

# NEVA BEAN TO CUP BEVERAGE MACHINE



## TECHNICAL MANUAL

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## **FOREWORD**

1. The information contained in this technical manual is applicable to the Neva Bean To Cup Beverage Machine. Due to customer requirements some units may vary from the one described in the manual.
2. Personnel who have undergone relevant equipment training must only undertake maintenance of the beverage machine.
3. The manufacturer reserves the right to make changes, without notice, to the design of the beverage machine, which may affect the information, contained in this manual.
4. The Neva Bean To Cup Beverage Machine is designed for indoor use, in an environment with an ambient temperature range of between 0°C and 40°C.

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## Section 1

# Technical Information

### INTRODUCTION

1. The Neva Bean To Cup Beverage Machine dispenses hot beverages in response to a pushbutton selection. All beverages are dispensed in cup measurements. A liquid crystal display provides status indications and operational information. All operations are microprocessor controlled.
2. A cup is placed under the dispense head and the selection is made via a pushbutton. The drink is then dispensed in the required quantity. The machine does not accept money, but a feature such as this can be added.
3. The status of the machine may be monitored, and the configuration altered, by accessing a program using the keypad and display. The program offers a menu of options; each consisting of a number of sub-options which can be altered.
4. The Neva Bean To Cup Beverage Machine has a feature, which heats the water in the boiler very quickly, with one heater connected, from a 230V, 16A single-phase supply.



**FIG 1.1 NEVA BEAN TO CUP BEVERAGE MACHINE**

**SPECIFICATIONS**

5.

DESCRIPTION	DETAILS
HEIGHT/CM	64(78 Inclusive Bean Canister)
WIDTH/CM	42
DEPTH/CM	51
WEIGHT/KG	26
TANK CAPACITY/LITRE	2.5
CANISTER CAPACITY - GRAM	DETAILS
FRESH COFFEE BEANS	1.5Kg
CHOCOLATE	1500g
TOPPING	1000g
MENU OPTIONS/SELECTIONS	8
DISPENSE TIME PER CUP/SEC	
POWER	3KW
CUP SERVING/HOUR	180
MAINS WATER/PORTABLE	YES/YES
MAX/MIN PRESSURE-BAR	MIN-1/MAX-8
ILLUMINATED BUTTONS	YES
BACK PANEL	YES
SELF CLEANING BUTTON	YES

## **SERVICES REQUIRED**

### **Electrical Supply**

6.

- (a) Single Heater Operation

Supply voltage : 230V, 50Hz, single phase, fused supply

Current rating : 10A/16A

- (b) The fused electrical supply should terminate at an appropriate isolator located within 1m of the beverage machine.

### **Water Supply**

7.

- (a) 15mm dia. Water mains supply, terminating at a convenient stop tap located within 1m of the beverage machine.
- (b) Water pressure : 1 bar minimum, 8 bar maximum
- (c) A 15mm double backcheck valve, with inspection port, should be fitted prior to the flexible hose.



## GENERAL DESCRIPTION

8. The Neva Bean To Cup Beverage Machine is a free-standing unit which may be mounted on a secured table, bench, cabinet or food and drink counter.

### Cabinet Front

9. The cabinet front door has a large picture panel area and located beneath this are 8 pushbuttons, which have removable front covers to enable fitting of individual selection labels. On the rear of the door is the display for accessing product information and machine settings plus the internal keypad, which provides access to the Operator and Engineer Program. The panel can, when unscrewed, be hinged to give access to the MPU and keyboard PCB.

### Cabinet Interior

10. A swivel open door provides access to the two plastic product containers, each fitted with a gear driven worm screw located in the base of each canister to dispense ingredients in exact amounts.

The ingredients are mixed with hot water in mixing bowls prior to the beverage being poured from the dispense head.

A plastic agitator is located inside of the milk topping and chocolate canister to ensure free and consistent flow of product. Additionally a whipper unit, located beneath the mixing bowls, ensures that the product and water are correctly mixed.

The ingredient canisters must be removed for filling of the products and when all four canisters are removed and steam hoods of the mixing bowls are removed the extract chamber can be removed for cleaning.

11. Located on the upper left hand panel is the machine on/off switch, which controls the power to the MPU, power supply. Access to all other components is either by removal of the lid assembly/boiler cover and motor shelf.
12. Further access to the inner components is achieved by removing the left-hand side panel by unscrewing the location screw and then the panel will drop down clear of its keyhole slots. Removing this panel gives access to all internal components.
13. The mains electricity supply cable enters the machine via a cable gland on the base panel of the machine, where it terminates in a terminal block. The supply is then connected via the terminal block, line filter to the on/off switch on the front of the machine.

## WATER SYSTEM

14. The main water supply enters the machine via a double chamber inlet valve, which is mounted in the cabinet base panel. A length of tube then takes the water supply into the top of the water boiler via an air break into a channel, which is directed, to the bottom of the heater tank.
15. Hot water is dispensed from the boiler, via the appropriate solenoid operated valve, to the mixing bowl. A length of tube directs any overflow from the boiler via overtemp safety thermostats to the waste tray.
16. The cold water mains supply enters the machine at the base of the cabinet and connects with a dual chamber solenoid operated inlet valve, which controls the flow of water to the boiler. The water is maintained at a constant level in response to signals from a water level probe which is connected to the Controller Board.
17. The water is heated to the required temperature by a single or up to 3 heating elements subject to configuration. The Controller Board ensures that the temperature is maintained to a predetermined level by controlling the supply to the heater in response to signals from the N.T.C. temperature sensor which forms part of the level/temperature probe assembly.
18. Hot water from the boiler is fed directly to the mixing bowls where it mixes with the dispensed ingredient to produce the selected beverage. Solenoid operated valves distribute the hot water to the selected mixing bowl, the amount of water being determined by the program setting.
19. The temperature of the water, is monitored by the Controller Board via a sensor inserted into the tank, thus causing the supply to the heater to be removed when the water in the boiler reaches its required temperature setting. If the temperature in the boiler increases causing the water to boil over, the water will flow down the overflow pipe over the overtemp sensors which will cut off the electrical supply to the heating elements. These sensors are mounted on the cabinet rear and are re-settable.

### Heater Control and Boosting

20. The heating control system employs an intelligent algorithm to obtain maximum performance as follows:-

Boost operation takes place when the inlet valve opens following a selection being taken. The heater control algorithm is instructed to turn on both SSR's for the duration specified in the variable CUP BOOST referred to Section 2 paragraph 24.

If the temperature is 50 more than the DESIRED TEMPERATURE, set in the CHANGE SETTING MENU (see Section 2 paragraph 24) all boosting operations are disabled.

If the actual temperature is between 0 – 35 less than the DESIRED TEMPERATURE one SSR is OFF and the other one toggles ON & OFF unless a boost operation is in progress then both SSR are ON.

If the actual temperature is between 35 - & 50 less than the desired temperature one SSR is ON and the other is OFF. Boost operations are as above.

