memmert
aralab

# web
# climaplus


**READ AND KEEP THESE INSTRUCTIONS**

**ORIGINAL MANUAL**

# INDEX



**NOTE:** Appendices are only available digitally.

# 1. CHARACTERISTICS

The Aralab ***ClimaPlus Web*** Human Machine Interface (HMI) is designed to provide a modern, intuitive, and flexible user interface for controlling a wide range of environmental chambers. With its responsive touchscreen and remote-access web functionality, the system brings advanced control and monitoring capabilities directly to your fingertips, whether you are at the chamber or connected from a desktop or mobile device on the same network.

Users can easily manage core chamber functions, including setting temperature and other property set points (desired value inside the chamber), creating and running multi-step programs, monitoring live system status, and responding to alarms. The HMI offers role-based access, ensuring security while allowing viewers, users, and administrators to access features appropriate to their needs. All major actions are accessible both locally from the chamber's HMI panel and remotely through a standard web browser via the chamber's IP address.

Advanced features such as full event and alarm logging, program scheduling, and custom chamber settings are included to simplify both routine operation and troubleshooting. The interface supports exporting data logs for further analysis or record-keeping, and provides convenient tools for managing maintenance events and user notifications. **The logging database retains up to a year of records (depends on the HMI module); once this limit is reached, the system automatically deletes the oldest entries to make room for new data.** Data can be logged externally (such as with a FitoLog application) or exported from the chamber.

Designed for versatility, the HMI offers multi-language support, strong user authentication, and seamless integration with industrial systems via Modbus TCP (via Ethernet or Wi-fi), making it suitable for laboratories, production environments, and quality-control applications across all supported chamber models.

# 2. GETTING STARTED

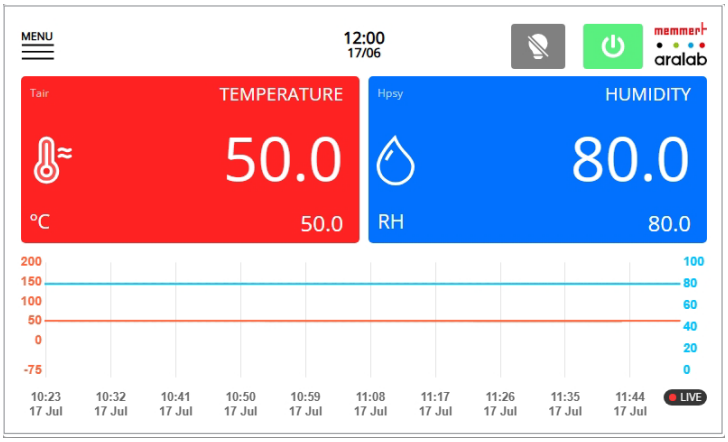



**Figure 1 – Home Screen**

Welcome to your Memmert-Aralab chamber. This "Getting Started" guide will help you begin using the chamber's Human Machine Interface (HMI) and accessing it from a web browser.

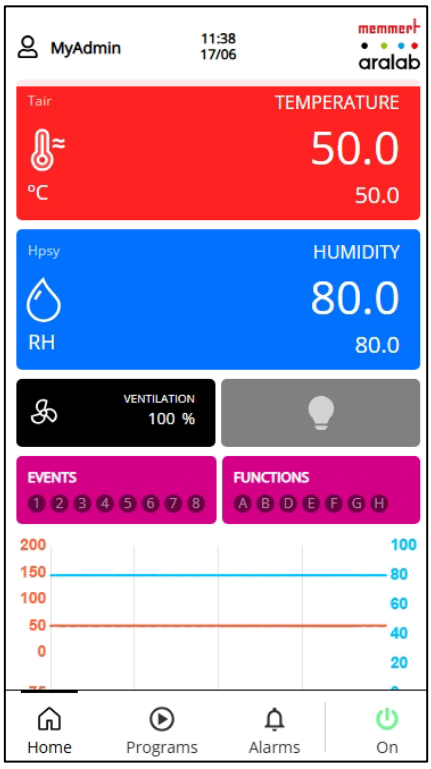



**Figure 2 – Mobile Home Screen**

Access via Mobile Devices is also available, with limited functionality, but will not be covered in this guide.

**Important:** For installation, safety, and chamber-specific operation, please consult your chamber model's dedicated manual.

## 2.1. BEFORE YOU BEGIN

You should have:

- Completed all installation and safety procedures described in your chamber's equipment manual.
- Performed any required physical setup per that document.

**This manual covers the universal ClimaPlus Web touchscreen controls. All hardware instructions are found in your chamber's model-specific equipment manual.**

| | |
|---|---|
|  | **NOTE:** All illustrative screenshots in this manual are from a chamber with Temperature and Humidity control. Depending on your chamber's specific controller the display may contain different elements. |

## 2.2. ACCESSING THE CHAMBER INTERFACE

Once the chamber has been powered on, the HMI will take a few seconds to update as the chamber boots up. Once it finishes, you'll be presented with the Home screen:

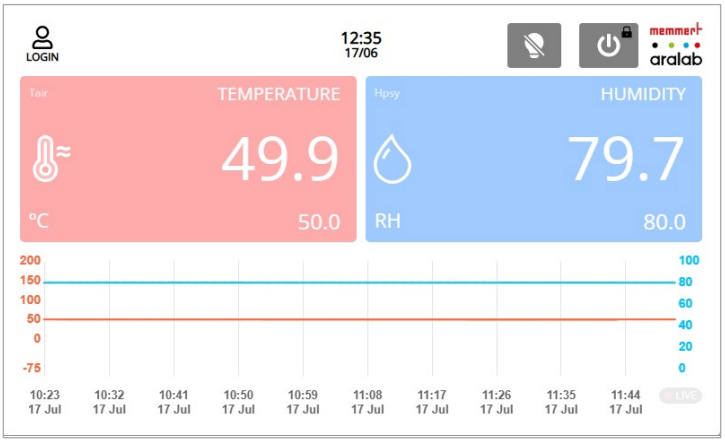



**Figure 3 – Initial Home Screen**

You can use the Memmert-Aralab chamber interface:

- **On the chamber's built-in touchscreen (HMI),**
- **Or remotely via a web browser** from any device connected to the same network.

To connect remotely, simply open a modern browser and enter the chamber's IP address. The connection is performed via HTTP and not HTTPS, so the browser may issue a warning to proceed.

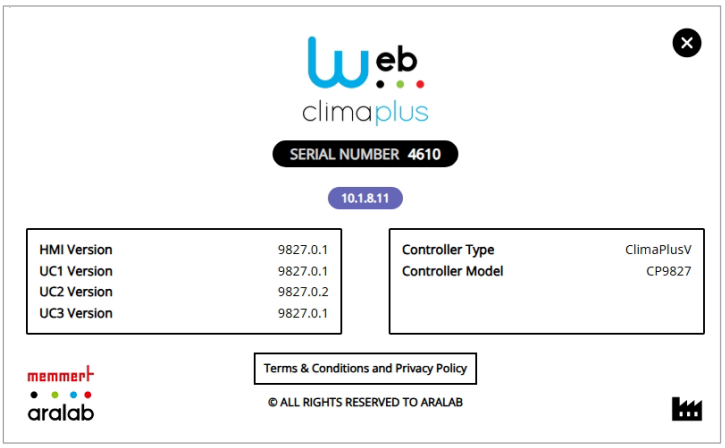



**Figure 4 - Controller Information Page displaying IP**

| | |
|---|---|
| | **TIP:** To find the chamber's IP address, tap the Memmert-Aralab logo on the HMI Home page. The chamber must be connected to your network via Ethernet. |

## 2.3. ON-SCREEN KEYBOARD

The controller can be fully operated via touch (or mouse in browsers). Any input can be set with selection boxes or on-screen keyboards.

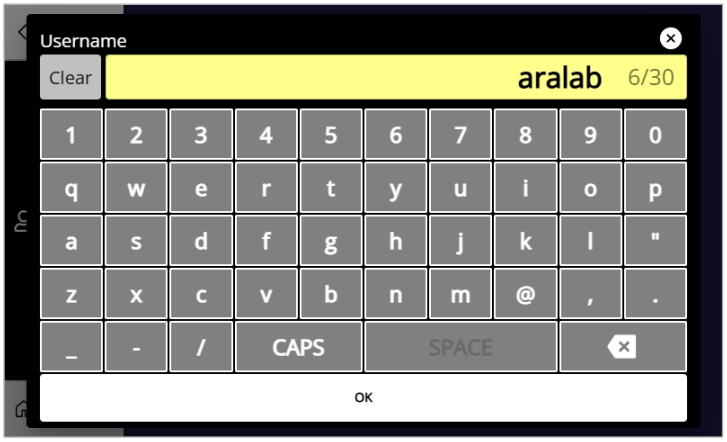



**Figure 5 - Text Keyboard**

Selecting any editable value or input box in the controller will open an on-screen keyboard for input of the desired values. Selecting 'OK' near the bottom will confirm the changes. Selecting 'X' in the top right will cancel them.

| | |
|---|---|
| | **TIP:** On a browser, the physical keyboard can be used to input all the possible keys shown on the on-screen keyboard. OK can be set with the Enter key and the input cancelled with Esc. |

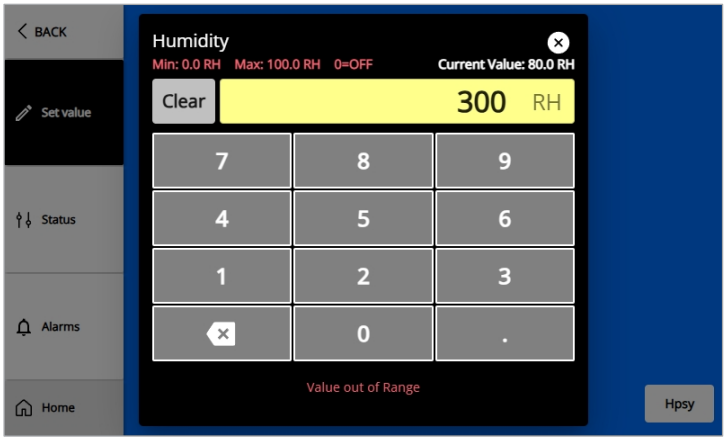



**Figure 6 - Number Keyboard Invalid Value**

Max and Min values allowed are also displayed in any editable parameter for easy reference. Values beyond the displayed limits cannot be input or will fail to validate.

Dialer indicates when 0 turns the property off instead of setting it to 0.

## 2.4. INITIAL LOGIN

Before Login, access is highly limited due to the security requirements. To log in:

1. In the Home page, press the LOGIN icon in the top left.

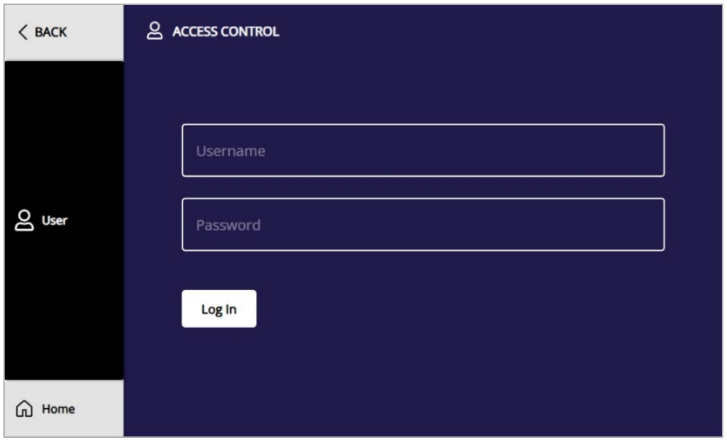



**Figure 7 - Login Screen**

2. In Access Control, select the Username and Password boxes to input user credentials.
3. By default, a single user account is available for initial access:
   - Username: **aralab**
   - Password: **aralab1985**
4. Enter the credentials and press Log In, completing the log in process with a warning.

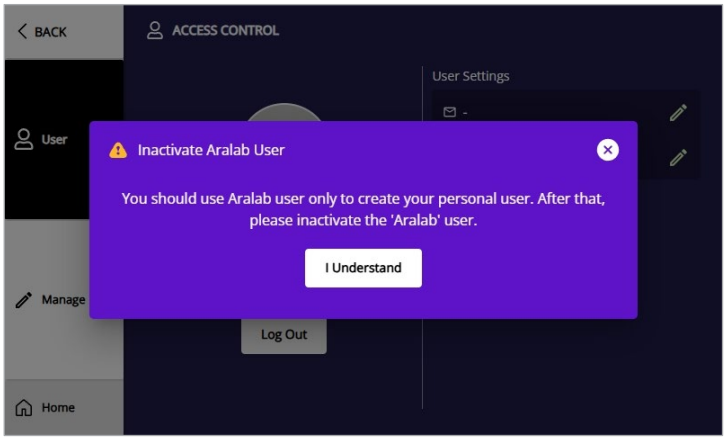



**Figure 8 - "aralab" User Security Warning**

## 2.5. CREATING YOUR USER ACCOUNT (FOR YOUR SECURITY)

To attain your first User Account you must use the "aralab" user account to create a new personal User with Administrator permissions:

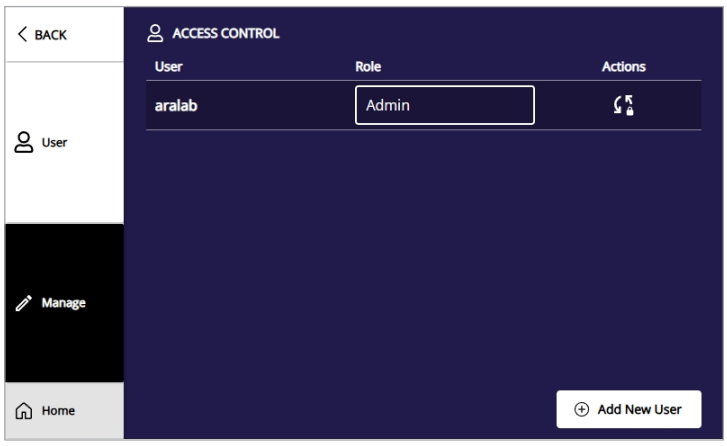



**Figure 9 - Manage Screen**

1. From Access Control, select the 'Manage' tab on the left.

| | |
|---|---|
| | **TIP:** If you left Access Control and don't know how to return, you should click any visible 'Home' icon, then the 'Menu' icon at the top left and finally click the "aralab" user icon at the bottom of the screen. |

2. Select 'Add New User' or the plus (+) icon button.

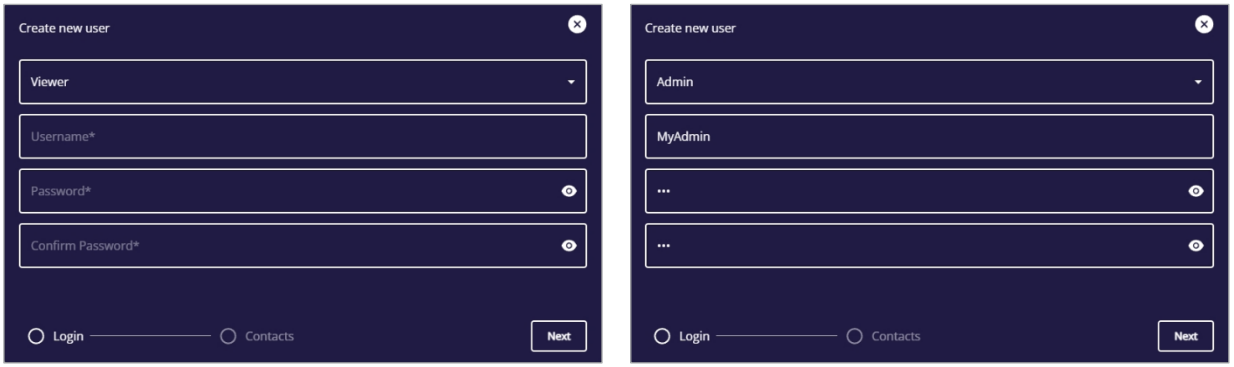



**Figure 10 - Add New User, Login Page**

3. In the dropdown menu, select 'Admin' role.
4. Input your preferred User credentials.
5. After everything is set, press 'Next' on the bottom right.

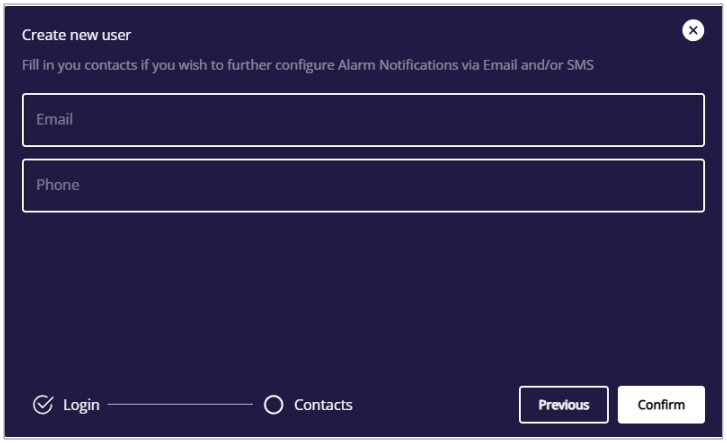



**Figure 11 - Add New User, Contacts Page**

6. Contacts, if you wish to configure Alarm Notifications, can be set now or later.
7. When done, or if leaving one or both empty, click 'Confirm'.
   The new user should be successfully created.

### 2.5.1 Inactivating Aralab Account

For security reasons you should now log out of the "aralab" account and inactivate it as follows:

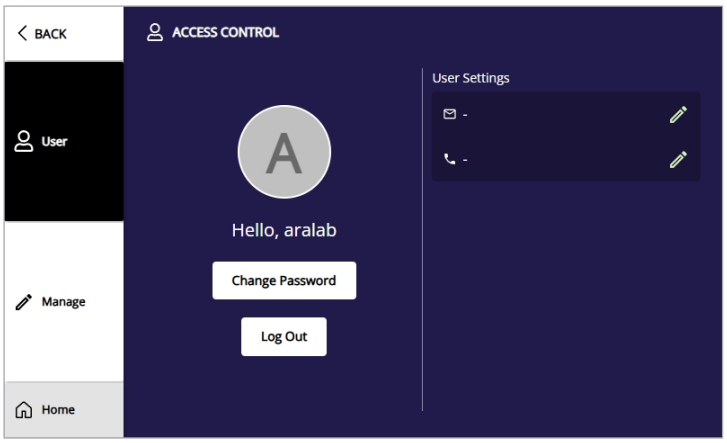



**Figure 12 - User Page for "aralab" User**

1. From the User tab in Access Control, Log Out.
2. Log in, as detailed in Initial Login, using the User Credentials you've created.

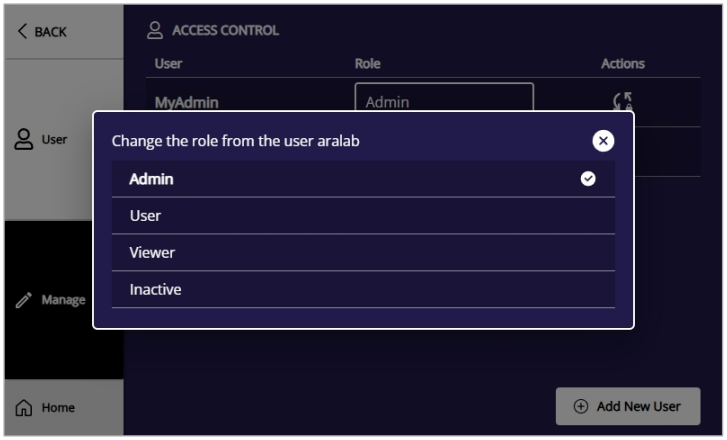



**Figure 13 - Changing "aralab" User Role**

3. In the Access Control Manage tab, select the "aralab" user role menu in the 'Role' column.
4. Select 'Inactive' role and confirm action to inactivate this account for your security.

**TIP:** The first user should be an administrator. Only administrators can access the Manage tab in Access Control to create other users. If your account cannot access the Manage tab, log into the "aralab" account again and set your user role to 'Admin' in the same way as described in the steps above.

## 2.6. BASIC NAVIGATION

Now that you are logged in into a user account, all pages become accessible. Bear in mind that the chamber is initially off, as indicated by the faded out coloring on the colored cards, and the grey OFF button.

