

THIS **SUPPLEMENT** CONTAINS
IMPORTANT
INFORMATION - PLEASE READ THOROUGHLY

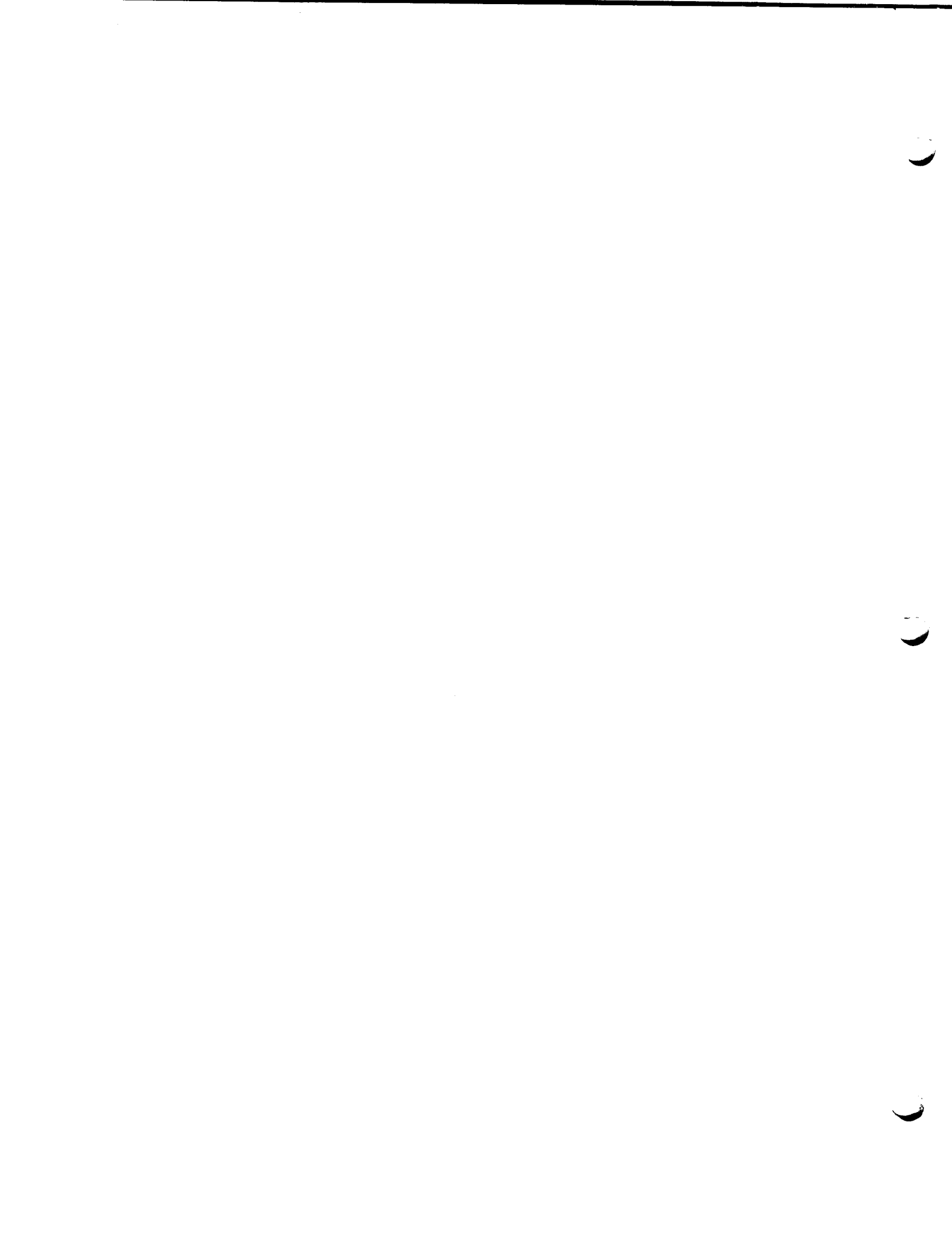


211

**HOT DRINK MERCHANDISER
SERVICE MANUAL**

**FOR USE WITH UNIVERSAL BOARD IN MACHINES WITH
VERSION 3.0.4 SOFTWARE WITH YELLOW LABEL**

300 JACKSONVILLE ROAD WARMINSTER, PA 18974



INTRODUCTION

This Service Manual Supplement provides additional information regarding the new control board available in the AP211, which includes a number of changes to provide additional selections, on board accountability and a cup sensor discount. All of these additional features are supported by the new 'Universal' board which will also be used in the C-Series. The information contained in this documentation regarding these improvements supersedes any information contained in the AP211 Service Manual V2.0.

IDENTIFICATION & INTERCHANGEABILITY

The Universal Control board is physically different from its predecessor, however it is interchangeable and can be retrofitted, except the metal cover on the Master Module which must be changed to a new cover because of the physical change to connectors on the board. The microprocessor on the board has a YELLOW label and will be marked DV 3.0.4. The Universal board will support the following coin mechanism interfaces: MC5000/TRC6000, Executive (Protocol A) and L+ (export controller mech).

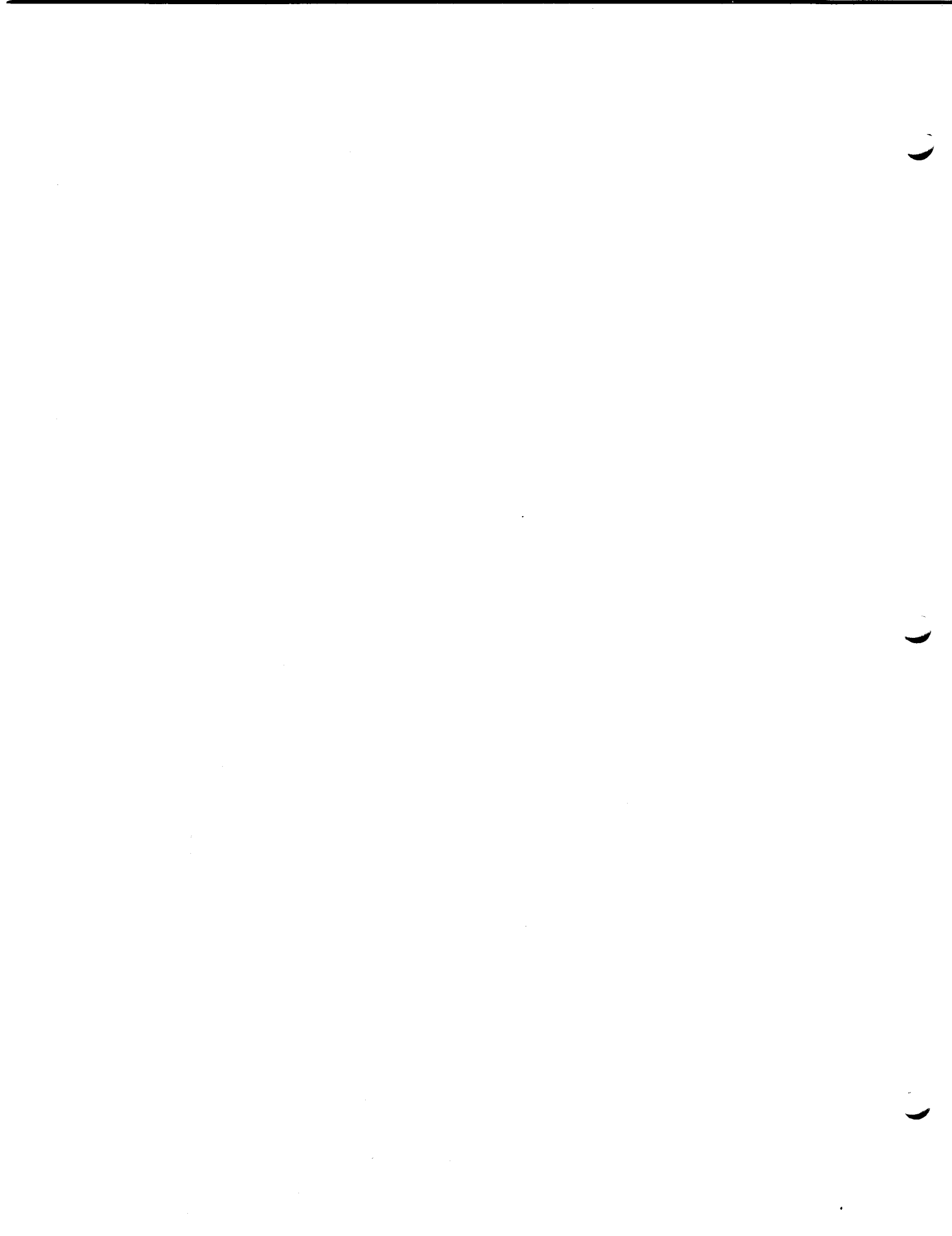
NEW SELECTIONS

The Universal board supports a number of new selections along with a new configuration as indicated in the table below. The primary changes are: 1) the addition of a new configuration "0" which will provide Cafe Mocha - a combination of coffee and chocolate, and 2) each selection that requires creme or sugar may have sugar substitute available as selections 5 and 6. This depends on whether the canister rack has soup/Soluble Gourmet Coffee or is replaced with sugar substitute. This is what allows each of the prime selections to have 4 or 6 selections available. A typical coffee selection with sugar substitute would be:

A1	A2	A3	A4	A5	A6
Black Coffee	Coffee w/ Creme	Coffee w/ Sugar	Coffee w Cr & Sug	Coffee w/ Sugar Sub	Coffee w/Cr & Sugar Sub

The following chart demonstrates the available combinations of drinks available for each of the configurations. For a machine without sugar substitute, the selections would be 1 through 4, and in models with sugar substitute would include two additional selection codes.

CONFIGURATION	SELECTIONS	SELECTION CODES	ADDITIONAL SELECTIONS WITH SUGAR SUB
0	COFFEE X 4 OR 6 CAFE MOCHA X 4 OR 6 TEA/DECAF X 4 OR 6 CHOCOLATE SOUP OR SUGAR SUBSTITUTE	A1⇒ A4 B1⇒B4 C1⇒C4 C5 C6 SOUP ONLY	A5, A6 B5, B6 D1, D2
1	COFFEE X 4 OR 6 STRONG COFFEE X 4 OR 6 TEA/DECAF X 4 OR 6 CHOCOLATE SOUP OR SUGAR SUBSTITUTE	A1⇒ A4 B1⇒B4 C1⇒C4 C5 C6 SOUP ONLY	A5, A6 B5, B6 D1, D2
2	COFFEE X 4 OR 6 ESPRESSO X 4 OR 6 TEA/DECAF X 4 OR 6 CHOCOLATE SOUP OR SUGAR SUBSTITUTE	A1⇒ A4 B1⇒B4 C1⇒C4 C5 C6 SOUP ONLY	A5, A6 B5, B6 D1, D2
3	COFFEE X 4 DECAF X 4 TEA X 4 CHOCOLATE	A1⇒ A4 B1⇒B4 C1⇒C4 C5	NOT AVAILABLE
4	COFFEE X 4 STRONG COFFEE X 4 DECAF X 4 STRONG DECAF X 4 CHOCOLATE SOUP ONLY	A1⇒ A4 B1⇒B4 C1⇒C4 C5 C6 SOUP ONLY	NOT AVAILABLE



ACCOUNTABILITY

Accountability is now internally contained in the nonvolatile memory on the logic board. This function was previously supported by 3 external meters. This internal accountability now supports as individual readings: total vends, total cash, total vends for each selection, and total free vends in nonresettable counters. The steps for obtaining this information are:

1. Press service switch one time.
2. Press **5** the display will alternately show the left four digits followed by the right four digits of the total cash accepted including a decimal point.
 EXAMPLE: Press **5** display shows 0000
 then display shows 03.40
 This would represent a total of \$ 3.40 total cash accepted.
3. Press **5** followed by the letter A followed by D. The display will show Ad, and then the display will show the total vends for all selections.
 EXAMPLE: Press **5** then A followed by D display shows Ad
 Display will show 0000
 then display shows 0053
 This would represent a total of 53 total vends.
4. Press **5** followed by a selection code and the total number of vends for that selection will be displayed.
 EXAMPLE: Press **5** then A1 display will show 0025
 This would represent a total of 25 vends of selection A1. Step 4 can be repeated as many times as required.
5. Press **5** and display will indicate the total number of free or executive key vends.
 EXAMPLE: Press **5** display will show 0000
 then display will show 0019
 This would represent a total of 19 free vends.

NOTE: Counters for vends by selection and total free vends are limited to 4 positions and will reset to 0000 after 9999.

CUP DISCOUNT PERCENTAGE SETTING

The new Universal Control Board will also provide a means to provide a price reduction referred to as a cup sensor discount. This cup sensor discount is expressed as a percentage of the total vend price. This percentage is entered as a three digit number in Channel 18, **2**. A machine with a cup sensor discount set to 00% would provide the customer with no discount for using their own cup, while one set to 100% would provide a free vend if a customer used their own cup. The steps for setting the cup sensor discount are:

1. Press service switch one time.
2. Press **1** and hold; The display will show the ingredient setting channels starting with channel 0 and increasing as the **1** is held.
3. Advance the display until channel 18 is shown.
4. Press **2** and use the * or # key until the required % is displayed. See table below for correct percentage based upon vend prices in use.

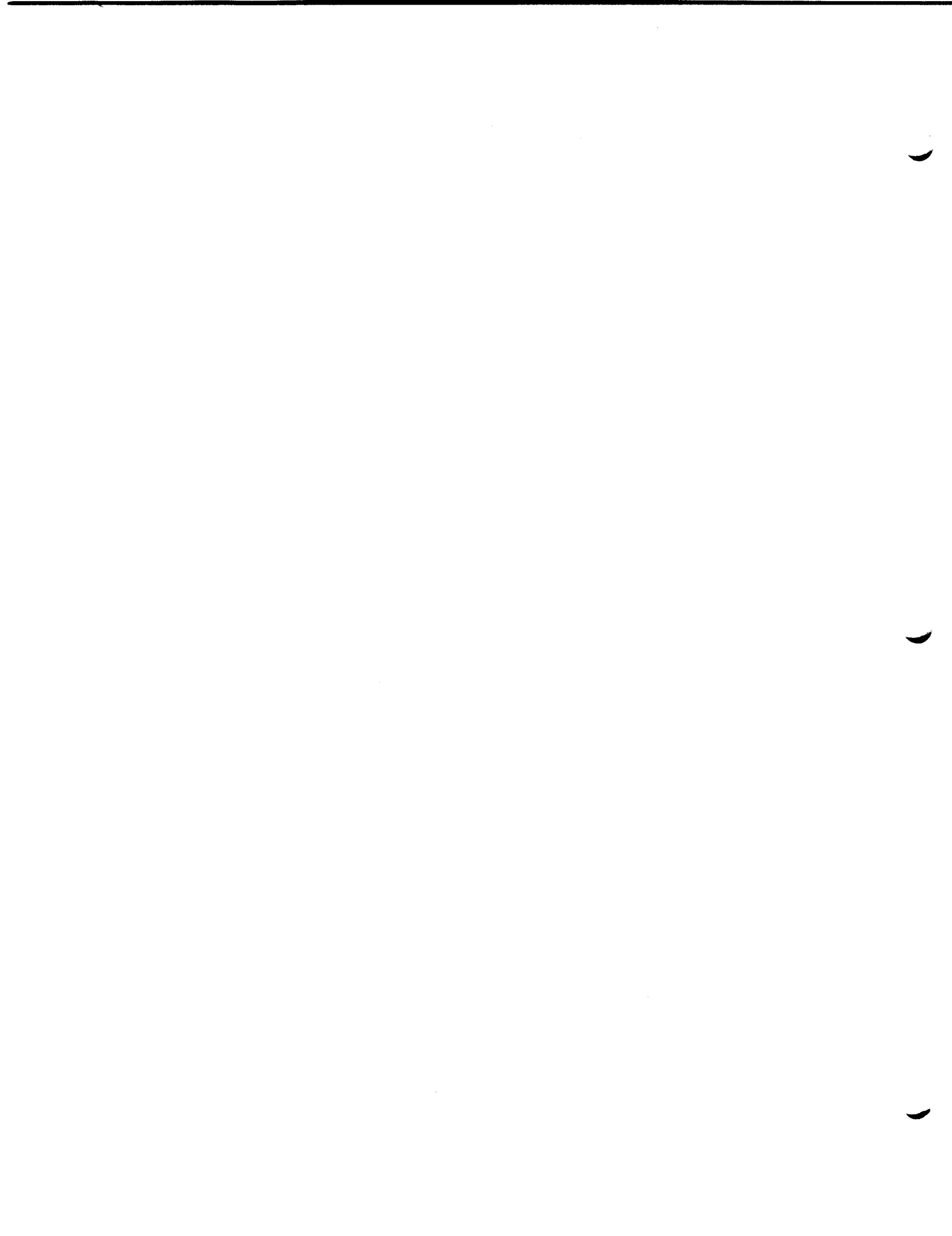
TO USE DISCOUNT % TABLE: locate all the vend prices you have in use in the machine. By referring to chart, pick the shaded area that includes all your prices. Enter the percentage at the top of that column into channel 18, **2**

DISCOUNT PERCENTAGE TABLE
 FOR 5¢ DISCOUNT PER CUP WHEN USING YOUR OWN CUP

PRICE	8%	9%	10%	12%	15%	17%
15¢	NO DISCOUNT					
20¢						
25¢						
30¢						
35¢						
40¢						
45¢						>10¢
50¢						

PRICE	8%	9%	10%	12%	15%	17
55¢						
60¢						
65¢						
70¢						
75¢						
80¢						
85¢						
90¢						

10¢ OR GREATER
DISCOUNT



CAFE MOCHA OPTION

In the new configuration "0", the B selection is now a combination of coffee & chocolate. Three additional channels have been added to allow proper setup of this selection. The chart below details the channels and the times for the cafe mocha selection. The valid selections for Cafe Mocha are B1 ⇔ B6, following the pattern for additives of a regular coffee selection.

NEW CHANNELS FOR FRESH BREW CAFE MOCHA SELECTION				
CHANNEL	BUTTON ②		BUTTON ③	
	FUNCTION	START	FUNCTION	DURATION
19	Cafe Mocha coffee water duration	4.0	Cafe Mocha coffee auger duration	1.1
20	Cafe Mocha chocolate start time	16.0	Cafe Mocha chocolate auger duration	1.2
21	Cafe Mocha chocolate water start time	15.0	Cafe Mocha chocolate water duration	2.8

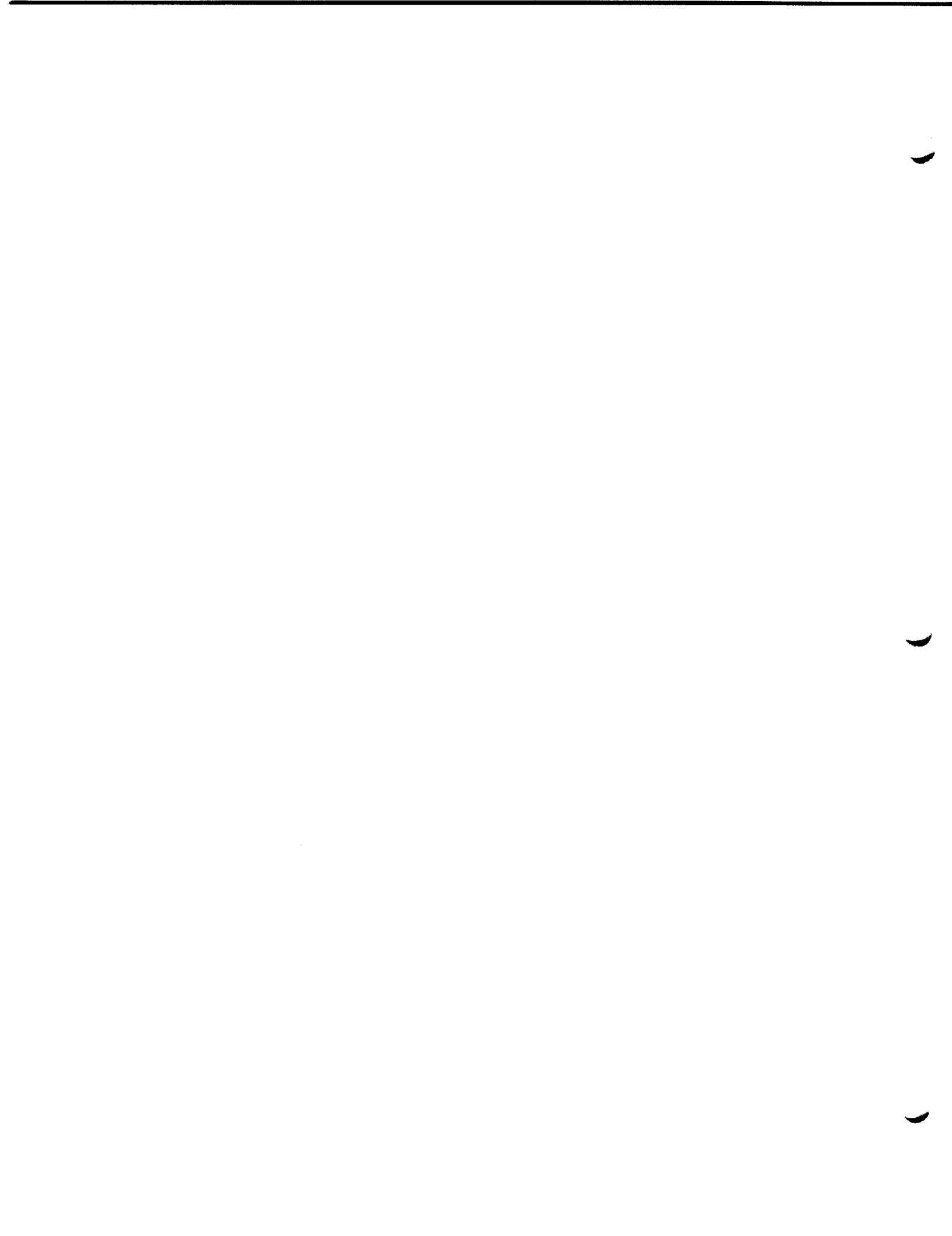
NEW CHANNELS FOR FREEZE DRIED CAFE MOCHA SELECTION				
CHANNEL	BUTTON ②		BUTTON ③	
	FUNCTION	START	FUNCTION	DURATION
19	Cafe Mocha coffee water duration	4.5	Cafe Mocha coffee auger duration	1.2
20	Cafe Mocha chocolate start time	9.0	Cafe Mocha chocolate duration	1.2
21	Cafe Mocha chocolate water start time	10.0	Cafe Mocha chocolate water duration	2.8

Note that there is not a separate start time for the coffee auger or coffee water. Both the auger and valve start at the same time listed for channel 2 - normal coffee. All times listed are approximations, and should be adjusted for proper gram throws which are dependent upon regional variation in product and customer tastes. While adjusting times, especially START times of either product or water, the primary premise for correct operation of the machine will depend upon maintaining the proper sequence of liquid and ingredients: dry ingredients should always fall into flowing liquid and should always be followed by flowing liquid to achieve a complete and thorough rinse of the mixing bowl or channel. A test should be made with Cafe Mocha with extra creme & sugar to ensure a correct rinse of the main trough, due to the reduced volume of liquid being delivered from the coffee portion of the selection.

*Pg 4
CH 1-21 for Config 0*



CHANNEL TIMES FOR FRESH BREW - CONFIGURATION 0				
CHANNEL	BUTTON ②		BUTTON ③	
	FUNCTION	START	FUNCTION	DURATION
1	COFFEE BREWER/WATER START	2.5	COFFEE BREWER, WATER DURATION	6.2
2	COFFEE START	0.0	COFFEE DURATION	1.7
3	LIGHT (COFFEE) START	13.7	LIGHT (COFFEE) DURATION	0.8
4	SUGAR START	14.5	SUGAR DURATION	1.0
5	TEA START	2.0	TEA DURATION	1.7
6	TEA WATER START	0.0	TEA WATER DURATION	7.3
7	SOUP START	2.0	SOUP DURATION	1.0
8	SOUP WATER/WHIPPER START	0.0	SOUP WATER/WHIPPER DURATION	7.3
9	CHOCOLATE START	2.0	CHOCOLATE DURATION	4.4
10	CHOCOLATE WATER/WHIPPER START	0.0	CHOCOLATE WATER/WHIPPER DURATION	7.2
11	SUGAR START - DECAF/TEA	3.0	SUGAR DURATION DECAF/TEA	0.8
12	NOT USED		NOT USED	
13	LIGHT START DECAF/TEA	4.0	LIGHT DURATION DECAF/TEA	0.8
14	NOT USED		NOT USED	
15	EXTRA LIGHT DURATION-COFFEE	0.2	EXTRA SUGAR DURATION-COFFEE	0.5
16	EXTRA LIGHT DURATION-DECAF/TEA	0.1	MACHINE CONFIGURATION	0.0
17	CUP DROP MOTOR START PULSE	1.8	CUP SENSOR FUNCTION .0- OFF .1- ON	0.1
18	CUP DISCOUNT %	00	ESPRESSO WATER % (Config 1.1 only)	NOT USED
19	CAFE MOCHA COFFEE WATER DURATION	4.0	CAFE MOCHA COFFEE AUGER DURATION	1.1
20	CAFE MOCHA CHOCOLATE START	16.0	CAFE MOCHA CHOCOLATE AUGER DURATION	1.2
21	CAFE MOCHA CHOCOLATE WATER START	15.0	CAFE MOCHA CHOCOLATE WATER DURATION	2.8



CHANNELS TIMES FOR FREEZE DRIED - CONFIGURATION 0				
CHANNEL	BUTTON ②		BUTTON ③	
	FUNCTION	START	FUNCTION	DURATION
1	COFFEE WATER START	0.0	COFFEE WATER DURATION	7.3
2	COFFEE START	2.0	COFFEE DURATION	1.7
3	LIGHT (COFFEE) START	2.6	LIGHT (COFFEE) DURATION	0.8
4	SUGAR START	2.3	SUGAR DURATION	1.0
5	TEA START	2.0	TEA DURATION	1.7
6	TEA WATER START	0.0	TEA WATER DURATION	7.3
7	SOUP START	2.0	SOUP DURATION	1.0
8	SOUP WATER/WHIPPER START	0.0	SOUP WATER/WHIPPER DURATION	7.3
9	CHOCOLATE START	2.0	CHOCOLATE DURATION	4.4
10	CHOCOLATE WATER/WHIPPER START	0.0	CHOCOLATE WATER/WHIPPER DURATION	7.2
11	SUGAR START - DECAF/TEA	3.0	SUGAR DURATION DECAF/TEA	0.8
12	NOT USED		NOT USED	
13	LIGHT START DECAF/TEA	4.0	LIGHT DURATION DECAF/TEA	0.8
14	NOT USED		NOT USED	
15	EXTRA LIGHT DURATION-COFFEE	0.2	EXTRA SUGAR DURATION-COFFEE	0.5
16	EXTRA LIGHT DURATION-DECAF/TEA	0.1	MACHINE CONFIGURATION	0.0
17	CUP DROP MOTOR START PULSE	1.8	CUP SENSOR FUNCTION .0- OFF .1- ON	0.1
18	CUP DISCOUNT %	00	ESPRESSO WATER % (Config 1.1 only)	NOT USED
19	CAFE MOCHA COFFEE WATER DURATION	4.5	CAFE MOCHA COFFEE AUGER DURATION	1.2
20	CAFE MOCHA CHOCOLATE START	9.0	CAFE MOCHA CHOCOLATE AUGER DURATION	1.2
21	CAFE MOCHA CHOCOLATE WATER START	10.0	CAFE MOCHA CHOCOLATE WATER DURATION	2.8



AP 211 PIN OUTS FOR UNIVERSAL CONTROL BOARD

LOGIC BOARD PIN CONNECTIONS

L1-POWER SUPPLY

- L1-1 12Vac hot
- L1-2 12Vac neutral
- L1-3 24Vac hot
- L1-4 Key - no connection
- L1-5 24Vac neutral

L2 \$ VALIDATOR

- L2-1 Credit input
- L2-2 Enable
- L2-3 Key
- L2-4 Escrow
- L2-5 Credit neutral
- L2-6 Ground

L3 - EXECUTIVE COIN MECH INTERFACE

- L3-1 24Vac return
- L3-2 Key - no connection
- L3-3 24Vac hot
- L3-4 Enable jumper to pin 6
- L3-5 No connection
- L3-6 Enable jumper to pin 4
- L3-7 No connection
- L3-8 Receive + (RX+)
- L3-9 Receive - (RX-)
- L3-10 Transmit + (TX+)
- L3-11 Transmit - (TX-)

L4 MAIN CONTROLLER INTERFACE

- L4-1 Data
- L4-2 Clock
- L4-3 Latch
- L4-4 Output enable
- L4-5 Diagnostic out of service
- L4-6 Free vend output
- L4-7 Cup sense
- L4-8 Key - no connection
- L4-9 dc Common
- L4-10 +12Vdc
- L4-11 +5Vdc
- L4-12 2Khz cup sense
- L4-13 Cup present indicator

L6 - COIN MECHANISM

- | | | |
|-------|------------------------|-------------------|
| L6-1 | To coin mech pin #3 | Send line |
| L6-2 | To coin mech pin #6 | Accept enable |
| L6-3 | To coin mech pin #7 | .25 dispense line |
| L6-4 | To coin mech pin #8 | .10 dispense line |
| L6-5 | To coin mech pin #9 | .05 dispense line |
| L6-6 | To coin mech pin #11 | Reset |
| L6-7 | To coin mech pin #1 | +5Vdc |
| L6-8 | To coin mech pin #4 | Interrupt line |
| L6-9 | To coin mech pin #5 | Data line |
| L6-10 | To coin mech pin #2&13 | dc ground |
| L6-11 | Key - no connection | |
| L6-12 | To coin mech pin #15 | 24Vdc hot |

L5 KEYPAD SELECTION PANEL

Pin 8 is common for all combinations-each selection is a combination of pin 8 plus two other pins

- A 8+5+7
- B 8+4+7
- C 8+3+7
- D 8+1+7
- 1 8+4+5
- 2 8+1+2
- 3 8+3+4
- 4 8+2+4
- 5 8+2+3
- 6 8+1+4
- * 8+1+3
- # 8+1+5

POWER BOARD CONNECTIONS

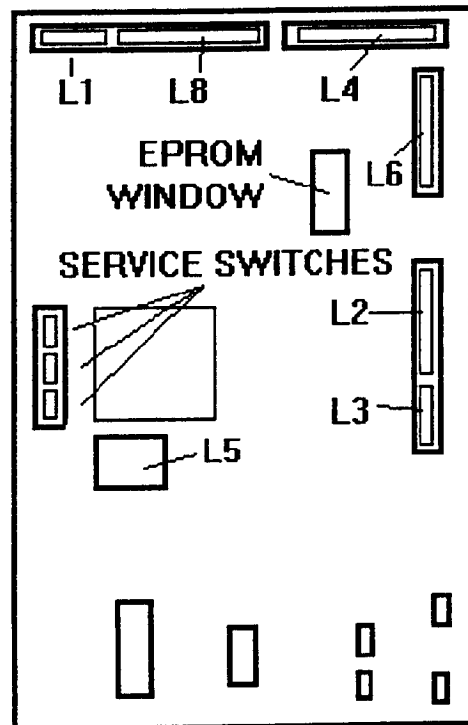
USED ONLY WITH 110V COIN MECH AND/OR VALIDATOR

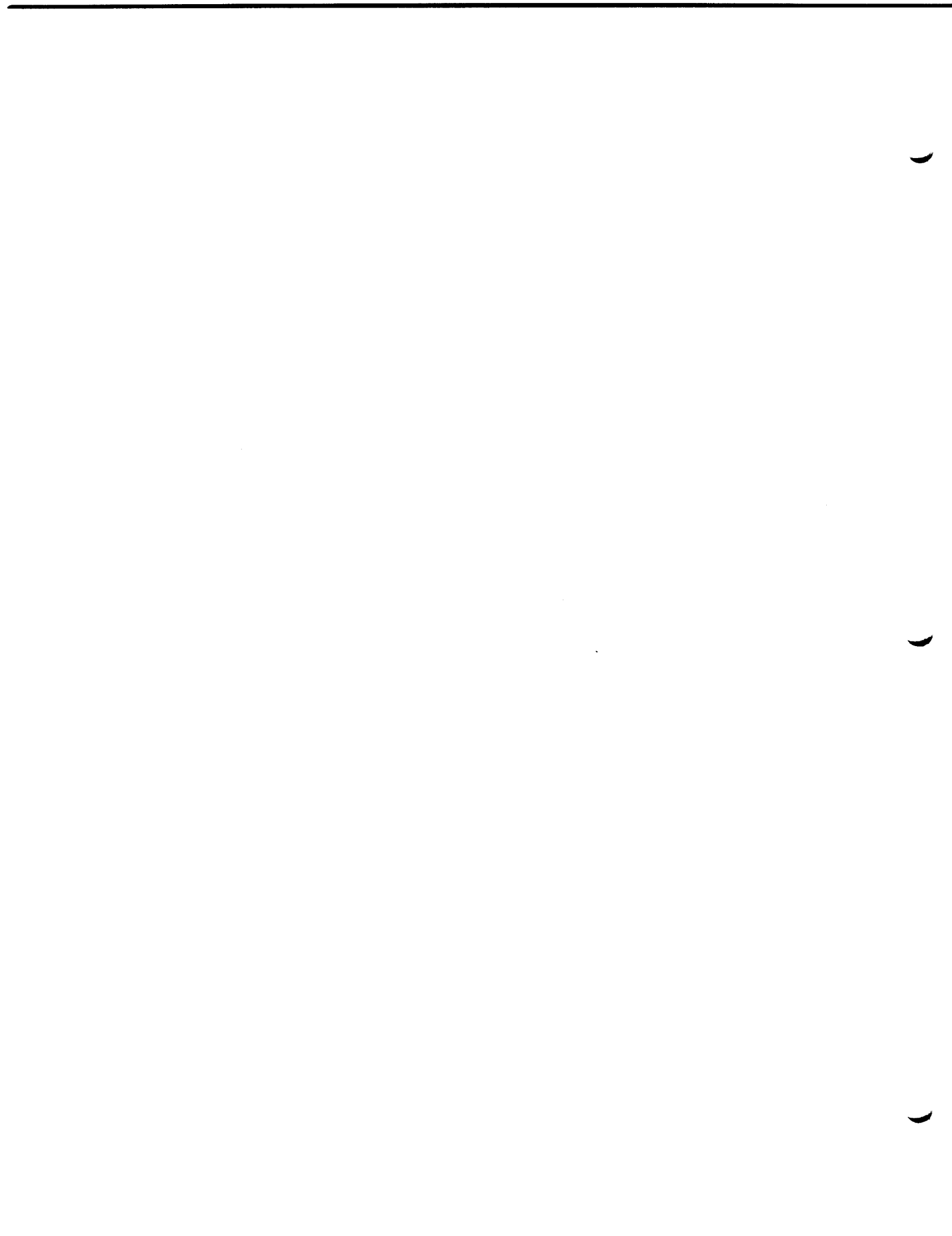
- P1-1 110V ac neutral in
- P1-2 Key - no connection
- P1-3 110V ac hot in

- P2-1 110V dc ground to coin mech pin 10
- P2-2 110V dc hot to coin mech pin 12
- P2-3 Key - no connection
- P2-4 No connection

- P3-1 110V ac neutral to validator pin 6
- P3-2 Key - no connection
- P3-3 110V ac hot to validator pin 4

MASTER MODULE CONNECTOR LOCATIONS







211

**HOT DRINK MERCHANDISER
SERVICE MANUAL**

FOR USE WITH VERSION DV2.0.5 SOFTWARE

300 JACKSONVILLE ROAD WARMINSTER, PA 18974

WARRANTY

Automatic Products international ltd. (APi) and Refreshment Machinery industries (RMi) warrants these automatic merchandisers (the "Unit"), manufactured by it, to be free under normal use and service from defects in material or workmanship for a period of two (2) years from the date of delivery of this Unit to the original purchaser. This warranty extends only to the original purchaser of the Unit and is limited to the repair or replacement, at APi/RMi's sole option, of any part or parts of the Unit that are returned to APi/RMi or to the authorized dealer or distributor of APi/RMi from whom the unit was purchased with all transportation charges prepaid, and which, on APi/RMi's examination, shall, conclusively appear to have been defective.

This warranty does not extend to:

1. any Unit, or part thereof, that was subjected to misuse, neglect, or accident by other than APi/RMi after its delivery to the original purchaser;
2. any Unit, or part thereof, that was modified, altered, incorrectly wired or improperly installed by anyone other than APi/RMi or used in violation of the instructions provided by APi/RMi;
3. a Unit which has been repaired or altered by anyone other than APi/RMi or authorized dealer/distributor;
4. a Unit which has had the serial number removed, defaced or otherwise altered;
5. plastic or glass windows, lamps, fluorescent tubes and water contact parts;
6. accessories used with the Unit that were manufactured by some person or entity other than APi/RMi.

