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# User Manual

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Mavam User Manual V3.0

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**NOTE:**

This manual is for the daily use of the machine. For detailed data, technical diagrams, installation, and troubleshooting please see the applicable document.

# Safety Warnings

## Safety Messages

### IMPORTANT Information for the Mavam Undercounter Espresso Machine

- **DISCONNECT FROM ALL POWER SOURCES BEFORE SERVICING**
- **Read the entire manual BEFORE operating this machine**
- **Steam and condensation from the steam wand discharge is HOT and may cause burns**
- **The steam wand tips become HOT during use, do not touch them - Use Caution!**
- **Always have the steam wand tip covered or inserted in the product to be steamed before turning steam on.**
- **Never remove the steam wand from the product that is being heated when the steam is on.**
- **Never remove the portafilter from the machine during the brewing process**
- **Keep water and moisture away from any electrical device or live power**
- **Steam tank water can be heated to 260°F (126°C), use caution around this**
- **The brew groups are heated to 200°F and deliver water as hot as 210°F (99°C) - Use Caution!**
- **Brew Group housings can be hot to the touch - Use Caution!**

#### *Brew Group*



## Warning Labels

**ATTENTION!** Wiring must conform to the current National Electric Code

**CAUTION!**

INSTALLER SUR UN CIRCUIT  
COMPORTAINT UNE PROTECTION A  
MAXIMUM D'INTENSITE DE # A or  
equivalent.

**CAUTION!**

TO BE INSTALLED WITH # A  
MAXIMUM OVERCURRENT  
PROTECTION- or equivalent

**WARNING!**

Wiring must conform to the current  
National Electric Code ANSI/NFPA No.  
70 or Canadian Electric Code Part 1,  
CSA Standard C22.1, and local  
building codes. Refer to wiring  
diagram. See nameplate on boiler box  
cover for minimum circuit ampacity and  
maximum over-current protection size.

**WARNING!**

Electric Shock Hazard. Can cause  
injury or death. Unit must be  
grounded in accordance with  
national and local codes.  
Line voltage is present at all  
components when unit is not in  
operation on units with single-pole  
contactors. Disconnect all remote  
electric power supplies before  
opening access panel. Unit may have  
multiple power supplies.

**SAFETY WARNING:**

The risk of serious burns or other bodily injury is always increased when working on a  
hot espresso machine. MAVAM LLC,  
is not responsible for personal injury can occur when servicing or maintaining any

## Operational Setting Limits

The machine will limit settings and operation to these ranges. They are not user adjustable.

Steam Pressure	0.0 to 1.5 Bar
Brew, Water Hose, and Group Temperature	85 to 110 C (185 to 230 F)
Steam Hose Temperature	100 to 178 C (212 to 350 F)
Pre-Infusion Time	0 to 360 seconds (6 minutes)
Brew Time	0 to 120 seconds (2 minutes)
Steam Time	0 to 120 seconds (2 minutes)
Water Time	0 to 30 seconds (½ minute)
Internal Boiler Unit Temperature	80 C (175 F)

# Overview

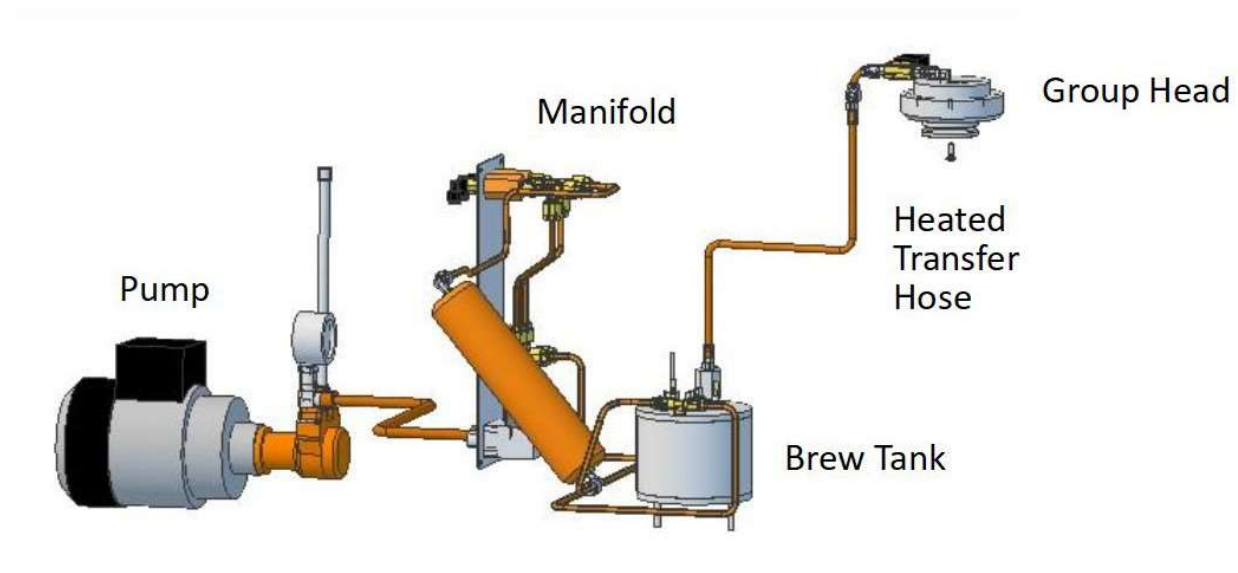
## Machine Description

The Mavam Under Counter Espresso Machine is a commercial espresso machine featuring a unique user interface that sits flush with the counter. Depending on model there may be one, two, or three group heads, one or two steam wands, one hot water jet, and one or two pitcher rinsers built into the drain tray. The steam boiler unit is connected to the user interface via heated transfer hoses. This allows the steam boiler unit to be installed up to 1 meter (3 feet) away from the user interface.

This arrangement allows the Barista to interact with the customer while working the machine. The user interface may also be finished in many styles: plated, powder coated, or stainless steel with various textures.

Another unique feature is the fully heated water path. Brew water is heated from entry into the Boiler Unit to the Group Head. This provides the user with a stable, steady, and constant supply of hot water to the coffee.

### *Water Path*



## Description of terms

The following terms are used throughout this manual and other Mavam publications. While not a full list these are the most used and common terms.

**User Interface:** This is the entire unit that sits on the countertop. It contains the Group tower, group head, steam wands, hot water jet, rinser jet, drain tray, operation controls and group display.