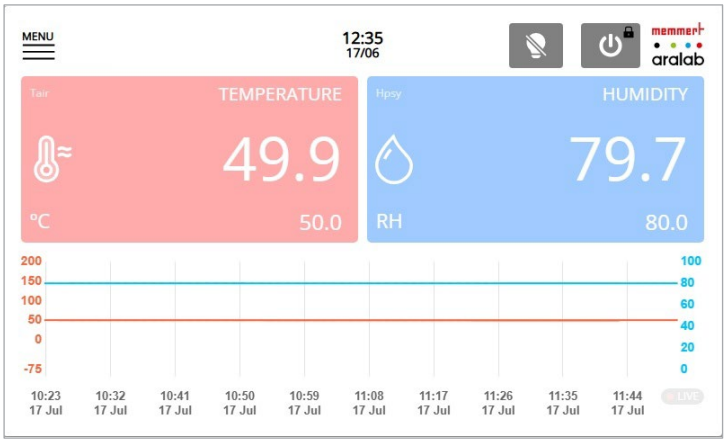



**Figure 14 - Home Screen with Chamber OFF**

The first available screen is the Home screen, which presents a variety of options:

An ON or OFF button to turn the chamber on and off, a light button for the chamber light, a chart with the latest hours of samples, cards with the chamber properties, such as temperature or humidity, which can be selected to modify them, and a clock with the latest notification icons.

The navigation options from Home are:

| | |
|---|---|
| MENU<br>Access<br>the Main Menu | memmert<br>aralab<br>Access the Controller<br>Information page |

| | |
|---|---|
| | **TIP:** If logged out, most accesses are blocked until Log In (button for login replacing Menu). |

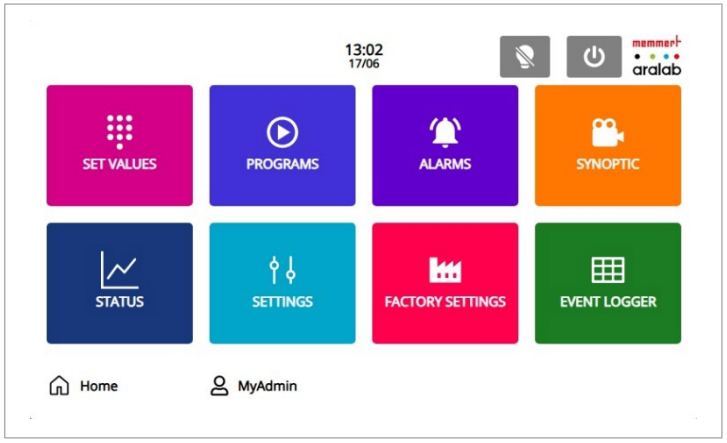



**Figure 15 - Main Menu**

The menu icon opens this screen, which allows access to the menus as indicated in the buttons.


**Figure 16 – Page Navigation**

Any opened menu can be navigated using the tabs on the left to select a submenu, and the arrows at the bottom, when they exist, to navigate pages or lists.

Aside from the colored menus, other accessible locations are:

| Home | | MyAdmin |
|---|---|---|
| Access the Home Screen | Access the Controller Information page | Access the Access Control menu |

**For further information on the contents of these pages, see their respective sections later in this manual.**

## 2.7. SETTING TEMPERATURE & HUMIDITY

Temperature and Humidity, if humidity control is included, can be observed and modified at any time directly from the Home screen (even when the chamber is off):

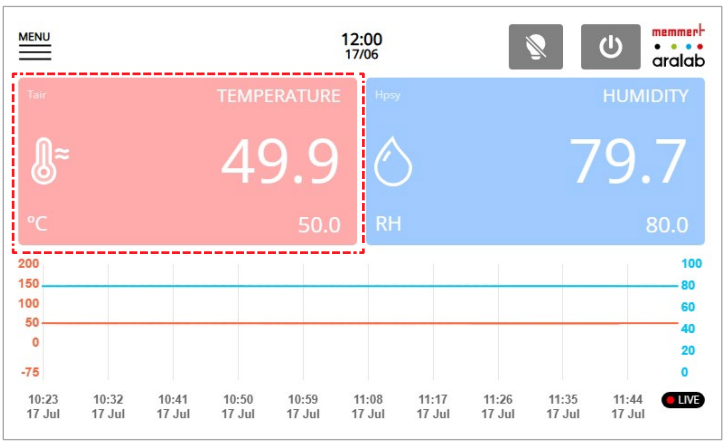



**Figure 17 - Home Screen, Temperature Card Highlighted**

1. From Home, select the card corresponding to the value you'd like to edit.

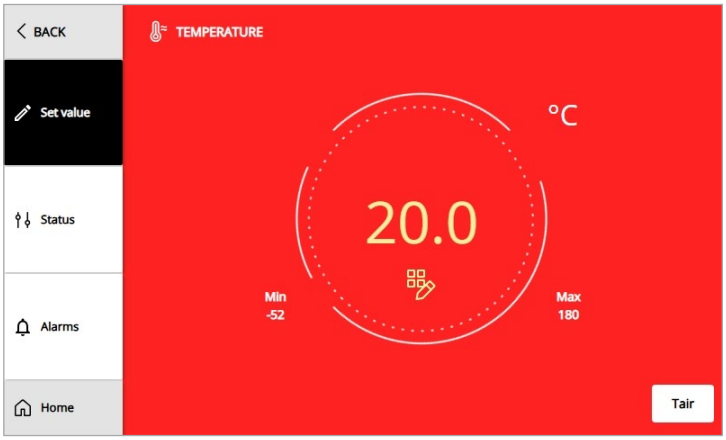



**Figure 18 - Temperature Set Value Screen**

2. Press the numeric value to select your set point (the desired value inside the chamber).

| | | |
|---|---|---|
| | **WARNING:** When adjusting the Temperature, there is a warning popup to verify that your set point is within the safety limits.<br><br>These safety limits are typically set in an external device located on the side of the chamber.<br>Check your chamber controller's respective appendices for more information. |  |

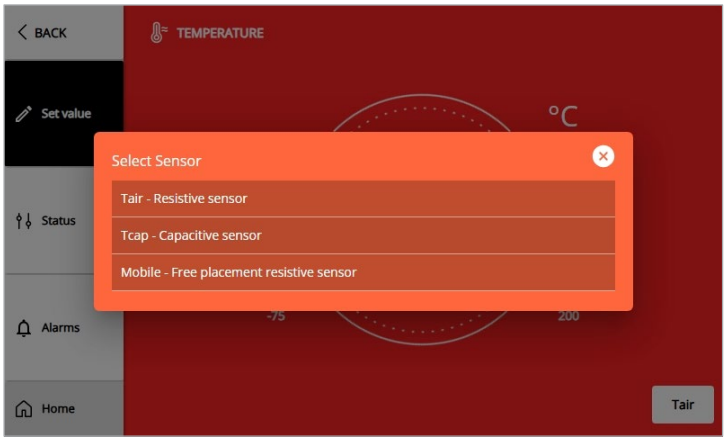



**Figure 19 – Changing Temperature Control Probe**

3. You can press the bottom right button to select the Control Probe. The button always displays the name of the current one.

| | |
|---|---|
| | **TIP:** The chamber will only start actualizing these set points once it is turned on, which can be done by pressing the button in the home screen such that it turns green to indicate it is on. The property cards will become a vivid color when the chamber's on.<br><br>  |

**For further information on how to set chamber values, like ventilation, see section 7 Set Values Menu later in this manual.**

## 2.8. CREATING AND RUNNING YOUR FIRST PROGRAM

Instead of manually setting the values the chamber should produce every time, this process can be automated through programs.

A program is a predefined sequence of instructions that the chamber will follow automatically when started. For example, rather than setting the temperature to 30 °C manually, waiting one hour, and then setting it to 20 °C, you can create a program that instructs the chamber to maintain 30 °C for one hour and then automatically lower the temperature to 20 °C. This program can be saved and reused whenever this test procedure is required.

Programs can be created and saved in a list through the Programs screen accessible through the Menu:

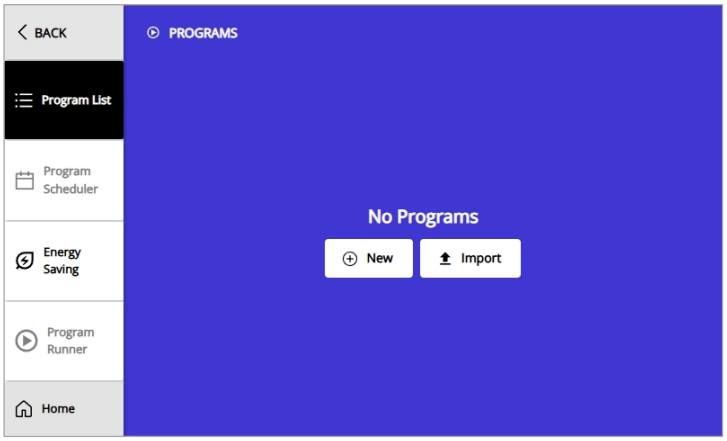



**Figure 20 – Empty Program List**

1. Open the PROGRAMS screen.
2. Select the 'New' button.

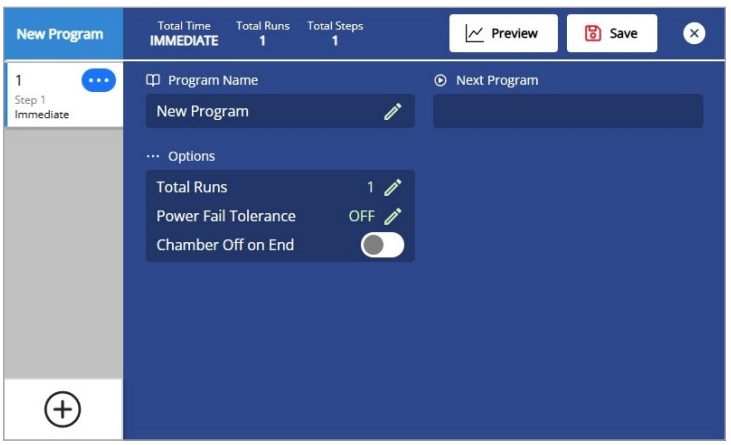



**Figure 21 – Create New Program, Program Configuration**

3. Input the desired program name and configuration.
4. The tab on the left shows the program steps, each of which can be opened and configured by selecting it.

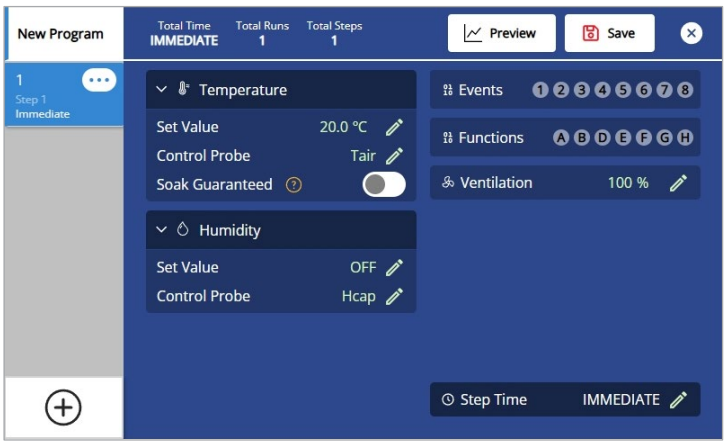



**Figure 22- Create New Program, Step Configuration**

5. Open step one and specify the desired values and probes for your chamber's properties, as well as Events, Functions, Ventilation, and duration for the step.
6. Further steps can be added via the plus (+) button on the bottom left. Add and configure further steps as needed.

**TIP:** The contextual menu on each step, indicated by the three dots (…) icon, allows renaming, duplicating, deleting, or reordering each step for faster step configuration.


**Figure 23- Create New Program, Preview Program**

7. Once finished, you can preview the execution of your program and adjust the settings again to achieve the desired program.
8. Press the ‘Save’ button to save the program.

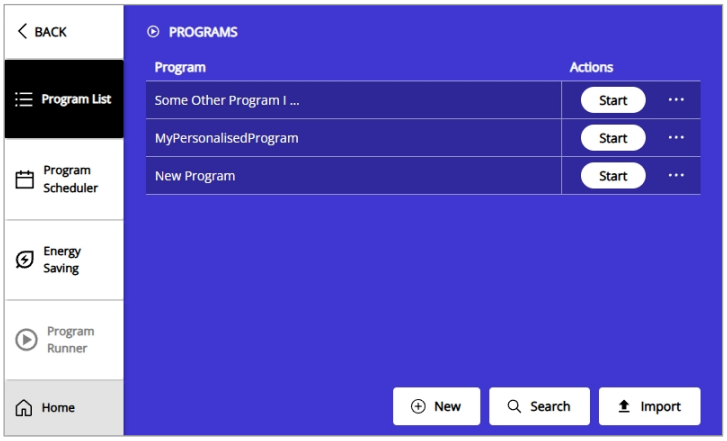



**Figure 24 - Program List With Programs**

9. The program can now be run from the edit screen with ‘Start Now’, or from the list of programs in the PROGRAMS screen.

**For details on the various configuration options see section 8 Programs Menu later in this manual.**

# 3. ACCESS CONTROL


The Access Control menu contains all the user management options, such as login, changing user settings and information, and creating users.

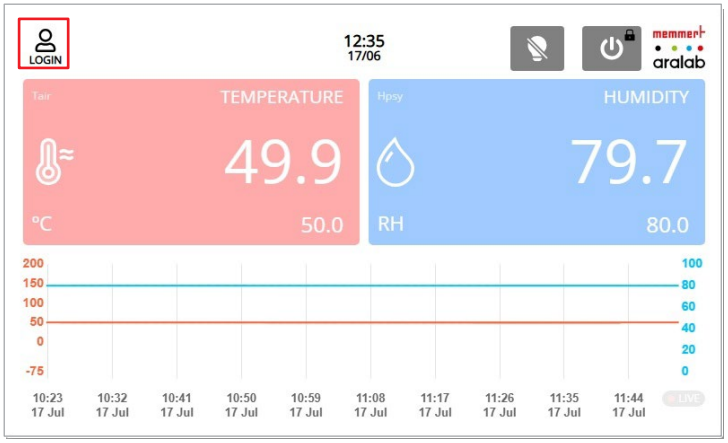



**Figure 25 - Home Screen With Login Navigation**

To login, press the Login icon from the Home Screen. Attempting to perform any action will also bring up the login screen so access permissions can be ascertained.

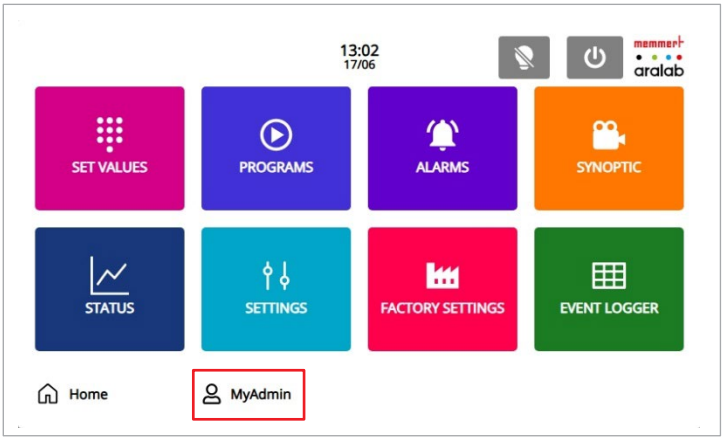



**Figure 26 - Main Menu With Access Control Navigation**

To access Access Control, press the user icon or the username from the Main Menu.

## 3.1. USER TAB

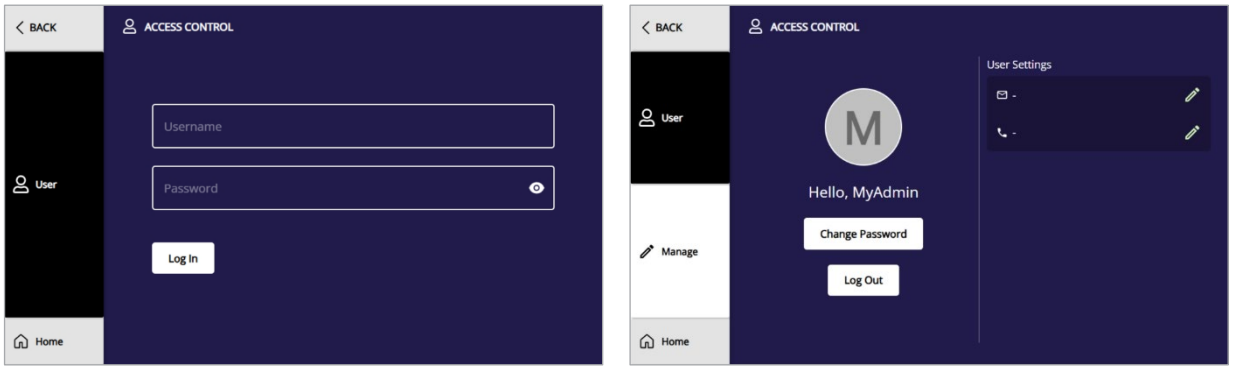



**Figure 27 - Access Control User Tab, Before and After Login**

In the User tab the user can login, logout, or change their own user data like password, Email, or SMS number.

**NOTE:** Different devices can have their own user logged in for simultaneous interaction with the chamber. UserA can be accessing from the chamber HMI, while UserB is viewing from a mobile device and MyAdmin is accessing on browser.
The same person can login and access from multiple devices on the same account.

For your first login you must use the default "aralab" account. See the **Getting Started 2.4 section** for details.

Accounts have their own permissions that dictate what the account has access to and what tasks it can perform:

- **Viewer** permissions can view but cannot change any values or configurations in the chamber. Every editable value will have the same lock icon as when the chamber is blocked due to a running program.
- **User** permissions have regular access to the operations of the chamber, such as setting set points, creating programs, or setting alarm values. User permissions can also export and import log and status data, or programs.
- **Admin** permissions can access admin only tabs, like the Manage menu in Access Control or the Energy Saving menu in Programs. Other users' permissions can be changed, and chamber settings can be altered. Can set alarm rules for Email/SMS.
- **Inactive** users cannot log in. Replaces a deletion function.

## 3.2. MANAGE TAB

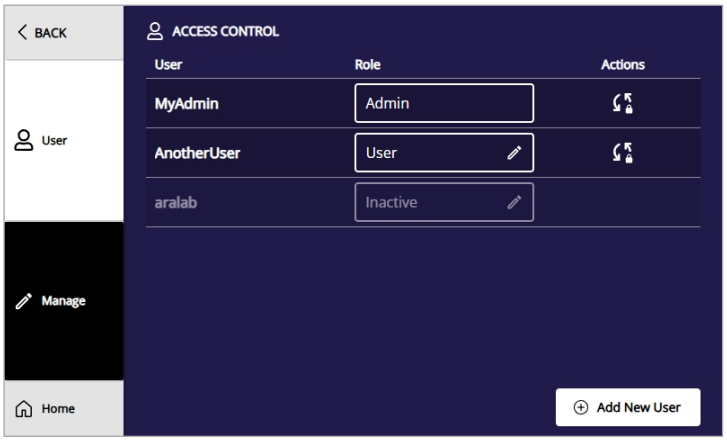



**Figure 28 - Access Control Manage Tab, List of Users**

The Manage tab is only accessible for Admin users and shows a list of all the users registered on the system. The Manage screen allows changing account permissions and passwords.

**NOTE:** Due to compliance with the FDA 21 CFR part 11 standard, created users can never be deleted from the chamber memory, only inactivated here such that login is disabled for the account.

New user accounts can also be created with 'Add New User'.

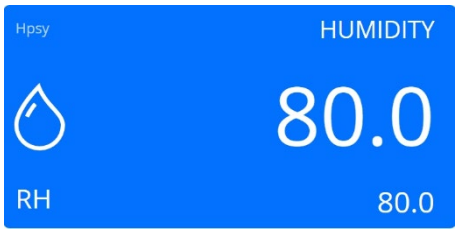
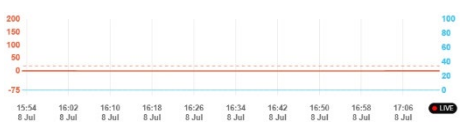
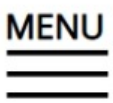

**Figure 29 - Access Control, Add New User from**

User accounts can be created with just a username and password, and the account's access permissions are initially set on creation. A created user account can also associate an email and SMS number or add that information later.

