



# **GPC Controller**

## **General Information & Application Guide**

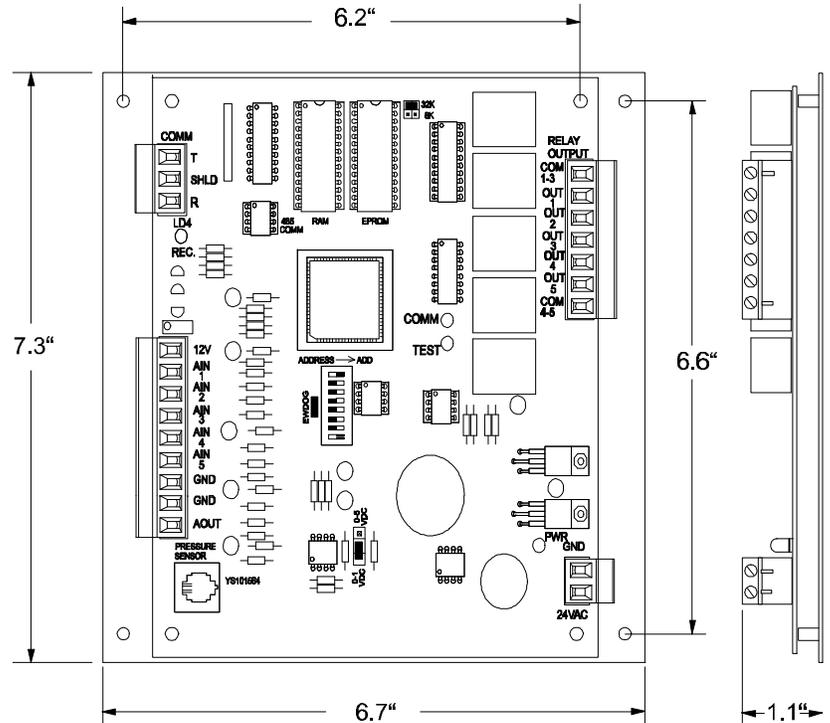
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# General Purpose Controller (GPC)

## Description

The General Purpose Controller (GPC) is used for controlling equipment or processes that cannot be controlled using the standard Zone Manager or CV controllers. The Auto-Zone ZoneView AZ computer front end software is used to interface with the GPC controller functions. The GPC is designed with 5 universal inputs, 5 binary outputs and 1 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. The 5 binary outputs may be configured to operate based on any of the 5 sensor inputs, outdoor air temperature, the GPC controllers internal schedule or an external schedule. In addition to the relay outputs the GPC contains one 0-10VDC analog output which can be configured for simple floating point control. The analog output can also be configured to operate based on any of the 5 sensor inputs, outdoor air temperature, the GPC controllers internal schedule or an external schedule.



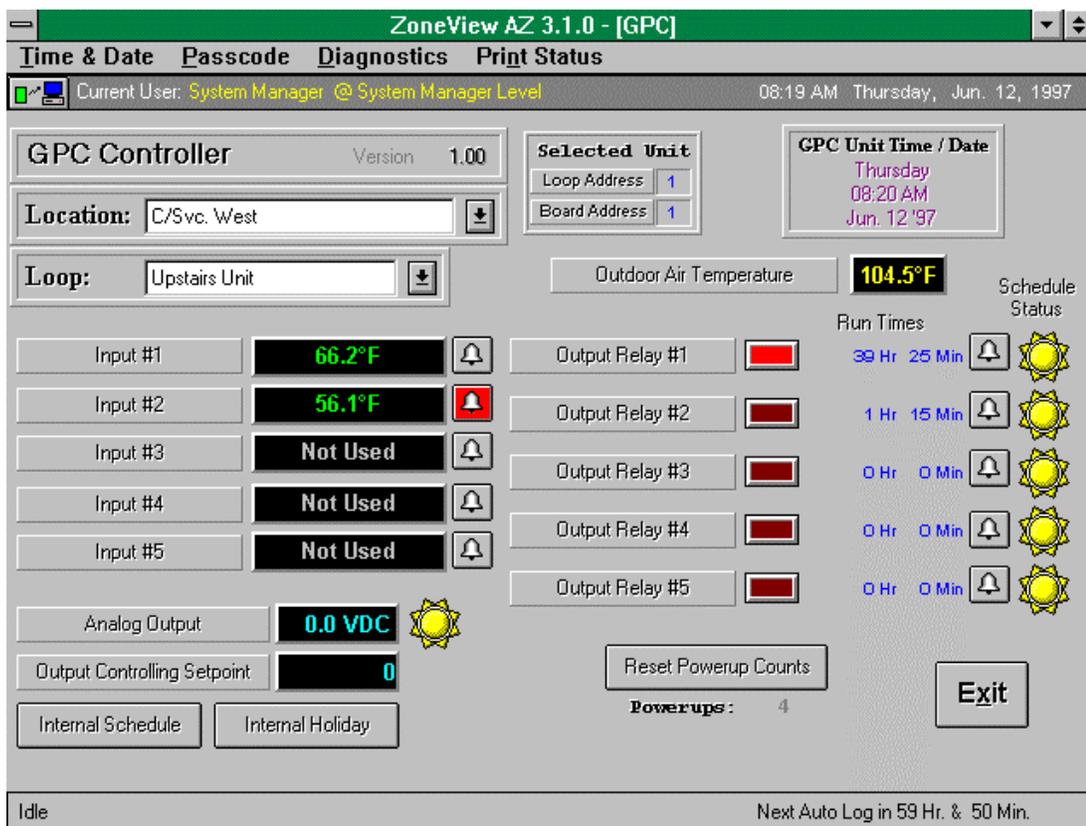
## Mounting

The GPC is provided with an integral backplate for mounting inside of a control enclosure. It is recommended that the GPC is 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 is available.

Technical Data		General Purpose Controller (GPC)	
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
<b>Inputs:</b>		<b>Outputs:</b>	
Types Allowed	Type III-10kohm sensors	Relay Qty.	5
	4-20ma sensors	Relay Power Rating	(2 Amp @ 24 VAC)
	N.O. Binary Contact	Analog Output Qty.	1
	N.C. Binary Contact	Analog Output Signal	0-10 VDC
Total Inputs Available	5		
WattMaster reserves the right to change specifications without notice			
<b>One Year Warranty</b>			

# General Purpose Controller ( GPC ) Status

Not all equipment can be controlled using the standard Constant Volume Unit or Zone Manager controllers. In these situations, the user can utilize the Auto-Zone GPC (AZGPC) to perform other tasks such as Humidity Control, Boiler Control, etc. A separate document called **GPC Examples** has been created to provide the user with some sample applications that the GPC can be configured for, so no examples will be provided in this manual.



As you can see from the above screen, all input and output status conditions are available. The input status readings reflect the type of configuration entered by the user, such as °F or "WG or RH%, etc. The description box located to the left of each input and output status box can be user programmed for a more understandable message describing the operation of that input/output. To change the description, select the desired box with the

mouse cursor and click the Left Button. A dialog box will open that allows you to change the description message currently in the box.

To access the Input Configuration programming screen, select the Input Status box for the desired input and click with the Left Mouse Button. To access the Analog Output Configuration screen, select the Analog Output Status box and click with the Left Mouse Button. To access the Relay Configuration screen, select the desired Relay LED indicator and click with the Left Mouse Button.