**Group Tower:** Stand connected to the User Interface counter panel that holds the brew head. The tower routes the hot water for brewing, power for the group heater, and brew head temperature sensors.

**Group Head:** Metal receptacle attached to the underside of the top of the Group Tower that holds the portafilter.

**Portafilter:** Mates with the Group Head and holds the basket containing ground coffee. A handle is attached to the portafilter so the barista may insert and remove the portafilter. There are many styles and configurations of portafilters.

**Blind Basket:** A cup that is installed in the portafilter without holes. This is used for cleaning the Group Head.

**Steam Wands:** Metal tubes shaped like an upside down “U”. Steam is piped from the steam boiler and exits at the Steam Wand tip.

**Hot Water Wand:** Metal tube shaped like an upside down “U”. Hot water is piped from the steam boiler and exits at the Hot Water Diffuser tip.

**Rinser Jet:** Fitting mounted in the Drip Tray connected to the rinser activation plate. When the rinser activation plate is pressed down cold water is sprayed from the fitting.

**Drain Tray:** Removable metal screen below the Group Heads. Water drains through this screen to the User Interface drain.

**Operation Controls:** Illuminated actuators button(s) that control a function of the machine. Each actuator may have more than one function depending on the mode selected.

**Group Display:** OLED display mounted in the User Interface base. This displays group temperature, mode of operation, and brew times for pre-infusion and brew cycles, and menu functions.

**Steam Boiler Unit:** Metal enclosure containing the steam boiler, brew tanks, water distribution manifold, pump interface, BCU (Boiler Control Unit electronics), 24V power supply.

**Pump:** AC motor with pump and pressure gauge and regulator attached. These are external to the unit.

## Machine Components

There are two categories of components, Main, and Group. Main components are the core parts of the Mavam Espresso machine regardless of the numbers of groups. Group components are the parts required for one group.

### Main Components

1. Boiler Unit: This contains the steam / hot water boiler, Pump power connections, Water distribution manifold, BCU, and 24V Power supply.
  - a. Steam boiler: Generates steam and is the hot water source for the hot water jet.
  - b. Pump power connections: Power output for the pump.
  - c. Water distribution manifold: Holds the check valves, pressure relief valves, steam boiler fill output, two water outputs per group.
  - d. BCU: Controls the steam boiler heat and fill, group temperature, and monitors internal temperature.
2. User Interface: The countertop piece of the machine holding the brew towers, steam wands, hot water jet, and user controls / display.
  - a. Steam wands: Outlet for steam from the steam boiler.
  - b. Water Jet: Outlet for the hot water tap from the steam boiler.
  - c. User Controls: Steam and Hot water buttons.

### Group Components

1. Boiler Unit: There is one of each of these components for each group.
  - a. Pump: Provides adjustable water pressure during brew.
  - b. Brew tank: Holds and heats water for the group before the heated transfer hose.
  - c. Heated transfer hose: Transports hot water between the Boiler Unit and User Interface.
  - d.
2. User Interface:
  - a. Group Tower: The focal point of the machine. Holds the Group Head, and the controls for the flow of water to the Group Head.
  - b. Grouphead: Holds the portafilter. The heater transfer hose is connected to the Group Head via a solenoid that controls water flow to the portafilter. The Group Head is also heated.
  - c. User Controls: Pre-infusion, Brew, Steam and Hot Water buttons.
  - d. User Display: Shows brew time information, mode, group temperature, and menu settings.



# Operation

## Controls

### Boiler Unit Controls

Controls on the boiler unit will usually not be needed during daily use of the machine.

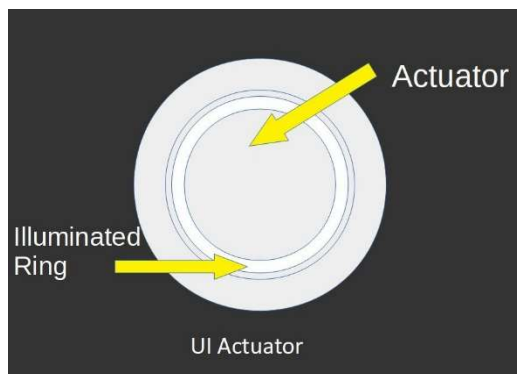
**Power Switch:** Power for the entire machine is controlled by the switch on the left side of the Boiler Unit. *Caution: while this removes power from the unit power is still supplied to the boiler unit from the main panel. Before working on or opening up the unit ensure power is removed from the main panel before beginning.*

**Boiler Unit Controller:** This is the main controller for temperature of all elements, steam pressure, steam hoses, fill, and internal sensing. Note: For operation of the BCU refer to the manual titled “BOILER UNIT CONTROLLER USE AND SETUP”.

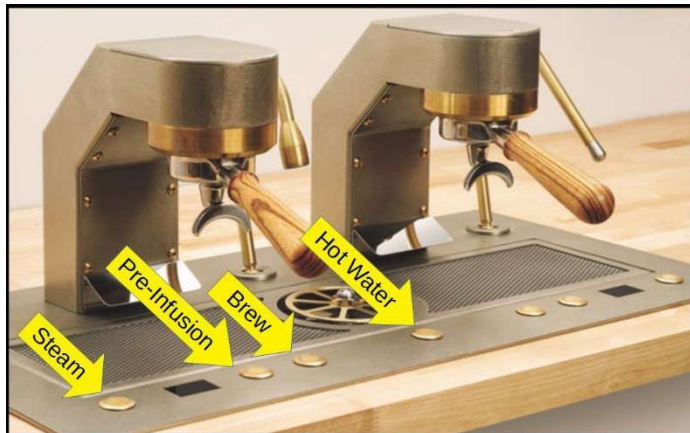
### User Interface

There are two main components of the User Interface used for operation, actuators, and UI display. Display is discussed in detail in the section “UI DISPLAY”.

### Actuators



*Actuator*



*Placement on User Interface*

UI Actuators control all the functions of the UI. They consist of an actuator, (the part you push), and an illuminated ring that indicates mode of operation.

## General

All controls on the User Interface are momentary actuators with an illuminated ring surrounding the actuator. The actuator controls all functions of the UI, (Pre-Infusion, Brew, Steam, and Water), the illuminated ring around the actuator indicates the state of the operation.

There are two types of actuators used on the UI, Mechanical and Piezo. Operation is slightly different for these two types of actuators. Any difference in operation between the mechanical and piezo actuators will be noted in the instructions. Mechanical actuators will depress when the center is pushed while Piezo actuators will not. Piezo actuators require a slight force to register a push different than the Mechanical actuators. Practice is encouraged prior to daily use with the Piezo actuators.