# 4. HOME SCREEN


**Figure 30 - Home Screen with Running Program and Multiple Notifications**

The Home Screen shows a variety of important chamber information and includes shortcuts to edit these configurations or address important warnings. The main shortcuts and information displayed specific to the Home Screen are as follows:

| | |
|---|---|
|  | One of the chamber's property cards ("Temperature" in this example), indicating the set point (bottom right), current value (center), and the sensor currently being displayed (top left). The color fades when the chamber is off.<br><br>Selecting the card opens a menu to configure these settings. |
|  | Another chamber property card ("Humidity"), displayed if the chamber supports more than one property. Other cards will appear on the Home screen for each supported property, with similar functionality. |
|  | Graph displaying the last 480 samples of the chamber's properties.<br><br>If selected, accesses the Status Menu. |
|  | Opens the Main Menu. |
|  | Opens the Access Menu. |

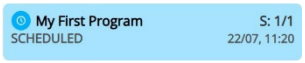
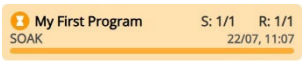
A further series of elements appear in the home screen only conditionally and indicate specific information:

| | |
|---|---|
|  | Appears when alarms are currently active. |
|  | Appears when Portal connection is enabled. Icon is red when the connection fails. |
|  | Appears when Remote Modbus TCP is enabled. Icon is red when the chamber enters security mode. |
|  | Appears when the chamber is connected to a computer executing the ***"FitoLog"*** application. |
|  | Appears when the maintenance interval is about to expire. Maintenance should be done before it expires. Icon is red after expiration, and maintenance should be performed as soon as possible. |
|  | Appears when the chamber connection is slow. |
|  | Appears when access is locked, due to a lack of permissions or a running program locking the chamber, blocking parameter editing. |

Several elements are permanent fixtures in both the Home Screen and the Main Menu:

| | |
|---|---|
|  | Indicates whether the chamber is off (gray) or on (green). Click to switch. |
|  | Indicates whether the chamber light is off (gray) or on (yellow). Click to switch. |
|  | Displays the chamber's set date and time as well as the important warnings described previously.<br><br>When selected, opens the most urgent warning page, starting with Alarms, then Maintenance warning. Otherwise, opens the Date Time Settings Menu. |
|  | Opens the controller information page. |

Informative pills are present in these screens when a program is scheduled or executing:

| | |
|---|---|
|  | Scheduled program displays the date it's scheduled to begin and the starting step.<br>When selected, opens Program Scheduler. |
|  | Running program displays finish date, the current step and the current run of the program.<br>When selected, opens Program Runner. |
|  | Paused program displays finish date if resumed immediately, the current step, and the current run of the program.<br>When selected, opens Program Runner. |
|  | The program is in Soak mode. The timer continues but the progress of the program is stopped until the values are within the established soak band limits.<br>When selected, opens Program Runner. |
|  | The program finished running at the given timestamp. Manually stopping the program will unlock the chamber.<br>When selected, opens Program Runner. |

# 5. MAIN MENU

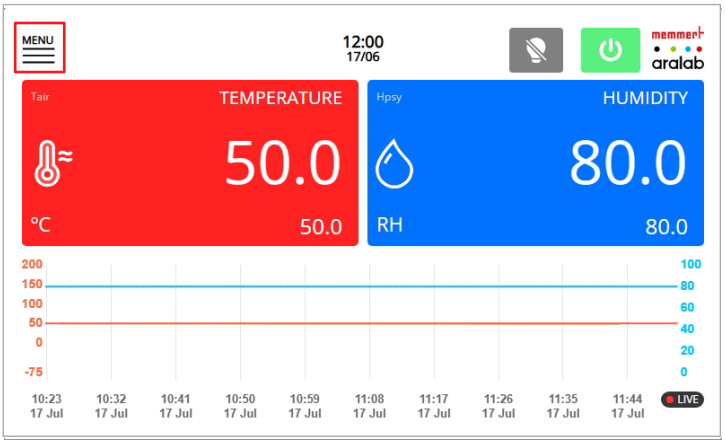



**Figure 31 - Home Screen with Main Menu**

The Main Menu can be accessed from the Home screen, via de Menu icon. It allows access to the all the other menus:

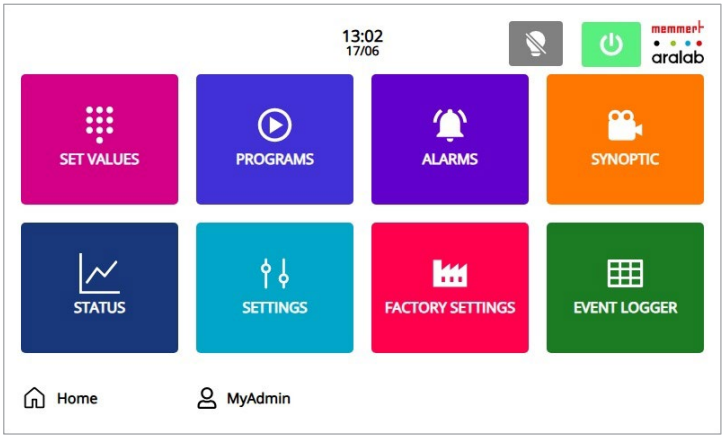
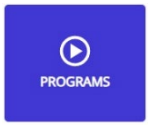
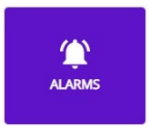
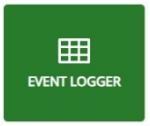
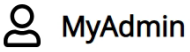



**Figure 32 - Main Menu screen (2)**

| | |
|---|---|
|   | Opens the chamber property configuration menus, as well as the Event and Function configuration menus. |
|   | Opens the program configuration menus. |
|   | Opens the alarm viewing/settings menus.<br><br>Red circle appears when there are active alarms and shows their number. |

| | |
|---|---|
|   | Opens the synoptic view. |
|   | Opens the status screens and charts. |
|   | Opens the special settings menus. |
|   | Opens the factory settings menus. |
|   | Opens the chamber logs, exclusively for viewing. |
|   | Returns to the home screen. |
|   | Opens the Access Control menus. |

# 6. PROPERTY CARDS

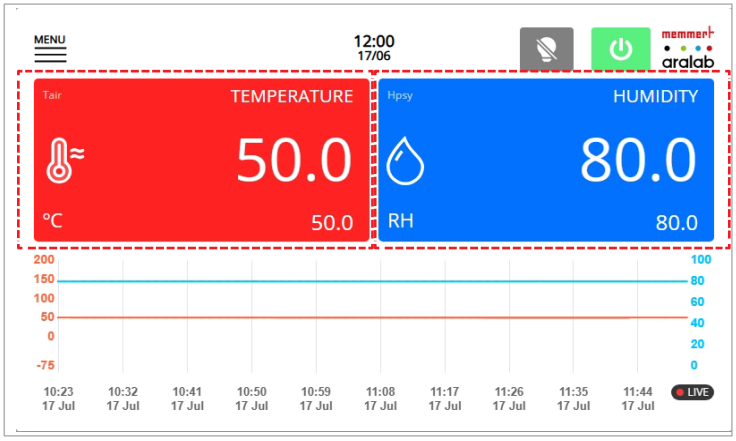
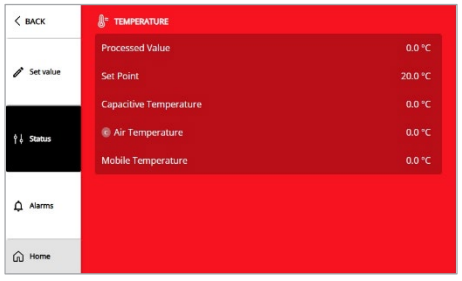
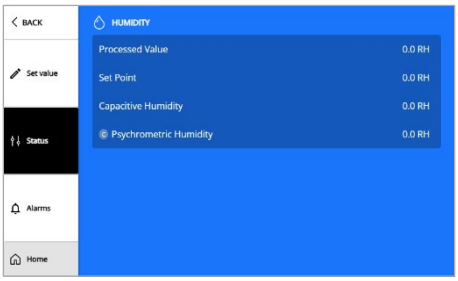
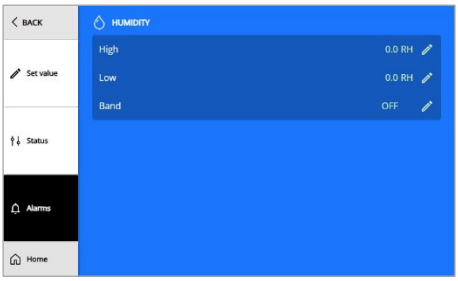



**Figure 33 - Home Screen with selectable cards**

The chamber properties can be monitored and configured from the home menu. Any chamber properties supported by the specific chamber appear here. Simply select any property card to open their menu.

| | |
|---|---|
|  | Enables setting the temperature and control probe. Select the value to set a new one via keyboard, and the control probe button to select a different one.<br><br>The available probes may be confirmed in the corresponding chamber controller appendix.<br><br>The minimum and maximum allowed values are also shown. |
|  | Contains the current measured air temperature value, the set point, and the values measured by the given sensors. |
|  | Enables setting the max and min temperature alarms, as well as the band (max difference between processed value and set point) alarm.<br><br>**NOTE:** The value "0" sets Band to OFF.<br><br>For more information on these alarm settings, see section **9.3 Settings** in the Alarms menu. |

| | |
|---|---|
|  | Enables setting the relative humidity and control probe. Select the value to set a new one via keyboard, and the control probe button to select a different one.<br><br>The minimum and maximum allowed values are also shown.<br><br>**NOTE:** The value "0" sets Humidity control to OFF. |
|  | Allows viewing the current measured relative humidity value, the set point and the values measured by the given sensors. |
|  | Enables setting the max and min relative humidity alarms, as well as the band (max difference between processed value and set point) alarm.<br><br>**NOTE:** The value "0" sets Band to OFF.<br><br>For more information on these alarm settings, see section **9.3 Settings Tab** in the Alarms menu. |

# 7. SET VALUES MENU


**Figure 34 - Set Values Menu Button**

Aside from the Property Cards or through programs, the various set points in the chamber may also be set through the Set Values menu, which shows all the chamber properties the specific chamber can control, as well as all the Event relays and Functions it possesses.

## 7.1. SET VALUES TAB

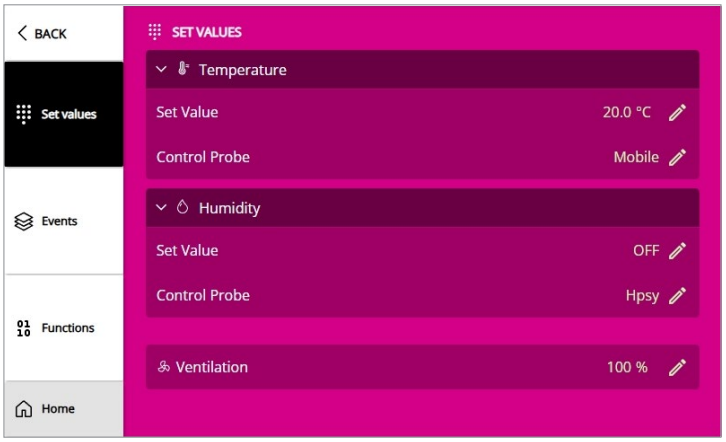



**Figure 35 - Set Values**

The Set values tab lists all the set points in the chamber, and is therefore chamber dependent, enabling their configuration. The available probes and properties may be confirmed in the corresponding chamber controller appendix.

Selecting the value you wish to edit, or the pencil icon near it, opens a keyboard dialer or an appropriate selection for the input of your desired set points.

| | |
|---|---|
| | **NOTE:** All values set from here are the control points for when no program is running. A running program generates all the set points automatically in accordance with how it was configured. When a program is running, values cannot be changed anywhere else, like in the Set Values Tab. |

## 7.2. EVENTS TAB

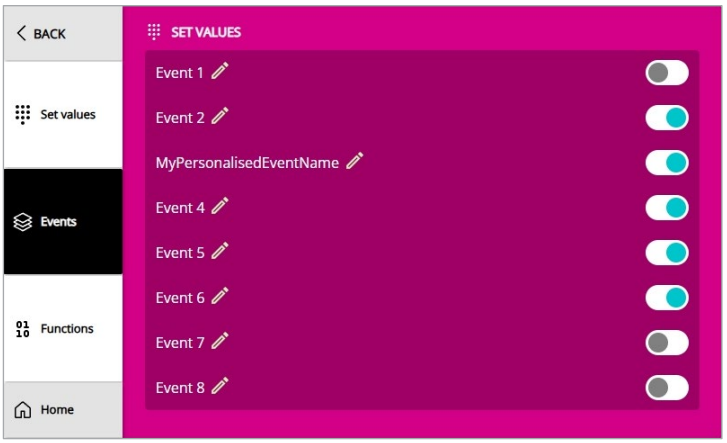



**Figure 36 - Events Selection**

The Events tab lists all the slots for customizable events available in the chamber, for which a custom name can be set. Each one can be enabled or disabled here by selecting the switch.

These event relays are associated with the physical available relays (normally open/closed) that can be used to connect external components or, in certain situations, enable special functions (electric outlet control, irrigation valves, etc.). The connections are made through external connectors, located on the back of the equipment.

## 7.3. FUNCTIONS TAB


**Figure 37 - Functions Selection**

The Functions tab lists all the control functions available in the chamber, typically named depending on what's available in the specific chamber. Each one can be enabled or disabled here by selecting the switch.

For more details on your chamber's specific functions see the respective chamber controller annex.

# 8. PROGRAMS MENU

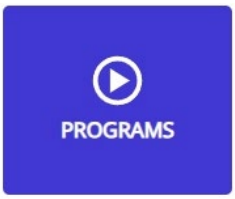



**Figure 38 - Programs Menu Button**

The ClimaPlus Web controller enables the creation and configuration of programs for automatic execution of configured settings.

A program is a set of instructions configured in advance for the chamber to execute each time the program is selected. This allows conditions and configurations required for frequent procedures to be saved and reused, ensuring they can be reproduced instantly whenever needed. Programs can be set to repeat until disabled or scheduled to run at a specific time.

With ClimaPlus Web, each program consists of a series of steps that the chamber will follow. For each step, you can define the desired set points and the duration. Steps can be duplicated or reordered to simplify program creation and setup.

| | |
|---|---|
| | **NOTE:** If the chamber is off in the home screen, starting any program manually or through schedule will automatically turn it on. Inversely, turning off the chamber in the home screen will automatically stop any running program. |

## 8.1. PROGRAM LIST TAB

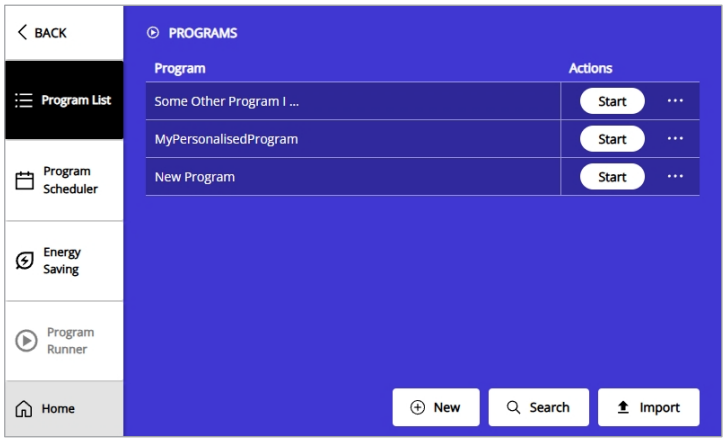



**Figure 39 - Program List with Programs**

The Program List tab lists programs, in order from most recently created to the oldest, and allows editing existing or creating new programs. Any program may also be run from here by selecting its entry's Start button. Scheduled programs will appear at the top of the list, to facilitate reviewing their contents.

Any entry in the list may be selected to open its configuration menu and edit the settings. Every entry also has a contextual menu in the three dots symbol (…) that offers several options such as

- **Favoriting** the entry to set it at the top of the list, or **unfavoriting** to remove it,
- **Editing** it the same way you would by selecting the entry,
- **Duplicating it,**
- **Exporting** the program (on a browser) so it can be imported on another machine,
- **Deleting** it.

The list can be searched with the 'Search' button, with which text can be input to search for matching programs. Programs can be imported (on browser) with 'Import', if previously exported with the contextual menu.

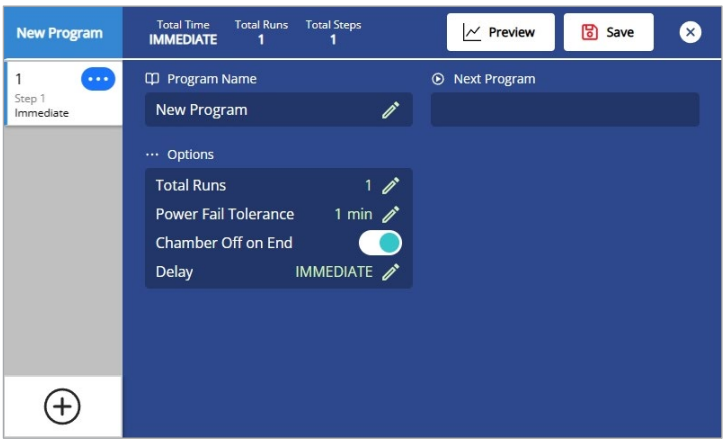



**Figure 40 – Create New Program (1)**

By editing a program, or creating a new one with 'New', a new screen will appear to enable configuration of high-level program settings:

- **Program Name** to identify or describe it.
- **Total Runs** define the number of times the program will run in a row.
- **Power Fail Tolerance** defines the maximum time the power can fail before the machine aborts the program once power is restored.
- **Chamber Off on End** defines whether the chamber will turn off once the program finishes running.
- **Delay** appears only if the chamber is set to turn off on end, and defines the time the chamber will wait after the program finishes running before turning off.

On the left, instead of tabs, there is a list of Steps for the program to follow. Selecting any step on the left will open it for configuration.

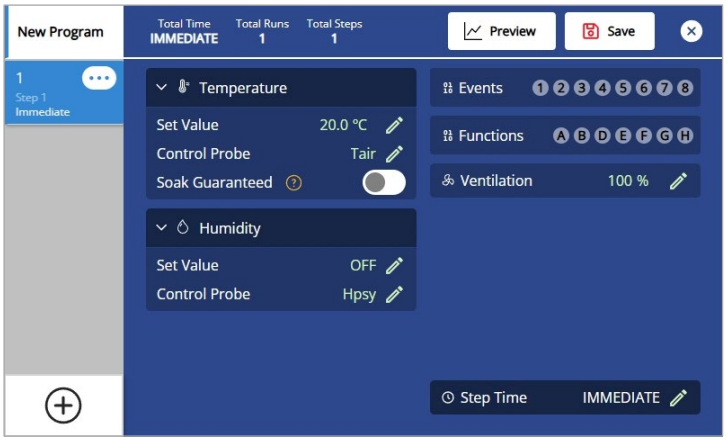



**Figure 41 – Create New Program Edit First Step**

An open step can be edited to configure which set points the chamber should be set to for the duration of that step.

The chamber properties, dependent on the chamber, can be set with:

- **Set Value**, which defines the set point for that property.
- **Control Probe**, which defines the sensor to be used to measure the property to compare against the set point.
- **Soak Guaranteed**, which defines a limit above and below the set point beyond which the program step time will be paused until the measured values return to being within the limits.

