



# PowerAire

Precision Control

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This manual describes the use and operation of the **POWERAIRE** Wind Ranger Plus wind speed monitor and control device. This manual is comprehensive and describes all functions and options available at the time of this manual's writing. Portions of this manual may not apply and are dependent upon the Wind Ranger Plus unit(s) purchased.

The screen graphics in this document are representative images of what appears on the physical touch screen device.

The Wind Ranger Plus reacts to the wind conditions affecting the anemometer. For the Wind Ranger Plus to give maximum beneficial effects the anemometer must be located within the same prevailing wind environment as the controlled device (IE: Fountains, Canopies, Umbrellas, Cooling Towers, Amusement Park Attractions, etc.).

Apply appropriate control power, anemometer input, and stage control connection(s) to the Wind Ranger Plus. The PA-WRPLUS-CUS-ELE schematics are connection references and are designed to be a general wiring guide.

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# POWERAIRE

**WIND RANGER PLUS**  
**Water Conservation Control for**  
**Fountains, Sprinklers, and other Activities**  
**Adversely Affected by the Wind.**

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[www.poweraire.com](http://www.poweraire.com)

STGS: 0 ANA: 0 ALM: 0 SCC-WRPLUS-HMI Rev1.23 04112025

### Power Up Screen:

1. This screen is to impart information as to what this control panel is and information as to how to contact the manufacturer of the Wind Ranger Plus control panel.
2. As an option and for a FEE the customer can provide us a bit map image of their logo and address to be inserted in the place of the POWERAIRE logo and address.
3. To indicate PLC operation the bar graph at the bottom of the screen will scroll from left to right, 0To 100%, at a rate of once every two seconds to indicate life. This screen will remain for 10 seconds and then switches to the appropriate SINGLE STAGE DISPLAY, TWO STAGE DISPLAY, THREE STAGE DISPLAY or FOUR STAGE DISPLAY screen.
4. The text at the bottom left of the screen provides information as to what the Wind Ranger Plus is configured as:
  - a. STGS:x  
Indicates how many stages have been enabled and the possible register values are 1, 2, 3, and 4.
  - b. ANA:x  
Indicates the status of the analog output option. Valid register values are 0 and 1 where a value of 0 indicates the analog option is deactivated and a value of 1 indicates the analog option is activated.
  - c. ALM:x  
Indicates the status of the alarm option. Valid register values are 0 and 1 where a value of 0 indicates the alarm option is deactivated and a value of 1 indicates the analog option is activated.
5. The text at the bottom right of the screen provides information of the HMI program file name, revision, and revision date.

## 2 - SINGLE STAGE DISPLAY

11 MAR 25 07:24:06	SINGLE STAGE DISPLAY	FRIDAY
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CURRENT WIND SPEED	0.0 MPH
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STAGE 1 INACTIVE
---------------------

STAGE 1 SETPOINTS		
WIND SPEED	10.0 MPH	
DWELL TO ON	0 MIN	05 SEC
DWELL TO OFF	0 MIN	10 SEC

STAGE RESET	MAIN MENU
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SINGLE STAGE DISPLAY screen:

1. This screen is considered the default screen for a Wind Ranger Plus single or 1 stage configuration. When this screen is exited a 2-minute timer is started. The timer is reset when any screen change is detected. If a screen change has not been detected within the 2-minute time period the SINGLE STAGE DISPLAY screen will be displayed.
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, SINGLE STAGE DISPLAY.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY
5. CURRENT WIND SPEED: Real time display of the anemometer's value in Miles Per Hour.
6. Stage 1 activity indicator: This indicator displays the two states of stage activity.
  - a. Inactive state; green background with black STAGE 1 INACTIVE text.  
The physical I/O digital output associated with stage 1 is de-energized.



- b. Active State: red background with white STAGE 1 ACTIVE text.  
The physical I/O digital output associated with stage 1 is energized.



7. STAGE 1 SETPOINTS: Text label describing the following related functions.
  - a. WIND SPEED: Current value of the stage 1 wind speed setpoint in Miles Per Hour.
  - b. DWELL TO ON: Current value of the stage 1 dwell to on setpoint in Minutes and Seconds.
  - c. DWELL TO OFF: Current value of the stage 1 dwell to off setpoint in Minutes and Seconds.
8. STAGE RESET: This is a momentary push button that when pressed resets stage 1 to an inactive state.
9. MAIN MENU: This is a momentary push button that when pressed the display switches to the MAIN MENU screen,

### 3 - TWO STAGE DISPLAY

11 APR 25 07:57:27	TWO STAGE DISPLAY		FRIDAY	
CURRENT WIND SPEED 0.0 MPH				
STAGE 1 INACTIVE		STAGE 2 INACTIVE		
SETPOINTS      STAGE 1      STAGE 2				
WIND SPEED	0.0 MPH		0.0 MPH	
DWELL TO ON	0 MIN	00 SEC	0 MIN	00 SEC
DWELL TO OFF	0 MIN	00 SEC	0 MIN	00 SEC
STAGE RESET		MAIN MENU		



## TWO STAGE DISPLAY screen:

1. This screen is considered the default screen for a Wind Ranger Plus two or 2 stage configuration. When this screen is exited via the MAIN MENU push button a 2-minute timer is started. The timer is reset when any screen change is detected, If a screen change has not been detect within the 2-minute time period the TWO STAGE DISPLAY screen will be displayed.
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, TWO STAGE DISPLAY.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY
5. CURRENT WIND SPEED: Real time display of the anemometer's value in Miles Per Hour.
6. Stage 1 activity indicator: This indicator displays the two states of stage activity.
  - a. Inactive state; green background with black STAGE 1 INACTIVE text.  
The physical I/O digital output associated with stage 1 is de-energized.



- b. Active State: red background with white STAGE 1 ACTIVE text.  
The physical I/O digital output associated with stage 1 is energized.



