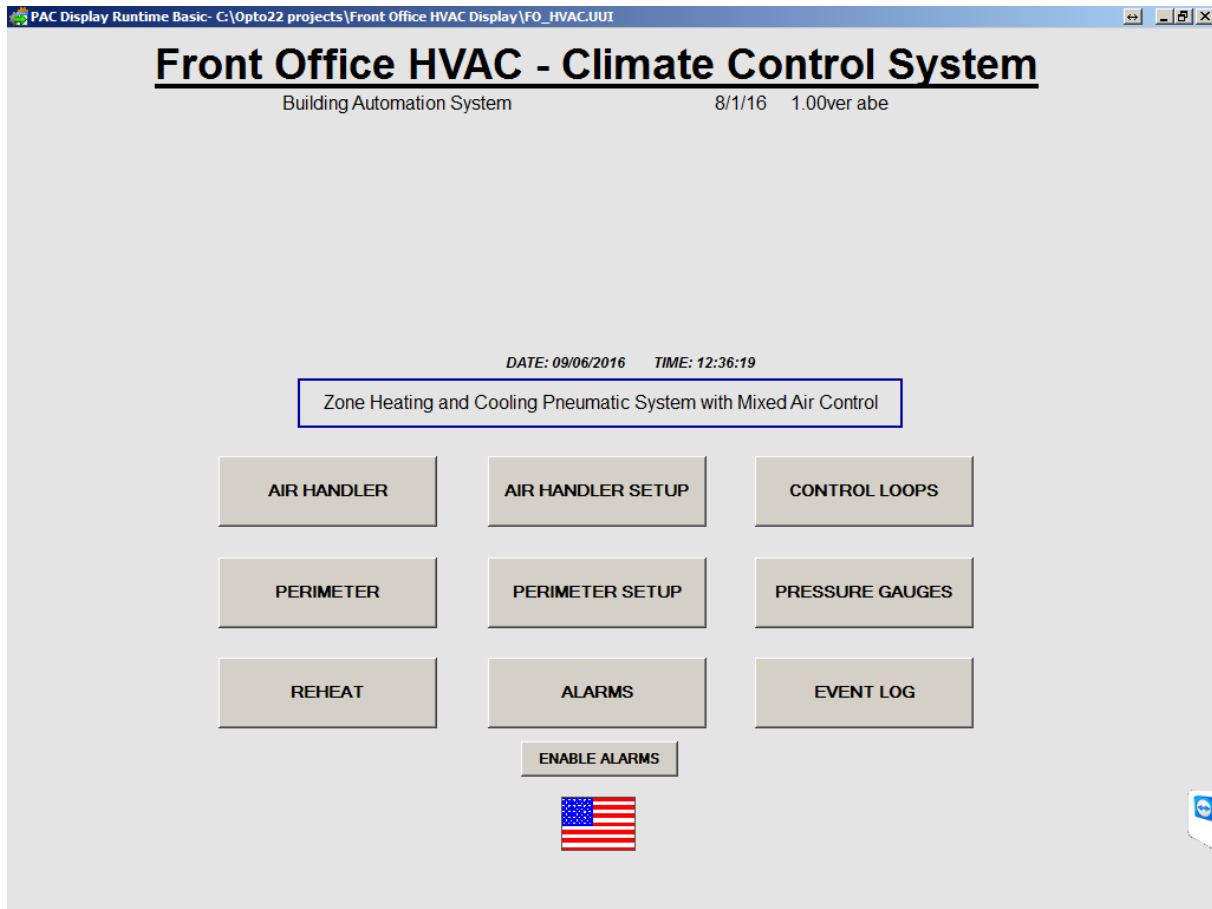# Climate Control System
<u>User Manual</u>

The Climate Control System will control the air temperature using outside air dampers, cooling and heating exchangers. Additional heating can be utilized by using the Reheat zones in the air duct. Window perimeter units are controlled using cooling and heating exchangers.