**TIP:** Yellow (?) icons open tooltips when selected:

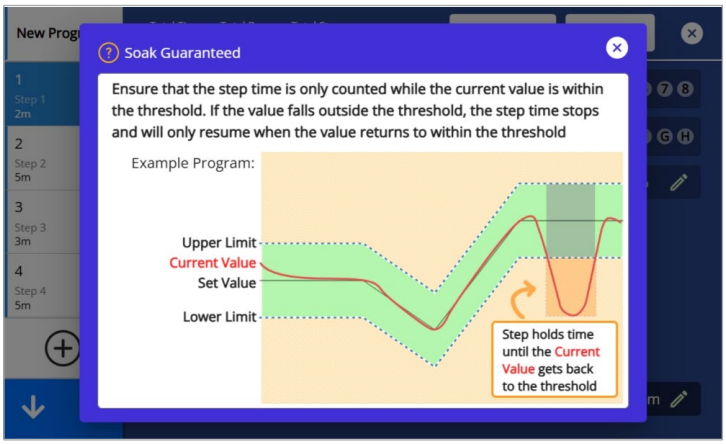



**Figure 42- Soak Guaranteed Tooltip**

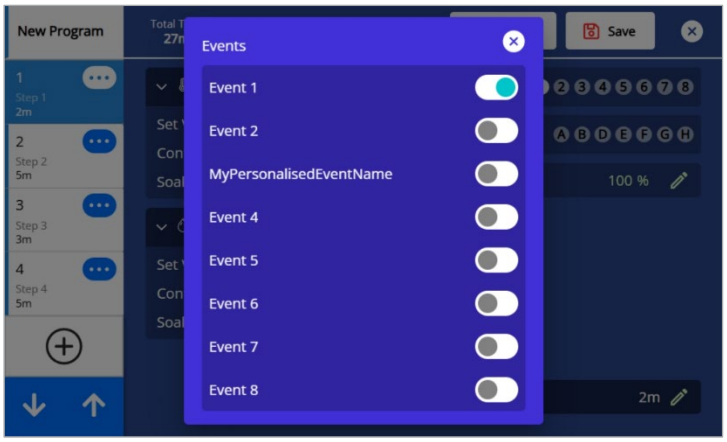



**Figure 43 - Event Configuration in Step**

The Events and Functions may be activated or deactivated by selecting the corresponding options, which will open popups with switches for each numbered or lettered event or function. Ventilation percentage can also be set here.

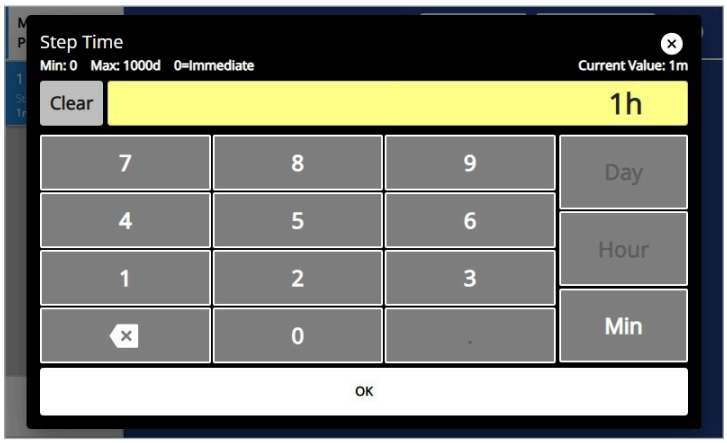
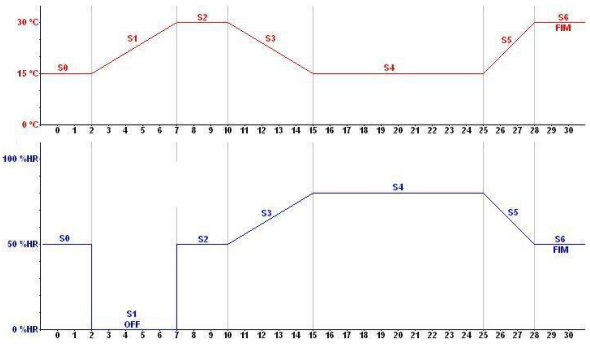
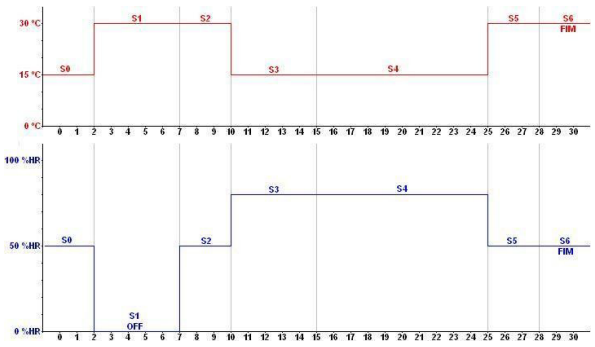



**Figure 44 - Create New Program Step Time Keyboard**

Step Time defines the duration of this step. Immediate steps will set the set points to the value immediately, and transition to the next step. Steps with a defined time will ramp the set point from the prior step's set point to the current step's set point.

| | |
|---|---|
| **Ramping**<br><br>Step 1:<br>T=15°C, H=50%rH, 2 min<br><br>(15°C ramps to 30°C)<br>Step 2:<br>T=30°C, H=0%rH, 5 min<br>Step 3:<br>T=30°C, H=50%rH, 3 min<br><br>(30°C ramps to 15°C and 50%rH ramps to 80%rH)<br>Step 4:<br>T=15°C, H=80%rH, 5 min<br>Step 5:<br>T=15°C, H=80%rH, 10 min<br><br>(15°C ramps to 30°C and 80%rH ramps to 50%rH)<br>Step 6:<br>T=30°C, H=50%rH, 3 min<br>Step 7:<br>T=30°C, H=50%rH, 4 min<br>(END) |  |

| | |
|---|---|
| **No Ramping**<br><br>Step 1:<br>T=15°C, H=50%rH, 2 min<br>Step 2:<br>T=30°C, H=0%rH, 0 min<br>Step 3:<br>T=30°C, H=0%rH, 5 min<br>Step 4:<br>T=30°C, H=50%rH, 3 min<br>Step 5:<br>T=15°C, H=80%rH, 0 min<br>Step 6:<br>T=15°C, H=80%rH, 15 min<br>(As an example, steps 4 and 5 have been combined into 6 since there is no need for ramping duration.)<br>Step 7:<br>T=30°C, H=50%rH, 0 min<br>Step 8:<br>T=30°C, H=50%rH, 3 min<br>Step 9:<br>T=30°C, H=50%rH, 4 min<br>(END) |  |

| | |
|---|---|
| | **NOTE:** The very first step cannot do ramping due to not having a defined prior first step. Similarly, Humidity to or from OFF also does not perform ramping. |

Every step has a contextual menu in the three dots symbol (…) that offers several options such as

- **Rename**, to identify or describe the step
- **Move Up**, changing its execution order (The first step doesn't have this option),
- **Move Down**, changing its execution order (The last step doesn't have this option),
- **Duplicate** it,
- **Deleting** it.


**Figure 45 – Create New Program, Program Preview**

At any time the progress of the current program can be checked in a graph via 'Preview'.

Once the program is complete, it can be saved through the 'Save' button. Once all changes are saved, the button changes to 'Start Now' to enable a quick start of the program. Alternatively, if the program is edited again, the button returns to 'Save' whenever there are unsaved changes.

## 8.2. PROGRAM SCHEDULER TAB

The execution of a program can, in addition to manual control, be scheduled to start at a given date and time. This is done in the Program Scheduler tab in the Programs menu.

This tab can also be accessed from the clickable pill element that appears in the top left area of the main menu and home screen when a program is scheduled, as described in the Home Screen section.

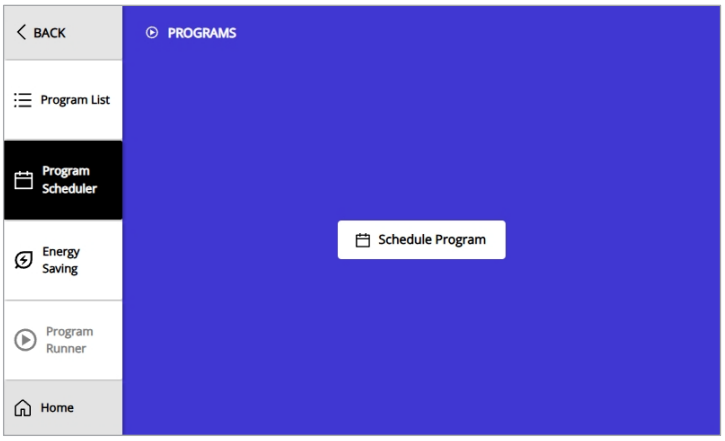



**Figure 46 - Empty Program Scheduler**

When no program is scheduled, that option is provided as the only one in the tab.

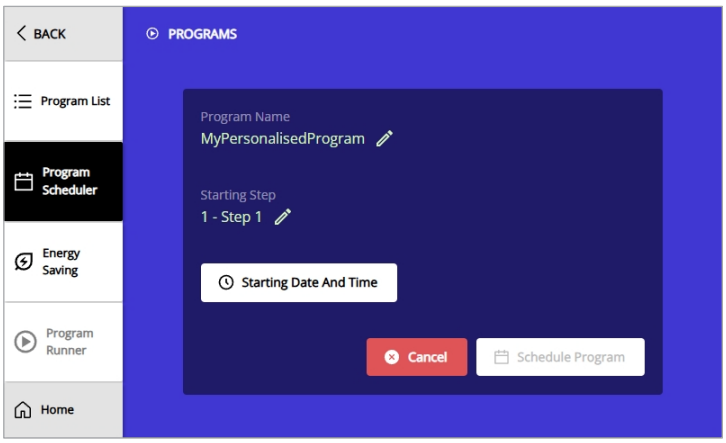



**Figure 47 - Program Scheduled Selection**

By selecting to 'Schedule Program' on the empty page, the list of programs is provided to pick a program from, filling in the program name and starting step as such. These can still be edited to change the program or the starting step.

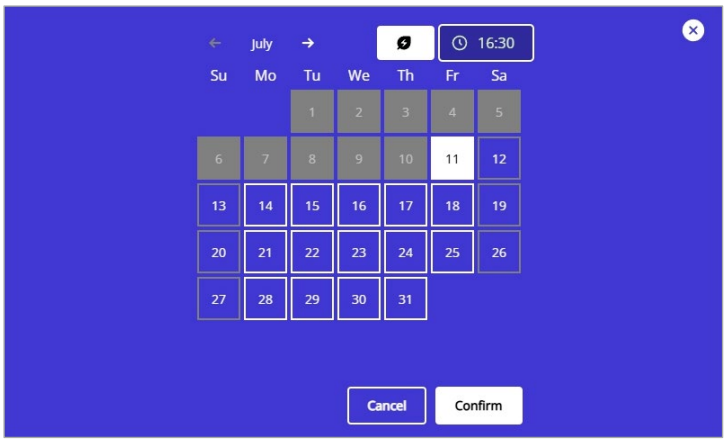



**Figure 48 - Program Scheduled Date and Time Selection**

Selecting the 'Starting Date And Time' opens a calendar to pick a date and time. Date can be picked by selecting a day of the month, and the months can be navigated with the arrows at the top. Time can be set by selecting the time on the top right of the calendar and manually inputting a time. Only dates and times in the future can be scheduled.

The leaf icon button will only appear if the Energy Saving policies in the machine have been set. This button automatically sets a starting time for the program to save energy costs, in accordance with the energy policy in Energy Settings.

| | |
|---|---|
| | **NOTE:** Only programs with duration shorter than 24 hours can be optimized for Energy Savings. |

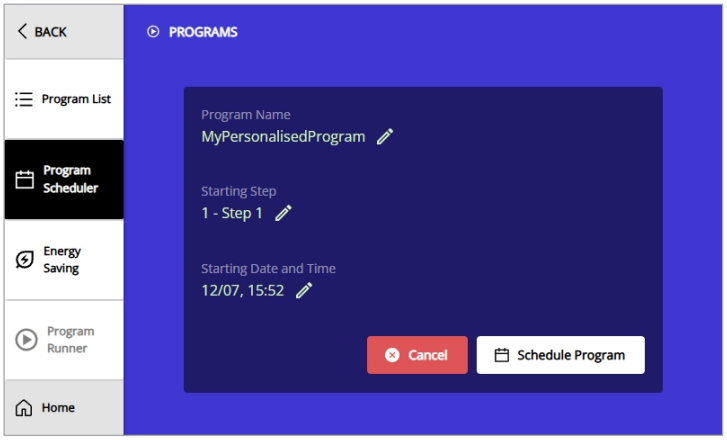



**Figure 49 - Program Scheduled Selection Complete**

Once all the data has been set, the scheduling can be finalized with 'Schedule Program', but each parameter can still be altered before the scheduling is concluded.

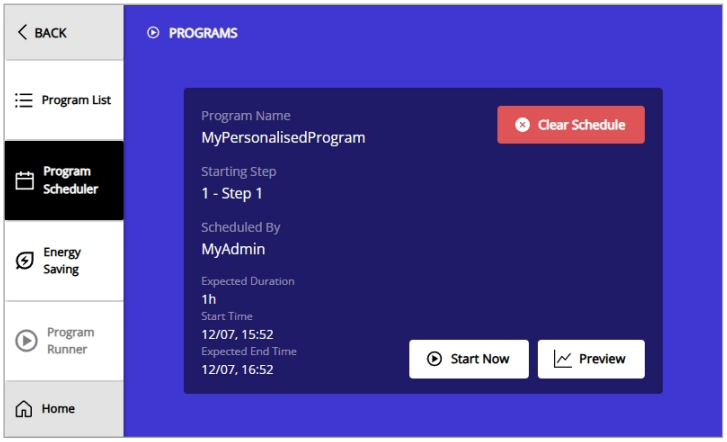



**Figure 50 - Program Scheduled**

Once a program has been scheduled it can always be reviewed and previewed here. It can also be started early here, in addition to the program list. For individually reviewing all the steps, the program can be found at the top of the Program List list.

## 8.3. ENERGY SAVING TAB

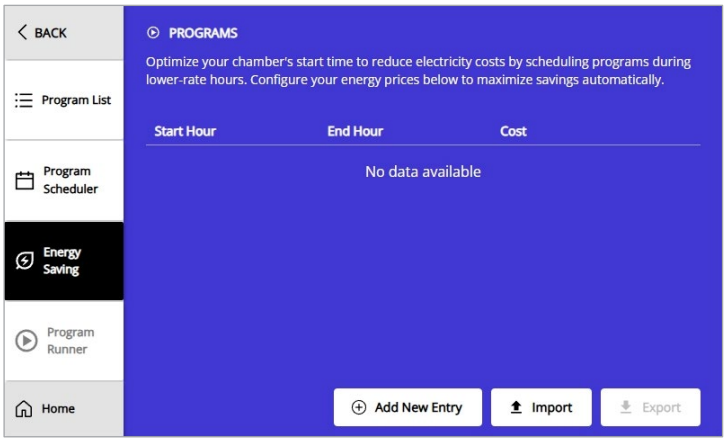



**Figure 51 - Empty Energy Cost**

The Energy Saving Tab allows setting the times in the day along with energy costs associated with those times, to enable optimization of program execution for cheaper times.

| | |
|---|---|
| | **NOTE:** To have access to this tab, the option "Program Energy Saving" on section **12.1 Chamber Tab** needs to be activated. |

'Add New Entry' can be used to add a new time entry with a Start Hour, and End Hour, and a Cost (which can represent a real value or an abstraction). The list of times can also be imported (on a browser) from this or another machine from which it was first exported.

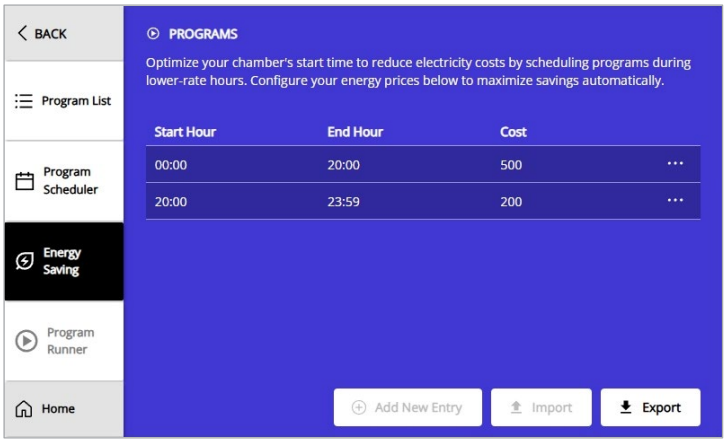



**Figure 52 - Completed Energy Cost**

In a scenario where there are cheaper costs after 20:00, the time schedule can be set as such, so that any scheduled program can be automatically set to start at 20:00 or any other time calculated to have the most savings. Once some entries are set, they can be Exported (on a browser) via de contextual three dots (…) menu.

| | |
|---|---|
|  | **NOTE:** These entries' time slots cannot intersect so as to not conflict in terms of costs. An entry's Start Hour should be 00:00 or the previous' End Hour. |

## 8.4. PROGRAM RUNNER TAB

When a program is running in the chamber the Program Runner tab becomes accessible.

This tab can also be accessed from the clickable pill elements that appear in the Main Menu and Home Screen when the program is running, as described in the Home Screen section. The tab's name reflects the state of the program: **Program Running**, for a running program; **Program Paused**, for a paused program, **Program SOAK**, for a program in soak, and **Program Finished**, for a program that has finished running.

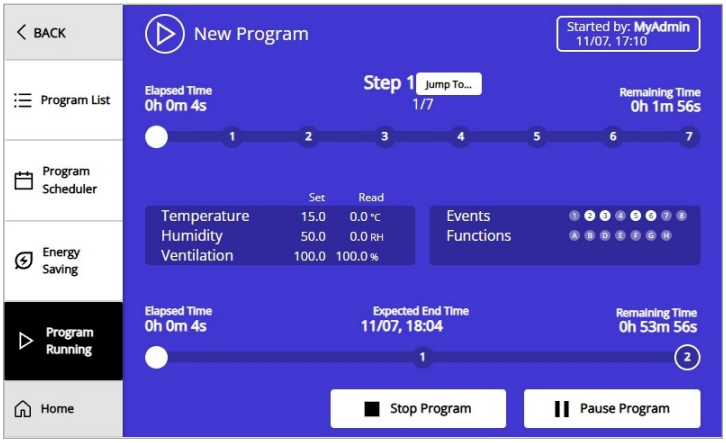



**Figure 53 - Program Running**

The Program Runner tab provides an overview of the current program for quick reference. Here, you can monitor both the set and actual (read) values for each chamber property, and easily check which events and functions are currently active.

The steps of the program are represented by the bar on the top, which is continuously filled in white as the program progresses. Upon the completion of the first step, the bar will be filled up to the number 1, and the number 1 itself will be filled.

Similarly, runs, if there are multiple, are depicted in the bar at the bottom. The progress bar will fill with white as more runs are completed. In the case of 1 single run, the progress bar behaves normally and indicates the progress from 0% to 100%.

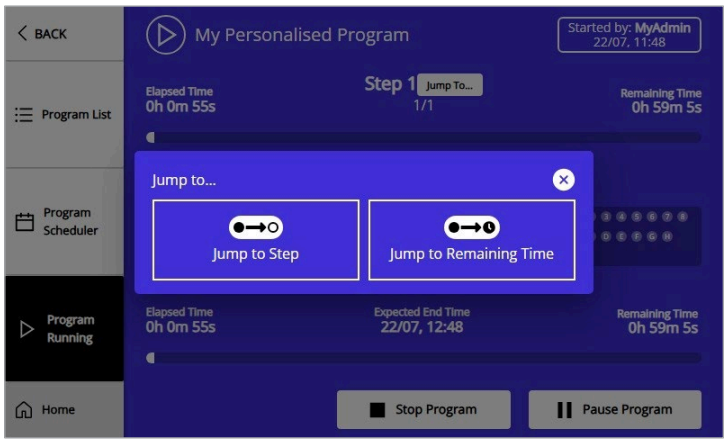



**Figure 54 - Program Running Jump To**

Aside from verification, the running of the program can also be manipulated. 'Stop Program' ends the program execution altogether, 'Pause Program' pauses it, and 'Jump To…' manipulates the pace of the program:

- **Jump to Step** opens a list of the program steps so the program execution will immediately jump to the chosen step, even if it's a prior one.
- **Jump to Remaining Time** will jump the progress of the step so that only the input time remains until the step finishes.

The Program Running tab also provides a visual indication of the state of the program.

Programs can be in five different states (the same ones as the pill element described in the Home Screen section).

Scheduled programs are not yet running and so the Program Running tab remains inaccessible.

Running programs are executing programs normally and any program state other than Scheduled blocks all the values in the chamber from being changed except by this program. The Program Running tab appears as already shown.

