



IntellusUltra Control Tablet Application

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Introduction

The IntellusUltra Control touchscreen application provides a convenient and intuitive user interface for programming and monitoring IntellusUltra and IntellusUltraConnect controllers. The touchscreen application works strictly as an interface to the IntellusUltra controller, and does not directly perform any chamber control functions. All control functions are performed by the IntellusUltra controller itself. If the application is closed, or the tablet is powered off, the chamber will still function.

The IntellusUltra controller is typically located behind the tablet and its housing. If you ever need to access the controller you will need to remove the tablet/bezel. Please contact our offices for advice on removing the tablet and bezel.

Please feel free to contact Percival Scientific with any questions you may have about this manual or using the IntellusUltra Control tablet application by calling 1-800-695-2743 or 515-465-9363 or by sending e-mail to service@percival-scientific.com.

Launching the IntellusUltra Control Application

The IntellusUltra Control application automatically launches whenever the chamber is powered. If you have closed the application, it may also be launched from the tablet's home screen. If the application does not automatically launch, simply touch the app's icon to launch the app.

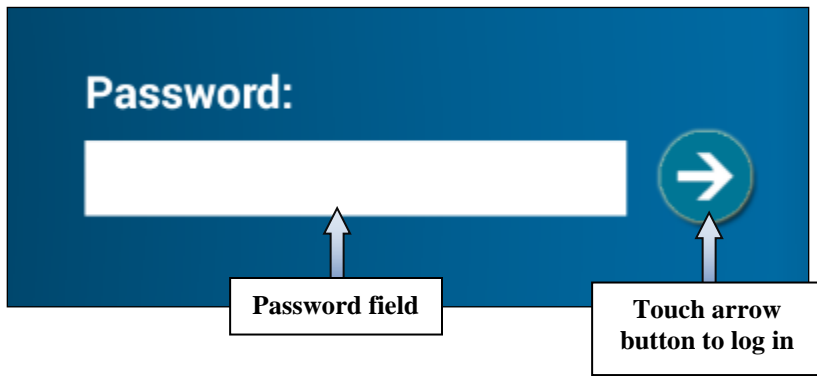
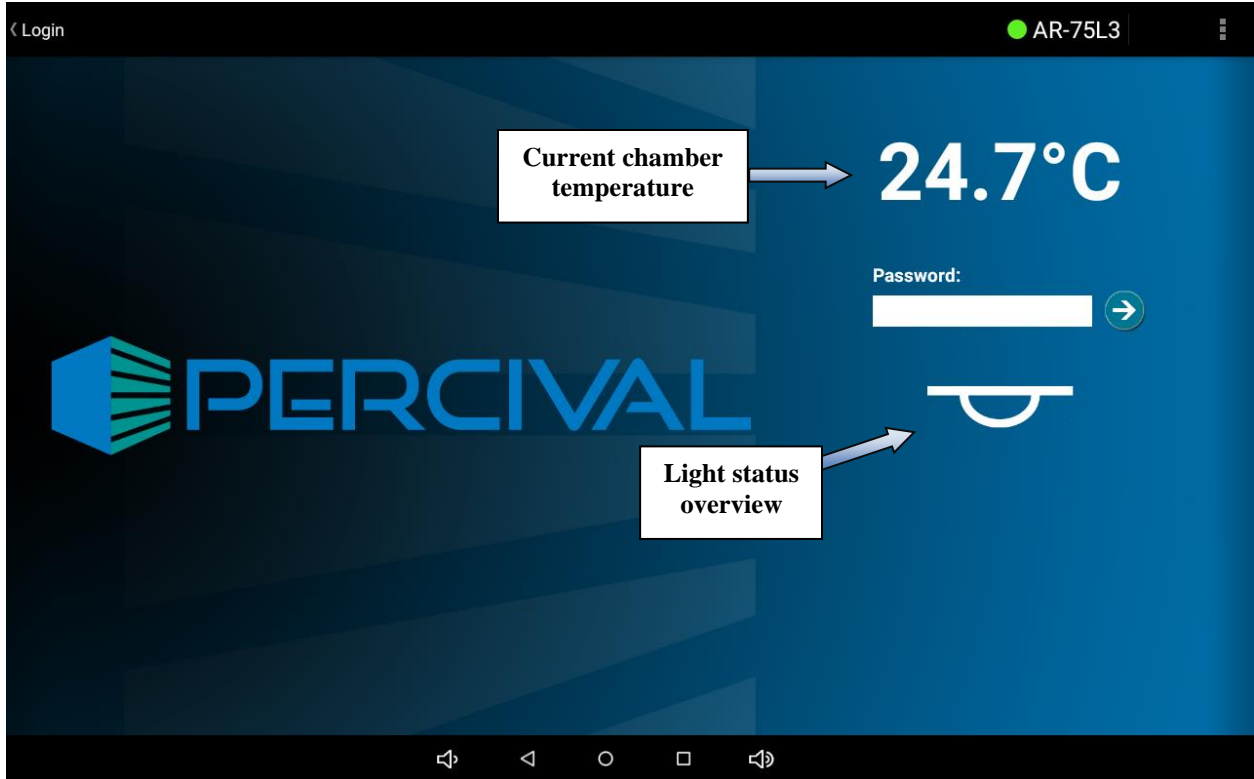
In addition to this manual, we have made some tutorial videos that are posted on our YouTube channel. Visit <https://www.youtube.com/@percivalscientific6365/videos> to view or video catalog.



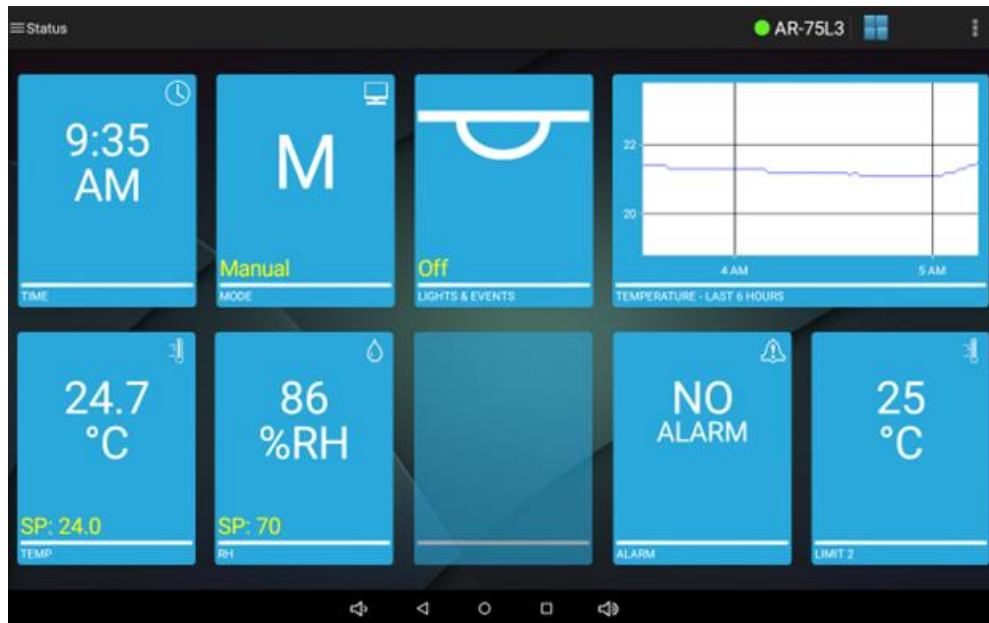
Login Screen

The login screen appears once the application is launched. This screen shows the current temperature in the chamber as well as an overview of the light status. The screen also allows the user to enter a password if security has been configured. Please refer to the section titled, ***“Settings – Security Screen”*** for information on configuring security.

If security has not been enabled simply touch the arrow button to log into the application. If security has been enabled touch anywhere in the password field. This will launch a keyboard allowing you to enter a password. Passwords may be up to four alphanumeric characters in length. Once the password has been entered, touch the arrow button to log in.

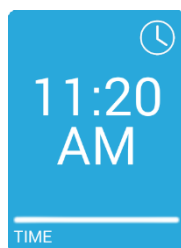


Status Screen

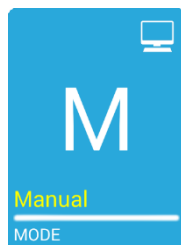


Status Screen

Once you have successfully logged in you will be taken to the status screen. The status screen provides an overview of the chamber's current status. The information on the status screen is updated once per minute. A time tile, operation mode tile, light overview tile, six hour temperature graph tile, temperature tile, humidity tile (if humidity system was ordered), auxiliary tile (if auxiliary system was ordered), alarm tile and limit 2 temperature tile provide the current status in the chamber.



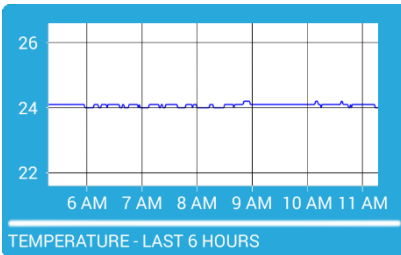
The time tile displays the current controller time. The time should match the current time in your location. See the section titled, ***“Settings – Time Screen”*** for information on setting controller time.



The operation mode tile displays the current running controller mode (M = manual mode, Di = diurnal mode, DLI = DLI mode, P = program mode and S = sequence mode). The tile also displays the current running program name if a program is running.



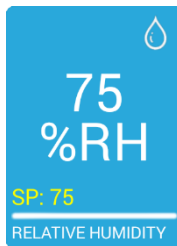
The lights tile displays an overview of the lighting outputs. A different icon will be displayed on the tile depending on whether all lights outputs are programmed off, are programmed partially on or are all programmed on.



The graph tile displays a plot of the temperature process value for the last six hours.



The temperature tile displays the current temperature process value and the set point (SP)



If a humidity system was ordered, the relative humidity tile displays the current humidity process value and the set point (SP)



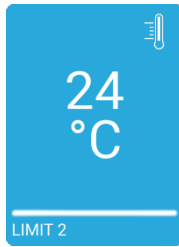
If an auxiliary system was ordered, the auxiliary tile displays the current auxiliary process value and the set point (SP)



A blank tile appears in the place of the humidity or auxiliary tiles if either system was not ordered. In the status screen example image, the auxiliary tile is blank because an auxiliary system was not ordered.



The alarms tile displays the current alarm status. This tile will turn red and display the alarm on the tile when an alarm is active.



The limit 2 tile displays the current redundant temperature process value.

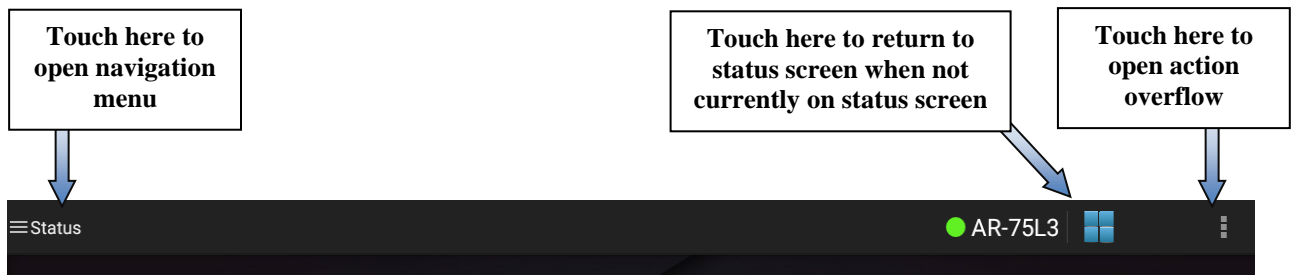
You may return to the status screen at any time by touching on the status screen icon in the action bar or by selecting **Status** from the navigation menu. Please refer to the ***“General Navigation”*** section below for more information.

General Navigation

The following section describes general navigation of the application.

Action Bar

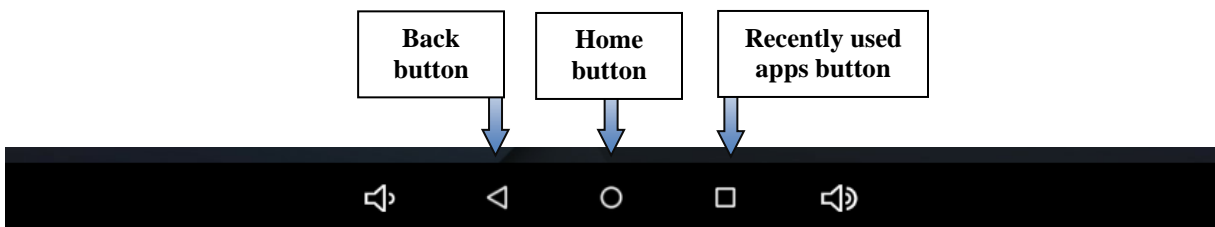
The action bar is displayed at the top of every screen. The action bar is used to display the navigation menu, display the controller name, provide a way to return to the status screen and to select additional options using the action overflow.



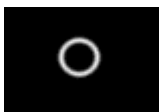
Action Bar

Back, Home and Recently Used Apps Buttons

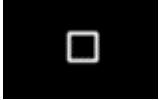
The back, home and recently used apps buttons appear on the bottom of all screens.



The back button will take you back to the last screen you accessed in the application. Touching this button while on the status screen may minimize the application.



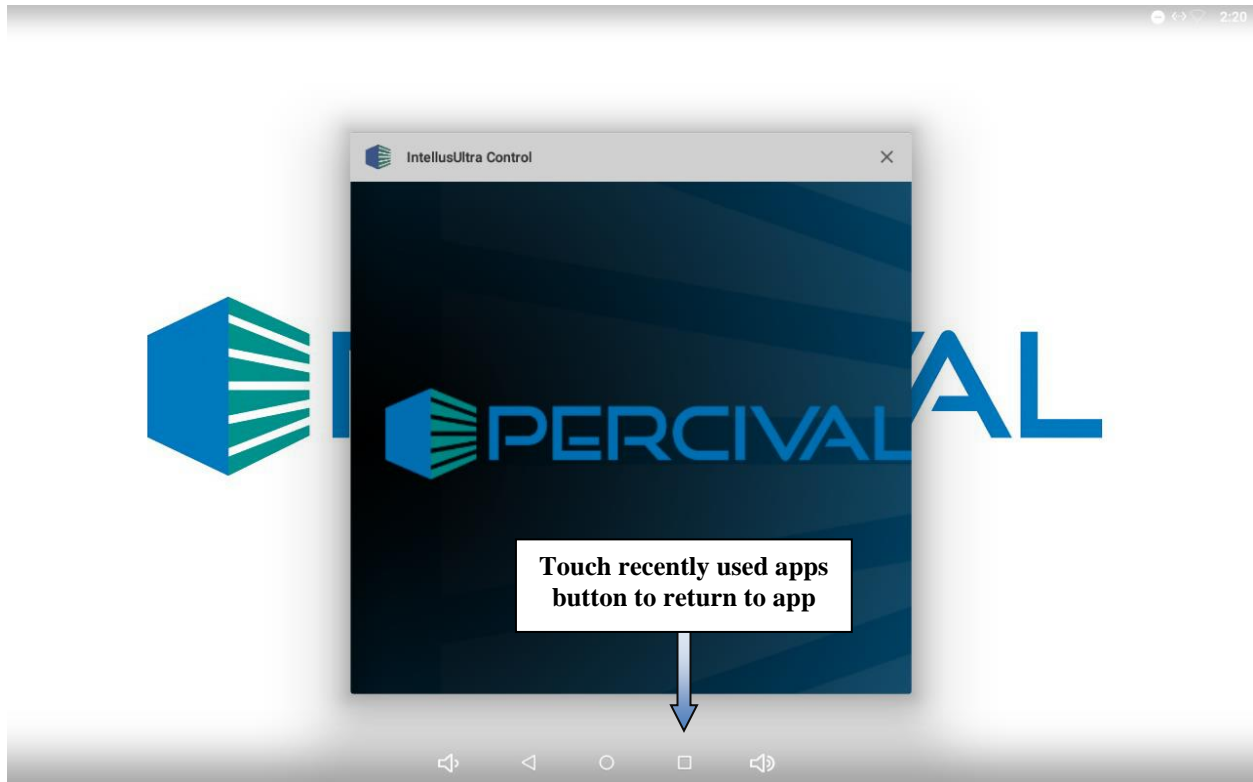
The home button will take you back to the tablet's home screen. This button should normally not be touched. If you touch this button you will need to touch the IntellusUltra Control app icon on the tablet's home screen to open the app again.



The recently used apps button displays a list of the open apps on the tablet. This button should normally not be touched. If you touch this button, simply touch it again to return to the app.

Recently Used Apps Screen

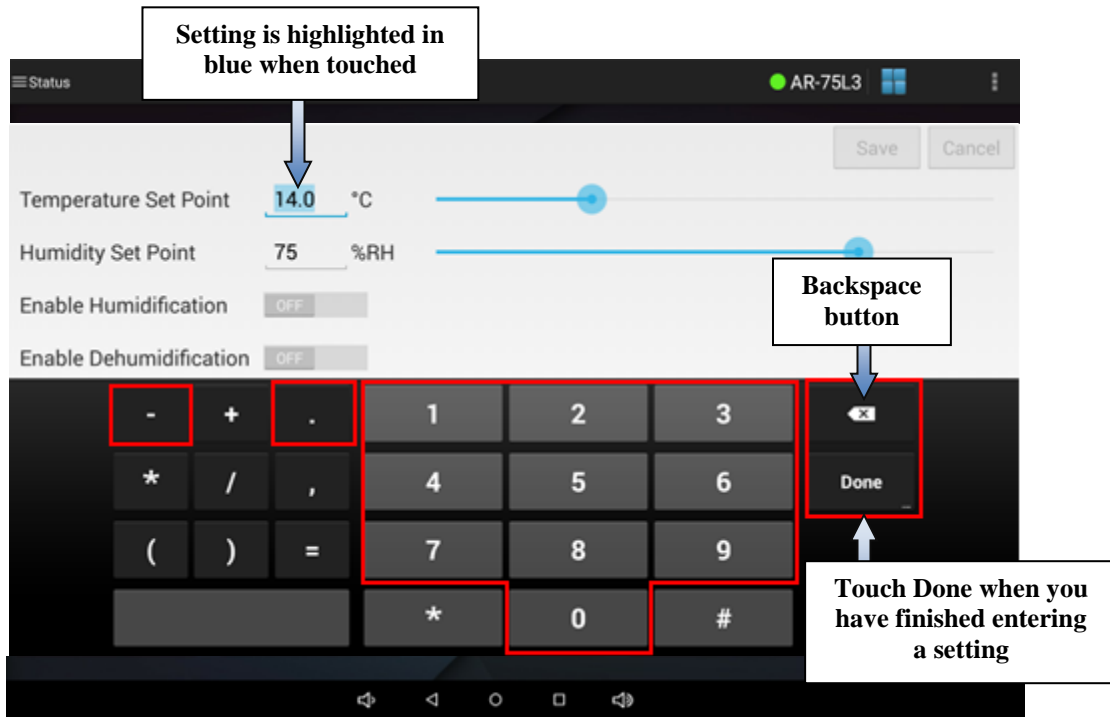
The recently used apps screen will appear if you touch the recently used apps button. To get back into the app, touch the recently used apps button again.



Recently Used Apps Screen

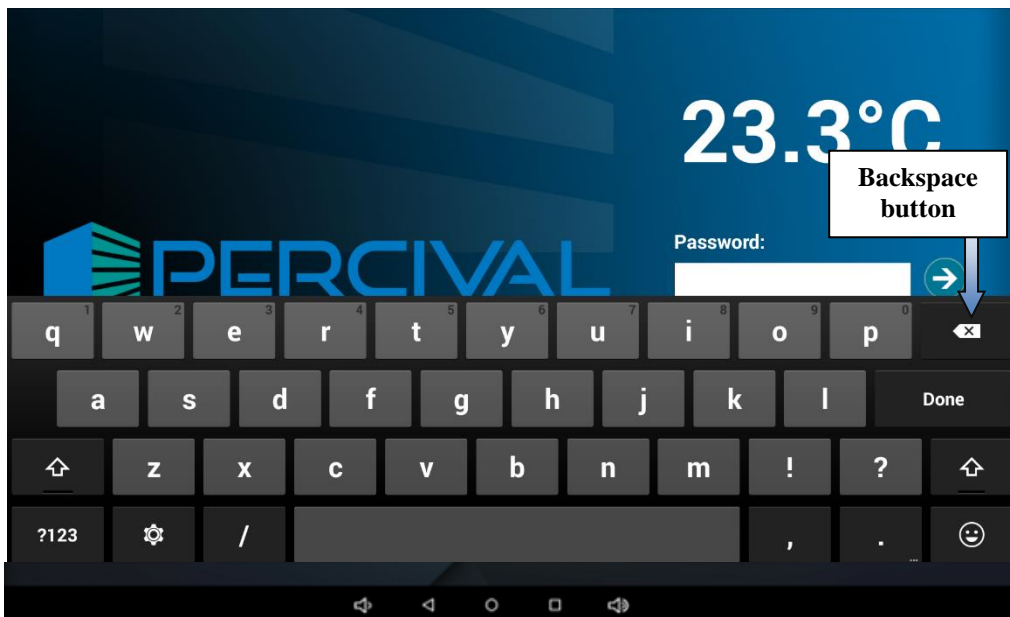
Keyboard

The keyboard appears when you touch an area that allows a setting to be modified. Changing a numeric setting will cause the numeric keyboard to appear. To change a setting using the numeric keyboard, use the keys to enter your desired value and touch the **Done** button when finished. Avoid touching the “+”, “*”, “/”, “,”, “(”, “)” and “=” keys as they are not used by the app. The keys highlighted in red are the only numeric keys utilized by the app. Use the backspace button to delete characters.



Numeric Keyboard

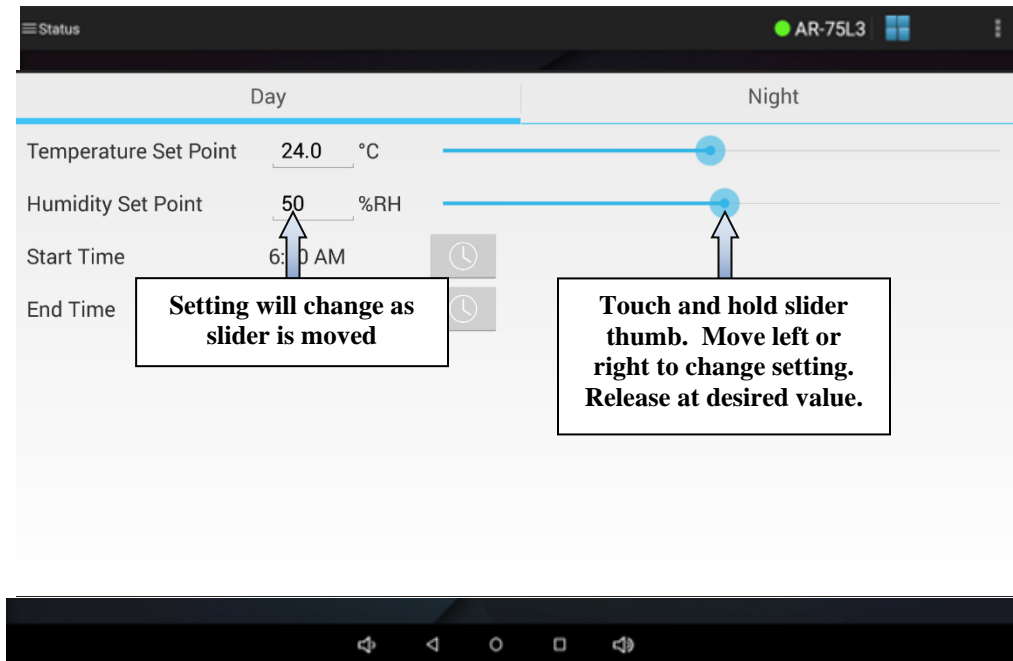
Changing an alphanumeric setting will cause the alphanumeric keyboard to appear. To change a setting using the alphanumeric keyboard, use the keys to enter your desired value and touch the **Done** button when finished. Use the backspace button to delete characters.



Alphanumeric Keyboard

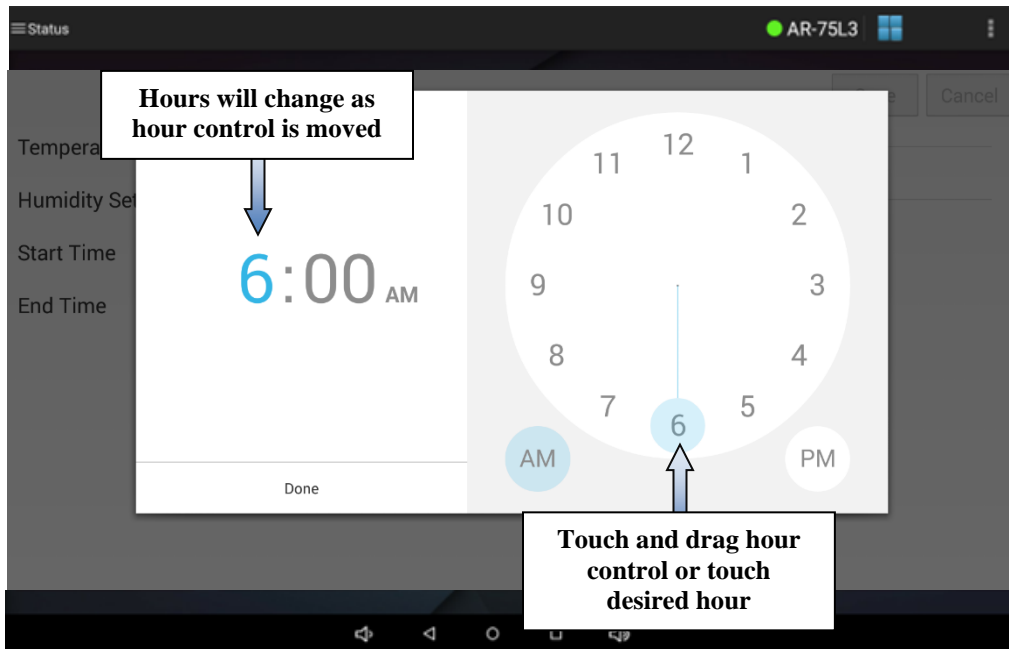
Sliders

Sliders are used to quickly change values in whole numbers. When moving a slider the setting next to the slider will change. To use a slider, touch and hold the slider thumb and then drag the thumb left or right. Release the slider thumb once the setting is at the desired value.

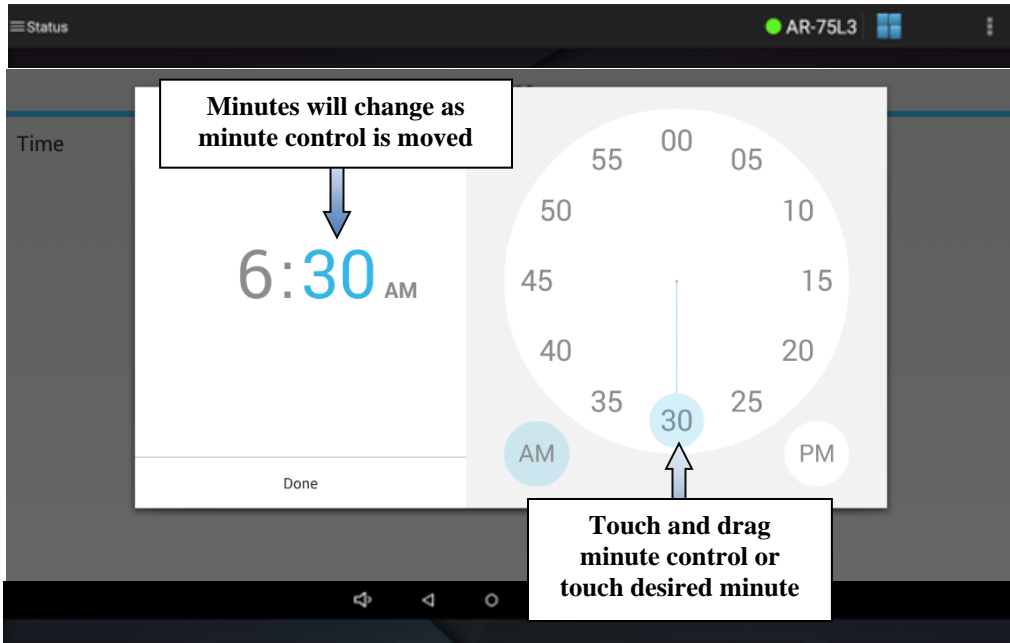


Time Picker

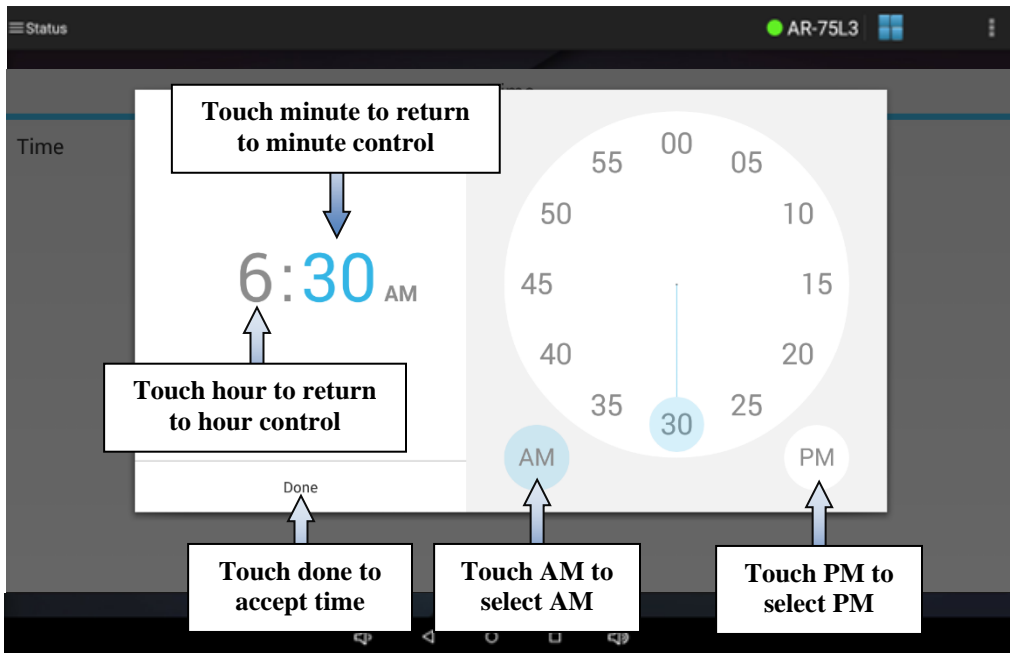
The time picker will appear when changing settings based on time. To use the picker, either touch and drag the hour control or touch the desired hour. You will notice that the hour changes in the time display to the left of the clock as well as on the clock's face. Once you have set the hour, release the hour control if you were dragging it. The time picker will automatically switch to the minutes control. Either touch and drag the minutes control or touch the desired minute to set the minutes. If you need to go back and change the hour, touch the hour on the time display to the left of the clock. If you need to go back and change the minutes, touch the minutes on the time display to the left of the clock. Once you have selected the hours and minutes, select AM or PM for the time by touching the AM or PM buttons. When you are finished, touch the **Done** button.



