CARBOLITE®
a VERDER company

OPERATIONAL MANUAL

Aries Plus
Controller

MEN-AriesPlus-CTRL | 23.01.2026

Translation

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1 Introduction

The AriesPlus is a touchscreen temperature controller developed by Carbolite Ltd.

It uses PID (Proportional Integral Derivative) algorithms to adjust the heating power and control the temperature within the product.

Users can navigate through the controller by pressing the on-screen buttons, and set values and parameters by pressing on fields within the screen. When alphanumerical values (names, passwords, times) are required, the on-screen keyboard will appear. If connected to an Ethernet network remote access via PC, tablet or smartphone is available.

1.1 Specification

Software Features	
Number of Programs	50
Number of Segments per Program	99
Data Logs	Can be exported on a USB stick or a remote device (all data is recorded in a **.csv** file format)
Real-time Clock with Calender	Yes
Time scheduler	Yes
Start time configurable	Yes
Ethernet Connectivity	Yes
Remote Connection on Local Ethernet Network via an Internet browser	Yes
User Levels	Two Password protected user levels to control access to functionality
Languages	• English • German • French • Italian • Spanish • Chinese • Japanese • Russian • Portuguese
Main Control Board	
Screen	7" capacitive touchscreen
Resolution	1024 x 600 pixels
Voltage	24 V dc

Thermocouple	Thermocouple input
USB	1 X USB socket
Ethernet	1 x Ethernet socket
Relay	1 x change over relay (used for options)
Over Temperature	Optional, with independent relay and thermocouple input
Cascade Control	Optional
Auto Tune	Up to 8 temperature points
Battery	Super capacitor (no battery)
Operating system	Linux based
I/O Expander module (optional)	
Voltage	24 Vdc
Thermocouple	4 x thermocouple input
Input	4 x digital input
Relay	3 x change over relay

1.2 Technical Terms

Due to the complex nature of temperature control, this manual uses technical terms.

In the table below is a list of some of the terms used within this manual, alongside their explanation:

Term	Description
Setpoint	The target temperature the furnace or oven is trying to reach (°C/°F/K)
Over-Temperature Protection (Optional)	A system to prevent the product or process being damaged if the temperature has increased above a temperature specified by the user (over-temperature setpoint). Power to the heating elements is stopped until either the temperature of the product drops below the over-temperature setpoint, or the user manually increases the over-temperature setpoint
Over-Temperature Setpoint (Optional)	The temperature at which the over-temperature protection system triggers
Heating element	The electrically powered heating device used within the product (furnace or oven).
Thermocouple	A thermoelectric device for measuring temperature
PID	Proportional Integral Derivative - the mathematical control system used by the controller
Program	A series of instructions that tell the controller how to behave. A program is divided into sections called "segments".
Segment	A section of a program. A program can have 99 individual segments. There are 4 different segment types that can be configured. The segments define how the controller behaves when a program reaches that segment. The last segment of a program must always be an "End" type
Guaranteed Soak	A system to ensure that the samples within the product are heated to the setpoint temperature for the entire duration of a dwell segment.
Ramp Rate	The number of degrees (°C /°F / K) the temperature should increase per minute or hour (dependent on "Ramp Units").
Ramp Units	Used to define whether the temperature should increase at **X**°C per minute or **X**°C per hour

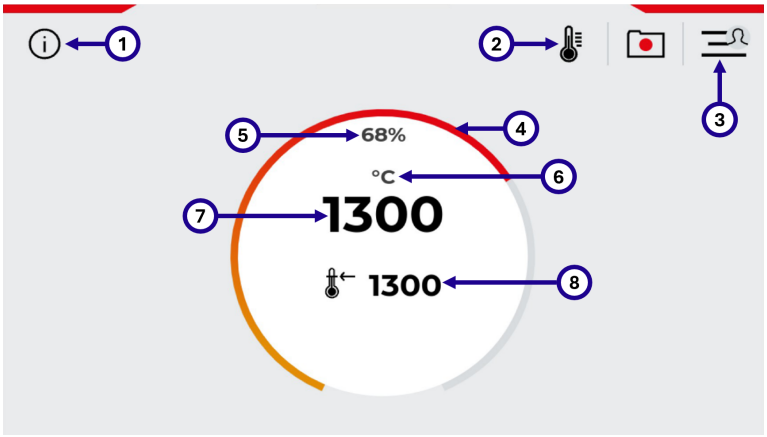
1.3 Navigation

The AriesPlus has numerous buttons and fields designed to be operated with your finger or a stylus or with a mouse when remote connected on a computer.

- You may:
  - Open a keyboard for entering alphanumerical values
  - Open a menu with more options
  - Progress to a new screen

Note: If using a stylus or pointer to operate the AriesPlus, **ALWAYS** ensure that it is blunt to avoid damaging the screen.

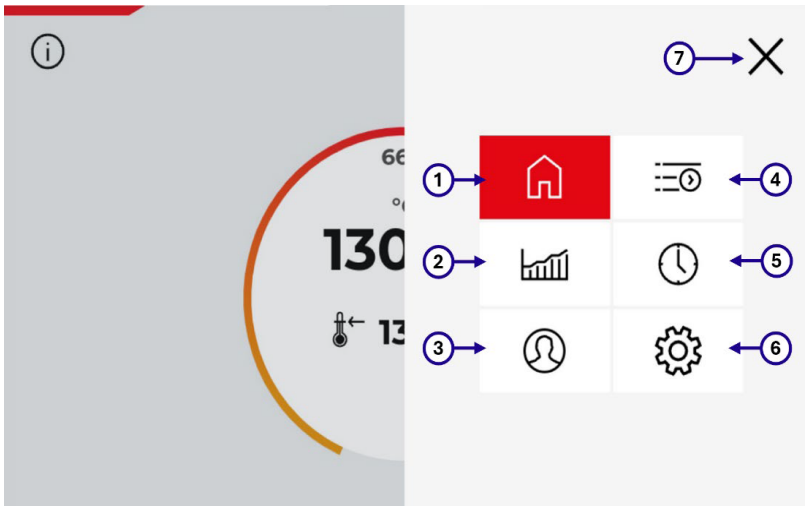
The AriesPlus display will default to the home screen:



1	To Service Information screen
2	To Over-Temperature screen (Optional)
3	To Navigation Menu
4	Power Output Indicator
5	Power Output Percentage
6	Temperature Units
7	Actual Temperature
8	Setpoint Temperature

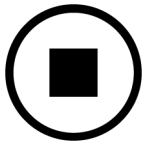
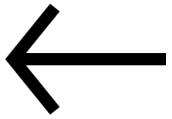
Home Screen: Single Zone Controller

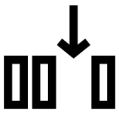
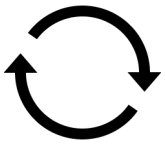
To access other screens and functionality options, press the 'burger menu' button on the top right-hand corner of the screen to open the navigation menu:



Navigation Menu

1	To Home screen
2	To Data Logging screen
3	To User Login screen
4	To Programming screen
5	To Time Scheduler screen
6	To Setting screen
7	Close Navigation Menu

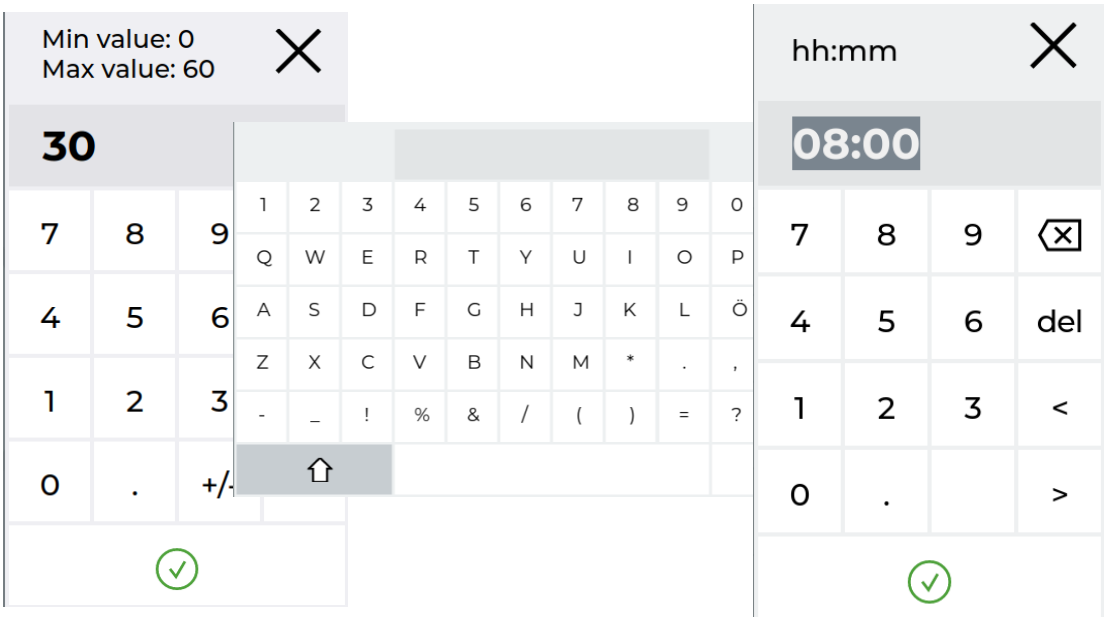
Icon	Function	Icon	Function
	Open Navigation menu		To Program Select screen
	Close		To Time Scheduler screen
	To Service Information screen		Stop program
	To Over-Temperature Alarm screen (if fitted)		Run program
	Over-Temperature Alarm icon (displays when the Over-Temperature alarm is triggered)		Pause Program
	Reset Over-Temperature Alarm		List View
	Return to previous screen		Graphical View
	Set load setpoint (cascade control only)		Cooling fan
	Set setpoint		Door lock

	Accept		Solenoid valve
	Operator		Insert new segment
	Supervisor		Delete
	Admin		Cycle Count-down
	Service		Auto Tune Running
	Settings		Additional actions
	Recording		Download
	Text Search		Favourite Pro-gram
	Duplicate a program		Rename a pro-gram
	Export a program		Import a pro-gram

	New program		End of program
	Active program segment		Detail settings
	Selection switch 'ON'		Selection switch 'OFF'
	Scheduled program/set point running		Password required
	Inserting a program segment		

1.4 On-Screen Keyboards

Various on-screen numerical and alphanumerical keyboards are available to input values into the AriesPlus.



Numeric Keyboard | Alphanumeric Keyboard | Numeric Time/Date Keyboard

⌫	Backspace - delete a value to the left of the cursor
del	Remove all values already input into the keyboard
✓	Confirm and apply the input values
✕	Close the keyboard
⇧	Switch between capital and lowercase letters
<	Move the cursor to the left
>	Move the cursor to the right

2 User Levels

There are 4 user levels within the AriesPlus. These user levels control access to functionality within the controller via permissions.

The default user level is **Operator**.

Operator

Supervisor

Admin

Service - Only used by Carbolite personnel

Functionality	Permissions			
Login / Change User Level				
Access Home Screen				
Change Setpoint (including Over-Temperature Setpoint)				
Run Pre-configured Programs				
Edit / Create Programs				
Edit Controller Language, Date, and Time Settings				
Edit Controller Settings				
Ethernet Communication				
Access to Offset-Calibration settings				
Set Manual Data Logging				
Download Manually Logged Data				
Set Automatic Data Logging				
Download Automatic Logged Data				
Edit Data Logging Settings				
Access Configuration and Hardware Settings				

2.1 Changing User Level

To change user level:

1. Go to the **LOGIN** screen
2. Select your desired user level by pressing the upper field. A pop-up window will appear giving you the option of "Supervisor", "Admin", or "Service". The window will close automatically when you have selected your user level.
3. Press the lower field to open the keyboard.
4. Enter the password for the selected user level.
5. Press the "Accept" icon.
6. Press "LOGIN", and the screen will update to indicate the new current user level.

Note: The current logged in user level is displayed on the Navigation Menu icon.

2.2 User Level Passwords

All passwords are case-sensitive.

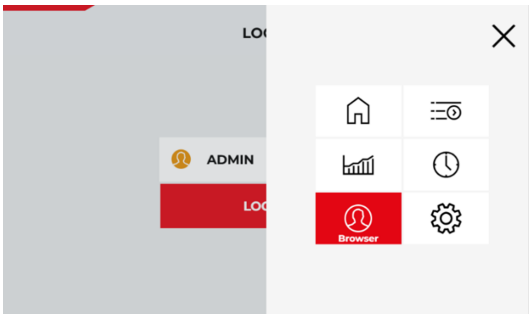
User	Password
Supervisor	23TT
Admin	67SS
Service	Please contact Carbolite Service for any operations that require controller calibration or software updates.

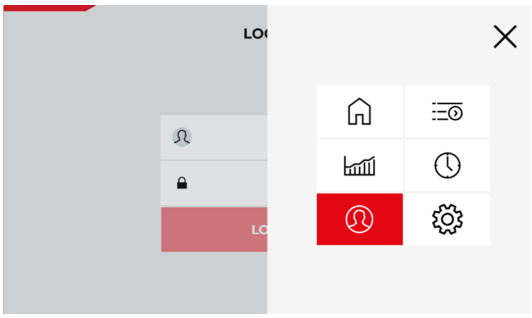
To return to the default user level (Operator), go to the **Login** screen and press the "Logout" button.

Note: The AriesPlus will automatically return to the Operator user level if your product is switched off or left unused for 10 minutes.

2.3 User Level Remote Access

The AriesPlus can be viewed from the web browser and can be accessed remotely by users to monitor processes, see section 12. The browser and controller will display 'BROWSER' under the user login icon to indicate when the user is logged in as Admin or Supervisor. The browser access does not allow users to set temperature or to start/pause/stop a program.





Browser access (Admin user level) Browser access (operator user level)

3 Simple Temperature Control

The AriesPlus can be used as a programmer or as a simple temperature controller.

The controller has been configured so that it cannot heat above the maximum stated temperature for the product you have purchased.

To set a setpoint temperature:

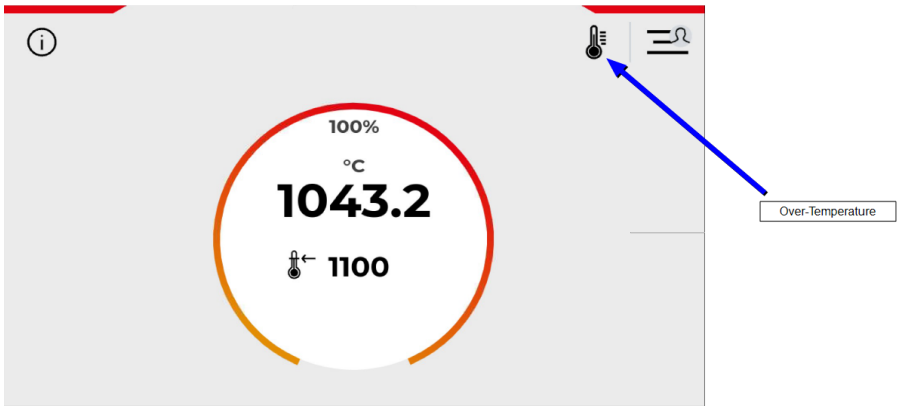
1. Go to the **HOME** screen.
2. Press on the small number on the lower part of the display beside the "set setpoint" icon. This will open the on-screen keyboard.
3. Type in the temperature you wish the product to reach.
4. Press "Accept" icon to close the keyboard.
5. The product will then begin to heat (or stop heating, depending on the temperature you have set). The "Power Output Indicator" will show the amount of power being used by the heating elements to achieve the setpoint.

Setting a Setpoint Temperature

4 Over-Temperature Protection (if fitted)

The AriesPlus can be fitted and configured to include over-temperature protection.

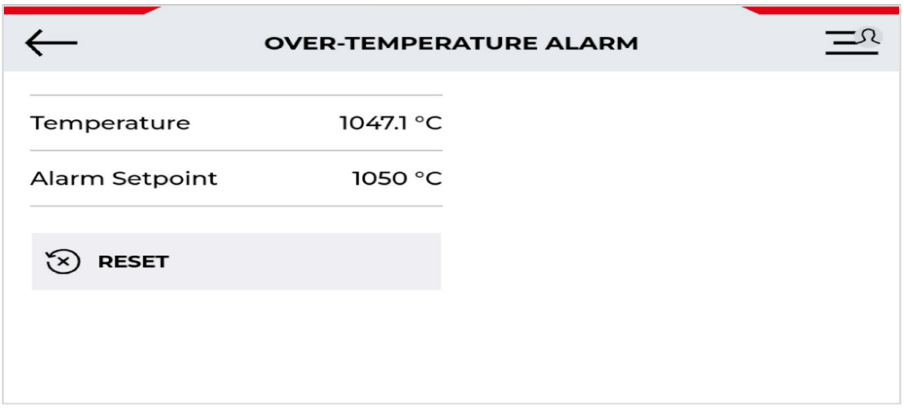
If over-temperature protection is fitted, the "Over-Temperature Alarm" icon will be visible at the top of the **Home** screen. This will allow the user to access the **OVER-TEMPERATURE Protection** screen and set an over-temperature setpoint.