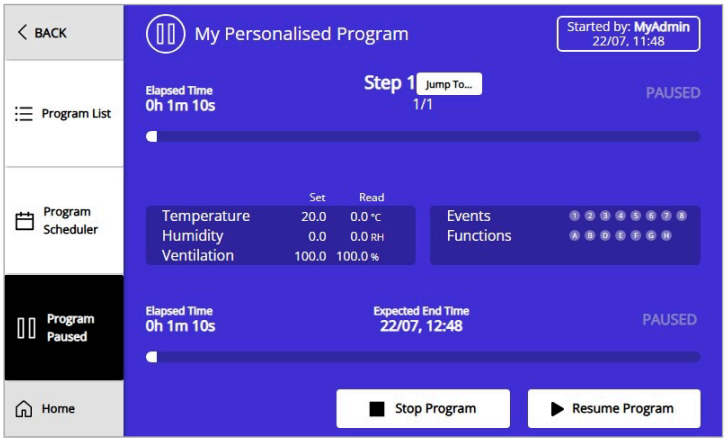



**Figure 55 - Program Running Paused**

Paused programs have been manually paused by a user using the 'Pause Program' button and can be resumed with the 'Resume Program' button that replaces it. The Program Paused text appears replacing the expected remaining time prediction.

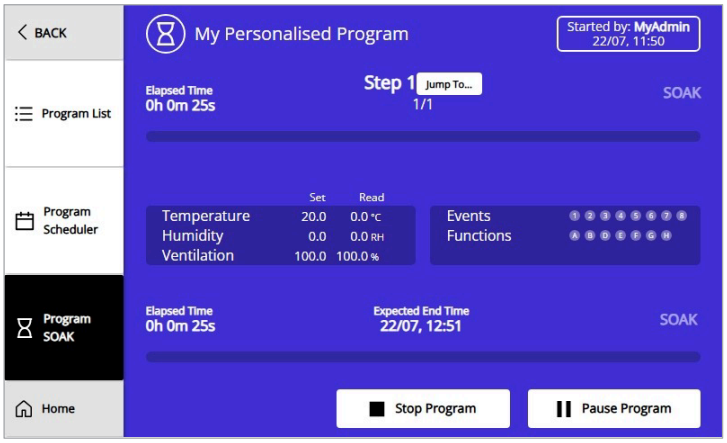



**Figure 56 - Program Running Soak**

Programs in SOAK mode do not progress due to the read value being outside the limits above or below the set point defined in the program configuration. The elapsed time progresses but not the program, until the read values are inside the desired limits. The Program SOAK text appears replacing the expected remaining time prediction.

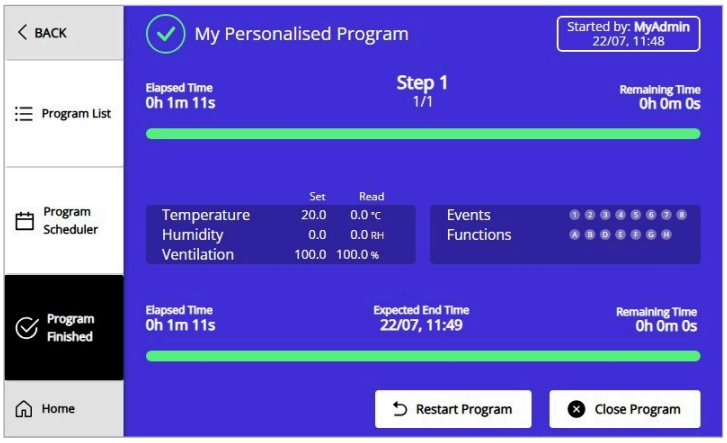



**Figure 57 - Program Running Ended**

Finished programs are indicated by the green progress bar, now having reached completion. A program is finished once all the time set for each step elapses with the program in running mode (and hence there is no progress during SOAK). The Program Finished tab appears as shown here.

A program can be Restarted or Closed from here. A program, when finished, continues to block the chamber from any other changes to the set points and other configurations. Only upon closing the program will the block be removed.

| | |
|---|---|
|  | **NOTE:** The set points in the chamber are set by the running program. Once the program finishes, or is stopped or paused, the set points will remain as set by the program. |

# 9. ALARMS MENU


**Figure 58 - Alarms Menu Button**

The alarms menu can be accessed from the Main Menu, or, if there are currently active alarms, the home screen warning or timestamp with the alarm notification icon in the Main Menu or Home.

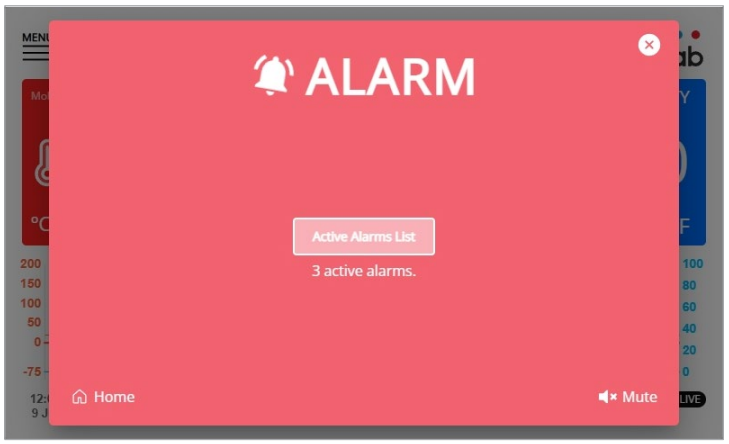



**Figure 59 - Home Screen Alarm Warning**

When there is a new active alarm there will be a notification on the top of the screen. In the Home screen, a red warning screen displays instead for ease of access to the alarm menu. The alarm buzzer may be muted from here, or, alternatively, the user can simply proceed to Home.

| | |
|---|---|
| | **NOTE:** An active alarm warning will replace the screen saver as seen in figure 59, if the screen saver is enabled. |

## 9.1. ALARMS TAB

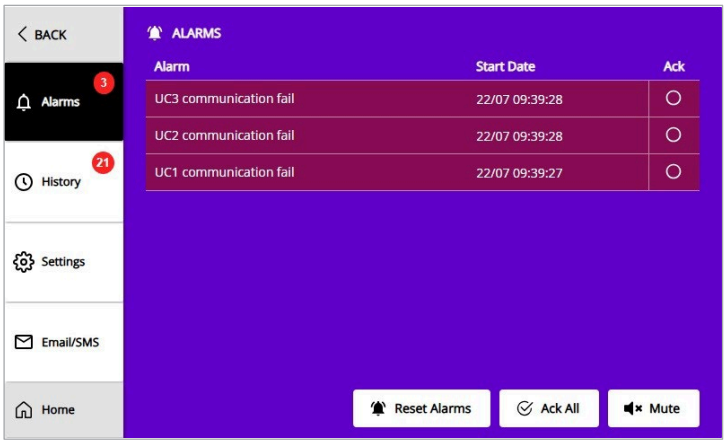



**Figure 60 - Active Alarms**

The alarms tab displays the currently active alarms in a list, which can be traversed with the navigational arrows if it occupies multiple pages. Once an alarm condition ceases, the corresponding alarm will disappear. Most alarms will also not display if the chamber is off.

The red icons in this tab indicate the number of currently active alarms.

**NOTE:** The Mute button mutes the buzzer for the duration set in the 'Mute time' configuration option in the section **9.3 Alarm Settings**

The current user can choose to acknowledge an active alarm to leave a record that this alarm was seen by the user in question. A comment can be left during this acknowledgement.

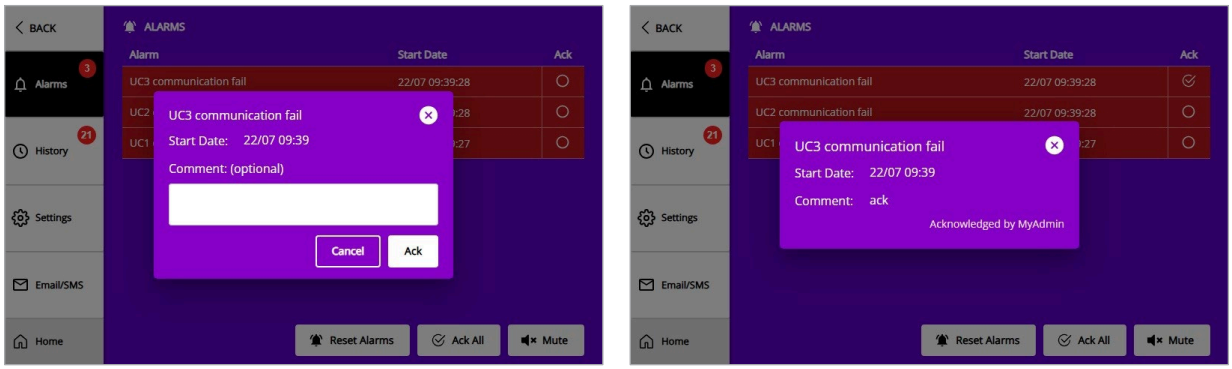



**Figure 61 – Acknowledge Active Alarm**

Selecting an unacknowledged entry on the list initiates this process, and can be completed by selecting the 'Ack' button. If a user wishes to acknowledge all active alarms at once, the 'Ack All' button can be used instead.

| | |
|---|---|
|  | **WARNING:** Some alarms will only turn off once they are reset. Resets occur with the "Reset Alarms" button or a chamber restart. |

The possible alarms and their conditions may be verified in your specific chamber controller appendix.

## 9.2. HISTORY TAB


**Figure 62 - Alarm History**

The History tab displays a list with all of the previous alarms, which can be traversed with the navigational arrows if it occupies multiple pages.

The red icons in this tab indicate the number of alarms that were never Acknowledged.

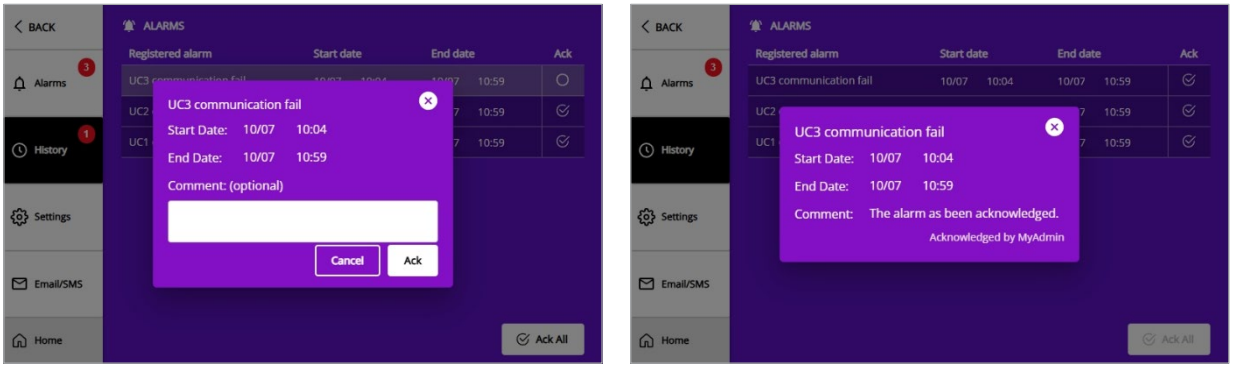



**Figure 63 - Acknowledge Past Alarm**

Like the Alarms tab, entries can be selected to open details and view Ack comments, but a user can also acknowledge an alarm from here, if it wasn't acknowledged when it was active.

Selecting any alarm without an Ack will open a popup with the timestamps and the ability to Ack the entry, leaving a comment if desired. Alternatively, like in the Alarms tab, all unacknowledged alarms can be acknowledged at once with 'Ack All'.

## 9.3. SETTINGS TAB

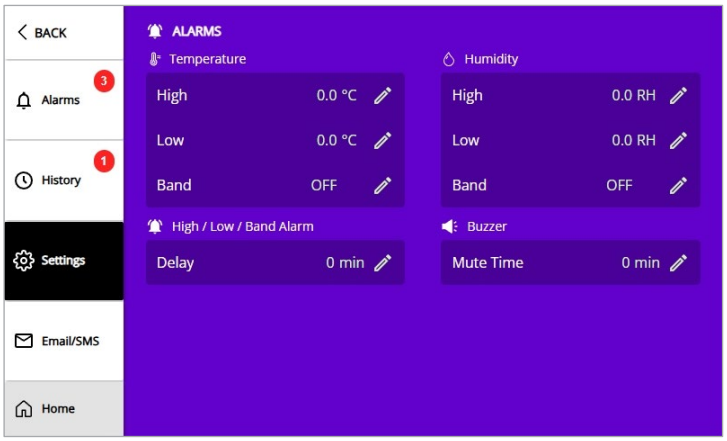



**Figure 64 - Alarm Settings**

The Alarm Settings tab enables the configuration of a variety of alarm conditions. The Temperature and other property alarms set here are the same as the ones that can be adjusted in the Property card menus, described in section **6 Property Cards**.

| | |
|---|---|
| ⚠ | **WARNING:** All alarm parameters must be duly adjusted for the current test. |

**High** sets the max value the property can hit, above which an alarm will set off.

**Low** sets the min value the property can hit, under which an alarm will set off.

**Band** sets the max difference between the processed value and set point, beyond which an alarm will set off. If a set point is 20 and band is 5, an alarm will set off at values below 15 and above 25.

| | |
|---|---|
| ✎ | **NOTE:** The value "0" sets Band to OFF.<br>Additionally, some chamber models include additional temperature and humidity sensors to allow comparison between sensors and detect any potential failures. A failure is detected when the difference between the sensors exceeds the defined band for more than 10 minutes, generating an alarm indicating this failure. |

**The High / Low / Band Alarm section** denotes options **exclusive** to these three alarm conditions. Specifically, a Delay, to avoid unnecessary alarms and buzzer activations due to brief or transient fluctuations in chamber conditions.

- **Delay** sets the period the system will wait for when the alarm condition is detected. If parameters return to normal before the set delay period ends, an alarm will not sound and will not be registered.

**NOTE:** Delay behavior may change depending on chamber model. Please consult your specific chamber's controller appendix to confirm any special behaviors.

**The buzzer section** defines the options relating to the alarm buzzer, the physical component that sounds an audible alarm in the chamber.

- **Mute Time** sets the duration the buzzer will remain silent after being muted. After this value is set the mute button must be pressed to apply the mute. If all alarms cease during the mute period, the mute ends and the buzzer will sound again on the next new alarm.

An external maximum and minimum temperature protection ensures that, in the event of a malfunction, the chamber stops and the corresponding audible alarm sounds, thus preventing potential overheating or overcooling inside the equipment and the material under test.

**TIP:** When setting alarm maximum and minimum values, the maximum safety temperature should be somewhat higher than the maximum temperature programmed in the controller, while the minimum safety temperature should be somewhat lower than the minimum temperature programmed in the controller, to account for overshoots and corrections inside the chamber as it aims for the set point.

**Alarm Visualization:**

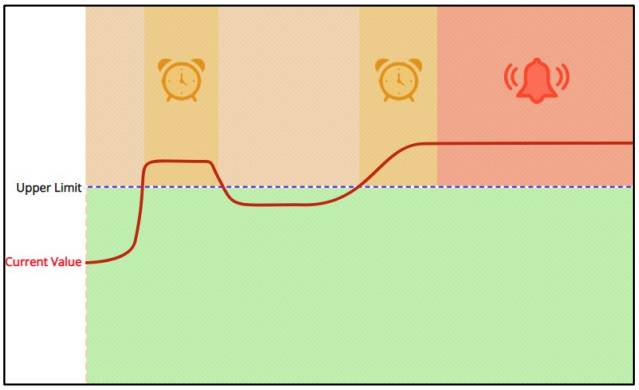



**Figure 65 – High Alarm**

The dotted line represents the set **High alarm.** If the current value is higher than the High alarm the delay counter starts according to the set delay (as seen in yellow) and if the parameters do not return to within the limit by the time the delay period ends the alarm buzzer will sound and the alarm will be registered (as seen in red).

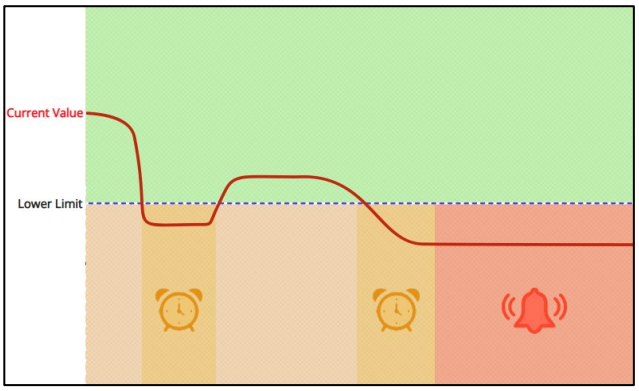



**Figure 66 – Low Alarm**

The dotted line represents the set **Low alarm.** The same logic as the High alarm applies to the Low alarm, which activates when the current value is lower than the Low limit.

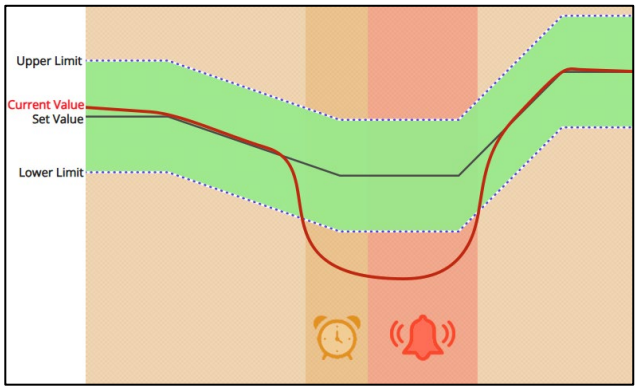



**Figure 67 – Band Alarm**

Setting a band creates two limits that function as in the prior cases:
**Upper Limit:** SET VALUE + BAND
**Lower Limit:** SET VALUE - BAND

## 9.4. EMAIL/SMS TAB

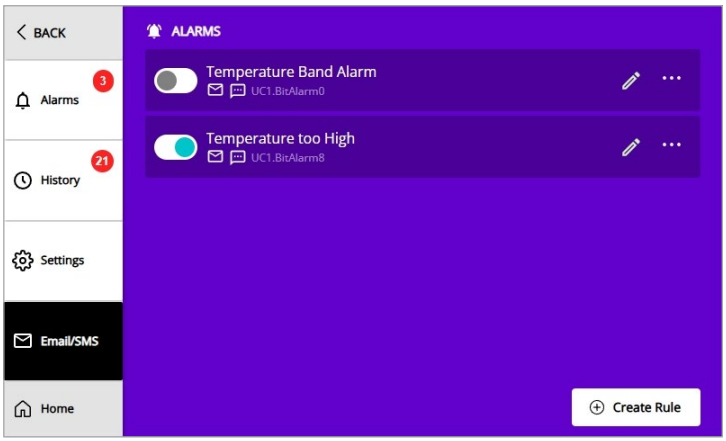



**Figure 68 - Email/SMS**

The Email/SMS tab allows configuring various rules such that chosen alarms send out an Email and or SMS to chosen users when triggered.

**TIP:** A Network connection is required for Email or SMSs to be sent. The connection can be set in the Network tab of the Settings Menu, as described in section **12.4 Network**.

The tab lists entries for each rule created, and they can be individually enabled or disabled. Each rule can be named and edited by selecting its entry or duplicated or deleted by opening the three dots (…) contextual menu.

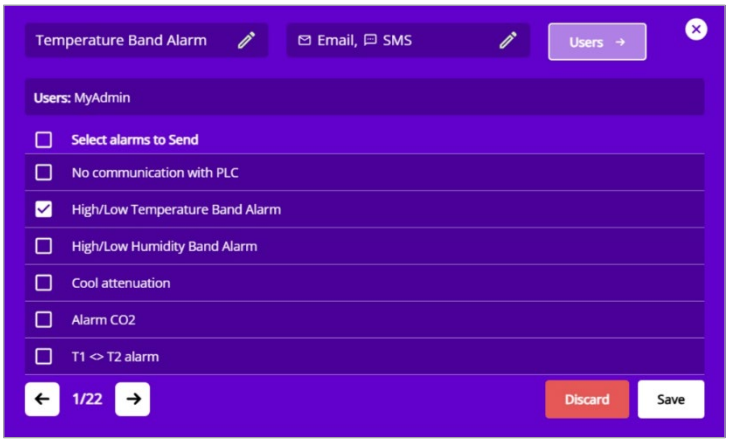



**Figure 69 - Email/SMS Alarm Configuration**

Selecting an entry opens its edit menu, which is identical to the rule creation menu via the "Create Rule" button.

