

# Watlow EZ-Zone Controller – Ovens



## Profile Programing Guide Watlow Controller

Watlow EZ-Zone for Sheldon Ovens

# WATLOW PROGRAMING GUIDE



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## *PURPOSE*

This guide describes how to program and launch heating profiles in the Watlow EZ-Zone Temperature Controller, when installed in Sheldon Manufacturing ovens. It is a simplified alternative to Chapter 7 of the controller's factory-provided manual, and explains the most commonly used programming options.

## *INTRODUCTION*

The Watlow EZ-Zone Controller can hold up to four heating (4) **profiles**, each with ten (10) sequential **steps**. Each step can be used to initiate one of three commonly used **options**:

- **Timed Interval.** Heating or cooling the oven.
- **Soak.** Constant temperature period.
- **End.** Concludes a running profile.

Each option includes **parameters** that can be set by the user. For example, the Soak option comes with time duration parameters for hours, minutes, and seconds.

All steps are stored sequentially in the controller's long-term memory.

- Profile 1: steps 1 -10
- Profile 2: steps 11 – 20
- Profile 3: steps 21 – 30
- Profile 4: steps 31 - 40

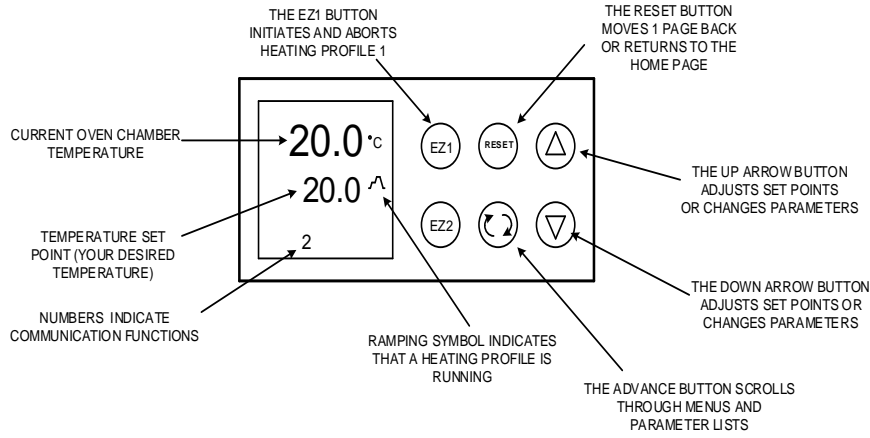
Steps and heating profiles will remained stored when the oven is turned off or experiences a power outage. In the event of a power interruption while running a profile, the oven will restart if the Power Switch is in the On position, but it will not automatically resume the profile. An interrupted profile must be re-launched by the user.

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## Watlow Controller Details



### MAIN TEMPERATURE CONTROL

The Watlow EZ-Zone Controller is used as the main temperature controller and display on several Sheldon Manufacturing ovens, and is labeled SET TEMPERATURE. The controller has a digital display, and Up / Down Arrow buttons used for adjusting the oven's temperature set point and for selecting menu options. On some ovens models the arrows are also used for setting the Over Temperature Limit setting.

EZ1

The EZ1 button is a shortcut button to launch heating Profile 1. It can also be used to manually abort a running profile.



The green Advance Button advances the display through pages and option lists.

RESET

The RESET Button is used to move the display back to previous pages when programing heating profiles, and to return to the Home Page. The Reset Button is labeled with an infinity  $\infty$  symbol on older Watlows.

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**Note:** The EZ2 Button does not have a function in Sheldon Manufacturing ovens.

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## COMMONLY USED PROFILE STEP OPTIONS

| Option  | Display Code | Function   |
|---|--------------|--|
| <b>Ramp Up / Ramp Down<br/>(Timed Interval)</b> | Ti           | The Timed Interval step option is used for ramping up or ramping down the oven's temperature over a user-selected time interval. <b>Note:</b> Use of this option must take into account the oven's maximum heating and cooling rates, which can vary with environmental conditions of your shop, production space, or laboratory.                            |
| <b>Soak</b>                                     | SoAh         | The Soak option runs the oven at a constant temperature for a duration programed using the option's minute, hour, and second parameter settings.   |
| <b>End Profile</b>                              | End          | <p>The End option ends a running profile when that step is reached. If the End option is not chosen, a running profile will advance to the next programed step stored in the controller's memory.</p> <p>The User "USER" parameter choice for End restores the oven to the user's manual control, and returns the oven to its pre-profile heating state.</p> |

## POWERING THE EXTERNAL OUTLET

This section does not apply to vacuum ovens.

