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EZ-Zone Controller – Ovens

Temperature Program Manual

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PROGRAM ELEMENTS

The oven controller holds up to 4 heating programs. A program is a heating recipe captured in software form in order to automate multi-step baking or heat treatment applications. Each program has 10 steps allocated to it, with the steps stored sequentially in the controller memory.

- Program 1: Steps   1 – 10
- Program 2: Steps 11 – 20
- Program 3: Steps 21 – 30
- Program 4: Steps 31 – 40

Chamber temperature red (top)

Temperature setpoint green (middle)

Display Homepage

Step Types:

Timed Interval (ti)

The Timed Interval includes temperature and time parameters for heating up or allowing the oven to cool down over a set period. This is also known as ramping up or ramping down. Always account for the maximum heating rate of the oven when setting this parameter to heat up and for ambient conditions when setting it to cool down the oven.

The maximum programmable time limit for the controller is 99 hours, 55 minutes.

Soak (SoAh)

Sets time parameters for running the oven at a constant temperature. A Soak step always uses the temperature setpoint of the previous step.

End (End)

Terminates a running program. Always select the User "USEr" parameter option for End. This setting restores the oven to operator control and returns the oven to its pre-program heating state.

POWER AND MEMORY

Temperature program steps remain stored when the oven is turned off or experiences a power outage. In the event of a power interruption while running a program, the oven will restart if the Power switch is in the ON position, but it will not automatically resume the program. The operator must re-launch an interrupted program.

INTRODUCTION

EVENT PARAMETERS

Watlow controllers for these ovens include an Event 1 parameter as one of the final parameters for most step types. The pre-programmed Event 1 parameter function varies by oven type.

Event 1 Parameter Set to On

"2" illuminates when oven is calling for heat
"3" illuminates when Event 1 is set to On

Vacuum Automation Ovens

TVO-2-A and TVO-5-A ovens include vacuum automation and automatic backfill functions controlled by the controller Event 1 parameter.

When Event 1 is set to On, the oven vacuum valve opens. When the program reaches the next step in which Event 1 is turned off, the valve closes, and the oven partially backfills to 600 torr. The parameter can be set to On or Off as part of a heating program or manually set from the homepage menu.

The Event 1 parameter is set to Off by default. It must be set to On for each heating program step in which the oven chamber will be evacuating or held under vacuum.

The Event 2 parameter does not have a pre-programmed function.

Forced Air Ovens – Powering an Attached Exhaust Blower

TFO-10 and TFO-28 ovens are each provided with an external electrical outlet, intended for powering an accessory exhaust blower fan mounted on the oven exhaust vent.

When the Event 1 parameter is set to On, the oven routes power to its external power outlet. When the program reaches the next step in which Event 1 is set to Off, the oven depowers the outlet.

The Event 1 parameter is set to Off by default. It must be set to On for each program step in which power will be supplied to an exhaust blower.

The Event 2 parameter does not have a pre-programmed function.
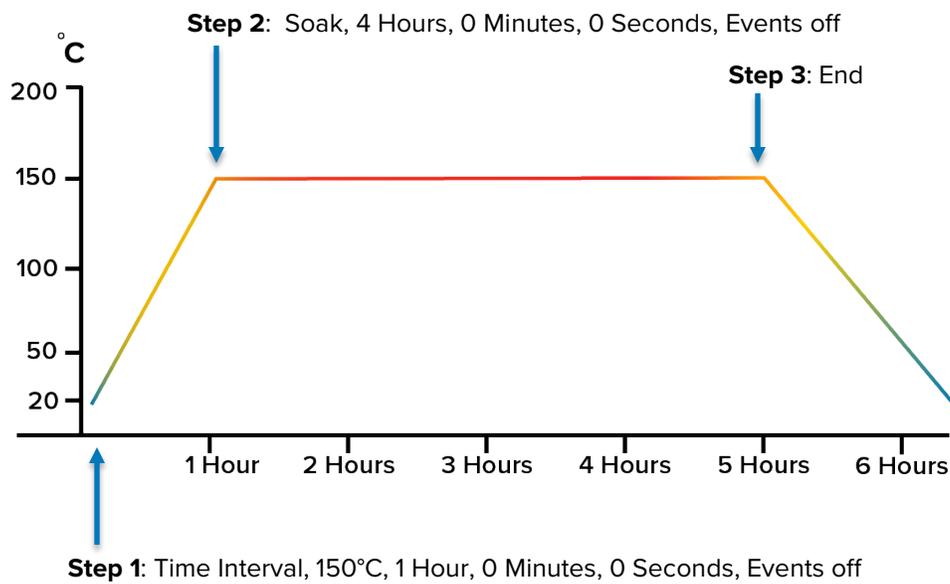
Note: The exhaust blower will suffer damage if directly exposed for prolonged periods to air 80°C or hotter while turned off. The exhaust vent the blower is mounted on should remain closed until the blower is activated. The vent dampener must be manually opened.

