



# Intellus Ultra Controller Manual

## **WARNING**

The controller should always be put into manual mode before changing the controller time. If you are running a program or sequence and you change the time unpredictable results may occur. Please refer to the section titled “Running Manual Settings” for information on putting the controller into manual mode. Please plan for Daylight Saving time changes in your programming strategy. Program operation will be suspended when running manual settings. Make sure you note what style of program is running and where the program or sequence is currently executing before running manual settings. See the “Status Menu” section for information on checking program execution status. Once you have switched to manual mode and changed the time you can resume program or sequence operation.

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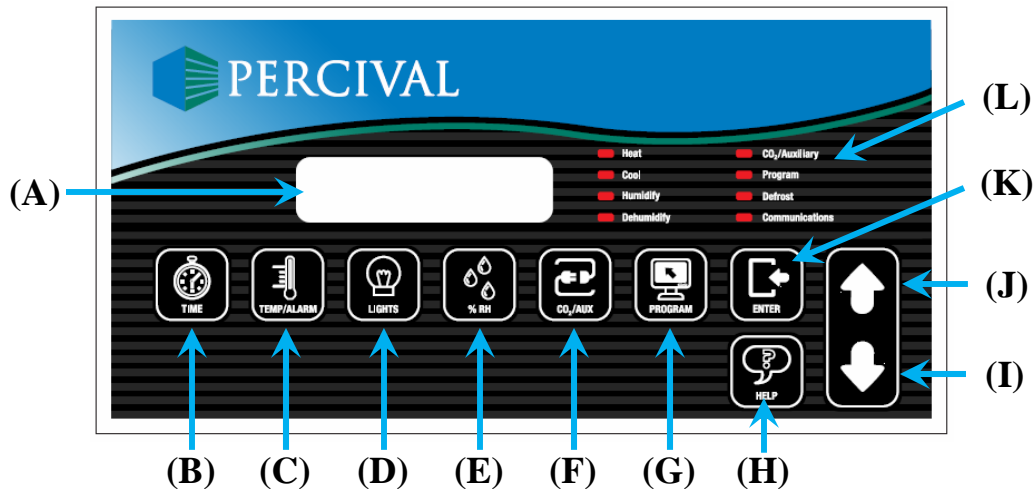
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## Introduction

Please feel free to contact Percival Scientific with any questions you may have about this manual or using the Intellus Ultra controller by calling 1-800-695-2743 or 515-465-9363 or by sending e-mail to [service@percival-scientific.com](mailto:service@percival-scientific.com).

## How to Use the Keys and Display



**Figure 1 – Intellus Display and Key Reference**

(A) Main Display, (B) Time Key, (C) Temp/Alarm Key, (D) Lights Key, (E) %RH Key, (F) CO<sub>2</sub>/Aux Key, (G) Prog Key, (H) Help Key, (I) Decrement Key, (J) Increment Key, (K) Enter Key, (L) LEDs

Refer to Figure 1:

### **Main Display (A)**

The main display shows all status and programming information.

### **Time Key (B)**

The Time key is used to set the system time and is also used when programming. When programming, it is used to set the time parameter of each step. Refer to the “Programming” section for more information.

### **Temp/Alarm Key (C)**

The Temp/Alarm key is used to enter the Temp/Alarm Menu. The Temp/Alarm Menu contains entries for the manual temperature setting, high and low safety settings, deviation alarm settings and defrost settings (if applicable). It is also used when programming to set the temperature parameter of each step.

### **Lights Key (D)**

This key is only active if a lighting option was ordered for the chamber. The Lights key is used to enter the Lights Menu. The Lights Menu contains entries for light settings, light lifetime information and the light lifetime alarm setting. It is also used when programming to set the lighting parameters of each step.

### **%RH Key (E)**

This key is only active if a humidity option was ordered for the chamber. The %RH key is used to enter the %RH Menu. The %RH Menu contains entries for the manual humidity setting and humidify/dehumidify activation settings. It is also used when programming to set the %RH parameter of each step.

### **CO<sub>2</sub>/Aux Key (F)**

This key is only active if a CO<sub>2</sub>/Aux option was ordered for the chamber. The CO<sub>2</sub>/Aux key is used to enter the CO<sub>2</sub>/Aux Menu. The CO<sub>2</sub>/Aux Menu contains entries for the manual CO<sub>2</sub>/Aux setting and CO<sub>2</sub>/Aux output activation settings. It is also used when programming to set the CO<sub>2</sub>/Aux parameter of each step.

### **Prog Key (G)**

This key is used to enter the Program Menu. The Program Menu contains selections used to enter/edit programs, run programs or run manual settings. Refer to the section titled “Programming” for more information.

### **Help Key (H)**

This key is used to display help information.

### **Decrement (I) / Increment (J) Keys**

These keys are used to scroll through available menu options and to decrease or increase values.

### **Enter Key (K)**

This key is used to begin editing values and to accept changes of values.

### **Status LEDs (L)**

- The Heat LED illuminates when the controller calls for chamber heating.
- The Cool LED illuminates when the controller calls for chamber cooling.
- The Humidify LED illuminates when the controller calls for the level of humidity to increase in the chamber.

- The Dehumidify LED illuminates when the controller calls for the level of humidity to decrease in the chamber.
- The CO<sub>2</sub>/Auxiliary LED illuminates when the controller calls for the level of CO<sub>2</sub>/auxiliary to increase in the chamber.
- The Program LED illuminates when the controller is running a program. The LED is off when the controller is running manual settings. The LED flashes when entering/editing a program. Refer to the sections titled “Running Manual Settings” and “Programming” for more information.
- The Defrost LED illuminates when the controller is running a defrost period. Refer to the section titled “Defrost Programming” for more information.
- The Communications LED illuminates when the controller is communicating with the optional Intellus Web Server.

**Note:** Only the appropriate LEDs for the options ordered will function.

## **Intellus Ultra Basic Operation**

When power is applied to the Intellus Ultra controller the display shows the current process values (current temperature, humidity level, etc.) inside the chamber. This display will be referred to as the “main display” throughout this manual.

After one minute with no key activation, the controller will always revert to the main display.

## **Setting Time**

To set the time use the following steps:

1. Press the **TIME** key.
2. Press the **ENTER** key.
3. Use the **▲** and **▼** keys as necessary to set the current time and then press **ENTER**.
4. Press the **TIME** key to return to the main menu.

## **Help**

Help is available at any time by pressing the **HELP** key. The appropriate help information will be displayed for the current display or prompt. Use the **▲** and **▼** keys as necessary to review help information. Press the **HELP** key again to exit help.

## **Status Menu**

The Status Menu displays the following information:

- Alarm information.

- Current process values in the chamber (main display). Refer to Figure 2.
- Current set points.
- Lighting status (displays only if lighting option was ordered with chamber).
- Program status (if a program or program sequence is running)
- Program sequence status (if a program sequence is running).

To navigate through the Status Menu, use the ▲ and ▼ keys as necessary.

3:30PM	24.0C	75%RH
LT:110		800PPM

**Figure 2 – Main Display**

The main display shows the following information:

- Current time (3:30PM in Figure 2). When the step type has been set to Elapsed – Non 24 Hour (see Setting Program Step Type), the time on the main display will read “000:00” when manual settings are running or will show the current step time remaining when running a program or sequence.
- Current temperature (24.0C in Figure 2).
- Current %RH (75% in Figure 2). **Note:** Only displays if a humidity option was ordered.
- Current light settings (110 in Figure 2). **Note:** Only displays if a lighting option was ordered. If a non-feedback (open loop) dimmable lighting option was ordered each output is displayed as a graphical block.
- Current CO<sub>2</sub>/Aux level (800PPM in Figure 2). **Note:** Only displays if a CO<sub>2</sub>/Aux option was ordered.

## **Lighting**

The Intellus Ultra controller is capable of programming/displaying up to sixteen separate light outputs. Not all of these outputs will be utilized in every chamber. The standard number of outputs utilized is two. The controller only displays the total number of light outputs utilized.

Lights are normally displayed and programmed using a ‘1’ to represent on and a ‘0’ to represent off. Refer to Figure 2. According to this display, light outputs #1 and #2 are on and light output #3 is off. If a non-feedback (open loop) dimmable lighting option was ordered, lights are displayed as graphical blocks. Please refer to the sections titled “Lights Menu” and “Programming” for more information on using the controller to program chamber lighting.



## **Temperature Menu**

The Temperature Menu contains the following settings:

- Manual temperature set point.
- Temperature high safety setting.
- Temperature low safety setting.
- Temperature deviation alarm activation setting.
- Temperature high deviation alarm setting.
- Temperature low deviation alarm setting.
- Temperature deviation alarm latching setting.
- Temperature deviation alarm buzzer setting.
- Number of defrosts (only appears if low temperature option was ordered).
- Defrost Duration (only appears if low temperature option was ordered).
- Defrost X Start (only appears if low temperature option was ordered).

### **Menu Entry**

To enter the Temperature Menu, press the **TEMP/ALARM** key.

### **Menu Navigation**

To navigate through the menu, use the ▲ and ▼ keys as necessary.

### **Modifying Settings**

To change any setting, press the **ENTER** key, use the ▲ and ▼ keys as necessary to change the setting and then press the **ENTER** key again to accept the change.

### **Exiting Menu**

To exit the Temperature Menu, press the **TEMP/ALARM** key.

### **Manual Temperature Set Point (Manual Temp Set Pt)**

This set point is used when running manual settings. Refer to the section titled “Running Manual Settings” for more information.

### **Temperature Safety High Alarm Setting**

This setting determines the process value at which the controller will trigger a high safety alarm. When a safety alarm occurs, the chamber will shut down its control functions to protect your experiment. It is recommended that you set the high safety at

least 3°C above your highest programmed temperature. When programming, be sure to note the highest temperature programmed. Use this temperature as the reference point for setting the high safety. Refer to the section titled “Alarms” for more information regarding alarms. This setting appears under the CO<sub>2</sub>/Aux menu when the auxiliary channel is used to control temperature safeties.

### **Temperature Safety Low Alarm Setting**

This setting determines the process value at which the controller will trigger a low safety alarm. When a safety alarm occurs, the chamber will shut down its control functions to protect your experiment. It is recommended that you set the low safety at least 3°C below your lowest programmed temperature. When programming, be sure to note the lowest temperature programmed. Use this temperature as the reference point for setting the low safety. Refer to the section titled “Alarms” for more information regarding alarms. This setting appears under the CO<sub>2</sub>/Aux menu when the auxiliary channel is used to control temperature safeties.

### **Temperature Deviation Alarm Activation Setting**

This setting is used to activate or deactivate deviation alarms. Deviation alarms are informational alarms that indicate when the temperature in the chamber has deviated from set point. Refer to the section titled “Alarms” for more information regarding deviation alarms.

### **Temperature High Deviation Alarm Setting**

This setting only appears when the deviation alarm activation setting is set to ‘Yes’. This setting is the deviation value from set point at which the controller will trigger a high deviation alarm. When a deviation alarm occurs, the controller activates the alarm buzzer if the deviation alarm buzzer setting is set to ‘Yes’ and a deviation alarm message is displayed. Refer to the section titled “Alarms” for more information regarding deviation alarms.

### **Temperature Low Deviation Alarm Setting**

This setting only appears when the deviation alarm activation setting is set to ‘Yes’. This setting is the deviation value from set point at which the controller will trigger a low deviation alarm. When a deviation alarm occurs, the controller activates the alarm buzzer if the deviation alarm buzzer setting is set to ‘Yes’ and a deviation alarm message is displayed. Refer to the section titled “Alarms” for more information regarding deviation alarms.

