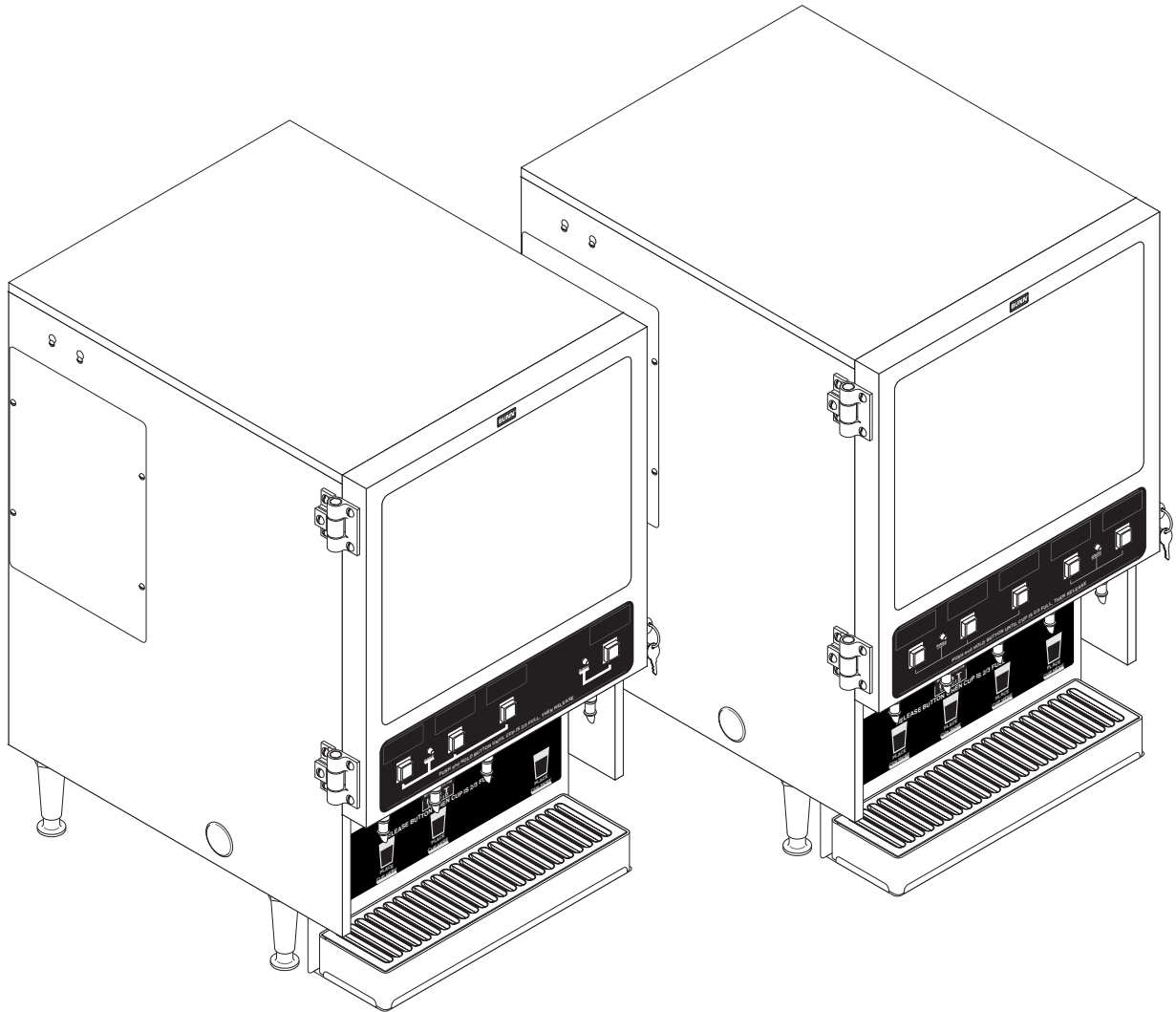


BUNN®

FMD-4

FMD-5



OPERATING & SERVICE MANUAL

BUNN-O-MATIC CORPORATION

POST OFFICE BOX 3227

SPRINGFIELD, ILLINOIS 62708-3227

PHONE: (217) 529-6601 FAX: (217) 529-6644

INTRODUCTION

This equipment dispenses hot beverages or soups on demand from powdered product. It is for indoor use only on a sturdy counter or shelf.

BUNN-O-MATIC COMMERCIAL PRODUCT WARRANTY

Bunn-O-Matic Corp. ("BUNN") warrants equipment manufactured by it as follows:

- 1) All equipment other than as specified below: 2 years parts and 1 year labor.
- 2) Electronic circuit and/or control boards: parts and labor for 3 years.
- 3) Compressors on refrigeration equipment: 5 years parts and 1 year labor.
- 4) Grinding burrs on coffee grinding equipment to grind coffee to meet original factory screen sieve analysis: parts and labor for 3 years or 30,000 pounds of coffee, whichever comes first.

These warranty periods run from the date of installation BUNN warrants that the equipment manufactured by it will be commercially free of defects in material and workmanship existing at the time of manufacture and appearing within the applicable warranty period. This warranty does not apply to any equipment, component or part that was not manufactured by BUNN or that, in BUNN's judgment, has been affected by misuse, neglect, alteration, improper installation or operation, improper maintenance or repair, damage or casualty. This warranty is conditioned on the Buyer 1) giving BUNN prompt notice of any claim to be made under this warranty by telephone at (217) 529-6601 or by writing to Post Office Box 3227, Springfield, Illinois 62708-3227; 2) if requested by BUNN, shipping the defective equipment prepaid to an authorized BUNN service location; and 3) receiving prior authorization from BUNN that the defective equipment is under warranty.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ANY OTHER WARRANTY, WRITTEN OR ORAL, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF EITHER MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The agents, dealers or employees of BUNN are not authorized to make modifications to this warranty or to make additional warranties that are binding on BUNN. Accordingly, statements by such individuals, whether oral or written, do not constitute warranties and should not be relied upon.

If BUNN determines in its sole discretion that the equipment does not conform to the warranty, BUNN, at its exclusive option while the equipment is under warranty, shall either 1) provide at no charge replacement parts and/or labor (during the applicable parts and labor warranty periods specified above) to repair the defective components, provided that this repair is done by a BUNN Authorized Service Representative; or 2) shall replace the equipment or refund the purchase price for the equipment.

THE BUYER'S REMEDY AGAINST BUNN FOR THE BREACH OF ANY OBLIGATION ARISING OUT OF THE SALE OF THIS EQUIPMENT, WHETHER DERIVED FROM WARRANTY OR OTHERWISE, SHALL BE LIMITED, AT BUNN'S SOLE OPTION AS SPECIFIED HEREIN, TO REPAIR, REPLACEMENT OR REFUND.

In no event shall BUNN be liable for any other damage or loss, including, but not limited to, lost profits, lost sales, loss of use of equipment, claims of Buyer's customers, cost of capital, cost of down time, cost of substitute equipment, facilities or services, or any other special, incidental or consequential damages.

USER NOTICES

Carefully read and follow all notices on the equipment and in this manual. They were written for your protection. All notices are to be kept in good condition. Replace any unreadable or damaged labels.



FMD-4 28328.0008

FMD-5 28328.0009

USER NOTICES (Cont.)

⚠WARNING

- ◆ Fill water tank before turning -on thermostat or connecting appliance to power source.
- ◆ Use only on a properly protected circuit capable of the rated load.
- ◆ Electrically ground the chassis.
- ◆ Follow national/local electrical codes.
- ◆ Do not use near combustibles.

FAILURE TO COMPLY RISKS EQUIPMENT DAMAGE, FIRE, OR SHOCK HAZARD

READ THE ENTIRE OPERATING MANUAL BEFORE BUYING OR USING THIS PRODUCT

THIS APPLIANCE IS HEATED WHENEVER CONNECTED TO A POWER SOURCE

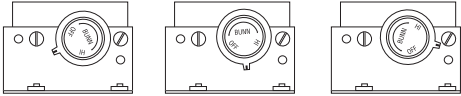
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00831.0000

This equipment must be installed to comply with the Basic Plumbing Code of the Building Officials and Code Administrators International, Inc. (BOCA) and the Food Service Sanitation Manual of the Food and Drug Administration (FDA). For models installed outside the U.S.A., comply with the applicable Plumbing /SanitationCode.

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CONTROL THERMOSTAT ADJUSTMENT



200° F

190° F

180° F

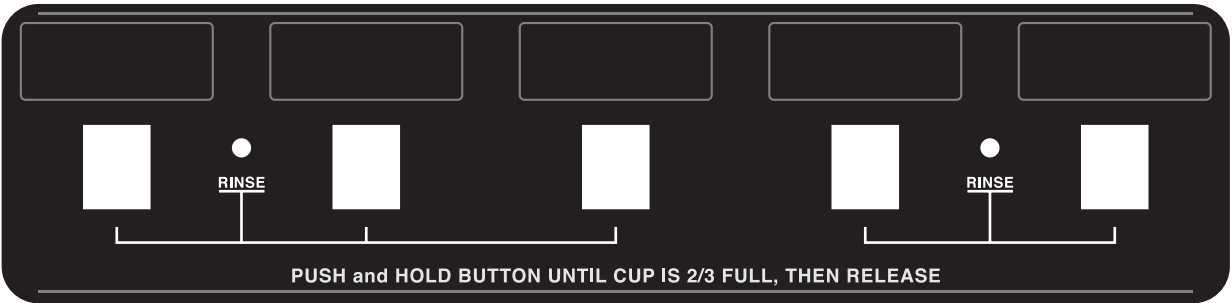
APPROXIMATE THERMOSTAT TEMPERATURE SETTINGS

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INITIAL SET-UP

1. Locate the drip tray assembly inside the dispenser door.
2. Remove the drip tray and the drip tray cover and set them aside.

ELECTRICAL REQUIREMENTS

CAUTION - The dispenser must be disconnected from the power source until specified in *Initial Set-Up*.

The 120 volt version of this dispenser has an attached cordset and requires 2-wire, grounded service rated 120 volts ac, 15 amp, single phase, 60 Hz. The mating connector must be a NEMA 5-15R.

The 120/208 and the 120/240 versions of this dispenser has an attached cordset. The mating connector must be a NEMA 14-20R.

(Refer to the dispenser's dataplate for exact voltage requirement.)

ELECTRICAL HOOK-UP

CAUTION – Improper electrical installation will damage electronic components.

1. An electrician must provide electrical service as specified.
2. Using a voltmeter, check the voltage and color coding of each conductor at the electrical source.
3. Open the front door of the dispenser and place the heater switch in the "OFF" (upper position).
4. Connect the dispenser to the power source.
5. If plumbing is to be hooked-up later be sure the dispenser is disconnected from the power source. If plumbing has been hooked-up, the dispenser is ready for *Initial Fill & Heat*.

PLUMBING REQUIREMENTS

This dispenser must be connected to a cold water system with operating pressure between 20 and 100 psi (138 and 690 kPa). This water source must be capable of producing a minimum flow rate of 4.5 fluid ounces (133.1 ml) per second. A shut-off valve should be installed in the line before the dispenser. Install a regulator in the line when pressure is greater than 100 psi (690 kPa) to reduce it to 50 psi (345 kPa). The water inlet fitting is $\frac{3}{8}$ " flare.

NOTE - At least 18 inches of an FDA approved flexible beverage tubing, such as reinforced braided polyethylene or silicone, before the dispenser will facilitate movement to clean the countertop. Bunn-O-Matic does not recommend the use of a saddle valve to install the dispenser. The size and shape of the hole made in the supply line by this type of device may restrict water flow.

This equipment must be installed to comply with the Basic Plumbing Code of the Building Officials and Code Administrators International, Inc. (BOCA) and the Food Service Sanitation Manual of the Food and Drug Administration (FDA). For models installed outside the U.S.A., you must comply to the applicable Plumbing/Sanitation Code for your area.

PLUMBING HOOK-UP

1. Flush the water line and securely attach it to the flare fitting on the bottom of the dispenser.
2. Turn-on the water supply.

INITIAL FILL & HEAT

CAUTION - The dispenser must be disconnected from the power source throughout the initial set-up, except when specified in the instructions.

1. Turn-on the water supply and connect the dispenser to the power source.
2. Water will automatically flow into the tank to the proper level and then shut-off. This will take less than five minutes.
3. When the tank is full of water, open the front door and place the heater switch in the "ON" (lower) position. A tank full of cold water will take approximately eighty minutes for the water to heat on 120 volt versions or forty minutes for 120/208 volt versions and 120/240 volt versions.

During this waiting period, complete these dispenser set-up steps:

- a. Place the drip tray in front of the dispenser. Set the drip tray cover in place.
- b. Place a set of keyholes in the cup locator plate over the screws beneath the hopper access door and push down gently.
- c. Fill the hoppers with the dry product to be dispensed.

LIQUID LEVEL CONTROL

The system automatically maintains the hot water tank's level by energizing the refill solenoid when the water level drops below the liquid level probe. If the system has not successfully refilled in 15 minutes, a refill error occurs. When a refill error occurs, the refill solenoid is de-energized and the left rinse L.E.D. will flash about once every 5 seconds. Once the cause of the refill error has been investigated (see the troubleshooting guide in the Operating and Service Manual) and cured, the system can be reset by placing the Rinse/Run switch in the programming (center) position, momentarily.

RINSE TIMERS

The dispenser is shipped from the factory with the rinse timers disabled. To enable the rinse timers, remove power from the dispenser, remove the lower access panel, and remove the jumper from J1 of the control boards. Replace the lower access panel, and return power to the dispenser. When enabled, the rinse timers automatically keep track of the time since the dispenser was last run through a rinse sequence. If the dispenser detects that a rinse sequence has not been run for 8 hours, the appropriate rinse L.E.D. will flash continually. If, after an additional 4 hours (12 hours total), a rinse sequence has still not been run, the appropriate rinse L.E.D. will light continuously, and the appropriate hopper drives will be disabled until a rinse sequence has been run.

RUNNING A RINSE SEQUENCE

1. Place the rinse/run switch in the rinse position.
2. Sequentially, or simultaneously, at each of the positions dispense for at least 10 seconds.
3. After the rinse L.E.D. has extinguished, the rinse timer is reset.
4. Return the rinse/run switch to the run position.

DISPENSER USE

1. Simply place a cup on the drip tray beneath the dispensing tip.
2. Press the button and dispense the beverage.
3. Release the button when the cup is approximately $\frac{2}{3}$ full and allow the whipper chamber to drain.

NOTE - The whipper chamber must drain at the end of each dispense.

COLD BEVERAGE SET-UP (OPTIONAL)

Cold beverages may be dispensed from the left dispense position. Simply place the HOT/COLD switch near the left whipper chamber in the “COLD” (upper) position.

CLEANING

Refer to the decal on the rear of the dispenser door for cleaning recommendations and procedures.

The use of a damp cloth rinsed in any mild, non-abrasive, liquid detergent is recommended for cleaning all surfaces on Bunn-O-Matic equipment.

ADJUSTMENTS

The beverage solenoid is preset to dispense approximately 9/10 ounce per second. This amount can be adjusted:

1. Disconnect the dispenser from the power source.
2. Remove the small left side access panel to adjust dispense valves 1, 2 & 3, and remove the small right side access panel to adjust dispense valves 4 & 5.
3. Rotate the control at the base of the solenoid clockwise to decrease or counterclockwise to increase the amount of water.
4. Replace appropriate access panels when finished.

HOPPER MOTOR SPEED PROGRAMING

The hopper dispense rate is preset at the factory. With 22 tooth gear and auger wire the preset dispense rate is approximately 3 to 5 grams per second. With 30 tooth gear and auger wire the preset dispense rate is approximately 5 to 7 grams per second. The hopper dispense rate can be adjusted to a range of dispense rates from approximately 1.5 to 12 grams per second, as follows:

1. Place the rinse/run switch in the center (program) position.
2. Place the increase/decrease switch in the desired (increase or decrease) position.
3. Press and release the dispense switch for the chamber you wish to adjust. Each time the dispense switch is pressed, the rinse L.E.D. will flash, and the motor speed for that hopper will be increased/decreased by approximately 2-1/2%.
4. Return the rinse/run switch to the run position after hopper motor speed adjustments are complete.

DRAINING THE HOT WATER TANK

CAUTION - The dispenser must be disconnected from the power source throughout these steps.

1. Disconnect the dispenser from the power source.
2. Place the tank heater switch in the "OFF" position.
3. Shut-off and disconnect the incoming water supply.
4. Remove the front, lower access panel.
5. Pull out drain tube to empty into a sink or a container with a minimum of 6-1/2 gallon capacity.
6. Make sure drain clamp is closed. Then, remove drain plug.
7. Direct tube into sink or container and open drain clamp. Continue draining tank until ALL of the water is out.

WARNING: Be very careful with the draining water because it can be very hot.

8. Close drain clamp, insert drain plug, place drain tube back into machine, and replace lower access panel.

NOTE - The dispenser must be refilled using the *INITIAL FILL & HEAT* steps before reconnecting to the power source.

TROUBLESHOOTING

A troubleshooting guide is provided to suggest probable causes and remedies for the most likely problems encountered. If the problem remains after exhausting the troubleshooting steps, contact the Bunn-O-Matic Technical Service Department.

- Inspection, testing, and repair of electrical equipment should be performed only by qualified service personnel.
- All electronic components have 120 volt ac and low voltage dc potential on their terminals. Shorting of terminals or the application of external voltages may result in board failure.
- Intermittent operation of electronic circuit boards is unlikely. Board failure will normally be permanent. If an intermittent condition is encountered, the cause will likely be a switch contact or a loose connection at a terminal or crimp.
- Solenoid removal requires interrupting the water supply to the valve. Damage may result if solenoids are energized for more than ten minutes without a supply of water.
- The use of two wrenches is recommended whenever plumbing fittings are tightened or loosened. This will help to avoid twists and kinks in the tubing.
- Make certain that all plumbing connections are sealed and electrical connections tight and isolated.
- This unit is heated at all times. Keep away from combustibles.