The illuminated ring has four different indications:

- Steady ON: This indicates the function is idle (off).

- Steady DIM: Used during the Pre-Infusion and Brew operation. Indicates that half of the operation not running. For example if PI is DIM and Brew is Slow Blink, Brew is on and PI is off

- Slow Blink: This indicates the function is running (on).

- Fast Blink: Only used in Menu mode when setting up group options.

All actuators operate in the same manner. If the function is off, (Steady ON), pressing the actuator will turn the function on (Fast Blink). If on, pressing the actuator will turn the function off. There is a short delay, ( $\frac{1}{4}$  second), required between pushes. Pushing the actuator faster than this will not register a new push.

Each actuator has two uses, regular operation, and menu (setting options for that group). Uses of the actuator are detailed in the “Functions” section.

## Startup

On power up the UI will display the version number in the upper data window. Please note this information for reference later on. Some operations are different depending on software version. These are noted in instructions as “After, (or before) Version X.X...” for example.

## Functions

Pre-Infusion and Brew are two phases of the coffee extraction cycle. Pre-Infusion introduces hot water to the coffee puck at a low pressure to saturate the coffee and let it bloom. Once the coffee has had a chance to bloom the Brew cycle is started. Hot water under pressure is forced through the coffee to produce espresso. Mavam gives the barista complete control over the time, pressure, and temperature the coffee is extracted at. How to change these settings is beyond the scope of this document, please refer to the appropriate instructions on how to change these settings.

### Pre-Infusion

Regular: Turns on and off the Pre-Infusion phase of the brew cycle. Maximum time allowed is 360 seconds (6 minutes). Pre-Infusion will shut off after this time.

Menu: Selects one of two options or increments a setting (counts up).

*NOTE: Holding down Mechanical actuator will in increment in 10s after counting three. Quickly pressing and releasing Piezo actuators will increment in 10s after a few pressed.*

### Brew

Regular: Turns on and off the Brew phase of the brew cycle. Maximum time allowed is 120 seconds (2 minutes). Brew will shut off after this time.

Menu: Selects one of two options or decrements a setting (counts down).

*NOTE: Holding down Mechanical actuator will in decrement in 10s after counting three. Quickly pressing and releasing Piezo actuators will decrement in 10s after a few pressed.*

### Steam

Regular: Turns on and off the Steam Wand. Maximum time allowed is 120 seconds (2 minutes). Steam will shut off after this time.

Menu: Used as Enter key.

### Hot Water

Regular: Turns on and off the Hot Water Jet. Maximum time allowed is 30 seconds (½ minute). Hot Water will shut off after this time.

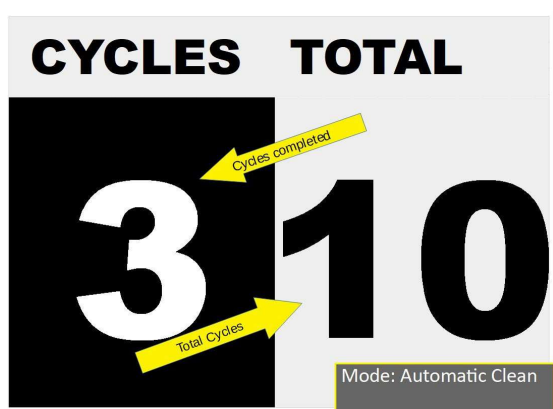
Menu: Used as alternate Enter key in three group machines.

## Group Head Cleaning

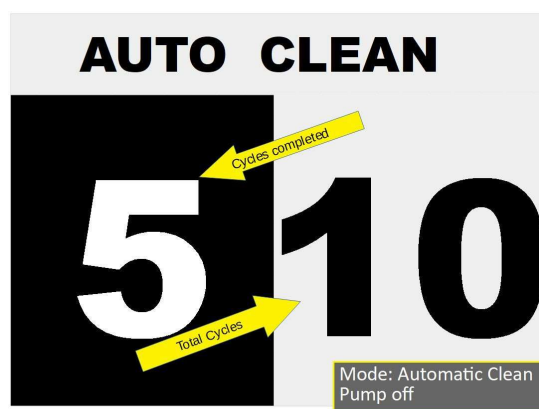
This is a special function usually performed at the end of the day. The clean cycle will run ten cycles of five seconds Brew phase and five seconds off. The UI display will show “AUTO CYCLE” in the top data window with the total cycles on the right of the bottom data window and cycles completed in the left of the bottom data window. After each cycle the top data window will display “CYCLES TOTAL” and a total of completed cycles. The following steps describe how to access this function

1. Enter Menu Mode
  - a. Using Mechanical actuators, and versions below 3.0, push and hold BOTH the Pre-Infusion and Brew actuators down until “HLD FOR MENU” shows in the top data display. Continue holding until “CLEAN? NO” is shown in the top data display.
  - b. Using Piezo actuators, and versions 3.0 and above, press and release BOTH Pre-Infusion and Brew actuators at the same time. “PSH FOR MENU” should show in the top data display. Press and release BOTH Pre-Infusion and Brew actuators again, (this has to be done within two seconds of the first part). If done within two seconds “CLEAN? NO” will show in the top data window.
2. When “CLEAN? NO” is shown use the Pre-Infusion actuator to change to “CLEAN? YES”. Press the Steam or Water actuator to start the clean cycle. If you do not want to perform the clean function leave at “NO” and press the Steam or Water actuator to move to the next menu function. Pressing the Brew actuator will change “YES” to “NO”.
3. Pressing either Pre-Infusion or Brew actuator at any time will cancel the clean cycle.
4. When completed, or stopped, the UI will return to Idle mode.

*Clean Cycle running*



*Clean Cycle running, Display between cycles*



# Manual and Automatic Modes

There are two modes used for the brew cycle, Manual, and Automatic. Current mode is shown in the upper left corner of the display in the upper data window. “MAN” = Manual, “AUTO” = Automatic.