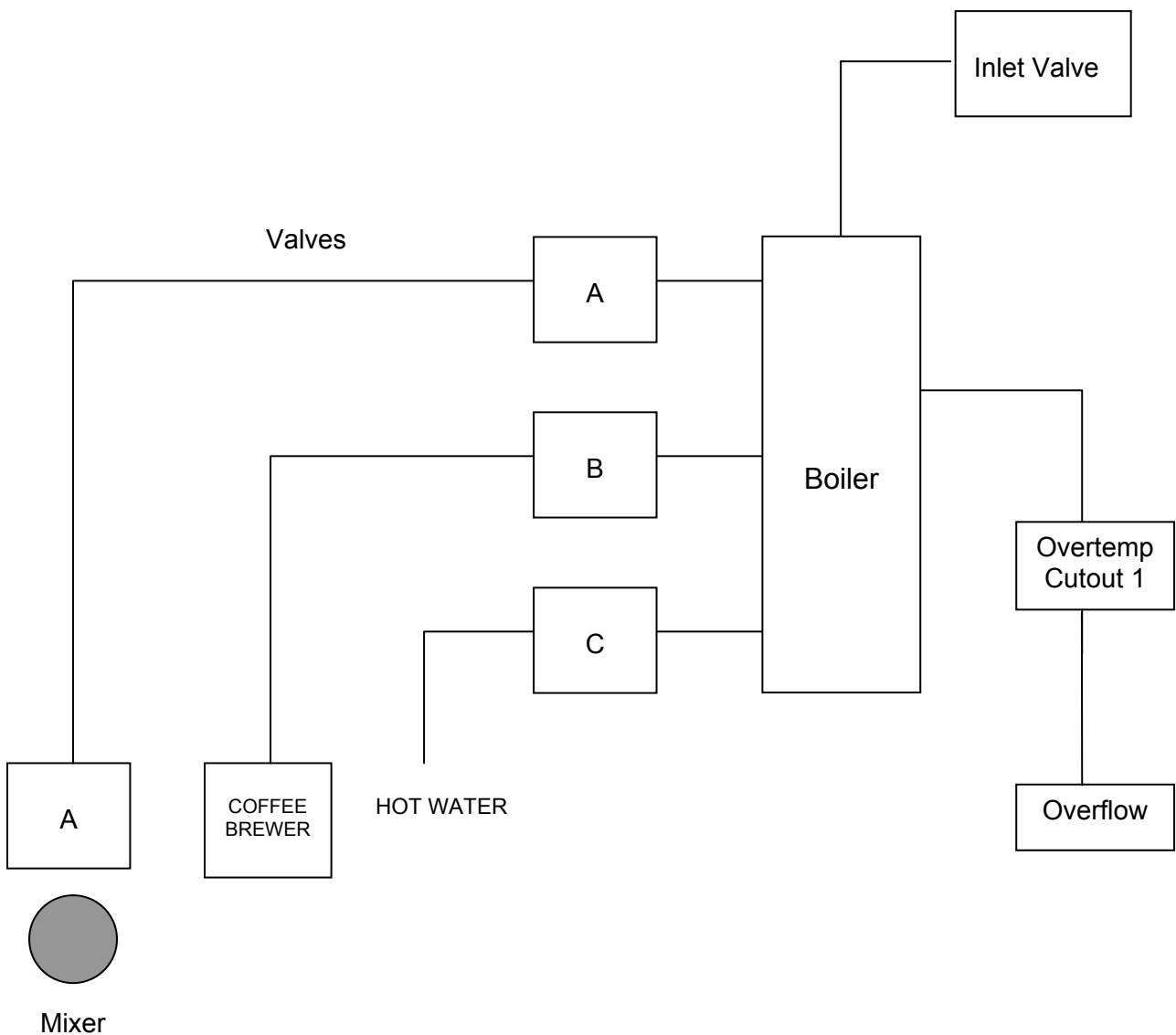
If the actual temperature is more than 50 below the desired temperature both SSR's are ON.

**Tank Filling & Overflow Protection**

21. The control system will only open the inlet valve for a maximum of 40 seconds. If the tank is not full at the end of this time the machine will enter a fault condition. The internal display will read "TANK FILL FAULT CALL OPERATOR". This fault can be cleared by switching the machine off and on.

Note: An empty tank may take several cycles to fill completely.

22. The second protective mechanism is designed to act as a fail-safe in the event that a slow leak occurs which does not result in the liquid entering the drip tray. The machine will cease all attempts to fill the tank after 20 tank top ups have been made, if no selections have been taken in the meantime.



**FIG 1.2 WATER SYSTEM – FUNCTIONAL DIAGRAM**

## ELECTRICAL AND ELECTRONIC SYSTEM

### Functional Description

23. The MPU Controller Board employs Microprocessor technology to monitor and control the operation of the beverage machine. The board contains the main System Program, the Operator's Program and the Engineer's Program, each stored in programmable read only memory.
24. Variables, such as the amount of ingredients dispensed, are stored in non-volatile random access memory (NVRAM) and are called up by addressing either the Operator's Program or the Engineer's Program as appropriate.
25. The main System Program tasks the microprocessor with continually checking the status of the input devices (keypad, probe, etc.) and responding to data received by signalling the output devices (LCD display, motors, whippers etc.) to take the appropriate action. The System Program also requests the microprocessor to interrogate the variable settings in NVRAM and to modify its actions accordingly.
26. Output transistors and F.E.T. devices on the MPU Controller Board convert signals from the Controller's microprocessor circuit to the current drive necessary to operate output devices, i.e. motors, whippers and inlet valve.