Home Screen with Over-Temperature Option

To set an over-temperature setpoint:

1. Press the "over-Temperature Alarm" icon on the **Home** screen. This will open the 'over-Tempeature Alarm 'screen.



2. Press on the Alarm Setpoint. This will open the on-screen keyboard.

3. Type in the desired temperature.

4. Press the green tick icon.

> **Note**: If the product reaches this temperature, the over-temperature alarm will be triggered and the power to the heating elements will be stopped, preventing the product from heating until the over-temperature controller is 'reset'. The over-temperature can not be reset until the actual temperature is below the over-temperature setpoint.

Press the "Back" button to return to the **Home** screen.

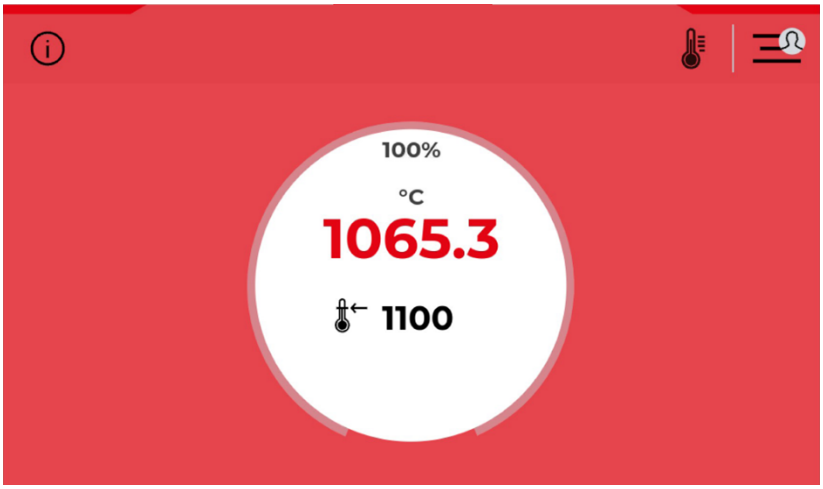
4.1 Over-Temperature Alarm

If the temperature of the product increases above the over-temperature setpoint, the

over- temperature alarm will be triggered. The home screen flashes red, the home screen temperature display changes to red text, and the heating is switched off.

If the GUI was displaying any other screen it will change to show the flashing home screen.

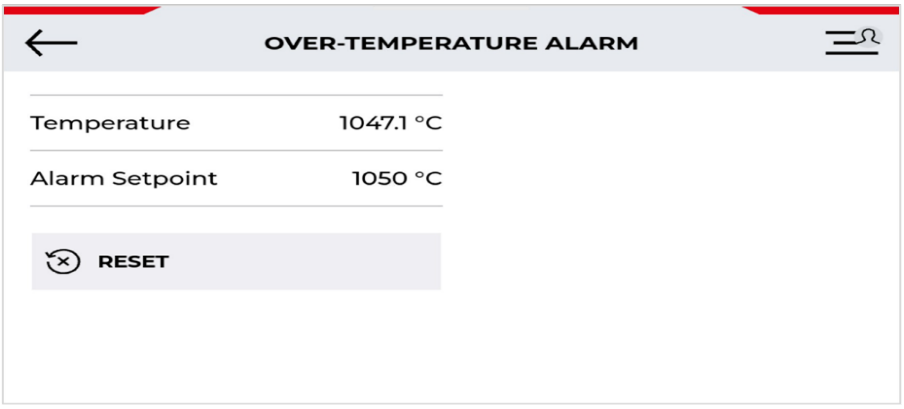
Note:If the over-temperature alarm is activated the following actions will also take place: • The single setpoint will be automatically set to zero • If a program was running it will be reset.



To stop the screen flashing red press the "Over-Temperature Alarm" icon to go to the Over-Temperature Alarm screen and then press the ‘Accept’ button.

The home screen temperature display remains in red text and the over-temperature alarm icon continues to flash red.

To ‘reset’ the over-temperature alarm the temperature must fall below the over-temperature alarm setpoint. Press the press the "Over-Temperature Alarm" icon to go to the Over-Temperature Alarm screen and then press the ‘Reset’ button.



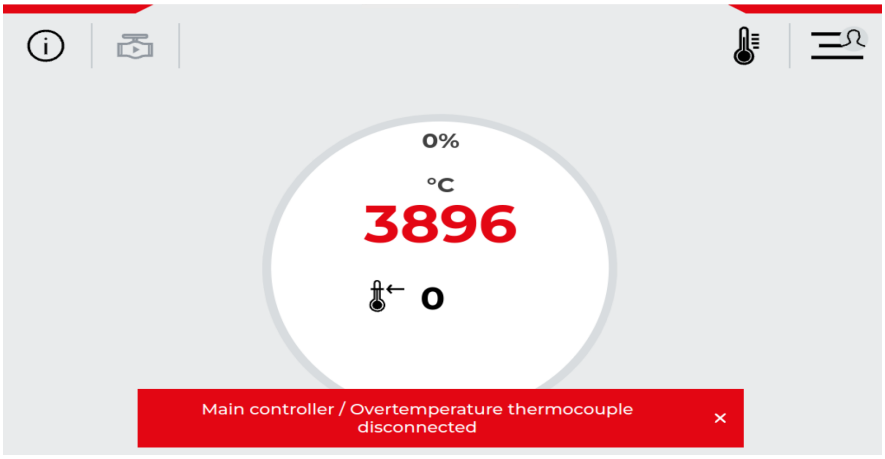
The display will return to the home screen, the temperature display and over-temperature will revert to their normal colour, and the heating is switched on.

5 Thermocouple Failure

5.1 Control Thermocouple

If a thermocouple becomes disconnected, or fails, the controller will display the "Thermocouple disconnected" as an error message, indicating that the thermocouple is unable to read a temperature.

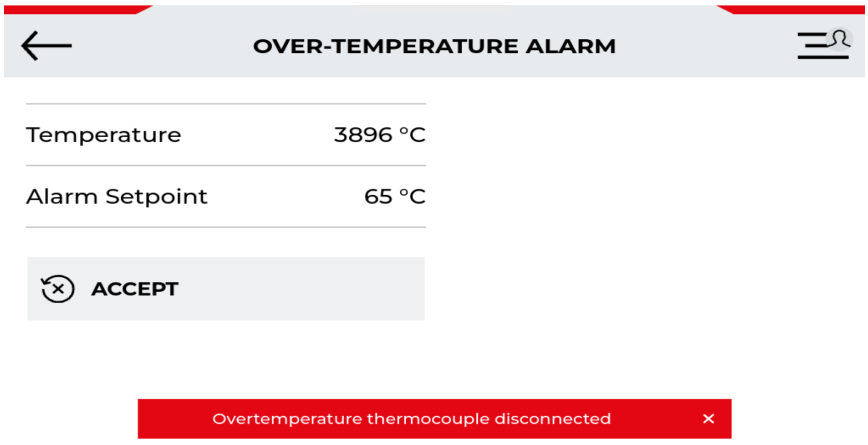
The controller will automatically switch to display a "high point" and further heating will be prevented.



Control Thermocouple Error Display

5.2 Over-Temperature Thermocouple (if fitted)

If an over-temperature controller is fitted and the thermocouple becomes disconnected, or fails, then the controller will go into an over-temperature alarm state. This is triggered because the thermocouple reading automatically defaults to the "high point" temperature, which will always be above the maximum value for the over-temperature setpoint. It is possible to acknowledge the alarm, but the product will not continue heating until the thermocouple is reconnected or replaced.

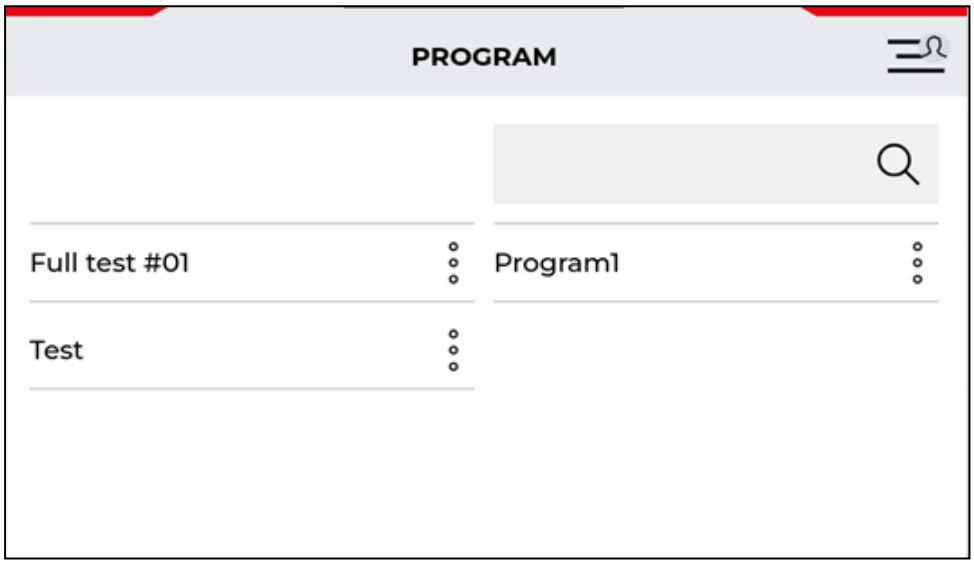


Over-Temperature Thermocouple Error Display

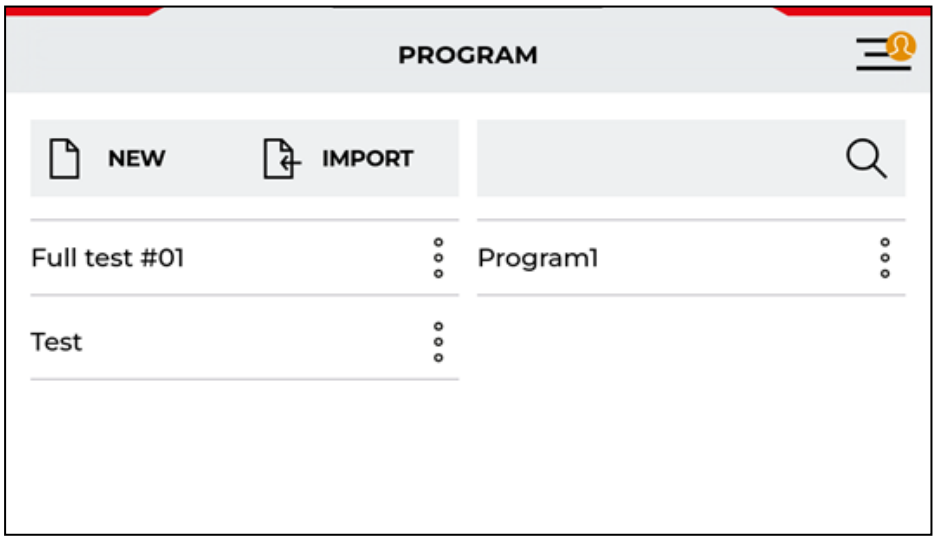
6 Programming

6.1 Overview

The **PROGRAM** screen shows a list of programs available for all users to run or schedule. To create or edit new programs, you must first log in as **Supervisor** or **Admin**.Use the main menu 'Programs' icon to navigate to programs. The display will automatically open the graphical view of the last program run or edited. Press the 'folder' icon in the top left to navigate to the 'program screen'



Programming Screen when Logged in as Operator



Programming Screen when Logged in as Admin

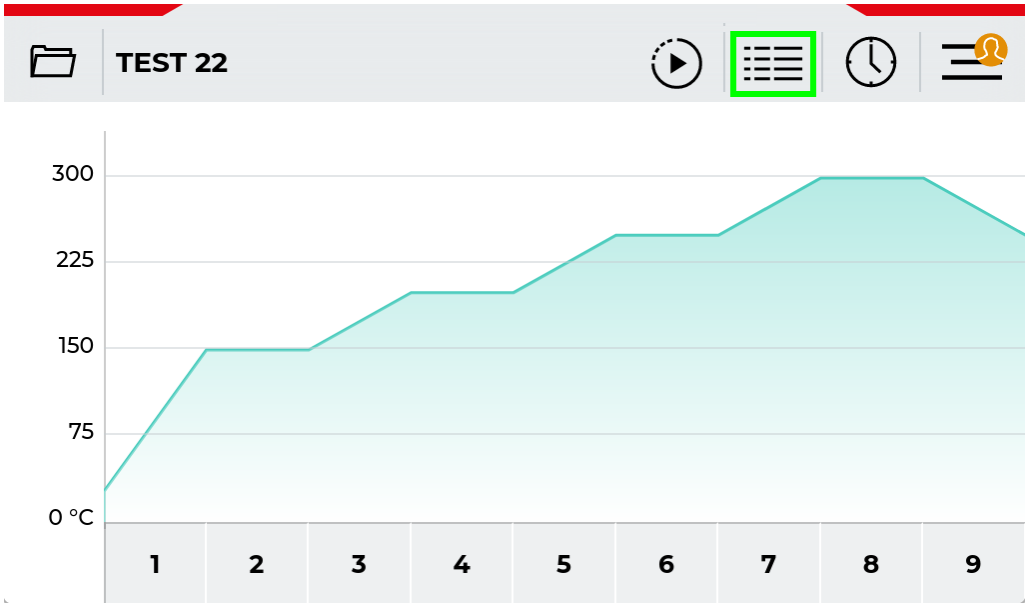
6.2 Viewing a Program

Programs can be viewed and edited in either a graphical or a list view. The default display format is the graphical view, which provides the operator with a visualisation of the temperature profile.

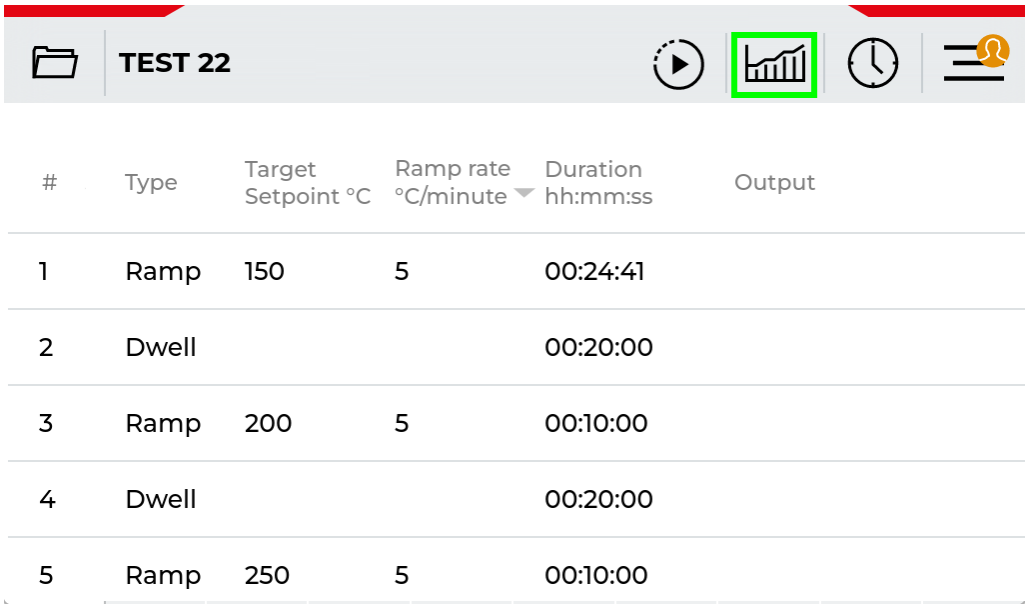
Note: When navigating the Program screen, the last accessed program opens in the graphical view.

The operator can switch between the graphical view and list view by pressing on the corresponding icon at the top of the screen.