<u>New Control Features:</u>
- New control using an OPTO22 controller and I/O modules.
- User friendly interface with robust temperature PID control.
- HMI user interface located in the basement which allows remote access. (un:user/pw:hvac)
- Data sent to the PI collection database for history trending.
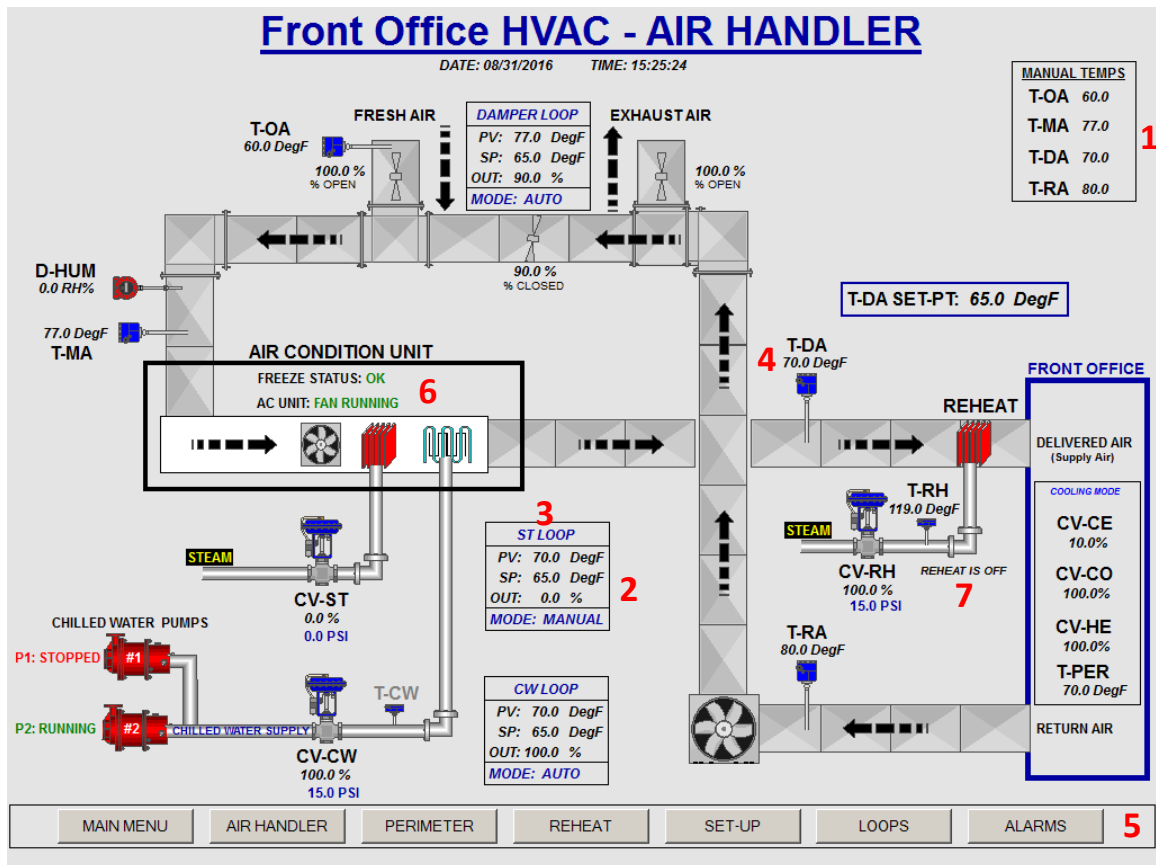- Critical Alarms sent via email.

9-6-16
Jim Abraham

Front Office Climate Control System
<u>Table of Contents</u>

AIR HANDLER MIMIC SCREEN:

1. Can enter manual temperature values if a sensor goes bad. 0=use temperature sensor reading.
2. Click on Loop box to have the control loop set-up window to appear.
3. Click on Loop name to have the control loop trend window to appear.
4. Click on a temperature reading to have the temperature trend window to appear.
5. Click on button on bottom of screen to navigate to different screens.
6. Alarms: AC unit Fan Run and Freeze status. (will flash red on screen)
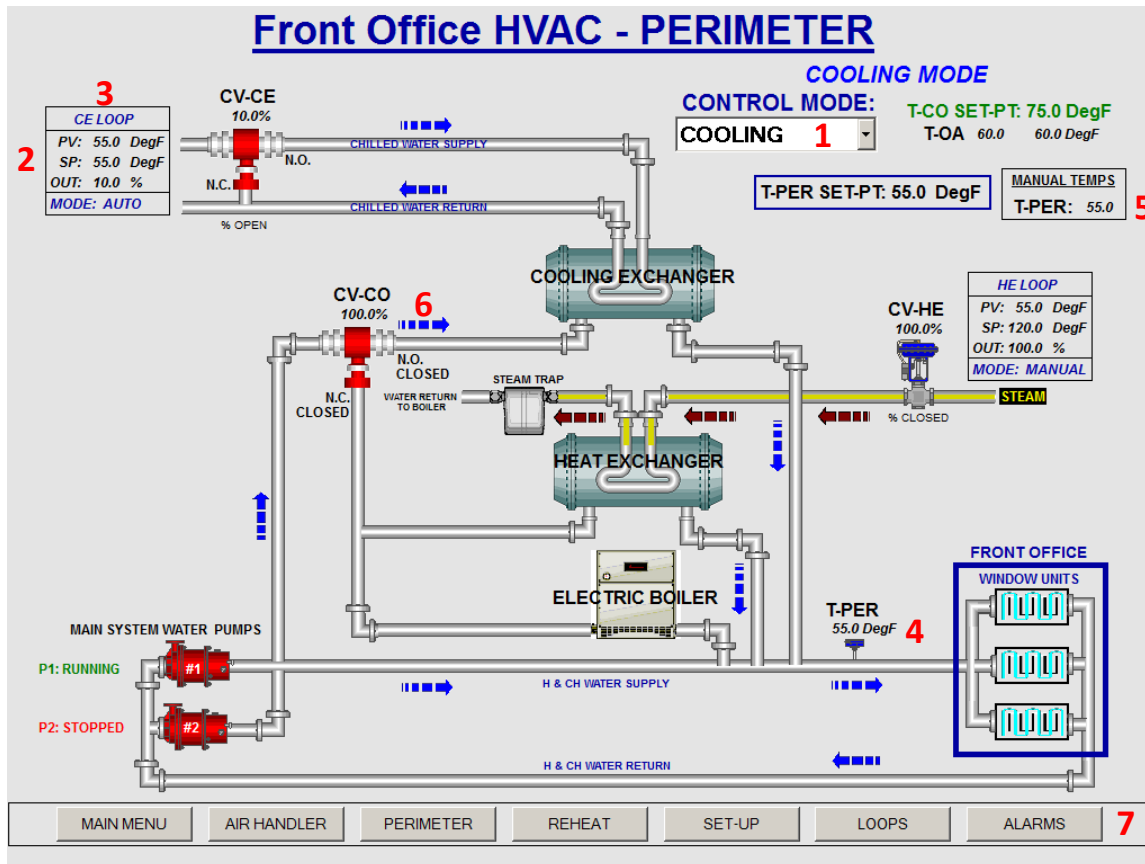7. Perimeter and Reheat modes.

AIR HANDLER SET-UP SCREEN:

1. Can enter Delivered Air Temperature Set-Points for Occupy and Un-Occupy times.
2. Can enter Damper Loop Output Clamp values for minimum positions. This is in order to comply with the required minimum outside air quantity for Occupy and Un-Occupy times.
3. The green arrow indicates the active time period.
4. Chilled Water Pump Control: Click on "CW Pump1 or 2" button to start/stop pump. Run/stop/Trouble status is displayed to the right.
5. To Auto transfer pumps, click on "Auto Transfer" button. Will count the days running and left until transfer.
6. Click on "Pump Cycle Time" to enter desired number of days for the pump to run.
7. Enter 24 Hr time for what time of day the pump will transfer.
8. Click on the "Exit Runtime" button to exit the runtime program and display the desktop. Note: if the runtime program is exited, the system will still operate normally.

