



BOILER UNIT CONTROLLER
For Under Counter and Mach 2
USE AND SETUP



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Overview

The Mavam controller is easily programmed and user friendly. Basic use is outlined in this manual.

Technicians may contact Mavam for access to second level programming at service@mavamespresso.com

Mavam Digital Control Panel UnderCounter



Program Knob

This is used for both select and enter functions. To select a function turn the knob clockwise or counter clockwise referred to as “CW and CCW”. To change the selected function parameter, push the knob. Referred to as PK in the rest of this manual

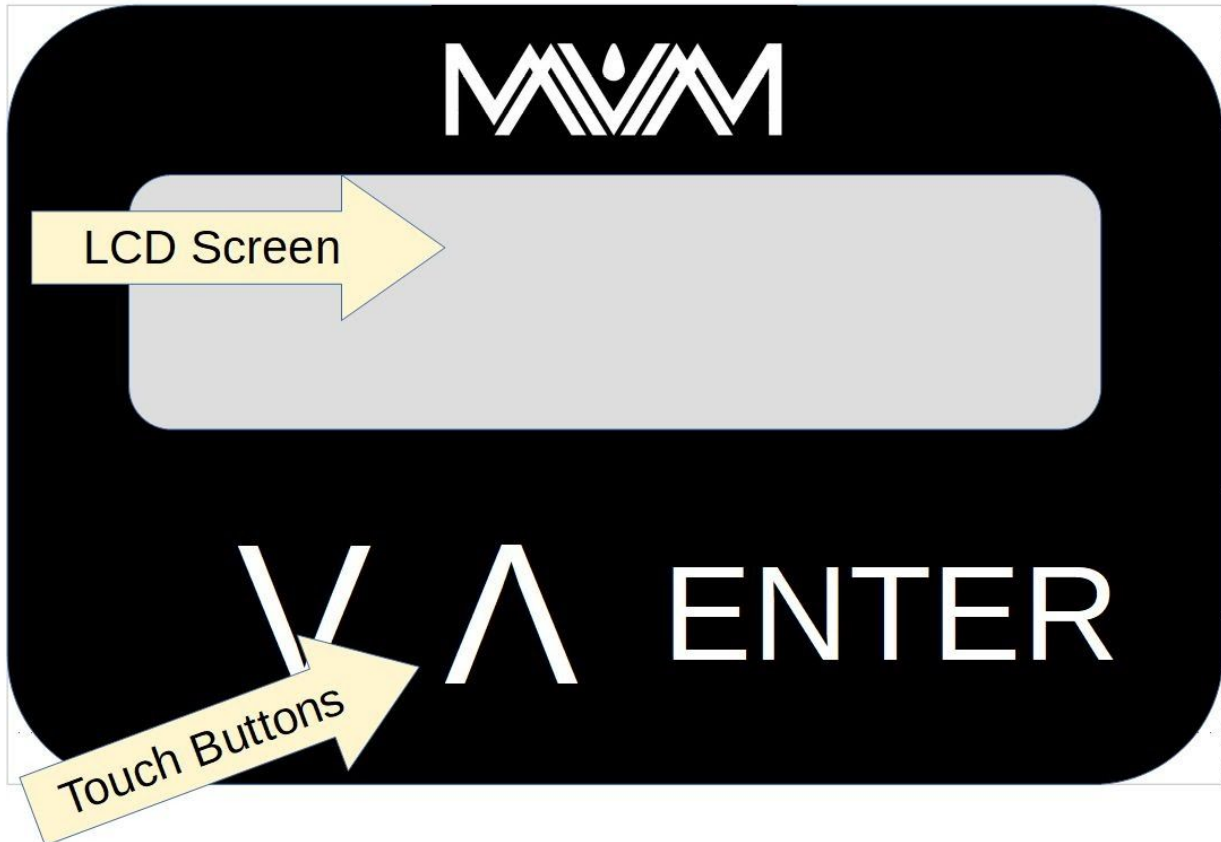
On/Off Button

This is used to enable the select mode function. There are four modes, ON, STANDBY, FILL, and OFF.