### **Temperature Deviation Alarm Latching Setting**

This setting only appears when the deviation alarm activation setting is set to ‘Yes’. This setting determines whether or not a deviation alarm is automatically cleared

if the temperature in the chamber recovers to within the deviation alarm range. Refer to the section titled “Alarms” for more information regarding deviation alarm latching.

### **Temperature Deviation Alarm Buzzer Setting**

This setting only appears when the deviation alarm activation setting is set to ‘Yes’. This setting determines whether or not the alarm buzzer activates when a deviation alarm occurs. Refer to the section titled “Alarms” for more information regarding deviation alarms.

### **Number Of Defrosts (only appears if it is determined that the chamber may need defrost periods)**

This setting determines the number of defrost periods that will occur over a twenty-four hour period. A maximum number of six periods can be programmed. When constantly running at low temperatures, Percival Scientific recommends a setting of two defrost periods set twelve hours apart. The necessity for programming defrost periods can be gauged by observing the inability of the chamber to hold the set point at low temperatures.

### **Defrost Duration (only appears if it is determined that the chamber may need defrost periods)**

This setting determines the length that each defrost period will last. The duration can be set between one and 999 minutes. Percival Scientific recommends seven minutes for each defrost period. Refer to the section titled “Defrost Programming” for more information.

### **Defrost X Start (only appears if it is determined that the chamber may need defrost periods)**

A prompt will appear to enter the start time for each defrost period. The number of periods is selected under the ‘Number Of Defrosts’ prompt. Refer to the section titled “Defrost Programming” for more information.

## **Lights Menu**

The Lights Menu is only visible if a lighting option was ordered.

The Lights Menu contains the following settings:

- Lighting settings for lighting outputs 1-16.
- Light lifetime display for lighting outputs 1-16
- Light lifetime reset for lighting outputs 1-16
- Light lifetime alarm setting

Changing light settings in this menu when running a program will override the programmed light settings for the current executing step.

**Note:** Not all of the lighting outputs will be utilized in every chamber. The standard number of outputs utilized is two. The controller only displays the total number of light outputs utilized.

### **Menu Entry**

To enter the Lights Menu, press the **LIGHTS** key.

### **Menu Navigation**

To navigate through the menu, use the ▲ and ▼ keys as necessary.

### **Modifying Settings**

To change any setting, press the **ENTER** key, use the ▲ and ▼ keys as necessary to change the setting and then press the **ENTER** key again to accept the change.

### **Exiting Menu**

To exit the Lights Menu, press the **LIGHTS** key.

### **Lighting Settings**

These settings are used to manually change the lighting settings. When standard lighting is provided a setting of 'On' will turn the lights connected to the output on. A setting of 'Off' will turn the lights connected to the output off. When non-feedback (open loop) dimmable lighting is provided each output can be set for a level between 0% and 100%. Changing light settings in this menu when running a program will override the programmed light settings for the current executing step.

**Note (open loop dimmable lighting):** The lights will be off when the lighting level is set between 0 and a factory preset threshold value. This limit is based on the minimum output level required to provide stable lighting. Please refer to the operation manual or the supplemental information provided with the operation manual for the threshold value. Any LED model is an exception. A setting of 0 in these models will turn the LEDs off. Any setting greater than 0 will turn the LEDs on.

### **Light Lifetime Display**

The amount of time that each light output has been on is displayed individually for each output. This information can be used for light maintenance. Percival Scientific recommends that fluorescent lights be changed at 5000 hour intervals. When the light

lifetime for an output reaches 5000 hours, change the bulbs that are powered by that output. Once this has been completed, reset the light lifetime for the output.

### **Light Lifetime Alarm Setting**

This setting determines the point at which a light lifetime alarm will occur. A light lifetime alarm will activate the alarm buzzer and display an alarm message. The value is set at a default of 5000 hours. A light lifetime alarm occurs when any of the light lifetimes has exceeded the alarm setting. To silence the alarm, press any key. The lights controlled by the light output which caused the light lifetime alarm should be changed and the light lifetime reset. The alarm message will only clear by resetting the light lifetime for the light output that triggered the alarm. Refer to the section titled “Alarms” for more information.

### **%RH Menu**

The %RH Menu is only accessible if a humidity option was ordered.

The %RH Menu contains the following settings:

- Manual humidity (%RH) set point.
- Enable Humidification (only appears when humidification system is ordered)
- Enable Dehumidification (only appears when dehumidification system is ordered)

### **Menu Entry**

To enter the %RH Menu, press the **%RH** key.

### **Menu Navigation**

To navigate through the menu, use the ▲ and ▼ keys as necessary.

### **Modifying Settings**

To change any setting, press the **ENTER** key, use the ▲ and ▼ keys as necessary to change the setting to your requirement and then press the **ENTER** key again to accept the change.

### **Exiting Menu**

To exit the %RH Menu, press the **%RH** key.

## **Manual %RH Set Point**

This set point is used when running manual settings. Refer to the section titled “Running Manual Settings” for more information.

## **Enable Humidify Setting (only appears when humidification system is ordered)**

This setting is used to turn the humidification system of the chamber on or off. A setting of ‘On’ will activate the humidification system as necessary. When an extreme low level of humidity is required, it is recommended that the ‘Enable Humidify’ setting be set to ‘Off’.

## **Enable Dehumidify Setting (only appears when dehumidification system is ordered)**

This setting is used to turn the dehumidification system of the chamber on or off. A setting of ‘On’ will activate the dehumidification system as necessary. When an extreme high level of humidity is required, it is recommended that the ‘Enable Dehumidify’ setting be set to ‘Off’.

## **CO<sub>2</sub>/Aux Menu**

The CO<sub>2</sub>/Aux Menu is only accessible if a CO<sub>2</sub> or auxiliary option was ordered.

The CO<sub>2</sub>/Aux Menu contains the following settings:

- Manual CO<sub>2</sub>/Aux set point.
- Enable CO<sub>2</sub>/Aux output 1
- Enable CO<sub>2</sub>/Aux output 2

## **Menu Entry**

To enter the CO<sub>2</sub>/Aux Menu, press the **CO<sub>2</sub>/AUX** key.

## **Menu Navigation**

To navigate through the menu, use the ▲ and ▼ keys as necessary.

## **Modifying Settings**

To change any setting, press the **ENTER** key, use the ▲ and ▼ keys as necessary to change the setting to your requirement and then press the **ENTER** key again to accept the change.

## **Exiting Menu**

To exit the CO<sub>2</sub>/Aux Menu, press the **CO<sub>2</sub>/AUX** key.

## **Manual CO<sub>2</sub>/AUX Set Point**

This set point is used when running manual settings. Refer to the section titled “Running Manual Settings” for more information.

## **Enable CO<sub>2</sub>/Aux Output 1 Setting**

This setting is used to turn the CO<sub>2</sub> or auxiliary output 1 of the chamber on or off. A setting of ‘On’ will activate the output as necessary.

**Note:** When the auxiliary channel is used for dimmable lighting this setting should always be set to ‘On’.

## **Enable CO<sub>2</sub>/Aux Output 2 Setting**

This setting is used to turn the CO<sub>2</sub> or auxiliary output 2 of the chamber on or off. A setting of ‘On’ will activate the output as necessary.

## **Alarms**

The Intellus Ultra controller will alert you to controller errors and to temperature safety alarms, temperature deviation alarms or light lifetime alarms. An example controller error would be if a sensor were not correctly connected to the controller. Alarms cannot be set while programming.

### **Temperature Safety Alarms**

High and low temperature safety alarms can be set in the Temperature Menu. When a temperature safety alarm occurs, the controller shuts down all chamber control components. This protects your experiment from overheating or overcooling. A message indicating the type of safety alarm will be displayed and the alarm buzzer will activate. To stop the buzzer, press any key. To clear the safety message, you will need to change the high or low safety alarm setting beyond the current temperature in the chamber.

**IMPORTANT!** Always remember to review the temperature safety alarm settings before running programs or manual settings. If manual settings are running and you intend to change the manual temperature set point change the safety alarm settings accordingly.

To adjust the temperature safety alarms use the following steps:

1. Press the **TEMP/ALARM** key.
2. Use the **▲** and **▼** keys as necessary to select ‘Safety High Alarm’ and then press **ENTER**.

3. Use the ▲ and ▼ keys as necessary to change the high safety alarm and then press **ENTER**.
4. Press the ▼ key. You will be prompted to enter the 'Safety Low Alarm'. Press the **ENTER** key.
5. Use the ▲ and ▼ keys as necessary to change the low safety alarm and then press **ENTER**.
6. Press the **TEMP/ALARM** key to return to the main display.

### **Using Auxiliary Channel for Temperature Safety Alarms (optional)**

If the option was ordered to utilize a separate sensor for the temperature safety alarms then the auxiliary channel has been configured to monitor the temperature in the chamber for safety alarm purposes. The temperature that the auxiliary sensor reads is displayed in the lower right-hand corner of the display. This is the temperature that is used to determine when a safety occurs.

The high and low safety settings appear under the auxiliary menu instead of the temperature menu.

To set the high and low safety settings, use the following steps:

1. Press the **CO<sub>2</sub>/AUX** key (this key may be labeled **TEMP SAFETY**).
2. You will be prompted to enter the 'Safety High Alarm'. Press the **ENTER** key. Use the ▲ and ▼ keys as necessary to change the high safety alarm and then press **ENTER**.
3. Press the ▼ key. You will be prompted to enter the 'Safety Low Alarm'. Press the **ENTER** key. Use the ▲ and ▼ keys as necessary to change the low safety alarm and then press **ENTER**.
4. Press the **CO<sub>2</sub>/AUX** key to exit the menu (this key may be labeled **TEMP SAFETY**).

If the auxiliary temperature reading disagrees with the normal temperature reading then the auxiliary calibration offsets will need to be adjusted. Adjust both offsets to agree with the normal temperature reading.

To adjust the auxiliary calibration offsets, use the following steps:

1. Press and hold both the **ENTER** and **CO<sub>2</sub>/AUX (TEMP SAFETY)** keys for approximately 3 seconds until the display changes to read 'Day Aux Offset'. **Note:** Always press and hold the **ENTER** key before pressing and holding the **CO<sub>2</sub>/AUX (TEMP SAFETY)** key.
2. Press the **ENTER** key. Use the ▲ and ▼ keys as necessary to change the day aux offset and then press **ENTER**.
3. Press the ▼ key. You will be prompted to enter the 'Night Aux Offset'.
4. Press the **ENTER** key. Use the ▲ and ▼ keys as necessary to change the night aux offset and then press **ENTER**.