Note: When logged in at **Supervisor** or **Admin** level, a short press on the segments within the program view will open up the segment edit panel, and a long press will display the '+' insert segment icon.To dimiss the '+' insert segment icon make a long press on one of the segments.



Graphical View (with List View icon highlighted)



#	Type	Target Setpoint °C	Ramp rate °C/minute	Duration hh:mm:ss	Output
1	Ramp	150	5	00:24:41	
2	Dwell			00:20:00	
3	Ramp	200	5	00:10:00	
4	Dwell			00:20:00	
5	Ramp	250	5	00:10:00	

List View (with Graphical View icon highlighted)

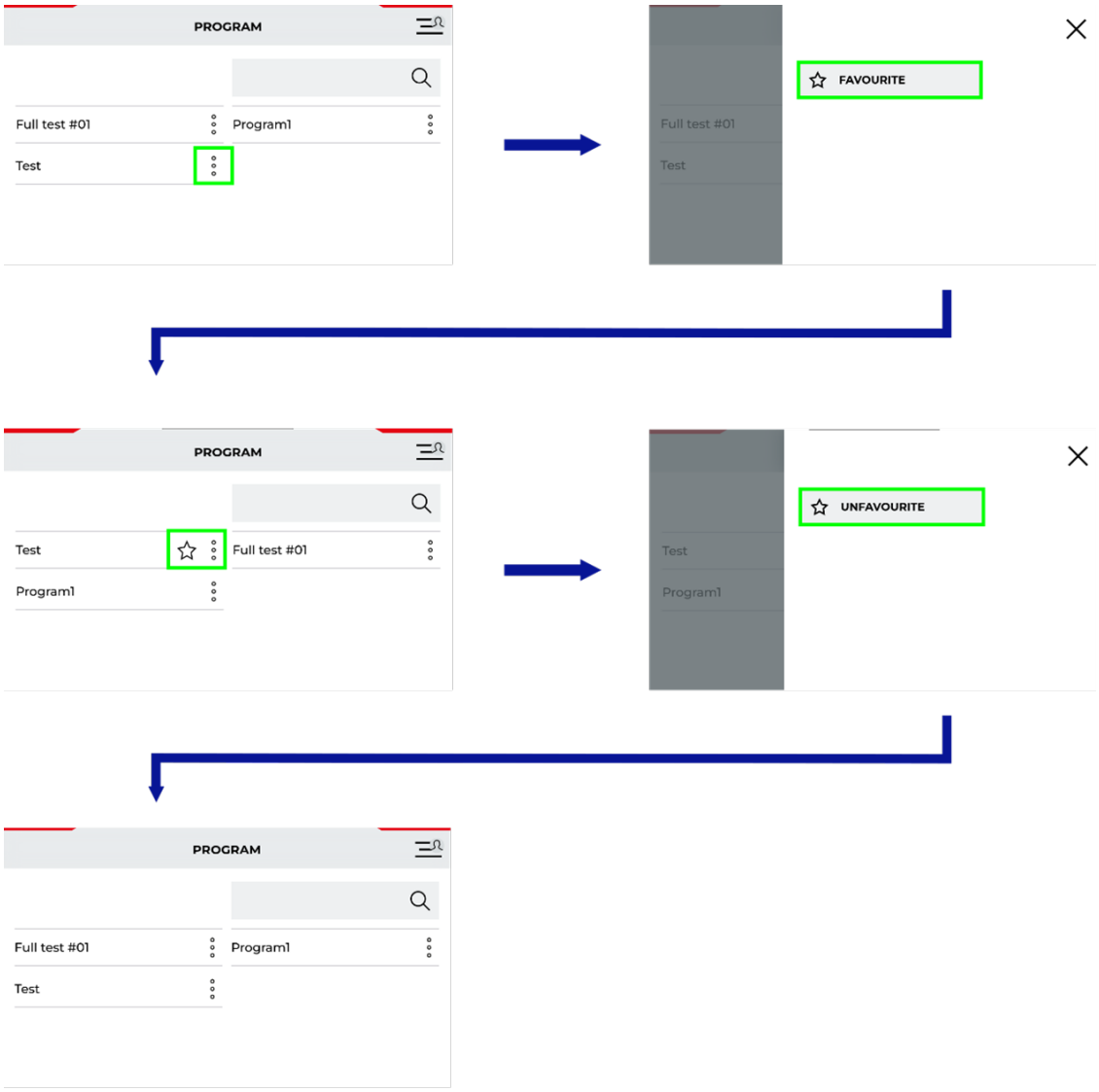
6.3 Favourites

If a program is used regularly or needs to be quickly identified, it is possible to "Favourite" it. Favouriting a program will mark it with a star icon and move it to the top of the list of programs on the **PROGRAM** screen.

To mark a program as a favourite:

1. Press on the "additional actions" icon beside the name of the program you wish to favourite. A menu of additional options will open.
2. Press on the star icon. The menu will close and a star will appear next to the program, and the program will be promoted to the top of the program list.

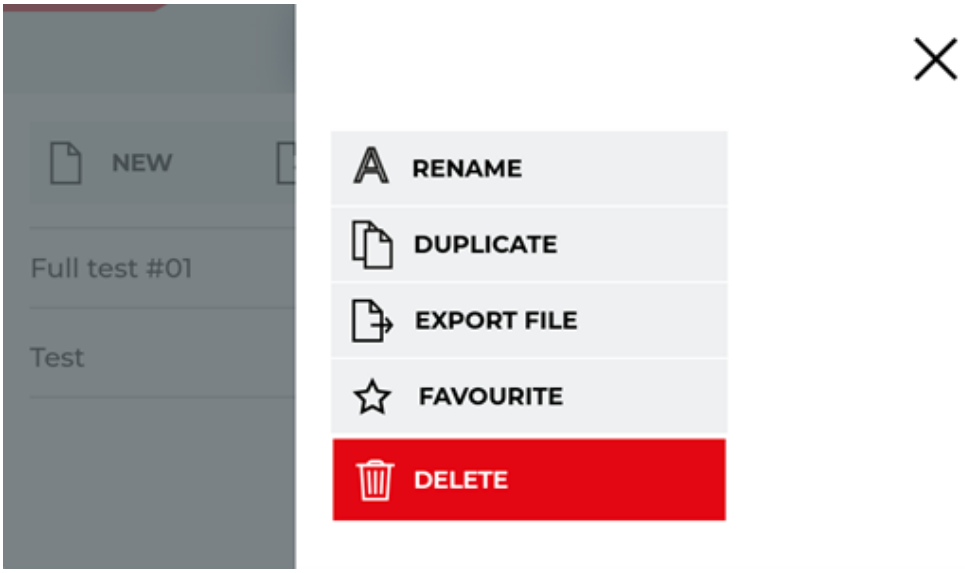
Note: If you need to "unfavourite" the program, repeat these steps. The text beside the star icon will change from "FAVOURITE" to "UNFAVOURITE" depending on which action you are performing.



"Favouriting" and "Unfavouriting" a Program (Operator Level)

6.4 Additional Actions

When logged in at Supervisor or Admin level, pressing the "additional actions" three dots icon beside a program name will open a menu showing a list of actions that can be performed for that program.



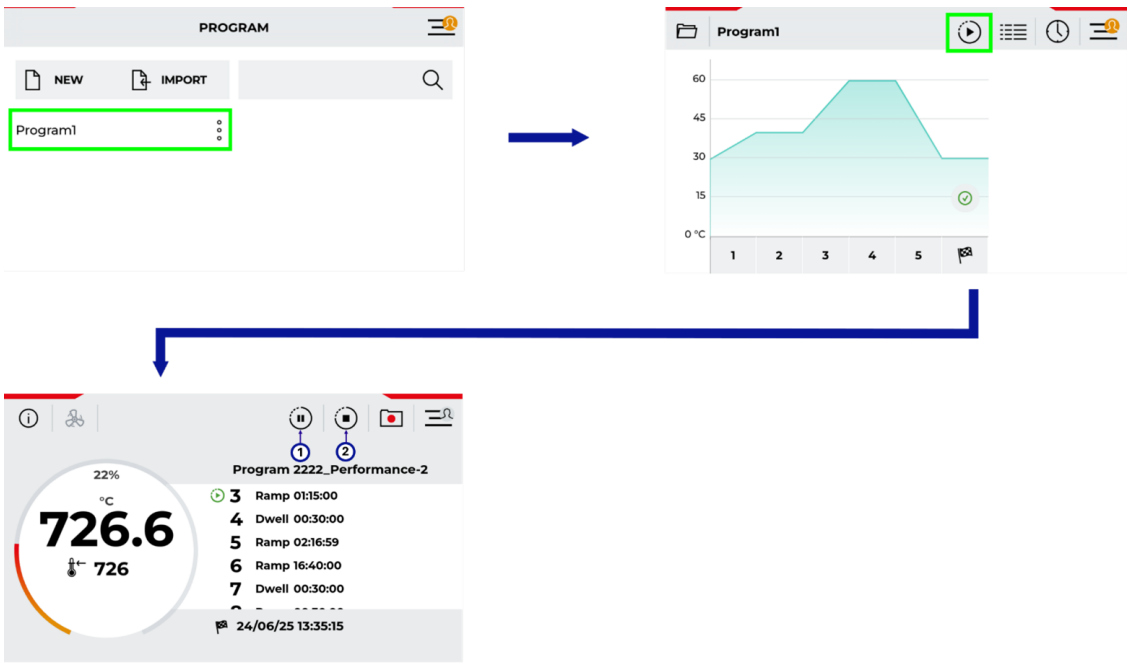
Additional actions menu panel (Supervisor or Admin level)

Action	Use
RENAME	When this action is pressed, an on-screen keyboard will appear, allowing the user to rename the program.
DUPLICATE	When this action is pressed, a copy of the program will appear in the program list. The duplicated program will be appended with "**_Copy1**". If required, the duplicate program can be renamed.
EXPORT FILE	When this action is pressed, details of the parameters of the program are exported to a **.csv** file. • If exporting directly from a product, insert a USB stick into the USB port, and the **.csv** file will be saved to the USB stick. • If you are viewing the controller remotely from another device via a web browser, the **.csv** file will be downloaded directly to the remote devices download folder.
FAVOURITE	When this action is pressed, a star icon will appear beside the program name, and the program will be promoted to the top of the program list.
DELETE	When this action is pressed, the program will be deleted. Once deleted, the program cannot be recovered.

6.5 Running a Program

To run a pre-configured program:

1. Go to the **Program** screen.
2. Press on an available program from the list. This will open the selected program as a graphical view.
3. Press the "Run Program" icon at the top of the screen.
4. You will be taken to the **Home** screen. Here you can view the program status and estimated completion time /date.
5. If at any point it is necessary to pause the program, press the "Pause Program" icon at the top of the **Home** screen. Press the "Run Program" icon to restart the program.
6. If at any point it is necessary to stop the program, press the "Stop Program" icon at the top of the **Home** screen.
7. When the program is complete:
    - If the end segment is set to "dwell", then the controller will maintain the temperature reached during the previous program segment, and the operator must stop the program manually.
    - If the end segment is set to "reset", then the controller will automatically reset to function as a simple temperature controller, and resume control at the previously set setpoint.



Running a Program (Single-Zone)

6.6 Scheduling a Program

For details on how to schedule a program, please refer to section "Time Scheduler" on page 48.

6.7 Creating a Program

Note: To create or edit a program, you must first be logged in at the **Supervisor** or **Admin** user level. See section " User Levels" on page 14 for instructions on how to change user level.

To create a program:

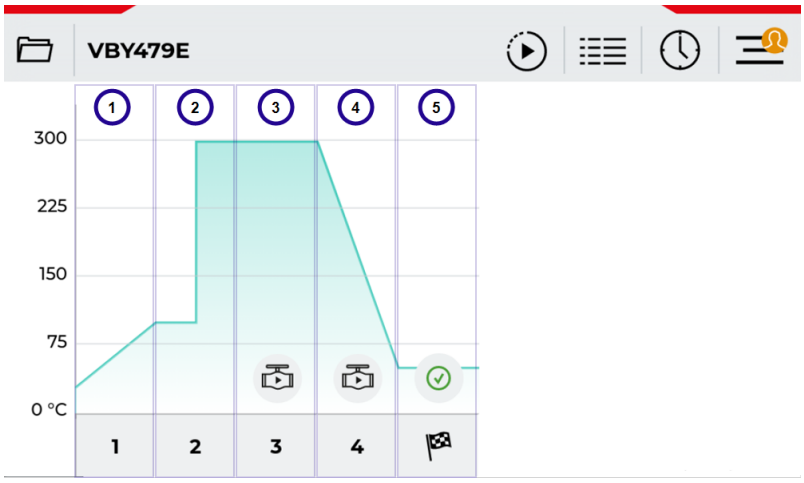
1. Go to the **Program** screen.
2. Press the "New Program" icon. An on-screen keyboard will open.
3. Input the desired program name, then press the "Accept" icon. A new program will be created, and the controller will open the segment edit panel for the first segment within the program.
4. Press on the "Segment Type" field to select a segment type.

Note: The segment type will determine the configurable options for each segment.

5. Configure the required settings for the segment, then press the "Accept" icon to confirm the settings.
6. To add a new segment press the "Insert New Segment" icon within the segment edit screen. This will open a menu that allows you to choose whether you wish to insert the segment before or after the current segment you have open.
7. A segment can be also be added by pressing and holding any of the segments in the graphical or list view until '+' symbols appear between each segment. Press on the '+' symbol to insert a new segment. The '+' symbols can be cancelled by pressing and holding any of the segments.
8. Configure as many segments as required.
9. The last segment of the program will always be an "End" segment type.

Note: The full graph in the program can be viewed by swiping on the graphical view. The end of the program is shown with a flag symbol on the last segment.

6.8 Segment Types

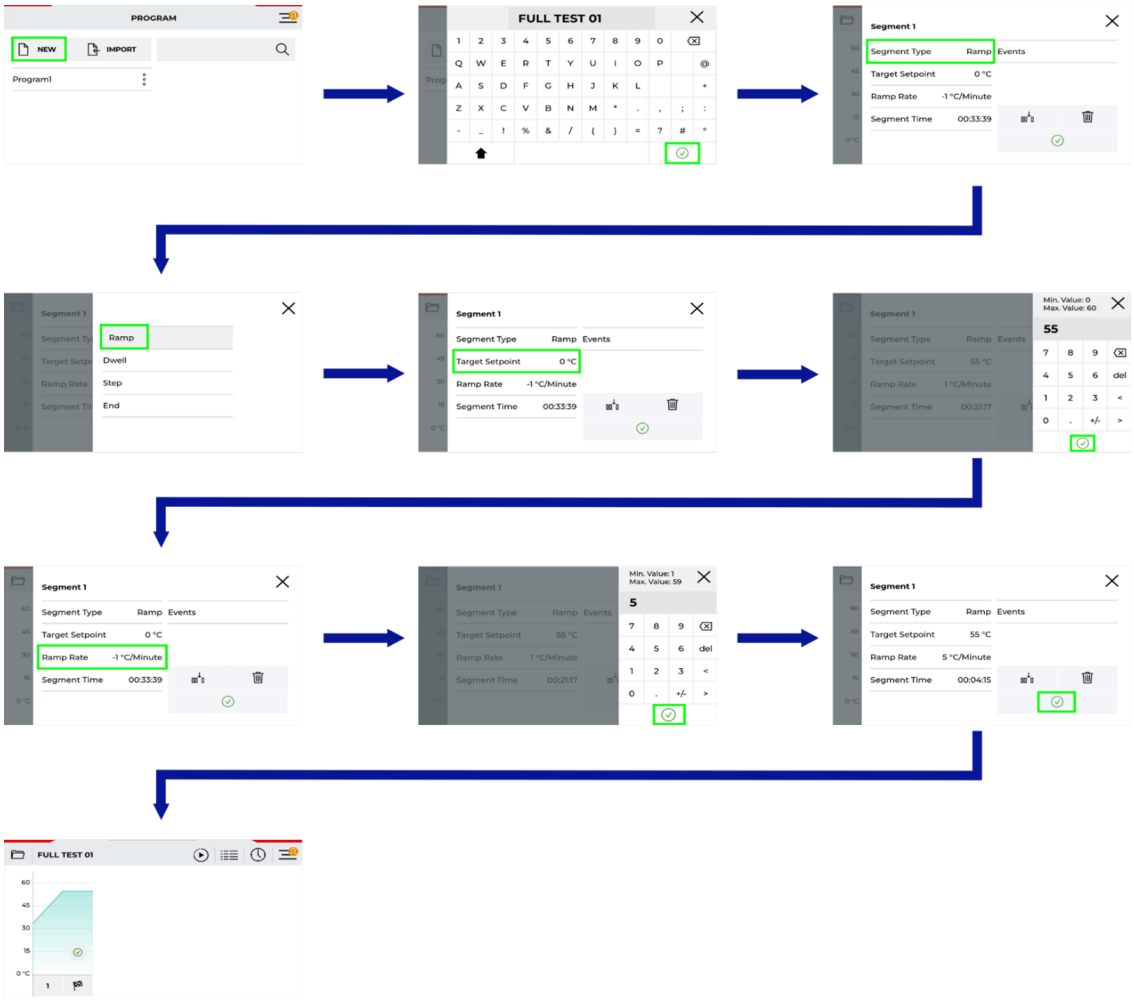


1	Ramp Segment
2	Step Segment
3	Dwell Segment
4	Ramp Segment
5	End Segment

Segment Type	Parameters	Description/ Use
End	End Type	Select how you want the program to end: • **Dwell** - maintain the temperature achieved by the previous segment until the user manually intervenes to reset the program • **Reset** - stop the program automatically and return to basic controller mode
	Events (optional)	Select an “event” to occur during that segment e.g. turn on a solenoid valve, turn on a fan etc.
Ramp	Target Setpoint	The desired temperature the controller should reach for that segment.
	Ramp Rate	The number of degrees (°C /°F / K) the temperature should increase/decrease per minute/hour. When entering a ramp rate values between 1 and 59 are allowed. If slower ramp rates are required please use the segment time to enter the desired segment time. In this way lower ramp rates are possible. **Note:**The ramp rate unit can be set for each program. This is done by pressing on the small triangle symbol beside the "Ramp Rate" parameter while on the "List View" for that program. The ramp rate unit can be set to either °C/Minute or °C/Hour.

