# EC24 Coffee System
# Service Manual

General Information . . . . . 2
Controls & Operation . . . . . 7
Grinder Set Up . . . . . 12
Component Access & Removal . . . . . 15
Troubleshooting Guide . . . . . 30
Technical Data . . . . . 40
Wiring Diagrams . . . . . 41

## INTRODUCTION

This Manual is a compilation of information from Wolf Appliance, Inc. and DeLonghi Group, meant to provide the most recent technical service information about model EC24. This information will enable the service technician to perform necessary repairs and return the appliance to proper operational condition.

The service technician should read the complete instructions contained in this Technical Service Manual before initiating any repairs on the Wolf appliance.

## IMPORTANT SAFETY INFORMATION

Below are the Product Safety Labels used throughout this manual. The "Signal Words" used are **WARNING** and **CAUTION**.

Please note that these safety labels are placed in areas where awareness of personal safety and product safety should be taken and lists the precautions to be taken when the signal word is observed.

**⚠ WARNING**

**INDICATES THAT HAZARDOUS OR UNSAFE PRACTICES COULD RESULT IN SEVERE PERSONAL INJURY OR DEATH**

**⚠ CAUTION**

**Indicates that hazardous or unsafe practices could result in minor personal injury or product and/or property damage**

In addition, please pay attention to the signal word ***"NOTE"***, which highlights especially important information within each section.

## TECHNICAL ASSISTANCE

If you should have any questions regarding the appliance and/or this manual, please contact:

*Wolf Appliance, Inc.*
*ATTN: Service Department*
*P.O. Box 44988*
*Madison, WI 53744 - 4988*

*Customer Assistance*
*Phone #: (800) 332 - 9513*
*Facsimile #: (608) 441 - 5887*

*Technical Assistance*
*(For Technicians in Customer's Homes Only)*
*Phone #: (800) 919 - 8324*

*Warranty Claims*
*Phone #: (800) 404 - 7820*
*Facsimile #: (608) 441 - 5886*

*Service Department e-mail Address:*
*customerservice@wolfappliance.com*

*Main Office Hours:*
*8:00 AM to 5:00 PM Central Time*
*Monday through Friday*
*(24/7 Phone Coverage)*

**This manual is designed to be used by Certified Service Personnel only. Wolf Appliance, Inc. assumes no responsibility for any repairs made to Wolf appliances by anyone other than Certified Service Technicians.**

## WARRANTY INFORMATION

This page contains a summary of the 2 & 5 Year Warranty that is supplied with every Wolf product, followed by a Non Residential Warranty Summary and then notes about the warranties.

**TWO & FIVE YEAR Warranty Summary**

- Two year TOTAL PRODUCT warranty, parts and labor.
- Limited Parts Only Warranty for the 3rd through 5th year on generator assembly, heating element assembly, LED board, display board, and on power board.

***NOTE:*** *This warranty only applies to products installed for normal residential use in the United States or Canada.*

**NON RESIDENTIAL Warranty Summary (Special Application)**

- Two year TOTAL PRODUCT warranty, parts and labor.

***NOTE:*** *This warranty only applies to products installed in demonstration kitchens, test kitchens, culinary and school kitchens, and other installations which help promote Wolf Appliance brand and products. Restaurant installations and other similar commercial applications carry no warranty .*

**60 DAY STAINLESS STEEL COSMETIC WARRANTY**

- Stainless steel (doors, panels, handles, product frames and interior surfaces) are covered by a limited 60-day parts and labor warranty for cosmetic defects on any unit under normal warranty.

**RATING PLATE INFORMATION**

- There are three information plates on the EC24. On right hand side is the manufacture's serial number. On the left hand side is Wolf Appliance rating plate and a second plate with Wolf Appliance serial number. (See Figures 1-1, 1-2, and 1-3).

***WARRANTY NOTES:***

- *All warranties begin at the time of the unit's initial installation.*
- *All Warranty and Service information collected by Wolf Appliance, Inc. is arranged and stored under the unit serial number and/or the customer's name. It is requested that you have the model and serial number available whenever contacting the factory or parts distributor.*

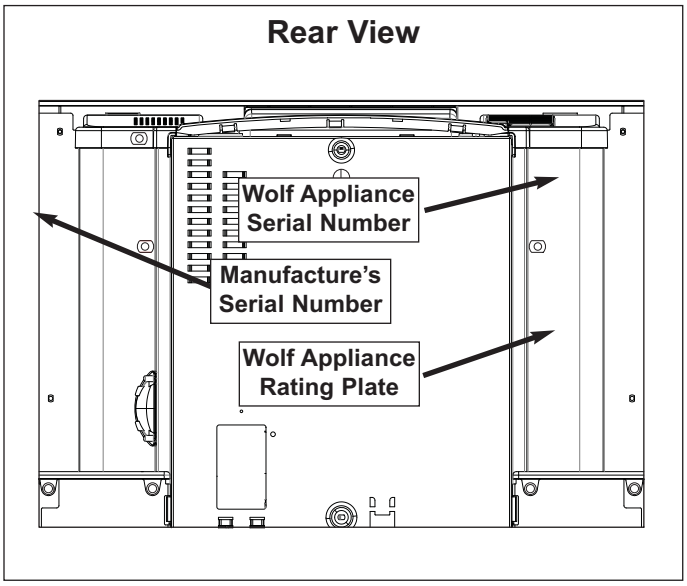



**Figure 1-1. Rating Plate Label Locations**


**Figure 1-2. Wolf Appliance Rating Plates**


**Figure 1-3. Manufacture's Rating Plate**

## COFFEE SYSTEM FEATURES

- Create perfectly brewed coffee, espresso, cappuccino, macchiato and latte at home.
- Separate hot water dispenser for tea.
- Mounted glide system provides easy access to unit.
- No direct water line is needed.
- Adjustable coffee strength.
- Adjustable coffee volume.
- Personalized “My Coffee” volume.
- Milk frothing carafe with adjustable settings, detaches for refrigerated storage and easy cleaning.
- Built-in coffee mill with adjustable grind settings.
- Auto on, auto off, and descaling features.
- Adjustable Hardness setting.
- Adjustable Temperature setting.
- Two and five year residential warranty—exclusions apply, see warranty information.

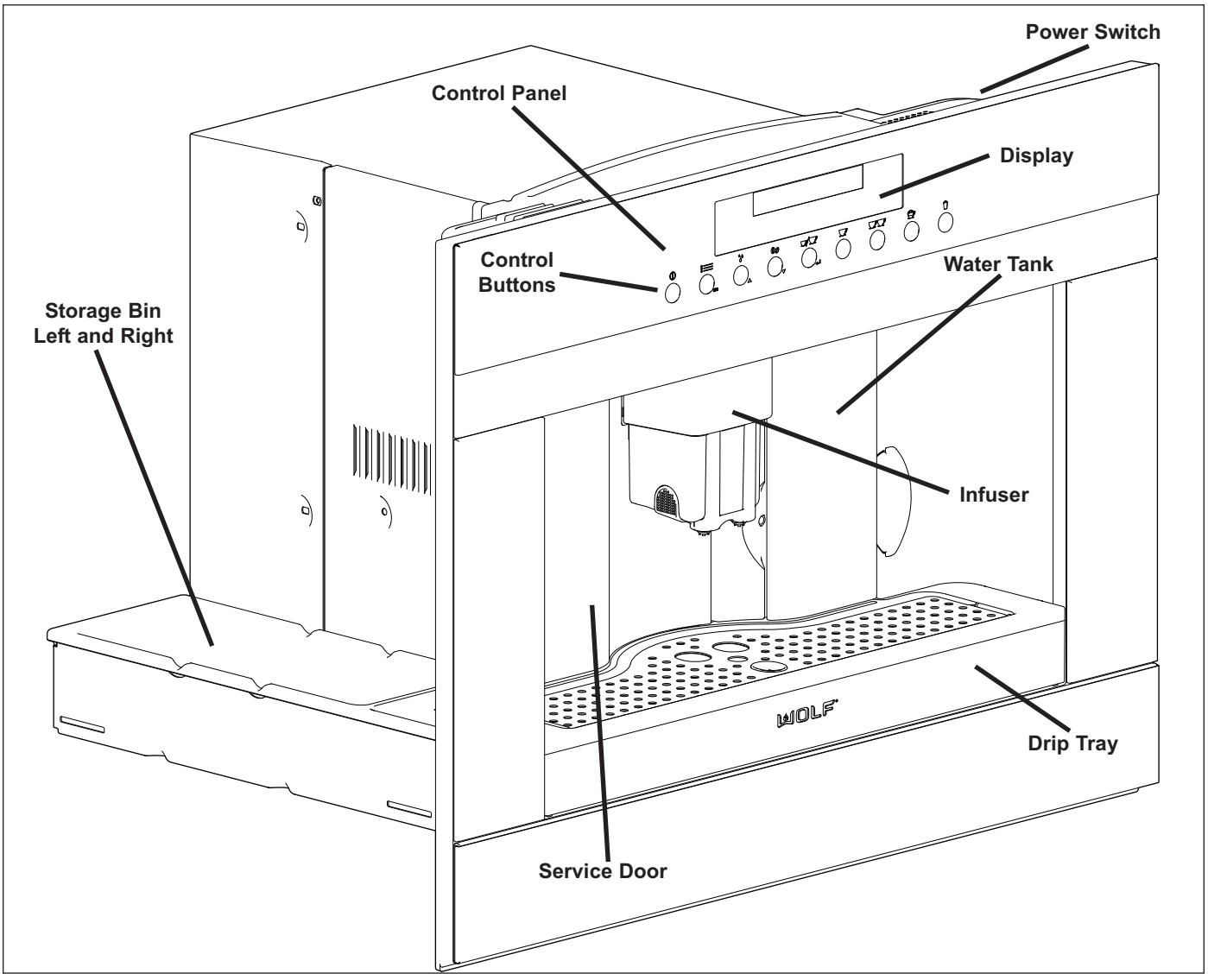



**Figure 1-4. Appliance Features**

## MODE/MENU SYMBOLS AND CONTROL PANEL

The display and control panel is streamlined and easy to use. Buttons are used to set mode, volume, and coffee strength. Buttons are also used to access extended options to personalize the coffee system for exceptional results.

### Mode Symbols (above control buttons)

**On/Standby:** Activates unit or places it in standby when main power switch is on.

**Extended Options:** Gives user ability to set thirteen options such as hardness, contrast, coffee temperature language, auto-start time.

**Hot Water:** Delivers hot water.

**Coffee Taste:** Selects desired coffee strength from pre-ground, extra mild, mild, standard, strong and extra-strong.

**Volume:** Selects desired volume of coffee from espresso, short coffee, coffee, long coffee, and my coffee.

**Cycle:** Initiates brewing cycle.

**Cycle with Double Volume:** Initiates brewing cycle with double volume.

**Cappuccino:** Makes cappuccino.

**Latte and Macchiato:** Makes latte, macchiato, caffelatte, or frothed milk.

### Menu Symbols (below control buttons)


**Exit Extended Options:** Exits the extended option mode.

**Scroll Up:** Selects next option, or moves ahead in the menu.

**Scroll Down:** Selects previous option, or moves back in the menu.

**Enter:** Selects the option, or confirms a menu choice.

**Control Panel Layout**

Control panel has a text display that gives modes and options in various languages. Control buttons are below the text display with mode symbols above control buttons and menu symbols below control buttons. While in a operational mode pressing the control button repeatedly moves through various mode options. For example pressing "Taste" mode control button repeatedly moves through *pre-ground, extra mild, mild, standard, strong and extra-strong modes*.

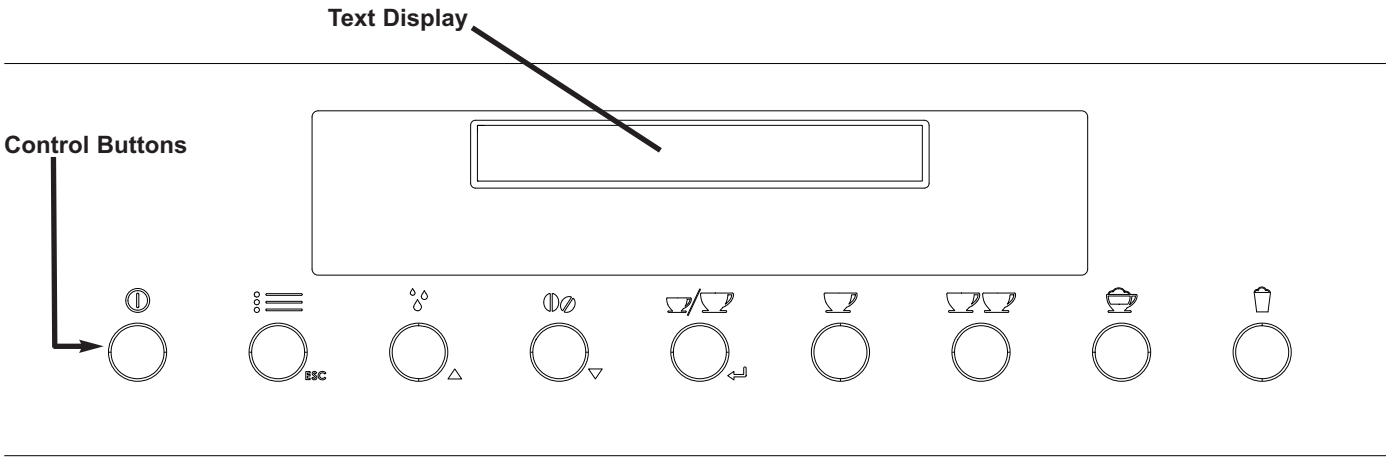



**Figure 1-5. Control Panel Layout**

## THEORY OF OPERATION

The Wolf Appliance EC24 can grind coffee, combined it with hot water, add steamed milk and offer other beverage selections. EC24 has a system for disposing of grinds, and a system for handling an over pressurized water circuit. EC24 can adjust for hard water and for many user preferences in the extended optionos mode.

**Water Circuit Components**

**Water Tank**
Water tank holds water EC24 uses to make coffee, steam, hot water, and rinse coffee delivery system. It has a Micro Switch at top of water tank area to sense when tank is inserted. Water tank has an internal float that registers water level through the reed switch at bottom of water tank area.

**Water Filter**
Water leaving water tank runs through a water filter before entering pump. Filter is used to prevent any particles from entering water circuit.

**Flowmeter**
Flowmeter measures water passing through it to pump. This volume is passed to power board to determine length of time for pump to run and total amount of water used.