To clear the Relay Run Timers, click on either the hours or minutes value with the Left Mouse Button. You will be questioned with a pop open dialog box to make sure you really want to clear the times.

The Bell Icon next to each input and relay output will change to RED if that particular point is in a user defined alarm condition.

The SUN Icon will change to a MOON Icon during unoccupied hours as determined by the schedule selected for each output.

As with the other controllers, the GPC contains its own internal trend log which logs all input/output conditions at a fixed 15 minute interval. Select the **Diagnostics** menu to retrieve the logs either to disk or printer. The current status can also be sent to a printer by selecting the **Print Status** menu.

The Outdoor Air Temperature is received from a Global Broadcast from one of the other standard Auto-Zone products. If no broadcast is available, the temperature will read 0.0°F. Although you can configure the GPC to read the outdoor air temperature, it is unable to broadcast it to the other controllers that might be attached to the communications loop. If outdoor air lockout is required for one of the GPC functions, it is recommended that the Auto-Zone Economizer Module be installed to provide this temperature.

Although the relays can be configured to “look” at an external scheduling device, the GPC does contain one internal schedule. This schedule has two Start/Stop Events per day and 14 Start/Stop Holidays. If more schedules are required, install the Auto-Zone Optimal Start Scheduler.

# GPC Input Configuration

As mentioned previously, select the desired input status box with the mouse and click the Left Button. This will open a configuration screen specifically for the selected input. This screen appears below:

To configure an analog input, the following items are available:

## Input Configuration

There are 3 possible input *types*:

- Thermistor Temperature Sensor ( Type 3 10K Ohms = 76°F )
- 4-20ma User Scaled Readings
- Binary Contact Closure or Contact Open ( N/O or N/C )

## Binary Input Configuration

If you selected a Binary Input Contact Closure, you can specify what constitutes an active condition, the relay contacts closing or the contacts opening.

## Sensor Reading Appendix

The following appendix values are fixed in code and cannot be changed. You may select the one that most closely identifies the type of reading you expect:

- {Blank} No appendix required, or none apply to reading.
- RH% Relative Humidity Percentage
- % Generic Percentage type of reading
- Deg F. Will actually display as °F on the Status Screen
- Deg C. Will actually display as °C on the Status Screen
- PPM Parts Per Million
- PSI Pounds Per Square Inch
- “WG Inches of Water Gauge
- “ Inches
- Ft. Feet
- RPM Revolutions Per Minute

## Sensor Calibration

If you have selected Thermistor Temperature Sensor, you can calibrate the reading by entering a positive value to increase the reading or a negative value to decrease the reading, if the actual temperature does not agree with the displayed value.

This calibration offset does *NOT* operate with the 4-20ma User Scaled Readings!

## Alarm Setup

If you need to generate an alarm condition with this input reading or contact closure, you can set the **Hi Alarm Limit** and **Lo Alarm Limit** and the amount these limits are spread apart during unoccupied hours ( **Nite Limit Spread** ). You can also specify the amount of time the input value must be out of bounds before it is considered an actual alarm condition ( **Alarm Delay Period** ).

You can disable this input from ever generating an alarm by selecting **the Alarming Disabled** check box. If alarming is disabled, an “X” will appear in the box.

## Sensor Reading Override

If you want to simulate a temperature or user scaled reading with or without an actual sensor attached, you can enter a positive value in this box that will override the current reading displayed on the Status Screen. No negative overrides are allowed...

## 4-20ma User Scaling

There are four values that need to be programmed for an input that has been configured for User Scaling:

- Maximum Reading @ 20ma      Enter the highest value to display when the maximum amount of current is applied to the input.
- Minimum Reading @ 4ma      Enter the lowest value to display when the minimum amount of current is applied to the input.
- Actual Min Current      To aid in the accuracy of reading, you can enter the actual minimum current applied with no stimulus on the sensor. If you don't know the actual current, use the standard 4.00ma value.
- Value of Dropping Resistor      If the dropping resistor that is attached between the sensor input terminal and a ground terminal is not exactly 250 Ohms, as measured with a Digital Ohm Meter, then enter the exact value in this box. If you don't know the actual resistance, enter the default 250 Ohm value.

The last two items are used for *calibrating* a user scaled input instead of using the previously mentions *Sensor Calibration* Offset.

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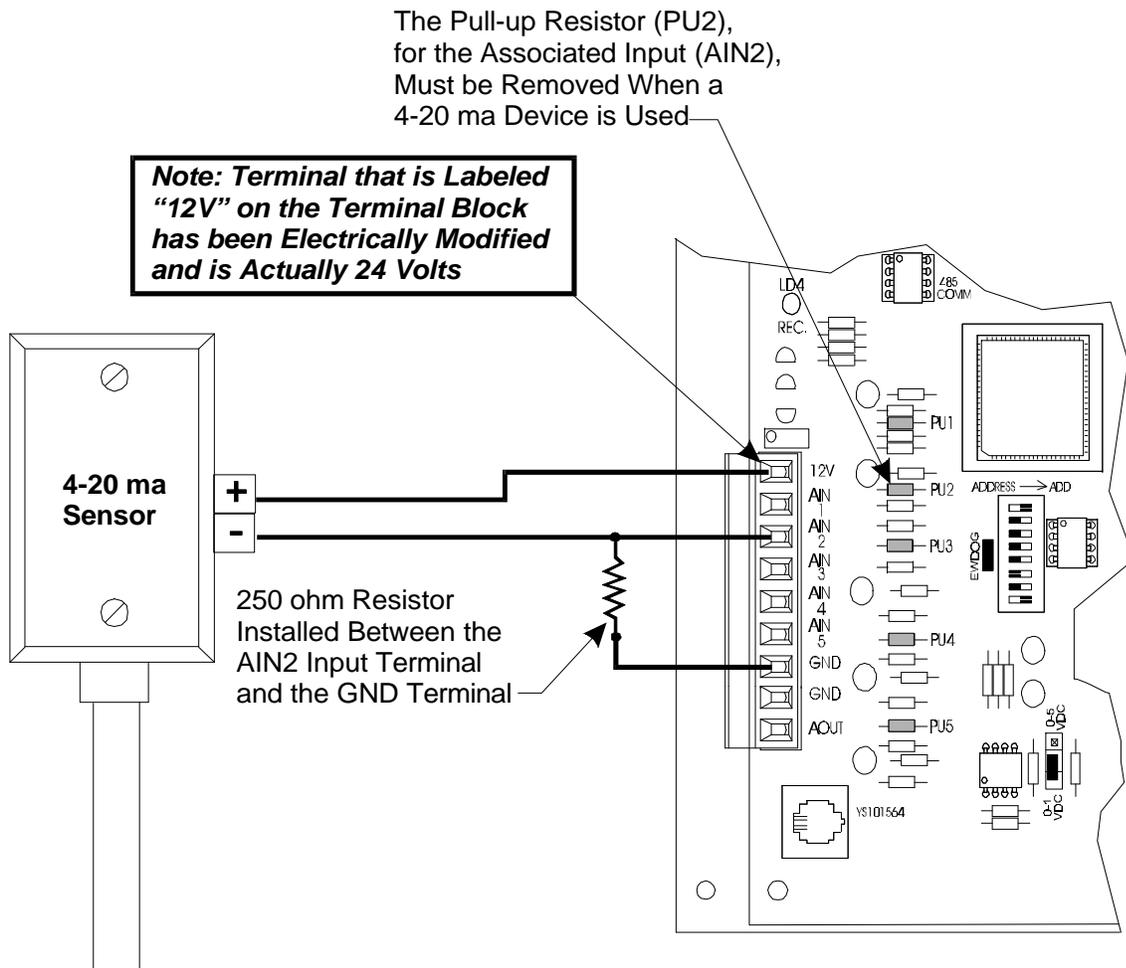
**NOTE: Once all values have been correctly entered, you must select the SAVE button before you exit the screen or the configuration data will not be sent to the controller!**

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## 4-20ma Sensor Connections

If you select an input for 4-20ma User Scaling, you must remove a resistor from the TUC-5R board and add a dropping resistor to the input terminals. The dropping resistor will always be 250 Ohms and you should use a minimum of 1% accuracy for this resistor.