Display Screen

The screen is a 24 x 2 LCD character display which includes all temperature, pressure, and status information. There are two main information screens. Moving between screens is done by rotating the PK clockwise or counter clockwise.

Mavam Digital Control Panel Mach 2



The Mach 2 panel uses touch controls to completely seal the panel from water and dirt. The UP and DOWN arrows control Right / Left, Increase / Decrease. Enter can be a short push or push and hold for different options. To keep unwanted inputs to a minimum if more than one button is touched at a time or an area outside of the button(s) are touched the input is disabled.

NOTE: When Programming Knob is used in instructions UP / DOWN button use is implied. UP / DOWN is only mentioned if use is different from Programming Knob functions.

Startup

Version and Group Display

On startup the screen will show the version number and number of groups this machine has. The BCU will initialize and when complete show Main Screen One.

Three Group BCU, Version 3.3

```
MAVAM MV3  3  GROUP
Version:  3.3
```

Operation

Main Screen One

This screen displays the group temperature(s), steam pressure, and unit status. Referenced hereafter as “MS1”. “GP1” and “GP2” are group One and group Two temperatures (“GP3” would be shown in a three group machine).

“STM” is the steam boiler pressure.

“OK” is displayed when there are no errors. “ER” will be shown if there are any errors. A number will be shown below the ER indicating how many errors have been detected.

Turning the PK CW or CCW will change the program selection. When at the most right or left selection, turning the PW will change main screens.

NOTE: The display will show temperatures for a Single, Two, or Three group depending on the number of groups the machine has.

MAIN SCREEN ONE

```
GP1      GP2      STM  OK
58.5     55.5     0.0
```

Main Screen Two

This screen displays the steam hose temperature(s), internal temperature, and menu option. Referenced hereafter as “MS2”.

MAIN SCREEN TWO

STML	STMR	INT	MENU
90.2	91.3	32	

Groups or Components not displayed

If a component or group is not displayed that component is NOT installed on the machine. This is dependent on the model of the machine.

LED Display

This is only used on the Under Counter machines.