- WARNING** –
- Exercise extreme caution when servicing electrical equipment.
 - Unplug the dispenser when servicing, except when electrical tests are specified.
 - Follow recommended service procedures
 - Replace all protective shields or safety notices

PROBLEM	PROBABLE CAUSE	REMEDY
Product will not dispense	1. No water	Water lines and valves to the dispenser must be open.
	2. No power or incorrect voltage to the dispenser	(A1) Check for 120 volts across the black and white wires on two wire 120 volt dispensers. (A2) Check for 120 volts across the red and white wires and the black and white wires, 208 volts across the red and black wires on three wire 120/208 volt dispensers and 240 volts across the red and black wires on three wire 120/240 volt dispensers. (B) Check circuit breakers or fuses.
	3. Dispense Switch	Refer to <i>Service</i> - Dispense Switch for testing procedure. See page 23
	4. Dispense Solenoid Valve	Refer to <i>Service</i> - Dispense Solenoid Valve for testing procedures. See page 35

TROUBLESHOOTING (cont.)

PROBLEM

Product will not dispense (cont.)

PROBABLE CAUSE

5. Solenoid Valve (Inlet)

REMEDY

Refer to *Service* - Solenoid Valve (Inlet) for testing procedures. See page 37

6. Control Board #1 and Probe

Refer to *Service* - Control Board and Probe for testing procedures. See page 20

7. Auger Drive

Refer to *Service* - Auger Drive. See page 13 & 15

8. Water Strainer

Remove the strainer and check for obstructions. Clear or replace.

9. Lime build-up

CAUTION - Tank and tank components should be delimed regularly depending on local water conditions. Excessive mineral build-up on stainless steel surfaces can initiate corrosive reactions resulting in serious leaks.

Inspect the tank assembly for excessive lime deposits. Delime as required.

10. Transformer

Refer to *Service* - Transformer for testing procedures. See page 41

Water is not hot

1. Limit Thermostat

CAUTION - Do not eliminate or bypass limit thermostat. Use only BOM replacement part #29329.1000

Refer to *Service* - Limit Thermostat for testing procedures. See page 31

2. Control Thermostat

Refer to *Service* - Control Thermostat for testing procedures. See page 19

3. Tank Heater

Refer to *Service* - Tank Heater for testing procedures. See page 38

TROUBLESHOOTING (cont.)

PROBLEM

PROBABLE CAUSE

REMEDY

Water is not hot (Cont.)

4. Tank Heater Switch

Refer to *Service* - Tank Heater Switch for testing procedures. See page 39

5. Relay (120V versions only)

Refer to *Service* - Relay for testing procedures. See page 40

6. Control Board #2 (120V versions only)

Refer to *Service* - Control Board #2 for testing procedures. See page 22

Spitting or excessive steaming

1. Lime build-up

CAUTION - Tank and tank components should be delimed regularly depending on local water conditions. Excessive mineral build-up on stainless steel surfaces can initiate corrosive reactions resulting in serious leaks.

Inspect the tank assembly for excessive lime deposits. Delime as required.

2. Control Thermostat

Refer to *Service* - Control Thermostat for testing procedures. See page 19

Dripping from dispense tip

1. Lime build-up

CAUTION - Tank and tank components should be delimed regularly depending on local water conditions. Excessive mineral build-up on stainless steel surfaces can initiate corrosive reactions resulting in serious leaks.

Inspect the tank assembly for excessive lime deposits. Delime as required.

2. Dispense Solenoid Valve

Remove the dispense solenoid valve and clear any obstructions. Rebuild or replace the valve if necessary. See page 35

Water flows into tank continuously

1. Control Board #1 and Probe

Refer to *Service* - Control Board and Probe for testing procedures. See page 20

2. Solenoid Valve (Inlet)

Refer to *Service* - Solenoid Valve (Inlet) for testing procedures. See page 37

TROUBLESHOOTING (cont.) PROBLEM

PROBABLE CAUSE

REMEDY

Product overflows container

1. Dispense Switch

Refer to *Service* - Dispense Switch for testing procedures. See page 23

2. Dispense Solenoid Valve

Remove the solenoid valve and clear any obstructions. Rebuild or replace the valve if necessary. See page 35

Weak product

1. Water Temperature

Place an empty container beneath the dispense tip. Initiate a dispense cycle and check the water temperature immediately below the dispense tip with a thermometer. Reading should be 180°F to 200°F (see thermostat temperature settings decal in *USER NOTICES* on page 3.)

2. Whipper Motor

Refer to *Service* - Whipper Motor for testing procedure. See page 27

3. Frother

Refer to *Service* - Frother Components. See page 26

4. Dispense Solenoid Valve

Refer to *Service* - Dispense Solenoid Valve for test procedures. See page 35

5. Auger Drive

Refer to *Service* - Auger Drive Components. See page 13 & 15

6. Auger Spring

Refer to *Service* - Auger Drive Components. See page 13 & 15

7. Auger Motor

Refer to *Service* - Auger Drive Components. See page 13 & 15

8. Rinse/Run Switch

Refer to *Service* - Rinse/Run Switch for test procedures. See page 32

9. Rinse Timer

Refer to *Operation* - Rinse Timer. See Page 5

10. Relay (120V versions only)

Refer to *Service* - Relay for testing procedures. See page 40

11. Control Board #2 (120V versions only)

Refer to *Service* - Control Board #2 for testing procedures. See page 22

TROUBLESHOOTING (CONT.)

PROBLEM	PROBABLE CAUSE	REMEDY
Dispenser is making unusual noises	1. Plumbing Lines	Plumbing lines should not be resting on the counter top.
	2. Water Supply	(A) The dispenser must be connected to a cold water line (B) Water pressure to the dispenser must not exceed 100 psi (690 kPa). Install a regulator if necessary to lower the working pressure to approximately 50 psi (345 kPa).
	3. Tank Heater	Remove and clean lime off the tank heater. See page 38
Excess dust	1. Fan	Refer to <i>Service</i> - Fan for testing procedures. See page 25
Display not lit	1. Lamp	Refer to <i>Service</i> - Lamp, see page 29 for lamp replacement.
	2. Lamp Holder	Refer to <i>Service</i> - Lamp Holder for testing procedures. See page 29
	3. Starter - Lamp	Refer to <i>Service</i> - Starter for testing procedures. See page 30
	4. Ballast	Refer to <i>Service</i> - Ballast for testing procedures. See page 18

SERVICE

This section provides procedures for testing and replacing various major components used in this dispenser should service become necessary. Refer to *Troubleshooting* for assistance in determining the cause of any problem.

WARNING - Inspection, testing, and repair of electrical equipment should be performed only by qualified service personnel. The dispenser should be unplugged when servicing, except when electrical tests are required and the test procedure specifically states to plug-in the dispenser.

COMPONENT ACCESS

WARNING - Disconnect the dispenser from the power source before the removal of any panel or the replacement of any component.

All components are accessible by opening the door, removal of the door panels, dispenser top covers, hopper(s), hopper support plate, splash guard, splash panel w/drip tray, lower front access panel and rear access cover.

Refer to the contents listing for component location.

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AUGER DRIVE COMPONENTS FMD-4

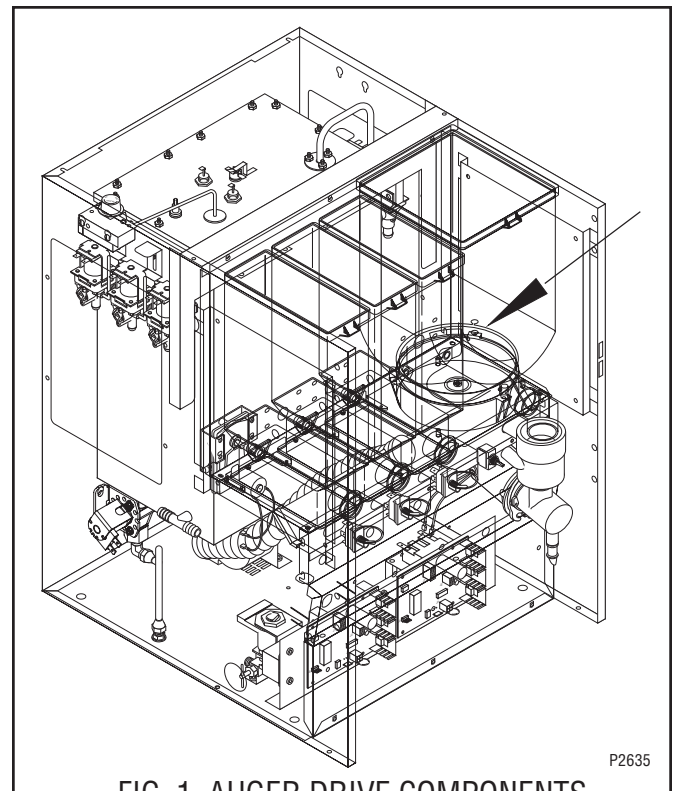


FIG. 1 AUGER DRIVE COMPONENTS

Location

The auger components are located inside the bottom part of the hopper except for the auger drive bracket, spacer and retaining clip, which are located on the outside rear of the hopper base. The auger motor is located on the lower right rear of the motor mounting panel. Refer to Fig. 2 for disassembly and assembly.

Test Procedures - Auger Motor

1. Disconnect the dispenser from the power source.
2. Disconnect the white/red wire and the white wire from the hopper speed control board.
3. Check the voltage across the white/red wire and the white wire with a voltmeter. With the rinse/run switch in the run (lower) position, connect the dispenser to the power supply. The indication must be :
 - a) 120 volts ac for two wire 120 volt models.
 - b) 120 volts ac for three wire 120/208 volt or 120/240 volt models.
4. Disconnect the dispenser from the power supply.

If voltage is present as described, proceed to #5. If voltage is not present as described, refer to the wiring diagram and check the dispenser wiring harness.

SERVICE

AUGER DRIVE COMPONENTS - FMD-4 (CONT.)

5. Check the voltage across the positive (red wire) terminal and the negative (black wire) terminal on the auger motor with a voltmeter. With the rinse/run switch in the run (lower) position press and hold the dispense switch. Connect the dispenser to the power supply. After a .6 second delay the indication must be 4.0 to 24.5 volts dc.

If voltage is present as described, the auger motor drive is operating properly. If auger does not turn, replace the auger motor.

If voltage is not present as described, replace the auger hopper drive board.

Removal, Cleaning and Replacement Hopper & Auger

1. Open the dispenser door and raise the top front cover.
2. Lift the hopper assy (15) over the pins on hopper support plate (11) and slide hopper assembly out the front of the dispenser.
3. Remove hopper lid (1) and empty product.
4. Pull off the ejector elbow (14).
5. Remove retainer clip (10) and washer (9) from the bottom of the hopper base (8).
6. Remove whipper shaft (3), wiper blade (4) and wiper drive gear (5) from the hopper base (8).
7. Remove auger wire (13) by pulling it out the front of the hopper base (8).
8. Remove auger drive bracket (6) by unscrewing left hand threads from auger drive shaft (12).
9. Slide spacer (7) and auger drive shaft bracket (6) off of the auger drive shaft (12).
10. Remove auger drive shaft (12) from hopper base (8).
11. Wash components in a mild solution of dish detergent using a bristle brush when needed.
12. Rinse and dry each item thoroughly.
13. Check for damaged or broken components, replace any if necessary and reassemble hopper assembly.
14. Install hopper assy (15) in the dispenser by sliding hopper assy on the hopper support plate (11) until the slot in the rear of the hopper base (8) seats against the pins in the hopper support plate (11).

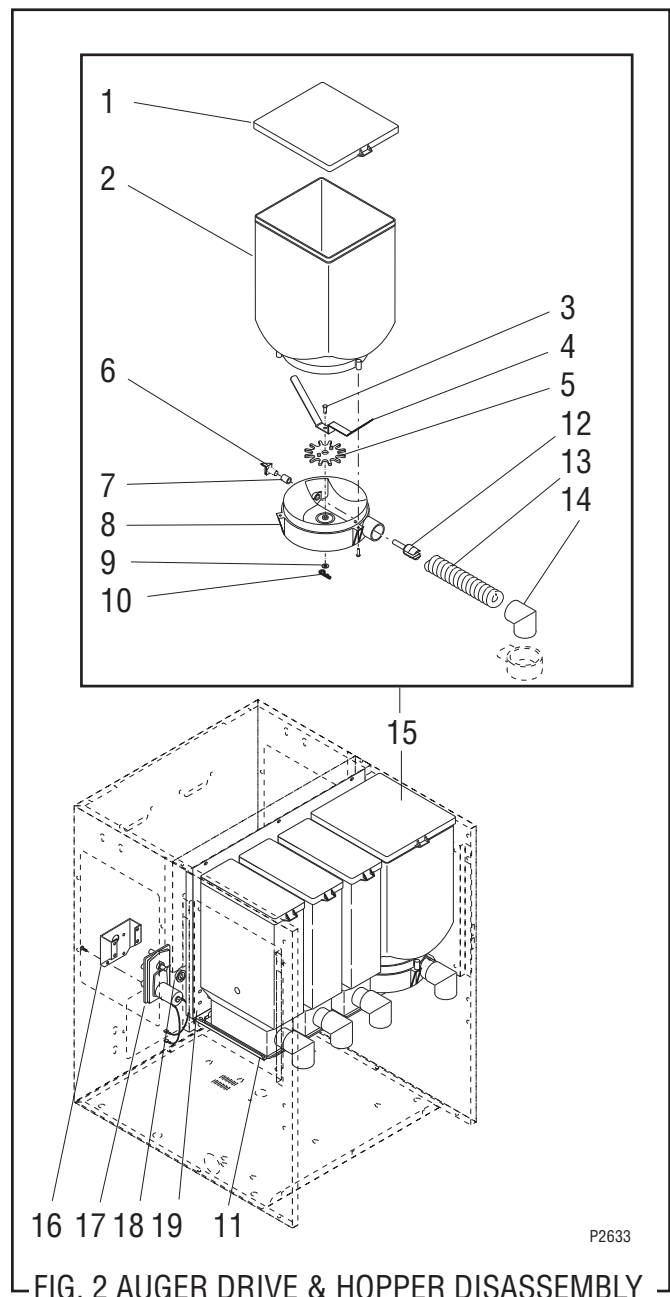


FIG. 2 AUGER DRIVE & HOPPER DISASSEMBLY

- | | |
|------------------------|--------------------------------|
| 1. Hopper Lid | 11. Hopper Support Plate |
| 2. Hopper | 12. Auger Drive Shaft |
| 3. Wiper Shaft | 13. Auger Wire |
| 4. Wiper Blade | 14. Ejector Elbow |
| 5. Wiper Drive Gear | 15. Hopper Assembly |
| 6. Auger Drive Bracket | 16. Auger Motor Bracket |
| 7. Spacer | 17. Auger Motor |
| 8. Hopper Base | 18. Dust Seal |
| 9. Washer | 19. Auger Motor Mounting panel |
| 10. Retainer Clip | |

SERVICE (cont.)

AUGER DRIVE COMPONENTS - FMD-4 (cont.)

Auger Drive Motor (Refer to Fig. 2)

1. Remove hopper assy (15), and set aside for reassembly.
2. Remove the four #8-32 screws securing the hopper support plate (11), remove plate and set aside for reassembly.
3. Remove the four #8-32 screws, located inside the dispenser housing on the lower right front of the auger motor mounting panel (19), securing auger motor mounting bracket (16) and auger motor (17) to the rear of the auger motor mounting panel (19).
4. Disconnect the wires from the hopper drive board.
5. Remove auger motor mounting bracket (16), auger motor (17) and dust seal (18) as an assembly.
6. Remove dust seal (18) from auger motor (17).
7. Disconnect the wires from the auger motor (17).
8. Remove the four #8-32 screws securing the auger motor (17) to the auger motor mounting bracket (16).
9. Remove auger motor (17) and discard.
10. Using four #8-32 screws install new auger motor (17) on mounting bracket (16).
11. Install dust seal (18) on auger motor shaft and align notch in seal with motor casting.
12. Reconnect the wires to the terminals on the hopper drive board.
13. Refer to Fig. 3 when reconnecting wires.
14. Using four #8-32 locking screws install auger motor, dust seal and mounting bracket to the rear of the auger motor mounting panel (19).
15. Install hopper assy (15).