5. Press the **CO<sub>2</sub>/AUX (TEMP SAFETY)** key to exit the menu.

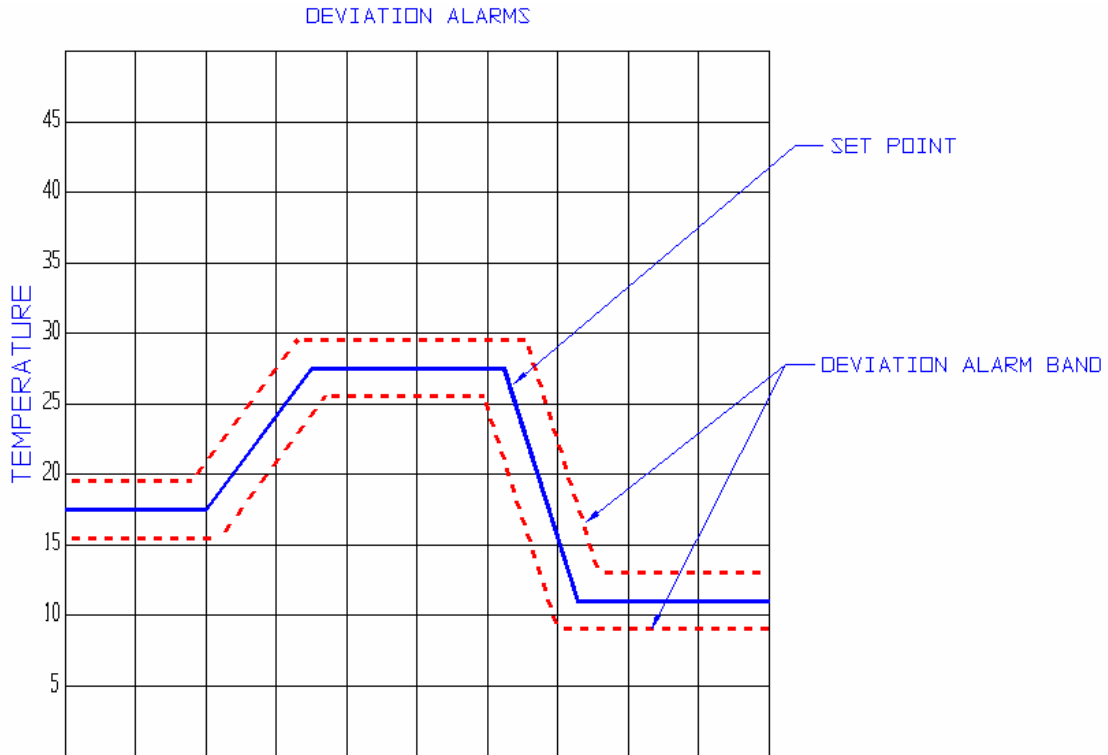
## Temperature Deviation Alarms

Temperature deviation alarms are informational only alarms that indicate when the temperature in the chamber has deviated a certain temperature above or below set point. The deviation alarms do not cause the chamber control components to shut down. If you are concerned about the temperature in the chamber deviating from a constant set point then the temperature safety settings should be used.

Deviation alarm activation and high and low temperature deviation alarm settings are set in the Temperature Menu. The high and low deviation alarm settings are the values at which the process value must deviate from the set point in order for a deviation alarm to occur. The high deviation alarm is set to 5.0°C by default and the low deviation alarm is set to -5.0°C by default. **Note:** These are not the absolute temperatures at which you want the alarms to occur. These are the values that the temperature process value must deviate from the set point in order to cause an alarm. For example, say the current temperature set point is 20°C and you want to know if the temperature in the chamber goes above 25°C or below 15°C. In this instance you would set the high deviation alarm setting to 5°C and the low deviation alarm setting to -5°C. The minimum value that the high deviation alarm can be set at is 2.0°C and the minimum value that the low deviation alarm can be set at is -2.0°C. It is recommended that the deviation alarm settings be left at their defaults of 5.0°C and -5.0°C.

When the deviation alarms are active a deviation band always exists around the set point. For example, if the set point is currently 24°C and the high deviation alarm is set to 5.0°C and the low deviation alarm is set to -5.0°C then the low side of the deviation band would be at 19°C and the high side would be at 29°C. If the controller's temperature is within the band of 19°C to 29°C and then falls outside the band then a deviation alarm will occur.

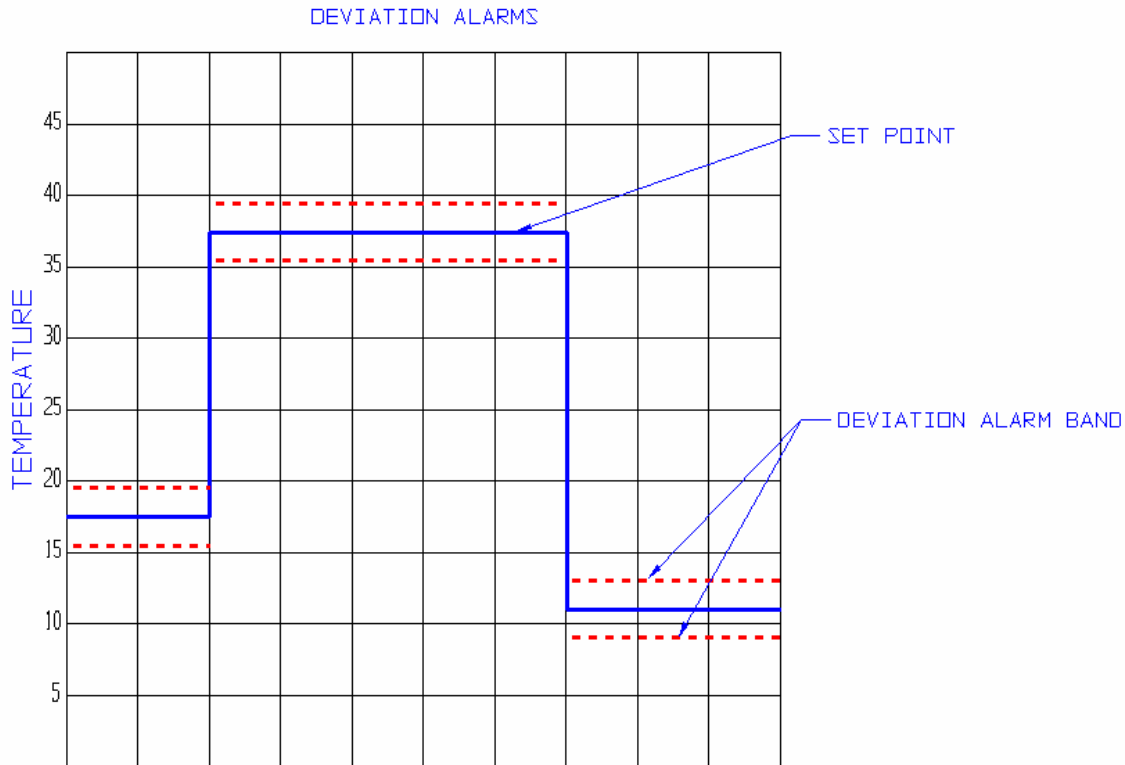
If the controller's program operation mode is set to **Ramping** (see **Setting Program Operation Mode**), the deviation band follows the set point while ramping. The following graph illustrates how the deviation band follows the set point when the program operation mode is set to **Ramping**.



**Figure 3 – Ramping Deviation Alarms Example**

If the controller’s program operation mode is set to **Ramping** (see **Setting Program Operation Mode**), any time the process value is within the deviation band and then falls outside of the deviation band a deviation alarm will occur. Therefore, it is highly recommended that when you ramp between temperature set points that you allow for the time it takes for the chamber to heat or cool the chamber. For example, if you were to attempt to ramp the chamber from 2°C to 36°C in 10 minutes, the chamber would not be able to heat quickly enough and a low deviation alarm would occur. As a general rule of thumb you should figure the chamber can heat at a rate of 1°C every 2.5 minutes and cool at a rate of 1°C every minute. Therefore, in the above example you would want to allow at least 85 minutes for the chamber to ramp between 2°C and 36°C.

The following graph illustrates how the deviation band follows the set point when the program operation mode is set to **Non-Ramping**.



**Figure 4 – Non-Ramping Deviation Alarms Example**

If the controller’s program operation mode is set to **Non-Ramping** (see **Setting Program Operation Mode**), the deviation band will change immediately when the set point changes. In the above graph, when the temperature set point changes between 17.5°C and 37.5°C, the deviation band changes immediately to function around the set point of 37.5°C. Therefore, a deviation alarm will not occur until the process value in the chamber enters the new deviation band around 37.5°C and then falls out. This design prevents unwanted deviation alarms between set point changes.

### **Deviation Silence Timer**

When running manual settings, a diurnal program or a non-ramping program a timer will activate whenever the set point changes. If the time set on the timer counts down to zero before the temperature process value has entered the new deviation band a deviation alarm will occur. The purpose of the timer is to inform the user when the chamber is unable to reach the new set point in an acceptable period of time. The timer is factory set to a value of 180 minutes by default. The chamber should be able to reach any temperature change in this period of time. If the chamber has not reached the new temperature set point in three hours a malfunction in the chamber may have occurred. The ability to change the default from 180 minutes is hidden from the user. If you desire to change the default, please contact our offices for advice on how to do so.

The deviation silence timer is not active while running a ramping program except for when the program is first run. After this point any time the temperature moves outside the deviation band an alarm will occur.

### **Deviation Alarm Latching**

When the deviation alarm latching parameter is set to 'Yes' and a deviation alarm occurs, the alarm buzzer and alarm message will continue to display until the alarm is physically cleared at the controller. Set the deviation alarm latching setting to 'Yes' when you always want to be informed of a deviation alarm even if the temperature process value re-enters the deviation band. To clear a latched deviation alarm, go to the controller and use the arrow keys to view the current temperature process value and set point. If the process value has re-entered the deviation band the message should clear. If it has not, change the 'High Deviation Alarm' and 'Low Deviation Alarm' settings so that the process value is within the deviation band. The deviation alarm should clear. Next, change the deviation values back to their original settings.

When the deviation alarm latching parameter is set to 'No' and a deviation alarm occurs, the alarm buzzer and alarm message will self clear if the temperature recovers to be within the deviation band.

### **Adjusting Deviation Alarm Settings**

To adjust the deviation alarm settings use the following steps:

1. Press the **TEMP/ALARM** key.
2. Use the **▲** and **▼** keys as necessary to select 'Deviation Alarms' and then press **ENTER**.
3. Use the **▲** and **▼** keys as necessary to change the deviation alarms setting and then press **ENTER**. A setting of 'Yes' will activate deviation alarms and a setting of 'No' will deactivate deviation alarms. If the deviation alarms setting was changed to 'No' press the **TEMP/ALARM** key to exit the menu.
4. If the deviation alarms setting was changed to 'Yes', press the **▼** key to select 'High Deviation Alarm' and then press **ENTER**.
5. Use the **▲** and **▼** keys as necessary to change the high deviation alarm setting and then press **ENTER**. Remember, this value is the value the temperature process value must deviate from set point in order to cause an alarm. For example, if your set point is 30°C and you want the high deviation alarm to occur at 35°C, then you would enter a value of 5.0°C for the high deviation alarm.
6. Press the **▼** key to select 'Low Deviation Alarm' and then press **ENTER**.
7. Use the **▲** and **▼** keys as necessary to change the low deviation alarm setting and then press **ENTER**. Remember, this value is the value the temperature process value must deviate from set point in order to cause an alarm. For example, if your set point is 30°C and you want the low

deviation alarm to occur at 25°C, then you would enter a value of -5.0°C for the low deviation alarm.

8. Press the ▼ key to select 'Deviation Latching' and then press **ENTER**.
9. Use the ▲ and ▼ keys as necessary to change the deviation alarm latching setting and then press **ENTER**.
10. Press the ▼ key to select 'Deviation Buzzer' and then press **ENTER**.
11. Use the ▲ and ▼ keys as necessary to change the deviation buzzer setting and then press **ENTER**. Changing the setting to 'Yes' will activate the buzzer when a deviation alarm occurs.
12. Press the **TEMP/ALARM** key to return to the main display.

When a deviation alarm occurs, the alarm buzzer will activate if the 'Deviation Buzzer' setting is set to 'Yes' and a message indicating the type of deviation alarm will be displayed. To stop the buzzer, press any key. To clear the deviation message, you will need to either wait until the temperature in the chamber recovers to within the deviation band or adjust the 'High Deviation Alarm' and 'Low Deviation Alarm' settings accordingly. If the 'Deviation Latching' setting is set to 'Yes' you will need to press any key to clear the message when the current temperature is within the deviation band.