WINDOW PERIMETER MIMIC SCREEN:

Front Office HVAC - PERIMETER

COOLING MODE

CONTROL MODE: COOLING **1**

T-CO SET-PT: 75.0 DegF
T-OA 60.0 60.0 DegF

3
CE LOOP
2
PV: 55.0 DegF
SP: 55.0 DegF
OUT: 10.0 %
MODE: AUTO

CV-CE 10.0%
% OPEN
N.C. N.O.
CHILLED WATER SUPPLY
CHILLED WATER RETURN

T-PER SET-PT: 55.0 DegF

MANUAL TEMPS
T-PER: 55.0 **5**

COOLING EXCHANGER

CV-CO 100.0% **6**
N.O. CLOSED
N.C. CLOSED

HE LOOP
PV: 55.0 DegF
SP: 120.0 DegF
OUT: 100.0 %
MODE: MANUAL

CV-HE 100.0%
% CLOSED
STEAM

STEAM TRAP
WATER RETURN TO BOILER

HEAT EXCHANGER

ELECTRIC BOILER

T-PER 55.0 DegF **4**

FRONT OFFICE
WINDOW UNITS

MAIN SYSTEM WATER PUMPS
P1: RUNNING #1
P2: STOPPED #2

H & CH WATER SUPPLY
H & CH WATER RETURN

| MAIN MENU | AIR HANDLER | PERIMETER | REHEAT | SET-UP | LOOPS | ALARMS |

7

1. Can select control mode using the pull down menu: COOLING/HEATING/AUTO modes.
2. Click on Loop box to have the control loop set-up window to appear.
3. Click on Loop name to have the control loop trend window to appear.
4. Click on a temperature reading to have the temperature trend window to appear.
5. Can enter manual temperature values if a sensor goes bad. 0=use temperature sensor reading.
6. Arrows will indicate cooling or heating water flow.
7. Click on button on bottom of screen to navigate to different screens.

WINDOW PERIMETER SET-UP SCREEN:

1. Can enter Perimeter Water Temperature Set-Points (Cooling Mode only) for Occupy and Un-Occupy times.
   Note: Perimeter Water Temperature Set-Point is calculated based on the outside temperatures for the heating mode.
2. Can enter Change-Over Water Temperature Set- Points (Auto Mode only) for Occupy and Un-Occupy times.
3. Can select control mode using the pull down menu: COOLING/HEATING/AUTO modes.
4. The green arrow indicates the active time period.
5. Main System Pump Control: Click on "Main Pump1 or 2" button to start/stop pump.
   Run/stop/Trouble status is displayed to the right.
6. To Auto transfer pumps, click on "Auto Transfer" button. Will count the days running and left until transfer.
7. Click on "Pump Cycle Time" to enter desired number of days for the pump to run.
8. Enter 24 Hr time for what time of day the pump will transfer.
9. Click on the "Exit Runtime" button to exit the runtime program and display the desktop.
   Note: if the runtime program is exited, the system will still operate normally.