7. STAGE 1 SETPOINTS: Text label describing the following related functions.
  - a. WIND SPEED: Current value of the stage 1 wind speed setpoint in Miles Per Hour.
  - b. DWELL TO ON: Current value of the stage 1 dwell to on setpoint in Minutes and Seconds.
  - c. DWELL TO OFF: Current value of the stage 1 dwell to off setpoint in Minutes and Seconds.
8. Stage 2 activity indicator: This indicator displays the two states of stage activity.
  - a. Inactive state; green background with black STAGE 2 INACTIVE text.  
The physical I/O digital output associated with stage 2 is de-energized.



- b. Active State: red background with white STAGE 2 ACTIVE text.  
The physical I/O digital output associated with stage 2 is energized.



9. STAGE 2 SETPOINTS: Text label describing the following related functions.
  - a. WIND SPEED: Current value of the stage 2 wind speed setpoint in Miles Per Hour.
  - b. DWELL TO ON: Current value of the stage 2 dwell to on setpoint in Minutes and Seconds.
  - c. DWELL TO OFF: Current value of the stage 2 dwell to off setpoint in Minutes and Seconds.

10. STAGE RESET: This is a momentary push button that when pressed resets stages 1 and 2 to an inactive state.
11. MAIN MENU: This is a momentary push button that when pressed the display switches to the MAIN MENU screen,

#### 4 - THREE STAGE DISPLAY

11 APR 25 07:58:15	THREE STAGE DISPLAY	FRIDAY
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CURRENT WIND SPEED 0.0 MPH		
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STAGE 1 INACTIVE	STAGE 2 INACTIVE	STAGE 3 INACTIVE
---------------------	---------------------	---------------------

SETPOINTS	STAGE 1	STAGE 2
WIND SPEED	0.0 MPH	0.0 MPH
DWELL TO ON	0 MIN 00 SEC	0 MIN 00 SEC
DWELL TO OFF	0 MIN 00 SEC	0 MIN 00 SEC

SETPOINTS	STAGE 3
WIND SPEED	0.0 MPH
DWELL TO ON	0 MIN 00 SEC
DWELL TO OFF	0 MIN 00 SEC

STAGE RESET	MAIN MENU
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### THREE STAGE DISPLAY screen:

1. This screen is considered the default screen for a Wind Ranger Plus three or 3 stage configuration. When this screen is exited via the MAIN MENU push button a 2-minute timer is started. The timer is reset when any screen change is detected, If a screen change has not been detect within the 2-minute time period the THREE STAGE DISPLAY screen will be displayed.
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, THREE STAGE DISPLAY.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY
5. CURRENT WIND SPEED: Real time display of the anemometer's value in Miles Per Hour.
6. Stage 1 activity indicator: This indicator displays the two states of stage activity.
  - a. Inactive state; green background with black STAGE 1 INACTIVE text.  
The physical I/O digital output associated with stage 1 is de-energized.



- b. Active State: red background with white STAGE 1 ACTIVE text.  
The physical I/O digital output associated with stage 1 is energized.



7. STAGE 1 SETPOINTS: Text label describing the following related functions.
  - a. WIND SPEED: Current value of the stage 1 wind speed setpoint in Miles Per Hour.
  - b. DWELL TO ON: Current value of the stage 1 dwell to on setpoint in Minutes and Seconds.
  - c. DWELL TO OFF: Current value of the stage 1 dwell to off setpoint in Minutes and Seconds.
8. Stage 2 activity indicator: This indicator displays the two states of stage activity.
  - a. Inactive state; green background with black STAGE 2 INACTIVE text.  
The physical I/O digital output associated with stage 2 is de-energized.



- b. Active State: red background with white STAGE 2 ACTIVE text.  
The physical I/O digital output associated with stage 2 is energized.



9. STAGE 2 SETPOINTS: Text label describing the following related functions.
  - a. WIND SPEED: Current value of the stage 2 wind speed setpoint in Miles Per Hour.
  - b. DWELL TO ON: Current value of the stage 2 dwell to on setpoint in Minutes and Seconds.
  - c. DWELL TO OFF: Current value of the stage 2 dwell to off setpoint in Minutes and Seconds.

10. Stage 3 activity indicator: This indicator displays the two states of stage activity.

- a. Inactive state; green background with black STAGE 3 INACTIVE text.  
The physical I/O digital output associated with stage 3 is de-energized.



- b. Active State: red background with white STAGE 3 ACTIVE text.  
The physical I/O digital output associated with stage 3 is energized.



11. STAGE 3 SETPOINTS: Text label describing the following related functions.

- d. WIND SPEED: Current value of the stage 3 wind speed setpoint in Miles Per Hour.
- e. DWELL TO ON: Current value of the stage 3 dwell to on setpoint in Minutes and Seconds.
- f. DWELL TO OFF: Current value of the stage 3 dwell to off setpoint in Minutes and Seconds.

12. STAGE RESET: This is a momentary push button that when pressed resets stages 1, 2 and 3 to an inactive state.

13. MAIN MENU: This is a momentary push button that when pressed the display switches to the MAIN MENU screen,

## 5 - FOUR STAGE DISPLAY

11 APR 25 07:59:20	FOUR STAGE DISPLAY	FRIDAY
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CURRENT WIND SPEED 0.0 MPH			
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STAGE 1 INACTIVE	STAGE 2 INACTIVE	STAGE 3 INACTIVE	STAGE 4 INACTIVE
---------------------	---------------------	---------------------	---------------------

SETPOINTS	STAGE 1		STAGE 2	
WIND SPEED	0.0 MPH		0.0 MPH	
DWELL TO ON	0 MIN	00 SEC	0 MIN	00 SEC
DWELL TO OFF	0 MIN	00 SEC	0 MIN	00 SEC

SETPOINTS	STAGE 3		STAGE 4	
WIND SPEED	0.0 MPH		0.0 MPH	
DWELL TO ON	0 MIN	00 SEC	0 MIN	00 SEC
DWELL TO OFF	0 MIN	00 SEC	0 MIN	00 SEC

STAGE RESET	MAIN MENU
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#### FOUR STAGE DISPLAY screen:

1. This screen is considered the default screen for a Wind Ranger Plus four or 4 stage configuration. When this screen is exited via the MAIN MENU push button a 2-minute timer is started. The timer is reset when any screen change is detected. If a screen change has not been detected within the 2-minute time period the FOUR STAGE DISPLAY screen will be displayed.
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, FOUR STAGE DISPLAY.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY
5. CURRENT WIND SPEED: Real time display of the anemometer's value in Miles Per Hour.
6. Stage 1 activity indicator: This indicator displays the two states of stage activity.
  - a. Inactive state; green background with black STAGE 1 INACTIVE text.  
The physical I/O digital output associated with stage 1 is de-energized.



