Orion
Control Systems

GPC-17 Controller

General Information &
Application Guide

General Purpose Controller

(GPC-17)

September 28th 2001

Description

The GPC-17 is a controller designed to “fill in the blanks” between standard off the shelf programs and minor non-standard applications. An example of a non-standard application might be exhaust fan control, based on building pressure or a simple boiler enable controller based on schedules or outdoor air temperature.

NOTE: This controller is not intended for use as a complete air handling controller or any other device that might require special sequences not available in the GPC-17.

The remainder of this document will describe the I/O configurations that are possible and will also include a few sample applications to aid the user in determining if this controller will meet their specific requirements.

Analog Input Configuration For 1 - 6

The first five analog inputs can be configured in several different ways. These include the following configurations:

1. Thermister Type III Temperature Sensors
2. 4 – 20ma User Scaled
3. Binary Contact Closures
4. 0 – 5 VDC User Scaled
5. Read Global Analog Broadcast from another Controller
6. Read Global Binary Broadcast from another Controller

Each input is separately configured so combinations of any type of input on the same controller are possible.

All readings can be overridden to specific values for test purposes. All thermister sensors can also be calibrated by entering positive or negative offsets to be applied to the current readings. All 4 – 20ma readings can be calibrated if the user has the exact current or resistance values available for entering in the calibration fields.

Any or all readings can also be “broadcast” to other controllers on the communications loop. For example. the Outdoor Air Temperature is broadcast on channel #2 by any unit that happens to have the sensor attached. If none of the standard package units have the outdoor air sensor attached, you could attach it to the GPC-17 and select it for broadcast on channel #2. All other controllers would “hear” the broadcast and use it in their normal operations. On the other hand, if you are measuring something like return air humidity, do NOT select channel #2 to broadcast it on, since all the package unit controls are expecting the outdoor air temperature. If no package controllers exist on your system then you are free to use any available global channel for broadcast. There are 32 possible global analog channels and 16 possible global binary channels.

Select global analogs to broadcast readings and global binary channels to broadcast contact closure (on/off) information.

If you select one of the unassigned channels for broadcast, it is assumed that you have other GPC-17 units installed that expect to receive information on those channels since the standard package code does not listen for broadcasts on unassigned channels.

CAUTION: If you elect to broadcast a reading from the GPC-17 to all other controllers on your installation, be sure to check the HELP screen to identify which Global Channels have already been assigned.

Each input also provides high and low alarm limits if the user requires out of range values to notify service personnel. The alarm limits can be widened at night and they can also be forced to be out of limits for a user defined amount of time before an alarm occurs. This prevents false alarms if the reading temporarily exceeds the limit but then recovers and stays within the limits the remainder of the time.

To keep things simple, all readings are limited to a resolution of ± 0.1 whether they are temperature readings or humidity levels or any of the other possible sensors available that can be scaled by the user. If you need higher resolution, then the GPC-17 is not the controller for your application.

Each input can also have an appendix selected to display with the reading to make them more user friendly. The possible appendix values are:

- (None) No Appendix Required
- RH% Relative Humidity
- % Percentage
- °F Degrees Fahrenheit
- °C Degrees Celsius
- PPM Parts Per Million
- PSI Pounds Per Square Inch
- “WG Inches of Water Gauge
- “ Inches
- Ft. Feet
- RPM Revolutions Per Minute

On inputs selected for Binary Input Contact Closure, the user can select Normally Open or Normally Closed Contacts.

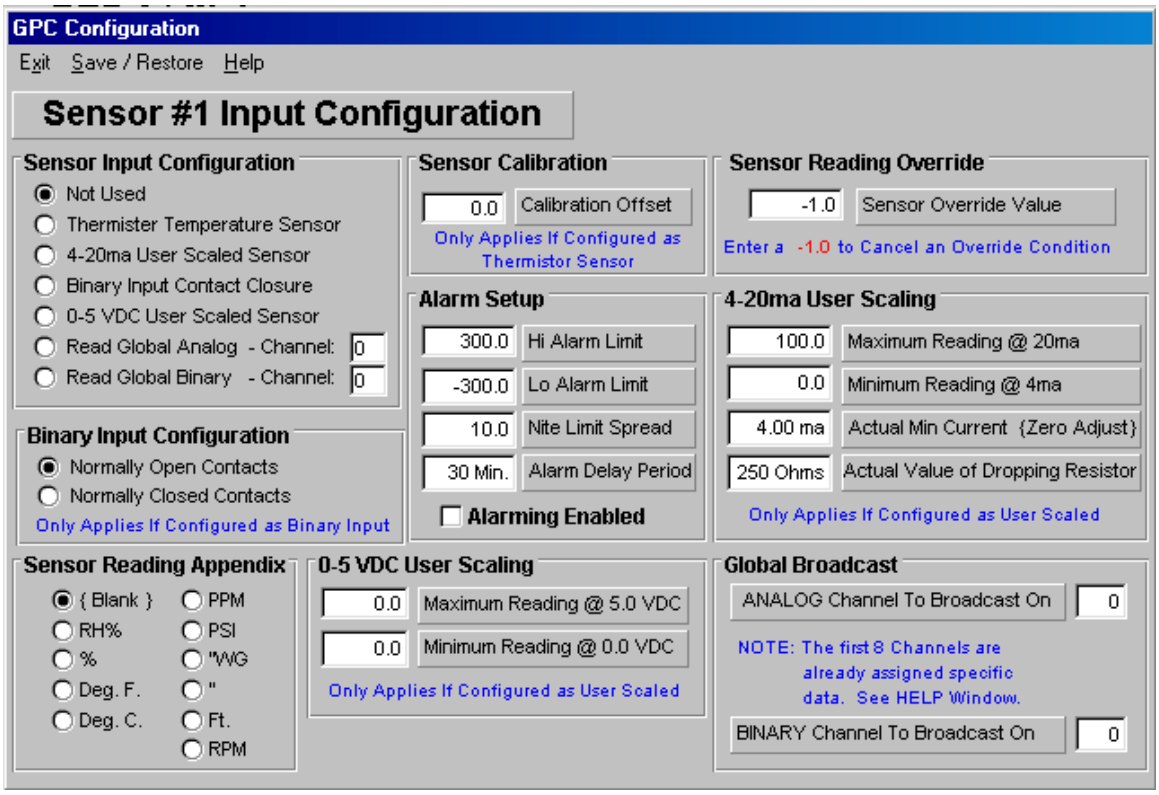


Figure 1 - Analog Input Configuration Screen

Analog Input #7

This analog input is reserved for a Building Pressure Sensor. This value can then be used to monitor the building pressure or to actually control the building/relief pressure using either a relay output or an analog output.

You can configure the scaling range and the type of input signal your pressure sensor provides.

NOTE: Be sure to remove the pullup resistor (PU R20) on input #7 for proper operation of your sensor.

The controlling setpoint and deadband are also adjustable to the hundredths of an inch range. If you select an analog output as the control method, Building Pressure control is one of the control selections and the GPC-17 has a built in control sequence for that option. If you select a relay to enable/disable a relief fan, simply select Building Pressure as the Control Source and setup the relay as you normally would for minimum/maximum run times and for setpoint deadband.

Analog Input #8

This analog input is reserved for Duct Static Pressure. This value can then be used to monitor the duct static or to actually control the duct static using an analog output and driving either inlet vanes or a VFD controller. It is not recommended that you attempt to use relays to control the duct static pressure, although this reading can be selected as a control source on the relay configuration screen.

CAUTION: If you select two relays to control duct static, WattMaster Controls cannot assume any liability for equipment damage caused by over-pressurization of the duct work!

If you require a Duct Static Pressure Sensor, you must use a Kavlico Pressure sensor provided by WattMaster Controls for proper sensor readings. No other sensors are currently supported for this input.

NOTE: Be sure to remove the THERM8 jumper on the RTU-17 board for proper sensor operation.

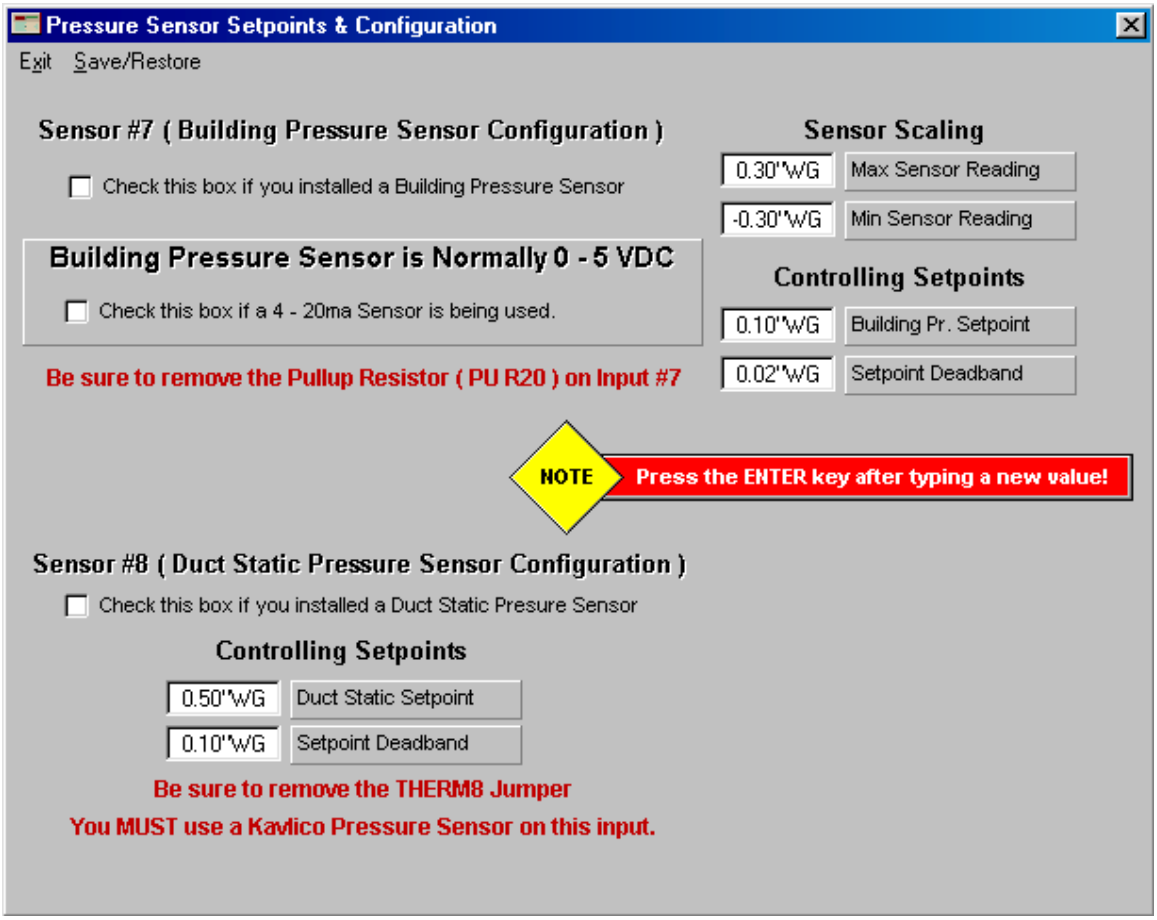


Figure 2 - Analog Input Configuration Screen

Relay Output Configuration

Control Methods

Each individual output relay can be configured separately for one of the following methods of control listed below.

0 = Not Used
1 = On Above High Limit Setpoint and Off Below Low Limit Setpoint
2 = On Above High Limit Setpoint and On Below Low Limit Setpoint
3 = Off Above High Limit Setpoint and On Below Low Limit Setpoint
4 = Off Above High Limit Setpoint and Off Below Low Limit Setpoint
5 = On with Contact Closure on Selected Input
6 = Off with Contact Closure on Selected Input
7 = Follow Internal Week Schedule (Only 1 Schedule Available)

Control/Reset Sources

The Control Source is also selectable. The list of possible sources is shown below. Keep in mind that Sensor Inputs #1 - #6 can be either analog readings or binary contact closures.

1 = Sensor Input #1
2 = Sensor Input #2
3 = Sensor Input #3
4 = Sensor Input #4
5 = Sensor Input #5
6 = Sensor Input #6
7 = Building Pressure
8 = Duct Static Pressure
9 = Outdoor Air Temperature received via Global Broadcast from another unit

If no **Reset Source** is required, be sure to select the same value that the **Control Source** has been configured for.

The **Logical AND Source** and the **Logical OR Source** also use the same list of available sources for their control also.

Enabling Relay

Interaction between relays is possible via an *Enabling Relay* feature. This allows the user to prevent a specific relay from activating until one of the other relays has had a chance to activate (See *Sample Configurations* Section). This can include such things as waiting for a fan to start before operating a heating or cooling stage.