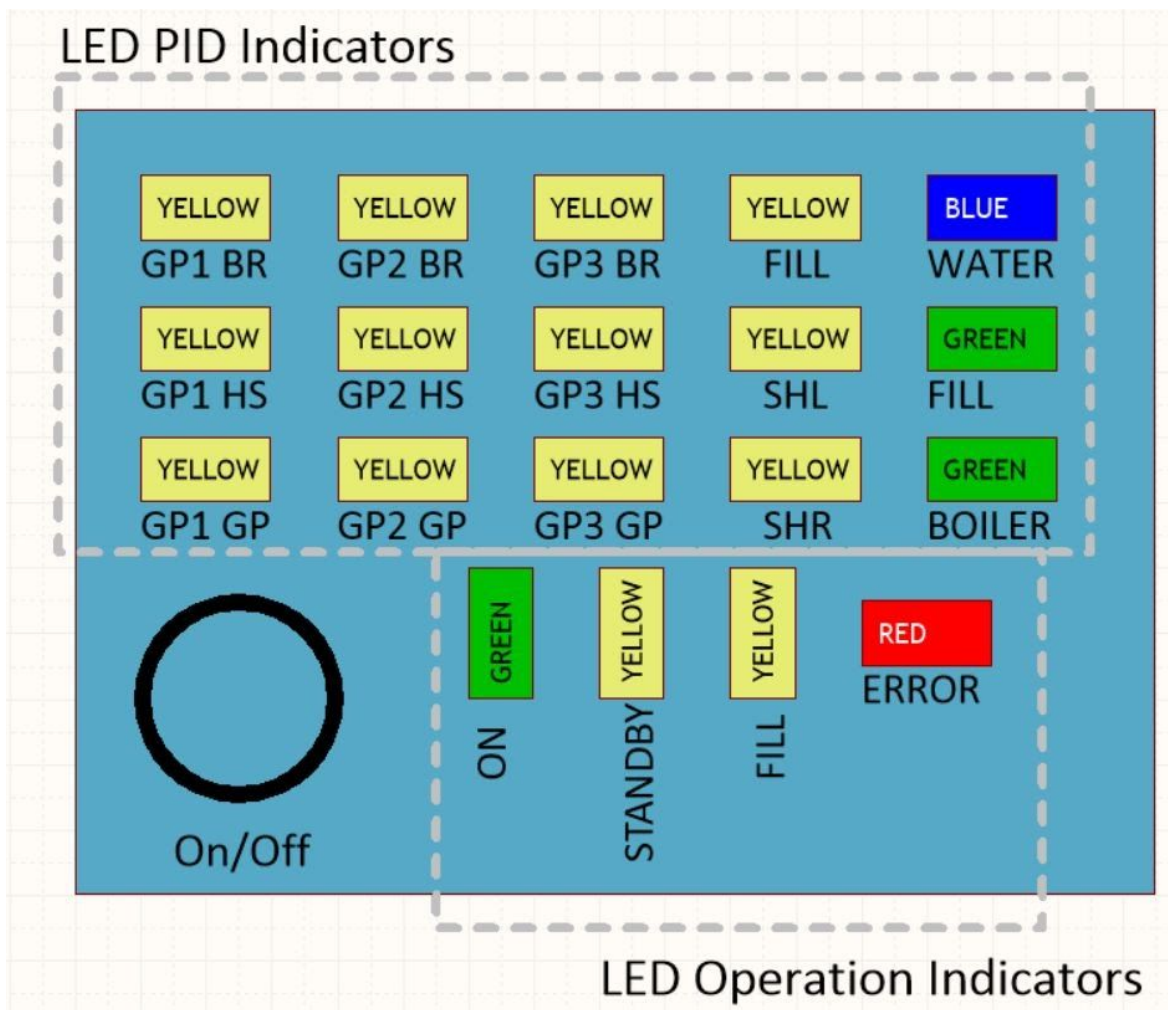
LED PID Indicators

These show the heater status for each group (brew, hose, and group heater), steam hose, and steam boiler, water presence, and fill operation

LED Operation Indicators

These show what mode the unit is in (On, Standby, and Fill). In OFF mode no LED is lit. The only red LED on the panel is the error indicator. If there is one or more errors with the BCU the LED will be illuminated

LED DIAGRAM



Operational Parameters

Parameter Overview

Selecting / changing parameters and operational modes will be covered later in this manual.

Group Temperature

Each Group has three heated components that can be controlled. They are listed below and referenced as such.

NOTE: For a more detailed explanation of group function please refer to the related technical document.

1. Brew: The brew tank is located in the Boiler Unit and is the first heated component of the group.
2. Hose: The hose connects the Brew and Group component of the group. It is external to the Boiler Unit.
3. Group: The Group component serves as the portafilter holder and brew head. It is located on the brew tower on the User Interface.

Each component may be set as a group or individually. The group temperature is displayed on MS1 labeled as "GPX" and is a composite of the three components of the group. Individual component temperatures are shown on the group sub-menu.

Steam Pressure

Steam pressure is displayed as "STM" on MS1 in BARS.

Steam Hose Temperature

There are two heated Steam Hoses per two and three group machines and one per single group machine. Temperature is shown on MS2 labeled as "STML"(STM1), and "STMR"(STM2).

Internal Temperature

Internal temperature is measured by a sensor on the printed circuit board and shown on MS2 labeled as "INT". This is used to monitor the ambient temperature of the Boiler Unit.

Menu

Contains parameters for operation and units displayed. Sub-menu items are;

1. Temperature Units: Selects either "C" (Celcius), or "F" (Fahrenheit). All temperatures will be shown in the selected unit of measurement.

Operation Modes

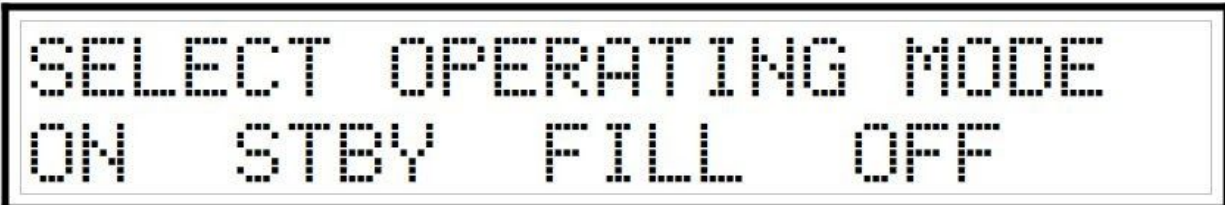
There are four modes of operation;