- b. Active State: red background with white STAGE 1 ACTIVE text.  
The physical I/O digital output associated with stage 1 is energized.



7. STAGE 1 SETPOINTS: Text label describing the following related functions.
  - a. WIND SPEED: Current value of the stage 1 wind speed setpoint in Miles Per Hour.
  - b. DWELL TO ON: Current value of the stage 1 dwell to on setpoint in Minutes and Seconds.
  - c. DWELL TO OFF: Current value of the stage 1 dwell to off setpoint in Minutes and Seconds.
8. Stage 2 activity indicator: This indicator displays the two states of stage activity.
  - a. Inactive state; green background with black STAGE 2 INACTIVE text.  
The physical I/O digital output associated with stage 2 is de-energized.



- b. Active State: red background with white STAGE 2 ACTIVE text.  
The physical I/O digital output associated with stage 2 is energized.



9. STAGE 2 SETPOINTS: Text label describing the following related functions.
  - g. WIND SPEED: Current value of the stage 2 wind speed setpoint in Miles Per Hour.
  - h. DWELL TO ON: Current value of the stage 2 dwell to on setpoint in Minutes and Seconds.
  - i. DWELL TO OFF: Current value of the stage 2 dwell to off setpoint in Minutes and Seconds.
10. Stage 3 activity indicator: This indicator displays the two states of stage activity.

- a. Inactive state; green background with black STAGE 3 INACTIVE text.  
The physical I/O digital output associated with stage 3 is de-energized.



- b. Active State: red background with white STAGE 3 ACTIVE text.  
The physical I/O digital output associated with stage 3 is energized.



11. STAGE 3 SETPOINTS: Text label describing the following related functions.

- j. WIND SPEED: Current value of the stage 3 wind speed setpoint in Miles Per Hour.
- k. DWELL TO ON: Current value of the stage 3 dwell to on setpoint in Minutes and Seconds.
- l. DWELL TO OFF: Current value of the stage 3 dwell to off setpoint in Minutes and Seconds.

12. Stage 4 activity indicator: This indicator displays the two states of stage activity.

- a. Inactive state; green background with black STAGE 4 INACTIVE text.  
The physical I/O digital output associated with stage 4 is de-energized.



- b. Active State: red background with white STAGE 4 ACTIVE text.  
The physical I/O digital output associated with stage 4 is energized.



13. STAGE 4 SETPOINTS: Text label describing the following related functions.

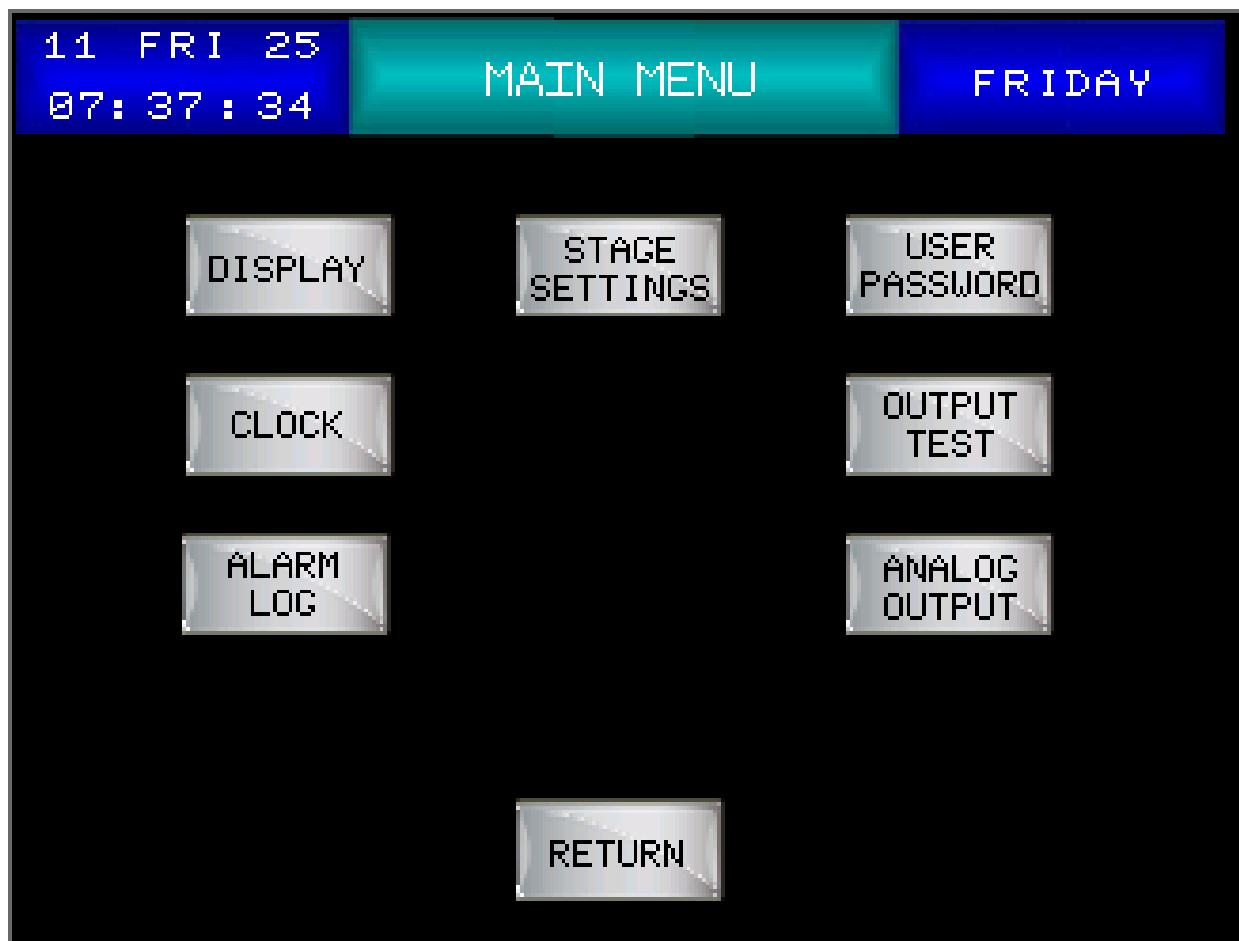
- a. WIND SPEED: Current value of the stage 4 wind speed setpoint in Miles Per Hour.
- b. DWELL TO ON: Current value of the stage 4 dwell to on setpoint in Minutes and Seconds.
- c. DWELL TO OFF: Current value of the stage 4 dwell to off setpoint in Minutes and Seconds.