In the top left the rule name can be set, in the top center it can be chosen whether Email, SMS, or both will be sent.

This page showcases a list of all the existing alarms that can prompt and email or SMS to be sent. Any number of them can be set to send an email or SMS when triggered by selecting them. When selected, the box will be checkmarked.

In the top right the 'Users' button can be pressed to switch the list to the list of users that can be set to receive the emails and SMSs in question.

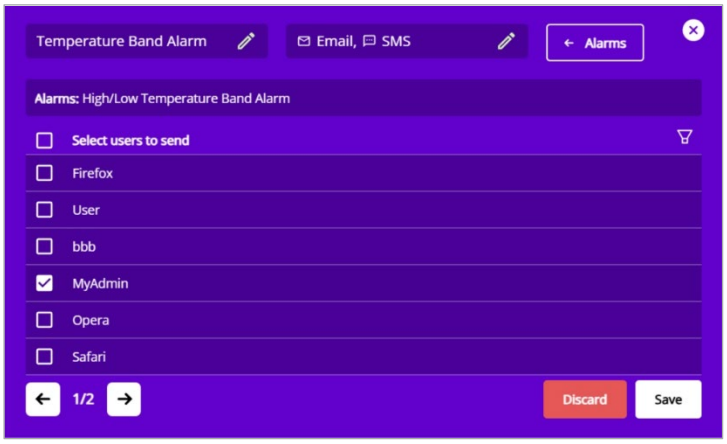



**Figure 70 - Email/SMS Users Configuration**

This new list shows the users in question and works much the same way the alarm list does. Any selected alarms are shown in a box above the list.

The 'Users' button now says 'Alarms' and selecting it switches back to the Alarm list. The button located there can always be pressed to switch between the lists, to the one it's currently labelled as.

After all alarms and users are selected, saving will create or edit the rule.

| | |
|---|---|
| | **NOTE: Email and SMS Pricing**<br>Email and SMS functionality may have a limit or additional cost. For more information visit the Aralab Portal or contact an Aralab representative. |

# 10. SYNOPTIC MENU


**Figure 71 - Synoptic Menu Button**

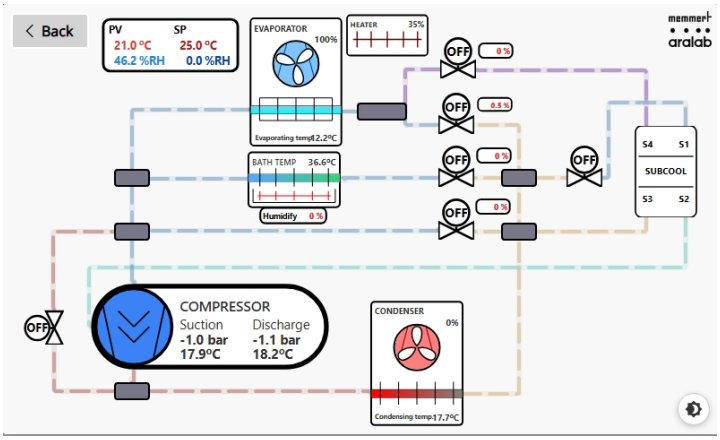



**Figure 72 - Synoptic Diagram with Chamber Off**

The synoptic menu displays a diagram illustrating various chamber components and their interactions for a better understanding of the machine interior and behavior.

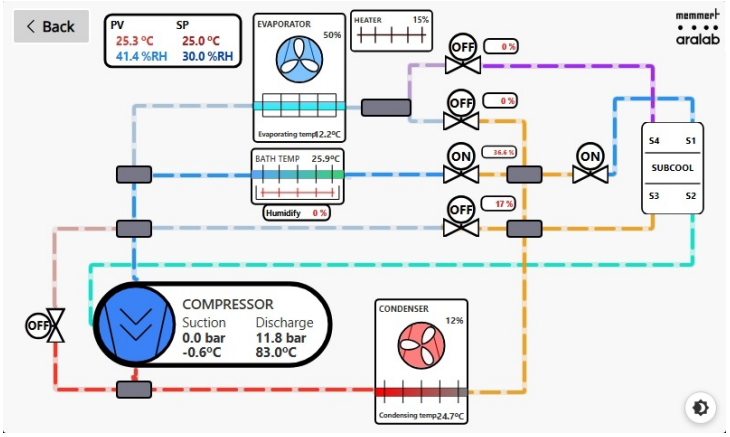



**Figure 73 - Synoptic Diagram with Active Chamber**

When the chamber is operating the diagram reflects the status information of the components in real time. Bright colors indicate active flow whereas greyed out colors indicate no flow, either because the chamber is off or because some component is stopping the flow to achieve the desired set point.

# 11. STATUS MENU

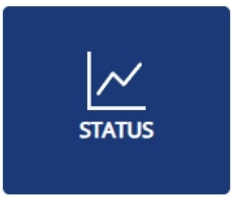



**Figure 74 - Status Menu Button**

The Status Menu contains an overview of all the information pertaining to the chamber sensors and chamber connections to devices or other input and output connections.

This menu serves mainly for viewing information and not for changing or adjusting any parameters. As such, Viewer permissions have full access to this chamber information.

## 11.1. CHARTS TAB


**Figure 75 - Status Charts**

The charts tab contains a graphical chart showing the evolution of the chamber properties over time.

The labels on the top right indicate through icons which property each line corresponds to, and the lines can be hidden and revealed by pressing the corresponding icon. The dotted line depicts the chamber set point, whereas the straight line represents the read value.

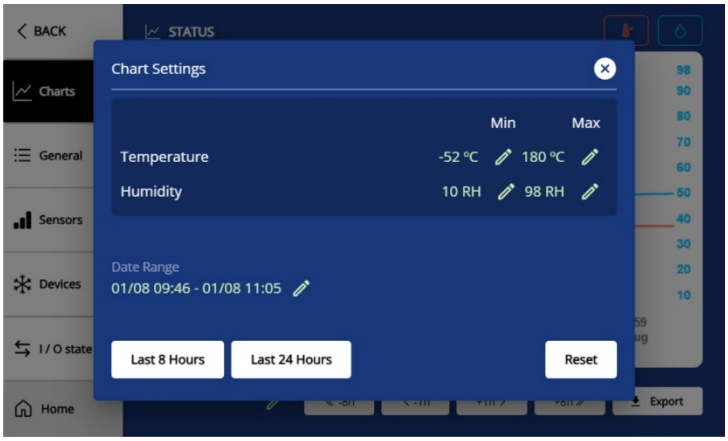



**Figure 76 - Status Charts Configuration**

It's possible to traverse the graph temporally in 1 or 8 hour chunks, but selecting the pencil icon will open the Chart Settings menu for more granular control of the exact scale and timeframe for the graph to depict.

In the Chart Settings the chamber properties appear and the scale for each individual one can be adjusted. A predefinition to show the last 8 hours or the last 24 hour exists through the buttons labelled as such, or the chart can be reset to the default values from the live chart in the home screen.

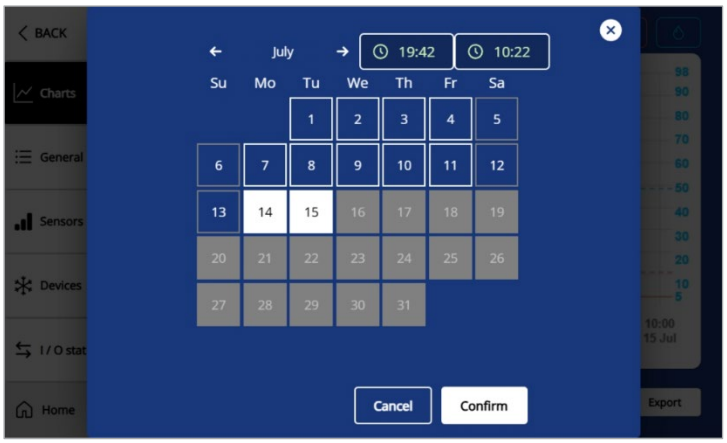



**Figure 77 - Status Chart Export Date Selection**

Alternatively, the date range for the chart to depict can be set manually.

A period of days can be picked by selecting a starting day and a final day, with the selected days being highlighted in white. The clocks at the top set, respectively, the starting time in the first day, and the final time in the final day, for the graph to plot.

| | |
|---|---|
| | **TIP:** Selecting an unselected day twice sets it as the only selected day. |

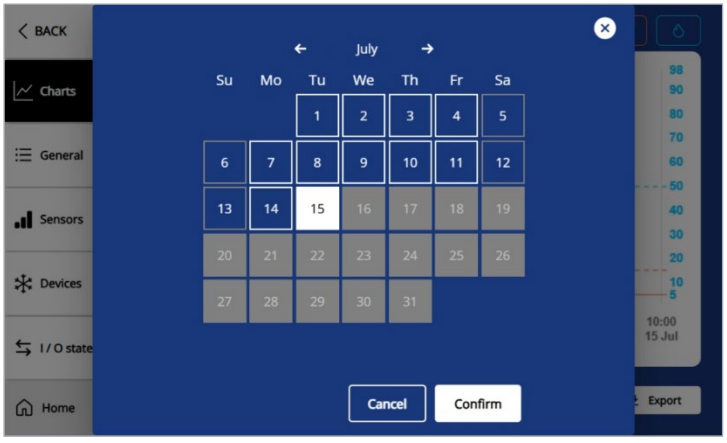



**Figure 78 - Status Chart Export Date Selection (2)**

It is also possible to export the chamber data used for the graph, either as csv file, or a *FitoLog* compatible D90 file. Using the same calendar as before, the days to export can be selected, and the full contents of each day will be exported.

## 11.2. GENERAL TAB


**Figure 79 - Status General**

The General tab contains information on each of the chamber's properties.

For example, the current value of the air temperature, its set point, and the requested heating/ cooling power. Or the current value of the relative air humidity, its set point, and the humidity/ drying power.

Similarly, pertinent information is shown for each of the chamber's properties.

## 11.3. SENSORS TAB


**Figure 80 - Status Sensors**

The Sensors tab contains the current values of the chamber's sensors. The currently enabled sensors are marked with a 'C'.

## 11.4. DEVICES TAB


**Figure 81 - Status Devices**

The Devices tab contains information on the state of any devices the chamber may contain, including optional ones.

For example, the compressor information shows the state of the compressor, as well as the temperature values and pressures associated with it.

## 11.5. I/O STATE TAB

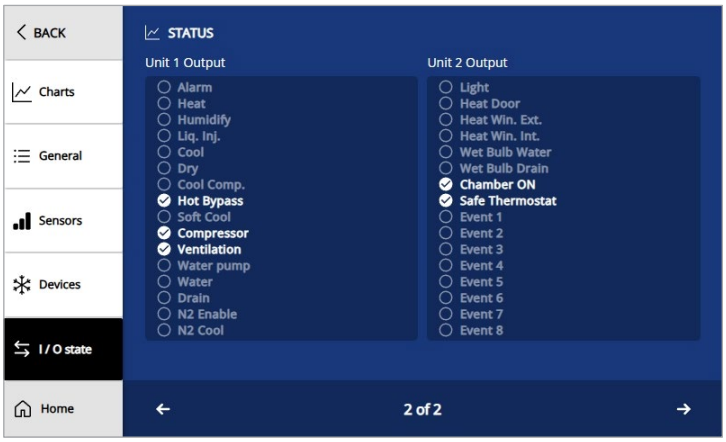



**Figure 82 - Status Inputs/Outputs**

The I/O State tab shows the state of all the electronic boards' digital inputs and outputs.

# 12. SETTINGS MENU


**Figure 83 - Settings Menu Button**

The Settings menu contains chamber spanning options like display language and control rules for features, like screensaver timer in the chamber HMI or the light timeout timer. The options shown here are dependent on the specific chamber's features. Admin permissions are required to enact changes to these settings.

## 12.1. CHAMBER TAB

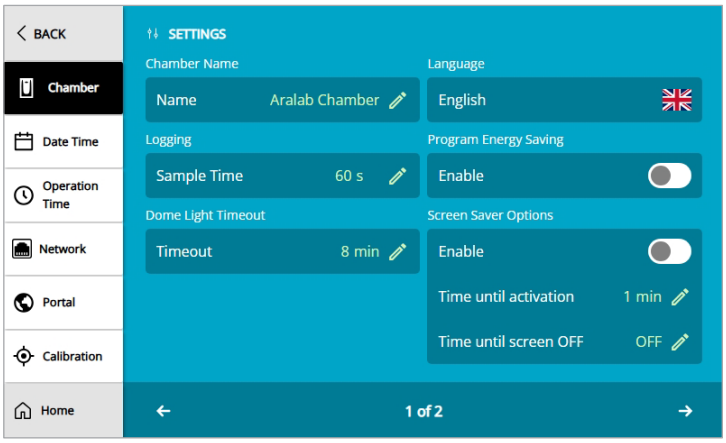



**Figure 84 - Settings Chamber**

The Chamber tab contains all the special settings in the chamber, such as:

- **Name** can be set for a chamber, appearing, for example, as the name of the browser tab when accessing the controller via browser.
- **Language** sets the chamber's display language.
- **Sample Time** sets the logging interval for samples.
- **Program Energy Saving** enables or disables the Energy Saving tab in the Programs menu. See section **8.3 in Programs Menu** for more information.
- **Screen Saver Options** toggle whether the screensaver options apply, the "Time until activation" of the screensaver, and the "Time until screen OFF" after the screensaver activates (can be set to OFF for the HMI to never turn off). Screensaver only activates on the HMI screen and without any active alarms.

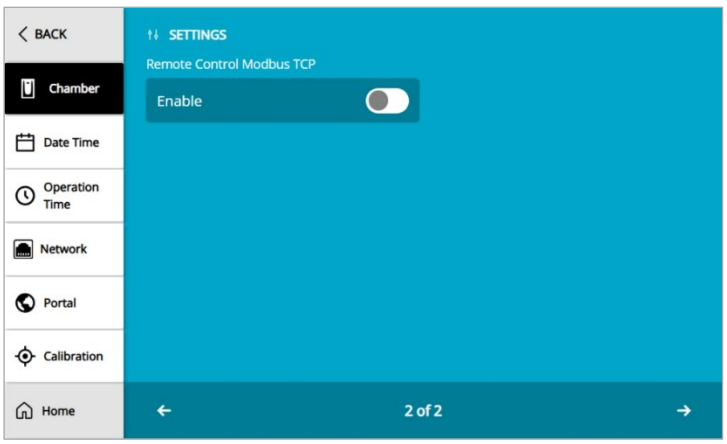



**Figure 85 - Settings Chamber Modbus TCP**

- **Remote Control Modbus TCP** enables or disables the chamber's ability to receive remote instructions via Modbus TCP commands. See section **15 Remote Control – Modbus TCP** for more information.

Other settings may be available depending on the specific chamber. Check the corresponding chamber controller appendices for more information.

## 12.2. DATE TIME TAB

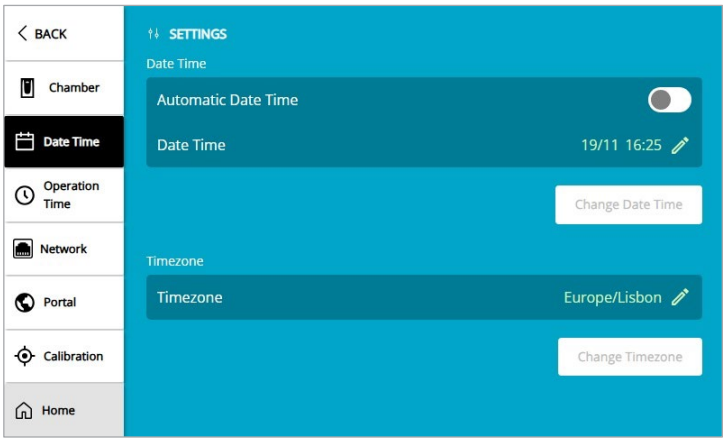



**Figure 86 - Settings Date Time**

The Date Time tab enables the configuration of the date and time the chamber operates on, registering all logs, alarms and schedules using the date and time set here.

**Automatic Date Time** uses a Network connection to reach an NTP Server (which can be input manually) and set a correct and accurate Date Time. It corresponds to the current Date and Time. This can be a local network so long as it has access to an NTP server.

When Automatic Date Time is disabled the date and time must be input manually.

**Timezone** mainly increments or decrements the current Date Time to match the new timezone. Therefore, a UTC+0 Timezone with 19/11 13:00 Date Time will transform into 20/11 01:00 Date Time when set to a UTC+12 Timezone.

| | |
|---|---|
|  | **WARNING:** The date and time set in the chamber must be accurate for all the logs to reflect reality. Every event the chamber registers uses these times and dates, and failure to set these to real values may hinder troubleshooting. |

## 12.3. OPERATION TIME TAB

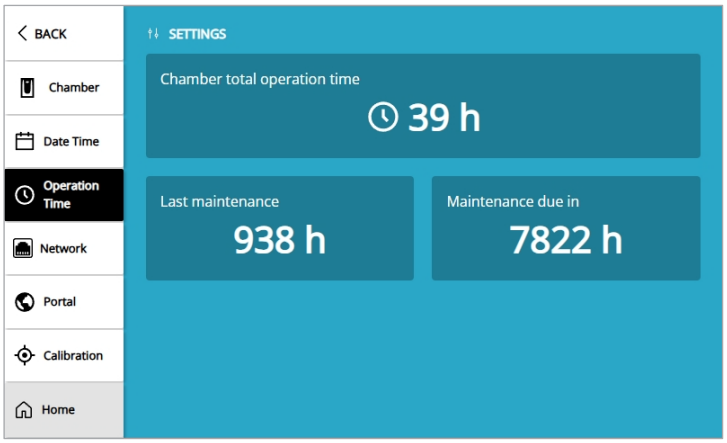



**Figure 87 - Settings Operation Time**

The Operation Time tab displays statistics about chamber operation time, including how long the chamber has been running, the time since the last maintenance, and how much time remains until the next maintenance is due.

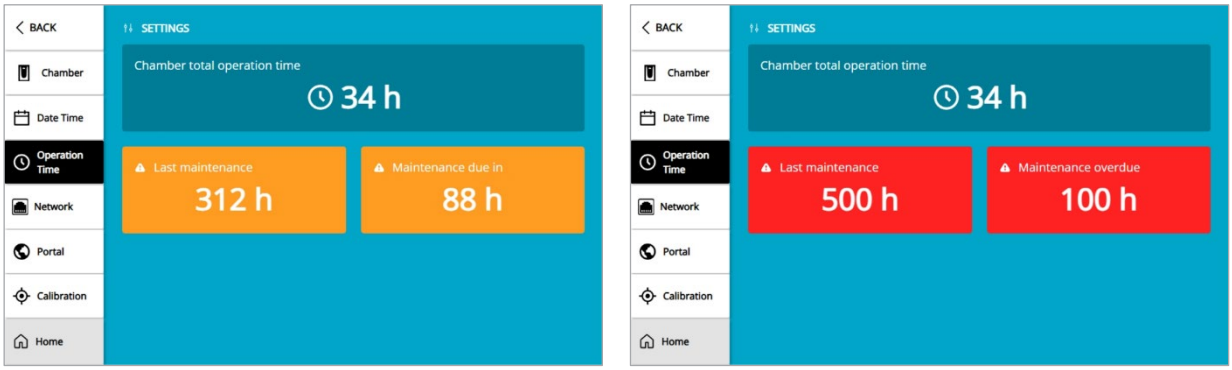



**Figure 88 - Settings Operation Time Warnings**

When maintenance is approaching or overdue, a warning will appear in this tab indicating either the remaining time until maintenance is required or how long it has been overdue.

The chamber always tracks the need for future maintenance, but a due warning will only appear as the scheduled maintenance time approaches.