Delay & Run Times

The relay can also be forced to remain on for a minimum amount of time or remain off for a minimum amount of time to prevent rapid cycling on and off under borderline operating conditions. A Starting Delay Period is also available so that a relay must also wait this amount of time, once it is enabled to activate before the relay output is actually energized.

Reset Source Limits

The Reset Source Limits are only required if you need the controlling setpoint to vary between the **Hi Limit Setpoint** and **Lo Limit Setpoint** based on some other condition such as outdoor air temperature. If no reset is required, simply enter the same values for the Hi and Lo Limit Setpoints and select the same **Reset Source** as you selected for the **Control Source**.

If you do require the main **Control Method** setpoint to reset, this is the range over which the reset source must change to cause the controlling setpoint to reset from the Lo Limit to the Hi Limit values you entered. For example: you want to reset the enable/disable point for a boiler enable signal based on the changing outdoor air temperature. You would enter the **Min**imum outdoor air temperature that would cause the Hi Limit Setpoint to be calculated and the **Max**imum outdoor air temperature that would cause the Lo Limit Setpoint to be calculated.

Controlling Setpoint Deadband

You should always enter a small deadband to prevent the relay from cycling on and off continuously due to a control source reading that is toggling right around the current setpoint. The deadband you enter is added to both sides of the setpoint to create an area where the relay does not stage on or off. For example: if your setpoint was 72°F and the

deadband was set for 0.5°F, the relay can change state when the temperature rises above 72.5°F or drops below 71.5°F.

Controlling Schedule

You can select the Internal Schedule to set the occupied or unoccupied mode of operation for the selected relay, or you can direct the relay to monitor for a global broadcast from a remote scheduling device. Up to seven, optimally started external schedules are possible.

AND/OR Conditional Tests

If more than one criteria is required to make a decision, there are two other options available to aid in the decision process. An **AND** condition and an **OR** condition. If you don't need additional tests, simply select the **Not Configured** option under the Control Method for each of these sources.

If you need two events to be true before the output can activate, use the **AND Control Method** and select a **Logical AND Source**.

If you want either the main Control Method OR an Alternate Control Method to activate the output, use the **OR Control Method** and select a **Logical OR Source**.

You can combine all three options to create a condition where two events must be true or a third separate event must be true to activate the output.

Run Time Alarm

If the selected relay output is controlling a device that needs periodic maintenance, you can enter a **Run Time Alarm Delay** period that, once exceeded, generates an alarm condition that will notify the user when it occurs. If you need to protect the equipment you can select the **Disable Relay** box and the relay will de-activate once this run time has been exceeded.

Output Mode When ACTIVE

Some control methods require the relay contacts to be closed when the output is activated, others require the contacts to be open. You can select which method of control to use with this option.

User Force Mode Override

The user can ignore the calculated relay state and force the output on or off using this button. This force mode remains in effect until the user cancels it or the power is lost and restored at the controller.

Hi/Lo Limit Setpoints

All control methods except the **Schedule Only** method require setpoints to be entered for control purposes. The relay state changes based on the control method selected and the current reading versus the **Hi Limit Setpoint** or **Lo Limit Setpoint**. If you have selected the **On Above and Off Below** method, then the relay would be active when the reading exceeds the Hi Limit Setpoint and it would not be active below the Lo Limit Setpoint. In either case, the user defined Deadband would also need to be satisfied before the actual relay change of state occurs.

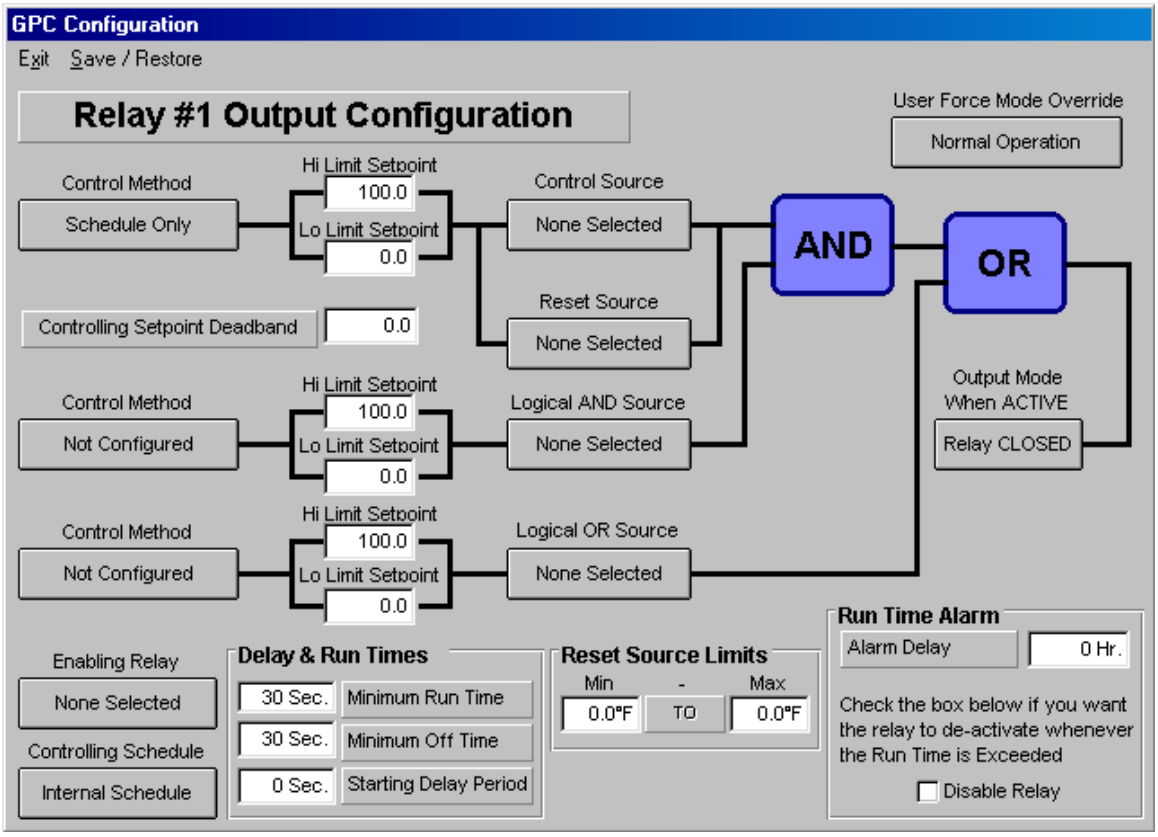


Figure 3 – Relay Output Configuration Screen

Analog / Voltage Output Configuration

Two Proportional Outputs (0 - 10 VDC) are available to the user. This output operates using standard floating point control or PID control as configured by the user. The controlling setpoint can be reset by any other sensor reading or the outdoor air temperature and the output voltage range can be limited by the user to some range other than the standard 0 - 10 VDC.

Possible Control Sources

0 = Not Used
1 = Sensor Input #1
2 = Sensor Input #2
3 = Sensor Input #3
4 = Sensor Input #4
5 = Sensor Input #5
6 = Sensor Input #6
7 = Building Pressure
8 = Duct Static Pressure
9 = Outdoor Air Temperature received via Global Broadcast from another unit

Possible Setpoints

1. Maximum Reset Source Temperature
2. Minimum Reset Source Temperature
3. Maximum Reset Setpoint
4. Minimum Reset Setpoint
5. Maximum Output Voltage
6. Minimum Output Voltage
7. Setpoint Hysterisis or Deadband
8. Output Voltage Step Change
9. Output Control Interval
10. Control Source
11. Setpoint Reset Source
12. Alternate Override Source

13. Alternate Override <> Comparator
14. Alternate Override Source Limit Setpoint
15. Alternate Override Fixed Voltage
16. Outdoor Enable High/Low Limits
17. Controlling Schedule (Internal or External)
18. Enabling Relay (Only operates when relay is active)
19. Manual Override Voltage
20. Control Type (Floating Point or PID Control)
21. PID Calculation Tuning Constants

Example of Setpoint Reset

As the *Reset Source* goes from its *Maximum Reset Source Temperature* to its *Minimum Reset Source Temperature* the *Controlling Setpoint* goes from its *Minimum Reset Setpoint* limit to its *Maximum Reset Setpoint* limit.

Since the reset limits can be set to any desired value, the user can initiate a reverse acting proportional reset or a direct acting proportional reset of the setpoint simply by crossing the min and max values if direct acting is required.

Direct Acting = As Temperature Rises the Setpoint Drops
Reverse Acting = As Temperature Rises the Setpoint Rises

PID Control

If you are controlling hot or chilled water valves, it is recommended that you select the PID mode of control to reduce output "hunting". Other uses, such as a fresh air damper, can be controlled with the simple floating point mode.

If you are using the PID method, the three tuning constants are described below. It is not possible to predict what values should be entered at the beginning. Only through observation and "tweaking" the values can you optimize the PID operation. In any case, it is recommended that you start with strictly Proportional control and then include Derivative in small amounts. Once those two values are set, you can introduce Integral to the equation to complete the PID tuning process.

Proportional Constant Kp

The proportional constant defines the amount of error that causes the output to travel from its' minimum to its' maximum output. If you enter a value of 10 for the Kp, then an error of 10 would cause the output to change the full 100%. An

error of 5 would cause it to change by 50%. As you can see, decreasing the value below 10 would increase the amount of error required to drive to the full 100% output value. For example: A Kp value of 5 would require an error of 20 to drive to the full 100% output position. A Kp value of 20 would require and error of 5 to drive to the full 100% output position.

Integral Constant Ki

The integral prevents the output from riding as some position above or below the actual setpoint without ever actually satisfying the setpoint. In other words, you may have a 50% output generated by the proportional effect, but your error shows you are still below the setpoint. You could introduce a small amount of integral to force the output to continue to adjust upwards until the error was reduced to zero. If you select too large an integral, you can create "windup" problems. That means that whenever there is a negative error, the integral continually grows smaller and smaller and the error must go positive to unwind that negative effect. On the opposite side, if the error was positive for a long amount of time, the integral would continue to grow larger and larger and the error would have to become negative to unwind this large positive integral effect. Start with a small value like 5 and see what the effect is on the output. Large constants will definitely bring the output to the desired level faster, but the windup will also be faster and will take longer to overcome, causing wild output swings or "hunting".

Derivative Constant Kd

The derivative is used to monitor the rate of change of the error and can feed forward additional output if the error is rapidly rising or reduce the output if the error is rapidly dropping. When adjusted correctly, this causes the output to bring the error under control faster and reduces the amount of "hunting". Unfortunately, the Integral and Derivative constants interact with each other and changing one can have an adverse affect on the other.

TIP: NEVER change more than one PID constant at a time because you will not be able to separate out the effects that each change made! Always start with strictly proportional control before adding any derivative or integral.

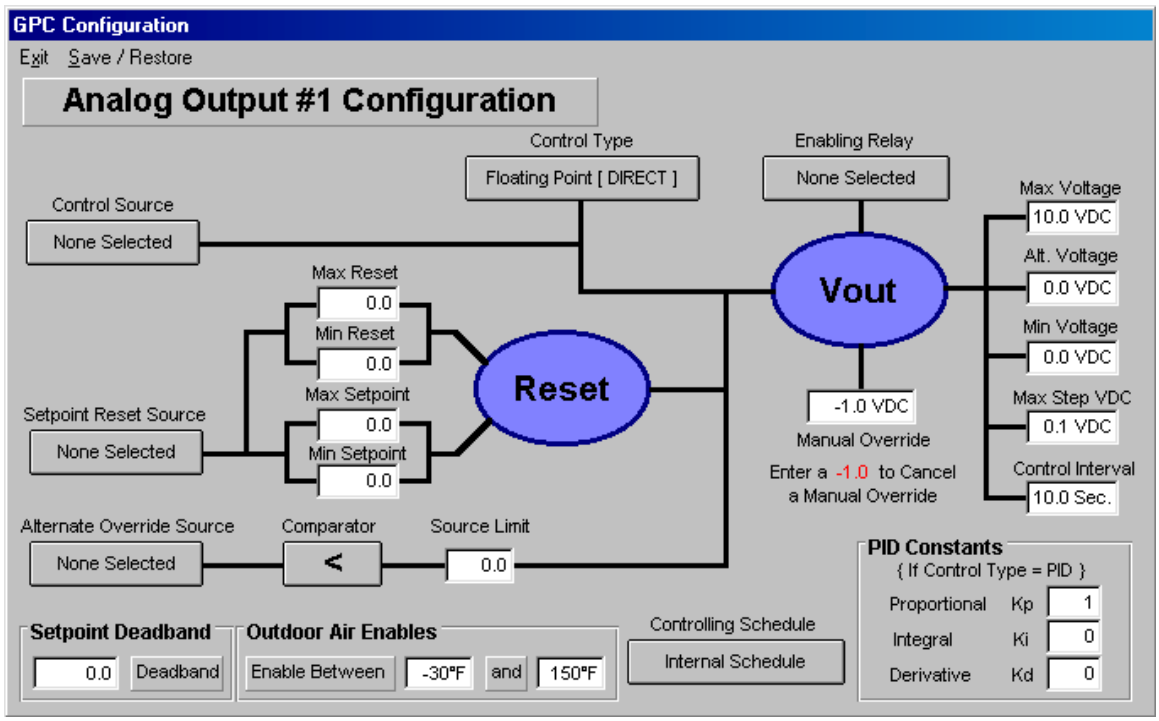


Figure 3 – Relay Output Configuration Screen

Sample Configurations

Sample #1

The user would like to control 4 boilers. Each boiler is controlled from the same Water Temperature sensor but at a different temperature reading. Once a boiler is activated it must remain on at least 5 minutes and if a boiler is de-activated it must remain off at least 10 minutes. Additionally, the boilers are locked out when the Outdoor Air Temperature is above 65°F.