14. STAGE RESET: This is a momentary push button that when pressed resets stages 1, 2, 3 and 4 to an inactive state.

15. MAIN MENU: This is a momentary push button that when pressed the display switches to the MAIN MENU screen,



## 6 - MAIN MENU



## MAIN MENU screen:

1. This screen allows the user to select control screens that determine how the Wind Ranger Plus functions. Note that these operators are always visible.
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, MAIN MENU.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY.
5. The following screen select push buttons are standard features of the Wind Ranger Plus. They are all password protected with the [UP1] password.
  - a. USER PASSWORD: Push button: Pressing this momentary push button switches the display to the USER PASSWORD control screen.
  - b. DISPLAY CONTRAST: Push button: Pressing this momentary push button switches the display to the DISPLAY CONTRAST control screen.
  - c. REAL TIME CLOCK SET: Push button: Pressing this momentary push button switches the display to the REAL TIME CLOCK SET control screen.
  - d. STAGE SET-POINTS: Push button. Pressing this momentary push button switches the display to the STAGE SET-POINTS control screen.
  - e. STAGE OUTPUT TEST: Push button. Pressing this momentary push button switches the display to the STAGE OUTPUT TEST control screen.
6. The following screen select buttons visibility are dependent upon what options have been added. They are password protected with the [UP1] password.
  - a. ANALOG OUTPUT CONTROL: Push button: Pressing this momentary push button switches the display to the ANALOG OUTPUT CONTROL screen.
  - b. ALARM LOG: Push button: Pressing this momentary push button switches the display to the ALARM LOG screen.
7. RETURN Push button: Pressing this momentary push button switches the display to the X STAGE DISPLAY screen from whence it came.
8. If for two minutes no user activity has been detected the display will automatically switch to the default X STAGE DISPLAY screen from whence it came.

## 7 - USER PASSWORD

11 FRI 25 07 45 06	USER PASSWORD	FRIDAY
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ENTER THE NEW PASSWORD  
OR PRESS CANCEL TO RETURN.

1234

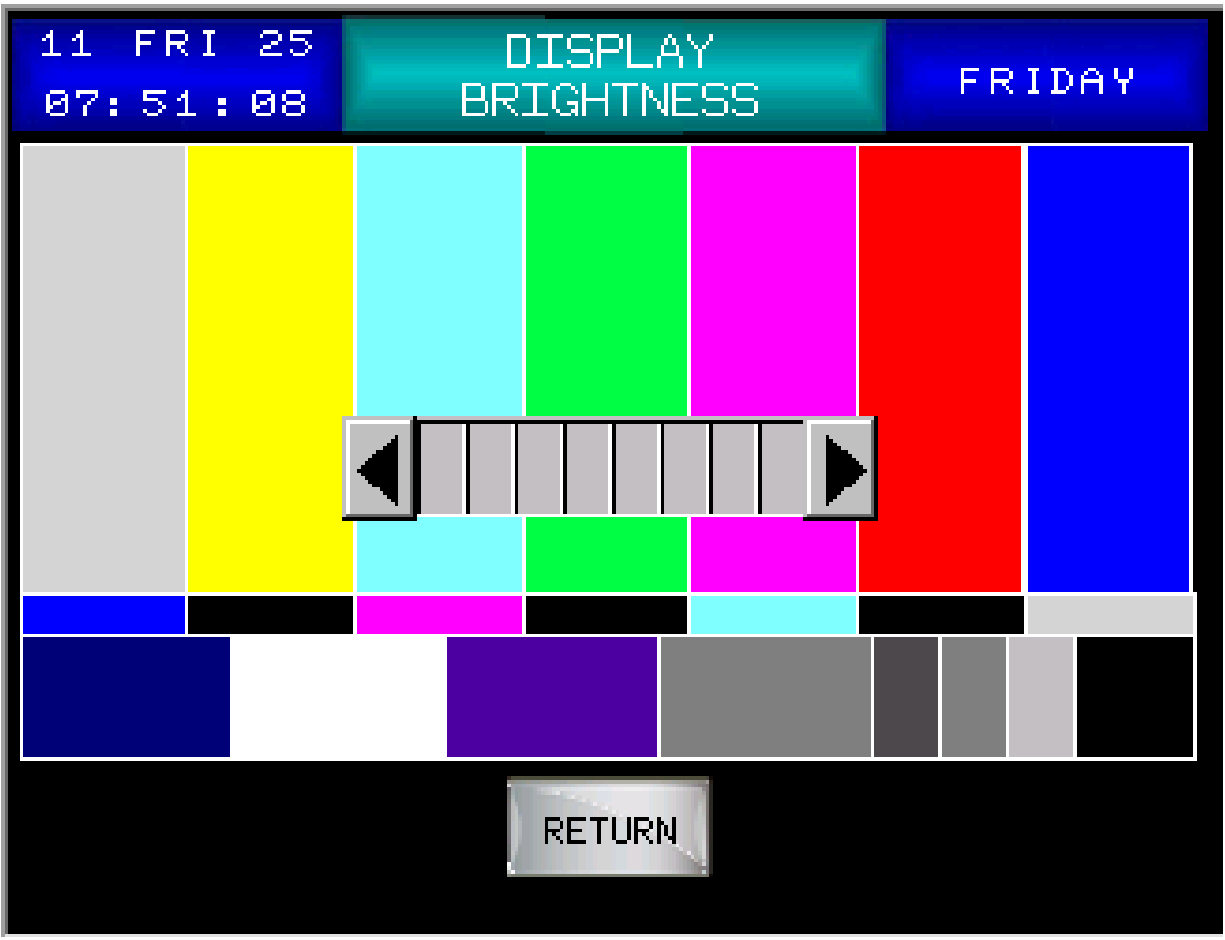
!!!CAUTION!!!  
DO NOT FORGET THIS PASSWORD.  
IF THE PASSWORD IS LOST, THE CONTROL  
UNIT WILL HAVE TO BE RETURNED TO  
THE FACTORY FOR RESETTING.