**Pump**
Water is drawn into pump and is discharged to generator assembly. It is discharged at approximately 220 psi. There is a relief valve at top of pump that discharges to over pressure system and drains to drip tray.

**Generator Assembly**
Generator assembly contains heating element - coffee, mechanic's valve, thermal cut outs (TCO), a temperature sensor (NTC), and a Micro Switch that senses when infuser is in the up position.

**Generator Assembly: Heating Element - Coffee**
Water is pumped into heating element-coffee and is heated. It then is discharged to mechanic's valve.

**Generator Assembly: Mechanic's Valve**
If bottom of mechanic's valve is depressed by infuser, hot water drains from bottom of mechanic's valve into infuser. If infuser is not depressing mechanic's valve and 3-Way valve is open, water is pumped toward 3-Way valve. If infuser is not depressing mechanic's valve and 3-Way valve is not open, water can not move. It may enter over pressure system and drain to drip tray.

**3-Way Solenoid Valve**
Water enters 3-Way valve from mechanic's valve only when 3-Way valve is open. If 2-Way valve is not open, water maybe over pressurized in 3-Way valve and enter over pressure system and drain to drip tray.

**Heating Element - Steamer**
Water enters heating element - steamer and if 2-Way valve is open flows to carafe coupling.

**2-Way Solenoid Valve**
When 2-Way valve is open water or steam flows through valve to carafe coupling.

**Carafe Coupling Assembly**
Carafe coupling assembly consists of: carafe coupling - which has a steam nozzle and water nozzle; and two Micro Switches - front switch to sense milk carafe, and back switch to sense water spout.

**WATER CIRCUIT**

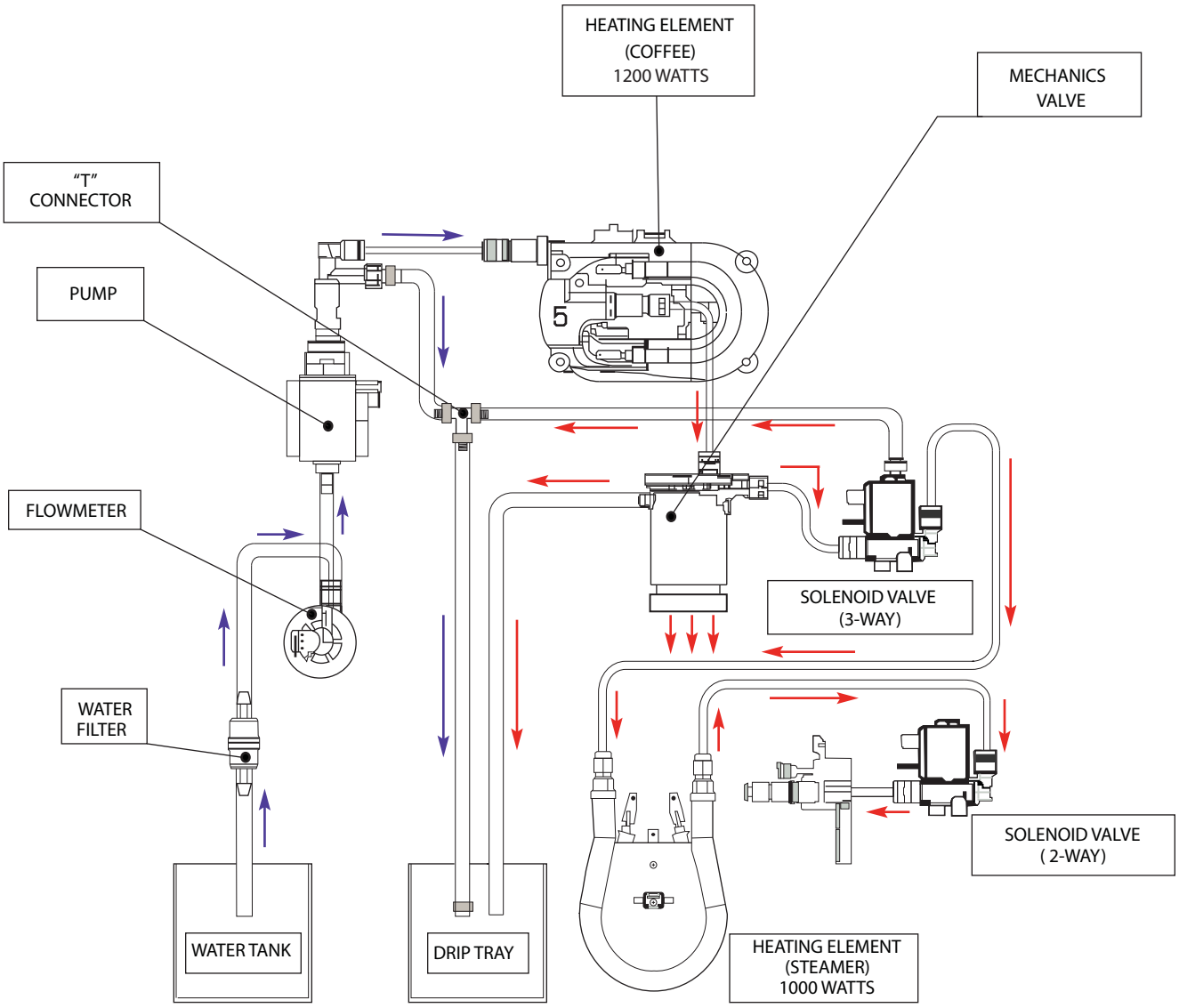



**Figure 2-1. EC24 Water Circuit**

**Grind System**

Grind system consists of grinder and infuser. Grinder grinds whole coffee beans at selected coarseness and directs grounds to the side where a chute places coffee grounds on top of the infuser. Pre-ground coffee from the top cover also flows to the chute and is directed to the infuser.

**Grinder Mill**

Grinder mill has two steel blades that grind coffee to selected coarseness determined by space between inner and outer mill blades. Mill blades can become worn or damaged over a period of time. Also, care must be used when removing coffee bean tank and grinder knob not to change the setting. If this occurs perform grinder set-up procedure.

**Infuser**

- Infuser is snapped into slider which is driven up and down by transmission assembly.
- When unit is powered on but idle, infuser is angled to left raised approximately half way on center shaft. (See Figure 2-2).
- When cycle is started, infuser angled to the left, lowers and ejects a coffee puck to assure top of infuser is clear.
- With infuser still tilted to left it rises to accept coffee grounds. (See Figure 2-3).
- Once grind cycle is complete or pre-ground coffee has been added and acknowledged, infuser begins moving up again and swinging to right. (See Figure 2-4).
- Infuser rises and compresses mechanic's valve. Pump comes on and water goes through mechanic's valve to top of infuser. (See Figure 2-5).

***Note:*** *Infuser may move up slightly at this point to compress coffee grounds further.*

- When all water has passed through mechanic's valve and infuser, infuser will lower and swing to left. Infuser will lower until lower limit Micro Switch is activated. Infuser will then eject coffee puck. (See Figure 2-6)
- Infuser will return to rest position or rise to accept coffee grounds if second cycle is required.
- When unit is placed in standby by cycling On/Standby control button, EC24 will run a rinse cycle. Then infuser will lower to removal position. (See Figure 2-7).

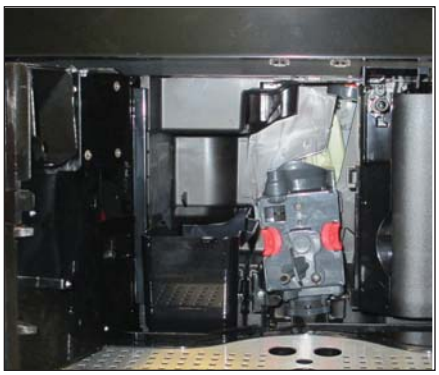
2-2. Idle Position

2-3. Receiving Grounds

2-4. Swinging to Right

2-5. Compressing Grounds

2-6. Ejecting Puck



2-7. Removal Position

**Electrical System**

Voltage is routed directly from plug to LED board and a small routing board located directly above heating element - assembly. Routing board is not a service part. From routing board voltage is sent to (See Page 6-2):

- TCO and heating element.
- TCO and generator assembly, and a second TCO if present.
- F4 on power board.
- 2-Way valve.
- 3-Way valve.

Voltage is then routed by power board to other components.

**Micro Switches**

- EC24 has seven Micro Switches that are used to assure position of components as needed.
- Upper Micro Switch - designated M1: located on generator assembly. It is a normally closed switch. When infuser rises and depresses mechanic's valve circuit is opened.
- Lower Micro Switch - designated M2: located on transmission assembly. It is a normally open switch. When infuser is lowered a tab on slider depresses switch and circuit is closed.
- Grounds Container Micro Switch - designated M3: located lower right of transmission assembly on frame support when looking at back of unit. It is a normally open switch. A tab on the back bottom of grounds container depresses switch and closes circuit.
- Door Micro Switch - designated M4: located beneath grinder. It is a two position switch. White wire to brown wire is normally open. When the door is closed circuit is closed. Black wire to brown wire is normally closed, and with door closed circuit is open.
- Milk Carafe Micro Switch - designated M5: located beneath steam and water nozzle behind trim. Front switch is milk carafe Micro Switch. It is a normally open switch. When milk carafe is insert circuit is closed.
- Water Spout Micro Switch - designated M6: located beneath steam and water nozzle behind trim. Back switch is water spout Micro Switch. It is a normally open switch. When water spout is insert circuit is closed.
- Water Tank Presence Micro Switch - designated M7: located on frame at top right hand side of unit, behind rear panel. It is a normally open switch. When water bin is inserted circuit is closed.

**Water Over pressurization System**

EC24 has a pump that discharges at approximate 220 psi. If water tubing or heating elements become obstructed, solenoid valves do not operate, or mechanic's valve fails, the water circuit may become over pressurized. EC24 is provided with over pressurization system to prevent damage to tubing or components.

Pump, mechanic's valve and 3-Way valve have relief ports that will open during any over pressurization and direct water to drip tray assembly. (See Figure 2-1 on page 2-3).

**Extended Options**

Extended options allows EC24 to be adjusted to preferred settings of customer, adjusted for water hardness, and perform routine descaling.

**Rinsing**
EC24 runs water through mechanic's valve, infuser, and door to wash any coffee residue from these parts. Rinse cycle will run when EC24 is turned on or off by On/Standby control button, or when unit runs auto-off. A rinse cycle my also be ran by selecting this option.

**Beep Enable/Disable**
Beep heard when a control button is pushed can be turned on or off.

**Descale**
Initiates descaling procedure to remove hardness from interior of pump, solenoid valves, and heating elements.

**Default**
Returns all settings to factory default setting.
- Beep: enabled
- Statistics: does not reset
- Contrast: three dots out of five
- Water hardness: four dots out of four
- Set temperature: two dots out of four
- Auto-off: 15 minutes
- Auto-start: disabled
- Adjust time: does not reset
- Energy Saving: disabled
- Set language: English

**Statistic**
Counts the total number of:
- coffees made
- number of times water bin has been refilled
- number of times descaled
- number of milk drinks prepared.

**Contrast**
Sets contrast between text display and text.

**Hardness**
Sets EC24 for hardness of water being used to make coffee. Harder water will trigger more frequent descaling.
One dot = 66 gallons. Two dots = 34 gallons. Three dots = 21 gallons. Four dots = 10.5 gallons.

**Set Temperature**
Adjusts coffee temperature for customer preference. Four dots is hottest setting.

**Auto-Off**
Turns EC24 off after 15 minutes, 30 minutes, 1 hour, 2 hours, or 3 hours.

**Auto-Start**
Turns unit on, rinses, and heats at preset times.

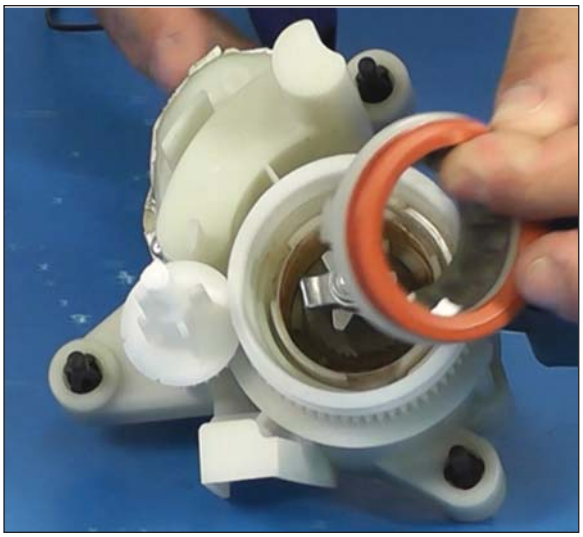
**Adjust Time**
Sets time of day. This is required for Auto-Start feature.

**Energy Saving**
Enables or disables energy saving mode.

**Set Language**
Set unit to read in preferred language. Select from English, Swedish, Norwegian, Russian, Dutch, French, German, Czech, Spanish, Portuguese, Polish, Finnish, Danish, Italian, and Slovenian.

## GRINDER SET-UP

The grinder has two steel mill blades. An inner mill blade, and an outer mill blade. Grind of coffee is determined by adjusting grind knob to desired setting. Setting can become out of adjustment by mill jamming or disassembly of the grinder without proper caution. This procedure is designed to set-up the grind coarseness setting correctly.



3-1. Removing Outer Mill

### Grinder Disassembly

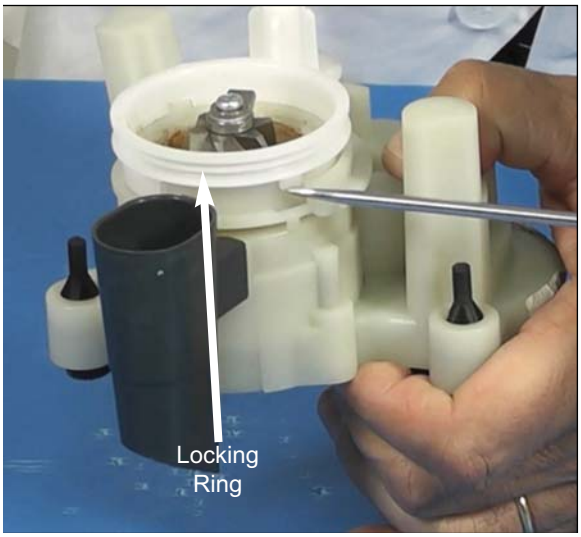
Remove grinder per instructions in Component Removal section of service manual.

Remove outer mill (See Figure 3-1):
- Turn white shaft clockwise until it stops.
- Pull outer mill straight up and out.