Some forced air and convection ovens are provided with an external electrical outlet for powering an accessory exhaust blower fan. Watlows for these ovens include an **Event 1** parameter for each step option. Switching this parameter from Off to On will trigger the power up of the oven's external power outlet, and any equipment attached to it, when the step is reached during a profile. Switching to parameter to Off depowers the outlet, when the step is reached.

By default the Event 1 parameter is set to Off. It must be switched to On **for each successive step** that you want it to run during the execution of the profile.

As of the current printing of this guide, the following ovens can use the Event 1 parameter to power an external exhaust blower: SMO5HP-2, SMO10HP-2, SMO14HP-2, SMO34HP-2, SMO38HP-2, and SMO5CR-2

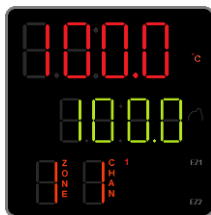
*The units previously designated as: HF4-2, HF10-2, HF15-2, HF25-2, HF37-2, and CR1-2*

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**Note:** The Event 2 parameter is not associated with an output or a function for Sheldon ovens. Always leave Event 2 set to Off.

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The Home Page

Temp in Red

Set Point in Green

## PROGRAMING A SIMPLE HEATING PROFILE

This is three-step profile that will ramp the oven up to 150°C over a one (1) hour period; then soak at 150°C for four (4) hours; and then return the oven to its pre-profile state, and manual user control.




An instructional video showing how to program this profile can be found at:  
<http://www.shellab.com/store/virtual-tour-vac-oven.html>.

The video applies to all ovens with the Watlow EZ-Zone Controller.












If at any time during the procedure you find yourself on the wrong screen, press the Reset Button once to jump back one page.

*Begin procedure on next page*

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|   |   |
|---|---|
|  <h2>Accessing the Profile Selection Menu Page</h2> <p>5 seconds</p> <ol style="list-style-type: none"> <li>1. Push and hold the green Advance Button for five (5) seconds. The display will advance twice. Release the button after the second advance, when the display shows “P1” “ProF”. This is the Profile Selection Page.             <ol style="list-style-type: none"> <li>a. The P1 indicates that Profile 1 is selected. You can scroll through all four profiles using the Up and Down Arrow buttons. Stay on P1 for this exercise.</li> </ol> </li> </ol> | <h3>1) Profile Selection Menu</h3>   |
|  <h2>Profile 1, Step 1 (1 hour ramp up to 150°C)</h2> <ol style="list-style-type: none"> <li>2. Press the green Advance Button again to choose Profile 1. The display should now read “1 P1”, indicating that the display is showing Step 1 of Profile 1. This is the Step Selection Menu.</li> </ol>  | <h3>2) Step Menu, Profile 1</h3>     |
|  <ol style="list-style-type: none"> <li>3. Press the Advance Button again to move to the Option Setup Page for Step 1. The “S.tYP” page name will show in green, and options for the step are shown in red.</li> </ol>   | <h3>3) Option Setup Page</h3>      |
|  <ol style="list-style-type: none"> <li>4. Press the Up or Down Arrow until the top display shows “Ti” for Timed Interval. This is the <b>ramping</b> timed interval option. It can be used to both ramp up and ramp down the oven’s temperature over a user-specified time period.</li> </ol>   | <h3>4) Timed Interval Option</h3>  |
|  <ol style="list-style-type: none"> <li>5. Press the Advance Button once. The display will show “tSP1” for the Temperature Set Point 1 parameter, and an adjustable temperature set point in red.</li> </ol>   | <h3>5) Temp. Set Point</h3>        |

