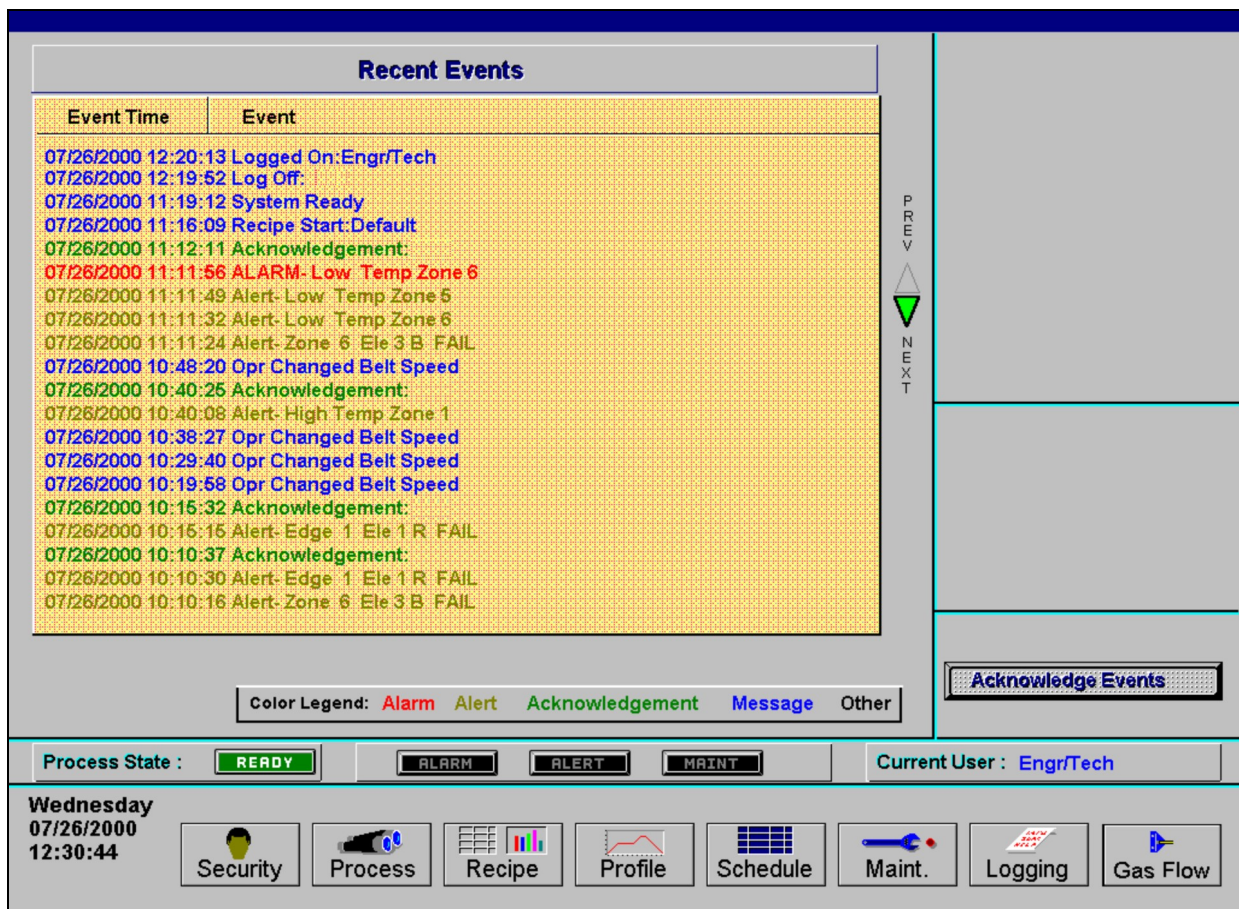


Figure 5-16: Logging Screen

## 5.5.6 Text Editing

A quick method of viewing the information presented in the file is to open a simple text editor such as Microsoft Notepad™.

## 5.5.7 Excel Import

The log files can also be conveniently imported into Microsoft Excel®.

## 5.6 Alarms

Alarms are audible and visual signals that the furnace has reached a state where the operator's attention is required.

### 5.6.1 Events

When an alarm sounds, the following events occur:

An audible alert will be heard from the furnace control panel.