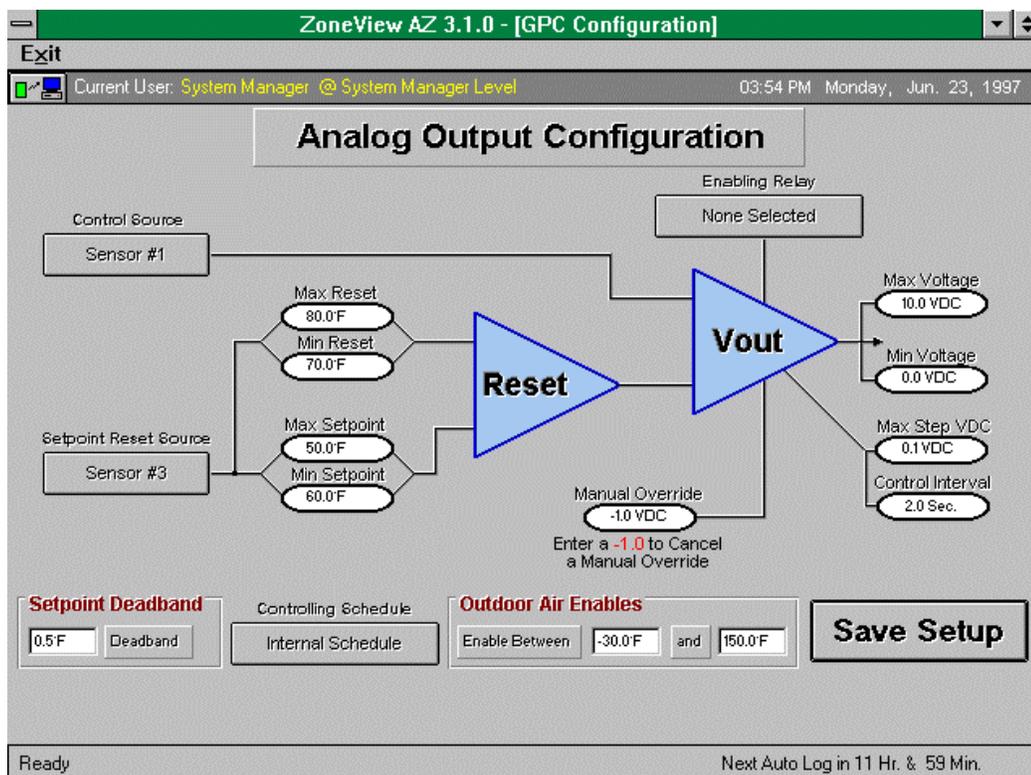
The following picture shows which resistors would be removed, depending in the input or inputs selected for 4-20ma operation. It also shows a sample dropping resistor installed on input #2:



# GPC Analog Output Configuration

The GPC contains one 0-10 VDC Analog Output. This output can be configured to provide simple *floating point* control. As the control source rises above its setpoint, the output signal increases up to 100% of the user defined maximum voltage. As the control source drops below the setpoint, the output signal drops to 0% or the user defined minimum voltage. If you need reverse acting operation, you can specify a higher minimum voltage than maximum voltage ( E.G.: Instead of 10.0 VDC for max voltage you could set 10.0 VDC for the min voltage and 0.0 VDC for the max ).

The Analog Output Configuration Screen is shown below:



## Control Source

Select the push-button located under the Control Source description. Click on it repeatedly with the mouse until the desired input is selected. All 5 inputs and the outdoor air temperature reading are available as control sources.

## Setpoint Reset Source

If the controlling setpoint needs to vary, based on some other temperature or condition, you can select which sensor will cause the setpoint to vary. All 5 inputs and the outdoor air temperature readings are available as reset sources.

## Max & Min Reset Limit

If you selected a Setpoint Reset Source, you will need to specify the range over which the reset reading will cause the maximum change in the setpoint. See Max & Min Setpoint Limit...

## Max & Min Setpoint Limit

If your setpoint needs to vary, based on a separate reset sensor value, enter the maximum changes allowed, in these two boxes. The Min and Max values can be reversed if you need to reverse the action of the reset sensor value.

**Example:** You would like the Setpoint to vary from 55°F up to 60°F as the Outdoor Air Temperature drops from 80°F to 20°F. You would enter 55 for the *Min Setpoint*, 60 for the *Max Setpoint*, 80 for the *Max Reset Limit* and 20 for the *Min Reset Limit*. You can reverse the direction of setpoint reset by swapping the min/max reset limits.

## Setpoint Deadband

Normally, you wouldn't want the output voltage to change at the precise moment it crosses the *Setpoint* value. You would want to allow it to cross above or below by a specified amount before any change actually occurred in the output voltage. This helps prevent signal *hunting* caused by attempting too tight of control to the setpoint.

## Max & Min Voltages

You enter the values here in the manner mentioned at the start of this section. Enter the maximum voltage that can be obtained if the control sensor reading is above the setpoint and the minimum voltage that can be obtained if the control sensor reading is below the setpoint.

## Max Step VDC

One method of speeding up or slowing down the output voltage signal is to change the amount of voltage step made each time an adjustment is made to the signal. Start out with the smallest value of 0.1 VDC to see how well control is maintained. If 0.1 VDC is too slow and the Control Interval is as fast as possible (1 Second), then you can speed up output changes by increasing the Step Voltage. If 0.1 VDC is already too fast, you can slow down the operation even more by increasing the Control Interval. Both the **Max Step VDC** and the **Control Interval** are used together to control the rate of change on the analog output.

## Control Interval

See the discussion shown above for **Max Step VDC**...

## Manual Override

Sometimes during troubleshooting, it is nice to be able to force the output voltage to a specific level without changing the setpoints. Enter any voltage between 0.0 and 10.0 VDC and the output will maintain that voltage until you enter a negative value to cancel the override.

## Controlling Schedule

Most control only occurs during occupied hours. If you need to follow a schedule you can select the GPC's Internal Schedule or you can assign an external schedule number to follow. If you assign an external schedule, you will need to install the Auto-Zone Optimal Start Scheduler somewhere on your communications loop. If no scheduling is required ( 24 hour operation ) simply select an unused external schedule, even if the Scheduler is not installed.

## Outdoor Air Enables

In addition to scheduling, the output can be enabled or disabled by the outdoor air temperature reading. If the outdoor air remains within the **Enable Between** setpoints, the analog output will be free to control, if the schedule is not disabling the output. If no outdoor air lockout is required, simply set the enable points back to the default values of -30°F and 120°F.