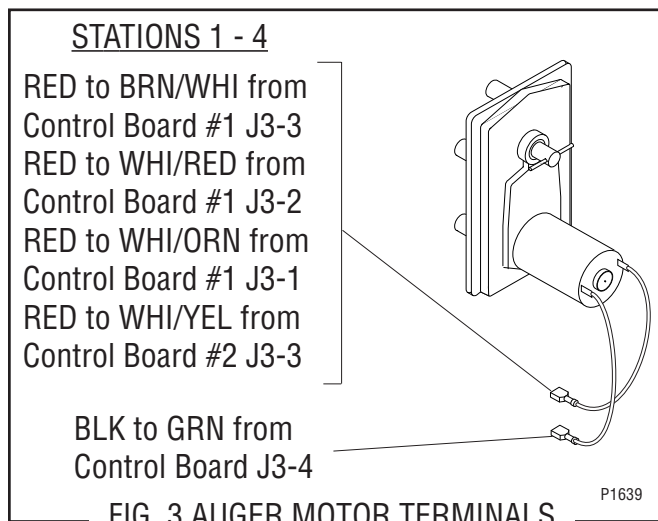


FIG. 3 AUGER MOTOR TERMINALS

AUGER DRIVE COMPONENTS - FMD-4 & FMD-5

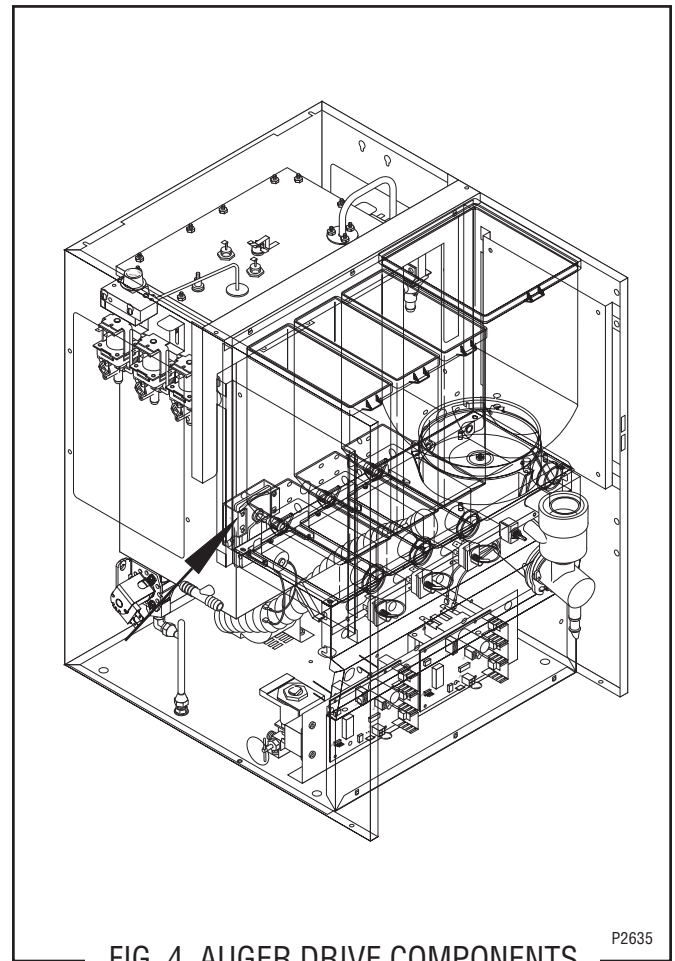


FIG. 4 AUGER DRIVE COMPONENTS

Location

The auger components are located inside the bottom part of the hopper except for the auger drive bracket, washer and locknut, which are located on the outside bottom rear of the hopper. The auger motors are located on the rear of the auger motor mounting panel. Refer to Fig. 5 for disassembly and assembly.

Test Procedures - Auger motors

1. Disconnect the dispenser from the power source.
2. Disconnect the wires from the motor to be tested.
3. Check the voltage across the positive (white/orange) wire for the right motor, or the positive (white/red) wire for the left motor and the negative (green) wire with a voltmeter. With the rinse/run switch in the run (lower) position press and hold the appropriate dispense switch. Connect the dispenser to the power supply. After a .6 second delay the indication must be 4.0 to 24.5 volts dc.

AUGER DRIVE COMPONENTS - FMD-4 & FMD-5 (cont.)

- If voltage is present as described and the auger does not turn, replace the auger motor.
If voltage is not present as described, refer to the wiring diagrams and check the dispenser wiring harness.

Hopper & Auger

-
- 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
- FIG. 5 AUGER DRIVE & HOPPER DISASSEMBLY

- 35135 012103

SERVICE (cont.)

AUGER DRIVE COMPONENTS - FMD-4 & FMD-5 (cont.)

Auger Drive Motor (Refer to Fig. 5)

1. Remove all hopper assemblies (20) and set aside for reassembly.
2. Remove the four #8-32 screws securing the hopper support plate (19), remove plate and set aside for reassembly.
3. Remove the four #8-32 locking screws, located inside the dispenser housing on the front of the auger motor mounting panel (14), securing auger motor mounting bracket (15) and auger motor (16) to the rear of the auger motor mounting panel (14).
4. Disconnect the wires from the auger motor (16) to be removed.
5. Remove auger motor mounting bracket (15), auger motor (16) and dust seal (17) as an assembly.
6. Remove dust seal (17) from auger motor (16).
7. Remove the four #8-32 screws securing the auger motor to the auger motor mounting bracket.
8. Remove auger motor and discard.
9. Using four #8-32 screws install new auger motor (16) on mounting bracket (15).
10. Install dust seal (17) on auger motor shaft.
11. Using four #8-32 locking screws install auger motor, dust seal and mounting bracket to the rear of the auger motor mounting panel (14)
12. Reconnect the wires to the terminals on the auger motor.
13. Install hopper support plate (19) and all hopper assemblies (20).
14. Refer to Fig. 6 when reconnecting wires.

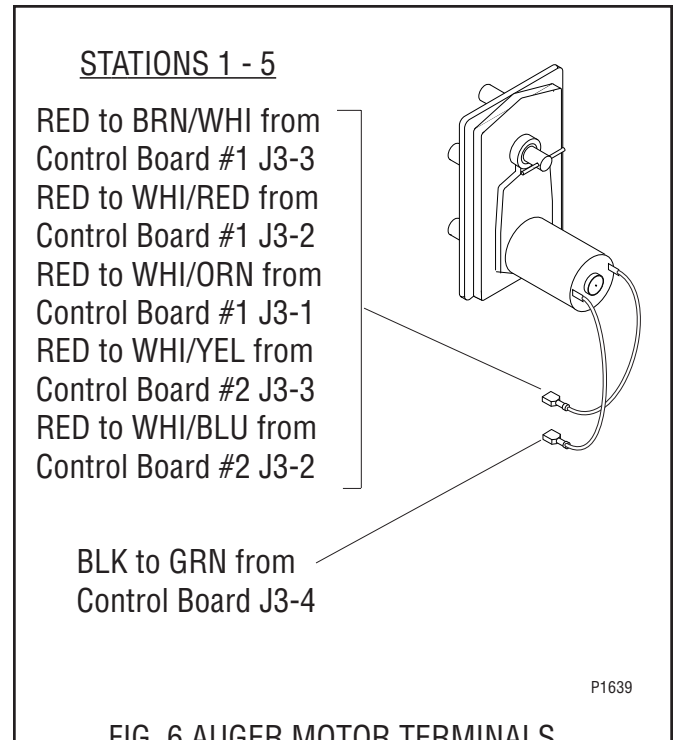


FIG. 6 AUGER MOTOR TERMINALS

SERVICE (cont.)

BALLASTS - FMD-4 & FMD-5

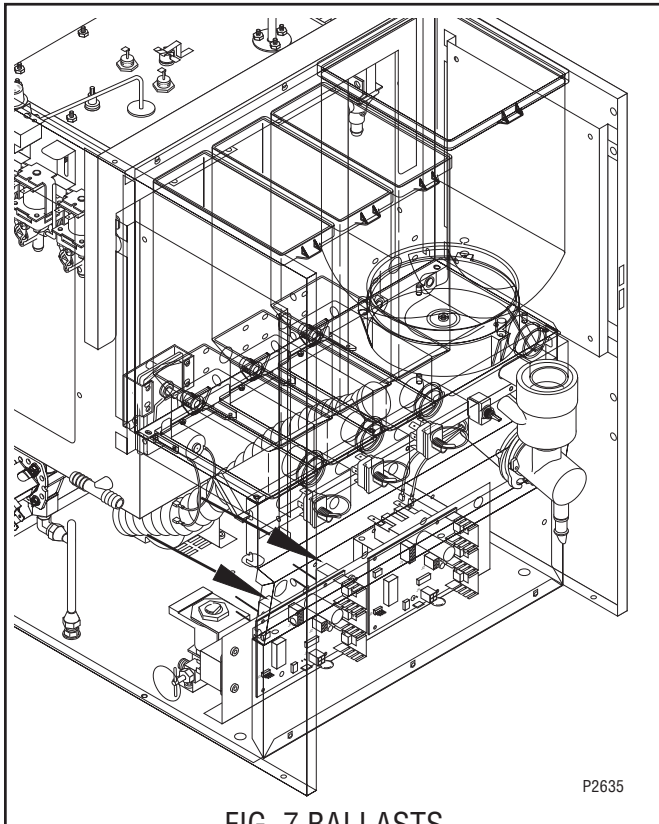


FIG. 7 BALLASTS

Location

The front door lamp ballast is located behind the front access panel on the left front side of the component bracket.

Test Procedure

1. Disconnect the dispenser from the power source.
2. Disconnect the two black lead on the ballast from the main harness.
3. Check for continuity between the two black leads on the ballast.

If continuity is present as described the ballast is operating properly.

If continuity is not present as described, replace the ballast.

Removal and Replacement

1. Loosen the three #8-32 screws securing the component bracket to the dispenser housing base.
2. Pull component bracket out the front of the dispenser far enough so the leads on each ballast can be disconnected from the main wiring harness and the door interconnect harness.
3. Remove the two #8-32 screws securing each ballast to the rear of the component bracket.
4. Remove and discard the ballast.
5. Install new ballast on the rear of the component bracket and secure each with two #8-32 screws.
6. Refer to Fig. 8 and reconnect the wires.
7. Place the component bracket into position and tighten the two #8-32 screws securing the component bracket to the dispenser housing base.

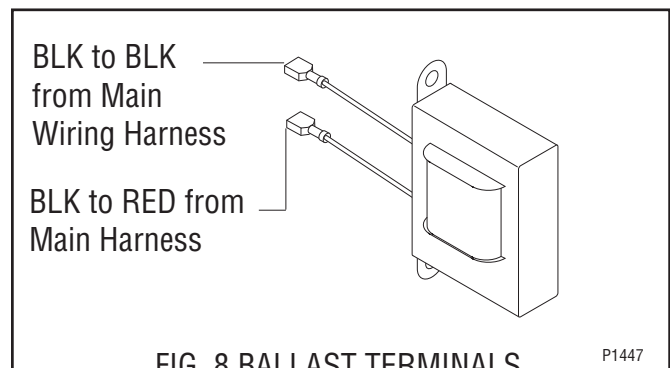


FIG. 8 BALLAST TERMINALS

SERVICE (cont.)

CONTROL THERMOSTAT - FMD-4 & FMD-5

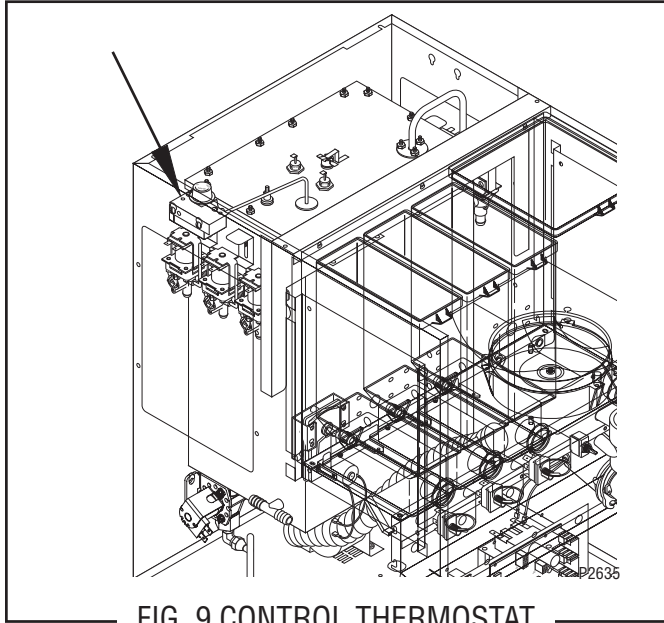


FIG. 9 CONTROL THERMOSTAT

Location

The control thermostat is located at the upper left rear of the dispenser housing.

Test Procedure

1. Disconnect the dispenser from the power source.
2. Disconnect the black wire of the control thermostat from the black lead from the limit thermostat.
3. Remove bulb from the tank.
4. Check the voltage across black wire on the control thermostat and the white or red wire on the tank heater with the tank heater switch in the "ON" lower position with a voltmeter. Connect the dispenser to the power source. The indication must be:
 - a) 120 volts ac for two wire 120 volt models.
 - b) 208 volts ac for three wire 120/208 volt models.
 - c) 240 volts ac for three wire 120/240 volt models.
5. Disconnect the dispenser from the power source.

If voltage is present as described the control thermostat is operating properly. Reinstall bulb into the tank. If voltage is not present as described, replace the thermostat.

Removal and Replacement.

1. Remove the thermostat capillary bulb by firmly pulling-up on the capillary at the tank lid. This will disengage the grommet from the tank lid.
2. Loosen the two #6-32 screws securing the thermostat to the front tank mounting bracket.
3. Disconnect the wires from the thermostat.
4. Remove thermostat and remove the screws and spacers from the thermostat.
5. Discard thermostat.
6. Install two spacers and two #6-32 screws on the new thermostat.
7. Position the thermostat on the bottom side of the front tank mounting bracket and tighten the two #6-32 screws.
8. Slide the grommet to the line 4.5" above the bulb on the new capillary tube.
9. Insert the capillary bulb through the hole in the tank lid and press the grommet firmly and evenly so that the groove in the grommet fits into the tank lid.
10. Carefully bend the capillary tube so that the tube and bulb inside the tank are in the vertical position and away from any electrical connections.
11. Refer to Fig. 10 and reconnect the wires.

NOTE - The capillary tube must be clear of any electrical termination and not kinked.

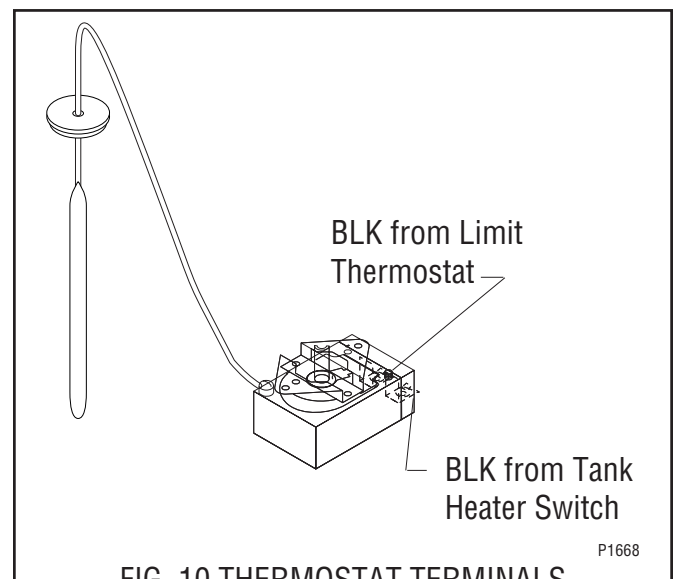
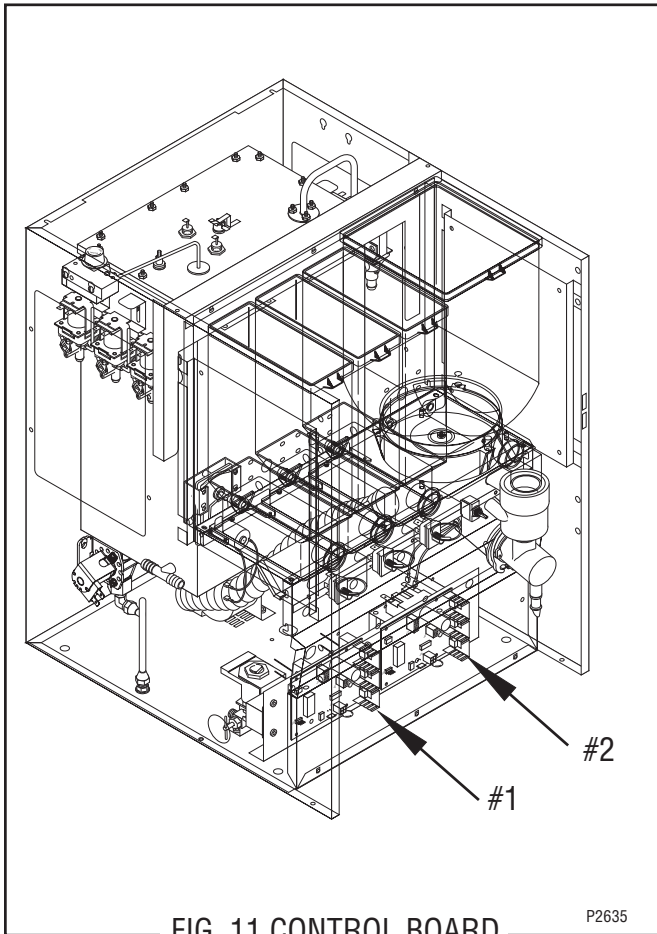


FIG. 10 THERMOSTAT TERMINALS

SERVICE (cont.)

CONTROL BOARD



Location:

The Control Boards are located behind the lower front access cover mounted on the component bracket.

Test Procedure:

Liquid Level Control Circuitry(Control Board #1):

1. Disconnect the dispenser from the power source.
2. Disconnect the six pin connector from J3 of the control board.
3. Check the voltage across pins 5 & 6 of the six pin connector on the wiring harness with a voltmeter. Connect the dispenser to the power source. The indication must be 24 volts ac.
4. Disconnect the dispenser from the power source.

If voltage is present as described, proceed to step 5. If voltage is not present as described, refer to the wiring diagram and check the dispenser wiring harness.

5. Reconnect the six pin connector of the wiring harness to J3 of the control board.
6. Disconnect the four pin connector from J4 of control board #1.
7. Check the voltage across pins 1 & 4 of the four pin connector on the wiring harness with a voltmeter. Connect the dispenser to the power source. The indication must be 120 volts ac for two wire 120 volt models, three wire 120/208 volt models, three wire 120/240 volt models.
8. Disconnect the dispenser from the power source.

If voltage is present as described, proceed to step 9. If voltage is not present as described, refer to the wiring diagram and check the dispenser wiring harness.