This warranty is exclusive and in lieu of any warranty of merchantability, fitness for purpose or other warranty of quality, whether expressed or implied, and of all liabilities and obligations on APi/RMi's part. Under no circumstances shall APi/RMi be responsible for any incidental, consequential or special damages, losses or expenses arising from or in connection with the use of, or the inability to use, the goods for any purpose whatsoever. No representative of APi/RMi or any other person is authorized to assume for APi/RMi, or agree to on the behalf of APi/RMi, any other liability or warranty in connection with the sale of this Unit.

APi/RMi reserves the right to make any changes or improvements in its products without notice and without obligation, and without being required to make corresponding changes or improvements in Unit theretofore manufactured or sold.

Automatic Products international, ltd.
75 West Plato Boulevard
St. Paul, MN 55107

Refreshment Machinery industries
300 Jacksonville Road
Warminster, PA 18974

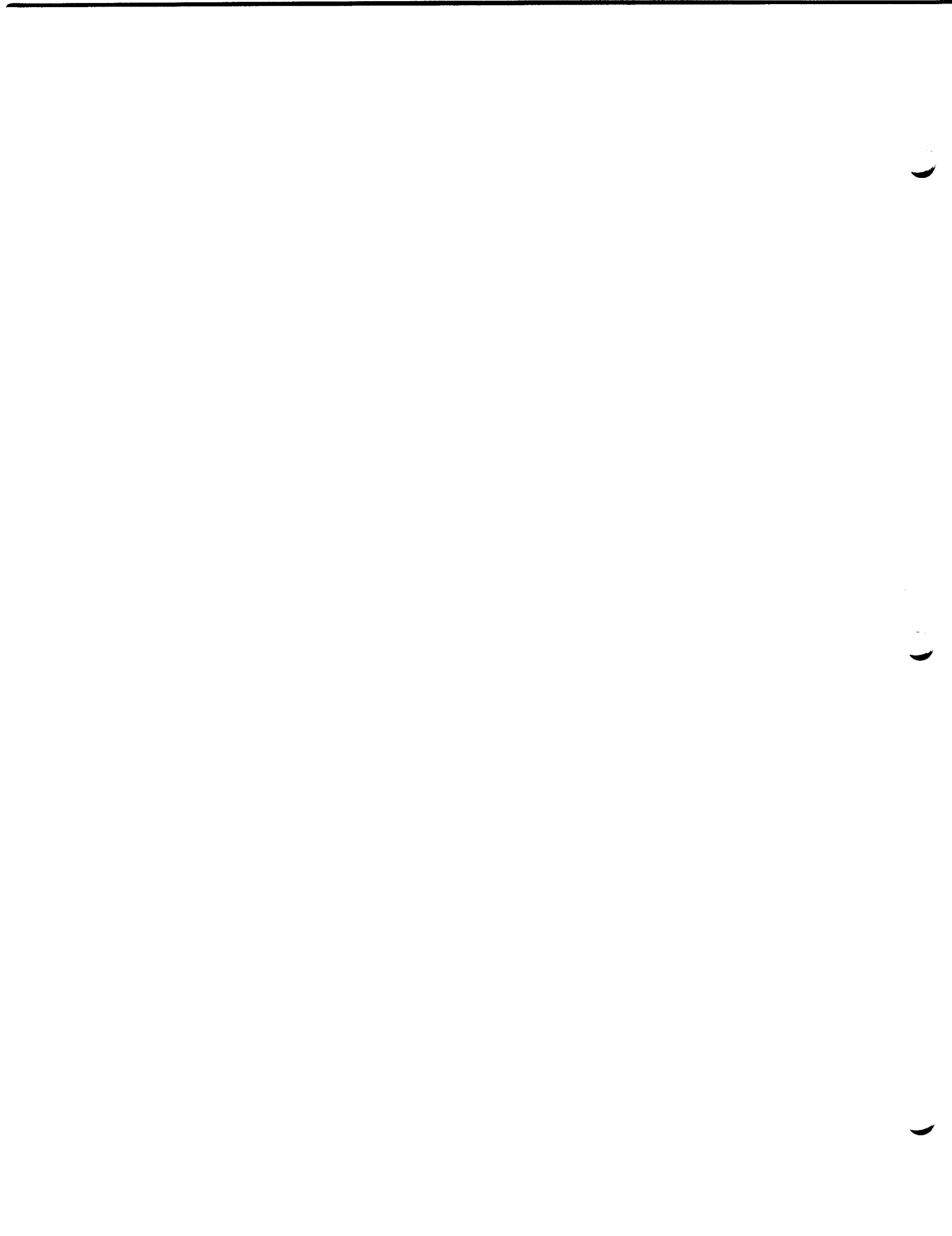
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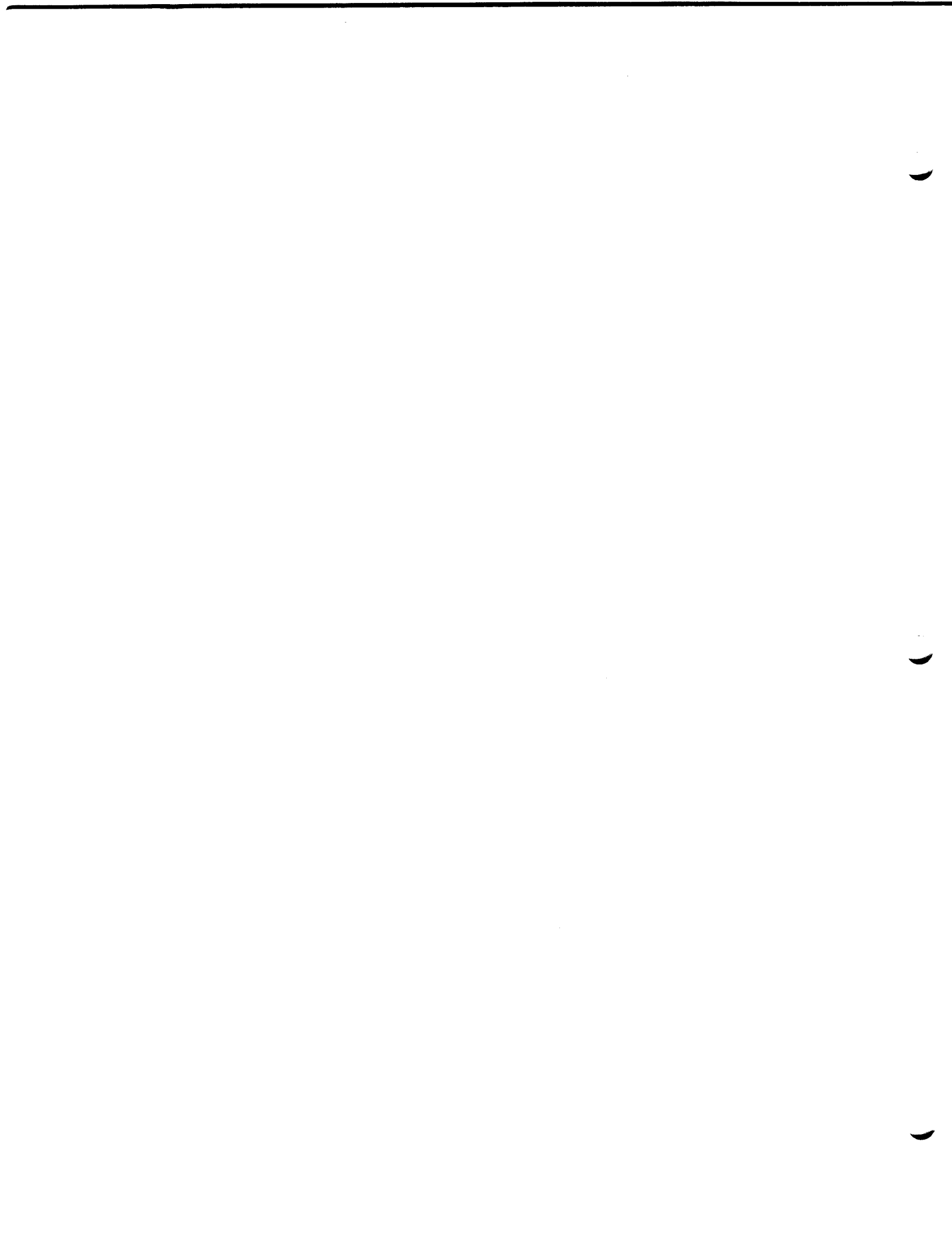
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To achieve the most trouble-free operation from your AP211 Hot Drink Merchandiser, it is recommended that this service manual be thoroughly read and the instructions followed pertaining to installation, servicing and maintaining of the unit.

Should you have questions pertaining to this manual or the vendor, please contact your APi/RMi distributor or write directly to:

Technical Service Dept.
Automatic Products int'l Ltd
300 Jacksonville Road
Warminster, PA 18974





FEATURES OF AP 211 HOT DRINK MERCHANDISER

FEATURES

STANDARD FEATURES

- USE YOUR OWN CUP option
- 24V or 110V capability for coin mech and/or validator

SELECTION SYSTEM

- Four coffee selections
- Four soluble decaf or tea selections
- Soup
- Whipped chocolate
- Easy to understand numeric keypad for selections.
- Easy to change selection labels.

PRICING

- All selections individually priced.
- Free vend feature.
- Accountability including vend counter and optional cash meter and/or free vend cash meter.

OPTIONS

- Whipped soluble gourmet coffee (SGC)
- Fresh brewed tea
- Free vend key switch
- Free vend timer

MODELS AND CAPACITIES

Ingredient:	LG	FD
	Capacities lbs.	
Regular Ground Coffee	6.0	-
Freeze Dried Coffee	-	1.0
Tea Leaf-Fresh brewed	2.5	2.5
or Instant	1.5	1.5
Sugar	4.0	4.0
Whitener	2.0	2.0
Chocolate	9.0	9.0
Soup or SGC	5.0	5.0

Most canisters are expandable to match inventory to usage.

CUPS:

7 oz.	560
8½ oz.	505

SPECIFICATIONS

DIMENSIONS:

Height: 72" Depth: 29" Width: 29"

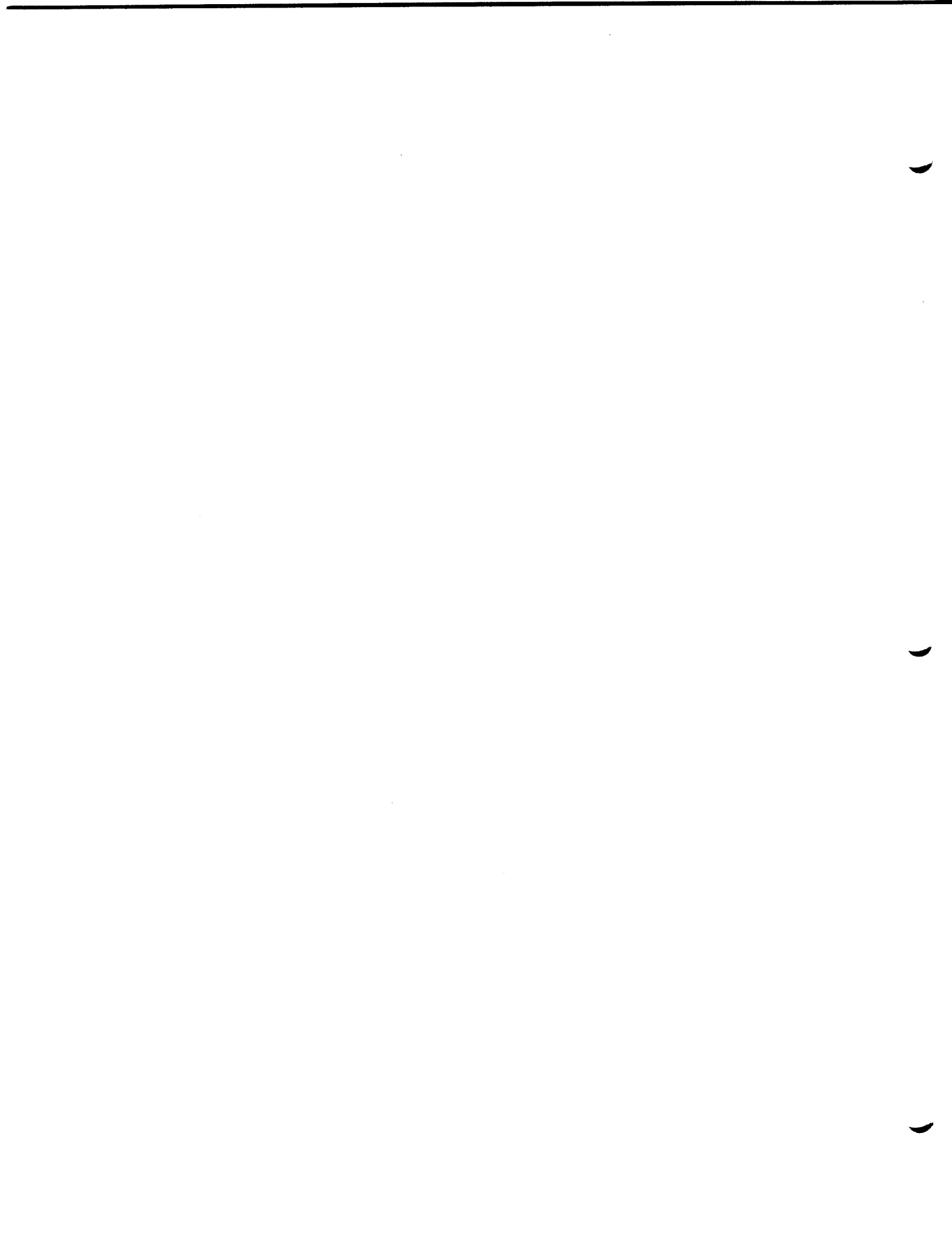
ELECTRICAL AND WATER REQUIREMENTS:

Electrical: 120 Volts; 60 Hz; 16 Amps

Water: Potable cold water, 20 psi minimum

SHIPPING WEIGHT

Freeze-dried	360 lbs.
Loose ground	400 lbs.



AP 211 INSTALLATION AND SET-UP INSTRUCTIONS

INSTALLATION

Unpack the vendor:

1. Remove shipping carton and plastic bag from vendor. Inspect exterior of cabinet for damage.
2. Remove clip from lock handle and open front door. If machine is equipped with a lock, the keys will be in the cup well. Inspect cabinet interior for evidence of damage.
3. Remove packing tape from *coffee hopper swing out bracket*, cup dispenser door, commodity trough and steam deflector, overflow and grounds waste floats. Remove cardboard canister retainer over canisters.
- ◆ SAVE CANISTER RETAINER FOR REUSE IF MACHINE IS TO BE RESHIPED.
4. Remove all cartons from floor of machine. These cartons will contain the *LG coffee hopper* & kickplate (if so equipped).

LOCATION SITE REQUIREMENTS

This vendor requires an external source of water and electricity for operation. The minimum requirements for these utilities are as follows:

WATER

The installation site must have a cold drinking water supply line that can be permanently coupled to the vendor. The water line should be one-half inch minimum diameter and be equipped with a manual shutoff within six feet of the machine. Water pressure should maintain 20 psi minimum while the vendor is taking on water. If incoming water pressure exceeds 90 psi, a pressure regulator should be installed in the line. The coupling provided with the machine is a 3/8" male flare fitting.

ELECTRICITY

A grounded dedicated electrical outlet rated at 120 volts, 60Hz, single phase and capable of delivering 20 amperes must be available within six feet of the vendor.

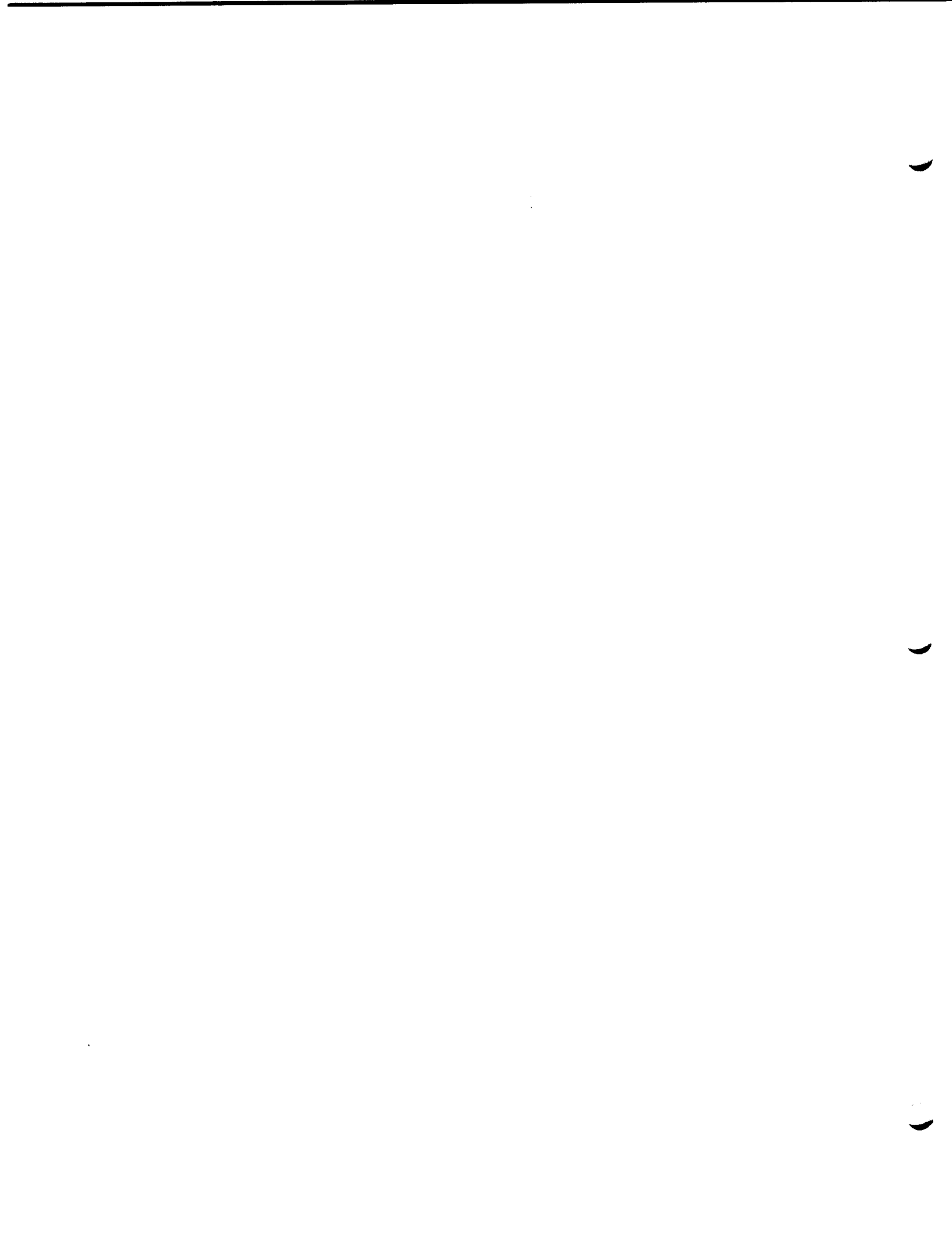
SET-UP INSTRUCTIONS

Set up the vendor at the location as follows:

1. Carefully level the vendor front to back and side to side.
2. *Swing coffee hopper support bracket out and install*

hopper. Be sure to engage auger driver with motor drive pin.

3. *Align the coffee delivery chute on the swing out bracket and position for best possible delivery of grounds to brewer.*
4. Install water filter cartridge (if so equipped). Check that the water tank drain valve is shut.
5. Remove shipping screw and nut from base of cup dispenser and remove screw from the cup dispenser latch at the top left side of the shadowbox.
6. Connect the vendor to the water supply line using 3/8" O.D. soft copper tubing (or similar plastic tubing) allowing one complete coil, approximately three feet in diameter, between the water supply line and vendor. This will allow movement of the vendor for cleaning and to reduce noise due to water pressure surges.
7. Plug machine into a 120Vac 20A receptacle. Set all switches to the on position. Check that the tank starts to fill and that there are no leaks.
- ◆ DO NOT LIFT THE FLOAT ROD OR SWITCH WHILE THE TANK IS FILLING. THIS WILL SIGNAL THE HEATER CIRCUIT THAT THE TANK IS FULL AND THE HEATER WILL BE TURNED ON REGARDLESS OF THE LEVEL OF WATER IN THE TANK.
8. Remove the packing block from the coin return button.
9. Remove packing tie downs holding the humidity bar.
10. *Loosen the two screws holding the brewer grounds splash guard on the front of brewer. The shield is designed to be able to swing a little as the spent grounds fall against it.*
11. *Install grounds bucket liner (supplied). Install grounds bucket behind front flange of rear splash guard. Be sure that the float is inside the bucket.*
12. Install overflow bucket against guide on lower left corner of machine. Be sure that the float and overflow hose(s) are inside the bucket.
13. Fill canisters and hoppers with product.
14. Open cup dispenser door and load with cups. Cup dispenser is set for 7 oz. or 8 1/4 oz. cups. If 9 oz. cups are desired, refer to service section for adjustments.

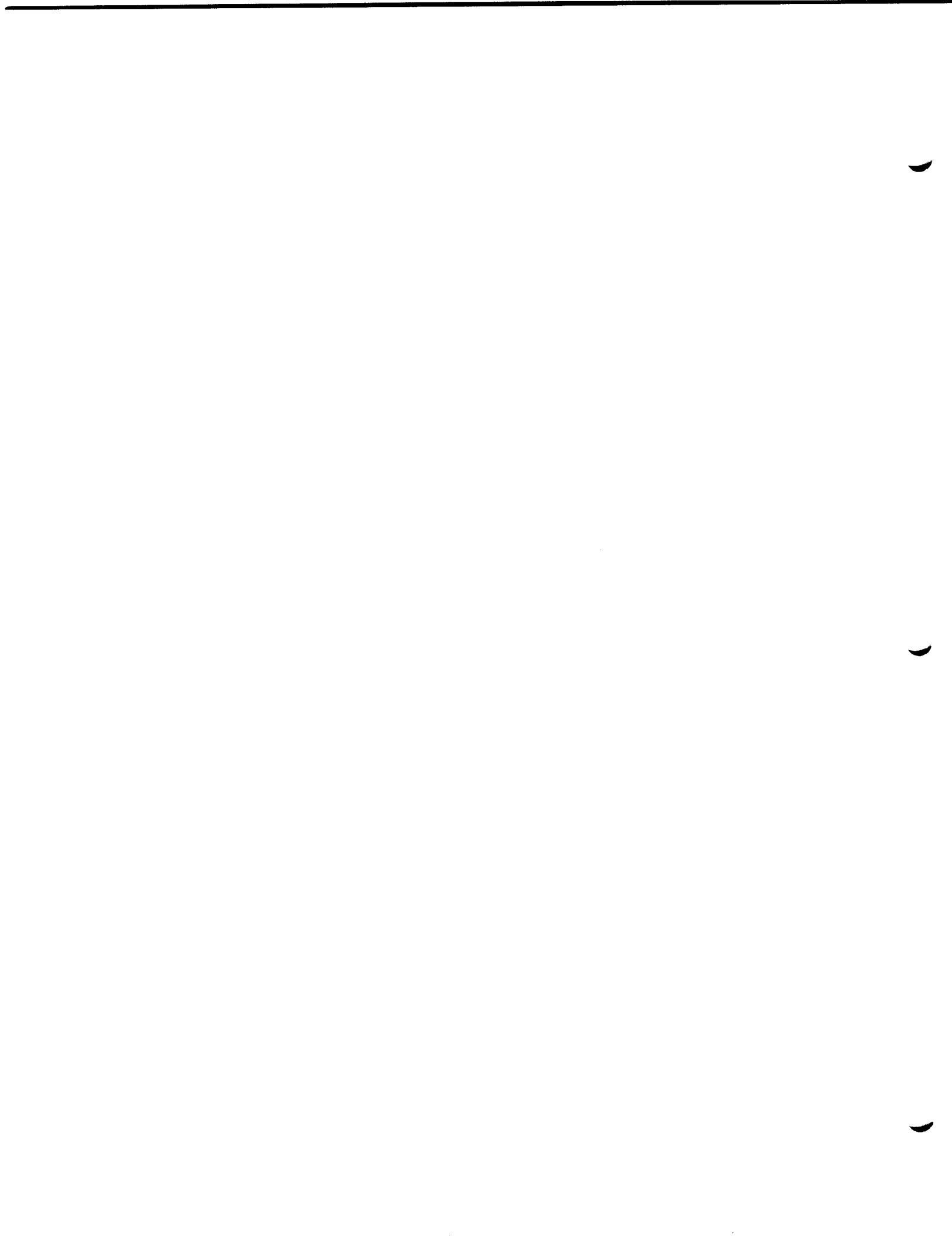


15. Remove power and install correct controller type (dummy) coin mechanism (and bill validator if so equipped). See page 2.02 for list of correct coin mechanisms and validators. Connect all harnesses and restore power.
16. Lift latch at top of cup cabinet and swing cup cabinet open. Install selection labels through slots on right edge of menu panel. Specific positions for each label are not assigned, however normal practice places the selections alphabetically by selection from top to bottom. The top position is normally reserved for Automatic Products label. Labels required differ in each configuration - see configuration chart for your model.
17. Access the service mode and set prices for all selections. See page 2.05 for specific instructions on setting prices.
 - ◆ SETTING PRICES TO 0.00 WILL SET A SELECTION TO FREE VEND.
 - ◆ SETTING A PRICE ABOVE 9.95 OR BELOW 0.00 WILL DISABLE A SELECTION AND CAUSE A "d" TO APPEAR IN THE LED DISPLAY. WHEN THE SELECTION IS PRESSED THE "MAKE OTHER SELECTION" LED WILL LIGHT. THIS IS USEFUL FOR BLOCKING UNUSED SELECTIONS OR DISABLING A SELECTION WHEN IT IS OUT OF ORDER.
18. Access the service mode and set the ingredient times, configuration, and cup sensor function. See page 2.06 for specific instructions on how to set ingredient settings. Factory settings should be regarded as approximations, and we recommend that all ingredient throws be checked with a gram scale, because of variations in product and taste.

BREW WATER ADJUSTMENTS

- ◆ *Setting the amount of water for brewed coffee selections is done by adjusting the duration (button ③) of channel 1. If a soft water condition exists, then the addition of a separate add-water switch kit may be necessary. DO NOT ATTEMPT TO ADJUST THE FRONT CAM TO CHANGE THE AMOUNT OF BREW WATER!*

The method used to allow all of the brew water to be delivered directly into the brewer, is the addition of a relay, the Brewer Fill Relay, to the left side of the brewer. The coil of this relay is energized when the brewer valve has power applied to it via channel 1. The duration of channel 1 directly controls the length of time that the valve is open and delivering water into the brewer. The contacts of the BFR interrupt the voltage to the brewer motor to hold the brewer in the open position until all the required brew water is delivered. After all the water is in the brew cylinder, the BFR restores voltage to the brewer motor and it completes the cycle.



OPERATING SYSTEM

INTRODUCTION

The control system in the AP211 is comprised of two basic components: the master module and the relay board. The master module is located in the door and can be removed easily. The relay board is mounted on the rear wall of the cabinet directly above the canister rack. The two boards communicate via a 12 wire interconnect harness, which runs through the junction box, located in the upper left front corner of the cabinet, next to the door hinge.

MASTER MODULE

The master module is comprised of the logic board, the keypad selection panel, the LED indicators and a three digit display to communicate with customers, and the 110V power board for operation of a 110V coin mechanism and/or dollar validator. If the machine is equipped with fresh brew tea the master module will contain a solid state relay that controls the cycling of the tea brewer motor. The master module is located on the door adjoining the left hand jamb of the shadow box and is accessed by swinging out the cup cabinet. The selector keypad portion of the module is mounted through a opening in the menu panel. The master module can be removed from the door by loosening four fasteners.

The logic board contains the three switches which control the access to the service mode and the dispensing of coins from the coin mechanism (see Figure 2.1). These switches can be accessed through an opening inside the cup cabinet. In the Operate Mode, pressing the top switch will pay out nickels, pressing the second switch will pay out dimes, and pressing both switches together will allow quarters to be paid out. Pressing the mode switch once allows access to the Service Mode. The Service Mode controls two functions: price setting and access to the channels which control the dispense times of all ingredients.

The logic board contains the electronic components which control the functions of the machine during a vend. The information required to operate the machine during a vend is permanently stored by a device which combines a micro-processor and an EEROM (Electrically Erasable Read Only Memory). The dispense time of each commodity and its sequence in the vend cycle is controlled by the micro-processor. Precise time adjustments determine the exact amount of ingredients dispensed. This exact time sequence ability enables accuracy to 1/10 of a second. These times are permanently stored on the board and do not require a battery to retain them even if power is removed from the machine.

Price setting is done by entering the service mode and pressing the selection whose price is being set. This will cause the current price to be displayed on the master module's display. The price can then be increased or

decreased by pressing the # or * buttons respectively. See page 2.05 for specific information regarding price setting.

The channels numbered 01 through 17 control the ingredient settings, configuration and function of the cup sensor. Each channel has two separate settings within each channel. Channels are accessed by pressing the mode switch once, pressing button ① will step up through each channel in sequence. Channels 01 through 14 have two settings which are referred to as **START** and **DURATION**. Channels 15, 16, and 17 each control specific functions according to the configuration of the machine. The channel settings are accessed by pressing button ② (**START**) or button ③ (**DURATION**) on the selection keypad. Each of these settings can be adjusted by increasing or decreasing the digits shown on the master module display by pressing the increase digit (# button) or the decrease digit (* button - see Figure 2.2). The function of each channel is determined by the configuration of the machine. The configuration of the machine is set in channel 16 button ④. See Chart 2.1 for additional information.

The **START** time of each channel indicates the exact time each function or commodity begins in each vend cycle. Each vend cycle starts at 0.0. All times are permanently stored to guarantee the correct sequence of operation.

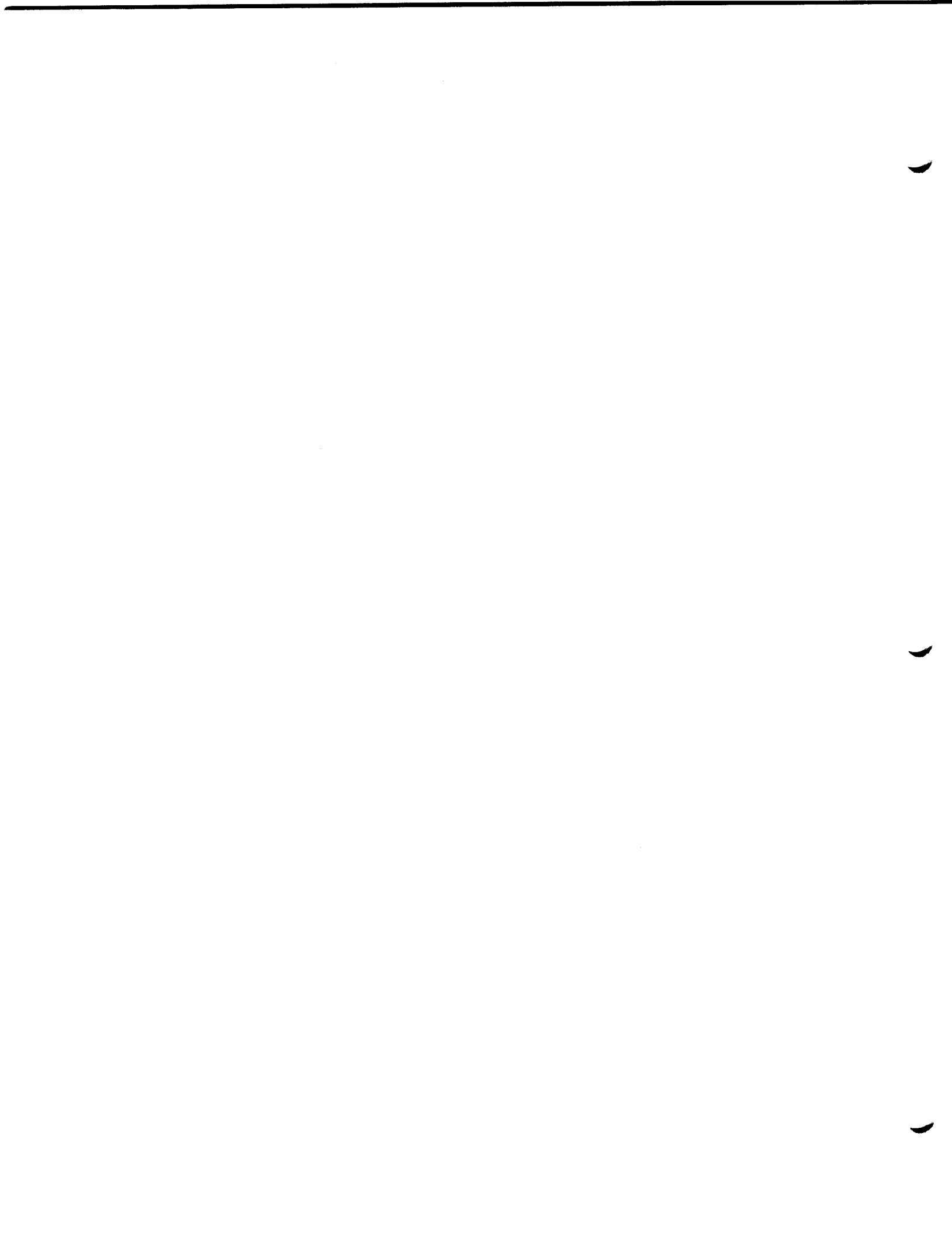
The **DURATION** determines the length of time within the vend cycle that each channel will operate. The amount of ingredient for a selection is controlled by adjusting the duration. After confirming that the duration for liquids are set correctly, cup levels should be set by adjusting the flow restrictor on the commodity valves.

◆ The settings in the channels for ingredients should be regarded as approximations and we recommend that all ingredient throws be checked with a gram scale.

CUSTOMER INFORMATION MESSAGES

The front side of the logic board has five LEDs and a three digit display positioned so that they are aligned with five customer information messages through windows on the master module label. These five messages are:

CHECK PRICE	This LED will light for 2 seconds when a selection is made but insufficient credit has been established. The correct vend price will also be displayed.
USE EXACT CHANGE	This LED will light when the coin mech signals the logic board that an insufficient number of coins are available for payback.
MAKE ALTERNATE SELECTION	This LED will blink for two seconds when a disabled selection, a non existent selection or a selection with a defective motor is chosen.



COFFEE BREWING This LED will light while a hot drink vend is in progress.

COFFEE MACHINE OUT OF SERVICE This LED will light when the coffee machine is in an Out of Order condition caused by full waste *and/or grounds buckets*, a low water condition in the heater tank or the absence of cups in the cup cabinet.

Directly above the LEDs is a three digit display that will show both numbers and letters to correspond to all available selections and will display both prices and amount of any money deposited. On power up, all LEDs and all segments of the displays will be illuminated.

ALPHA-NUMERIC SELECTION KEYPAD

The alpha-numeric keypad selection panel consists of the letters A,B,C and D and numbers 1 through 6 and additional keys marked # and *. All selections are made with a letter/number combination (example A1,B3 etc.) and the # and * buttons are used to add extra lightener and/or extra sugar respectively to a vend. The buttons also have additional functions within the service mode; for time setting for ingredients, the # button will increase the displayed number in .1 second increments, the * button will decrease a displayed number by the same increment; for price setting # and * will increase or decrease the price in 5¢ increments.

TEST VEND

An additional function included in the service mode, is that the control system allows button ④ to deliver a test vend without a cup or extras. This returns you to the service mode after the test vend and can be used while setting up the ingredient throws.

ACCOUNTABILITY

Accountability available in the AP211 is provided by a maximum of to 3 non-resettable meters in a bracket mounted on the inside of the door. This bracket is located on left hand jamb of the shadow box just above the master module. The machine has a standard 24Vdc mechanical vend counter. In addition, two optional 24Vdc cash meters are available. These cash meters will track the amount of cash taken during a vend (cash meter) and/or the amount of each vend while the machine is on free vend (free vend cash).

POWER BOARD

The power board is located on the back of the master module, and provides a filtered 110Vac source for operation of a validator, and a rectified 110Vdc source to operate a controller type coin mech. Twenty four volt operation of a coin mech and/or validator are supplied by

the machine's internal power supply for the logic board.

RELAY BOARD

The relay board is mounted on the rear wall of the cabinet directly above the canister rack. This relay board converts the logic level information supplied by the logic board's 17 channels into activation of one or more of the eleven 110Vac output lines to produce a properly timed hot drink vend.