Time Picker – Hour Control

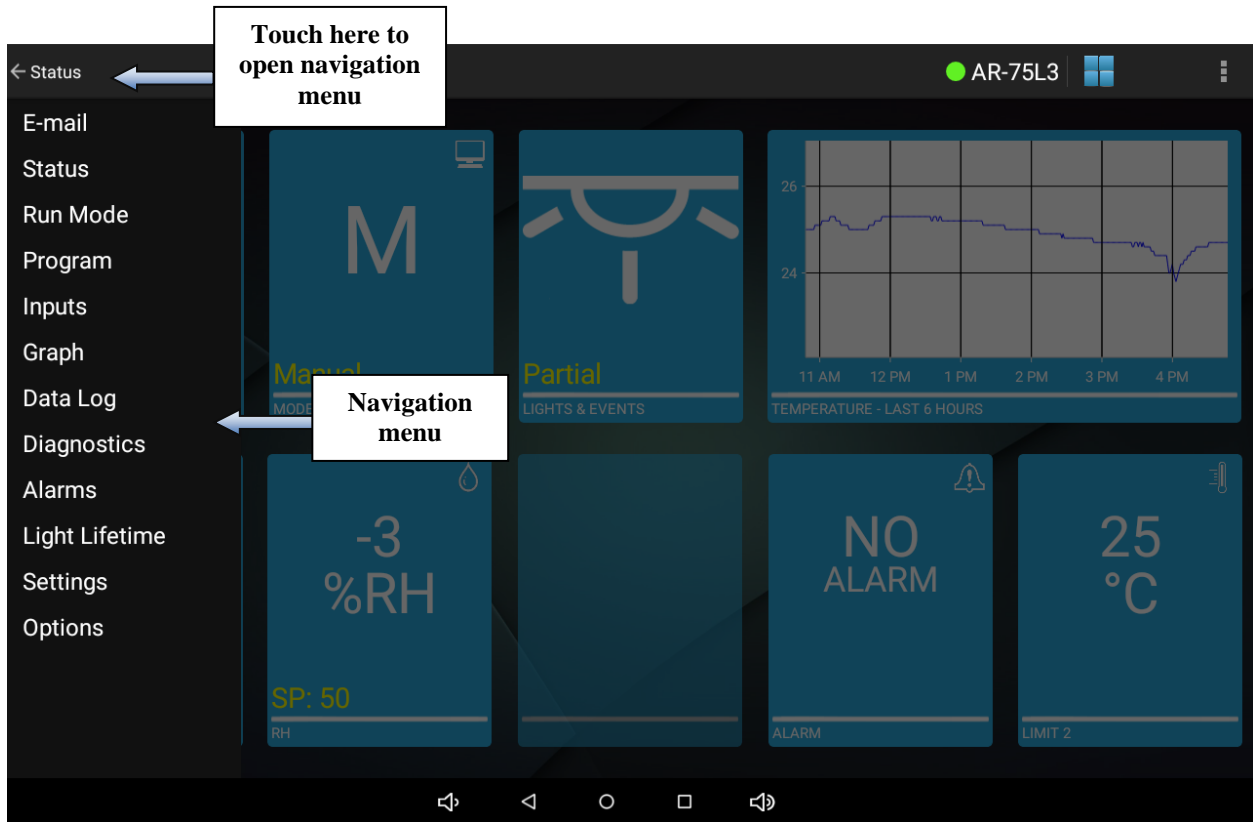


Time Picker – Minute Control

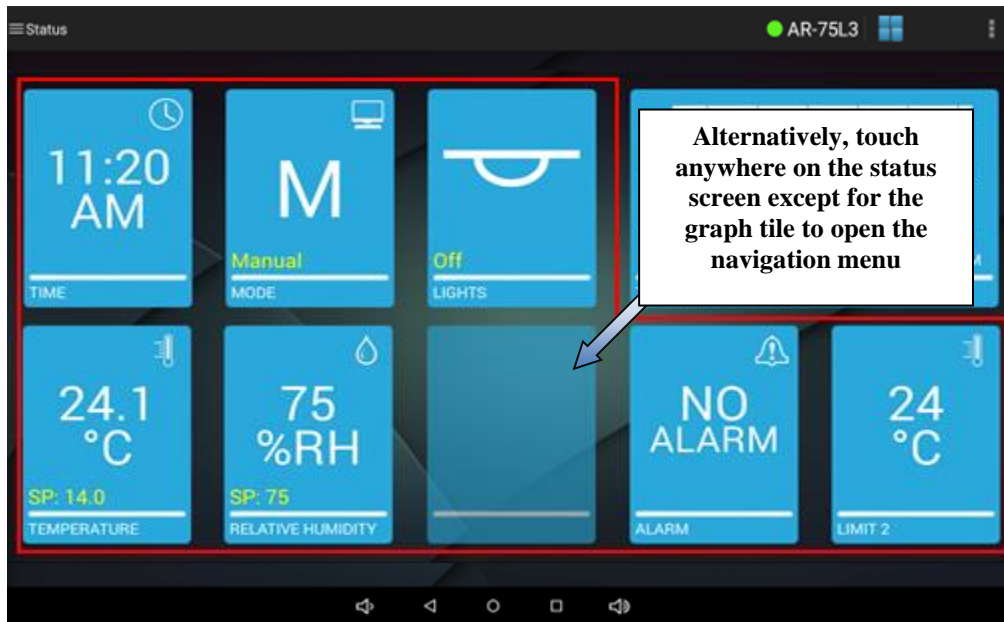


Navigation Menu

The navigation menu is used to select the different IntellusUltra control features of the application. To display the navigation menu at any time touch the navigation menu area of the action bar (top left). The navigation menu may also be displayed by touching anywhere on the status screen except for the graph tile. Touching the graph tile will take you to the graph screen.



Navigation Menu



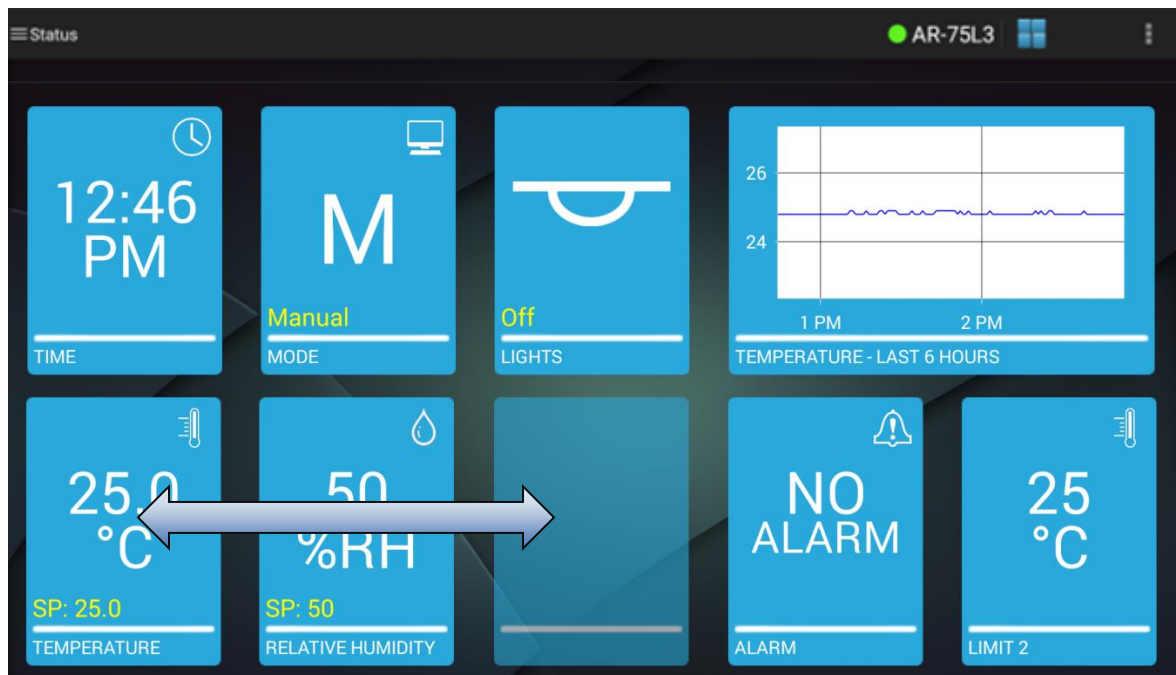
The navigation menu contains the following menu items:

- **Status** – Used to return to the status screen.
- **Run Mode** – Used to select the desired operation mode of the controller.
- **Program** – Selecting this menu item will open a submenu consisting of the following items:
 - **Diurnal** – Used to configure settings for the diurnal program option.
 - **Two-step** – Used when Diurnal programming is needed but you need to adjust the lighting (Diurnal is only all On or all Off).
 - **DLI** (if applicable) – Used to configure settings for the DLI program option. This option only appears when a closed loop dimmable lighting option was ordered.
 - **Multi-step** – Used to create and edit multi-step programs.
 - **Sequence** – Used to create a sequence of multi-step programs.
- **Inputs** – Used to set the manual settings for temperature, humidity (if applicable), auxiliary (if applicable) and lighting (if applicable). These settings are continually ran when running the manual operation mode. Also used to program defrost periods when a low temperature option was ordered. This menu item will not appear when running a program.
- **Graph** – Displays a 24-hour graph of the temperature process value and set point. The graph can also contain a second plot of either the humidity (if applicable) and auxiliary (if applicable).
- **Data Log** – Used to export data to a USB drive.
- **Diagnostics** – Used to display diagnostic information of the chamber and controller.
- **Alarms** – Used to set alarm settings for temperature.
- **Light Lifetime** – Used to view and reset the light lifetime of light outputs.

- **Settings** – Selecting this menu item will open a submenu consisting of the following items:
 - **Calibration** – Used to set calibration offsets for temperature, humidity (if applicable) and auxiliary (if applicable).
 - **Time** – Used to set the controller time.
 - **Prog Type** – Used to set the program type.
 - **Security** – Used to configure security.

Input Tile Navigation

Only three input tiles are displayed on the main display screen at a time. If inputs 4-7 are enabled on the Intellus control system, the corresponding input tiles can be viewed on the main display screen by swiping left in this area of the screen. Swiping to the right will show the previous three input tiles.



Action Overflow Menu

The action overflow menu is used to perform the following actions:

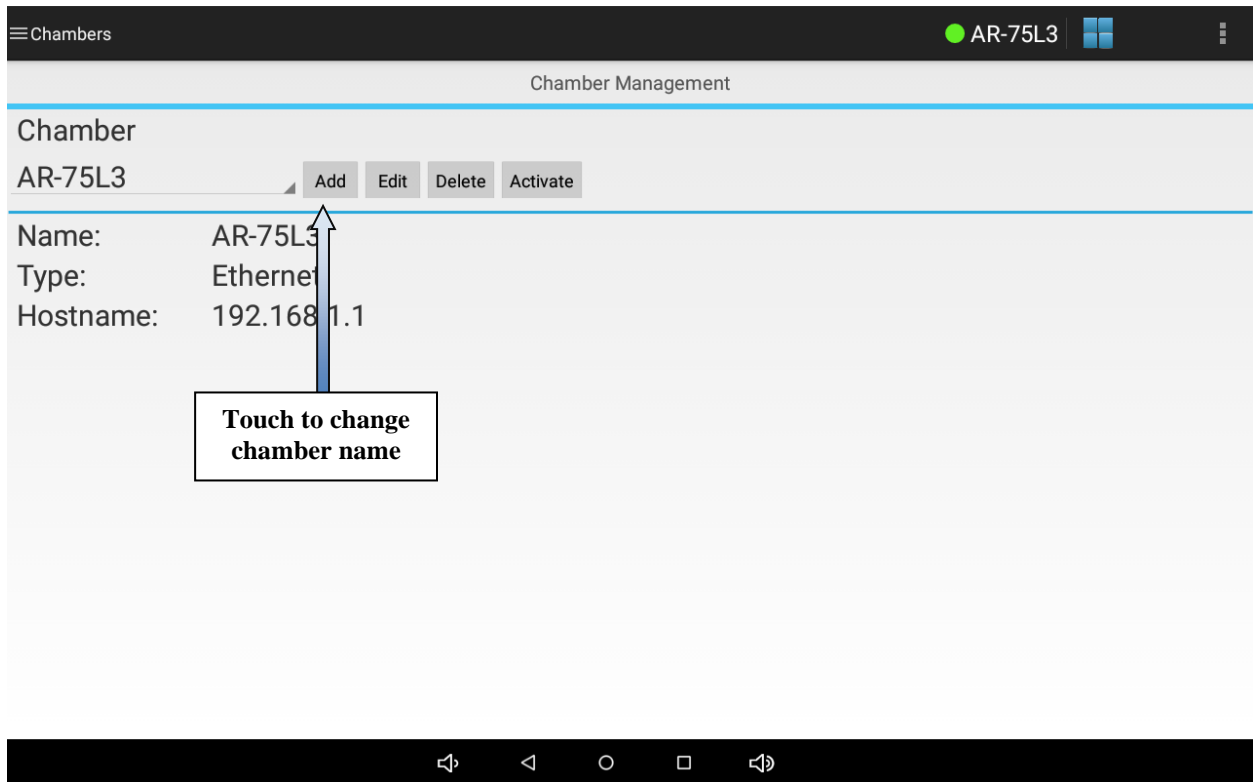
- Manage chambers – Setting up communications if not setup already.
- Log out
- Display app version
- Save a debug log

To open the action overflow menu, touch the action overflow button.



Action Overflow - Manage Chambers

The manage chambers option allows you to rename the chamber. This is an optional feature. The chamber name is the model number by default. If you wish to change the chamber name, open the action overflow menu by touching the action overflow button. Next, touch **Manage Chambers**. Next, touch the “Edit” next to the name field. The alphanumeric keyboard will appear allowing you to change the name. Touch the **Next** button when you have finished changing the name. The Type will now display. This most likely will be Ethernet. Touch the **Next** button again and the IP Address or Hostname will appear. Do not change this unless required by your IT administrator. Press Save then Activate when finished. The name you chose will appear on the action bar.



Manage Chambers Screen

Action Overflow – Log Out

Use the log out action when you wish to log out of the tablet app when security is enabled. Please refer to the section titled “**Settings – Security Screen**” for information on configuring security. The app will automatically log out after 10 minutes of inactivity. If you wish to log out sooner, touch the action overflow menu button and choose **Log Out**. You will be taken to the login screen.

Action Overflow – About

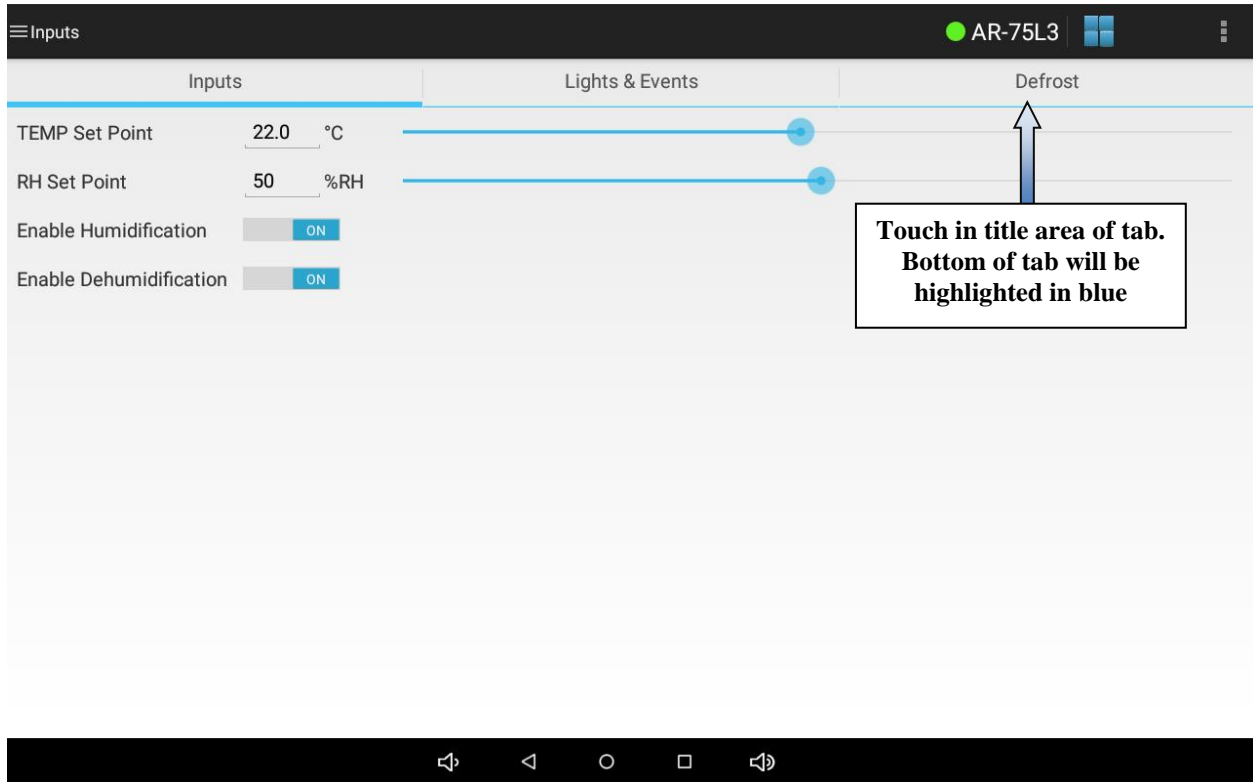
Use the about action to display the current version of the tablet app.

Action Overflow – Save Debug Log

Use the save debug log option to create files that may be sent to Percival Scientific for troubleshooting issues with the app.

Selecting Tabbed Pages

Some screens have more than one page of settings. These settings are laid out as tabbed pages. To switch between tabbed pages, touch anywhere in the tab title area. The bottom of the tab will be highlighted in blue to indicate the tab has been selected.

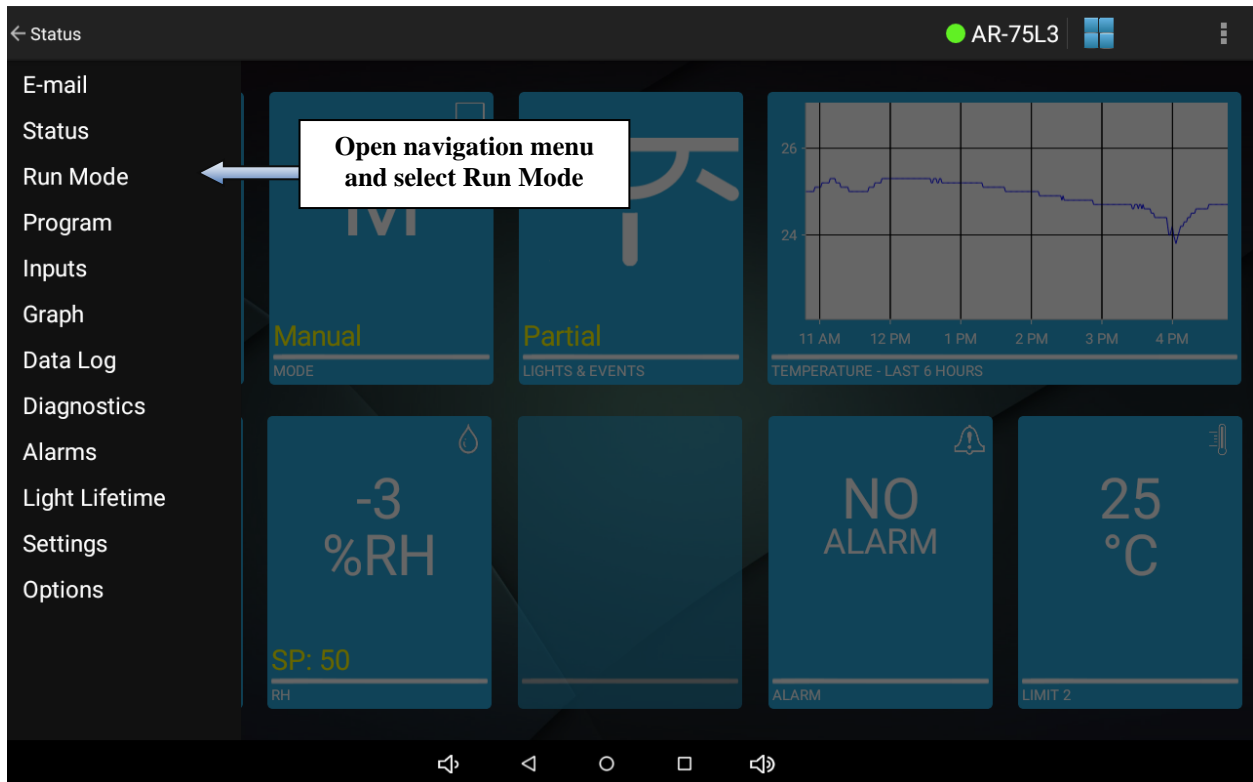


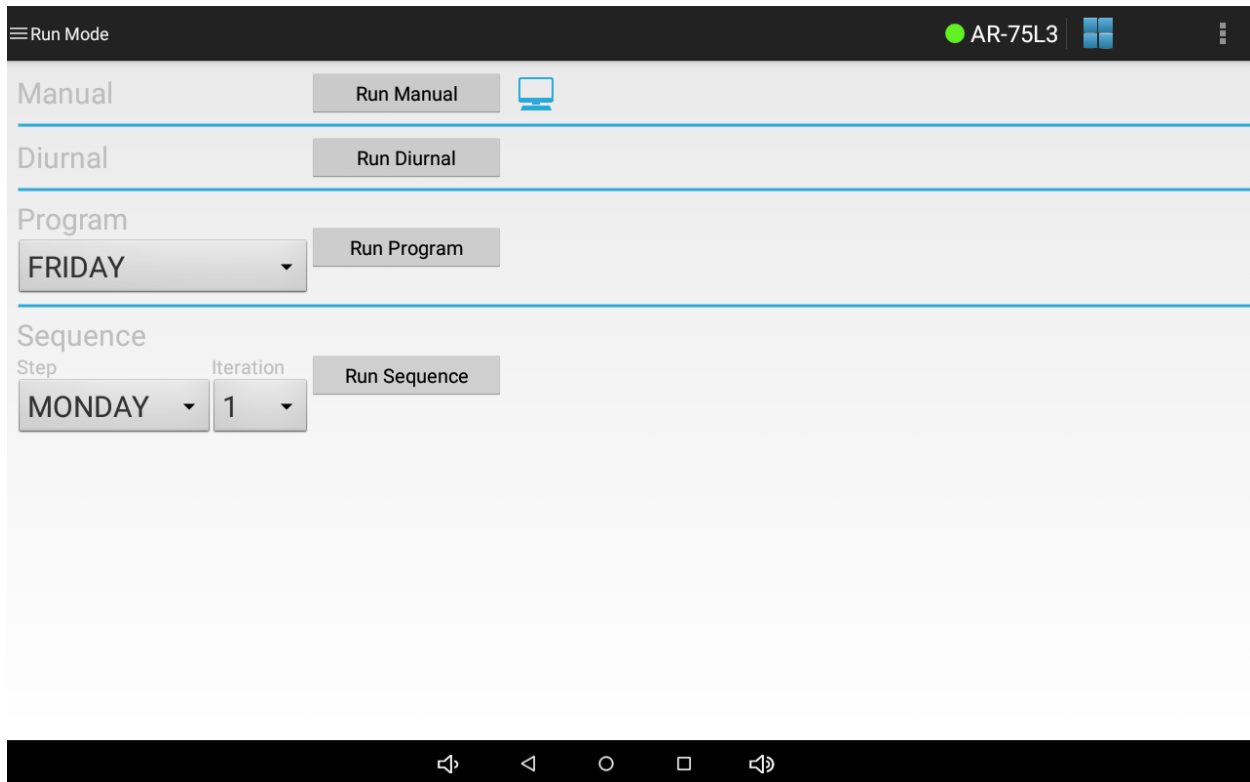
Controller Time

One of the first tasks that should be accomplished when running the tablet application for the first time is to set the controller time. This may be accomplished using the settings - time screen. Please refer to the section titled, ***“Settings – Time Screen”*** for information on setting the controller time.

Run Mode Screen

The run mode screen is used to select the mode of operation you wish the controller to run. To access the run mode screen, open the navigation menu and select **Run Mode**.





Run Mode Screen

The following operation mode types may be run from the run mode screen.

Manual mode Manual mode is used to run constant set points for temperature, humidity (if applicable), auxiliary (if applicable) and lighting (if applicable). Please refer to the section titled ***“Manual Screen”*** for information on changing manual settings.

Diurnal mode Diurnal mode is used to run a set of day and night settings for temperature, humidity (if applicable), auxiliary (if applicable) and lighting (if applicable). Please refer to the section titled ***“Program - Diurnal Screen”*** for information on changing the diurnal program settings.

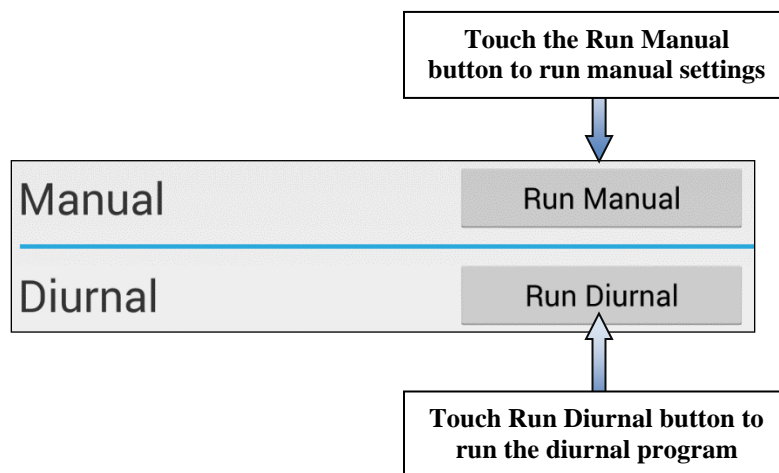
Two-step mode Two-step mode is used to run a set of day and night settings for temperature, humidity (if applicable), auxiliary (if applicable) and lighting (if applicable). The main advantage is you can adjust the lighting whereas the Diurnal mode is either all On (or 100%) or all Off (or 0%). Please refer to the section titled ***“Program – Two-step Screen”*** for information on changing the Two-step program settings.

DLI mode DLI mode is a special programming mode that only appears if a closed loop dimmable lighting option was ordered. Please refer to the section titled **“Program - DLI Screen”** for information on changing the DLI program settings.

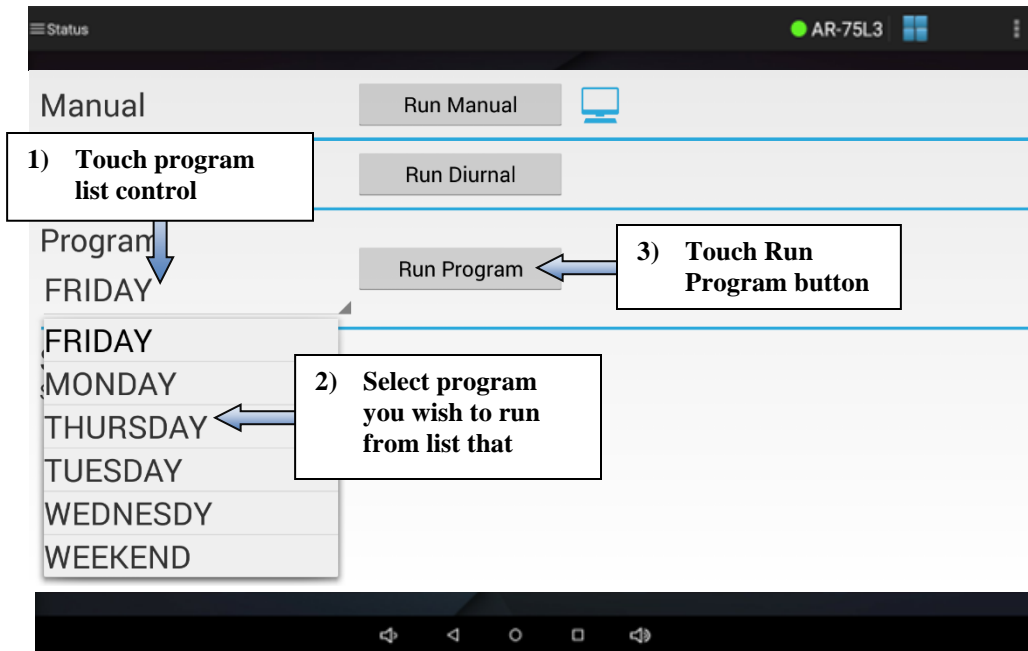
Program mode Program mode is used to run a multi-step program. A multi-step program allows you to enter multiple settings for temperature, humidity (if applicable), auxiliary (if applicable) and lighting (if applicable) throughout a 24-hour or longer period. Please refer to the section titled **“Program – Multi-step Screen”** for information on entering a multi-step program.

Sequence mode Sequence mode is used to run a series of multi-step programs. Please refer to the section titled **“Program – Sequence Screen”** for information on programming a sequence.

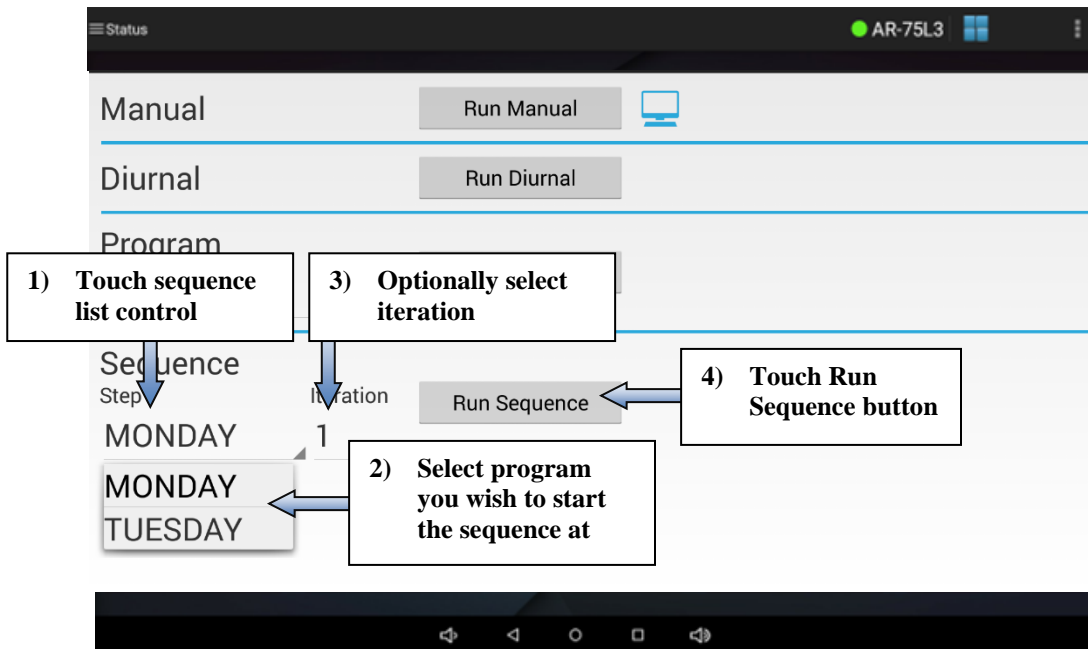
To run the manual, diurnal or DLI mode, touch the button for the mode you wish to run. The mode will start running immediately. A run mode icon will indicate which mode is running.



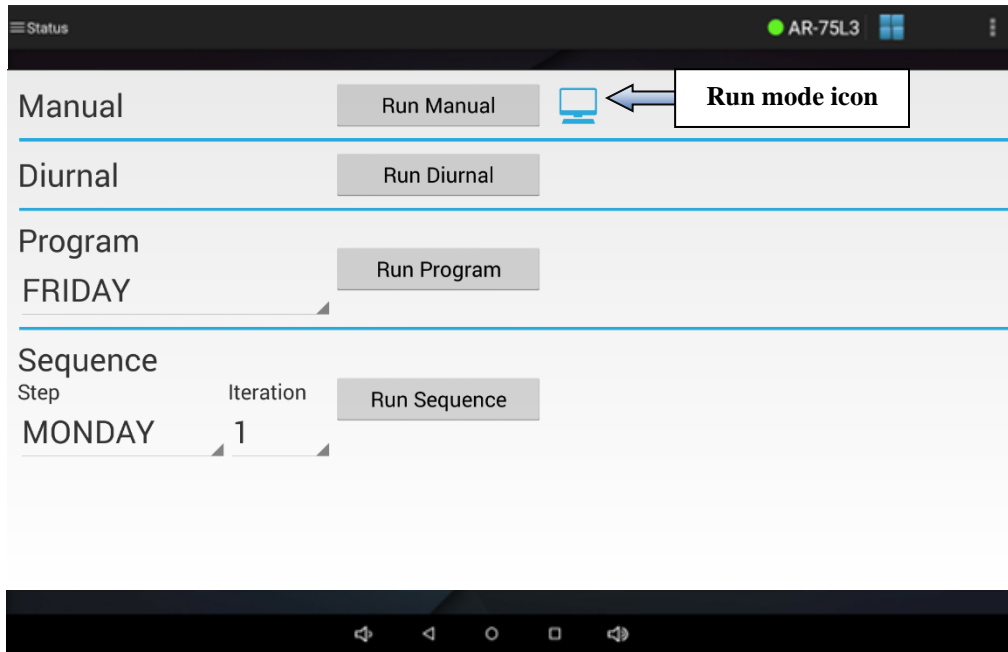
To run a multi-step program, first touch the program list control and select which program you wish to run from the list that appears. Next, touch the **Run Program** button. The mode will start running immediately. A run mode icon will indicate that the program is running.