Inspect white seal of outer mill. (See Figure 3-2).

3-2. Inspect White Seal

Remove Locking Ring by releasing three tabs. (See Figure 3-3)




3-3. Removing Outer Mill

**Align Mill for Adjustment:**

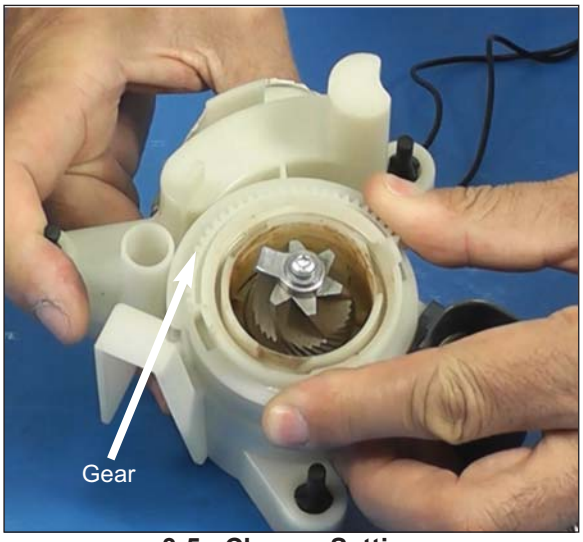
- Turn white shaft counter-clockwise until it stops.
- Pull shaft straight out. (See Figure 3-4).

Adjust Mill Setting (See Figure 3-5):

***Note:*** *Mark gear position prior to adjusting.*

- Turn gear counter-clockwise to increase coarseness.
- Turn gear clockwise to decrease coarseness.

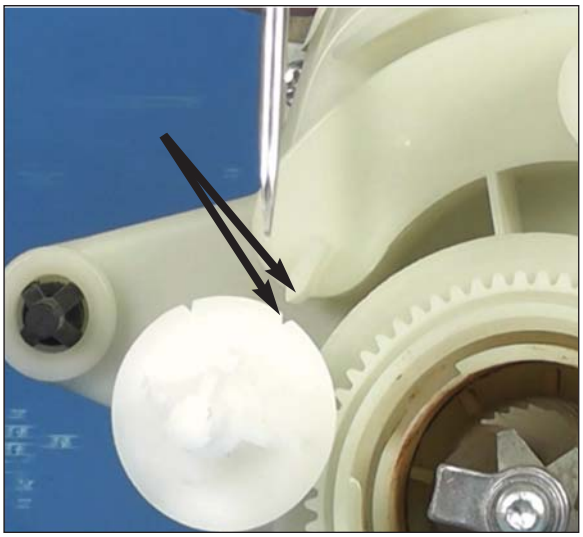
**3-4. Align Mill for Adjustment**




**3-5. Change Setting**

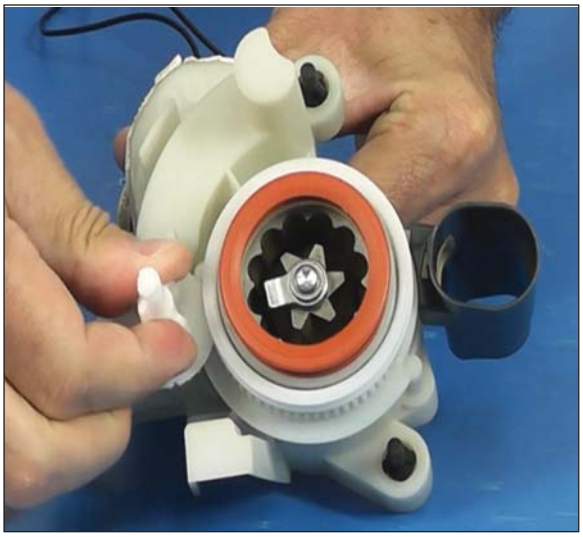
**Assemble Grinder:**

1 Install shaft - assure notchs line up. (See Figure 3-6).
2 Install locking ring. (See Figure 3-7).
3 Turn shaft clockwise until it stops.
4 Insert outer mill. (See Figure 3-8).
5 Center mill by turning shaft counter-clockwise until it stops.
6 Install grinder in EC24.



**3-6. Align Notch**

**3-7. Install Locking Ring**



**3-8. Center Grinder**

## COMPONENT ACCESS AND REMOVAL

This section explains how to access and remove components in a EC24 unit. An attempt has been made to arrange these procedures in such a way as to simulate which components would need to be removed first in order to gain access to other components. When following a component removal procedure, it may be necessary to reference another component removal procedures listed earlier in this section.

***NOTE:*** *Before continuing, please take note of the WARNINGS and CAUTION below.*

**⚠ WARNING**

- **TO AVOID ELECTRIC SHOCK OR DEATH, POWER TO UNIT MUST BE DISCONNECTED WHENEVER ACCESSING AND/OR REMOVING COMPONENTS POWERED BY ELECTRICITY OR COMPONENTS NEAR OTHER ELECTRICAL COMPONENTS.**
- **IF NECESSARY TO REMOVE THE APPLIANCE FROM ITS INSTALLATION, REMEMBER THAT IT IS HEAVY AND COULD TIP AND/OR FALL, RESULTING IN SERIOUS INJURY.**

**⚠ CAUTION**

**Be careful when handling sheet metal parts - Edges may be sharp.**

**⚠ CAUTION**

**EC24 generates steam and hot water which can cause burns.**

**Tools Needed**

- 6-Lobe Torx Type Driver - Size: T-20 Security Bit.
  (remove back panel)
- Watch screwdriver - flat blade.
  (o-rings, locking spade terminals, infuser valve, and grinder selector knob)
- Socket or nut driver 7 mm, 10 mm and 13mm.
  (Generator Assembly, heating element, and solenoids)
- Offset phillips screwdriver.
  (LED/Display board and grounds container Micro Switch)
- 7 mm and 10 mm Box Wrench.
  (Generator Assembly and heating element)
- Phillips Screw Driver.
- Gloves (to protect hands from cuts)
- Multimeter.
- Cleaning Rags.
- Small Tie Wraps.
- Needle Nose Pliers.

**Water Tank.**
The water tank is located to right of coffee spout. Grab lip on sides of water tank and pull it straight back. (See Figure 4-1). The water tank has a removeable lid for filling and cleaning. It has an internal float that will trigger the message “Fill Tank” when water level is too low.

**Service Door.**
Service door opens and swings to the left with coffee spout attached. This allows access to grounds container and infuser. (See Figure 4-2).

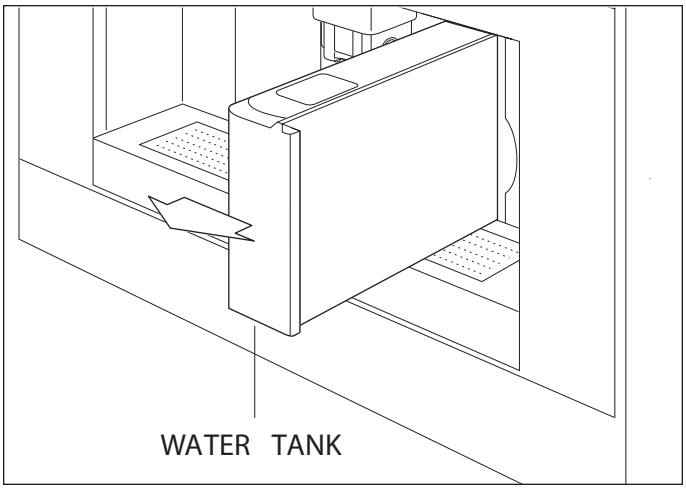
**Grounds Container**
With the service door open pull drip tray forward. Remove grounds container and empty. (See Figure 4-2).

**Infuser**
With infuser in down position, and service door open pull drip try forward. Depress red locking tabs on each side of infuser. Pull infuser directly out. (See Figure 4-3).

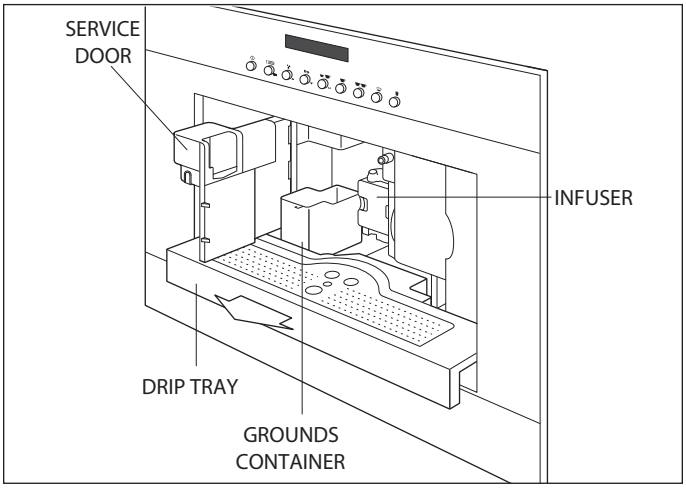
**Infuser Screen**
Extract screw from screen and clean screen and top of infuser. Screen should be cleaned regularly by customer. (See Figure 4-4).

**Infuser Valve**
In some situations where flow through the infuser does not seem correct, and infuser screen has been cleaned. Use a small flat bladed watch screwdriver to pry valve from top of infuser below infuser screen. Clean infuser valve. (See Figure 4-4).

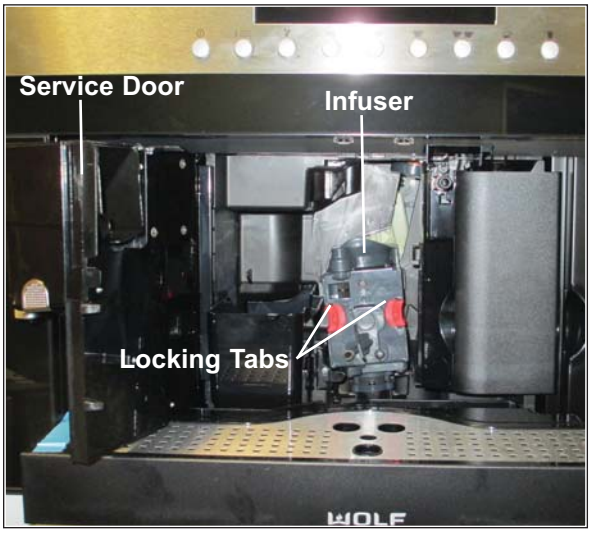
***Notes:***
- *Screen should be cleaned periodically by customer.*
- *Infuser can only be removed or installed in down position.*



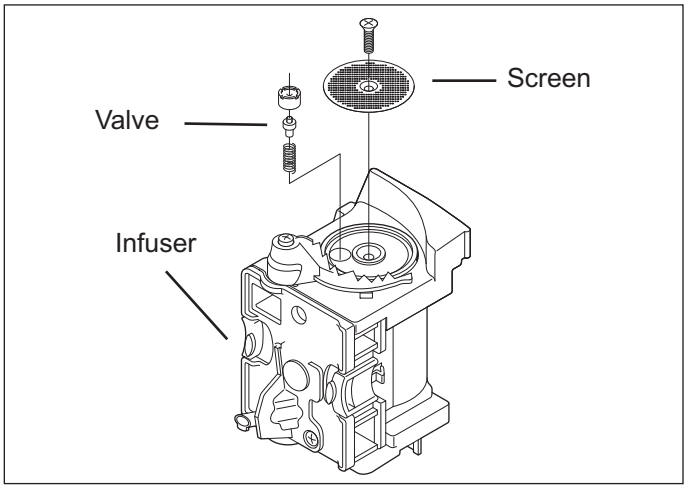
**4-1. Removing Water Tank**



**4-2. Service Door Open**



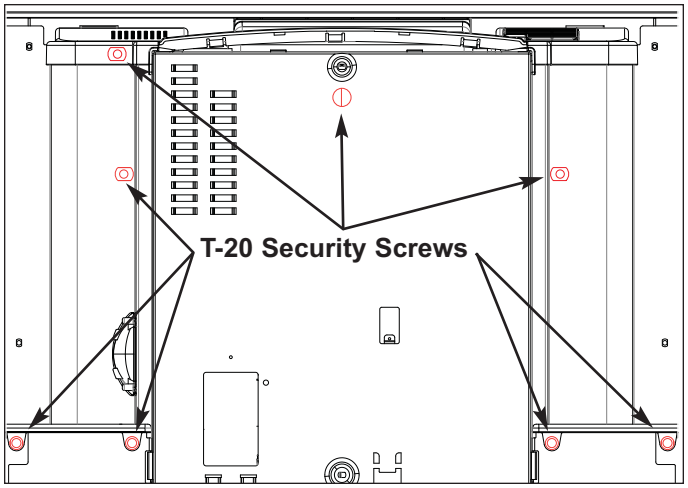
**4-3. Removing Infuser**



**4-4. Cleaning Infuser**

### EC24 Security Screws

EC24 has T-20 Security Torx screws located on the sides and back of the unit. These special screws need to be replaced in the location they were removed from. (See Figure 4-5, 4-6 and 4-7).

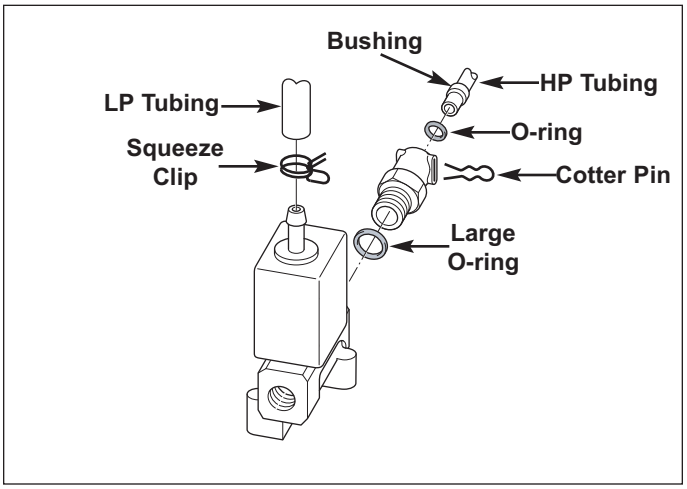



4-5. Rear of EC24

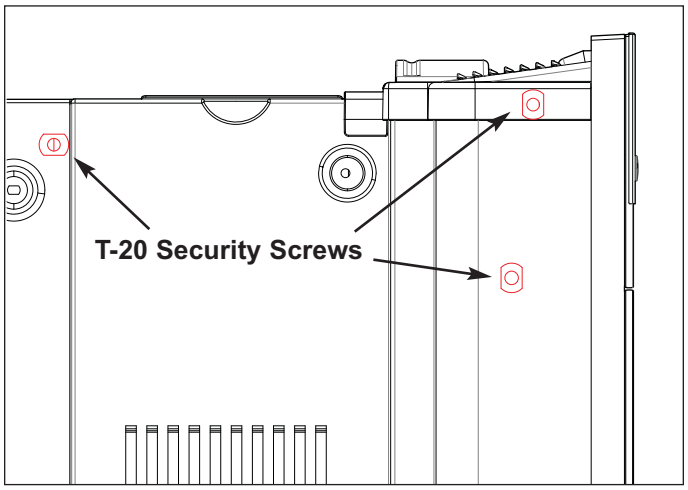
### Tubing

High Pressure Tubing (HP): Is hard plastic tubing with a bushing on each end. Tube is seated in a hard plastic connection on top of an o-ring. Then it is locked in place with a cotter pin.

