

**USING THE WATLOW F4T CONTROLLER:
SUPPLEMENTAL USER MANUAL**
v.1.00

- Read this manual carefully before using equipment
- Familiarize yourself with all safety precautions before using equipment
- Keep this manual for future reference

ESPEC NORTH AMERICA, INC.

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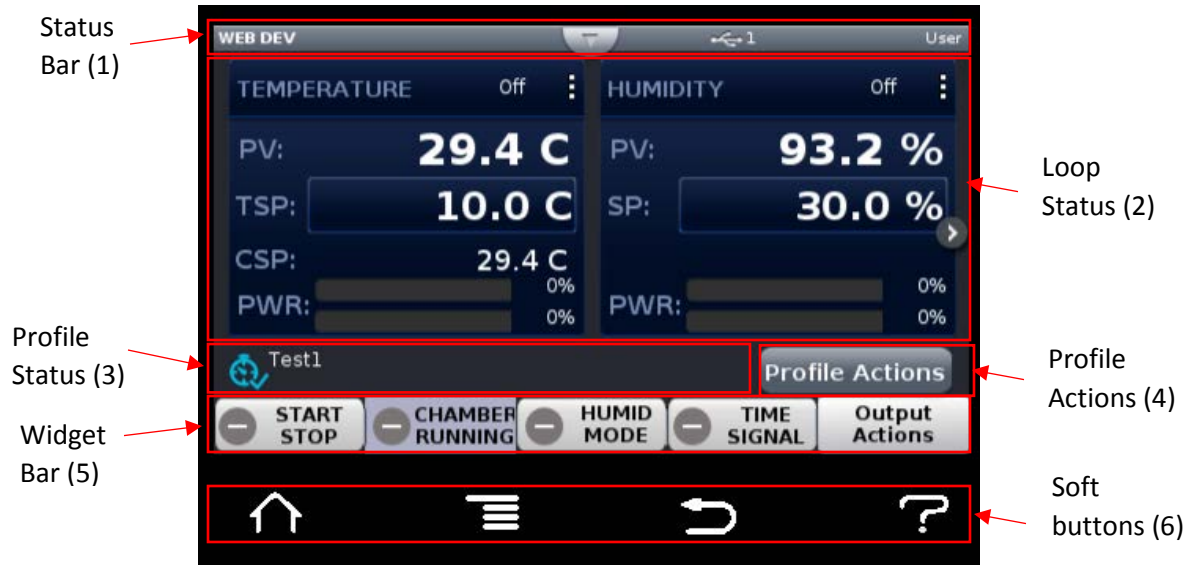
1. F4T Controller Video Training

F4T videos are available online at <http://f4t.watlow.com>

- Tutorial: Data Logging
- Tutorial: Trending & Graphing
- Tutorial: File Transfers

2. Home Screen

The screen shot below shows a home screen for a chamber with two control loops (Temperature and Humidity). On a Temperature only chamber, the home screen will be configured to contain only the “Temperature” control loop and it will fill the screen.



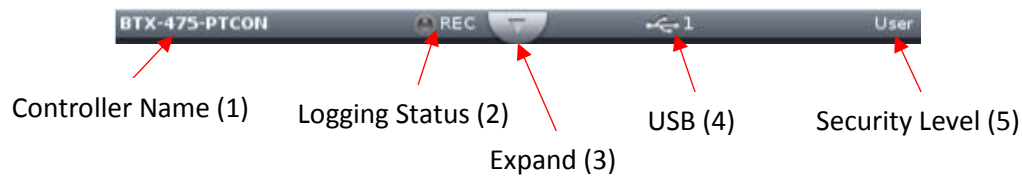
	Name	Function	Details
1	Status Bar	Shows the error and alarm status of the controller; additionally errors and alarms may be cleared by expanding this section	3. Status Bar – Clearing & Viewing Active Alarms
2	Loop Status	View and update the current settings of the control loops	4. Loop Status – Configuring & Viewing Control Loops
3	Profile Status	Shows the current status of any running profile	5. Profile Status Bar
4	Profile Actions	Control profile execution as well as creation and editing of the profiles on the controller	6. Profile Actions
5	Widget Bar	Controls chamber start stop as well as shortcuts to two profile events	7. Widget Bar
6	Soft Buttons	Buttons to assist in navigating the controllers various screens	8. Soft Buttons



When an alarm or error is triggered a pop up will be generated as shown. If the condition that triggered the alarm has been rectified the alarm may be cleared by pressing the clear button. The pop up message may also be dismissed without clearing the alarm by pressing the dismiss button. To clear alarms that have been dismissed see [3.1 Clearing & Viewing Alarms/Errors](#).

3. Status Bar – Clearing & Viewing Active Alarms

The status bar shows various details of the controller, primarily it is used to notify the user of any alarms (flashing yellow), errors (flashing red) and messages. Triggered errors and alarms may be viewed and cleared using the expanded status bar.



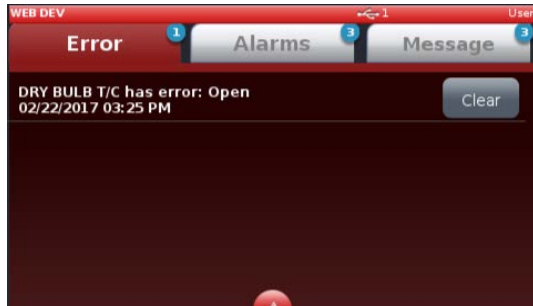
	Name	Function	Details
1	Controller Name	The name of the controller, default is Model-options	
2	Logging Status	When green the controller is logging data; this is an optional feature, and operation instructions are included in the options manual.	
3	Expand	Expand the status bar to show the Error, Alarms, and Message screens. This is also where alarms are cleared.	3.1 Clearing & Viewing Alarms/Errors
4	USB	Visible when USB drives are plugged into the controller.	
5	Security Level	The user currently logged in, this is used to restrict access to certain features. The following security levels are supported:	
	Admin	The user will have full access to the F4T configuration. This requires contacting the service department for the admin password.	
	User	The user will get access to the settings for everyday operation of the F4T controller.	