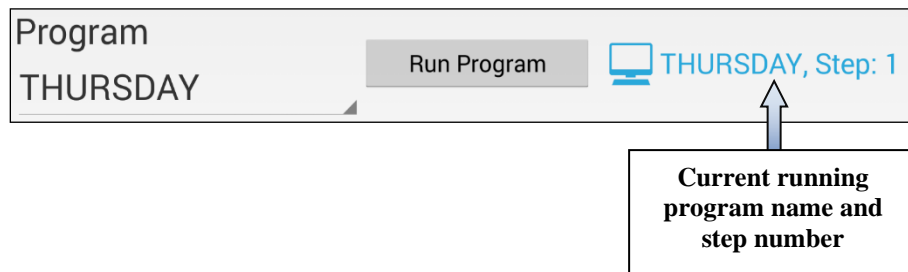
To run the sequence mode, first touch the sequence step list control and select which program you wish to start the sequence at from the list that appears. Typically this would be the first program in the sequence. Next, optionally touch the iteration control and select which iteration of the first program you wish to start the sequence at. Typically this would be 1 for the first iteration. Next, touch the **Run Sequence** button. The mode will start running immediately. A run mode icon will indicate that the sequence is running.



A run mode icon indicates which mode is currently running. In the sample below, the run mode icon is displayed in the manual mode row which indicates manual settings are currently running.



If the run mode icon is in the program row a program is running and the current running program name and step number will be displayed next to the icon.

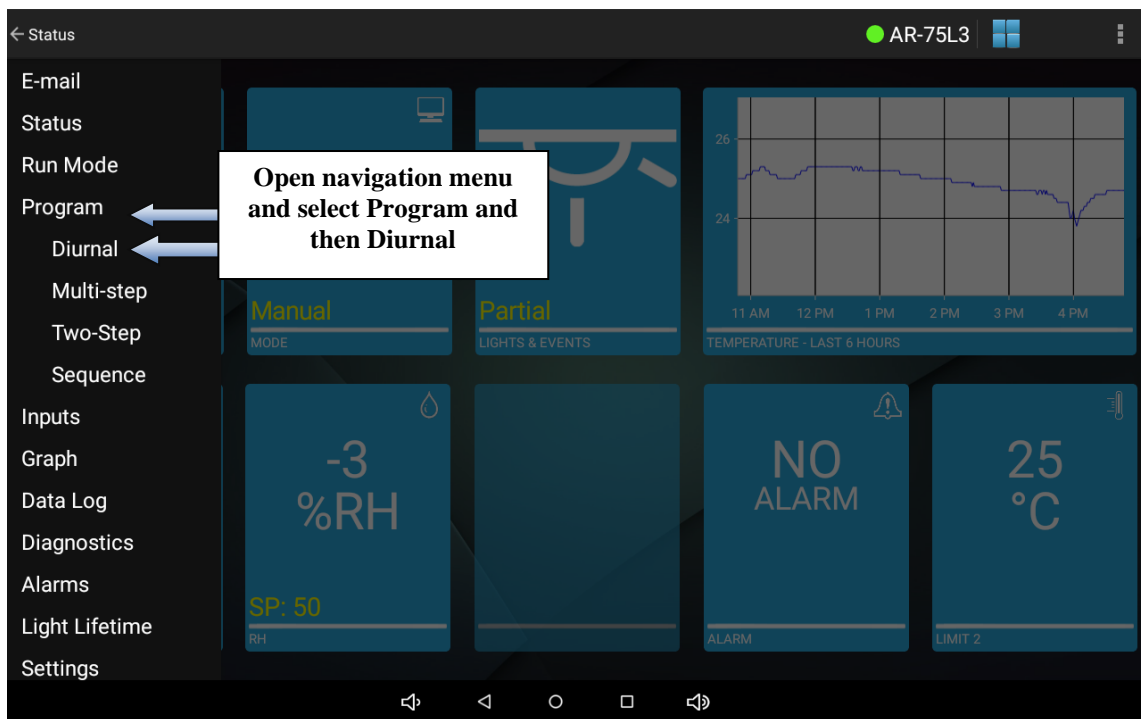


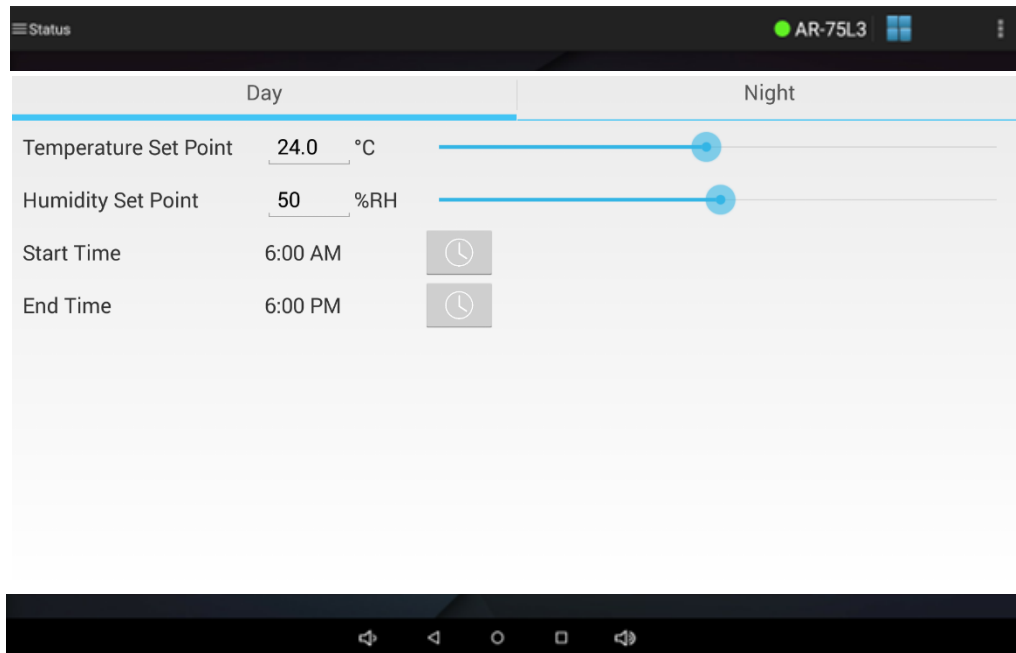
If the run mode icon is in the sequence row a sequence is running and the current running program name, sequence step number and sequence iteration number will be displayed next to the icon.

Program - Diurnal Screen

The program - diurnal screen is used to configure a diurnal program, which allows users to quickly set up a simple day/night program with two sets of set points. The configuration of a diurnal program requires users to enter the relevant day and night set points for each chamber process value and the day period start and end times. During the day period, all light outputs will be on (100%). During the night period, all light outputs will be off. For additional information, please refer to the IntellusUltra & Connect Manual.

To access the program - diurnal screen, open the navigation menu and select **Program** and then select **Diurnal** from the submenu that appears.

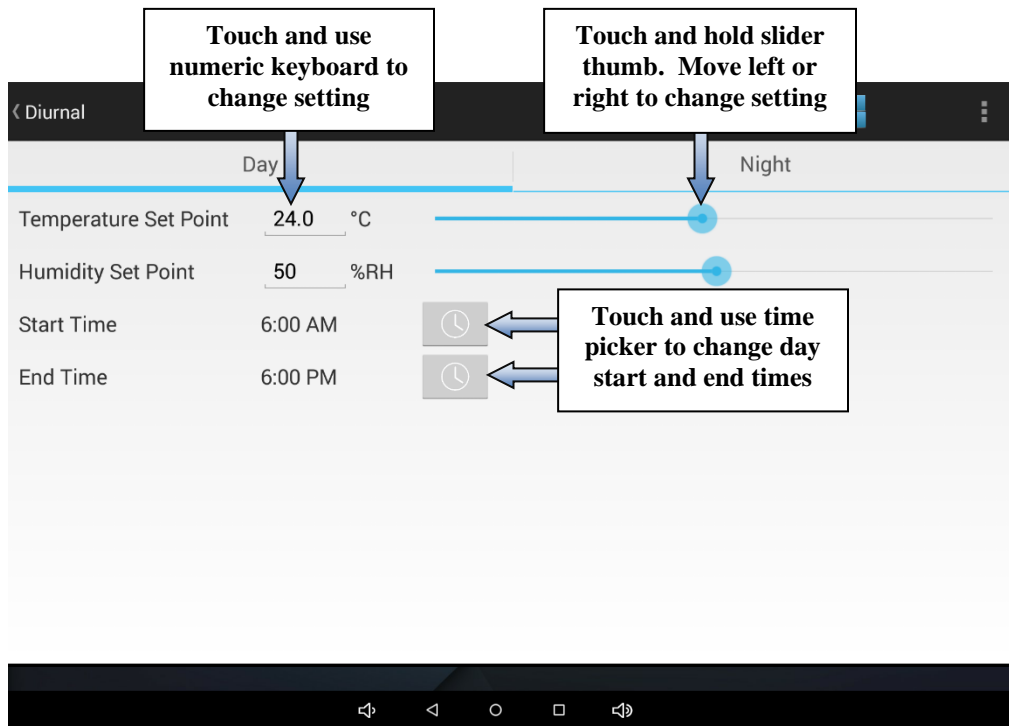




Program - Diurnal Screen

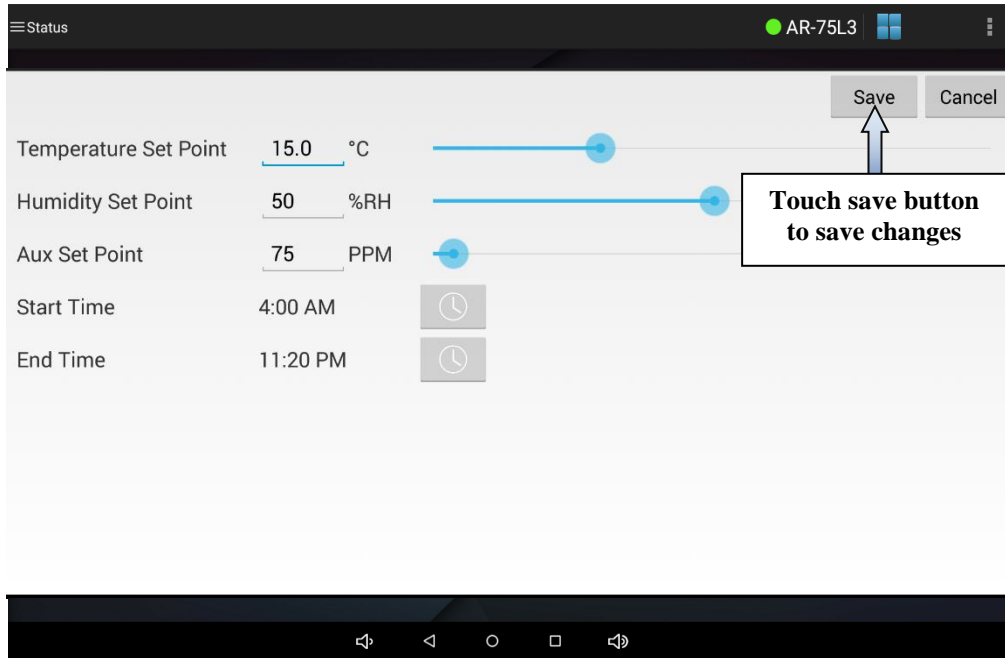
To set the temperature, humidity (if applicable) and auxiliary (if applicable) day settings for the diurnal program, either touch each setting and use the numeric keyboard to change the setting or use the slider next to each setting.

To change the length of the day period of the diurnal program, touch the time picker button for the start and end times and use the time picker to set each time. The night period will be the remainder of the 24 hours minus the length of the day period.

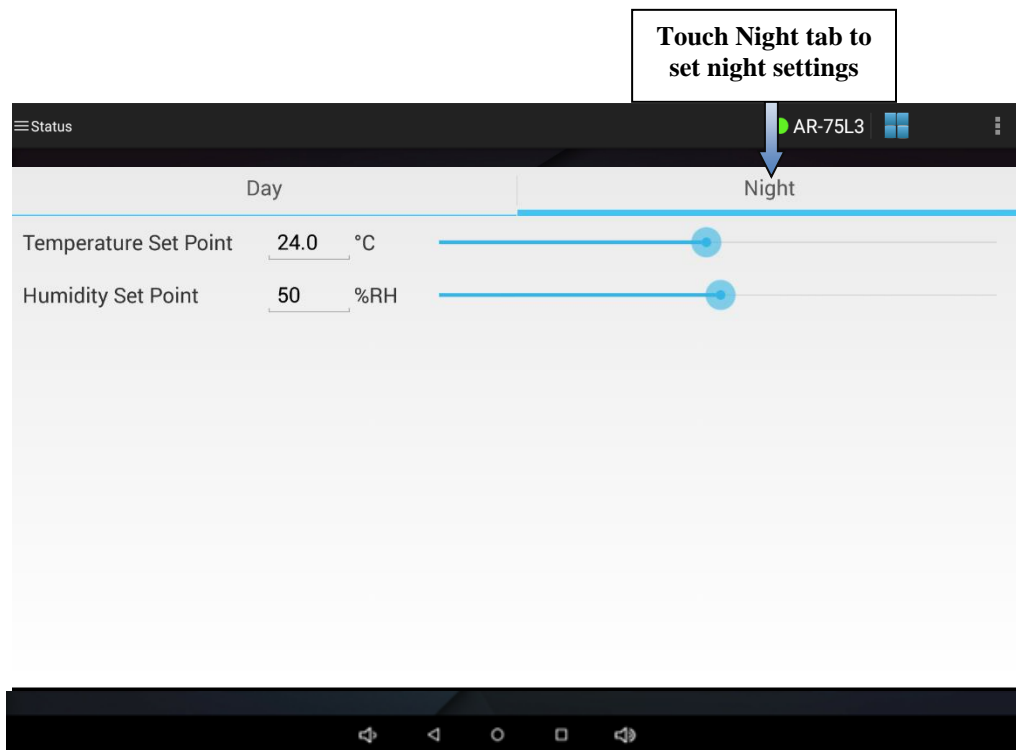


IMPORTANT!

When changing settings, you must touch the **Save** button at the top right of the page in order to save any modified settings. You may change any or all settings on a page before touching **Save**. However, if you do not touch **Save** before navigating away from the page the settings modified on the page will revert back to their original values.



To set the temperature, humidity (if applicable) and auxiliary (if applicable) night settings for the diurnal program first select the **Night** tab. Next, either touch each setting and use the numeric keyboard to change the setting or use the slider next to each setting. Touch the **Save** button to save any changes.



When you have finished configuring the settings for the diurnal program you may run the diurnal program by navigating to the **“Run Mode”** screen and touching the **Run Diurnal** button.

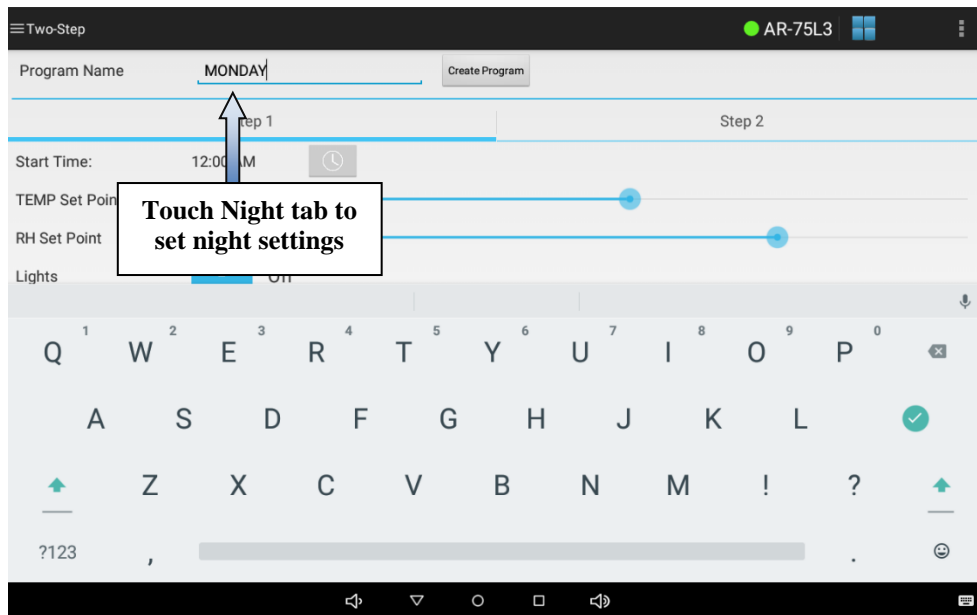
Program – Two-Step Screen

The program - Two-Step Screen is used when you looking for a diurnal program but want to adjust the lighting. As mentioned before, in diurnal mode, you cannot adjust the lights. For additional information, please refer to the IntellusUltra & Connect Manual.

To access the program – Two-Step screen, open the navigation menu and select **Two-Step** and then select **Two-Step** from the submenu that appears.

To create a program, touch the **Program Name** button. You will be prompted to enter a program name. Program names may be up to eight characters in length and may contain only letter, numbers or a “- “. No spaces or other special characters are allowed.

Important: Do not press Create Program until all values are entered.

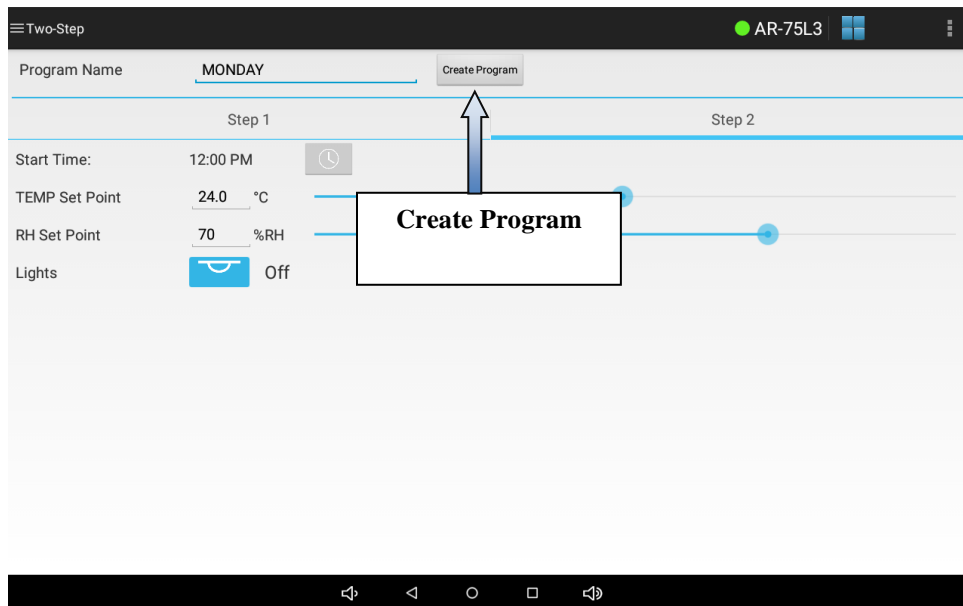


Enter the values for Step 1. This is usually the Day step.

Use the time picker to change step time. For temperature, humidity or auxiliary use the numeric keypad or slider. For lighting a special light settings screen will appear. To change individual light settings for a step, touch and hold the light parameter you wish to change. For on/off lights use the on/off toggle to set the light output. For dimmable lights either use the numeric keypad or slider to set the light output.

To add a step to the program – This is normally your night mode.

- 1) Touch the **Step 2** button. Adjust as you did above.



You may now press **Create Program**. The new program will be populated in the Programs menu in the Run Mode screen. Please refer to the section titled, *“Run Mode Screen”* for information on running a multi-step program.

Program - DLI Screen

The program - DLI screen is used to configure the daily light integral (DLI) program. The daily light integral programming method is an optional programming method which only appears when a closed loop dimmable lighting system was ordered. If the chamber was ordered with a closed loop dimmable lighting system then this programming method will appear under the programming menu.

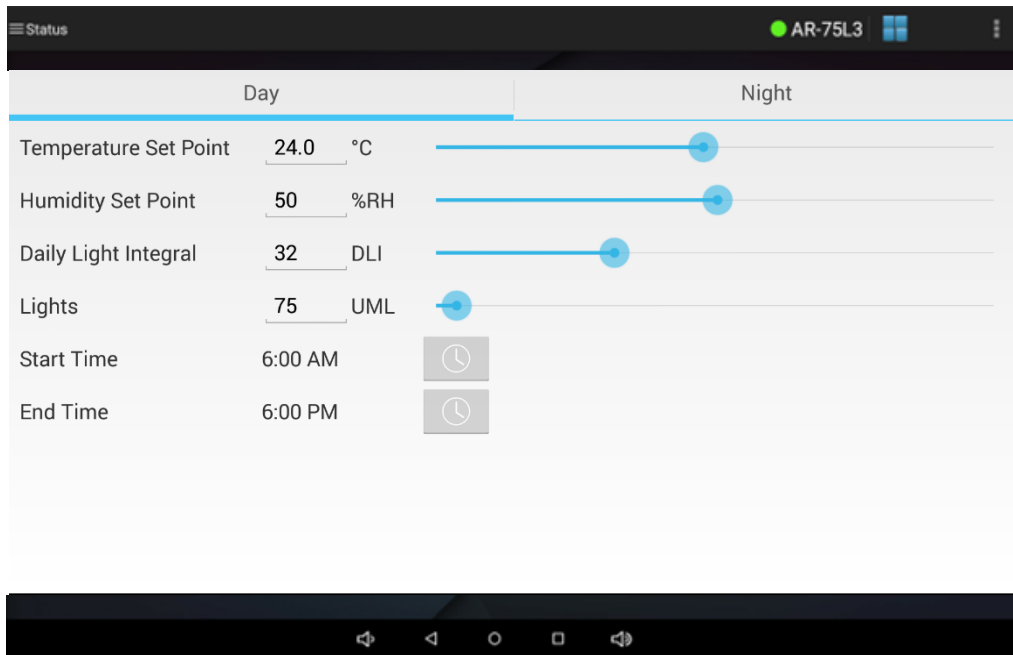
Instead of defining the absolute day start and end times, the DLI program controls lighting based upon accrued amounts of light quanta (in units of mol/day) compared to a threshold

value. Lights are energized at the day period start time and controlled to a constant level equal to the programmed PPF value. Once the DLI has accumulated to the defined DLI threshold value or the day period end time is reached (whichever happens first) the lights will automatically turn off for the remainder of the 24-hour day. This process will then repeat daily.

For additional information regarding DLI programming, please refer to the IntellusUltra & Connect Manual.

To access the program - DLI screen, open the navigation menu and select **Program** and then select **DLI** from the submenu that appears.

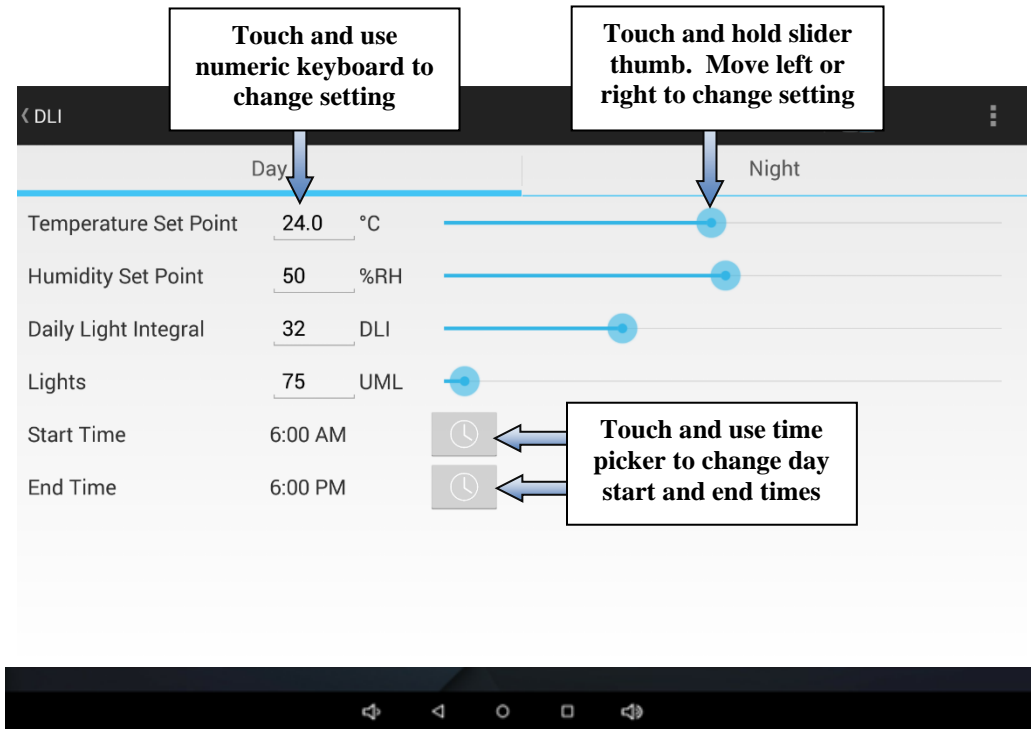




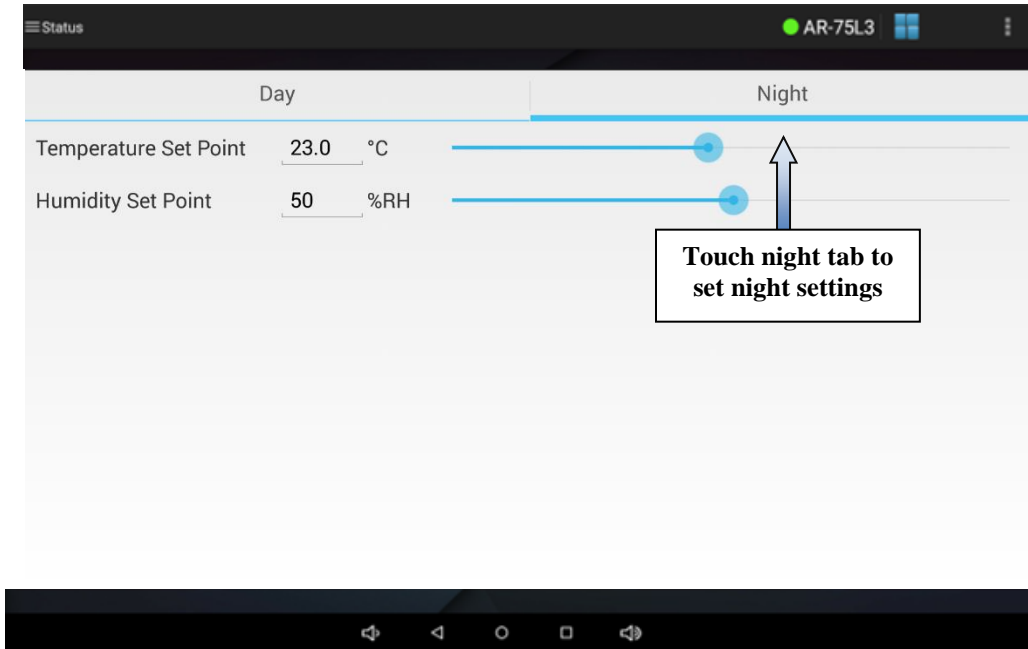
Program - DLI Screen

To set the day temperature, humidity (if applicable), DLI and lighting day settings for the DLI program either touch each setting and use the numeric keyboard to change the setting or use the slider next to each setting.

To change the length of the day period of the DLI program, touch the time picker button for the start and end times and use the time picker to set the time.



To set the temperature and humidity (if applicable) night settings for the DLI program first select the Night tab. Next, either touch each setting and use the numeric keyboard to change the setting or use the slider next to each setting. Remember to touch **Save** to save any modified settings.

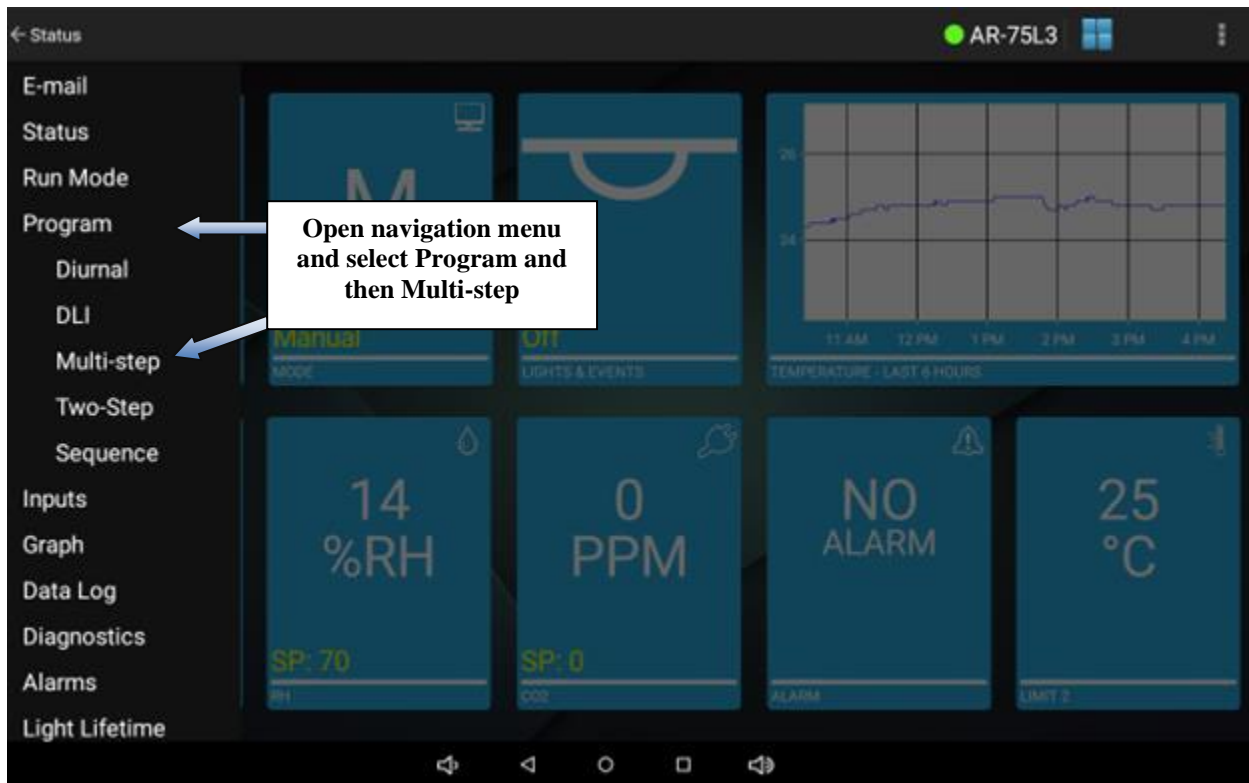


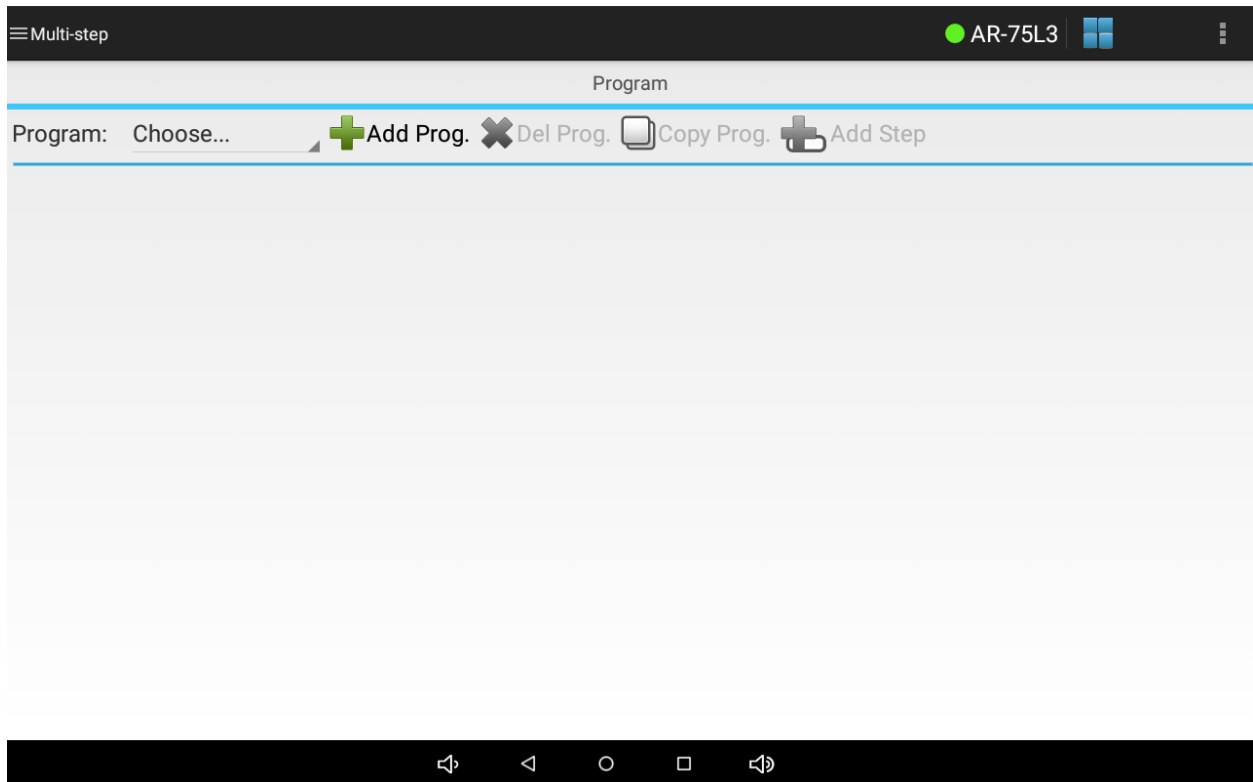
Once the desired settings have been configured, the DLI program can be initiated by navigating to the ***“Run Mode”*** screen and touching the **Run DLI** button.