REHEAT MIMIC SCREEN:
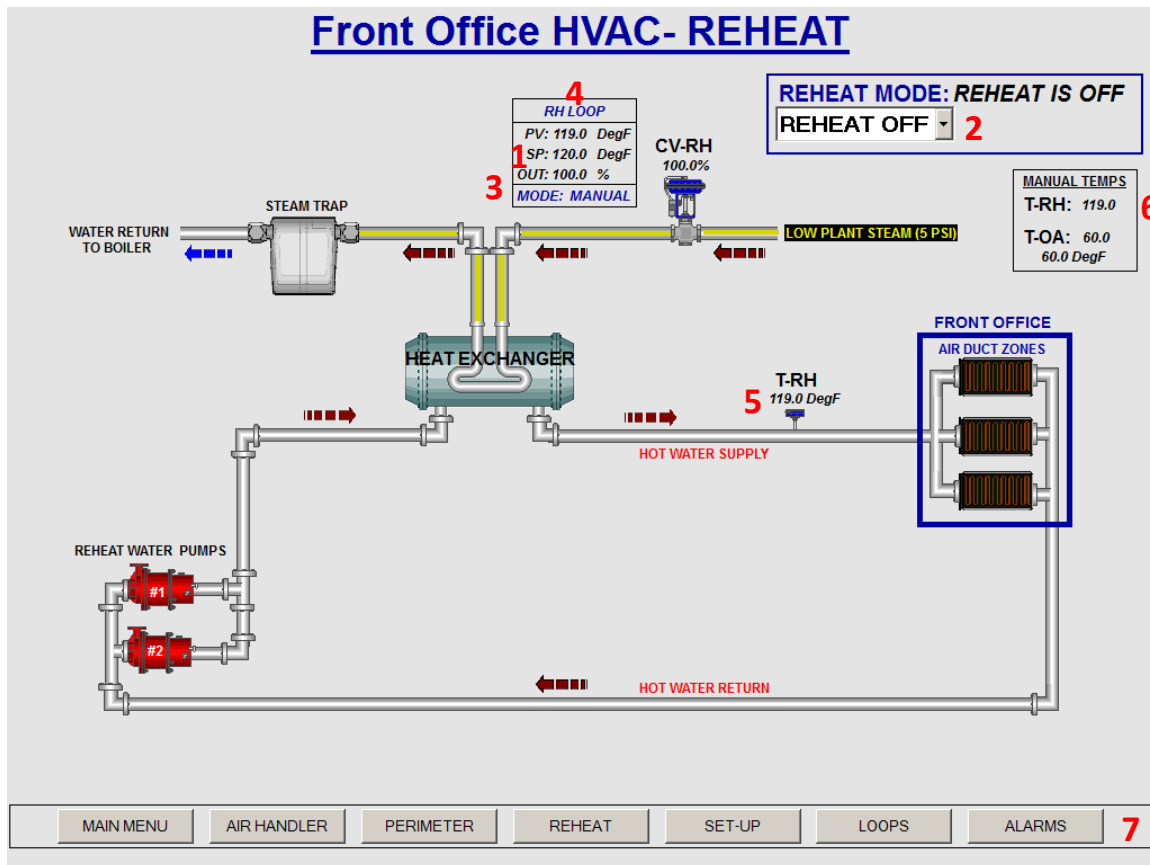
1. Reheat Temperature Set-Point is calculated based on the outside temperatures.
2. Can select control mode using the pull down menu: Reheat On/Off modes.
3. Click on Loop box to have the control loop set-up window to appear.
4. Click on Loop name to have the control loop trend window to appear.
5. Click on a temperature reading to have the temperature trend window to appear.
6. Can enter manual temperature values if a sensor goes bad. 0=use temperature sensor reading.
7. Click on button on bottom of screen to navigate to different screens.

Note: No control of the water pumps.

CONTROL LOOP SET-UP SCREEN:

Front Office HVAC- CONTROL LOOP SET-UP

COOLING MODE   **REHEAT IS OFF**

AIR HANDLER   **PERIMETER**   **REHEAT**

DAMPER LOOP	CW LOOP	ST LOOP	CE LOOP	HE LOOP	RH LOOP
PV: 77.0 DegF	PV: 70.0 DegF	PV: 70.0 DegF	PV: 55.0 DegF	PV: 55.0 DegF	PV: 119.0 DegF
SP: 65.0 DegF	SP: 65.0 DegF	SP: 65.0 DegF	SP: 55.0 DegF	SP: 180.0 DegF	SP: 180.0 DegF
OUT: 0.0 %	OUT: 100.0 %	OUT: 0.0 %	OUT: 10.0 %	OUT: 100.0 %	OUT: 100.0 %
MODE: MANUAL	MODE: AUTO	MODE: MANUAL	MODE: AUTO	MODE: MANUAL	MODE: MANUAL

Toggle Mode: [Loop Mode] [Loop Mode] [Loop Mode] [Loop Mode] [Loop Mode] [Loop Mode]

Gain:	2.00	2.00	2.00	2.00	2.00	2.00
Reset:	0.50	0.50	0.50	0.50	0.50	0.50
Out High Limit:	90 %	100 %	100 %	100 %	100 %	100 %
Out Low Limit:	0 %	0 %	0 %	0 %	0 %	0 %

AIR TEMPERATURES

	RAW	FILTERED	FILTER WT	
T-OA: 60.0	60.0 DegF	###.# DegF	6 SEC	● [FILTER]
T-MA: 77.0	77.0 DegF	77.0 DegF	6 SEC	● [FILTER]
T-DA: 70.0	70.0 DegF	70.0 DegF	6 SEC	● [FILTER]
T-RA: 80.0	80.0 DegF	80.0 DegF	6 SEC	● [FILTER]

WATER TEMPERATURES

	RAW	FILTERED	FILTER WT	
T-PER: 55.0	55.0 DegF	55.0 DegF	6 SEC	● [FILTER]
T-RH: 119.0	119.0 DegF	119.0 DegF	6 SEC	● [FILTER]
T-CW:				