Low Pressure Tubing (LP): Is soft flexible tubing pressed over a connection, or pressed over a connection with a squeeze clip.




Tubing and O-rings



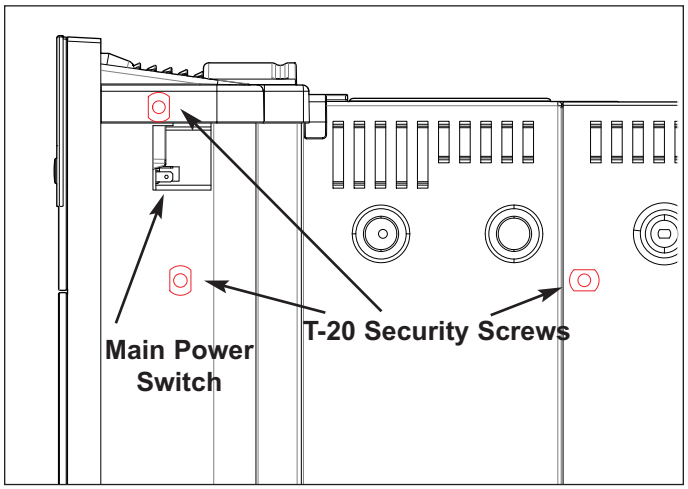

4-6. Left Side of EC24

### O-rings

O-ring: Small o-rings are placed between HP tubing and connection. When removing HP tubing a small screw-driver should be used to carefully remove the o-ring and store it.

Large O-ring: Large o-rings are used on screwed in connections. Rarely are these connections opened. If they are the large o-ring should be removed and stored.

- O-rings should be store in a plastic bag to prevent them from drying out.
- Cracked or dried out o-rings should be replaced.
- If o-rings need to be lubricated use a Food Safe Grease.

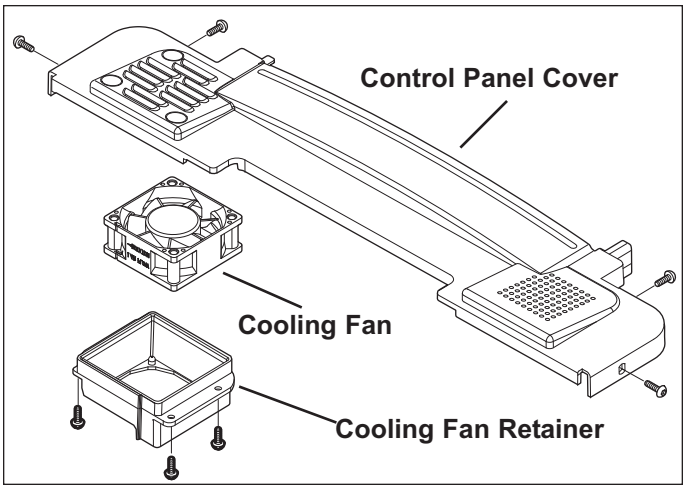



4-7. Ride Side of EC24

### Cooling Fan Removal

To remove cooling fan EC-24 must be pulled forward, and deenergized, then (See Figure 4-8):

1. Extract two T-20 security screws from right hand side of control panel cover and two T-20 security screws from left hand side of control panel cover.
2. Lift control panel cover.
3. Disconnect cooling fan harness from LED board terminal J-1.
4. Extract four phillips screws from cooling fan retainer.
5. Remove cooling fan.

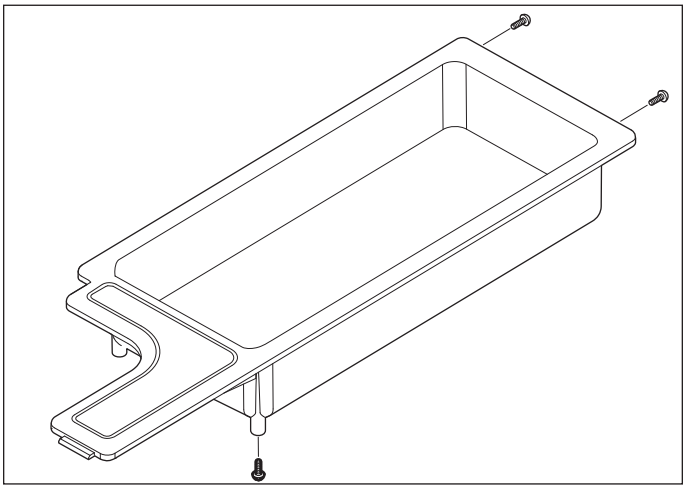



**4-8. Cooling Fan**

### Left and Right Tray Removal

To remove left and/or right tray EC-24 must be pulled forward and deenergized, then (See Figure 4-9):

1. Extract two T-20 security screws from rear of each tray.
2. Extract phillips screw from bottom of unit holding front of each tray.
3. Remove tray.



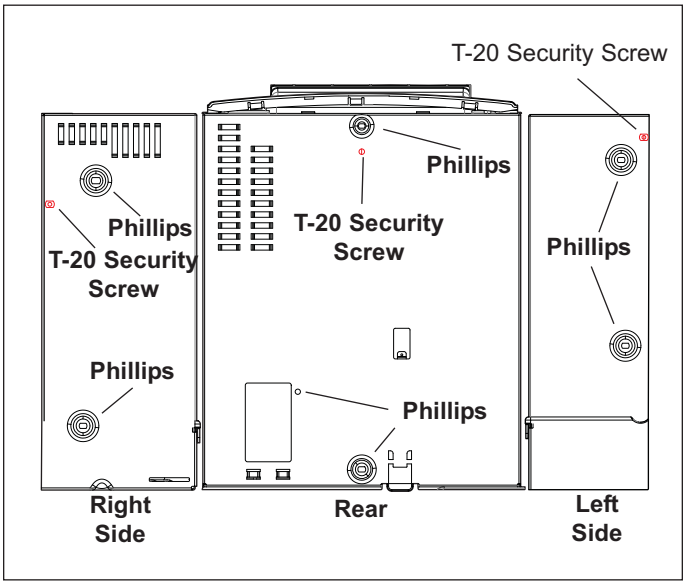
**4-9. Left and/or Right Tray**

### Back Panel Removal

To remove the back panel, T-20 security screws and phillips screws must be removed from left side, right side, and rear of unit, then (See Figure 4-9):

***Note:*** *T-20 security screws must be reinstalled in same hole as removed from. Refer to page 4-4 for location.*

1. Extract one T-20 security screw (with lock washer) and two phillips screws from right side rear panel.
2. Extract one T-20 security screw (with lock washer) and two phillips screws from left side rear panel.
3. Extract one T-20 security screw with cord retainer and three phillips screw from rear of EC24.
4. Pull back panel straight back and remove from unit.




**4-10. Removing Rear Panel**

**Power Board Removal**

When reinstalling power board it is important to route wire harnesses correctly. Wire harnesses can cause an issue when installing back panel. (See Figure 4-11). To remove power board back panel must be removed, then:

1. Remove all wire harness from power board.
2. Extract five screws holding power board to interior shell. (See Figure 4-11).

***Notes:***

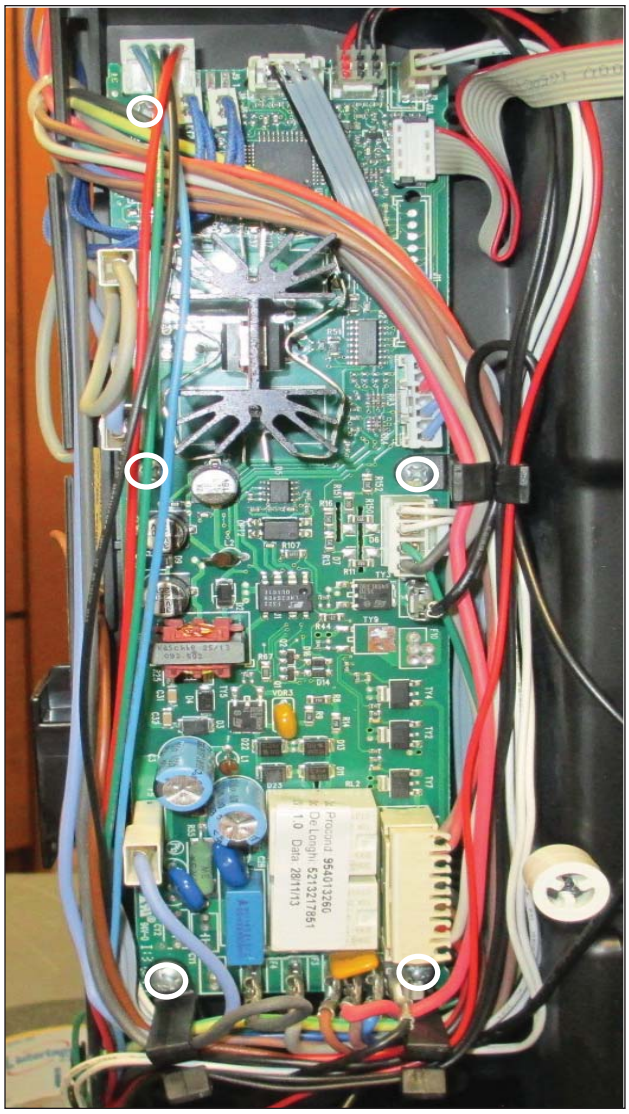
- *All spade (flag) terminals have locks.*
- *Lower two screws and rear middle screw have wire retainers on them.*
- *Figure 4-11 is ICB Power Board. Routing and terminals are the same, but wire colors may be different.*

**Power Board Installation (See Figures 4-12 and 4-13).**

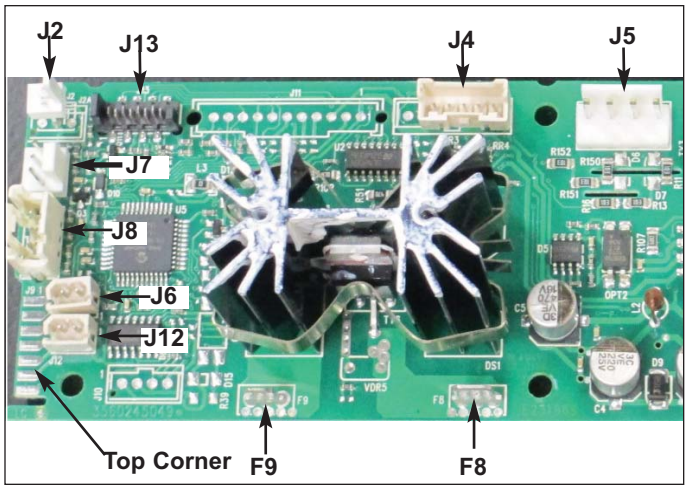
1. Install five screws holding power board to interior shell.
2. Connect ribbon cable with red stripe to J13.
3. Connect 2 pin molex with white wires to J2.
4. Connect 3 pin molex with white, blue, and red to J7.
5. Connect ribbon cable with black stripe to J8.
6. Connect 4 pin molex with blue, green, black, and red over the top left corner of power board.
7. Connect two pin molex with white or blue wires on J6.
8. Connect two pin molex with white or blue wires on J12.

***Note:*** *NTC wires can be blue or white. It does not matter which NTC is connect to J6 or J12.*

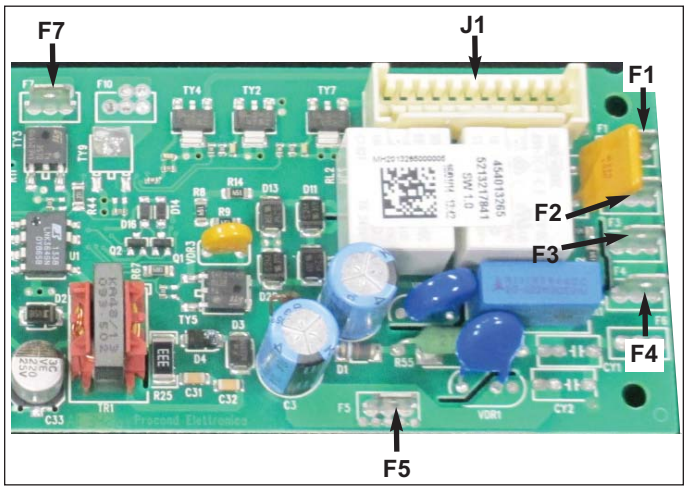
9. Connect 4 pin molex with black, and three white to J4.
10. Connect 4 pin molex with black, and three white to J5.
11. Connect large molex connector with, white, red, brown, black, red, and brown to J1.
12. Connect red wire with locking spade terminal to F7.
13. Connect brown wire with locking spade terminal to F1.
14. Connect any of the three black wires with locking spade terminals to F2, F3, and F4.
15. Connect white wire with large white connector to F5.
16. Connect brown wire with large white connector to F8.
17. Connect black wire with large white connector to F9.



**4-11. Wire Routing ICB Power Board**




**4-12. Upper Side Power Board**




**4-13. Lower Side Power Board**

### Flowmeter Removal

Flowmeter measures amount of water taken in by water pump. This will determine amount of coffee made. To remove flowmeter remove back panel, then:

1. Extract screw holding power cord or power receptacle bracket. If wires are removed from power cord connection, mark which terminal is L1. (See Figure 4-14).
2. Remove rubber cover for molex connector. (See Figure 4-15)
3. Remove molex connector.
4. Remove tubing from flowmeter.
5. Pull flowmeter straight up and remove.