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**NOTE: Once all values have been correctly entered, you must select the SAVE button before you exit the screen or the configuration data will not be sent to the controller!**

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# GPC Relay Configuration

There are 5 relays available on the GPC board that can be configured to operate based on any of the 5 attached sensors, the outdoor air temperature, the internal schedule, or, an external schedule.

The Relay Configuration Screen is shown below:

**Relay #1 Output Configuration**

Control Method: Schedule Only  
 Hi Limit Setpoint: 100.0  
 Lo Limit Setpoint: 0.0  
 Control Source: None Selected

Control Method: Not Configured  
 Hi Limit Setpoint: 100.0  
 Lo Limit Setpoint: 0.0  
 Logical AND Source: None Selected

Control Method: Not Configured  
 Hi Limit Setpoint: 100.0  
 Lo Limit Setpoint: 0.0  
 Logical OR Source: None Selected

Enabling Relay: None Selected

Controlling Schedule: Internal Schedule

**Delay & Run Times**

30 Sec. Minimum Run Time  
 30 Sec. Minimum Off Time  
 0 Sec. Starting Delay Period

**Run Time Alarm**

0 Hr. Alarm Delay

User Force Mode Override: Normal Operation

**Save Setup**

Ready Next Auto Log in 59 Hr. & 59 Min.

## Control Methods

There are a maximum of 3 Control Sources for any given relay output. The first source is considered the standard control event and is the only source that should be selected if only one method of control is required for a relay output. No matter how many control sources are required ( up to the max of 3 ) they all can be configured to control the relay in a different manner. If all 3 sources are used, then you can see from the above screen that sources 1 and 2 are logically **AND**'ed

together to make the decision and the 3rd source is logically **OR**'ed with the first two sources. Since the 2nd and 3rd control sources are optional, either can be left un-programmed. This provides the user with a simple AND / OR test between the main control source and one other alternate control source. The available methods of control for each source are listed below:

- ON Above Hi Setpoint
- ON Above Hi Setpoint
- OFF Above Hi Setpoint
- OFF Above Hi Setpoint
- ON with Contact Closure
- OFF with Contact Closure
- Follow Week Schedule Only
- OFF Below Lo Setpoint
- ON Below Lo Setpoint
- ON Below Lo Setpoint
- OFF Below Lo Setpoint
- OFF when Contact Opens
- ON when Contact Opens

In the above control modes, if a relay is selected for ON Above / ON Below then the only time the relay is OFF is while the control source is between the setpoint limits. If the mode is OFF Below / OFF Above then the relay is ON while the control source is between the setpoint limits.

If the mode is to Follow Week Schedule Only, then the relay would be active during occupied hours and would be off during unoccupied hours.

## Hi & Lo Setpoints

If the control method you selected is of the Above / Below variety, the control source value is compared to the Hi and Lo Limit Setpoints to make the decision to turn on or off.

Keep in mind how the selected source has been scaled (temperature, humidity, etc.) when you enter the limit setpoints.

## Control Source

As previously mentioned, there can be up to 3 control sources for any given relay. Select which of the 5 onboard sensors or the outdoor air temperature will be used for each of the 3 sources. If one of the sources is not required, then simply leave the button displaying the words *None Selected* for that particular control source.

## Enabling Relay

Sometimes a control scheme needs to make sure another relay is active before it turns on another relay (E.G.: Fan relay should be on before activating compressor). The Enabling Relay button can be toggled to select which of the other 4 relays needs to be turned on before this relay can activate. If this relay is on and the enabling relay turns off, this relay will also turn off.

## Controlling Schedule

If you have selected a relay to be controlled by a schedule, you can specify which schedule it should follow with this button. There is one internal schedule available and 7 external schedules available if the Auto-Zone Optimal Start Scheduler is installed.

## Delay and Run Times

To prevent rapid cycling ON/OFF if a control source is wavering close to the setpoint, you can enter a minimum RUN and OFF time for the relay. Before a relay can activate it must have been OFF for its Minimum OFF Time. Once a relay has turned on, it must remain on for its Minimum RUN Time.

Another useful feature is the Start Delay Period. Although a relay may have satisfied its Minimum OFF Time, you may not want it to start immediately. This can occur if more than one relay suddenly becomes enabled at the same time but you only want one relay at a time to activate ( E.G. Compressor Staging ).

## Run Time Alarm

Each relay has an automatic timer keeping track of how much accumulated run time it has reached. If you have a piece of equipment that needs to be serviced after a fixed period of run time, you set a Run Time Alarm to this number of hours. As soon as the relay has accumulated that many hours, it will generate an alarm condition that is logged with ZoneView AZ and can also generate an alarm callout, if the system is equipped with this option.

## User Force Mode Override

As with the Analog Output Voltage, we sometimes would like to be able to force an output to a known condition during testing or maintenance and not worry about it changing before we are finished. You can force a relay ON or OFF with this command and it will remain in that condition until you remove the force mode with this same button. Only when the button displays Normal Operation will the relay resume its control based on the selected control method and source.

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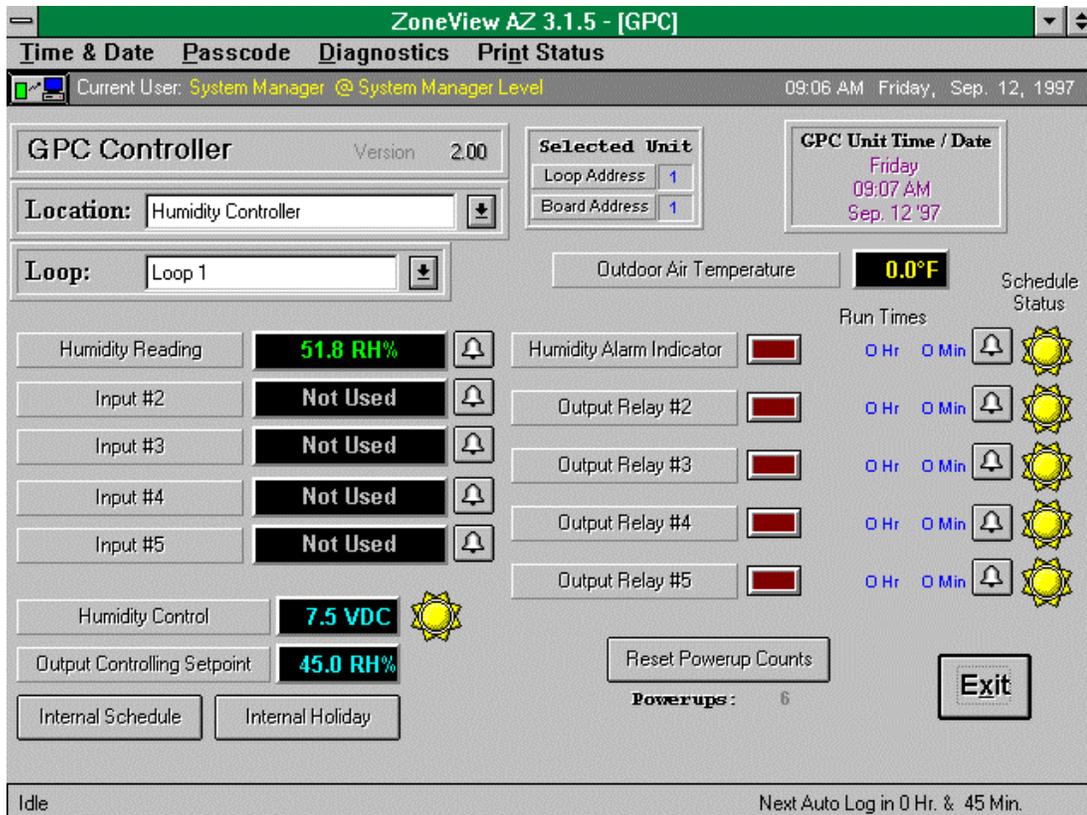
**NOTE: Once all values have been correctly entered, you must select the SAVE button before you exit the screen or the configuration data will not be sent to the controller!**

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When the schedule goes occupied, the analog output will begin to modulate to control humidity in a heated warehouse space. As the humidity drops below a user adjustable setpoint, the signal will increase to provide more humidity in the space. As the humidity rises above a user adjustable setpoint, the signal will decrease to allow the humidity to decrease in the space. The separation between the two setpoints creates a deadband area where no adjustments are required by the analog output.