Analog Input #1 Configured as Thermister Type III Sensor

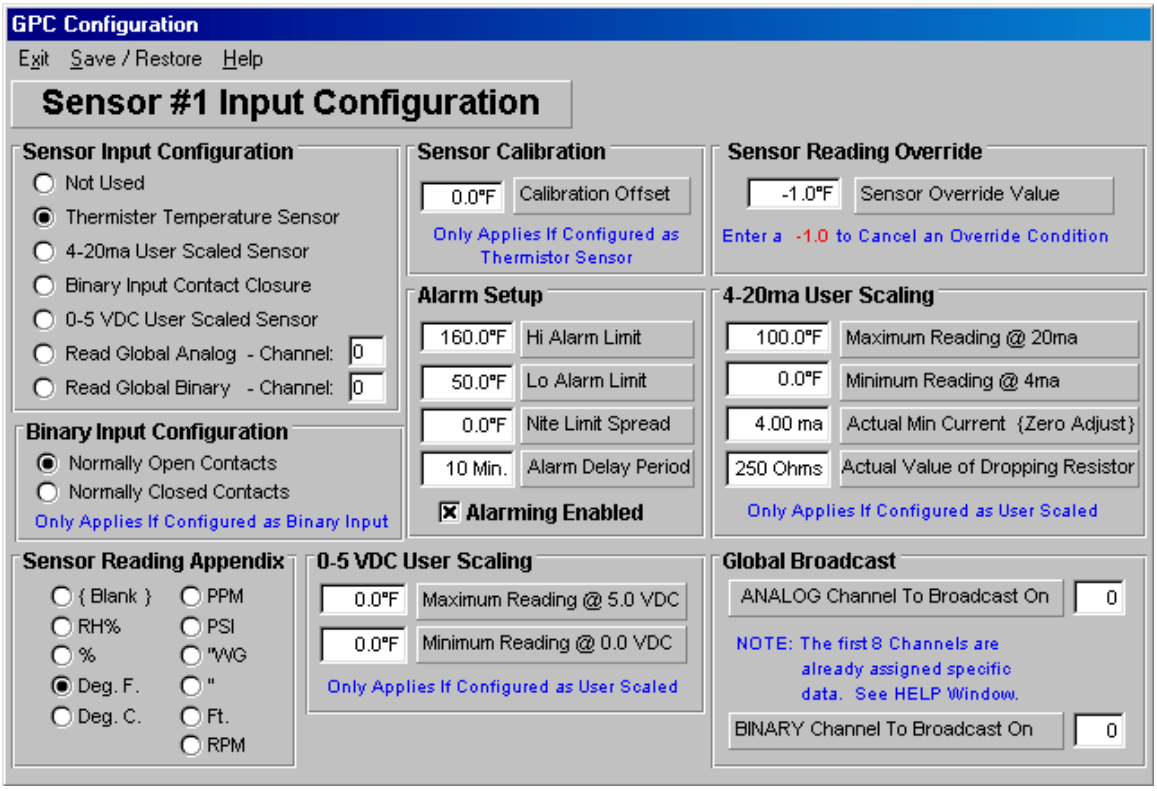


Figure 4 – Sensor #1 Input Configuration

Note that some Hi and Lo alarm limits were set and that the reading is in degrees fahrenheit.

Analog Input #2 Configured as Not Used
Analog Input #3 Configured as Not Used
Analog Input #4 Configured as Not Used
Analog Input #5 Configured as Not Used
Analog Input #6 Configured as Not Used
Analog Input #7 Building Pressure Sensor is not Required
Analog Input #8 Duct Static Pressure Sensor is not Required

Relay Output #1 Programming (Used for Outdoor Air Enable / Disable)

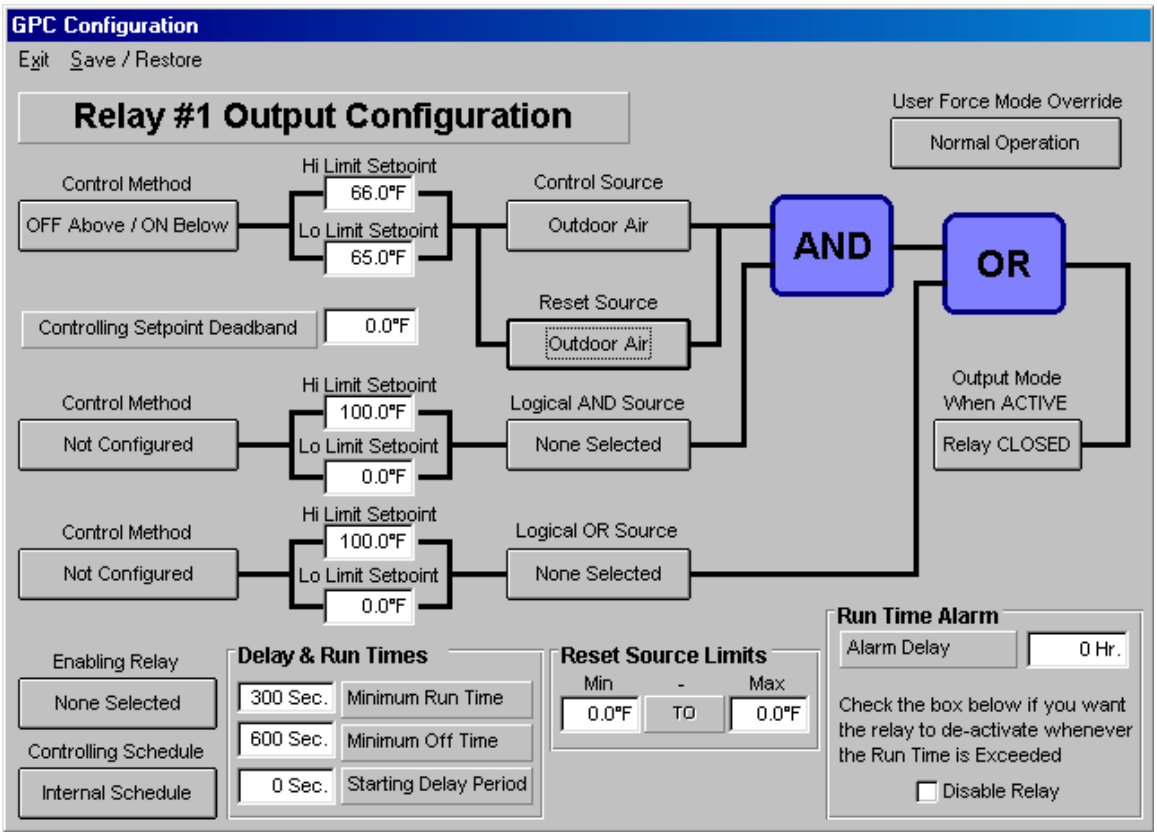


Figure 5 – Relay #1 Output Configuration

NOTE: Nothing is physically connected to Relay #1. Its only use is to enable or disable the other relays.

If you want the internal schedule to also control this output and the subsequent boiler stages, program the desired start/stop times for each day of the week. If you don't want the control sequence to follow a schedule, but to be active anytime the outdoor air is below the enable setpoint, simply set the internal schedule to be active continuously 24 hours a day.

Relay Output #2 Programming (Used for Boiler #1)

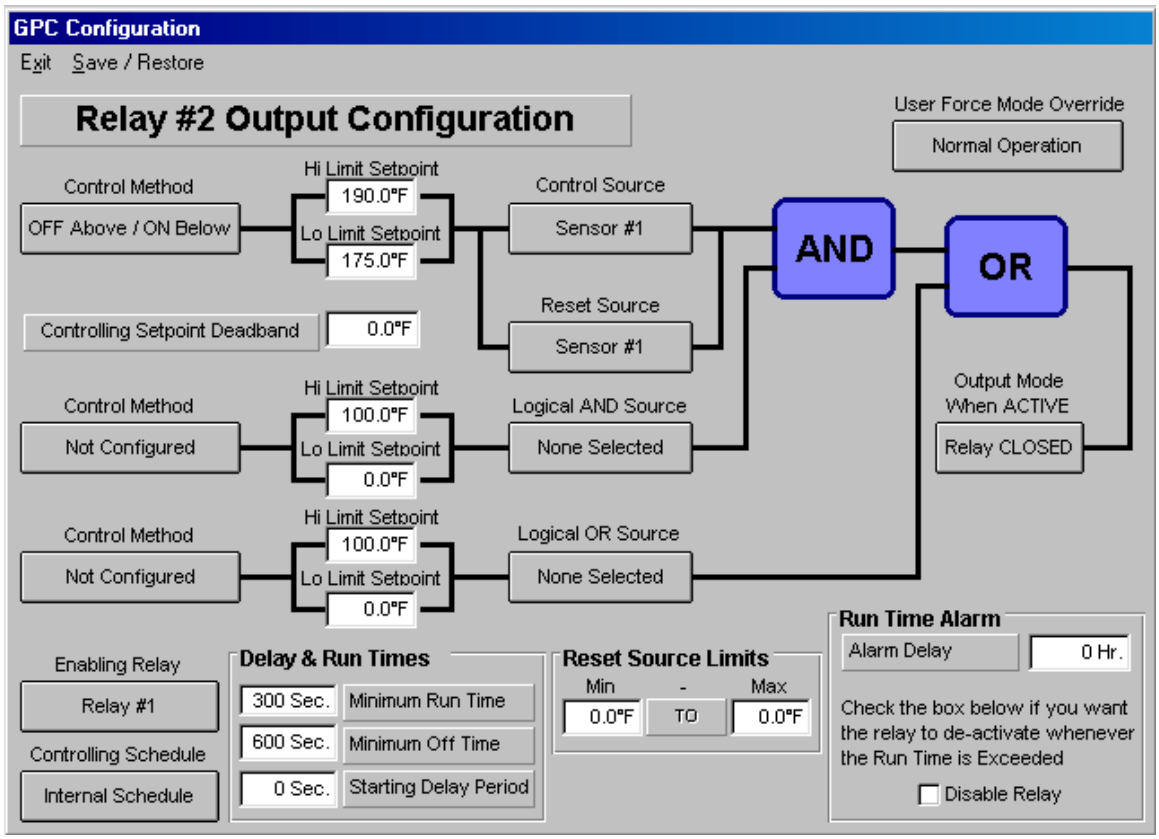


Figure 6 – Relay #2 Output Configuration

As you can see, the first boiler stage is enabled to operate if the water temperature is below 175°F and will remain on until it rises to 190°F. This first stage can only operate if the outdoor air enabling relay #1 is active. Once activated, the boiler must remain on for 5 minutes and once de-activated it must remain off for 10 minutes.

Since we are not resetting the operating setpoint, the Reset Source has been set to the same input as the Control Source. *You must always have a Reset Source whether or not you are actually resetting the setpoint!*

The Hi Limit Setpoints for the Logical AND Method and Logical OR Method are defaults that are ignored since neither of those methods have been configured. There is no need to change them since they are not used.