9. Reconnect the four pin connector of the wiring harness to J4 of control board #1.
10. Disconnect the ten pin connector from J2 of control board #1.
11. Carefully connect a piece of insulated jumper wire to pin 10 (top right) of J2 on the control board. Keep the other end of this wire away from any metal surfaces of the dispenser.
12. Check the voltage across the terminals of the inlet solenoid valve with a voltmeter. Connect the dispenser to the power source. The indication must be 120 volts ac for two wire 120 volt models, three wire 120/208 volt models, three wire 120/240 volt models after a delay of approximately 10 seconds.
13. Touch the free end of the jumper wire to the dispenser housing. The indication must be 0.
14. Move the jumper wire away from the housing. The indication must, again, be 120 volts ac for two wire 120 volt models, three wire 120/208 volt models, three wire 120/240 volt models after a delay of approximately 5 seconds.
15. Disconnect the dispenser from the power source and remove the jumper wire.

If voltage is present as described, proceed to step 16. If the voltage is not present as described, replace control board #1.

SERVICE (cont.)

CONTROL BOARD (CONT.)

16. Reconnect the ten pin connector of the wiring harness to J2 of control board #1.
17. Gently pull the liquid level probe out of the tank lid and inspect for corrosion. Replace it if necessary.
18. Place the probe so that neither end is in contact with any metal surface of the dispenser.
19. Check the voltage across the terminals of the inlet solenoid valve with a voltmeter. Connect the dispenser to the power source. The indication must be 120 volts ac for two wire 120 volt models, three wire 120/208 volt models, three wire 120/240 volt models after a delay of approximately 10 seconds.
20. Move the probe's flat end to the dispenser housing. The indication must be 0.
21. Move the probe's flat end away from the housing. The indication must, again, be 120 volts ac for two wire 120 volt models, three wire 120/208 volt models, three wire 120/240 volt models after a delay of approximately 5 seconds.
22. Disconnect the dispenser from the power source.

If the voltage is present as described, re-install the probe. The liquid level control circuitry is operating properly.

If the voltage is not present as described, check the pink probe wire and green tank wire for continuity.

Hopper Motor Control Circuitry (Stations 1-3, Control Board #1 & Stations 4-5, Control Board #2):

1. Disconnect the dispenser from the power source.
2. Disconnect the six pin connector from J3 of the appropriate control board.
3. Check the voltage across pins 5 & 6 of the six pin connector on the wiring harness with a voltmeter. Connect the dispenser to the power source. The indication must be 24 volts ac.
4. Disconnect the dispenser from the power source.

If voltage is present as described, proceed to step 5. If voltage is not present as described, refer to the wiring diagram and check the dispenser wiring harness.

5. Reconnect the six pin connector of the wiring harness to J3 of the control board.
6. Check that the rinse/run switch is in the run position.
7. Check the voltage across the red (+) terminal and the black (-) terminal of the auger motor with a voltmeter. Connect the dispenser to the power source. Press and hold the appropriate dispense switch. After a delay of about .6 seconds, the indication must be between +4.0 and +24.5 volts dc.

If the voltage is present as described, the hopper motor control circuitry is operating properly.

If the voltage is not present as described, replace the control circuit board.

Tank Heater Relay Control Circuitry (Control Board #2)(120V dispensers only):

1. Disconnect the dispenser from the power source.
2. Disconnect the six pin connector from J3 of control board #2.
3. Check the voltage across pins 5 & 6 of the six pin connector on the wiring harness with a voltmeter. Connect the dispenser to the power source. the indication must be 24 volts ac.
4. disconnect the dispenser from the power source.

If voltage is present as described, proceed to step 5.
If voltage is not present as described, refer to the wiring diagram and check the dispenser wiring harness.

5. Reconnect the six-pin connector of the wiring harness to J3 of control board #2.
6. Disconnect the four-pin connector from J4 of control board #2.
7. Check the voltage across pins 1 & 4 of the four-pin connector on the wiring harness with a voltmeter. The indication must be 120 volts ac.
8. Disconnect the dispenser from the power source.

If voltage is present as described, proceed to step 9.
If voltage is not present as described, refer to the wiring diagram and check the dispenser wiring harness.

9. Reconnect the four-pin connector of the wiring harness to J4 of control board #2.
10. Check the voltage across the coil terminals of the tank heater relay with a voltmeter. Connect the dispenser to the power source. The indication must be 0 volts ac.

If voltage is absent as described, proceed to step 11.
If voltage is present, replace the control circuit board #2.

11. Place containers below any three dispenser nozzles.
12. Simultaneously initiate dispenses at each of the selected dispense stations while monitoring the voltage across the coil terminals of the tank heater relay. The indication must be 120V ac.

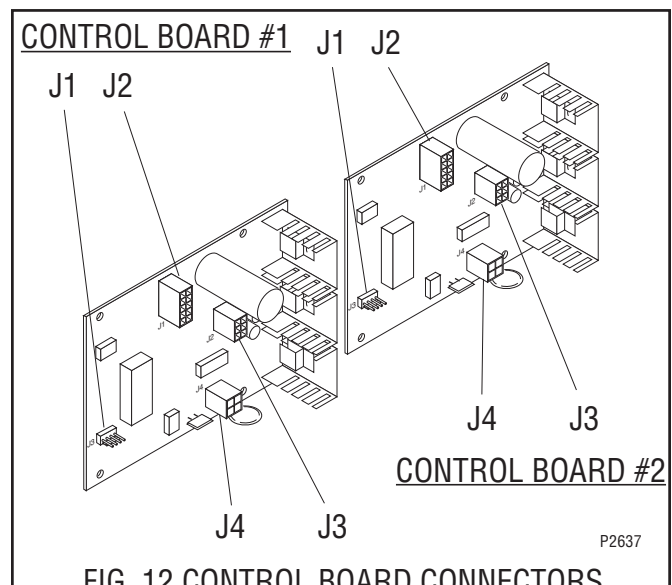
If voltage is present as described, the control board #2 is functioning correctly.

If voltage is not present as described, replace the control circuit board #2.

Removal and Replacement:

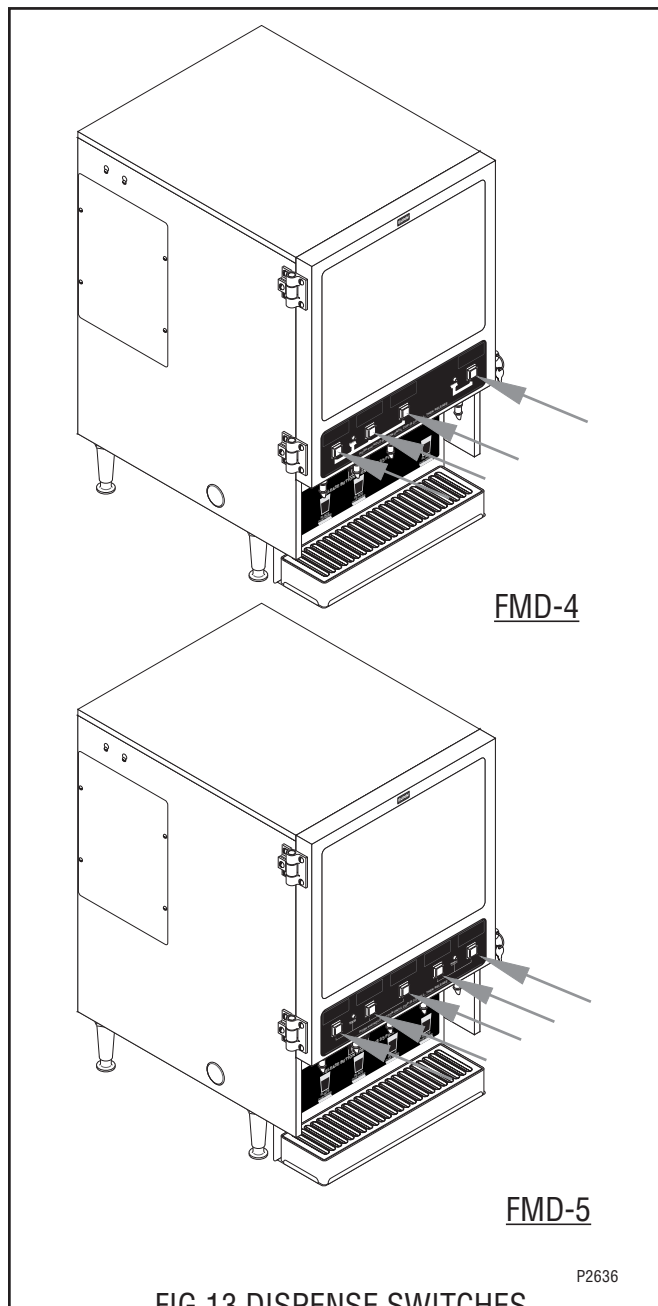
1. Disconnect the three plugs on the main wiring harness from the connectors on the control board.
2. Remove the four #6-32 keps nuts securing the control board to the component bracket.
3. Remove control board and discard.
4. Install new control board on the component bracket using four #6-32 keps nuts.
5. Reconnect the three plugs on the main harness to the connectors on the control board.

NOTE: J4 is not connected on Control Board #2 on 120/208 - 240V dispensers.



SERVICE (cont.)

DISPENSE SWITCH(S) - FMD-4 & FMD-5



Location:

The dispense switches are located on the lower outside of the dispenser door.

Test Procedure:

1. Disconnect the dispenser from the power source.
2. Open the dispenser door and remove the bottom door cover.
3. Disconnect the wires from the door interconnect wiring harness to the dispense switch to be tested.
4. Check for voltage across the black and red/white wires for the dispense switch to be tested from the door interconnect wiring harness. Connect the dispenser to the power supply. The indication must be:
 - a) 120 volts ac for two wire 120 volt models.
 - b) 120 volts ac for three wire 120/208 volt or 120/240 volt models.
5. Disconnect the dispenser from the power source.

If voltage is present as described, proceed to #6.
If voltage is not present as described, refer to the wiring diagram and check the dispenser wiring harness.

6. With a voltmeter, check the voltage across the remaining two wires of the dispense switch being tested from the door interconnect wiring harness. Connect the dispenser to the power source. The indication must be +5 volts dc.

If voltage is present as described, proceed to #7.
If voltage is not present as described, refer to the wiring diagram and check the dispenser wiring harness.

SERVICE (cont.)

DISPENSE SWITCHES (cont.)

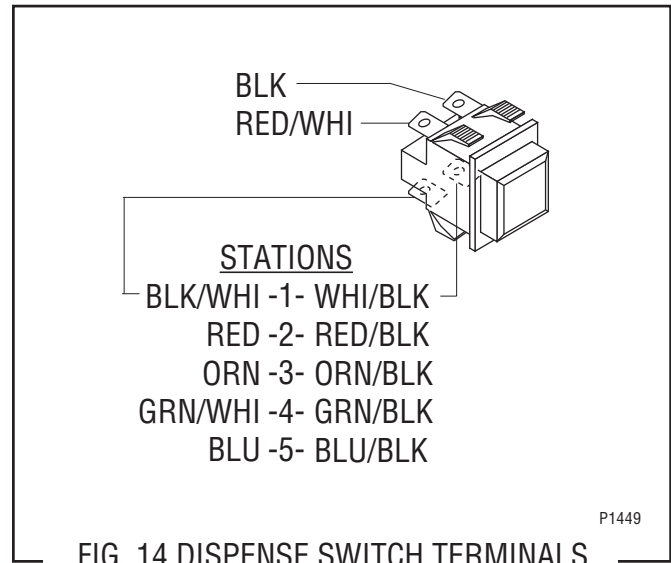
7. Check for continuity across the terminals (top right to top left; bottom right to bottom left) of the dispense switch with the switch in the "ON" position. Continuity must not be present when the switch is in the "OFF" released position.

If continuity is present as described, reconnect the connector to the door interconnect wiring harness, the switch is operating properly.

If continuity is not present as described, replace the switch.

Removal and Replacement

1. Open the dispenser door.
2. Remove the six #8-32 screws securing the bottom door cover and remove cover.
3. Disconnect the wires on the dispense switch from the door interconnect wiring harness.
4. Compress the clips inside the door on the dispense switch and gently push the switch through the opening.
5. Push the new switch into the opening and spread the clips to hold the switch in the door.
6. Reconnect the wires to the dispense switch from the door interconnect wiring harness.
7. Reinstall the door bottom cover using six #8-32 screws.
8. Refer to Fig. 14 when reconnecting wires.



SERVICE (cont.)

FAN

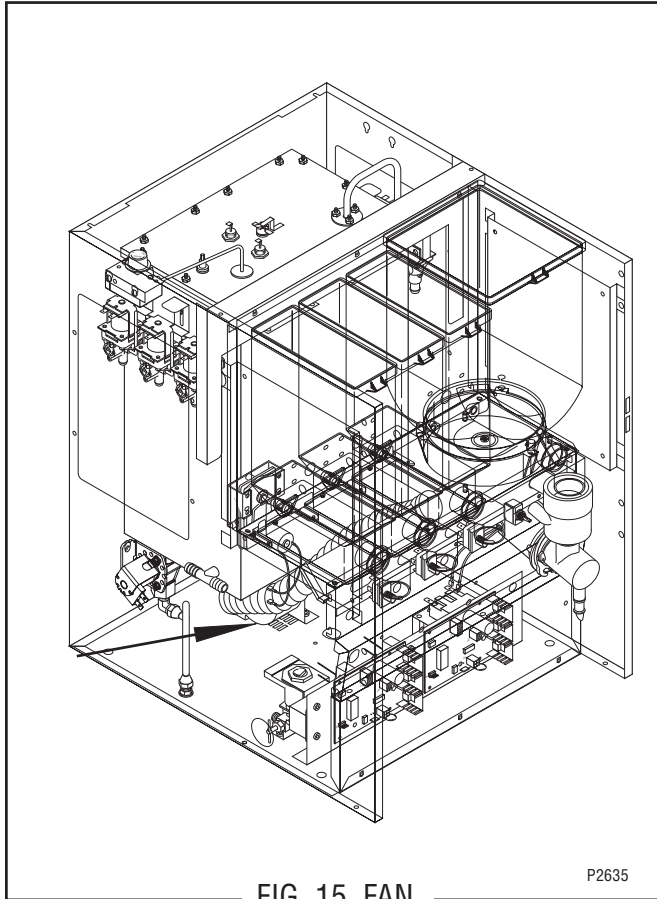


FIG. 15 FAN

Location:

The fan is located inside the dispenser housing on the center rear of the dispenser base plate.

Test Procedures:

1. Disconnect the dispenser from the power source.
2. Disconnect the black and white wires from the fan terminals.
3. Check the voltage across the black and white wires on the main harness with a voltmeter. Connect the dispenser to the power source. The indication must be:
 - a) 120 volts ac for two wire 120 volts models.
 - b) 120 volts ac for three wire 120/208 volt or 120/240 volt models.

If voltage is present as described, replace the fan
If voltage is not present as described, refer to wiring diagram and check the dispenser wiring harness.

Removal and Replacement:

1. Disconnect the vacuum hose from the fan.
2. Remove the two #8-32 locking screws securing the fan to the dispenser housing base plate.
3. Disconnect the wires from the fan terminals and discard the fan
4. Refer to Fig. 16 and connect the wires to the new fan.
5. Install new fan through the rear access hole and secure to the dispenser housing base plate using two #8-32 locking screws.
6. Reconnect the vacuum hose to the fan.

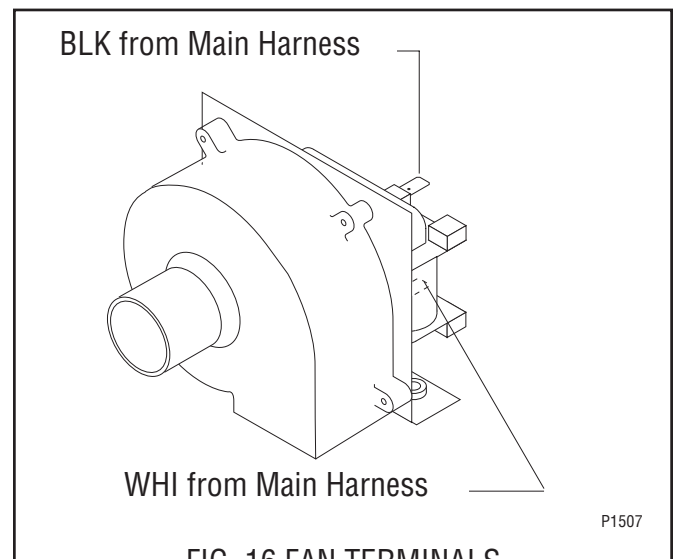


FIG. 16 FAN TERMINALS

SERVICE (cont.)

FROTHER AND WHIPPER MOTOR - FMD-4 (shown) & FMD-5

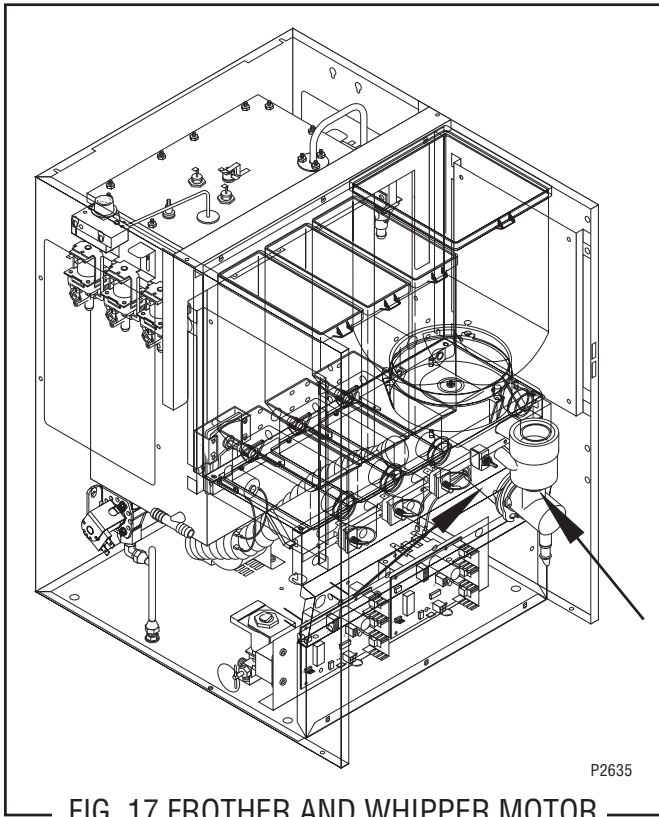


FIG. 17 FROTHER AND WHIPPER MOTOR

Location:

The frothers are located behind the dispenser door, mounted on the front panel inside the whipper chamber.

