

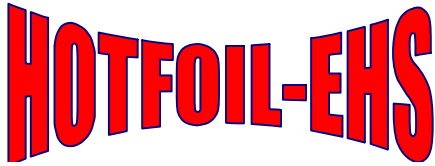
Industrial Heating Systems and Controls

Hotfoil-EHS, Inc.
2960 East State Street Extension
Hamilton, NJ 08619
Tel: (609) 588-0900
Fax: (609) 588-8333
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Hotfoil Hopper Maintenance System

HMI Operating Manual

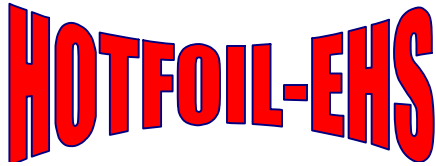


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This manual describes the screen and programming capabilities of the hopper heating system HMI.

The HMI system is housed in a Wall Mount NEMA 12 enclosure. A 10" touch screen interface, mounted on the outside of the enclosure door, is the main control and display point for the heating system. The power supply, back plane, Ethernet communications module, PLC controller, and other components are mounted on the back panel inside the cabinet.

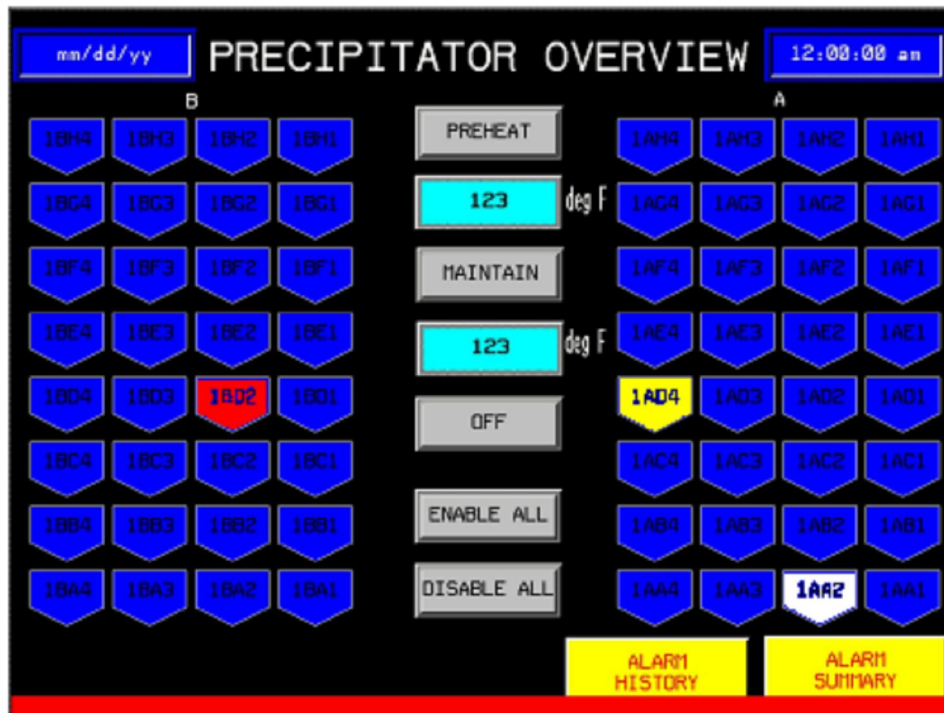
The HMI communicates over with two (2) hopper heater cabinets each controlling the hopper heaters.

The heater system is controlled and viewed through x display screens. They are:

1. Precipitator Overview Screen
2. Individual Precipitator Hopper Screen
3. Alarm History Screen

Precipitator Overview Screen

The Precipitator Overview screen shows the designation of the hoppers for the A and B precipitators,



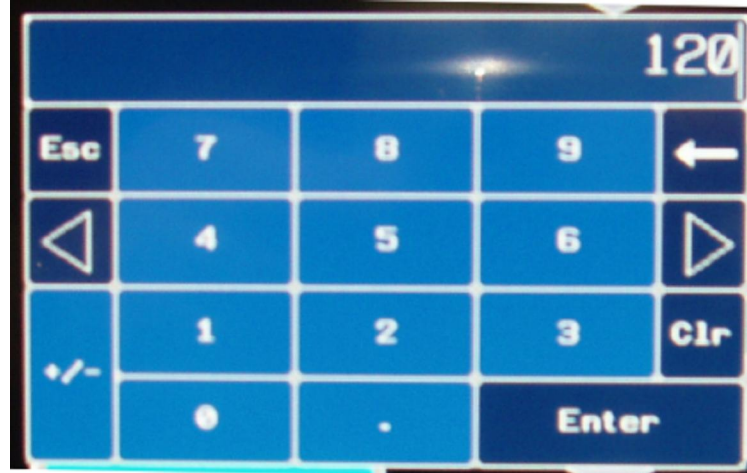
Each of the hopper icons can be shown in up to seven different colors. The color code is shown below:

Red	Circuit Breaker Trip
Orange	Over Temperature
Green	At Temperature
Grey	Disabled
White	Enabled
Cyan	Under Temperature
Yellow	Attempting to Reach Temperature

The button strip down the middle of the screen allows the heaters to be placed in various modes of operation. The system can be placed in the Preheat mode or the Maintain mode by touching the appropriate button. The Preheat and Maintain temperatures can be set by touching the appropriate button and entering the desired temperature on the pop-up keypad. System and heater enable and disable can be changed by touching the appropriate button.

Preheat will only activate after the system has been shut down and restarted or a hopper has been disabled and re-enabled. Once the Maintain temperature has been reached preheat is inactive.





Pop-up Keypad

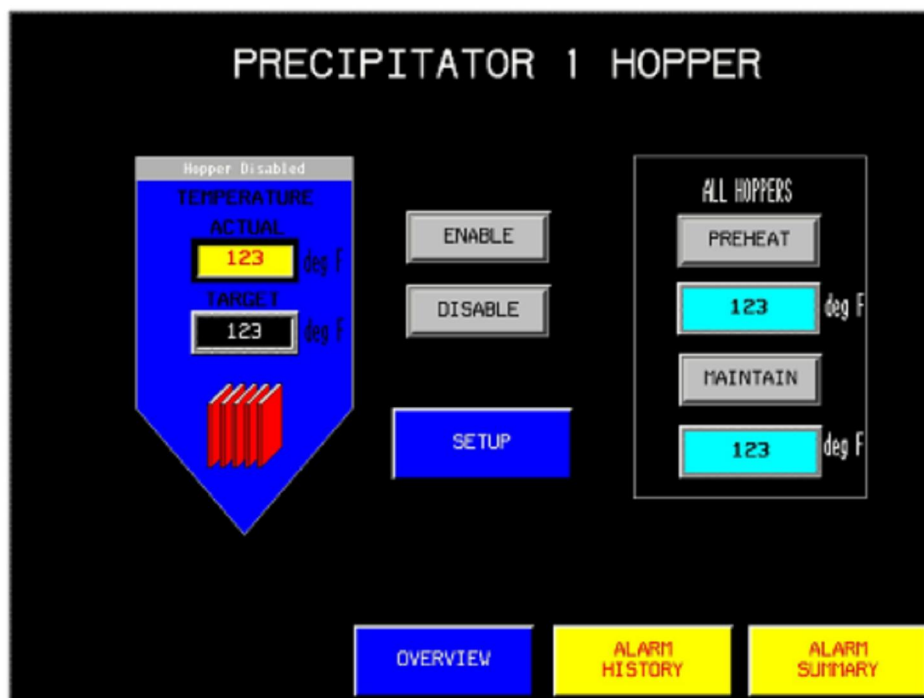
There are certain conditions that will scroll across the bottom of this screen with a red background. They are:

- An active alarm
- A fault of a power supply feeding an I/O node or circuit breaker failure
- An Over or Under temperature notification

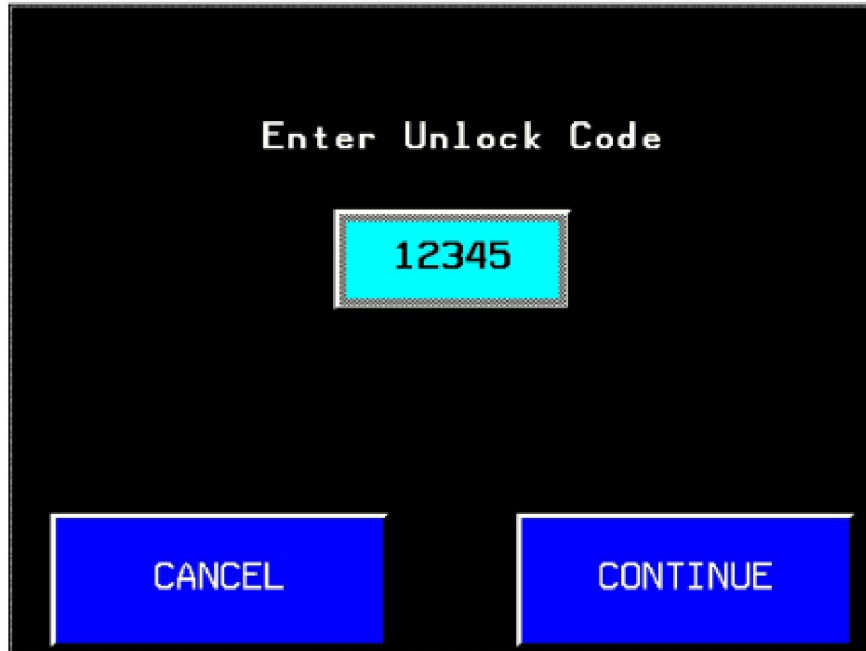
Details of these, as well as all other alarms can be viewed by touching the Alarm History or Alarm Summary button in the lower right corner of the display. The alarm screen will be described in later in this manual.