Keep in mind that there are instances where an unexpected deviation alarm may occur. The following are cases where an unexpected deviation alarm may occur:

- A ramping program is running and the program attempts to ramp the temperatures over a wide range too quickly.
- The set point is changed from a low value to a high value and the chamber temperature overshoots or undershoots the new set point. For example, the set point is changed from 4°C to 35°C. If you have the high deviation alarm setting set at 2°C an alarm may occur because the chamber may overshoot 37°C.
- The door is opened.
- During a defrost period on chambers ordered with a low temperature option.

### **Light Lifetime Alarm**

The light lifetime alarm can be set to inform you when your lamps have been on beyond their recommended lifetime. Each light output configured in the controller will accumulate the number of hours it has been programmed on. When any of the configured light outputs has been on for longer than the light lifetime alarm setting then a light lifetime alarm will occur. When a light lifetime alarm occurs, the alarm buzzer will activate and a message indicating the alarm will be displayed. To silence the alarm, press any key. The lights controlled by the light output which caused the light lifetime alarm should be changed and the light lifetime reset. The alarm message will only clear by resetting the light lifetime for the light output that triggered the alarm.

To adjust the light lifetime alarm setting use the following steps:

1. Press the **LIGHTS** key.

2. Use the ▲ and ▼ keys as necessary to select 'Light Life Alarm' and then press **ENTER**.
3. Use the ▲ and ▼ keys as necessary to change the light lifetime alarm setting and then press **ENTER**.
4. Press the **LIGHTS** key to return to the main display.

In the event of an alarm, to investigate which light output(s) caused the alarm use the following steps:

1. Press the **LIGHTS** key.
2. Use the ▲ and ▼ keys as necessary to select 'Light 1 Life'. Review this value. If it's greater than the light lifetime alarm setting then the accumulated lifetime for this light output should be reset.
3. Press the ▼ key repeatedly to review each additional light output configured on the chamber. If the light lifetime for any additional light output exceeds the light lifetime alarm setting then reset the accumulated lifetime for that output.
4. Press the **LIGHTS** key to return to the main display.

To reset the accumulated light lifetime of a light output use the following steps:

1. Press the **LIGHTS** key.
2. Use the ▲ and ▼ keys as necessary to select 'Light x Reset Time' where x is the number of the light output you want to reset and then press **ENTER**.
3. Use the ▲ and ▼ keys as necessary to select 'Yes' and then press **ENTER**.
4. Either use the ▲ and ▼ keys as necessary to select another light output to reset or press the **LIGHTS** key to return to the main display.

## **Controller Errors**

When a controller error alarm occurs a message indicating the type of alarm will be displayed and the alarm buzzer will activate. To stop the buzzer, press any key. To clear the alarm, you will need to correct the cause of the alarm.

## **Using Auxiliary Channel For Closed-Loop Dimmable Lighting (optional)**

If the option was ordered to control the level of lighting via feedback from a light sensor then the auxiliary channel has been configured for this purpose. The current level of lighting read by the light sensor is displayed in the lower right hand corner of the display.

When running manual settings, the CO<sub>2</sub>/Aux menu is used to set the level of lighting required. The CO<sub>2</sub>/Aux key on the controller overlay may have been renamed 'LIGHT DIMM' when dimmable lamps are utilized. Refer to the 'CO<sub>2</sub>/Aux Menu'

section of this manual for information on using this menu to control the lighting when running manual settings. Lighting levels can be programmed using the programming features of the controller. For more information on programming the lighting levels please refer to the “Programming” section.

Dimmable ballasts have a minimum output level that they can produce. The controller has been configured to turn off the lights at a set point below this level. Please refer to the operation manual or supplemental information that has been provided with the operation manual for information on the threshold value at which the dimmable lamps will turn off.

**IMPORTANT!** When this option is provided, the ‘Enable Aux Output 1’ option should always be set to ‘On’.

## **Running Manual Settings**

Static set points for temperature, humidity and CO<sub>2</sub>/Aux can be run as necessary via manual settings. For example, say you wanted to run a constant temperature of 28°C with 70% humidity with all lights off.

To configure manual settings, use the following steps:

1. Press the **TEMP/ALARM** key. You will be prompted to enter the ‘Manual Temp Set Pt’.
2. Press **ENTER**. Use the ▲ and ▼ keys as necessary to change the manual temperature set point and then press **ENTER**.
3. If lighting was ordered, press the **LIGHTS** key. You will be prompted to enter the setting for ‘Light 1’.
4. Press **ENTER**. Use the ▲ and ▼ keys as necessary to change the setting for Light 1 and then press **ENTER**.
5. Press the ▼ key. If Light 2 has been configured you will be prompted to enter the setting for ‘Light 2’.
6. Repeat steps 4 and 5 to change each additional configured light output until you are prompted with the ‘Light 1 Life’ value. At this point continue reading at step 7.
7. If an optional humidity system was ordered, press the **%RH** key. You will be prompted to enter the ‘Manual RH Set Point’.
8. Press **ENTER**. Use the ▲ and ▼ keys as necessary to change the manual relative humidity set point and then press **ENTER**.
9. If an optional CO<sub>2</sub>/Aux system was ordered, press the **CO<sub>2</sub>/AUX** key. You will be prompted to enter the ‘Manual Aux Set Point’.
10. Press **ENTER**. Use the ▲ and ▼ keys as necessary to change the manual CO<sub>2</sub>/Aux set point and then press **ENTER**.

Once the set points have been entered, press the **PROG** key to enter the Program Menu. Use the **▲** and **▼** keys as necessary to select 'Run Manual' and then press **ENTER**. The controller will now run the manual set points continuously.

When the step type has been set to Elapsed – Non 24 Hour (see Setting Program Step Type), the time on the main display will read "000:00" to indicate that manual settings are running.

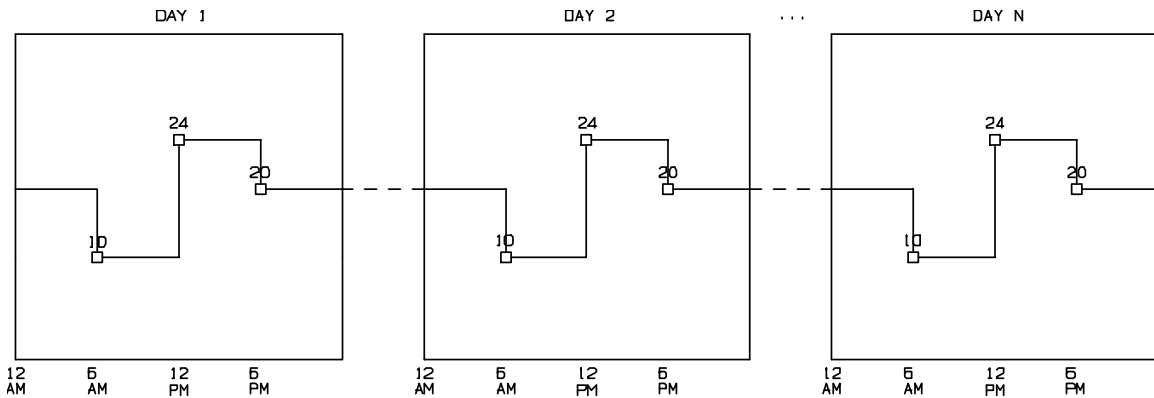
## **Programming**

The Intellus Ultra controller allows for the entry of up to 50 different programs spread over a total of 500 steps when configured to run with a step type of '24 Hour' (see Changing Programming Modes). The controller allows for the entry of up to 20 different programs spread over a total of 60 steps when configured to run with a step type of 'Elapsed - Non 24 Hour' (see Changing Programming Modes). Each program can be given a unique eight-character name. The "Program Sequence" feature can be used to sequence multiple programs. This feature is used to extend the effective program length.

It is important to remember to set the temperature safety alarms accordingly before running a program. Set the high alarm above the highest temperature set in the program. Set the low alarm below the lowest temperature set in the program.

## **Setting Program Operation Mode**

Programs can operate in either non-ramping or ramping mode. The default mode is non-ramping. When programs run in non-ramping mode the controller will immediately change to the new set points upon changing steps. For example, if you have a step programmed at 6:00AM for 10°C and a step programmed at 12:00PM for 24°C the set point will be 10°C between 6:00AM and 11:59AM and then change to 24°C at 12:00 PM.



**Figure 5 – Sample non-ramping program**



When programs run in ramping mode the controller will ramp the set point as necessary between the current step's set point and the next step's set point \*. For example, if you have a step programmed at 6:00AM for 10°C and a step programmed at 12:00PM for 24°C the set point will ramp between 10°C and 24°C over six hours. Figure 6 illustrates this example. Between 6:00AM and 12:00PM the set point (and subsequently process value) will increase approximately .04°C per minute.

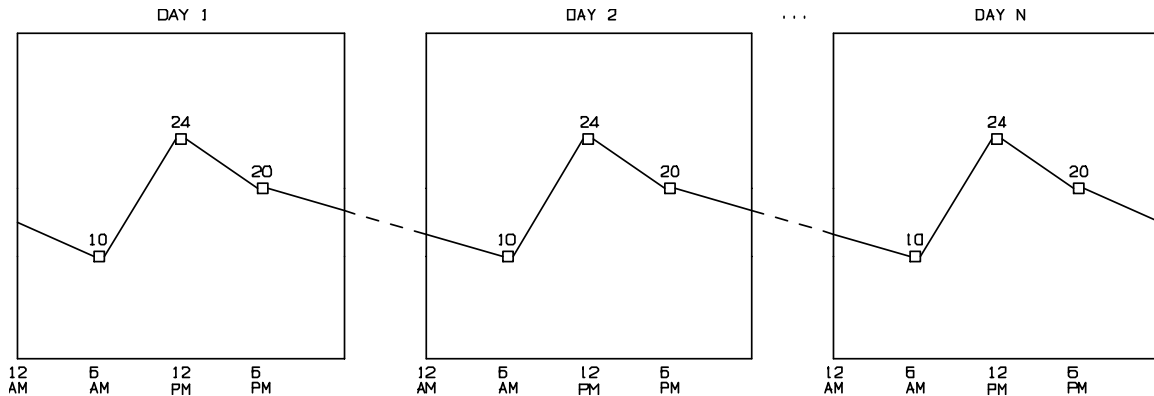


Figure 6 – Sample ramping program

\* - If the chamber was ordered with the open loop dimmable lighting option you must program intermediate steps in order to simulate ramping of the dimmable lights. The lights will not automatically ramp. All other values (temperature, humidity, auxiliary) will ramp between set points.

You can add non-ramping steps to a ramping program. Using the previous example, to hold the temperature at 10°C between 6:00AM and 12:00PM you simply add a step at 11:59AM with a temperature set point of 10°C. The controller will maintain the temperature at 10°C between 6:00AM and 11:59AM and at 12:00AM will immediately change the set point to 24°C.

If you do not wish to use the default program operation mode (non-ramping) you can change the mode to ramping. To do this, use the following steps:

1. Hold both the **ENTER** and **▲** keys simultaneously for approximately four seconds. The controller will prompt you to enter the security level password. The default password is '1111'. If this password does not work then security may have been configured. If this is the case, contact the person responsible for securing the controller and have them enter the password. If the first character of the password is not flashing, press the **ENTER** key. Use the **▲** and **▼** keys as necessary to change characters. Press the **PROG** key to advance to the next character. You may repeatedly press the **PROG** key to scroll through and review the password. Pressing the **PROG** key at the last character will cause the character selection to wrap around. Press the **ENTER** key when the security level password has been successfully entered.