[MAIN MENU] [AIR HANDLER] [PERIMETER] [REHEAT] [SET-UP] [GAUGES] [ALARMS]

1. Click on Loop box to have the control loop set-up window to appear.
2. Click on Loop name to have the control loop trend window to appear.
3. Click on "Loop Mode" button to manually toggle the control loop mode.
   Note: be careful, since this function is performed automatically by the program.
4. Click on Loop parameters to change Gain/Reset/Output Clamps.
   (Note: need to save to controller flash memory)
5. Can enter manual temperature values if a sensor goes bad. 0=use temperature sensor reading.
6. Click on "Filter" button to filter the temperature readings. Also can enter a filter time weight.
   Green indicator = filter being used.
7. Click on button on bottom of screen to navigate to different screens.

ALARM POP-UP SCREEN:

1. Click on the "Alarm" button at the bottom of the screen to display the Alarm screen which will pop-up over the current screen being viewed. To close click on the [X] in the top right corner of screen.
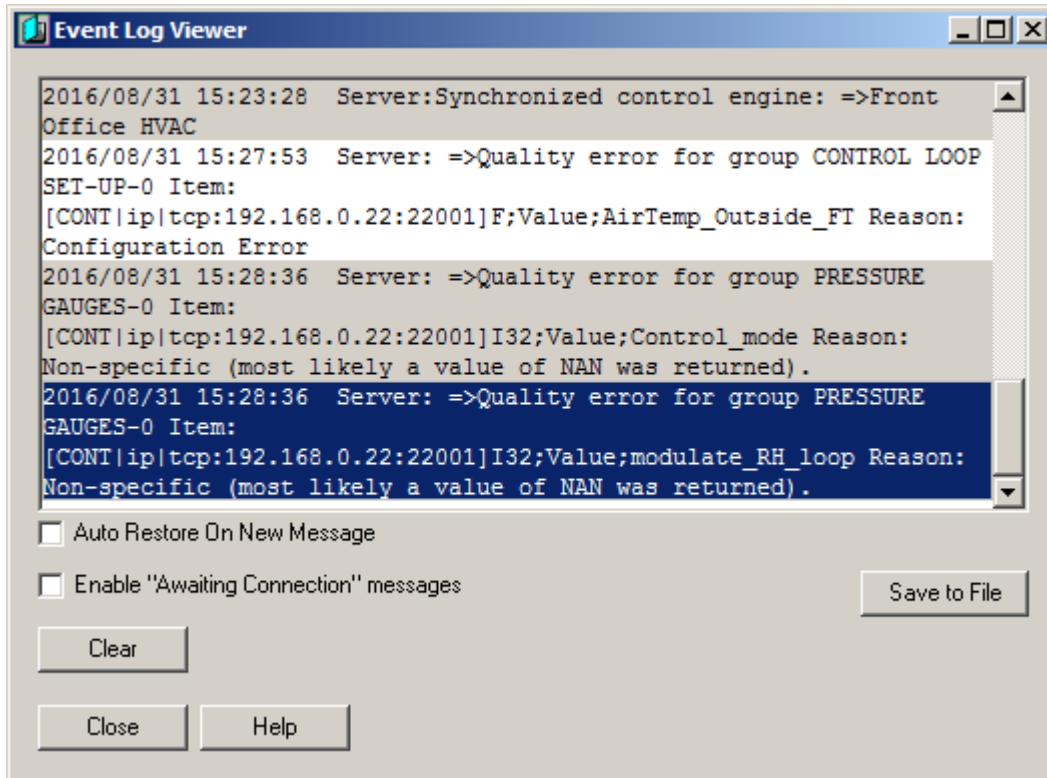   **Note: If runtime program has just started, it's important to enable the alarms. Also found on the Main Menu screen.**