	Segment Time	The amount of time the segment should be active for. The controller will adjust this value automatically when a "Target Setpoint" and "Ramp Rate" is set. The time can be entered as hh:mm:ss or dd:hh:mm. Press the small triangle symbol at the top of the number keypad to swap between hh:mm:ss (maximum value = 23:59:59) or dd.hh.mm (maximum value = 98:23:59) **Note:** If a "Target Setpoint" has been set but a "Ramp Rate" has not yet been set, the operator can input a "Segment Time", and the controller will automatically calculate the "Ramp Rate" value.
	Events (optional)	Select an “event” to occur during that segment e.g. turn on a solenoid valve, turn on a fan etc.
Dwell	Segment Time (Duration)	The length of time that the controller should maintain the temperature achieved by the previous segment in the program. Press the small triangle symbol at the top of the number keypad to swap between hh:mm:ss (maximum value = 23:59:59) or ddd.hh.mm (maximum value = 150:00:00)
	Events (optional)	Select an “event” to occur during that segment e.g. turn on a solenoid valve, turn on a fan etc.
	Guaranteed Soak	Used to ensure that the samples within the product are heated to the setpoint temperature for the entire duration of the dwell segment. If guaranteed soak is activated, then the operator must set a "Soak Tolerance" value. **Note:** When "Guaranteed Soak" is enabled, the dwell segment may be active for longer than the "Segment Time" value specified to ensure the samples reach and maintain the required temperature for the specified dwell time. If at any point the actual temperature falls outside the parameters of the guaranteed soak, then the controller will restart the guaranteed soak period once the temperature returns within those parameters. **Values:** • **Band** - The guaranteed soak will activate when the setpoint temperature is within the range determined by the Soak Tolerance value. Example: If the "Setpoint Temperature" is 500°C, and the "Soak Tolerance" is set to 5°C, then the guaranteed soak will activate when the temperature is between 495°C and 505°C.

		• **Low** - The guaranteed soak will activate when the actual temperature is within a number of degrees below the setpoint temperature, as determined by the "Soak Tolerance" value. Example: If the setpoint temperature is 500°C, and the "Soak Tolerance" is set to 5°C, then the guaranteed soak will be active when the temperature is 495°C and above. • **High** - The guaranteed soak will activate when the actual temperature is within a number of degrees above the setpoint temperature, as determined by the "Soak Tolerance" value. Example: If the setpoint temperature is 500°C, and the "Soak Tolerance" is set to 5°C, then the guaranteed soak will be active when the temperature is 505°C and below. • **Off** - Guaranteed soak is not activated.
	Soak Tolerance	Determines the temperature(s) at which the guaranteed soak function is active in relation to the setpoint.(see guaranteed soak description above).
Step	Target Setpoint	The desired temperature the controller should reach for that segment.
	Events (optional)	Select an “event” to occur during that segment e.g. turn on a solenoid valve, turn on a fan etc.



Creating a Program

6.9 Editing Program

To edit program you have already configured:

1. Go to the **Program** screen

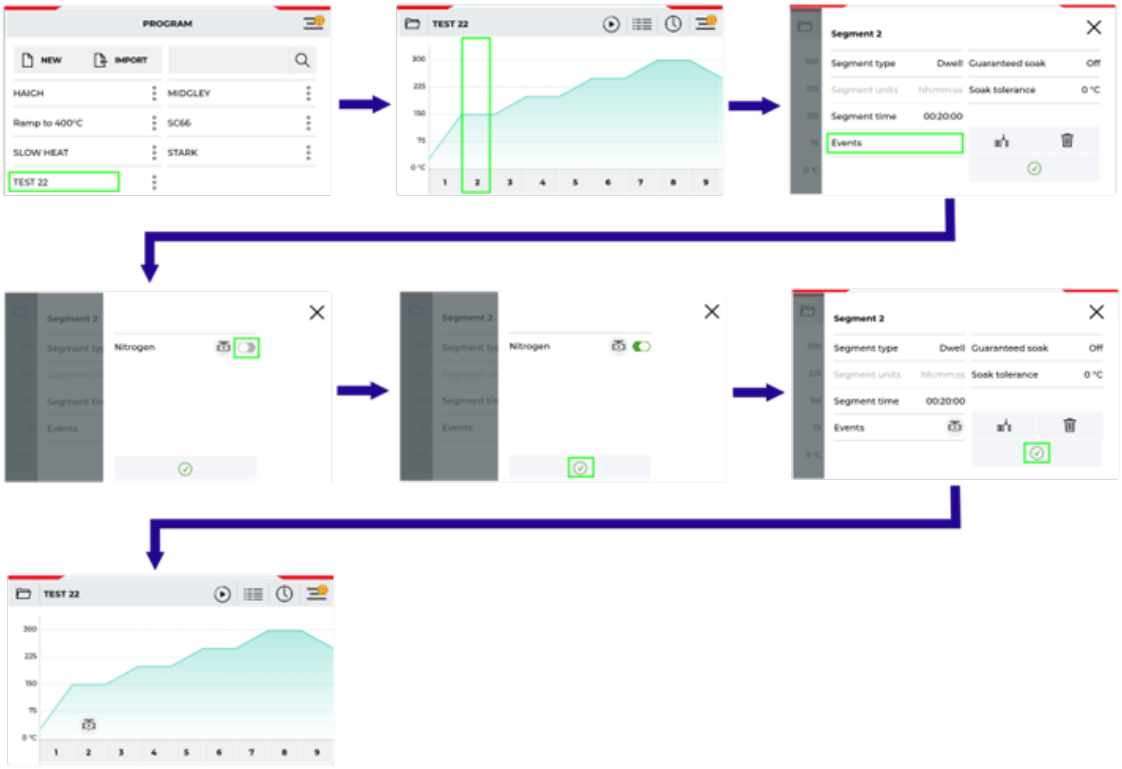
2. Press on the name of the program you wish to edit. This will open the selected program as a graphical view.

3. On the graph , press on the segment you wish to edit to open the segment edit panel.

4. Make adjustments to the segments within the program , or delete them as required.

Note : It is not possible to delete "End" segments.

Note : To edit a program in the list view, follow the same method as described for editing it in the graphical view.

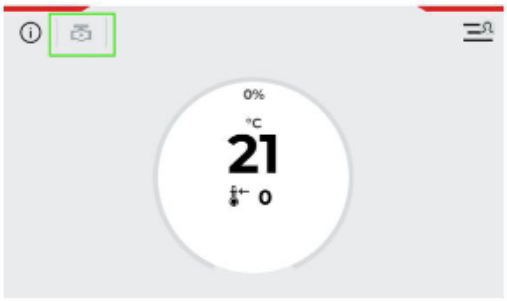


Editing an existing program to activate a segment output event (in graphical view)

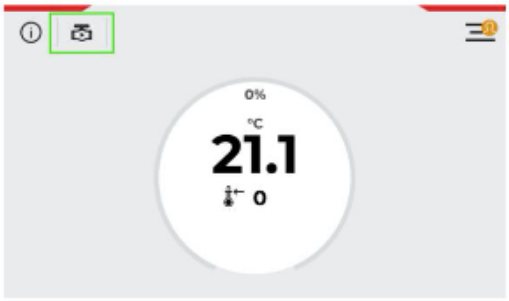
6.10 Program Events

If the product was ordered with an “Advanced inert gas package, with solenoid valve switched by program segment output” the AriesPlus controller will be configured to allow the solenoid valve to be switched open or closed in each segment of a program.

An icon to represent the solenoid valve is shown in the upper left of the home screen. When the valve is closed it is show in grey, and when it is open it is shown in black.



Solenoid valve closed

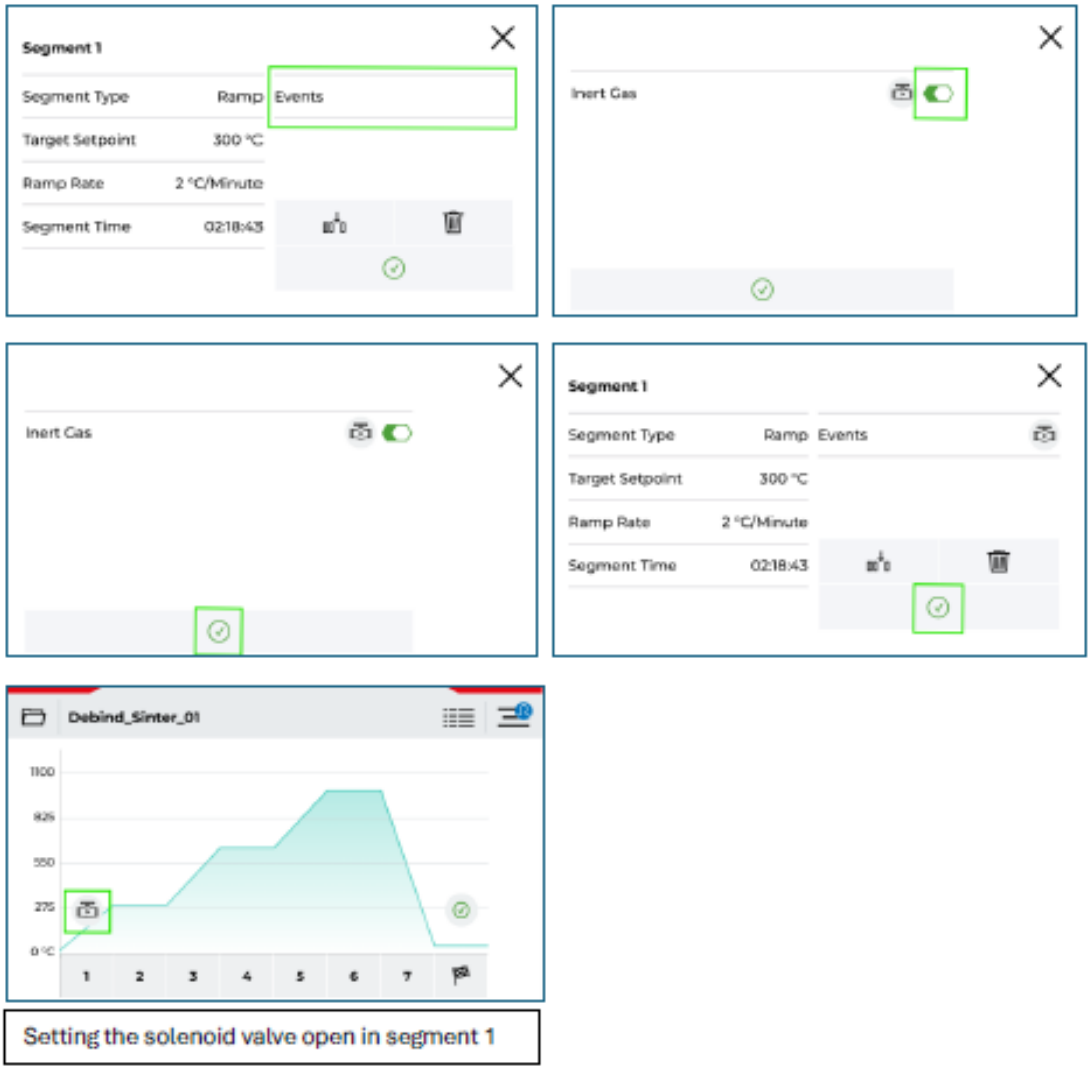


Solenoid valve open

When creating and editing programs the solenoid value can be set to be open or closed in each segment.

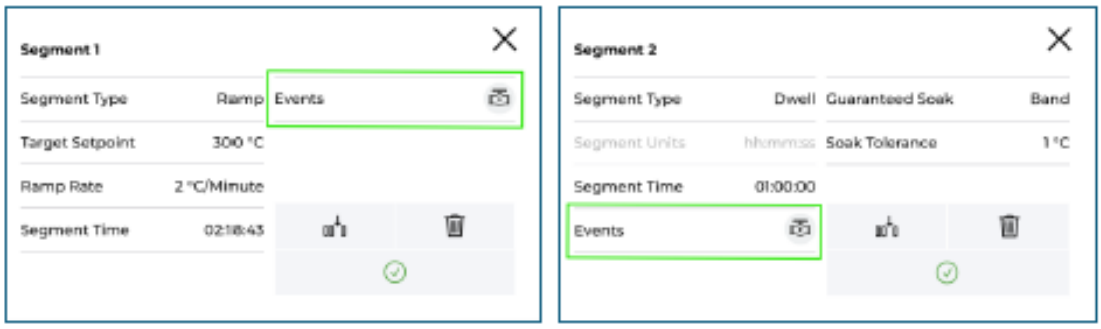
Solenoid valve closed in all program segments

Solenoid valve open in all program segments



Setting the solenoid valve open in segment 1

For different segment types the 'Events' button is in different positions on the screen.



7 Importing & Exporting Programs

7.1 Import

Note: Program data can only be imported when logged in at **Supervisor** or **Admin** level.

To import a preconfigured program using a USB stick:

Note: Make sure the program on the USB stick is saved in the root directory.

1. Insert the USB stick containing the program into the USB port on the product control panel
2. Go to the **PROGRAM** screen.
3. Press on "IMPORT". A menu panel will appear.
4. Press on "Program Name" and input the name you wish to give the imported program.
5. Press on "Ramp Rate Unit" and input the ramp rate unit for the program you wish to import. This will be either "°C/Minute" or "°C/Hour".
6. Press on "Browse USB Drive" to search for the program in the roots directory. When the controller identifies the program on the USB stick, the "VERIFY" button will become available.
7. A program list opens to make sure the right program is being imported.
8. Scroll to the bottom of the program list and press on "Import" to import the program. The program will then appear in the program list .

Importing a Program using a USB stick.

To import a preconfigured program remotely using a browser.

1. Go to PROGRAM screen.
2. Press on "IMPORT". A menu panel will appear.
3. Press on "Program Name" and input the name of the program.
4. Press on "Ramp Rate Unit" and input the ramp rate unit for the program you wish to import. This will be either "°C/Minute" or "°C/Hour".
5. Press on “Find File” to find the file remotely.
6. Press on “Verify” when the file is selected.
7. A program list opens to make sure the right program is being imported.
8. Press on "Import" to import the program. The program will open in the graphical view.