Program - Multi-step Screen

The program – multi-step screen is used to configure one or more programs consisting of multiple steps. Use this programming method when you wish to create a more complicated profile than a simple diurnal or DLI program. When using the default **24 Hour** program step type you may enter steps covering a 24 hour period in each program. When using the **Elapsed** program step type you may enter steps that count down over a period less than or greater than 24 hours in each program. When running a multi-step program the program will repeat daily when using the **24 Hour** program step type and will repeat once the last step has completed using the **Elapsed** program step type. Before attempting to program please refer to the section titled, “**Settings – Prog Type Screen**” for information on the different program step types and operation modes.

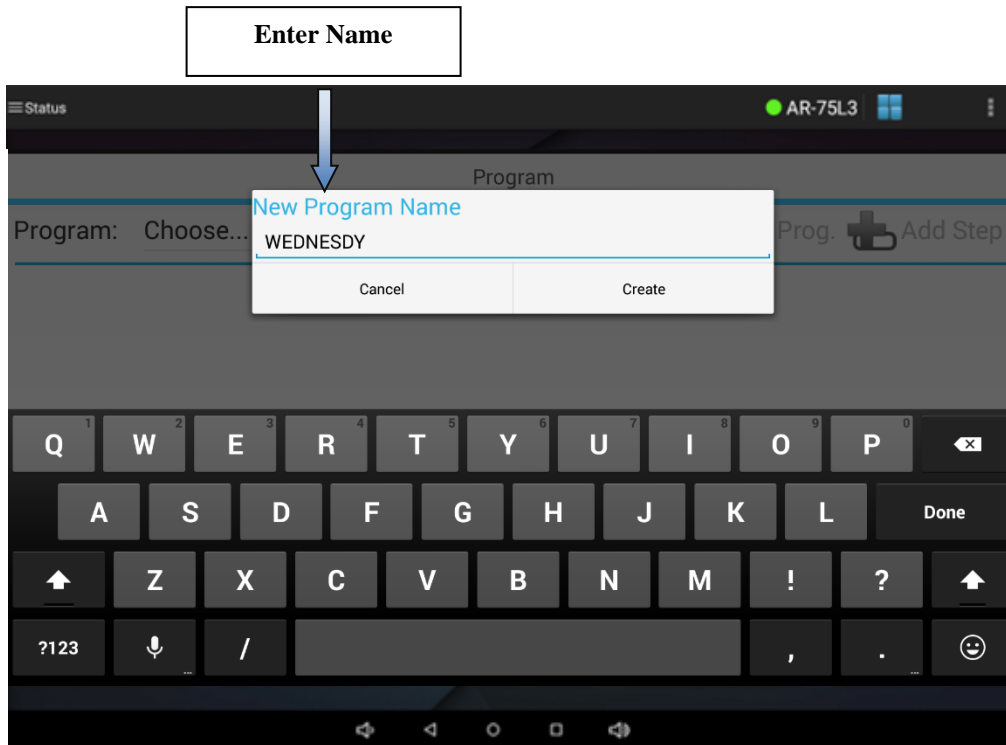
To access the program – multi-step screen, open the navigation menu and select **Program** and then select **Multi-step** from the submenu that appears.





Program – Multi-step Screen

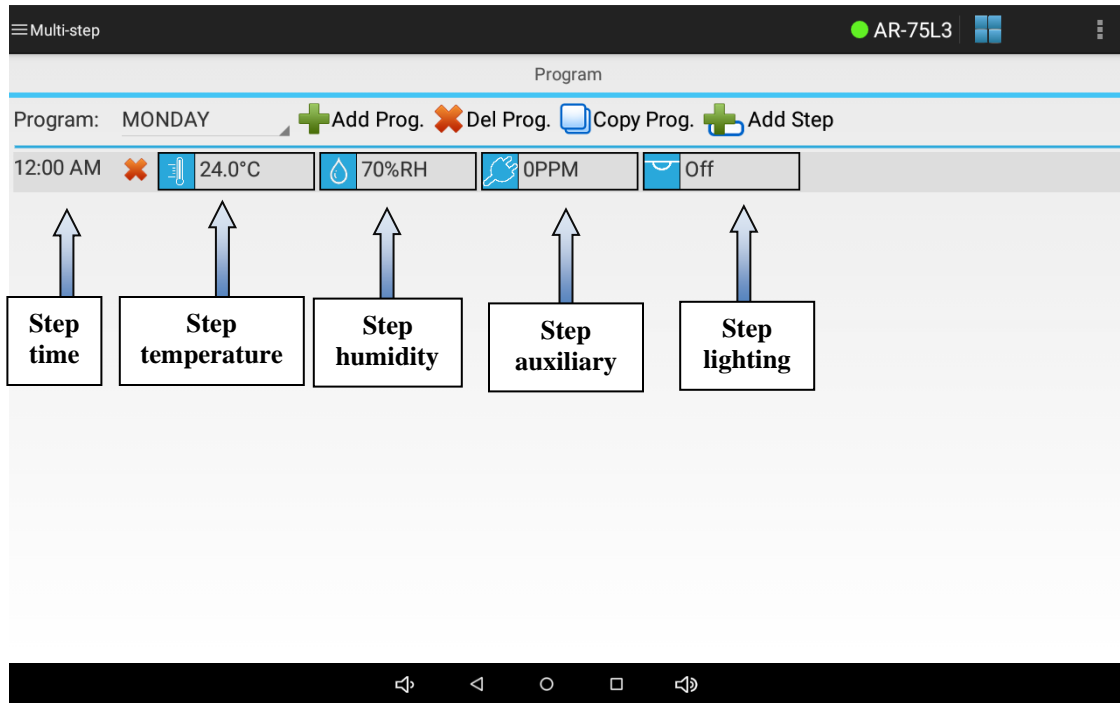
To create a program, touch the **Add Prog** button. You will be prompted to enter a program name. Program names may be up to eight characters in length and may contain only letter, numbers or a “-”. No spaces or other special characters are allowed. Touch the **New Program Name** field and use the alphanumeric keyboard that appears to enter a program name. Touch the **Create** button to create the program.



The app will automatically add one step with default settings at midnight when using the **24 Hour** program step type. The app will automatically add one step with a countdown time of 1 minute when using the **Elapsed** program step type.

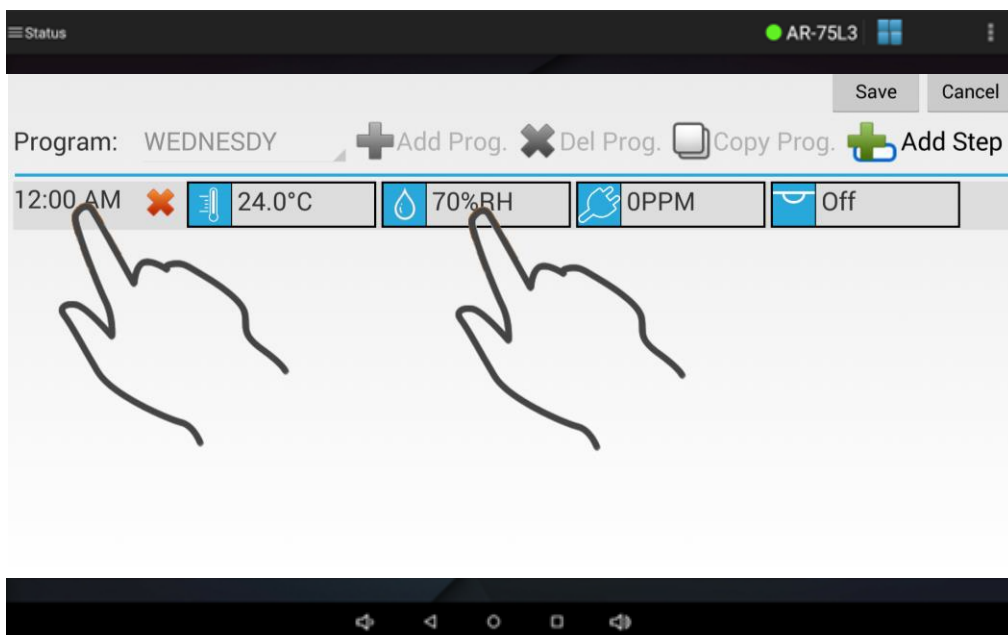
Each step allows the following parameters to be set:

- Step Time – This is the time at which the step will start if the program step type is set to **24 Hour**. If the step type is set to **Elapsed** the step time is the duration of the step.
- Step Temperature – If the program step type is set to **24 Hour** then this is the temperature set point the chamber will try to achieve at the beginning of the step. If the program step type is set to **Elapsed** then this is the temperature set point the chamber will try to achieve at the end of the step.
- Step Humidity (if applicable) – If the program step type is set to **24 Hour** then this is the humidity set point the chamber will try to achieve at the beginning of the step. If the program step type is set to **Elapsed** then this is the humidity set point the chamber will try to achieve at the end of the step.
- Step Auxiliary (if applicable) – If the program step type is set to **24 Hour** then this is the auxiliary set point the chamber will try to achieve at the beginning of the step. If the program step type is set to **Elapsed** then this is the auxiliary set point the chamber will try to achieve at the end of the step.
- Step Lighting (if applicable) – The lighting settings for configured light outputs.

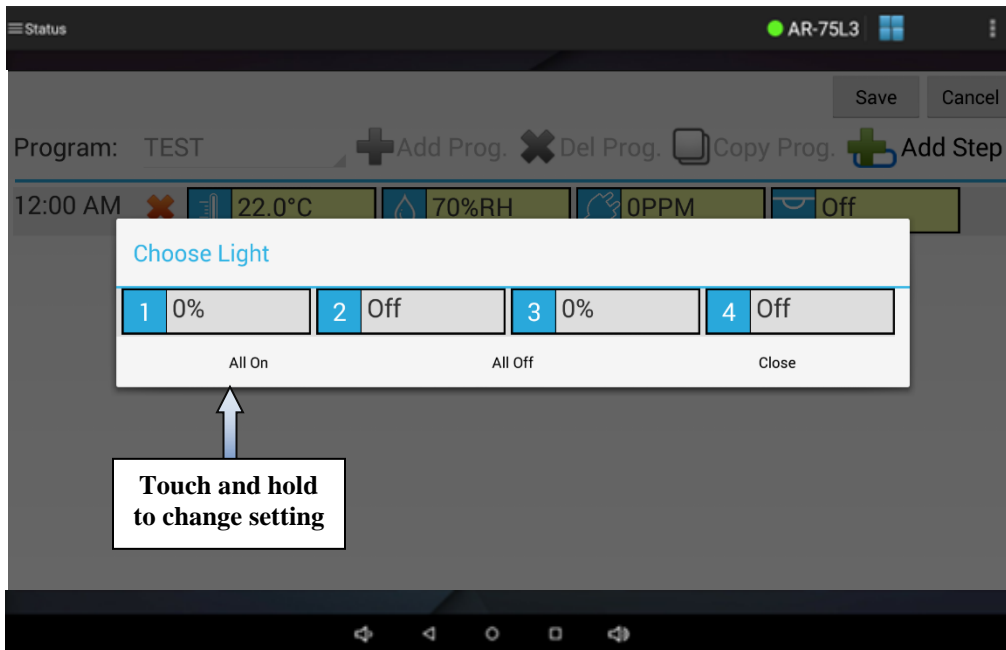


To change any parameter in a step:

- 1) Touch and hold the parameter value you wish to change until the parameter settings screen appears. The following example shows where you can touch and hold either the time parameter or the humidity (%RH) parameter in order to initiate the change. Any other parameter may be modified in the same manner.



- 2) Use the time picker to change step time. For temperature, humidity or auxiliary use the numeric keypad or slider. For lighting a special light settings screen will appear. To change individual light settings for a step, touch and hold the light parameter you wish to change. For on/off lights use the on/off toggle to set the light output. For dimmable lights either use the numeric keypad or slider to set the light output.



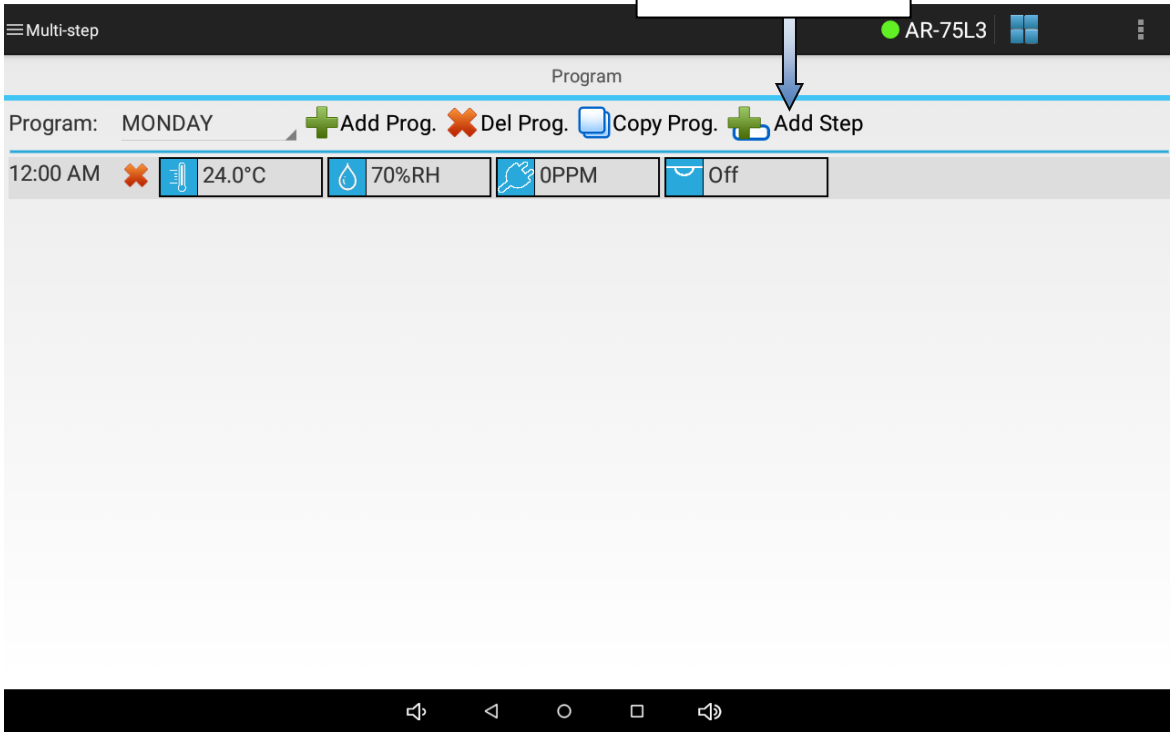
Lights Setting Screen

- 3) Once you have modified the setting, touch **OK** or **Close** to close the parameter settings screen.
- 4) Repeat steps 1-3 for any other parameter you wish to change.

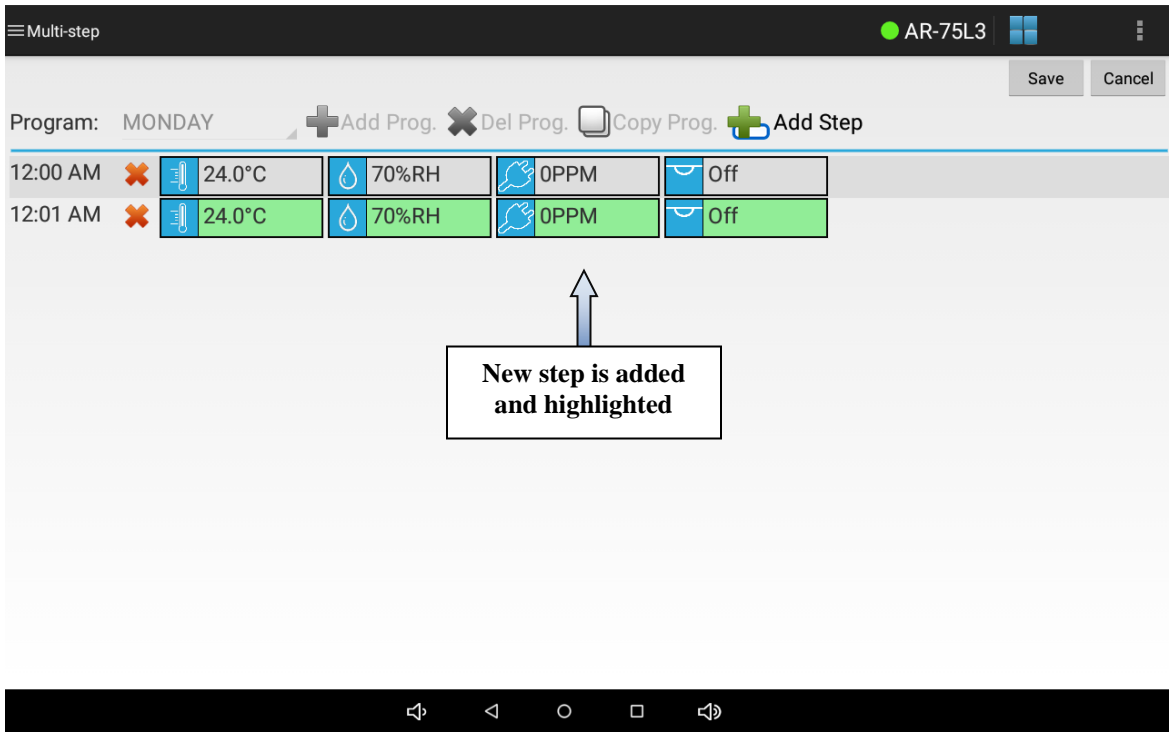
To add steps to the program:

- 2) Touch the **Add Step** button. A new step will be added below the last step in the program. The step will be highlighted in green to indicate a new step has been created.

**Touch Add Step
button to add a step
to the program**




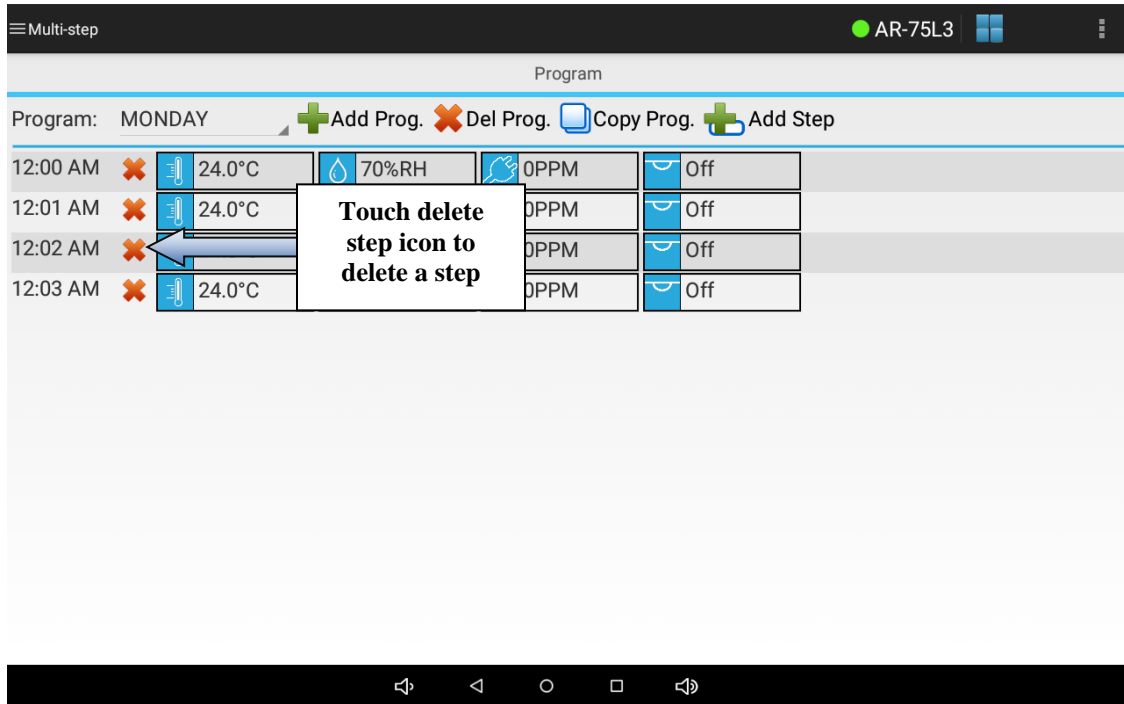
Save Cancel



**New step is added
and highlighted**

To delete steps from a program:

- 1) Touch the delete step icon () next to the step time you wish to delete.
- 2) Touch **Delete** to confirm the deletion.

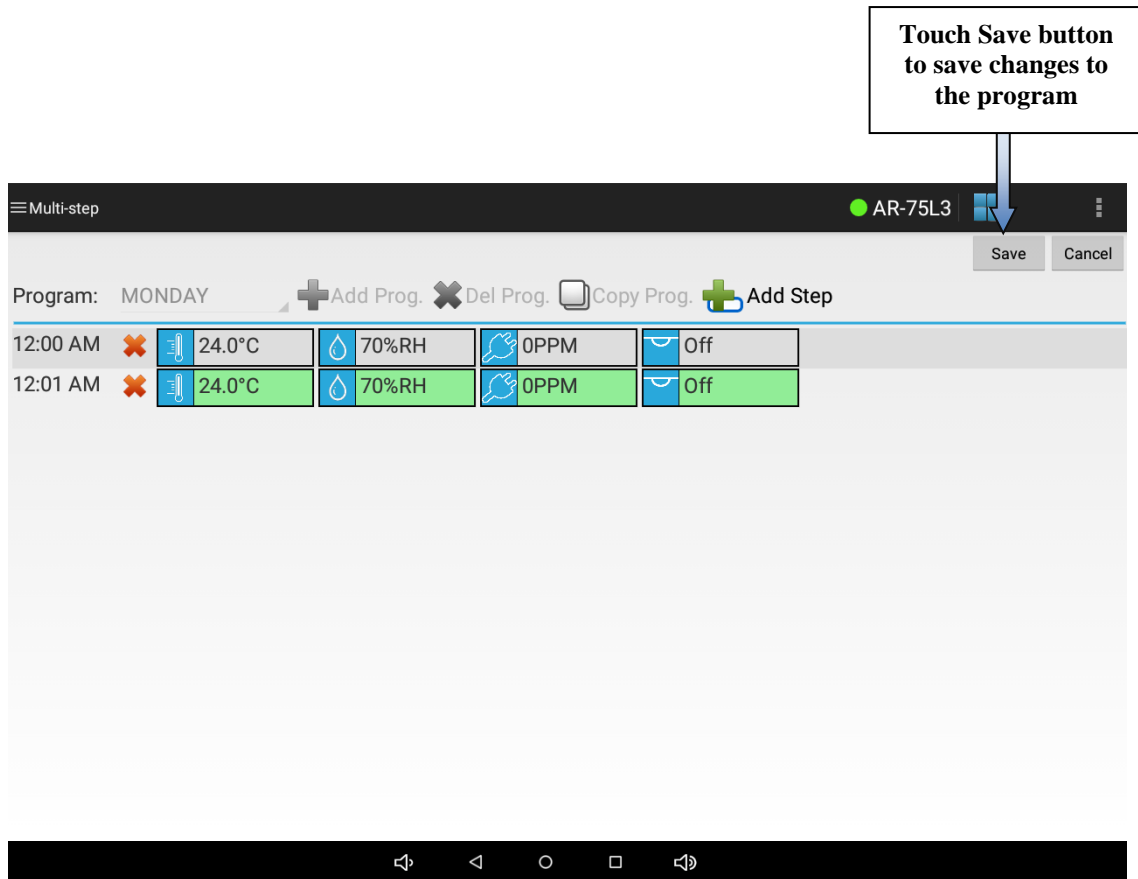


To edit steps in a program:

- 1) On any step, touch and hold the parameter you wish to change and use the procedures described above for changing parameters in a step. The step will be highlighted in yellow to indicate a parameter was modified.

To save the program:

- 1) Touch the **Save** button.



IMPORTANT!

You must touch the **Save** button at the top right of the page in order to save any modified settings in a program. If you do not touch **Save** before navigating away from the page the changes to the program will not be saved.

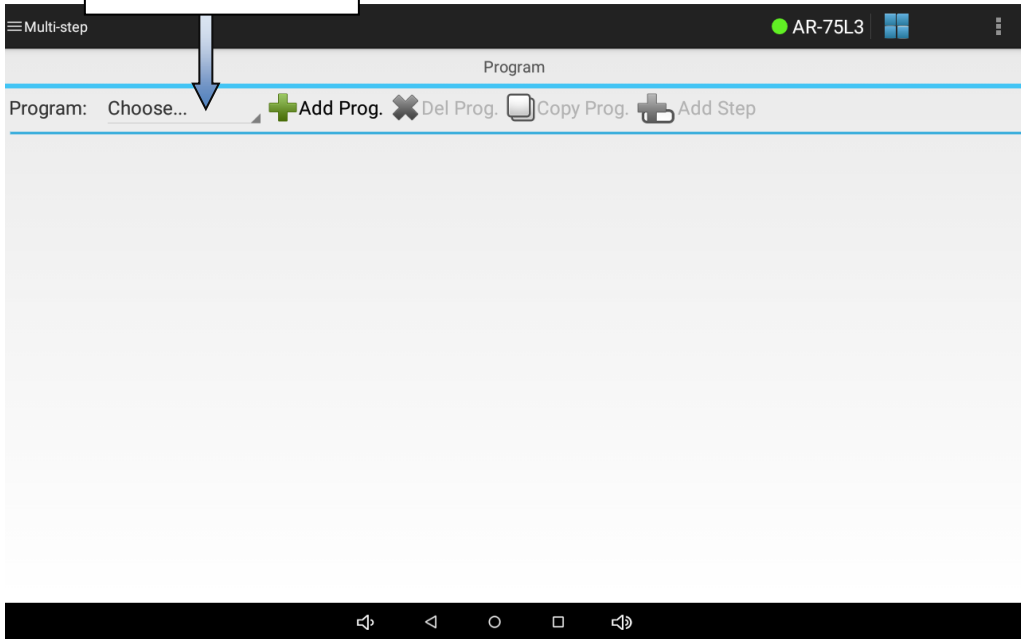
Creating New Programs

To create additional programs, touch the **Add Prog.** button. Follow the steps above to name and modify the program to your needs.

Deleting Programs

To delete existing programs, touch the program list control and select the program you wish to delete from the list that appears. The program will be loaded. Once the program has loaded, touch the **Del Prog.** button. Touch the **Delete** button to confirm that you wish to delete the program.

Touch program list control to select program to delete

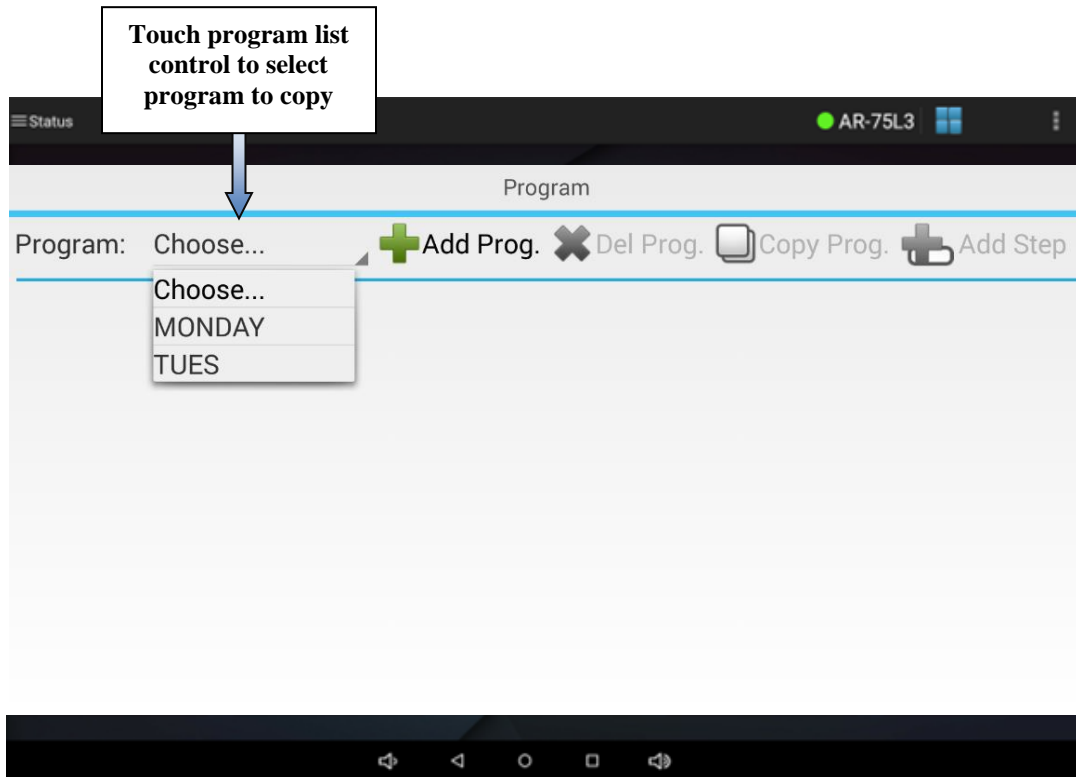


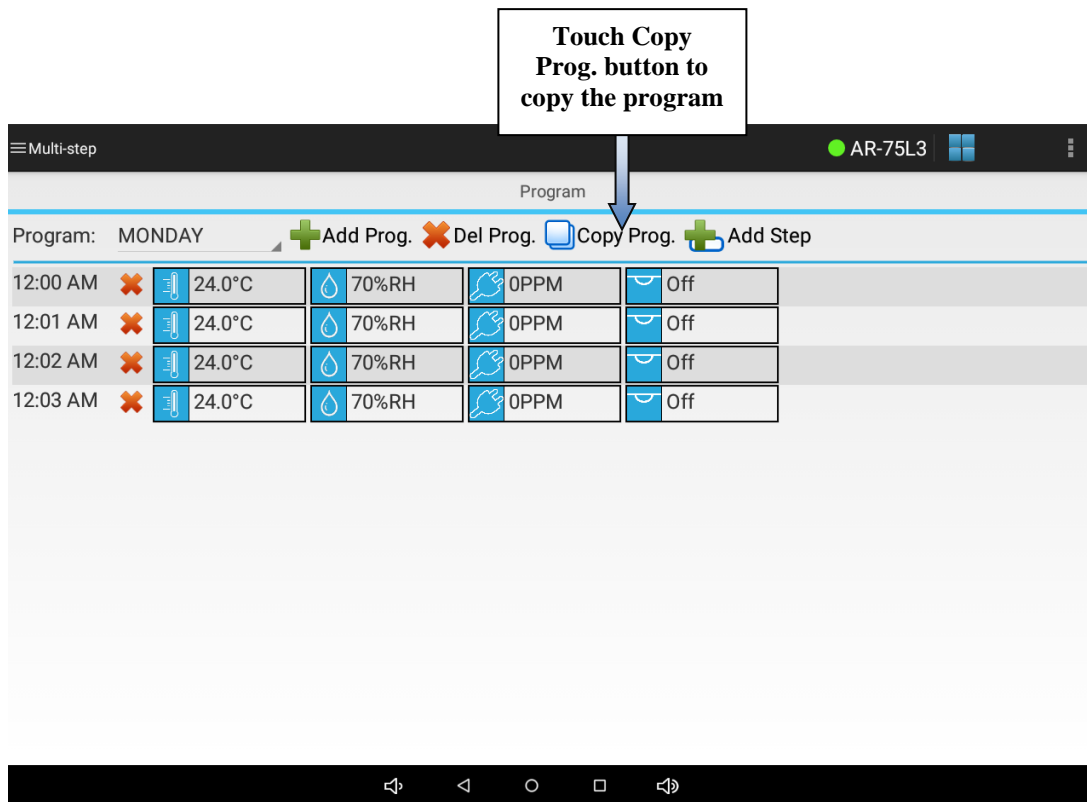
Touch Del Prog. button to delete the program



Copying Programs

To copy existing programs, touch the program list control and select the program you wish to copy from the list that appears. The program will be loaded. Once the program has loaded, touch the **Copy Prog.** button. Give the new program a name and then touch the **Create** button to copy the loaded program to the new program. Once the program is copied you will be able to modify it.