**IMPORTANT!** While navigating through this menu you will see prompts asking if you want to change the LVL1 – LVL3 and SLVL passwords. Do not change any of these passwords unless you intend to activate security on the controller.

2. Use the ▲ and ▼ keys as necessary until ‘Program Type’ appears in the upper display and then press **ENTER**.
3. Use the ▲ and ▼ keys as necessary to select ‘Ramping’ and then press **ENTER**.
4. Hold both the **ENTER** and ▲ keys simultaneously for approximately four seconds. You will return to the status menu. The controller is now set to run programs in ramping mode.

You can change the method back to non-ramping by following the same steps and selecting “Non-Ramping” instead of “Ramping” in step #3.

## **Setting Program Step Type**

The controller is capable of running programs using a step type of either 24 Hour or Elapsed – Non 24 Hour. The default step type used is 24 Hour. When using the 24 Hour step type, programs are created and run within a 24 hour period. The time parameter of each step can range from 12:00AM to 11:59PM. When a program is run using the 24 Hour step type the program will either repeat itself from the beginning or move to the next program if a sequence of programs is running. When the program operation mode is non-ramping the program will maintain the temperature set point programmed in each step until the next step is encountered. When the program operation mode is ramping the program will ramp the temperature set point set between each step’s set points.

When using the Elapsed – Non 24 Hour step type, programs can be created to run for periods shorter or longer than 24 hours. The time parameter of each step can range from 1 minute to 999 hours and 59 minutes. When a program is run using the Elapsed – Non 24 Hour step type the program will count down the time in each of the programmed steps until the time on the last step has count down to zero. At this point the program will either repeat itself from the beginning or move to the next program if a sequence of programs is running. For example, say you wanted to shorten the day and night periods in order to accelerate your experiment. You could program a step to last 10 hours with lights on and another step to last 7 hours with lights off. This program would run in a 17 hour cycle as opposed to a 24 hour cycle.

When the program operation mode is non-ramping the program will maintain the temperature set point programmed in each step until the next step is encountered. When the program operation mode is ramping the program will ramp the temperature set point from the previous step’s set point to the current set point in the time period programmed in the step. For example, say you have a two step program with the first step’s time

programmed to 10 hours with a temperature of 24°C and the second step's time programmed to 7 hours with a temperature of 10°C. When you first run the program the program will ramp the set point from the current manual temperature setting to 24°C over a period of 10 hours. The next step will ramp the set point from 24°C to 10°C over a period of 7 hours. The program will then repeat itself by ramping the temperature from 10°C to 24°C over a period of 10 hours and then ramping from 24°C to 10°C over a period of 7 hours.

**Note:** When using the Elapsed – Non 24 Hour step type it is recommended that you run manual settings before running a program or sequence. If you are currently running a program (including diurnal) and want to switch to running another program, run manual settings first.

**Note:** If you have created a sequence of programs this sequence will be lost when changing step types.

To change the program step type, use the following steps:

1. Hold both the **ENTER** and **▲** keys simultaneously for approximately four seconds. The controller will prompt you to enter the security level password. The default password is '1111'. If this password does not work then security may have been configured. If this is the case, contact the person responsible for securing the controller and have them enter the password. If the first character of the password is not flashing, press the **ENTER** key. Use the **▲** and **▼** keys as necessary to change characters. Press the **PROG** key to advance to the next character. You may repeatedly press the **PROG** key to scroll through and review the password. Pressing the **PROG** key at the last character will cause the character selection to wrap around. Press the **ENTER** key when the security level password has been successfully entered.

**IMPORTANT!** While navigating through this menu you will see prompts asking if you want to change the LVL1 – LVL3 and SLVL passwords. Do not change any of these passwords unless you intend to activate security on the controller.

2. Use the **▲** and **▼** keys as necessary until 'Step Type' appears in the upper display and then press **ENTER**.
3. Use the **▲** and **▼** keys as necessary to select '24 Hour' or 'Elapsed – Non 24Hr' and then press **ENTER**.

## **Diurnal Programming**

The diurnal style of programming allows you to quickly set up a simple day/night program with two sets of set points. When programming the diurnal style the controller prompts you to enter the relevant day and night set points for the options ordered and day

period start and end times. The night period is automatically assumed to be the remainder of the 24 hour period minus the length of the day period. During the day period, all light and event outputs will be on. During the night period, all light and event outputs will be off.

**IMPORTANT!** Some chambers are equipped with optional event outputs that are used to power miscellaneous equipment or chamber components. These components will be powered during the day period. It is not recommended that the diurnal style of programming is used in these instances. Alternatively you can create a simple two step non-ramping program that only programs light outputs to be on during the day period. Any miscellaneous outputs can be left off during the day period. If the only outputs that are configured on the controller are used to control lights then the diurnal style of programming can be used.

To program using the diurnal style, use the following steps:

1. Press the **PROG** key.
2. Use the ▲ and ▼ keys as necessary to select 'Enter/Edit Diurnal' and then press **ENTER**. **Note:** The Program LED flashes when programming.
3. You are now prompted to enter the day set point for temperature. To change the day set point for temperature, press the **ENTER** key, use the ▲ and ▼ keys as necessary to set the day set point and then press the **ENTER** key again to accept the setting.
4. Press the ▼ key to advance to the next setting.
5. If a humidity option was ordered you are now prompted to enter the day set point for humidity. If a humidity option was not ordered proceed to step 7. To change the day set point for humidity, press the **ENTER** key, use the ▲ and ▼ keys as necessary to set the day set point and then press the **ENTER** key again to accept the setting.
6. Press the ▼ key to advance to the next setting.
7. If a CO<sub>2</sub>/Aux option was ordered you are now prompted to enter the day set point for CO<sub>2</sub>/Aux. If a CO<sub>2</sub>/Aux option was not ordered proceed to step 9. To change the day set point for CO<sub>2</sub>/Aux, press the **ENTER** key, use the ▲ and ▼ keys as necessary to set the day set point and then press the **ENTER** key again to accept the setting.
8. Press the ▼ key to advance to the next setting.
9. You are now prompted to enter the day period start time. During the day period all light and event outputs will be on. During the night period all light and event outputs will be off. To change the day period start time, press the **ENTER** key, use the ▲ and ▼ keys as necessary to set the day period start time and then press the **ENTER** key again to accept the setting.
10. Press the ▼ key to advance to the next setting.
11. You are now prompted to enter the day period end time. To change the day period end time, press the **ENTER** key, use the ▲ and ▼ keys as

necessary to set the day period end time and then press the **ENTER** key again to accept the setting.

12. Press the **▼** key to advance to the next setting.
13. You are now prompted to enter the night set point for temperature. To change the night set point for temperature, press the **ENTER** key, use the **▲** and **▼** keys as necessary to set the night set point and then press the **ENTER** key again to accept the setting.
14. Press the **▼** key to advance to the next setting.
15. If a humidity option was ordered you are now prompted to enter the night set point for humidity. If a humidity option was not ordered proceed to step 17. To change the night set point for humidity, press the **ENTER** key, use the **▲** and **▼** keys as necessary to set the night set point and then press the **ENTER** key again to accept the setting.
16. Press the **▼** key to advance to the next setting.
17. If a CO<sub>2</sub>/Aux option was ordered you are now prompted to enter the night set point for CO<sub>2</sub>/Aux. If a CO<sub>2</sub>/Aux option was not ordered proceed to step 18. To change the night set point for CO<sub>2</sub>/Aux, press the **ENTER** key, use the **▲** and **▼** keys as necessary to set the night set point and then press the **ENTER** key again to accept the setting. Press the **▼** key.
18. You will now return to the Program Menu. To exit the Program Menu, press the **PROG** key.

To edit a diurnal program use the following steps:

1. Press the **PROG** key.
2. Use the **▲** and **▼** keys as necessary to select 'Enter/Edit Diurnal' and then press **ENTER**.
3. Use the **▲** and **▼** keys as necessary to review settings.
4. If any setting needs to be changed, press the **ENTER** key, use the **▲** and **▼** keys as necessary to change the setting and then press **ENTER** to accept.
5. Once you are finished, keep pressing the **▼** key until you return to the Program Menu. To exit the Program Menu, press the **PROG** key.

To run a diurnal program use the following steps:

1. Press the **PROG** key.
2. Use the **▲** and **▼** keys as necessary to select 'Run Diurnal' and then press **ENTER**. The diurnal program will now run.

The main display will read "Day" or "Night" to indicate that the diurnal program is running.

**Note:** The diurnal program always runs in 24 hour non-ramping mode regardless of the configured program operation mode and step type.

## Creating a New Program

**Note:** The option to create a new program will not be available if the maximum number of steps or maximum number of programs has already been entered into the controller. The maximum number of steps is five-hundred and the maximum number of programs is fifty when the controller is configured with a program step type of “24 Hour”. The maximum number of steps is sixty and the maximum number of programs is twenty when the controller is configured with a program step type of “Elapsed – Non 24Hr”.

To create a new program, use the following steps:

1. Press the **PROG** key.
2. Use the ▲ and ▼ keys as necessary to select ‘Create Program’ and then press **ENTER**. **Note:** The Program LED flashes when programming.
3. You will now be asked to enter the program name. The default program name is the current month followed by the current day followed by the current year followed by the current program number. For example, if the date is October 3, 2001 and you are creating the second program of the day the default name is ‘10030102’. Use the ▲ and ▼ keys as necessary to change characters. Press and hold the ▼ key until the character disappears to blank characters. Press the **PROG** key to advance to the next character. You may repeatedly press the **PROG** key to scroll through and review the program name. Press the **ENTER** key when you have finished entering the program name.
4. A step with default data will be entered into the program.

12:00AM	24.0C	70%RH
LT:000		0 PPM

**Note:** The above display assumes that the chamber was ordered with optional humidity and CO<sub>2</sub> packages and that the program step type is set to “24 Hour”.

The time entry of this step is the time at which the step will begin to run. In the above step example, the chamber will run the temperature set point of 24.0°C, humidity set point of 70%, CO<sub>2</sub> set point of 0PPM and light settings of light outputs 1-3 off at 12:00AM.

000:01	24.0C	70%RH
LT:000		0 PPM

**Note:** The above display assumes that the chamber was ordered with optional humidity and CO<sub>2</sub> packages and that the program step type is set to “Elapsed – Non 24Hr”.

5. To change the time setting for a step, press the **TIME** key. Use the ▲ and ▼ keys as necessary to change the time, then press **ENTER** to accept.
6. To change the temperature setting for a step, press the **TEMP/ALARM** key. Use the ▲ and ▼ keys as necessary to change the temperature, then press **ENTER** to accept.
7. To change the humidity setting for a step, press the **%RH** key. Use the ▲ and ▼ keys as necessary to change the humidity setting, then press **ENTER** to accept.
8. To change the lighting settings for a step, press the **LIGHTS** key. Repeatedly pressing the **LIGHTS** key cycles through the available light outputs. If your controller is configured with more than eight light outputs there will be a second set of outputs that you can cycle through. Only eight outputs can be shown on the display at one time. The first set is displayed as 'L1' and the second set is displayed as 'L2'.

Use the ▲ and ▼ keys as necessary to change each light setting. For standard lighting use a '0' for off and a '1' for on. When dimmable lighting is provided, set the desired level for each output. When you are finished changing the outputs to your requirements, press the **ENTER** key.