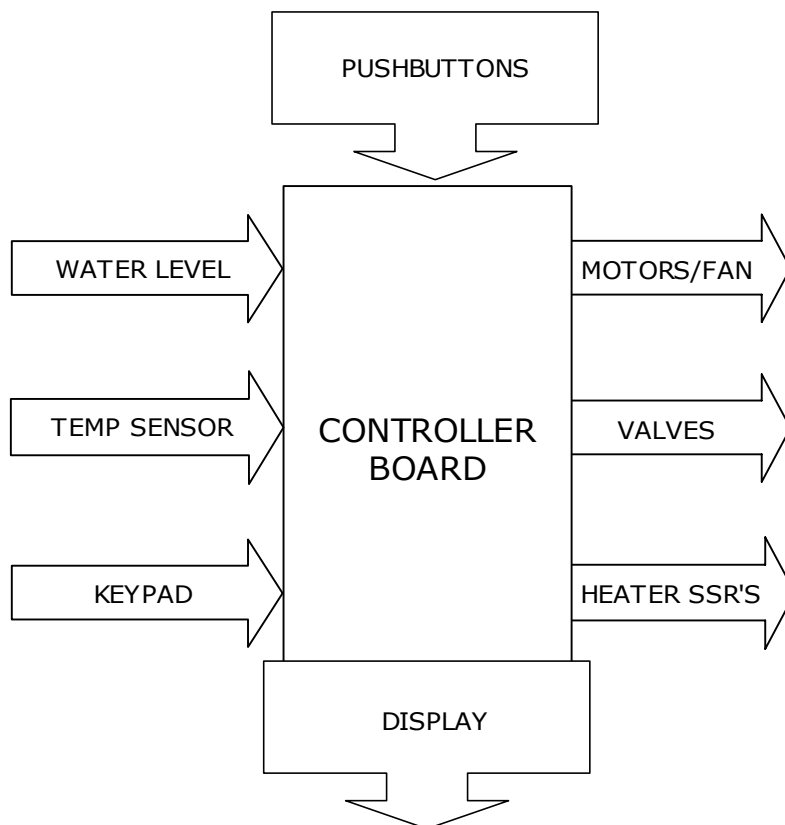


FIG 1.3 ELECTRICAL & ELECTRONIC SYSTEM – FUNCTIONAL DIAGRAM

### Circuit Description

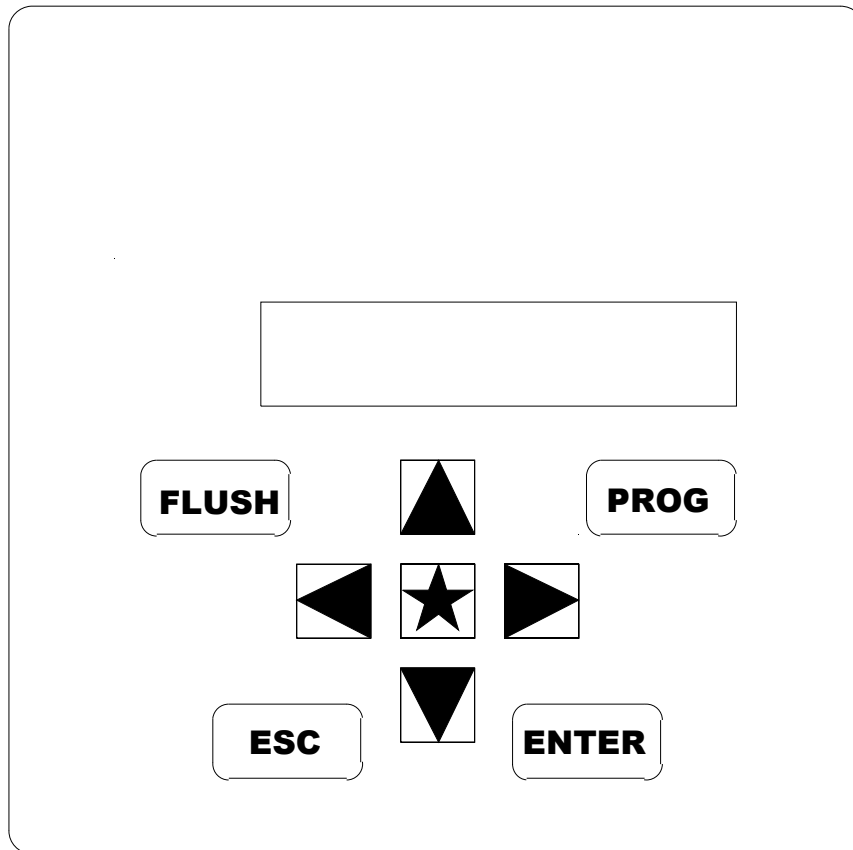
27. If the beverage machine is supplied by a 230V single-phase supply from a 10A or 16A outlet (or from a 13A domestic outlet), only heater 1 can be connected in circuit a 15A fuse protects the heater circuit, a solid state relay (SSR) contact and high temperature cut-out is placed in the circuit of heater
28. The SSR switches the supply to the heaters as directed by the MPU Controller in response to data received from the temperature sensor part of the temperature/level probe, thus maintaining the water in the boiler at the correct temperature. However, if the water in the boiler starts to boil, the high temperature cut-outs remove the supply to the heaters. Reset buttons for cut-out 1 is accessible at the top of the machine.
29. A 230V ac main supply is taken from terminal block to the Power Supply PCB via the on/off switch. The Power Supply PCB provides DC supplies of 24V, 12V and 5V. The 24V-dc output supplies the ingredient motors, whipper motors, extract fan, SSR and solenoid operated valves. The 12V-dc output supplies the MPU Controller Board and operational coin acceptor (if fitted).
30. The MPU Controller Board continually checks the status of input devices connected to plugs J1 and J3, and responds to any change of state by signalling the operation of the relevant output devices via on-board current drive transistors. Thus, for example, the water level probe controls the operation of the inlet valve and the temperature sensor controls the operation of the SSR.
31. The dispensing of a beverage begins with the keypad selection, which is scanned by the MPU Controller Board via a ribbon connector. Control Signals corresponding to the required actions are then generated by the MPU Controller to operate the relevant output devices in the correct sequence and for the specified duration. Operator data information is sent in parallel form to the (LCD) Display.

## Section 2 Programming

### INTRODUCTION

1. The Neva Bean To Cup Beverage Machine provides two discrete user programs: The Operator's program and the Engineer's Program. The Operator's Program is available to both the Operator and the Service engineer, but the Engineer's Program is only available to the SERVICE ENGINEER.
2. Both the programs are stored in programmable read only memory on the Controller Board. The values and settings (Variables), which the program allows the programmer to alter, are store in NVRAM (non-volatile random access memory).
3. Settings are maintained, with out the need for back-up battery, when the power supply is removed.

## INTERNAL KEYPAD LAYOUT



## KEYPAD FUNCTIONS

4. The Operator's Program is available to the operator and Service Engineer. The Program provides options for counting the number of drinks dispensed for each beverage, monitoring the weight of ingredients used, showing the total vends dispensed and resetting the drink dispensed counters if applicable. Additionally, the operator can set the machine to Out of Service if required.
5. Keypad functions when used in the Operator's programming mode, are as follows:-
  - (1) Key (ENTER) used to access a function.
  - (2) Key (PROG) used to access the operators program, then used to change menu functions.
  - (3) ARROWS UP (▲), DOWN (▼), LEFT (◀), RIGHT (▶) are used for adjustments when in program mode.
  - (4) ★ key is used for selecting option when in output test mode.

## **OPERATOR PROGRAM**

### **Accessing the Operators Mode**

6. Accessing the Operator program is by pressing the PROG key on the internal keyboard. The display will show:

**PRESS DRINK TO DISPLAY COUNTER**

### **DISPLAY COUNTER**

7. The DISPLAY COUNTER option is accessed on entering the Operator's Program. The resettable vend counts may be viewed by pressing each drink key (as shown on the keypad) in turn.
8. To access other options, press PROG on the internal keypad. The other options are as follows:

**TOTAL VEND**

**VIEW INGREDIENT COUNTERS**

**RESET COUNTERS**

### **TOTAL VENDS**

9. Access the Total Vends Count option using PROG key, the display will show total vend count.

### **VIEW INGREDIENT COUNTERS**

10. Access the View Ingredient Counters option by using PROG key. Press ENTER to display the first counter, then press the  $\blacktriangle$  UP arrow to scroll through the others.

### **RESET COUNTERS**

11. Access Reset Counters by using PROG key, to clear drink counters press ENTER. The display will show:

**ARE YOU SURE  
ENTER (Y) ESC (N)**



## ENGINEER PROGRAM

### Accessing the Engineer Program

12. The operator program must be accessed before the Engineer Program can be accessed, the operation is as follows:

(1) Press PROG to access the Operator Program, the display will show:

**PRESS DRINK TO DISPLAY COUNTER**

(2) Press PROG again, the display will show:

**TOTAL VENDS**

(3) Now, press the bottom left hand selection button on the front of the door. The display will now show:

**SELECT DRINK TO MODIFY**

### Accessing the Engineers Mode

13.

(1) Gain access to the Operator mode.

(2) Press the PROG key until the display shows 'TOTAL VENDS'.

(3) At this point, on the external keypad, press the bottom left hand key.

(4) The machine is now in engineer's mode.

**Program Options**

14. Twelve program options are available as follows:

**SELECT DRINK TO MODIFY**  
**SELECT DRINK TO TEST**  
**OUTPUT TEST**  
**SELECT DRINK TO RESTORE PRESET**  
**CHANGE PRICE OR INHIBIT DRINKS**  
**SET INGREDIENT THROW RATE**  
**TANK STATUS**

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**INITIALISE**  
**CHANGE SETTINGS**  
**FLUSH SET UP**  
**PRESS DRINK FOR FIXED COUNTERS**  
**QUIT ENGINEER PROGRAM**

15. Repeated pressing of PROG key causes the program to scroll through the options in the above sequence. Therefore a specific option is accessed by pressing PROG key until that option is displayed. To access any program press ENTER.