### Reed Sensor

Reed sensor senses when the water tank is in place and what the water level is. To remove reed sensor remove back panel, then (See Figure 4-14):

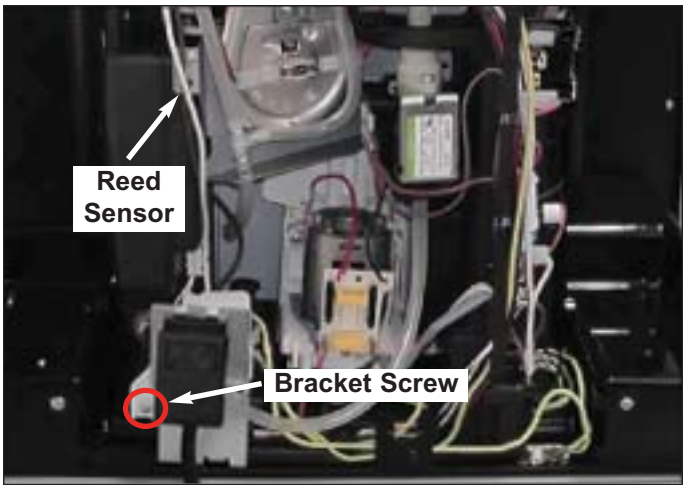
1. Extract screw holding power cord or power receptacle bracket. If wires are removed from power cord connection, mark which terminal is L1.
2. Remove wire connector from J2 on power board and route wire back to rear of unit.
3. Extract phillips screw holding reed sensor.

### Water Filter Removal

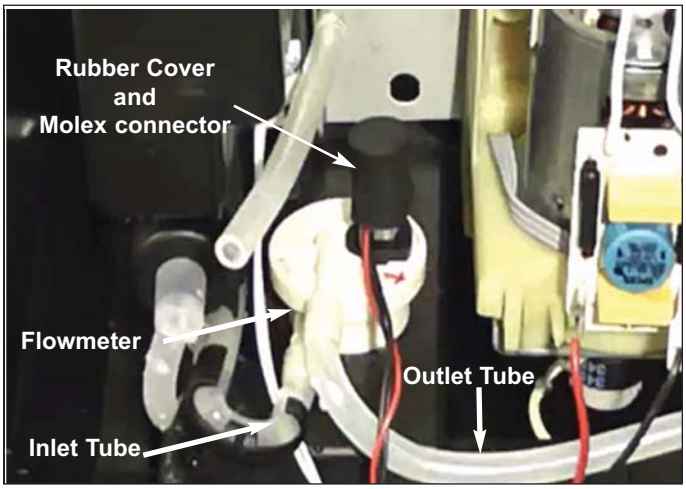
Water filter is located on outlet of water tank. It's purpose is to prevent small particles from entering water system. To remove water filter first remove power cord or power receptacle bracket, then (See Figure 4-16):

1. Remove water tank outlet tube.
2. Pull water filter from clips.
3. Remove flowmeter inlet tube.
4. Replace water filter.

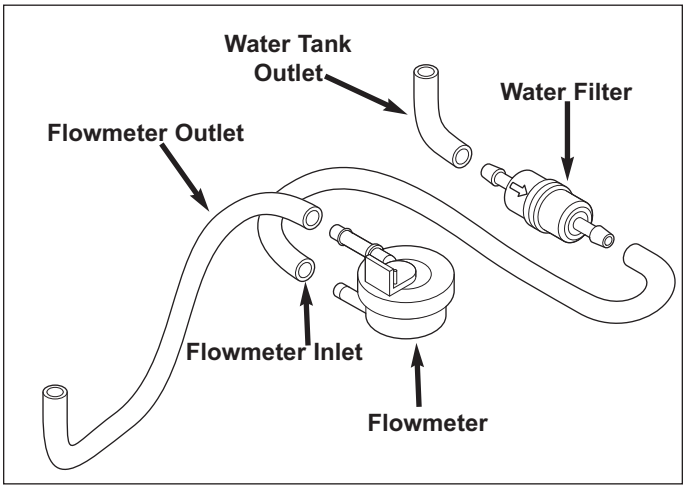
***Note:*** *There is a directional arrow on water filter. Flow is from water tank outlet to flowmeter inlet.*




**4-14. Power Cord Connection**




**4-15. Flowmeter**

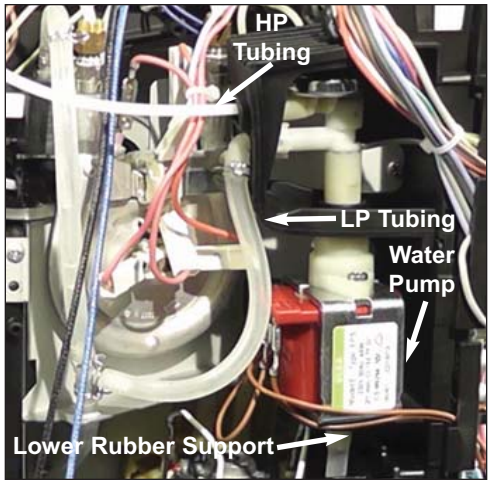



**4-16. Water Filter And Tubing**

### Water Pump Removal

Water pump has a regulator at top of discharge tubing that sends water to generator assembly. The connection below that is tubing to drip tray (pressure relief system). Inlet from flowmeter is at bottom of water pump. To remove water pump remove back panel, then:

1. Remove cotter pin on water pump discharge line and remove HP tubing and o-ring. (See Figure 4-17).
2. Compress squeeze clip on pressure relief line and remove LP tubing.
3. Disconnect two wires from water pump housing.
4. Pull front of rubber support over the pressure relief line elbow. (See Figure 4-18).
5. Pull right hand side of rubber support from slot in casing. Pull water pump forward.
6. Disconnect inlet tubing from bottom of water pump and pull water pump through lower rubber support.

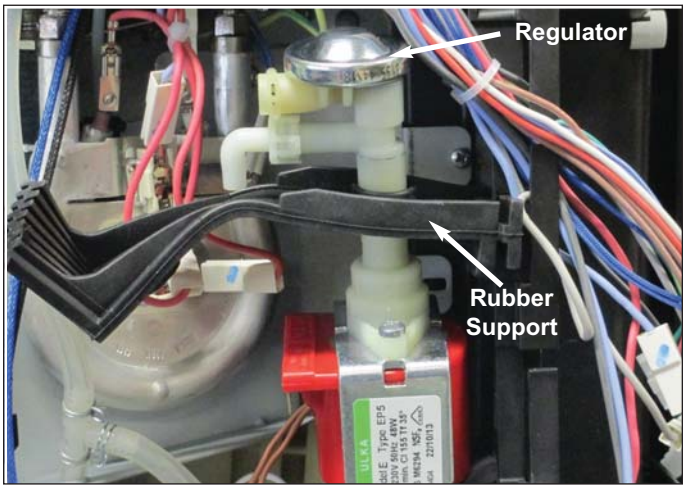



**4-17. Water Pump Removal**

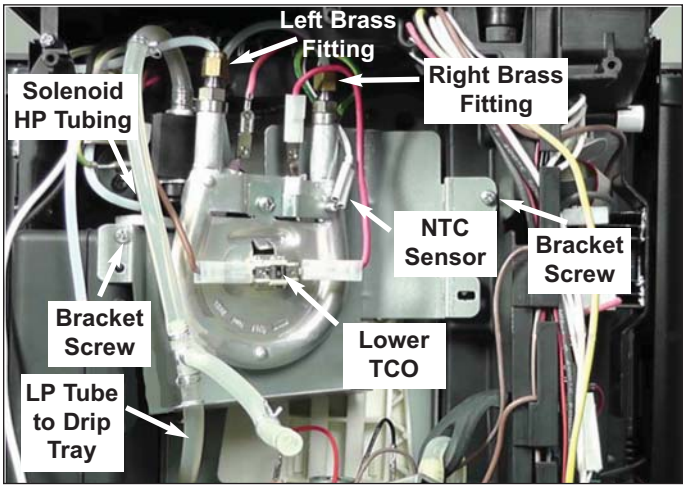
### Heating Element (Steam) Removal

Heating element for steam is mounted on a bracket that spans most of the back cavity of the unit. Mounted on the heating element is lower thermal cut out (TCO), and a temperature sensor (NTC Sensor). On back part of heating element bracket the heating element solenoid is mounted. This solenoid is referred to as 3- Way valve. To remove heating element first remove water pump, then:

1. Using 10 mm box wrench loosen but do not remove brass fitting at top left hand side of heating element. This is the line from heating element to two way solenoid valve. (See Figure 4-19).
2. Using T-20 extract ground screw with double wires.
3. Disconnect pressure relief hose from connection on lower part of “T” removing line to drip tray.
4. Extract two screws holding heating element bracket.
5. Remove brown wire from heating element and black wire from Lower TCO.
6. Remove cotter pin, HP tubing, and o-ring from 3-Way valve’s inlet from mechanics valve.
7. Using 7 mm nut driver or socket remove nut from back side heating element bracket for NTC sensor.
8. Using 10 mm box wrench remove brass fitting at top right hand side of heating element. This is line from three way valve to heating element (steam).
9. Disconnect wires from 3-way valve.
10. Remove heating element bracket with heating element and 3-way valve attached.
11. Use 7 mm nut driver or socket to remove nut from back side of heating element bracket for lower TCO.
12. Remove heating element (steam).




**4-18. Rubber Support**

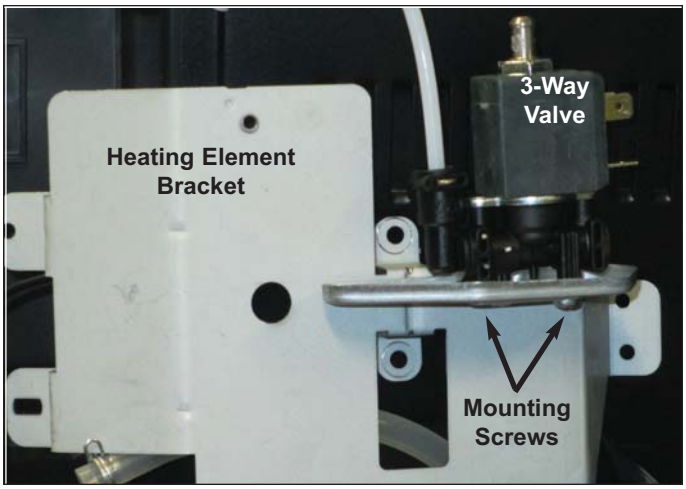



**4-19. Heating Element (steam)**

**Heater Element Solenoid (3-Way Valve) Removal**

Heater element solenoid is mounted on back of heating element bracket. This solenoid is referred to as 3-Way valve. To remove 3-Way valve first remove water pump, then:

1. Using 10 mm box wrench loosen but do not remove brass fitting at top left hand side of heating element. (See Figure 4-19).
2. Using T-20 extract ground screw with double wires.
3. Disconnect pressure relief hose from connection on lower part of "T" removing line to drip tray.
4. Extract two screws holding heating element bracket.
5. Remove brown wire from heating element and black wire from Lower TCO.
6. Remove cotter pin, HP tubing, and o-ring from 3-Way valve's inlet from mechanics valve.
7. Using 7 mm nut driver or socket remove nut from back side heating element bracket for NTC sensor.
8. Using 10 mm box wrench remove brass fitting at top right hand side of heating element. This is line from three way valve to heating element (steam).
9. Disconnect the wires from the 3-way valve.
10. Remove heating element bracket with heating element and 3-way valve attached.
11. Extract two screws beneath 3-Way valve and remove valve. (See Figure 4-20).



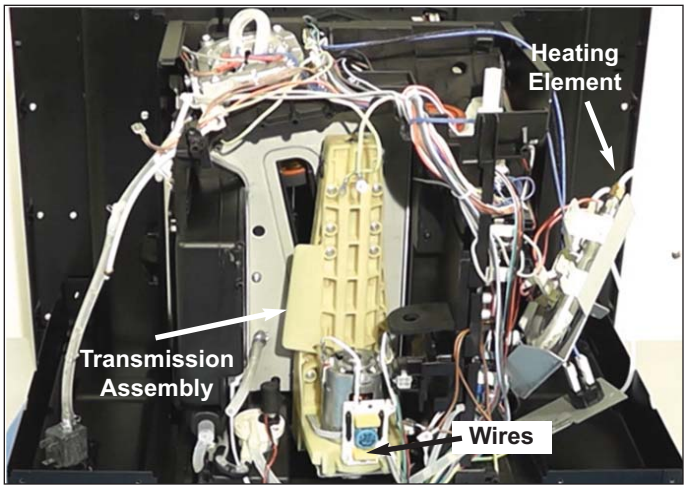

**4-20. Heating Element Solenoid (3-Way Valve)**

**Transmission Assembly Removal**

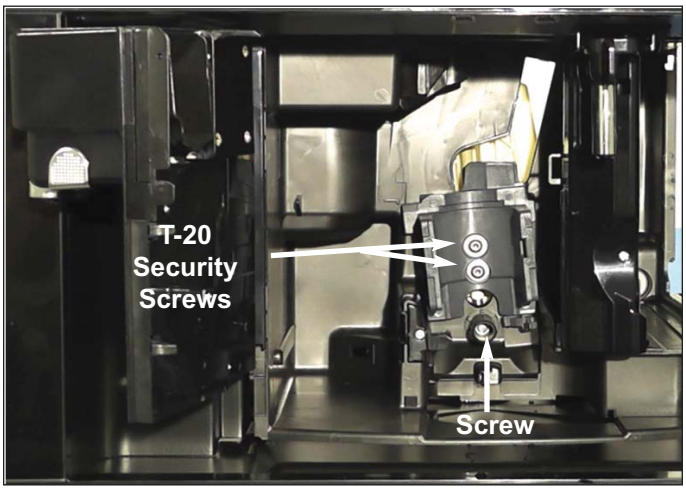
Transmission assembly moves the infuser up and down to compress the water into the coffee grounds. Transmission assembly houses lower infuser limit Micro Switch and hall sensor. To remove transmission assembly remove water pump, disconnect heating element with 3-Way valve and move to the side, then:

1. Disconnect red wire and black wire from base of transmission assembly motor. (See Figure 4-21).
2. Open service door, remove drip tray, and infuser.
3. Using T-20 extract two screws from Slider. (See Figure 4-22).
4. Extract screw securing transmission assembly.
5. With transmission assembly leaning forward remove two ground wires from bottom of transmission assembly next to transmission belt.
6. Remove two white wires from behind transmission assembly motor for lower infuser limit Micro Switch.
7. Route ribbon cable for hall sensor from power board back to transmission assembly.
8. Remove transmission assembly.