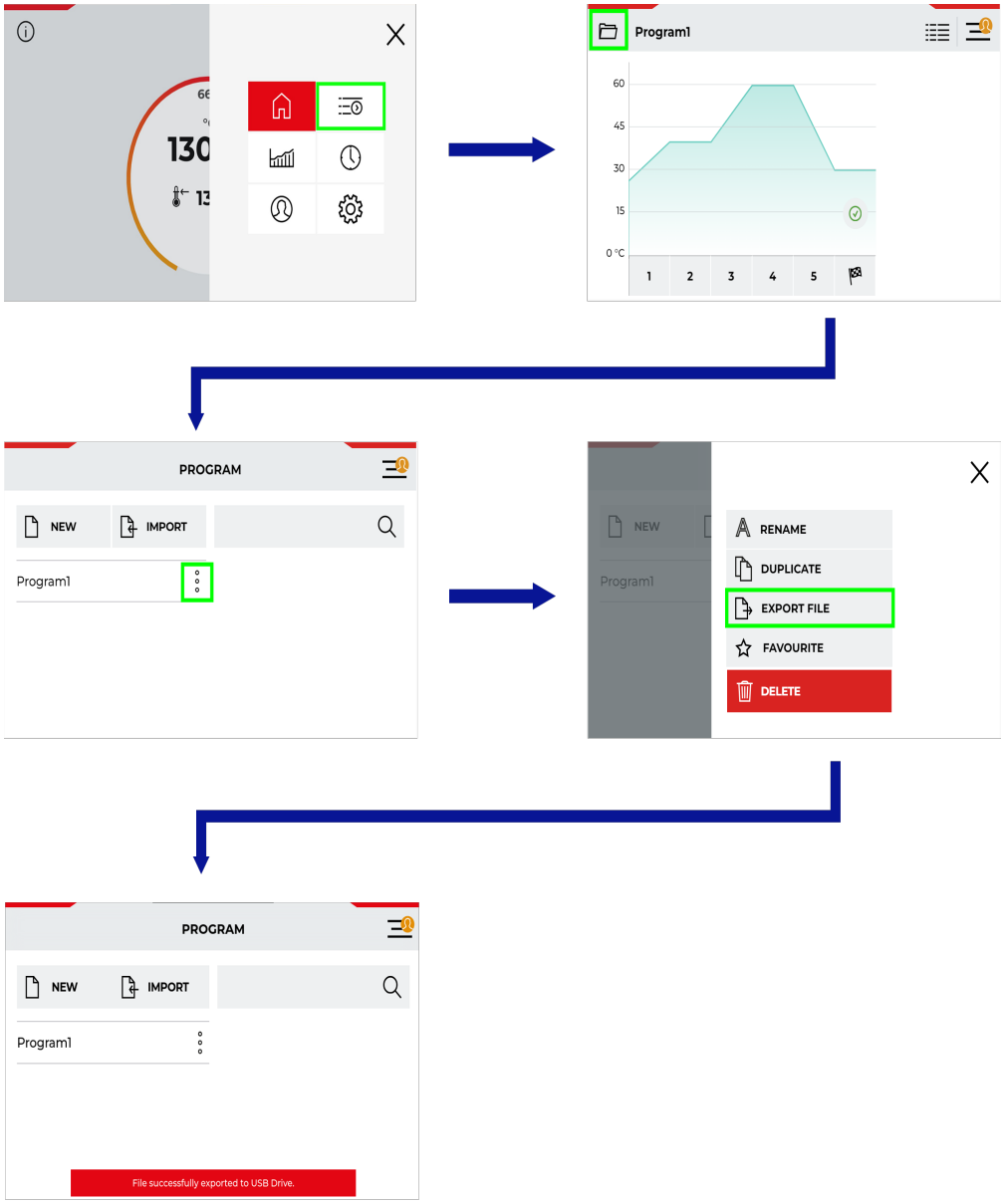
Importing a program from a remote device

7.2 Export

Note: Program data can only be exported when logged in at **Supervisor** or **Admin** level.

To export a preconfigured program using USB stick:

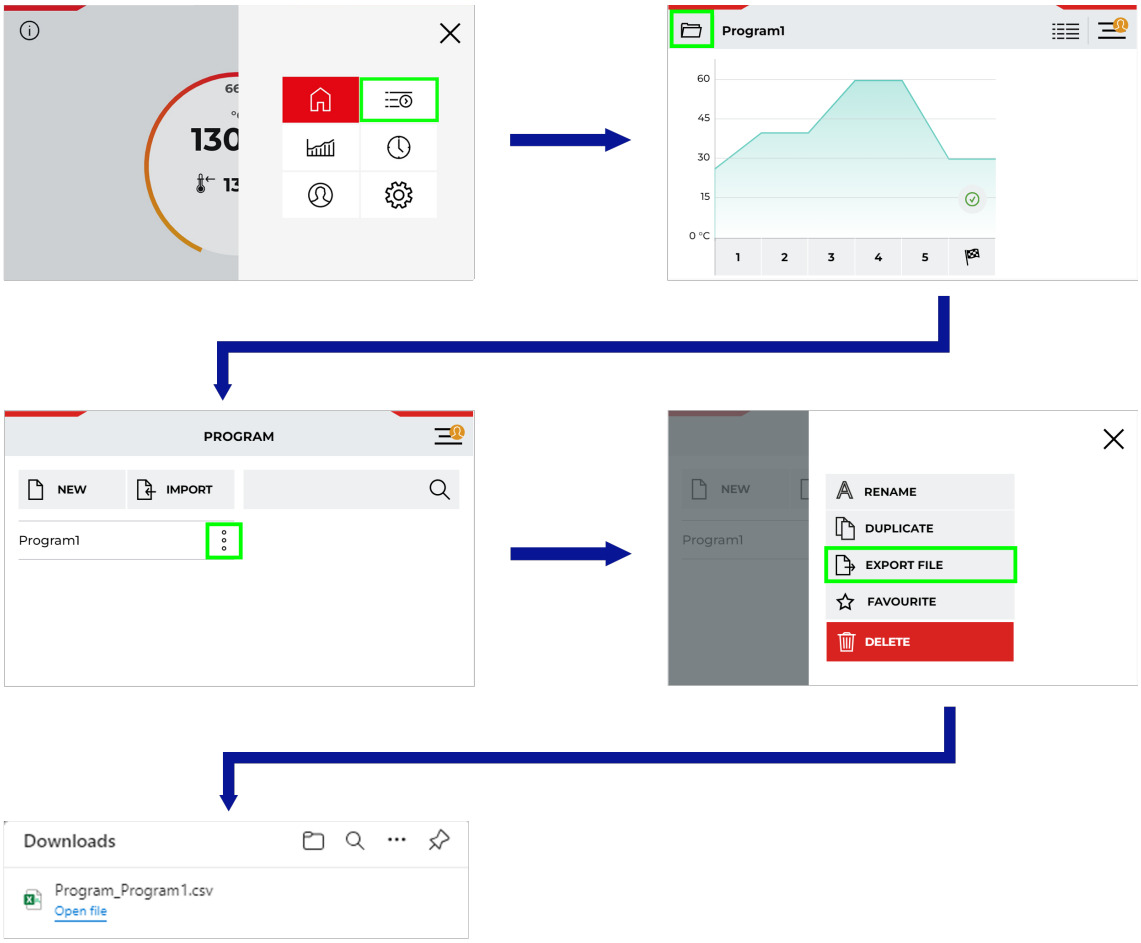
1. Insert a USB stick into the USB port on the product control panel
2. Go to the **PROGRAM** screen.
3. Press on the "additional actions" icon beside the program you wish to export. This will open an on-screen menu.
4. Press "EXPORT File". The program data will be converted to a **.csv** file, and exported to the USB stick. **Program_** will be added to the beginning of the filename.



Exporting a program to a USB stick

To export a preconfigured program remotely using a browser:

1. Go to the PROGRAM screen.
2. Press on the "additional actions" icon beside the program you wish to export. This will open an on-screen menu.
3. Press "EXPORT File". The program data will be downloaded as a .csv file. Program_ will be added to the beginning of the filename.



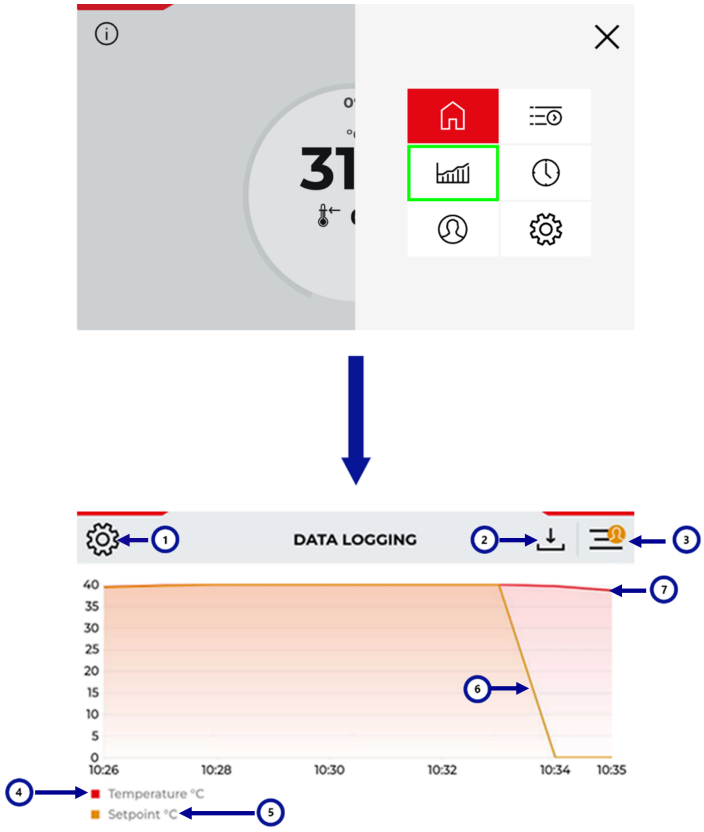
Exporting a program to a remote device

8 Data Logging

The data logging function allows users to log the setpoint, actual temperature, relay status, and download test data from the AriesPlus to a **.csv** file.

All logged data is stored locally on the controller and must be exported manually by the operator.

To access Data Logging screen, press on **DATA LOGGING** screen using the menu panel. User can zoom and drag the displayed graph to access the data for the entire Time Span.



1	Data Logging Settings
2	Download
3	To Navigation Menu
4	Show / Hide Tem-perature
5	Show / Hide Setpoint
6	Setpoint
7	Temperature

Note: The controller display chart will update once every 30 seconds. This display update is not related to the logging rate. Pinch zoom can be used to zoom in on a particular period of time. Zoom can also be used in the browser view by using a wheel mouse. Once zoomed in the chart can be swiped left or right.

IMPORTANT: The chart view will display up to 48 hours of data (if the controller stays on) and then would be wiped from the memory. This chart view provides a live view of the process and is independent from the data logging. The chart view is not saved in the controllers memory. The chart will start to show data once the power is switched on, up to a maximum of 48 hours (see 'time span')

8.1 USB Requirements

IMPORTANT: Any USB stick used with the AriesPlus **must be formatted in FAT32**.

8.2 Data Logging Settings

Data logging to the controller's memory begins when the user enables the data logging function in the data logging settings. There are two options for data logging:

1. Manual Logging : The user can start and stop logging by turning the 'Logging' switch on or off. When logging is activated, the user will be prompted to enter a batch identifier. This identifier will be included with each data log entry, allowing data for a specific batch to be easily downloaded.

2. Automatic Logging (Auto Record Mode) : By enabling the 'Auto Record Mode' switch, logging will automatically begin each time a program is run. In this mode, the program name is included in each data log entry.

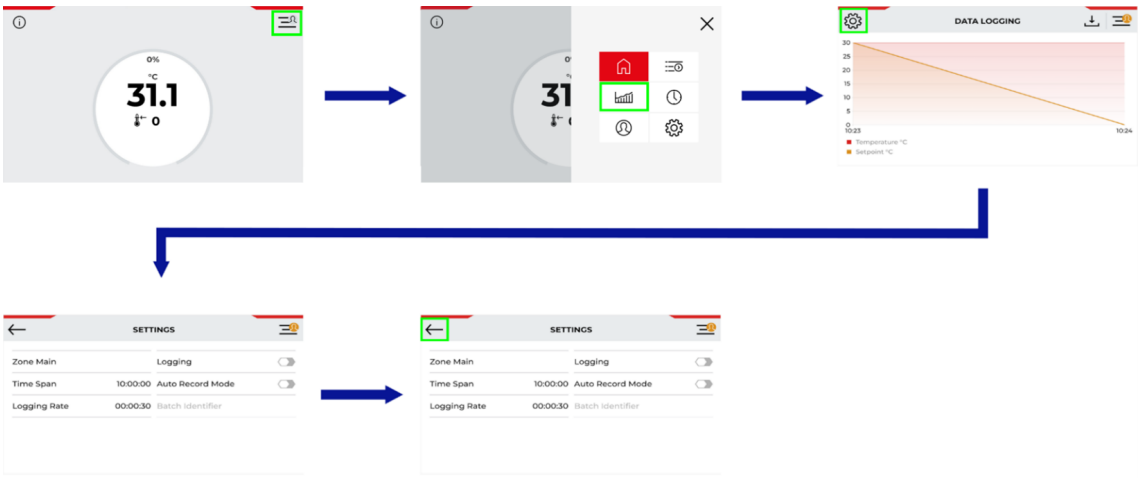
Logged data can be downloaded either by selecting a batch identifier or by specifying a date and time range.

Note: The user must be logged in as Supervisor or Admin to change the logging settings.

To change the data logging settings:

1. Go to the **DATA LOGGING** screen.
2. Press the "Settings" icon to open the **Data Logging Settings** screen.
3. Once you have set the parameters, press the "Back" button to returnto the **DATA LOGGING** screen.

Note: If a user with "Operator" permissions is scheduled to perform the data logging, it is recommended that you now logout to prevent any unwanted amendments to the data logging settings.



The following table shows the available parameters:

Parameter	Description
Zone Main	Shows the heating zone.
Time Span	The amount of elapsed time shown on the data logging graph. • hh : mm : ss **Note:** The maximum time span value is 48 :00 :00
Logging Rate	The interval of time between consecutive data log records. The minimum value is 10 seconds which is entered as 00 :00 :10.
Logging	Switches the data logging on and off. Once switched on logged data is saved to the controller memory. The user will be prompted to enter a batch identifier when logging is switched on.
Auto Record Mode	Automatically switches the data logging on when a program is run, and switches off the data logging when a program is stopped. The program name is written to each data log record.
Batch Identifier	The user is prompted to enter a batch identifier when manually switching on the data logging. The batch identifier will be part of the file name of the .csv file if downloading a batch. **Warning:** Only use alphanumerical characters in the file name. Any "Special Characters" (e.g. & ! #) may cause errors when the log file is downloaded to a computer.

8.3 Recording Data

Automatic Data Logging

Automatic data logging only functions when a program is running. The logging starts when the program starts, and ends when the program is reset.

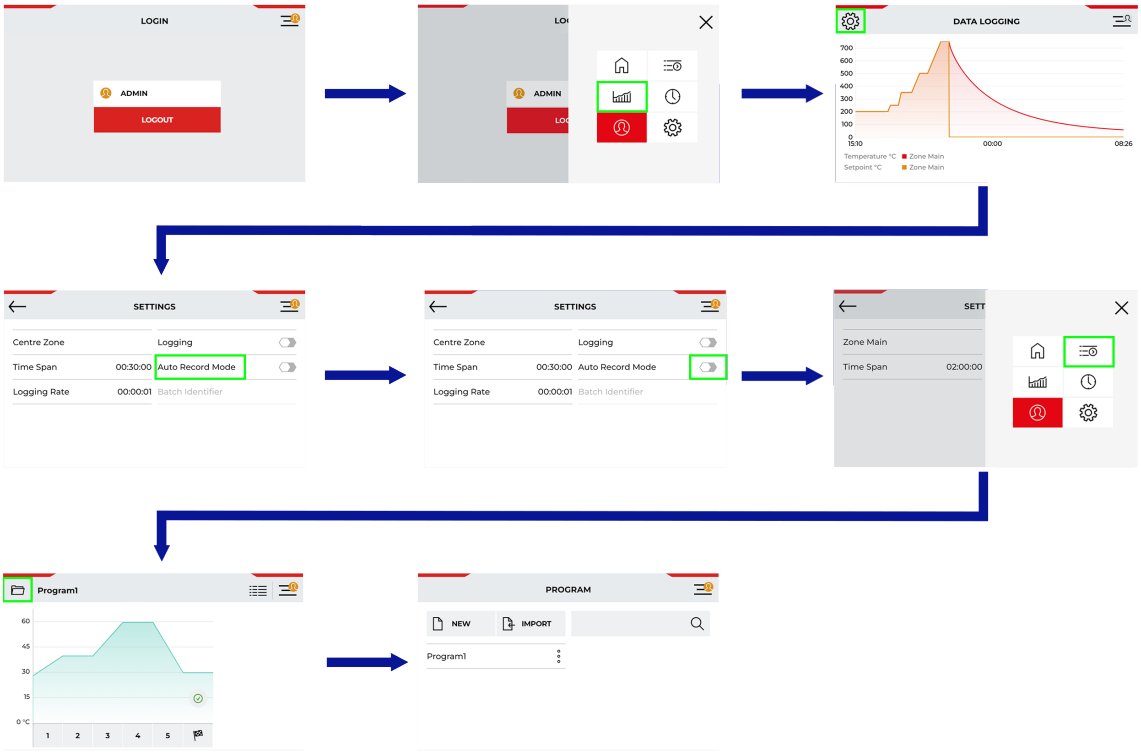
To log data automatically:

1. Login at the"Supervisor" or "Admin" user level
2. Go to the **Data Logging** screen
3. Press the "Settings" button to access **Data Logging Settings** screen
4. Turn on Auto Record Mode by pressing the hexagonal switch.
5. Go to the **Programming** screen and run, or schedule, the program you wish to record.