*Note: In adherence to our philosophy of total user control you may change the mode “on the fly” for each shot if desired. For example, if in Automatic, you may want to pull a different shot. You can change to Manual when starting the shot and have full control of that shot.*

## Manual Mode

This mode gives the barista complete control over the brew cycle. Once a portafilter is inserted and ready for use the user may initiate the brew cycle by starting Pre-Infusion or go directly to Brew. In the brew cycle pressing the actuator for the phase that is running, (Slow Blink), will stop the brew cycle, pressing the other actuator, (Steady Dim), will change to that phase. For example: User starts the Pre-Infusion phase and after the desired time has elapsed starts the Brew phase. Pressing the Brew actuator will finish the cycle, pressing the Pre-Infusion actuator will change the brew cycle to the low pressure Pre-Infusion phase.

*Note: When Brew phase is started the elapsed time will continue to count up in the Brew phase window of the display.*

## Automatic Mode

*NOTE: This is for version 2.4 and above. Previous versions have one auto setting and do not show auto setting in lower window. Operation is the same as A1 for previous versions.*

Automatic settings are shown in the lower data window when idle, A1 and A2. Settings are shown as two numbers separated by a forward slash “A1:20/30 A2:15/25”. The first number is the Pre-Infusion time, the second is Brew time. Pressing the Pre-Infusion actuator will start A1, pressing the Brew actuator will start A2 (*if in Automatic mode*). When started the cycle will run for the pre-set time and stop. The program will be shown in the upper data window when running, “AUTO:1”, if running A1, “AUTO:2”, if running A2. The cycle may be stopped anytime by pressing the current phase actuator. For example, if in Pre-Infusion phase, pressing the Pre-Infusion actuator will cancel the cycle, (*For version 3.0 and above this is slightly different*).

## Changing Modes “On the fly”

The user may always change operating mode at the start of the brew cycle. Once the cycle has ended the mode will return to the preset mode. How to change modes is different depending on the type of actuator the machine is equipped with. The two types of actuators are Mechanical and Piezo. Each method is described separately below.

### Mechanical:

When starting a brew cycle press and hold the actuator for two seconds. This will switch modes “on the fly”.

### Piezo:

Start the brew session, then within two seconds, press the same actuator to switch modes. Pressing the actuator after two seconds will cancel the cycle. Pressing the same actuator right after switching modes will cancel the cycle.

### Operation:

When in Manual mode:

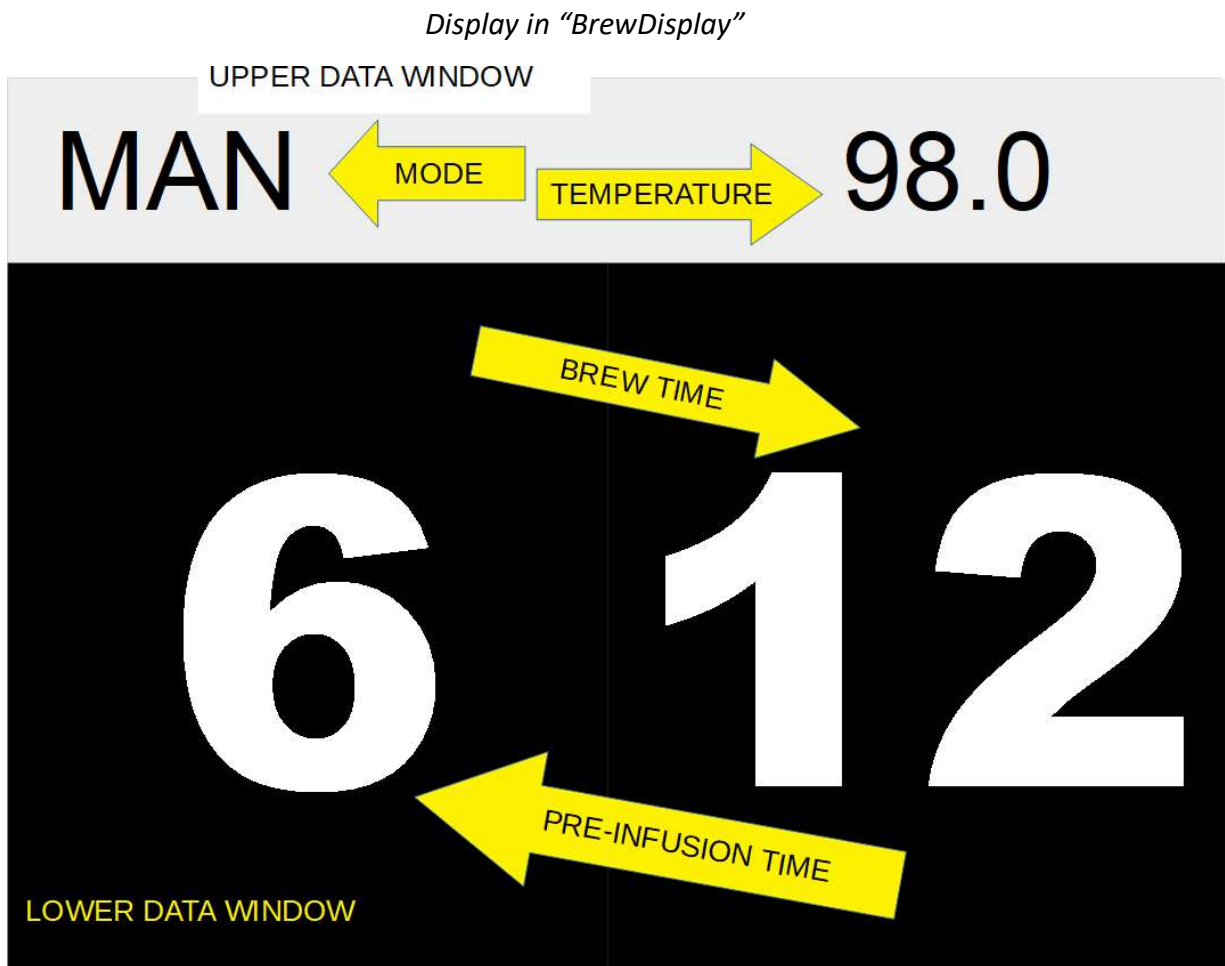
Using the Pre-Infusion actuator will switch to A1 Pre-Infusion Automatic mode, Brew actuator will start A2 Brew Automatic mode.

*NOTE: if using the Brew actuator the Pre-Infusion time will be skipped.*

When in Automatic mode:

Using the Pre-Infusion actuator will switch to Manual mode in Pre-Infusion phase, Brew actuator will start Manual mode in Brew phase.

## UI Display



There is one display per group. The display is located in the front of the UI, (closest to the barista), and centered on the group.