***Note:*** *Hall sensor has ribbon cable that can't be removed.*




**4-21. Transmission Assembly**




**4-22. Slider Screws**

### Transmission Belt Removal

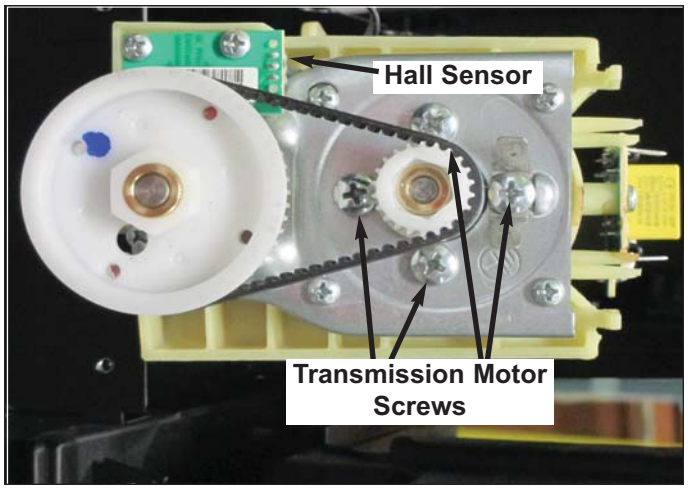
1. With transmission assembly removed slide the transmission belt off of smaller transmission motor gear. (See Figure 4-23).

### Transmission Belt Installation

1. Place transmission belt over transmission motor gear.
2. Place transmission belt over larger gear as far as possible. Rotate transmission motor gear slowly driving the belt around the larger gear.

### Transmission Motor Removal

To remove transmission motor, remove transmission belt, then:
1. Remove four transmission motor screws. (See Figure 4-23).
2. Remove transmission motor.



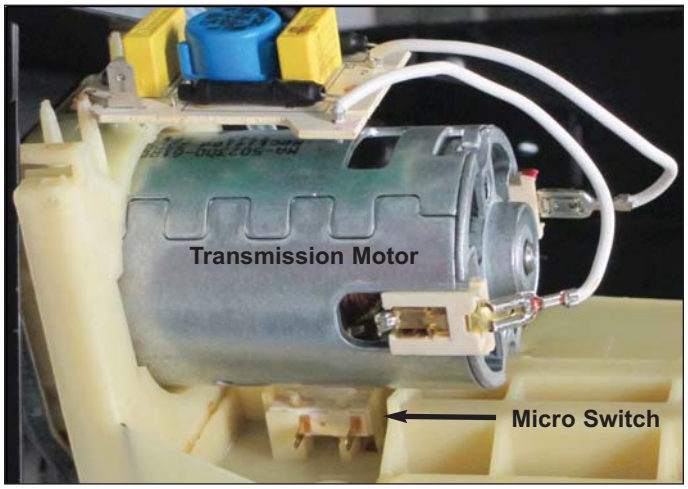
4-23. Transmission Drive Motor

### Hall Sensor Removal

Hall sensor counts the gear revolutions to position infuser correctly. The hall sensor has a non-removable ribbon cable attached to it. To remove hall sensor thread ribbon cable from power board through cabinet, then:
1. Extract two screws holding hall sensor. (See fig ure 4-23).
2. Thread hall ribbon cable through transmission assembly support.

### Lower Infuser Limit Micro Switch

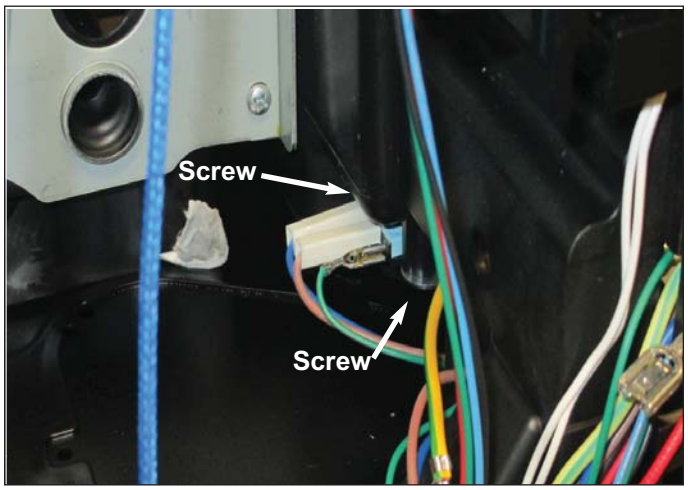
To access lower infuser limit Micro Switch remove transmission assembly, then (see Figure 4-24):
1. Remove transmission motor. (See Figure 4-23).
2. Remove lower infuser limit Micro Switch.



4-24. Lower Limit Micro Switch

### Grounds Container Micro Switch Removal

To access grounds container Micro Switch remove transmission assembly, then (See Figure 4-25):
1. Using an offset phillips screwdriver extract two screws holding grounds container Micro Switch.



4-25. Grounds Container Micro Switch

### Upper Panel Removal

To remove generator assembly (includes mechanic's valve and heating element coffee), grinder assembly, and coffee bean tank upper panel must be removed. Remove back panel, then:

1. Extract four screws located below lip of upper panel, holding it on. (See Figure 4-26).
2. Remove upper panel.

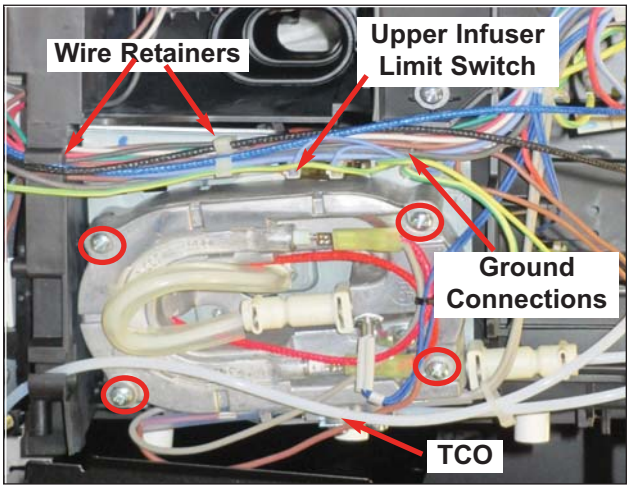
4-26. Upper Panel

### Generator Assembly

Generator Assembly includes heating element coffee, mechanic's valve, TCO, upper infuser limit Micro Switch, and discharge tubing from heating element coffee to mechanic's valve. To remove generator assembly, remove upper panel, drip tray, water tank, and grounds container, then (See Figure 4-27):

1. Remove wire bundle from two wire retainers.
2. Disconnect wires from upper infuser limit Micro Switch.
3. Remove three ground wires from spade terminals.
4. Using 7 mm nut driver or box wrench to hold the nut of the four screws at the corners of the heating element coffee (circled in red).
5. Remove generator assembly.

***Note:*** *Front screw nuts are accessed from front of unit with service door open. Rear screw nuts are accessed from back of generator assembly.*



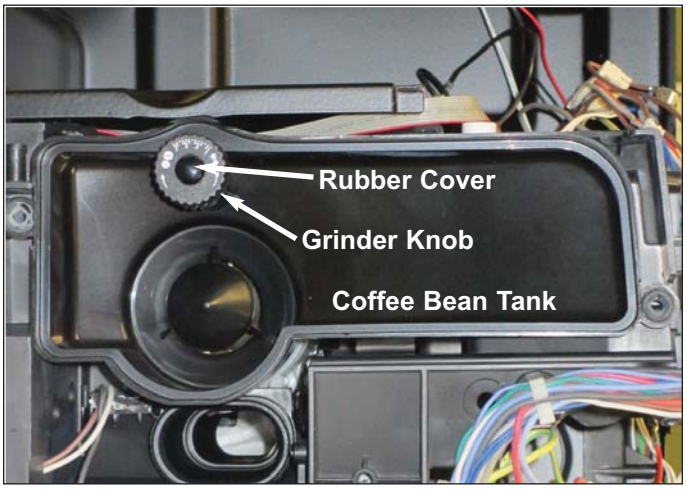
4-27. Generator Assembly

### Coffee Bean Tank Removal

Coffee bean tank removal is necessary to access grinder assembly. To remove coffee bean tank, remove back panel and, upper panel, then (See Figure 4-28):

***Note:*** *Try not to turn grinder knob while removing grinder knob or coffee bean tank. If grinder knob is turned to much then grinder assembly may need to go through* ***"Grinder Assembly Setup Procedure."***

1. Using a flat blade watch screwdriver or sharp point remove grinder knob center rubber cover.
2. Extract screw in center of grinder knob and remove knob.
3. Remove coffee bean tank.



4-28. Coffee Bean Tank

### Grinder Assembly Removal

Grinder assembly can wear or become jammed. To remove grinder assembly remove back panel, upper panel, and coffee bean tank, then:

1. Pull grinder assembly out. Thread black wires from power board through frame, then remove grinder assembly.

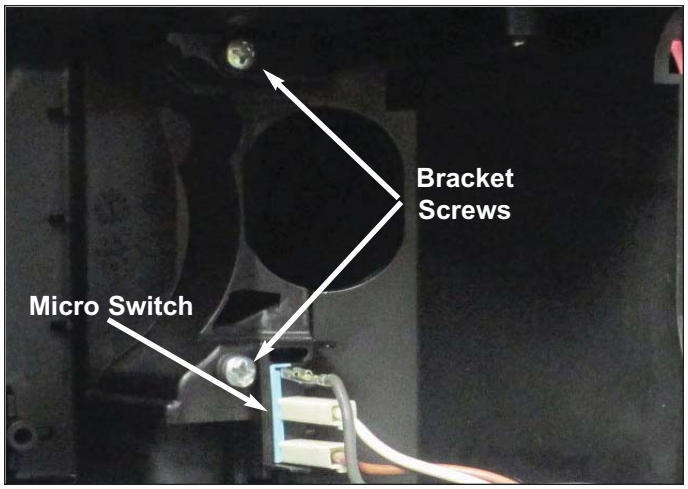
***Note:*** *A new grinder assembly or a grinder assembly that has been rotated excessively by grinder knob while EC-24 is not running may need to be set up. See* ***Grinder Assembly Setup Procedure.***


**4-29. Grinder Assembly**

### Door Closed Micro Switch Removal

Door closer Micro Switch is depressed by a tab on service door. To remove door closer Micro Switch remove back panel, upper panel, coffee bean tank and grinder assembly, then (See Figure 4-29 and 4-30):

1. Extract two bracket screws.
2. Bracket is snapped in. Gently pry it to left and up.
3. Disconnect wires from door closed Micro Switch.
4. Replace switch.

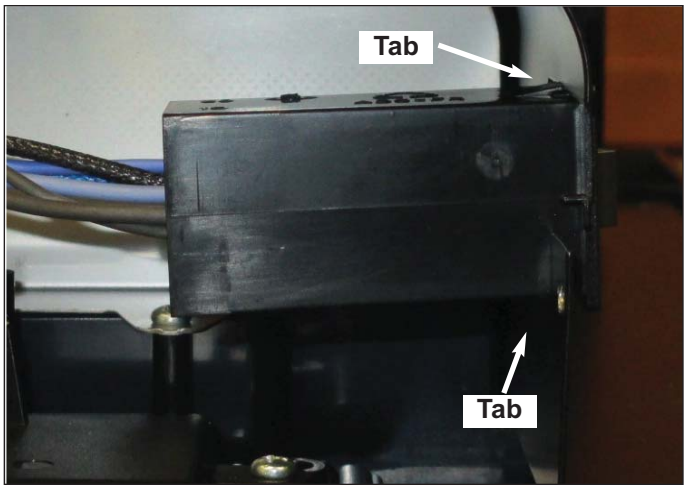



**4-30. Door Closed Micro Switch and Bracket**

**Power Switch Removal**

Power switch for EC-24 is located on right hand side directly below control panel cover. To remove power switch remove control panel cover as in procedure for removing cooling fan on page 4-5, then:

1. Depress tabs on either side of power switch and push switch out of unit. (See Figure 4-31)
2. Feed wire bundle through slot and disconnect wires from power switch.



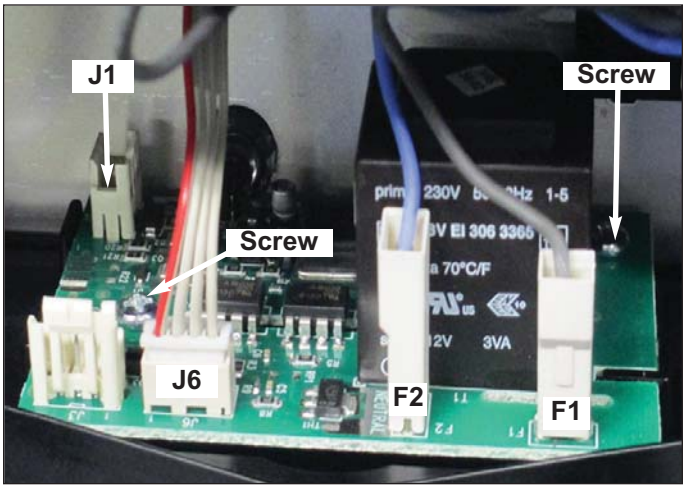
**4-31. ICB Power Switch**

**LED Board Removal**

There is an additional method for removing LED board if an offset screw driver is not available. Follow "**Display Board Removal"** procedure.

Remove control panel cover, then (See Figure 4-32):

1. Remove wires from F1 and F2, molex connector from J1 and ribbon cable from J6 on LED board.
2. Using an offset phillips screwdriver extract two screws holding LED board.