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SIMPLE HEATING RECIPE PROGRAM EXAMPLE

- **Step 1**: A Timed Interval that ramps the oven up to 150°C over a 1-hour period

- **Step 2**: A Soak that runs the oven at 150°C for 4 hours

- **Step 3**: An End that terminates the program and returns the oven to manual user control

Step 2: Soak, 4 Hours, 0 Minutes, 0 Seconds, Events off

Step 3: End

°C

200

150

100

50

20

1 Hour   2 Hours   3 Hours   4 Hours   5 Hours   6 Hours

Step 1: Time Interval, 150°C, 1 Hour, 0 Minutes, 0 Seconds, Events off

The constant temperature setpoint on the homepage is set to zero in this example. When the program reaches its End step, the oven returns to the constant temperature setpoint. In this case, it will cool to room temperature plus waste heat from the oven.

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PROGRAM EXAMPLE 1

SETTING UP THE EXAMPLE PROGRAM

RESET

If at any time during the procedure you find yourself on the wrong screen, push the Reset button once to return to the previous menu page.

Access the Program Page

1. **Advance to the Program (ProF) page, starting from the Homepage**

Press and hold for 5 seconds

- The display will advance between pages twice. Release the button when the display shows "ProF" in the green middle line.

- **Note:** The P1 indicates that Program 1 is selected. The Arrow buttons scroll through all 4 programs on this page. Stay on P1 for this exercise.

Step 1 (Program 1) 1-hour ramp up to 150°C

1. **Access the Program 1 Step Selection menu**

1X

Step 1 (top)

Program 1 (middle)

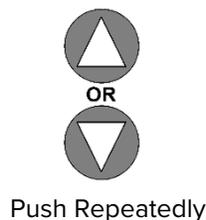**2.** **Advance to the Step Type (S.TYP) options menu for Step 1**

1X

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3. **Scroll to the Timed Interval option for the Step Type**

OR

Push Repeatedly

- Push the UP or DOWN arrow buttons repeatedly until the top line shows "ti"

- "ti" indicates the Timed Interval step type is selected.

- **Note**: Timed Intervals are used to ramp up or ramp down the oven temperature over a programmed period.

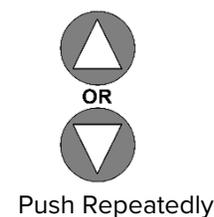**4.** **Advance to the Interval Temperature Setpoint parameter page**

1X

- T.SP1 indicates Temperature Setpoint.

- This is the temperature the oven will heat up or passively cool down to during the interval.

5. **Adjust the Temperature Setpoint to 150°C**

OR

Push Repeatedly

- Temperature Setpoint set to 150°C.

- **Note**: Pressing and holding an arrow button will cause the temperature to advance in increments of ten (10).

6. **Save the Setpoint and Advance to the Hours parameter page**

1X

- Hours parameter for the Timed Interval.

- **Note**: Pushing the Advance button both saves the new temperature setpoint and advances to the hour parameter.

7. **Set the Hours Parameter**

1X

- Set to 1 Hour.

- **Note:** This is the time in hours the oven will spend reaching the 150°C entered above. You must account for the maximum heating rate of the oven whenever you set this parameter.

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8. **Save the Hours parameter setting and Advance to the Minutes parameter page**

1X

- Minutes parameter for the Timed Interval.

- **Note**: Pushing the Advance button saves the Hour setting **and** advances to the Minutes parameter

9. **Leave the Minutes parameter set to zero and Advance to the Seconds parameter**

1X

- Push the Advance button without adjusting the Minutes Parameter.

10. **Advance through the Event parameters making no adjustments**

2X

- Pushing Advance twice skips through both Event pages, returning to the Step Type options.

- This leaves both Event parameters set to Off.

11. **Return to the Program 1 Step Menu from the Step Type menu page**

RESET

1X

- Step Type parameter menu, Timed Interval selected.

Step 1 of Program 1 is now saved

- Program 1 Step Selection menu.

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Step 2, 4-hour constant temperature soak at 150°C

1. **Scroll to Step 2**

1X

- Step 2 of Program 1 selected.

2. **Advance to the Step Type (S.TYP) Options menu for Step 2**

1X

3. **Scroll to the Soak Option**

OR

Push Repeatedly

- Push the Up or Down arrow buttons repeatedly until the top line shows "SoAh".

- **Note**: This is the heat Soak step type used to operate the oven chamber at a constant temperature over a selected period. **The Soak uses the temperature setpoint from the previous program step**.

4. **Advance to the Soak Hours parameter page**

1X

- Hours parameter for the Soak interval.

5. **Set the Hours Parameter**

- Set to 4 Hours for this exercise.