CANCEL

USER PASSWORD screen:

1. This screen allows the user to enter a numeric password [UP1] to help prevent unauthorized users from making changes to the operation of the Wind Ranger Plus control. The factory default for this password is the number Zero, Take heed of the cautionary note to not forget the password.
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, USER PASSWORD.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY
5. USER PASSWORD numeric entry object: Pressing this object will display a numeric entry keypad. The user may enter a numeric password [UP1] that can be up to 8 digits in length IE: 0-99999999.
6. RETURN button: Pressing this momentary push button causes the display to return from whence it came, the MAIN MENU screen.
7. If for two minutes no user activity has been detected the display will automatically switch to the default X STAGE DISPLAY Screen.

## 8 - DISPLAY BRIGHTNESS



DISPLAY BRIGHTNESS screen:

1. This screen allows the user to adjust the brightness of the HMI display.
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, DISPLAY BRIGHTNESS.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY.
5. BRIGHTNESS LEVEL: To change the screen brightness and contrast, the user can press the right > arrow key to raise and the left arrow key < to lower.
6. RETURN button: Pressing this momentary push button causes the display to return from whence it came, the MAIN MENU screen.
7. If for two minutes no user activity has been detected the display will automatically switch to the default X STAGE DISPLAY Screen.

## 9 - REAL TIME CLOCK SET

11 APR 25 07:52:33	REAL TIME CLOCK SET	FRIDAY
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MONTH 04	DAY 11	YEAR 2025
HOUR 07	MINUTE 52	SECOND 33

Note: The HMI clock uses  
24 hour time convention.

RETURN

## REAL TIME CLOCK SET screen:

1. This screen allows the user to set the real time clock to the local time zone.
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, CLOCK SETTING.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY
5. MONTH numeric entry and display object: The current month is shown in the display. Pressing this object will display a numeric entry keypad. The user may enter the current month. Valid entries are numbers 1 through 12.
6. DAY numeric entry and display object: The current day is shown in the display. Pressing this object will display a numeric entry keypad. The user may enter the current day. Valid entries are numbers 1 through 31.
7. YEAR numeric entry and display object: The current year is shown in the display. Pressing this object will display a numeric entry keypad. The user may enter the current year. Valid entries are numbers 1 through 99.
8. HOUR numeric entry and display object: The current hour is shown in the display. Pressing this object will display a numeric entry keypad. The user may enter the current hour. Valid entries are numbers 0 through 23.
9. MINUTE numeric entry and display object: The current minute is shown in the display. Pressing this object will display a numeric entry keypad. The user may enter the current minute. Valid entries are numbers 0 through 59.
10. SECOND numeric entry and display object: The current second is shown in the display. Pressing this object will display a numeric entry keypad. The user may enter the current second. Valid entries are numbers 0 through 59.
11. RETURN button: Pressing this momentary push button causes the display to return from whence it came, the MAIN MENU screen.
12. If for two minutes no user activity has been detected the display will automatically switch to the default X STAGE DISPLAY Screen.



10 - STAGE 1 SETPOINTS

11 FRI 25 07:49:11	STAGE SETPOINTS	FRIDAY
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CURRENT WIND SPEED	0.1 MPH
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STAGE 1 INACTIVE
---------------------

STAGE 1 SETPOINTS		
WIND SPEED	0.1 MPH	
DWELL TO ON	1 MIN	01 SEC
DWELL TO OFF	1 MIN	01 SEC

MAIN MENU	STAGE 1
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## STAGE 1 SETPOINT screen:

1. This screen allows the user to set the values that control the stage 1 digital outputs.
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, STAGE SETPOINTS.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY.
5. CURRENT WIND SPEED: Real time display of the anemometer's value in Miles Per Hour.
6. Stage 1 activity display indicates the current stage state where:
  - a. The stage inactive state is shown as:



- b. The stage active state is shown as:



7. STAGE 1 SETPOINTS: Text label describing the following related functions.
  - a. WIND SPEED: Text label, Adjacent to this label is a numeric entry and display object. The current wind speed setpoint is shown as Miles Per Hour on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 0.1 through 99.0.
  - b. DWELL TO ON: Text label, Adjacent to this label is:
    - i. The minute's numeric entry and display object. The current setpoint is shown as minutes on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 99.
    - ii. The second's numeric entry and display object. The current setpoint is shown as minutes on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 59.

Note that this time value is the amount of time the wind speed must be at or greater than the stage 1 wind speed setpoint. When this occurs the physical I/O digital output associated with stage 1 is energized.

- c. DWELL TO OFF: Text label, Adjacent to this label is:
    - i. The minute's numeric entry and display object. The current setpoint is shown as minutes on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 99.
    - ii. The second's numeric entry and display object. The current setpoint is shown as minutes on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 59.