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|  |  |
|--|--|
| <p> Press and hold</p> <p>6. Adjust the temperature set point to 150°C using the Arrow buttons. Holding down an Arrow Button will cause the adjustment to speed up.</p>   | <p><b>6) Set Point 150 C</b></p>            |
| <p> 7. Press the Advance Button. This saves the setting of 150°C and advances to the Hour Parameter page.</p> <p> a. Use the Arrow Buttons to adjust the Hour setting to 1.</p> <p> b. Press the Advance Button advance to the Minute and then Second Parameter Pages. Adjust these parameters to zero (0) using the Arrow Buttons.</p> | <p><b>7 ) Hour Parameter Page</b></p>       |
| <p> 8. Press the Advance Button two (2) times to move through the “Ent1” and “Ent2” event parameter pages. Leave both of these parameters set to “oFF”.</p> <p>a. Pressing the Advance Button the second time will return the display to the Timed Interval Option setup page.</p>   | <p><b>8) Event Pages</b></p>               |
| <p> RESET</p> <p>9. Once back at the Timed Interval Option setup page press the Reset Button to return to the Step 1 on Profile 1’s Step Selection Menu.</p>  | <p><b>9) Timed Interval</b></p>           |
| <p>10. Step 1 of Profile 1 is now saved.</p>   | <p><b>10) Step 1 Profile 1 Saved</b></p>  |



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|   |   |
|---|---|
| <p> <b>Profile 1, Step 2 (4 hour constant temperature soak at 150°C)</b></p> <p>11. Use the Up Arrow Button to advance the top red display to “2”, for step 2 of the profile.</p>  | <p>11) Step 2 Profile 1</p>  |
| <p> 12. Press the Advance Button once to advance to the Option Setup page for Step 2.</p>  | <p>12) Setup Page 2</p>      |
| <p> 13. Use the Up Arrow Button to scroll through the options in the red menu to the “SoAh” Soak option. Soaking is a period of constant temperature. The default temperature for a soak is the last temperature set point selected in a previous step. In this case, the 150°C chosen in step 1.</p>  | <p>13) Soak Setup</p>       |
| <p> 14. Press the Advance Button to move to the “hour” parameter page.</p> <p> a. Use the Up Arrow to enter a value of four (4) hours in the top display for the soak.</p> <p> b. Press the Advance Button three (3) times to save the Hour value, then move through and save the Minute and Second parameters at 0.</p> | <p>14) Soak Time</p>       |
| <p> 15. Press the Advance Button two more times to move through the “Ent1” and “Ent2” event menu pages. Leave both parameters set to “oFF”.</p> <p>a. Pressing the Advance Button the second time will return the display to the Soak Option setup page.</p>   | <p>15) Event Pages</p>     |

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|  |  |
|--|--|
|  <p>16. Once back at the setup Soak Option Page, press the Reset Button to save the programed soak.</p> | <p><b>16) Soak Saved</b></p>              |
| <p>17. Step 2 of Profile 1 has now been saved.</p>   | <p><b>17) Step 2 Profile 1 Saved</b></p>  |

*Procedure continued on next page.*

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|  |  |
|--|--|
|  <h2>Profile 1, Step 3 (Ending the Profile)</h2> <p>18. Press the Up Arrow to advance to Step 3.</p>  | <p>18) Step 3 Profile 1</p>     |
|  <p>19. Press the Advance Button to move to the “S.tYP” setup option menu page for Step 3.</p> <p>a. Use the Up Arrow to select the “End” option to end the profile.</p>  | <p>19) Option Page, End</p>     |
|  <p>20. Use the Advance Button to move to the End Option parameter menu page.</p>  <p>a. Use the Arrow Buttons to select the “USER” parameter setting.</p> <p>b. The User setting will restore manual control of the oven to the user, and return the oven to its pre-profile heating state when the step is run.</p> | <p>20) User Parameter</p>      |
|  <p>21. Press the Advance Button three times to save the End parameter as User, and leave the Event 1 and Event 2 parameters set to Off.</p>  | <p>21) Event Pages</p>        |
|  <p>22. Once back at the “End S.tYP” setup page, press the Reset Button to save and return to Profile 1’s Step Selection Menu Page.</p>   | <p>22) End Setup, Saving</p>  |