**SELECT DRINK TO MODIFY  
INGREDIENT/WATER ADJUSTMENTS PROGRAM**

16. This program allows access to the specific variables that control each selection for the purposes of configuring each drink to suit the customers precise requirements. Each drink selection has it own unique set of control variables. The function of each variable is largely self explanatory the values displayed represent start times and opening (valve) or running (motors) times in units of one tenth of a second. The method of editing all variables is identical.

- (1) The SELECT DRINK TO MODIFY option allows modification of individual drink timings. First select the drink. For example, let us choose the Freshbrew Coffee Press the Coffee button. The display will show:

**INGREDIENT DUR  
50**

This represents the run time for the coffee grinder in tenths of a second. In this case fifty tenths of a second i.e. 5.0 seconds.

- (2) Use ▲, ▼ to step through the remaining variables that control the operation of this selection. The following displays will be visible in turn: -

<b>WATER 1 DURATION 75</b>	i.e. The valve time for the first delivery 7.5 seconds.
<b>WATER 2 DELAY 0</b>	i.e. The delay between the first and second deliveries.
<b>WATER 2 DURATION 0</b>	i.e. The valve time for the second delivery 0 seconds.
<b>WHIPPER DELAY 0</b>	i.e. The delay time which controls the start time of the whipper.
<b>WHIPPER DURATION 0</b>	i.e. The length of time for which the whipper runs.
<b>LOCK DELAY DEL 45</b>	i.e. The delay time which controls the unlocking of the brewer, 4.5 seconds.
<b>PUMP 1 START DEL 0</b>	i.e. The time delay in starting of the air pump.
<b>PUMP 1 DURATION 20</b>	i.e. The time for which the air pump is active, 2.0 seconds.
<b>PUMP 2 START DEL 50</b>	i.e. The time delay in starting the air for the second time, 5 seconds.
<b>PUMP 2 DURATION 35</b>	i.e. The time for which the air pump is active for the second stage, 3.5 seconds.
<b>PUMP 3 START DEL 0</b>	i.e. The time delay in starting the air for the third time.
<b>PUMP 3 DURATION 0</b>	i.e. The time for which the air pump is active.
<b>DRAIN TIME 30</b>	i.e. The time taken for the brewer to drain,3 seconds.

<b>SUP WATER START</b> <b>0</b>	i.e. The start time of the supplemental water.
<b>SUP WATER DUR</b> <b>0</b>	i.e. The stop time of the supplemental water.
<b>EXTRA ROTATION</b> <b>0</b>	i.e. Forces extra rotation of the brewer. After vend to clear residual grouts if necessary. 1=extra rotation.
<b>SCALE FACTOR</b> <b>100%</b>	i.e. An overall scaling applied to the drink settings.

- (3) To modify a particular variable use the arrow keys to display the appropriate setting and then press ENTER. The display will change to show the name of the variable on the top line and below it the text **Value=** followed by the current value on the bottom line.
- (4) A flashing cursor will appear over the least significant digit of the current value. The **▲** (UP), **▼** (DOWN), keys can be used to increment or decrement the value as required. The **◀** (LEFT) and **▶** (RIGHT) keys can be used to shift the cursor left and right to rapidly effect large changes.
- (5) When the correct value has been set press ENTER to confirm the change. To discard the changes press PROG. The display will revert to showing the setting name and it new value.

### SELECT DRINK TO TEST

17. The SELECT DRINK TO TEST option allows any selected drink to be dispensed, while still in the Engineer's Program, in order to be tested. This facility is useful for testing a drink that has been modified.

Press DRINK A, for example, to test a change made to the selection in the SELECT DRINK TO MODIFY option.

### OUTPUT TEST

18. The OUTPUT TEST option allows an output device to be operated. The **▲** (UP), **▼** (DOWN), keys are used to move through the list of output devices. When the desired device is displayed use the ENTER key to select the device. The **▲** (UP), **▼** (DOWN), keys are then used to set the state of the device whose name is currently displayed ON and OFF. To return to the device selection mode press the PROG key

For example, to operate the coffee mixer motor select **COFFEE WHIPPER** by pressing **▲** until it appears in the display window, then press ENTER to select the device then press **▲** to switch the motor ON.

\* Due to continuous program intervention these components will not respond to OUTPUT TEST control.

## SELECT DRINK TO RESTORE PRESETS

19. This menu allows the factory preset settings for this drink to override the ones currently contained in the machine. Simply press a drink button and the presets for this drink will be restored.

## CHANGE PRICE OF, OR INHIBIT DRINKS

20. The CHANGE PRICE OF, OR INHIBIT DRINK option allows individual drinks to be priced or inhibited.

- (1) Press the drink key (e.g. DRINK A). The display will show:

**DRINK A  
FREE**

- (2) To set DRINK A to FREE, press ENTER, otherwise press ▲ (UP) and the display will show:

**DRINK A  
PRICE 1**

- (3) To set PRICE 1, press ENTER, otherwise press ▲ (UP) and the display will show:

**DRINK A  
PRICE 2**

- (4) To set PRICE 2, press ENTER, otherwise press ▲ (UP) and the display will show:

**DRINK A  
INHIBITED**

- (5) To set DRINK A INHIBITED, press ENTER.
- (6) To set for a Jug option, press ENTER. Jug option is set to allow button to be programmed as Jug function but will only operate when either an internal switch or external key switch is operated.
- (7) Once a setting has been made by pressing ENTER, the program exits from the CHANGE PRICE OF, OR INHIBIT DRINK option and returns to the main Engineer's Program.

## SET INGREDIENT THROW RATE

21. The SET INGREDIENT THROW RATE option allows the engineer to alter ingredient throw rates in grams dispensed per second of operation of the ingredient motor for the product usage calculation displayed in Operators Program.

- (1) Press ENTER. The display will show:

**INGREDIENT A (GRAMS PER SECOND)  
00001.05**

- (2) To change the value of the Espresso throw rate, press ENTER again. The display will show:

**INGREDIENT A (GRAMS PER SECOND)  
VAL = 00001.05**

- (3) Press ▲ (UP) to increase the value or ▼ (DOWN) to decrease it.
- (4) Having set the new throw rate, press ENTER to enter the new value.
- (5) Press ▲ (UP) to display the next ingredient.
- (6) Press ESC to exit from the SET INGREDIENT THROW RATE option.

**TANK STATUS**

22. The TANK STATUS option allows the engineer to view the status of the boiler water level and temperature.

- (1) Press ENTER to display the tank status. The display will show:

**PROBE IS WET  
90 °C ADC = 380 (0,0)**

The value 380 is a number corresponding to the temperature setting.

The value (0,0) is the element status.

- (2) Press PROG to exit from the TANK STATUS option and access the next Engineer's Program option.

**INITIALISE**

23. The INITIALISE option allows the engineer to initialise the machine.

- (1) Press ENTER. The display will show:

**ARE YOU SURE?  
ENTER (Y) MODE (N)**

- (2) Press ENTER to initialise the machine or PROG to access the next Engineer's Program option.

**CHANGE SETTINGS**

24. CHANGE SETTINGS allows alteration of the following machine settings:

DESIRED TEMP                      90°C (380)

Allows setting of normal operating temperature.

TEMPERATURE LOW                  77°C (0027)

Allows setting of low cut-out point.