3.1 Clearing & Viewing Alarms/Errors

Once the menu has been expanded the user will be presented with three tabs.

To clear an alarm or error:

1. Clear the cause of the alarm, for example: reset the Product Temp Protector by allowing chamber back into its configured range.
2. Navigate to the appropriate screen shown below (Error or Alarms tab).
3. Press the clear button; if the clear button is not present the cause of the alarm has not been fixed.



This screen shows all currently triggered errors. Errors do not directly stop the chamber; they can however trigger an alarm which will stop the chamber. An example of this would be the “DRY BULB T/C has error: Open” shown triggered here, which has triggered the “TEMP OUT OF RANGE: Error” on the Alarms Tab.



This screen shows all currently triggered alarms.



This screen shows messages that may be set and cleared via Modbus only. ESPEC currently uses this screen to show the basic network status of the optional web controller.

3.2 Available Alarms

This section lists alarms that can be found on benchtop chambers.

Benchtop size 1 & 4 alarms:

- Alarm #1: “TEMP OUT OF RANGE”: This alarm will trigger when the temperature inside the chamber is no longer within the allowable range.
- Alarm #2: “HUMID OUT OF RANGE”: This alarm will trigger when the humidity inside the chamber is no longer within the allowable range.
- Alarm #3: “TEMPERATURE FAULT”: This alarm is triggered when the user settable product temp. protector has tripped.
- Alarm #4: “CIRC. FAULT”: This alarm is triggered with the air circulator motor’s thermal protection has tripped.
- Limit #5: “OT1 FAULT”: This alarm will trigger when the independent safety sensor has reached the maximum allowed temperature for the chamber (216°C).

BTZ-4200 Alarms:

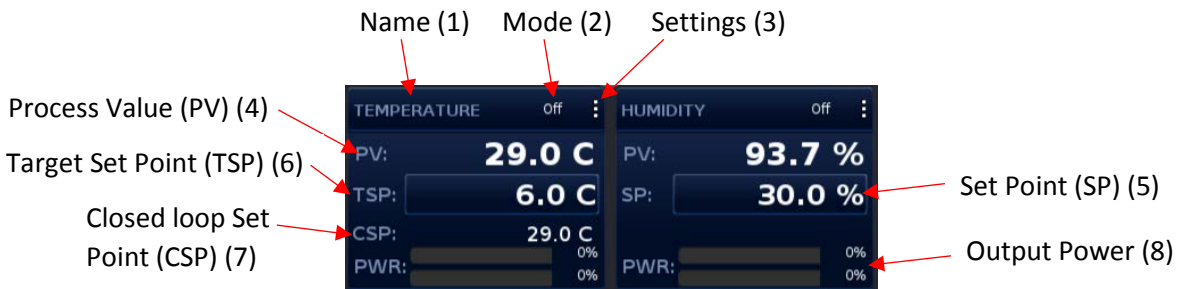
- Alarm #1: “TEMP OUT OF RANGE”: This alarm will trigger when the temperature inside the chamber is no longer within the allowable range.
- Alarm #3: “TEMPERATURE FAULT”: This alarm is triggered when the user settable product temp. protector has tripped.
- Alarm #4: “CIRC. FAULT”: This alarm is triggered with the air circulator motor’s thermal protection has tripped.
- Alarm #5: “HIGH PRES. FAULT”: This alarm occurs when the refrigeration systems pressure is outside of the allowed operating range.
- Limit #5: “OT1 FAULT”: This alarm will trigger when the independent safety sensor has reached the maximum allowed temperature for the chamber (216°C).

4. Loop Status – Configuring & Viewing Control Loops

This section describes the available settings for a control loop

4.1 Home Screen Display

The features and functions of the control loops shown on the home screen are detailed here.



See [4.2 Control Loop Settings Expanded](#) on the following page for more information on all functions in the table below.

	Name	Function
1	Name	The name of the control loop, this is settable under the loop settings.
2	Mode	The current loop control mode, possible modes:
	Off	The loop is disabled.
	Auto	The loop is enabled.
	Manual	Output a fixed power (heating or cooling).
3	Settings	Adjust further control loop settings not accessible from the home screen; such as control mode and ramping.
4	Process Value (PV)	The current conditions inside the chamber.
5	Set Point (SP)	The condition the controller should try to attain, or when running manual mode the heating/cooling output power.
6	Target Set Point (TSP)	The Set Point once ramping has completed. This is only shown (in place of SP) when ramping is enabled or when running a profile.
7	Closed Loop Set Point (CSP)	The Set Point at this time; when ramping this will slowly adjust between the start and end points of the ramp. This is only shown when ramping is enabled or when running a profile
8	Output Power	The amount of heat (upper red bar) or cooling (the lower blue bar) that the loop is using to attain the desired conditions inside the chamber.

4.2 Control Loop Settings Expanded

This is a detailed list of all settings available for each control loop when the “Settings” button is pressed (Item 3 on above table).

WEB DEV

1

User

TEMPERATURE

Done

Name

TEMPERATURE

Control Mode Active

Auto

Control Mode

Auto

Set Point

10.0

Autotune Set Point

100

Autotune Aggressiveness

Critical

Autotune

No

Dead Band

0.1

Manual Power

0.0

Idle Set Point

23.0

Ramp Action

Both

Ramp Scale

Minutes

Ramp Rate

5.0

Name

The name of the control loop

Control Mode Active

The current mode of the loop.

Control Mode

Select the control mode, options:

Auto

Use a PID loop to reach a set point.