Note that this time value is the amount of time the wind speed must be less than the stage 1 wind speed setpoint. When this occurs the physical I/O digital output associated with stage

1 is de-energized.

8. MAIN MENU push button: Pressing this momentary push button causes the display to return from whence it came, the MAIN MENU screen.



9. STAGE select push button(s): If the Wind Ranger Plus is configured as a 1-stage device the STAGE 1 push button will be accessible at the bottom of the screen.



10. If no user activity has been detected for 2 minutes the display will automatically switch to the default X STAGE DISPLAY Screen.

## 10 - STAGE 2 SETPOINTS

11 FRI 25  
07:48:33

STAGE SETPOINTS

FRIDAY

CURRENT WIND SPEED 0.1 MPH

STAGE 2  
INACTIVE

STAGE 2 SETPOINTS

WIND SPEED	0.1 MPH	
DWELL TO ON	1 MIN	01 SEC
DWELL TO OFF	1 MIN	01 SEC

MAIN MENU

STAGE 1

STAGE 2

## STAGE 2 SETPOINTS screen:

1. If the Wind Ranger Plus is configured as a 2-stage device this screen allows the user to set the setpoint values that control the stage 2 relay output.
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, STAGE SETPOINTS.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY.
5. CURRENT WIND SPEED: Real time display of the anemometer's value in Miles Per Hour.
6. Stage 2 activity display indicates the current stage state where:

- a. The stage inactive state is shown as:



- b. The stage active state is shown as:



7. STAGE 2 SETPOINTS: Text label describing the following related functions.
  - a. WIND SPEED: Text label, Adjacent to this label is a numeric entry and display object. The current wind speed setpoint is shown as Miles Per Hour on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 0.1 through 99.0.
  - b. DWELL TO ON: Text label, Adjacent to this label is:
    - i. The minute's numeric entry and display object. The current setpoint is shown as minutes on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 99.
    - ii. The second's numeric entry and display object. The current setpoint is shown as seconds on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 59.

Note that this time value is the amount of time the wind speed must be at or greater than the stage 2 wind speed setpoint. When this occurs the physical I/O digital output associated with stage 2 is energized.

- c. DWELL TO OFF: Text label, Adjacent to this label is:
  - i. The minute's numeric entry and display object. The current setpoint is shown as minutes on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 99.
  - ii. The second's numeric entry and display object. The current setpoint is shown as seconds on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 59.

Note that this time value is the amount of time the wind speed must be less than the stage 2 wind speed setpoint. When this occurs the physical I/O digital output associated with stage

2 is de-energized.

8. MAIN MENU push button: Pressing this momentary push button causes the display to return from whence it came, the MAIN MENU screen.



9. STAGE select push buttons: If the Wind Ranger Plus is configured as a 2-stage device the STAGE 1 and STAGE 2 push buttons will be accessible at the bottom of the screen. These buttons allow the user to select which stage he wishes to view or alter the setpoints of.



10. If no user activity has been detected for 2 minutes the display will automatically switch to the default X STAGE DISPLAY Screen.

## 10 - STAGE 3 SETPOINTS

11 FRI 25  
07:47:56

STAGE SETPOINTS

FRIDAY

CURRENT WIND SPEED 0.1 MPH

STAGE 3  
INACTIVE

STAGE 3 SETPOINTS

WIND SPEED	0.1 MPH	
DWELL TO ON	1 MIN	01 SEC
DWELL TO OFF	1 MIN	01 SEC

MAIN MENU

STAGE 1

STAGE 2

STAGE 3

### STAGE 3 SETPOINTS screen:

1. If the Wind Ranger Plus is configured as a 3-stage device this screen allows the user to set the setpoint values that control the stage 3 relay output.
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, STAGE SETPOINTS.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY.
5. CURRENT WIND SPEED: Real time display of the anemometer's value in Miles Per Hour.
6. Stage 3 activity display indicates the current stage state where:

- a. The stage inactive state is shown as:



- b. The stage active state is shown as:



7. STAGE 2 SETPOINTS: Text label describing the following related functions.
  - a. WIND SPEED: Text label, Adjacent to this label is a numeric entry and display object. The current wind speed setpoint is shown as Miles Per Hour on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 0.1 through 99.0.
  - b. DWELL TO ON: Text label, Adjacent to this label is:
    - i. The minute's numeric entry and display object. The current setpoint is shown as minutes on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 99.
    - ii. The second's numeric entry and display object. The current setpoint is shown as seconds on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 59.

Note that this time value is the amount of time the wind speed must be at or greater than the stage 3 wind speed setpoint. When this occurs the physical I/O digital output associated with stage 3 is energized.



c. DWELL TO OFF: Text label, Adjacent to this label is:

- i. The minute's numeric entry and display object. The current setpoint is shown as minutes on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 99.
- ii. The second's numeric entry and display object. The current setpoint is shown as seconds on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 59.

Note that this time value is the amount of time the wind speed must be less than the stage 3 wind speed setpoint. When this occurs the physical I/O digital output associated with stage 3 is de-energized.

8. MAIN MENU push button: Pressing this momentary push button causes the display to return from whence it came, the MAIN MENU screen.



9. STAGE select push buttons: If the Wind Ranger Plus is configured as a 3-stage device the STAGE 1, STAGE 2 and STAGE 3 push buttons will be accessible at the bottom of the screen. These buttons allow the user to select which stage he wishes to view or alter the setpoints of.



10. If no user activity has been detected for 2 minutes the display will automatically switch to the default X STAGE DISPLAY Screen.