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GLOBAL SCALING%	100	<p>Adjustment of cup volume of drinks. All aspects of drink are scaled, i.e. product, whipper, water.</p> <p>(1) To change the GLOBAL SCALING setting, for example, press ENTER. The display will show:</p> <p style="text-align: center;"><b>GLOBAL SCALING %</b> <b>100</b></p> <p>(2) To alter the GLOBAL SCALING percentage value (from 100), press ENTER. The display will show:</p> <p style="text-align: center;"><b>GLOBAL SCALING %#</b> <b>VALUE = 100</b></p> <p>(3) The cursor will be flashing on the last digit of the number 100.</p> <p>(4) Alter the GLOBAL SCALING percentage value, as required, using ▲ (UP), ▼ (DOWN), ◀ (LEFT) and ▶ (RIGHT).</p> <p>(5) Press ENTER to enter the new setting or press ESC to leave the original setting.</p> <p>(6) Press ▼(DOWN) to access the next setting (OUT OF SERVICE) and repeat sub-paras (3) to (6). Continue in this manner until all required settings have been altered.</p> <p>(7) Press prog to exit from the CHANGE SETTINGS option and access the next Engineer's Program option.</p>
DRY VEND FLAG	0	<p>Enables product only operation: 0 = Water On, 1 = Water Off</p>
CUP BOOST	5	<p>Allows increase/decrease of temperature boost per cup dispense.</p>
RESERVED 1	17	
RESERVED 2	30	
FILTER WARN TIME		<p>At the end of a brew cycle the brew chamber should be depressurized. The brewer is prevented from opening until the pressure subsides. This variable controls the length of time after the brewer should have depressurized, but has not, that a 'Change Belt' warning is displayed.</p>

FILTER FAIL TIME		At the end of a brew cycle the brew chamber should be depressurized. The brewer is prevented from opening until the pressure subsides. This variable controls the length of time after the brewer should have depressurized, but has not, that a filter blocked error is displayed.
MAXIMUM BREWER VENDS		This is the number of operations before the grout bin needs emptying 100
OUT OF SERVICE	0	Enables machine to be programmed out of service: 0 = On, 1 = Off
DISABLE BREWER	0	Enables brewer to be programmed out of service: 0 = On, 1 = Off
BEHAVIOUR CODE		Standard
CREDIT DEVICE		Free  Selects cash system:  0 = No Cash system* 1 = Digicard system 2 = Reserved for future use 3 = G13 coin acceptor  *No cash system (0) is the default setting following INITIALISE.
CREDIT LOCK	0	Disables all free drink facilities:  0 = Credit Lock disabled (default setting) 1 = Credit Lock active  When Credit Lock is set to 1, Credit Device and Credit Lock settings are not displayed. Additionally, Select Drink to Test, Select Drink to restore Presets, Change Price or Inhibit Drinks and initialise options are disabled. To disable the Credit Lock after it has been set, see below.

### Disabling the Credit Lock

25. To disable the CREDIT LOCK after it has been set, proceed as follows:

- (1) Enter CHANGE SETTINGS and set the Dry Vend Flag to 42.
- (2) Exit from CHANGE SETTINGS.
- (3) Enter CHANGE SETTINGS and set the Dry Vend Flag to 0.



- (4) Set the Credit Lock to 0.

### **PRESS DRINK FOR FIXED COUNTERS**

26. The PRESS DRINK FOR FIXED COUNTERS option allows the engineer to view the resettable vend counters associated with a selected drink.
  - (1) Press the drink selection key on the keypad.
  - (2) Press prog to exit from the PRESS DRINK FOR FIXED COUNTERS option and access the next Engineer's Program option.

### **Quit Engineer Program**

27. Press ENTER.

## Section 3

# Installation and Maintenance

### INTRODUCTION

1. The information given in this Section covers installation, commissioning and maintenance procedures for the Neva Bean To Cup Beverage Machine. These procedures must be carried out by authorised personnel who are fully conversant with the equipment, using only manufacturer's approved parts.
2. Servicing personnel must be familiar with the SAFETY WARNINGS, as detailed, before undertaking any installation, commissioning or maintenance procedure on the beverage machine. Any procedure which is found to be impracticable, inadequate or inaccurate should be reported to the Management for further investigation.
3. The requirements of proper hygiene in respect of food products must be ensured at every level of contact with the beverage machine and the ingredients associated with it.
4. In compliance with current regulations, the materials used in the manufacture of the beverage machine are non-corrosive, non-tainting and do not support the growth of bacteria. Refer to Statutory Instrument 1987 No.1523, and to The Model Water Bylaws 1986, Statutory Instrument 1987, No.1147. Non-metallic materials in contact with drinking water comply with the requirements of BS6920: Part 1: 1988. Therefore, only manufacturer's parts must be used.

## SAFETY WARNINGS

1. Maintenance of the beverage machine is only to be undertaken by trained personnel who are fully aware of the dangers involved and who have taken adequate precautions.
2. Lethal voltages are exposed when the mains electrical supply to the beverage machine is available and any of the following items are removed:
  - Lid and cover assembly
  - Motor shelf
  - Side panels

Maintenance personnel must ensure that the machine is isolated from the mains electrical supply before removing any of these items.
3. Replacement of the Type Y mains cable requires special tools. Should the cable become damaged, a trained person from an approved service agent must only carry out replacement.
4. THIS APPLIANCE MUST BE EARTHED.
5. Ensure that the connection to the water system is compliant with the pertinent national and local legislation. In the UK the Model Water Bylaws 1986 Statutory Instrument (SI) No.1147 are applicable.
6. Ensure that the unit is positioned such that the plug connecting the unit to the mains supply is accessible.
7. The beverage machine is designed for indoor use, in an environment with an ambient temperature range of between 0°C and 40°C. The machine should be located close to the appropriate electrical and water services with a minimum of 100mm (4in) clearance between the rear of the cabinet and the wall to allow adequate ventilation, and, if in a corner location, not closer to the right hand wall than 400mm (16in) to accommodate opening of the door.  
**The unit should not be situated in an area where a water jet could be used.**
8. The beverage machine is a heavy item. Care must be taken when lifting it.
9. The water in the boiler, and the boiler itself, are hot enough to scald or burn, even some time after the machine has been switched off. The boiler must be drained, filled with cold water and drained again before any attempt is made to handle it or any of its associated parts.
10. Young children, the aged and the infirm should not be allowed to operate the beverage machine unsupervised, in order to protect them from the risk of being scalded by hot beverages.

## FROST WARNING

Care must be taken to protect the beverage machine from frost. Do not attempt to operate the machine if it becomes frozen. Contact the nearest service agent immediately. Do not restore the machine to operational use until it has been checked and approved for use by the service agent.

## INSTALLATION

- WARNINGS**
- (1) THE BEVERAGE MACHINE IS A HEAVY ITEM. CARE MUST BE TAKEN WHEN LIFTING IT.
  - (2) THE BEVERAGE MACHINE MAY TOPPLE IF THE MOUNT IS WEAK OR INSECURE. ENSURE THAT THE MOUNT IS SECURE AND THAT IT CAN SUPPORT THE WEIGHT OF THE MACHINE.
  - (3) ENSURE THAT THE MAINS ELECTRICAL SUPPLY IS ISOLATED BEFORE CONNECTING THE SUPPLY CABLE TO THE MACHINE.

### Location

5. The beverage machine is designed for indoor use, in an environment with an ambient temperature range of between 0°C and 40°C. The machine should be located close to the appropriate electrical and water services with a minimum of 100mm (4in) clearance between the rear of the cabinet and the wall to allow adequate ventilation, and, if in a corner location, not closer to the right hand wall than 400mm (16in) to accommodate opening of the door.

The unit should not be situated in an area where a water jet could be used.

### Levelling

6. The machine should be levelled both fore and aft and side-to-side by adjustment of the four leveling feet, using a spirit level on the cabinet floor to check for level.

The unit must be mounted within 10° of the vertical for safe operation.