Manual

Set a fixed output power. (Not recommended)

Off

Disable control (Not recommended)

Set Point

The set point the control loop should control too

Autotune Set Point

Disregard

Autotune Aggressive

Disregard

Autotune

Disregard

Dead Band

Disregard

Ramp Action

Select how the controller changes the set point, options:

Off

Do not ramp, go to the new set point directly.

Startup

Ramp from the PV to the SP when loop is enabled.

Set Point

Ramp when the SP is changed.

Both

Ramp on both Startup and SP change.

Ramp Scale






The time base for the *Ramp Rate*.

Ramp Rate

The Rate at which to ramp.

5. Profile Status Bar

This section of the home screen shows the profile status. It does this by using several different icons.

Example	Profile Status	Description
 New Profile Remaining: 00:00 Step 3 of 6 Ramp Rate Remaining: 00:00:00	Running	The listed profile is currently executing.
 Test Step 1 of 3 Ramp Time	Paused	The listed profile has been manually paused.
 Test	Terminated	The listed profile has been stopped early.
 Test1	Complete	The listed profile completed normally.
 New Profile Monday: 00:00	Calendar Start	The listed profile will start at the given time.

6. Profile Actions

The “Profile Actions” button is used for all interactions with profiles.



The “Profile Actions” button displays a contextual menu that will display different options depending on the state of the profile engine shown here:

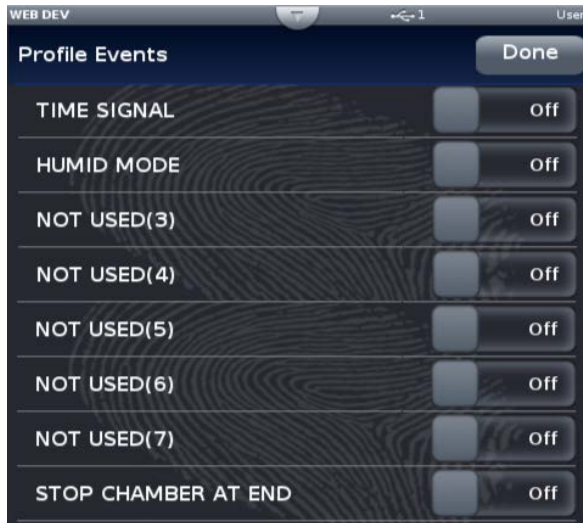
Running Profile		
Menu Item	Function	Details
Pause	Suspends running the profile, the profile can resume running at the same point.	
Terminate	Stop running the profile, the profile cannot resume running; it must be started again.	
View/Edit Profile Events	View and edit profile events	6.1 View/Edit Profile Events
Create Profile	Create a new profile	6.3 Create a Profile
Cancel	Return to the home screen	2. Home Screen

Profile Not Running		
Menu Item	Function	Details
Run Last	Starts the last executed profile	
Run Profile	Displays a list of all profiles	6.2 Profile List
View/Edit Profile Events	View and edit profile events	6.1 View/Edit Profile Events
Create Profile	Create a new profile	6.3 Create a Profile
Go to Profiles	Displays a list of all profiles	6.2 Profile List
Clear Profile Status	Removes the profile icon from the Profile Status Bar	5. Profile Status Bar
Cancel	Return to the home screen	2. Home Screen

Profile Paused		
Menu Item	Function	Details
Resume	Continue running the suspended profile from the point at which it was paused	
Terminate	Cancels profile execution	
View/Edit Profile Events	View and edit profile events	6.1 View/Edit Profile Events
Create Profile	Create a new profile	6.3 Create a Profile
Cancel	Return to the home screen	2. Home Screen

6.1 View/Edit Profile Events

From this screen all profile events may be accessed. To turn the event on or off actuate the slider next to the desired output's name.

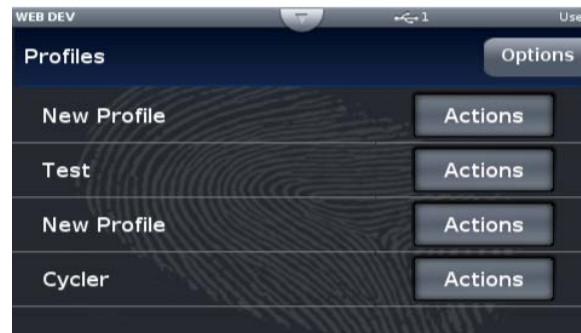


Standard Profile events are:

1. Time Signal
2. HUMID MODE (humidity chambers only)
3. DRY AIR/GN2/LOW HUMID ENABLE (optional)
4. LN2 ENABLE (optional)
5. NA
6. NA
7. PTC ON ENABLE (optional)
8. STOP CHAMBER AT END [of profile]
(when this is on the chamber will turn off when a profile ends, or is terminated)

6.2 Profile List

The list of profiles currently on the controller. This section will cover what actions can be taken from this screen.



The “Options” button opens a menu with the following options:

Menu Item	Function	Details
Create Profile	Create a new profile	6.3 Create a Profile
View/Edit Profile Events	View and edit profile events	6.1 View/Edit Profile Events
Import File	Import a profile from a file on a USB flash drive	
Cancel	Close this menu	

Each profile on the list has an “Actions” button, it will open a menu with the following items:

Menu Item	Function	Details
Run Profile	Start this profile on the first step	
Custom Run	Start this profile on a specified step (presents a new menu with all available steps for this profile)	
Calendar Start	Start this profile on a day of the week (Sunday-Saturday) at a specified time (presents a new menu for selecting the day and time)	
View/Edit Steps	Open a list of steps for this profile, they can be edited and viewed from there	6.4 Edit a Profile
View/Edit Details	View and or edit this profiles global parameters; name, password, and guaranteed soak settings.	6.4 Edit a Profile
Export File	Save this profile as a file to a USB flash drive	
Delete Profile	Remove this profile from the chamber	
Cancel	Close this menu	

6.3 Create a Profile

Profiles are created by first entering the profile details.