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|   |   |
|---|---|
| <p> RESET</p> <p>23. Steps 1 – 3 of Profile 1 are now saved and ready to run as a self-terminating, three (3) step profile.</p> <ol style="list-style-type: none"><li>Press the Reset Button to return to the home page.</li></ol>   | <p>23) End Setup Saved</p>   |
| <p> <b>EZ1 Profile 1 Launch (Optional)</b></p> <p>24. Press the orange EZ1 shortcut button to quick launch Profile 1.</p> <p>A red “EZ1” will illuminate on the bottom right of the Home Page, and a red ramping icon will show just to the right of the green temperature set point. It may take several seconds for the controller to perform its calculations and then start heating the oven.</p> <p>The profile is now active and will run for its five (5) hour, three (3) step duration, unless aborted by pressing the EZ1 Button again.</p> | <p>23) End Setup Saved</p>  |

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## PROGRAMING PROFILES 2 - 4

The following procedure is used to start programing Profiles 2 – 4, beginning at the Home Page.

|   |   |
|---|---|
|  <p>Hold</p> <ol style="list-style-type: none"><li>1. Hold down the Advance Button for five (5) seconds to reach the Profile Selection Menu.<br/> a. Press an Arrow Button to select P2, or P3, or P4. "P2" indicates Profile 2, etc.</li></ol>   | <p>1) Profile Page</p>       |
|  <ol style="list-style-type: none"><li>2. Press the Advance Button.<ol style="list-style-type: none"><li>a. If P2 was chosen, the screen will now show "11 P2".</li><li>b. "11" indicates step 11. Profile 2 consists of steps 11 – 20 in the controller's memory.</li></ol></li></ol>   | <p>2) Step 1 Profile 1</p>  |
|  <ol style="list-style-type: none"><li>3. Press the Advance Button again to advance to the Option Setup Menu for Step 11.<br/><p>Program as many of Steps 11 – 20 of Profile 2 as needed, using the Timed Interval and Soak options. Choose the <b>End</b> option for the final step you wish to end the profile on. Repeat this procedure to program Profiles 3 or 4 as needed.</p></li></ol> | <p>3) Setup Page</p>       |









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## LAUNCHING PROFILES



Profile 1 may be **quick launched** from the Home Page by pressing the EZ1 Button once.

All four (4) profiles may be launched from the **Profile Start Menu**.

|  |  |
|--|--|
|  <ol style="list-style-type: none"> <li>Starting at the Home Page, press the Advance Button repeatedly until the Profile Start Menu appears in the display, with a step between 1 and 40 shown in red at the top right..</li> </ol>   | <p><b>1) Profile Start Menu</b></p>             |
|  <ol style="list-style-type: none"> <li>Use an Arrow Button to scroll to the you wish to launch             <ol style="list-style-type: none"> <li>Scroll to <b>Step 1</b> to launch Profile 1; <b>Step 11</b> to launch Profile 2; <b>Step 21</b> to launch Profile 3; <b>Step 31</b> to launch Profile 4.</li> </ol> </li> </ol>  | <p><b>2) Profile 2 Selected</b></p>            |
|  <ol style="list-style-type: none"> <li>After scrolling to the step, press the Advance Button.<br/>The display will advance to the Profile Action Request Page (P.AC1)</li> </ol>   | <p><b>3) Profile Action Request Page</b></p>  |
|  <ol style="list-style-type: none"> <li>Use an Arrow Button to change “nonE” to “Step”.<br/>Approximately three (3) seconds after changing the parameter setting, the heating profile will launch automatically, and the red ramping indicator will illuminate.<br/>The “Step” parameter setting will automatically revert back to “nonE” when the profile launches.</li> </ol> | <p><b>4) Profile Launching</b></p>            |

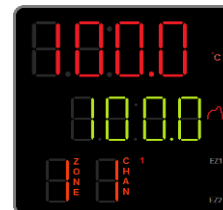
*Procedure continued on next page*

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5. Press the Reset Button to return to the Home Page while the profile is running.

5) Returned to Home Page



## COMBINING PROFILES

Profiles may be combined by programing their steps sequentially as a single profile. For example, programming steps 1 – 14 sequentially, and choosing the End option for Step 14, will cause Profile 1 to run through all 14 steps when launched. Launching Profile 2 in this programing configuration would only run Steps 11 – 14.

## ABORTING A RUNNING PROFILE

The EZ1 Button can be used to abort a running profile.

EZ1

- Press the button **once** to abort Profile 1 if it was launched using the **EZ1 quick launch function**.