The data will now be automatically recorded.

Note: The record button will be displayed on the HOME screen to show the program is being recorded.

Important: The Auto Record Mode switch needs to be ON before running the program to preserve the data logging for the entire program.



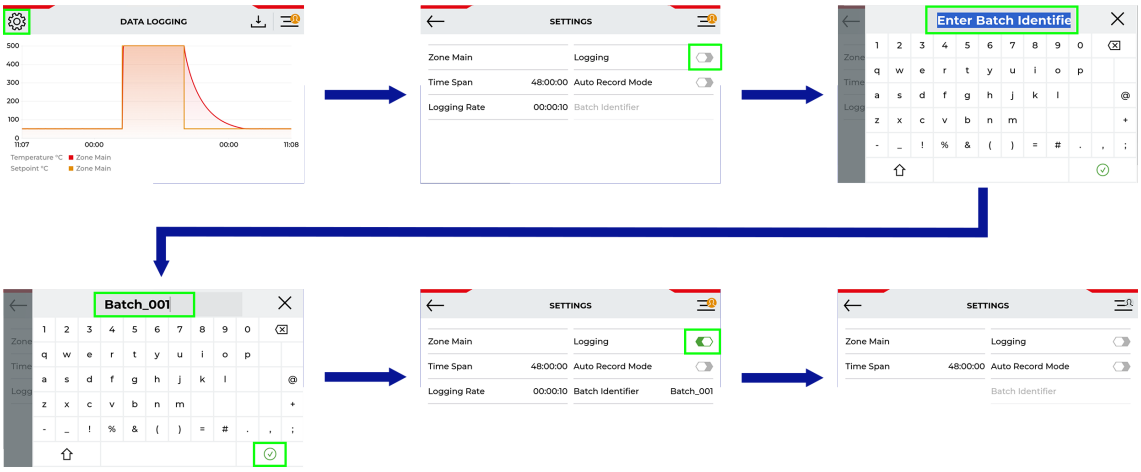
Setting Automatic Data Logging - User Level: Admin

8.4 Manual Data Logging

Manual data logging can be used at any time when a program is running, or if the AriesPlusis being used as a simple temperature controller.

To log data manually:

1. Go to the **Data Logging View** screen
2. Press the "Settings" button to access Data Logging Settings screen.
3. Turn on Logging by pressing the hexagonal switch. Automatic Data Logging is now disabled.
4. The controller will prompt the user to add a Batch Identifier when Logging switch is ON. An on-screen keyboard will allow user to customize the file name for the batch.
5. To stop data logging, press the switch again to turn it OFF.



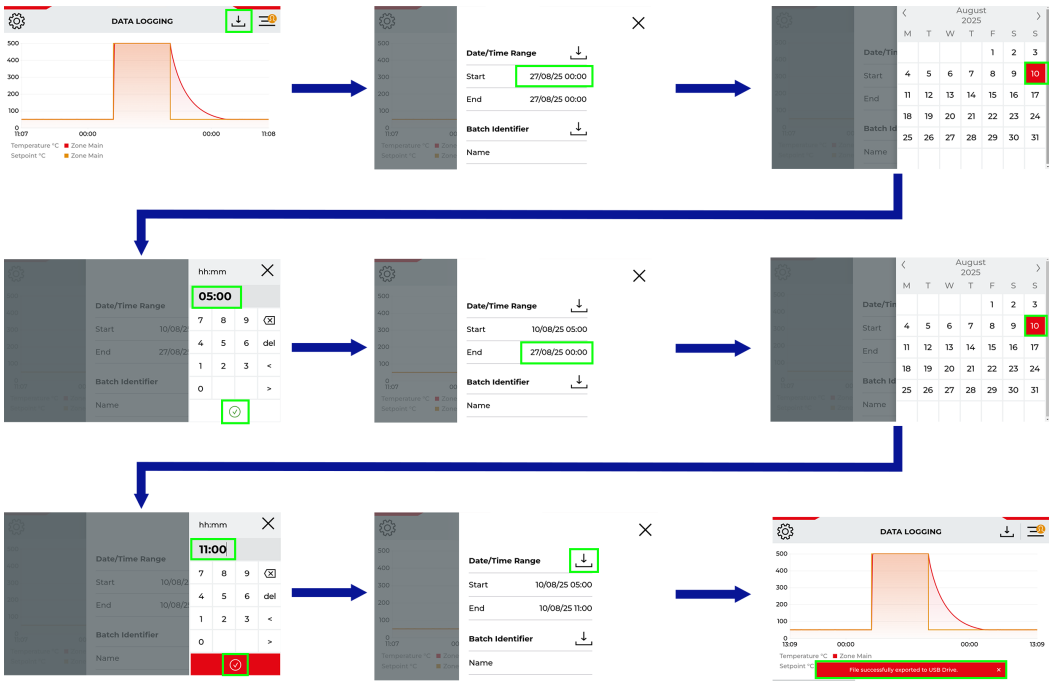
8.5 Downloading Data to USB

Note: The user must be logged in as **Superviosr** or **Admin** to download the data logs

To download data logs to the USB:

Insert a USB stick into the USB port on the product control panel.

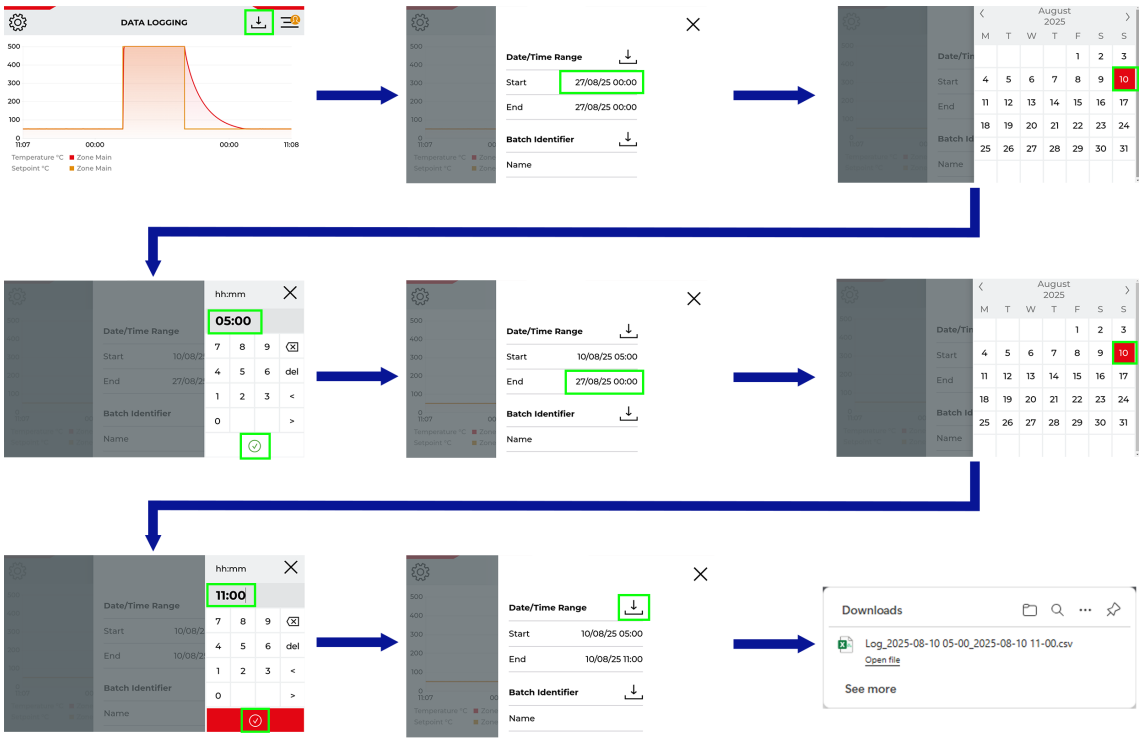
1. Go to the **Data Logging** screen.
2. Press the download button.
3. User can download the data logs according to the "Date/Time Range" or by "Batch Identifier".
4. Data will be converted to a .csv file and exported to the USB stick. Batch_ will be added to to the beginning of the filename if using the batch identifier download option.



Downloading data logs to a USB

To download data logs on a remote device:

1. Go to the **Data Logging** screen.
2. Press the download button.
3. User can download the data logs according to the "Date/Time Range" or by "Batch Identifier" by pressing on each button.
4. Press on download to download the data logs as a .csv file. Batch_ will be added to the beginning of the filename if using the batch identifier download option.



Downloading data logs on a remote device

9 Opening Logged Data

The AriesPlus exports logged data in a comma separated file format (**.csv**), which can be opened on various operating systems using standard spreadsheet software.

Note: The following instructions and screenshots depict a Windows 10 operating system with Office 365 installed. Other versions of Windows and Microsoft Office may vary in appearance.

To access the data once it has been downloaded to the USB stick:

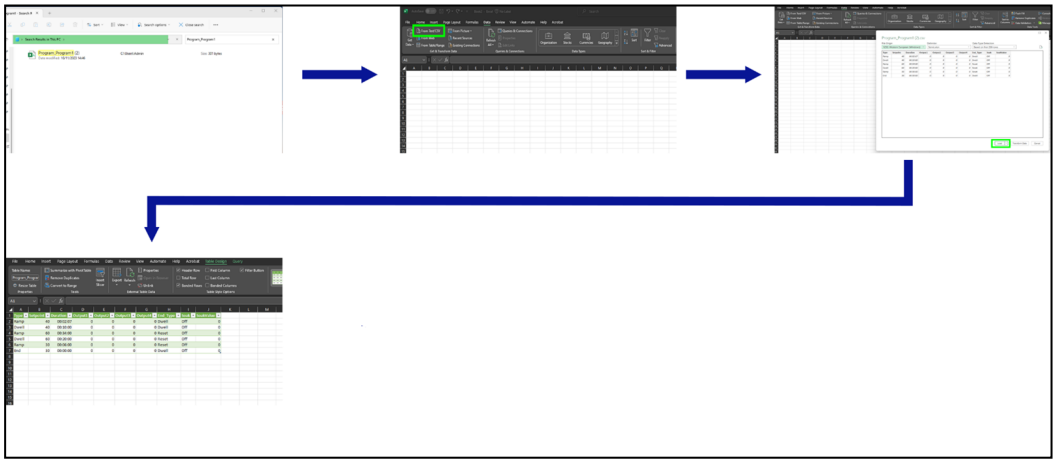
1. Remove the USB stick from the product
2. Insert the USB stick into a computer
3. Open the file structure and find the **Batch_.csv** file.
4. It is recommended that you save this file to a secure location on your computer.
5. Open Microsoft Excel and import **.csv** file using the Data tool bar.

To access the data once it has been downloaded remotely:

1. Open the file structure and find the **Batch_.csv** file.

2. It is recommended that you save this file to a secure location on your computer.

3. Open Microsoft Excel and import **.csv** file using the Data tool bar.



Opening data logs in Microsoft Excel

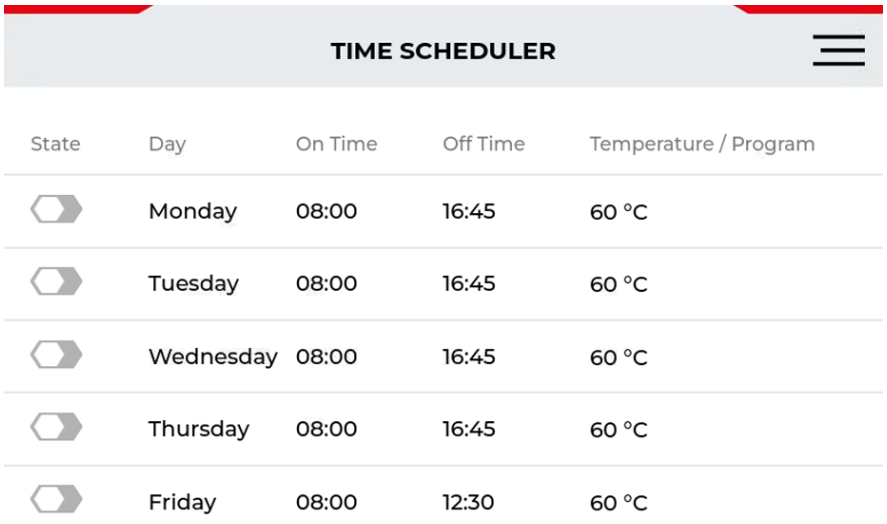
10 Time Scheduler

The Time Scheduler function allows users to configure the controller to automatically run programs or heat to a set temperature during a calendar week (Monday - Sunday). This functionality is beneficial to users who run routine or continuous processes that do not require frequent manual intervention.

It is only possible to configure one scheduled event per day. If a daily process requires multiple temperature changes within a 24 hour period, then these should be first defined within a program, and the operator should use the time scheduler function to start the program at the required time.

The time scheduler cannot be adjusted or set using a remote web browser connection.

Note: When the Time Scheduler function is active, the ”Time Scheduler” icon will appear at the top of the **HOME** screen.



Time Scheduler screen

10.1 Single Setpoint Scheduling

When a single setpoint is scheduled, at the desired time, the controller will heat up to temperature and dwell there for the duration of the scheduled time. Once the set time has elapsed, the controller will revert to controlling to the setpoint that was active prior to the scheduled event.