- **Note:** This is the time in hours the oven will spend soaking at the temperature entered in Step 1.

6. **Save the Hours setting and Advance to the Set Up menu page**

5X

- Pushing the Advance button 5 times saves the Hours setting, then skips through the Minutes, Seconds, and both Event parameters.

- **Note**: This leaves the Minutes and Seconds for Step 2 set to 0 (zero) and the Events set to Off.

7. **Return to the Program 1 Step Selection menu**

RESET

1X

- Step 2, Program 1

Step 3, Terminate Program, Restore User Control

1. **Scroll to Step 3**

- Step 3 of Program 1 selected

2. **Advance to the Step Type menu for Step 3**

1X

3. **Scroll to End option**

OR

Push Repeatedly

- Push the Up or Down arrow buttons repeatedly to scroll to "End".

- **Note**: This step type terminates an active program when the program reaches it.

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4. Advance to the End option parameter page

1X

- **Note**: Always leave this parameter set to "USEr". User restores control of the oven to the operator when the program terminates and resumes running the oven at the previous constant temperature setpoint.

5. Advance through the rest of the End loop parameters

3X

- This returns the display to the Step Type menu without changing the End or Event parameters.

6. Return to the Program 1 Step Selection menu

RESET

1X

- Step 3, Program 1.

7. Return to the Homepage

RESET

2X

The program is now ready to launch.

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SIMPLE PROGRAM LAUNCH

Program 1 (Step 1) can be fast launched on the Homepage using the EZ1 Button.

1. Quick launch Program 1.

EZ1
   a. Push the EZ1 button.

The current setpoint, which will adjust during timed interval steps as the oven heats or cools.

Ramping icon illuminates

"2" illuminates when heating after calculations

"EZ1" lamp illuminated

Program 1 is now active and will run for its complete duration unless aborted by pushing the EZ1 Button again.

EZ2 Pushing the EZ2 Button on the Homepage launches Program 2 (step 11).

- Pushing EZ2 a second time aborts the program.

End of Procedure

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ACCESSING PROGRAMS 2 - 4

How to access the programs to set up heating recipes.

Access the Programming Page

1. Advance to the Programming page, starting from the Homepage

Press and hold for 5 seconds

- The display will advance between pages twice. Release the button when the display shows "ProF" in the green middle line.

- **Note:** The P1 indicates that Program 1 is selected. The Arrow buttons scroll through all 4 programs on this page.

Select a Program and Access the Program Step Selection Menu

1. Select the Program you wish to set up

- Program 2 selected in this example.

2. Access the Program by advancing once

1X

- This is the first step of Program 2

- The oven controller holds 40 steps allocated between the 4 programs.

  Program 1: Steps   1 - 10
  Program 2: Steps   11 - 20
  Program 3: Steps   21 - 30
  Program 4: Steps   31 - 40

3. Advance to the Step Type menu for Step 11 (Program 2's first step).

1X

- The program can now be set up as per the example program on pages 6 – 11.

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COMBINING PROGRAMS

Programs may be combined by configuring steps sequentially as a single program.

For example, programming steps 1 – 14 sequentially and choosing the End Option for Step 14 causes Program 1 to run through all 14 steps when launched. Launching Program 2 in this configuration would only run Steps 11 – 14.

LAUNCHING PROGRAMS

Program 1 can be quick launched from the Homepage by pushing the EZ1 button once.

Program 2 can be quick launched from the Homepage by pushing the EZ2 button once.

EZ1

EZ2

All four (4) programs may be launched from the **Program Start Menu**.

1. **Advance to the Program Start menu, starting from the Homepage**

Push Repeatedly

- Push Advance repeatedly until "PSt1" appears in the middle display.

- Step 1 of 40 steps selected in this example.

2. **Scroll to the Program Step you wish to launch**

- First step of Program 2 selected in this example.

- Scroll to **Step 1** to launch Program 1; **Step 11** to launch Program 2; **Step 21** to launch Program 3; **Step 31** to launch Program 4.

3. **Advance to the Program Action Request Page (P.AC1)**

1X

- Advancing prepares the controller to launch the previously displayed Step.

4. **Change the Program Action Request parameter to Step "StEP"**

1X

- This launches the selected step.

Continued next page

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The Program will launch approximately 3 seconds after the Program Action Request parameter is changed to Step.

Action Parameter automatically reverts to none

Ramping icon illuminates

5. **Return to the Homepage**

RESET

1X

• The program will continue to run until reaching the first step set to End.

ABORTING A RUNNING PROGRAM

The EZ1 Button can be used to abort an active program.

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

EZ1
- Push the button **twice** to abort any programs launched from the Program Action page.

Note: Pushing the EZ1 Button while running a program launched from the Program Action page does the following.

1. It immediately quick launches Program 1, ending the previous program.

2. Pushing the button a second time then aborts the newly launched Program 1.

End of Guide

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