The whipper motors are located on the back side of the whipper motor mounting panel.

Test Procedure:

1. Disconnect the dispenser from the power source.
2. Disconnect the red and white wires (FMD-1 & FMD-2 left motor) or orange and white wires (FMD-2 right motor) of the main harness from the black leads of the motor.
3. Press and hold the dispense switch and check the voltage across the disconnected harness wires with a voltmeter. Connect the dispenser to the power source. The reading must be:
 - a) 120 volts ac for two wire 120 volt models.
 - b) 120 volts ac for three wire 120/208 volt or 120/240 volt models.

4. Disconnect the dispenser from the power source.

If voltage is present as described, replace the motor. If voltage is not present as described, refer to the wiring diagrams and check the dispenser wiring harness.

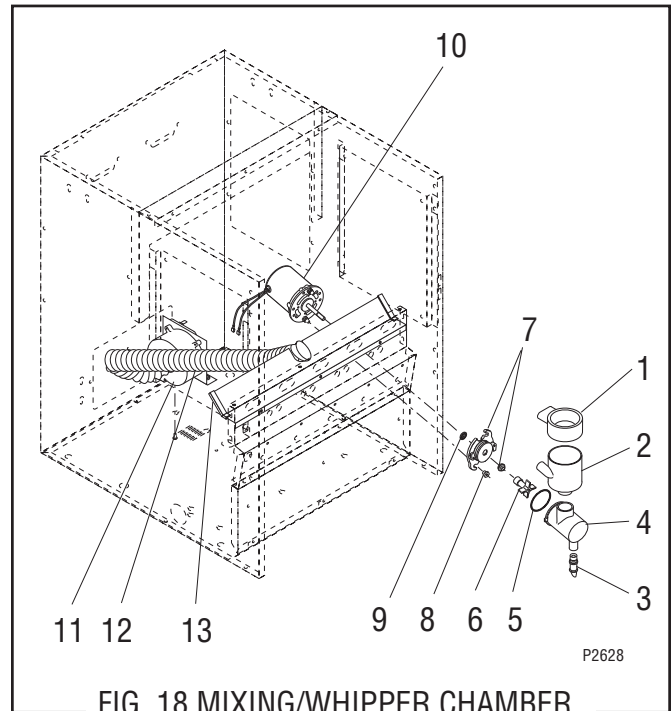


FIG. 18 MIXING/WHIPPER CHAMBER COMPONENTS

- | | |
|----------------------|-----------------|
| 1. Steam Collector | 8. Nut |
| 2. Mixing Chamber | 9. Slinger |
| 3. Dispense Tip | 10. Motor Assy. |
| 4. Whipper Chamber | 11. Fan |
| 5. O-Ring | 12. Vacuum Hose |
| 6. Frother | 13. Baffle |
| 7. Receptacle w/Seal | |

Removal, Cleaning & Replacement (Refer to Fig. 18):

1. Open the dispenser door and raise the top front cover.
2. Lift the front edge of the each hopper assembly over the tab on the hopper support panel and slide each hopper assembly out the front of the dispenser. Set aside for reassembly.
3. Remove the four #8-32 screws securing the hopper support panel to auger motor mounting panel and the whipper motor mounting panel. Set aside for reassembly.

SERVICE (cont.)

FROTHER AND WHIPPER MOTOR - FMD-4 (shown) & FMD-5 (cont.)

4. Disconnect vacuum hose (12) from fan baffle (13).
 5. Remove the steam collector (1) by pulling it forward and at the same time twisting it clockwise.
 6. Pull the mixing chamber (2) out of the whipper chamber (4).
 7. Remove the two #4-40 x .25" screws securing the fan baffle (13) to the whipper motor mounting panel and remove fan baffle. Set aside for reassembly.
 8. Remove dispense tip (3) and twist the whipper chamber (4) clockwise and pull it off the whipper chamber receptacle (7).
 9. Pull the frother (6) off the motor shaft. Notice the flat side on the shaft and the matching flat inside the frother. It is important that these two flats are lined up when reassembling.
 10. Slip the O-ring (5) off the whipper chamber receptacle (7).
 11. Slide the receptacle w/seal off of the motor shaft.
 12. Slide the slinger (9) off of the motor shaft.
 13. Remove the two nuts (8) securing whipper chamber receptacle (7) and whipper motor (10) to the front panel.
- NOTE:** To remove the receptacle only rotate clockwise until the receptacle clears the nuts (8) and slide off of the motor shaft.
14. Disconnect the black leads on the motor (10) from the main wiring harness.
 15. Remove motor and discard.
 16. Install new motor (10) on rear of front panel and secure with two nuts (8) and connect black leads on the motor to the main wiring harness. Refer to Fig. 19 when reconnecting wires
 17. Slide slinger (9) onto the motor shaft flush against the front panel.
 18. Wash remaining components in a mild solution of dish detergent using a bristle brush.
 19. Rinse thoroughly and allow to dry before reinstalling in the dispenser.
 20. Slide whipper chamber receptacle w/seal (7) and O-ring (5) on to the motor shaft.
 21. Rotate the receptacle w/seal (7) counterclockwise until it snaps into place on the motor mounting nuts (8).
 22. Push frother (6) onto the motor shaft, making sure the flat in the frother (6) lines up with the flat on the motor shaft.
 23. Install whipper chamber (4) on the whipper chamber receptacle (7) by twisting counterclockwise until the tabs on the whipper chamber (4) lock with the tabs on the whipper chamber receptacle (7). Be sure dispense port is pointing down.
 24. Install dispense tip (3) into the bottom of the whipper chamber (4).
 25. Using two #4-40 screws secure the fan baffle to the whipper motor mounting panel.
 26. Install vacuum hose (12) on fan baffle (13).
 27. Install hopper support panel using four #8-32 screws.
 28. Slip the mixing chamber (2) onto the mixing chamber water inlet tube far enough so the mixing chamber (2) will seat inside the whipper chamber (4).
 29. Install the steam collector (1) onto the mixing chamber (2) by pushing down and toward the dispenser while twisting until the flange on the steam collector lines-up with the slot in the front panel.
 30. Install hopper assembly in the dispenser by sliding hopper assembly on the hopper support panel until the slot in the bottom rear of the hopper seats against the shoulder screw in the hopper support panel.

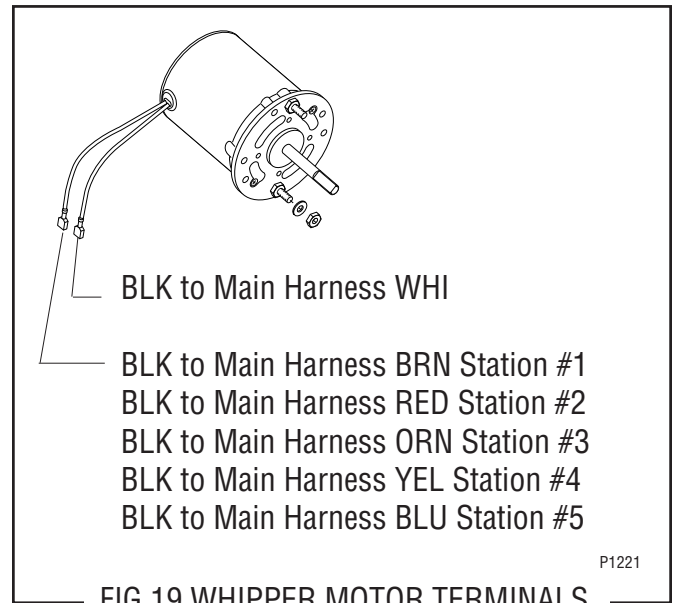


FIG.19 WHIPPER MOTOR TERMINALS

SERVICE (cont.)

INCREASE/DECREASE SWITCH

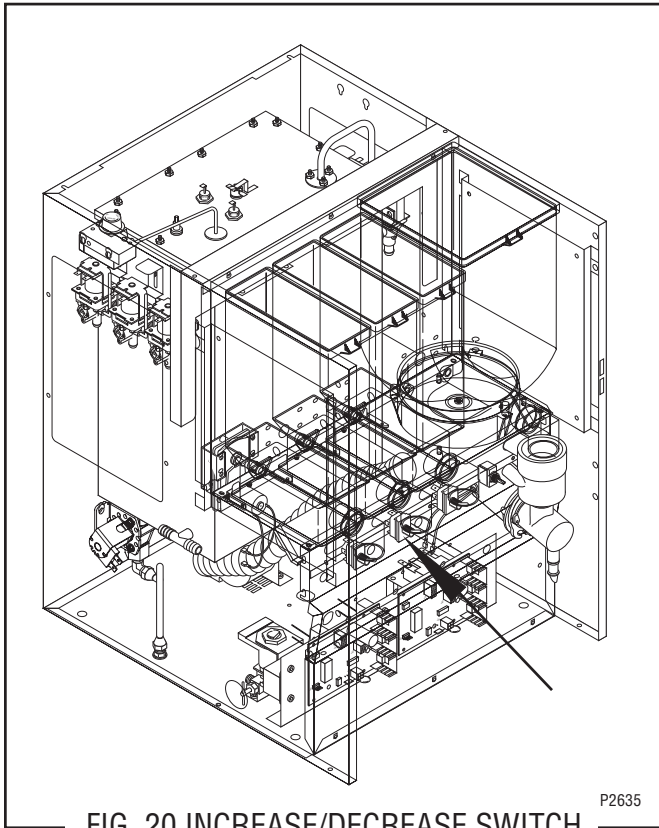


FIG. 20 INCREASE/DECREASE SWITCH

Location:

The increase/decrease switch is located on the lower left front of the whipper motor mounting panel.

Test Procedure:

1. Disconnect the dispenser from the power source.
2. Disconnect the wires from the switch terminals.
3. Check for continuity between the center terminal and upper terminal with switch in the decrease position (lower). Check for continuity between the center terminal and the lower terminal with the switch in the increase position (upper).

If continuity is present as described, the switch is operating properly.

If continuity is not present as described, replace the switch.

Removal and Replacement:

1. Open the dispenser door.
2. Remove the facenut securing the increase/decrease switch to the whipper motor mounting panel.
3. Remove switch with wires attached from the back side of the whipper motor mounting panel.
4. Disconnect the wires from the switch and discard the switch.
5. Refer to Fig. 21 when connecting the wires to the new switch.
6. Install new switch with wires attached through the hole in the whipper mounting panel and secure with facenut.

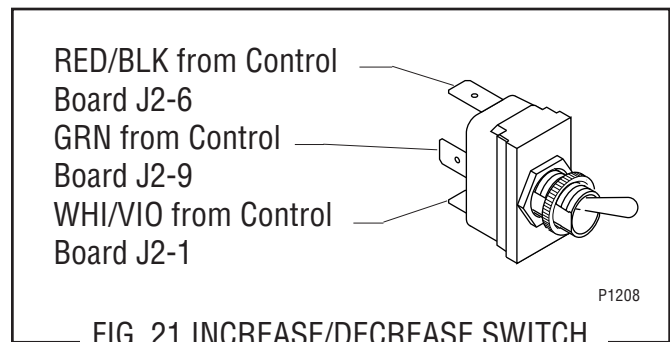


FIG. 21 INCREASE/DECREASE SWITCH
TERMINALS

SERVICE (cont.)

LAMP HOLDERS

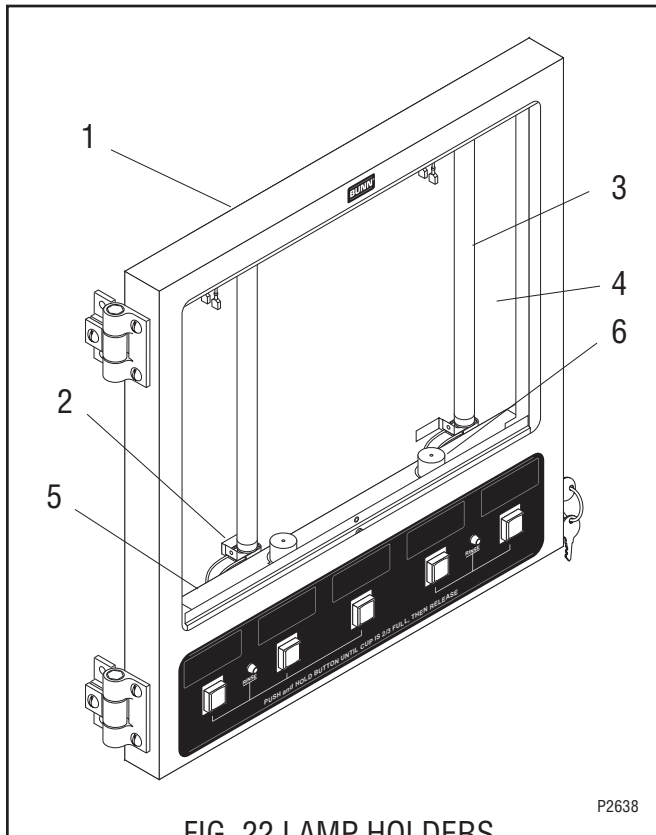


FIG. 22 LAMP HOLDERS

- | | |
|-----------------|---------------------|
| 1. Door Assy | 4. Upper Panel |
| 2. Lamp Holders | 5. Lower Panel |
| 3. Lamp | 6. Starter W/Socket |

Location:

The lamp holders are located on the front of the upper panel behind the display panel.

Test Procedure:

1. Disconnect the dispenser from the power source.
2. Remove upper door panel (4) and disconnect the door wiring harness from the leads on the lamp holders.
3. Remove lamp from lamp holders.
4. Check for continuity on each lead of the lamp holders.

If continuity is present as described, lamp holders are operating properly.

If continuity is not present as described replace the lamp holder.

Removal and Replacement:

1. Open dispenser door (1).
2. Remove the six #8-32 screws securing lower door panel (5) to the door (1) and remove cover.
3. Disconnect the door wiring harness from the door interconnect wiring harness.
4. Remove three #8-32 screws securing the upper door panel (4) to the door.
5. Remove the upper door cover (4), lamp (3), lamp holders (2) and door wiring harness as an assembly.
6. Disconnect the wires from the lamp holder to be replaced from the door wiring harness.
7. Rotate lamp (3) 90° and remove from lamp holders (2).
8. Remove the #6-32 screw securing the lamp holder (2) to be removed, remove lamp holder (2) and discard.
9. Install new lamp holder (2) and secure with a #6-32 screw.
10. Connect the wires on the new lamp holder to the door wiring harness.
11. Install lamp (3) into lamp holders (2) and turn 90° until the pins snap in place.
12. Install upper door panel (4), lamp (3), lamp holders (2) and door wiring harness as an assembly using three #8-32 screws.
13. Reconnect the plug on the door wiring harness to the connector on the door interconnect wiring harness.
14. Install the door lower panel (5) using six #8-32 screws.

LAMP REPLACEMENT (Refer to Fig. 22)

1. Open dispenser door (1).
2. Remove the six #8-32 screws securing lower door panel (5) to the door (1) and remove cover.
3. Disconnect the door wiring harness from the door interconnect wiring harness.
4. Remove three #8-32 screws securing the upper door panel (4) to the door.
5. Remove the upper door cover (4), lamp (3), lamp holders (2) and door wiring harness as an assembly.
6. Rotate lamp (3) 90° and remove from lamp holders (2).
7. Install lamp (3) into lamp holders (2) and turn 90° until the pins snap in place.
8. Install upper door panel (4), lamp (3), lamp holders (2) and door wiring harness as an assembly using three #8-32 screws.

SERVICE (cont.)

LAMP REPLACEMENT (Refer to Fig.22)(cont.)

9. Reconnect the plug on the door wiring harness to the connector on the door interconnect wiring harness.
10. Install the door lower panel (5) using six #8-32 screws.

LAMP STARTER and SOCKET (Refer to Fig. 22)

Location:

The lamp starter (6) is located inside the door assy (1) on the top of the door lower panel (5).

Test Procedures:

1. Disconnect the dispenser from the power source.
2. Disconnect the starter leads from the door wiring harness.
3. Remove lamp starter from starter socket.
4. Check for continuity on each lead of the starter socket.

If continuity is present as described the starter socket is operating properly.

If continuity is not present as described replace the starter socket.

5. Remove starter (6) from starter socket.
6. Check for continuity across the pins on the bottom of the starter (6).

If continuity is present as described, replace the starter.
If continuity is not present as described, starter is operating properly.

Note: If continuity tests are both as described and lamp does not light, replace the starter.

Removal and Replacement (Refer to Fig.22):

1. Open dispenser door assy (1)
2. Remove the four #8-32 screws securing the door lower panel (5) to the door assy (1).
3. Disconnect the leads on the starter socket from the door wiring harness.
4. Remove lower door panel (5) and starter w/socket (6) as assembly.
5. Compress the spring tabs on the socket and remove socket from the door bottom cover (5).
6. Rotate starter 90° and remove from the starter socket.
7. Insert new starter (6) into socket and turn 90° until the pins snap in place.
8. Install new socket by compressing spring tabs on the socket and pushing the socket up through the hole in the lower door panel (5) and releasing spring tabs.
9. Connect the sockets leads to the door wiring harness.
10. Install door lower panel (5) with starter and starter socket on door assy (1) using four #8-32 screws.