Relay Output #3 Programming (Used for Boiler #2)

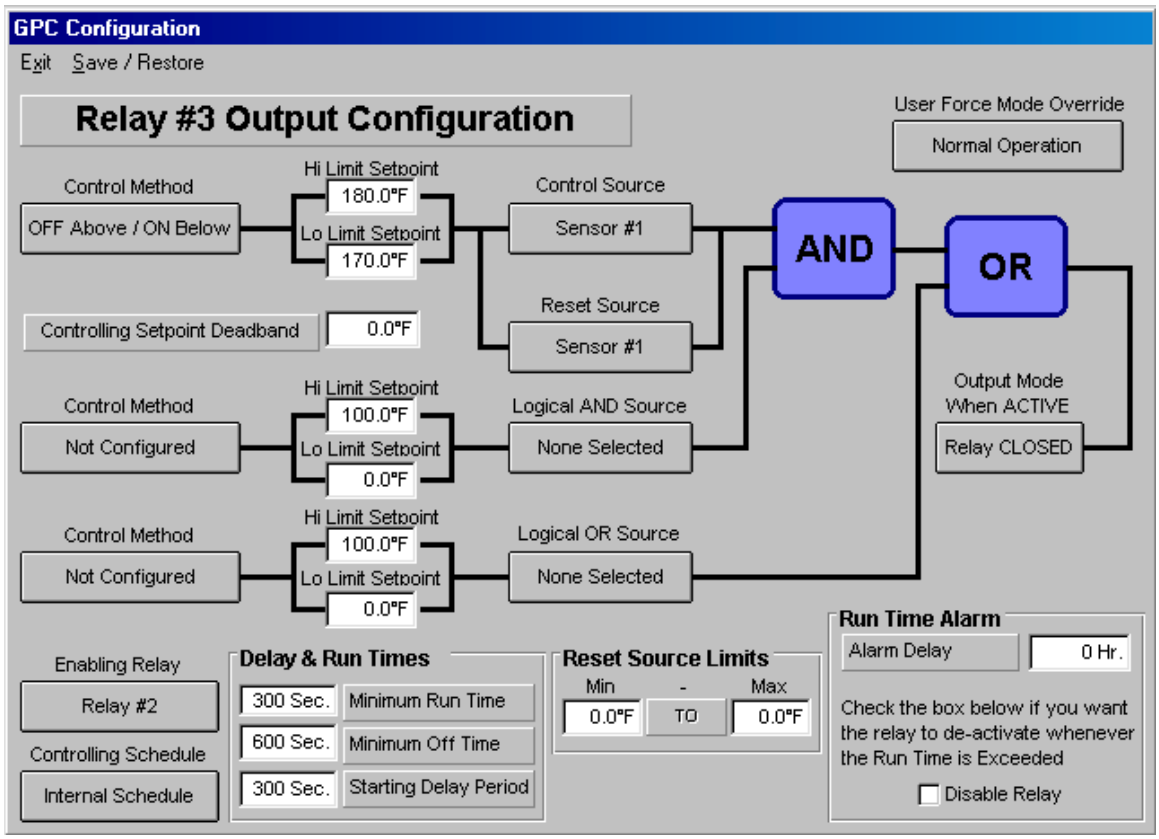


Figure 7 – Relay #3 Output Configuration

The second boiler stage is enabled to operate if the water temperature is below 170°F and will remain on until it rises to 180°F. The second stage can only operate if the first boiler stage relay #2 has been active for at least 5 minutes. Once activated, this stage must remain on for 5 minutes and once de-activated it must remain off for 10 minutes.

Since we are not resetting the operating setpoint, the Reset Source has been set to the same input as the Control Source. *You must always have a Reset Source whether or not you are actually resetting the setpoint!*

The Hi Limit Setpoints for the Logical AND Method and Logical OR Method are defaults that are ignored since neither of those methods have been configured. There is no need to change them since they are not used.

Relay Output #4 Programming (Used for Boiler #3)

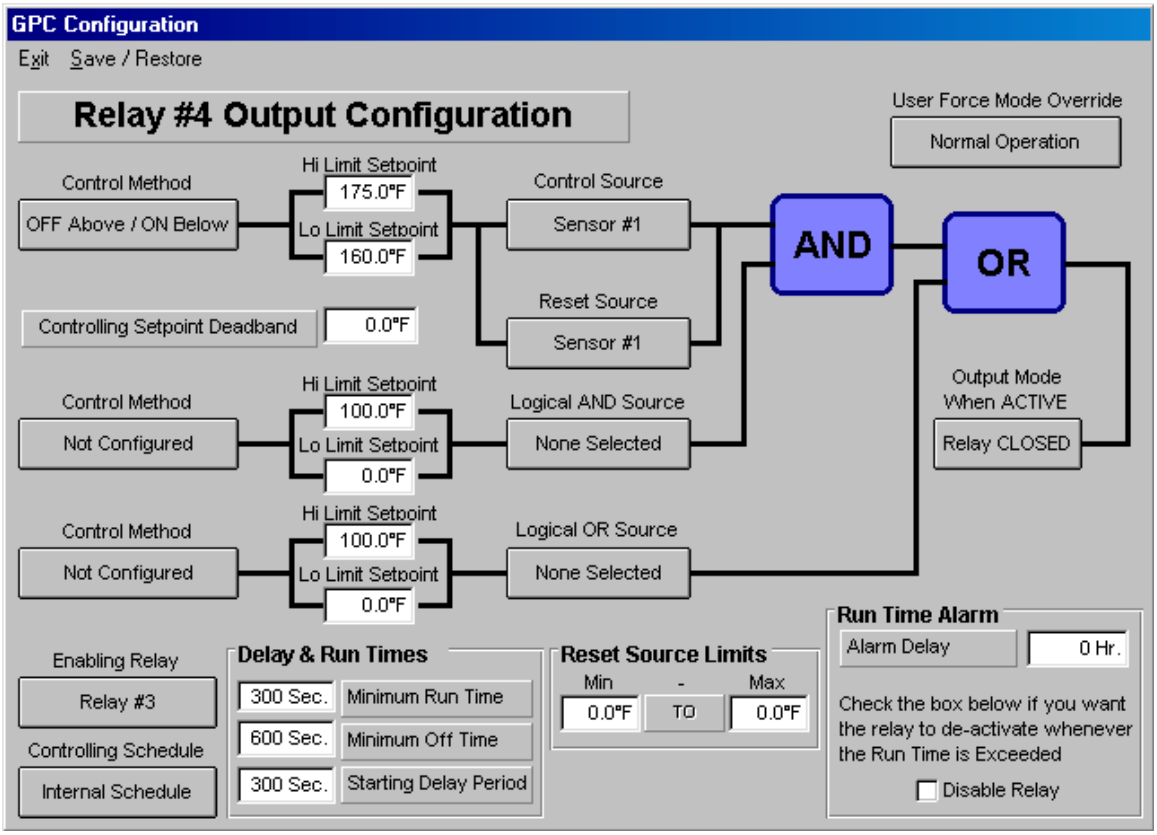


Figure 8 – Relay #4 Output Configuration

The third boiler stage is enabled to operate if the water temperature is below 160°F and will remain on until it rises to 175°F. The third stage can only operate if the second boiler stage relay #3 has been active for at least 5 minutes. Once activated, this stage must remain on for 5 minutes and once de-activated it must remain off for 10 minutes.

Since we are not resetting the operating setpoint, the Reset Source has been set to the same input as the Control Source. *You must always have a Reset Source whether or not you are actually resetting the setpoint!*

The Hi Limit Setpoints for the Logical AND Method and Logical OR Method are defaults that are ignored since neither of those methods have been configured. There is no need to change them since they are not used.

Relay Output #5 Programming (Used for Boiler #4)

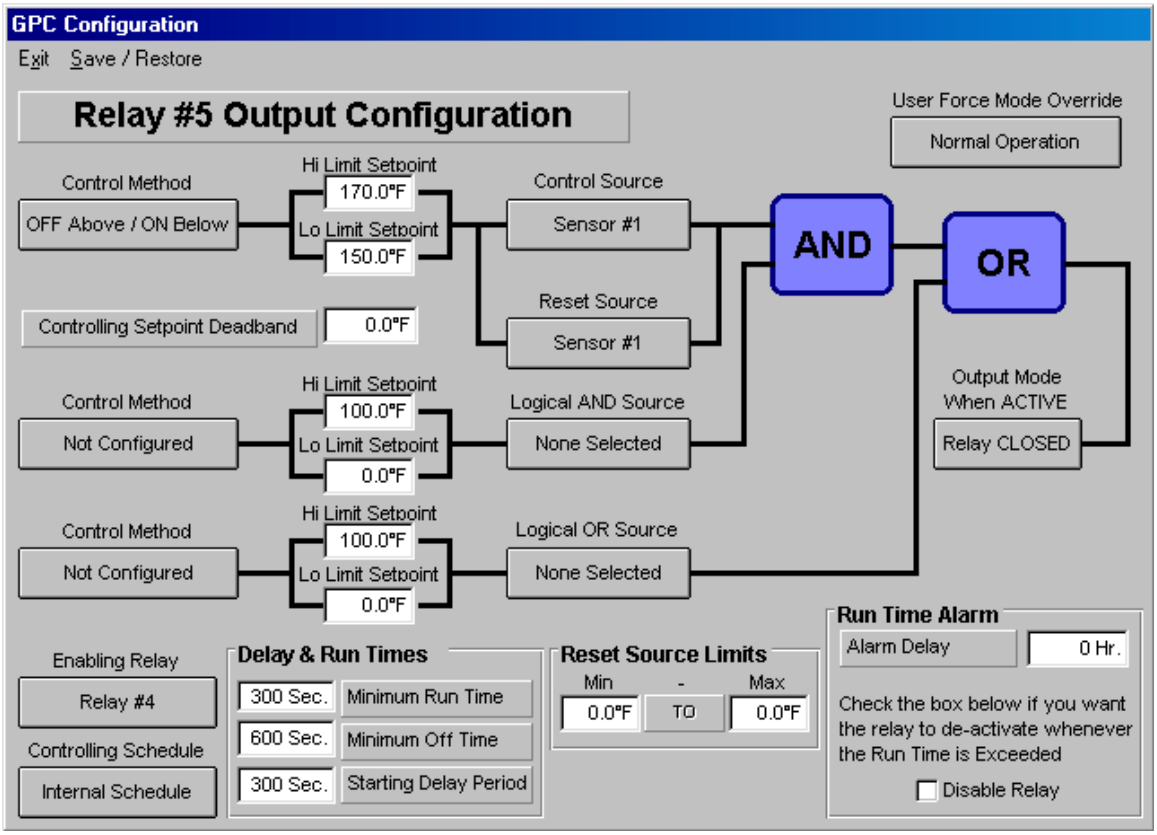


Figure 9 – Relay #5 Output Configuration

The fourth boiler stage is enabled to operate if the water temperature is below 150°F and will remain on until it rises to 170°F. The fourth stage can only operate if the third boiler stage relay #4 has been active for at least 5 minutes. Once activated, this stage must remain on for 5 minutes and once de-activated it must remain off for 10 minutes.

Since we are not resetting the operating setpoint, the Reset Source has been set to the same input as the Control Source. *You must always have a Reset Source whether or not you are actually resetting the setpoint!*

The Hi Limit Setpoints for the Logical AND Method and Logical OR Method are defaults that are ignored since neither of those methods have been configured. There is no need to change them since they are not used.

The Starting Delay Period that was set for stages 2 to 4 prevent all four boiler stages from activating at the same time as soon as they are enabled to begin operation. Each stage must run for 5 minutes before the next stage can be activated.

Voltage Output Programming

Control Source None Selected

Since no analog output control is required, simply leave the Control Source set to None Selected and no analog output control will take place.

Operation

Relay #1 enables the boilers to operate if the outdoor air temperature is below the low setpoint and the schedule is occupied. Each boiler is enabled to operate if the previous boiler is currently active and has been on for at least 5 minutes. All four boilers monitor the same analog input sensor for the Water Temperature reading. The #1 Enable Relay monitors a global broadcast from another controller on the RS-485 communications loop for the outdoor air temperature. The voltage output is not used so no control source is selected, and no other related setpoints require modification.

Shown below is a sample Status Screen for this sample application. Notice that the boilers are not enabled even though the schedule is active because the outdoor air temperature is too high.