1. ON: Default mode on power on. Full operation of unit, fill, heat, and pumps all active.
2. STBY: Standby. Lowers temperature and pressure setpoints to a fixed setting. Used to keep the unit on a standby "ready to go" state while lowering power usage.
3. FILL: Turns heat and steam pressure OFF. Keeps pumps and UI ON. Used to fill or drain the unit without turning on heat or steam pressure.
4. OFF: Turns off the BCU and removes power from the UI.

NOTE: If there is water present in the boiler the blue WATER LED will stay illuminated.

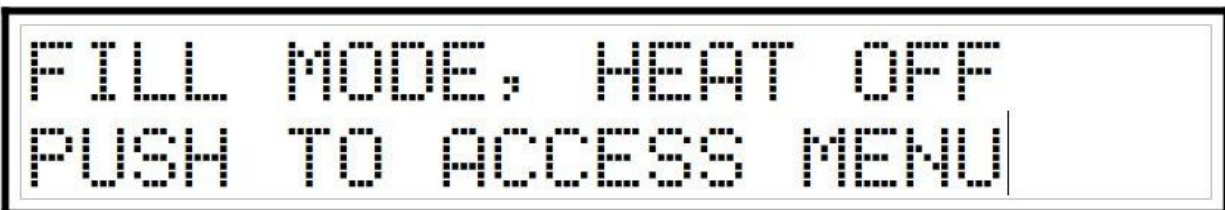
WARNING: *High Voltage is NOT disconnected from the unit. Before servicing or opening the unit make sure High Voltage is disconnected at the service breaker.*

OPERATION MODE SCREEN



To change the operating mode press the ON / OFF button (Under Counter), OR? press ENTER when screen is idle (Mach 2). Use the Programming Knob to change the mode and press ENTER when mode is selected.

OPERATION MODE, FILL SELECTED



Selecting and Changing Parameters

Selecting Parameters

The Program Knob is used to select all parameters. Turning the PK CW or CCW will select the parameter to the left or right of the current cursor position. If the current cursor position is on the far left or right of the screen turning the PK in that direction will either change screens or wrap around to the opposite side of the screen.

Cursor Indicators

There are three cursor modes;

1. Idle: No brackets shown, viewing parameters only.
2. Selected: Parameter bounded by two reverse arrows ">xx<".
3. Changing: Parameter to be changed bounded by two square brackets "[XX]".

When turning to select parameters the selected parameter will change from capital letters to lower case letters and be bracketed by two reverse arrow characters "> xx <". When a parameter has been selected to be changed it will be bracketed by two reverse square brackets "[XX]". If no user input is made in ten seconds the brackets will be cleared and the screen will change to Idle.

Idle Screen (MS1)

```
GP1    GP2    GP3    STM OK
200.5  199.7  200.0  0.0
```

Group 2 (Group temperature selected)

```
GP1    >gp2<    GP3    STM OK
200.5  199.7  200.0  0.0
```

Group 2 (Group temperature changing)

```
GP2 SET TEMPERATURE
[201.0]
```

Example of selecting a parameter (GP1 temperature)



Changing Parameters

When changing a parameter pressing the PK will enter the new setting into memory. If you wish to exit without making any changes there are two options. Either press and hold the PK until the screen changes to Idle, or do not make any more changes for at least ten seconds. After ten seconds the screen will change to Idle and any changes will be discarded.

NOTE: All parameters are held in non volatile memory and are retained whether power is applied to the unit or not for a period of at least ten years.

Changing group or individual temperatures

There are two options available when changing group temperatures:

- A. Group: This will change all three individual component temperatures as a set.
- B. Individual: This changes each component independently. It is recommended to use this option only after some experience with the machine. Reasons to use this option are beyond the scope of this manual. For most operations setting the temperature using the Group option is preferred.

Changing Group Temperature

Select the group to change then press and release the PK. This will change the screen to the group temperature change display. The temperature will be bracketed by square brackets “[133.4]” for example. Turn the PK to change the set temperature. Once the desired set temperature is reached press the PK to enter the new set temperature into memory.