VEND ENABLE RELAY

The Vend Enable Relay (VER) is located directly below the relay board on the rear wall of the cabinet. The purpose of this relay is to provide an interface between the 110V circuit which runs through the sold out circuit (waste buckets, cup soldout and heater safety/water level) and the logic level vend enable circuit. The coil of the relay is the input from the sold out circuit and when the switch of the relay is closed, the vend enable circuit is completed.

FREE VEND

Free vend for the entire machine is provided by a two pin jumper located adjacent to the VER. The two pin socket in the machine harness may be connected to the two wire jumper plug to place the machine on continuous free vend. This two wire jumper could also be cut and spliced to an external key switch or a timer assembly to further control the free vend function.

- ◆ THE FREE VEND FUNCTION IS CREATED BY A CLOSED CIRCUIT. DO NOT APPLY VOLTAGE TO THIS CONNECTOR!

COIN MECHANISM

This machine requires the use of one of the following coin mechanisms:

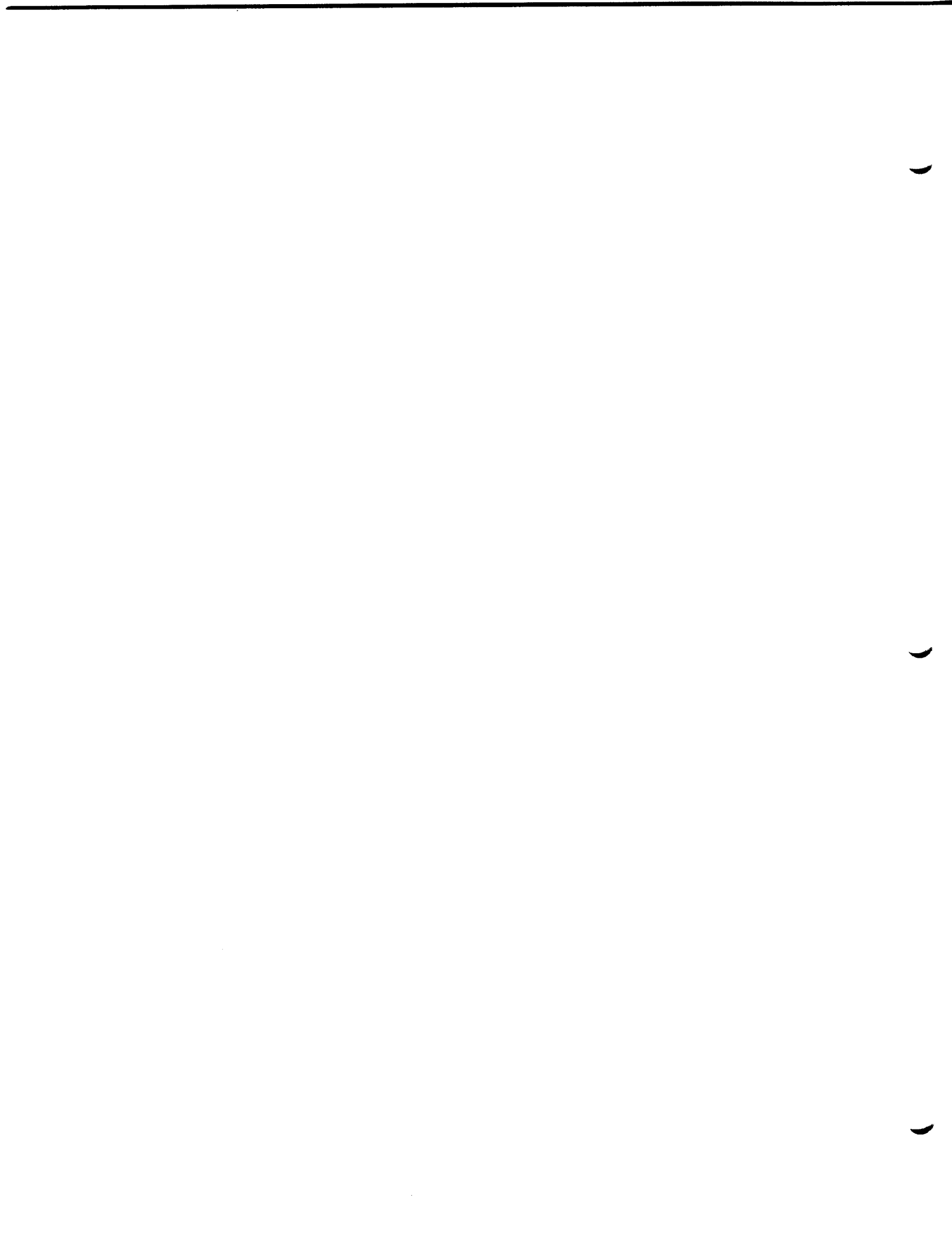
24 VOLT DC/15 PINS

MARS	TRC6010XV
COINCO	9302LF

When the machine is equipped for 110V, as indicated by the presence of 110Vdc at pins 10 & 12 of the coin mech socket, and a properly wired power board located on the back of the master module, the following coin mechanisms may also be used:

110 VOLT DC/12 PINS

MARS	TRC6000
MARS	MC5000
COINCO	9300L



BILL VALIDATORS

Bill validators using the full face NAMA standard will fit into an opening directly above the coin entry bezel. The following validators may be used:

24 VOLT AC	
MARS	VFM1-L2-U4C,U2C
MARS	VFM3-L2-U4C,U2C
CONLUX	NB 20
DIXIE/NARCO	USA15 (88x5005)

The machine is also equipped to supply 110V for a validator and the following bill validators may also be used:

110 VOLT AC	
DIXIE-NARCO(ARDAC)	USA15 (88x5003)
MARS	VFM1-L1-U4C,U2C
MARS	VFM3-L1-U4C,U2C
CONLUX	NB 20

The power connections for the validator are located in the harnesses dressed along the door stiffener below the access slots for the selection labels. The connection for the 24V validators will be a 3 pin plug with two double yellow wires. The connection for a 110V validator will be an identical 3 pin connector with a white and blue pair of wires. The universal voltage (24 & 110V) Mars validator harness is P/N 35921. Harnesses for other validators should be obtained directly from the manufacturer. Before installing a validator, the validator opening cover and the security backing plate must be removed.

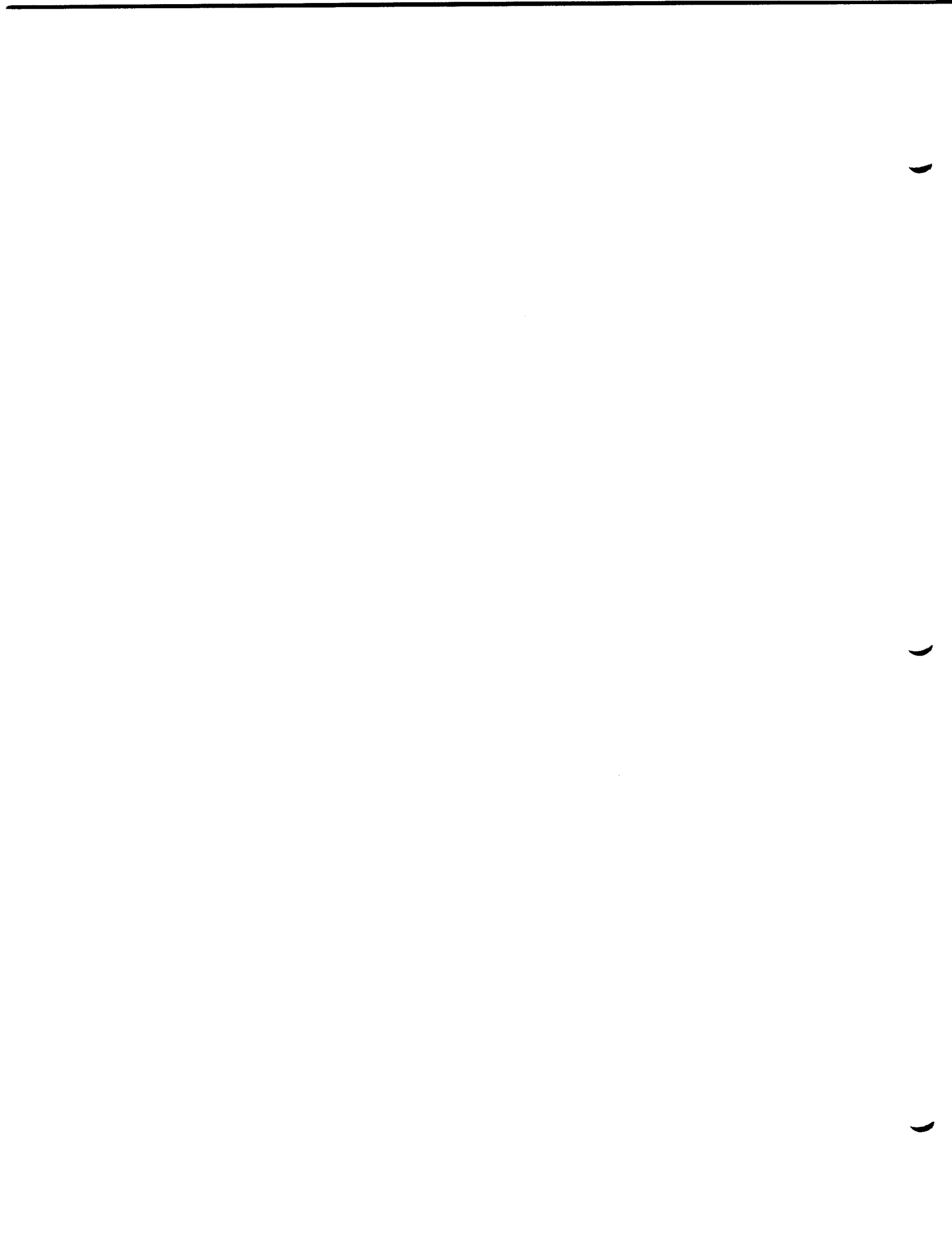
EXITING THE SERVICE MODE

The service mode can be exited at any time by one of the following:

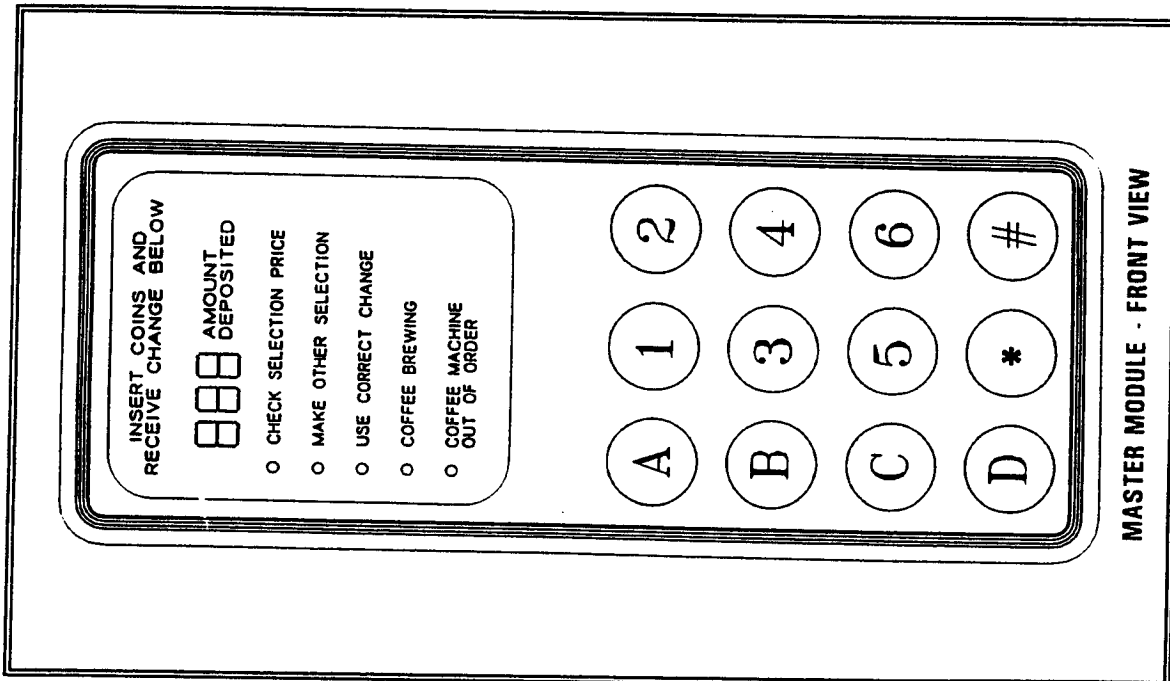
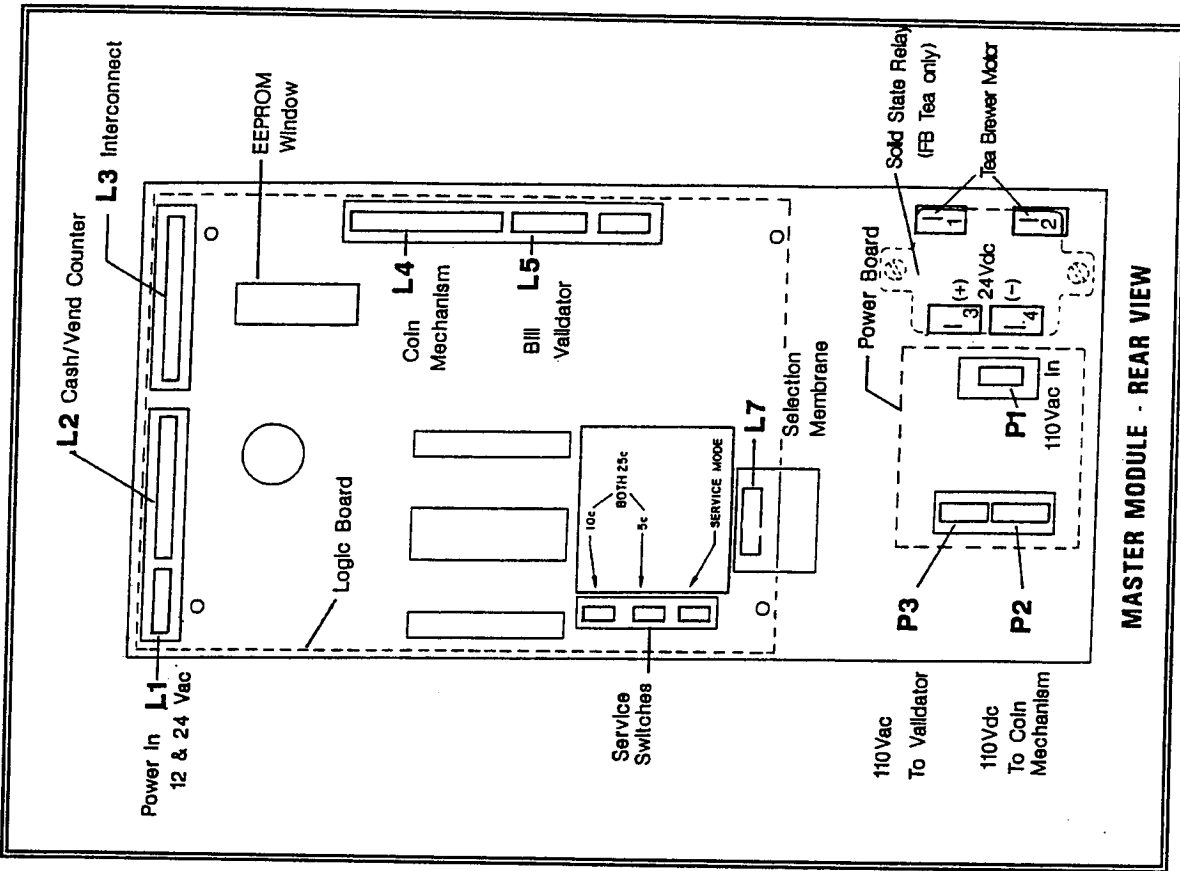
- Depress mode switch once.
- Remove and reapply power to machine or control board.
- Leaving for 25 seconds without depressing any switches it will automatically return to the normal operate mode.

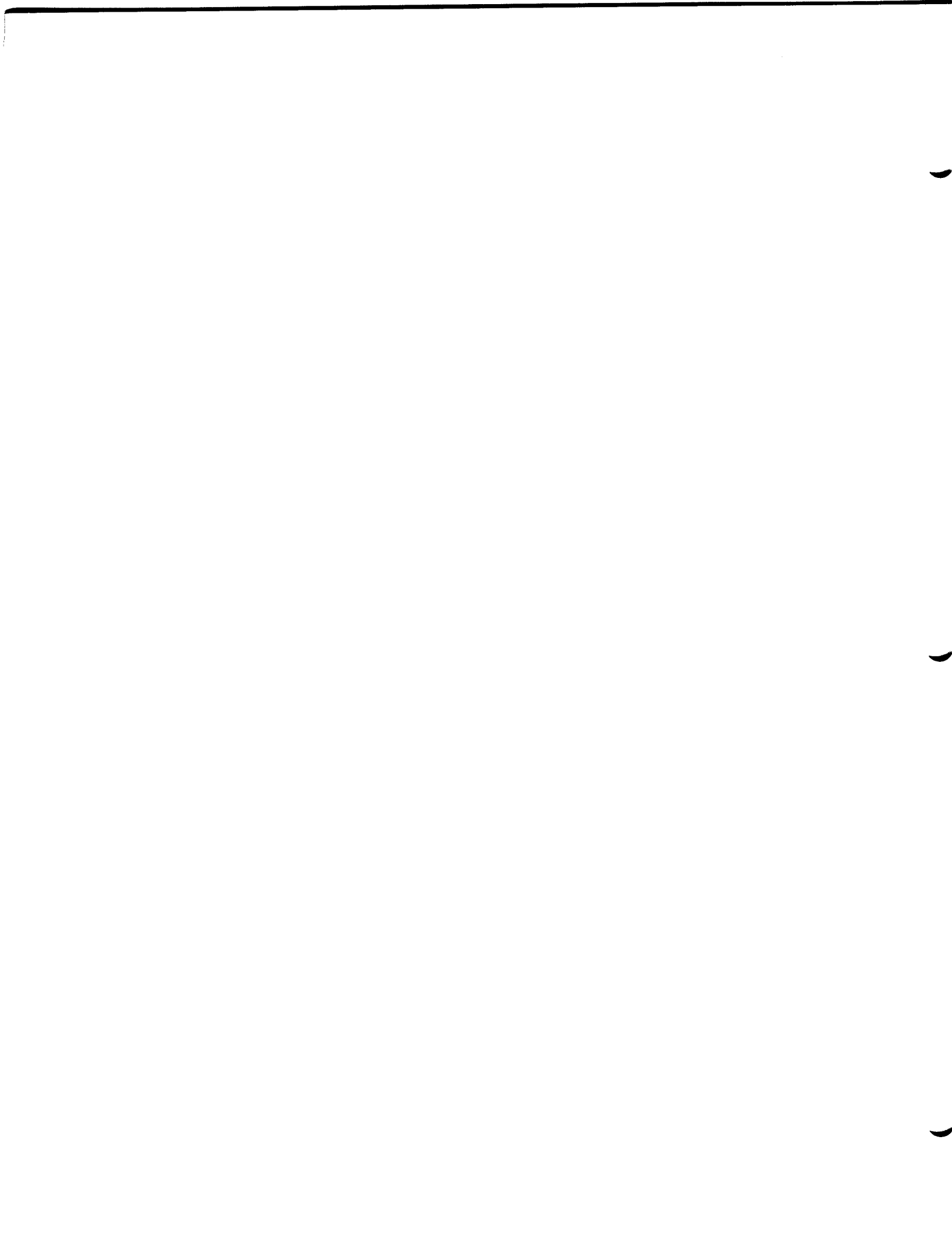
USING THE CONFIGURATION CHARTS

The pages included in Section 2 of this manual, starting with page 2.07, consist of configuration charts for each of the different arrangements available for this machine. Each configuration chart contains a drawing of the canister rack layout, the assignment of labels on the door, and a timing chart that displays the function and factory standard times of each of the channels in the machine. These charts will greatly assist in understanding and setting up your machine. Compare the canister rack in your machine to the drawings on the configuration charts to identify which is yours. If you do not have all the canisters shown on the drawing, ignore the channels for those selections while setting up the machine. Remember, factory standard times are a starting point and we always recommend that all ingredient throws be checked with a gram scale, because of variations in product and customer preference.



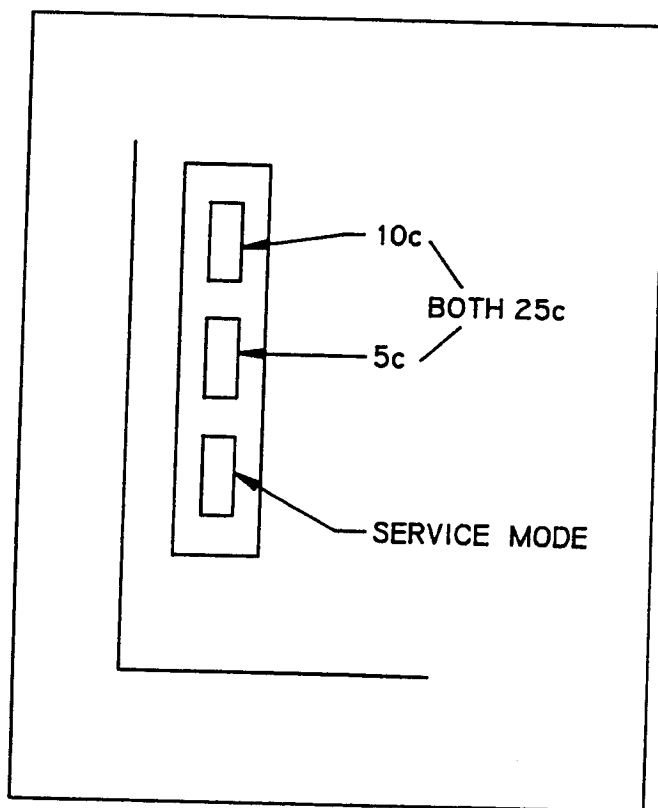
MASTER MODULE LAYOUT





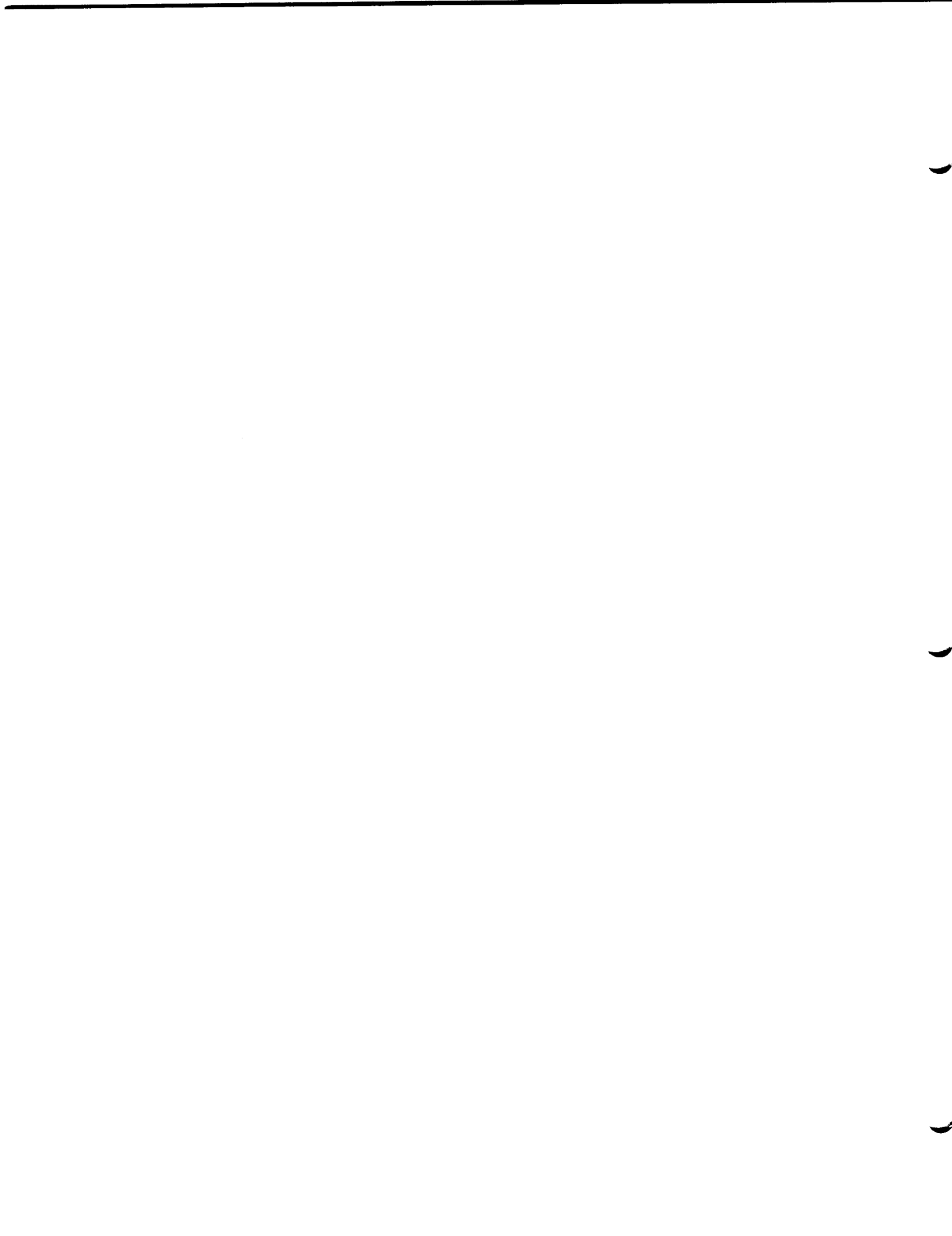
SET PRICE AND CHECK PRICE

1. Enter the service mode by pressing the mode switch on the control board once. Display will be blank.
 2. Depress the desired selection (example A1), and the current price for that selection will appear on the display. This is the 'CHECK PRICE' function. Maximum price available is \$9.95. Minimum price is \$0.00. If a "d" appears, then the selection is disabled.
 3. To **increase** the current price, press and hold the "#" button until the desired price is reached.
To **decrease** the current price, press and hold the "*" button until the desired price is reached.
To change a selection from disabled to active, increase or decrease the price until the desired price is reached.
 4. **SINGLE TEST VEND** - Enter the service mode by pressing the mode switch on the control board once. Display will be blank. Press ④ and an "F" will be displayed. Enter the desired selection and the vend will begin regardless of the machine's status.
- ◆ PRESSING ④ WILL PROVIDE A TEST VEND WITH OUT A CUP OR EXTRA CREME OR SUGAR.
 - ◆ SETTING PRICES TO 0.00 WILL SET A SELECTION TO FREE VEND.
 - ◆ SETTING A PRICE ABOVE 9.95 OR BELOW 0.00 WILL DISABLE A SELECTION AND CAUSE A "d" TO APPEAR IN THE LED DISPLAY. WHEN THE SELECTION IS PRESSED THE "MAKE OTHER SELECTION" LED WILL LIGHT. THIS IS USEFUL FOR BLOCKING UNUSED SELECTIONS OR DISABLING A SELECTION WHEN IT IS OUT OF ORDER.



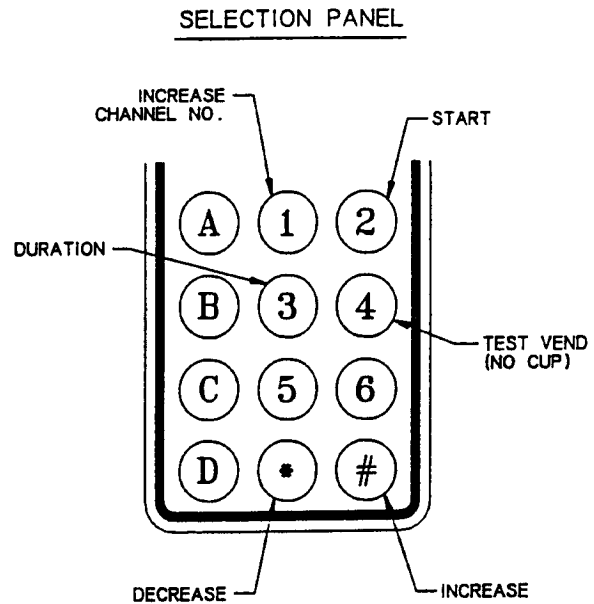
CONTROL BOARD SWITCH FUNCTIONS

FIGURE 2.1



SET TIME CHANNELS

1. Enter the service mode by pressing the mode switch on the control board once. Display will be blank.
2. Access the desired channel by pressing button ①. Pressing button ① repeatedly will increase the channel number shown in the LED display. See chart for definition of channels for appropriate models.
3. For channels 1 through 14, pressing button ② will display the **START** time for each specific channel. Pressing button ③ will display the **DURATION** for each specific channel. Changing the duration will change the gram throw or amount of water for each channel. See accompanying charts for the specific function of the channels by model and/or configuration.
4. To increase the current time for either **START** or **DURATION**, press and hold the # button until the desired time is reached. To decrease the current time, press and hold the * button until the desired time is reached. To lock (enter) a time that has been changed, press ①, ②, ③ or ④ button.



- ◆ **PRESSING BUTTON ④ WILL ESTABLISH A TEST VEND (WITH NO CUP DELIVERED) AND ENTER ANY CHANGES TO A START OR DURATION TIME - THIS ALSO LEAVES THE MACHINE'S CONTROL SYSTEM IN THE SERVICE MODE WHICH ALLOWS YOU TO RETURN TO CHANNEL 1 WITHOUT PRESSING THE MODE SWITCH.**

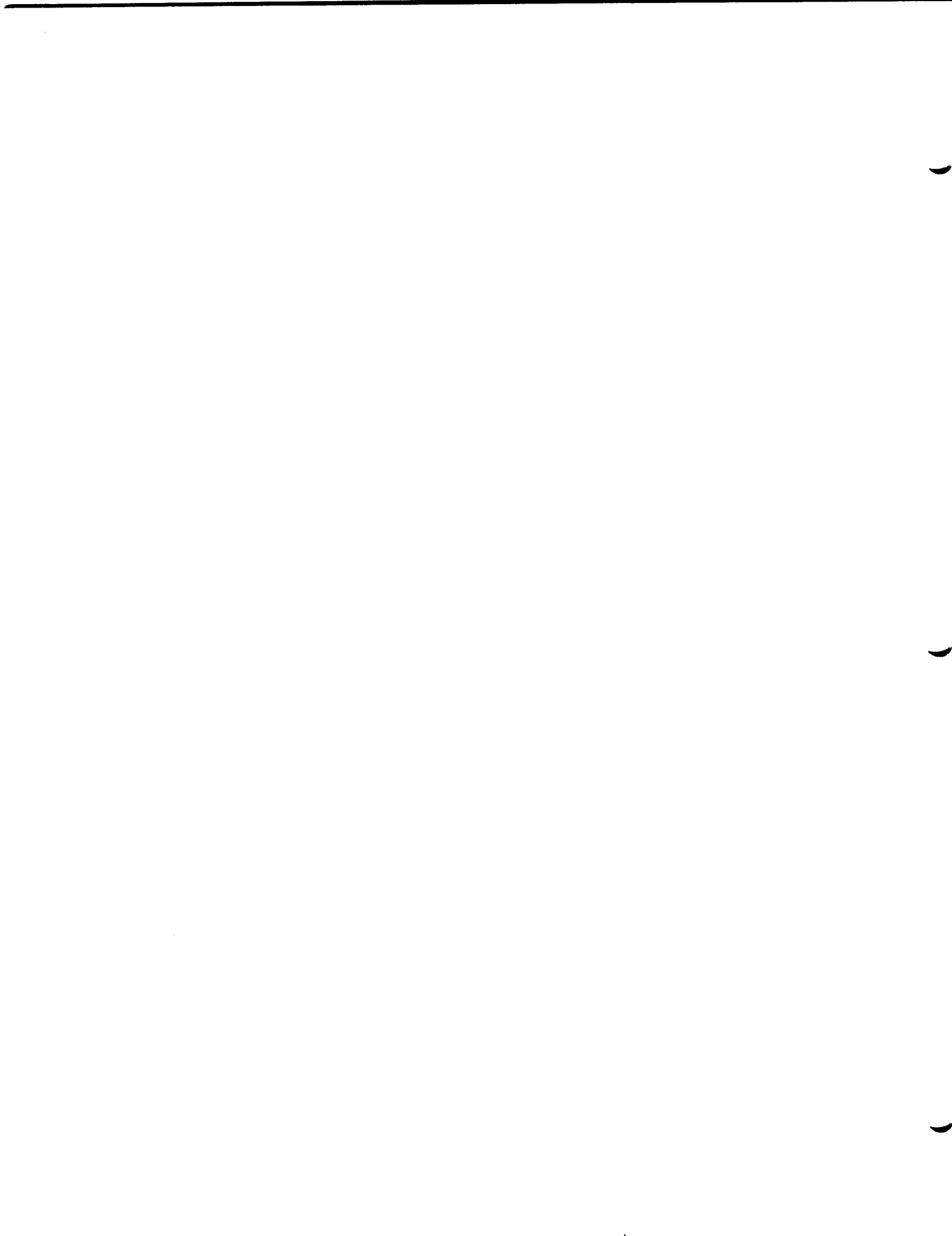
FUNCTION OF SELECTION SWITCHES IN SERVICE MODE

FIGURE 2.2

5. For channels 15,16 and 17, the ② and ③ button set specific functions as defined in the chart below:

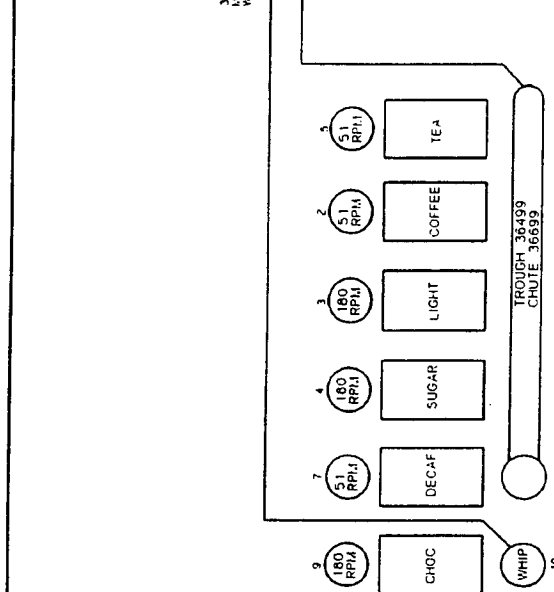
CHART 2.1
FUNCTIONS FOR CHANNELS 15,16,17

CHANNEL	BUTTON 2 FUNCTION	BUTTON 3 FUNCTION
15	COFFEE EXTRA LIGHTENER DURATION	EXTRA SUGAR DURATION
16	TEA EXTRA LIGHTENER DURATION	MACHINE CONFIGURATION 00.1 FD,LG (STANDARD) 00.3 FDD,LGD,FDT,LGT 00.4 FDDS,LGDS
17	CUP DROP PULSE DURATION STANDARD SETTING - 1.8	CUP SENSOR CONFIGURATION 00.0 STANDARD-WILL DELIVER CUP EVERY VEND 00.1 CUP SENSOR INSTALLED WILL NOT VEND UNLESS CUP IS PRESENT