2. An alarm pop-up message will appear whenever an alarm occurs. Options are to acknowledge the alarm or close the alarm message.
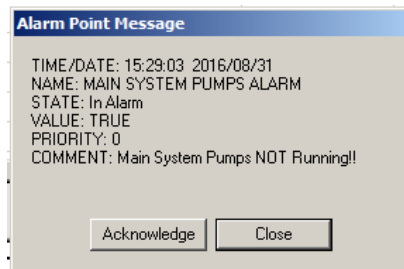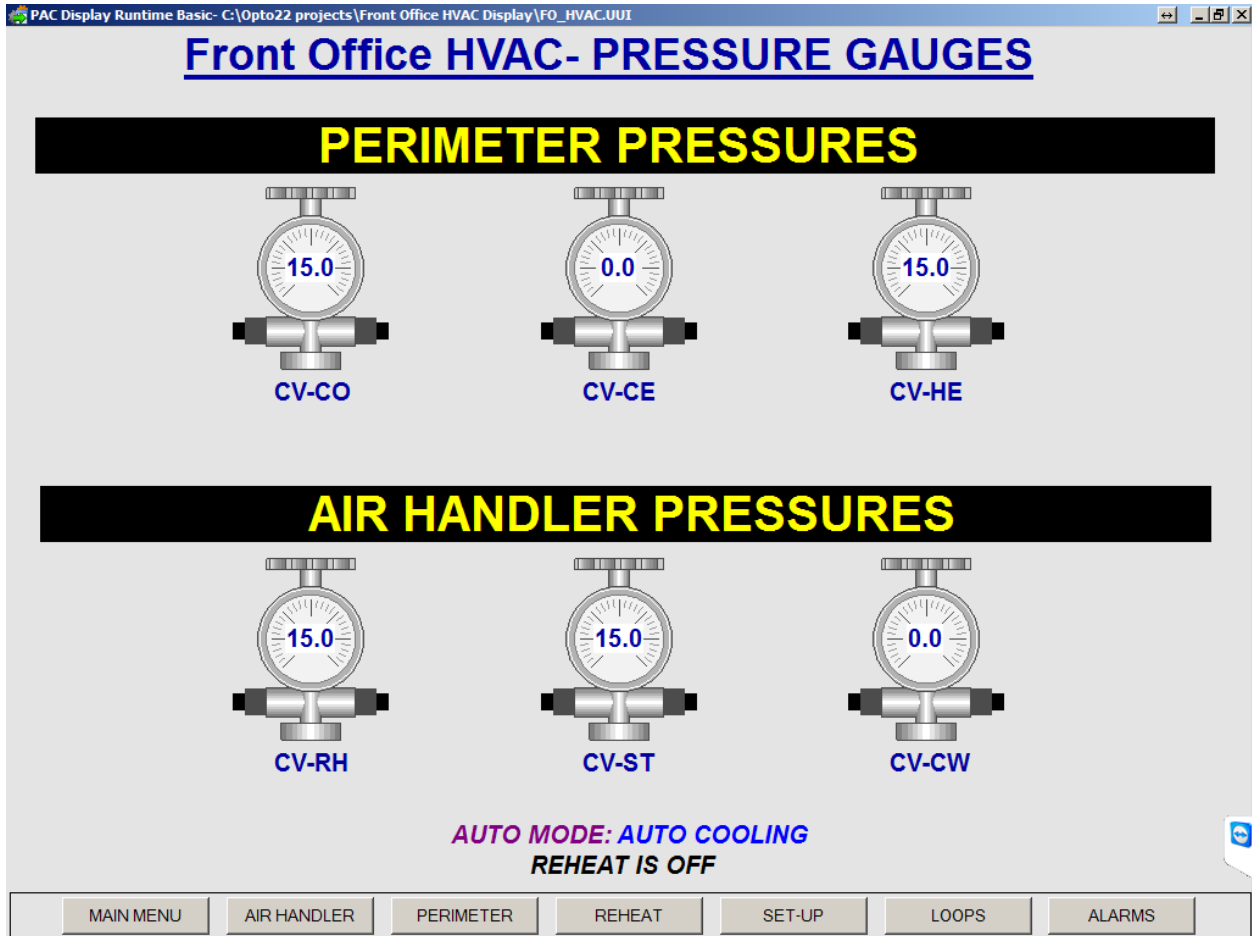
EVENT LOG POP-UP SCREEN:

1. Click on the "Event Log" button on the Main menu screen to display the event logs.

PRESSURE GUAGES SCREEN:

1. Displays what the actual pressure gauges should be reading.

Notes:
- This can be used to troubleshoot a problem with the control valves and system operation.
- The actual gauges will be mounted above the HMI screen, so it will be easy to check pressure readings.