Individual Hopper Screen

Touching a hopper button on the Precipitator Overview Screen will bring up a screen specific to the chosen hopper. The right side of the screen shows the Preheat and Maintain information from the Precipitator Overview Screen as well as an Disable/Enable button for this particular hopper.



Also shown is a Setup button (discussed in detail later) for setting the PID and PWM parameters of the heater system. Touching the Setup button brings up a screen requiring a password be entered before the setup screen is shown. Only authorized personnel with the appropriate code will be able to gain access to the Setup screen.



Enter Unlock Code Screen

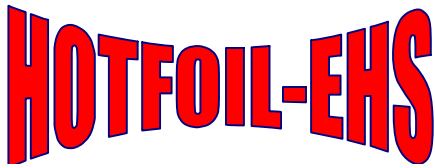
The hopper pictorial on the left side of the Individual Hopper Screen shows a hopper along with its actual and target temperature. The red heater icon shows that the heater is in operation.

Touching the Overview button will return you to the Precipitator Overview Screen.

Alarm Screen

The alarm screen is viewed by touching either the Alarm History or Alarm Summary button.

The Alarm Summary screen will show all active alarms. The Alarm History screen will show all alarms that have been cleared.



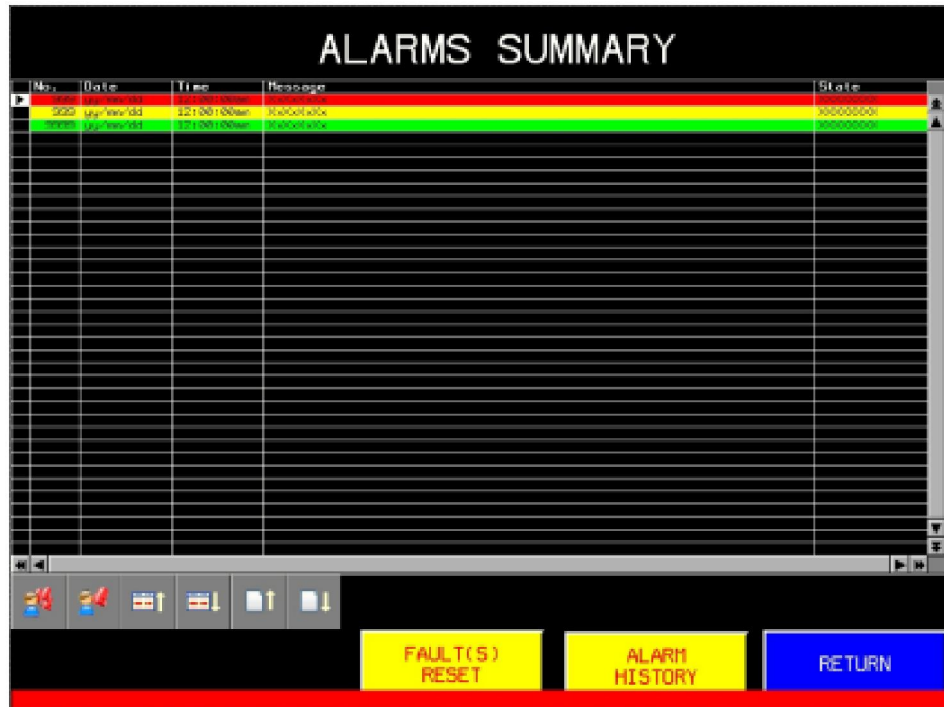
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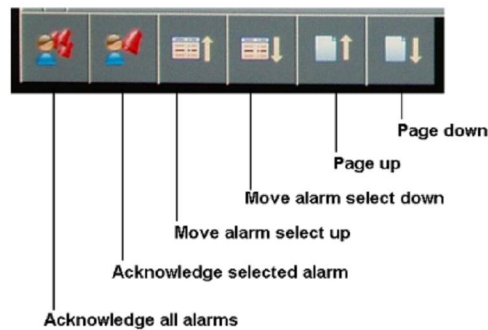
Alarm History Screen