The alarm box near the bottom of the process screen will light up.

Moving the mouse pointer over the bar across the bottom of the screen will highlight it in red as seen below.



Clicking on this bar will bring up the [Alarm Monitor](#) pop-up window as shown in Figure 5-17: Alarm Monitor Pop-up Window.

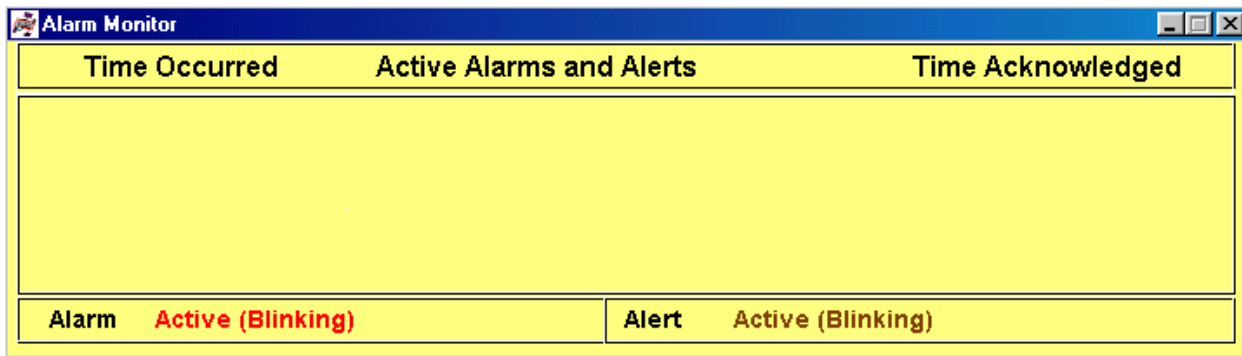


Figure 5-17: Alarm Monitor Pop-up Window

If you click on the pop-up window, the furnace software will automatically bring up the Logging screen behind the [Alarm Monitor](#).

### Acknowledge Events



To silence the audible alert and acknowledge the alarm, click on the [Acknowledge Events](#) button from the Process or Logging Screen.

## 5.7 Other Options

### 5.7.1 Element Monitor (Option )

Furnaces can be outfitted with element monitors used to trace continuity through each heat lamp. This option is only available from the maintenance screen and is not accessible the operator. Details of this option are discussed further in Section 7.3.2 on p.70.

### 5.7.2 WINKIC Prophet (Option )

The WINKIC prophet is a system of high-temperature thermocouples that are placed inside the quartz tubes along the bottom of the process section. These thermocouples allow the engineer or operator to continuously monitor several points of the temperature profile at all times.

### 5.7.3 WINKIC On Screen Profiling (Option )

On screen profiling is a useful feature allowing the user to observe a temperature profile of a thermocouple as it travels through the furnace.

When installed as an option with the furnace, six female thermocouple connectors are available near the entrance of the process section as shown below in Figure 5-18.



Figure 5-18: Thermocouple Interface

A separate manual is provided with the WINKIC interface board and software for on screen profiling. FurnacePros will initially setup the software to match the process section of each furnace.

### 5.7.4 Product Tracking (Option □)

The purpose of the product sensor and on-screen tracking feature is to count the number of product-units traveling through the furnace. A set of sensors at the entrance and exit detect the leading edge of a product-unit leaving the loading station or arriving at the unloading station. The tracking feature triggers an alert if the exit sensor does not detect the arrival of an expected product-unit at the unloading station.

To initiate the count, activate one or more tracking lanes by clicking the lane button(s) on the upper left corner of the process screen.