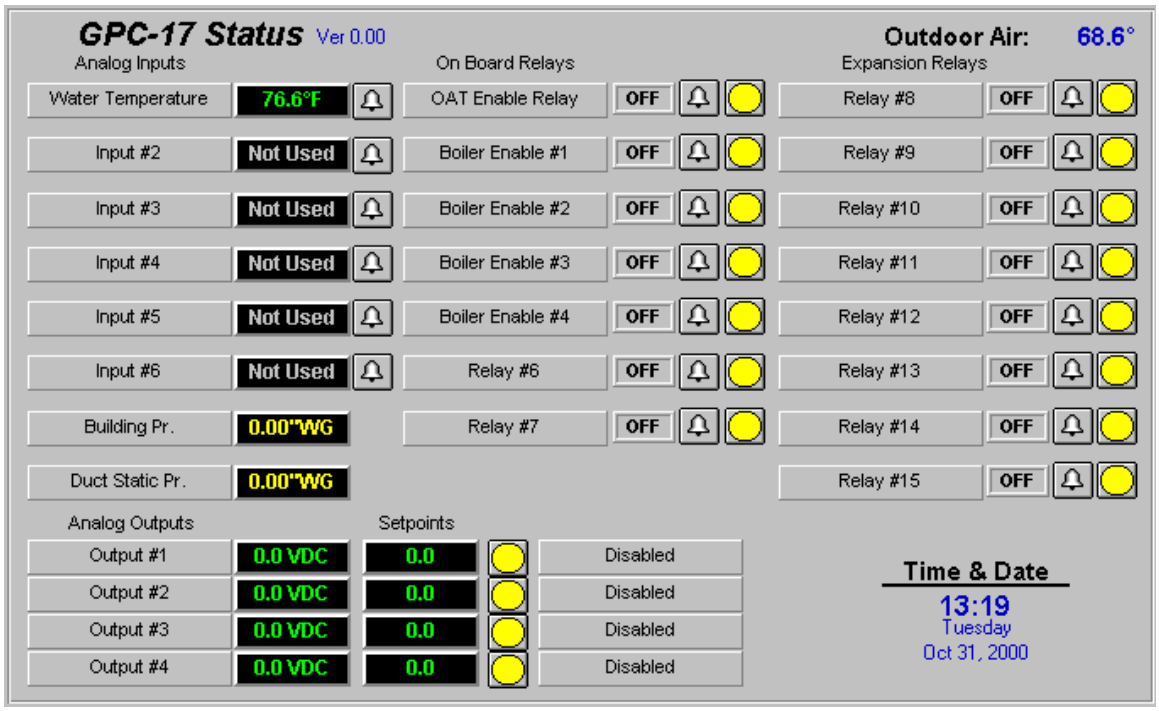


Figure 10 – GPC-17 Status

This next sample screen shows that the outdoor air temperature has dropped enough to enable the boilers to operate. Since we included the 5 minute Start Delay Period, only the first boiler stage is enabled at this point. Keep in mind that although relay #1 is active, nothing is connected to the output because its only function is to provide an outdoor air enable signal for the boiler staging.

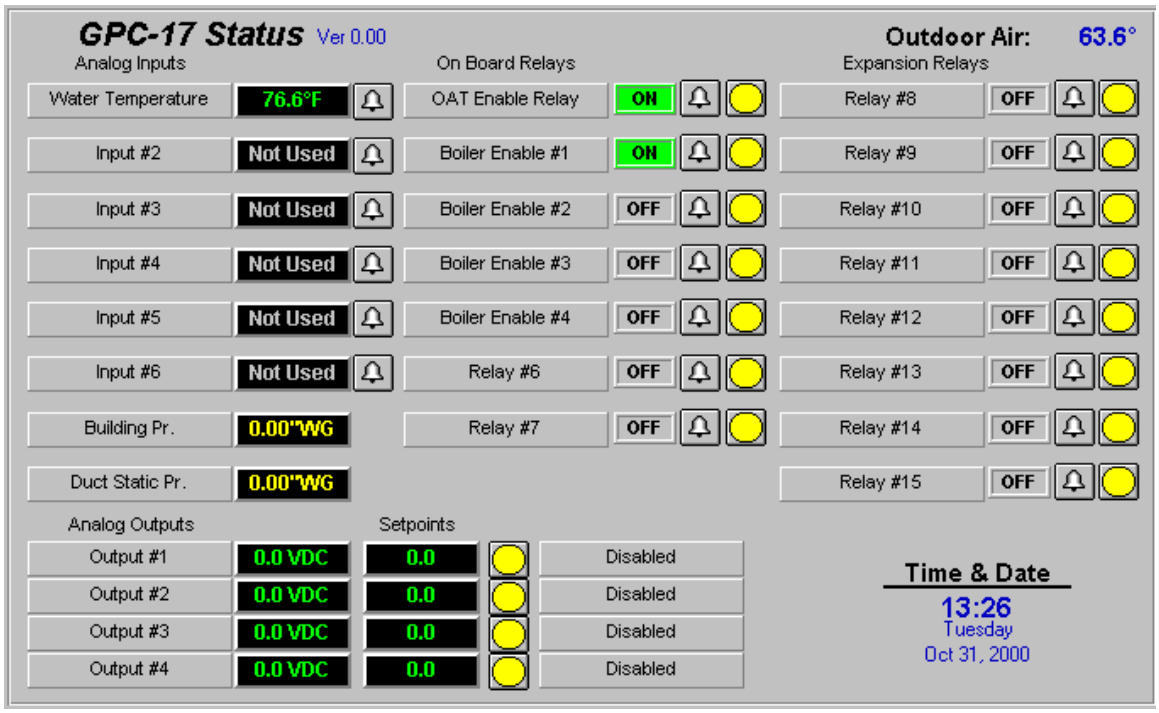


Figure 11 – GPC-17 Status

Sample #2

The user would like to control a simple 100% Outdoor Air Make-up Air Handler with PID Control of a Valve for Heating and DX Stages for Cooling. The unit operates its own fan and has scheduled operation for Occupied / Unoccupied modes. No control occurs in the unoccupied mode. Low Limit Protection closes the outdoor air damper if the outdoor air temperature drops below a protection setpoint. A separate enthalpy sensor drives a Disable Contact Closure that overrides the Outdoor Air Dampers closed since no de-humidification sequence is required. This unit also controls a relief fan anytime the main fan is running and requires the building pressure sensor to be installed.