A relay output will activate as an alarm indicator anytime the humidity drops below a user defined level.



## Humidifier Setup Explanations

**NOTE #1:** The following setup instructions only describe the changes made to the defaults which show up the first time you load the setup screens for the GPC. Things such as **Alarm Setup** and **4-20ma User Scaling** are ignored in the case of a **Binary Input Contact Closure** so they can be ignored in that instance.

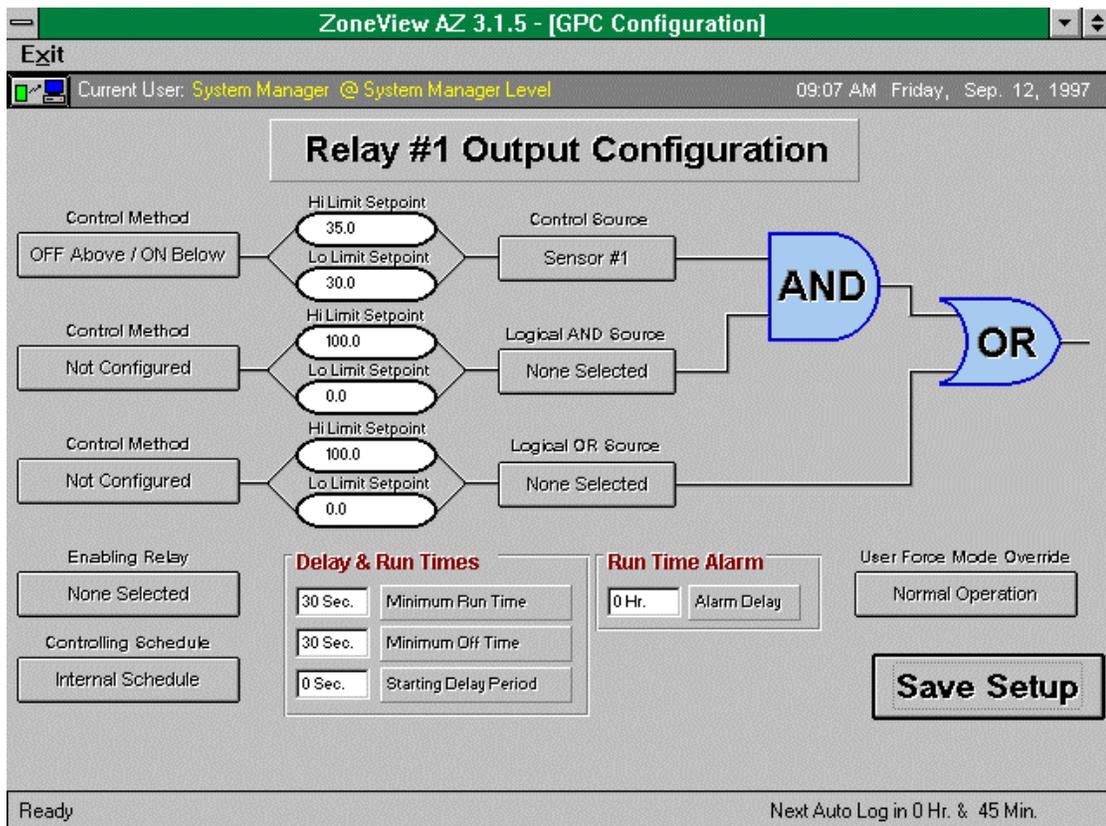
**NOTE #2:** Be sure to select the **Save Setup** button before exiting each setup screen or your selections will not be saved at the GPC and it will not function as expected!

**NOTE #3:** You can change the Sensor Input and Relay Output descriptions on the Status Screen by selecting them with the left mouse button.

## Sensor #1 Input Configuration

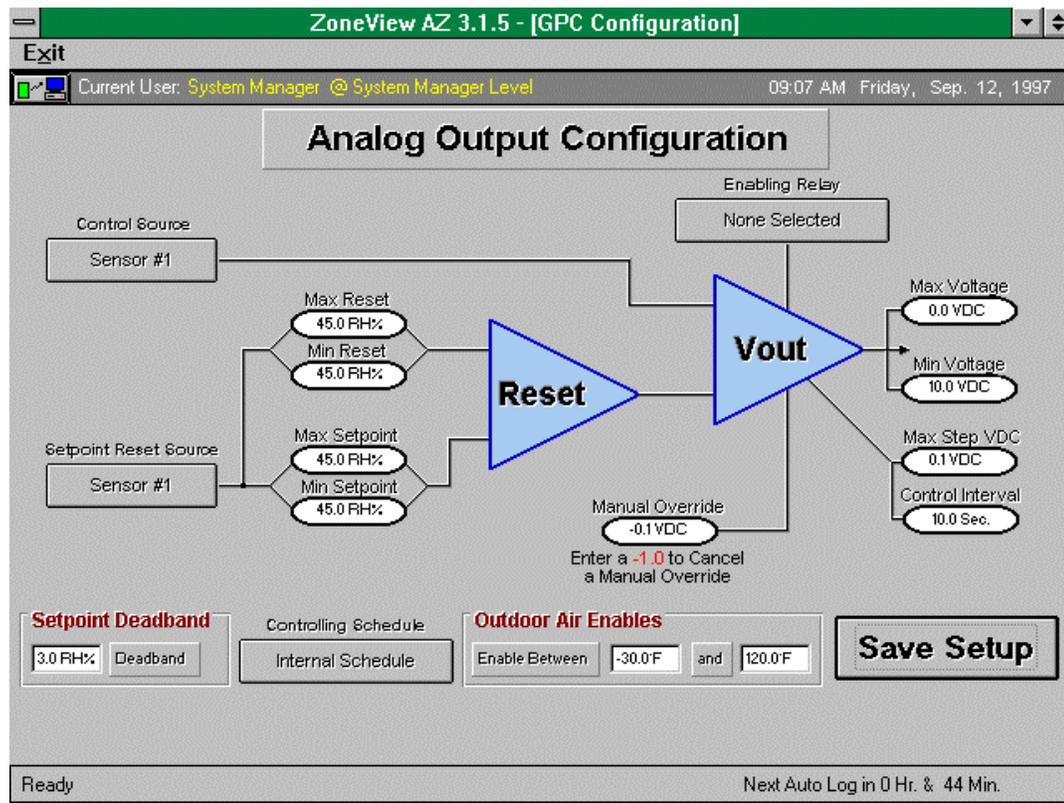
1. Select 4-20ma User Scaled Sensor
2. Select RH% Sensor Reading Appendix
3. Enter 100% for the Hi Alarm Limit
4. Enter 30% for the Lo Alarm Limit
5. Enter 100% for the Maximum Reading @ 20ma
6. Enter 0% for the Minimum Reading @ 4ma
7. Done