FDSELO6

CHAMEL NUMBER		KEY (BUTTON) NO. 2		CHAMEL DESCRIPTION		KEY (BUTTON) NO. 3	
LINE No.	DESCRIPTION	VALUE	LINE No.	DESCRIPTION	VALUE		
0	LONG DELAY TIME	N/A	N/A	SHORT DELAY TIME	10.0 (SECONDS)		
1	COFFEE WATER START	10.0 (SECONDS)	1	COFFEE WATER DURATION	7.3 (SECONDS)		
2	COFFEE START	2.0 (SECONDS)	2	COFFEE DURATION	1.7 (SECONDS)		
3	LIGHT START (COFFEE)	2.6 (SECONDS)	3	LIGHT DURATION (COFFEE)	0.8 (SECONDS)		
4	SUGAR START (COFFEE)	2.3 (SECONDS)	4	SUGAR DURATION (COFFEE)	1.0 (SECONDS)		
5	TEA START	2.0 (SECONDS)	5	TEA DURATION	1.7 (SECONDS)		
6	DECAF/TEA WATER START	0.0 (SECONDS)	6	DECAF/TEA WATER DURATION	7.3 (SECONDS)		
7	SOUP START	2.0 (SECONDS)	7	SOUP DURATION	1.0 (SECONDS)		
8	SOUP WATER, WHIPPER START	0.0 (SECONDS)	8	SOUP WATER, WHIPPER DURATION	7.3 (SECONDS)		
9	CHOCOLATE START	2.0 (SECONDS)	9	CHOCOLATE DURATION	4.4 (SECONDS)		
10	CHOCOLATE WATER, WHIPPER START	0.0 (SECONDS)	10	CHOCOLATE WATER, WHIPPER DURATION	7.2 (SECONDS)		
11	SUGAR START (DECAF/TEA)	3.0 (SECONDS)	4	SUGAR DURATION (DECAF/TEA)	0.8 (SECONDS)		
12	DECAF START	2.5 (SECONDS)	7	DECAF DURATION	2.5 (SECONDS)		
13	LIGHT START (DECAF/TEA)	4.0 (SECONDS)	3	LIGHT DURATION (DECAF/TEA)	0.8 (SECONDS)		
14	XXXXXXXXXXXXXXXXXXXX	0.0 (SECONDS)	-	XXXXXXXXXXXXXXXXXXXX	0.0 (SECONDS)		
15	E/TEA LIGHT DURATION (COFFEE)	0.2 (SECONDS)	-	XXXXXXXXXXXXXXXXXXXX	0.0 (SECONDS)		
16	EXTRA SUGAR DURATION	0.1 (SECONDS)	4	EXTRA SUGAR DURATION	0.5		
17	EXTRA LIGHT DURATION (DECAF/TEA)	0.1 (SECONDS)	N/A	MACHINE CONFIGURATION CODE	0.3		
18	MACHINE CODE SELECTION	1.8 (SECONDS)	N/A	CUP SENSOR CONFIG	0.1		
19	CUP DROP TIME	1.8 (SECONDS)		0 = NO SENSOR			
20	CUP SENSOR SELECTION			1 = SENSOR PRESENT			



SELECTION: COF/CHOC/TEA/DECAF

NOTE:

1. DISABLE C6.
2. TIMES FOR 8 1/4 oz CUPS.

Automatic Products

1. INSERT COIN
2. ENTER SELECTION CODE

COFFEE
BLACK WHITE BLK * SUGAR WHT * SUGAR
A1 AZ A3 A4

DECAFFEINATED COFFEE
BLACK WHITE BLK * SUGAR WHT * SUGAR
B1 B2 B3 B4

TEA
BLACK WHITE BLK * SUGAR WHT * SUGAR
C1 C2 C3 C4

EXTRA - MAKE SELECTION THEN PRESS
* EXTRA SUGAR F EXTRA WHITE

HOT CHOCOLATE
C5

NAME: **TIMES FOR 21IFD WITH DECAF AND TEA**

DATE: **5/24/93**

DRAWN: **R. YOUNG**

MODEL: **211**

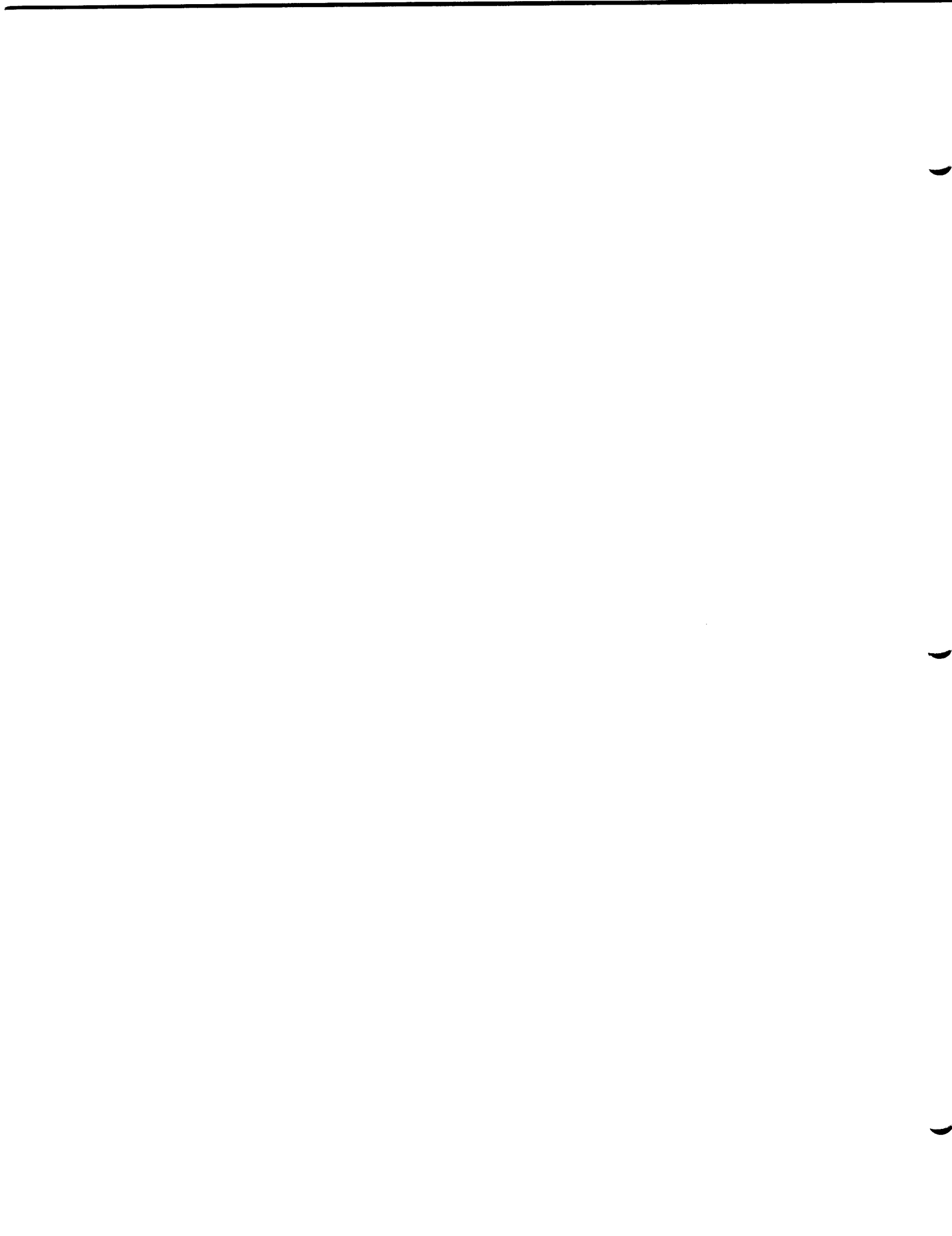
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Refreshment Machinery Industries
300 Jacksonville Road, Warrimber, PA 15914

NUMBER: **FDSELO6**

SIZE: **B**

REV: **A**



FDSEL07

TIMING CHART, 211FD OPTION 07--MACHINE CONFIG CODE 0.1

CHANNEL NUMBER	CHANNEL DESCRIPTION	KEY (BUTTON) NO. 2		KEY (BUTTON) NO. 3	
		LINE No	VALUE	LINE No	VALUE
0	LONG DELAY TIME	N/A	10.0 (SECONDS)	N/A	10.0 (SECONDS)
1	COFFEE WATER START	1	0.0 (SECONDS)	1	7.3 (SECONDS)
2	COFFEE START	2	2.0 (SECONDS)	2	1.7 (SECONDS)
3	LIGHT START (COFFEE)	3	2.6 (SECONDS)	3	0.8 (SECONDS)
4	SUGAR START (COFFEE)	4	2.3 (SECONDS)	4	1.0 (SECONDS)
5	DECAF/TEA START	5	2.0 (SECONDS)	5	1.7 (SECONDS)
6	DECAF/TEA WATER START	6	0.0 (SECONDS)	6	7.3 (SECONDS)
7	SOUP/SCC START	7	2.0 (SECONDS)	7	1.0 (SECONDS)
8	SOUP/SCC WATER, WHIPPER START	8	0.0 (SECONDS)	8	7.3 (SECONDS)
9	CHOCOLATE START	9	2.0 (SECONDS)	9	4.4 (SECONDS)
10	CHOCOLATE WATER, WHIPPER START	10	0.0 (SECONDS)	10	7.2 (SECONDS)
11	SUGAR START (DECAF/TEA)	4	3.0 (SECONDS)	4	0.8 (SECONDS)
12	STRONG COFFEE START	2	2.0 (SECONDS)	2	2.5 (SECONDS)
13	LIGHT START (DECAF/TEA)	3	4.0 (SECONDS)	3	0.8 (SECONDS)
14	XXXXXXXXXXXXXXXXXXXX	-	0.0 (SECONDS)	-	0.0 (SECONDS)
15	EXTRA LIGHT DURATION	3	0.2 (SECONDS)	4	0.5
16	EXTRA SUGAR DURATION	3	0.1 (SECONDS)	4	0.5
17	EXTRA LIGHT DURATION	3	0.1 (SECONDS)	N/A	0.1
18	MACHINE CODE SELECTION	11	1.8 (SECONDS)	N/A	0.1
19	CUP DROP TIME				
20	CUP SENSOR SELECTION				

NOTE:

1. TIMES FOR 8 1/4 oz CUPS.

**1 RIGHT COINS
2. ENTER SELECTION CODE**

COFFEE
BLACK WHITE BLK * SUGAR WHT * SUGAR
A1 A2 A3 A4

STRONG COFFEE
BLACK WHITE BLK * SUGAR WHT * SUGAR
B1 B2 B3 B4

DECAFFEINATED COFFEE
BLACK WHITE BLK * SUGAR WHT * SUGAR
C1 C2 C3 C4

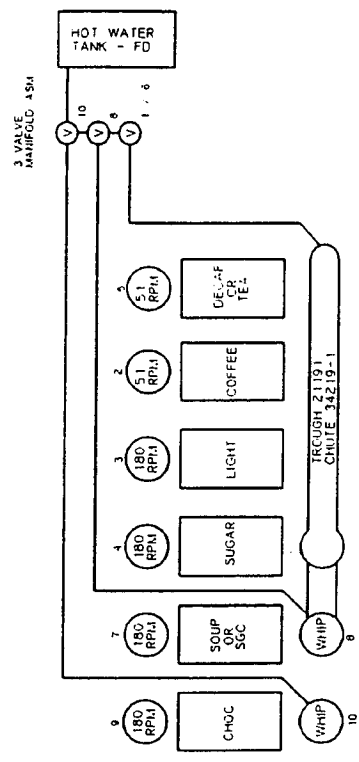
EXTRA - MAKE SELECTION THEN PRESS
* EXTRA SUGAR F EXTRA WHITE

HOT CHOCOLATE
C5

SOUP
C6

TEA BLACK C1 WHITE C2 BLK * SUGAR C3 WHT * SUGAR C4

SOCC C5



NAME TIMES FOR 211FD FULL RACK NO FB TEA

DATE 5/24/93

DRAWN R. YOUNG

MODEL 211

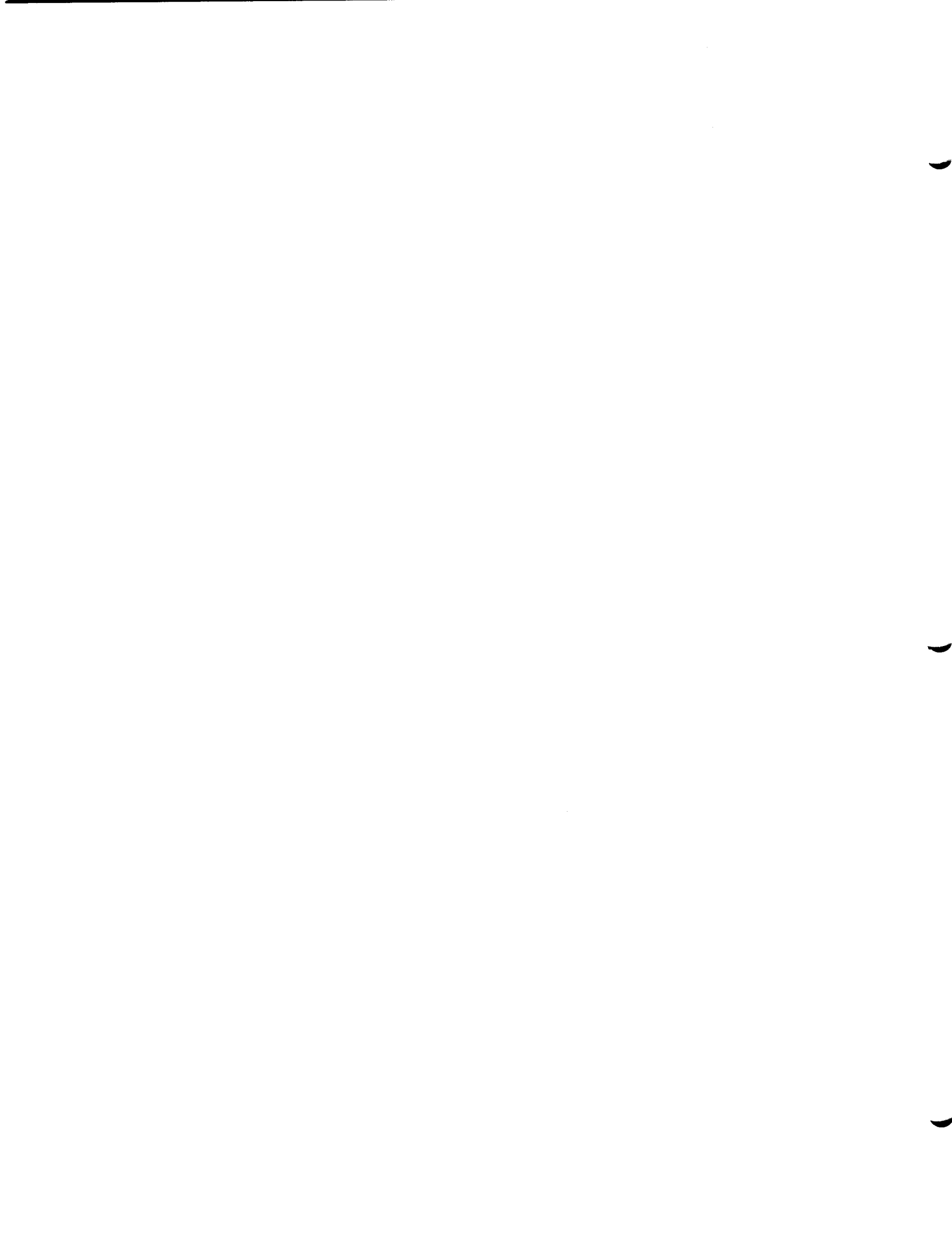
APP.

DO NOT SCALE THIS DRAWING
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Refinement Machinery Industries
300 Jamboree Road, Warminster, PA 18974

NUMBER FDSEL07 B A

SIZE REV



TIMING CHART, 211FD OPTION 08--MACHINE CQNFIC CODE 0.4

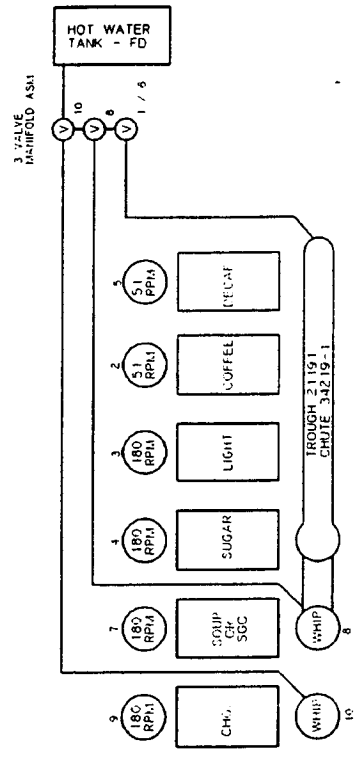
CHANNEL DESCRIPTION	KEY (BUTTON) NO. 2		KEY (BUTTON) NO. 3	
	LINE No	VALUE	LINE No	VALUE
LONG DELAY TIME	N/A	10.0 (SECONDS)	N/A	10.0 (SECONDS)
COFFEE WATER START	1	0.0 (SECONDS)	1	7.3 (SECONDS)
COFFEE START	2	2.0 (SECONDS)	2	1.7 (SECONDS)
LIGHT START (COFFEE)	3	2.6 (SECONDS)	3	0.8 (SECONDS)
SUGAR START (COFFEE)	4	2.3 (SECONDS)	4	1.0 (SECONDS)
DECAF START	5	2.0 (SECONDS)	5	1.0 (SECONDS)
DECAF WATER START	6	0.0 (SECONDS)	6	7.3 (SECONDS)
SOUP/SGC START	7	2.0 (SECONDS)	7	1.0 (SECONDS)
SOUP/SGC WATER, WHIPPER START	8	0.0 (SECONDS)	8	7.3 (SECONDS)
CHOCOLATE START	9	2.0 (SECONDS)	9	4.4 (SECONDS)
CHOCOLATE WATER, WHIPPER START	10	0.0 (SECONDS)	10	7.2 (SECONDS)
SUGAR START (DECAF)	4	3.0 (SECONDS)	4	0.8 (SECONDS)
STRONG COFFEE START	2	2.0 (SECONDS)	2	2.5 (SECONDS)
LIGHT START (DECAF)	3	4.0 (SECONDS)	3	0.8 (SECONDS)
STRONG DECAF START	5	2.0 (SECONDS)	5	2.5 (SECONDS)
EXTRA LIGHT DURATION	3	0.2 (SECONDS)		
EXTRA SUGAR DURATION			4	0.5
EXTRA LIGHT DURATION	3	0.1 (SECONDS)		
MACHINE CODE SELECTION				
CLIP DROP TIME	11	1.8 (SECONDS)		
CLIP SENSOR SELECTION				

Automatic Products
 1. FIRST COINS
 2. ENTER SELECTION CODE
 EXTRA - MAKE SELECTION TREAT PRESS
 * EXTRA SUGAR
 † EXTRA WHITE

COFFEE	BLACK A1	WHITE A2	BLK * SUGAR A3	WHIT * SUGAR A4
STRONG COFFEE	BLACK B1	WHITE B2	BLK * SUGAR B3	WHIT * SUGAR B4
DECAFFEINATED COFFEE	BLACK C1	WHITE C2	BLK * SUGAR C3	WHIT * SUGAR C4
STRONG DECAFFEINATED	BLACK A5	WHITE A6	BLK * SUGAR A5	WHIT * SUGAR A6
HOT CHOCOLATE	C5			
SOUP	C6			

NOTE:

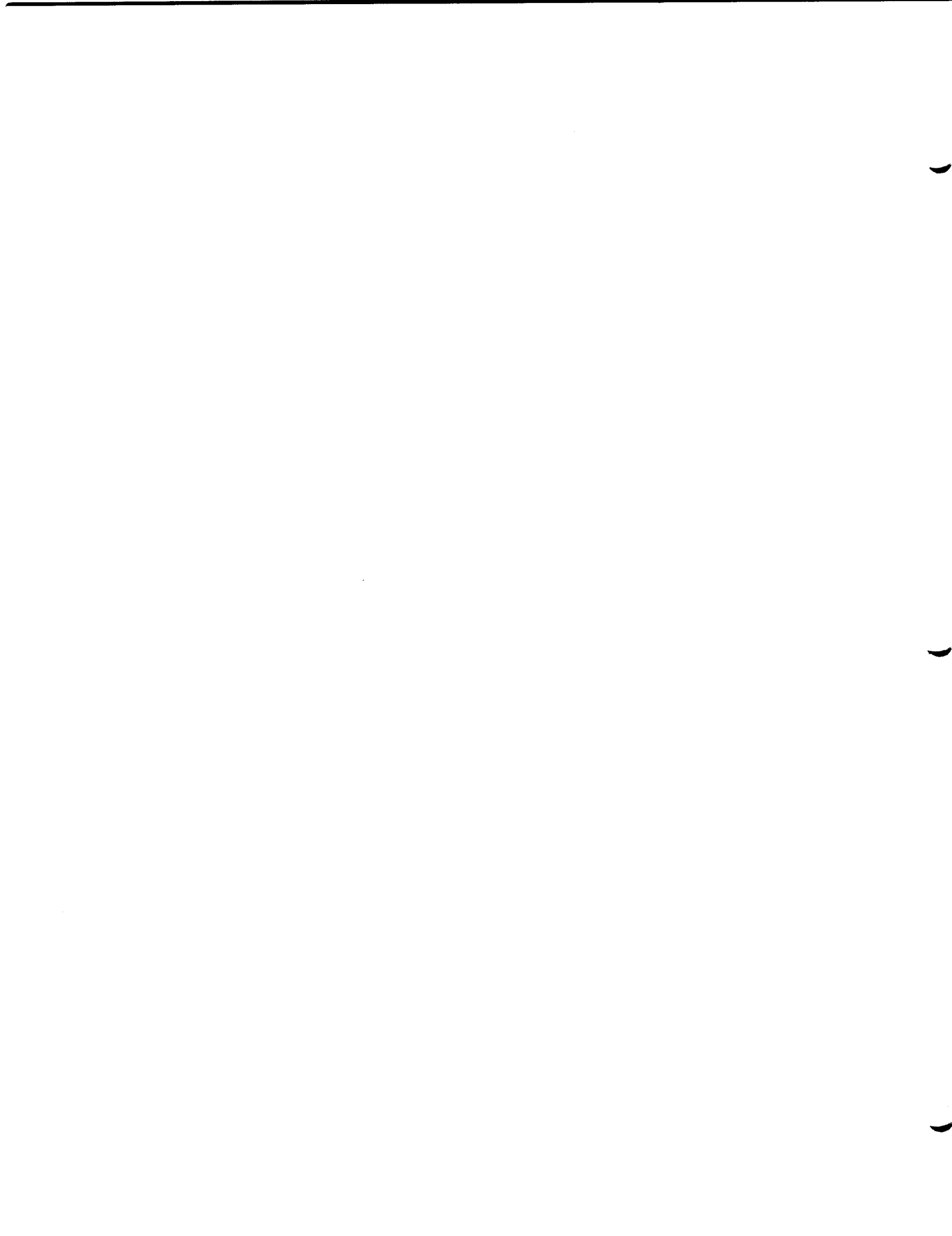
1. TIMES FOR 8 1/4 oz CUPS.



NAME TIMES FOR 211FD FULL RACK, NO TEA, STRONG DECAF

DATE	5/24/93
DRAWN BY	R. YOUNG
APP	
MODEL	211
DO NOT SCALE DRAWING	THE INFORMATION ON THIS DRAWING IS UNAUTHORIZED USE IS PROHIBITED
NUMBER	FDSEL08 B A
SIZE	REV

Refreshment Machinery Industries
 300 Jacksonville Road, Warminster, PA 18974



FDSEL 11

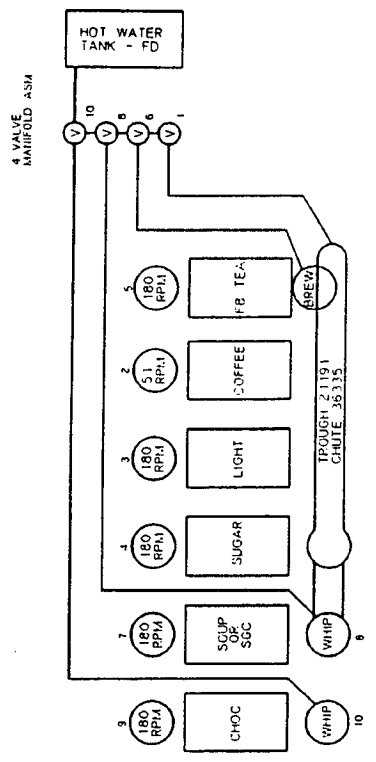
TIMING CHART, 211FD OPTION 11--MACHINE CONFIG CODE 0.1

CHANNEL NUMBER	CHANNEL DESCRIPTION	KEY (BUTTON) NO. 2		KEY (BUTTON) NO. 3	
		LINE No	VALUE	LINE No	VALUE
0	LONG DELAY TIME	N/A	10.0 (SECONDS)	N/A	10.0 (SECONDS)
1	COFFEE WATER START	1	0.0 (SECONDS)	1	7.3 (SECONDS)
2	COFFEE START	2	2.0 (SECONDS)	2	1.7 (SECONDS)
3	LIGHT START (COFFEE)	3	2.6 (SECONDS)	3	0.8 (SECONDS)
4	SUGAR START (COFFEE)	4	2.3 (SECONDS)	4	1.0 (SECONDS)
5	FB TEA START	5	2.0 (SECONDS)	5	1.3 (SECONDS)
6	FB TEA WATER START	6	0.0 (SECONDS)	6	7.3 (SECONDS)
7	SOUP/SSC START	7	2.0 (SECONDS)	7	1.0 (SECONDS)
8	SOUP/SSC WATER, WHIPPER START	8	0.0 (SECONDS)	8	7.3 (SECONDS)
9	CHOCOLATE START	9	2.0 (SECONDS)	9	4.4 (SECONDS)
10	CHOCOLATE WATER, WHIPPER START	10	0.0 (SECONDS)	10	7.2 (SECONDS)
11	SUGAR START (FB TEA)	4	3.0 (SECONDS)	4	0.8 (SECONDS)
12	STRONG COFFEE START	2	2.0 (SECONDS)	2	2.5 (SECONDS)
13	LIGHT START (FB TEA)	3	4.0 (SECONDS)	3	0.8 (SECONDS)
14	TEA BREWER START (DUMP)	X	15.0 (SECONDS)	X	1.5 (SECONDS)
15	EXTRA LIGHT DURATION (COFFEE)	3	0.2 (SECONDS)		
15	EXTRA SUGAR DURATION			4	0.5
16	EXTRA LIGHT DURATION (FB TEA)	3	0.1 (SECONDS)		
16	MACHINE CODE SELECTION	11	1.8 (SECONDS)	N/A	0.1
17	CUP DROP TIME				
17	CUP SENSOR SELECTION			N/A	0.1

NOTE:

- 1. TIMES FOR 8 1/4 oz CUPS.

Automatic Products	
1. INSERT DIALS 2. DIAL SELECTION CODE	
COFFEE	BLACK WHITE BLK * SUGAR WHT * SUGAR A1 A2 A3 A4
STRONG COFFEE	BLACK WHITE BLK * SUGAR WHT * SUGAR B1 B2 B3 B4
FRESH LEAF TEA	BLACK WHITE BLK * SUGAR WHT * SUGAR C1 C2 C3 C4
EXTRA - MAKE SELECTION THEN PRESS	* EXTRA SUGAR # EXTRA WHITE
CHOCOLATE	C5
SOUP	C6



NAME: TIMES FOR 211FD WITH FB TEA

MODEL: 211

DATE: 5/24/93

DRAWN BY: R. YOUNG

APP.:

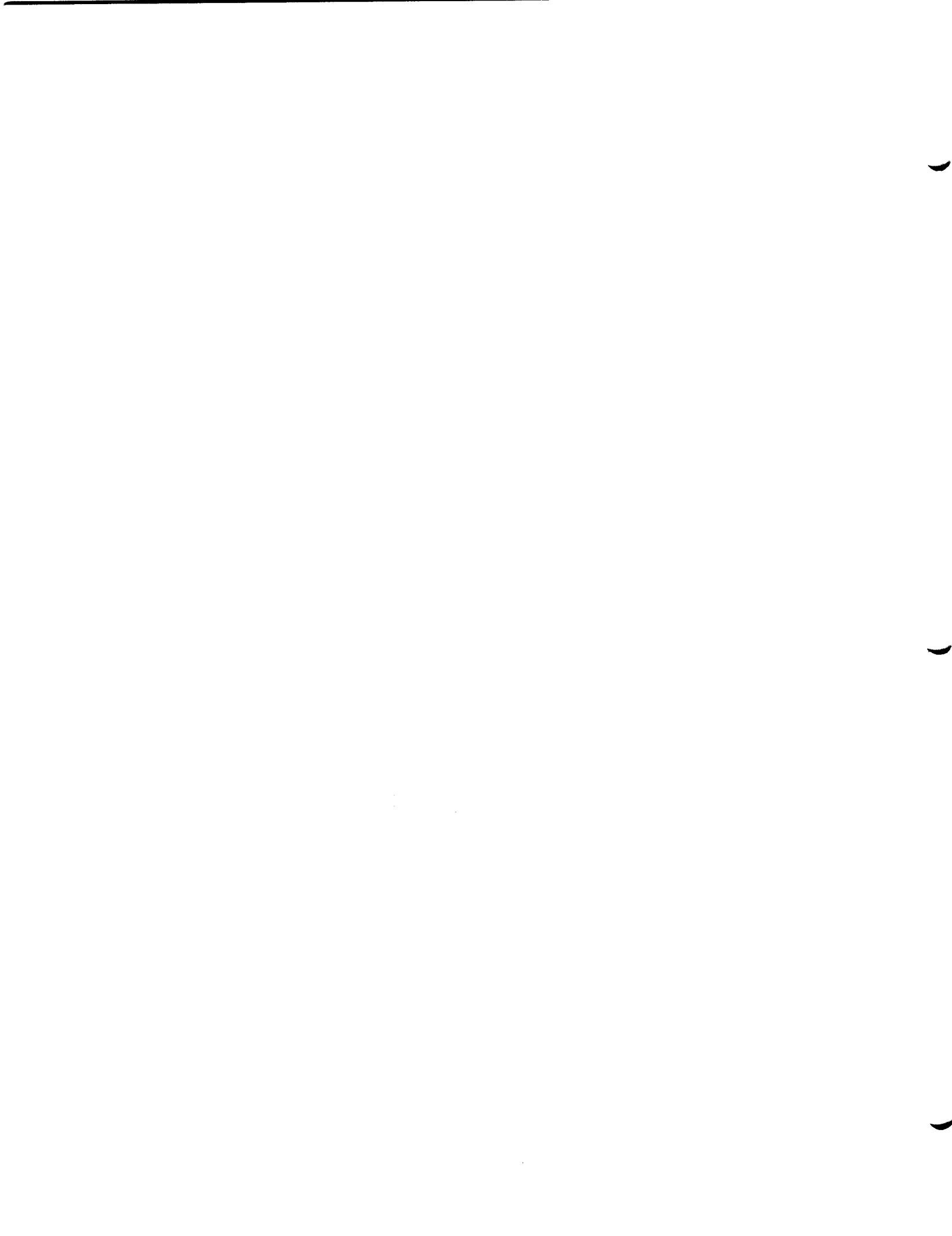
DO NOT SCALE DRAWING

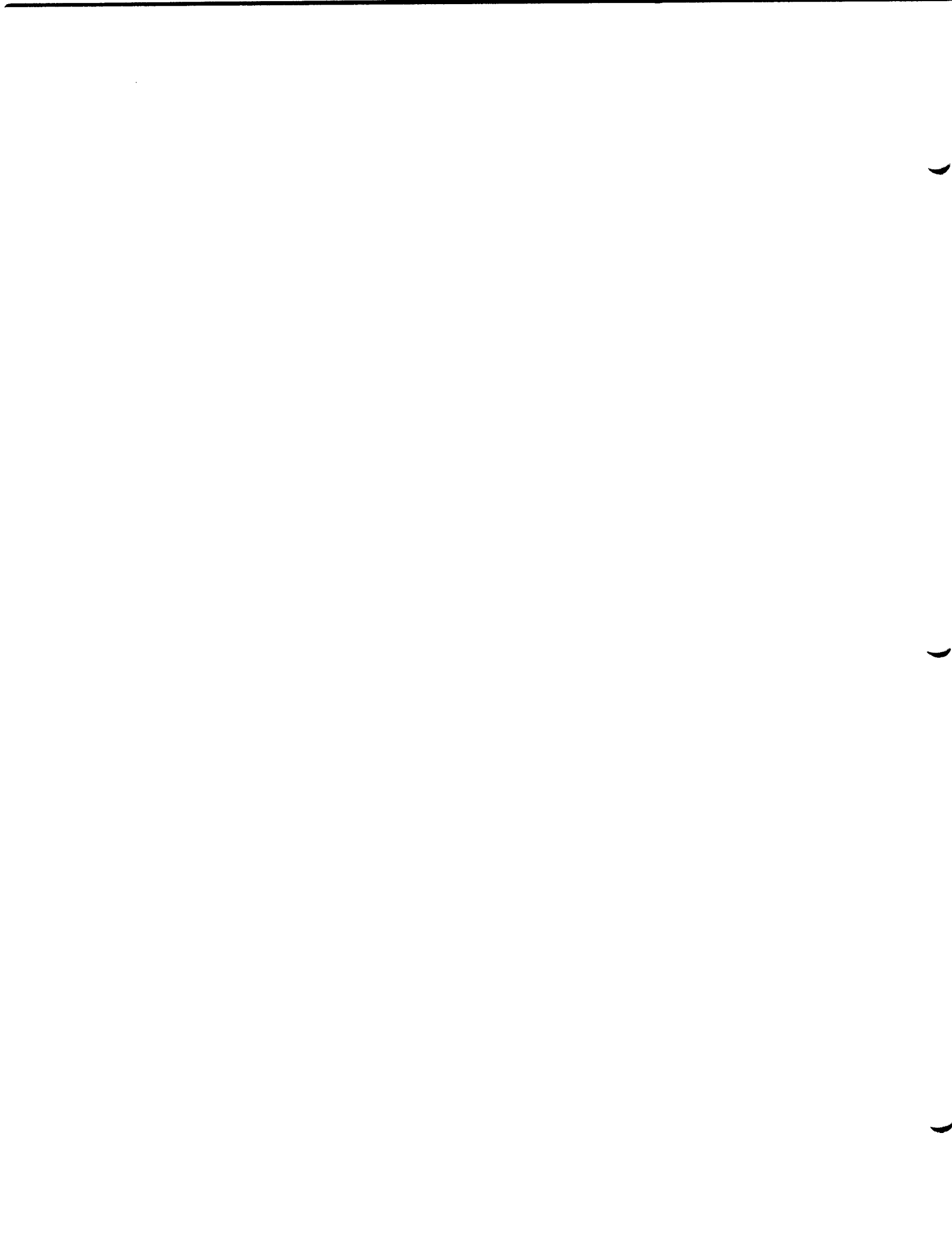
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Refreshment Machinery Industries
300 Jesseville Road, Warminster, PA 18974

NUMBER: FDSEL 11 B A

SIZE REV: B A





CHARMEL NUMBER	TIMING CHART, 211LG OPTION 07--MACHINE CONFIG CODE 0.1		KEY (BUTTON) NO. 2		KEY (BUTTON) NO. 3	
	CHARMEL DESCRIPTION	LINE No.	VALUE	CHARMEL DESCRIPTION	LINE No.	VALUE
0	LONG DELAY TIME	N/A	23.0 (SECONDS)	SHORT DELAY TIME	N/A	19.0 (SECONDS)
1	BREWER WATER START	1	2.5 (SECONDS)	BREWER DURATION	1	6.2 (SECONDS)
2	COFFEE START	2	0.0 (SECONDS)	COFFEE DURATION (COFFEE)	3	1.7 (SECONDS)
3	LIGHT START (COFFEE)	3	13.7 (SECONDS)	SUGAR DURATION (COFFEE)	4	0.8 (SECONDS)
4	SUGAR START (COFFEE)	4	14.5 (SECONDS)	DECAF/TEA DURATION	5	1.7 (SECONDS)
5	DECAF/TEA START	5	2.0 (SECONDS)	DECAF/TEA WATER DURATION	6	7.3 (SECONDS)
6	DECAF/TEA WATER START	6	0.0 (SECONDS)	SOUP/SGC DURATION	7	1.0 (SECONDS)
7	SOUP/SGC START	7	2.0 (SECONDS)	SOUP/SGC WATER, WHIPPER DURATION	8	7.3 (SECONDS)
8	SOUP/SGC WATER, WHIPPER START	8	0.0 (SECONDS)	CHOCOLATE DURATION	9	4.4 (SECONDS)
9	CHOCOLATE START	9	0.0 (SECONDS)	CHOCOLATE WATER, WHIPPER DURATION	10	7.2 (SECONDS)
10	CHOCOLATE WATER, WHIPPER START	10	0.0 (SECONDS)	SUGAR DURATION (DECAF/TEA)	4	0.8 (SECONDS)
11	SUGAR START (DECAF/TEA)	4	3.0 (SECONDS)	STIRRING COFFEE DURATION	2	2.5 (SECONDS)
12	STIRRING COFFEE START	2	0.0 (SECONDS)	LIGHT DURATION (DECAF/TEA)	3	0.8 (SECONDS)
13	LIGHT START (DECAF/TEA)	3	4.0 (SECONDS)	XXXXXXXXXXXXXXXXXX	-	0.0 (SECONDS)
14	XXXXXXXXXXXXXXXXXX	-	0.0 (SECONDS)	XXXXXXXXXXXXXXXXXX	-	0.0 (SECONDS)
15	EXTRA LIGHT DURATION	3	0.2 (SECONDS)	EXTRA SUGAR DURATION	4	0.5
15	EXTRA SUGAR DURATION	4	0.1 (SECONDS)	MACHINE CONFIGURATION CODE	N/A	0.1
16	EXTRA LIGHT DURATION	3	0.1 (SECONDS)	CUP SENSOR CONFIG	N/A	0.1
16	MACHINE CODE SELECTION	11	1.8 (SECONDS)	0 = NO SENSOR 1 = SENSOR PRESENT		
17	CUP DROP TIME					
17	CUP SENSOR SELECTION					

NOTE:

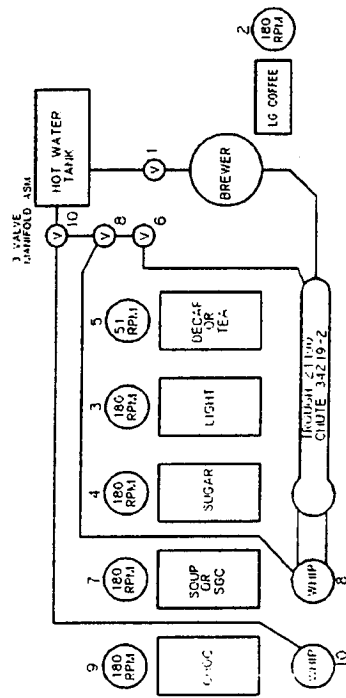
1. TIMES FOR 8 1/4 oz CUPS.