SERVICE (cont.)

LIMIT THERMOSTAT

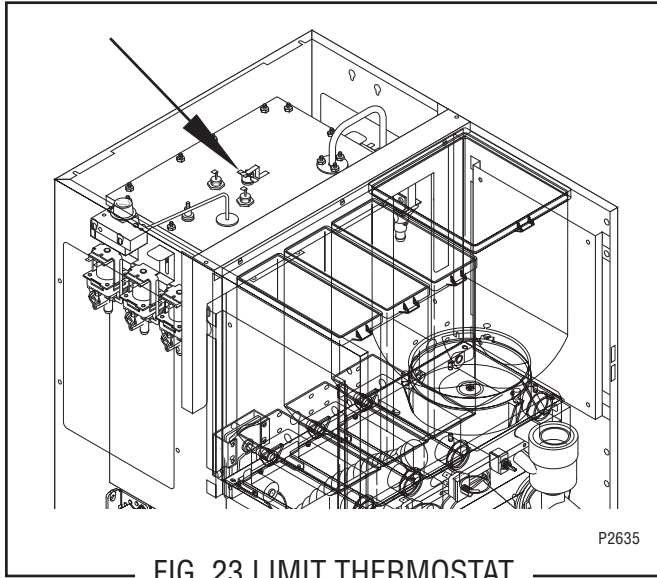


FIG. 23 LIMIT THERMOSTAT

Location:

The limit thermostat is located in the center of the tank lid.

Test Procedures:

1. Disconnect the dispenser from the power source.
2. Disconnect both black wires from the limit thermostat.
3. Check for continuity across the limit thermostat terminals.

If continuity is present as described, the limit thermostat is operating properly.

If continuity is not present as described, replace the limit thermostat.

Removal and Replacement:

1. Remove all wires from the limit thermostat terminals.
2. Carefully slide the limit thermostat out from under the retaining clip and remove the limit thermostat.
3. Carefully slide the new limit thermostat into the retaining clip.
4. Refer to Fig. 24 when reconnecting the wires.

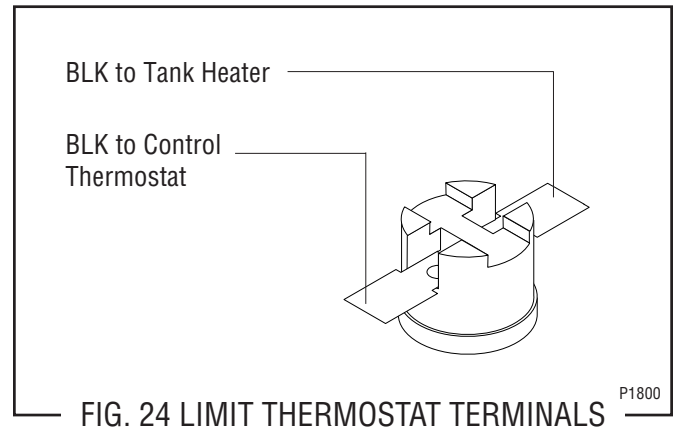


FIG. 24 LIMIT THERMOSTAT TERMINALS

SERVICE (cont.)

RINSE/RUN SWITCH

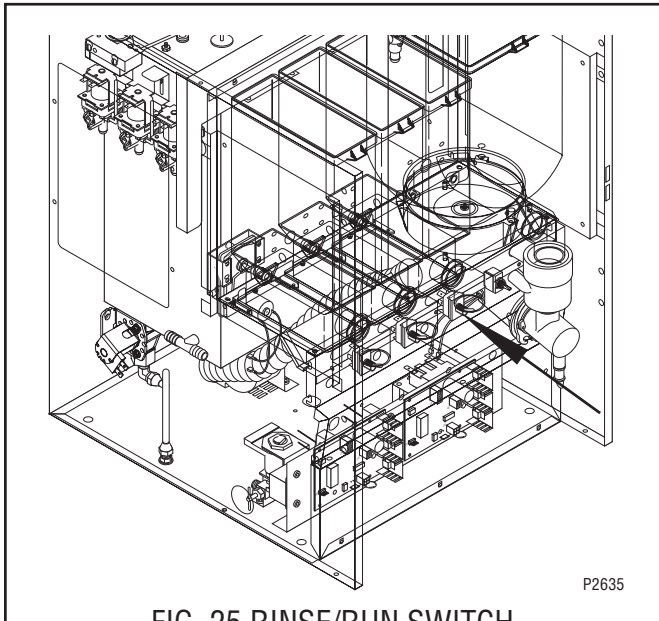


FIG. 25 RINSE/RUN SWITCH

Location:

The rinse/run switch is located on the lower center of the whipper motor mounting panel.

Test Procedures:

1. Disconnect the dispenser from the power source.
2. Check for continuity between the center left terminal and left bottom terminal, also between the center right terminal and the right bottom terminal with the switch in the rinse position (upper). Check for continuity across the center left terminal and the top left terminal, also between center right terminal and the top right terminal with the switch in the run position (lower). Continuity must not be present when the switch is in the center position.

If continuity is present as described, the switch is operating properly.

If continuity is not present as described, replace the switch.

Removal and Replacement:

1. Open the dispenser door.
2. Remove the facenut securing the run/rinse switch to the whipper motor mounting panel.
3. Remove switch with wires attached from the back side of the whipper motor mounting panel.
4. Disconnect the wires from the switch and discard the switch.
5. Refer to Fig. 26 when connecting the wires to the new switch.
6. Install new switch with wires attached through the hole in the whipper motor mounting panel and secure with facenut.

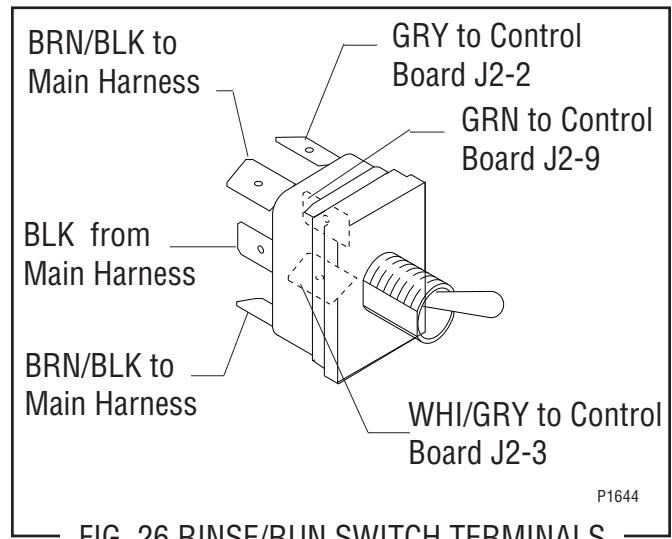


FIG. 26 RINSE/RUN SWITCH TERMINALS

SERVICE (cont.)

HOT/COLD SWITCH (Optional)

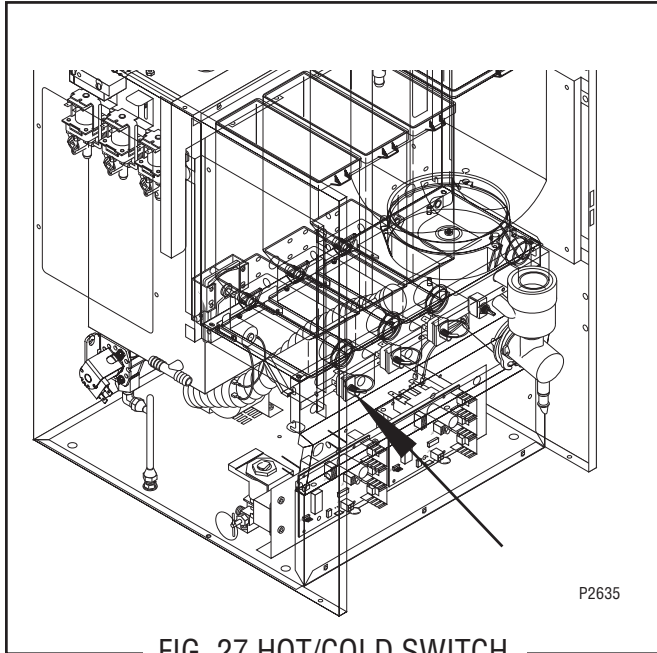


FIG. 27 HOT/COLD SWITCH

Location:

The hot/cold switch is located on the left side of the whipper motor mounting panel.

Test Procedure:

1. Disconnect the dispenser from the power source.
2. Disconnect the four pin plug from the hot/cold switch and the four pin connector on the main wiring harness.
3. Press the left dispense switch on the door and, with a voltmeter, check the voltage across the white wire (pin 4) and red wire (pin 2) in the four pin connector on the main wiring harness. Connect the dispenser to the power source. The indication must be:
 - a) 120 volts ac for two wire 120 volt models, and three wire 120/208 volt and 120/240 volt models.
 - b) 240 volts ac for two wire 240 volt models.
4. Disconnect the dispenser from the power source.

If voltage is present as described, reconnect the four pin plugs and proceed to #5.

If voltage is not present as described, refer to the *Wiring Diagrams* and check the main wiring harness.

5. Disconnect the wires from the switch terminals.
6. With the switch in the “Cold” (upper) position check for continuity between the center terminal and the bottom terminal. With the switch in the “Hot” (lower) position check for continuity between the center terminal and the upper terminal.

If continuity is present as described, the hot/cold switch is operating properly.

If continuity is not present as described, replace the switch.

Removal and Replacement:

1. Remove all wires from the switch terminals.
2. Remove the mounting nut on the front of the whipper motor mounting panel.
3. Remove the hot/cold switch from the rear of the front panel and discard.
4. Reconnect the wires to the terminals on the rear of the new switch.
5. Push new hot/cold switch through the hole on the left side of the whipper motor mounting panel and secure with mounting nut.
6. Refer to Fig. 28 when reconnecting the wires.

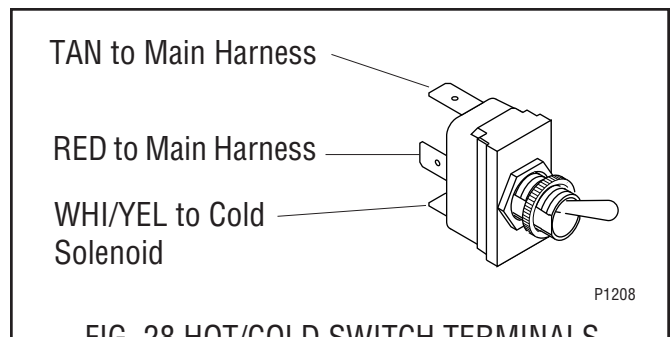


FIG. 28 HOT/COLD SWITCH TERMINALS

SERVICE (cont.)

SOLENOID VALVE (COLD WATER - OPTIONAL)

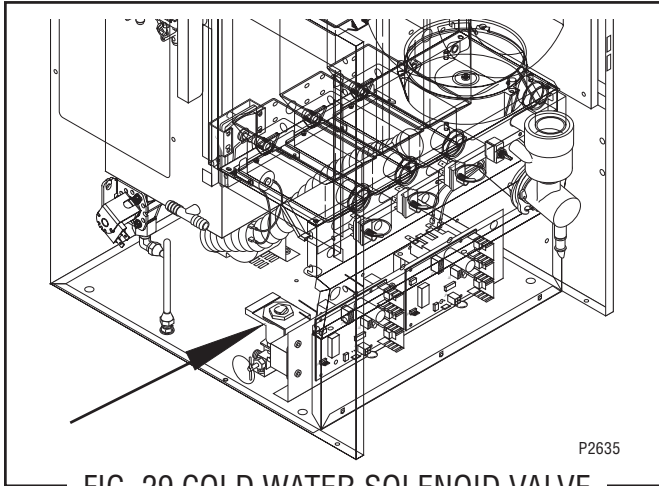


FIG. 29 COLD WATER SOLENOID VALVE

Location:

The cold water solenoid valve is located on the left side of the dispenser base just behind the component bracket.

Test Procedures:

1. Disconnect the dispenser from the power source.
2. Disconnect the white and white/yellow wires from the solenoid valve. With the "HOT/COLD" switch in the "COLD" (upper) position press the left dispense switch on front of the door.
3. With a voltmeter, check the voltage across the white and white/yellow wires. Connect the dispenser to the power source. The indication must be:
 - a) 120 volts ac for two wire 120 volt models, three wire 120/208 volt, and 120/240 volt models.
 - b) 240 volts ac for two wire 240 volt models.
4. Disconnect the dispenser from the power source.

If voltage is present as described, proceed to #5

If voltage is not present as described, refer to *Wiring Diagrams* and check dispenser wiring harness.

5. Check for continuity across the solenoid valve coil terminals.

If continuity is present as described, reconnect the white and white/yellow wires to the solenoid.

If continuity is not present as described, replace the solenoid valve.

6. Check the solenoid valve for coil action. Connect the dispenser to the power source. With "HOT/COLD" switch in the "COLD" (upper) position press the left dispense switch and listen carefully in the vicinity of the solenoid valve for a "clicking" sound as the coil magnet attracts.
7. Disconnect the dispenser from the power source.

If the sound is heard as described and water will not pass through the solenoid valve, there may be a blockage in the water line before the solenoid valve or, the solenoid valve may require inspection for wear, and removal of waterborne particles.

If the sound is not heard as described, replace the solenoid valve.

Removal and Replacement:

1. Loosen the two screws securing the component bracket to the dispenser base. Lift the component bracket off of the base and move to the right.
2. Remove the white and white/yellow wires from the solenoid valve.
3. Turn off the water supply to the dispenser.
4. Disconnect the water lines to and from the solenoid valve.
5. Loosen the two #8-32 screws and washers securing the solenoid mounting bracket to the base. Remove solenoid bracket and solenoid valve as an assembly.
6. Remove the two #10-32 screws and lockwashers securing the solenoid valve to the solenoid bracket.
7. Using two #10-32 screws and lockwashers install new solenoid valve on solenoid mounting bracket.
8. Install the solenoid valve and bracket on the dispenser base and tighten the two #8-32 screws.
9. Securely fasten the water lines to and from the solenoid valve.
10. Refer to Fig. 30 when reconnecting the wires.

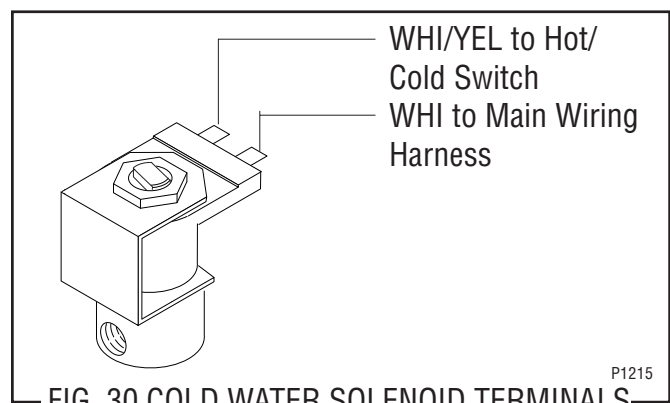


FIG. 30 COLD WATER SOLENOID TERMINALS

SERVICE (cont.)

SOLENOID VALVE (DISPENSE) - FMD-4 & FMD-5

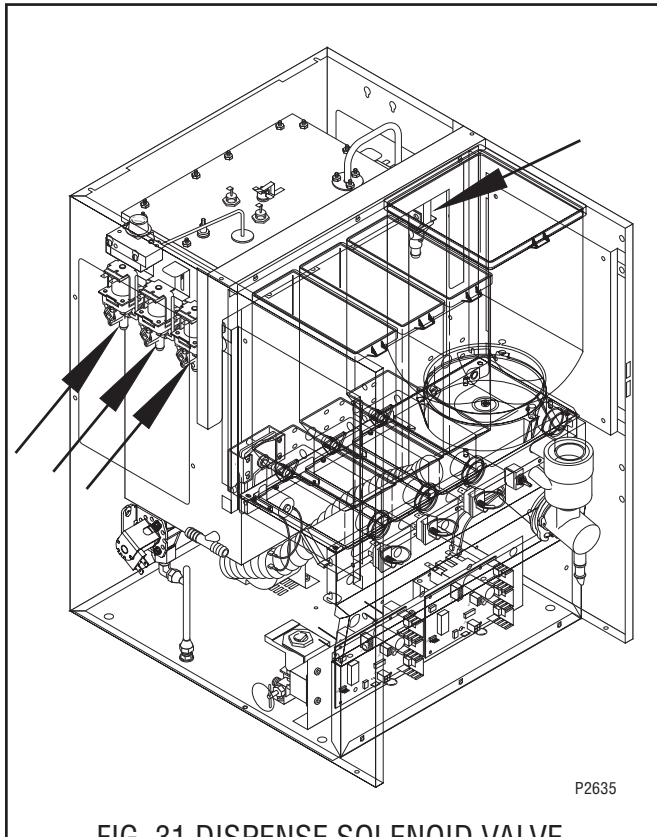


FIG. 31 DISPENSE SOLENOID VALVE

Location:

The dispense solenoid is located on the upper left center of the tank.

Test Procedures:

1. Disconnect the dispenser from the power source.
2. Disconnect the two wires from the solenoid valve that is being tested. With the "RINSE/RUN" switch in the "RINSE" upper position press the dispense switch on front of the door.
3. Check the voltage across the two wires with a voltmeter. Connect the dispenser to the power source. The indication must be 120 volts ac for two wire 120 volt models, three wire 120/208 and 120/240 volt models.
4. Disconnect the dispenser from the power source.

If voltage is present as described, proceed to #5
If voltage is not present as described, refer to wiring diagram and check dispenser wiring harness.