*Placement of Display on User Interface*



## Display Modes

There are two modes of display, Brew Display, and Menu Display. Brew mode is displayed when Menu mode is not being used.

### Brew Display

Information on the screen is dependant on what phase of operation is active and mode of operation. (X) refers to illustration on next page. The different phases are:

Idle: Group not in use, Steam and / or Water may be in use. (1), (2), (3)

Pre-Infusion: Pre-Infusion phase of the brew cycle in use. (4)

Brew: Brew phase of brew cycle in use (5)

Post Brew: Pre-Infusion and Brew phase finished. (6)

Menu: Changing group options. See *“Using the Menu Functions”*

Modes of operation are Manual, and Automatic.

### Data Table

Table of data shown in different phases and modes.

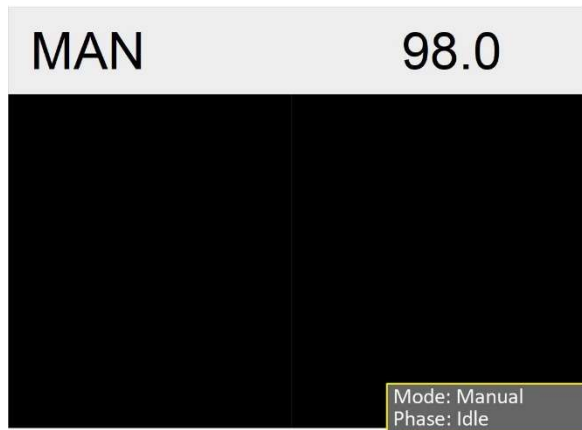
Phase	Mode	Steam, Water ON	Group Temperature	Pre-Infusion Time	Brew Time	Auto Settings
Idle	M, A	M,A	M, A	X	X	A
Pre-Infusion	M, A	X	M,A	M,A	M,A	X
Brew	M,A	X	M,A	M,A	M,A	X
Post Brew	M,A	M,A	M,A	M,A	M,A	X
Menu	S	S	S	S	S	S

M = Shown in Manual Mode, A = Shown in Automatic Mode, X = Not Displayed, S = Special use

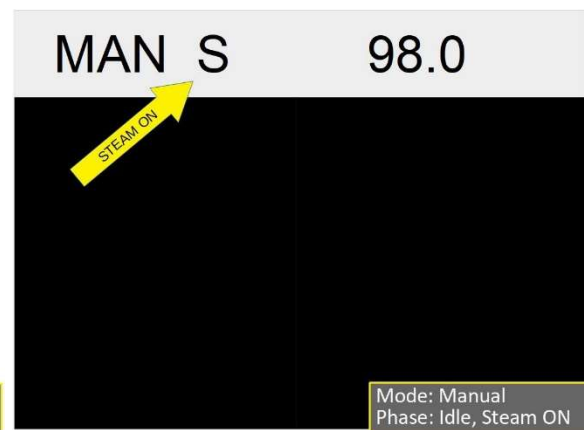


## Screen Examples

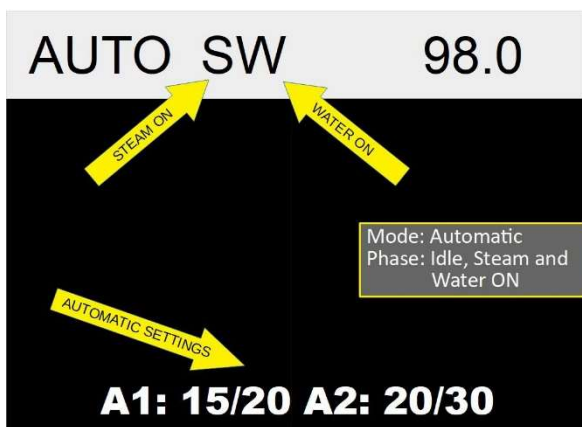
(1) Idle Screen



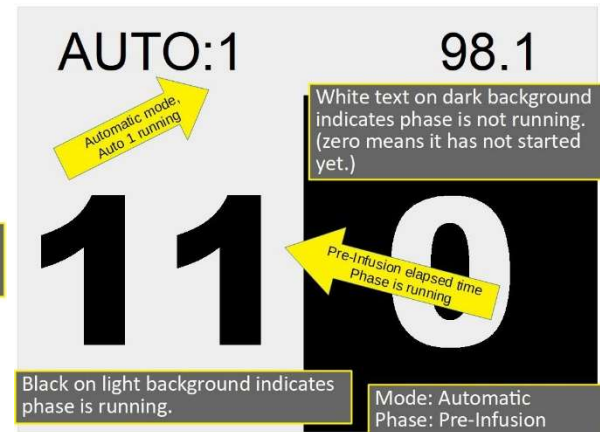
(2) Idle Screen, Steam ON



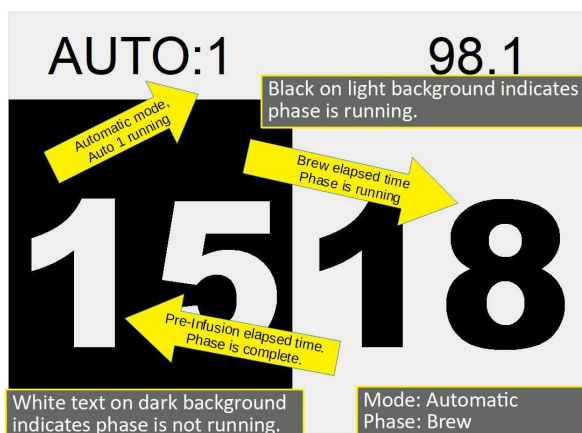
(3) Idle, Steam and Water ON



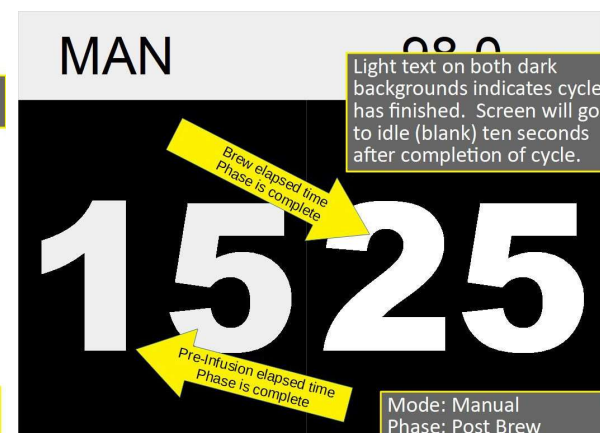
(4) Pre-Infusion phase



(5) Brew phase



(6) Post Brew phase



Menu functions and screens are covered in “USER INTERFACE MENU INSTRUCTIONS”

# USER INTERFACE MENU INSTRUCTIONS

## Menu Overview

Menu functions allow the user to set or change the operating parameters of the User Interface. Features available in the menu are listed in order with the *Parameter* in italics and options available in parenthesis (). Default option shown in brackets [].