The color code for the alarms is as follows:
 Red – Active unacknowledged alarm
 Yellow – Active acknowledged alarm
 Green – Cleared alarm (history screen only)



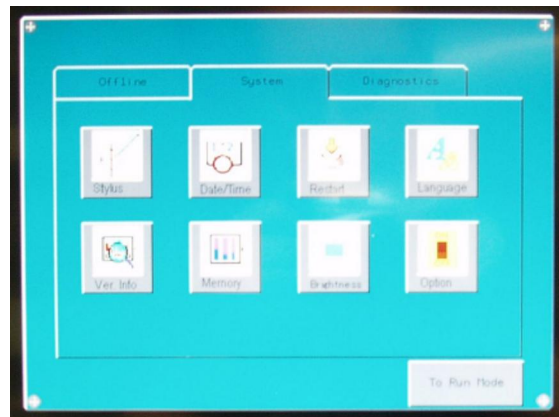
Alarm Summary Screen

The buttons on the lower left side of the screen are for acknowledging alarms and moving up and down the Alarm screen. They work as follows:



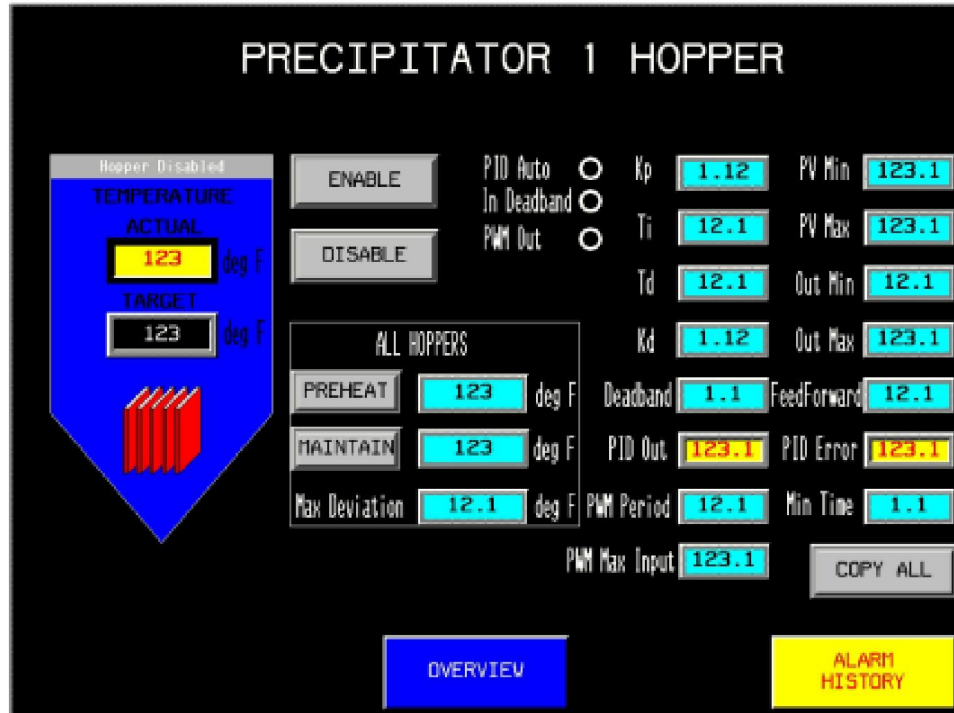
The Return button will bring you back to the Precipitator Overview Screen.

If the following screen appears please touch the “To Run Mode” button in the lower left corner of the screen. Although there is no security code required to enter these programming screens, they should not be adjusted by other than a qualified programmer.



Set-up Screen

When the Set-up button on the Individual Hopper Screen is touched the following Set-up Screen will appear.



This screen should only be used by someone knowledgeable in the setting and fine tuning of proportional–integral–derivative controllers and pulse width modulation controllers.

The following is a definition of the variables that can be adjusted from this screen.

- K_p – proportional gain
- T_i – integral time
- T_d – derivative time
- K_d – derivative gain
- PV_{min} – minimum allowable value of measured temperature (for scaling)
- PV_{max} – maximum allowable value of measured temperature (for scaling)
- Out_{min} – minimum action PID output in %
- Out_{max} – maximum action PID output in %
- PWM Period – cycle period
- Min time – minimum contact engagement time
- PWM Max Input – percent (5) PWM period

Touching the Copy All button will copy the entered information into all the hopper programs.