Relay #1 Output Configuration



1. Select OFF Above / ON Below using the first Control Method button
2. Enter 35.0 for the Hi Limit Setpoint
3. Enter 30.0 for the Lo Limit Setpoint
4. Select Sensor #1 using the Control Source button
5. Done

## Analog Output Configuration



1. Select Sensor #1 using the Control Source button
2. Select Sensor #1 using the Setpoint Reset Source button, even though we are not resetting the setpoint. ( You must *always* select a reset source! )
3. Enter 45.0 RH% for all 4 Reset Items ( Max Reset, Min Reset, Max Setpoint, Min Setpoint).
4. Enter 3.0 RH% for the Setpoint Deadband
5. Since we want the voltage to decrease as we go above the setpoint we need to enter 0.0 VDC for the Max Voltage and 10.0 VDC for the Min Voltage to reverse the direction of control.
6. Select Internal Schedule using the Controlling Schedule button
7. Set the Outdoor Air enables as required. ( Usually - 30.0 to 120.0 to ignore OAT )
8. The Max Step VDC and the Control Interval can be changed to adjust the rate of voltage change on the analog output.
9. Done

When the schedule enters the Occupied Mode, a relay will activate to drive the Outdoor Air Damper full open. When the damper reaches full open, a contact will be energized which enables the Fan Relay to activate.

With both the outdoor air damper and fan relays active, the unit will now monitor a discharge temperature sensor. If the discharge temperature drops below an adjustable setpoint, a heating enable relay will activate. When the discharge air temperature rises back above the enable setpoint by an adjustable amount, the heating enable relay will de-energize.

A normally closed smoke alarm contact will be monitored during normal operation. If the contact opens, indicating a smoke alarm, all other relays will be disabled until the contact closes again.

Minimum run and off times can be programmed for the relays to prevent rapid cycling on and off. This provides protection for the equipment in case of intermittent contact operation.

When the schedule goes unoccupied, all relays will be deactivated.

An optional dirty filter contact input can be included to activate an alarm relay in the event of an alarm condition.

The screenshot displays the ZoneView AZ 3.1.5 - [GPC] control interface. The title bar shows the application name and version. Below the title bar, there are tabs for Time & Date, Passcode, Diagnostics, and Print Status. The current user is System Manager @ System Manager Level, and the time is 03:47 PM on Thursday, Sep. 11, 1997.

The main interface is divided into several sections:

- GPC Controller:** Version 2.00, Location: Make-Up Air Unit, Loop: Loop 1.
- Selected Unit:** Loop Address: 1, Board Address: 1.
- GPC Unit Time / Date:** Thursday 03:47 PM Sep. 11 '97.
- Outdoor Air Temperature:** 0.0°F.
- Run Times:** A table showing run times for various relays and contacts, each with a bell icon and a sun icon.
- Contacts and Relays:** A list of contacts and relays with their current status (Active, Not Active, Not Used) and a red indicator light.
- Other Parameters:** Analog Output (0.0 VDC), Output Controlling Setpoint (0.0), Internal Schedule, and Internal Holiday.
- Powerups:** 6 powerups, with a Reset Powerup Counts button.
- Exit:** A button to exit the application.

The status bar at the bottom shows "Idle" and "Next Auto Log in 0 Hr. & 51 Min."

## Make-Up Controller Setup Explanations

**NOTE #1:** The following setup instructions only describe the changes made to the defaults which show up the first time you load the setup screens for the GPC. Things such as **Alarm Setup** and **4-20ma User Scaling** are ignored in the case of a **Binary Input Contact Closure** so they can be ignored in that instance.

**NOTE #2:** Be sure to select the **Save Setup** button before exiting each setup screen or your selections will not be saved at the GPC and it will not function as expected!

**NOTE #3:** You can change the Sensor Input and Relay Output descriptions on the Status Screen by selecting them with the left mouse button.

## Sensor #1 Input Configuration

1. Select Binary Input Contact Closure

2. Done

## Sensor #2 Input Configuration

1. Select Thermister Temperature Sensor
2. Select Deg F. symbol
3. Set 150.0°F Hi Alarm Limit
4. Set 40.0°F Lo Alarm Limit
5. Set 5 Min. Alarm Delay Period
6. Done

### Sensor #3 Input Configuration

**Sensor #3 Input Configuration**

**Sensor #1 Input Configuration**

- Not Used
- Thermister Temperature Sensor
- 4-20ma User Scaled Sensor
- Binary Input Contact Closure

**Binary Input Configuration**

- Normally Open Contacts
- Normally Closed Contacts

**Sensor Reading Appendix**

- {Blank }
- PPM
- RH%
- PSI
- %
- "WG
- Deg. F.
- "
- Deg. C.
- Ft.
- RPM

**Sensor Calibration**

0.0 Calibration Offset

*Only Applies If Configured as Thermistor Sensor*

**Sensor Reading Override**

-1.0 Sensor Override Value

*Enter a -1.0 to Cancel an Override Condition*

**Alarm Setup**

300.0 Hi Alarm Limit

300.0 Lo Alarm Limit

10.0 Nite Limit Spread

30 Min. Alarm Delay Period

Alarming Disabled

**4-20ma User Scaling**

100.0 Maximum Reading @ 20ma

0.0 Minimum Reading @ 4ma

4.00 ma Actual Min Current {Zero Adjust}

250 Ohm Actual Value of Dropping Resistor

*Only Applies If Configured as User Scaled*

**Save Setup**

Ready Next Auto Log in 0 Hr. & 50 Min.

1. Select Binary Input Contact Closure
2. Done

## Sensor #4 Input Configuration

**Sensor #1 Input Configuration**

Not Used  
 Thermister Temperature Sensor  
 4-20ma User Scaled Sensor  
 Binary Input Contact Closure

**Binary Input Configuration**

Normally Open Contacts  
 Normally Closed Contacts  
Only Applies If Configured as Binary Input

**Sensor Reading Appendix**

|Blank|     PPM  
 RH%     PSI  
 %     \"WG  
 Deg. F.     \"  
 Deg. C.     Ft.  
 RPM

**Sensor Calibration**

0.0 Calibration Offset  
Only Applies If Configured as Thermistor Sensor

**Sensor Reading Override**

-1.0 Sensor Override Value  
Enter a -1.0 to Cancel an Override Condition

**Alarm Setup**

300.0 Hi Alarm Limit  
 300.0 Lo Alarm Limit  
 10.0 Nite Limit Spread  
 30 Min. Alarm Delay Period  
 Alarming Disabled

**4-20ma User Scaling**

100.0 Maximum Reading @ 20ma  
 0.0 Minimum Reading @ 4ma  
 4.00 ma Actual Min Current {Zero Adjust}  
 250 Ohm Actual Value of Dropping Resistor  
Only Applies If Configured as User Scaled

**Save Setup**

Ready Next Auto Log in 0 Hr. & 49 Min.