5. Check for continuity across the solenoid valve coil terminals.

If continuity is present as described, reconnect the wires to the solenoid (see Fig. 32), proceed to #6

If continuity is not present as described, replace the solenoid valve.

6. Check the solenoid valve for coil action. Connect the dispenser to the power source. With "RINSE/RUN" switch in the "RINSE" upper position press the dispense switch and listen carefully in the vicinity of the solenoid valve for a "clicking" sound as the coil magnet attracts.
7. Disconnect the dispenser from the power source.

If the sound is heard as described and water will not pass through the solenoid valve, there may be a blockage in the water outlet before the solenoid valve or, the solenoid valve may require inspection for wear, and removal of waterborne particles.

If the sound is not heard as described, replace the solenoid valve.

SERVICE (cont.)

SOLENOID VALVE (DISPENSE) - FMD-4 & FMD-5 (cont.)

Removal and Replacement:

1. Remove the four #8-32 screws securing the side access panel to the housing. Remove panel and set aside.
2. Remove the wires from the solenoid valve.
3. Turn-off the water supply to the dispenser.
4. Using the tank drain tube, drain enough water from the tank so the water level is below the dispense valve mounting hole.
5. Disconnect the water line from the solenoid valve.
6. Remove the #8-32 keps nut securing the solenoid valve bracket to side of the tank. Remove solenoid valve.
7. Install new solenoid valve and o-ring on side of the tank and secure in place with valve mounting bracket and #8-32 keps nut.
8. Push the water line onto the tube on bottom of solenoid valve.
9. Refer to Fig. 32 and reconnect the wires.
10. Reinstall side access panels.

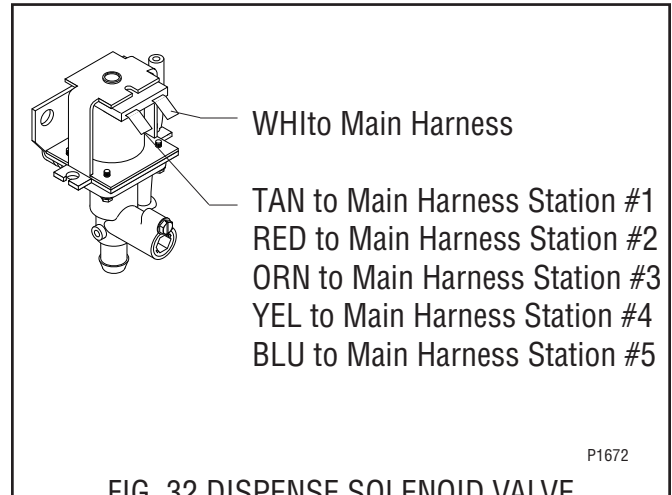


FIG. 32 DISPENSE SOLENOID VALVE
TERMINALS

SERVICE (cont.)

SOLENOID VALVE (INLET)

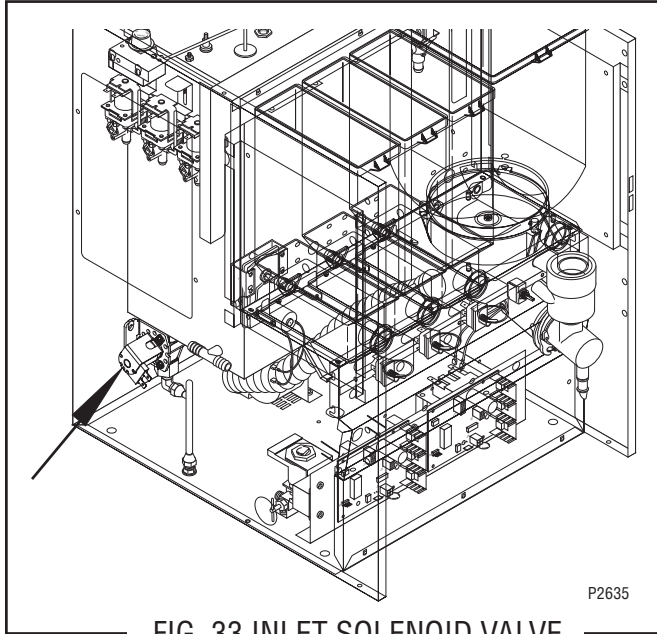


FIG. 33 INLET SOLENOID VALVE

Location:

The inlet solenoid is located on the lower left side near the rear panel.

Test Procedures:

1. Disconnect the dispenser from the power source.
2. Disconnect the white and violet wires from the solenoid valve.
3. Check the voltage across the white and violet wires with a voltmeter. Connect the dispenser to the power source. The indication must be 120 volts ac for two wire 120 volt models, three wire 120/208 and 120/240 volt models.
4. Disconnect the dispenser from the power source,

If voltage is present as described, proceed to #5

If voltage is not present as described, refer to the wiring diagram and check dispenser wiring harness.

5. Check for continuity across the solenoid valve coil terminals.

If continuity is present as described, reconnect the white and violet wires to the solenoid.

If continuity is not present as described, replace the solenoid valve.

6. Check the solenoid valve for coil action. Connect the dispenser to the power source. Listen carefully in the vicinity of the solenoid valve for a "clicking" sound as the coil magnet attracts.
7. Disconnect the dispenser from the power source.

If the sound is heard as described and water will not pass through the solenoid valve, there may be a blockage in the water line before the solenoid valve or, the solenoid valve may require inspection for wear, and removal of waterborne particles.

If the sound is not heard as described, replace the solenoid valve.

Removal and Replacement:

1. Remove the white and violet wires from the solenoid valve.
2. Turn-off the water supply to the dispenser.
3. Disconnect the water lines to and from the solenoid valve.
4. Remove the two #8-32 screws securing the solenoid to the rear of the dispenser housing. Remove solenoid.
5. Remove the two #8-32 U-Type fasteners from the solenoid bracket.
6. Install the two #8-32 U-Type fasteners and the two #8-32 screws on the new solenoid.
7. Install new solenoid on rear of dispenser housing and tighten the two screws
8. Securely fasten the water lines to and from the solenoid valve.
9. Refer to Fig. 34 and reconnect the wires.

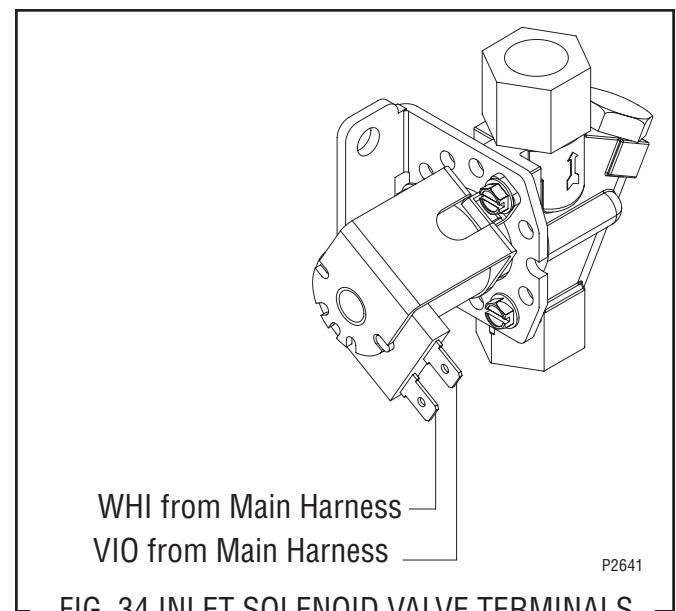


FIG. 34 INLET SOLENOID VALVE TERMINALS

SERVICE (cont.)

TANK HEATER

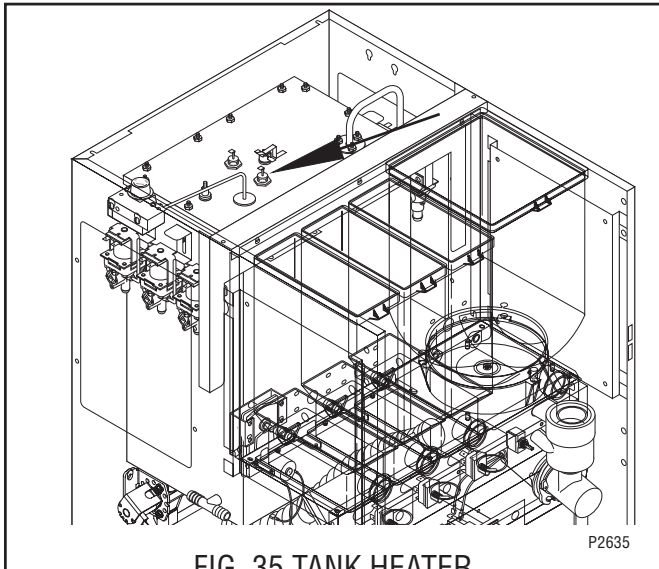


FIG. 35 TANK HEATER

Location:

The tank heater is located inside the tank and secured to the tank lid.

Test Procedure:

1. Disconnect the dispenser from the power source.
2. Check the voltage across the black and white wires 120 volt models or black and red wires for 120/208 volt models or 120/240 volt models with a voltmeter. Connect the dispenser to the power source. The indication must be:
 - a) 120 volts ac for two wire 120 volt models;
 - b) 208 volts ac for three wire 120/208 volt models.
 - c) 240 volts ac for three wire 120/240 volt models.
3. Disconnect the dispenser from the power source.

If voltage is present as described, proceed to #4.

If voltage is not present as described, refer to the dispenser wiring diagram and check the wiring harness.

4. Disconnect the black wire and the white or red wire from the tank heater terminals.
5. Check for continuity across the tank heater terminals.

If continuity is present as described, reconnect the wires, the tank heater is operating properly.

If continuity is not present as described, replace the tank heater.

NOTE - If the tank heater remains unable to heat, remove and inspect heater for cracks in the sheath.

Removal and Replacement:

1. Disconnect the dispenser from the power source.
2. Disconnect the water supply tube on the tank lid.
3. Disconnect the black wires on the limit thermostat.
4. Disconnect the black wire and the white or red wire from the tank heater terminals.
5. Disconnect the pink wire from the liquid level probe and the green wire from the tank.
6. Remove the thermostat capillary bulb by firmly pulling-up on the capillary at the tank lid. This will disengage the grommet from the tank lid.
7. Remove the ten #8-32 nuts securing the tank lid to the tank.
8. Remove tank lid with limit thermostat, liquid level probe and tank heater as an assembly.
9. Remove the two hex nuts securing the tank heater to the tank lid. Remove tank heater with gaskets and discard.
10. Install new tank heater with gaskets on the tank lid and secure with two hex nuts.
11. Install tank lid with limit thermostat, liquid level probe and tank heater on the tank and secure with ten #8-32 hex nuts.
12. Connect water inlet line to the tank lid.
13. Reconnect the black wires to limit thermostat, the pink wire to the liquid level probe and the green wire to the tank. Refer to the limit thermostat and the liquid level board and probe sections in this manual when reconnecting wires.
14. Refer to Fig. 36 when reconnecting the wires to the tank heater.

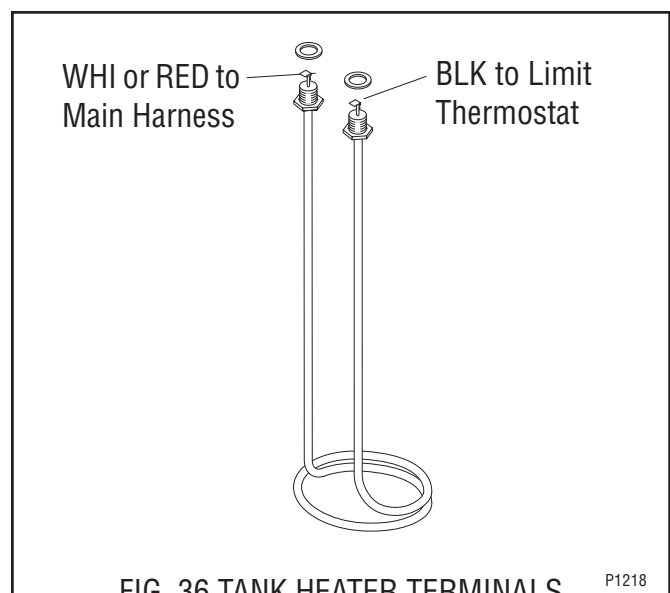


FIG. 36 TANK HEATER TERMINALS

SERVICE (cont.)

TANK HEATER SWITCH

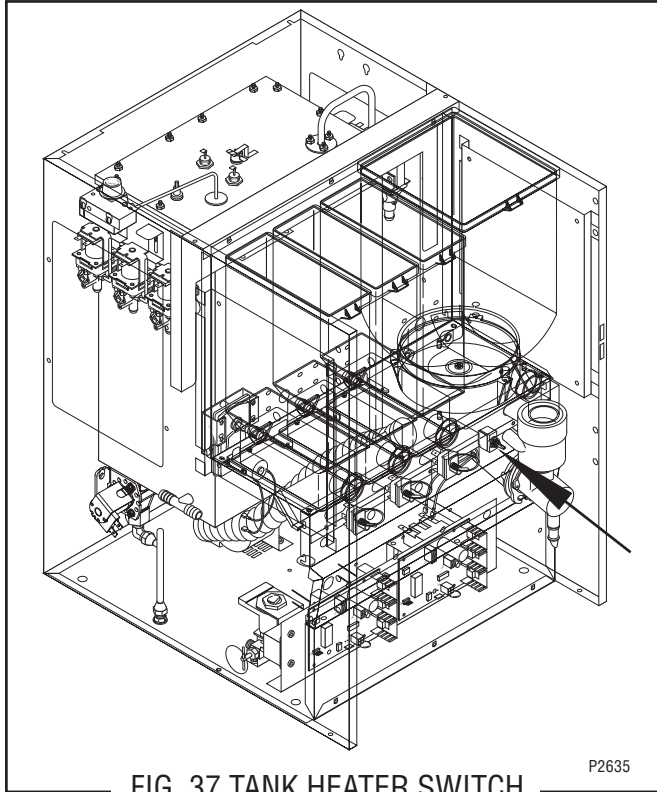


FIG. 37 TANK HEATER SWITCH

Location:

The tank heater switch located inside the dispenser on the upper right of the front panel.

Test Procedure:

1. Disconnect the dispenser from the power source.
2. Disconnect the black wires from the main wiring harness.
3. With the switch in the "ON" lower position check for continuity between the center and the upper terminal. With the switch in the "OFF" upper position no continuity should be present between center and upper terminals.

If continuity is present as described, the tank heater "ON/OFF" switch is operating properly.

If continuity is not present as described, replace the switch.

Removal and Replacement:

1. Remove the switch mounting nut on the front of the front panel.
2. Remove switch with wires attached from the rear of the front panel.
3. Remove the wires from the switch terminals and discard switch.
4. Connect the wires to the new switch, refer to Fig. 38.
5. Push new switch through hole in the front panel and secure with facenut.

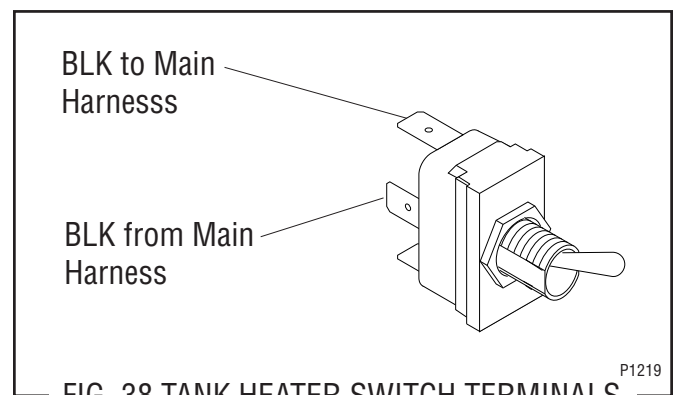


FIG. 38 TANK HEATER SWITCH TERMINALS

SERVICE (cont.)

TANK HEATER RELAY (120V Dispensers only)

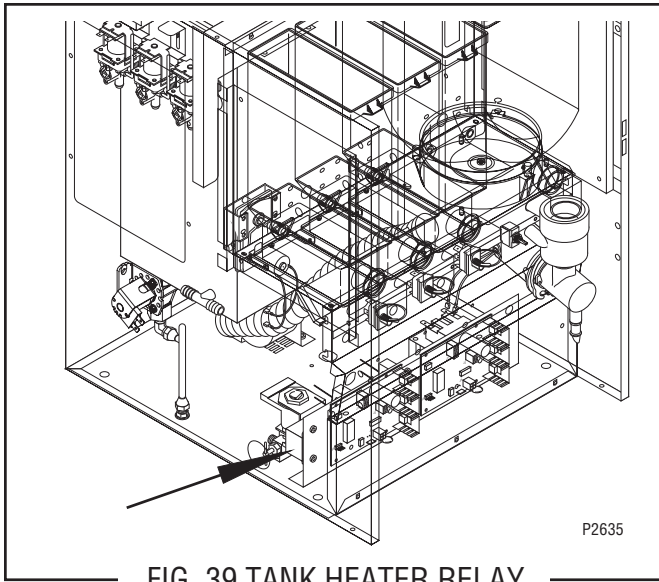


FIG. 39 TANK HEATER RELAY

Location:

The tank heater relay is located behind the lower front access cover, mounted on the left rear side of the component bracket.

Test Procedure:

1. Disconnect the dispenser from the power source.
2. Place the tank heater switch in the "OFF" (upper) position.
3. With an ohmmeter, check for continuity between normally closed (NC-5) and common (COM-3) terminals of the relay. The indication must be less than 1 ohm.

If continuity is present as described, proceed to step 4.
If continuity is not present as described, replace the relay.

4. With an ohmmeter, check the resistance across the coil terminals (1 & 2) of the relay. The indication must be approximately 4,000 ohms (4k Ω).

If the resistance measures as described, proceed to step 5.