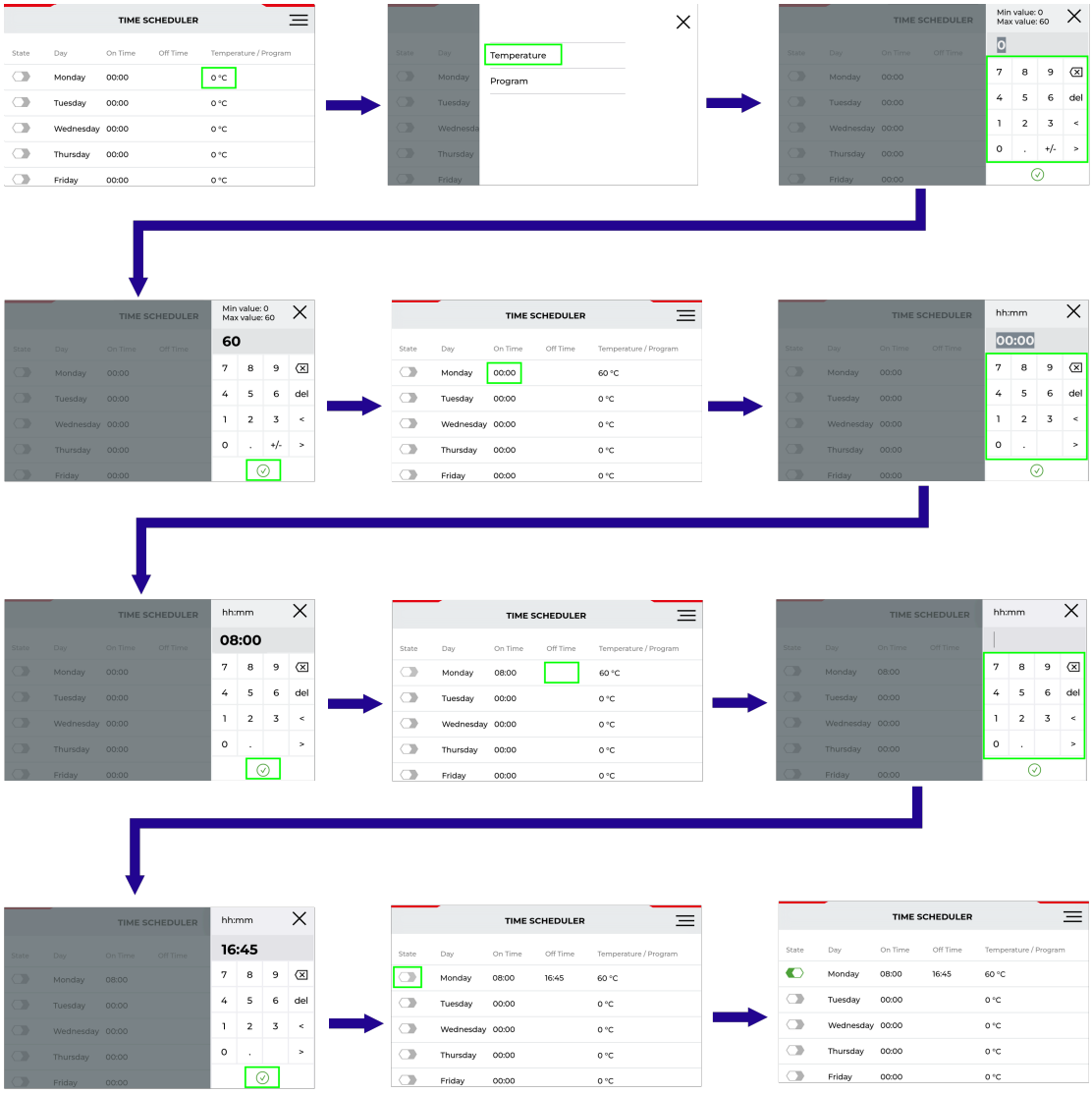
Scheduling a Single Setpoint:

For the day on which you want to schedule the single setpoint:

1. Press on the value in the "Temperature / Program" column. A menu will appear with the options of "Temperature" or "Program".
2. Press on "Temperature" to open an on-screen keyboard.
3. Input the desired setpoint temperature.
4. Press the "Accept" button to confirm the temperature and close the keyboard.
5. Press on the value in the "On Time" column. This will open an on-screen keyboard.
6. Input the time at which you want the single setpoint function to begin. This must be in 24 hour format e.g. 0830. The keyboard will automatically insert the separator colon so the time will read 08:30 on the controller.
7. Press the "Accept" button to confirm the start time and close the keyboard.
8. Press on the value in the "Off Time" column. This will open an on-screen keyboard.
9. Input the time at which you want the single setpoint function to end. This must be in 24 hour format e.g. 1300. The keyboard will automatically insert the separator colon so the time will read 13:00 on the controller.
10. Press the "Accept" button to confirm the end time and close the keyboard.
11. In the "State" column, press on the switch icon.
    a. When the scheduled event is enabled, the switch will turn green and the hexagon will be on the right-hand side of the switch.
    b. When the scheduled event is disabled, the switch will turn grey and the hexagon will be on the left-hand side of the switch.

Note: Once the scheduled event is enabled, it is not possible to edit the values. To edit, you must first disable the event by pressing the "State" switch.

Note: If a scheduled temperature is enabled during the scheduled on time the product will start to heat immediately.



Scheduling a Setpoint

10.2 Program Scheduling

When a program is scheduled, at the desired time, the controller will start the program. Once the program is complete:

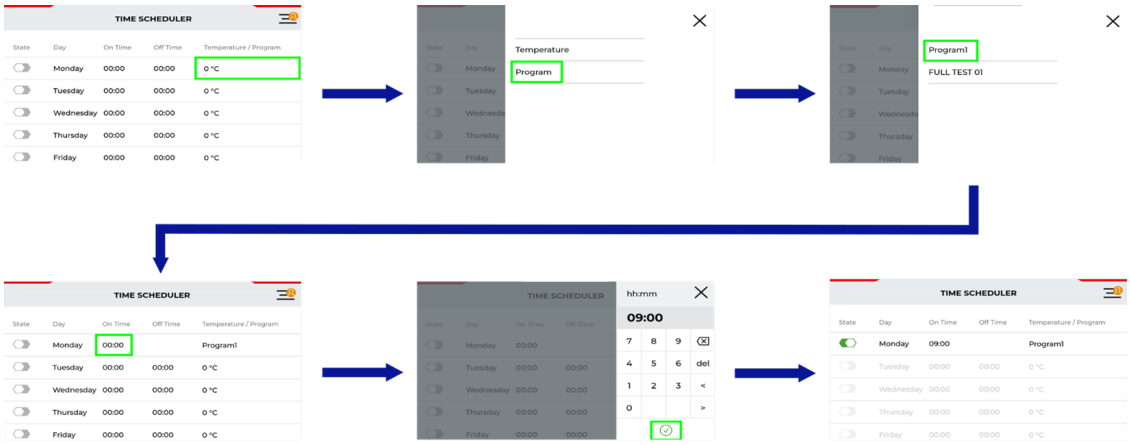
- If the end segment is set to "reset", then the controller will revert to controlling to the setpoint that was active prior to the scheduled event.
- If the end segment is set to "dwell", then the controller will continue to maintain the desired dwell temperature until the operator manually intervenes to reset the program. The operator must navigate to the home screen and press the "stop" icon to end the program.

Note: Because it is possible to configure a program to last a week or longer, the time scheduler function only allows one program to be scheduled per week. If a program is scheduled, the operator will be able to use the controller to set a single setpoint, however the controller will not allow a program to be started manually due to potential conflicts with the scheduled program.

Schedule a Program:

For the day on which you want to schedule the single setpoint:

1. Press on the value in the "Temperature / Program" column. A menu will appear with the options of "Temperature" or "Program".
2. Press on "Program".
3. A menu will appear with a list of programs. Press on the name of the program you wish to schedule. The menu will close and the controller will return to the **TIME SCHEDULER** screen.
4. Press on the value in the "On Time" column. This will open an on-screen keyboard.
5. Input the time at which you want the single setpoint function to begin. This must be in 24 hour format e.g. 0800. The keyboard will automatically insert the separator colon so the time will read 08:00 on the controller.
6. Press the "Accept" button to confirm the start time and close the keyboard.
7. In the "State" column, press on the switch icon.
   a. When the scheduled event is enabled, the switch will turn green and the hexagon will be on the right-hand side of the switch.
   b. When the scheduled event is disabled, the switch will turn grey and the hexagon will be on the left-hand side of the switch.



Scheduling a Program

11 Settings

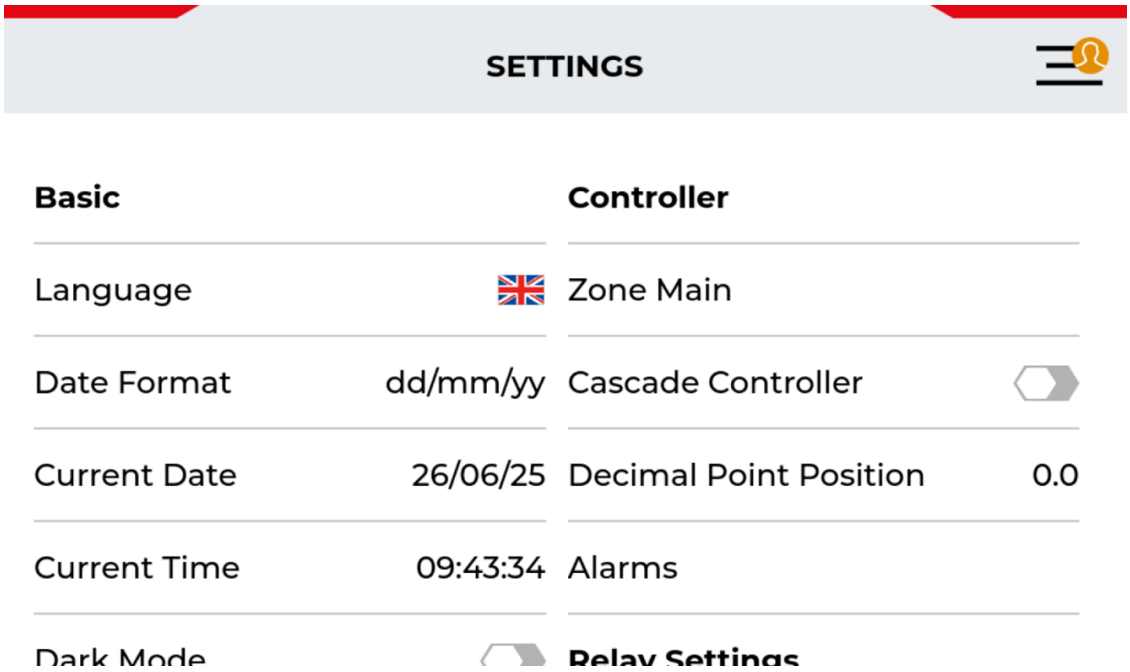
To access the SETTINGS screen, select the settings icon from the navigation menu.

Note: The number of settings available for adjustment depends on the user level selected on the **LOGIN** screen.

The SETTINGS screen is divided into the following sections: **Basic**, **Controller.**

To use the AriesPlus controller effectively, it is necessary to input some basic settings.

For most parameters, pressing on the corresponding field will open a menu of available options. Other parameters can be toggled on or off by pressing the hexagonal switch.



Settings Screen

11.1 Basic

The "Basic" settings allow users to view the interface language, time, date, communications, and theme settings.

Note: Basic settings (except Dark Mode) are only adjustable when logged in at **Admin** level.

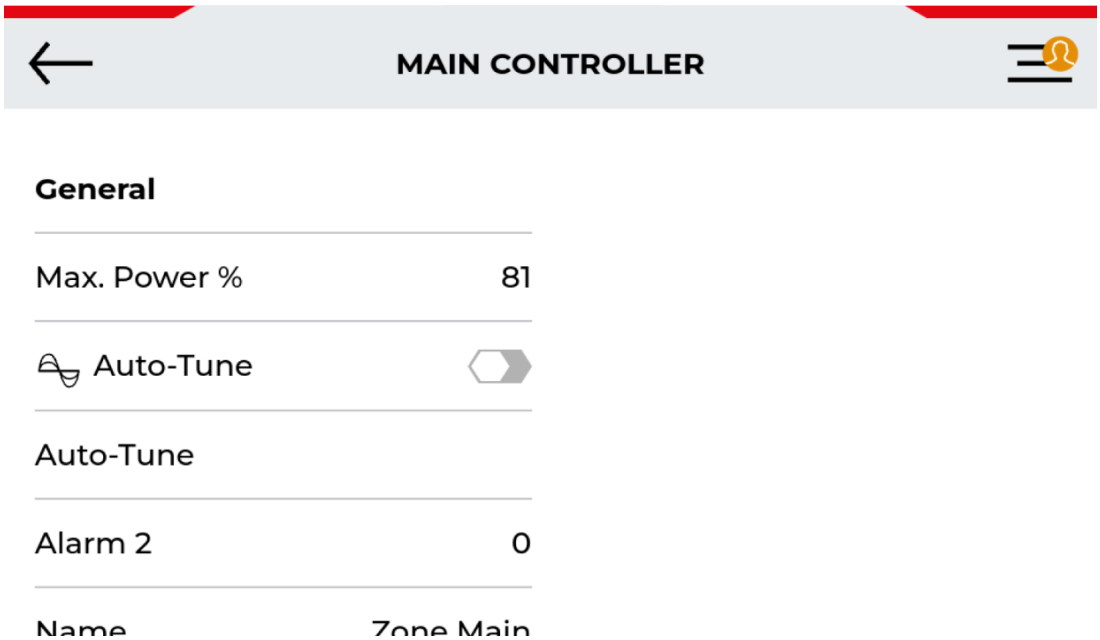
Parameter	Use
Language	Press on the "Language" field to select your desired interface language.
Date Format	Press on the "Date Format" field to select your desired date format e.g. **dd/mm/yy**, **mm/dd/yy** etc.
Current Date	Press on the "Current Date" field to set the date in days, months, and years e.g. **dd/mm/yy**
Current Time	Press on the "Current Time" field to set the time in hours, minutes, and seconds e.g. **hh:mm:ss**. Time is presented in 24 hour format.
Dark Mode	Press on the switch icon to change display themes from light to dark mode.
Communication	Press on the "Communication" field to view and select remote communications options.
Software Update	Press the "Software Update" field to access functions to update the controller software. **Note:** Requires a USB stick with the updated software files.
Service	Press on the "Service" field to view service contact details and controller software information.

11.2 Controller

Note: Controller settings are only available when logged in at **Admin** level.

Parameter	Use
Zone Main	Press on the "Zone Main" field to access controller parameters on the "MAIN CONTROLLER" screen. The MAIN CONTROLLER screen contains parameters relating to, output power, auto-tune and optional alarms.
Cascade (if configured)	Press on the "Cascade Control" field to set cascade control parameters.
Decimal Points Position	Press the "Decimal point position" field to select the desired decimal point position.
Alarms (if configured)	Press the "Alarms" field to set any configured alarms.
Relays (if configured)	Press the "Relays" field to set any configured relays.

11.3 Main Controller Settings



Settings Screen for the Main Heated Zone

General

Parameter	Use
Max Power (%)	Used to adjust the amount of power delivered by the heating elements of the product. Depending on the design of the product and the voltage of the intended power supply, the Max Power (%) value may be adjusted in order to protect the heating elements from overloading and unnecessary wear. For more information please see section 15.
Auto-Tune (with hexagonal switch)	Runs the autotune programme. Used to refine the PID terms within the controller and optimise the temperature control for the product. For more information please see section 16.
Auto-Tune Config	Used to define the Auto-Tune temperatures.

11.4 Dark Mode

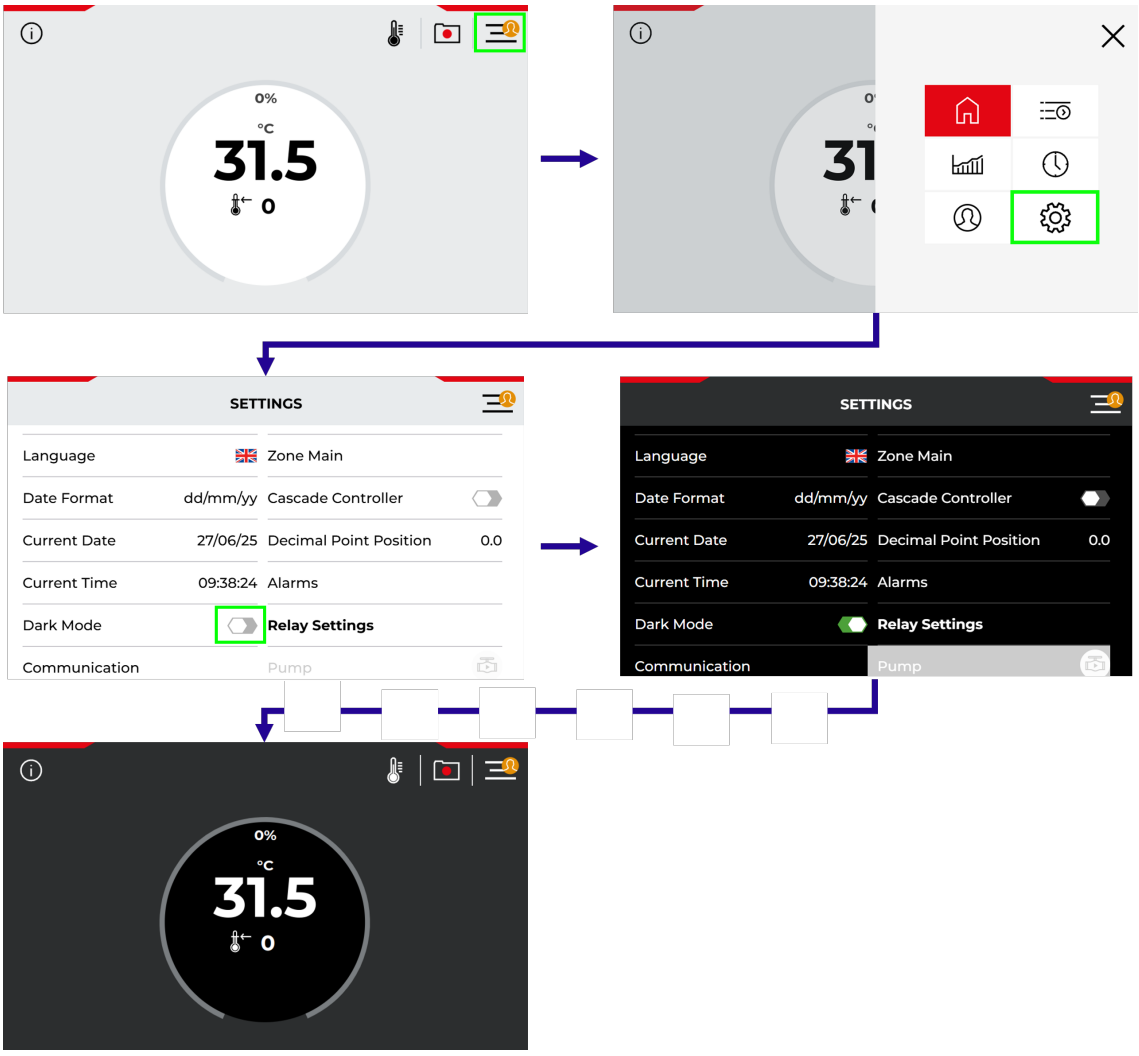
The AriesPlus provides the option of switching the display to"Dark Mode".