## 10 - STAGE 4 SETPOINTS

11 FRI 25 07:47:12	STAGE SETPOINTS	FRIDAY
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CURRENT WIND SPEED 0.1 MPH

STAGE 4  
INACTIVE

STAGE 4 SETPOINTS		
WIND SPEED	0.1 MPH	
DWELL TO ON	1 MIN	01 SEC
DWELL TO OFF	1 MIN	01 SEC

MAIN MENU   STAGE 1   STAGE 2   STAGE 3   STAGE 4

#### STAGE 4 SETPOINTS screen:

1. If the Wind Ranger Plus is configured as a 4-stage device this screen allows the user to set the setpoint values that control the stage 4 relay output.
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, STAGE SETPOINTS.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY.
5. CURRENT WIND SPEED: Real time display of the anemometer's value in Miles Per Hour.
6. Stage 4 activity display indicates the current stage state where:
  - a. The stage inactive state is shown as:



- b. The stage active state is shown as:



7. STAGE 2 SETPOINTS: Text label describing the following related functions.
  - a. WIND SPEED: Text label, Adjacent to this label is a numeric entry and display object. The current wind speed setpoint is shown as Miles Per Hour on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 0.1 through 99.0.
  - b. DWELL TO ON: Text label, Adjacent to this label is:
    - i. The minute's numeric entry and display object. The current setpoint is shown as minutes on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 99.
    - ii. The second's numeric entry and display object. The current setpoint is shown as seconds on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 59.

Note that this time value is the amount of time the wind speed must be at or greater than the stage 4 wind speed setpoint. When this occurs the physical I/O digital output associated with stage 4 is energized.

c. DWELL TO OFF: Text label, Adjacent to this label is:

- i. The minute's numeric entry and display object. The current setpoint is shown as minutes on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 99.
- ii. The second's numeric entry and display object. The current setpoint is shown as seconds on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 00 through 59.

Note that this time value is the amount of time the wind speed must be less than the stage 4 wind speed setpoint. When this occurs the physical I/O digital output associated with stage 4 is de-energized.

8. MAIN MENU push button: Pressing this momentary push button causes the display to return from whence it came, the MAIN MENU screen.



9. STAGE select push buttons: If the Wind Ranger Plus is configured as a 4-stage device the STAGE 1, STAGE 2, STAGE 3, and STAGE 4 push buttons will be accessible at the bottom of the screen. These buttons allow the user to select which stage he wishes to view or alter the setpoints of.



10. If no user activity has been detected for 2 minutes the display will automatically switch to the default X STAGE DISPLAY Screen.

# 11- STAGE OUTPUT TEST

11 FRI 25 07:42:17	STAGE OUTPUT TEST	FRIDAY
CURRENT WIND SPEED 0.1 MPH		
<div>STAGE 1 OUTPUT</div> <div>OFF</div> <div>STAGE 1 INACTIVE</div>		<div>STAGE 2 OUTPUT</div> <div>OFF</div> <div>STAGE 2 INACTIVE</div>
<div>STAGE 3 OUTPUT</div> <div>OFF</div> <div>STAGE 3 INACTIVE</div>		<div>STAGE 4 OUTPUT</div> <div>OFF</div> <div>STAGE 4 INACTIVE</div>
<div>RETURN</div>		

## STAGE OUTPUT TEST screen:

1. This screen allows the user to test the functionality of the digital output(s) that are controlled by their respective stage setpoints. The display of the screen is dependent upon the number of stages the Wind Ranger Plus has been configured as. For example: If the Wind Ranger Plus has been configured as a single stage unit, The STAGE 1 OUTPUT will be displayed whereas the STAGE 2 OUTPUT, STAGE 3 OUTPUT, and STAGE 4 OUTPUT will not be visible to the user. This logic pertains to the other 3 configurations
2. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
3. Upper Middle: This is a text label designating the name of the screen, STAGE OUTPUT TEST.
4. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY
5. CURRENT WIND SPEED: Real time display of the anemometer's value in Miles Per Hour.
6. STAGE 1 OUTPUT: Text label describing the following related functions.
  - a. Below and to the left of the label is a push button. The function of this push button are as follows:

- i. Inactive state: gray background with black OFF text. Stage 1 digital output off.



- ii. Active state: red background with white ON text. Stage 1 digital output on.



- b. Below and to the right of the label is an activity indicator. This function of this indicator is to display the two states of stage activity.

- i. Inactive state: green background with black STAGE 1 INACTIVE text. Stage 1 digital output off.



- ii. Active state: red background with white STAGE 1 ACTIVE text. Stage 1 digital output on.



7. STAGE 2 OUTPUT: Text label describing the following related functions.

- a. Below and to the left of the label is a push button. The function of this push button are as follows:

- i. Inactive state: gray background with black OFF text. Stage 2 digital output off.



- ii. Active state: red background with white ON text. Stage 2 digital output on.



- b. Below and to the right of the label is an activity indicator. This function of this indicator is to display the two states of stage activity.

- i. Inactive state: green background with black STAGE 1 INACTIVE text. Stage 2 digital output off.



- ii. Active state: red background with white STAGE 1 ACTIVE text. Stage 2 digital output on.



8. STAGE 3 OUTPUT: Text label describing the following related functions.

- a. Below and to the left of the label is a push button. The function of this push button are as follows:

- i. Inactive state: gray background with black OFF text. Stage 3 digital output off.



- ii. Active state: red background with white ON text. Stage 3 digital output on.



- b. Below and to the right of the label is an activity indicator. This function of this indicator is to display the two states of stage activity.

- i. Inactive state: green background with black STAGE 3 INACTIVE text. Stage 3 digital output off.



- ii. Active state: red background with white STAGE 3 ACTIVE text. Stage 3 digital output on.



9. STAGE 4 OUTPUT: Text label describing the following related functions.

- a. Below and to the left of the label is a push button. The function of this push button are as follows:

- i. Inactive state: gray background with black OFF text. Stage 4 digital output off.



- ii. Active state: red background with white ON text. Stage 4 digital output on.



- b. Below and to the right of the label is an activity indicator. This function of this indicator is to display the two states of stage activity.

- i. Inactive state: green background with black STAGE 4 INACTIVE text. Stage 4 digital output off.



- ii. Active state: red background with white STAGE 4 ACTIVE text. Stage 4 digital output on.