EZ1

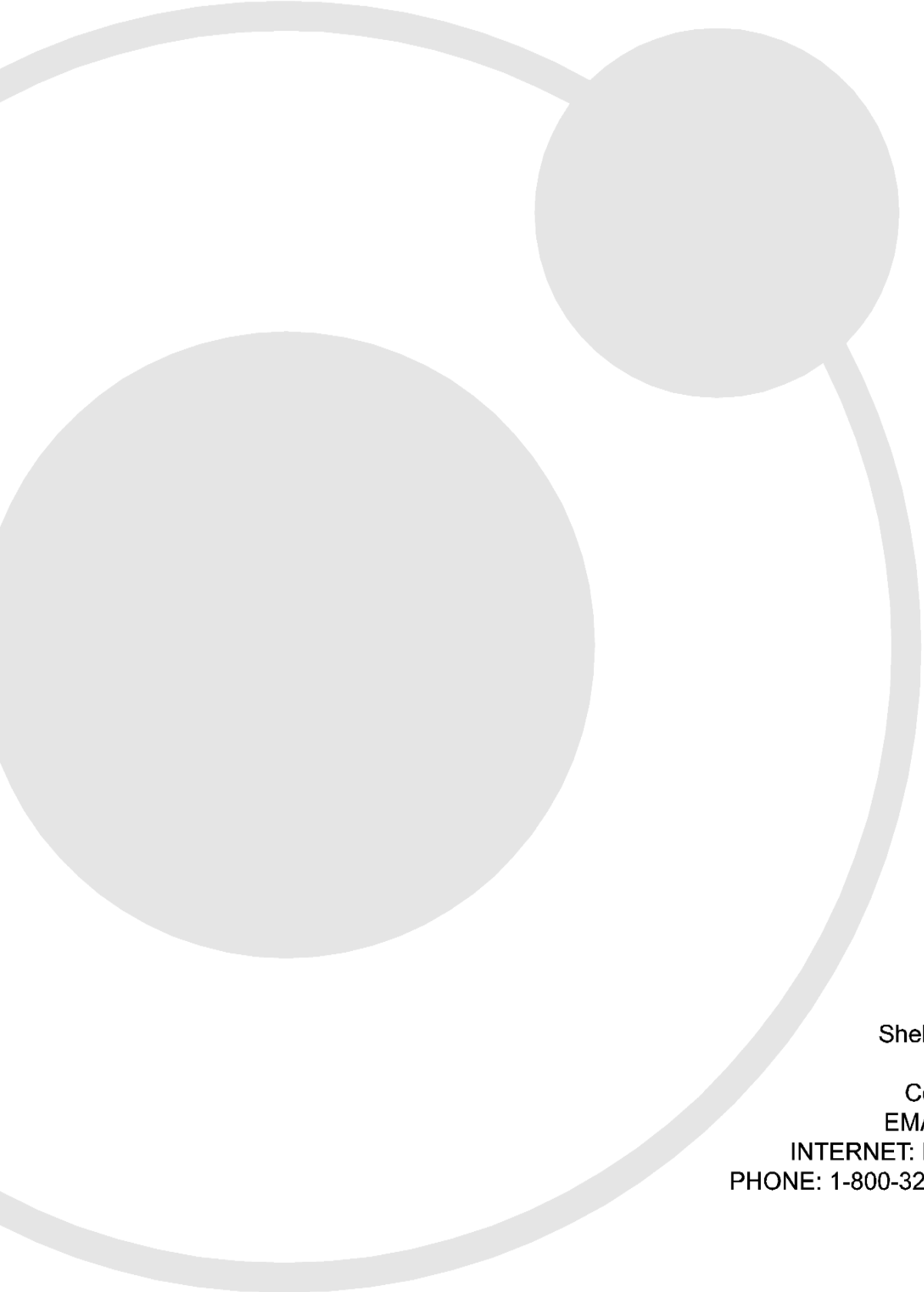
- Press the button **twice** to abort **any profiles launched from the Profile Start Page**, as described in items 1 – 5 on the previous pages.

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**Note:** Pressing the EZ1 Button while running a profile launched from the Profile Start Page does the following. It immediately launches Profile 1, ending the previous profile. Pressing the button a second time then aborts the newly launched Profile 1.

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End of Guide



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