Charmel Products	1. INSERT CODE	2. ENTER SELECTION CODE
COFFEE FRESH BREWED	BLACK WHITE BLK * SUGAR WHIT * SUGAR A1 A2 A3 A4	
STRONG FRESH BREWED	BLACK WHITE BLK * SUGAR WHIT * SUGAR B1 B2 B3 B4	
DECAFFEINATED COFFEE	BLACK WHITE BLK * SUGAR WHIT * SUGAR C1 C2 C3 C4	
EXTRA - MAKE SELECTION THEN PRESS	* EXTRA SUGAR * EXTRA WHITE	
HOT CHOCOLATE	C5	
SOUP	C6	

TEA BLACK WHITE BLK * SUGAR WHIT * SUGAR
C1 C2 C3 C4

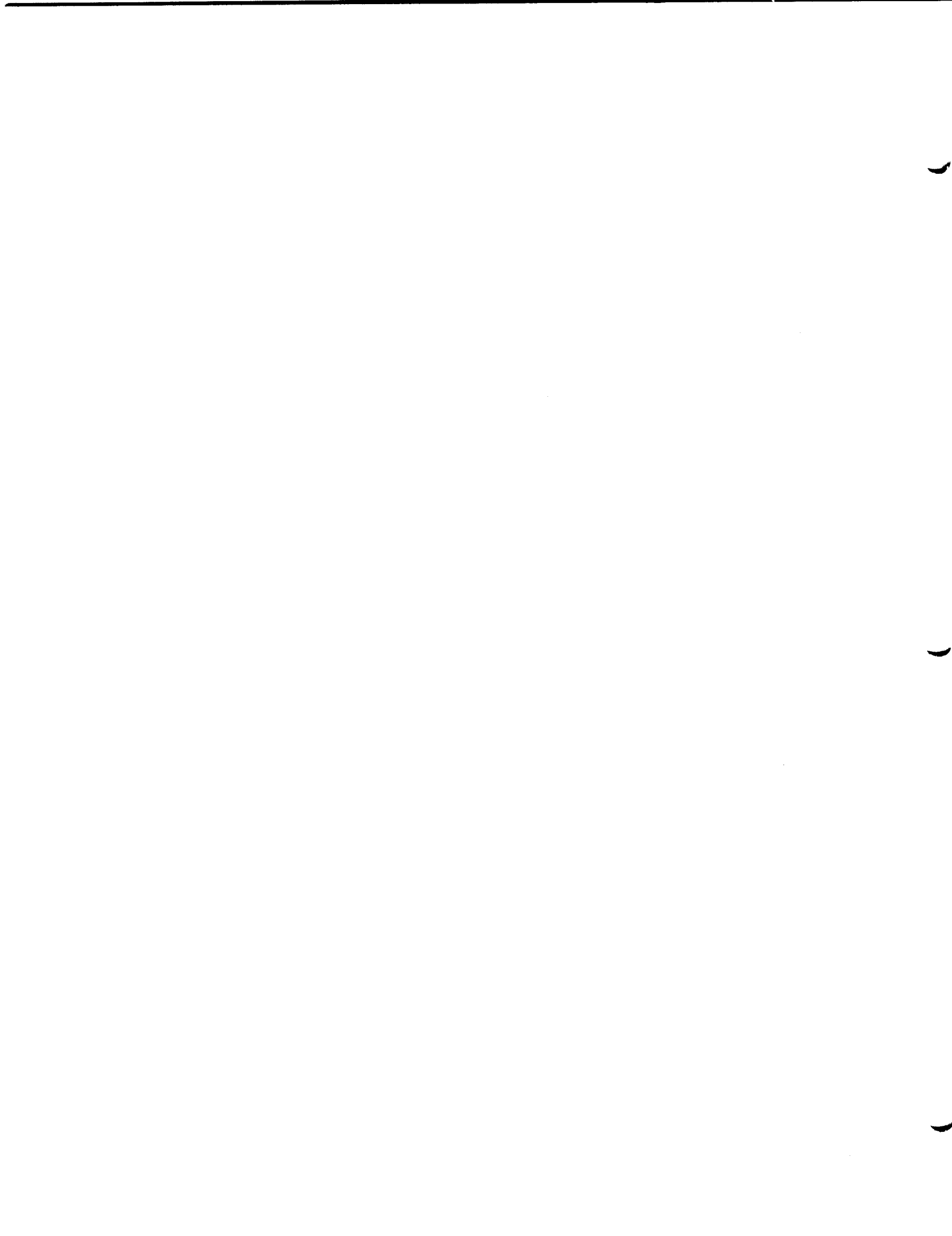
SGC C6

LGSEL07



NAME: TIMES FOR 211LG FULL RACK NO FB TEA		DATE
MODEL: 211		DRAWN: R. YOUNG
DO NOT SCALE DRAWING		APP: 5/24/93
THE INFORMATION ON THIS DRAWING IS UNAUTHORIZED USE IS PROHIBITED		
NUMBER	SIZE	REV.
LGSEL07	B	A

Refreshment Machinery Industries
300 Jacksonville Road
Warminster, PA 18914

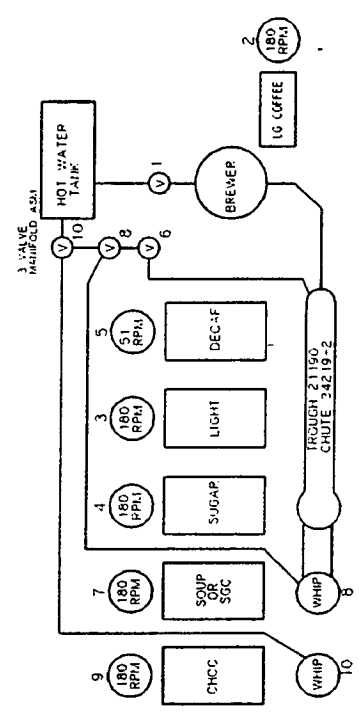


TIMING CHART, 211LG OPTION 08--MACHINE CONFIG CODE 0.4

CHANNEL NUMBER	CHANNEL DESCRIPTION	KEY (BUTTON) NO. 2		CHANNEL DESCRIPTION	KEY (BUTTON) NO. 3	
		LINE No	VALUE		LINE No	VALUE
0	LONG DELAY TIME	N/A	23.0 (SECONDS)	SHORT DELAY TIME	N/A	19.0 (SECONDS)
1	BREWER WATER START	1	2.5 (SECONDS)	BREWER DURATION	1	6.2 (SECONDS)
2	COFFEE START	2	0.0 (SECONDS)	COFFEE DURATION	2	1.7 (SECONDS)
3	LIGHT START (COFFEE)	3	13.7 (SECONDS)	LIGHT DURATION (COFFEE)	3	0.8 (SECONDS)
4	SUGAR START (COFFEE)	4	14.5 (SECONDS)	SUGAR DURATION (COFFEE)	4	1.0 (SECONDS)
5	DECAF START	5	2.0 (SECONDS)	DECAF DURATION	5	1.0 (SECONDS)
6	DECAF WATER START	6	0.0 (SECONDS)	DECAF WATER DURATION	6	7.3 (SECONDS)
7	SOUP/SGC START	7	2.0 (SECONDS)	SOUP/SGC DURATION	7	1.0 (SECONDS)
8	SOUP/SGC WATER, WHIPPER START	8	0.0 (SECONDS)	SOUP/SGC WATER, WHIPPER DURATION	8	7.3 (SECONDS)
9	CHOCOLATE START	9	2.0 (SECONDS)	CHOCOLATE DURATION	9	4.4 (SECONDS)
10	CHOCOLATE WATER, WHIPPER START	10	0.0 (SECONDS)	CHOCOLATE WATER, WHIPPER DURATION	10	7.2 (SECONDS)
11	SUGAR START (DECAF)	4	3.0 (SECONDS)	SUGAR DURATION (DECAF)	4	0.8 (SECONDS)
12	STRONG COFFEE START	2	0.0 (SECONDS)	STRONG COFFEE DURATION	2	2.5 (SECONDS)
13	LIGHT START (DECAF)	3	4.0 (SECONDS)	LIGHT DURATION (DECAF)	3	0.8 (SECONDS)
14	STRONG DECAF START	5	2.0 (SECONDS)	STRONG DECAF DURATION	5	1.5 (SECONDS)
15	EXTRA LIGHT DURATION	3	0.2 (SECONDS)	EXTRA SUGAR DURATION	4	0.5
16	EXTRA LIGHT DURATION	3	0.1 (SECONDS)	MACHINE CONFIGURATION CODE	N/A	0.4
17	CUP DROP TIME	11	1.8 (SECONDS)	CUP SENSOR CONFIG.	N/A	0.1
17	CUP SENSOR SELECTION			0 = NO SENSOR 1 = SENSOR PRESENT		

NOTE:

1. TIMES FOR 8 1/4 oz CUPS.



Automatic Products	1. WATER COMP.	EXTRA - MAKE SELECTION FIRST PRESS
	2. ENTER SELECTION CODE	• EXTRA SUGAR P EXTRA WHITE
COFFEE FRESH BREWED	BLACK A1 WHITE A2 BLK * SUGAR A3 WHIT * SUGAR A4	
STRONG FRESH BREWED	BLACK B1 WHITE B2 BLK * SUGAR B3 WHIT * SUGAR B4	
DECAFFEINATED COFFEE	BLACK C1 WHITE C2 BLK * SUGAR C3 WHIT * SUGAR C4	
STRONG DECAFFEINATED	BLACK A5 WHITE A6 BLK * SUGAR B5 WHIT * SUGAR B6	
HOT CHOCOLATE	C5	
SOUP	C6	

SGC

C6

NAME: **TIMES FOR 211LG FULL RACK, NO TEA, STRONG DECAF**

DATE: 5/24/93

MODEL: 211

DRAWN: R. YOUNG

APP.:

DO NOT SCALE DRAWING

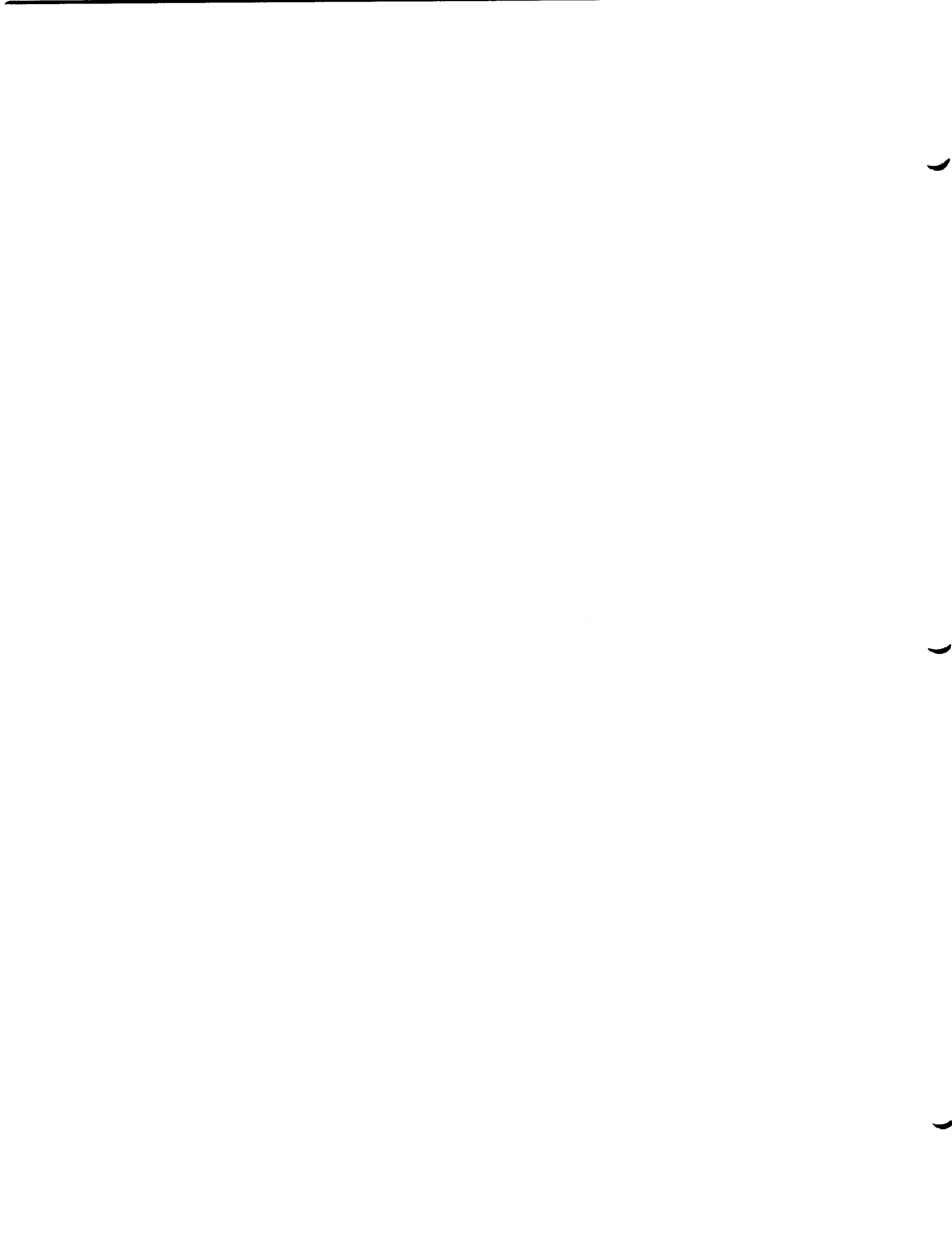
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Refreshment Machinery Industries
300 Jacksonville Road, Worcester, PA 18771

NUMBER: LGSEL08

SIZE: B

REV: A



TIMING CHART, 211LG OPTION 11--MACHINE CONFIG CODE 0.1

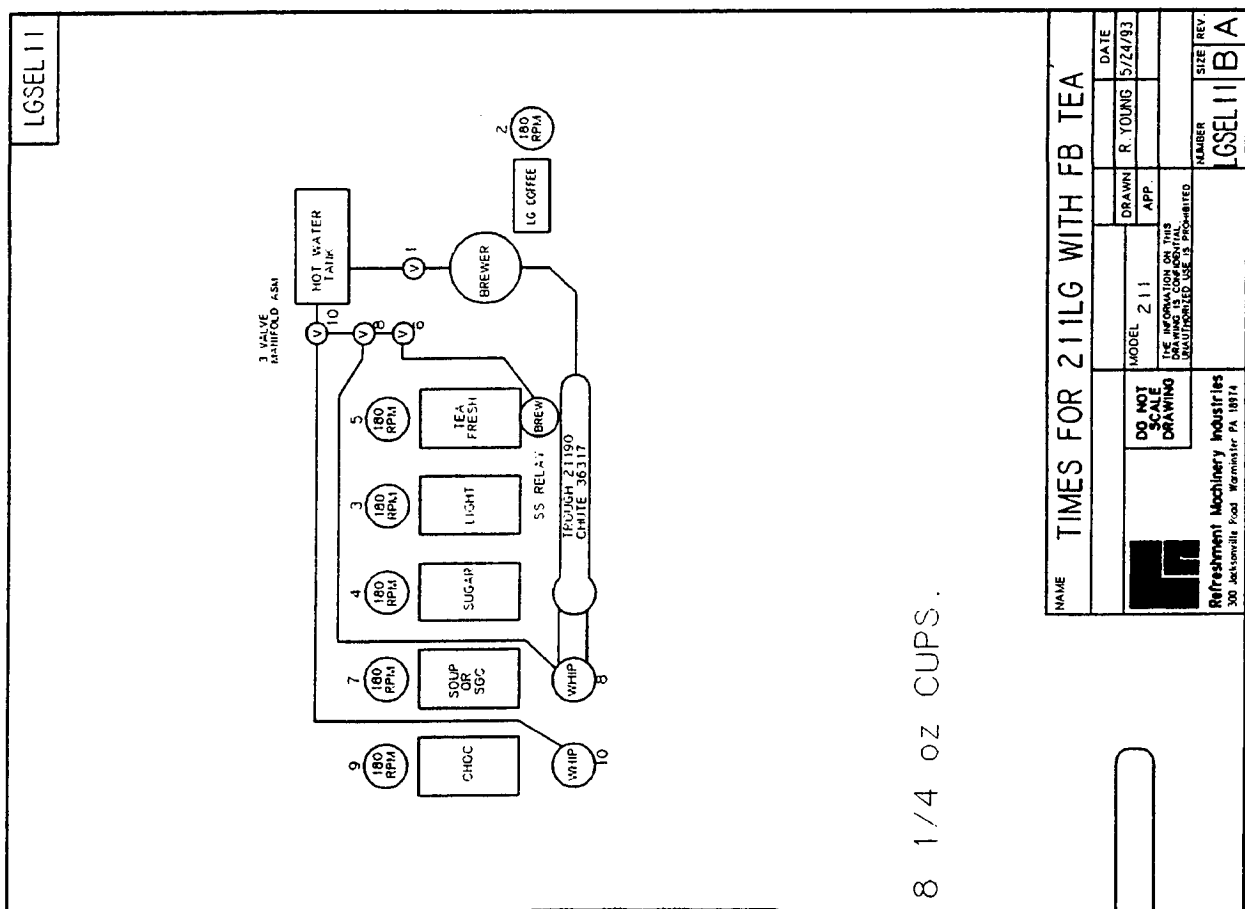
CHANNEL NUMBER	CHANNEL DESCRIPTION	KEY (BUTTON) NO. 2		CHANNEL DESCRIPTION	KEY (BUTTON) NO. 3	
		LINE No	VALUE		LINE No	VALUE
0	LONG DELAY TIME	N/A	23.0 (SECONDS)	SHORT DELAY TIME	N/A	19.0 (SECONDS)
1	BREWER WATER START	1	2.5 (SECONDS)	BREWER DURATION	1	6.2 (SECONDS)
2	COFFEE START	2	0.0 (SECONDS)	COFFEE DURATION	2	1.7 (SECONDS)
3	LIGHT START (COFFEE)	3	13.7 (SECONDS)	LIGHT DURATION (COFFEE)	3	0.8 (SECONDS)
4	SUGAR START (COFFEE)	4	14.5 (SECONDS)	SUGAR DURATION (COFFEE)	4	1.0 (SECONDS)
5	FB TEA START	5	2.0 (SECONDS)	FB TEA DURATION	5	1.7 (SECONDS)
6	FB TEA WATER START	6	0.0 (SECONDS)	FB TEA WATER DURATION	6	7.3 (SECONDS)
7	SOUP/SSC START	7	2.0 (SECONDS)	SOUP/SSC DURATION	7	1.0 (SECONDS)
8	SOUP/SSC WATER, WHIPPER START	8	0.0 (SECONDS)	SOUP/SSC WATER, WHIPPER DURATION	8	7.3 (SECONDS)
9	CHOCOLATE START	9	2.0 (SECONDS)	CHOCOLATE DURATION	9	4.4 (SECONDS)
10	CHOCOLATE WATER, WHIPPER START	10	0.0 (SECONDS)	CHOCOLATE WATER, WHIPPER DURATION	10	7.2 (SECONDS)
11	SUGAR START (FB TEA)	1	3.0 (SECONDS)	SUGAR DURATION (FB TEA)	1	0.8 (SECONDS)
12	STRONG COFFEE START	2	0.0 (SECONDS)	STRONG COFFEE DURATION	2	2.3 (SECONDS)
13	LIGHT START (FB TEA)	3	4.0 (SECONDS)	LIGHT DURATION (FB TEA)	3	0.8 (SECONDS)
14	TEA BREWER START (DUP.)	4	15.0 (SECONDS)	TEA BREWER DURATION	4	1.3 (SECONDS)
15	EXTRA LIGHT DURATION (COFFEE)	3	0.2 (SECONDS)	EXTRA LIGHT DURATION	3	0.5 (SECONDS)
16	EXTRA SUGAR DURATION	3	0.1 (SECONDS)	EXTRA SUGAR DURATION	4	0.5 (SECONDS)
17	MACHINE CODE SELECTION	11	1.8 (SECONDS)	MACHINE CONFIGURATION CODE	N/A	0.1 (SECONDS)
18	CUP DROP TIME			CUP SENSOR CONFIG	N/A	0.1 (SECONDS)
19	CUP SENSOR SELECTION			0 = NO SENSOR		
				1 = SENSOR PRESENT		

NOTE:

- 1. TIMES FOR 8 1/4 oz CUPS.

Automatic Products		1. START CODE		2. ENTER SELECTION CODE	
COFFEE FRESH BREWED	BLACK A1	WHITE A2	BLK + SUGAR A3	WHIT + SUGAR A4	
STRONG FRESH BREWED	BLACK B1	WHITE B2	BLK + SUGAR B3	WHIT + SUGAR B4	
FRESH LEAF TEA	BLACK C1	WHITE C2	BLK + SUGAR C3	WHIT + SUGAR C4	
EXTRA - MAKE SELECTION THEN PRESS	* EXTRA SUGAR		# EXTRA WHITE		
CHOCOLATE	C5				
SOUP	C6				

SOCC C6



NAME: **TIMES FOR 211LG WITH FB TEA**

DATE: 5/24/93

DRAWN: R. YOUNG

APP: []

MODEL: 211

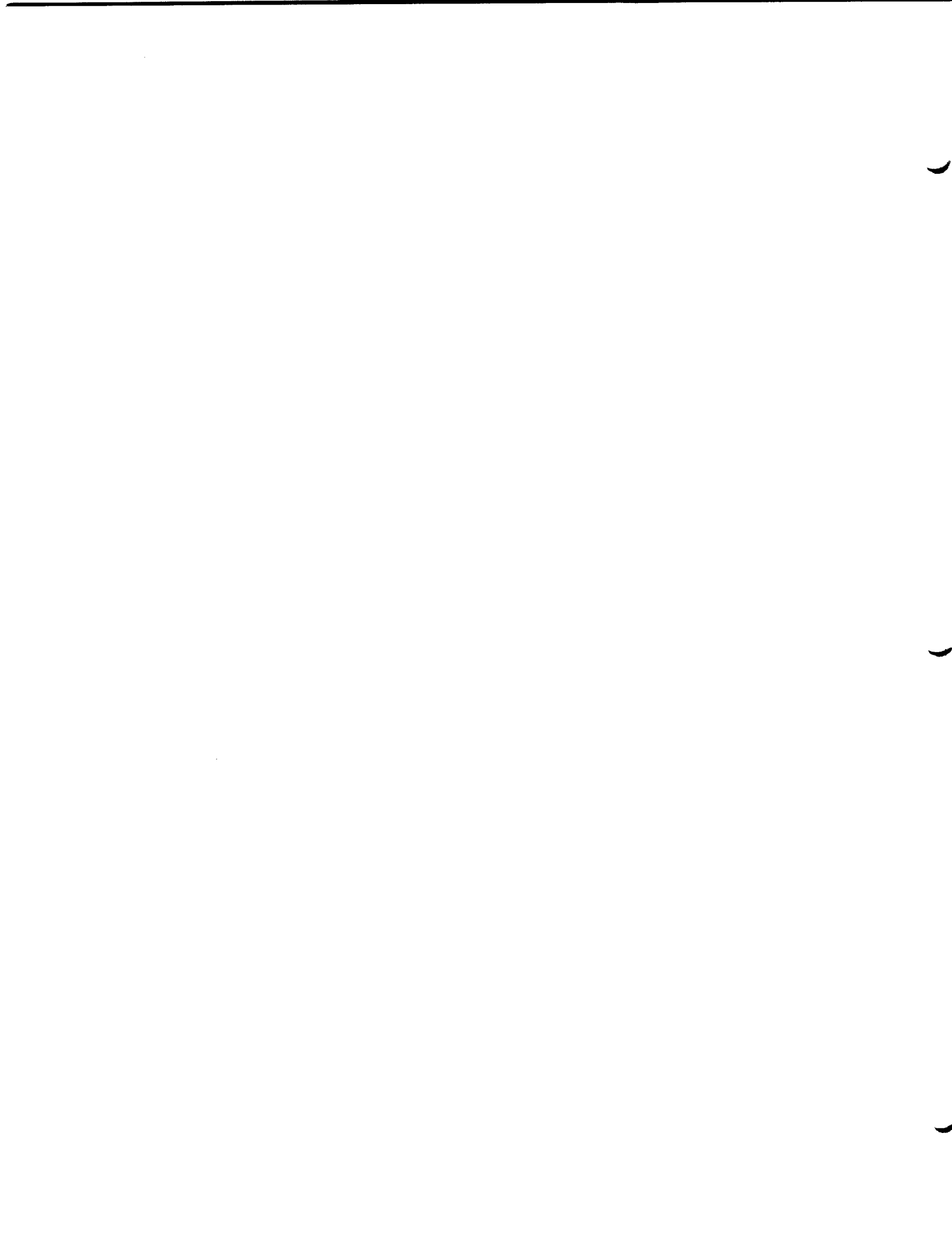
DO NOT SCALE DRAWING

THE INFORMATION ON THIS DRAWING IS UNAUTHORIZED USE IS PROHIBITED

Refreshment Machinery Industries
300 Jacksonville Road Warminster PA 18974

NUMBER: LGSEL11B

SIZE REV: A



SERVICE SECTION

SANITIZING AND CLEANING PROCEDURES

FOR LG MACHINES - DO EVERYTHING

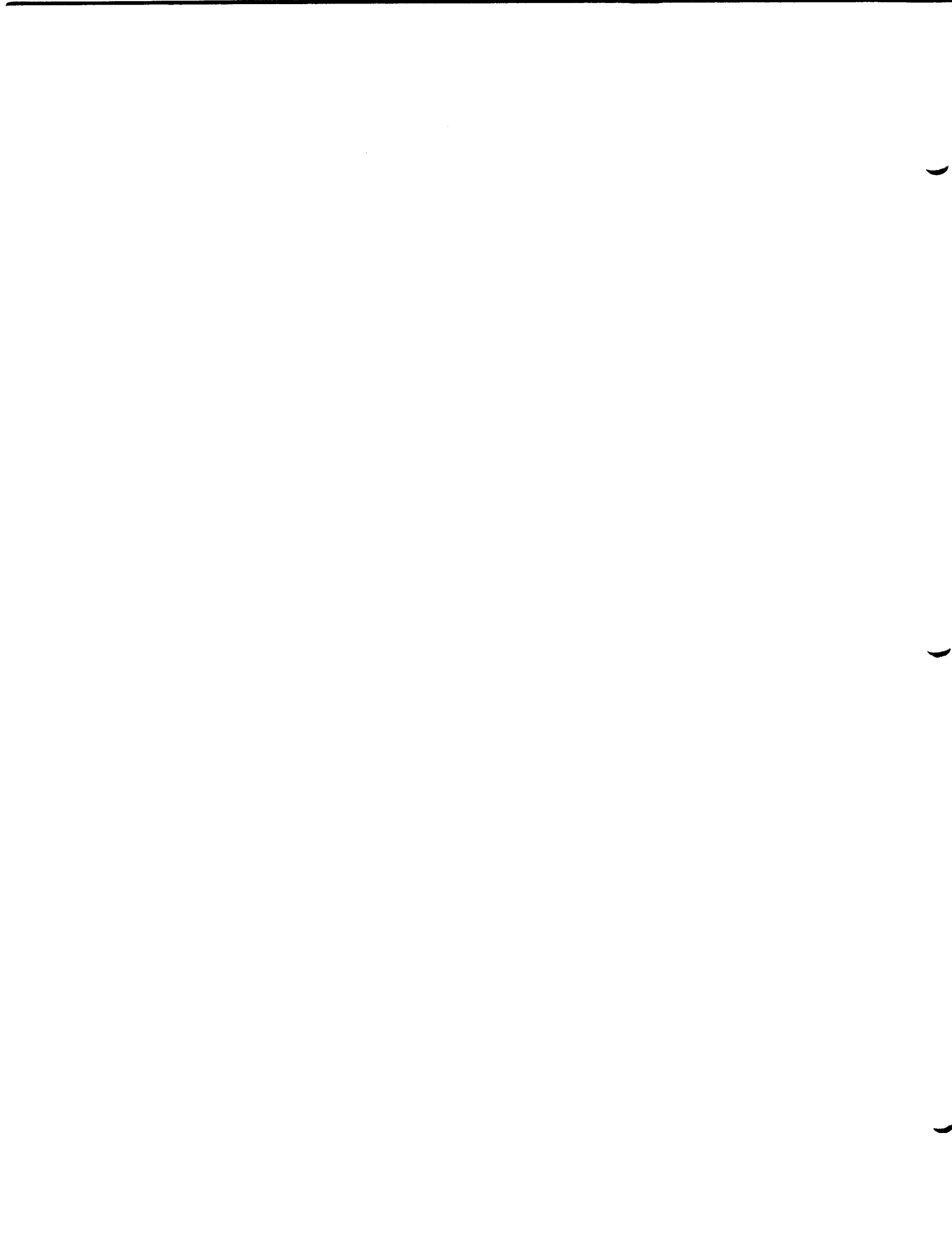
FOR FD MACHINES - SKIP *ITALICS*

EACH VISIT

1. Fill cup cabinet with cups to required level. Wipe interior and exterior of cup cabinet.
2. Replenish all canisters. Clean any spills. Wipe lids of canisters with a damp towel. Dry all damp surfaces.
3. *Cycle the brewer to the dump position by depressing the right rear roller switch until the brewer will continue to run on it's own. When brewer reaches the forward dump position, turn off the control circuit breaker. Remove splash guard from the front of the brewer. Using spray hose, rinse any loose grounds from brewer and splash guard. Replace splash guard and restore power to machine.*
4. Remove humidity bar (**CAUTION-BAR IS HOT**) and commodity chutes from the trough. Check all canister spouts and commodity chutes for blockages. Rinse commodity chutes and trough with spray hose to remove any residue. If necessary, the trough can be scrubbed with a damp cloth or a soft brush, followed with a hot water rinse from the spray hose. Do not scour the trough with any abrasive material! This can result in a poor wash of the trough and poorly mixed ingredients in a drink, or residue in the trough. Carefully dry commodity chutes and reinstall humidity bar and commodity chutes.
5. Using warm water and detergent, clean other interior surfaces, wipe with a damp cloth and wipe dry.
6. Remove cupwell, grate and vend door, clean with hot water and detergent. Rinse with clear water and dry with clean cloth or paper towel. Wipe inside of door, clean vend door guides. Replace cupwell, grate and vend door in machine.
7. *Remove disposable bag containing spent coffee grounds and rinse bucket with hot water and replace liner. Empty and scrub waste bucket. Rinse with anti-bacterial solution. Do not rinse bucket after anti-bacterial solution is used- this will defeat its purpose. Clean floor of machine with hot water and wipe dry. Replace buckets in machine making sure both floats are hanging free and all hoses are in the buckets.*
8. Set one test vend or coin test to check for proper operation. Lock vendor door, clean exterior of door and cabinet.

QUARTERLY

1. *Cycle brewer to the 'dump' position, spray with rinse hose to remove any excessive grounds. Disconnect the brewer cable from the carriage by gently pushing the carriage to the rear and lifting the cable out of its slot. Lift the lower brewer assembly latch and remove the bottom half of the brewer. Place in a bucket of hot water to allow it to soak.*
2. Remove steam duct, exhaust hose, and metal screen between exhaust motor and mounting plate. Rinse clean with hot water. Dry with a clean cloth and return to position.
3. Disassemble chocolate whipper (and any additional whippers) housing and mixing bowl by spreading the wire clips and pulling straight out. Clean parts with hot water. Clean and inspect the whipper base and impeller for wear. Reassemble making sure the large 'O' ring is positioned correctly inside the whipper housing.
4. Disconnect all hoses from mixing bowls, channel and delivery spout and clean with hot water. Replace hoses.
5. *Remove lower half of brewer from bucket and rinse well with hot water and inspect brew filter, screen and gasket for wear, rips or obstruction of the filter or screen. Replace if necessary. Replace brew base assembly in brewer and reconnect cable.*
6. *Clean coffee delivery chute with a dry cloth.*
7. Clean coin mechanism acceptor with a damp cloth and wipe dry.
8. Perform **EACH VISIT** procedure above.



FUNCTION OF THE BREWER IN AN AP 211

The heart of the AP 211 Hot Drink Merchandiser is the open cylinder brewer. It has been "time proven" and "experience improved". It is simple, lightweight, easy to clean and easy to service.

HOW THE BREWER WORKS

The word "front" used in this description refers to the parts of the brewer nearest the observer, standing before the open cabinet.

All AP 211 fresh brew machines have the brewer stopping at the same point. The brewer is stopped with the brew carriage aligned directly over the brew filter and under the coffee delivery chute. When a brewed coffee drink is selected, the ground coffee from the LG canister is delivered directly to the brew chamber via the stainless steel coffee delivery chute. This cycle may be interrupted if the cup sensor is activated and no cup is present in the cupwell.

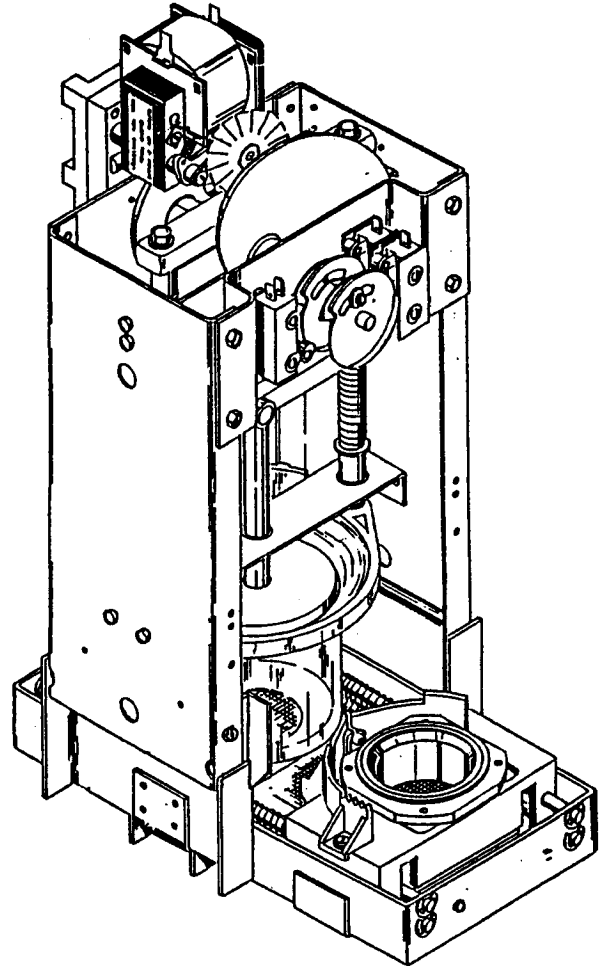


FIGURE 3.1

The brewer starts at the time determined by channel 1 (typically 3.00 seconds) after the coffee hopper has augured coffee into the brew chamber. When the brewer starts, the cable will begin to retract the brew carriage towards the rear of the base assembly. Once the right rear (brewer cycle) switch rides up on the high side of the rear cam, the brewer will continue to run until it falls back into the valley at the end of the cycle.