**4-32. LED Board**

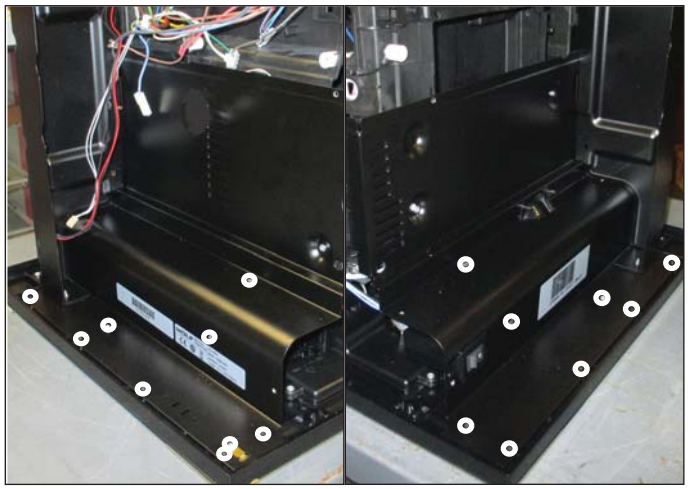
### Display Board Removal

Remove control panel cover, then:

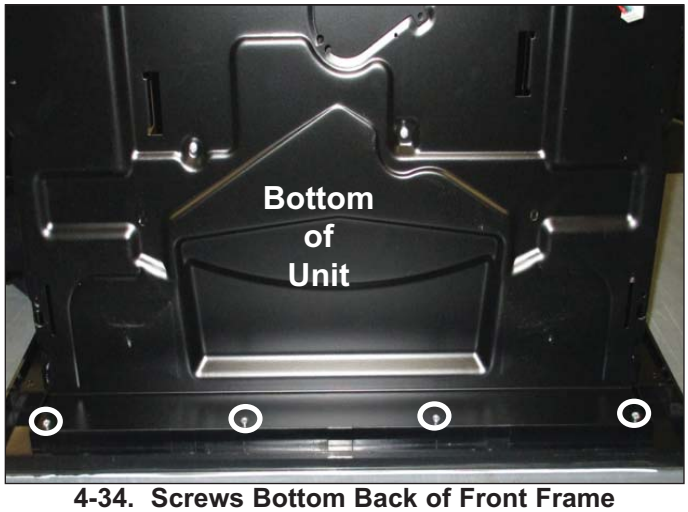
1. Extract all screws marked in white from left and right hand side panels. Unit is shown face down. (See Figure 4-33).

***Note:*** *Ground screw is a self-tapping machine screw and not a plastic screw.*

2. Extract four screws from bottom back of front frame assembly. (See Figure 4-34).
3. Extract five screws in coffee cup area ceiling. Figure 4-35 is with service door open looking up at the EC-24 from below.
4. Lift entire front frame assembly with support bracket from unit frame. Front frame assembly will contain LED board, display board and push buttons.
5. Remove wires from LED board and from routing board.
6. Extract four screws holding display board housing to front frame assembly, then remove display board housing. (See Figure 4-36).
7. Extract four screws holding display board to display board housing and remove display board.

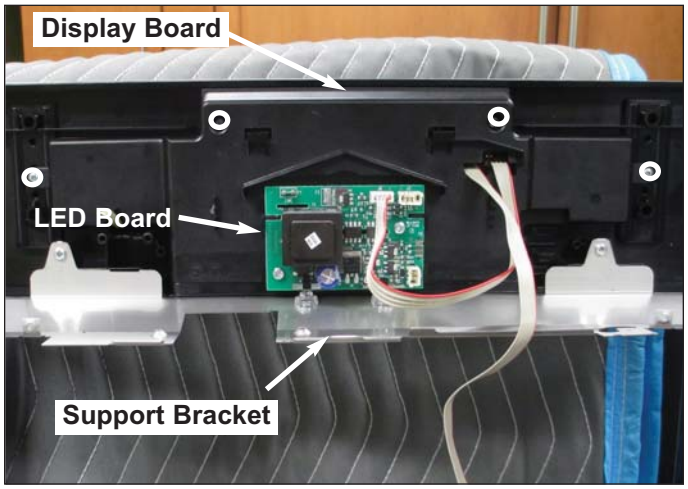


**4-33. Left and Right Side Panel Screws**




**4-34. Screws Bottom Back of Front Frame**

**4-35. Five Screws In Coffee Cup Area**

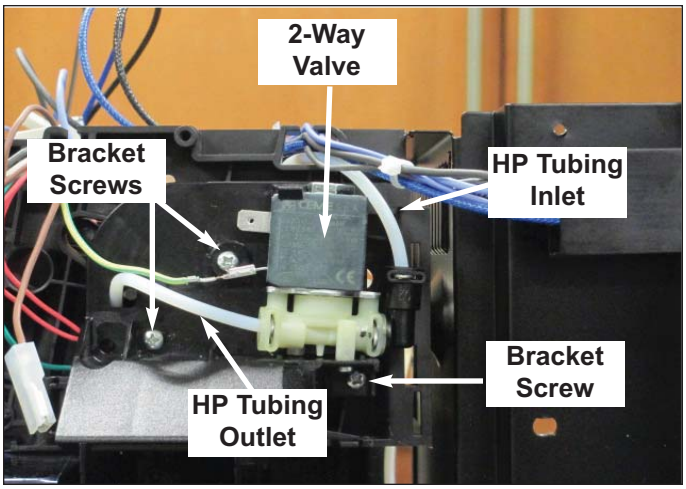



**4-36. Display Board Back of Front Frame**

**Steamer Solenoid (2-Way Valve) Removal**

Steamer Solenoid, referred to as 2-Way valve opens to allow water from heating element to steam and hot water nozzle. To remove 2-Way valve remove control panel cover, and front frame assembly, then (See Figure 4-37):

1. Remove cotter pin, HP tubing and o-ring from 2-Way valve outlet to nozzles.
2. Remove cotter pin, HP tubing and o-ring from 2-Way valve inlet from Heating Element.
3. Remove wires from 2-Way valve.
4. Extract three screws holding 2-Way valve bracket to cabinet, and remove 2-Way valve and bracket.
5. Extract screws holding 2-Way valve to bracket.

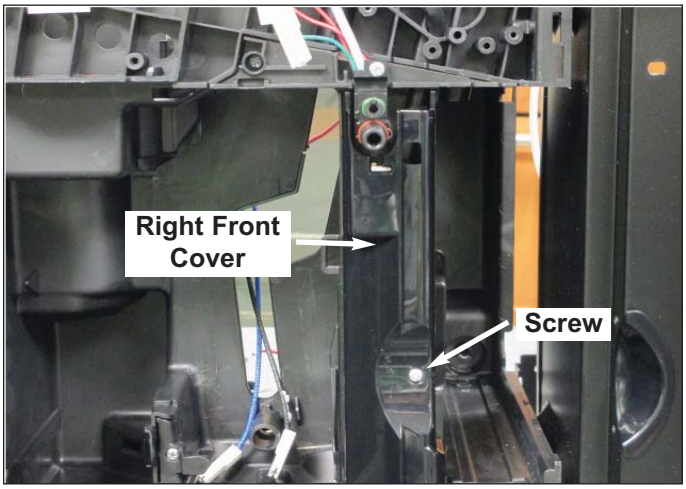


4-37. 2-Way Valve

**Milk Carafe and Water Spout Micro Swith Removal**

Milk carafe and water spout Micro Switches are located behind right front cover. To remove milk carafe and water spout Micro Switches open service door, remove drip tray, then:

1. Extract screw from right front cover and remove cover. (See Figure 4-38).
2. Front Micro Switch is for milk carafe and is a normally closed Micro Switch. (See Figure 4-39).
3. Rear Micro Switch is for water spout and is a normally closed Micro Switch. (See Figure 4-39).
4. Extract screw holding Micro Switch bracket.

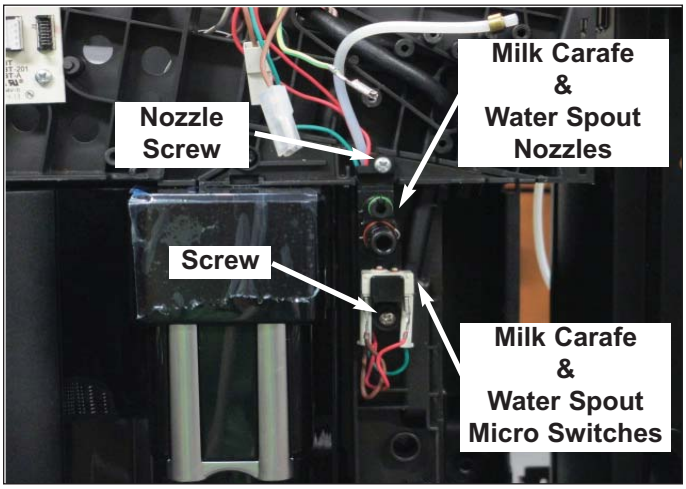


4-38. Right Front Cover

**Milk Carafe and Water Spout Nozzle Removal**

Milk carafe and water spout nozzles direct steam or water to cup or milk carafe. When water spout or milk carafe are insert the appropriate Micro Switch is opened and the incorrect nozzle is blocked. To remove milk carafe and water spout nozzle remove front frame assembly, 2-Way valve, and right front cover, then (See Figure 4-39):

1. Extract screw holding Micro Switch bracket.
2. Extract screw holding nozzle assembly and pull nozzle assembly forward.
3. Remove cotter pin, HP tubing and o-ring from back of nozzle.

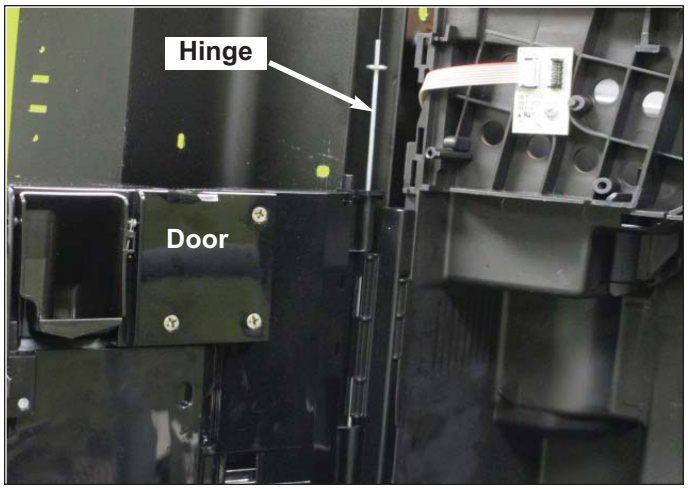


4-39. Milk Carafe and Water Spout Micro Switches

**Front Door Assembly Removal**

To remove front door assembly remove control panel cover, and front frame assembly, then:

1. Open front door assembly and pull hinge pin straight up with a pair of needle nose pliers. (See Figure 4-40).




**4-40. Front Door Assembly**

# TROUBLESHOOTING

Purpose of this section is to assist a Certified Technician in determining cause of the EC24 malfunction. This section has been arranged into four parts.

- Messages: a discussion of screen messages and how to correct the issue.
- Load Test Mode: This is EC24 diagnostics. How to enter and perform tests in Load Test Mode.
- Troubleshooting Guide: suggestions on possible causes of malfunction.
- Test Procedures: suggestions on how to perform mechanical tests on some EC24 components.

## Electrical Status

EC24 has three different electrical states. Messages generated depend on what state EC24 is in.
- Off: Main power switch is open. Power to display board, but no power to power board.
- Standby: Main power switch is closed. Power to display and power boards.
- On: On/Standby control button has been pressed. System is preparing or is prepared to make a beverage.

## Messages

EC24 displays various messages on text display. Most messages are instructions to user to perform a function such as: “Empty Grounds Container;” “Close Door;” and “Fill Tank.” Most messages can have multiple causes including a mechanical issue.

***Note:*** *Suggestions are arranged by order of occurrence. For example: It is more likely for “Descale” message to be caused because the unit needs descaling than a bad power board.*

| Message | Status | Possible Cause | Suggestions |
|---|---|---|---|
| **Close Door** | Standby or On | • Service door is open<br>• Tab on service door is damaged<br>• Service door Micro Switch circuits is faulty | 1. Close service door.<br>2. Replace service door.<br>3. Check brown wire to white wire circuit is closed when service door Micro Switch is depressed.<br>4. Check black wire to brown wire circuit is open when service door Micro Switch is depressed. |
| **Descale** | On | • If coming on immediately after descaling, likely descale was not done correctly. | 1. Descale unit.<br>2. Descale unit a second time.<br>3. Replace power board. |

| Message | Status | Possible Cause | Suggestions |
|---|---|---|---|
| **Empty Circuit Fill Circuit** | On | • No water flow in water circuit.<br><br>***Note:*** *This message can be caused by water tank being pulled out and reinserted while pump is running.* | 1. Air in water circuit. Insert water spout and press control button - .<br>2. Faulty pump. Run pump in load test mode. Check voltage to pump from power board.<br>3. Faulty solenoid. Check both sole noids in load test mode.<br>4. Blocked water flow. Check filter.<br>5. Check flow through water circuit.<br>6. Faulty flow meter. Check connec tion on flow meter and power board.<br>7. Replace Mechanic's valve. |
| **Empty Grounds Container** | On | • Number of pucks is counted by power board. | 1. Empty grounds container.<br>2. Replace power board. |
| **Fill Beans Container** | On | • Grinder is jammed<br>• Grinder motor is faulty<br>• No power to grinder | 1. Fill beans container.<br>2. Remove back panel, upper panel, coffee bean tank and inspect grinder.<br>3. Test grinder in lode test mode.<br>4. Check voltage to grinder from power board. |
| **Fill Tank** | Standby or On | • Water tank is not installed correctly<br>• Water tank float is not working correctly<br>• Water Tank Micro Switch circuit is faulty<br>• Reed sensor is faulty | 1. Fill water tank.<br>2. Assure water tank is installed cor rectly and tab on back of tank is not damaged.<br>3. Empty and fill water tank - assure float is moving.<br>4. Check circuit closes when water tank Micro Switch is depressed.<br>5. Disconnect reed switch from power board and check resistance. With water tank in and full, resistance should be 10-15 ohms. |

| Message | Status | Possible Cause | Suggestions |
|---|---|---|---|
| **General Alarm** | Standby or On | • NTC (temperature sensor) failure<br>• Upper and/or Lower limit Micro Switch circuit is faulty<br>• Hall sensor<br>• Heating Element<br>• TCO failure<br>• Power board failure | 1. Message occurs when unit is turned on. Check resistance of both NTC (temperature sensor).<br>2. Message occurs after small move ment of infuser, or strange noise when infuser moved. Check upper and lower limit Micro Switch circuit.<br>3. Message occurs after small move ment of infuser. Check hall sensor.<br>4. Still heating after at least 6 minutes. Check both TCO (temperature sen sor).<br>5. Still heating after at least 6 minutes. Check both heating elements.<br>6. Message occurs after small move ment of infuser, or unit has been heating for at least 6 minutes. |
| **Grind too Fine, adjust Mill/Grinder** | Standby or On | • Infuser operation is obstructed. | 1. Adjust grind setting to a coarser grind. Only adjust when grinder is running.<br>2. Too much pre-ground coffee. Put EC24 in standby and then turn on.<br>3. Infuser not clearing puck. |
| **Heating Up Please Wait** | Standby or On | • Heating up to make coffee, hot water or steam.<br>• Not heating properly. | 1. If message lasts for at least 6 min utes check both heating elements and both TCO (temperature sen sor). |
| **Insert Grounds Container** | Standby or On | • Grounds container not inserted correctly<br>• Tab on grounds container is damaged<br>• Grounds container Micro Switch circuit is faulty<br>• Power Board | 1. Insert Grounds container.<br>2. Inspect and install grounds contain er.<br>3. Check circuit closes when grounds container Micro Switch depressed.<br>4. Replace power board. |
| **Insert Milk Container** | On, milk drink selected | • Milk carafe not inserted correctly<br>• Damaged milk carafe lid<br>• Milk carafe Micro Switch circuit is faulty | 1. Insert milk carafe.<br>2. Inspect milk carafe lid.<br>3. Check circuit closes when milk carafe Micro Switch is depressed. |
| **Insert Water Spout** | On, water selected On | • Water spout not inserted correctly<br>• Damaged water spout<br>• Water spout Micro Switch circuit is faulty | 1. Insert water spout correctly.<br>2. Inspect water spout.<br>3. Check circuit closes when water spout Micro Switch is depressed. |