Analog Input #1 Configured as a Thermister Type III Sensor for Space Temperature

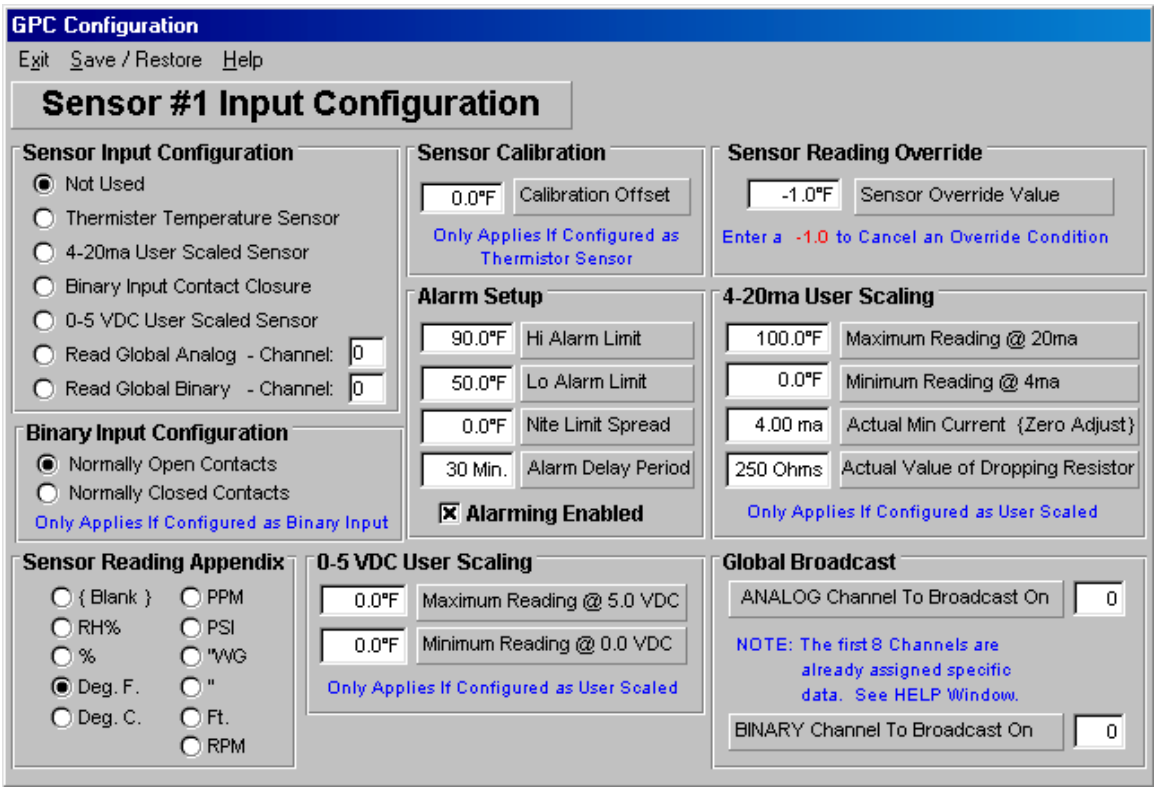


Figure 12 – Sensor #1 Input Configuration

Analog Input #2 Configured as a Thermister Type III Sensor for Supply Air Status

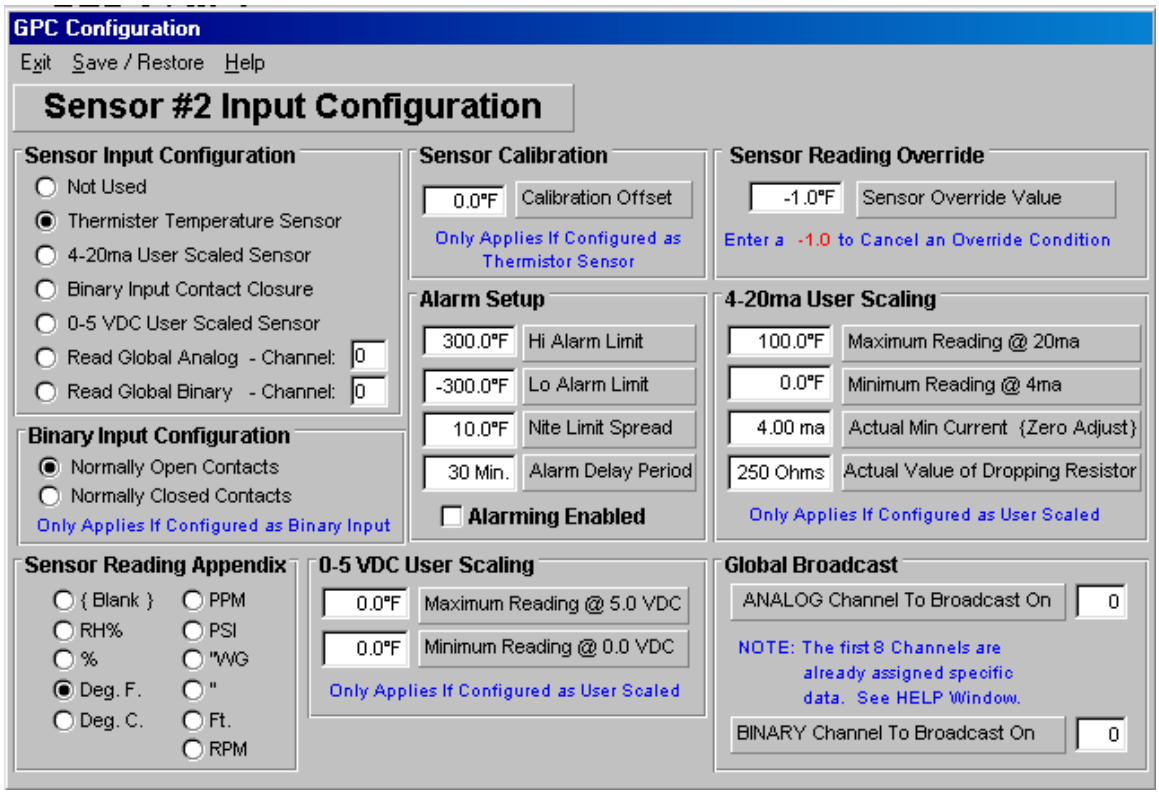


Figure 13 – Sensor #2 Input Configuration

Analog Input #3 Configured as a Thermister Type III Sensor for Outdoor Air

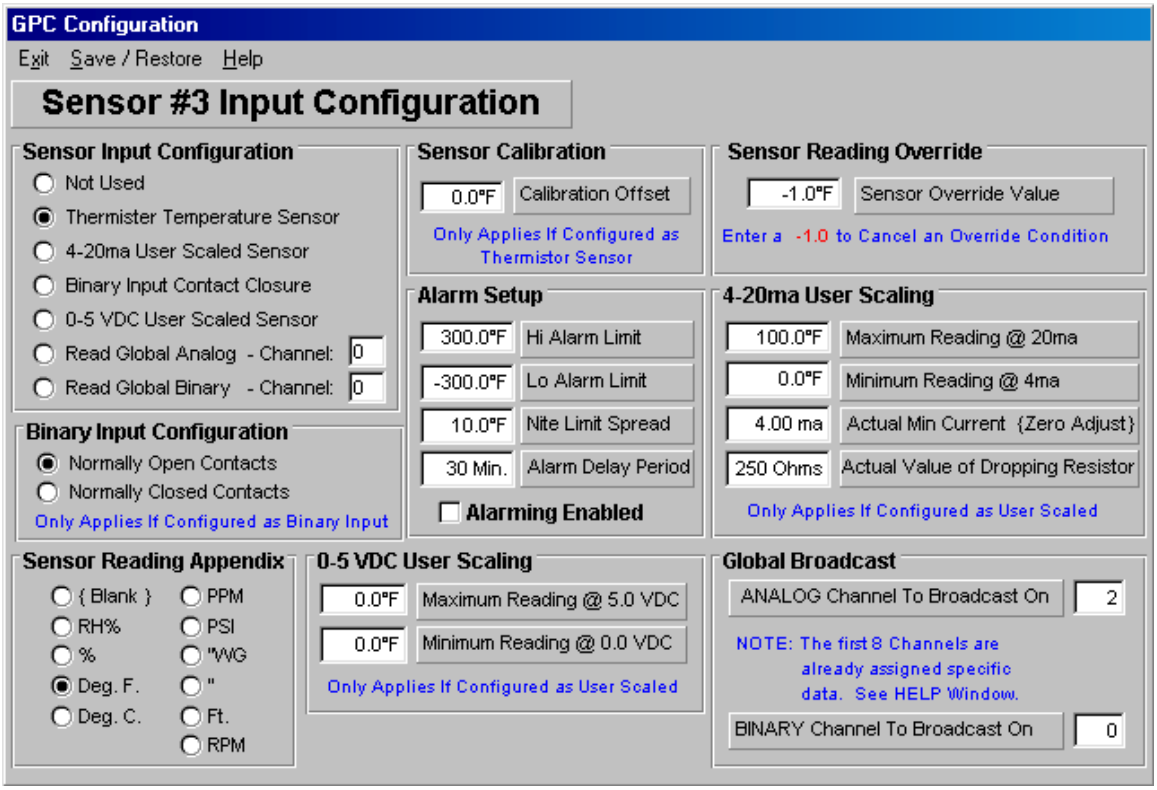


Figure 14 – Sensor #3 Input Configuration

Analog Input #4 Configured as a Binary Contact Closure for Enthalpy Disable

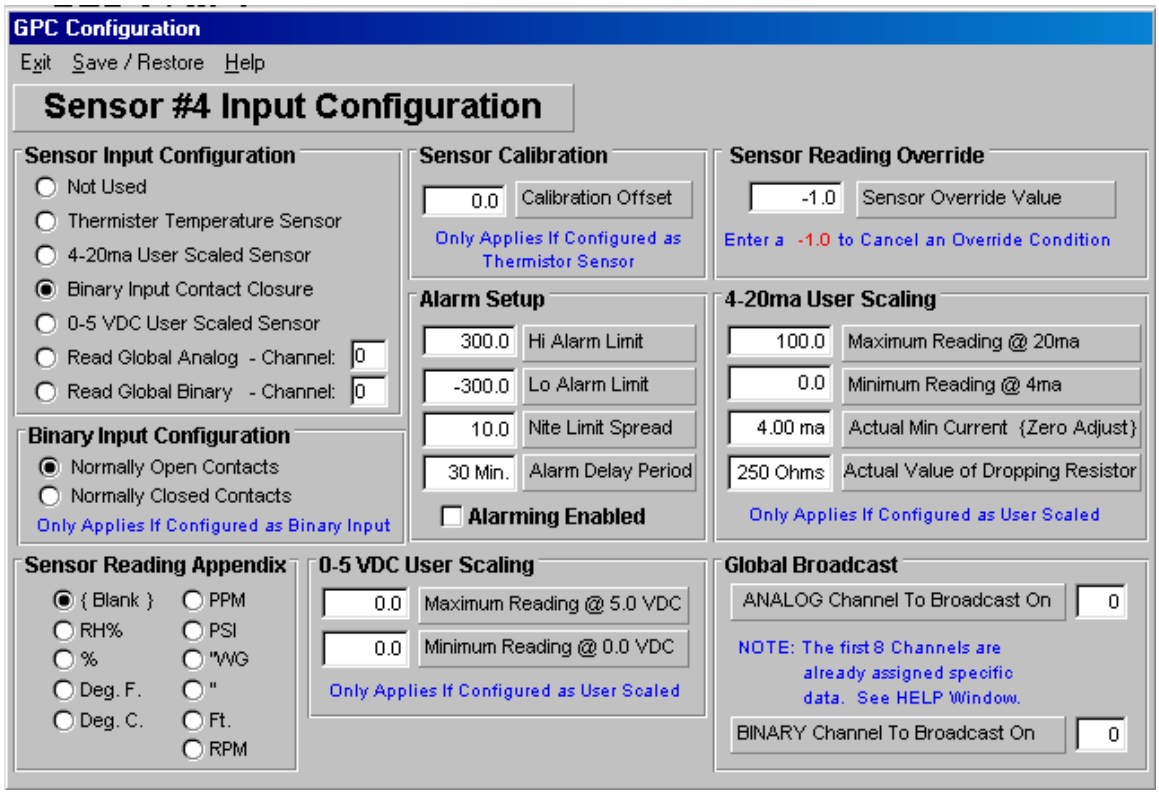


Figure 15 – Sensor #4 Input Configuration

Analog Input #5 Configured as Type 0 (Not Used)
Analog Input #6 Configured as Type 0 (Not Used)

Analog Input #7 Building Pressure Sensor is Installed for Control Use

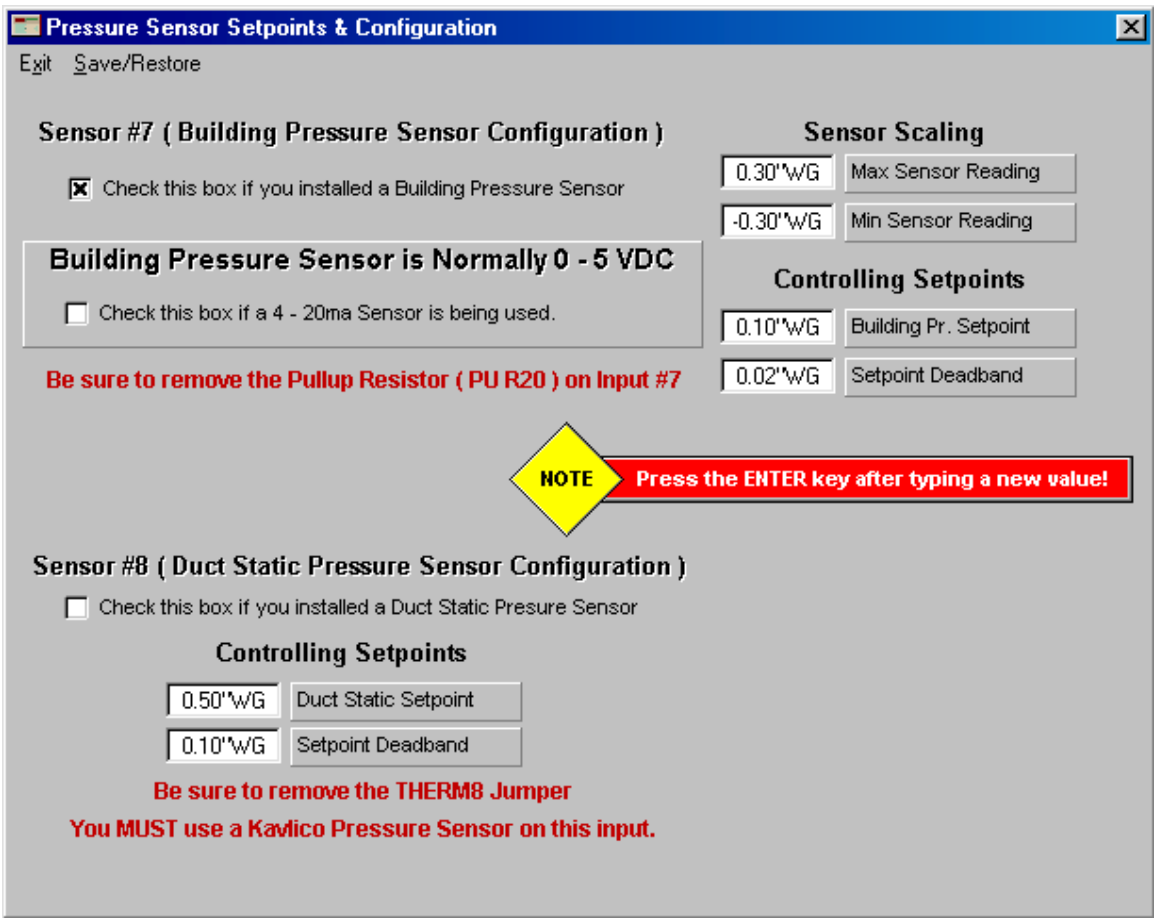


Figure 16 – Pressure Sensor Setpoints & Configuration

Relay Output #1 Programming (Used for Fan Control)

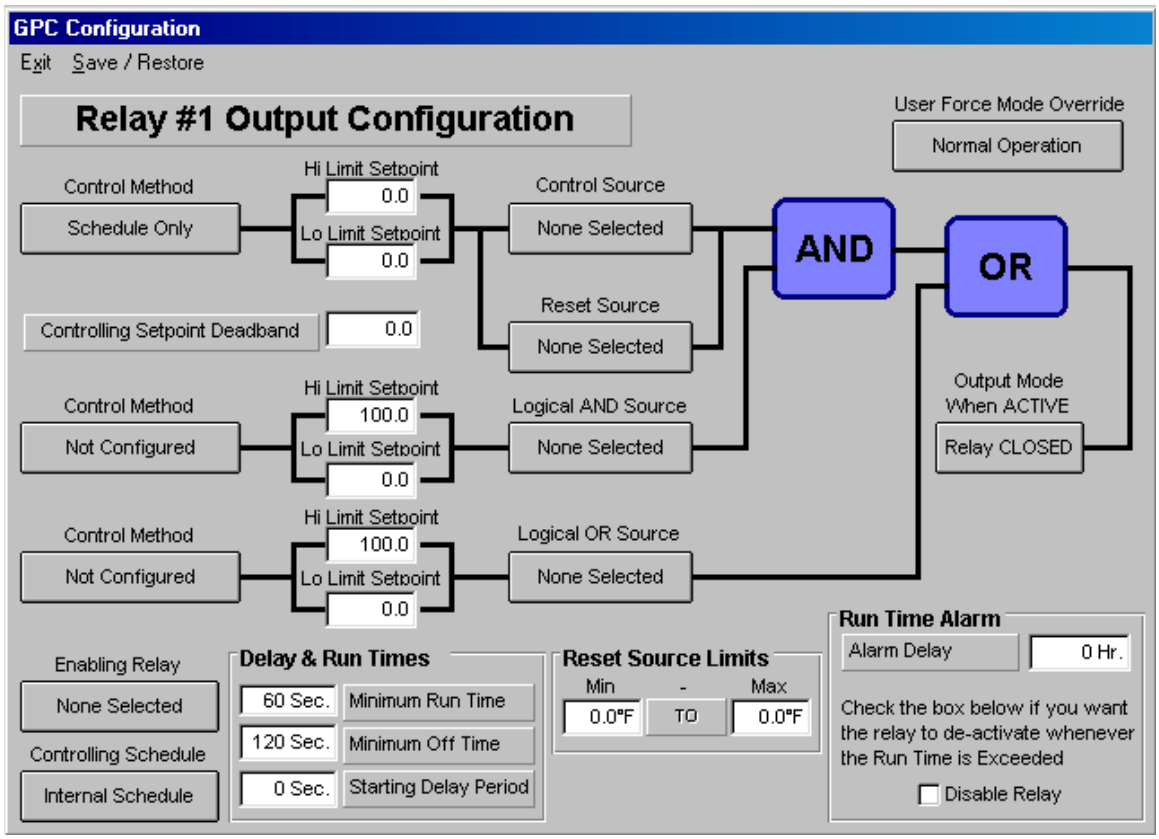


Figure 17 – Relay #1 Output Configuration

Relay Output #2 Programming (Used for DX Cooling Stage #1)