New Profile	
Name	New Profile
Password	
Guaranteed Soak Deviation 1	5.6
Guaranteed Soak Deviation 2	10.0

To create the profile once at this screen:

- Enter a Name in the Name Field.
- Enter a password required to start this profile (if desired).
- Enter the “Guaranteed Soak Deviation” for each control loop. Guaranteed Soak is the amount by which the process value is allowed to differ from the loop’s set point for steps when it is set to On. In such steps when the process value differs from the set point by more than this value, the step timer stops running until the process value returns to within the band defined by the set point plus or minus this value.
 - Guaranteed Soak Deviation 1: Deviation for the Temperature control loop.
 - Guaranteed Soak Deviation 2: Deviation for the Humidity control loop (on chambers with humidity).

Once the desired settings have been entered, the profile steps can be edited by pressing the “Options” button and selecting “Create Steps”. For information on editing a profiles steps see [6.4 Edit a Profile](#) on the following page.

6.4 Edit a Profile

This section describes how to edit an existing profile (or newly created one). There are two main sections first the profile details which edit global profile settings, and the profile steps themselves.

6.4.1 Profile Details

This is where the global profile details can be edited:

- **Name:** The name of the profile
- **Password:** The password required to start this profile (if desired).
- **Guaranteed Soak Deviation:** prevents the step duration timer from counting down until the difference between the process value and set point is this range.
 - **Guaranteed Soak Deviation 1:** Deviation for the Temperature control loop.
 - **Guaranteed Soak Deviation 2:** Deviation for the Humidity control loop (on chambers with humidity).

The “Options” button offers the following menu items:

Menu Item	Function	Details
Done	Finish editing this profile	
Run Profile	Run this profile	
View/Edit Steps	View and edit the steps of this profile	6.4 Edit a Profile
Delete Profile	Remove this profile from the controller	
Cancel	Close this menu	

6.4.2 Profile Steps

This is where all profile steps are edited on existing or newly created profiles.



	Name	Function
1	Options	Selecting this will access the following profile editor options:
		Done Finish editing the profile
		Run Profile Run this profile
		View/Edit Details Edit profile details (see 6.4 Edit a Profile)
		Cancel Close this menu
2	Actions	Selecting this gives several options on what to do with this step, these options are:
		Edit Step Parameters Edit the selected steps parameters
		Delete Step Delete this step
		Insert Insert a step before this one
		Cancel Close this menu
3	Step Type	Selecting this will allow the steps type to be changed. Once a new step type is chosen the step parameters screen will be opened for editing. For further details on available step types and there parameters see 6.4.3 Step Types & Parameters .
4	Add Step	Selecting this will add a step to the end of the profile.

6.4.3 Step Types & Parameters

This section describes what each of the available step types are, as well as all the associated parameters for each step type.

For all steps:

- Guaranteed Soak prevents the step from advancing (pausing the step timer if there is one) until the difference between the process value and set point is within the range set in the profile details section see [6.4 Edit a Profile](#).
- Profile events are only modified at the start of a profile step. This means that the user can modify these events manually at any time while the profile is executing.

Step Type: Soak		
This step type maintains each loop's set point constant for the step's duration.		
Hours	The duration of this profile step is set with these three parameters.	
Minutes		
Seconds		
Guaranteed Soak Enable 1	Temperature guaranteed soak	
Guaranteed Soak Enable 2	Humidity guaranteed soak (Humidity models only)	
Profile Events (8)	The last eight items are the profile events, see 6.1 View/Edit Profile Events for details on their function. They can have the following states for each step:	
	Off	Turn the event off at the start of this step
	On	Turn the event on at the start of this step
	Unchanged	Do nothing with the event for this step

Step Type: Ramp Time		
This step type adjusts each loop's set point gradually from the previous set point to the step's Set Point over the step's duration.		
Target Set Point Loop 1	Temperature set point at the end of the step.	
Hours	The duration of this profile step is set with these three parameters.	
Minutes		
Seconds		
Target Set Point Loop 2	Humidity set point at the end of the step (Humidity models only)	
Guaranteed Soak Enable 1	Temperature guaranteed soak	
Guaranteed Soak Enable 2	Humidity guaranteed soak. (Humidity models only)	
Profile Events (8)	The last eight items are the profile events, see 6.1 View/Edit Profile Events for details on their function. They can have the following states for each step:	
	Off	Turn the event off at the start of this step
	On	Turn the event on at the start of this step
	Unchanged	Do nothing with the event for this step

Step Type: Ramp Rate		
This step type adjusts each loop's set point at the user set Rate of change until it reaches the step's Set Point.		
Target Set Point Loop 1	Temperature set point at the end of the step.	
Rate	Temperature ramp rate in degrees/minute	
Guaranteed Soak Enable 1	Temperature guaranteed soak.	
Target Set Point Loop 2	Humidity set point at the end of the step (Humidity models only)	
Rate	Humidity ramp rate in %RH/minute. (Humidity models only)	
Guaranteed Soak Enable 2	Humidity guaranteed soak. (Humidity models only)	
Profile Events (8)	The last eight items are the profile events, see 6.1 View/Edit Profile Events for details on their function. They can have the following states for each step:	
	Off	Turn the event off at the start of this step.
	On	Turn the event on at the start of this step.
	Unchanged	Do nothing with the event for this step.

Step Type: Wait For
This step type will hold the profile until the specified conditions on the event inputs are met. When multiple conditions are specified, the profile will not proceed until all conditions are satisfied at the same time. This series of chamber do not come with any event inputs setup so this step type cannot be used.