**Note (dimmable lighting):** The lights will be off when the lighting level is set between 0 and a factory preset threshold value. This limit is based on the minimum output level required to provide stable lighting. Please refer to the operation manual or the supplemental information provided with the operation manual for the threshold value. Any LED model is an exception. A setting of 0 in these models will turn the LEDs off. Any setting greater than 0 will turn the LEDs on.

9. To change the CO<sub>2</sub>/Aux setting for a step, press the **CO<sub>2</sub>/AUX** key. Use the ▲ and ▼ keys as necessary to change the CO<sub>2</sub>/Aux setting, then press **ENTER** to accept.
- To add additional steps to the program, press the **PROG** key. Use the ▲ and ▼ keys as necessary to select 'Add Step' and then press **ENTER**. Repeat steps 5-9 to edit each step added. **Note:** The 'Add Step' option will not be available if the maximum number of steps has been reached.
  - To review the current steps in the program, use the ▲ and ▼ keys as necessary when no settings are being edited. When editing, a parameter will be flashing. If no step parameters are flashing then you are not editing. If the program step type is set to Elapsed – Non 24Hr the current step number navigated to will be displayed for one second.

- To delete a step, use the ▲ and ▼ keys as necessary to select the step you wish to delete. Once the step is selected, press the **PROG** key. Use the ▲ and ▼ keys as necessary to select 'Delete Step' and then press **ENTER**.
- To quit programming, press the **PROG** key. Use the ▲ and ▼ keys as necessary to select 'Quit' and then press **ENTER**. You will return to the main display.
- Refer to the section titled 'Running Programs' for information on running a program.

## **Editing a Program**

**Note:** This option does not appear when a sequence is running. When the step type is set to 24 Hour you may edit any program including the current running program. If changes are made to the current running program they will take effect immediately. When the step type is set to Elapsed – Non 24 Hour you may edit any program except the current running program. In order to edit the current running program you will need to stop the program's execution by running manual settings.

To edit a program use the following steps:

1. Press the **PROG** key.
2. Use the ▲ and ▼ keys as necessary to select 'Edit Program' and then press **ENTER**.
3. Use the ▲ and ▼ keys as necessary to select the program you wish to edit and then press **ENTER**. If the step type is set to Elapsed – Non 24 Hour and a program is currently running this program's name will not appear in the list.
4. You will be prompted to edit the program name. If you wish to leave the name the same, press the **ENTER** key. If you wish to change the name, use the ▲ and ▼ keys as necessary to change characters. Press the **PROG** key to advance to the next character. You may repeatedly press the **PROG** key to scroll through and review the program name. Press the **ENTER** key when you have finished editing the program name. **Note:** If you rename a program that exists in a sequence the entire sequence will be deleted.
5. Use the ▲ and ▼ keys as necessary to review each step. If the program step type is set to Elapsed – Non 24Hr the current step number navigated to will be displayed for one second.
6. If any setting needs to be changed, press the appropriate key. For example, if the temperature setting needs to be changed for a step, press the **TEMP/ALARM** key. Use the ▲ and ▼ keys as necessary to change the setting and then press **ENTER** to accept.



7. Remember that when any setting is flashing you are editing that particular step. To navigate through the program, use the ▲ and ▼ keys as necessary when no settings are flashing.
8. You may add and delete steps by pressing the **PROG** key and selecting the appropriate prompt. **Note:** The 'Add Step' option will not be available if the maximum number of steps has been reached.
9. When you have finished editing, press the **PROG** key. Use the ▲ and ▼ keys as necessary to select 'Quit' and then press **ENTER**. You will return to the main display.

## **Deleting a Program**

**Note:** This option does not appear when a sequence is running. When the step type is set to 24 Hour you may delete any program including the current running program. When the step type is set to Elapsed – Non 24 Hour you may delete any program except the current running program. In order to delete the current running program you will need to stop the program's execution by running manual settings.

To delete a program use the following steps:

1. Press the **PROG** key.
2. Use the ▲ and ▼ keys as necessary to select 'Delete Program' and then press **ENTER**.
3. Use the ▲ and ▼ keys as necessary to select the program you wish to delete and then press **ENTER**.
4. When prompted to confirm deletion, use the ▲ and ▼ keys as necessary to select 'Yes' and then press **ENTER**.
5. Press the **PROG** key to return to normal operation.

**IMPORTANT!** Deleting a program that appears in a sequence of programs will cause the entire sequence to be deleted.

## **Copying a Program**

**Note:** The option to copy a program will not be available if the maximum number of steps or maximum number of programs has already been entered into the controller.

To copy a program use the following steps:

1. Press the **PROG** key.
2. Use the ▲ and ▼ keys as necessary to select 'Copy Program' and then press **ENTER**.
3. Use the ▲ and ▼ keys as necessary to select the program you wish to copy and then press **ENTER**. **Note:** If copying a program would cause

the controller to exceed its maximum step limit then this program name will not be available in the list of programs available to copy.

4. You will be prompted to edit the new program name. If you wish to leave the name the same as the default, press the **ENTER** key. If you wish to change the name, use the **▲** and **▼** keys as necessary to change characters. Press the **PROG** key to advance to the next character. You may repeatedly press the **PROG** key to scroll through and review the program name. Press the **ENTER** key when you have finished editing the program name.
5. You will now enter the program edit mode. You may change/add/delete steps as necessary to the copied program.
6. When you have finished editing the copied program, press the **PROG** key. Use the **▲** and **▼** keys as necessary to select 'Quit' and then press **ENTER**. You will return to the main display.

## Creating a Sequence of Programs

**Note:** This option does not appear when a sequence is running. You must either be running manual settings or an individual program in order for this option to appear.

You can create a sequence of programs to run by selecting to program a sequence. A sequence of programs consists of a list of programs that you choose to run. Any program that you have created in the controller can be added to the sequence.

When adding programs to the sequence you also enter the number of iterations for the program to run. This allows you to run any program in the sequence more than one time in a row. Once a program finishes running it will either repeat again based on the number of iterations entered or will continue to the next program in the sequence.

An example of a sequence of programs appears below. This program runs a different program each day of the week except for Saturday and Sunday. On Saturday and Sunday the sequence runs the same program, 'Weekend'.

<b>Program Name</b>	<b>Iterations</b>
Monday	1
Tuesday	1
Wednesday	1
Thursday	1
Friday	1
Weekend	2

**IMPORTANT!** Deleting a program that appears in a sequence of programs will cause the entire sequence to be deleted.

To create a sequence of programs use the following steps:

1. Press the **PROG** key.
  2. Use the ▲ and ▼ keys as necessary to select ‘Program Sequence’ and then press **ENTER**.
  3. If no sequence currently exists you will be prompted to ‘Create Sequence’. Press **ENTER** to create a sequence.
  4. Use the ▲ and ▼ keys as necessary to select the program you wish to add to the sequence and then press **ENTER**.
  5. Use the ▲ and ▼ keys as necessary to select the number of iterations you wish the added program to run and then press **ENTER**.
- To add more programs to the sequence, select ‘Add Program’ and press the **ENTER** key. Follow steps 4 & 5 above to add the new program.
  - To delete a program from the sequence, use the ▲ and ▼ keys as necessary to select ‘Delete Program’ and then press **ENTER**. When prompted to select the program, use the ▲ and ▼ keys as necessary to select the program you wish to delete from the sequence and then press **ENTER**.
  - To insert a program into the sequence, use the ▲ and ▼ keys as necessary to select ‘Insert Program’ and then press **ENTER**. When prompted to select the program, use the ▲ and ▼ keys as necessary to select the program you wish to insert into the sequence and then press **ENTER**. When prompted to select the program to insert after, use the ▲ and ▼ keys as necessary to select the program you wish to insert the program after and then press **ENTER**.
  - To view the current sequence, use the ▲ and ▼ keys as necessary to select ‘View Sequence’ and then press **ENTER**. Use the ▲ and ▼ keys to review the steps in the sequence. Press the **ENTER** key to return to the program menu or the **PROG** key to exit the program menu.
  - When you are finished programming the sequence, use the ▲ and ▼ keys as necessary to select ‘Quit’ and then press **ENTER**. Refer to the section titled “Running Programs/Sequence of Programs” for information on running the sequence.

**IMPORTANT!** – The following information is provided to make sequence programming easier. Please read and be aware of this information before attempting to enter a sequence.

- Write the sequence of programs and number of iterations for each program down before attempting to enter a sequence.
- Use the View Sequence option to verify that the sequence has been entered properly.
- If the program step type is set to “24 Hour” - When changing from one program to another in a running sequence the last step of the current program and the first step in the next program are used to determine the set point. In other words, if the last step programmed in the current running program is at 10:00PM and the first step in the next program is at 6:00AM the controller will use these two times as

the basis for the set point. If the controller is set to ramp set points, the set point will ramp between the set points at 10:00PM and 6:00AM. It is suggested (not required) that any program used in a sequence have a step entered at 12:00AM. This way you will always know the set point the new program will start at when the controller switches from the current running program to the next program in the sequence. If you do not set the first step of each program to 12:00AM, unpredictable results may occur when running the sequence.

- If the program step type is set to “Elapsed – Non 24Hr” - When changing from one program to another in a running sequence the last step of the current program and the first step in the next program are used to determine the set point when the operation mode is set to ramping.

## Viewing a Sequence

To view a programmed sequence use the following steps:

1. Press the **PROG** key.
2. Use the ▲ and ▼ keys as necessary to select ‘View Sequence’ and then press **ENTER**.
3. Use the ▲ and ▼ keys to review the steps in the sequence. Press the **ENTER** key to return to the program menu or the **PROG** key to exit the program menu.

## Running Programs / Sequence of Programs

**Note:** When the step type is set to Elapsed – Non 24 Hour the option to run a program or sequence does not appear when a program or sequence is currently running. You will need to run manual settings before running a program or sequence.

To run a single program use the following steps:

1. Press the **PROG** key.
2. If the program LED is lit because you are currently running a program or sequence, use the ▲ and ▼ keys as necessary to select ‘Run Manual’ and then press **ENTER**. Next, press the **PROG** key to re-enter the program menu. It is always recommended that manual settings are run before running another program when a program or sequence is currently running. If the program LED is not lit, proceed to step 3.
3. Use the ▲ and ▼ keys as necessary to select ‘Run Program’ and then press **ENTER**.
4. Use the ▲ and ▼ keys as necessary to select the program you wish to run and then press **ENTER**.
5. The Program LED illuminates indicating that the program is running.

When viewing the status menu, you can view the current program name and current step number that is running. To do this, use the ▲ and ▼ keys as necessary to scroll to the display resembling Figure 7 below.

Running Program: MONDAY Step #2
------------------------------------

**Figure 7 – Program Sequence Status**

To run a sequence of programs use the following steps:

1. Press the **PROG** key.
2. If the program LED is lit because you are currently running a program or sequence, use the ▲ and ▼ keys as necessary to select ‘Run Manual’ and then press **ENTER**. Next, press the **PROG** key to re-enter the program menu. It is always recommended that manual settings are run before running a sequence when a program or sequence is currently running. If the program LED is not lit, proceed to step 3.
3. Use the ▲ and ▼ keys as necessary to select ‘Run Sequence’ and then press **ENTER**.
4. Use the ▲ and ▼ keys as necessary to select the program you wish to start the sequence from and then press **ENTER**. This is normally the first program you added to the sequence.
5. Use the ▲ and ▼ keys as necessary to select the iteration of the program selected to start the sequence from and then press **ENTER**. This is normally the first iteration.
6. The Program LED illuminates indicating that the sequence is running.

When viewing the status menu, you can view the current point in the sequence that is running. To do this, use the ▲ and ▼ keys as necessary to scroll to the display resembling Figure 8 below.