## 12.4. NETWORK TAB

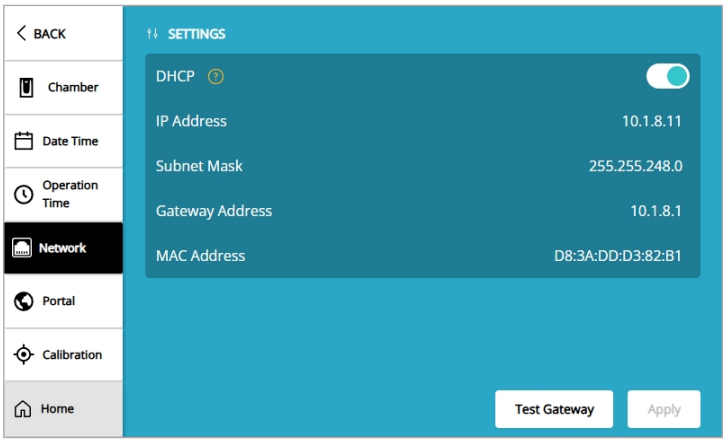



**Figure 89 - Settings Network**

The Network Tab indicates the Addresses and mask being used to establish a Network connection. Enabling DHCP performs this setup automatically, whereas disabling it allows manual input of Addresses and DNS servers.

A Network connection enables connecting to the *FitoLog* application, the Aralab Portal, Modbus TCP remote control, and remote device accesses, but the connection is not required for normal chamber operation. Internet connection is similarly only strictly necessary to connect to the Aralab Portal, enabling remote updates and other features detailed in the next section.

'Test Gateway' can be used to test the chamber's gateway connection.

## 12.5. PORTAL TAB

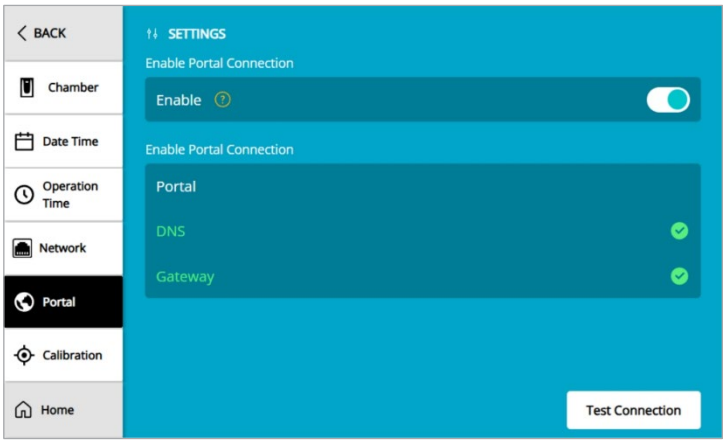



**Figure 90 - Settings Portal**

The Portal tab manages the chamber connection to the Aralab Portal. 'Test Connection' will test the connection to the portal, indicating green icons if the connection is established and red icons if it isn't.

The Aralab Portal is a web-based application that allows customers to manage their climatic chambers. Through the Portal, users can view information about their chambers, check documentation, request maintenance services, order spare parts, and track the status of service requests. The Portal can also notify users of alarms or important events via email or SMS (as established by the rules in the Email/SMS tab of the Alarm menu **Section 9.4**), and the management of notification credits is handled directly within the Portal.

## 12.6. CALIBRATION TAB

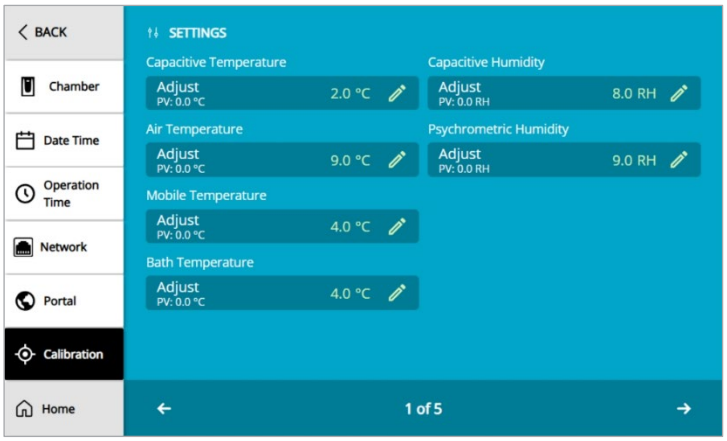



**Figure 91 - Settings Calibration**

The Calibration tab contains several pages with all the parameters the chamber possesses to allow adjusting and calibrating all the chamber sensors.

# 13. EVENT LOGGER MENU

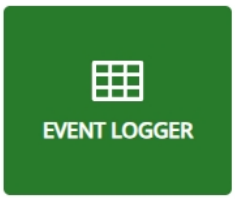



**Figure 92 - Event Logger Menu Button**

The Event Logger contains a list with all the logs pertaining to chamber activity. Each action undertaken by a user account, alarms, or program progression (such as when runs complete) are registered in the Event Logger.

| | |
|---|---|
| | **NOTE:** System activity like alarms, schedules and program progression is registered as a 'System' user. Similarly, Modbus TCP remote commands are registered as a Modbus user. |

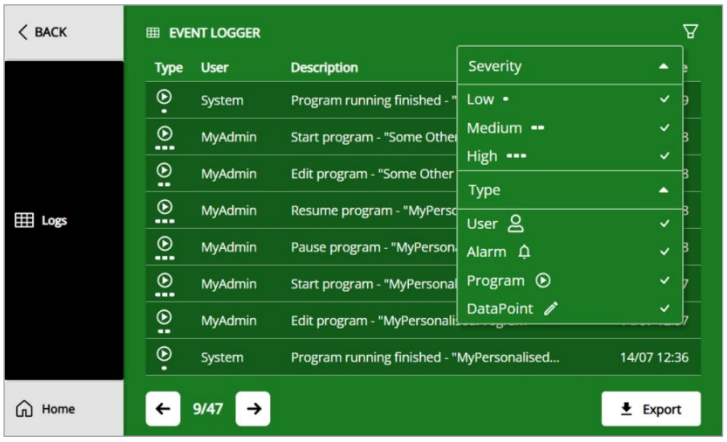



**Figure 93 - Event Logger**

In the top right corner, a filter is available so that only logs with the filtered conditions are shown. The list can be filtered by Type:

| | |
|---|---|
| | **User** – Logs related to user management actions, like logging in or out, changing passwords, permissions, email or SMS number, as well as creating users. |
| | **Alarm** – Logs related to alarms, but not the configuration of alarm values. |

| | |
|---|---|
|  | **Program** – Logs related to programs, like their creation, editing, scheduling and execution. |
|  | **DataPoint** – Logs related to editable parameters anywhere in the chamber, like setting temperatures, enabling and disabling events and functions, and any other setting parameter. |

The list can also be filtered by Severity (impact on the chamber):

| | |
|---|---|
|  | **Low** – Low impact actions like programs completing runs, users logging in and out, and data being exported. |
|  | **Medium** – Medium impact actions like editing programs and most values affecting the chamber's operation settings, scheduling and creating programs, and acknowledging alarms. |
|  | **High** – High impact actions like starting or deleting a program, changing user data or permissions, or other Admin permission actions like altering network settings or energy policy. |

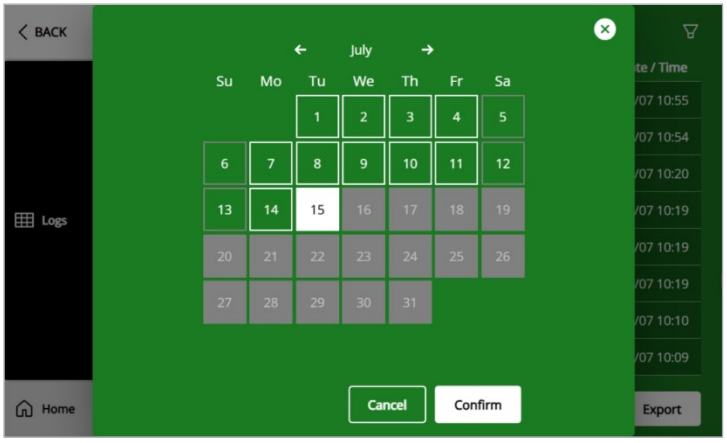



**Figure 94 - Event Logger Export Date Selection**

All the chamber activity logs can be exported for any chosen period of time. This data is exported in a csv file and contains additional timestamped navigation information, registering every page visited by each user account.

# 14. CONTROLLER INFORMATION

Pressing the Memmert-Aralab logo will open up the Controller Information page.

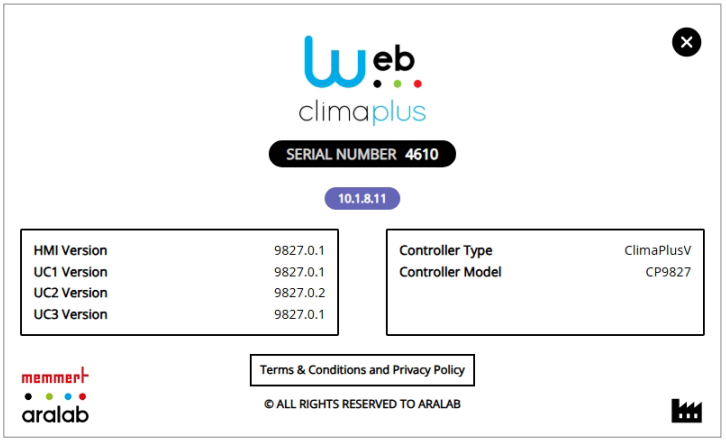



**Figure 95 - Controller Information**

This screen contains the identifying controller information (*software* & *hardware*), as well as the chamber's. This information can be solicited in a technical assistance request.

The page shows: the equipment serial number, the IP address, the HMI, PLC versions, the Controller type and model, and the production date.

Terms & Conditions can also be viewed here.

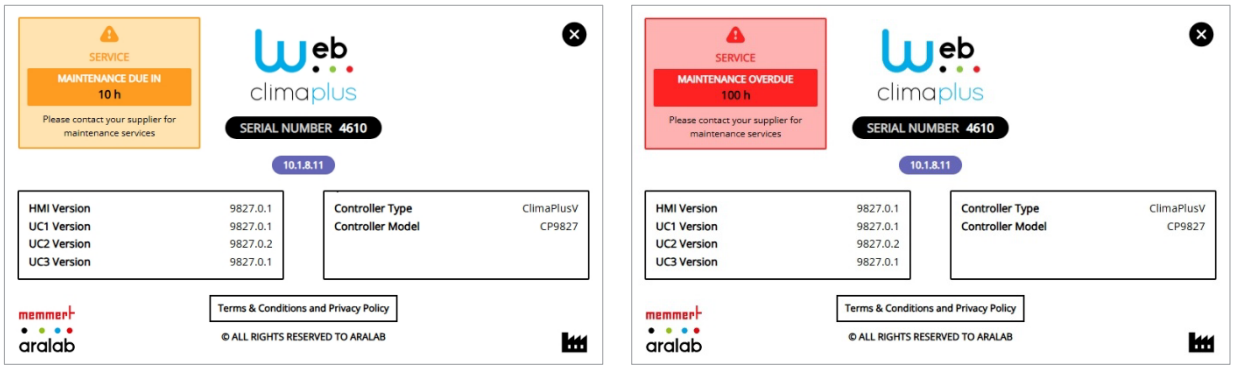



**Figure 96 - Controller Information with Maintenance Warning**

The maintenance warnings, as described in section **12.3 in the Settings Menu**, also feature prominently in this page.

# 15. REMOTE CONTROL – MODBUS TCP

You can enable remote control (writing) of the climatic chamber via the Modbus TCP protocol in the settings/configuration menu.

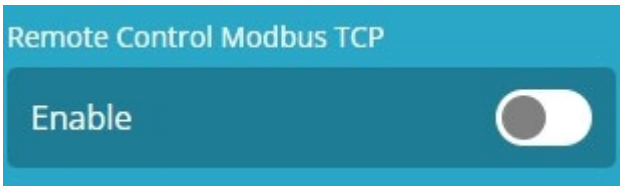



**Figure 97 - Remote Control Modbus Settings Switch**

### Enabling and Securing Remote Writing:

To prevent unauthorized access through Modbus TCP, a specific communication procedure is required for remote writing and to keep the chamber on:

1. Enable Remote Control using the switch shown above.
2. **Write to address 1902** once every 30 seconds or less to maintain remote writing.

- Address 1902 increments +1 every second and will turn off the chamber and disable remote writing if 30 or above. It's reset to 0 every time it receives a write message.

### Communication Table:

- The communication table defines which Modbus TCP addresses on the chamber are available for reading and writing.
- **Writing:** You can only write to R/W (read/write) variables if the procedure above is correctly followed.
- **Reading:** Data reading is always allowed.

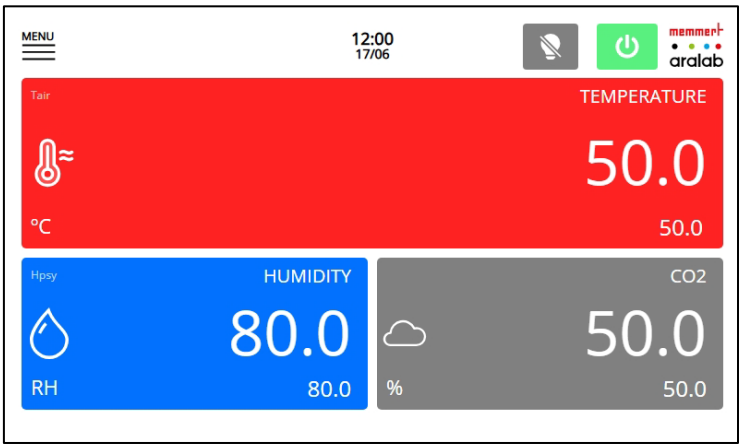
### Communication Monitoring:

- **Address 1901** increments from 0 until 1000 every second and then resets back to 0. This address can be read so as to monitor the Modbus TCP communication and catch communication delays or failures.

# 16. CHAMBER SPECIFIC APPENDICES

## 16.1. CP9827 Controller Appendix

CP9827 CHAMBER FEATURES AND LIMITATIONS




**CP9827 is compatible with:**

- Temperature Control, Humidity Control and CO2 carbonation.
- Tair (Resistive Sensor), Tcap (Capacitive Sensor), and Mobile (Free placement Resistive Sensor) temperature probes.
- Hpsy (Psychrometer Sensor), and Hcap (Capacitive Sensor) humidity probes.

| | |
|---|---|
|  | **WARNING:** Tcap and Hpsy cannot be used in conjunction in this controller. |

**CP9827 has the following special settings** (Settings Menu)**:**

**N2 Cooling**:

Defines the high and low bands for nitrogen injection in order to accelerate cooling. N2 injection starts when the process temperature exceeds the Set Value + High Band and stops when it falls below the Set Value + Low Band.

**Mobile Control – Control Speed**:

When a Mobile probe is present and set as the control probe, this setting determines how the probe influences temperature control.

At higher speeds, the control attempts to reach the Set Value more quickly, but with greater oscillation. At lower speeds, it takes longer to reach the Set Value, but with less oscillation.

Details and Formulas:

- When Control Speed = 0:

Temperature control is performed directly by the Mobile Probe, except when the difference between the Mobile Probe and the Set Value is greater than 15°C. In this situation, the Tair Probe will control until the difference is reduced to less than 15°C.

- When Control Speed > 0:

An offset is calculated for the Set Value, generating a virtual Set Value (Set Value + Offset), for which the Tair Probe performs control.

The offset is calculated using the difference between the Mobile Probe and the Set Value, allowing the control to be "pulled" to the Mobile Probe when there are thermal loads. Ex.: if the mobile probe is +1°C above the Set Value, a virtual Set Value equal to "set value − 1°C" is generated (offset = −1°C).

Offset Calculation:

When the difference between the Set Value and the Mobile Probe ≥ 10°C, the offset is ~0.116 × (Mobile Probe Control Speed) °C/min

When the difference between the Set Value and the Mobile Probe < 10°C::

1. A Multiplicative Factor is calculated:

A factor between 0.001 and 1.0 depending on the deviation of the Tair from the virtual Set Value. When the Tair = virtual Set Value, factor = 1. As it deviates, the factor decreases to 0.001 when the deviation reaches ≥ 4.995°C (up/down).

The deviation is mapped as exemplified in the following points:

| SP-4,995 | SP-4,8 | SP-4,5 | SP-4 | SP-3 | SP-2 | SP-1 | SP |
|---|---|---|---|---|---|---|---|
| 0,001 | 0,04 | 0,1 | 0,2 | 0,4 | 0,6 | 0,8 | 1 |

2. An offset increment is generated to apply to the current offset every 5.12s:
   - Offset_increment = Multiplicative Factor × (difference between Set Value and Mobile Probe) × (Control Speed) × 0.001

The offset is limited to a maximum of ±30°C so that the virtual Set Value does not deviate more than 30°C from the Tair Set Value, and is also limited so that the minimum and maximum temperature limits in the chamber are respected.

**High / Low / Band Alarm Delay**:

For CP9827 the defined delay in Alarm Settings (**9.3**) only delays the buzzer sounding.

The CP9827 controller may be used in chambers that do not possess some of these features, like Humidity Control, N2 Cooling, or CO2 carbonation.

Please consult your supplier if you have questions about your specific chamber.

## CP9827 CHAMBER FUNCTIONS

### Function A – Bath off

This function turns the bath off, emptying it, regardless of chamber values and set points. The bath is otherwise automatically emptied at extreme temperatures below -2°C, above 98°C, or if humidity set point is off.

### Function B – Dry boost

This function sets the drying power at 100%.

This function should only be used in situations with no water as described in Function A, as it can freeze water. Otherwise, use should be reserved for short bursts.

### Function C – Control by mobile

This function sets the temperature control probe to the mobile sensor.

### Function D – Dew test

This function is used for specific tests aiming to saturate humidity using Bath Temperature. When ON, the Bath Temperature will be set according to the temperature set point.

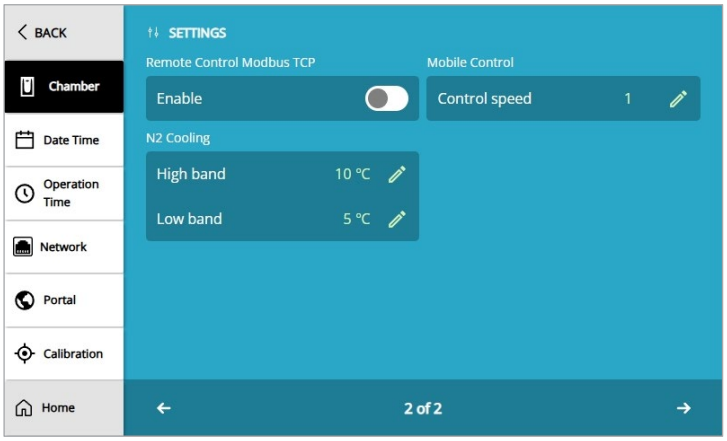
### Function E – Compressor start

This function turns the cool compressors on even if the chamber has not automatically done so yet.

Used to speed up the cooling process inside the chamber by turning the compressors on before the chamber detects that a new set point with lower temperature requires it.

### Function F – Enable N2 injection

For quick cooling of the chamber injects -200°C N2, according to the settings setup in page 2 of the Chamber Tab in the Settings Menu (**Section 12.1** in the ClimaPlus Web manual).



High band is the temperature above the set point at which the N2 Cooling is turned on, and Low band is the temperature above the set point at which N2 Cooling is turned off. With Set point 90°C, High band 10°C and Low band 5°C, N2 Cooling is turned on at 100°C and above and turned off at 95°C and below.

**Function G – PID intg temp / 2**

**Function H – PID intg hum / 2**

A PID intg (integrator) value is used to help stabilize the chamber at the desired set points (reducing situations of values constantly shifting from above to below the set point, or never reaching the set point).

These functions divide the PID intg parameter for temperature or humidity control by half at the moment the function is turned on. This adjustment helps reduce overshoot during transitions (such as when changing from a ramp to a stable set point). Overshoot occurs when a property rises above the set point before settling.

When activated, the PID intg value is immediately halved.

This lower integral value reduces the effect of accumulated past error in the PID controller, making the system less aggressive and minimizing the risk of overshoot.

The new, halved value remains in effect until you turn the function off and on again (which would halve it again).

These functions are used when you need strict temperature or humidity control and want to minimize deviation or oscillation around the set point, especially if you anticipate a set point change that could cause overshoot.