### Securing

7. The Neva Bean To Cup Beverage Machine is a free-standing unit which can be mounted on a secure table, bench, cabinet or food and drink counter.

## CONNECTING THE WATER SERVICES

**Refer to the current requirements of The Model Water Bylaws 1986**

**Statutory Instrument (SI) No.1147.**

8. The water supply should be taken from a 15mm rising main at a pressure of between 1 to 8 bar and should be fitted with a stopcock to isolate the supply during servicing. A 15mm double backcheck valve, with inspection port, should be fitted to the flexible hose.
9. The outlet should be fitted with BSP connections and must be positioned within 1.5m of the machine to ensure correct fitting of the hose. If possible, the outlet should be located behind the machine to prevent misuse.
10. Before connecting the machine hose to the mains outlet, flush the system, via the stopcock, to remove any impurities that may have accumulated in the mains supply pipe.
11. Connect the machine hose to the mains outlet using the seals supplied and ensure that all fittings are tight. Turn on the water supply at the stopcock and check for leaks, both behind and inside the machine.

## CONNECTING THE ELECTRICAL SERVICES

- WARNINGS**
- (1) THE MACHINE MAINS CABLE MUST BE CONNECTED TO THE SUPPLY VIA A SAFETY ISOLATOR SWITCH WHICH PROVIDES A CONTACT SEPARATION OF AT LEAST 3mm.
  - (2) REPLACEMENT OF THE Y TYPE MAINS CABLE REQUIRES SPECIAL TOOLS. SHOULD THE CABLE BECOME DAMAGED, REPLACEMENT MUST ONLY BE CARRIED OUT BY A TRAINED PERSON FROM AN APPROVED SERVICE AGENT.
  - (3) ENSURE THAT THE SUPPLY TO THE ISOLATOR SWITCH IS ISOLATED BEFORE MAKING ANY CONNECTIONS TO IT.
  - (4) ENSURE THAT THE SUPPLY TO THE BEVERAGE MACHINE IS ISOLATED BEFORE MAKING ANY CONNECTIONS TO THE TERMINAL BLOCK AT THE REAR OF THE MACHINE.
  - (5) THE BEVERAGE MACHINE MUST BE EARTHED.

12. The mains cable fitted to the machine should be 3-core, depending on the electrical supply available and the number of heaters to be connected in circuit. The cable is terminated at a terminal block at the base of the machine. Terminal block connections for different supply and heater configurations are shown in Fig 1.4. Connection to the electrical supply must not be carried out using a cable with more cores than required.
13. Do not attempt to connect more than one heater to a 230V, 10A or 16A single phase supply. The mains cable must be connected to the supply via a safety isolator switch, preferably located behind the machine. Ensure that the supply to the isolator switch is isolated before making the connections. Ensure that the supply to the beverage machine is isolated before making any connections to the terminal block. The machine must be earthed.
14. Connect the beverage machine, via a safety isolator switch with a contact separation of at least 3mm, to a 230V, 50Hz, 13A supply. Note that replacement of the Y Type mains cable requires special tools. Should the cable become damaged, replacement must only be carried out by a trained person from an approved service agent.  
  
**To reconfigure the machine to operate from a 110V supply, move the voltage selector link on the PSU to the 110V position and replace the 240V 3kW element (part no. 12345) with a 110V 1.6kW element (part no. 56223).**
15. Preferably, the isolator switch should be located behind the machine to prevent accidental damage or misuse.
16. The number of heaters which can be connected in circuit depends on the supply available. The supply requirements are as follows.

- 1 heater operation (3kW): 230V, 10A/16A single phase, 50Hz

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17. The 3-core cable connections for 1 heater operation from a 230V, 10A/15A supply are as follows:

LIVE	BROWN
NEUTRAL	BLUE
EARTH	GREEN/YELLOW

**Important:** Where a beverage machine is to be connected to a 13A domestic socket outlet, a 3-core power cable capable of carrying a minimum current of 13A, Part No. 54416, must be used. This cable is fitted as standard.

## DESCALING THE TANK

WARNING

ENSURE THAT THE TANK IS FLUSHED WITH COLD WATER  
BEFORE ATTEMPTING TO HANDLE IT.

18. If the tank requires descaling, proceed as follows:
  - (1) Isolate the machine from the electrical supply.
  - (2) Flush the tank with cold water.
  - (3) Remove the tank, taking note of the connections, which have been removed.
  - (4) Remove the solenoid operated valves and the thermostat probe from the tank.
  - (5) Check the heater element for signs of deterioration. Replace if necessary.
  - (6) Descale the tank in the approved manner.
  - (7) After descaling, flush the tank thoroughly with cold water, refit the solenoid operated valves and thermostat probe, and install and reconnect the tank to the machine.
  - (8) Restore the electrical supply to the machine and carry out a test of the quality of each beverage before returning the machine to operational use.



## COMMISSIONING

- WARNINGS
- (1) TO AVOID EXPOSURE TO HAZARDOUS VOLTAGES, DO NOT LEAN INTO THE MACHINE OR TOUCH ANY EXPOSED LIVE POINTS WHEN THE MAINS SUPPLY IS AVAILABLE TO THE MACHINE AND ANY OF THE FOLLOWING ITEMS ARE REMOVED: INGREDIENT CANISTER ENCLOSURE, LID AND COVER ASSEMBLY, MOTOR SHELF, SIDE PANELS.
  - (2) THE WATER IN THE BOILER IS HOT. AVOID CONTACT WITH WATER LEAKING FROM THE BOILER OR FROM ANY OF ITS ASSOCIATED VALVES, TUBES AND PIPES.

19. It is essential that the Service Engineer responsible for installing and commissioning the machine ensures that:
  - (1) all electrical and water supplies are correctly and safely connected;
  - (2) all covers, panels or access doors are in place and secured, and the machine is left in a SAFE condition;
  - (3) the Operator is familiar with the SAFETY PRECAUTIONS for the machine;
  - (4) the importance of hygiene and regular cleaning is fully appreciated by the Operator.
20. With the water and electrical supplies connected to the machine, proceed as follows:
  - (1) Set the On/Off switch on the machine to OFF.
  - (2) Isolate the electrical supply from the machine.
  - (3) Open the cabinet door and locate the waste tray.
  - (4) Ensure that the overflow pipes are not trapped.
  - (5) Restore the electrical supply to the machine.
  - (6) Set the On/Off switch on the machine to ON.
  - (7) Check that the boiler fills with water and that the water supply cuts off when the correct level is reached, i.e. no water overflows into the waste tray. (The machine may have to be switched OFF and ON several times in order to fill the tank).
  - (8) Check that the heater heats the water to the correct temperature.
  - (9) Select the Engineer's Program and run through the Output Test to check that all components are functioning correctly.
  - (10) Fill the ingredient canisters.
  - (11) Check the complete range of machine operations.
  - (12) If required, select the Engineer's Program and change the pre-set values to suit customer requirements.