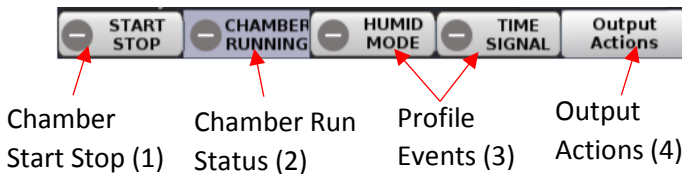
Step Type: Instant Change		
This step type sets each loop's set point to the step's Set Point without ramping from the previous set point and holds that set point for the step's duration.		
Target Set Point Loop 1	Temperature set point at the end of the step.	
Hours	The duration of this profile step is set with these three parameters.	
Minutes		
Seconds		
Target Set Point Loop 2	Humidity set point at the end of the step (Humidity models only)	
Guaranteed Soak Enable 1	Temperature guaranteed soak.	
Guaranteed Soak Enable 2	Humidity guaranteed soak. (Humidity models only)	
Profile Events (8)	The last eight items are the profile events, see 6.1 View/Edit Profile Events for details on their function. They can have the following states for each step:	
	Off	Turn the event off at the start of this step.
	On	Turn the event on at the start of this step.
	Unchanged	Do nothing with the event for this step.



Step Type: Jump	
This step type repeats steps in the profile starting at the jump step to a specified step for the number of times set. This option is not available for step 1. A zero entered for the Number of times will create an infinite loop.	
Jump Step	The first profile step in this loop, the last step is the step prior to the jump step.
Jump Count	The number of times to execute the loop.
Profile Events (8)	The last eight items are the profile events, see 6.1 View/Edit Profile Events for details on their function. They can have the following states for each step:
	Off Turn the event off at the start of this step.
	On Turn the event on at the start of this step.
	Unchanged Do nothing with the event for this step.

Step Type: End	
This step type sets what each loop and event output does when the profile ends.	
End Action Loop 1	This specifies what the Temperature loop will do, the options are:
	User Run the set point set from the home screen (see 4. Loop Status – Configuring & Viewing Control Loops)
	Off Set the control mode for the loop to Off (see 4. Loop Status – Configuring & Viewing Control Loops). <u>This is not recommended, use the event “STOP CHAMBER AT END” (event #8) to disable control instead.</u>
	Hold Maintain the last set point of the profile.
End Action Loop 2	This specifies what the Humidity loop will do, the options are the same as the Temperature loop. (Humidity models only)
Profile Events (8)	The last eight items are the profile events, see 6.1 View/Edit Profile Events for details on their function. They can have the following states for each step:
	Off Turn the event off at the start of this step
	On Turn the event on at the start of this step
	Unchanged Do nothing with the event for this step

7. Widget Bar





The widget bar is used to start and stop the chamber, monitor run status, and enable/disable some profile events.



	Name	Function
1	Chamber Start Stop	This input will start or stop the chamber when pressed. Note that the chamber cannot run if there are any active alarms; see 3.1 Clearing & Viewing Alarms/Errors for further details.
2	Chamber Run Status	This output shows if the chamber is currently running in run mode.
3	Profile Events	<p>These are shortcuts to profile events, all profile events can be found the “Profile Actions” > “View/Edit Profile Events”, see 6.1 View/Edit Profile Events.</p> <p>On humidity chambers the  button is used to toggle humidity mode on and off. The  button is used to toggle the state of the time signal.</p>
4	Output Actions	This button serves no useful function and is disabled by default.

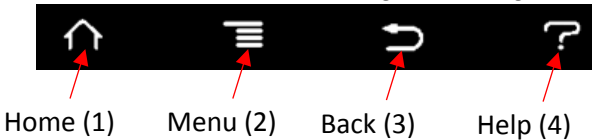
7.1 Reading Widgets

This widgets on the bar can indicate several different things.

- Function Keys & events:
 - These buttons that may be pressed (“START STOP”, “HUMID MODE”, “TIME SIGNAL” as shown in [7. Widget Bar](#)), which enable or disable certain features. Note that the “START STOP” button is momentary and will not stay enabled when pressed.
 - Enabled: 
 - Disabled: 
- Indicators:
 - These are indicators showing the status of an output “CHAMBER RUNNING” as shown in [7. Widget Bar](#). For instance the “CHAMBER RUNNING” indicator shows whether the chamber is running or not. The available states are:
 - Enabled: 
 - Disabled: 

8. Soft Buttons

The buttons located below the screen are used to navigate through the various menus on the



controller.

	Name	Function
1	Home	Returns directly to the home menu as shown in 2. Home Screen
2	Menu	Enter the controller setup menus; for more details refer to Watlow’s “F4T Setup Operation” manual.
3	Back	Go back to the previous screen
4	Help	Shortcut to the help menu, gives details about the controller’s installed hardware and software.

9. Common Operations

This section details how to do common tasks; it does not go into detail about the function of each screen.

9.1 Start or Stop the Chamber

From the home screen ([2. Home Screen](#)) press the “START STOP” button on the widget bar.

To stop the chamber (“CHAMBER RUNNING” Enabled):

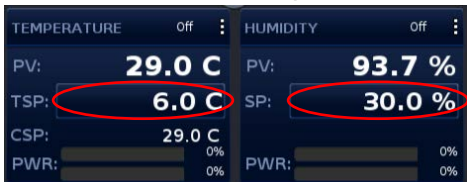


To start the chamber (“CHAMBER RUNNING” Disabled):



9.2 Change the Temperature/Humidity Set Point

From the home screen ([2. Home Screen](#)) press the “TSP” or “SP” button (circled below) of the desired control loop then use the on screen number pad to enter the new set point.



9.3 Start a Profile

From the home screen (2. Home Screen):

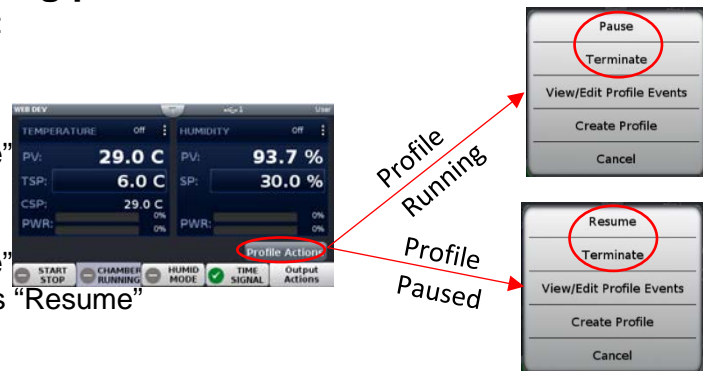
1. Press “Profile Actions”
2. Press “Run Profile”
3. Press “Actions” (of the desired profile)
4. Press “Run Profile” or “Custom Run”
 - a. “Run Profile” will start the selected profile at step 1.
 - b. “Custom Run” will allow the start step to be selected.