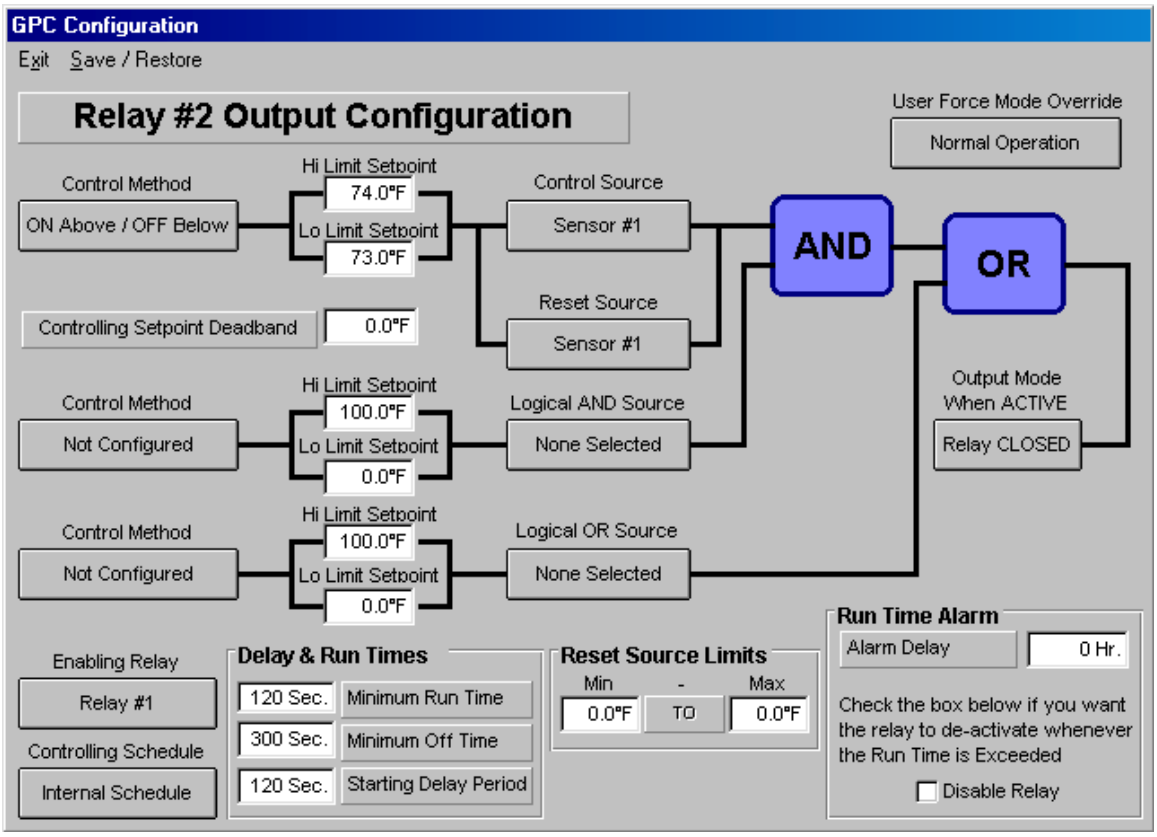


Figure 18 – Relay #2 Output Configuration

Relay Output #3 Programming (Used for DX Cooling Stage #2)

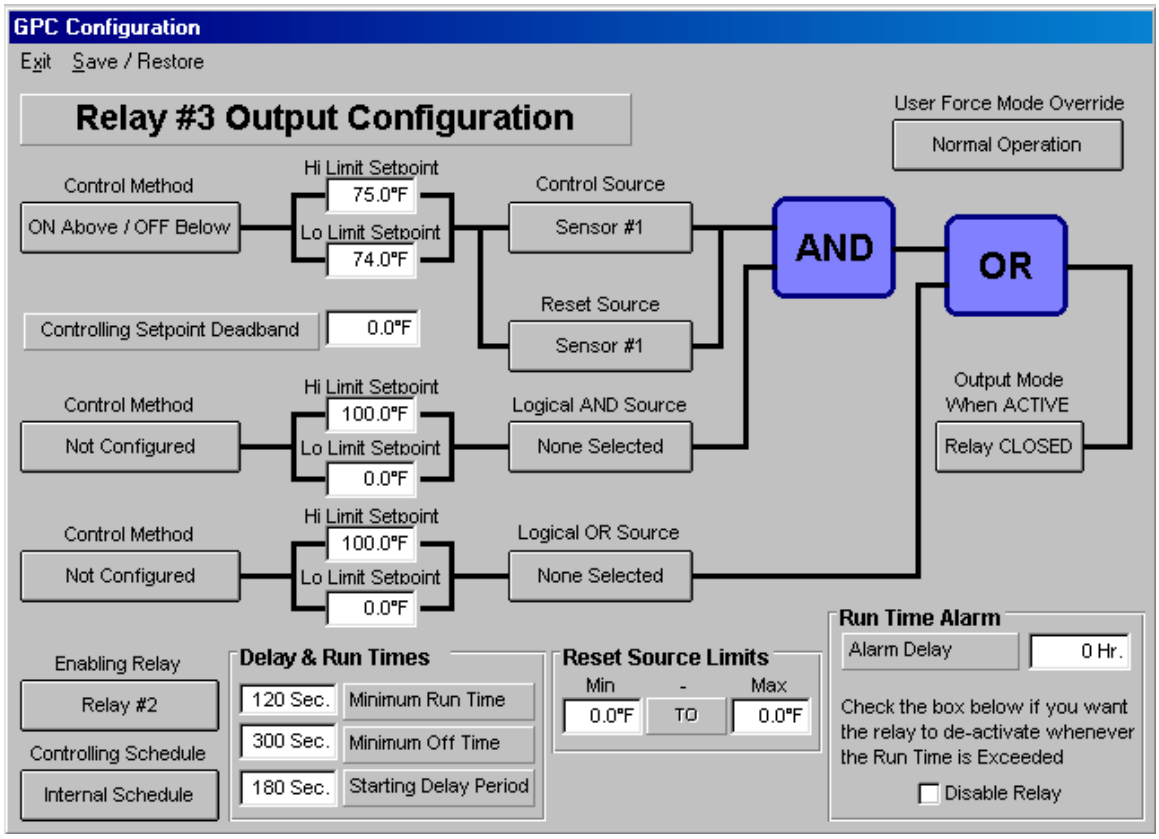


Figure 19 – Relay #2 Output Configuration

Relay Output #4 Programming (Used for 100% Outdoor Air Damper)

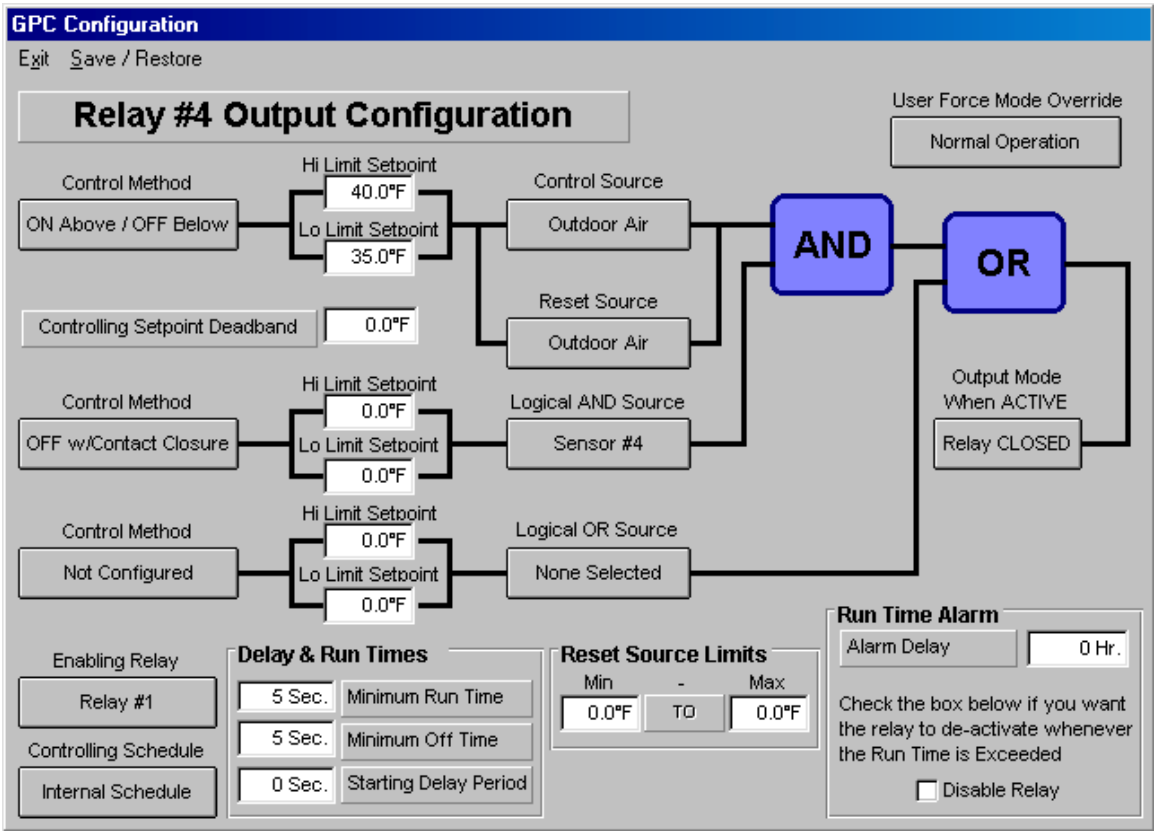


Figure 20 – Relay #2 Output Configuration

Relay Output #5 Programming (Used for Relief Fan Control)