If the resistance does not measure as described, replace the relay.

5. Disconnect the wires from the normally closed (NC-5) and common (COM-3) terminals of the relay.

6. With an ohmmeter, check for continuity between the normally closed (NC-5) and common (COM-3) terminals of the relay.
7. Place containers below any three dispense nozzles.
8. Connect the dispenser to the power source.
9. Simultaneously initiate dispenses at each of the selected dispense stations while monitoring continuity across the referenced terminals of the tank heater relay. The indication must be open circuit.

If continuity is absent as described, the relay is functioning correctly.

If continuity is present, replace the relay.

Removal and Replacement:

1. Loosen the three #8-32 screws securing the component bracket to the dispenser housing base.
2. Pull component bracket out the front of the dispenser far enough so the tank heater relay can be disconnected from the main wiring harness.
3. Disconnect the tank heater relay from the main wiring harness.
4. Remove the two #8-32 screws securing the tank heater relay to the rear of the component bracket.
5. Remove and discard the tank heater relay.
6. Install new tank heater relay on the rear of the component bracket and secure with two #8-32 screws.
7. Connect the tank heater relay to the main wiring harness (see Fig. 40).
8. Place the component bracket into position and tighten the three #8-32 screws.

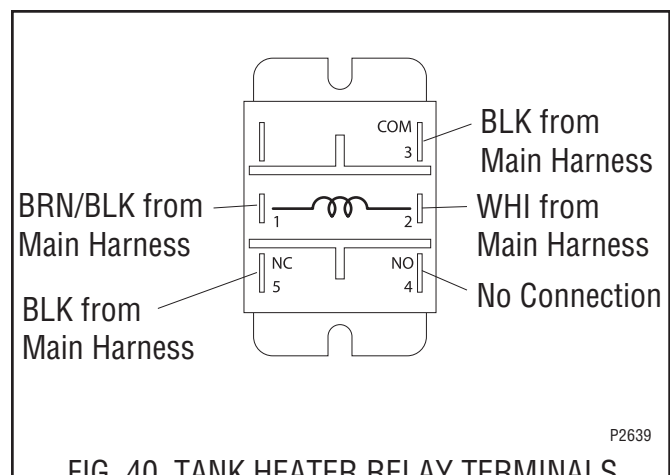


FIG. 40 TANK HEATER RELAY TERMINALS

SERVICE (cont.)

TRANSFORMER

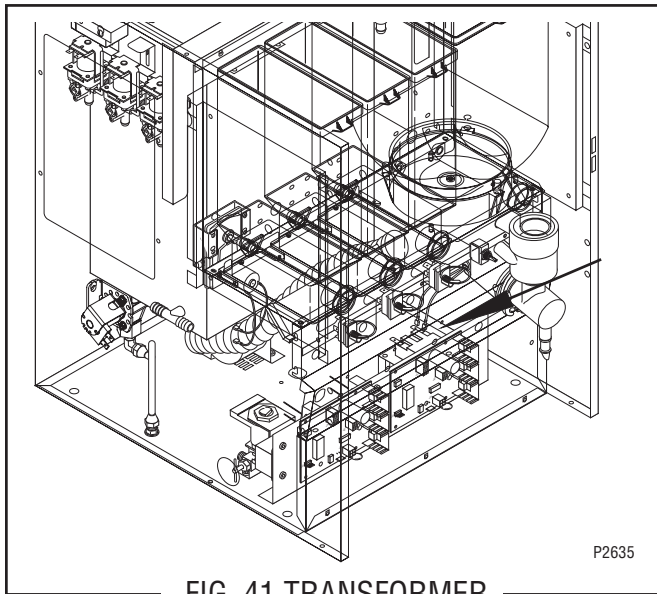


FIG. 41 TRANSFORMER

Location:

The transformer is located behind the lower front access cover, mounted on the right rear side of the component bracket.

Test Procedure:

1. Disconnect the dispenser from the power source.
2. Disconnect the four wires of the main harness from the transformer.
3. Check the voltage across black wire and the white wire on the main harness. Connect the dispenser to power source. The indication must be:
 - a. 120 volts ac for two wire 120 volt models.
 - b. 120 volts for three wire 120/208 volt models and three wire 120/240 volt models.
4. Disconnect the dispenser from the power source.

If voltage is present as described reconnect the wires and proceed to #5.

If voltage is not present as described, refer to the wiring diagrams and check the main wiring harness.

5. Check the voltage between J3-5 and J3-6 on the six pin connector at either control board. Connect the dispenser to the power source. The indication must be 24 volts ac.

If voltage is present as described the transformer is operating properly.

If voltage is not present as described, replace the transformer.

Removal and Replacement:

1. Loosen the three #8-32 screws securing the component bracket to the dispenser housing base.
2. Pull component bracket out the front of the dispenser far enough so the transformer can be disconnected from the main wiring harness.
3. Disconnect the transformer from the main wiring harness.
4. Remove the two #8-32 screws securing the transformer to the rear of the component bracket.
5. Remove and discard the transformer.
6. Install new transformer on the rear of the component bracket and secure with two #8-32 screws.
7. Connect the transformer to the main wiring harness (see Fig. 42).
8. Place the component bracket into position and tighten the three #8-32 screws.

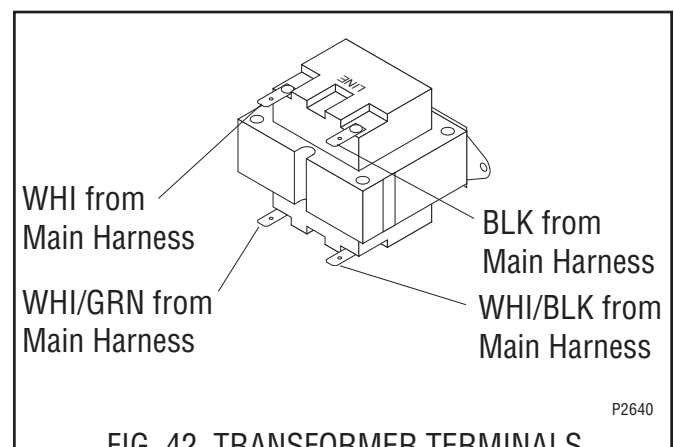
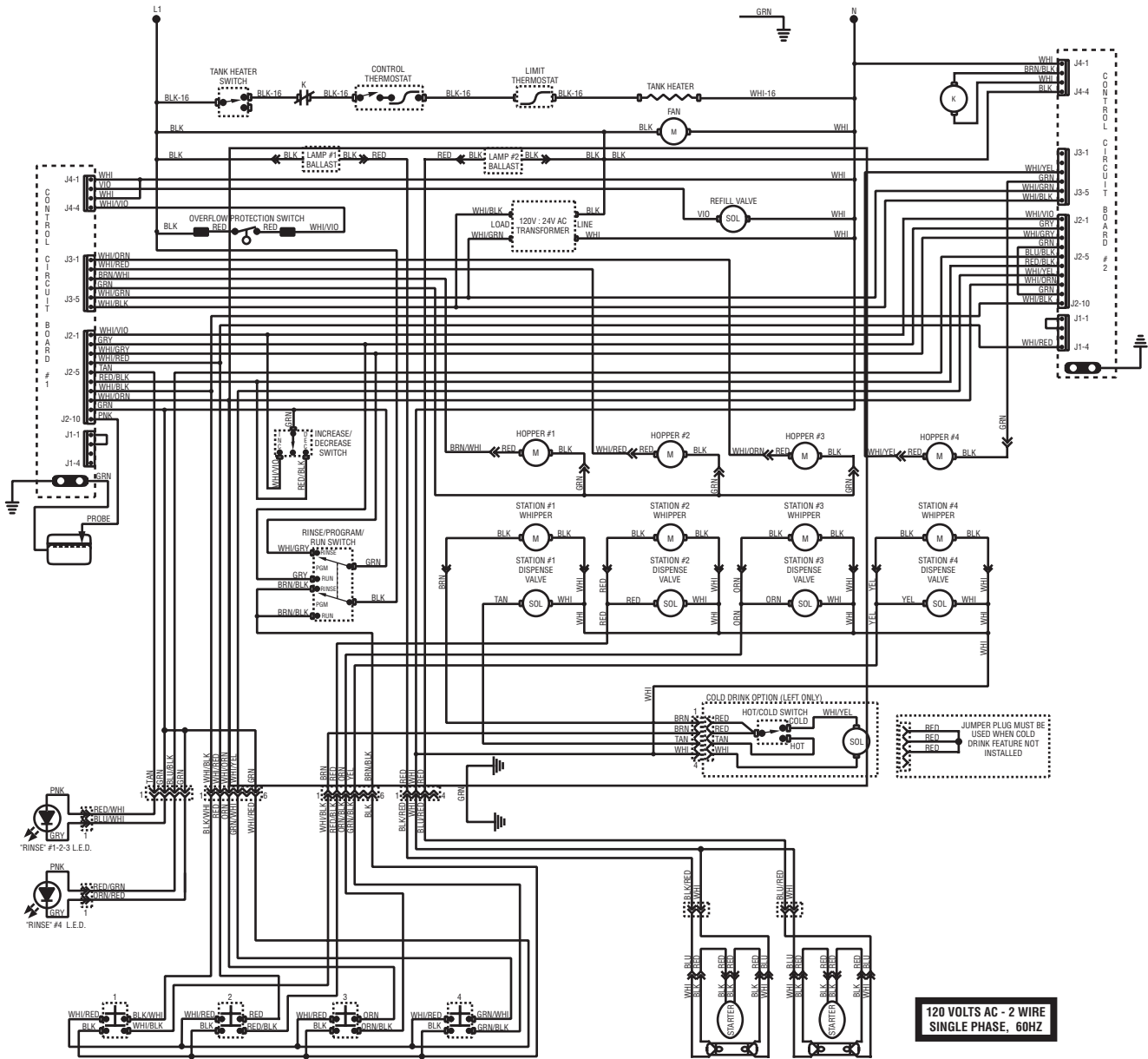
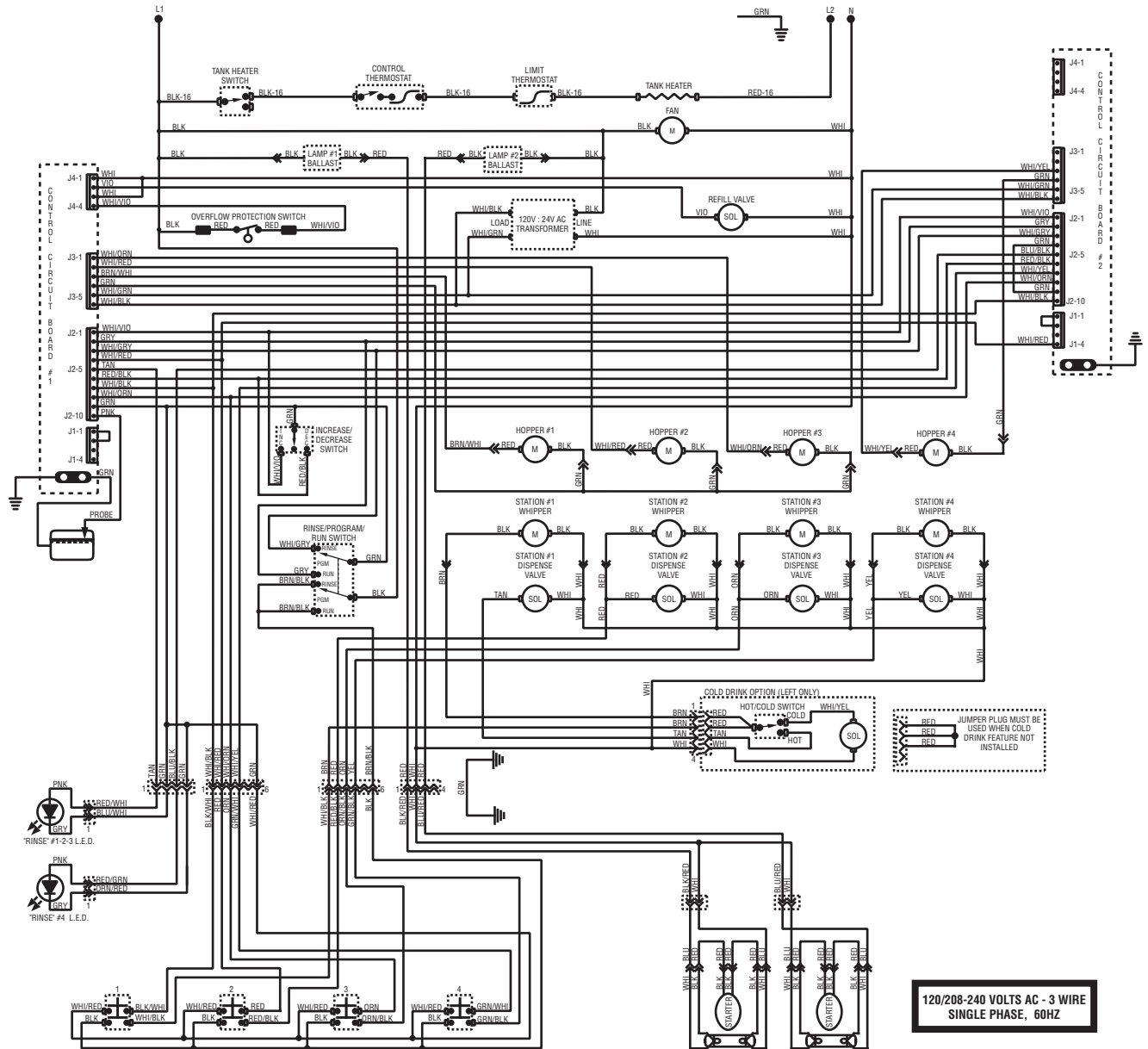


FIG. 42 TRANSFORMER TERMINALS

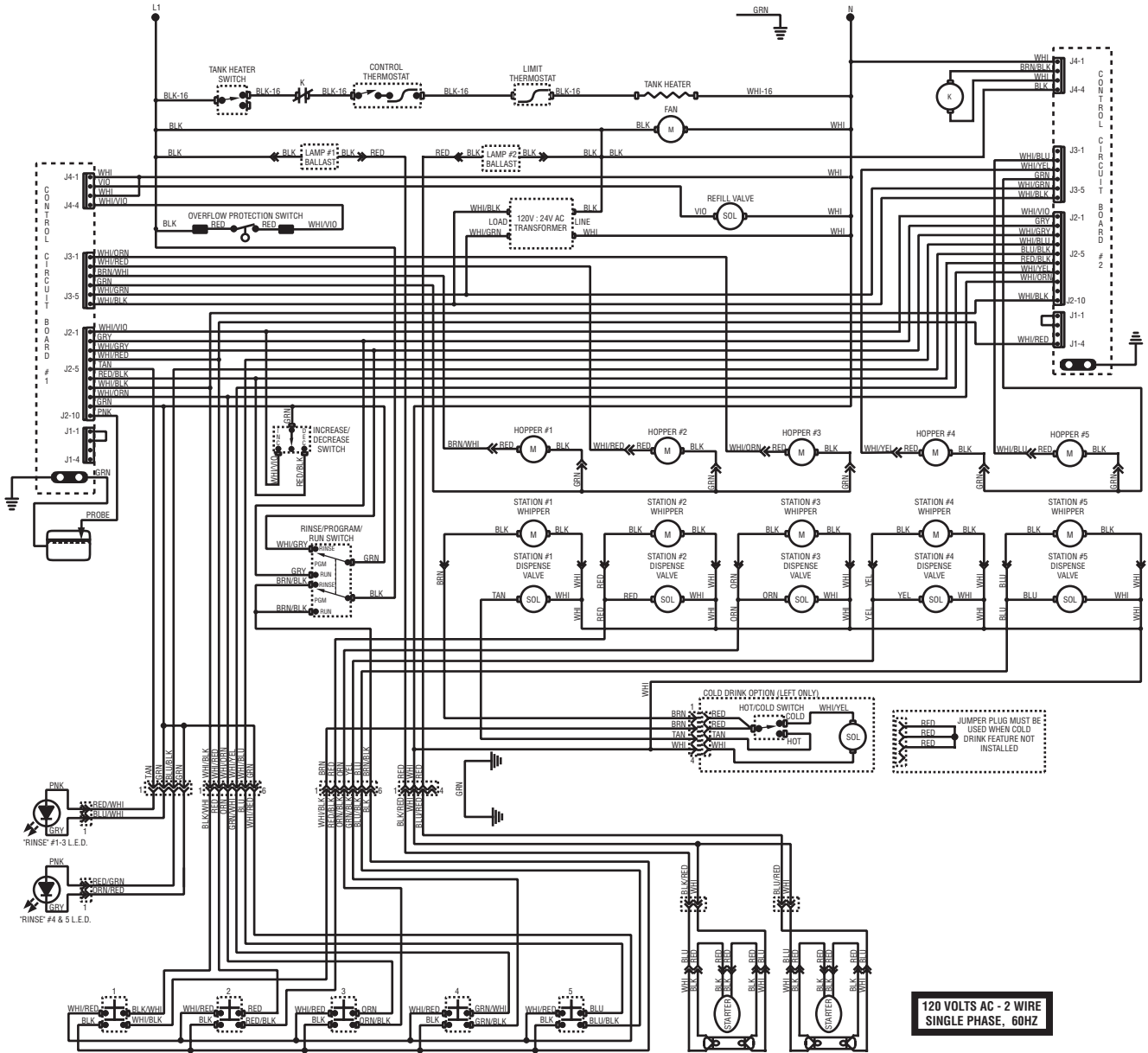
SCHEMATIC WIRING DIAGRAM FMD-4



SCHEMATIC WIRING DIAGRAM FMD-4



SCHEMATIC WIRING DIAGRAM FMD-5



SCHEMATIC WIRING DIAGRAM FMD-5