9.4 Stop/Pause/Resume a running profile

From the home screen (2. Home Screen):

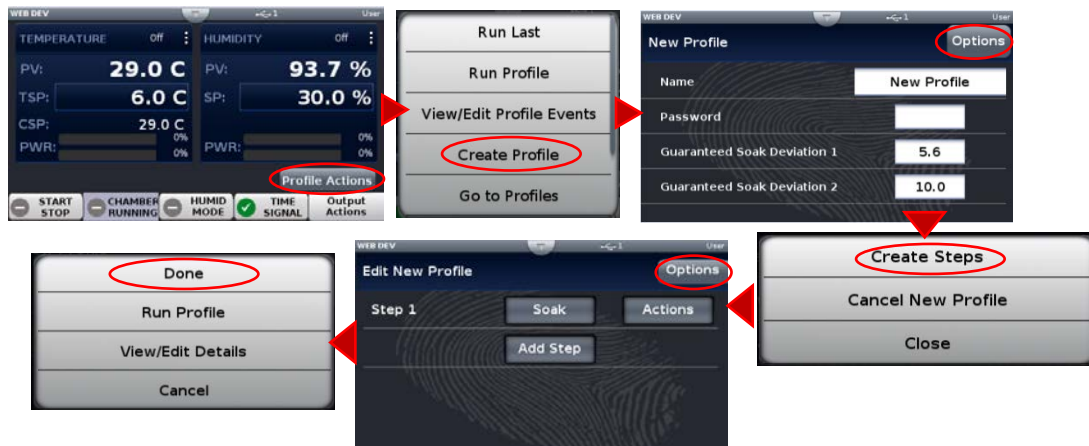
1. Press “Profile Actions”
2. The program is running:
 - a. To stop it press “Terminate”
 - b. To pause it press “Pause”
3. The program is paused:
 - a. To stop it press “Terminate”
 - b. To resume execution press “Resume”



9.5 Create a Profile

From the home screen ([2. Home Screen](#)):

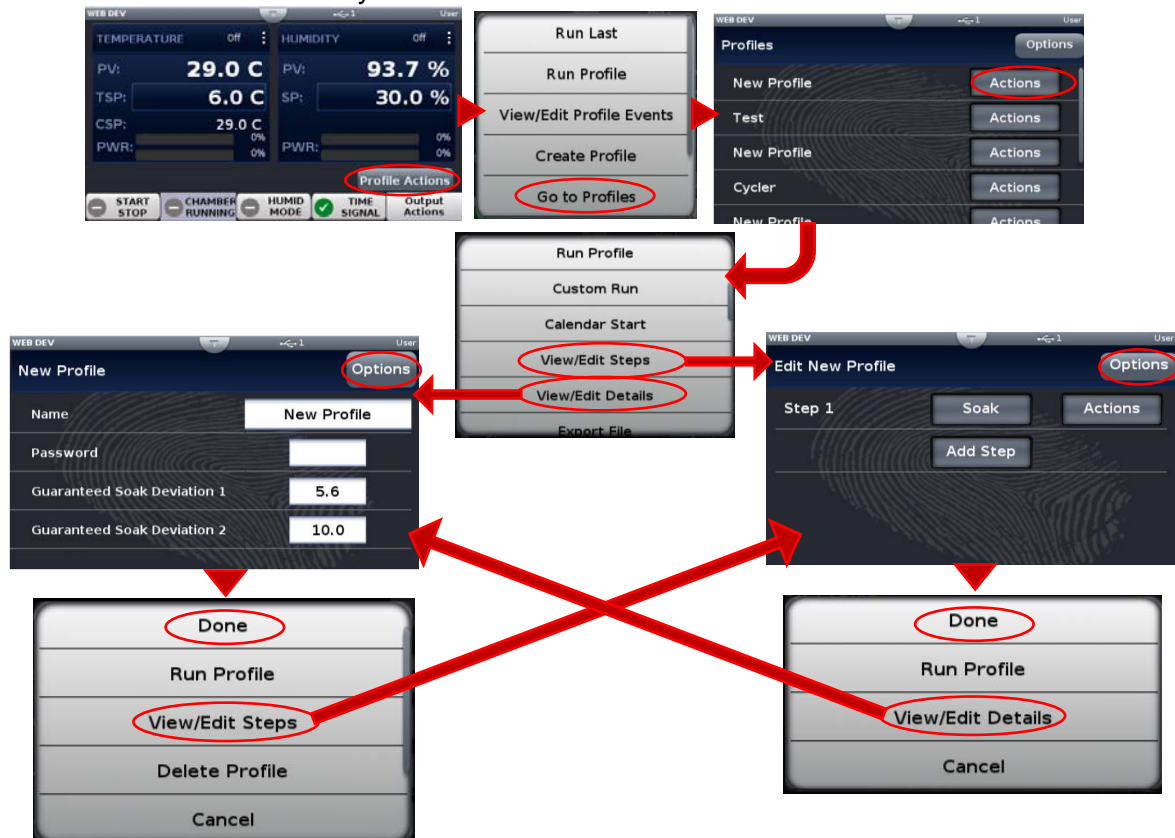
4. Press “Profile Actions”
5. Press “Create Profile”
6. Enter Profile details
 - a. For full details see [6.3 Create a Profile](#).
7. Press “Options”
8. Press “Create Steps”
9. Input the desired steps and their parameters.
 - a. For full details on the functionality of the profile step editor see [6.4.2 Profile Steps](#).
 - b. For full details on each step type see [6.4.3 Step Types & Parameters](#).
10. Press “Options”
11. Press “Done”