Running Programs

Please refer to the section titled, **“Run Mode Screen”** for information on running a multi-step program.

Creating a Sequence of Programs

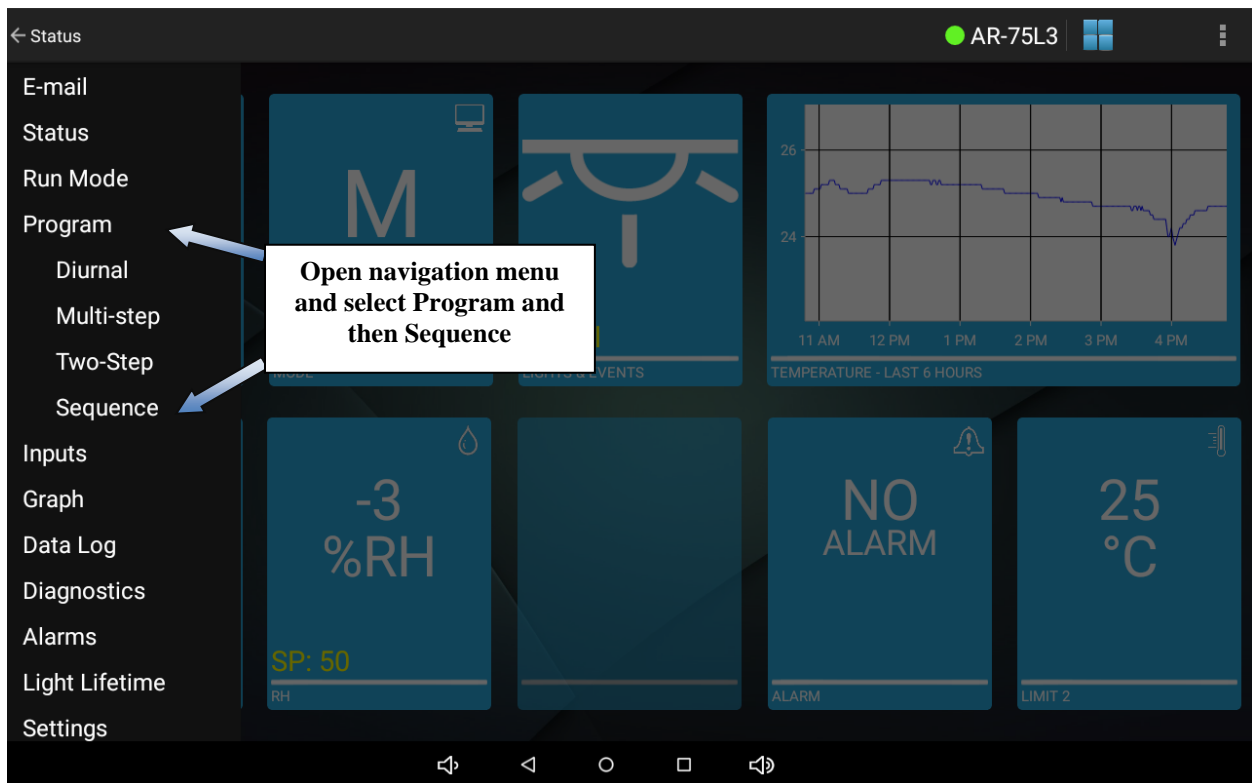
Users may create a sequence of programs to run by choosing to program a sequence. A sequence of programs consists of a list of programs that you choose to run. Any program stored in the controller may be added to the sequence.

When adding programs to the sequence, the number of iterations the program is to run must also be entered. This allows any program in the sequence to run 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.

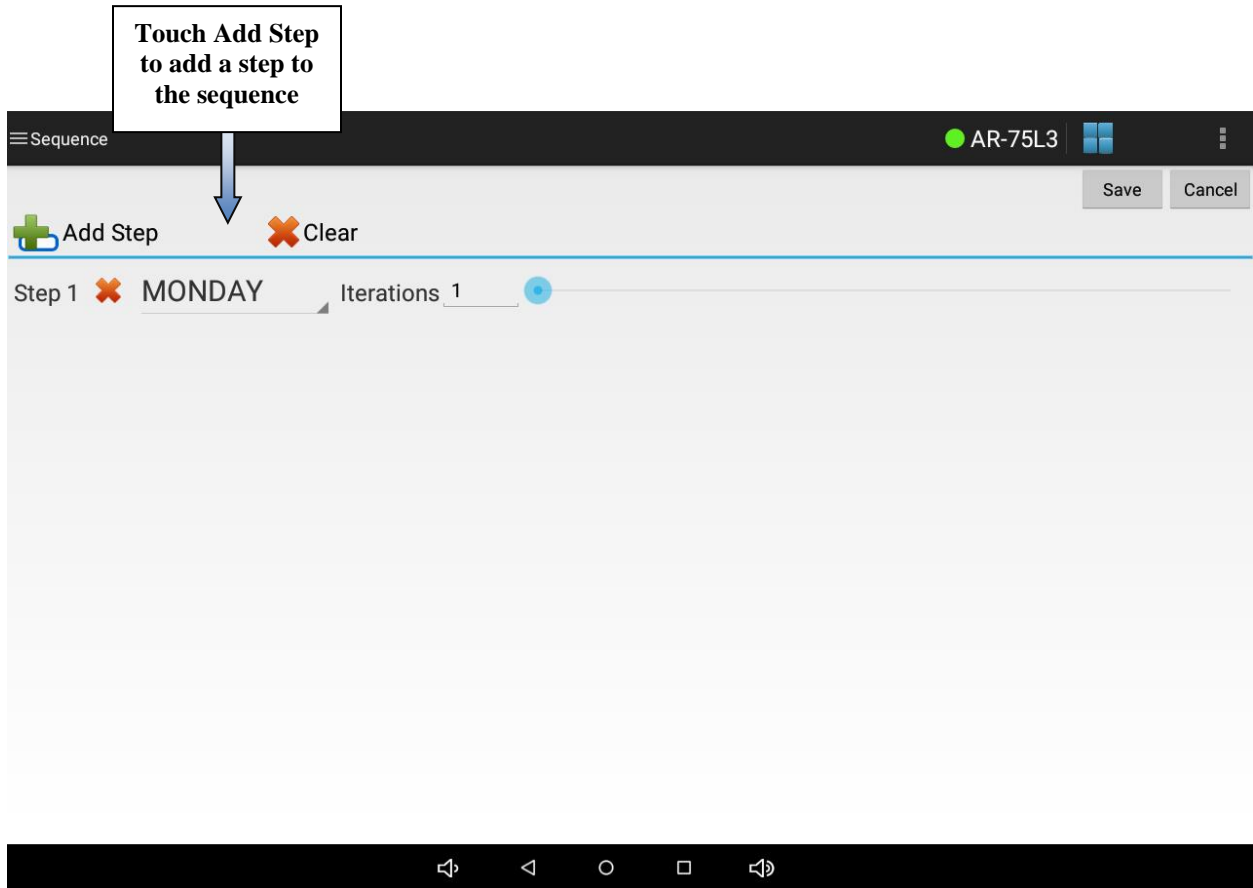
An example of a sequence of programs appears below. This sequence runs a different program each day of the week except for Saturday and Sunday. On Saturday and Sunday the sequence runs the same program, ‘Weekend’. This is done by setting the number of iterations to 2.

Program Name	Iterations
Monday	1
Tuesday	1
Wednesday	1
Thursday	1
Friday	1
Weekend	2

To access the program – sequence screen, open the navigation menu and select **Program** and then select **Sequence** from the submenu that appears.

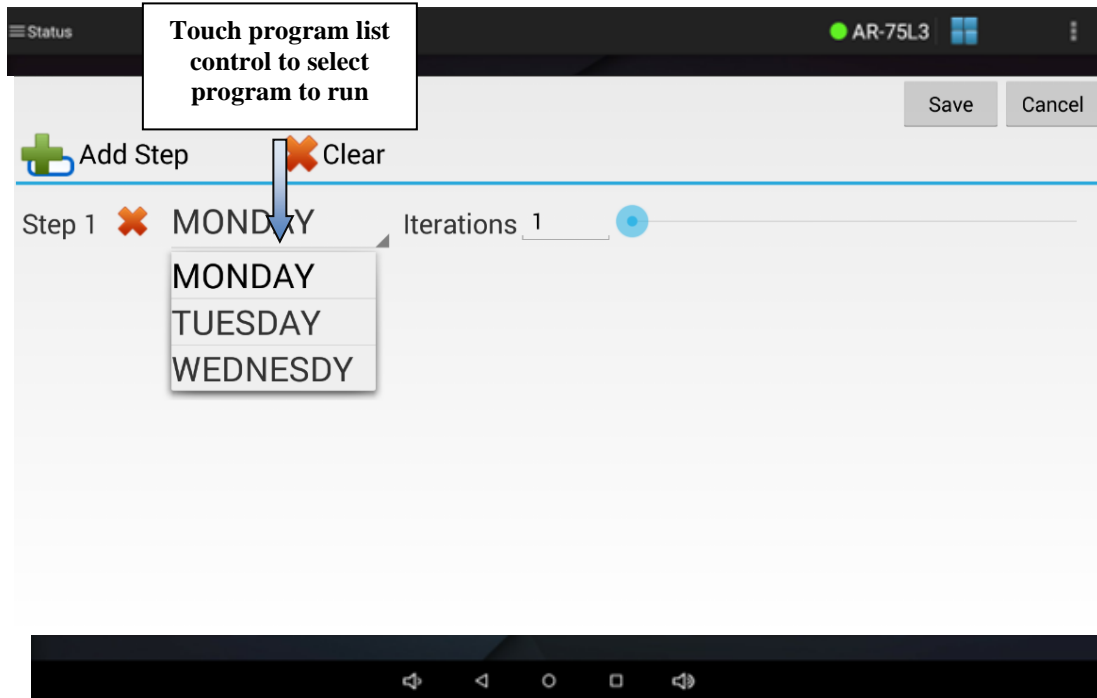


To add steps to the sequence, touch the **Add Step** button.



Program – Sequence Screen

Touch the program list control and select the program you wish to run in the sequence step from the list that appears.

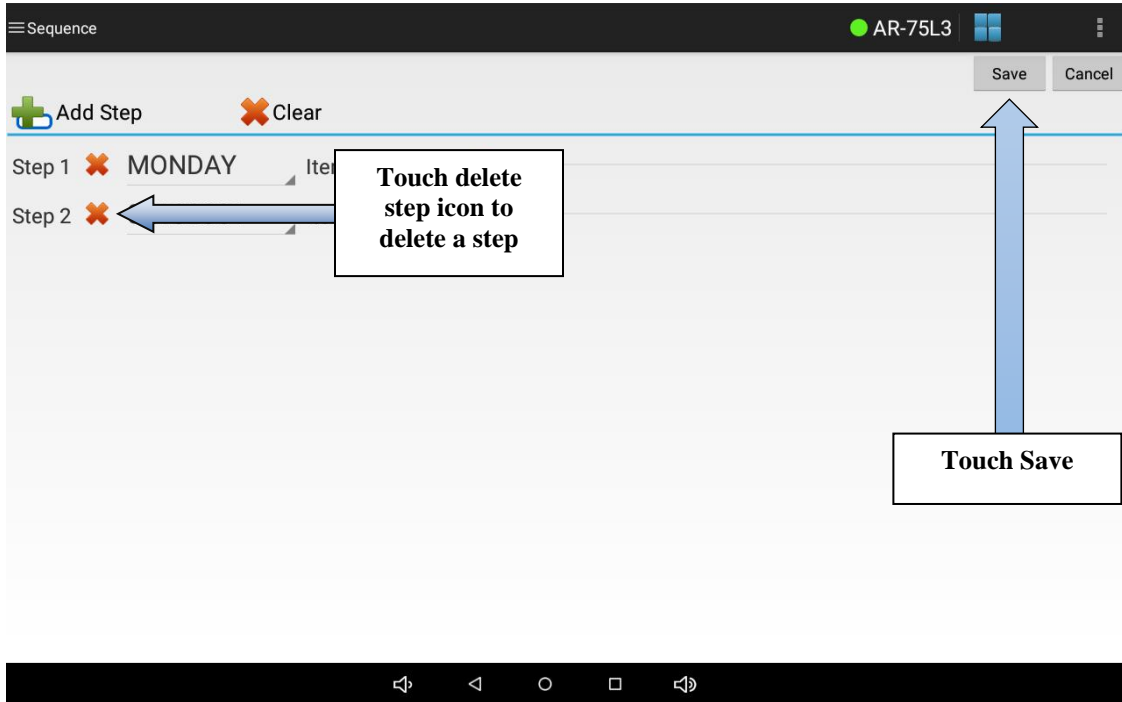


Next, optionally touch the iterations setting and use the numeric keyboard to change the setting or use the slider next to the setting.

Add more steps to the sequence by pressing the **Add Step** button and following the procedures described above to modify the step.

Deleting Sequence Steps

To delete steps from a sequence, touch the delete step icon next to the step you wish to delete.

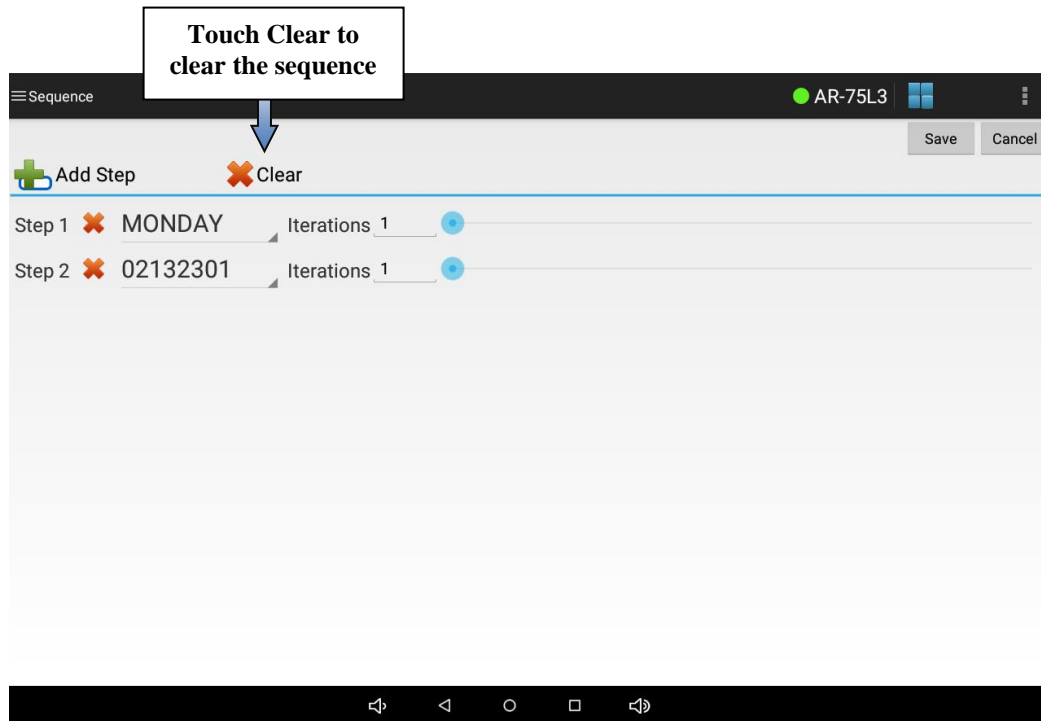


IMPORTANT!

You must touch the **Save** button at the top right of the page in order to save any modified settings in the sequence. If you do not touch **Save** before navigating away from the page the changes to the sequence will not be saved.

Clearing the Sequence

To clear the sequence, touch the **Clear** button. Touch **Delete** to confirm you wish the sequence to be cleared.



Running a Sequence

Please refer to the section titled, *"Run Mode Screen"* for information on running a sequence.

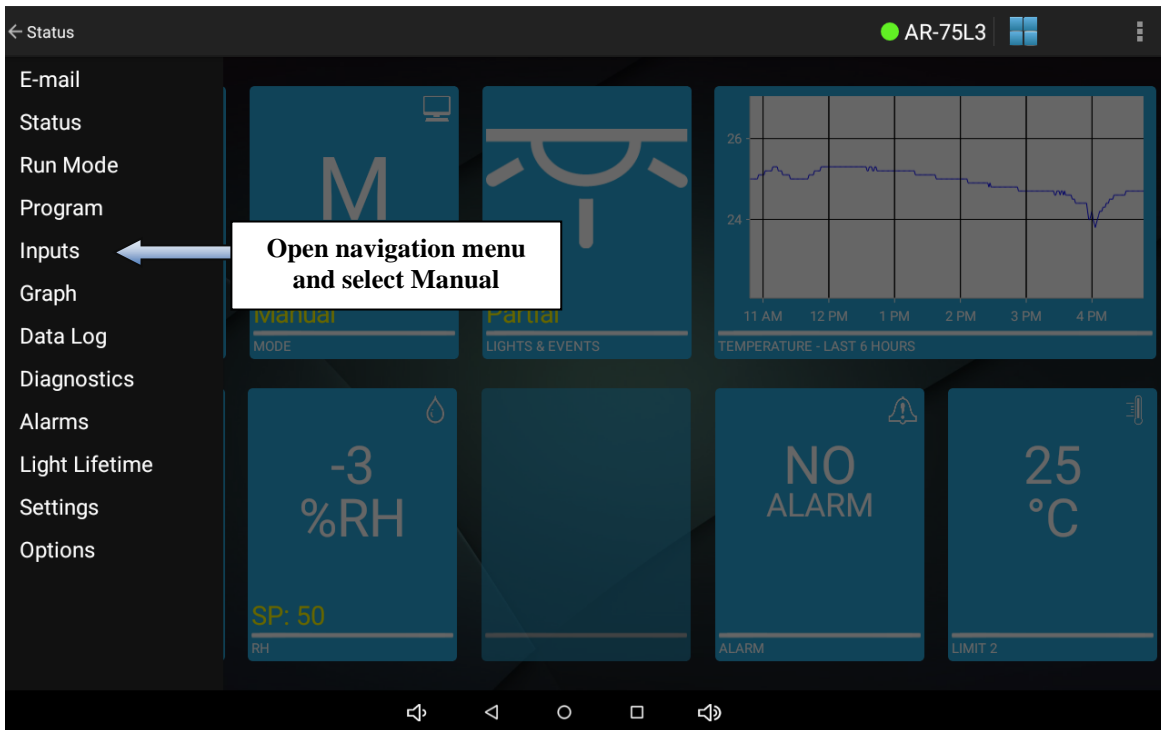
IMPORTANT!

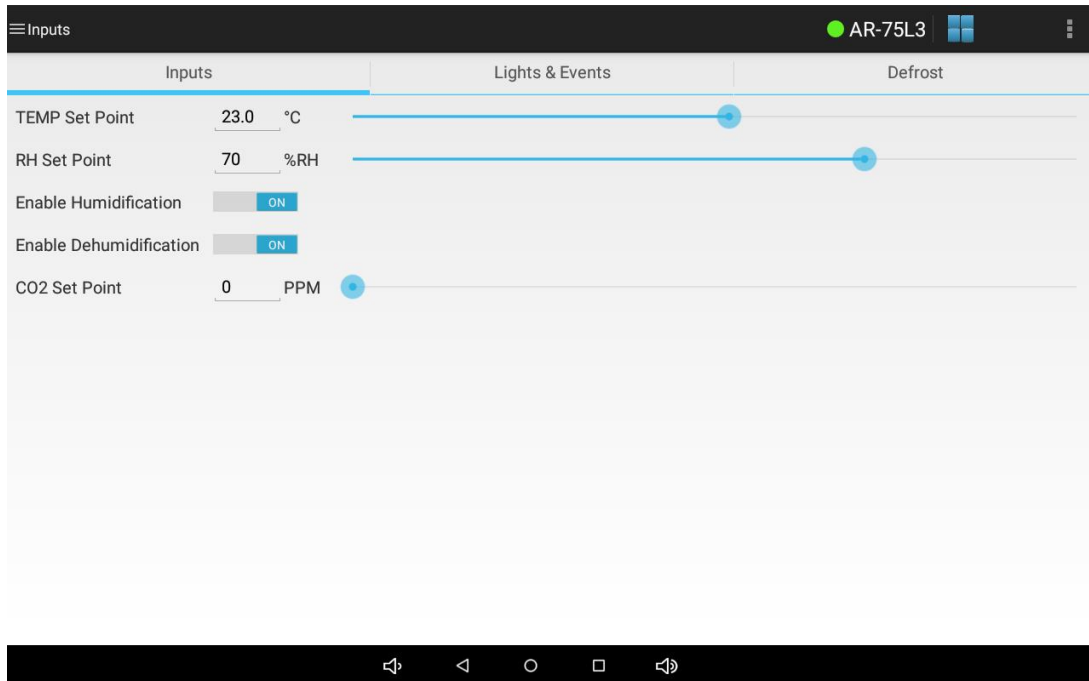
You are unable to edit a running sequence. When you open the sequence screen all controls will be disabled if a sequence is running. If you wish to edit a sequence you must run manual settings first.

Manual Screen

Constant set points for temperature, humidity (if applicable), auxiliary (if applicable), expansion slots 4 through 7 (if applicable) and lighting (if applicable) may be run as necessary via Inputs or Manual settings. For example, to run a constant temperature of 28°C with 70% humidity and all lights off, these settings must be configured on the Inputs or Manual screen. The Inputs or Manual screen is also used to configure defrost settings, if a low temperature chamber was ordered that requires defrost periods.

To access the manual screen, open the navigation menu and select Inputs or Manual.

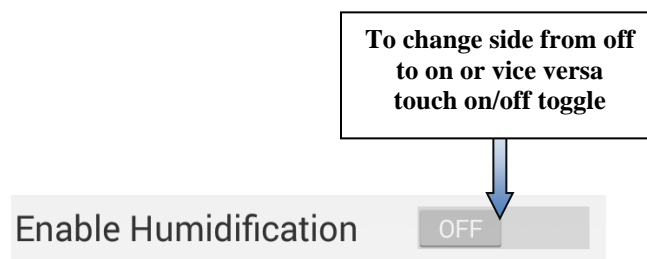




Inputs or Manual Screen

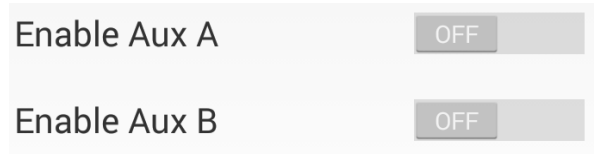
To set the temperature, any applicable process values and lighting (if applicable) set points on the Inputs or Manual settings screen, touch each setting and use the numeric keyboard or slider to change the desired setting. Remember to touch **Save** to save any modified settings.

The humidity, auxiliary and certain types of expansion channels have two sides which may be enabled or disabled. For humidity the two sides are humidification and dehumidification. To enable the humidification output on the control system, set the humidification side to on. Likewise, to enable the dehumidification output on the control system, set the dehumidification side to on. To disable humidity control outputs on the control system, switch both humidification and dehumidification sides to off. To enable or disable a side, touch the on/off toggle next to the setting you wish to change. The side will switch states.

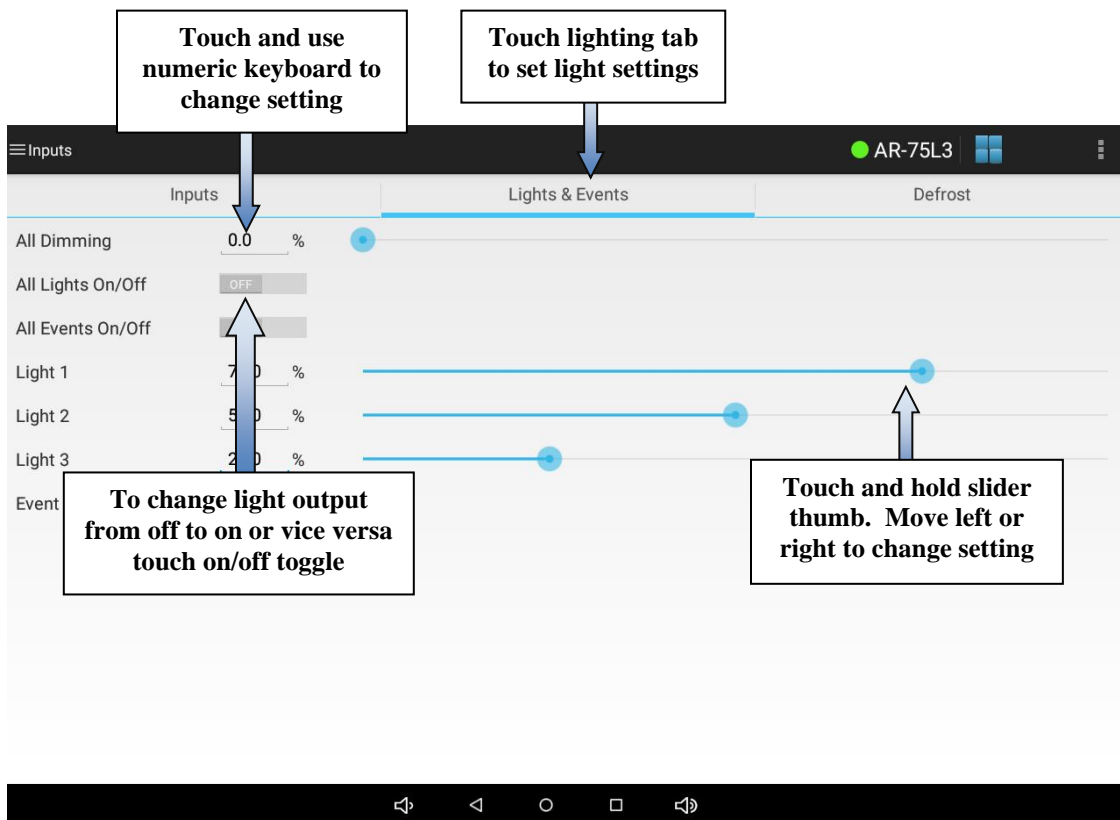


The auxiliary channel and expansion channel sides are typically configured for CO₂, closed loop dimmable lighting or heating the water pan for dew chambers. The sides for these channels

will display as “Enable [Input Name] A” or “Enable [Input Name] B”. If an additive CO₂ option was ordered the channel A side is used to enable or disable the addition of CO₂ into the chamber environment. If a CO₂ removal option was ordered the channel B side is used to enable or disable the removal of CO₂ from the chamber environment. If closed loop dimmable lighting was ordered only the channel A side is used to enable or disable the control of lighting. For lighting applications, the channel’s B side is not configurable. Likewise, for dew chambers, only the channel A side is user configurable, to enable or disable the water pan heater. No channel B side is required.

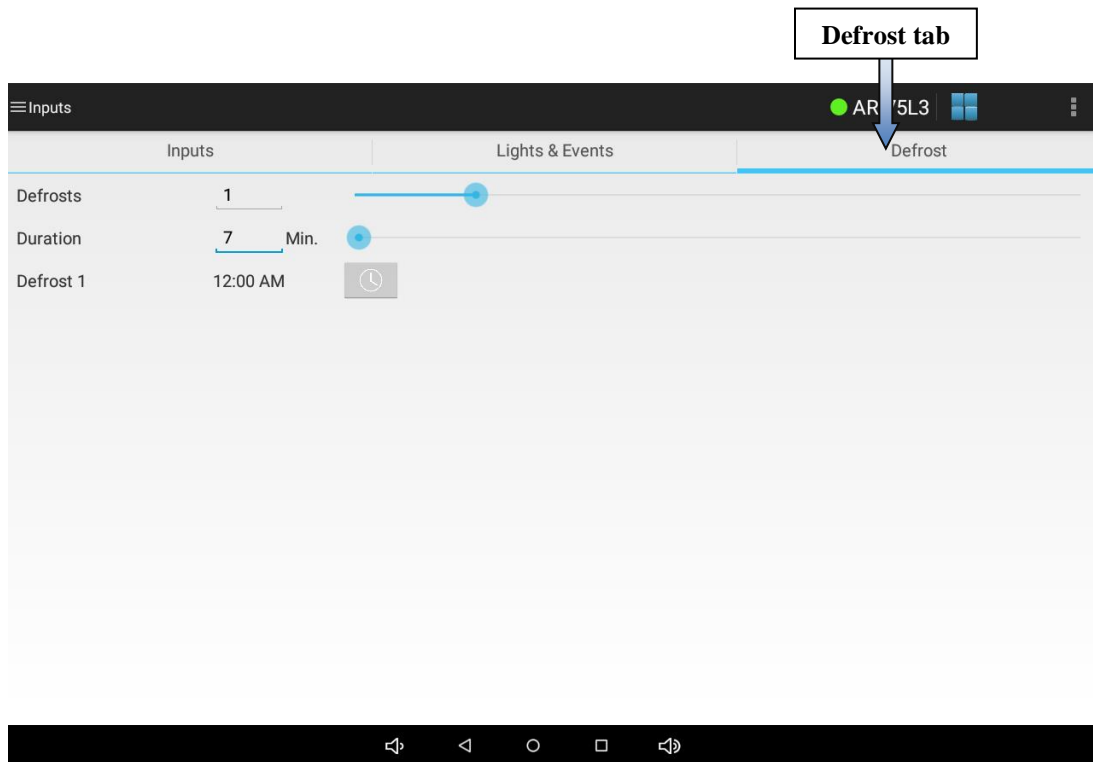


To change the manual lighting settings first touch the **Lighting** tab. Next, touch the on/off toggle next to the light output you wish to enable or disable. For optional dimmable lights, either touch the setting you wish to change and use the numeric keyboard to change the setting or use the slider next to each setting.



Defrost Settings (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. If the chamber was designed to require defrost programming you will see a **Defrost** tab on the Inputs or Manual screen.



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

IMPORTANT!