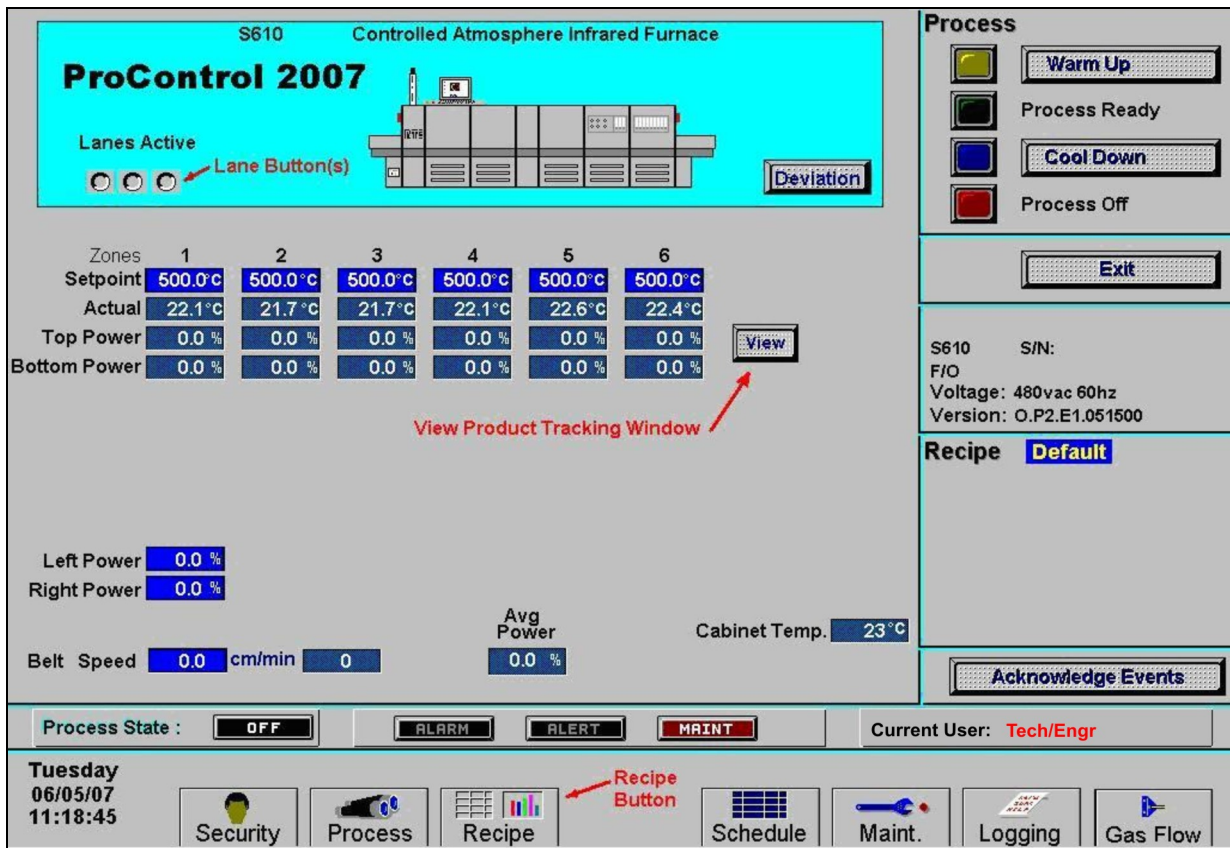


Figure 5-19: Process Screen Highlighting Lane Button, View Button and Recipe Button

The product-unit length must be set in the Recipe Screen.



Once in the Recipe Screen, double-click on the box next to the label [Product Length](#) (Figure 5-20).