9.6 Edit a Profile

From the home screen ([2. Home Screen](#)):

1. Press “Profile Actions”
2. Press “Go to Profiles” (not available when a profile is running)
3. Press “Actions” on the desired profile.
4. Press “View/Edit Steps” to modify profile steps
 - a. Modify the profile steps.
 - i. For full details on the functionality of the profile step editor see [6.4.2 Profile Steps](#).
 - ii. For full details on each step type see [6.4.3 Step Types & Parameters](#). Press “Options”
 - b. Press “Done”
5. Press “View/Edit Details” to modify global parameters (Name, Password, Guaranteed Soak Deviation)
 - a. Modify profile details
 - i. For full details see [6.4 Edit a Profile](#).
 - b. Press “Options”
 - c. Press “Done”
6. Press the home soft key below the screen.



9.7 Delete a Profile

From the home screen (2. Home Screen):

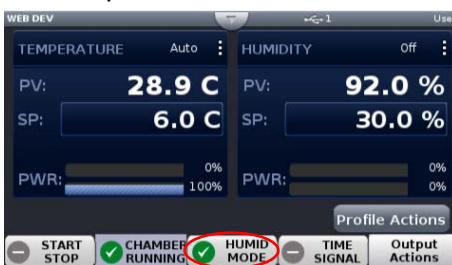
1. Press “Profile Actions”
2. Press “Go to Profiles” (not available when a profile is running)
3. Press “Actions” on the desired profile.
4. Press “Delete Profile” (at bottom of menu scroll the screen down)



9.8 Enable/Disable Humidity (humidity chambers only)

From the home screen (2. Home Screen) press the “HUMID MODE” button on the widget bar. The button also indicates the current state.

Humidity Enabled



Humidity Disabled



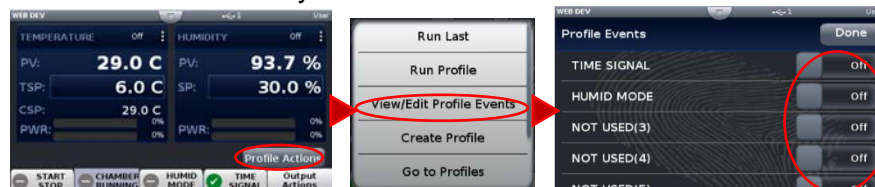
9.9 Enable/Disable a Profile Event

From the home screen (2. Home Screen):

1. The profile events “HUMID MODE” (humidity chambers only) and “TIME SIGNAL” events are available on the widget bar.
 - a. Press on the event to enable it or disable it.



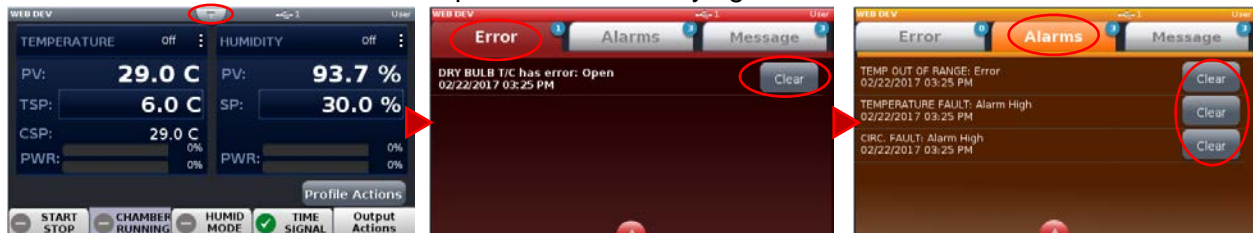
2. To access other time signals.
 - a. Press “Profile Actions”
 - b. Press “View/Edit Profile Events”
 - c. The On/Off sliders may be used to turn each event on and off.



9.10 Clear an Alarm

From any screen:

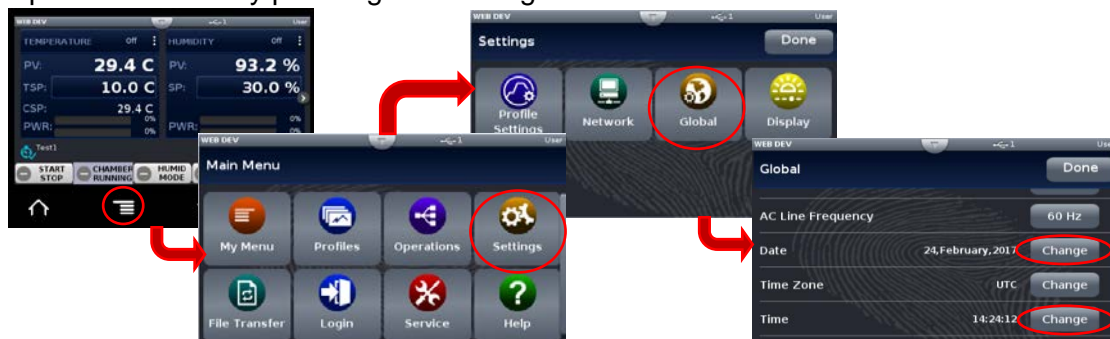
1. Press the down arrow on the status bar.
2. Select the “Error” tab
3. On each error press the “Clear” button
 - a. If no clear button is present the underlying cause must be corrected first.
4. Select the “Alarms” tab
5. On each alarm press the “Clear” button
 - a. If no clear button is present the underlying cause must be corrected first.