1. Select Binary Input Contact Closure
2. Done

## Relay #1 Output Configuration

The screenshot shows the 'Relay #1 Output Configuration' window in ZoneView AZ 3.1.5. The window title is 'ZoneView AZ 3.1.5 - [GPC Configuration]'. The user is 'System Manager' at 'System Manager Level' on 'Thursday, Sep. 11, 1997' at '03:49 PM'. The configuration is as follows:

- Control Method 1:** Schedule Only. HI Limit Setpoint: 100.0, Lo Limit Setpoint: 0.0. Control Source: None Selected.
- Control Method 2:** ON w/Contact Closure. HI Limit Setpoint: 100.0, Lo Limit Setpoint: 0.0. Logical AND Source: Sensor #3.
- Control Method 3:** Not Configured. HI Limit Setpoint: 100.0, Lo Limit Setpoint: 0.0. Logical OR Source: None Selected.

The logic diagram shows an AND gate receiving inputs from the first two control methods, and an OR gate receiving inputs from the AND gate and the third control method.

**Enabling Relay:** None Selected

**Controlling Schedule:** Internal Schedule

**Delay & Run Times:**

- 30 Sec. Minimum Run Time
- 30 Sec. Minimum Off Time
- 0 Sec. Starting Delay Period

**Run Time Alarm:**

- 0 Hr. Alarm Delay

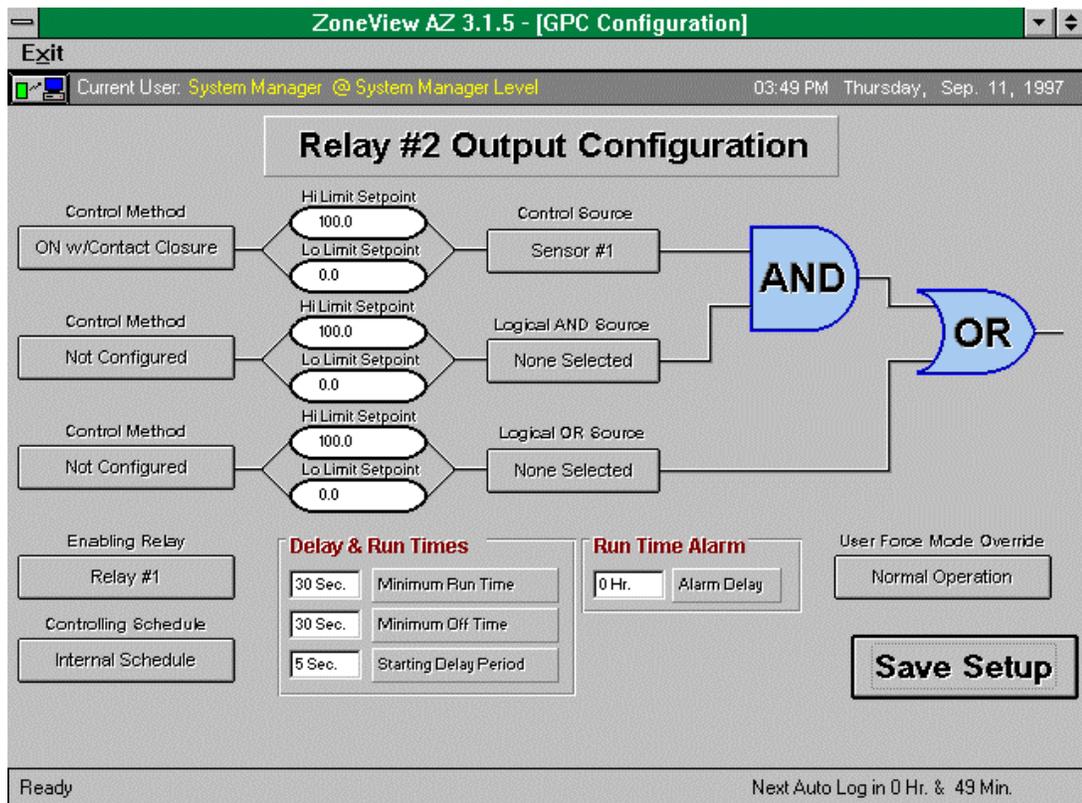
**User Force Mode Override:** Normal Operation

**Save Setup** button is present.

Status bar: Ready, Next Auto Log in 0 Hr. & 49 Min.

1. Select Schedule Only using the first Control Method button.
2. Select ON w/Contact Closure using second Control Method button.
3. Select Sensor #3 using Logical AND Source button.
4. Make sure the controlling schedule button shows Internal Schedule.
5. Option: You can change the Minimum Run and Off time if desired...
6. Done

Relay #2 Output Configuration



1. Select ON w/Contact Closure using the first Control Method button.
2. Select Sensor #1 using the Control Source button.
3. Select Relay #1 using the Enable Relay button.
4. Enter a 5 second Starting Delay Period.
5. Done

## Relay #3 Output Configuration

The screenshot displays the 'Relay #3 Output Configuration' window in the ZoneView AZ 3.1.5 software. The window title is 'ZoneView AZ 3.1.5 - [GPC Configuration]'. The current user is 'System Manager' at 'System Manager Level', and the date is 'Thursday, Sep. 11, 1997' at '03:49 PM'. The main configuration area is titled 'Relay #3 Output Configuration' and contains several sections:

- Control Method:** Three buttons are shown: 'OFF Above / ON Below' (selected), 'Not Configured', and 'Not Configured'.
- Limit Setpoints:** Each control method has associated 'HI Limit Setpoint' and 'Lo Limit Setpoint' fields. The first method has HI at 50.0 and LO at 40.0. The other two methods have HI at 100.0 and LO at 0.0.
- Control Source:** A dropdown menu is set to 'Sensor #2'.
- Logical AND Source:** A dropdown menu is set to 'None Selected'.
- Logical OR Source:** A dropdown menu is set to 'None Selected'.
- Enabling Relay:** A dropdown menu is set to 'Relay #2'.
- Controlling Schedule:** A dropdown menu is set to 'Internal Schedule'.
- Delay & Run Times:** A table with the following values:
 

30 Sec.	Minimum Run Time
30 Sec.	Minimum Off Time
0 Sec.	Starting Delay Period
- Run Time Alarm:** A dropdown menu is set to '0 Hr.' and an 'Alarm Delay' field is present.
- User Force Mode Override:** A dropdown menu is set to 'Normal Operation'.
- Logic Diagram:** A blue 'AND' gate is connected to a blue 'OR' gate. The 'AND' gate has two inputs from the 'Control Source' and 'Logical AND Source' fields. The 'OR' gate has two inputs from the 'Logical AND Source' and 'Logical OR Source' fields.
- Buttons:** A large 'Save Setup' button is located at the bottom right.

The status bar at the bottom shows 'Ready' and 'Next Auto Log in 0 Hr. & 48 Min.'.