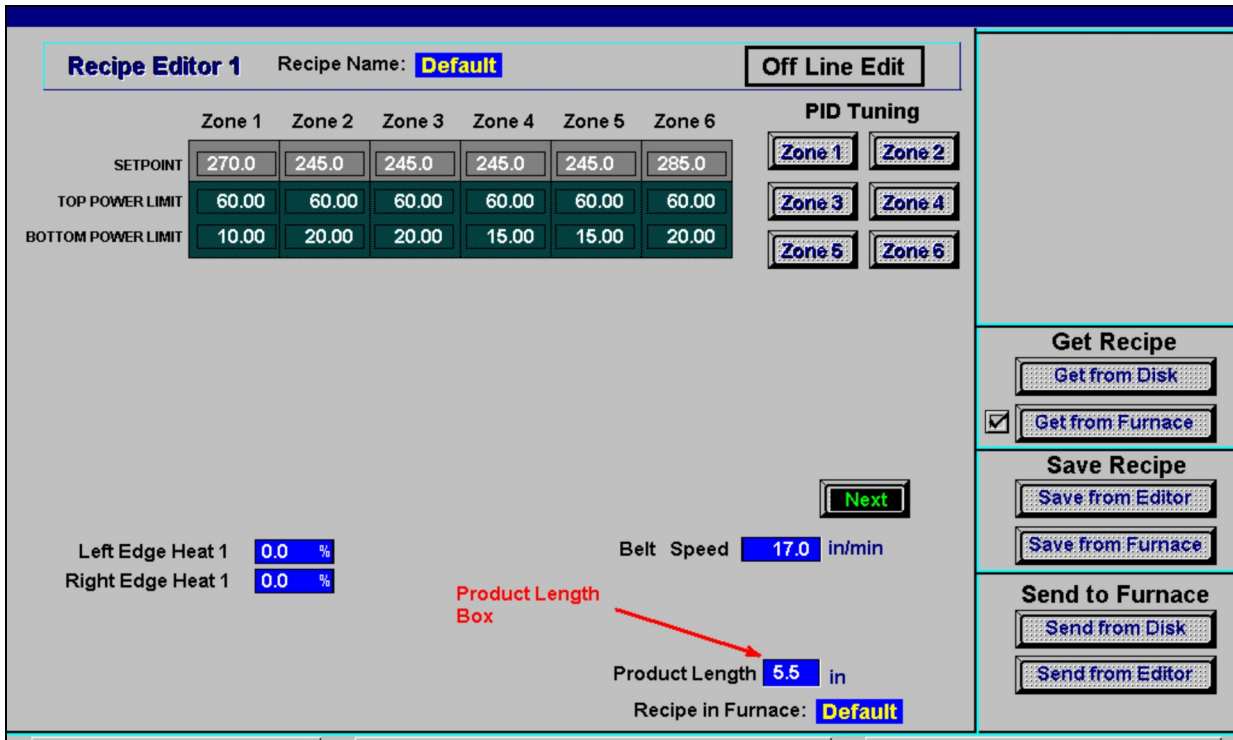


Figure 5-20: Recipe Screen Highlighting Product Length input field box

A pop-up window labeled [Send Value](#) will appear as seen in Figure 5-21. Define the product-unit length in the product length window, and click [OK](#).

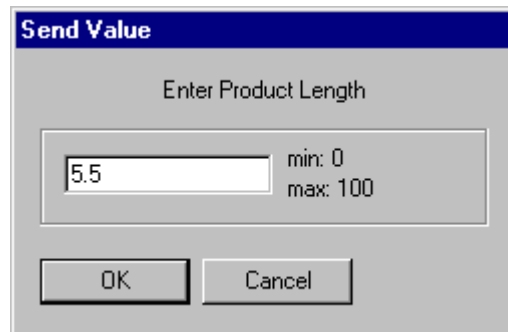


Figure 5-21: Send Value window

### 5.7.5 View Product Tracking



To view the product tracking window, return to the recipe screen shown in Figure 5-19 above and click the [View](#) button. Figure 5-22 shows the product tracking window labeled [Product](#). Rectangular representations of the defined product-unit length will scroll this screen at the set belt speed. The number of units, which have entered the furnace, will appear in the [ENTR](#) column. The number of units processed through the furnace will appear in the [EXIT](#) column. The number of units still in process will appear in the [INSIDE](#) column. Click on the [Clear Product Counts](#) button to reset the count to zero.

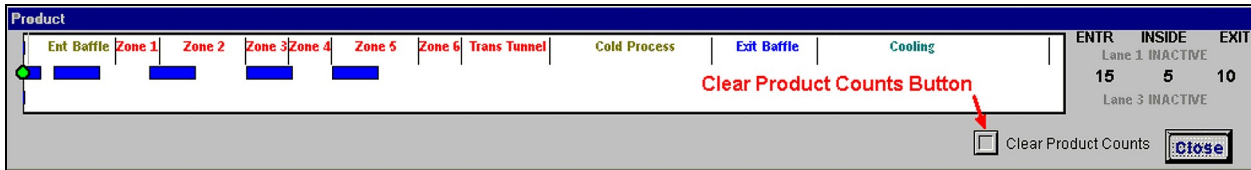


Figure 5-22: Product Tracking Window  
Highlighting the [Clear Product Counts](#) Button