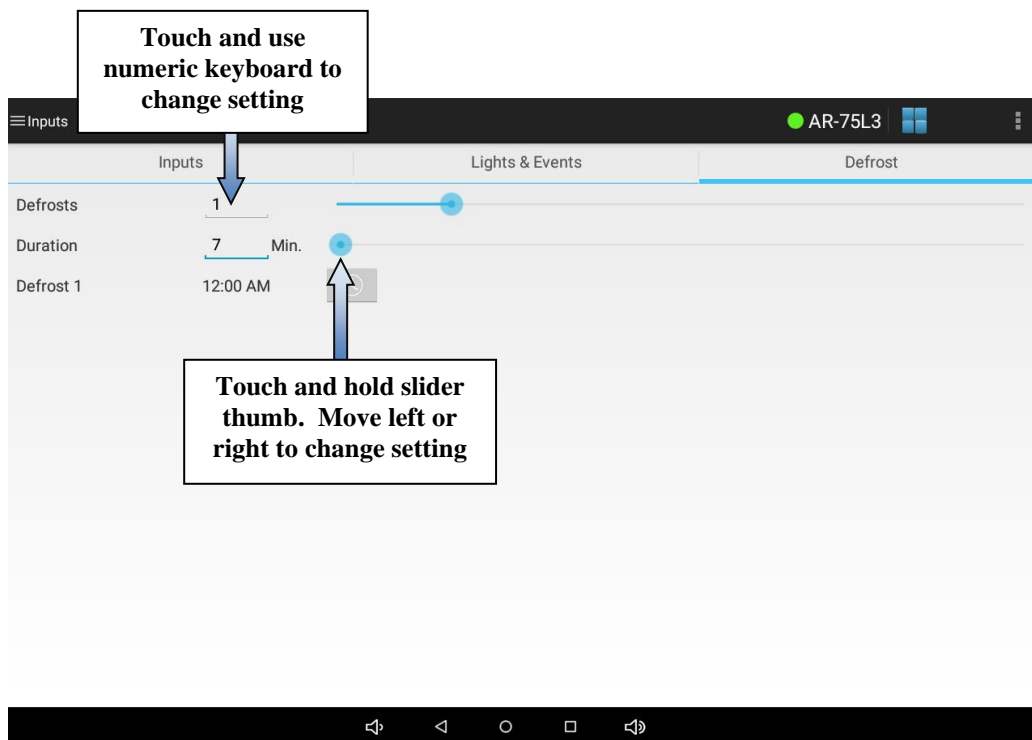
The programmable defrost system consists of a hot gas bypass which temporarily diverts hot gas (heated refrigerant) through the refrigeration coils to melt any formed ice. The lights and unit cooler fans will be turned off to minimize the temperature rise during the defrost period. If continuous lighting is important to your experiment, please be sure to

program the defrost periods when the lights are off. Note that the chamber will not defrost unless the current chamber temperature is below a preset value determined by Percival Scientific. This value is typically 7°C.

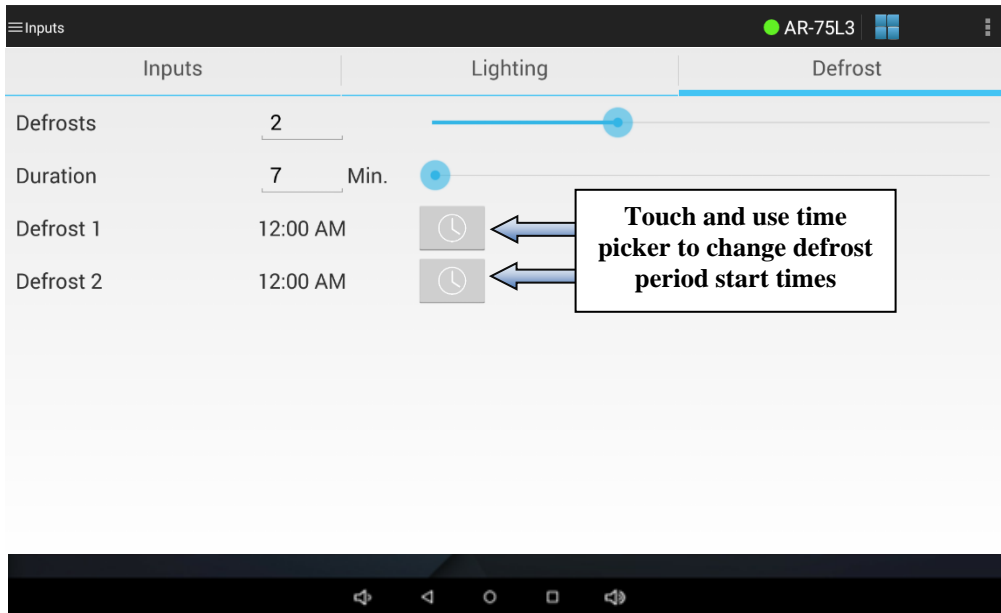
To set defrost periods, first set the number of defrosts between 1 and 6. Leaving the number at 0 will not defrost the chamber. To set the number of defrosts, either touch the defrosts setting and use the numeric keyboard to change the setting or use the slider next to the setting.

To change the defrost duration, either touch the duration setting and use the numeric keyboard to change the setting or use the slider next to the setting.

Once the desired number of defrost periods and defrost duration is set, touch the **Save** button.

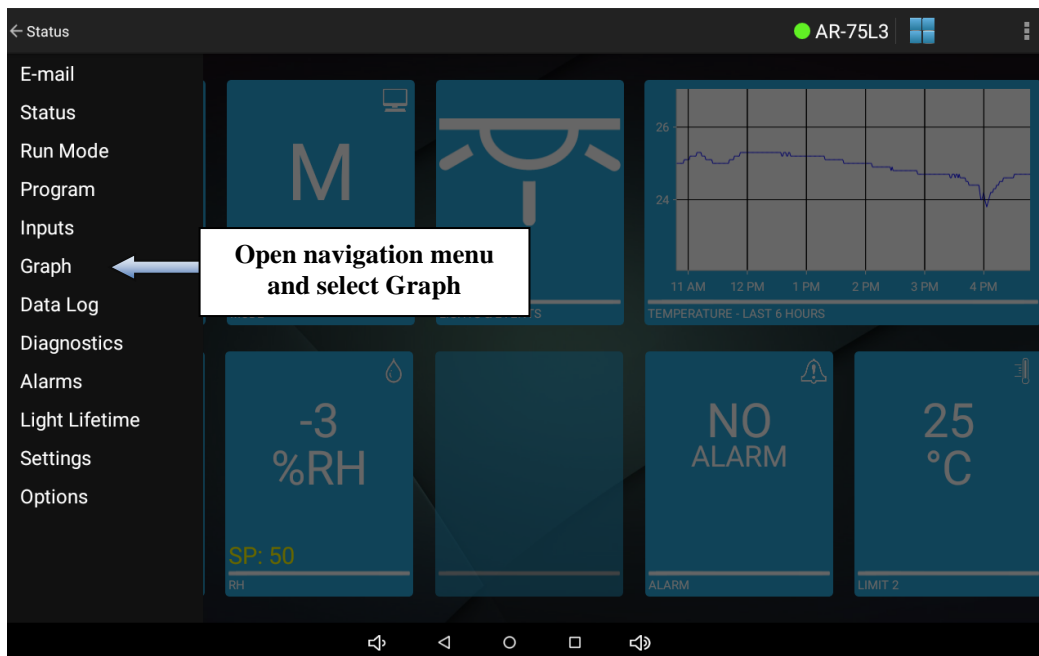


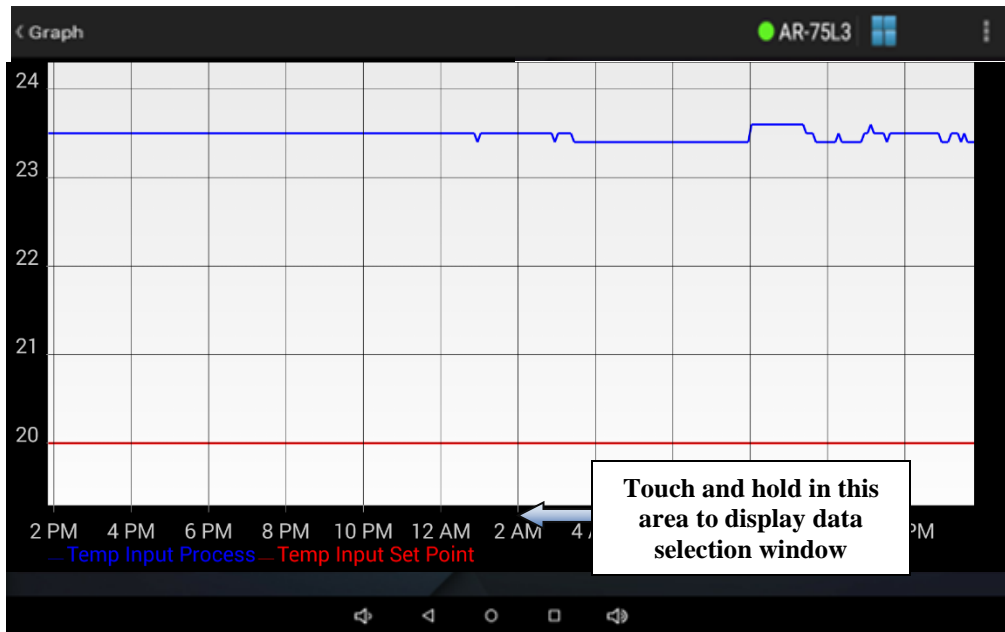
Once the number of defrost periods is set to a number greater than 0 you will see times for each defrost period appear. Use the time picker to set the times at which you want the chamber coils to be defrosted. Remember to touch the **Save** button when you have finished setting the defrost times.



Graph Screen

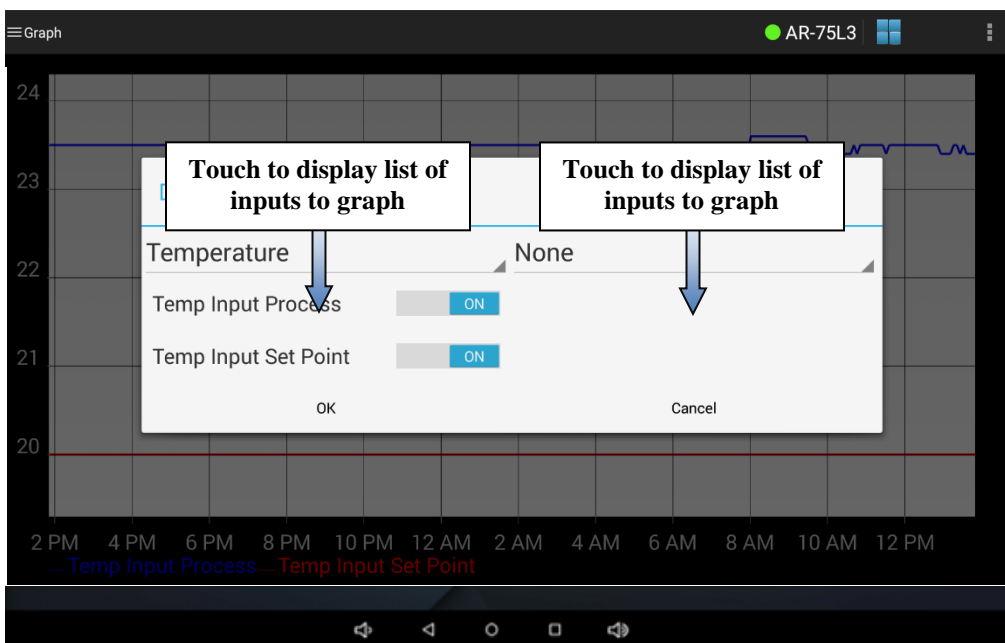
The graph screen displays a 24-hour graph of the temperature process value against its set point by default. To access the graph screen, open the navigation menu and select **Graph**.

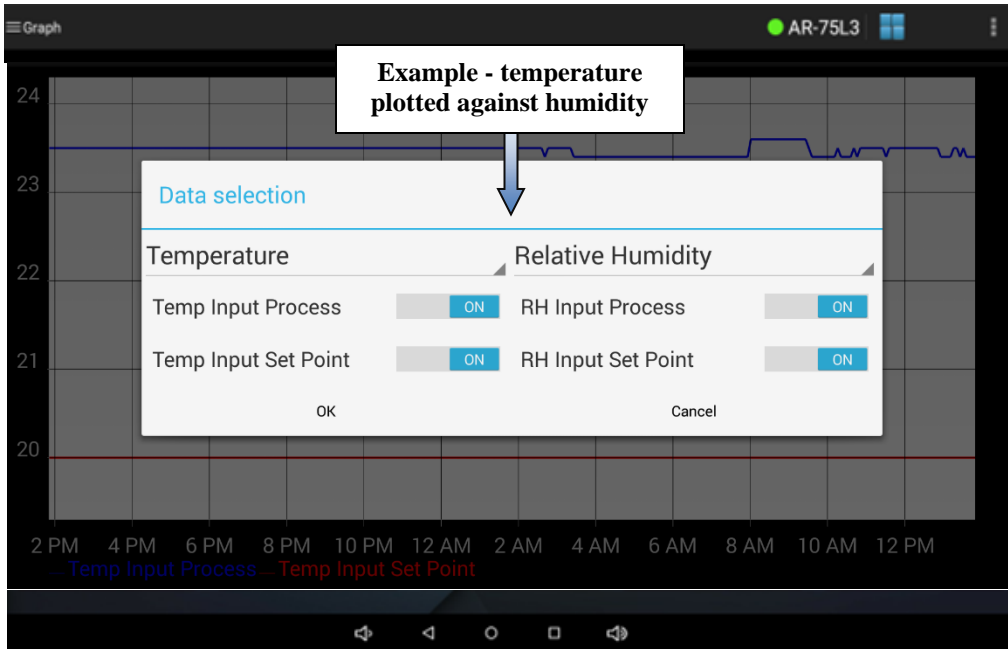




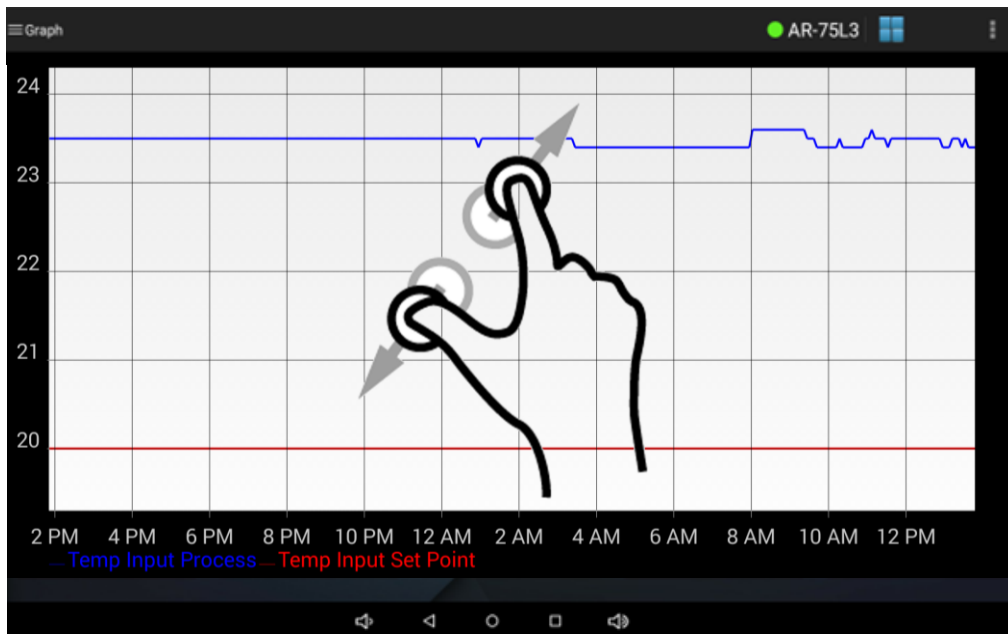
Graph Screen

Up to two inputs may be plotted on the graph screen at one time. To change the inputs plotted, touch and hold in the area below the graph where the times and legend are displayed. The data selection window will appear. Use the controls to change the inputs you wish to be graphed as well as to select whether to graph the input process value and the set point. Touch **OK** to accept.





You may use two fingers on the graph itself to pinch and zoom in or out. Once zoomed in you may swipe left or right to move backwards or forwards in time. To return to the normal scale, navigate away from the graph screen using the navigation menu and then select it again.



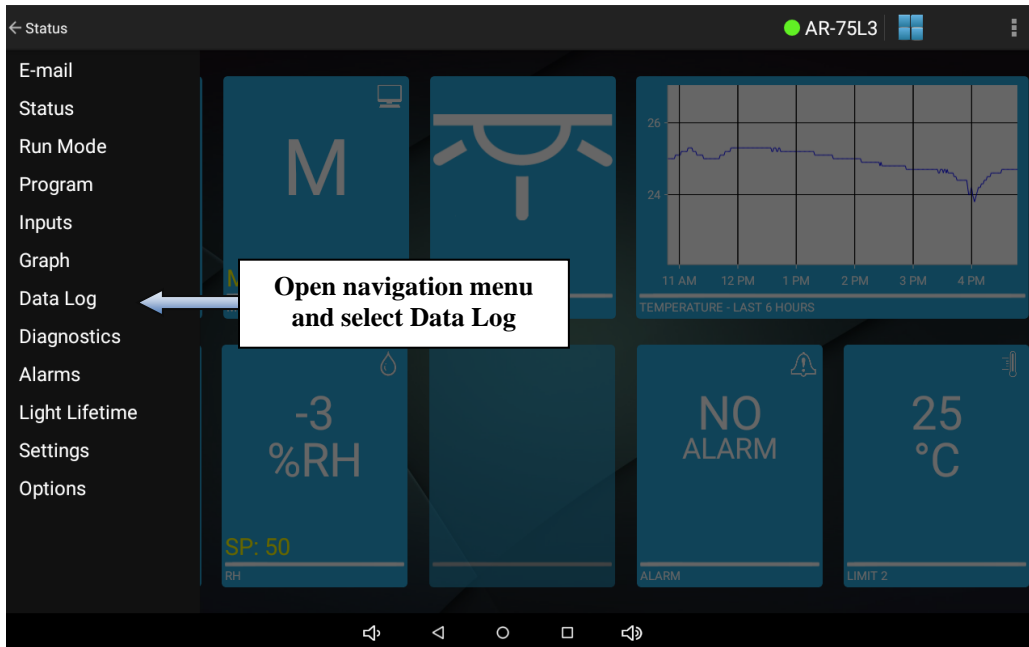
Data Log Screen

If an IntellusUltraConnect controller was ordered, data is automatically logged every minute to an onboard SD card. This card is preinstalled at the factory. The end user may export up to one year's worth of data at any time using a customer supplied USB flash drive. The data is exported as a single CSV (comma separated values) file that may be directly imported into Microsoft Excel or similar software. The first row of the exported file contains header information for the parameters logged. For a complete listing of all the logged parameters, please refer to the IntellusUltra & Connect Manual.

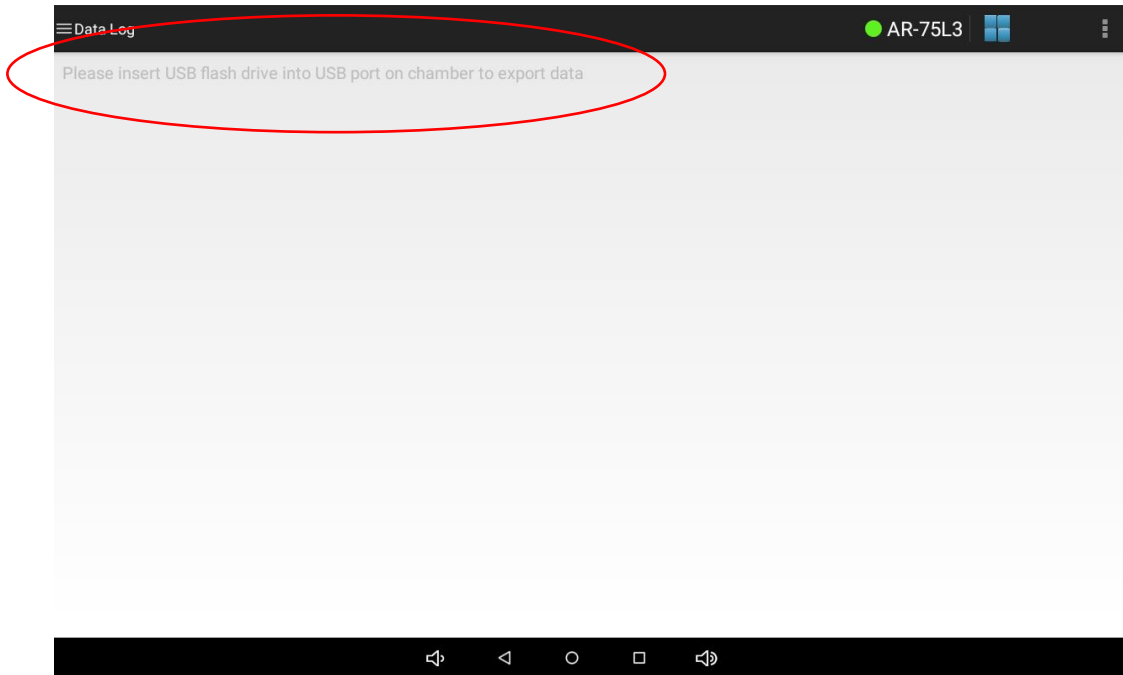


USB flash drive

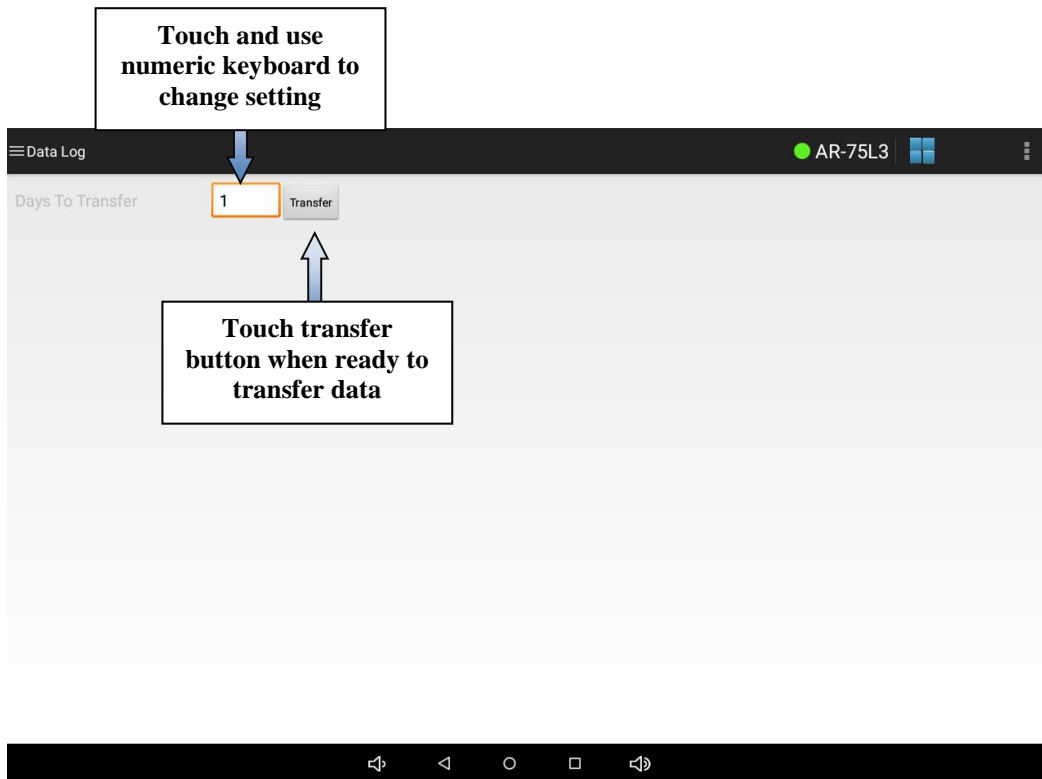
Within the tablet application, the Data Log screen is used to initiate the transfer of data stored on the SD card to a USB flash drive. To access the Data Log screen, open the navigation menu and select **Data Log**.



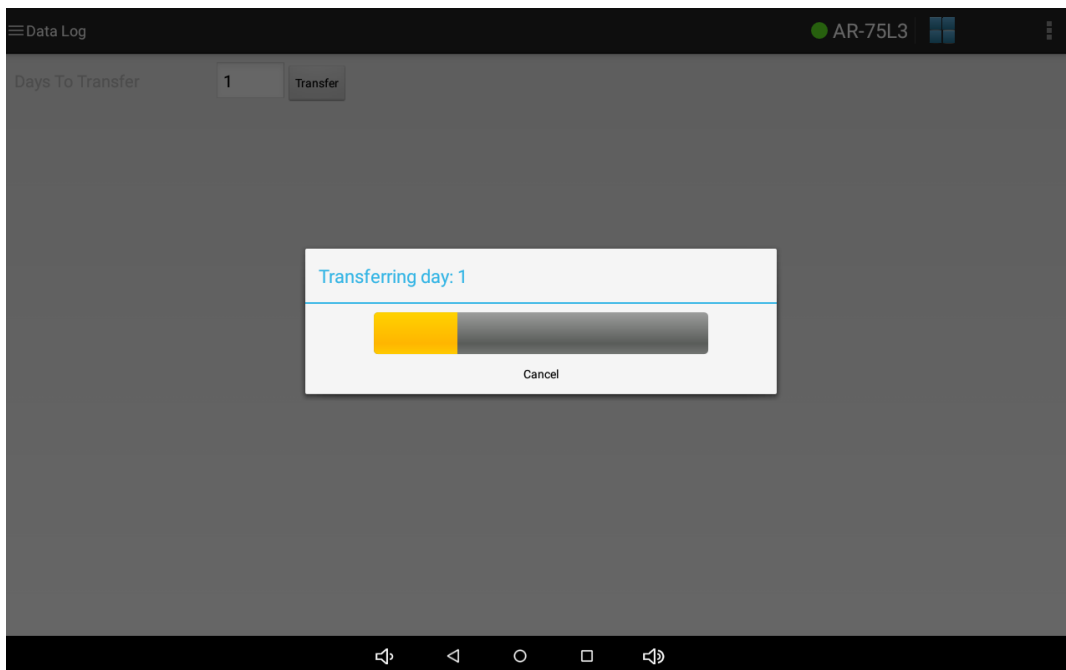
If a USB flash drive has not been installed in the USB port on the chamber the following screen will appear. If the following screen appears, please ensure that a USB flash drive has been installed.



If a USB flash drive has been inserted the following screen will appear. To set the number of days you wish to export, touch the **Days to Transfer** setting and use the numeric keyboard to change the setting. Next, touch the transfer button to initiate the transfer.



During the transfer process the following screen will appear. The status of the transfer process will be updated as the data is exported. If you wish to cancel the process, touch the **Cancel** button. When the process is complete, touch the **OK** button. At this point you may remove the USB flash drive and import the file using a computer with Microsoft Excel or similar software.



IMPORTANT!

The age and type of USB flash drive used may affect the amount of time it takes to export the data log. Typically it takes approximately one minute to export one day's worth of data. If you notice it is taking much longer than this to export one day's worth of data, use the procedure described above to cancel the data log transfer and use a different USB flash drive. Typically it has been found that newer USB 3.0 flash drives (manufactured after 1/1/2014) work faster than older drives. It is recommended that you regularly export the data. Regularly exporting the data will shorten the period of time needed to wait for the data to export. Percival Scientific recommends that data is exported on a weekly or daily schedule.

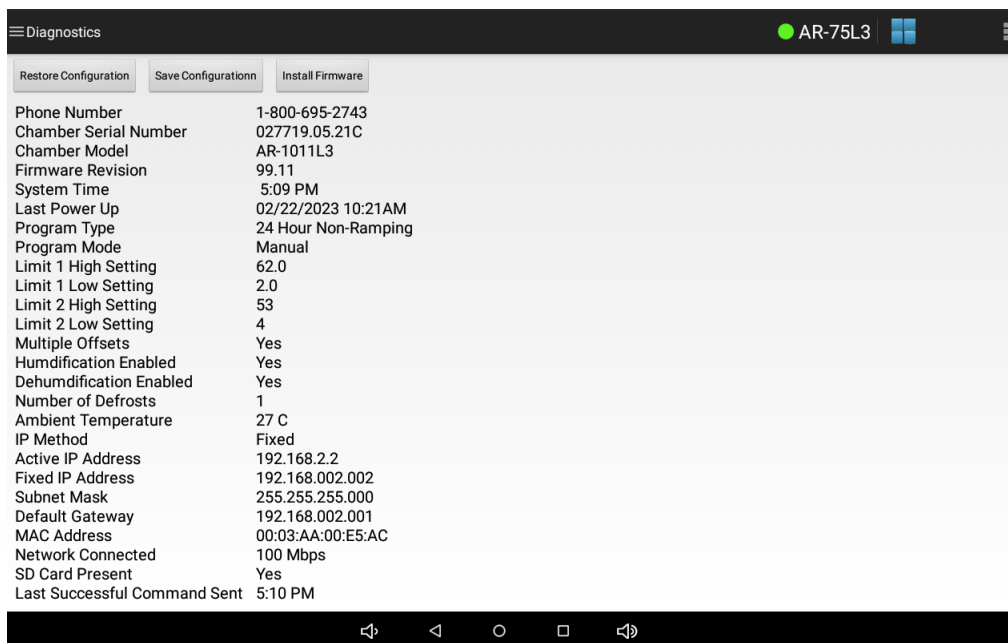
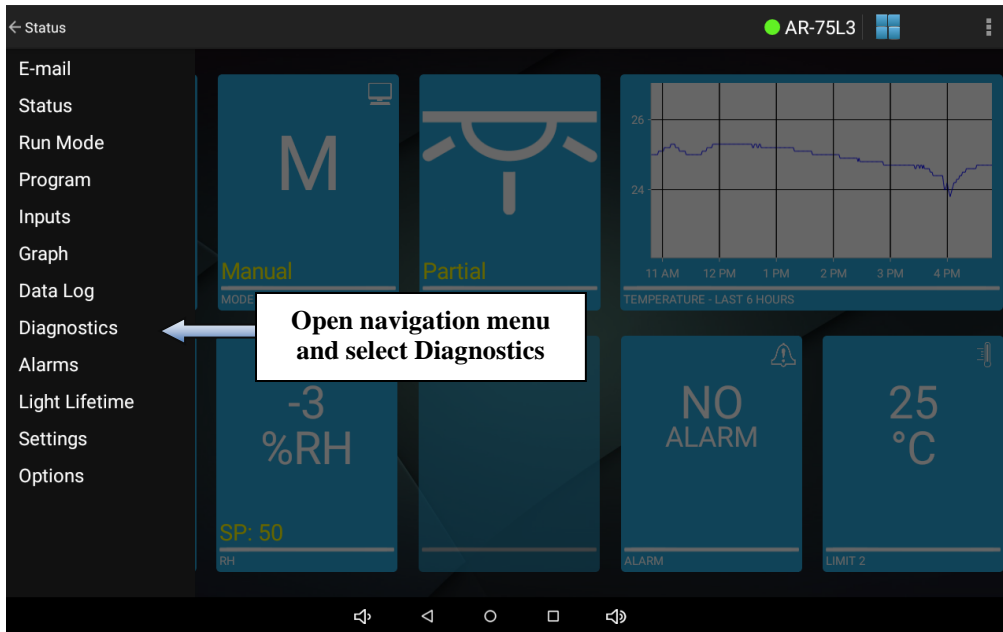
The file name of the exported data on the USB flash drive will consist of the chamber serial number and the date the data was exported. For example, a chamber with a serial number of 20000.01.14A exported on 4/10/2014 will have a file name of 020000_01_14A04_10_2014.csv. This allows you to identify the chamber when exporting data from more than one chamber. The chamber's serial number may be referenced on the diagnostics screen. Refer to the section titled "***Diagnostics Screen***" for more information. If you export the data more than once on the same day the previous file will be overwritten.

For additional information regarding the content, storage and retrieval of control system data, please refer to the IntellusUltra & Connect Manual.

Diagnostics Screen

The diagnostics screen displays an overview of information that is helpful in determining the current state the controller is operating in. It is also used for troubleshooting potential issues with Percival Scientific's support staff. You may be asked to record and read off some of the settings on the diagnostics screen when contacting Percival Scientific for support.

To access the diagnostics screen, open the navigation menu and select **Diagnostics**.