1. *CLEAN?* [NO], (YES) Selects auto clean cycle if yes.
2. [*CELSIUS*], (*FAHRENHEIT*) Selects temperature unit.
3. *OFFSET* [0.0] Sets a hardware offset for the temperature display. *NOTE*: only set this if you are sure you know the the calibrated temperature of the group. This is set at the factory and normally does not need to be changed.
4. [*MANUAL*], (*AUTOMATIC*) Changes mode between Manual and Automatic.
5. *AUTO PI NO:1* [0], (0 to 360) Sets the Pre-Infusion time for Automatic one.
6. *AUTO BR NO:1* [0], (0 to 120) Sets the Brew time for Automatic one.
7. *AUTO PI NO:2* [0], (0 to 360) Sets the Pre-Infusion time for Automatic two.
8. *AUTO BR NO:2* [0], (0 to 120) Sets the Brew time for Automatic two.
9. *EXITING MENU* End of menu, returns to Idle.

If there is no activity for thirty (30) seconds the menu function will exit and return to Idle.

The Steam AND / OR Water Actuator is used as an Enter button. On three group machines the Water actuator is used for the center User Interface Enter button. For ease of display the Steam Actuator is shown in all illustrations.

## Entering the Menu

There are two methods of entering the menu functions depending on the version number.

### Below Version 3.0

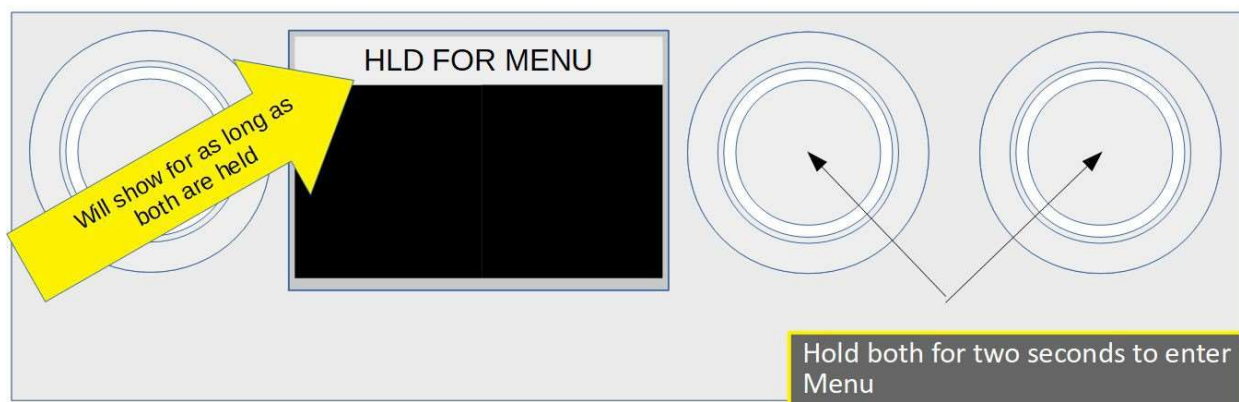
Push and hold BOTH the Pre-Infusion and Brew actuators down until “HLD FOR MENU” shows in the top data display. Continue holding until “CLEAN? NO” is shown in the top data display. One of the brew phases may start while holding the buttons, it will be cancelled when the menu is entered. Releasing either actuator before two seconds will exit the menu and return to idle.

### Version 3.0 and above

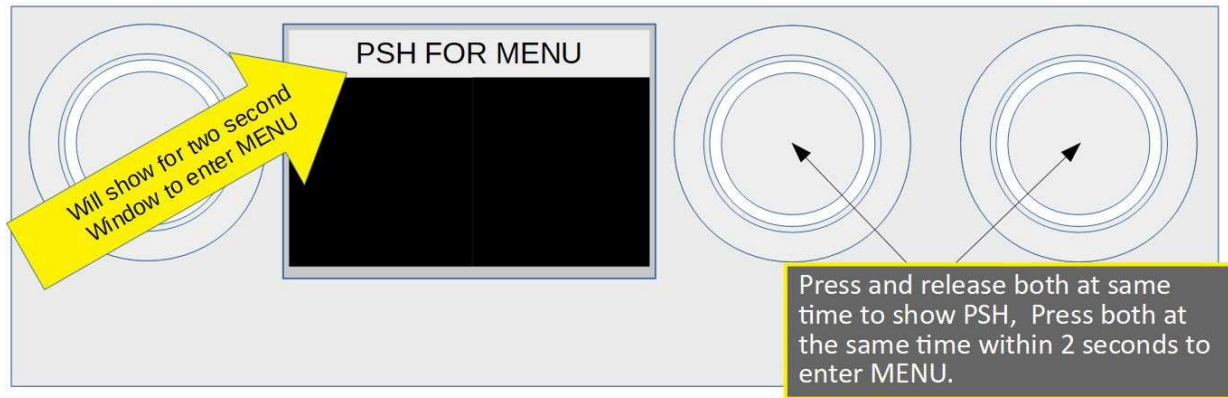
Using Piezo actuators or Mechanical actuators press and release BOTH Pre-Infusion and Brew actuators at the same time. “PSH FOR MENU” will show in the top data display. Press and release BOTH Pre-Infusion and Brew actuators again, (this has to be done within two seconds of the first part). If done within two seconds “CLEAN? NO” will show in the top data window. If “PSH FOR MENU” is not displayed and one of the brew phases are started just press BOTH again, the phase will be cancelled when the “PSH FOR MENU” is displayed.