Note: The controller default is "Light Mode".

Note: It is possible to change to and from Dark Mode at any user level.

To switch between Light Mode and Dark Mode:

1. Go to the **SETTINGS** screen.
2. Press on the switch beside the Dark Mode parameter. The screen will switch from Light Mode to Dark Mode.



Switching between Light Mode and Dark Mode

11.5 Remote Access via Web Browser

When connected to a local network via ethernet, the AriesPlus controller can be viewed from a web browser, allowing users to monitor processes remotely.

The controller utilises DHCP (Dynamic Host Configuration Protocol) functionality to obtain an IP address. Provided that their device is connected to the same local network as the controller, operators can connect to a particular controller by typing the corresponding IP address into a web browser.

This enables the AriesPlus to be viewed from a computer, tablet, or mobile phone.

Note: For safety reasons, some functionality is restricted when accessing the controller remotely. It is not possible to adjust a setpoint, run a program, or schedule a program when accessing the controller remotely.

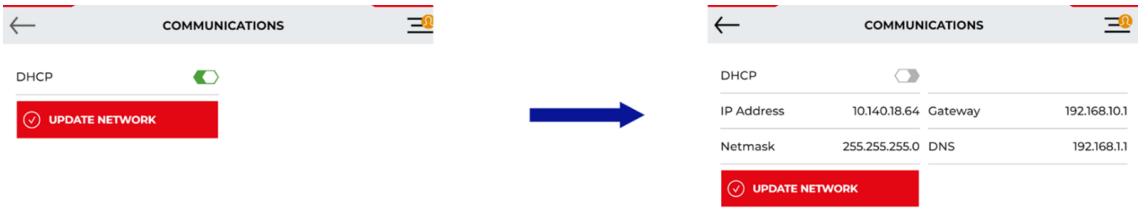
11.6 Ethernet Communication

The AriesPlus provides an option to manually configure IP address and network settings.

Note: The controller default option has DHCP enabled.

To configure ethernet communicationsettings:

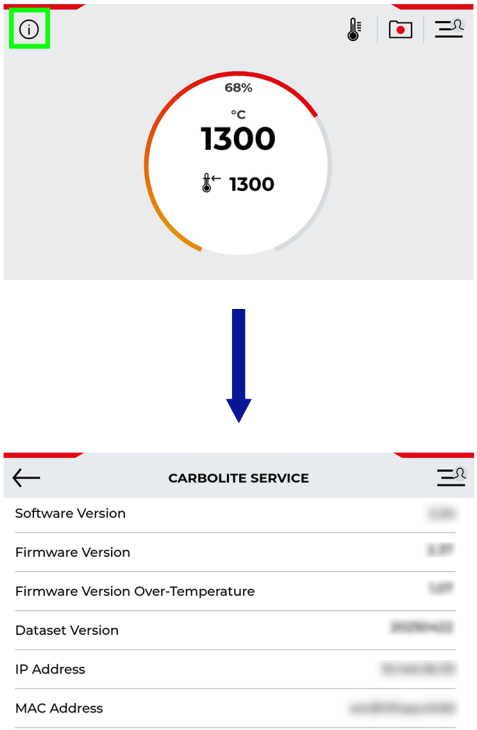
1. Log in as **"Admin"**.
2. Go to the **SETTINGS** screen.
3. Press on COMMUNCATIONS
4. Press on the hexagonal switch beside DHCP to enable or disable connection.
5. Network settings can be edited by pressing on the different option network
6. Press "Update Network" to finalise settings.



Ethernet communications screen

11.7 IP Address

The IP address of the controller can be found at the bottom of the **SERVICE** screen.



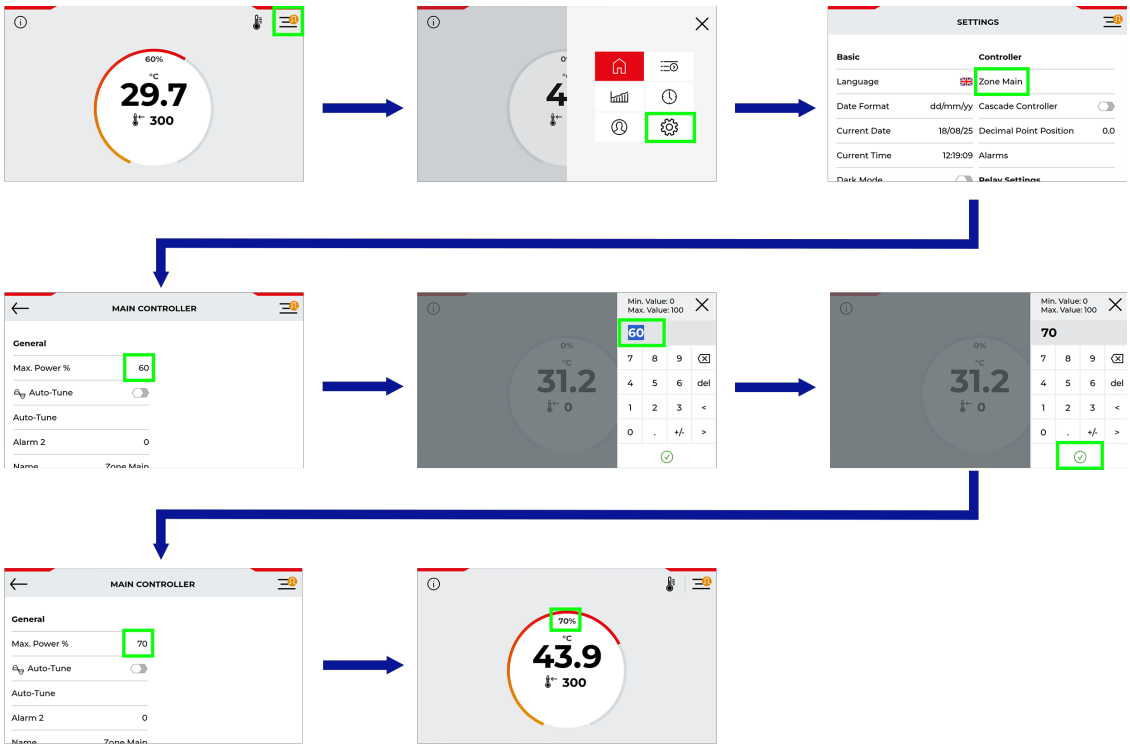
Accessing the service screen

11.8 Adjusting the Maximum Power Output Settings

Note: To adjust any settings, you must first be logged in at **Admin** level

To adjust the power settings:

1. Navigate to the SETTINGS screen for the controller you wish to adjust.
2. Press on "Zone Main" to open up the "Main controller" screen.
3. Press on the "Max. Power %" field. A numeric keyboard will open allowing you to input values between 0-100 (%). This refers to a percentage of the total power output the oven/-furnace was designed to achieve. Please refer to the "Power Settings" section of your oven/furnace manual for specific details.
4. Once you have set the new maximum power output, the "Power Output Indicator" on the **HOME** screen will be limited to that power level e.g. if the "Max. Power %" value is set to 75, the controller will apply no more that 75% power.



Adjusting the Maximum Power Output to 70%

11.9 Using Auto-Tune to Optimise Temperature Control

All Carbolite products are preconfigured for optimum performance when used within their normal expected operating temperature range.

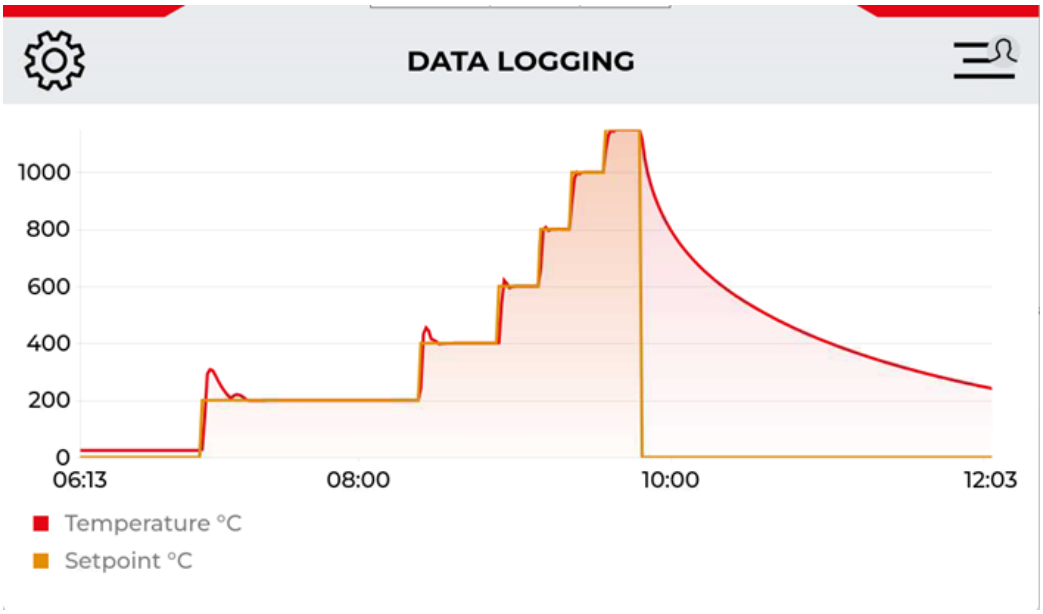
Depending on the intended application, it may be necessary for the product to be used outside of this normal range, in which case some tuning may be required in order to optimise the PID controls within the temperature controller e.g. if a high temperature product is to be used at a significantly lower temperature than it was originally designed for, or if a particularly heavy sample/load is to be heated.

The auto tune settings can not be adjusted or set using a remote web browser connection.

Note: When the Auto Tune function is active, the "Auto Tune Running" icon will appear at the top of the **HOME** screen.

To configure the auto-tune function:

1. Ensure that the product is cold (at ambient temperature) before proceeding.
2. Navigate the SETTINGS screen for 'Zone Main' to open the main controller.
3. Press on 'Auto-Tune Config' to see the preconfigured PID controls.
4. The user can edit the temperature at which the auto tune will take place 'Temp °C' and the start temperature from which the auto tune will commence 'Start Temp °C'.
5. The user can add rows to the list by holding onto the row until a + sign appears between each row. Pressing on the + sign will copy the previous row and insert a new row. The 'Temp °C' and 'Start Temp °C' can be edited accordingly.
6. The user can delete rows in the list by pressing the delete icon within each row.
7. Use the back arrow button at the top left of the screen to navigate back to the 'Main controller screen'
8. Pressing on the 'Auto-Tune' button to switch the auto-tune parameter from 'Off' to 'On '.
9. The power output indicator on the HOME screen will illuminate when the product begins the auto- tuning cycle:
10. The controller heats until it is within a few degrees (°C / °F / K) of the programmed setpoint.
11. The controller then cuts off power to the heating elements.
12. The controller allows the temperature to overshoot the target setpoint.
13. When the temperature drops below the point at which the controller stopped heating, it turns the power to the heating elements back on.
14. The controller will then allow the temperature to undershoot (not reach the target setpoint).
15. The controller analyses the information it received from the overshoot and undershoot scenarios and calculates new PID terms that will optimize temperature control for the new temperature range.
16. The new PID terms are applied, and the controller then heats as normal until it reaches the target setpoint, then maintains that setpoint.



Graphical Example of Auto-Tuning a Product at six temperatures

11.10 Controller Updates

Over time, updates to the AriesPlus will be necessary to ensure that the controller software and operating system remain compatible.

Carbolite may also release updates to introduce new functionality or improve existing functionality.

Updates can be downloaded from a secure portal, and should be copied onto a USB stick formatted to FAT 32 to transfer them to the controller.

Note: Updates can only be made when logged in at **Admin** level.

Note: Software and operating system updates cannot be done in the browser.

Note: Make sure the program on the USB stick is saved in the root directory.

To update the controller:

1. Insert the USB stick containing the update files into the USB port on the product control panel.
2. Go to the **SETTINGS** screen.
3. Press on "Software Update" in the "Basic" settings list. This will open an on-screen menu.
4. Press on "Browse USB Drive". The controller will search the USB stick for the relevant files.
5. Once the controller identifies the update files, the "VERIFY" button will become available. Press the "VERIFY" button to begin the software update.
6. The screen will display a scrolling wheel during the update process. Once complete it is recommended to reboot the controller by switching the products power switch off then on.

11.11 Power Cycling

In the event of a power cycle (power to the controller is switched off, then back on again):

- If the AriesPlus was being used as a simple temperature controller, it will continue to control at the last configured setpoint once power is restored.
- If the AriesPlus was running a program, the program will be aborted. It will restart as a simple temperature controller.

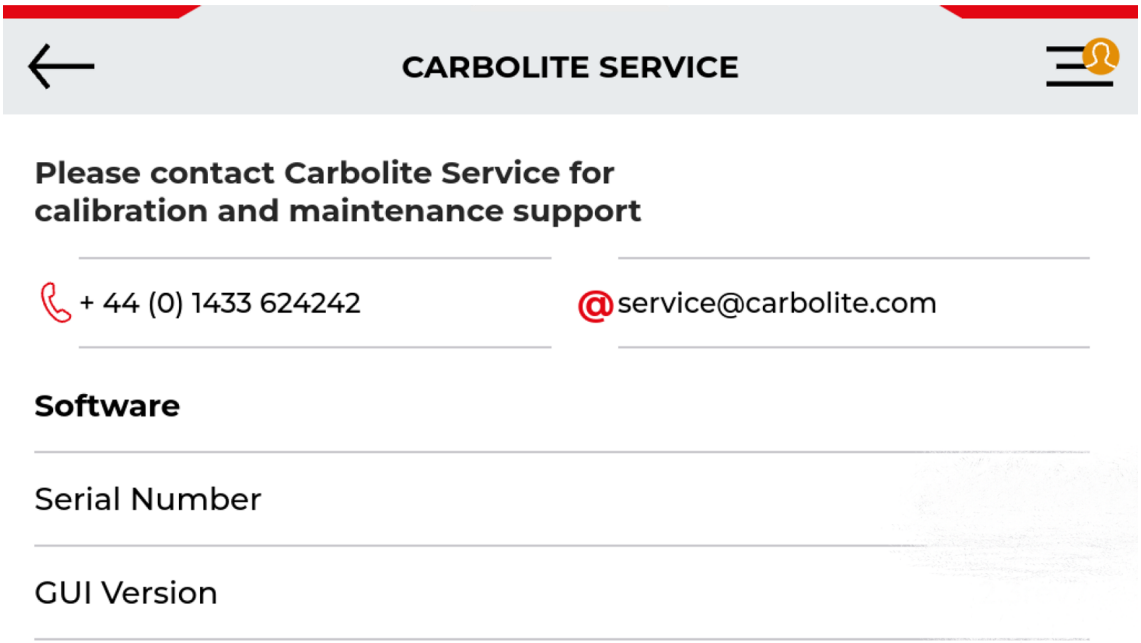
Note: If the user is logged in as Admin or Supervisor, the AriesPlus will open in the Operator user level after the power is turned back on.

11.12 Carbolite Service Screen

The Carbolite Service screen provides company contact details, information on the software installed on the controller, and if connected to a network, the IP address of the controller.

If you encounter a fault with the controller, then it is necessary that you provide the controller software information to the Carbolite Service department.

Note: Service number and email details can be edited only at the "Admin" user level.



11.13 Controller Replacement

Please contact Carbolite Service for assistance.

Carbolite Gero Ltd.

Parsons Lane
S33 6RB Hope Valley
England

Contact:

+44 1433 620011
info@carbolite.com