Step: 1 MONDAY
Iteration: 1

**Figure 8 – Program Sequence Status**

**Note:** The following options are not available when a sequence of programs is running:

- Running another program (if step type is set to Elapsed – Non 24 Hour)
- Editing a program
- Deleting a program
- Programming a sequence

You will need to stop running the sequence and run manual settings before these options are available.

**Note:** When the step type is set to Elapsed – Non 24 Hour the option to run a program or sequence does not appear when a program or sequence is currently running. You will need to run manual settings before running a program or sequence.

## **Sample Program**

6:00AM – 15.0°C, 60% humidity, one half lights on.  
10:00AM - 17.0°C, 65% humidity, all lights on.  
2:00PM – 21.0°C, 70% humidity, all lights on.  
6:00PM – 24.0°C, 70% humidity, one half lights on.  
10:00PM – 21.0°C, 60% humidity, all lights off.

**Note:** The sample program assumes the chamber was ordered with a humidity option and two light outputs. It also assumes the operation mode is set to non-ramping. The steps necessary to complete an actual program in your chamber may be different. If your chamber has less or additional options the displays presented in the sample program will not exactly reflect the displays you are presented with.

Use the following steps as a guide to entering the sample program:

- Press the **PROG** key.
- Use the **▲** and **▼** keys as necessary to select ‘Create Program’ and then press **ENTER**.
- When prompted to “Edit Program Name”, press **ENTER** to accept the default name.
- The display reads as follows.

12:00AM	24.0C	70%RH
L1:00		

- Press the **TIME** key. The step time flashes indicating that you can change the time.
- Use the **▲** and **▼** keys as necessary to change the time to 6:00AM.
- Press the **TEMP/ALARM** key. The step temperature value flashes indicating that you can change the temperature value.
- Use the **▲** and **▼** keys as necessary to change the temperature to 15.0°C.
- Press the **%RH** key. The step humidity value flashes indicating that you can change the humidity value.
- Use the **▲** and **▼** keys as necessary to change the %RH to 60%.
- Press the **LIGHTS** key. The step lighting output #1 value flashes indicating that you can change the lighting output #1 value.
- Use the **▲** and **▼** keys as necessary to change the first light output to 1 (on).

- Press **ENTER**. Verify that no settings are flashing. The display should read as follows.

6:00AM	15.0C	60%RH
L1:10		

- Press the **PROG** key.
- Use the ▲ and ▼ keys as necessary to select “Add Step” and then press **ENTER**. The display reads as follows.

6:01AM	15.0C	60%RH
L1:10		

- Press the **TIME** key.
- Use the ▲ and ▼ keys as necessary to change the time to 10:00AM.
- Press the **TEMP/ALARM** key.
- Use the ▲ and ▼ keys as necessary to change the temperature to 17.0°C.
- Press the **%RH** key.
- Use the ▲ and ▼ keys as necessary to change the %RH to 65%.
- Repeatedly press the **LIGHTS** key until the second output flashes.
- Use the ▲ and ▼ keys as necessary to change the second light output to 1 (on).
- Press **ENTER**. Verify that no settings are flashing. The display should read as follows.

10:00AM	17.0C	65%RH
L1:11		

- Press the **PROG** key.
- Use the ▲ and ▼ keys as necessary to select “Add Step” and then press **ENTER**. The display reads as follows.

10:01AM	17.0C	65%RH
L1:11		

- Press the **TIME** key.
- Use the ▲ and ▼ keys as necessary to change the time to 2:00PM.
- Press the **TEMP/ALARM** key.
- Use the ▲ and ▼ keys as necessary to change the temperature to 21.0°C.
- Press the **%RH** key.
- Use the ▲ and ▼ keys as necessary to change the %RH to 70%.
- Press **ENTER**. Verify that no settings are flashing. The display should read as follows.

2:00PM	21.0C	70%RH
L1:11		

- Press the **PROG** key.
- Use the ▲ and ▼ keys as necessary to select “Add Step” and then press **ENTER**. The display reads as follows.

2:01PM	21.0C	70%RH
LT:11		

- Press the **TIME** key.
- Use the ▲ and ▼ keys as necessary to change the time to 6:00PM.
- Press the **TEMP/ALARM** key.
- Use the ▲ and ▼ keys as necessary to change the temperature to 24.0°C.
- Repeatedly press the **LIGHTS** key until the second output flashes.
- Use the ▲ and ▼ keys as necessary to change the second light output to 0 (off).
- Press **ENTER**. Verify that no settings are flashing. The display should read as follows.

6:00PM	24.0C	70%RH
LT:10		

- Press the **PROG** key.
- Use the ▲ and ▼ keys as necessary to select “Add Step” and then press **ENTER**. The display reads as follows.

6:01PM	24.0C	70%RH
LT:10		

- Press the **TIME** key.
- Use the ▲ and ▼ keys as necessary to change the time to 10:00PM.
- Press the **TEMP/ALARM** key.
- Use the ▲ and ▼ keys as necessary to change the temperature to 21.0°C.
- Press the **%RH** key.
- Use the ▲ and ▼ keys as necessary to change the %RH to 60%.
- Press the **LIGHTS** key.
- Use the ▲ and ▼ keys as necessary to change the first light output to 0 (off).
- Press **ENTER**. Verify that no settings are flashing. The display should read as follows.

10:00PM	21.0C	60%RH
LT:00		



Verify that no settings are flashing. Use the ▲ and ▼ keys as necessary to review the program. Remember, when reviewing the program that you may change any incorrect settings as necessary by pressing the appropriate keys. When you have finished reviewing the program, press the **PROG** key and use the ▲ and ▼ keys as necessary to select 'Quit' and then press **ENTER**. Refer to the section titled "Running Programs" for information on running the sample program.

## **Defrost Programming (optional)**

When a low temperature option is ordered or it is determined that the chamber may need defrost periods the controller may be configured to allow the defrosting of the chamber's cooling coil(s). Most chambers are not provided with a defrost system. Please refer to any supplemental information provided with the operation manual. This information will indicate whether or not defrost programming is necessary.

Some chambers are configured for automatic defrost and utilize two cooling coils. In this case, the Intellus Ultra controller is not configured for defrosting. To see if your controller is configured for defrosting, follow the steps listed below. If the 'Number Of Defrosts' prompt does not appear then your chamber has been set up for automatic defrosting.

When the controller is configured for defrosting, up to six defrost periods can be programmed over a twenty-four hour period. When constantly running low temperatures, Percival Scientific recommends that two seven minute periods be programmed twelve hours apart. The number of and/or duration of periods may need to be adjusted. The necessity for programming defrost periods can be gauged by observing the inability of the chamber to hold the set point at low temperatures.

To program defrost periods, use the following steps:

1. Press the **TEMP/ALARM** key.
2. Use the ▲ and ▼ keys as necessary to select 'Number Of Defrosts'. If this prompt does not appear, then your chamber has been configured for automatic defrost.
3. Press the **ENTER** key. Use the ▲ and ▼ keys as necessary to select the number of defrost periods required and then press the **ENTER** key.
4. Press the ▼ key. You will be prompted to enter the 'Defrost Duration'.
5. Press the **ENTER** key. Use the ▲ and ▼ keys as necessary to set the duration of each defrost period and then press the **ENTER** key.
6. Press the ▼ key. You will be prompted to enter the 'Defrost 1 Start'. This is the time that the first defrost period will start.
7. Press the **ENTER** key. Use the ▲ and ▼ keys as necessary to set the start time of the first defrost period and then press the **ENTER** key.

If you programmed to have more than one defrost period then you will need to set the remaining start times. To set the remaining times:

1. Press the ▼ key to advance to the next period.
2. Press the **ENTER** key. Use the ▲ and ▼ keys as necessary to set the start time of the defrost period and then press the **ENTER** key.

Once you have set the start times for each period, press the **TEMP/ALARM** key to exit the temperature menu.

## **Calibration Offsets**

**Important!** Calibration offsets are not normally altered. Calibration offsets should only be changed when the temperature, humidity or auxiliary values displayed on the controller do not agree with your measurement device.

The chamber is calibrated at our factory at a temperature of 25.0°C with all lights on and all lights off. If the current temperature, humidity or CO<sub>2</sub>/Aux displayed disagrees with your measurement device(s) adjust the calibration offsets. Multiple day and night offsets are available for temperature. Single day and night offsets are available for humidity (if ordered) and CO<sub>2</sub>/Aux (if ordered). The Day Offset will be used when any light output is on. The Night Offset will be used when all light outputs are off. The value entered for each offset is added to the input value as required and the new value is displayed and used for control. For example, if you have placed a thermometer in the chamber at the location of your experiment and it reads 26.3°C and the Intellus controller reads 26.0°C then you'd enter a calibration offset of 0.3°C. Calibration offsets cannot be set while programming.

Multiple temperature offsets are available or you may use a single day and night offset. You may choose to use multiple offsets if you regularly run temperatures at the extremes of the chamber's temperature range. For example, say your experiment requires the temperature to run at 4°C, 25°C and 40°C. The chamber is calibrated at the factory at a temperature of 25°C. If you run at 4°C and 40°C the calibration will drift. In this instance you may choose to use multiple offsets. There are three day and night offsets that may be used at three temperatures. In the above example, you could enter a day and night offset at 4°C, 25°C and 40°C. The controller will linearly apply the offsets between the three temperatures.

If the chamber needs to be calibrated to a different standard measurement device use the following steps as a guide:

1. Turn all lights off in the chamber
2. Position the new standard measurement device in the area of the chamber of most interest/importance to the experiment
3. Set the chamber to 'Manual' mode, and set the manual set points to the desired calibration value(s).
4. Let the chamber run for approximately 20-30 minutes to allow the system to stabilize

5. Compare the Intellus process value to the value output from the standard, and enter the **difference** between the two into the night calibration offset menu. For example: If the Intellus controller is reading 30°C and the standard thermometer reads 28°C, then enter -2.0°C into the night temperature offset menu. This will offset the Intellus temperature readout so that it agrees with the standard. Entering -2.0°C will change the readout from the Intellus display to 28°C from the previous 30°C.
6. At this point the Intellus controller is re-calibrated to the new standard for night mode (all lights off). Repeat steps 1 through 5, running the chamber in day mode (all lights on), and enter the calibration offset into the day calibration offset.

The above example should be applied when using a single day/night offset for temperature. If you intend to use multiple temperature offsets you should decide upon the three temperatures at which you want to calibrate the chamber at and then enter those values into the day and night temperature 1-3 settings (see below). Then you would want to run the chamber at the three temperature settings with lights on to determine the day offset at each temperature and then with lights off to determine the night offset.

To adjust the temperature offsets using a single day/night offset use the following steps:

1. Press and hold both the **ENTER** and **TEMP/ALARM** keys for approximately 3 seconds until the display changes to read 'Multiple Offsets'. **Note:** Always press and hold the **ENTER** key before pressing and holding the **TEMP/ALARM** key.
2. Press the **ENTER** key and use the ▲ and ▼ keys as necessary to select 'No' and then press **ENTER**.
3. Press the ▼ key to select 'Day Temp Offset' and then press **ENTER**.
4. Use the ▲ and ▼ keys as necessary to change the offset and then press **ENTER**.
5. Press the ▼ key to select 'Night Temp Offset' and then press **ENTER**.
6. Use the ▲ and ▼ keys as necessary to change the offset and then press **ENTER**.
7. Press the **TEMP/ALARM** key to return to the main display.