NOTE: There is a pre-set window of temperatures allowed, the user can not change the set temperature outside of this window.

Group 2 selected for change

```
GP1  >GP2<  GP3  STM OK
200.5 199.7 200.0 0.0
```

Group 2 Group Temperature being changed (PK pressed and released)

```
GP2 SET TEMPERATURE
[201.0]
```

Changing Individual Component Temperatures

OFF Option new for version 3.3 and above;

When changing individual temperatures it is possible to turn the channel OFF. This will turn the heater OFF for that component and ignore any error messages for that channel. This may be desired to clear errors or disable a component due to service or operational needs. To turn a channel OFF either decrease OR increase the channel to its limit and continue. Going PAST the limit will show OFF for that component. The channel may be enabled anytime by changing the set temperature.

GROUP 1, BREW, OFF SELECTED

```
GP1    BREW    HOSE    GROUP
Set [ OFF ] 98.0  97.5
```

Special indicators when components are OFF

In some circumstances a component may be off and affect the group display. In this case a letter will be displayed after the temperature. Normally the Group temperature is displayed on the main screen. If the Group is OFF then Hose temperature will be displayed with a "H" after the temperature. If BOTH the Group and Hose are OFF then "B" will be displayed after the temperature. If all three are OFF then "OFF" will be displayed on the main screen.

Group 1, Group OFF, Main Screen Indication, Hose temperature displayed

```
GP1    GP2    GP3    STM  ER
98.5H  99.0    97.0    1.2  OK
```

To change individual component temperatures. Select the Group containing the components to be changed. Press and HOLD the PK until the screen showing the three component temperatures is displayed.

NOTE: The screen shows the current temperature of each component, not the temperature setting.

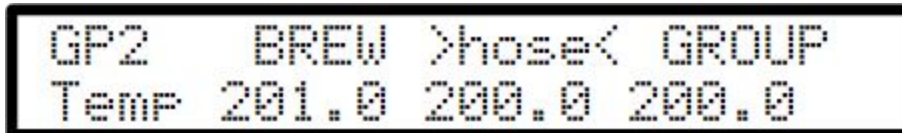
Group 2 Individual Component Temperature Screen



```
GP2  BREW  HOSE  GROUP
Temp 201.0 200.0 200.0
```

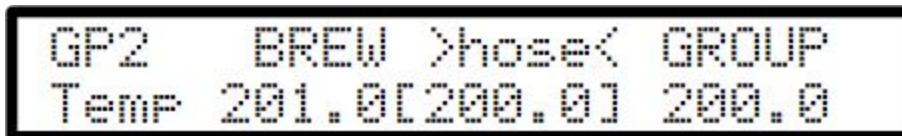
Turn the PK until the desired component is selected then press and release the PK to change that temperature setting.

Group 2, Hose temperature selected



```
GP2  BREW  >hose<  GROUP
Temp 201.0 200.0 200.0
```

Group 2, Hose temperature being changed



```
GP2  BREW  >hose<  GROUP
Temp 201.0 [200.0] 200.0
```

To enter the new temperature into memory press and release the PK. The screen will change to Idle with no brackets. Repeat the above procedure to change other component temperatures. Once finished make sure there are no components selected, (no brackets showing), press and release the PK to return to MS1.

NOTE: The Group component screen will not timeout after no activity. This allows the user to monitor individual temperatures for that group if desired.

Changing Steam Hose Temperatures and Steam Pressure

Use the same procedure as above, (Individual), for changing Steam Hose Temperature(s) and Steam Boiler Pressure settings.

Menu Options

As of Version 2.6 there is one Menu Option; Temperature Display Units.

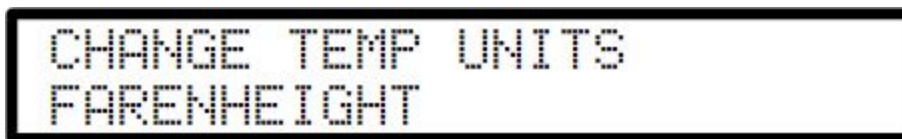
To change units, select MENU and press and release the PK. When the menu option screen is shown select C/F and press and release the PK.