1. Select OFF Above / ON Below using the first Control Method button.
2. Select Sensor #2 using the Control Source button.
3. Select Relay #2 using the Enabling Relay button.
4. Done

## Relay #4 Output Configuration

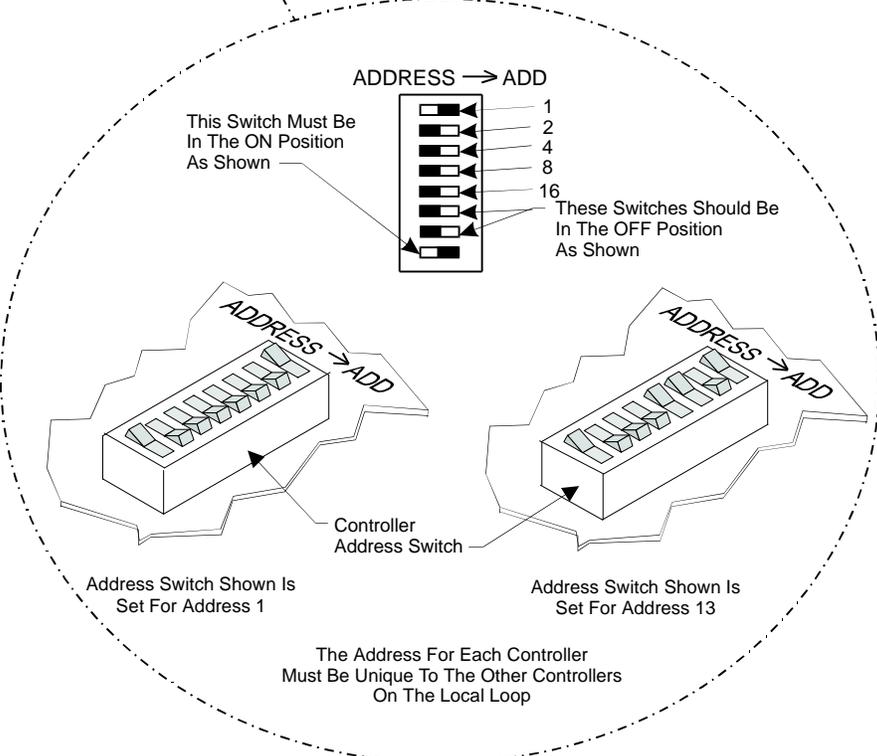
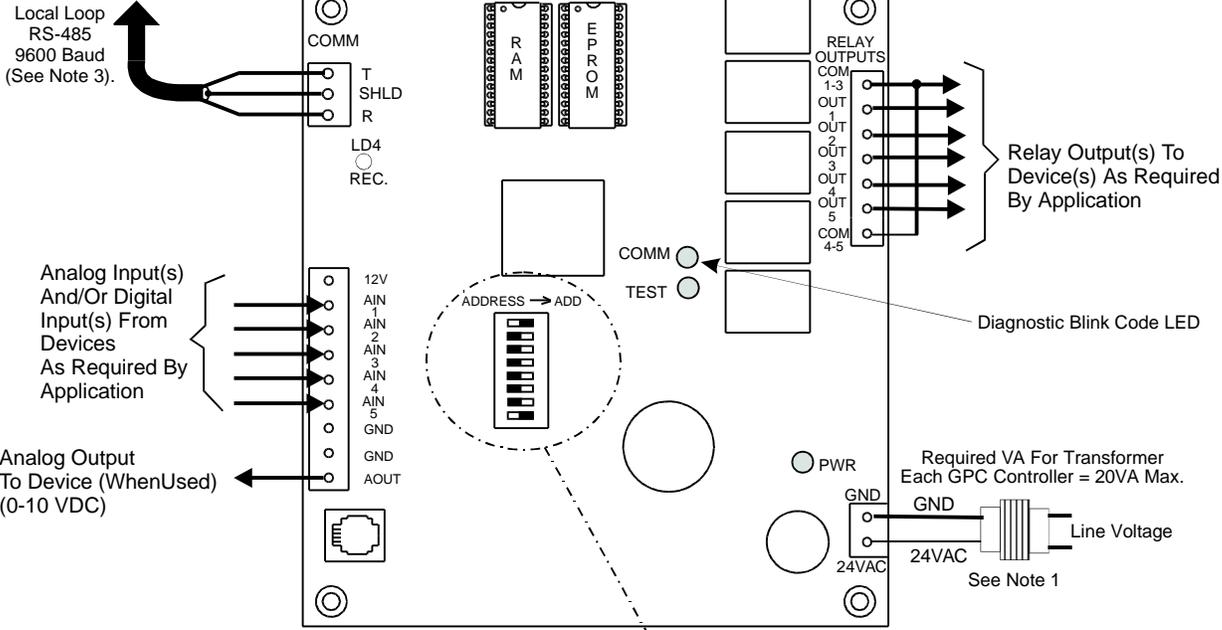
The screenshot shows the 'Relay #4 Output Configuration' window in the ZoneView AZ 3.1.5 software. The window title bar indicates the current user is 'System Manager @ System Manager Level' and the date is 'Thursday, Sep. 11, 1997' at '03:49 PM'. The interface is divided into several sections:

- Control Method:** Three buttons are visible: 'ON w/Contact Closure' (selected), 'Not Configured', and 'Not Configured'.
- Limit Setpoints:** Each control method has associated 'Hi Limit Setpoint' (100.0) and 'Lo Limit Setpoint' (0.0) fields.
- Control Source:** A dropdown menu is set to 'Sensor #4'.
- Logical AND Source:** A dropdown menu is set to 'None Selected'.
- Logical OR Source:** A dropdown menu is set to 'None Selected'.
- Enabling Relay:** A dropdown menu is set to 'None Selected'.
- Controlling Schedule:** A dropdown menu is set to 'Internal Schedule'.
- Delay & Run Times:** A section with three rows of input fields:
  - 30 Sec. Minimum Run Time
  - 30 Sec. Minimum Off Time
  - 0 Sec. Starting Delay Period
- Run Time Alarm:** A section with two input fields: '0 Hr.' and 'Alarm Delay'.
- User Force Mode Override:** A dropdown menu is set to 'Normal Operation'.
- Logic Diagram:** A blue AND gate is connected to the 'Control Source' and 'Logical AND Source' fields. Its output is connected to an OR gate, which also receives input from the 'Logical OR Source' field.
- Buttons:** A large 'Save Setup' button is located at the bottom right.
- Status Bar:** At the bottom, it shows 'Ready' on the left and 'Next Auto Log in 0 Hr. & 48 Min.' on the right.

1. Select ON w/Contact Closure using the first Control Method button.
2. Select Sensor #4 using the Control Source button.
3. Done

All Comm Loop Wiring Is  
Straight Thru  
T — T — T — T →  
SH — SH — SH — SH →  
R — R — R — R →  
Connect To  
Next Controller  
And/Or  
MiniLink On  
Local Loop

### GPC Controller



**Caution!**  
GPC Controllers Must Have Address Switches Set Between 1 And 30 When Used With CV or CV-EX Systems. Auto-Zone Plus Systems and Basic Systems Require That The Address Switches Be Set Between 18 To 30.

**Note:**  
The Power To The GPC Controller Must Be Removed And Reconnected After Changing The Address Switch Settings In Order For Any Changes To Take Effect.

**Caution:**  
Disconnect All Communication Loop Wiring From The GPC Controller Before Removing Power From The GPC Controller. Reconnect Power And Then Reconnect Communication Loop Wiring.

- Notes:**
- 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 2 Conductor Twisted Pair With Shield. Use Belden #82760 Or Equivalent.

JOB NAME	
FILENAME	<b>WattMaster</b> CONTROLS
GPCALL1.CDR	
DATE: 10/26/98	DRAWN BY: B. CREWS
PAGE	DESCRIPTION:
1	Auto-Zone Systems GPC Controller Wiring



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