To adjust the temperature offsets using multiple day/night offsets use the following steps:

1. Press and hold both the **ENTER** and **TEMP/ALARM** keys for approximately 3 seconds until the display changes to read 'Multiple Offsets'. **Note:** Always press and hold the **ENTER** key before pressing and holding the **TEMP/ALARM** key.
2. Press the **ENTER** key and use the ▲ and ▼ keys as necessary to select 'Yes' and then press **ENTER**.
3. Press the ▼ key to select 'Day Temp Offset 1' and then press **ENTER**.

4. Use the ▲ and ▼ keys as necessary to change the offset and then press **ENTER**. This is the offset that will be applied at Day Temp Point 1 which is set below.
5. Press the ▼ key to select 'Day Temp Offset 2' and then press **ENTER**.
6. Use the ▲ and ▼ keys as necessary to change the offset and then press **ENTER**. This is the offset that will be applied at Day Temp Point 2 which is set below.
7. Press the ▼ key to select 'Day Temp Offset 3' and then press **ENTER**.
8. Use the ▲ and ▼ keys as necessary to change the offset and then press **ENTER**. This is the offset that will be applied at Day Temp Point 3 which is set below.
9. Press the ▼ key to select 'Night Temp Offset 1' and then press **ENTER**.
10. Use the ▲ and ▼ keys as necessary to change the offset and then press **ENTER**. This is the offset that will be applied at Night Temp Point 1 which is set below.
11. Press the ▼ key to select 'Night Temp Offset 2' and then press **ENTER**.
12. Use the ▲ and ▼ keys as necessary to change the offset and then press **ENTER**. This is the offset that will be applied at Night Temp Point 2 which is set below.
13. Press the ▼ key to select 'Night Temp Offset 3' and then press **ENTER**.
14. Use the ▲ and ▼ keys as necessary to change the offset and then press **ENTER**. This is the offset that will be applied at Night Temp Point 3 which is set below.
15. Press the ▼ key to select 'Day Temp Point 1' and then press **ENTER**.
16. Use the ▲ and ▼ keys as necessary to change the temperature and then press **ENTER**. This is the temperature at which Day Temp Offset 1 will be applied.
17. Press the ▼ key to select 'Day Temp Point 2' and then press **ENTER**.
18. Use the ▲ and ▼ keys as necessary to change the temperature and then press **ENTER**. This is the temperature at which Day Temp Offset 2 will be applied.
19. Press the ▼ key to select 'Day Temp Point 3' and then press **ENTER**.
20. Use the ▲ and ▼ keys as necessary to change the temperature and then press **ENTER**. This is the temperature at which Day Temp Offset 3 will be applied.
21. Press the ▼ key to select 'Night Temp Point 1' and then press **ENTER**.
22. Use the ▲ and ▼ keys as necessary to change the temperature and then press **ENTER**. This is the temperature at which Night Temp Offset 1 will be applied.
23. Press the ▼ key to select 'Night Temp Point 2' and then press **ENTER**.
24. Use the ▲ and ▼ keys as necessary to change the temperature and then press **ENTER**. This is the temperature at which Night Temp Offset 2 will be applied.
25. Press the ▼ key to select 'Night Temp Point 3' and then press **ENTER**.

26. Use the ▲ and ▼ keys as necessary to change the temperature and then press **ENTER**. This is the temperature at which Night Temp Offset 3 will be applied.
27. Press the **TEMP/ALARM** key to return to the main display.

To adjust the humidity offsets use the following steps:

1. Press and hold both the **ENTER** and **%RH** keys for approximately 3 seconds until the display changes to read 'Day RH Offset'. **Note:** Always press and hold the **ENTER** key before pressing and holding the **%RH** key.
2. Press the **ENTER** key.
3. Use the ▲ and ▼ keys as necessary to change the offset and then press **ENTER**.
4. Press the ▼ key to select 'Night RH Offset' and then press **ENTER**.
5. Use the ▲ and ▼ keys as necessary to change the offset and then press **ENTER**.
6. Press the **%RH** key to return to the main display.

To adjust the CO<sub>2</sub>/Aux offsets use the following steps:

1. Press and hold both the **ENTER** and **CO<sub>2</sub>/AUX** keys for approximately 3 seconds until the display changes to read 'Day Aux Offset'. **Note:** Always press and hold the **ENTER** key before pressing and holding the **CO<sub>2</sub>/AUX** key.
2. Press the **ENTER** key.
3. Use the ▲ and ▼ keys as necessary to change the offset and then press **ENTER**.
4. Press the ▼ key to select 'Night Aux Offset' and then press **ENTER**.
5. Use the ▲ and ▼ keys as necessary to change the offset and then press **ENTER**.
6. Press the **CO<sub>2</sub>/AUX** key to return to the main display.

## **Configuring Security (optional)**

**IMPORTANT!** : Please be aware of the following points before configuring security.

- Security is optional. If you do not need to secure your controller then do not configure security.
- If you are unsure about how to configure security, please contact Percival Scientific. If configuration is not done properly it can result in the controller becoming password locked. If this happens it will need to be returned to Percival Scientific and unlocked at your expense.
- Always write down passwords as you change them. This will prevent you from inadvertently restricting access to the controller. Keep the passwords in

a safe place that is readily accessible by those you trust with full access to the controller.

Four levels of security are available with the Intellus Ultra controller. Levels one through three can be assigned a password up to four characters. When the controller leaves Percival Scientific security is disabled. To activate security you must change only one of the default passwords. A description of what is accessible via each level follows:

#### **Level 4**

Level 4 is the most secure level and only allows access to the display loop. No password exists for this level. When logging off or if the controller senses no keypad activity for five minutes the controller will revert to this level.

#### **Level 3**

Level 3 allows level 4 access plus access to changing the temperature alarms (if activated), humidity alarms (if activated) and CO<sub>2</sub>/Auxiliary alarms (if activated). When logging in to the controller the Level 3 password must be entered to gain access to this level.

#### **Level 2**

Level 2 allows level 3 access plus full access to the time, temperature, lights, %RH and CO<sub>2</sub>/Aux menus. Level 2 also allows the running of program files but restricts the ability to program files. A password must be entered to gain access to this level. When logging in to the controller the Level 2 password must be entered to gain access to this level.

#### **Level 1**

Level 1 allows full access to the controller. When logging in to the controller the Level 1 password must be entered to gain access to this level.

#### **Security Level**

The Security Level password is used to gain entry to the menu that allows the changing of passwords. You cannot use the security password to log in and out of the controller.

Security is configured by holding both the **ENTER** and **▲** keys simultaneously for approximately four seconds. The controller will prompt you to enter the security level password, which is '1111'. If the first character of the password is not flashing, press the **ENTER** key. Use the **▲** and **▼** keys as necessary to change characters. Press the **PROG** key to advance to the next character. You may repeatedly press the **PROG** key to scroll through and review the password. Pressing the **PROG** key at the last

character will cause the character selection to wrap around. Press the **ENTER** key when the password '1111' has been successfully entered.

You will now be prompted to change the Level 1 (Lv11) password. The default password is '0001'. If you do not wish to change the password, press the ▼ key and continue reading at the next paragraph. To change the password, press **ENTER**, use the ▲ or ▼ key to change the flashing prompt to 'Yes' and then press **ENTER**. Next, press the ▼ key. You will be prompted to enter a new password for level 1. To enter the password, press **ENTER**. The first character will begin flashing. Use the ▲ and ▼ keys as necessary to change characters. Press the **PROG** key to advance to the next character. You may repeatedly press the **PROG** key to scroll through and review the password. Press the **ENTER** key when the password has been successfully changed.

You will now be prompted to change the Level 2 (Lv12) password. The default password is '0002'. If you do not wish to change the password, press the ▼ key and continue reading at the next paragraph. To change the password, press **ENTER**, use the ▲ or ▼ key to change the flashing prompt to 'Yes' and then press **ENTER**. Next, press the ▼ key. You will be prompted to enter a new password for level 2. To enter the password, press **ENTER**. The first character will begin flashing. Use the ▲ and ▼ keys as necessary to change characters. Press the **PROG** key to advance to the next character. You may repeatedly press the **PROG** key to scroll through and review the password. Press the **ENTER** key when the password has been successfully changed.

You will now be prompted to change the Level 3 (Lv13) password. The default password is '0003'. If you do not wish to change the password, press the ▼ key and continue reading at the next paragraph. To change the password, press **ENTER**, use the ▲ or ▼ key to change the flashing prompt to 'Yes' and then press **ENTER**. Next, press the ▼ key. You will be prompted to enter a new password for level 3. To enter the password, press **ENTER**. The first character will begin flashing. Use the ▲ and ▼ keys as necessary to change characters. Press the **PROG** key to advance to the next character. You may repeatedly press the **PROG** key to scroll through and review the password. Press the **ENTER** key when the password has been successfully changed.

You will now be prompted to change the Security Level (Slv1) password. The default password is '1111'. To change the password, press **ENTER**, use the ▲ or ▼ key to change the flashing prompt to 'Yes' and then press **ENTER**. Next, press the ▼ key. You will be prompted to enter a new password for the security level. To enter the password, press **ENTER**. The first character will begin flashing. Use the ▲ and ▼ keys as necessary to change characters. Press the **PROG** key to advance to the next character. You may repeatedly press the **PROG** key to scroll through and review the password. Press the **ENTER** key when the password has been successfully changed.

**IMPORTANT!:** It is necessary to change the security level password when implementing security. The security level password is used to enter the menu that allows the changing of passwords. If this password is not changed, anyone could use the default '1111' password and override password settings. **NOTE:** It is *extremely important* that

you remember the security level password after it is changed. If it is forgotten, the controller will need to be returned to Percival Scientific at your expense in order to restore it to its password defaults.

To exit the security menu, press and hold both the **ENTER** and **▲** keys simultaneously for approximately two seconds.

## **Logging In/Out**

Once security is configured each user that accesses the controller will need to log in and out.

To log in, use the following procedure

Press and hold both the **HELP** and **▼** keys until you are prompted to enter your password. Use the **▲** and **▼** keys as necessary to change characters. Press the **PROG** key to advance to the next character. You may repeatedly press the **PROG** key to scroll through and review the password. Pressing the **PROG** key at the last character will cause the character selection to wrap around. Press the **ENTER** key when the password has been successfully entered.

To log out, use the following procedure:

Press and hold both the **HELP** and **▼** keys until the “Logout Successful” message appears.

**IMPORTANT!:** Remember to log out when you are finished using the controller. The controller will automatically log you out if there is no keypad activity for five minutes.

## **Disabling Security**

To disable security you must reset each password to its default. See the ‘Configuring Security’ section for information on settings passwords.

- Level 1 Default Password : ‘0001’
- Level 2 Default Password : ‘0002’
- Level 3 Default Password : ‘0003’
- Security Level Default Password : ‘1111’

## **Battery Backup**

A battery is provided to protect the volatile memory of the controller in the cases where power is not applied to the chamber. Examples of volatile memory are controller time and running program status. The approximate life expectancy of the battery is 7



years. It is recommended that the battery be replaced every 5 years to prevent the controller from losing its volatile memory contents when power is not applied.

The battery can be replaced by the end user. A 3V lithium battery similar to a watch battery is used. The direct replacement number is Rayovac BR1225 but a suitable equivalent can be used. To replace the battery, turn power to the chamber off and then unplug all chamber power cords. Next, access the rear of the Intellus controller. Use a screwdriver to pry the battery loose. Be sure not to touch any of the other board components with the screwdriver when prying the battery loose. Do not use a magnetized screwdriver. Replace the battery and reapply power to the chamber. You will need to set the controller time and manual light settings as necessary. If you were running a program you will need to restart it as the controller will revert to running in manual mode when the battery is replaced. If assistance is necessary, please contact Percival Scientific.