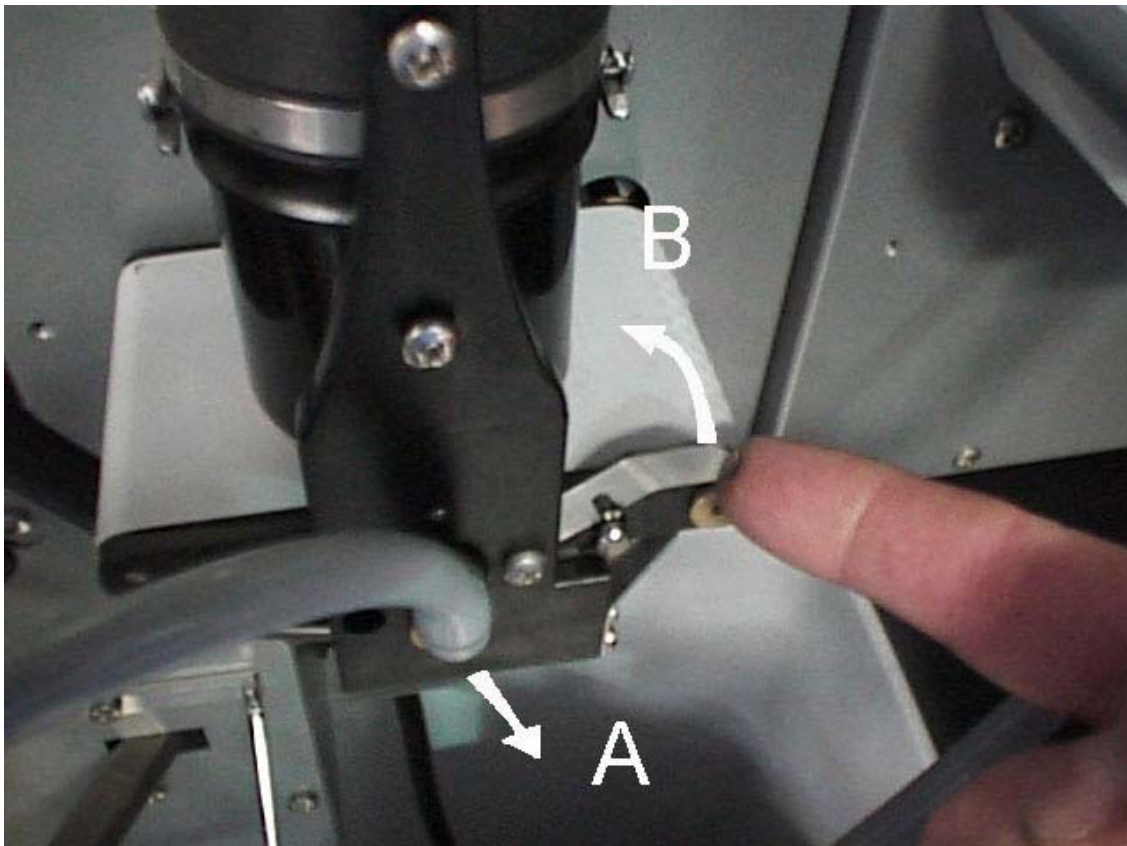
- (13) Set the On/Off switch on the machine to OFF.
- (14) Isolate the electrical supply from the machine.
- (15) Check all hose connections for leaks.
- (16) Clean the interior and exterior of the cabinet.
- (17) Restore the electrical supply to the machine.
- (18) Set the On/Off switch on the machine to ON.
- (19) Operate the machine through the complete range of dispense operations and check that each one is correct.

## DAILY HYGIENE

### Cleaning

21.

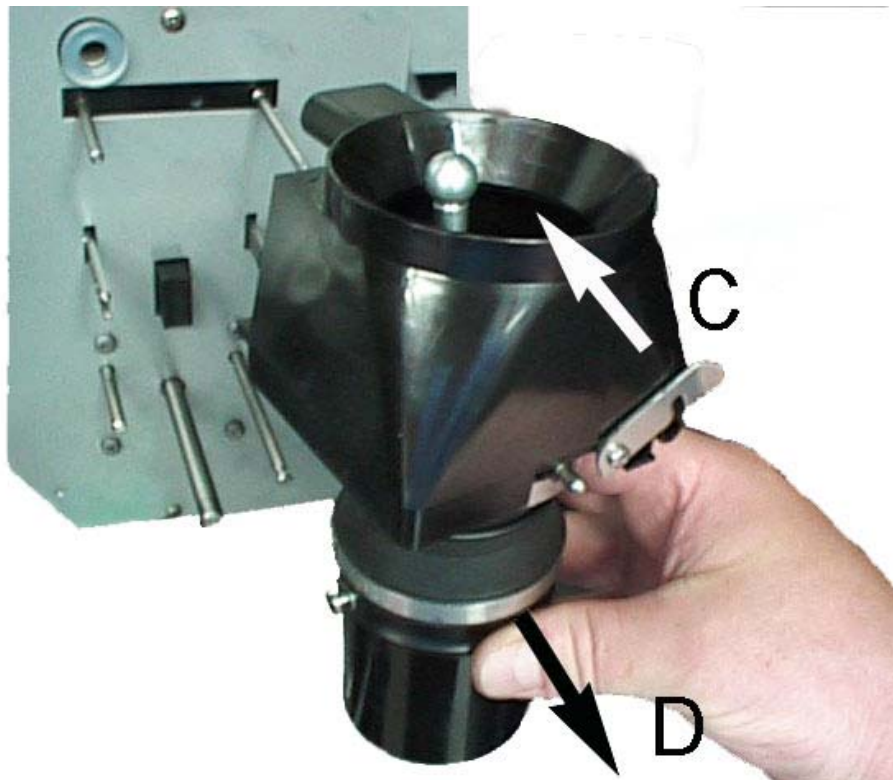
- (1) Set the On/Off switch on the machine to OFF and isolate the mains electrical supply from the machine. Unlock and open the cabinet door.
- (2) Remove the ingredient canisters. Wipe clean the exterior surfaces of the canister assembly. Wipe dry.
- (3) Remove the waste tray and grille. Empty the contents of the tray and wash and dry the tray and grille.
- (4) Remove the coffee grouts bucket. Empty the contents of the bucket and wash and dry it.
- (5) Disconnect the tube connecting the coffee brewer to the mixing bowl by pulling the black right-angled fitting (A) away from the brewer itself. Remove the coffee brewer safety cover and lift the lower carriage locking lever (B) to the vertical, (unlocked position). Remove the carriage assembly by pulling it gently towards the front of the machine.



- (6) Disconnect the ball and socket coupling visible inside the coffee brewer extract chamber. This is accomplished by pulling the lower vertical rod towards the front of the machine.



- (7) Move the upper locking lever (C) to the vertical, (unlocked position) and remove the brew chamber assembly (D) by pulling it gently towards the front of the machine.



- (8) Wash and dry the carriage and brew chamber assembly. Check the filter belt for signs of wear or damage and if necessary replace.
- (9) Disconnect the pipes from the mixing bowls and dispense head. Remove the mixing bowls, tubes and dispense nozzles, and also the whipper paddle and whipper base. Wash and dry these items.
- (10) Wash and dry the dispense area.

- (11) Wipe clean all accessible inner and outer surfaces of the machine. Wipe dry.
- (12) Refit the whipper bases, paddles, mixing bowls, tubes and dispense nozzles and brewer parts. The assembly procedure for the brewer is the reverse of the disassembly procedure. Ensure that both brewer-locking levers are in the locked, (horizontal position) and that the brewer safety cover is in place before proceeding to the next section.
- (13) Replace the grouts collection bucket and refit the front cover, ingredient canister assembly and waste tray and grille.

### Filling

22.

- (1) Remove the canisters from the machine. Remove the lid from each one in turn and fill it with the correct ingredient refitting the lid afterwards.
- (2) Place the canisters back in the machine ensuring that each one is in the correct position.
- (3) Restore the mains electrical supply to the machine and set the On/Off switch on the machine to ON.