10. Note that leaving this screen for any reason deactivates any manual control of the digital outputs and resets any logic that has manual control of the digital output logic. All the pushbuttons should go to their respective inactive states.
11. RETURN button: Pressing this momentary push button causes the display to return from whence it came, the MAIN MENU screen.
12. If for two minutes no user activity has been detected the display will automatically switch to the default X STAGE DISPLAY Screen.



## 12 - ANALOG OUTPUT CONTROL

11 FRI 25 07:41:05	ANALOG OUTPUT CONTROL		FRIDAY
CURRENT WIND SPEED 0.1 MPH			
ANALOG OUTPUT SCALE (AUTO MODE)			
WIND SPD MIN	0.0 MPH	OUTPUT @ MIN	20.0 mA
WIND SPD MAX	99.0 MPH	OUTPUT @ MAX	4.0 mA
ANALOG OUT HAND		ANALOG OUT CONTROL	
12.0 mA		<div>HAND</div> <div>ON</div> <div>AUTO</div>	
CURRENT ANALOG OUT 0.1 mA			
RETURN			

## ANALOG OUTPUT CONTROL screen:

6. This screen controls how the analog I/O output functions with respect to wind conditions. This screen is only accessible if the analog option has been enabled.
7. Upper Left Corner: Real Time Clock display formatted as 24-hour indicating the hour, minute, and second of the day and the date formatted as DD-MM-YY.
8. Upper Middle: This is a text label designating the name of the screen, ALARM LIST.
9. Upper Right Corner: Day of week display formatted as SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY
10. CURRENT WIND SPEED: Real time display of the anemometer's value in Miles Per Hour.
11. ANALOG OUT SCALE AUTO MODE: Text label describing the following related functions. The Wind Ranger Plus analog output is intended to interface with a variable frequency drive (VFD). This VFD presumably powers the pump motor that supplies the water to the feature the Wind Ranger Plus was installed to protect. This protection includes wind born water loss and or water damage caused by the feature pump running in inclement conditions.
  - a. WIND SPEED MIN: This is a text label, Adjacent to this label is a numeric entry and display object. The current wind speed low setpoint is shown as Miles Per Hour on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 0.1 through 99.9. The following logic will never run again under normal circumstances. Upon very first power up and run of the PLC program a value of 0 is to be written into this register.
  - b. WIND SPEED MAX: This is a text label, Adjacent to this label is a numeric entry and display object. The current wind speed high setpoint is shown as Miles Per Hour on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 0.1 through 99.9. The following logic will never run again under normal circumstances. Upon very first power up and run of the PLC program a value of 99.9 is to be written into this register.
  - c. ANALOG OUTPUT a: This is a text label, Adjacent to this label is a numeric entry and display object. The current analog output a setpoint is shown as milliamps on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 4.0 through 20.0. The following logic will never run again under normal circumstances. Upon very first power up and run of the PLC program a value of 20.0 is to be written into this register.
  - d. ANALOG OUTPUT b: This is a text label, Adjacent to this label is a numeric entry and display object. The current analog output b setpoint is shown as milliamps on the display. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 4.0 through 20.0. The following logic will never run again under normal circumstances. Upon very first power up and run of the PLC program a value of 4.0 is to be written into this register.

The setpoint data values entered above are part of a linear mathematical formula that takes this form:

$$\frac{((Wind\ Speed - Wind\ Speed\ Min) * (Analog\ Out\ b - Analog\ Out\ a))}{(Wind\ Speed\ Max - Wind\ Speed\ Min)} + Analog\ Out\ a = Analog\ Out$$

Note that all CAPS are not used in the formula to keep it contiguous and readable.

Using the default setpoint values and increasing wind speeds the Wind Ranger Plus will produce the following Analog output:

- a. 0.0 MPH the analog I/O output is approximately 20.0 mA.
- b. 50.0 MPH the analog I/O output is approximately 12.0 mA.
- c. 99.9 MPH the analog I/O output is approximately 4.0 mA.

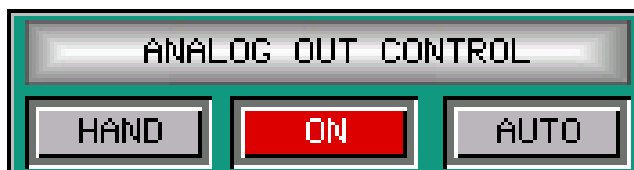
12. ANALOG OUT CONTROL: Text label describing the following related functions.

These three push buttons serve as type of HOA (Hand/Off/Auto) three position selector switch where: Only one function can be active at a time. Any of the three pushbuttons can initiate a function, there is no order to the selection of functions as you would find in a 3-position HOA selector switch. The following logic will never run again under normal circumstances. Upon very first power up and run of the PLC program the OFF push button should be in its active state.

- a. HAND push button: The function of this push button are as follows:
  - i. Inactive state: gray background with black HAND text.
  - ii. Active state: yellow background with black HAND text. The ANALOG OUT HAND value is sent out the analog I/O output.



- b. OFF push button: The function of this push button are as follows:
  - i. Inactive state: gray background with black OFF text.
  - ii. Active state: red background with black OFF text. A value of 4 mA is sent out the analog I/O output.



- c. AUTO push button: The function of this push button are as follows:
  - i. Inactive state: gray background with black AUTO text.
  - ii. Active state: green background with black OFF text. The ANALOG OUT SCALE AUTO MODE value is sent out the analog I/O output.



13. ANALOG OUT HAND: This is a numeric entry and display object. Pressing this object will display a numeric entry keypad. The user may enter a new setpoint value. Valid entries are numbers 4.0 through 20.0. This device works in conjunction the ANALOG OUT CONTROL HAND push button.
14. CURRENT ANALOG OUT: Real time display of the analog I/O output signal.
15. RETURN button: Pressing this momentary push button causes the display to return from whence it came, the MAIN MENU screen.
16. If for two minutes no user activity has been detected the display will automatically switch to the default X STAGE DISPLAY Screen.