Diagnostics Screen

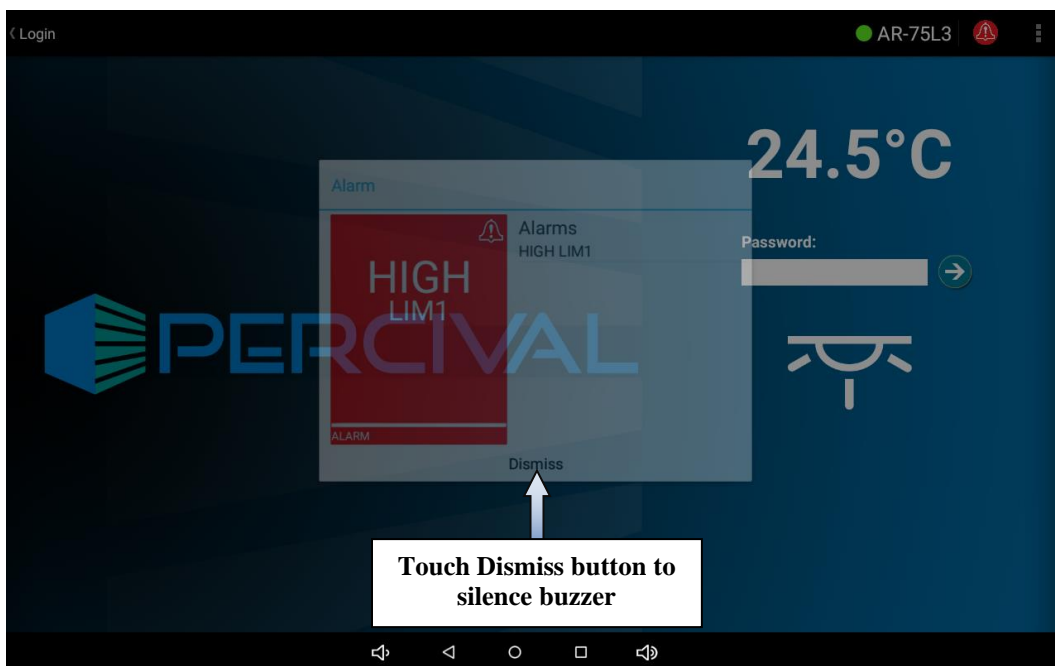
To view all of the information that is available on the diagnostics screen, swipe up or down.

For additional information regarding the Diagnostics Menu and its content, please refer to the IntellusUltra & Connect Manual.

Alarms Screen

The IntellusUltra control tablet application will alert you to temperature limit alarms, temperature deviation alarms, light lifetime alarms and controller errors. An example controller error would be if a sensor were not correctly connected to the controller.

When an alarm occurs a buzzer will sound on the IntellusUltra controller and the tablet app will display an alarm window. To silence the buzzer, touch the **Dismiss** button on the alarm window that appears.



Alarms Window

The alarm will still be active once the buzzer is silenced. This is indicated by the alarm icon in the action bar. Touching the alarm icon will cause the alarm window to open. The alarm tile on the status screen will also turn red and indicate the type of alarm. In order to clear the alarm you will need to correct the cause of the alarm.



Temperature Limit Alarms

Two sets of high and low temperature limit alarms may be configured on the alarms screen. The first set monitors the temperature in the chamber and will trigger an alarm when the temperature goes outside the bounds set for the high or low limit 1 alarms. The second set independently monitors the temperature in the chamber (using a separate sensor and its own microprocessor) and will trigger an alarm when the temperature goes outside the bounds set for the high or low limit 2 alarms. The limit 2 alarm bounds should be set outside of the limit 1 alarm bounds unless a dew chamber was ordered.

When a temperature limit alarm occurs, the controller shuts down all chamber control components. This protects your experiment from overheating or overcooling. A message indicating the type of limit alarm will be displayed in the alarm window and the alarm buzzer will activate. To silence the buzzer, touch the **Dismiss** button on the alarm window that appears. To clear the alarm message, you will need to either change the high or low limit alarm setting that caused the alarm beyond the current temperature in the chamber or wait for the temperature to return within the bounds of the limit alarm settings. This can often most quickly be accomplished by opening the chamber door.

CAUTION

Always remember to review the temperature limit 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 limit alarm settings accordingly.

Temperature Deviation Alarms

Please refer to the IntellusUltra & Connect Manual for a complete description of the Deviation Alarm feature's configuration and operation.

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 limit settings should be used.

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, if 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 may be set at is 2.0°C and the minimum value that the low deviation alarm may 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.

Deviation Alarm Latching

When the deviation alarm latching parameter is set to 'Yes' and a deviation alarm occurs, the alarm message will continue to display until the alarm is cleared using the app even if the temperature has returned inside the deviation band. 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, open the **Status** screen and view the current temperature process value and set point. If the process value has re-entered the deviation band the message should clear once you open the alarm window and press the **Dismiss** button. If it has not, temporarily change the **Deviation Alarm High** or **Deviation Alarm Low** settings so that the process value is within the deviation band. The deviation alarm should now clear after pressing **Dismiss** in the alarm window (touch alarms icon to access). 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.

Deviation Alarm Buzzer

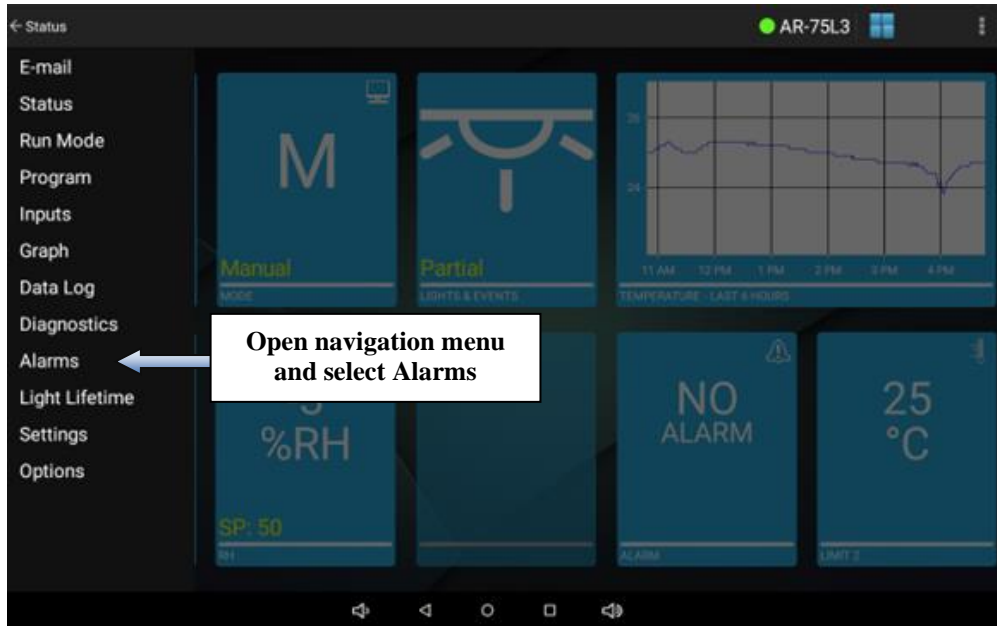
When a deviation alarm occurs, the alarm buzzer will activate if the **Deviation Buzzer** setting is set to 'Yes'. To stop the buzzer, touch the **Dismiss** button in the alarm window that appears or touch the alarms icon and then touch the **Dismiss** button. To clear the deviation message, you will need to either wait until the temperature in the chamber recovers to within the deviation band or adjust the **Deviation Alarm High** or **Deviation Alarm Low** settings accordingly.

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.

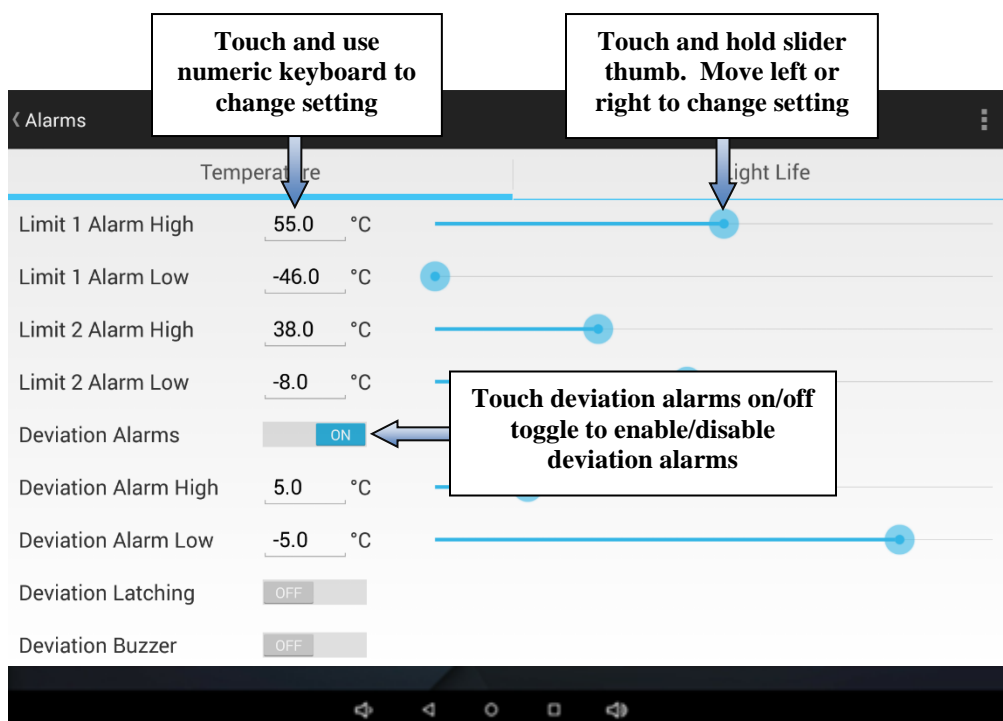
To access the alarms screen, open the navigation menu and select **Alarms**.



Alarms Screen

To set the Limit 1 Alarm High, Limit 1 Alarm Low, Limit 2 Alarm High and Limit 2 Alarm Low settings, either touch each setting and use the numeric keyboard to change the setting or use the slider next to each setting.

If you wish to use deviation alarms and they are currently disabled, touch the deviation alarms on/off toggle. The individual deviation alarm settings will appear and may be set. Remember to touch **Save** to save any modified settings.

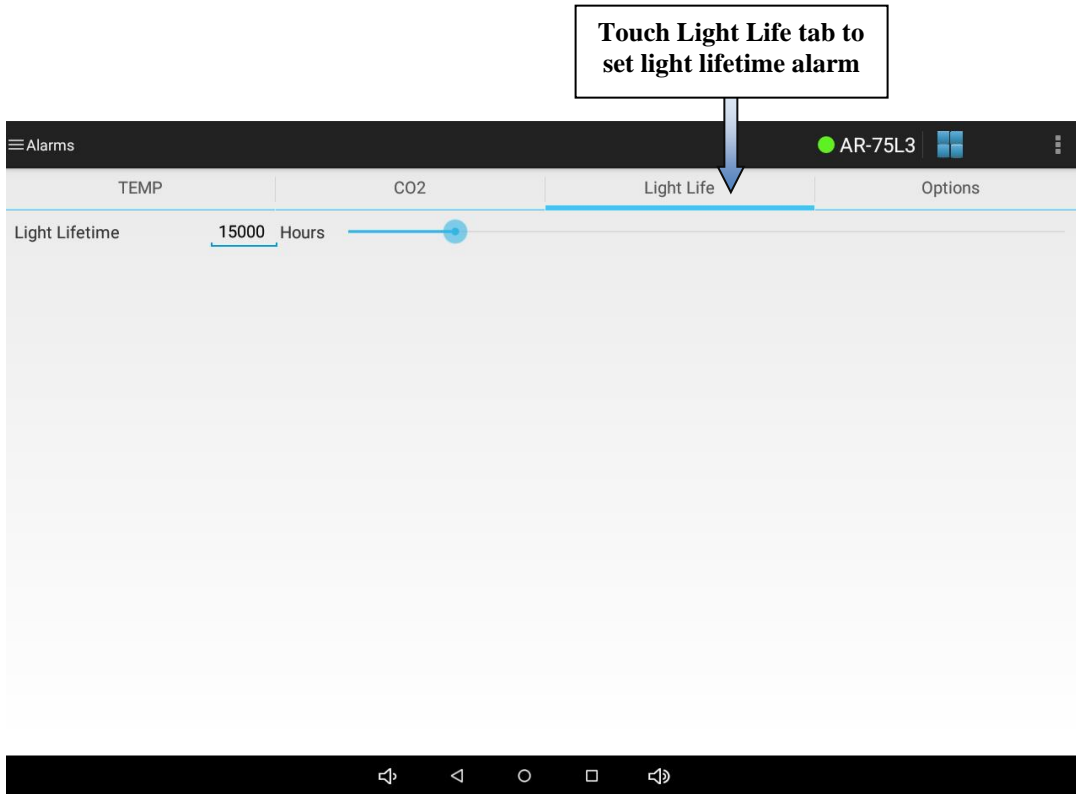


Light Lifetime Alarm

The light lifetime alarm may 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 in the alarm window. To silence the buzzer, touch the **Dismiss** button on the alarm window that appears. The lights controlled by the light output or outputs 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 or outputs that triggered the alarm. To

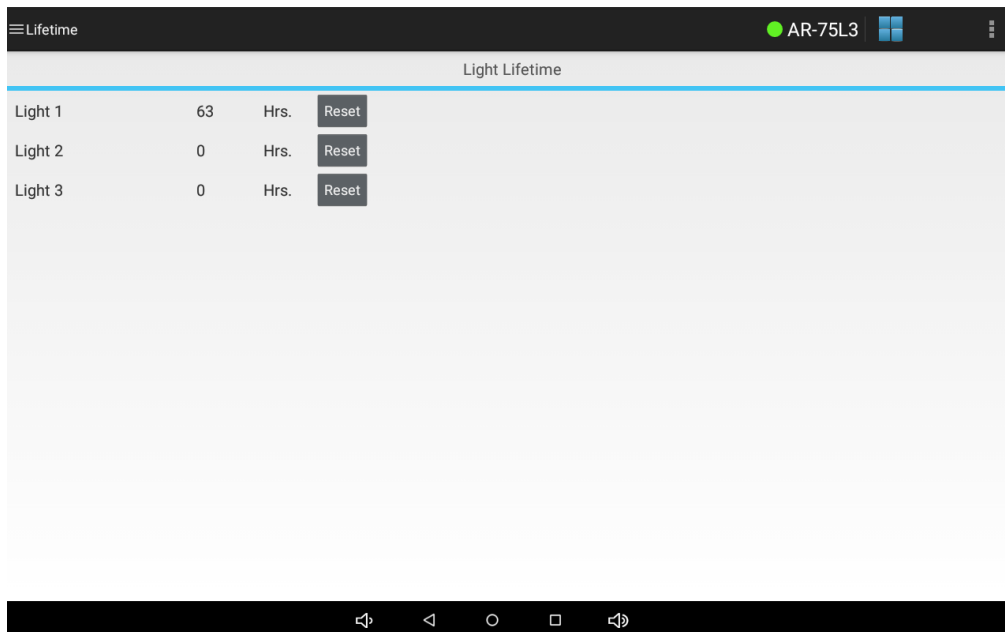
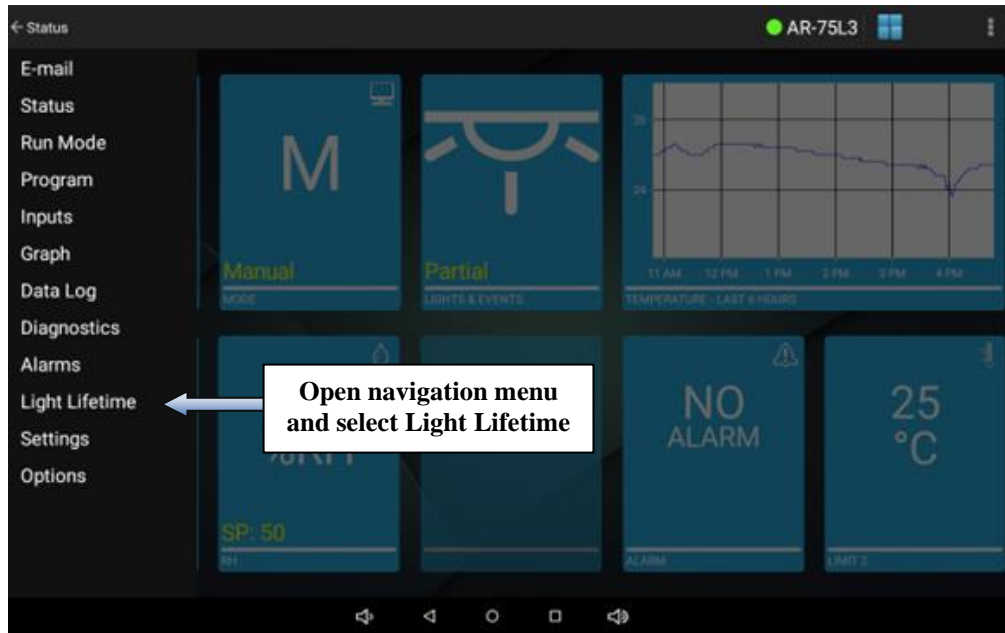
reset or review the accumulated light lifetime for outputs refer to the section titled ***“Light Lifetime Screen”***.

To set the light lifetime alarm first touch the **Light Life** tab. Next, either touch the light lifetime alarm setting and use the numeric keyboard to change the setting or use the slider next to the setting. Remember to touch **Save** to save any modified settings.



Light Lifetime Screen

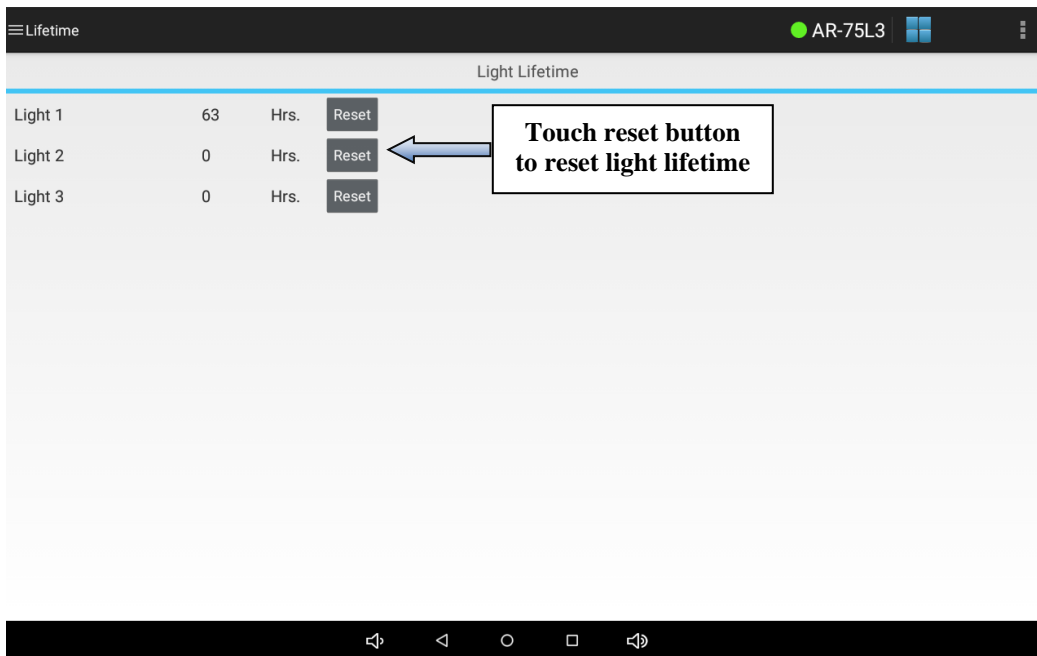
The light lifetime screen is used to monitor and reset the accumulated light lifetime for each light output. To access the light lifetime screen, open the navigation menu and select **Light Lifetime**.



Light Lifetime Screen

The accumulated light lifetime for each output may be reset at any time. Normally the lifetime should only be reset once the lifetime value has exceeded the recommended lifetime for the type of lamps installed in the chamber. The light lifetime alarm setting on the alarms screen is designed to indicate when the lamps should be changed. This value is defaulted at 15,000 hours. This may be more or less than the recommended lifetime for the style of lamps installed in the chamber. Please contact our offices for advice on what lifetime alarm value to use.

If the light lifetime alarm is triggered, check the light lifetime screen to see which light outputs have been on for more than the light lifetime alarm value. Change the lamps that are controlled by any output whose accumulated lifetime is greater than the alarm value. Once the lamps are changed, touch the **Reset** button next to the appropriate light output(s). Touch the **Save** button to confirm that you wish to reset the light lifetime(s). This will reset the value(s) back to 0. Once all outputs greater than the alarm value have been reset the light lifetime alarm should clear.



Settings - Calibration Screen

CAUTION

Calibration offsets are not normally altered. Calibration offsets should only be changed when the temperature, humidity, auxiliary or expansion channel values displayed on the status screen do not agree with your measurement device.

The chamber is calibrated at our factory at a temperature of 25°C with all lights on and all lights off. If the current temperature, humidity level or auxiliary level 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 temperature, temperature limit 2, humidity (if ordered) and auxiliary (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 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 IntellusUltra control tablet app reads 26.0°C then you'd enter a calibration offset of 0.3°C.

Multiple temperature offsets are available or you may use a single day and night temperature 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.

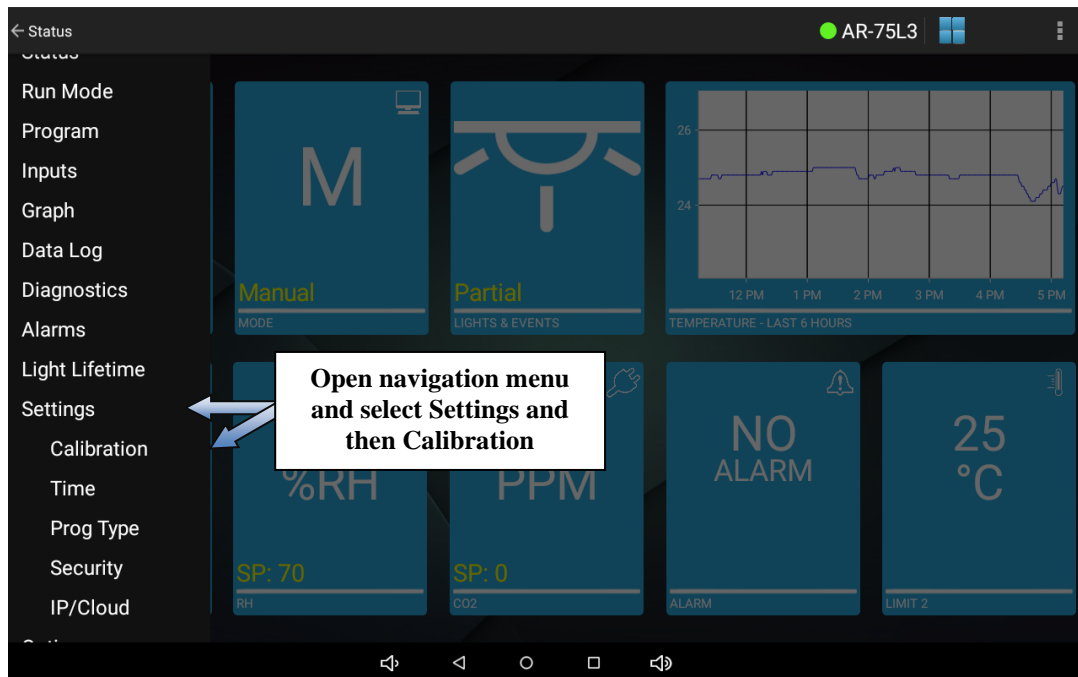
If the chamber needs to be calibrated to a different standard measurement device use the following steps as a guide:

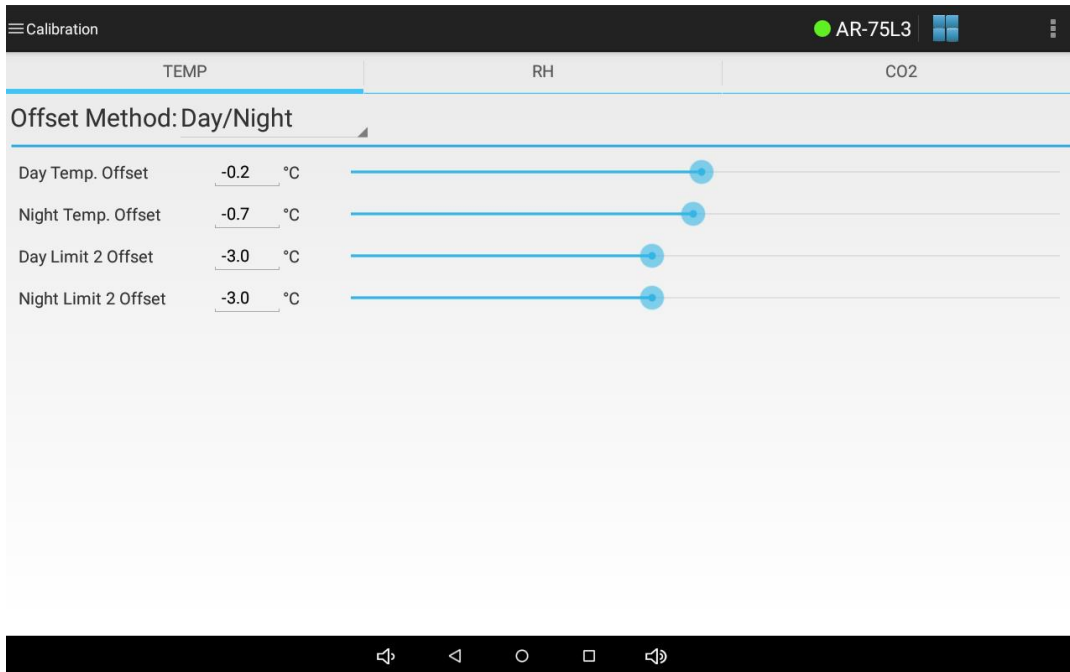
- 1) Turn all lights off in the chamber
- 2) Position the new standard measurement device in the area of the chamber of most interest/importance to the experiment
- 3) Set the chamber to 'Manual' mode, and set the manual set points to the desired calibration value(s).
- 4) Let the chamber run for approximately 20-30 minutes to allow the system to stabilize
- 5) Compare the process value to the value output from the standard and enter the **difference** between the two into the night calibration offset. For example: If the IntellusUltra control tablet app is reading 30°C and the standard thermometer reads 28°C, then enter -2.0°C into the night temperature offset. This will offset the

temperature readout so that it agrees with the standard. Entering -2.0°C will change the readout to 28°C from the previous 30°C. Refer to the information below for information on setting the temperature offsets.

- 6) At this point the IntellusUltra 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.

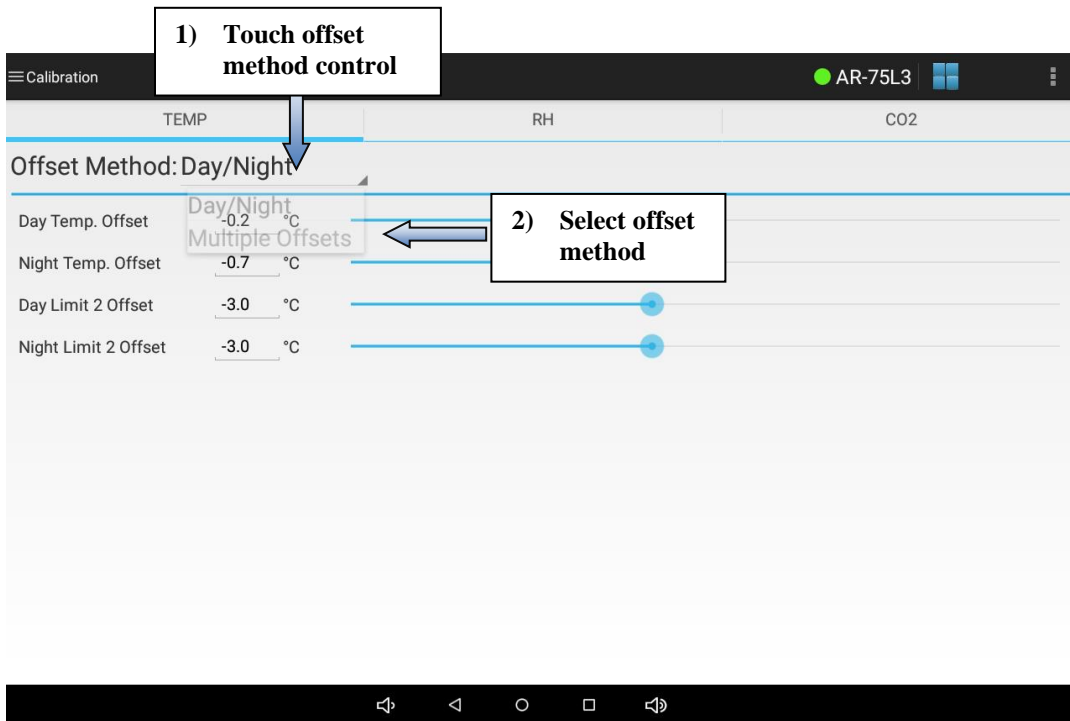
To access the calibration offsets screen, open the navigation menu and select **Settings** and then select **Calibration** from the submenu that appears.



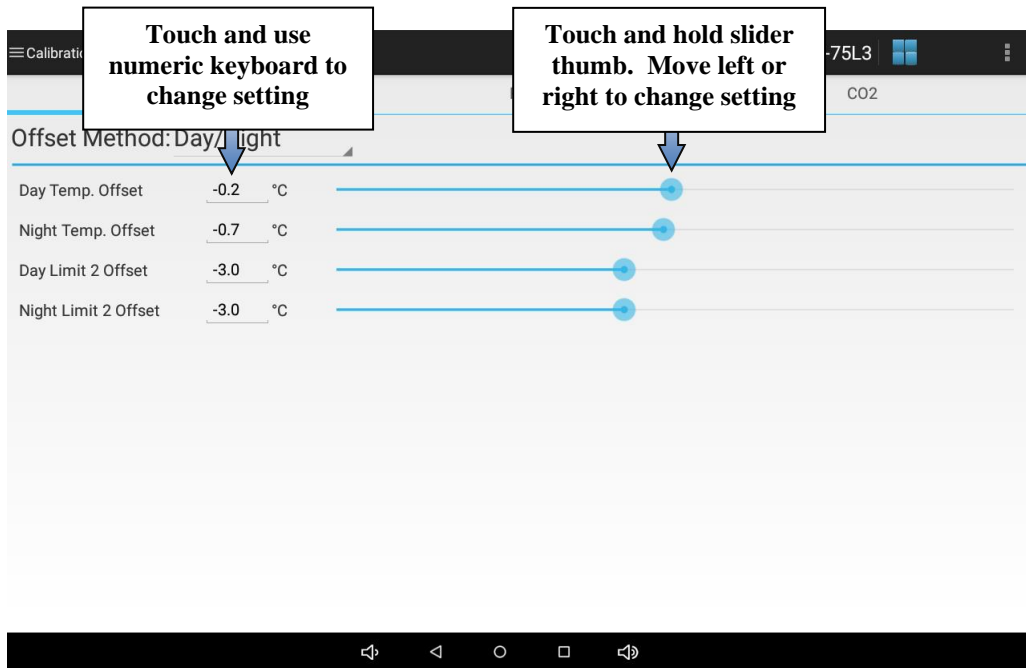


Calibration Screen

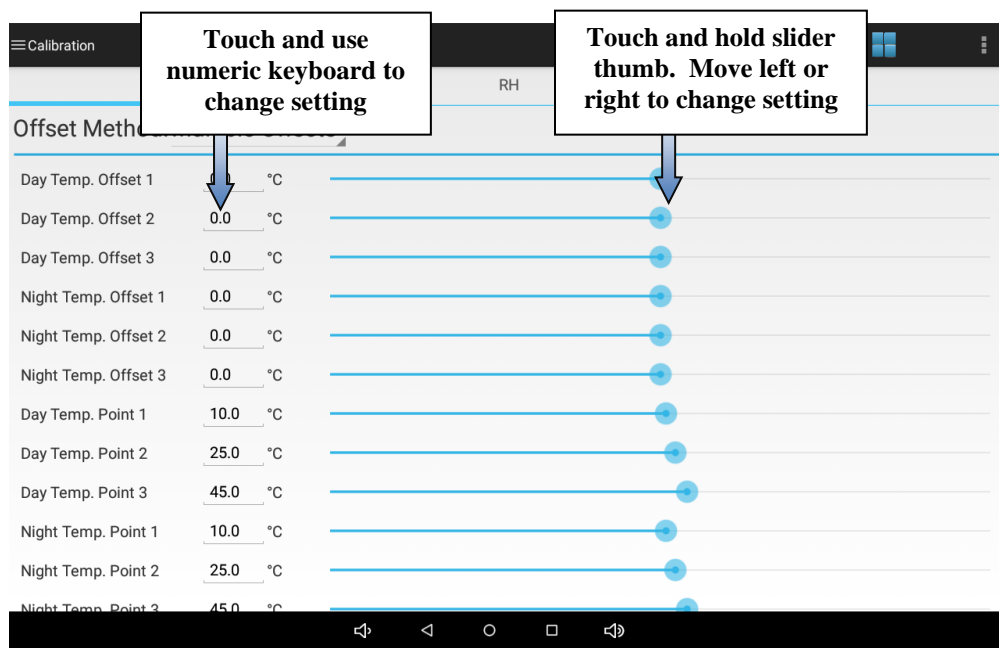
To select between running day/night temperature offsets and multiple temperature offsets touch the offset method control and select the desired method from the list that appears.