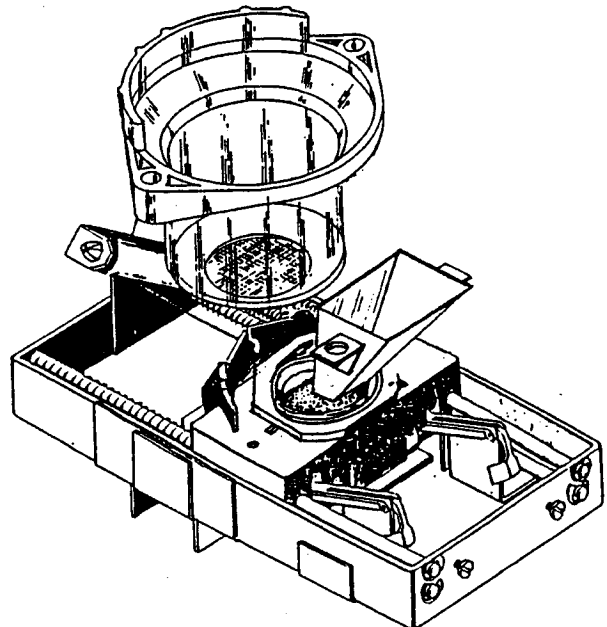
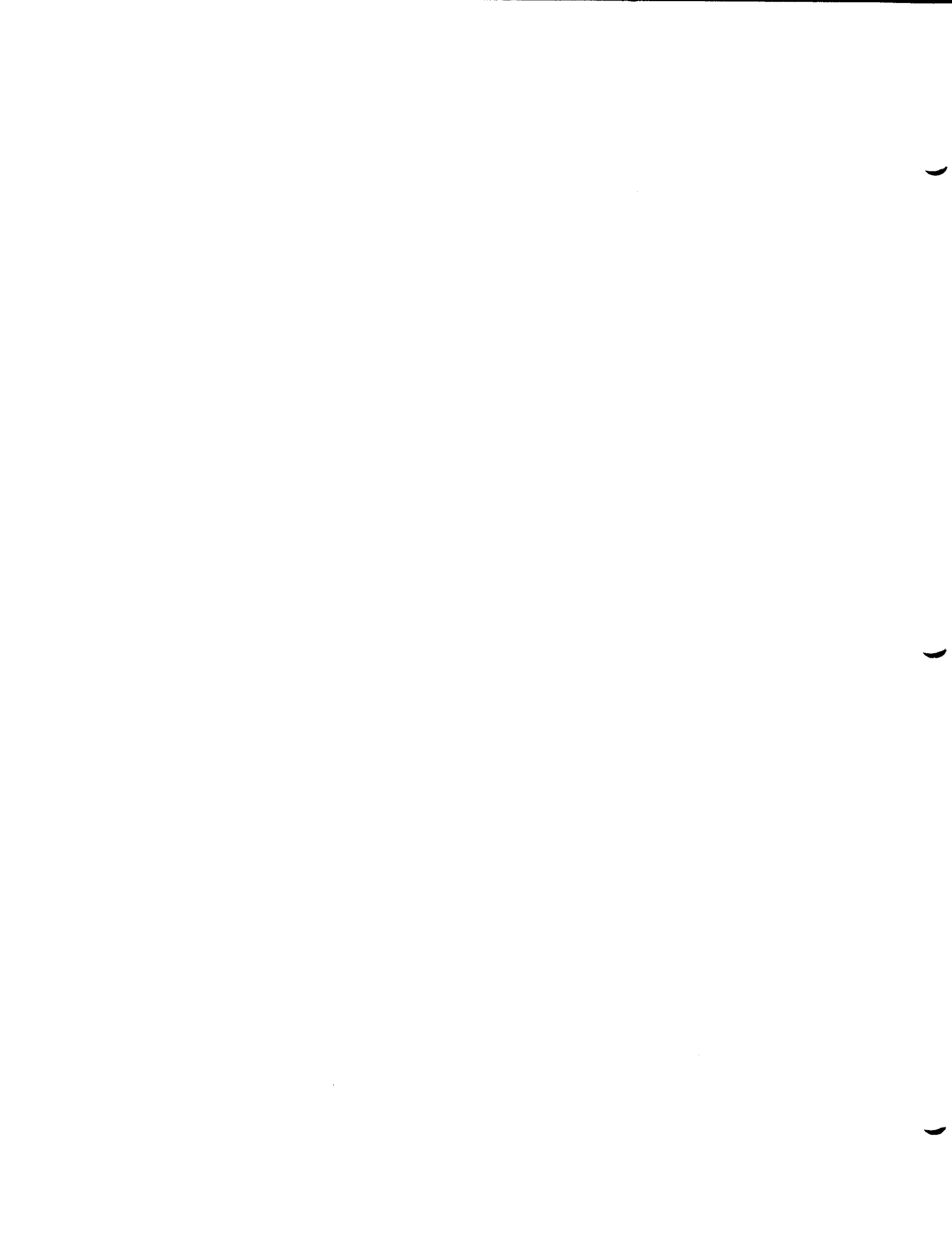


FIGURE 3.2



The brew carriage will continue back until it is slightly behind the clear brew cylinder when the brew cylinder starts its downward motion. At the proper time the cable is slackened slightly to allow the brew carriage to move forward and self-align with the cylinder. As the cylinder clamps down on the brew chamber seal, the roller of the front right switch should be entering the valley of the front cam and the switch will send voltage to the brew water valve and the Brew Delay Relay. The Brew Delay Relay (BDR) interrupts the voltage to the brewer motor to allow the brewer valve to deliver all the water required to the brewer. The brew water valve and the BDR are energized for the duration of channel 1. The cylinder is held against the brew chamber seal by the springs on the cylinder support rods. The water will flow into the cylinder down through the grate in the bottom of the cylinder into the coffee filled brew chamber. The grate in the bottom of the cylinder prevents the coffee grounds from floating up into the cylinder.

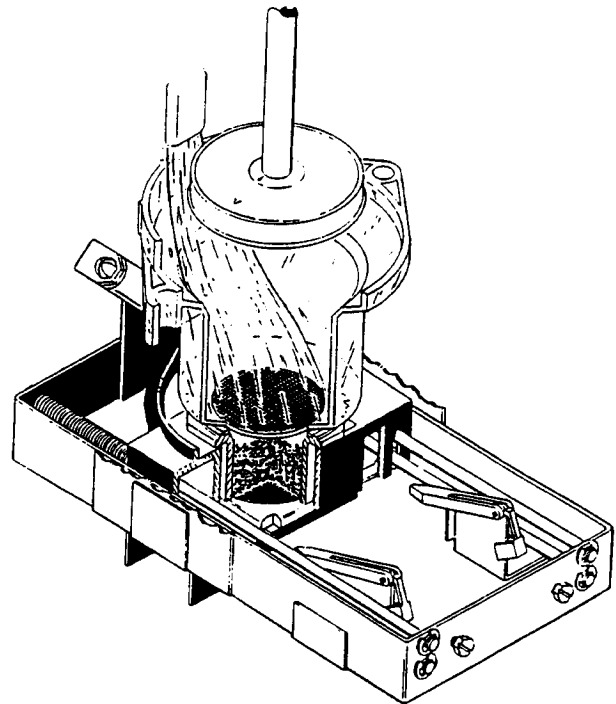


FIGURE 3.3

As the cycle continues, the piston is moved down into the cylinder by the large cam on the main shaft. Air trapped between the piston and the water in the cylinder is quickly heated by the hot water and begins to expand. The downward motion of the piston, plus the pressure of the expanding air, forces the water through the coffee grounds in the brew chamber and out through the delivery funnel to the trough. The heated, compressed air follows the water through the grounds forcing the remaining water out of the grounds and drying the grounds.

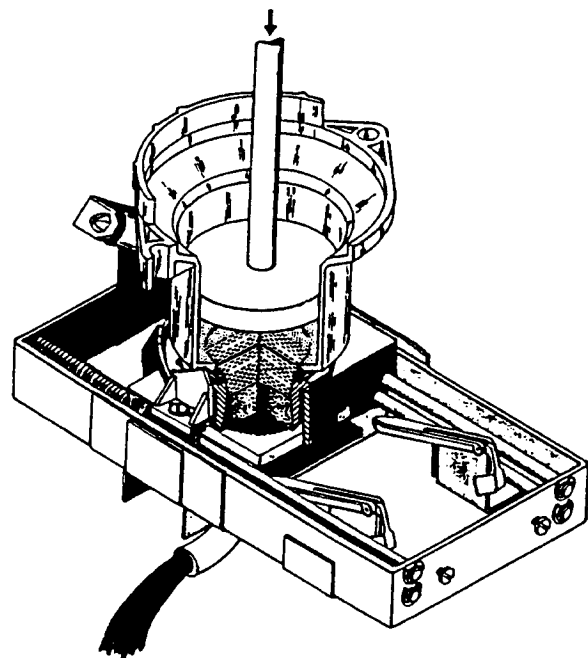
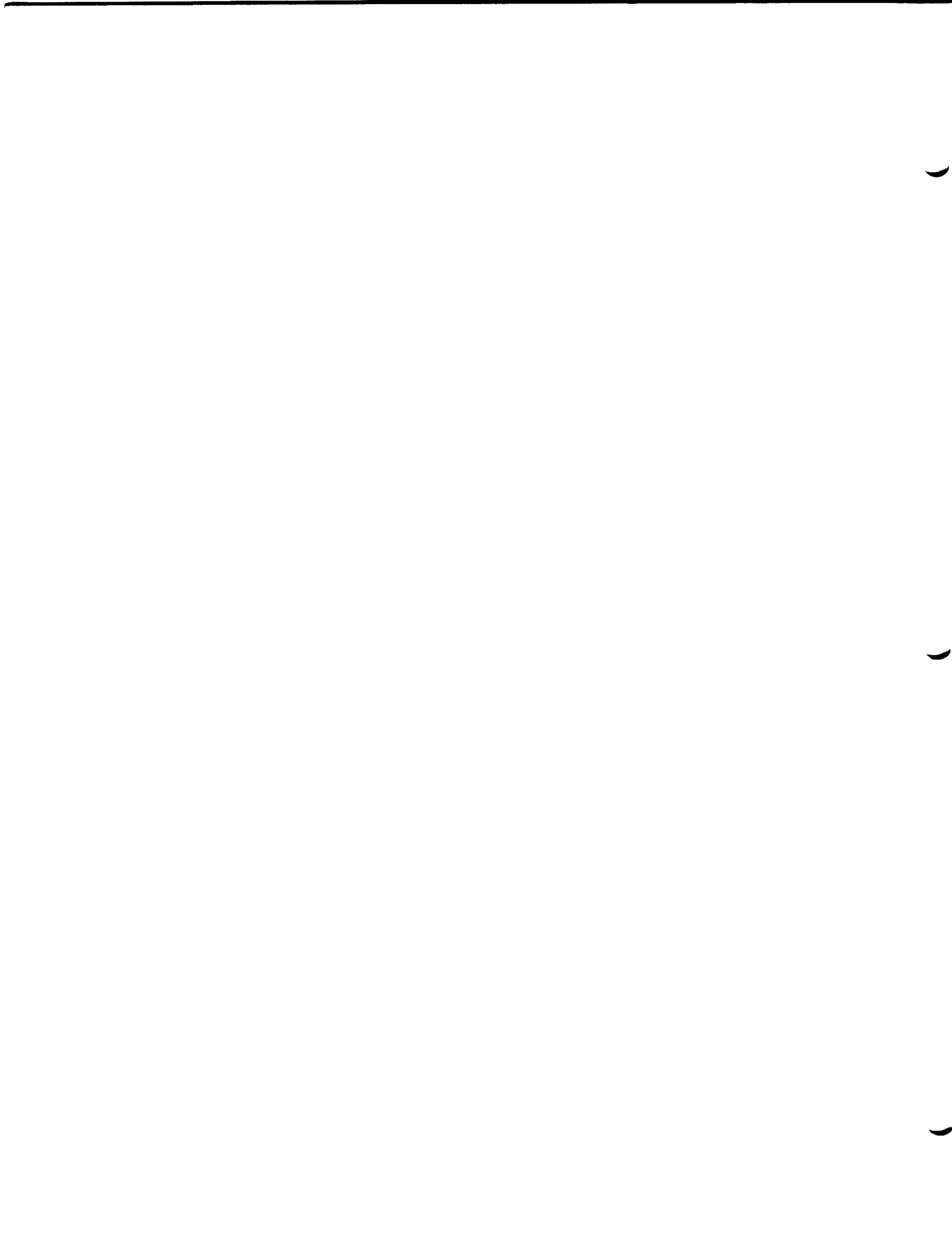


FIGURE 3.4



After the water has passed through the bed of grounds, the brewer starts the portion of the cycle that empties the brewer of spent grounds and resets the brewer for the next vend. The looseness in the brew carriage cable is removed and the piston and cylinder are raised far enough to allow the brew carriage to pass under the cylinder.

The cable is then slowly unwound, controlling the forward motion of the brew carriage, which is being forced forward by the carriage rod springs. As the brew carriage passes over the two white pawls in the base assembly, the two ears on the sides of brew chamber lift the brew chamber evenly allowing it to ride up the pawls.

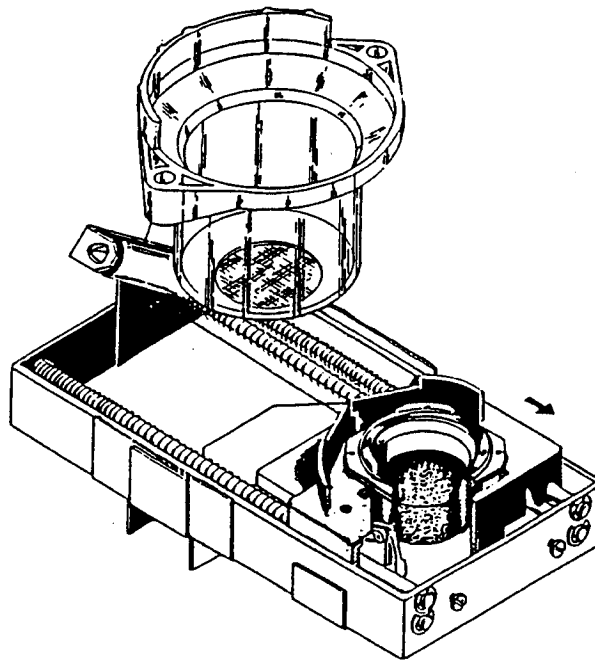


FIGURE 3.5

As soon as the ears are free of the support of the pawls, the brew chamber snaps downward, dislodging the spent grounds into the grounds bucket. The cable will then begin to retract the brew carriage toward the rear of the base assembly until the brew chamber is directly over the filter and under the delivery chute. At this point the roller of the right rear switch will fall into the valley of the rear cam, removing power from the brewer motor. This returns the brewer to the standby position and the brewer will remain in this position awaiting the next vend (see FIGURE 3.2).

◆◆ THE STOPPING POSITION OF THE BREWER IS A CRITICAL ADJUSTMENT. MISALIGNMENT OF THE BREW CHAMBER AND THE FILTER IN THE STOPPING POSITION CAN CAUSE A LEAK BETWEEN THE BOTTOM OF THE BREW CHAMBER AND THE TOP OF THE FILTER. THE CORRECT STOPPING POSITION OF THE BREWER IS INDICATED BY THE CARRIAGE MOVING THE FILTER ASSEMBLY BACKWARDS APPROXIMATELY 1/8" AS THE BREWER COMES TO REST.

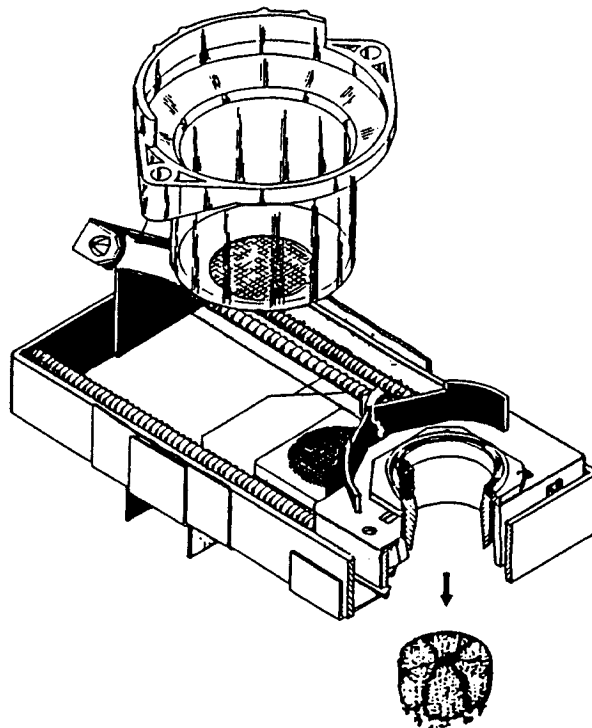
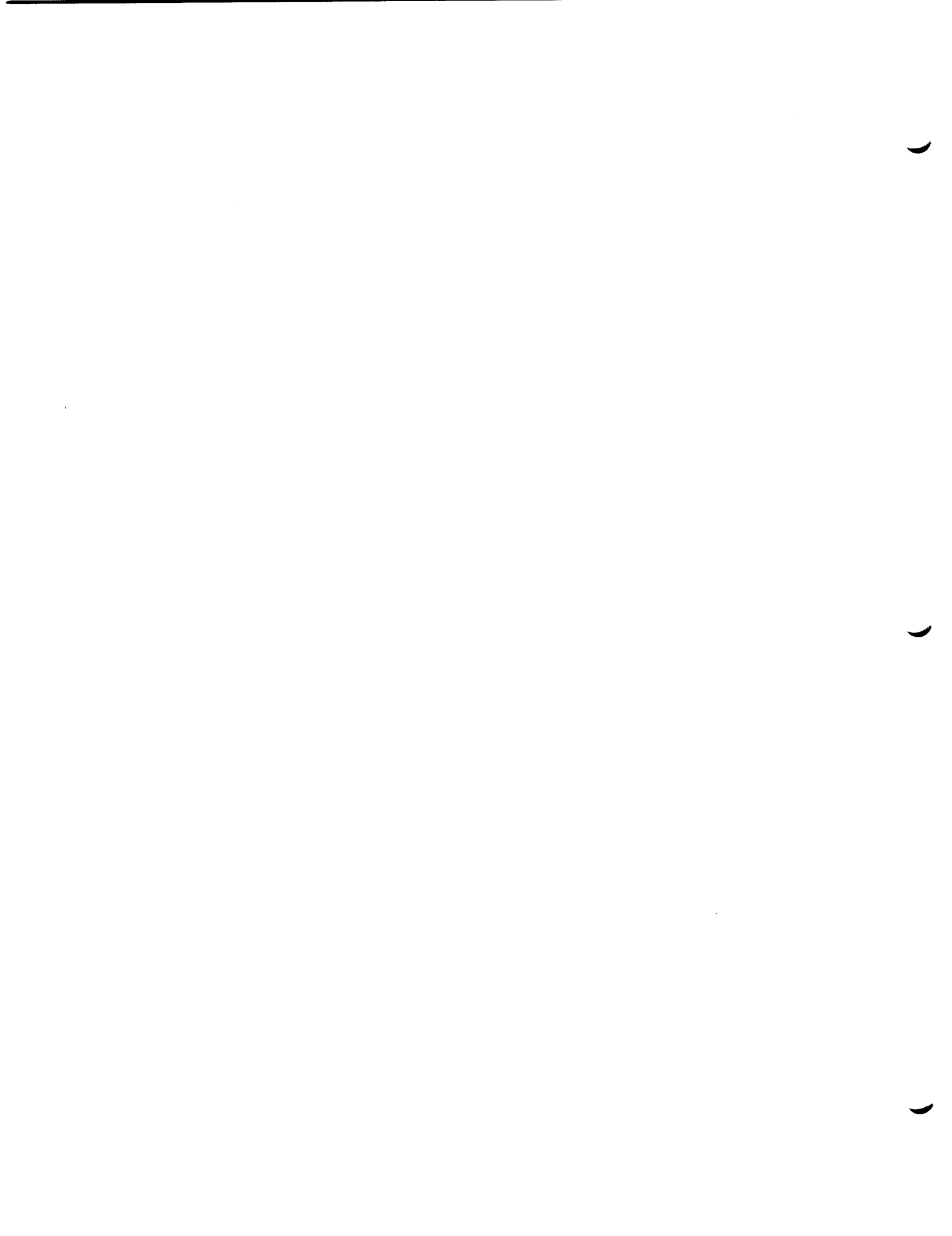


FIGURE 3.6



BREW CARRIAGE AND CABLE ADJUSTMENT

The horizontal movement of the carriage is caused by the springs in the base assembly. The action of the springs is controlled by the brew carriage cable assembly. The cable is wrapped on a spool and wound and unwound to move the carriage in synchronization with the other movements of the brewer. The cable spool is controlled by a gear segment driven by the rear cam of the main cam shaft assembly. The shape of the cam determines when the cable is wound and unwound.

When the cylinder is pressing down on the brew chamber, the cable should be slack. Just as the clear brew cylinder begins to raise, the cable tightens to prevent the carriage from jumping forward as the cylinder clears the alignment shoulder of the brew carriage. As soon as the cylinder is high enough to clear the carriage, the cable is unwound and the carriage moves forward to dump the spent grounds. After the spent grounds are dumped, the cable again winds on the outer spool and pulls the carriage to the stopping position.

The cable is attached to the outer section of the spool with a cotter pin. The inner portion of the spool is connected to a shaft and a small gear. The gear is rotated by a pivoting segment gear driven by a cam follower riding on the edge of the rear cam of the main shaft assembly. The inner and outer sections of the cable spool have matching teeth which provide a positive mesh, but allow for adjustment. When the two parts are assembled, they are secured by a screw and washer which prevent them from being disengaged.

ADJUSTMENT OF THE BREW CABLE

Operate the brewer through a complete cycle and observe that:

- A. The alignment shoulder of the carriage is slightly behind the rear vertical edge of the brew cylinder just as the cylinder starts down.
- B. The cable goes slightly slack just before the cylinder contacts the surface of the brew chamber gasket.
- C. After brewing, the carriage moves forward slowly and evenly all the way to the dump position.

If all three of these conditions are not met, then a cable adjustment should be made using the following procedure:

1. Swing the coffee hopper out to allow clear access to the brewer. Depress the right rear switch on the top of the brewer and allow the brewer to cycle to the brew position. Turn off power.
2. Remove the two outside screws holding the top brewer mounting bracket to the water tank. Loosen the remaining mounting screws in the keyhole slots in the top and bottom mounting brackets.
3. Locate the wiring harness for the brewer and release the harness from the cable clamp on the rear wall of the cabinet so that the brewer harness is hanging free.

4. Lift the brewer to clear the keyholes and turn the brewer clockwise and hang the right rear corner of the top brewer mounting bracket on the bracket on the right side wall near the lock bracket.

FIGURE 3.7

5. Mark the inner and outer section of the cable spool with a pencil line across both pieces to provide a reference mark.

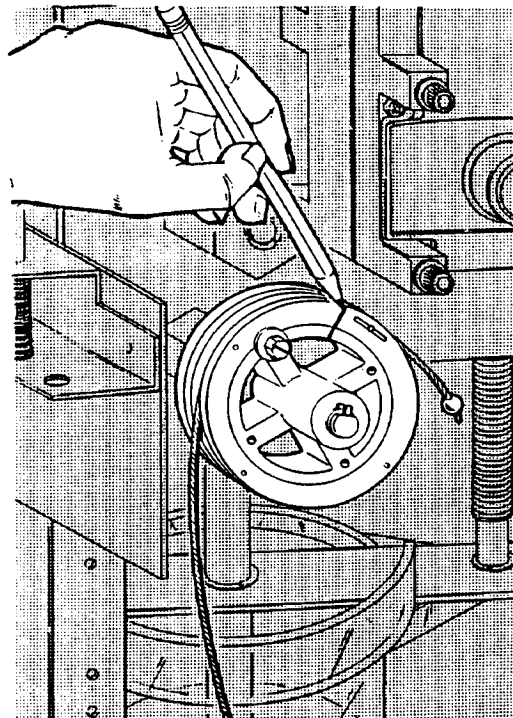
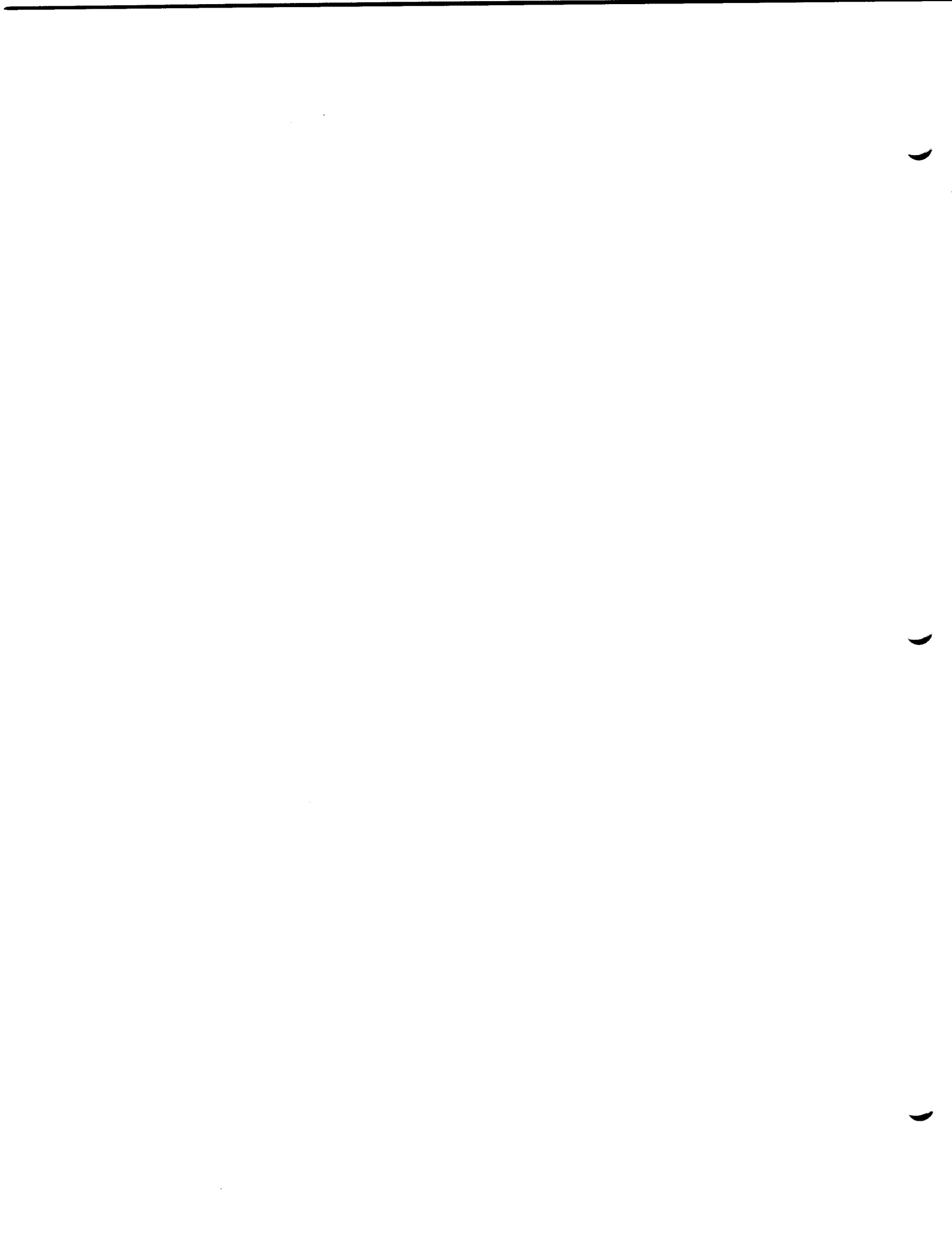


FIGURE 3.8



6. Restore power and cycle the brewer to the dumping position and turn off the power.
7. If the carriage was not correctly behind the cylinder and is being forced back out of the way or the cylinder is resting on top of the alignment shoulder of the brew carriage (see FIGURE 3.9) and causing the brew water to leak from between the cylinder and the brew chamber, then an adjustment of only one or two teeth to shorten the cable is needed - go to step 12. If the original adjustment has been lost, then a 'scratch' adjustment will have to be made - continue to step 8.

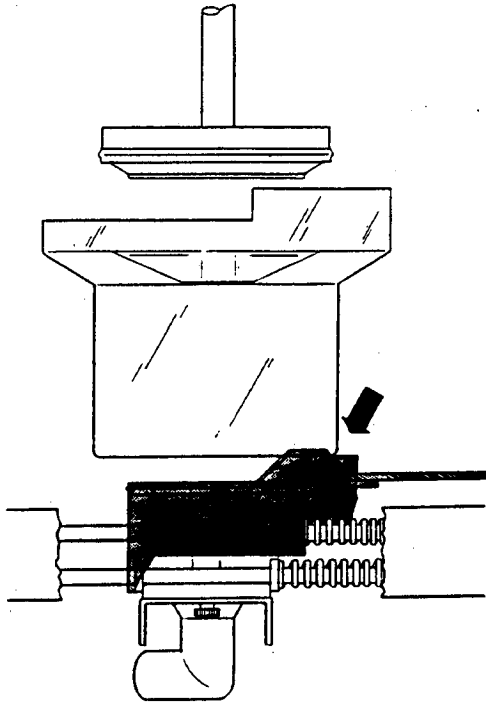


FIGURE 3.9

8. Confirm that the cam follower is in the deepest valley of the rear cam (See Figure 3.11) by cycling the brewer to this position. This position of the cam and follower guarantees that the brewer is in the dump position.
9. Feed the cable down between the white roller and the support bracket and towards the front of the brewer. Slip the cable into the slot on the rear of the carriage.
10. Wind the cable clockwise on the outer spool until the carriage is pulled back from the inner face of the base assembly (See Figure 3.10) 1/8 to 3/16 inch.

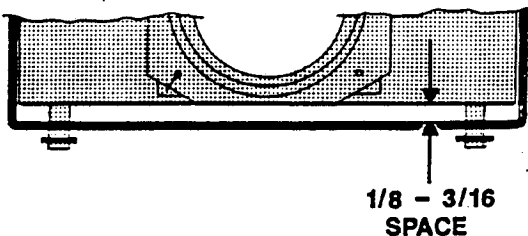


FIGURE 3.10

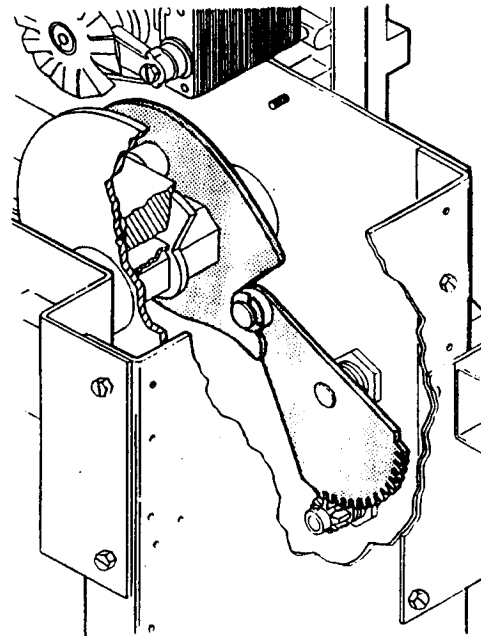
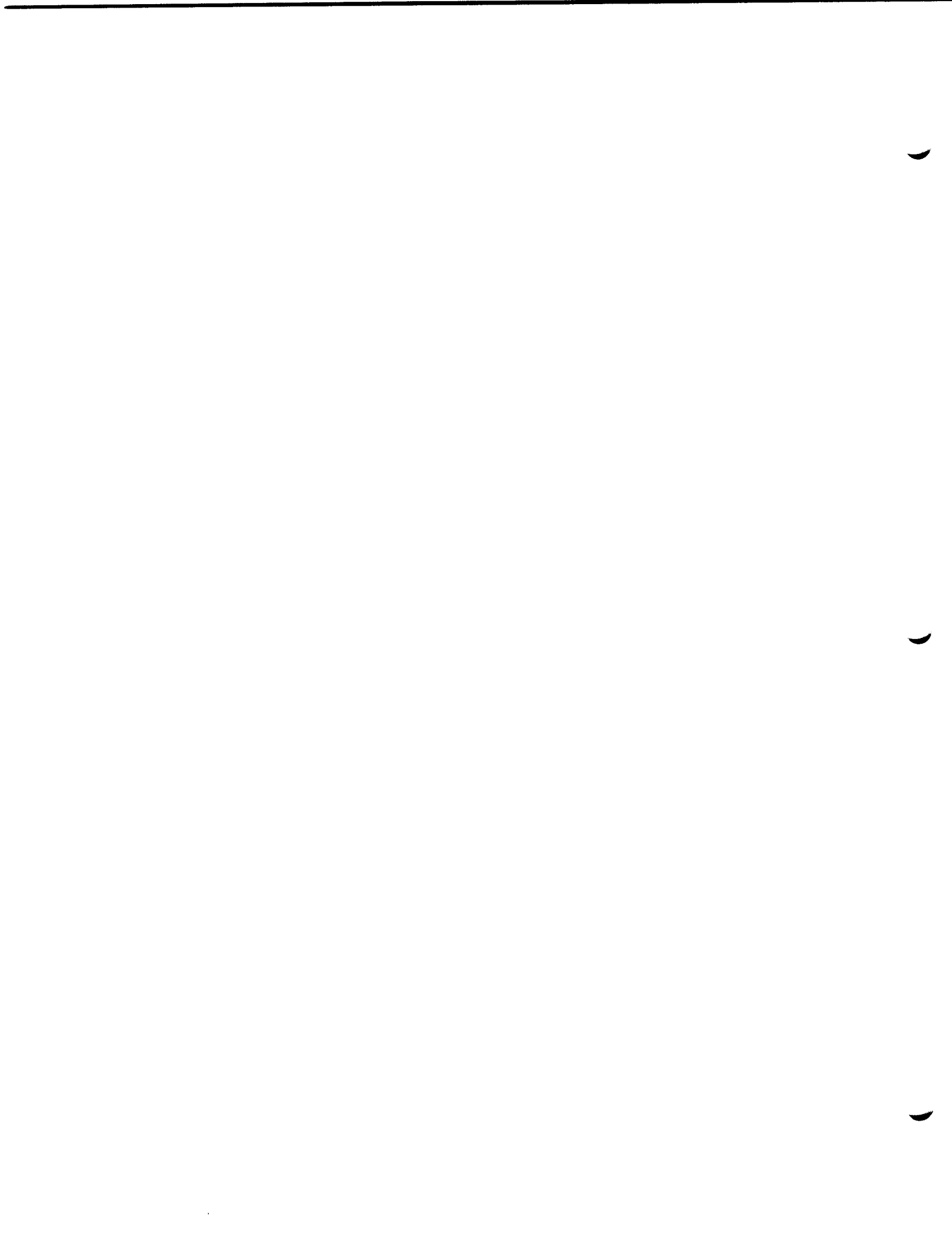


FIGURE 3.11

11. While holding the follower in the valley of the cam, (see FIGURE 3.11) install the outer section of the cable spool over the inner section. Release the follower and spool and check that the clearance set above is maintained. If so, make a new reference mark across the spool and rotate it counter-clockwise one tooth - proceed to Step 13.
12. Carefully pull the outer section of the cable spool off and rotate it one tooth clockwise to tighten the cable and replace the outer spool.
13. Restore power and cycle the brewer again, watching for the three conditions listed at the start of this procedure.
14. If the carriage is still not being drawn back far enough during the cycle, repeat Step 12.
15. After ensuring that the cable is adjusted correctly, replace the screw and washer that secure the two halves of the cable spool and cycle the brewer to the brewing position and turn off the power. Lift the brewer and turn brewer counter clockwise to its original position and replace the screws removed in Step 3 above and tighten the keyhole screws. Restore power and test vend.



WATER SYSTEM

The water system is a gravity system (thus requiring no pumps or compressors) with an open air break at the tank inlet required by most local codes. The temperature control will maintain the water temperature near the boiling point. Coffee extraction requires hot water as close to boiling as possible. The thermostatic control system has been time proven as a very dependable, yet simple control method.

WATER INTAKE SYSTEM

There are two possible configurations in the intake system. The standard method is a straight tube with a shut-off valve between the inlet fitting and the water inlet valve. The optional (and recommended) method provides for a water filter to be installed as a part of the original equipment. The filter housing includes the shut-off valve. To turn off the water at the filter, rotate the black handle counter clockwise.

The coils of the water inlet valve are activated by the float switch on the tank lid. This single top switch controls the intake of water into the water tank. This valve also functions as a safety overflow valve. If the safety overflow (bucket float) switch in the waste or used grounds bucket is open, the valve will not allow water into the water tank.