CP9827 MODBUS TCP BOARD

| Function | Modbus TCP | Access | Value type | Acceptable values |
|---|---|---|---|---|
| Setpoint Temperature | 1001 | R / W | 16-bit Integer (x10) | -100 to 200 (x10) |
| Setpoint Humidity | 1002 | R / W | 16-bit Integer (x10) | 0 to 100 (x10) |
| Setpoint CO2 | 1003 | R / W | 16-bit Integer (x10) | 0 to 100 (x10) |
| PV Temperature | 1009 | R | 16-bit Integer (x10) | |
| PV Humidity | 1010 | R | 16-bit Integer (x10) | |
| PV CO2 | 1011 | R | 16-bit Integer (x10) | |
| SP / PV Ventilation | 1012 | R / W | 16-bit Integer (x10) | 0 to 100 |
| PV Air Temperature | 1013 | R | 16-bit Integer (x10) | |
| PV Capacitive Temperature | 1014 | R | 16-bit Integer (x10) | |
| PV Mobile Temperature | 1015 | R | 16-bit Integer (x10) | |
| PV Psychometric Humidity | 1016 | R | 16-bit Integer (x10) | |
| PV Capacitive Humidity | 1017 | R | 16-bit Integer (x10) | |
| PV Dry Bulb Temperature | 1020 | R | 16-bit Integer (x10) | |
| PV Wet Bulb Temperature | 1021 | R | 16-bit Integer (x10) | |
| PV Bath Temperature | 1022 | R | 16-bit Integer (x10) | |
| PV HMI Temperature | 1023 | R | 16-bit Integer (x10) | |
| PV CO2 Power Integrator | 1065 | R | 16-bit Integer (x10) | |
| PV CO2 Power Injection | 1066 | R | 16-bit Integer (x10) | |
| PV Humidity PID Integrator | 1067 | R | 16-bit Integer (x10) | |

| | | | | | |
|---|---|---|---|---|---|
| PV Humidity Dry Power | 1068 | R | 16-bit Integer (x10) | | |
| PV Humidify Power | 1069 | R | 16-bit Integer (x10) | | |
| Cool Integrator | 1070 | R | 16-bit Integer (x10) | | |
| Cool Power | 1071 | R | 16-bit Integer (x10) | | |
| Temperature PID Integrator | 1072 | R | 16-bit Integer (x10) | | |
| Soft Cool Power | 1073 | R | 16-bit Integer (x10) | | |
| Heat Power | 1074 | R | 16-bit Integer (x10) | | |
| PV Condensation Temperature | 1083 | R | 16-bit Integer (x10) | | |
| PV Discharge Temperature | 1084 | R | 16-bit Integer (x10) | | |
| PV Discharge Pressure | 1085 | R | 16-bit Integer (x10) | | |
| PV Suction Temperature | 1086 | R | 16-bit Integer (x10) | | |
| PV Suction Pressure | 1087 | R | 16-bit Integer (x10) | | |
| PV Cooling Water Temperature | 1088 | R | 16-bit Integer (x10) | | |
| PV Cooling Water Pressure | 1089 | R | 16-bit Integer (x10) | | |
| Temperature Discharge Attenuation | 1093 | R | 16-bit Integer (x10) | | |
| Pressure Discharge Attenuation | 1094 | R | 16-bit Integer (x10) | | |
| Temperature Suction Attenuation | 1095 | R | 16-bit Integer (x10) | | |
| Liquid Injection Power | 1104 | R | 16-bit Integer (x10) | | |
| Cool Discharge Power | 1105 | R | 16-bit Integer (x10) | | |
| Cool Compressor Power | 1106 | R | 16-bit Integer (x10) | | |
| Events & Functions | 1113 | R / W | 16-bit Integer (Individual bits) | 0x0001 | Event 1 |
| | | | | 0x0002 | Event 2 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | 0x0004 | Event 3 |
| | | | | 0x0008 | Event 4 |
| | | | | 0x0010 | Event 5 |
| | | | | 0x0020 | Event 6 |
| | | | | 0x0040 | Event 7 |
| | | | | 0x0080 | Event 8 |
| | | | | 0x0100 | Function A |
| | | | | 0x0200 | Function B |
| | | | | 0x0400 | Function C |
| | | | | 0x0800 | Function D |
| | | | | 0x1000 | Function E |
| | | | | 0x2000 | Function F |
| | | | | 0x4000 | Function G |
| | | | | 0x8000 | Function H |
| Unit 1 Digital Outputs (1-8) | 1122 | R | 8-bit Byte (Individual bits) | 0x0001 | Alarm |
| | | | | 0x0002 | Heat |
| | | | | 0x0004 | Humidify |
| | | | | 0x0008 | Liquid. Injection |
| | | | | 0x0010 | Cool |
| | | | | 0x0020 | Dry |
| | | | | 0x0040 | Cool Compressor |
| | | | | 0x0080 | Hot Bypass |
| Unit 1 Digital Outputs (9-16) | 1123 | R | 8-bit Byte (Individual bits) | 0x0001 | Soft Cool |
| | | | | 0x0002 | Compressor |
| | | | | 0x0004 | Ventilation fail |
| | | | | 0x0008 | Water pump |
| | | | | 0x0010 | Water |
| | | | | 0x0020 | Drain fail |
| | | | | 0x0040 | N2 Enable |
| | | | | 0x0080 | N2 Cool |
| Unit 2 Digital Outputs (1-8) | 1125 | R | 8-bit Byte (Individual bits) | 0x0001 | Light |
| | | | | 0x0002 | Heat Door |
| | | | | 0x0004 | Heat Win. Ext. |
| | | | | 0x0008 | Heat Win. Int |
| | | | | 0x0010 | Wet Bulb Water |

| | | | | | |
|---|---|---|---|---|---|
| | | | | 0x0020 | Wet Bulb Drain |
| | | | | 0x0040 | Chamber ON |
| | | | | 0x0080 | Safe Thermostat |
| Unit 2 Digital Outputs (9-16) | 1126 | R | 8-bit Byte (Individual bits) | 0x0001 | Event 1 |
| | | | | 0x0002 | Event 2 |
| | | | | 0x0004 | Event 3 |
| | | | | 0x0008 | Event 4 |
| | | | | 0x0010 | Event 5 |
| | | | | 0x0020 | Event 6 |
| | | | | 0x0040 | Event 7 |
| | | | | 0x0080 | Event 8 |
| Unit 1 Digital Inputs (1-8) | 1131 | R | 8-bit Byte (Individual bits) | 0x0001 | Fail Temperature Max |
| | | | | 0x0002 | Fail Temperature Min |
| | | | | 0x0004 | Fail Compressor High Pressure |
| | | | | 0x0008 | Fail Compressor Internal |
| | | | | 0x0010 | Fail Ventilation |
| | | | | 0x0020 | Fail AC Power |
| | | | | 0x0040 | Water |
| | | | | 0x0080 | Fail Compressor Heater |
| Unit 2 Digital Inputs (1-8) | 1134 | R | 8-bit Byte (Individual bits) | 0x0001 | No Wet Bulb Water |
| | | | | 0x0002 | Fail Compressor Power |
| | | | | 0x0004 | Ventilation OK |
| | | | | 0x0008 | Fail Condenser Ventilation |
| | | | | 0x0010 | STB OK |

| | | | | | |
|---|---|---|---|---|---|
| | | | | 0x0020 | Security OK |
| | | | | 0x0040 | EUCAR Door Closed |
| | | | | 0x0080 | EUCAR Emergency Activated |
| Unit 3 Digital Inputs (1-8) | 1137 | R | 8-bit Byte (Individual bits) | 0x0001 | Program Wait |
| | | | | 0x0002 | Go Next Segment |
| | | | | 0x0004 | Go Safety |
| | | | | 0x0008 | Not Remote |
| | | | | 0x0010 | n/u |
| | | | | 0x0020 | n/u |
| | | | | 0x0040 | n/u |
| | | | | 0x0080 | n/u |
| Program Running | 1140 | R | 16-bit Integer | 0: No Running Program, Other: ID of Running Program | |
| Running Segment | 1141 | R | 16-bit Integer | | |
| Program Running Status | 1142 | R | 16-bit Integer | 1: Finished, 2: Paused, 3: Running, 4: Waiting (soak), 5: Power failure error | |
| Control Probe | 1143 | R | 16-bit Integer | 0: Tair + Hpsy, 1: Tair + Hcap, 2: Tcap + Hcap | |
| Control Version | 1144 | R | 16-bit Integer | | |
| Control Release | 1145 | R | 16-bit Integer | | |
| Control Revision | 1146 | R | 16-bit Integer | | |
| Chamber Serial Number | 1147 | R | 16-bit Integer | | |
| Chamber On/Off | 1150 | R | 16-bit Integer | 0: Chamber OFF, 1: Chamber ON | |
| Remaining Segment Time - Days | 1156 | R | 16-bit Integer | | |
| Remaining Segment Time - Hours | 1157 | R | 16-bit Integer | | |
| Remaining Segment Time - Minutes | 1158 | R | 16-bit Integer | | |
| Remaining Segment Time - Seconds | 1159 | R | 16-bit Integer | | |
| Elapsed Program Time - Days | 1160 | R | 16-bit Integer | | |

| | | | | | |
|---|---|---|---|---|---|
| Elapsed Program Time - Hours | 1161 | R | 16-bit Integer | | |
| Elapsed Program Time - Minutes | 1162 | R | 16-bit Integer | | |
| Elapsed Program Time - Seconds | 1163 | R | 16-bit Integer | | |
| Remaining Program Time - Days | 1164 | R | 16-bit Integer | | |
| Remaining Program Time - Hours | 1165 | R | 16-bit Integer | | |
| Remaining Program Time - Minutes | 1166 | R | 16-bit Integer | | |
| Remaining Program Time - Seconds | 1167 | R | 16-bit Integer | | |
| Events & Functions (Sample Accumulated ON Events) | 1204 | R | 16-bit Integer | 0x0001 | Event 1 |
| | | | | 0x0002 | Event 2 |
| | | | | 0x0004 | Event 3 |
| | | | | 0x0008 | Event 4 |
| | | | | 0x0010 | Event 5 |
| | | | | 0x0020 | Event 6 |
| | | | | 0x0040 | Event 7 |
| | | | | 0x0080 | Event 8 |
| | | | | 0x0100 | Function A |
| | | | | 0x0200 | Function B |
| | | | | 0x0400 | Function C |
| | | | | 0x0800 | Function D |
| | | | | 0x1000 | Function E |
| | | | | 0x2000 | Function F |
| | | | | 0x4000 | Function G |
| | | | | 0x8000 | Function H |
| Alarms 1 | 1205 | R | 16-bit Integer | 0x0001 | High/Low Temperature Band Alarm |
| | | | | 0x0002 | High/Low Humidity Band Alarm |
| | | | | 0x0004 | Cool attenuation |
| | | | | 0x0008 | Alarm CO2 |
| | | | | 0x0010 | T1 <> T2 alarm |
| | | | | 0x0020 | H1 <> H2 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | alarm |
| | | | | 0x0040 | Drain fail |
| | | | | 0x0080 | Incorrect humidity sensor selected |
| | | | | 0x0100 | Maximum temperature alarm |
| | | | | 0x0200 | Minimum temperature alarm |
| | | | | 0x0400 | Compressor high pressure alarm |
| | | | | 0x0800 | Compressor internal alarm |
| | | | | 0x1000 | Ventilation fail |
| | | | | 0x2000 | AC power fail |
| | | | | 0x4000 | No water alarm |
| | | | | 0x8000 | Oil heater fail |
| Alarms 2 | 1206 | R | 16-bit Integer | 0x0001 | No wet bulb water alarm |
| | | | | 0x0002 | Compressor power fail |
| | | | | 0x0004 | Fire board alarm |
| | | | | 0x0008 | Condenser ventilation fail |
| | | | | 0x0010 | STB / Emergency alarm |
| | | | | 0x0020 | Fire alarm |
| | | | | 0x0040 | Temperatur e control sensor fail |
| | | | | 0x0080 | Humidity control sensor fail |
| | | | | 0x0100 | Alarm 24 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | 0x0200 | Alarm 25 |
| | | | | 0x0400 | Low gas alarm |
| | | | | 0x0800 | Low water condenser pressure |
| | | | | 0x1000 | Alarm 28 |
| | | | | 0x2000 | Alarm 29 |
| | | | | 0x4000 | Alarm 30 |
| | | | | 0x8000 | Alarm 31 |
| Alarms 3 | 1207 | R | 16-bit Integer | 0x0001 | Air temperature sensor fail |
| | | | | 0x0002 | Capacitive temperature sensor fail |
| | | | | 0x0004 | Capacitive humidity sensor fail |
| | | | | 0x0008 | Wet bulb temperature sensor fail |
| | | | | 0x0010 | Bath water temperature sensor fail |
| | | | | 0x0020 | Mobile temperature sensor fail |
| | | | | 0x0040 | CO2 sensor fail |
| | | | | 0x0080 | Alarm 39 |
| | | | | 0x0100 | Condensing temperature sensor fail |
| | | | | 0x0200 | Discharge temperature sensor fail |
| | | | | 0x0400 | Discharge pressure sensor fail |
| | | | | 0x0800 | Suction temperature sensor fail |
| | | | | 0x1000 | Suction pressure sensor fail |
| | | | | 0x2000 | Condenser |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | water temperature sensor fail |
| | | | | 0x4000 | Condenser water pressure sensor fail |
| | | | | 0x8000 | Alarm 47 |
| Alarms 4 | 1208 | R | 16-bit Integer | 0x0001 | Alarm 48 |
| | | | | 0x0002 | Alarm 49 |
| | | | | 0x0004 | Alarm 50 |
| | | | | 0x0008 | Alarm 51 |
| | | | | 0x0010 | Alarm 52 |
| | | | | 0x0020 | Alarm 53 |
| | | | | 0x0040 | Alarm 54 |
| | | | | 0x0080 | Alarm 55 |
| | | | | 0x0100 | Alarm 56 |
| | | | | 0x0200 | Alarm 57 |
| | | | | 0x0400 | Version mismatch |
| | | | | 0x0800 | UC3 communication fail |
| | | | | 0x1000 | UC2 communication fail |
| | | | | 0x2000 | UC1 communication fail |
| | | | | 0x4000 | Program error |
| | | | | 0x8000 | Alarm 63 |
| Select Program | 1230 | R / W | 16-bit Integer | Write ID corresponding to Program. ID visible in Program Details | |
| Program Control | 1231 | R / W | 16-bit Integer | 1: Stop, 2: Start or Resume (Program Selected in 1230), 3: Pause | |
| Control Probe Selection | 1232 | R / W | 16-bit Integer | 1: Tair + Hpsy, 2: Tair + Hcap, 3: Tcap + Hcap | |
| Chamber On/Off | 1233 | R / W | 16-bit Integer | 1: Chamber OFF, 2: Chamber ON | |

CP9827 ALARM LIST

| Alarm Name | FitoLog Name | Alarm Description |
|---|---|---|
| High Low Temperature Band Alarm | Alarm Temp | Exceeded the programmed maximum/minimum temperature, or the temperature deviated from the Setpoint by a value greater than the defined band. |
| High/Low Humidity Band Alarm | Alarm Hum | Exceeded the programmed maximum/minimum humidity, or the humidity deviated from the Setpoint by a value greater than the defined band. |
| Compressor Alarm | Cool Attn | The compressor shuts down due to excessive attenuation, likely caused by deficiencies in air/water cooling. |
| CO2 Alarm | Alarm CO2 | When the maximum/minimum CO2 level is exceeded or the CO2 level deviates from the Setpoint by a value greater than the programmed range. |
| T1 ≠ T2 Alarm | T1 <> T2 | The primary temperature control sensor differs from the secondary by more than the programmed value in the band. |
| H1 ≠ H2 Alarm | H1 <> H2 | The primary humidity control sensor differs from the secondary by more than the programmed value in the band. |
| Drain Alarm | Drain Fail | The bath water was not drained properly. Likely due to a blockage in the drain or a failure of the respective solenoid valve.<br>May occur with chamber off. |
| Incorrect Humidity Sensor Selected | HumSensErr | 1) Psychrometric humidity sensor selected for low humidity set value; 2) Capacitive humidity sensor selected for high reference humidity set value. |
| Maximum Temperature Alarm | Max Temp | Exceeded the maximum alarm temperature set on module TM1.<br>Turns the chamber off. |
| Minimum Temperature Alarm | Min Temp | Exceeded the minimum alarm temperature set on module TM1.<br>Turns the chamber off. |
| High Pressure Alarm | Comp HiPress | Excessive discharge pressure in the compressor. Likely due to a failure in the condenser caused by a blockage in air circulation or a lack of water in the cooling circuit. |

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| Compressor Internal Alarm | Comp IntFail | Compressor internal protection activated. |
| Ventilation Alarm | Ventilation | Ventilation failure. |
| Power Fail Alarm | AC Power | Power failure due to voltage outside of predefined limits or phase reversal.<br>Turns the chamber off. |
| No Water Alarm | No Water | Lack of water for the dew point bath. |
| Oil Heater Alarm | OilHeatrFail | Failure in the compressor oil heating. |
| No Water Wet Bulb Alarm | No WB Water | Lack of water for the psychrometric humidity sensor. |
| Power Fail Compressor Alarm | No PowerComp | Power supply failure to the compressor. |
| Fire Board Alarm | FireBoard | Fire electronics board failure |
| Condenser Fail Alarm | CondVentFail | Failure in condenser ventilation. |
| STB / Emergency Alarm | Emergenc/STB | 1) High-temperature fuse failure; 2) Activation of emergency alarm button.<br>Turns the chamber off. |
| Fire Alarm | Fire | Fire detected. |
| Incorrect Temperature Sensor Selected or Sensor Fail | CtrlTSenFail | 1) Selected deactivated control sensor; 2) Failure of one or more sensors on the UC1 electronics board. UC1 sensors: air temperature, (capacitive), wet bulb temperature, capacitive air temperature.<br>May occur with chamber off. |
| Incorrect Humidity Sensor Selected or Sensor Fail | CtrlHSenFail | 1) Selected deactivated control sensor; 2) Failure of relative air humidity sensos on the UC1 electronics board.<br>May occur with chamber off. |
| Low Gas Alarm | Low Gas | Lack of refrigerant in the compressor circuit.<br>May occur with chamber off. |
| Water Condenser Alarm | No WaterCond | Lack of water pressure in the condenser cooling circuit. |
| Air Temperature Sensor Fail | AirTemp Sens | Check if the PT100 sensor wires are broken or short-circuited. |
| Capacitive Temperature Sensor Fail | CapTemp Sens | Check if the 4-20mA sensor wires are broken or short-circuited. |
| Capacitive Humidity Sensor Fail | CapHum Sens | Check if the 4-20mA sensor wires are broken or short-circuited. |

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|---|---|---|
| Wet Bulb Temperature Sensor Fail | WetBulb Sens | Check if the PT100 sensor wires are broken or short-circuited. |
| Bath Water Temperature Sensor Fail | Bath Sens | Check if the PT100 sensor wires are broken or short-circuited. |
| Mobile Temperature Sensor Fail | Mobile Sens | Check if the PT100 sensor wires are broken or short-circuited. |
| CO2 Sensor Fail | CO2 Sensor | Check if the 4-20mA sensor wires are broken or short-circuited. |
| Condensing Temperature Sensor Fail | Condg T Sens | Check if the PT100 sensor wires are broken or short-circuited |
| Discharge Temperature Sensor Fail | DisTemp Sens | Check if the PT100 sensor wires are broken or short-circuited. |
| Discharge Pressure Sensor Fail | DisPressSens | Check if the 4-20mA sensor wires are broken or short-circuited. |
| Suction Temperature Sensor Fail | SucTemp Sens | Check if the PT100 sensor wires are broken or short-circuited. |
| Suction Pressure Sensor Fail | SucPressSens | Check if the 4-20mA sensor wires are broken or short-circuited. |
| Condenser Water Temperature Sensor Fail | CdWaterTSens | Check if the PT100 sensor wires are broken or short-circuited. |
| Condenser Water Pressure Sensor Fail | CdWaterPSens | Check if the 4-20mA sensor wires are broken or short-circuited. |
| Version Mismatch | VersionMism | Incorrect combination of control firmware versions. |
| UC3 Communication Fail | FAIL UC3 | Critical failure indicating malfunction of the UC3 control electronics board. |
| UC2 Communication Fail | FAIL UC2 | Critical failure indicating malfunction of the UC2 control electronics board. |
| UC1 Communication Fail | FAIL UC1 | Critical failure indicating malfunction of the UC1 control electronics board. |

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| Program Error Alarm | Prog Error | A power failure occurred during the execution of a program, exceeding the maximum allowed power interruption.<br>Turns the chamber off. |

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**Even The Best Gets Better**