Turn the PK to select either Celcius or Farenheit units then press and release the PK.

Menu Options Screen



Change Temperature Units Screen



Error Codes

Types of Errors


Global

Global errors affect the operation of the entire machine. What machine functions are disabled or restricted is based on the error detected. All global errors sound an audible alarm, (alarm beep), illuminate the red error LED and show on the LCD screen until all global errors are cleared.

Global Error Display

Global errors are shown as a message on the LCD screen, overriding the normal display. If there is more than one global error the message will cycle through each error until cleared.

Internal overtemp error display



INTERNAL OVERTEMP ALERT
CHECK BU FAN & VENTS


Individual

Individual errors only affect that component or function. The rest of the machine will continue to operate normally. What component functions are disabled or restricted is based on the error detected.

Individual Error Display

One or more individual errors will illuminate the red error LED, and change "OK" to "ER" on MS1 until the error is cleared. The number of errors will be indicated below the "ER".

MS1, no errors detected



GP1	GP2	GP3	STM	OK
200.5	199.7	200.0	0.0	

Individual Errors displayed, two errors detected



GP1	GP2	GP3	STM	ER
200.5	199.7	200.0	0.0	2

Component Temperature or Steam error indication

If the error is associated with a group heater or steam pressure that display will show “---.” instead of a temperature or pressure.

Group 2 Hose error showing



Displaying Individual Errors

Each Individual Error cause can be displayed. Turn the PK to select “>ER<” then press and release the PK. The initial error display will be shown.

Initial error screen, two errors detected



Turn the PK either CW or CCW to display each error cause. Each error will display the component or function where the error was detected, the error number, total number of errors, and the cause of the error.

Individual error cause screen



NOTE: Finding and correcting the cause of the error is beyond the scope of this manual.

Clearing Errors

Errors will clear automatically if the condition returns to normal **except** for the “Fill Overtime, No water” error.

Table of Error Messages

Global Error Messages

1. INTERNAL OVERTEMP ALERT; The BCU has detected that the internal temperature has exceeded the preset limit. Check the BCU fan, vents, and make sure nothing is blocking the cooling system of the BCU.

For "Group X..." Substitute "X" for the group number, 1,2, or 3.

1. "GROUP X BREW", "GROUP X HOSE", "GROUP X GROUP"
 - a. "Over Temperature"; The component has exceeded its maximum allowed temperature. Heat to that component is turned off.
 - b. "RTD Sensor Missing"; The sensor that measures temperature is not detected. Heat to that component is turned off.
 - c. "Sensor Chip No Response"; The on board chip used to monitor component temperature is not working. Heat to that component is turned off.
2. "STEAM HOSE 1", "STEAM HOSE 2"
 - a. "Over Temperature"; The component has exceeded its maximum allowed temperature. Heat to that component is turned off.
 - b. "RTD Sensor Missing"; The sensor that measures temperature is not detected. Heat to that component is turned off.
 - c. "Sensor Chip No Response"; The on board chip used to monitor component temperature is not working. Heat to that component is turned off.
3. "STEAM BOILER"
 - a. "Overpressure"; Steam Boiler has exceeded its preset pressure limit. Heat to the Steam Boiler is turned off.
4. "Pressure Sensor Missing"; Sensor used to measure pressure is not detected. Heat to the Steam Boiler is turned off.
5. "BOILER FILL"
 - a. "Fill Overtime, No Water"; Boiler has attempted to fill for more than thirty seconds and has not detected water in the boiler. Heat to the Steam Boiler is turned off and the fill function is disabled. To reset this error the machine must be fully reset, (turned off and on again).

Breaker Switch

WARNING THIS MACHINE UTILIZES A POWER BREAKER AND SHOULD BE TURNED OFF BEFORE DOING ANY INTERNAL BOILER WORK.

Under Counter breaker is located on the lower left corner of the boiler box.

Mach 2 breaker is located on front lower left, under the display.

BEFORE WORKING ON THE POWER SUPPLY OF THE MACHINE BE SURE TO UNPLUG THE CORD FROM EXTERNAL POWER.