THE WATER TANK

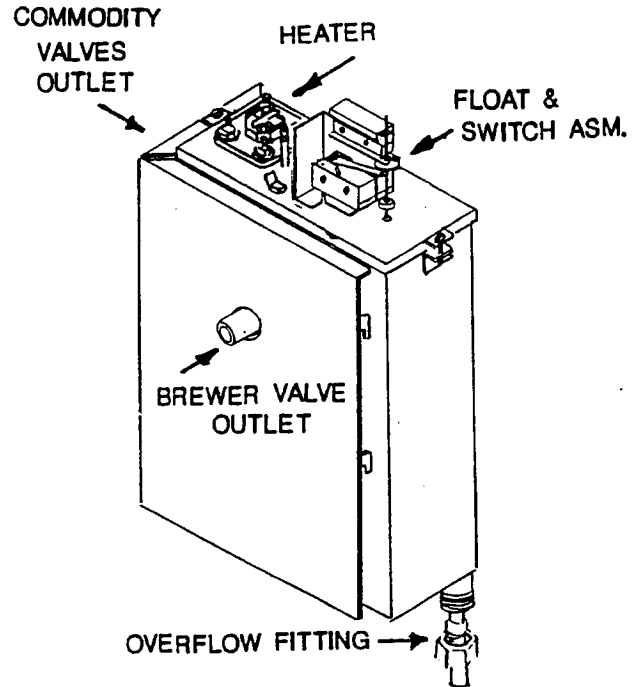
The water tank for loose ground and the freeze-dried models use the same principles of operation, the only difference being the number and position of the outlets for valves or manifolds. The water tank is constructed of stainless steel and holds approximately four gallons of water.

Both tanks have a removable lid that is sealed at the top of the tank with a gasket. Each tank has one 1500 Watt heater mounted through a hole in the tank lid, controlled by a thermostat mounted on the tank lid. The thermostatic control system consist of a thermodisc located on the lid of the tank that senses the temperature of the water via a copper sensor that extends down inside the tank. *The thermodisc for the LG water tank is rated at 195°F, while the thermodisc for the FD model is rated at 180°F.*

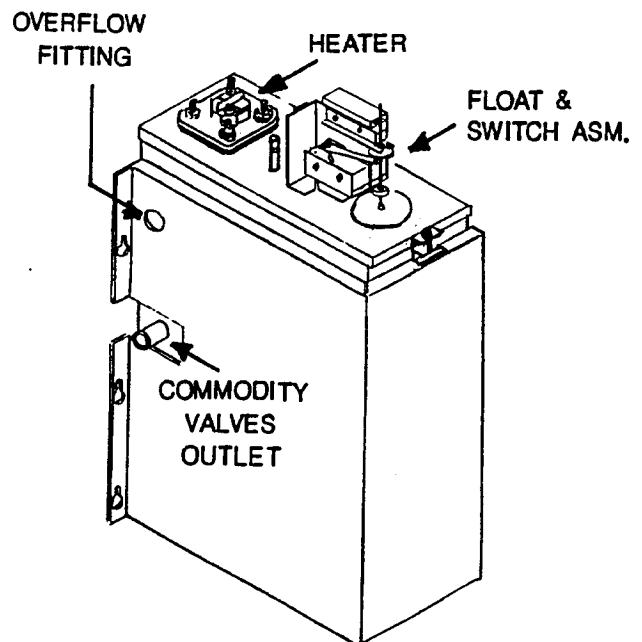
WATER DELIVERY SYSTEM

A maximum of four electrically energized valves with an easily serviceable diaphragm comprise the water delivery system. The number, position and function of the valves change dependent upon the configuration of the machine. They are: *the Coffee Brew Water Valve*, the Chocolate Water Valve, the FD Coffee/Decaf/Tea Water Valve, the Fresh Brew Tea Water Valve, and the Soup/SGC Water Valve. Each of these valves will release water into its particular segment of the commodity mixing channels, depending on the beverage selected. The arrangement of the valves are dependent upon the model and the configuration of the machine. *The standard position of valves in an LG model are a three valve manifold mounted on the left side of the heater tank and a brewed coffee valve located behind the brewer on the front face of the*

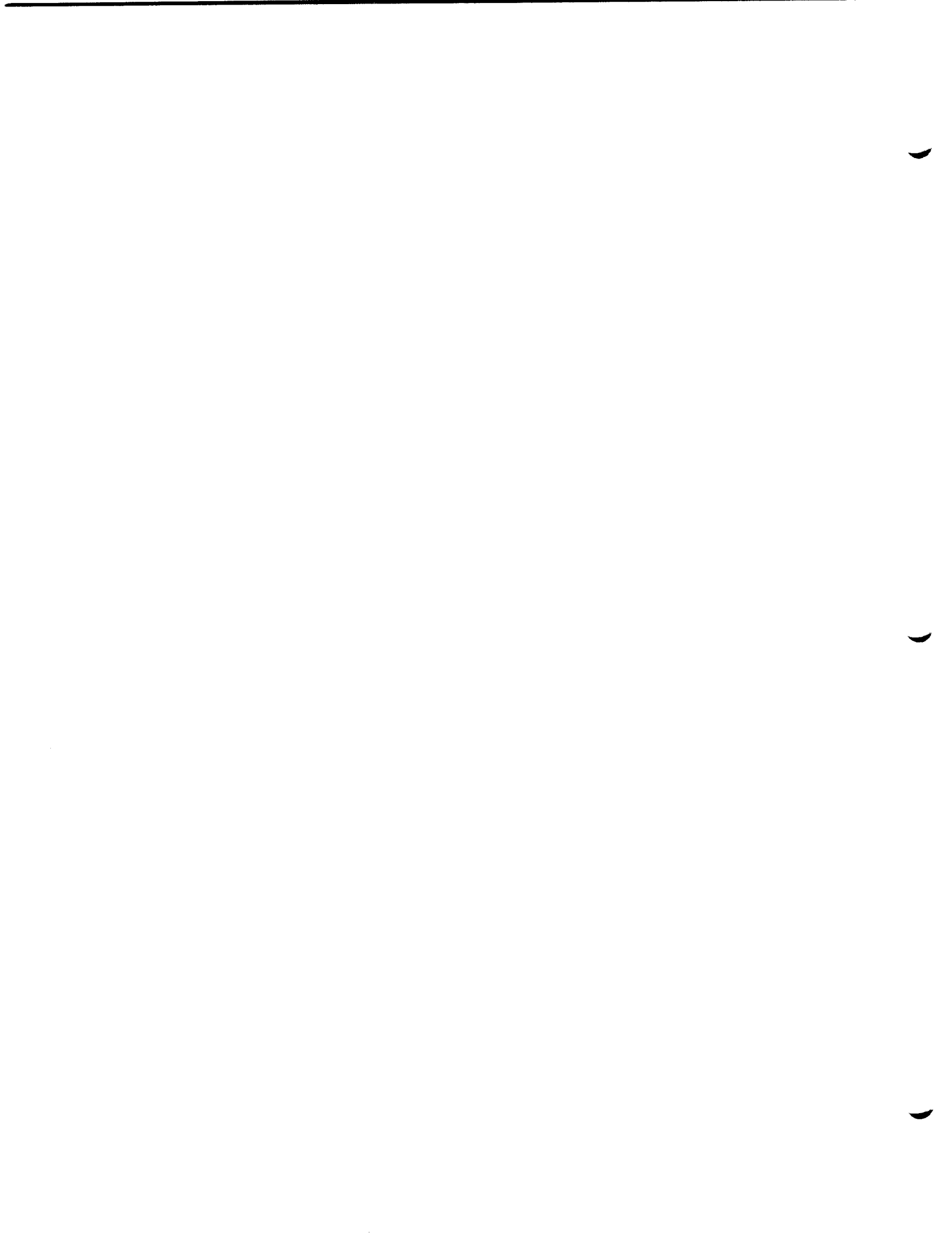
tank. The standard position of the valves in an FD model has a three valve manifold mounted on the left side of the heater tank.



FRESH BREW WATER TANK
FIGURE 3.12



FREEZE DRIED WATER TANK
FIGURE 3.13



THE COFFEE BREW WATER VALVE

This valve is mounted on the face of the water tank directly behind the brewer. The brew water valve is controlled by the right front switch on the brewer and the duration of channel 1. See Figure 1.1.

TEA, SOUP, FRESH BREW TEA AND CHOCOLATE VALVES

These valves are mounted into a manifold on the left side of the water tank. Separate valves are essential because each beverage may require a different amount of water to brew the beverage properly, and each beverage is made and released from the machine through its own channels to avoid taste contamination. Each valve is controlled by at least one separate time channel on the logic board. Each of these valves is connected to the commodity rack by a flexible silicone hose.

RINSE HOSE

A convenience feature is the rinse hose. This is provided for maintaining proper machine sanitation. It is long enough to reach each part of the machine which will normally require cleaning. To avoid any possibility of this hose leaking, a storage bracket has been provided, which holds the outlet of the hose above the normal water level in the tank. This hose also provides a means of partially draining the tank to allow for the removal of a valve for maintenance.

◆ ◆ **CAUTION - ADDITIONAL WATER MUST BE REMOVED FROM THE WATER TANK VIA THE DRAIN VALVE LOCATED ON THE BOTTOM OF THE TANK BEFORE REMOVING THE BREWER VALVE FOR SERVICE!**

OVERFLOW HOSE

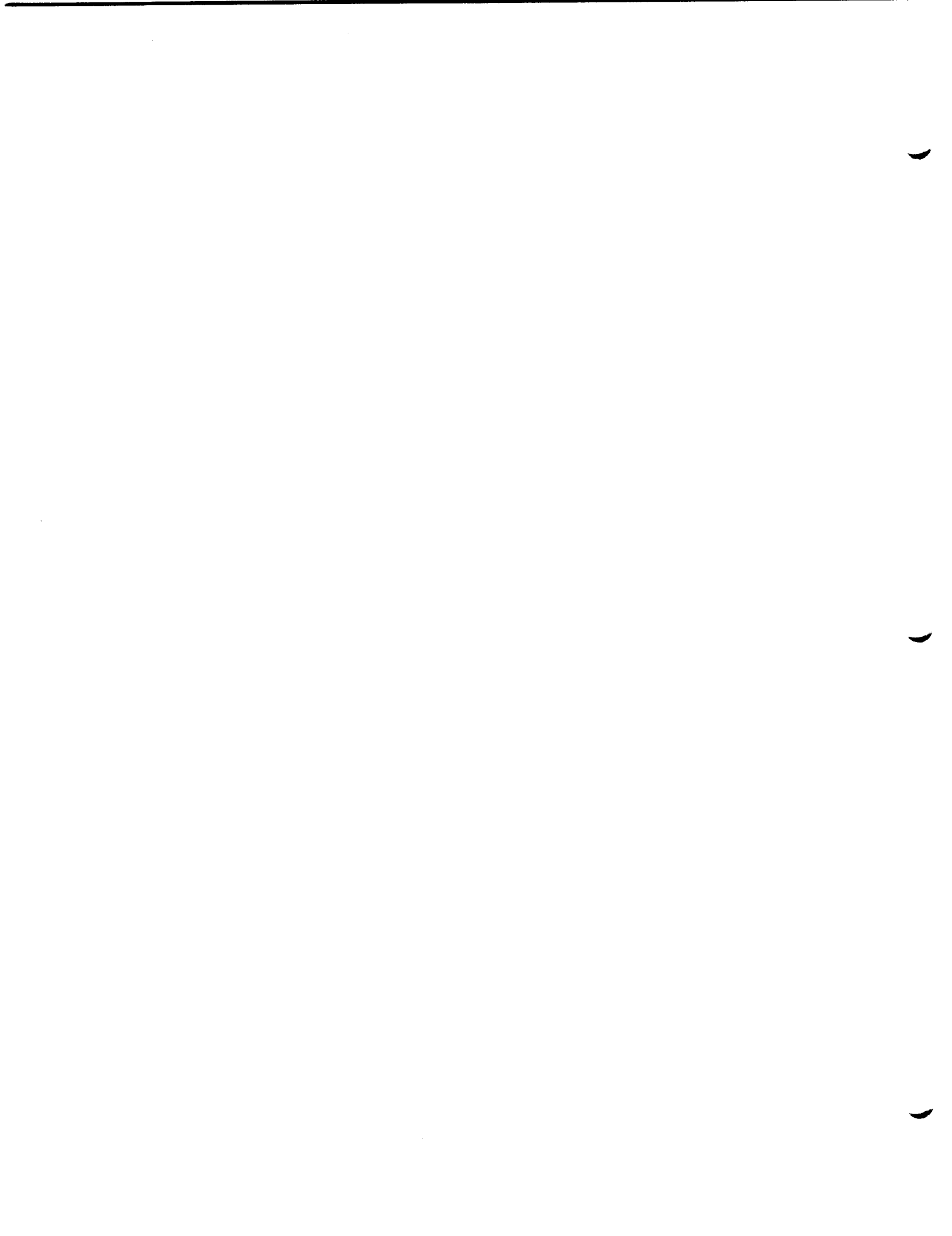
Mounted on the upper left rear side of the water tank is the overflow fitting. Should the water level in the tank rise too high, regardless of the reason, the excess will run out of the fitting, through the overflow tubing and directly to the liquid waste bucket. There should be no kinks or low spots in this hose. *In the LG model tank, the overflow function is a standpipe located in the inside of the tank. Water rising above the preset level will overflow down through the standpipe and into the waste bucket.*

OVERFLOW SAFETY

If an overflow condition continues, the level in the waste bucket will rise and eventually raise the float of the safety overflow switch and disable the Vend Enable Relay (VER), placing the machine on a "OUT OF ORDER" status. When "OUT OF ORDER", any coins inserted will be returned. All 110 volt functions from the motor control board will be disabled including the water inlet valves.

REMOVAL OF HEATER ELEMENT

In the event a heater element fails, and must be replaced, removal of the heater element is made less complicated by the addition of an access cover on the roof of the cabinet. This access cover is located in the right rear corner of the cabinet top, and is secured in place by a wingnut. Once the wingnut is loosened, the panel is pivoted clear of the opening in the top of the machine. The positioning of the opening allows the element to be removed from either a fresh brew tank or a freeze dried tank with a minimum of difficulty.



THE CANISTER RACK

The canister rack provides support for the entire dry product commodity system and is of open construction design, with a minimum of horizontal surfaces to catch dust and spillage. The motors which drive the canister augers are all located behind and under the steel cover. Each motor may be removed, if necessary, by disconnecting the wires, loosening four screws and lifting it out. Water tubes, to direct the water to the mixing channel and whipper, are stainless steel and permanently attached to ensure proper alignment.

COMMODITY SYSTEM

Containers for the dry product which the hot beverage machine dispenses are made of rugged translucent plastic. They are designed to dispense products on a first in-first out basis in order to insure fresh product at all times.

The augering system used to dispense the products runs in reinforced nylon bearings to ensure a long trouble-free life. The dispensing end of the canister have different spouts, some of which have louvers. These louvers control the accuracy of discharge so that proper mixing is assured for each drink. The translucent materials permit the service person to estimate the contents of the canister without having to open the canister. Commodity levels may be marked on the outside of the canister so that the service person can easily refill them to a pre-determined level. This type of control will reduce product waste and assure commodity freshness by the elimination of overfilling.

THE HUMIDITY BAR

The humidity bar is a vital part of the commodity system. It is electrically heated and by providing a slightly higher temperature at the canister spouts, will prevent moisture from being absorbed by the dry products in areas where high humidity is present. If the machine is operated in a humid atmosphere without the humidity bar in operation, it is likely that the dry products will cake and not dispense properly. The tabs on the humidity bar fit into their respective slots in the commodity rack between the canisters. The humidity bar plugs into a harness on the left side of the cabinet.

THE STEAM EXHAUST CONTROL SYSTEM

Steam from the hot water needed to make the beverages is controlled by this system. Uncontrolled steam in a vending machine will create severe problems through caking and hardening of the dry products. Such a condition will prevent proper dispensing. By moving low velocity air, in high volume through the areas where steam is generated, the steam is removed before it can reach the dry product dispensers. The steam laden air is moved by a squirrel cage blower, and discharges outside the machine cabinet. The steam is generated whenever the machine is activated to dispense a beverage. The hot water used to make coffee, tea or soup, passes through the main mixing channel as the dry products are dropped. Immediately

behind the mixing channel is a vacuum duct which is connected to the blower by a round plastic hose. Directly over the mixing channel is the steam deflector and commodity chute. Lightener, sugar, tea and soup products are dropped into the moving liquid in the mixing channel directly from their respective canisters. The design of this deflector is such that a constant stream of dry air is pulled down through the commodity chutes of the deflector and actually helps delivery of the product to the mixing channel. At the same time this deflector effectively prevents the steam vapor from rising in the area of the commodity canister outlets.

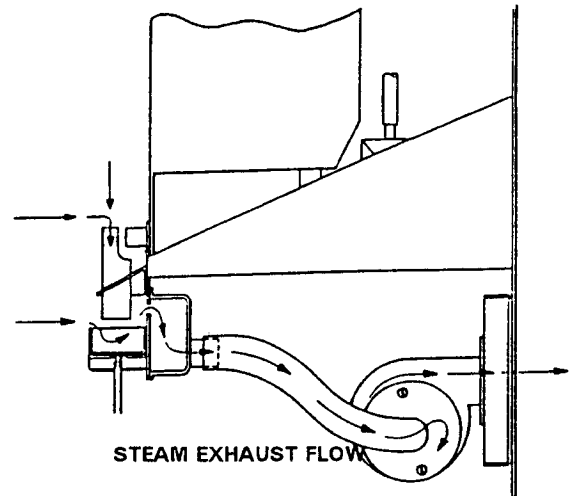


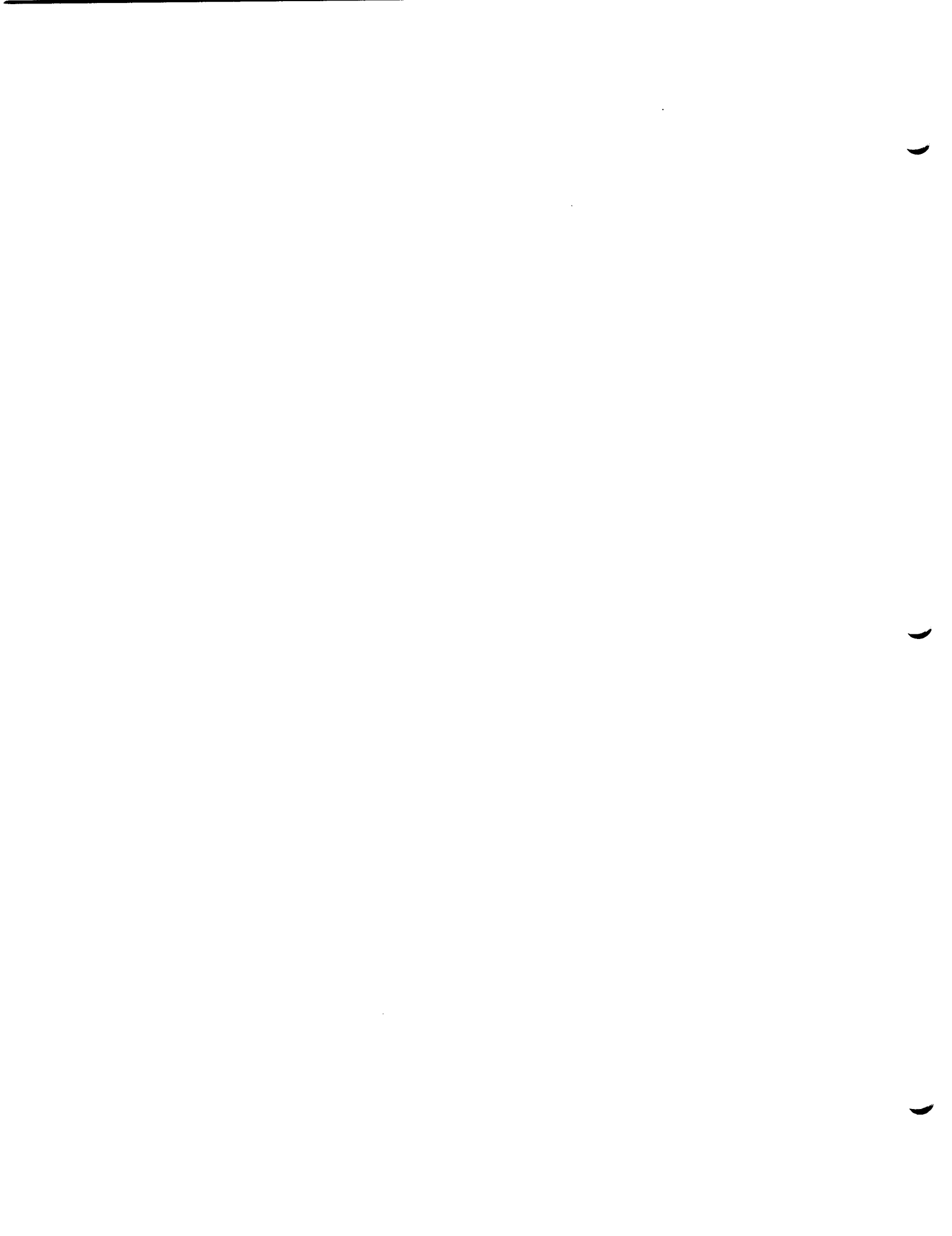
FIGURE 3.14

The components of the steam exhaust system: the mixing channel, the steam deflector, the steam duct, the hose to the blower, and the metal screen behind the exhaust fan assembly are all easily removed for cleaning. Cleaning is easily accomplished by rinsing in hot water. The mixing channel itself, which carries the beverage, should be sanitized according to the current industry practices.

REMOVAL OF STEAM EXHAUST DUCT

1. To remove the steam exhaust duct, pull the top down away from the front plate of the canister rack and lift from the bottom flange.
2. To install the steam exhaust duct, place the bottom lip of the duct on the bottom flange of the canister rack, behind the front plate.
3. Rotate the top of the exhaust duct towards the back of the front plate of the rack until it snaps securely in place.
4. Looking at the front of the rack, slide the duct left or right until the slots in the front plate properly line up with the ends of the exhaust duct.

See Figure 3.15



REMOVAL OF STEAM EXHAUST DUCT

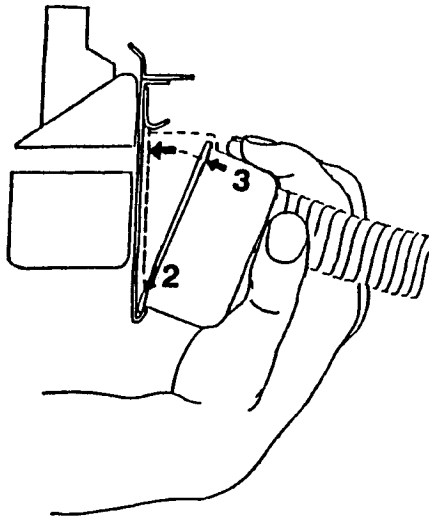


FIGURE 3.15

CHOCOLATE WHIPPER

The chocolate beverage is thoroughly mixed and made more attractive to the user by whipping it as it is delivered. There is a separate mixing system for chocolate. It does not pass through the same mixing system as coffee or other beverages. As soon as the water for chocolate is released the whipper motor, which runs at high speed, starts. The chocolate powder is dropped from its canister directly into the water in the mixing bowl and flows into the whipper chamber and then to the cup. The whipper parts are all of a food service approved plastic material, highly resistant to mechanical damage. They are easily removed, without tools, for sanitization. The assembly is held together by spring clips.

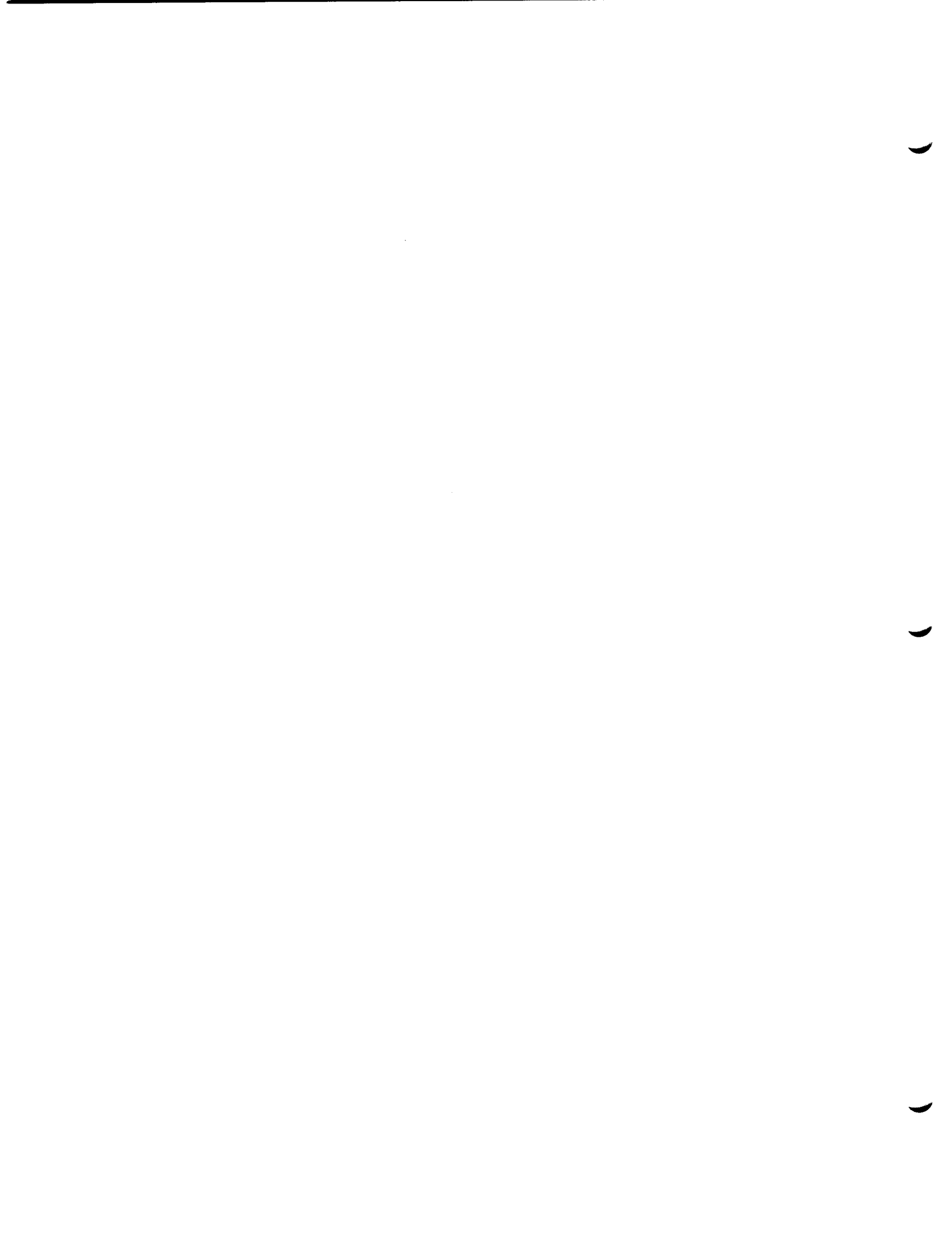
MIXING CHANNEL AND ACCESSORIES

The use of specialty products may require the use of higher speed motors and/or additional whippers. Kits exist for the installation of additional whippers under the outlet of the soup mixing bowl and the channel mixing bowl. The harness for connecting the additional whipper for the soup position is included in the machine harness. Harnesses for kits that add an additional whipper to the merchandiser are also available.

FRESH TEA BREWER

The AP 211 also has the capability to deliver a cup of fresh brewed tea. The tea brewer assembly consists of three basic parts: the canister and auger motor assembly, the tea brewer and the spent tea chute and drip tray. The entire assembly occupies the extreme right position on the canister rack. The canister and motor assembly are secured to the top of the rear shelf of the canister rack by one fixed clamp that allows for easy removal. The brewer and drip tray snap into the canister rack using the same locating tabs as a normal canister. The spent tea chute clips into the front of the brewer and guides the spent leaves to the grounds bucket for disposal. All wiring for the tea brewer is already included in the merchandiser. It consists of a 6 pin plug which is inserted in a square hole in the rear face of the canister rack, and two wires for the canister motor, which are fed up through a hole in the top shelf of the canister rack.

The tea brewer has a gravity fed, open brew chamber, similar in operation to the coffee brewer, except that no piston is used. A fresh brewed tea selection, once selected, begins with the canister motor augering a small quantity of leaf tea (approximately 2.5 grams for an 8 1/4 oz. drink) into the open brew chamber. The separate brewed tea water valve then opens and delivers the water to the brew chamber via a tube mounted on the side of the canister motor mounting bracket. Best results are achieved by reducing the flow of the water by adjusting the metering screw on the valve to stretch the water flow out over the longest time possible. This allows the water and tea to steep for as long as possible before the brewed tea liquid flows out the delivery spout and into the mixing channel where lightener and sugar can be added. The lightener and sugar are controlled by channels separate from the coffee lightener and sugar. The tea leaves are prevented from following the liquid by a fine mesh filter that also acts as the bottom of the brew chamber. After the liquid has seeped through the tea, the brewer cycle switch receives a start pulse from the solid state relay located in the master module. This starts the brewer motor and its crank arm into the dump cycle. The crank arm moves the brew chamber and carriage forward as two ears on the side of the brew chamber contact two pawls that force the brew chamber up. As the ears of the brew chamber clear the support of the pawls, the four brew chamber springs snap the brew chamber down, ejecting the spent tea into the chute which guides it to the waste bucket. The brewer then cycles home to await the next vend.



CUP DELIVERY SYSTEM

Every beverage sold through the AP 211 hot beverage merchandiser requires a clean disposable cup. Mounted on the inside of the door is the cup cabinet which is a storage area for a large number of cups and a device to separate and dispense a single cup for each cycle of the machine. Included in the throat of the cup delivery area are two switches which control the function of the cup cabinet and the machine. The switch mounted at the rear of the throat of the cup drop controls the function of the spirals in the cabinet. When this switch is clear of the top of the last 7-8 cups remaining in the cup drop ring, it will supply power to the spiral advance motor, which moves a stack of cups to refill the cup delivery position. The spiral advance motor will run only for the duration of the cup drop start pulse. The length of the cup drop start pulse is factory set a 1.8 seconds and a column of cups will require two vend to advance to the delivery position. This new stack of cups will depress the spiral advance switch and remove power from the spiral motor. The second switch, mounted so that it will activate when 3-4 cups remain in the cup drop throat, is the sold out or out of service switch and will disable the vend enable relay and light the "OUT OF ORDER" LED on the control panel.

CUP CABINET

Cups are stored in an inline flat magazine mounted on the inside of the vendor door. This magazine is completely covered to protect the cups from accidental contamination. The entire cup cabinet may be swung out for easy access to the control board, service switches and selection labels. The base of the cup cabinet holds the cup dispenser.

Cups are moved from the storage position to the dispensing mechanism (referred to as the "cup drop") as needed. When the stack of cups in the cup drop has been reduced to seven or eight cups the spiral advance switch is released which applies power to energize the cup spiral motor.

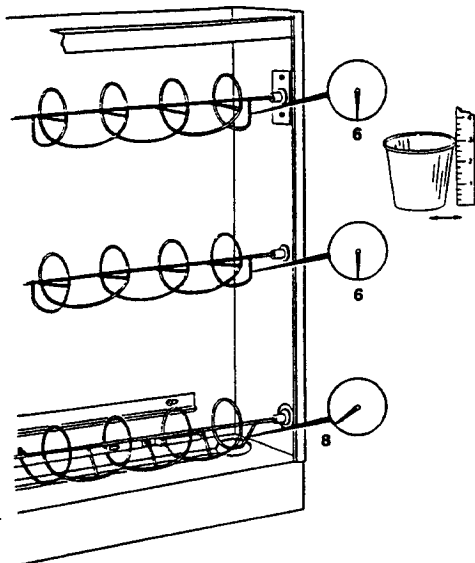


FIGURE 3.16

The cup spirals will turn simultaneously to advance the remaining stacks of cups on the base plate toward the cup drop opening.

When the stack of cups nearest the cup drop opening is advanced, it will drop into the remaining cups. The new cups will depress the spiral advance switch which removes power from the cup spiral motor. The cup spirals are designed so that a stack of standard vending cup will nestle between the turns. It is important that the spirals are properly oriented to each other so the stacks of cups will advance in a vertical position.

Figure 3.16 illustrates the relationship between the three spirals. When the spirals are correctly adjusted, the return wire at the end of the spirals will point as shown. When the upper two spirals (which should be identical) point to 6 o'clock, the bottom spiral should point to 8 o'clock. This is done because the bottom part of a cup is smaller in diameter than the top rim.

The spirals are properly set before the machine leaves the factory and should not require adjustment before being put in service. The synchronized movement of the three spirals is maintained by the toothed drive belts which connect the toothed gear on the end of each spiral rod and the cup spiral motor.

CUP DROP MECHANISM

The cup separator used in the AP 211 hot drink merchandiser is a Lisern separator. The rotary motion of the cup drop motor is converted to a push-pull motion by a crank arm which drives the lever of the cup drop ring. The cup to be dropped is separated from the rest of the cups in the stack by the cams of the cup ring. The cup is then guided to the cupwell by a delivery chute. As the cams return to the starting position the next cup in the stack is prepared to be dropped for the next cycle. When the cup mechanism is in a standby position the lever of the cup ring is pulled back against the arm of the cup motor cycle switch.

The correct stopping position of the cup drop ring is shown in Figure 3.17.

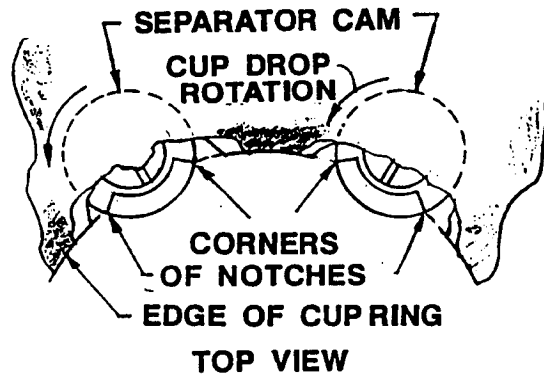
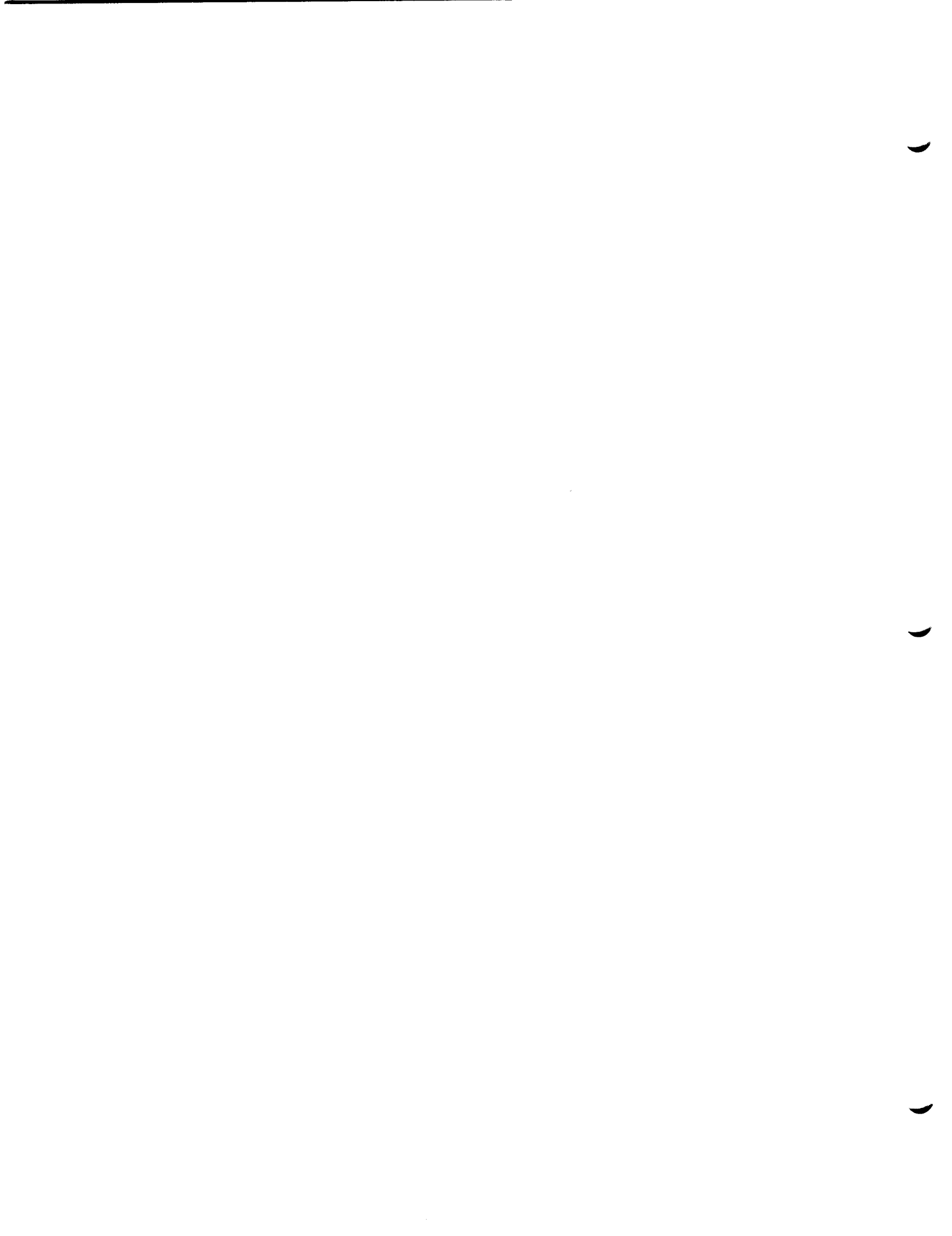


FIGURE 3.17



The leading and trailing edges of the cams should be hidden under the gray ring of the cup ring assembly. If an adjustment of the switch is necessary, slightly loosen the two mounting screws and reposition the switch until the correct stop position is achieved and then retighten the screws. However, the arm of the switch should not be bottomed against the body of the switch nor against the body of the cup ring.