9.11 Set the Date/Time

From any screen:

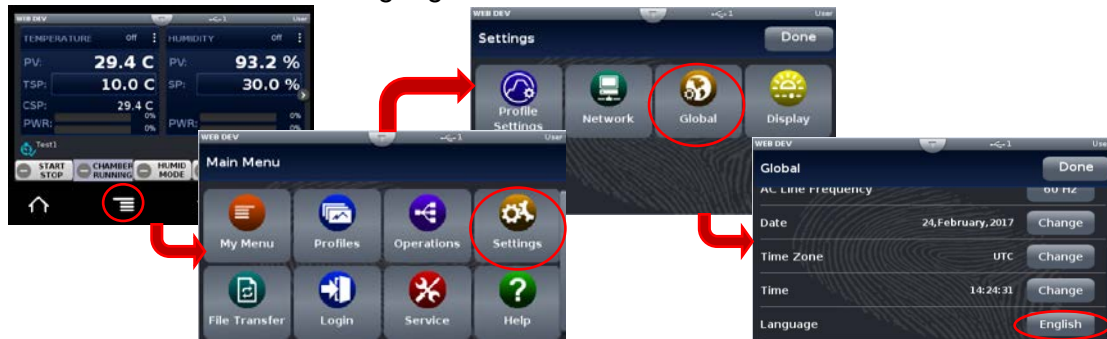
1. Press the menu soft button.
2. Press the “Settings” button.
3. Press the “Global” button.
4. Update the Date by pressing the “Change” button on that row.
5. Update the Time by pressing the “Change” button on that row.



9.12 Change the Language

From any screen:

1. Press the menu soft button.
2. Press the “Settings” button.
3. Press the “Global” button.
4. Press the button on the “Language” line.



9.13 Change the Controller Temperature Units (°C or °F)

From any screen:

1. Press the menu soft button.
2. Press the “Settings” button.
3. Press the “Global” button
4. Press the button on the “Temperature Units” line.
5. Select the desired units.
6. The communications interfaces each have their own independent temperature unit's settings.
 - a. To configure Modus TCP (communications over Ethernet) see [9.14 Configure the Controller for a Network \(Modbus TCP\)](#).
 - b. To configure Modbus RTU (communications over RS232 or RS485) see [9.15 Configure the RS232/RS485 interface \(Modbus RTU\)](#).



9.14 Configure the Controller for a Network (Modbus TCP)

From any screen:

1. Press the menu soft button.
2. Press the “Settings” button.
3. Press the “Network” button
4. Press “Ethernet”



5. Configure the network settings as desired.
 - a. Note that when using “DHCP” as the “IP Address Mode” and the “Actual IP Address” is 192.168.0.222 the F4T failed to find a DHCP server and has fallen back to this default IP address. This could mean one of the following:
 - i. The F4T was not plugged into a network at boot.
 - ii. The network was not allowing the F4T to join the network.
 - iii. The network does not support DHCP.
 - b. To use a static IP Address:
 - i. Change “IP Address Mode” from “DHCP” to “Fixed”
 - ii. Enter the required IP address, subnet, and gateway into the newly visible fields (there will be 4 for each).
 - c. To use DHCP:
 - i. Change “IP Address Mode” to DHCP.
 - d. Configure Modbus:
 - i. “Modbus TCP Enable” will turn Modbus over Ethernet on or off.
 - ii. “Modbus word order” specifies how the 32bit Modbus value registers will be arranged (ESPEC’s software all expect “Low High”)
 - iii. “Modbus Data Map”: Select which Modbus register map to use:
 1. The standard F4T interface, offers full access to everything (ESPEC’s software all expect this map)
 2. The F4 compatibility mode, offers some data on the old F4 modbus register map. This mode is very limited and is not supported by ESPEC.
 - e. Press the “Done” button
 - f. Cycle power to the chamber

9.15 Configure the RS232/RS485 interface (Modbus RTU)

From any screen:

1. Press the menu soft button.
2. Press the “Settings” button.
3. Press the “Network” button
4. Press the “Modbus” menu item.



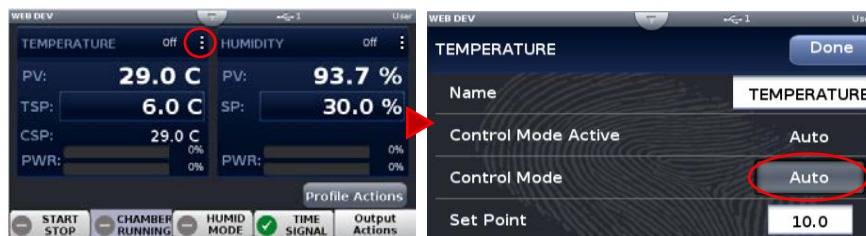
5. Configure the settings to match the required installations:
 - a. “Modbus word order” specifies how the 32bit Modbus value registers will be arranged (ESPEC’s software all expect “Low High”)
 - b. “Modbus Data Map”: Select which Modbus register map to use:
 1. The standard F4T interface, offers full access to everything (ESPEC’s software all expect this map)
 2. The F4 compatibility mode, offers some data on the old F4 Modbus register map. This mode is very limited and is not supported by ESPEC.
6. Press the “Done” button
7. Cycle power to the chamber.

9.16 A Control Loop stays off

When a Profiles end step is setup to turn a control loop off running the chamber at constant set points can be difficult. To fix this problem follow the procedure below:

From the home screen ([2. Home Screen](#))

1. Press the three dots next to the loop name.
2. Change “Control Mode” to “Auto”.
3. Press the “Done” button.



9.17 Setup Power out Profile Resume

When power is lost unexpectedly the F4T can be configured to resume a profile (if it was running) when power is restored.

1. Press the menu soft button.
2. Press the “Settings” button.
3. Press the “Profile Settings” button.
4. Enter the maximum allowed down time (length of power outage) in the “Power Out Minutes” & “Power Out Hours” fields. Setting both of these to 0 disables this feature.
5. Press “Done”



Using the Watlow F4t Controller: Supplemental User Manual

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v.1.00 3/2017

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