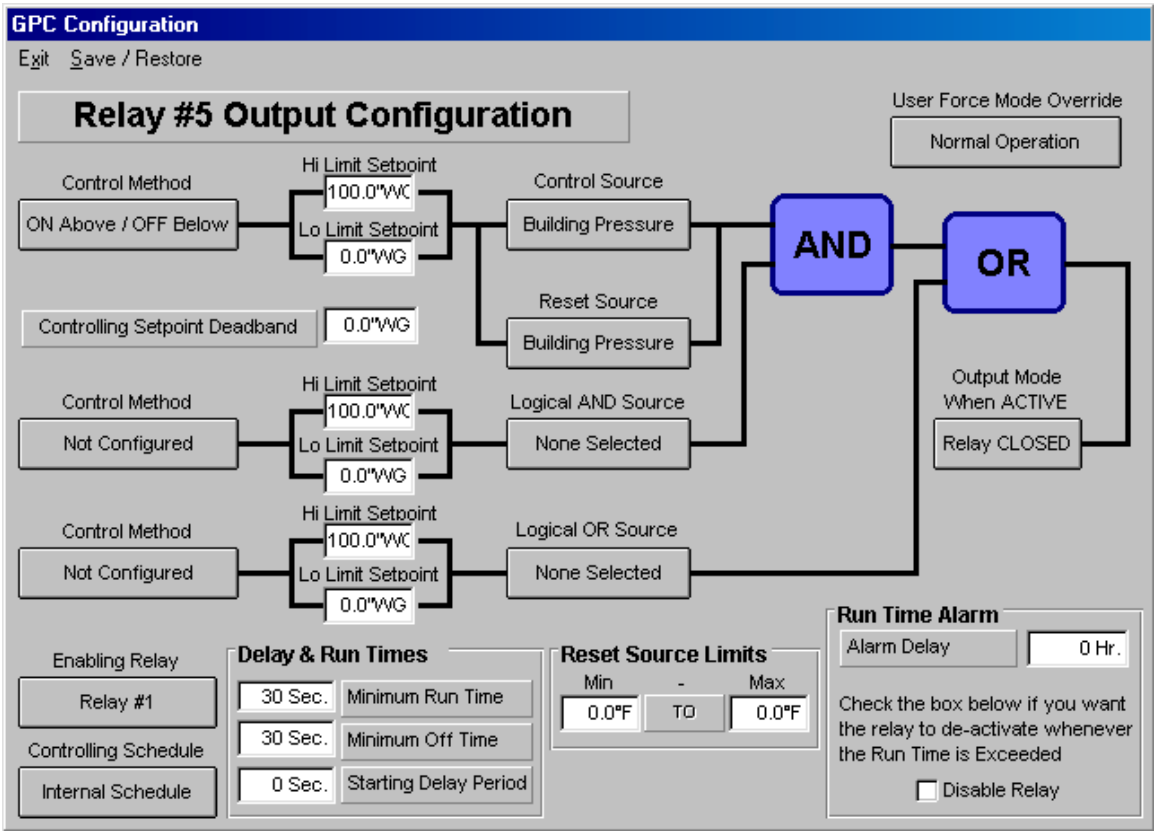


Figure 21 – Relay #2 Output Configuration

Voltage Output #1 Programming

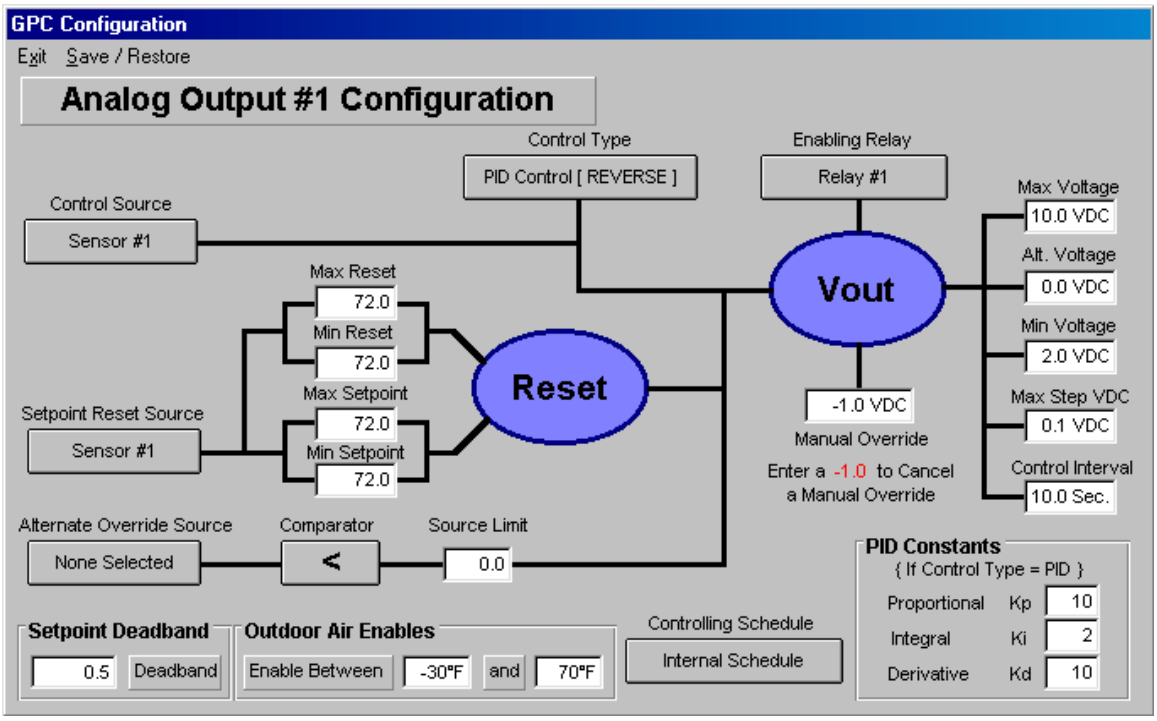


Figure 22 – Relay #2 Output Configuration

Operation

When the Internal Schedule calls for Occupied Mode, the Fan relay is energized (If the Fan has been off at least 2 minutes). If the Outdoor Air Temperature is above 40°F the Outdoor Air Dampers are allowed to open (Relay #4). The Outdoor Air Dampers will remain open until the schedule goes unoccupied or the outdoor air temperature drops below 35°F. Also, if the Enthalpy Disable contact closes, the Outdoor Air Dampers will close. (Sequence assumes spring return dampers)

The DX Cooling stages up or down based on the Space Temperature Hi / Lo Limit Setpoints assigned to each relay. As the temperature rises above the Hi Limit Setpoint, the associated stage will activate. As it drops below the Lo Limit Setpoint, the stage will de-activate. The activation/de-activation sequences both require the minimum run and off times to be satisfied and the start delay period to be satisfied.

As the Space Temperature drops below the Analog Outputs Setpoint, the PID control loop will modulate the output voltage to operate a hot water valve that maintains the setpoint displayed next to the output voltage display.

Shown below is a sample status screen showing the unit with a cooling demand and all DX Cooling Stages active along with the Outdoor Air Dampers commanded open. The building pressure is low enough that the relief fan relay is not active at this time.

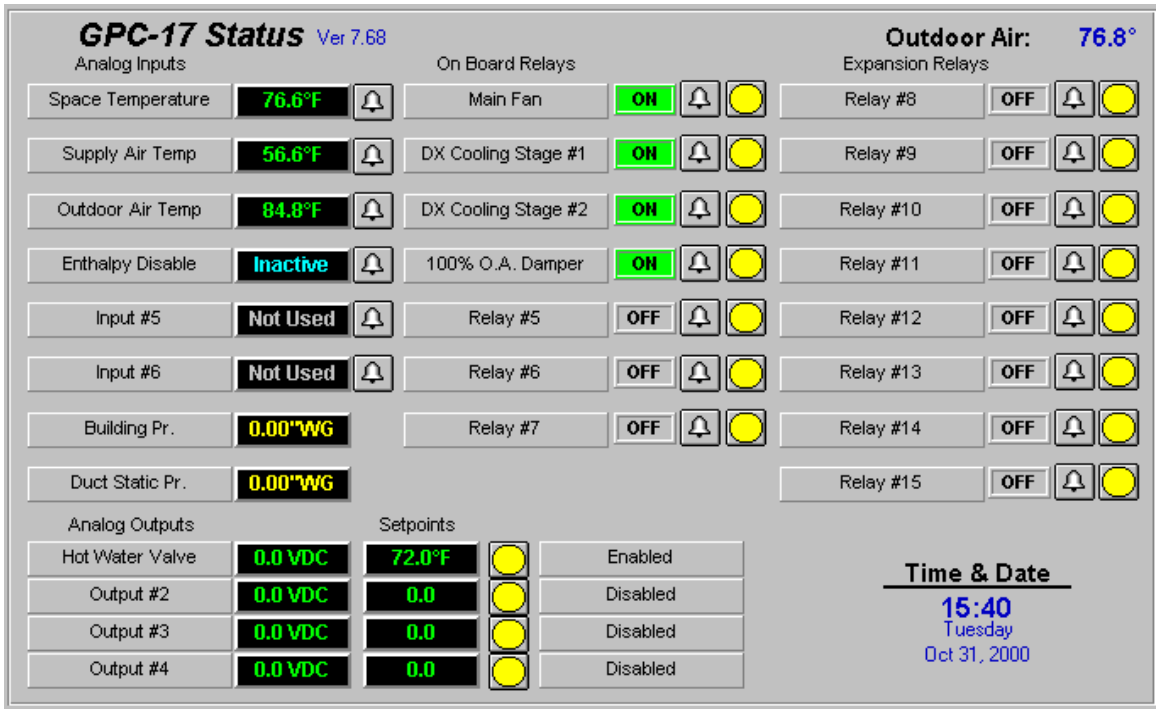


Figure 23 – GPC–17 Status Screen

Required VA For Transformer
Each Controller = 10 VA Min.

Line Voltage

See Note 1

Line Voltage

24VAC

GND

Note:
- All Circuit Board Contacts Are N.O.
- All Contacts Are Rated For 2 Amps @ 24VAC Pilot Duty Only
- Do Not Apply Any Voltage Greater Than 24VAC

Note:
Set-up, Programming And Monitoring Of The GPC-17 Controller Requires The Use Of A Personal Computer And Prism Software.

Analog Inputs And/Or Digital Inputs From Devices As Required By Application

Relay Outputs To Devices As Required By Application

All switches (1 thru 4) must be in the "ON" position

Ribbon Connector

Relay Outputs to Devices As Required By Application

Ground

24V

Ribbon Connector

GPC-17 Controller

Local Loop RS-485 Communications To Other Controllers And/Or System Manager

Optional Relay Expansion Board

This Switch Must Be In The ON Position As Shown

These Switches Should Be In The OFF Position As Shown

The Address For Each Controller Must Be Unique To The Other Controllers On The Local Loop

ADD

16 8 4 2 1

Controller Address Switch

Address Switch Shown Is Set For Address 1

Address Switch Shown Is Set For Address 13

Caution!
Controller Must Have Address Switch Set Between 1 and 60

Analog Output To Device (0-10 VDC)

Optional Analog Output Board

1.)24 VAC Must Be Connected So That All Ground Wires Remain Common.

2.)All Wiring To Be In Accordance With Local And National Electrical Codes and Specifications.

3.)All Communication Wiring To Be 18 Ga. Minimum, 2 Conductor Twisted Pair With Shield. Belden #82760 Or Equivalent.

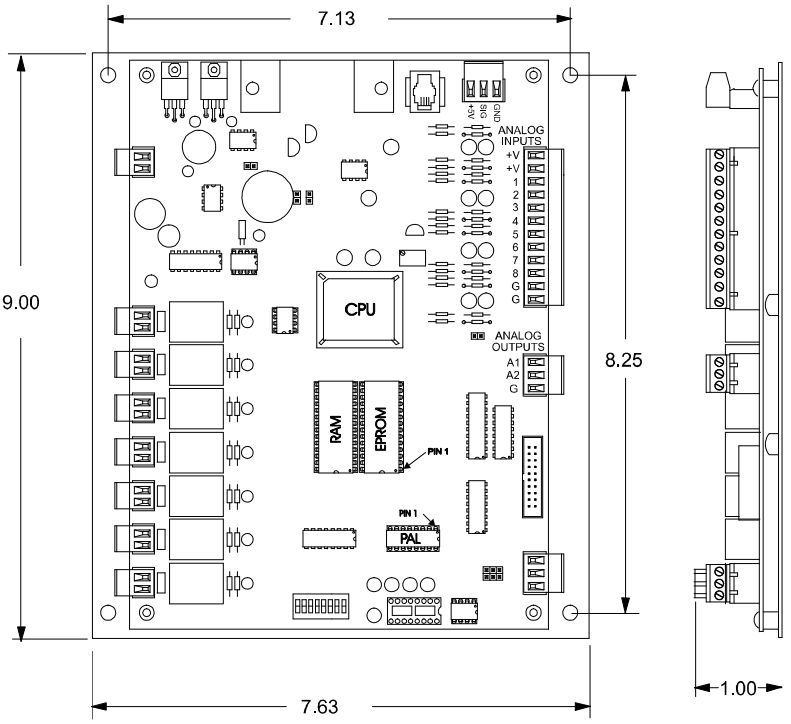
4.)It Is Recommended That All Controllers Address Switches Are Set Before Installation.

JOB NAME	
FILENAME	WattMaster CONTROLS
W-GPC-17CNTRL1A.CDR	
DATE: 05/12/04	DRAWN BY: B. Crews
PAGE	DESCRIPTION:
1	OE310-21-GPC GPC-17 Controller

OE310-21 General Purpose Controller (GPC17)

Description

The OE310-21 General Purpose Controller (GPC-17) is used for controlling equipment or processes that cannot be controlled using the standard Zone Manager or CV controllers. The WattMaster Prism computer front end software is used to interface with the GPC-17 controller functions. The GPC-17 is designed with 6 universal inputs, 7 binary outputs and 2 analog output. Each input can be configured for use of either a Type III-10k ohm thermistor temperature sensor, 4-20ma sensor or a N.O. or N.C. binary contact closure. Sensor reading values can be selected for the specific input type, such as, %RH, Deg. F, RPM, etc.. If a thermistor type temperature sensor is used, a calibration option is available to offset the actual temperature in relation to the displayed reading. It also has one input configures for Duct Static Pressure and one configured for Building Pressure. The 7 binary outputs may be configured to operate based on any of the 8 sensor inputs, outdoor air temperature, the GPC-17 controller's internal schedule or an external schedule. A Relay Expansion Board can be connected to the GPC-17 to give it an extra 8 relay outputs. In addition to the relay outputs the GPC-17 contains two 0-10VDC analog outputs which can be configured for simple floating point control. The analog output can also be configured to operate based on any of the 8 sensor inputs, outdoor air temperature, the GPC-17 controller's internal schedule or an external schedule. In addition an Analog Output Expansion Board can be connected to the GPC-17, giving it two additional analog outputs.



Mounting

The GPC-17 is provided with an integral backplate for mounting inside of a control enclosure. It is recommended that the GPC-17 be mounted in the HVAC unit control enclosure, or in a control enclosure in the building equipment room. An optional factory control enclosure for the GPC-17 is available.

Technical Data			**OE310-21 General Purpose Controller (GPC-17)**
Power	24 Volt AC	Weight	1.5 lb.
Power Consumption	20 VA Maximum	Network Connection	RS-485
Operating Temp	10°F to 149°F	Protocol	HSI Open Protocol Token Passing
Operating Humidity	90% RH Non-Condensing	Communications	RS-485 - 9600 Baud
Inputs:		***Outputs:***	
Types Allowed	Type III-10kohm sensors	Relay Qty.	7
	4-20ma sensors	Relay Power Rating	(2 Amp @ 24 VAC)
	N.O. Binary Contact	Analog Output Qty.	2
	N.C. Binary Contact	Analog Output Signal	0-10 VDC
Total Inputs Available	8		
WattMaster reserves the right to change specifications without notice			
Three Year Warranty			

Orion Control Systems

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