If you selected to run day/night offsets, to set the day and night temperature offsets either touch each setting and use the numeric keyboard to change the setting or use the slider next to each setting. Remember to touch **Save** to save any modified settings.

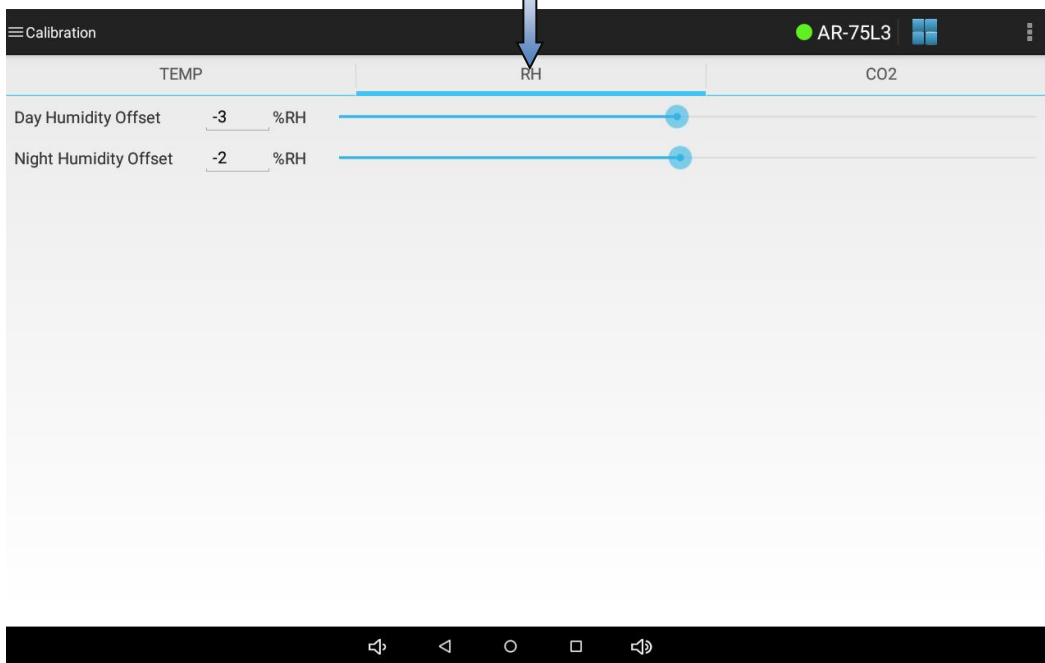


If you selected to run multiple offsets, to set the day 1-3 and night 1-3 temperature offsets and day 1-3 and night 1-3 offset points either touch each setting and use the numeric keyboard to change the setting or use the slider next to each setting. Remember to touch **Save** to save any modified settings.



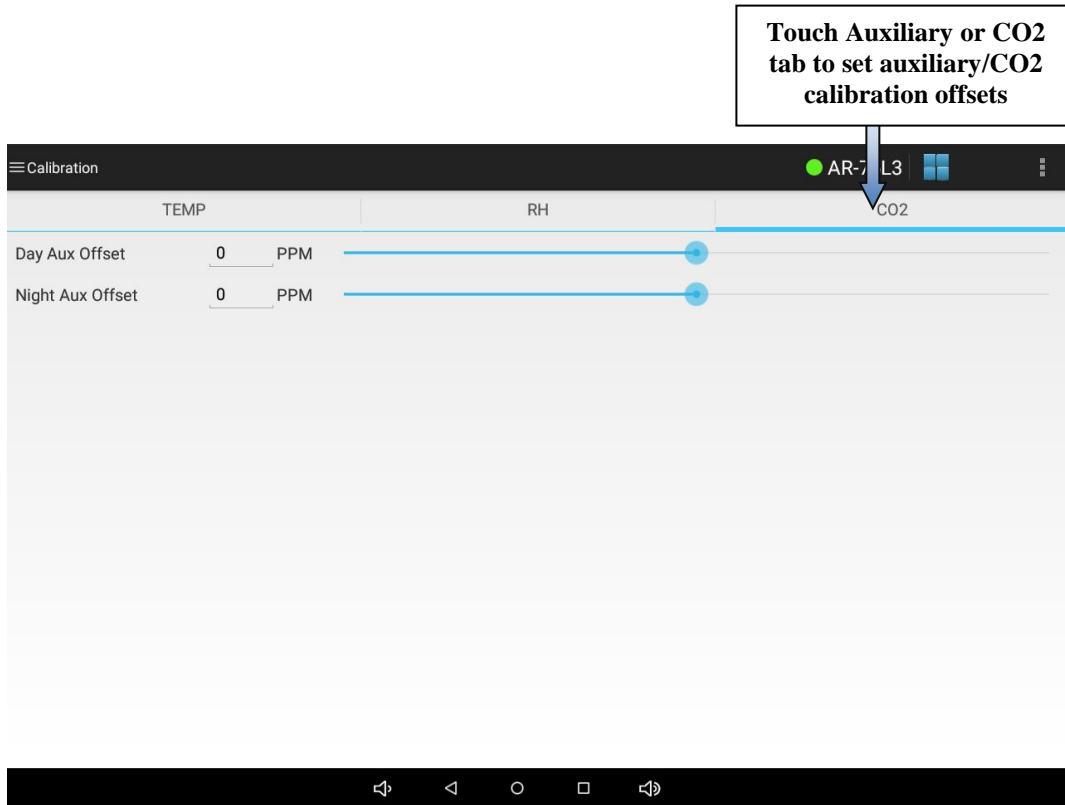
If a humidification or dehumidification system was ordered you will have a **Humidity** tab on the calibration screen. To set the day/night humidity offsets, first touch the **Humidity** tab.

**Touch Humidity
tab to set humidity
calibration offsets**



To set the day and night humidity offsets either touch each setting and use the numeric keyboard to change the setting or use the slider next to each setting. Remember to touch **Save** to save any modified settings.

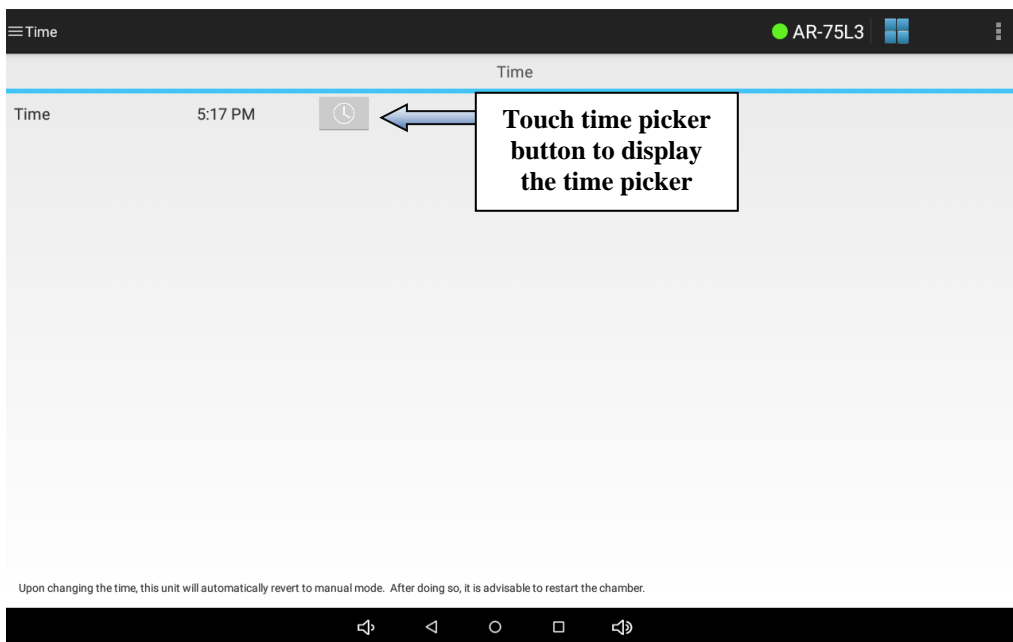
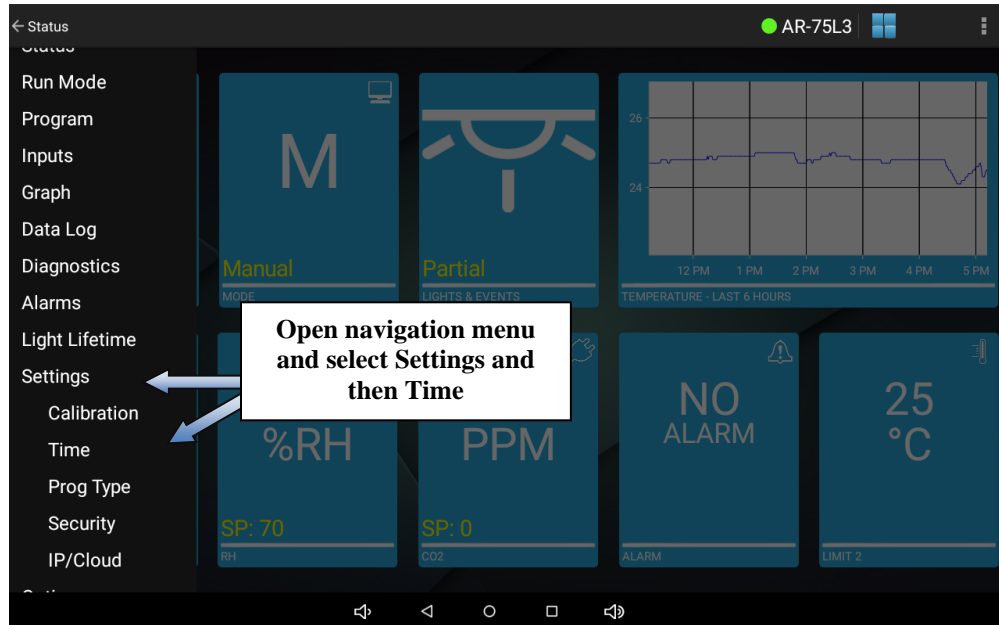
An additional tab is added to the Calibration screen for every additional auxiliary channel or CO2 channel enabled on the control system. To set the day/night auxiliary/CO2 offsets, select the appropriate tab.



To set the day and night offsets, touch the desired settings slider or use the numeric keyboard to change the value. Remember to touch **Save** to save any modified settings.

Settings - Time Screen

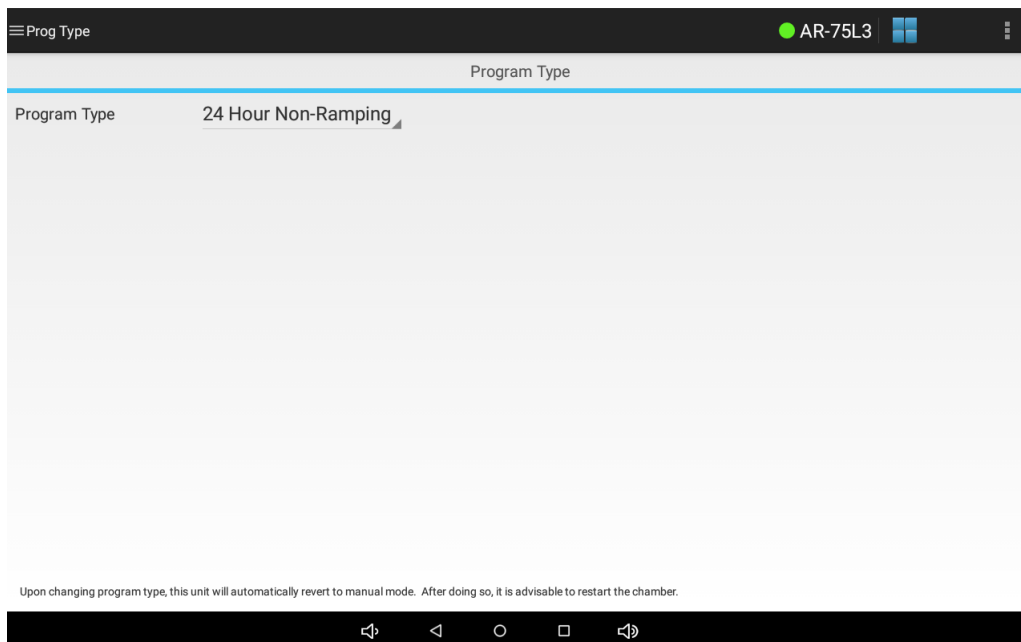
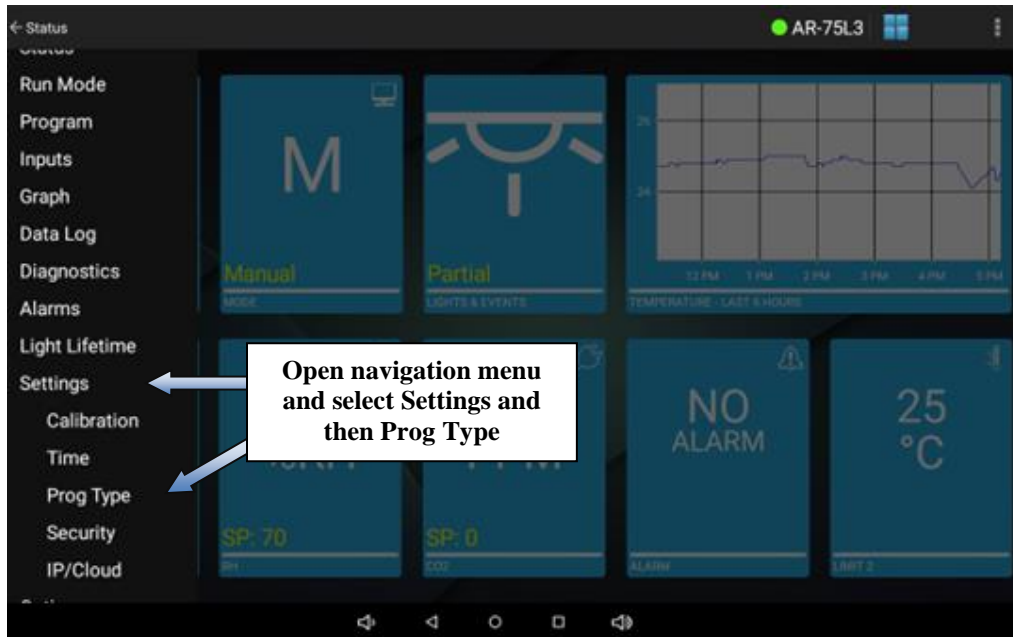
The time screen is used to set the IntellusUltra controller's time. To access the time screen, open the navigation menu and select **Settings** and then select **Time** from the submenu that appears. To set the controller time, touch the time picker button and use the time picker to set the current time. Touch the **Save** button once you have set the correct time.



Time Screen

Settings – Prog Type Screen

For a complete description of the different program types, please refer to the IntellusUltra & Connect Manual. To review or change the control system's program type, open the navigation menu and select **Settings** and then select **Prog Type** from the submenu that appears.

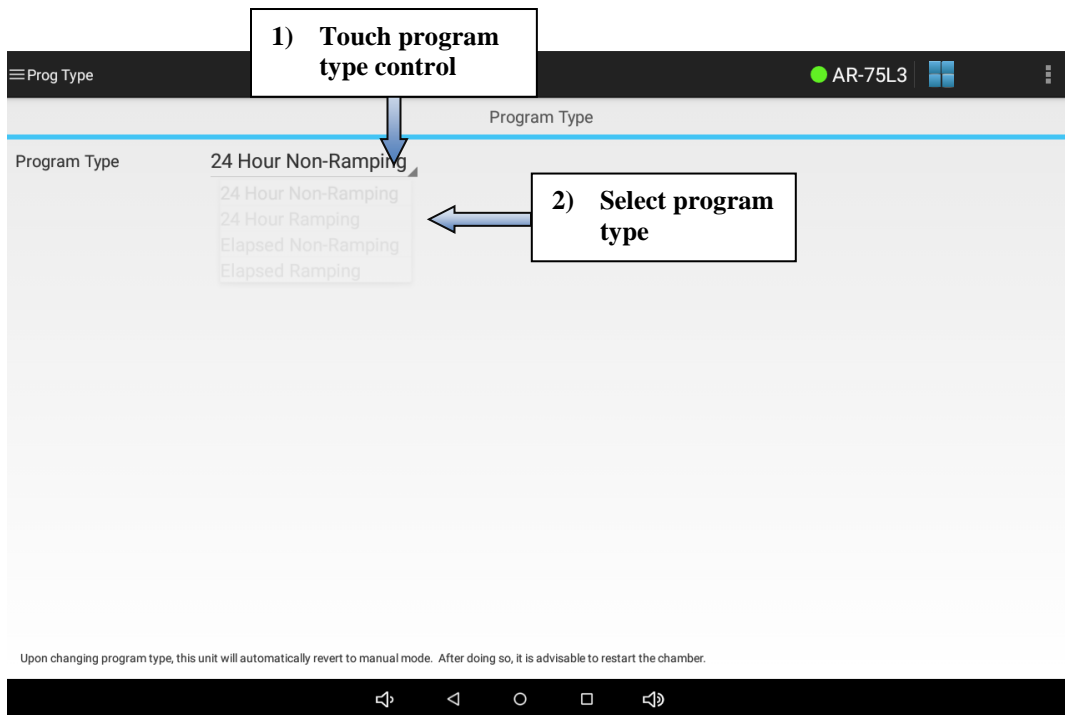


Prog Type Screen

The currently configured program type operating on the controller is displayed in the dropdown box on the Program Type screen. The default program type is '24 Hour Non-Ramping'.

To change this setting, touch the program type control and select the program type you wish to run from the list that appears. Touch the **Save** button once you have selected the desired program type.

Note: When using the Elapsed 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. Also, an existing program sequence will be lost when changing step types.



Settings – Security Screen

IMPORTANT!

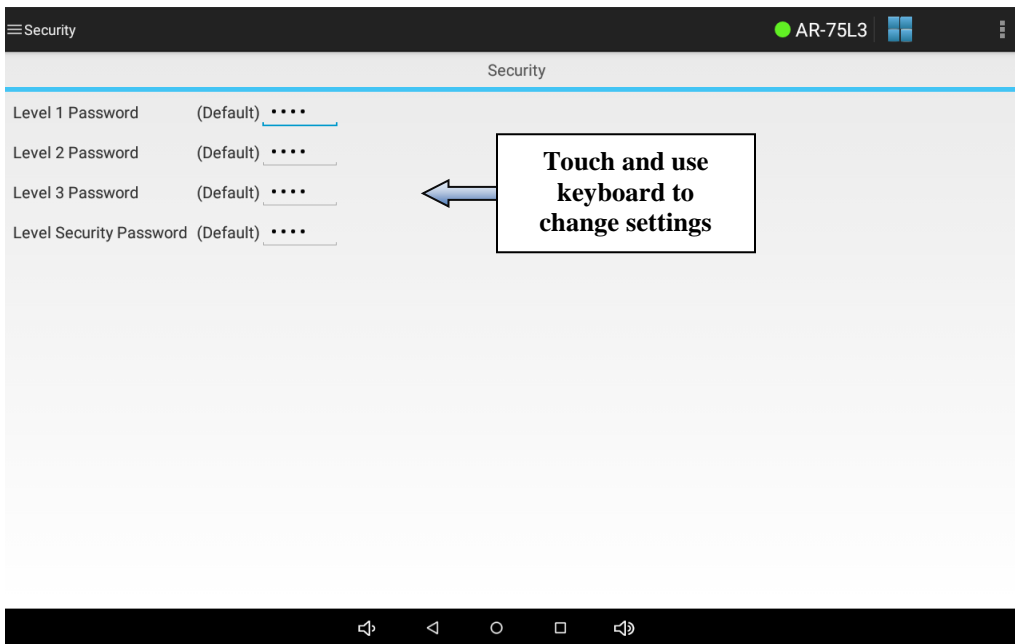
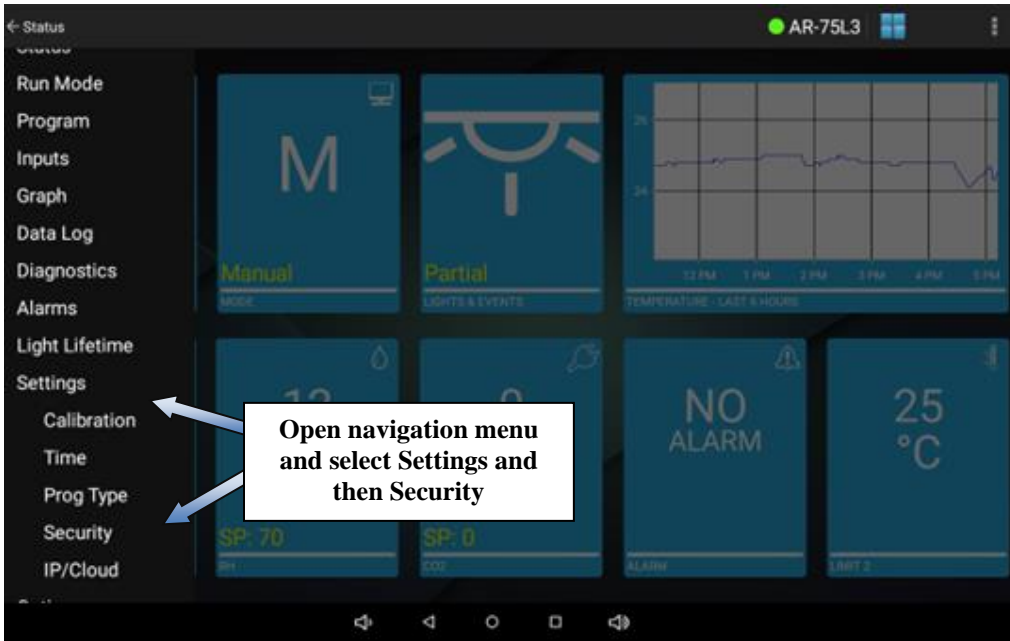
Please refer to the **IntellusUltra & Connect Manual** prior to the configuration of any control system security features!

- Security is optional. If you do not need to secure the tablet app then do not configure security.
- If unsure about how to configure security, please contact Percival Scientific. If configuration is not done properly it may 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.
- Each password must be four characters in length. Only lowercase, uppercase letters and numbers can be used for passwords
- Once passwords have been set the chamber will need to be powered off and then on again in order to enable security.

⚠ CAUTION

It is mandatory to change the security level password when implementing security. The security level password is used to enter the security screen that allows the changing of passwords. If this password is not changed, anyone could use the default '1111' security level 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 enable security, open the navigation menu and select **Settings** and then select **Security** from the submenu that appears.



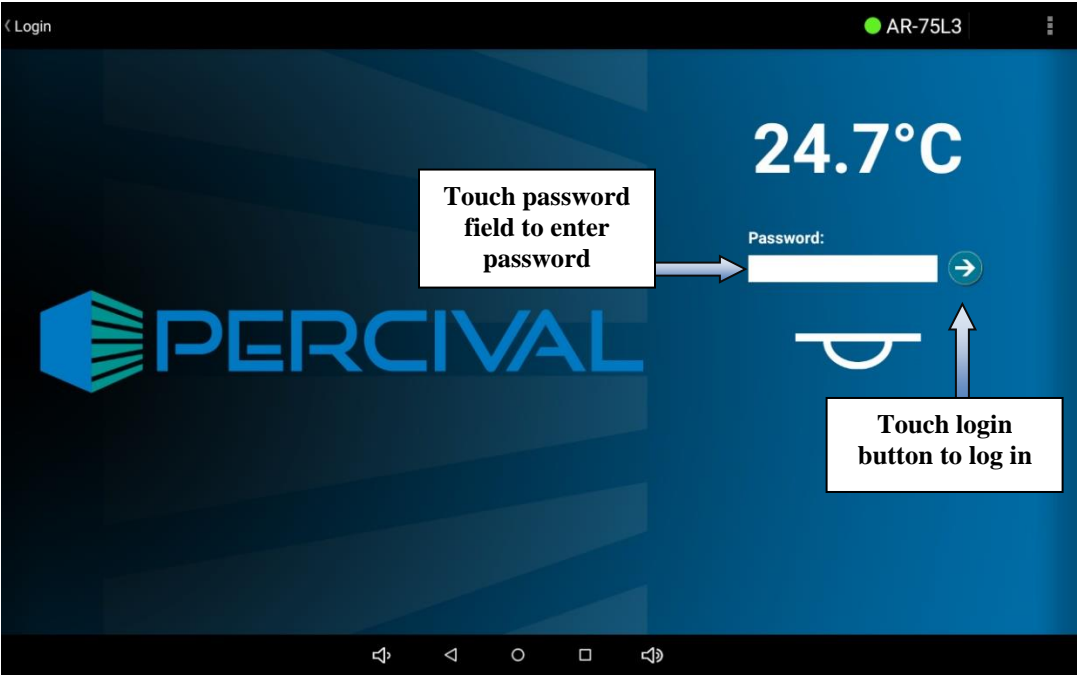
Security Screen

To set a password, touch any of the level 1-3 password or security password settings and use the keyboard to change the setting. Once you have changed a password or passwords remember to touch **Save** to save any modified settings.

IMPORTANT!

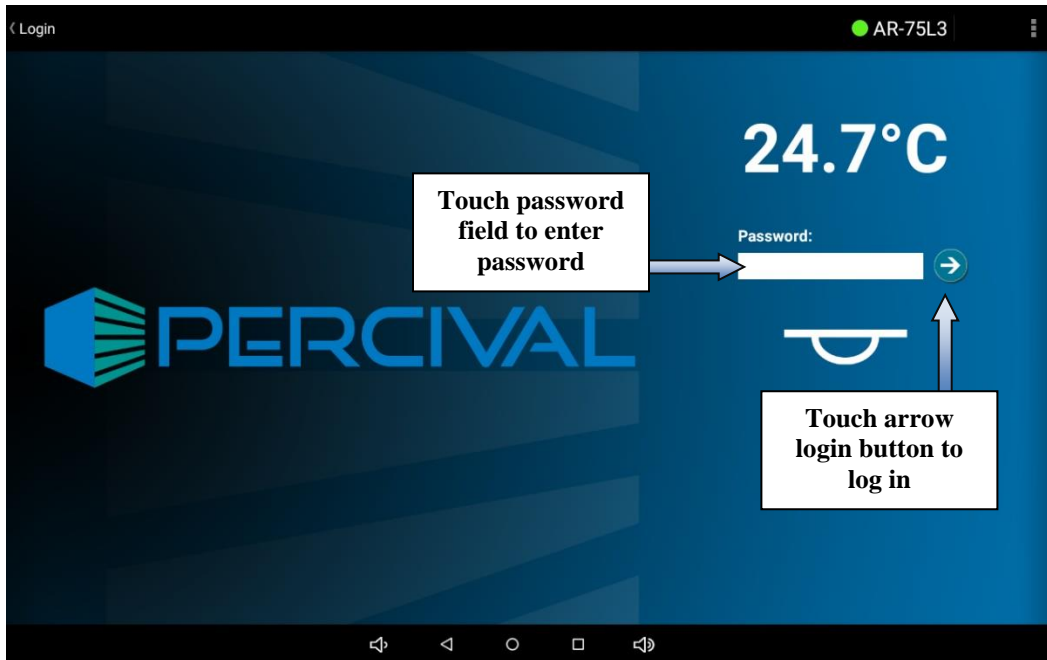
You must turn the chamber power off and then on again in order for security to be enabled.

Once the chamber is powered on again the app will re-launch at the login screen. In order to log in, touch the password field and enter the password for the level you wish to log in as using the alphanumeric keyboard that appears. Next, touch the login (arrow) button.

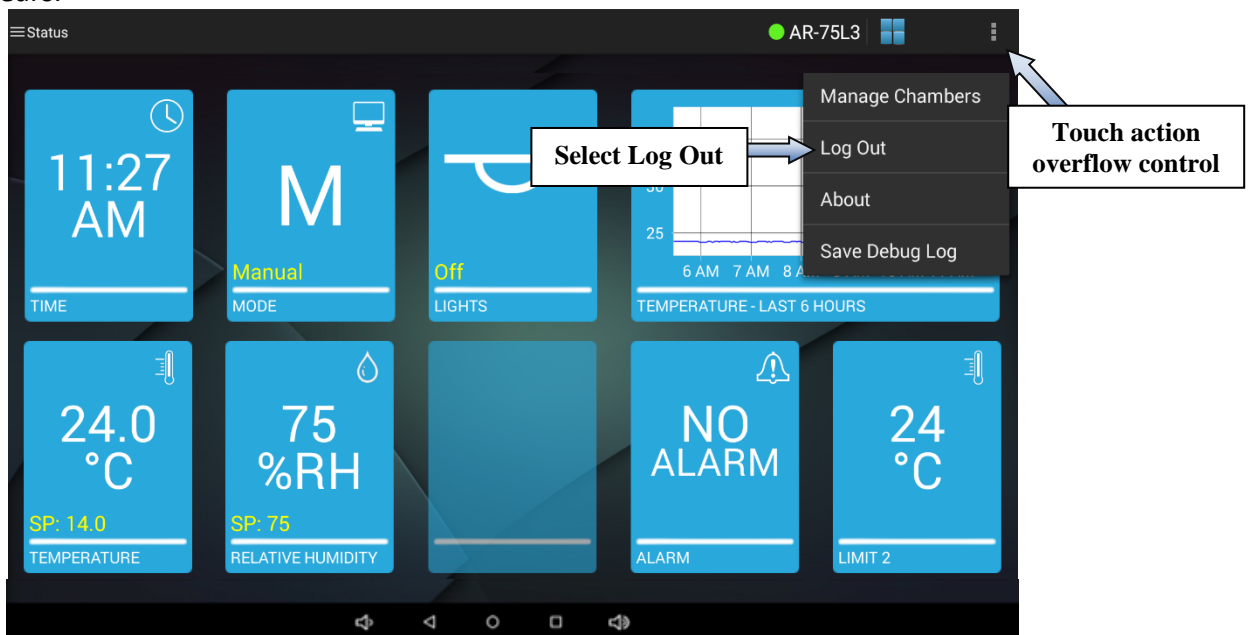


Logging In/Out

Once security is enabled each user that accesses the controller will need to log in and out. To log in, touch the password field and enter the password for the level you wish to log in as using the alphanumeric keyboard that appears. Next, touch the login (arrow) button.



To log out, touch the action overflow control on any screen and select **Log Out** from the menu that appears.



The application will automatically log out after 10 minutes of inactivity.

Disabling Security

To disable security you must reset each password to its default. See the “**Settings – Security Screen**” 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

To disable security, log in as the security level user and change all off the passwords to their default values listed above. Once you have changed the passwords remember to touch **Save** to save any modified settings.

IMPORTANT!

You must turn the chamber power off and then on again in order for security to be disabled.