*NOTE: Timing is important for this operation, it may take a few tries to “get” it, no harm is done to the machine if multiple tries are needed.*

*Entering the Menu by holding (Versions prior to 3.0)*



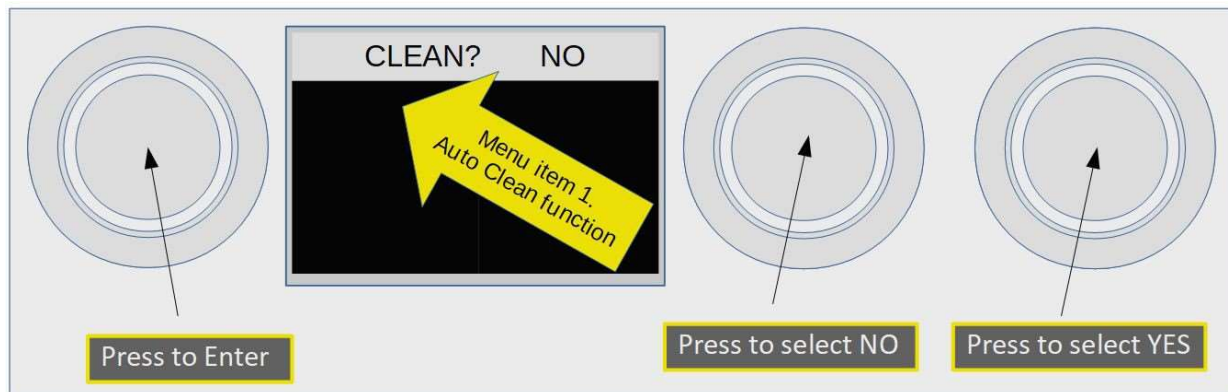
Entering the Menu by pushing both Pre-Infusion and Brew (Versions 3.0 and above)



### Menu Item 1, Selecting Auto Clean Cycle

When “CLEAN? NO” is shown use the Pre-Infusion actuator to change to “CLEAN? YES”. Press the Steam or Water actuator to start the clean cycle. If you do not want to perform the clean function leave at “NO” and press the Steam or Water actuator to move to the next menu.

*Menu item 1. Auto Clean Cycle.*



Example screens when Auto Clean has been selected and run

Auto Clean Running



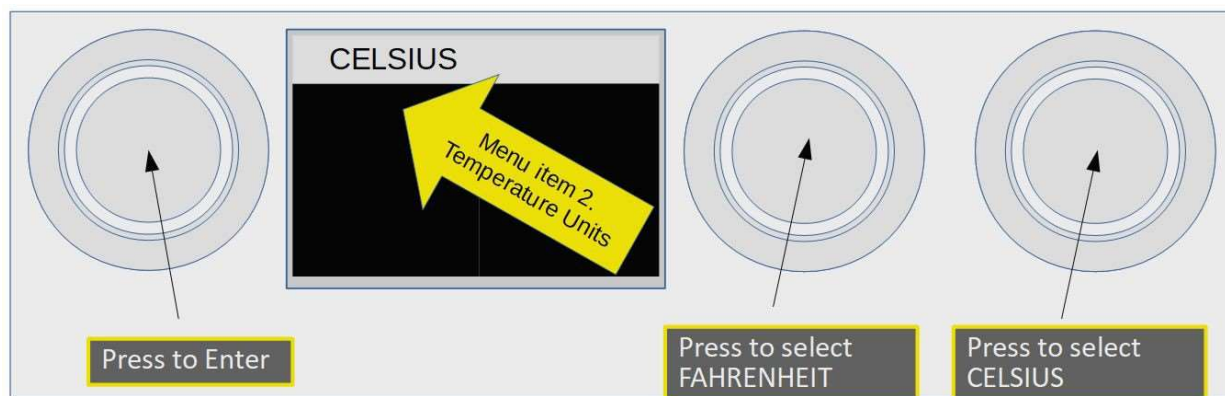
Auto Clean between cycles



## Menu Item 2, Selecting Temperature Units

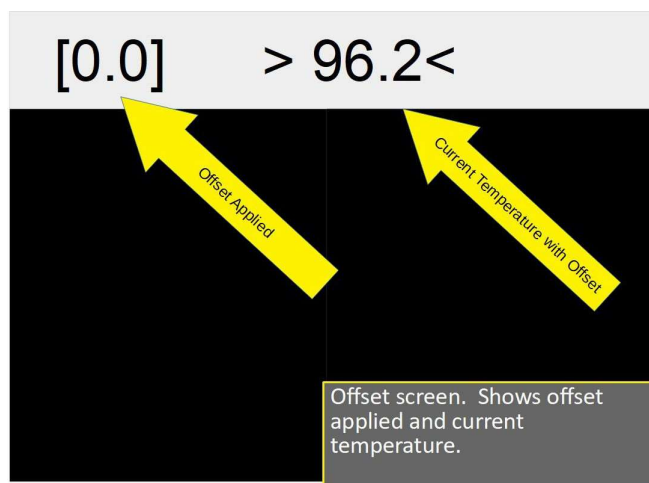
You may select the temperature units to be either Celsius, or Fahrenheit. Press the Pre-Infusion actuator for Fahrenheit or Brew for Celsius. Upper data window will display selection.

*Menu Item 2, Selecting Temperature Units*



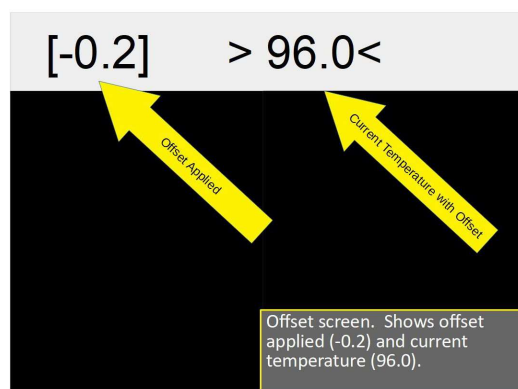
## Menu Item 3, Offset

This is used to calibrate the temperature sensor. Calibration is done at the factory using highly accurate temperature measurement tools. You should only undertake this operation if you have a full understanding of this function. Offset and current temperature are displayed in the upper data window.