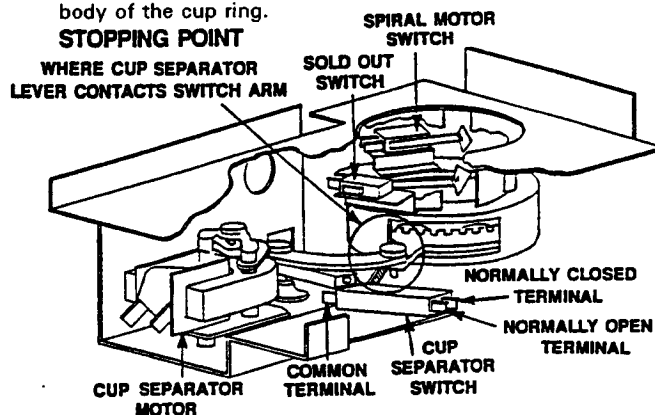


FIGURE 3.18

Starting voltage for the cup drop motor goes to the normally open (NO) contact of the cycle switch which is being held closed by the lever of the cup drop ring. This starting voltage is controlled by channel 17, button ②. The running voltage for the cup drop motor is connected to the normally closed (NC) contact of the switch. The common of the switch is connected to the cup drop motor.

The running voltage remains on the NC contact of the switch for the duration of the vend. If the cup drop lever fails to interrupt the voltage due to incorrect switch adjustment or a faulty switch, the cup drop motor will run for the entire vend cycle.

If the start voltage remains on the NO contact of the switch longer than one complete revolution of the crank arm, the motor will run a second time. The length of the start voltage is controlled by the setting of channel 17, button ② and is factory set to 1.8 seconds. This voltage also will energize the cup spiral motor if the spiral advance switch detects a low quantity of cups remaining in the throat of the cup drop. Because of the short duration of this pulse, it will typically take two vends to advance the next column of cups to the vend position.

"USE YOUR OWN CUP OPTION"

A option available in the AP 211 detects the presence of a cup or mug in the cupwell and can disable the vend if a cup is not present. If the cup sensor configuration (channel 17, button ③) is set to 0.00 then the cup delivery circuit will deliver a cup for every vend. If the cup sensor configuration (channel 17, button ③) is set to 0.1, then the vend will not commence until a cup is present in the cupwell. This cup can be placed in the cupwell by the customer or delivered by the machine.

CHANGING TO A 9 OZ CUP

If it becomes necessary to change to a 9 oz. cup the following procedure should be followed:

1. Remove the cover of the cup dispenser by lifting the cover up so the hinge pins are free of their sockets.
2. Remove all cups.
3. Remove the nuts from the right and left end of the upper support, and remove the upper support.
4. Loosen the two nuts securing the belt guard to the right side of the cup cabinet and remove the belt guard.
5. Remove the screws from the bearing plates on the top and middle spiral. Remove the drive belts between the spirals.
6. Remove the toothed gear from the right end of the center spiral shaft. Remove the right end of the middle shaft from the nyloner bearing and move the nyloner to the outer hole nearest the front of the cup cabinet. Place the spiral shaft end back into the nyloner. Replace the toothed gear on the center shaft.

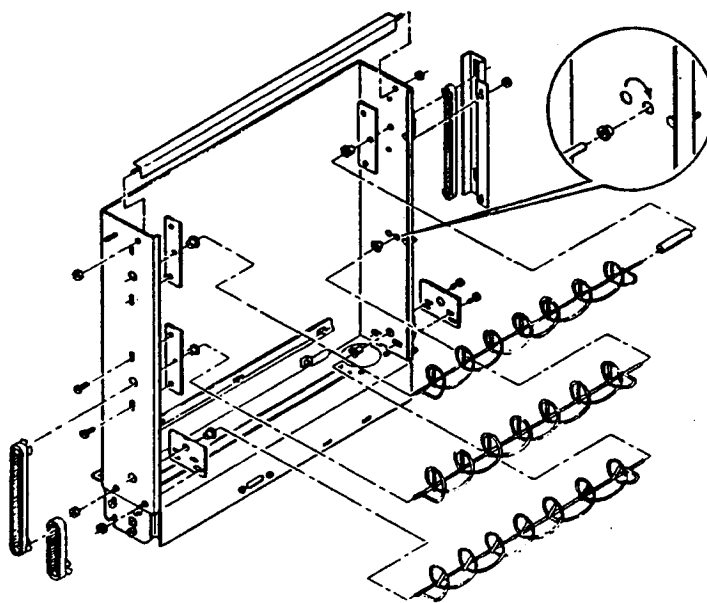


FIGURE 3.19

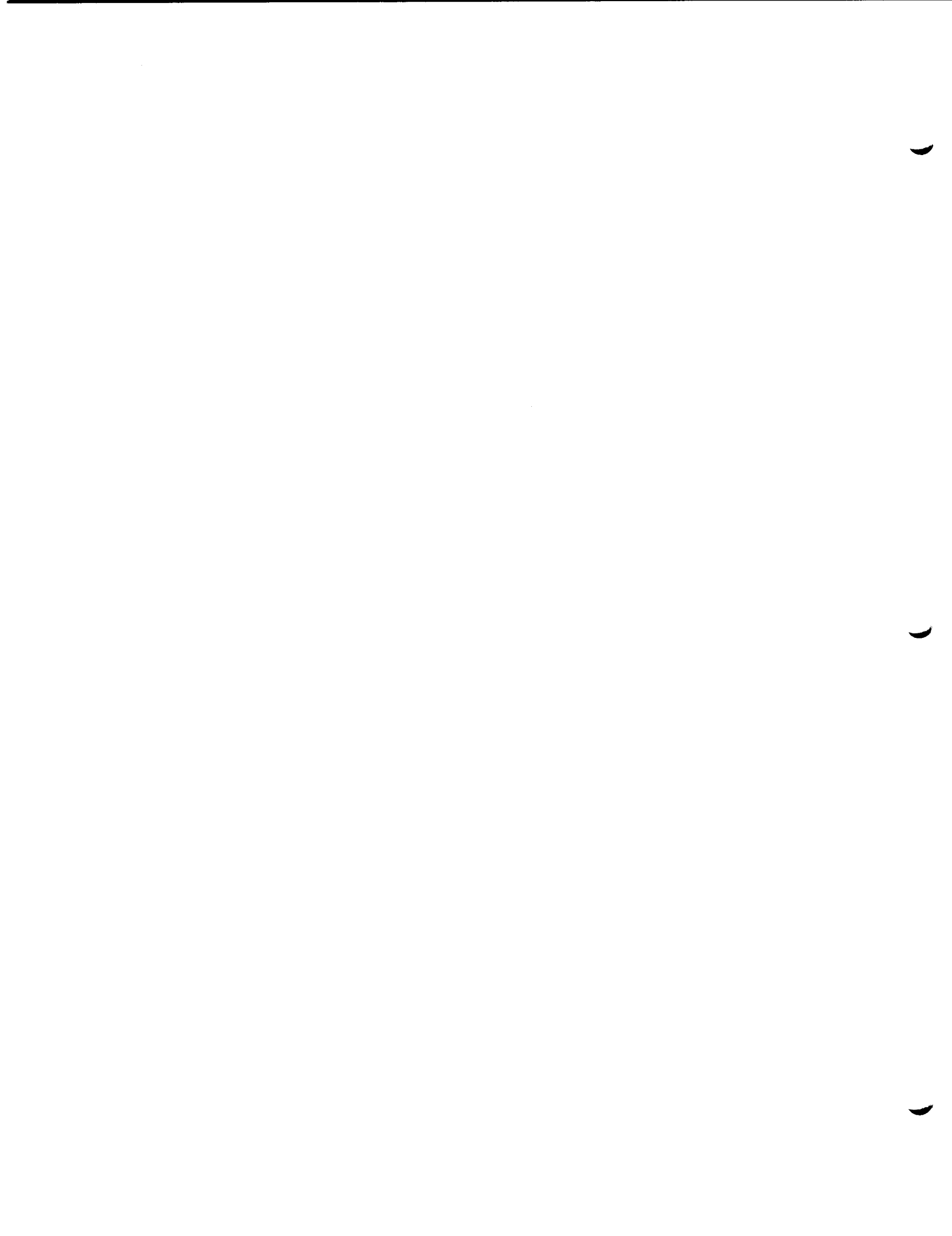
7. Remove the left end of the top shaft from the nyloner bearing and move the nyloner to the outer hole nearest the front of the cup cabinet. Place the spiral shaft end back into the nyloner.
8. Turn the two bearing plates 180 degrees so the spirals are in front of the screw holes in the bearing plates. It may be necessary to gently spread the top of the cup cabinet to gain clearance to rotate the bearing plates for the spirals. Reinstall the mounting screws in the bearing plate, leaving the plates loose enough to be adjusted.



9. Place the cup to be used in the bottom spiral and against the cup guide on the back of the cup cabinet. Check for 1/4 inch clearance between the cup and the center shaft of the bottom spiral. If clearance is correct, then proceed to the next step. If clearance is not correct then remove the two nuts on the motor end of the bottom spiral plate and the two screws on the opposite end. Gently spread the sides of the cup cabinet to gain clearance to remove the right end of the bottom shaft from the nyliner bearing and move the nyliner to the outer hole nearest the front of the cup cabinet. Place the spiral shaft end back into the nyliner. Replace and tighten the nuts and screws and adjust the position of the motor to tighten the small belt.
10. Replace and tighten the upper support.
11. Replace the drive belts. Do not tighten!
12. Turn the bottom spiral until the right hand end points to 8 o'clock as previously described.
13. Position the center spiral so the right hand end points to 6 o'clock.
14. Tighten the belt between the bottom and center spiral by lifting up on the center spiral shaft and tightening the mounting screws. Be sure the teeth of the belt and the drive gear are meshed correctly. Maintain the 6 and 8 o'clock relationship between the two spirals while tightening the mounting screws.
15. Position the top spiral so the right hand end points to 6 o'clock. Repeat the belt tightening procedure following the same precautions as above. Replace and secure the belt guard.

When changing from a 7 or 8 1/4 oz. cup to a 9 oz. cup either the cup separator itself or the worm gears inside the cup separator must be changed. Both the cup separator and the worm gears (cams) are available from the RMi Spare Parts Dept.

1. Note the position of the spiral advance and sold out switch so they can be restored to the correct position. Loosen the three large slotted screws that secure the grey cup ring to the base of the cup cabinet. As the screws are loosened the nuts holding the cup ring in place, the nuts will fall out of the hex shaped recesses inside the cup ring.
2. Carefully disengage the lever of the cup drop ring from the crank arm of the cup drop motor and remove the grey ring.
3. Replace the cup ring or the internal cams of the cup ring and install the three kep nuts into the hex recesses in the cup ring with the star washer down. Tighten the screws. Make sure that:
 - a) the sold out and spiral advance switches are correctly positioned.
 - b) the white lever of the cup ring has the pin of the cup motor crank arm inserted in the hole of the lever.
 - c) the arm of the cup motor cycle switch is behind the white lever of the cup ring.
 - d) the stopping position of the cup ring is adjusted correctly - see Figure 3.17

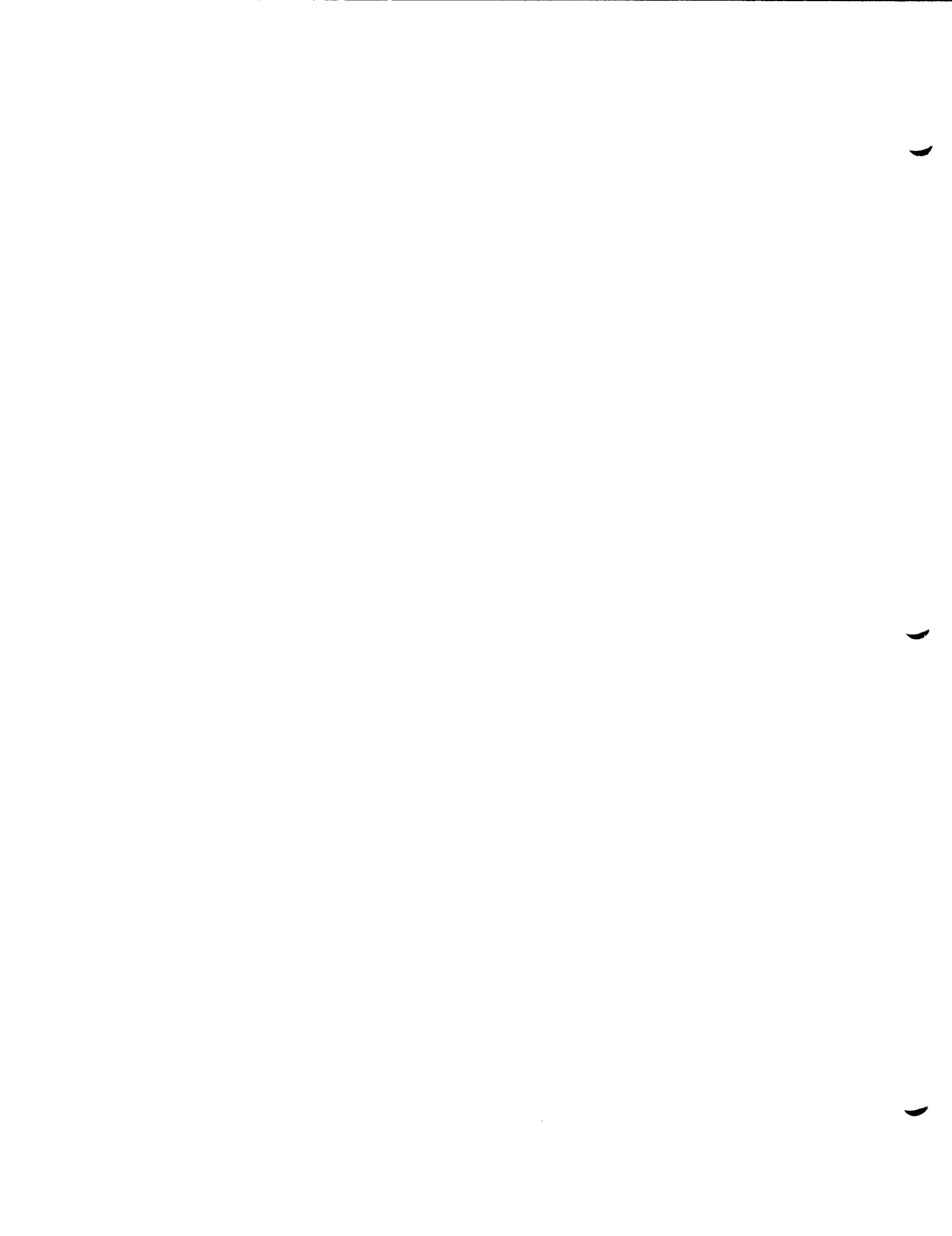


211 TROUBLESHOOTING CHART

PROBLEM	POSSIBLE CAUSE	REMEDY
No power-complete machine including fluorescent light and service outlet	Power cord unplugged	Plug in power cord
	Loose or broken wire in power cord	Repair or replace
	Bad connections in power cord to EMI filter and switch panel	Check all terminals
	No voltage from wall outlet	Check outlet and supply circuit breaker
	On/off switch or wiring defective or open	Repair or replace
Machine will not vend or accept money	Circuit breaker(s) tripped	Reset or replace
	Power transformer disconnected or defective	Repair or replace Check logic board L1-1&2,L1-3&5
	Incorrect coin mechanism installed	Check page 2.02 for list of correct coin mechanisms
	Defective coin mechanism	Replace or disconnect and test machine button ④
	Check cup sensor operation	Set channel 17, button ⑤ to 0.0 and test again
Excessive amount of liquid in overflow bucket	Water present (float) switch defective or out of adjustment	Adjust or replace switch
	Float waterlogged	Replace float
	Commodity water valve leaking	Repair or replace
	Water inlet valve leaking	Repair or replace-check supply line for high pressure. Install pressure regulator to correct.
Lightener and/or sugar not selected but appearing in drink	Clogged exhaust system	Check steam exhaust (duct,hose,fan and humidity bar)-clean as needed
	Exhaust motor not running	Service or replace
	Scratched or defective trough causing poor wash	Replace
	Mixed products in canisters	Dump products and replace
Wet grounds dispensed from brewer	Clogged brew filter	Replace
	Clogged filter support screen	Clean or replace
	Scored or cracked brew cylinder	Replace
	Worn or defective piston or seal	Replace
	Check gram throw	Using gram scale, adjust correct channels
	Soft water or coffee gases causing excessive pressure in brewer	Reduce brew water and install add water kit to reduce excessive pressure

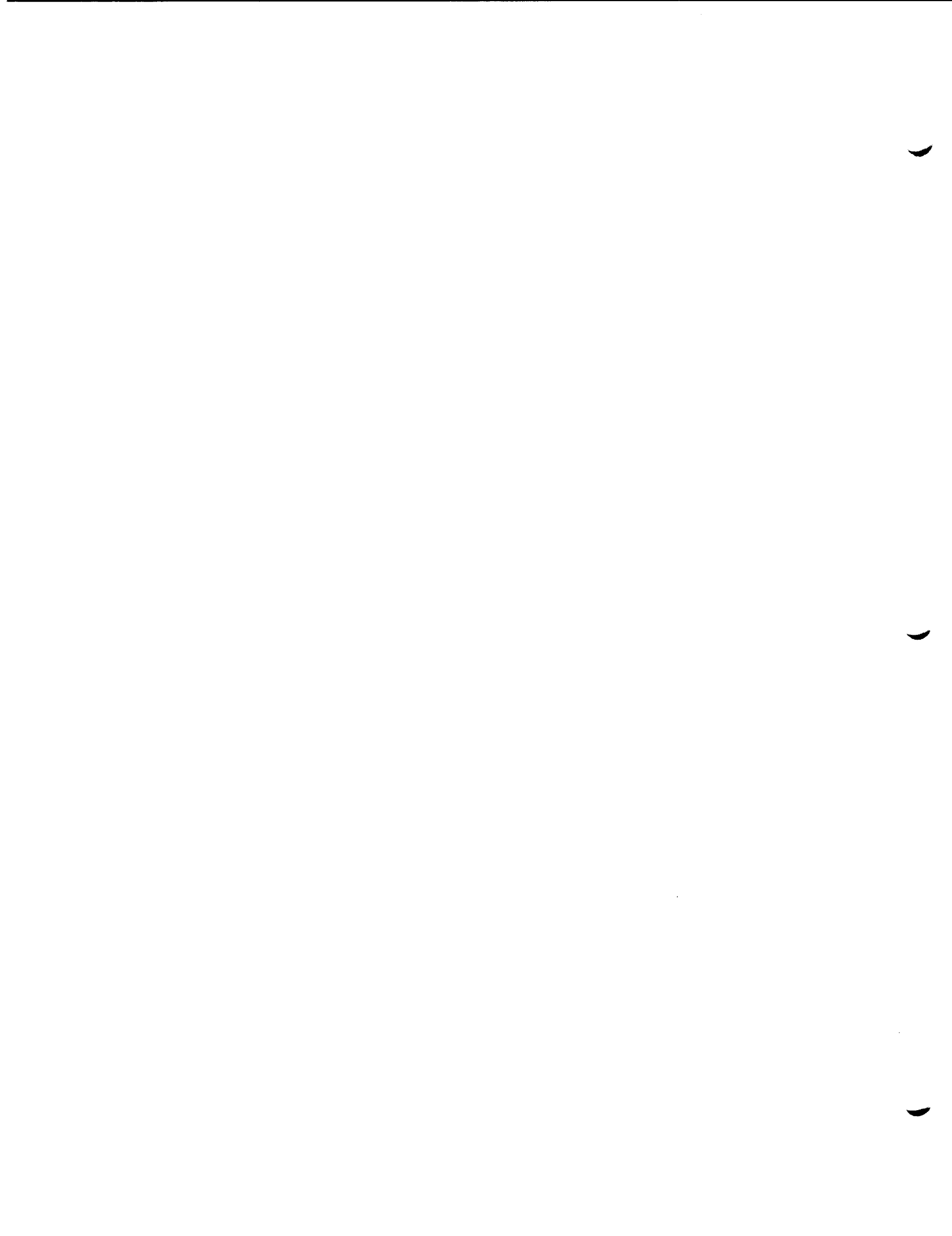


211 TROUBLESHOOTING CHART		
PROBLEM	POSSIBLE CAUSE	REMEDY
Weak and/or cold coffee	Check gram throws	Using gram scale, adjust correct channels
	Brew water valve leaking	Repair or replace valve
	Defective thermostat	Replace
	Defective heater	Replace
	Incorrect alignment of brew chamber and filter	Adjust stop position of brewer-check brewer motor brake arm for coasting
Cup occasionally not full (Short cup)	Excessive coffee in brew chamber	Using gram scale, adjust correct channels
	Float rod sticking or bent	Straighten or replace
	Water inlet switch sticking or defective	Replace
	Float rod access cover loose	Secure in proper position
	Water valves opening late due to mechanical defect or low voltage	Repair or replace valve Correct low voltage problem
	Brewer cable not adjusted properly causing brewer leak	Adjust cable
	Brewer stop position incorrect trapping grounds on seal or between chamber and filter	Adjust rear brewer cam or switch for correct stop position
	Check brew chamber seal for excessive grounds	Check for proper alignment of coffee delivery chute
	Clogged water filter	Replace
	Low water supply or damaged supply line	Change water supply or replace water supply line
	Incorrect cylinder and carriage alignment	Check brewer cable adjustment
Grounds in cup	Brewer dumping wet grounds	See wet grounds section
	Torn or ripped brew filter	Replace
	Missing funnel cover	Replace
Water only-No coffee	Carriage wiper binding on filter	Confirm that brew filter is seated correctly Clean brew base assembly
	Warped brew filter	Replace
	Bent filter support screen	Replace
	LG canister tunneling	Agitator defective or jammed Auger inoperative
	Faulty interlock switch or assembly	Adjust or replace
	No coffee in canister	Service
	Check channels in set up mode for correct times	See timing chart

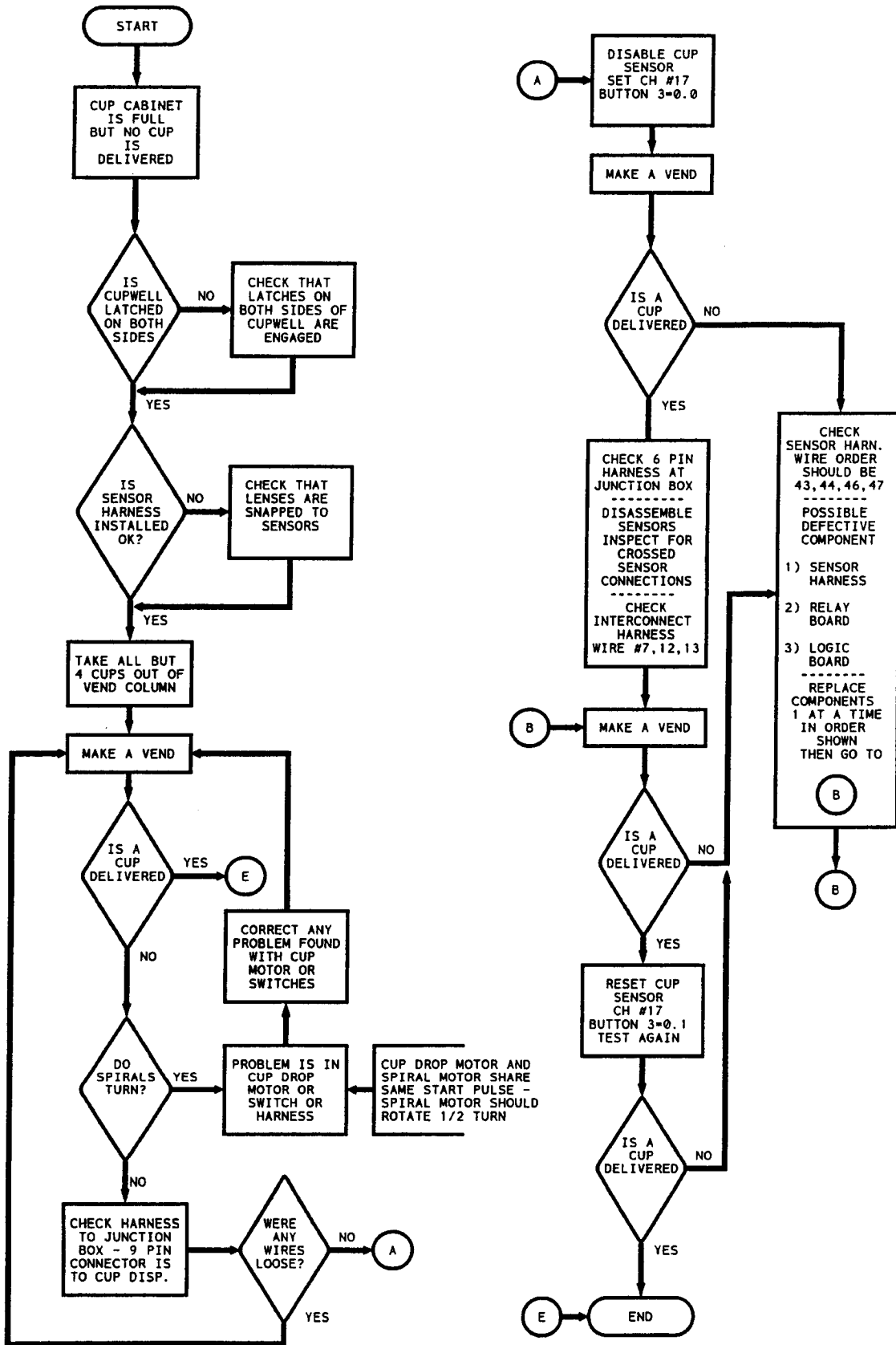


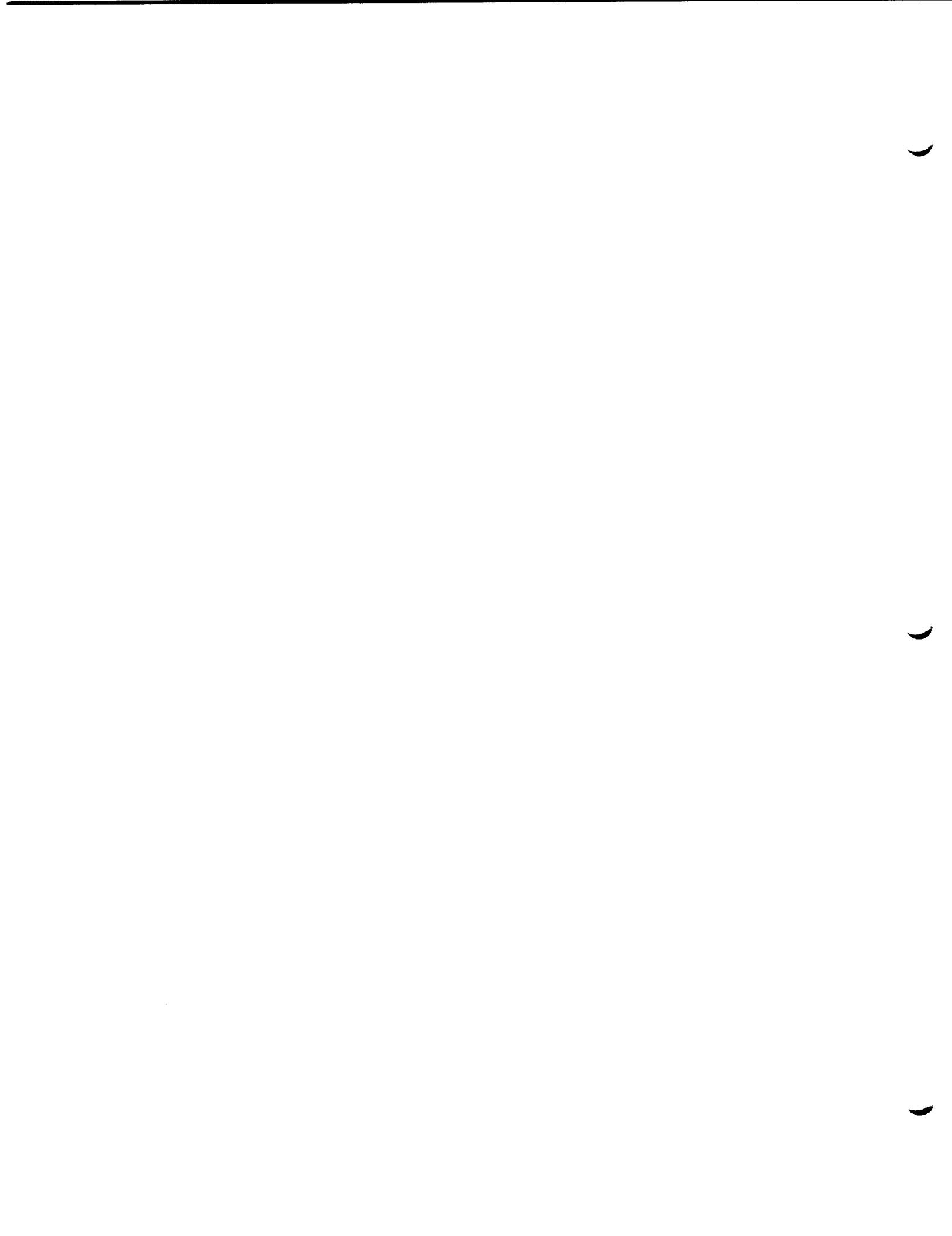
211 TROUBLESHOOTING CHART

PROBLEM	POSSIBLE CAUSE	REMEDY
Water in grounds bucket	Brew water valve leaking	Repair or replace valve
	Defective piston seal (wet grounds)	Replace
	Incorrect cylinder and carriage alignment	Check brewer cable adjustment
Brewer leaking	Refer to brewer section in service manual	Soft water or coffee gases causing stalling or excessive pressure
	Excessive amount of coffee grounds on brew base assembly	Clean or service
	Cracked or damaged brew cylinder	Replace
	Special washers missing from between brew cylinder and cylinder rods	Replace
	Worn or damaged brew chamber seal	Replace
	Cracked or damaged brew chamber	Replace
	Worn filter or seal	Replace
	Cracked or damaged brew carriage	Replace
	Brew filter support bracket broken	Replace
	Improper brew cable adjustment	Adjust
	Funnel support brace bowed	Replace brew base frame
	Worn or broken delivery funnel	Replace
	Brew base assembly - parts worn or broken (springs, pawls, etc)	Replace parts
	Bent carriage or filter rods	Replace or straighten
No cups	Cups jammed together in cup cabinet	Adjust or replace spiral advance switch
	Wrong type cups or cup ring	Replace cups or cup ring
	Defective cup drop motor	Replace
	USE YOUR OWN CUP option not working	Cupwell not aligned correctly
		Sensors blocked or dirty
		Sensors or board malfunctioning
		Cup sensor configuration set wrong set channel 17 button ③ to 0.0 to disable cup sensor
		See Cup Problem Flowchart, page 3.17
	See Service Section, page 3.12	
Multiple or intermittent cups	Cup motor cycle switch out of adjustment, broken or defective	Adjust or replace
	Cup motor brake arm sticking on causing motor to coast	Check for rubber tip on brake arm-repair or replace
	Cup drop motor start pulse too long	Check channel 17 button ② for correct duration = 1.8 seconds
	Cup motor cycle switch wiring reversed	Correct wiring



CUP PROBLEM FLOWCHART





AP 211 PIN OUTS

RELAY BOARD PIN CONNECTIONS

R1 MAIN CONTROLLER INTERFACE

R1-1 Data
 R1-2 Clock
 R1-3 Latch
 R1-4 Output enable
 R1-5 Diagnostic out of service
 R1-6 Free vend output
 R1-7 Cup sense
 R1-8 Key - no connection
 R1-9 dc Common
 R1-10 +12Vdc
 R1-11 +5Vdc
 R1-12 2Khz cup sense
 R1-13 Cup present indicator

R2 CUP SENSE AND EXECUTIVE KEY

R2-1
 R2-2 Cup sensor led +
 R2-3 Cup sensor led -
 R2-4
 R2-5 Cup sensor detector
 R2-6 Cup sensor detector
 R2-7
 R2-8 Vend enable +
 R2-9 Free vend (executive key) +
 R2-10 Vend enable and free vend return

R3 VEND OUTPUTS

	CONTROLLED BY CHANNEL #
R3-1 110Vac to brewer	1
R3-2 110Vac to coffee auger	2
R3-3 110Vac to lightener motor	3,13
R3-4 110Vac to sugar motor	4,15
R3-5 Key - no connection	
R3-6 110Vac to soup water & whipper	8
R3-7 110Vac to soup auger	7
R3-8 110Vac to tea water	6
R3-9 110Vac to tea auger	5
R3-10 110Vac constant in (After bucket switches)	
R3-11 110Vac to chocolate auger	9
R3-12 110Vac to choc water and whipper	10
R3-13 110Vac to cup drop motor start	17

LOGIC BOARD PIN CONNECTIONS

L1-POWER SUPPLY

L1-1 12Vac hot
 L1-2 12Vac neutral
 L1-3 24Vac hot
 L1-4 Key - no connection
 L1-5 24Vac neutral

L2 - DC OUTPUTS - ALL 24Vdc

L2-1-3 No connection
 L2-4 24Vdc to solid state relay - FB tea
 L2-5 Free vend cash meter +dc
 L2-6 Vend counter +dc
 L2-7 Cash meter +dc
 L2-8 Common -dc
 L2-9 Key - no connection
 L2-10 24Vdc to solid state relay - FB tea
 L2-11 No connection

L3 MAIN CONTROLLER INTERFACE

L3-1 Data
 L3-2 Clock
 L3-3 Latch
 L3-4 Output enable
 L3-5 Diagnostic out of service
 L3-6 Free vend output
 L3-7 Cup sense
 L3-8 Key - no connection
 L3-9 dc Common
 L3-10 +12Vdc
 L3-11 +5Vdc
 L3-12 2Khz cup sense
 L3-13 Cup present indicator

L4 - COIN MECHANISM

L4-1 To coin mech socket pin 3	Send line
L4-2 To coin mech socket pin 6	Accept enable
L4-3 To coin mech socket pin 7	.05 dispense line
L4-4 To coin mech socket pin 8	.10 dispense line
L4-5 To coin mech socket pin 9	.25 dispense line
L4-6 To coin mech socket pin 11	Reset
L4-7 To coin mech socket pin 1	5Vdc hot
L4-8 To coin mech socket pin 4	Interrupt line
L4-9 To coin mech socket pin 5	Data line
L4-10 To coin mech socket pin 2&13	dc ground
L4-11 Key - no connection	
L4-12 To coin mech socket pin 15	24Vdc hot

L5 \$ VALIDATOR

L5-1 Credit input
 L5-2 Enable
 L5-3 Key
 L5-4 Escrow
 L5-5 Credit neutral
 L5-6 Ground

L7 KEYPAD SELECTION PANEL

Pin 8 is common for all combinations-each selection is a combination of pin 8 plus two other pins

A 8+5+7
 B 8+4+7
 C 8+3+7
 D 8+1+7
 1 8+4+5
 2 8+1+2
 3 8+3+4
 4 8+2+4
 5 8+2+3
 6 8+1+4
 * 8+1+3
 # 8+1+5

POWER BOARD CONNECTIONS

USED ONLY WITH 110V COIN MECH AND/OR VALIDATOR

P1-1 110V ac neutral in
 P1-2 Key - no connection
 P1-3 110V ac hot in

 P2-1 110V dc ground to coin mech socket pin 10
 P2-2 110V dc hot to coin mech socket pin 12
 P2-3 Key - no connection
 P2-4 No connection

 P3-1 110V ac neutral to validator pin 6
 P3-2 Key - no connection
 P3-3 110V ac hot to validator pin 4