### Flushing

23. A flush self clean cycle may be initiated by means of the dedicated flush switch, (Green Button) located on the inside of the machines door or alternatively via the Operators program. All that is required to start a flush cycle using the dedicated flush button is to momentarily press the green button. Once started the machine will rinse each mixing system in turn and then carry out a brewer cycle putting only hot water through the brewer. Pressing any key will terminate the self-clean cycle however once in progress the brewer flush cycle cannot be halted.
24. To initiate a self-clean cycle from within the operators program the procedure is as follows:
  - (1) Enter the Operator's Program by pressing the PROG key.
  - (2) Scroll through the Operator's Program options by repeatedly the PROG button until the flush option is displayed.
  - (3) Press key 5 (ENTER) to start the flush cycle. Press any key to stop the cycle.
  - (4) Press PROG repeatedly until the operators program exits.

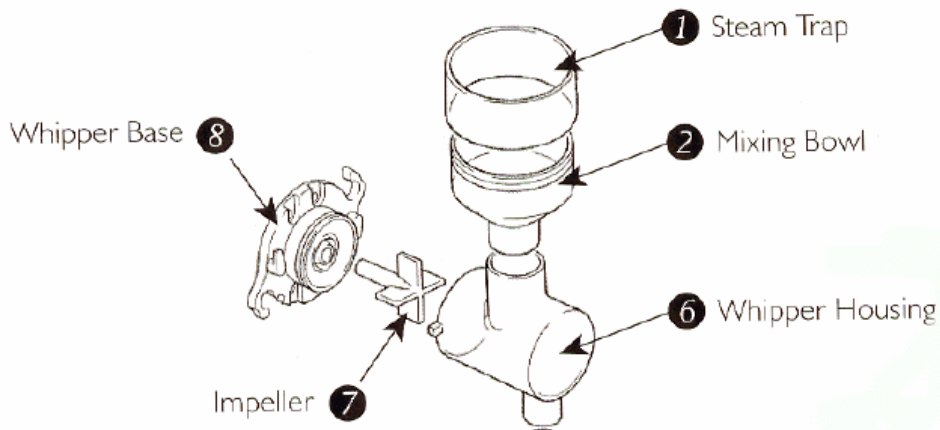
## WEEKLY HYGIENE

### Cleaning

25. On a weekly basis an identical procedure to that described in section 21 should be carried out with the following additional activities.
- (1) The ingredients should be removed from the canisters and the canisters washed and allowed to thoroughly dry, before being refilled with ingredients and restored to the machine. It is recommended that the canisters be left to dry overnight.
  - (2) The brewer filter belt should be removed and cleaned by soaking it in a suitable de-staining solution.

**WARNING**

- (1) THE UNIT MUST NOT BE CLEANED USING A WATER JET OR SPRAY.
- (2) THE ENCLOSURE IS NOT WATERPROOF AND DAMAGE MAY OCCUR IF EXCESSIVE VOLUMES OF WATER ARE USED IN THE CLEANING PROCESS.



WHIPPER AND MIXING BOWL ASSEMBLY

- (3) Set the on/off switch on the machine to off and isolate the mains electrical supply from the machine. Unlock and open the cabinet door.
- (4) Rotate the canister nozzles then remove the ingredient canisters. Wipe clean the exterior surfaces of the canister assembly and dry thoroughly.
- (5) Disconnect the pipes from the mixing bowls and remove the dispense nozzles from the dispense head. Wash and dry these items.
- (6) Rotate and remove the steam trap **1**, then remove the mixing bowl **2**. Remove the whipper housing **6** by turning to the right and then pulling towards you.
- (7) Remove the whipper impellor **7** by pulling toward you. Finally turn the whipper base **8** to the right and pull off.
- (8) Clean all the whipper parts in hot water using the recommended sterilising agent and dry them thoroughly.

- (9) Remove the extract chamber from the canister shelf. Wash and dry the cover.
- (10) Clean all accessible inner and outer surfaces of the machine using a damp cloth and wipe dry.
- (11) Replace the cleaned parts.
- (12) Replace the ingredient canister after filling with product and rotate the canister nozzle downwards.
- (13) Switch on the machine and set on/off switch to on.
- (14) Flush the machine by pressing green button on back of door to ensure there are no leaks and everything is working correctly.
- (15) Remove waste tray and grille and empty contents.
- (16) Clean waste tray and grille and replace.

### **Filling Procedure**

26.

- (1) Open door of machine with key provided.
- (2) Turn ingredient chutes to ensure that product is not trailed over the counter.
- (3) Lift out the product canister. Remove lid of canister and fill with correct ingredients to within 3cm of top of canister. Do not overfill canister or compress the product in canister.
- (4) Wipe the exterior of the canister with a clean damp cloth using the recommended cleaning agent. Dry the canister with a clean dry cloth or paper towel.
- (5) Return the canister to the machine. Remember to turn the ingredient chutes back to a downward facing position.
- (6) Always ensure that the canisters are located in the correct position. The ingredient name is written on the rear of the machine to assist you.
- (7) Check that the auger at the rear of the canister is correctly aligned with the cogs at the back of the machine.

## FAULT FINDING GUIDE

FAULT	POSSIBLE CAUSE	ACTION
FATAL I <sup>2</sup> C ERROR Displayed	(a) Electrical noise	(a) Check motors
	(b) MPU Board fault	(b) Replace MPU Board
	(c) Software error	(c) Reset power
Keypad does not bleep	(a) Keypad damaged	(a) Replace keypad
	(b) Keypad disconnected	(b) Reconnect
	(c) MPU Board fault	(c) Replace MPU Board
Drinks cold	(a) Heater fuse blown	(a) Check and replace
	(b) Thermal cut-out tripped	(b) Reset trip
	(c) Desired temperature incorrectly set	(c) Check desired temperature setting
	(d) Excessive scaling in heater tank	(d) Check tank and descale if necessary
	(e) Solid state relay fault	(e) Check relay
	(f) Low cut-out in program incorrectly set	(f) Reset low cut-out setting
	(g) Temperature probe wet	(g) Dry probe and check for leaks.
No motor operation	(a) Jammed motor	(a) Check motor operation
	(b) Power Supply failure safety trip	(b) Reset power
Machine inoperable; no display	(a) Power Supply failure	(a) Replace Power Supply Board



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FAULT	POSSIBLE CAUSE	ACTION
Heater tank not filling	(a) Low water pressure	(a) Check water pressure
	(b) Inlet valve fault	(b) Check inlet valve
	(c) MPU Board fault	(c) Replace MPU Board
Heater tank boiling over	(a) Incorrect desired temperature setting	(a) Reset desired temperature setting
	(b) Temperature probe fault	(b) Replace probe
	(c) MPU Board fault	(c) Replace MPU board
	(d) Short on solid state relay	(d) Replace relay
Heater tank overfilling	(a) Probe open circuit	(a) Check probe circuit
	(b) Inlet valve fault	(b) Check inlet valve and replace if necessary
	(c) Level probe incorrectly positioned	(c) Reposition probe
Bearding of ingredient	(a) Extractor fan fault	(a) Check fan
	(b) Steam hoods missing from mixing bowls or incorrectly positioned	(b) Fit steam hoods to mixing bowls and position correctly.
Machine floods	(a) Dispense pipes incorrectly fitted to dispense head	(a) Reposition pipes
	(b) Mixing bowls incorrectly fitted	(b) Reposition mixing bowls
	(c) Whipper seals missing	(c) Check seals
	(d) Overflow pipe incorrectly fitted	(d) Refit overflow pipe
No display	(a) Display connector loose	(a) Refit connector
TEMP LOW displayed	(a) Thermal cut-out tripped	(a) Reset cut-out
	(b) Heater fuse blown	(b) Check fuse
	(c) Incorrect temperature setting	(c) Check program setting

## Section 4 Exploded Parts Diagram