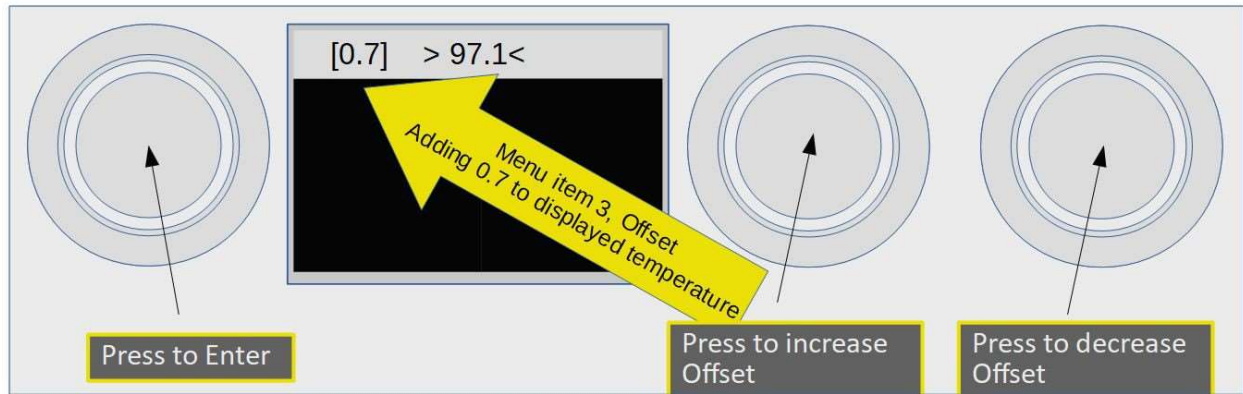


Offset is in brackets "[0.0]" (Zero offset applied). Current temperature is between arrows "> 96.2<". The offset is added or subtracted from the temperature sensor input. To set the offset you must know the measured temperature coming out of the brew head during a brew cycle. Usually a test instrument such as a Scace temperature and pressure monitor is used. Using the screen example to the left offset

is [0.0] and temperature reads 96.2. Using a test instrument temperature has been measured to be 96.0, Offset is changed to [-0.2]. This is subtracted from the sensor input and displayed temperature is now 96.0 (screen at right).



### Menu item 3, Offset

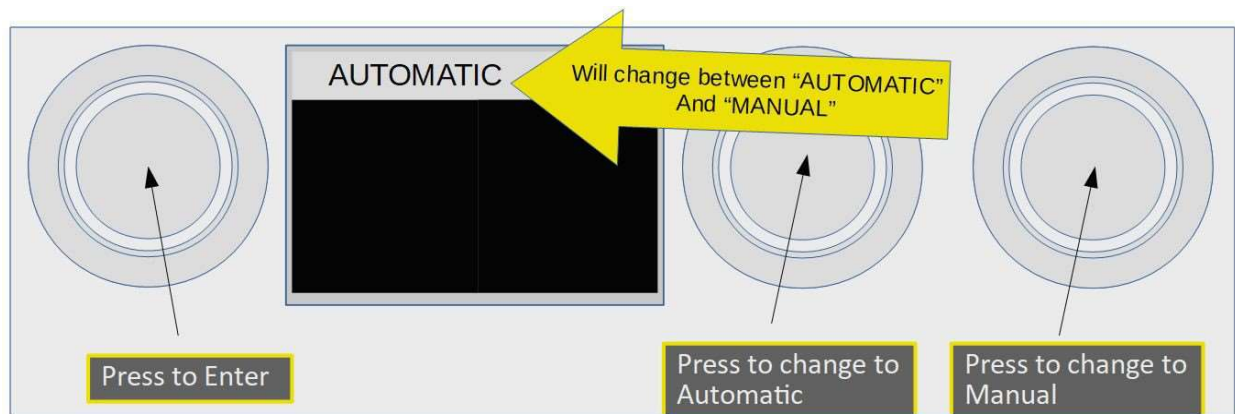


When changing the offset use the Pre-Infusion and Brew actuators to increase or decrease the offset until the displayed temperature matches the measured temperature.

### Menu Item 4, Manual / Automatic

Change modes between Manual and Automatic. Mode is displayed in the upper data window. Pressing the Pre-Infusion actuator changes mode to Automatic, pressing the Brew actuator changes to Manual. Pressing Steam or Water applies the selection.

### Menu Item 4, Manual / Automatic

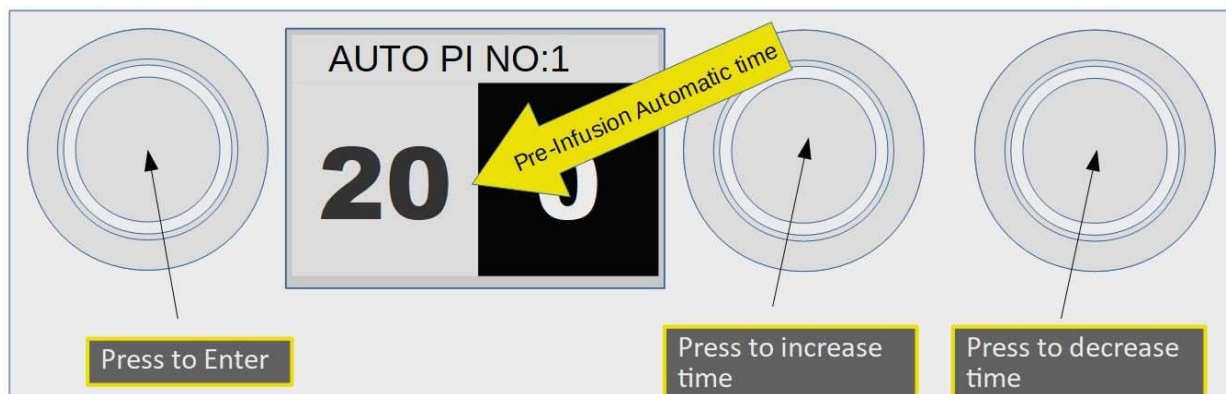




### Menu Item 5, Setting Automatic Pre-Infusion Time:1

This is the first of four Automatic time settings. It is useful to set these even if you are not using Automatic mode. The ability to change “on the fly” lets these routines be used if desired.

Setting the time to zero “0” will skip the Pre-Infusion phase for that brew cycle. Once set to the desired time Enter will save the setting and move to Item 6.



### Menu Item 6, Setting Automatic Brew Time:1

This is the second of four Automatic time settings. Setting the time to zero “0” will skip the Brew phase for that brew cycle. Once set to the desired time Enter will save the setting and move to Item 7.



### Menu Item 7, 8, Setting Automatic Pre-Infusion and Brew Time:2

This is the third and fourth of four Automatic time settings. Function is the same as 5 and 6 above except this sets Automatic 2. When finished with Item 8, pressing Enter will exit the menu and return to the Idle screen.

NOTE: After no activity for thirty seconds the Menu will exit and return to the Idle screen. If you have entered a setting or do not wish to record that setting just let the menu sit idle and it will exit not saving that setting.



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# User Manual

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