| Message | Status | Possible Cause | Suggestions |
|---|---|---|---|
| **Less Coffee** | On | • Excessive amount of pre-ground coffee. | Excessive grounds should have been ejected as a puck. If not, place unit in standby, then turn on. |
| **Please Wait** | Standby or On | • Normal part of some operations.<br>• Message occurs for over 6 minutes indicates component error. | If message occurs for over 6 minutes then:<br>1. Run descale.<br>2. Follow suggestions for General Alarm. |
| **Rinsing** | Standby, On or Extended Options | • Message occurs at start-up and shut-down. Able to initiate through extended options. Message should clear after rinse is performed. | 1. Cycle power then initiate rinse through extended options.<br>2. If rinse is not performed follow suggestions under Empty Circuit - Fill Circuit. |
| **Self-Diagnosis** | Standby | • EC24 not able to complete self-diagnostic because of component error. | 1. Cycle power and attempt to turn on again.<br>2. Follow suggestions under General Alarm. |
| **Turning Off Please Wait** | On | • Normal when EC24 is going to Standby through auto-off or On/Standby control button being pushed.<br>• If message occurs for over 6 minutes indicates component error. | Normal if EC24 is going to standby.<br>1. EC24 runs a rinse before going into standby. Likely unable to initiate rinse. Follow suggestions for Empty Circuit - Fill Circuit. |

## Load Test Mode

In lode test mode components can be activated by pressing control button and observing the result. This also makes it easier to confirm voltage. If a component is not working, voltage should be checked to assure it is not a wiring issue or power board issue.

**Entering Load Test Mode**

With EC24 off press and hold coffee taste - and cycle - , then turn EC24 on with main power switch. Upper bar of text display will be lit, and it will say self-diagnostics briefly. Let go of control buttons. After a few seconds text display will read “Load Test Mode.”

On/Standby control button activates both 3-Way solenoid valve (EV1) and 2-Way solenoid (EV2).

Extended options control button activates 2-Way solenoid valve (EV2) and cooling fan.

Hot water control button activates 3-Way solenoid valve (EV1) and lights.

Coffee taste control button activates transmission motor down. Moves infuser down.

Volume control button activates transmission motor up. Moves infuser up.

Cycle control button activates heater assembly - coffee.

Cycle with double volume control button activates heater assembly - steam.

Cappuccino control button activates pump.

Latte and Macchiato control button activates grinder.

To exit load test mode at anytime press the main power switch, turning the unit off.

***Note:*** *two control buttons can not be activated at the same time.*

## Self-Diagnostics

With EC24 off press and hold coffee taste - and hot water - , then turn EC24 on with main power switch. EC24 wil run a self-diagnostic then go to standby.

## Electric Test

With EC24 off press and hold coffee taste - and cycle with double volume - , then turn EC24 on with main power switch. Text display with then read “Electric Test Mode.” EC24 will run grinder, solenoids, transmission motor up, transmission motor down, and both heating elements. After approximately two minutes grinder motor will run again, test will end and EC24 will enter standby.

## Display Test Mode

With EC24 off press and hold coffee taste - and volume - , then turn EC24 on with main power switch. All LED will come on for 30 seconds. Then text display will read “Display Test Mode” on first line and “Button” on second line. When a control button is pushed, the number of the control button - as counted from left to right - will appear next to “Button.” For example: if you press control button coffee taste - number “4” will appear next to “Button.” When corresponding number appears next to “Button” it confirms that control button is operating correctly. Thirty seconds after last key stroke EC24 will reset the language. Press and hold enter - until EC24 states language is set.

***Note:*** *If wrong language is set, enter Extended Options mode to set correct language.*

## Troubleshooting Guide

Troubleshooting guide is meant to assist a Certified Technician in diagnosing common issues where EC24 is not performing correctly and is not presenting a message. It is important to keep in mind water circuit is the most critical system for EC24. Tracing water flow through water circuit usually will determine what the issue is. Water circuit diagram can be found in section two and section seven. Suggestions have been arrange by ease of testing.

| Issue | Possible Cause | Suggestions |
|---|---|---|
| **Infuser will not move - no motor noise.** | Infuser not installed correctly. | Remove and reinstall infuser. |
| | Broken/defective service door tab. | Inspect service door tab. If damaged replace service door. |
| | Transmission Assembly filter board. | Inspect filter board for damage. Measure resistance between board terminal and wire to motor on each side. Resistance should be close to zero. Measure resistance from board terminal to board terminal and from motor wire to motor wire. Resistance should be very high. |
| | Defective Transmission motor. | Check resistance of transmission motor. Check resistance between motor terminals and motor case. |
| | Wiring/Voltage issue. | Check voltage to transmission motor. |
| | Door Micro Switch circuit is faulty. | Check door Micro Switch circuit closes when service door is closed on power board. Door Micro Switch is located beneath the grinder. |
| | Transmission assembly track is jammed or slider damaged. | Remove transmission assembly and inspect track and slider. |
| **Infuser will not move - can hear transmission motor.** | Broken transmission belt. | Feel bottom of transmission assembly for intact belt. |

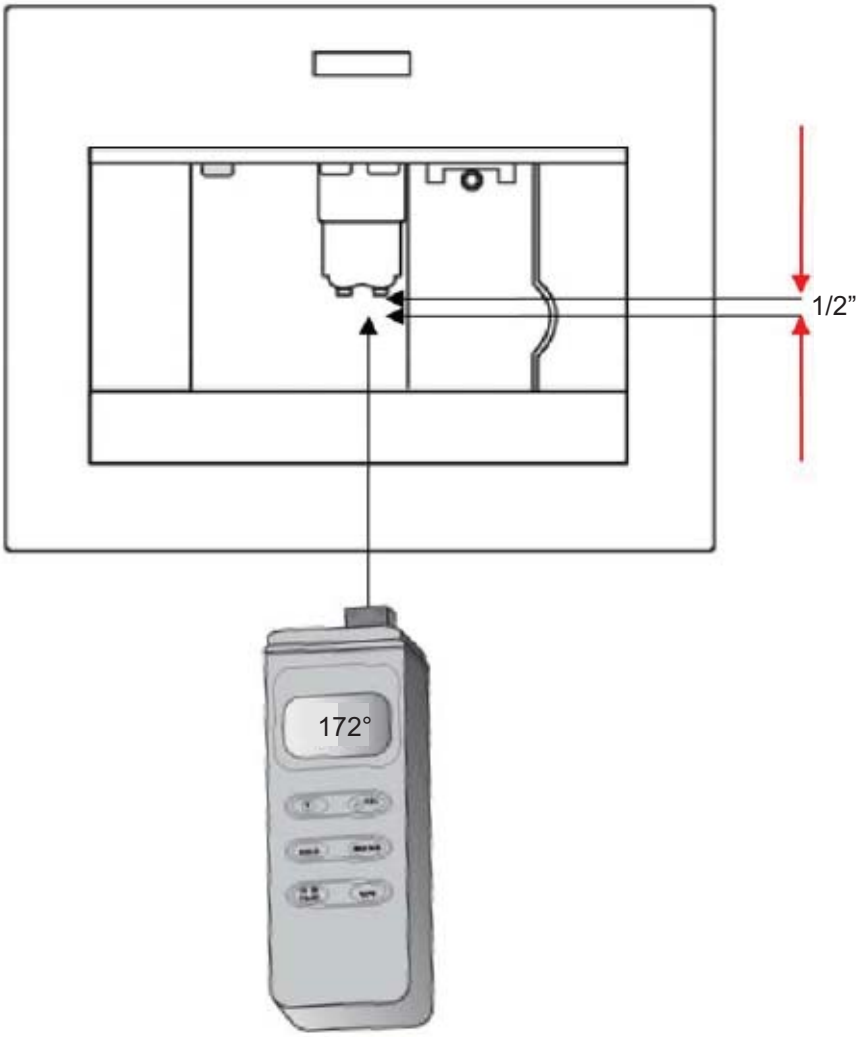
| Issue | Possible Cause | Suggestions |
|---|---|---|
| **Cold Coffee - no difference in outlet temperature after rinse.** | Check temperature. | Compare temperature of coffee coming out of coffee spout before rinse cycle, and after a rinse cycle. Coffee temperature should be approximately 172° F (± 5° F). |
| | Cold coffee cups. | Warm cup with hot water or use cup warmer. |
| | Coffee temperature is set low. | Verify temperature setting in extended options mode. One dot is the lowest temperature setting. |
| | Scale has built up on heating elements. | Confirm number of cups made and number of descalings through statistics in extended options mode. Check water lines for appearance of scale. |
| | Heating element is bad. | Measure resistance of heating elements from power board. |
| | No voltage to one of the heating elements. | Check wiring and voltage from power board to each heating element. |
| **Cold Coffee - difference in outlet temperature after rinse.** | Energy saving mode shut down heating elements. | Run a rinse cycle through extended options mode prior to making coffee. Disable energy saving mode. |
| **Bad coffee taste and/or lack of crema. Issue from the beginning.** | Poor quality coffee. | Coffee bean quality has a lot to do with the finished cup of coffee. Try a premium bean. |
| | Coffee grind is too fine. | Adjust coarseness to 7 while grinder is running. Make two or three cups of coffee and check grounds again. If grind is still too fine perform “Grinder Set-Up.” |
| | Coffee grind is too coarse. | Adjust coarseness to 4 while grinder is running. Make two or three cups of coffee and check grounds again. If no variation adjust coarseness to 1 while grinder is running. Check grounds again. If grind is still too coarse perform “Grinder Set-Up.” |
| **Bad coffee taste and/or lack of crema. Issue has started recently.** | Change in coffee brand. | A change in coffee brand may require a change in the grind setting. |
| | Mill blades have become warn. | Adjust coarseness to 4 while grinder is running. Make two or three cups of coffee and check grounds again. If no variation adjust coarseness to 1 while grinder is running. Check grounds again. If grind is still too coarse perform “Grinder Set-Up.” If grinder set up does not correct the issue or you notice mills are in bad shape while performing “Grinder Set-up” replace grinder. |

| Issue | Possible Cause | Suggestions |
|---|---|---|
| **Coffee production is very slow.** | Blocked infuser screen or valve. | Remove infuser and clean screen. If screen is very dirty remove valve and clean. |
| | Grind is too fine. | Adjust grind to a coarser setting while grinder is running. |
| | Water hardness is set too low. | Descale unit. If that corrects the issue adjust to a harder water setting in extended options. |

## Test Procedures

### Measuring Coffee Temperature

1. Turn on EC24 and allow unit to run heat up and rinse cycle.
2. Make a cup of coffee.
3. While EC24 is delivering the coffee place a temperature probe or thermocouple in coffee flow approximately 1/2" below spout.
4. Temperature should read 172° F ± 5° F.
5. If temperature is not correct check temperature setting and see "Cold Coffee" in troubleshooting guide.




5-1. Measuring Coffee Temperature

**Testing Water Circuit**

Step 1:
1. Insert water spout and place a cup beneath it.
2. In lode test mode run pump until pitch changes signifying water circuit is pressurized.
3. Depress control button On/Standby - ⏻ which opens 2-Way and 3-Way solenoid valves.
4. There should be a small discharge of water.
5. If there is no water discharged than there is a fault in the water circuit. Procede to step 2.

Step 2:
1. Remove back panel.
2. Disconnect pump discharge from heating element - coffee inlet.
3. Place a cup under the tube, and in lode test mode activate pump.
4. If water is discharged from pump, filter, flow meter and pump are good. Proceed to step 4.
5. If water is NOT discharged from pump proceed to step 3.

Step 3 - No water is discharged from pump.
1. Remove flowmeter from EC24.
2. Disconnect water inlet line from flowmeter.
3. Remove water tank.
4. Blow gently into flowmeter inlet line. There will be resistance at first, but with constant pressure water can be blown backward into water tank area.
5. If it is possible to blow through flowmeter inlet line then flowmeter is blocked. Replace flowmeter.
6. If it is NOT possible to blow through flowmeter inlet line then filter is blocked. Replace filter.

Step 4: Water is discharged from pump.
1. Assemble unit except for back panel and attempt to run hot water and/or steam through EC24.
2. If you are able to run hot water and/or steam through EC24 then replace mechanic's valve.
3. If you are NOT able to run hot water and/or steam through EC24 then:
    a. Remove left hand connection (when looking at front of unit) from heating element - steam. This is outlet from 3-Way valve.
    b. Place cup under tubing and run pump in lode test mode.
4. If water is discharged from line, replace 2-Way solenoid valve.
5. If water is NOT discharged from line, replace 3-Way solenoid valve.

***Note:*** *Electrical connection, resistance, and power to suspected component should be checked before determining component has actually failed.*

**⚠ CAUTION**

**During step 4 it is possible heating element-coffee is hot enough to produce steam. Use extreme caution that tubing is not aim in any persons direction or that cup may deflect steam toward a person. Steam can cause severe burns.**

**Testing Mechanic's Valve**

1. In load test mode move infuser up using control button volume - ☕/☕ until text display reads "Limit Switch Up."
2. Open service door.
3. Insert flat blade screwdriver into service door tab opening and hold service door Micro Switch closed.
4. Place a cup in front of the spout on the infuser.
5. Activate pump using control button cappuccino - ☕ .

If water is discharged pump, generator assembly (heating element - coffee and mechanic's valve) are good.
If water is NOT discharged try cleaning bottom of mechanic's valve:
1. Open service door.
2. Remove infuser.
3. Extract two screws from bottom of mechanic's valve.
4. Remove lower cover and large o-ring.
5. Use a small brush and water to clean cover, o-ring, and bottom of mechanic's valve.
6. Reassembly bottom of mechanic's valve.

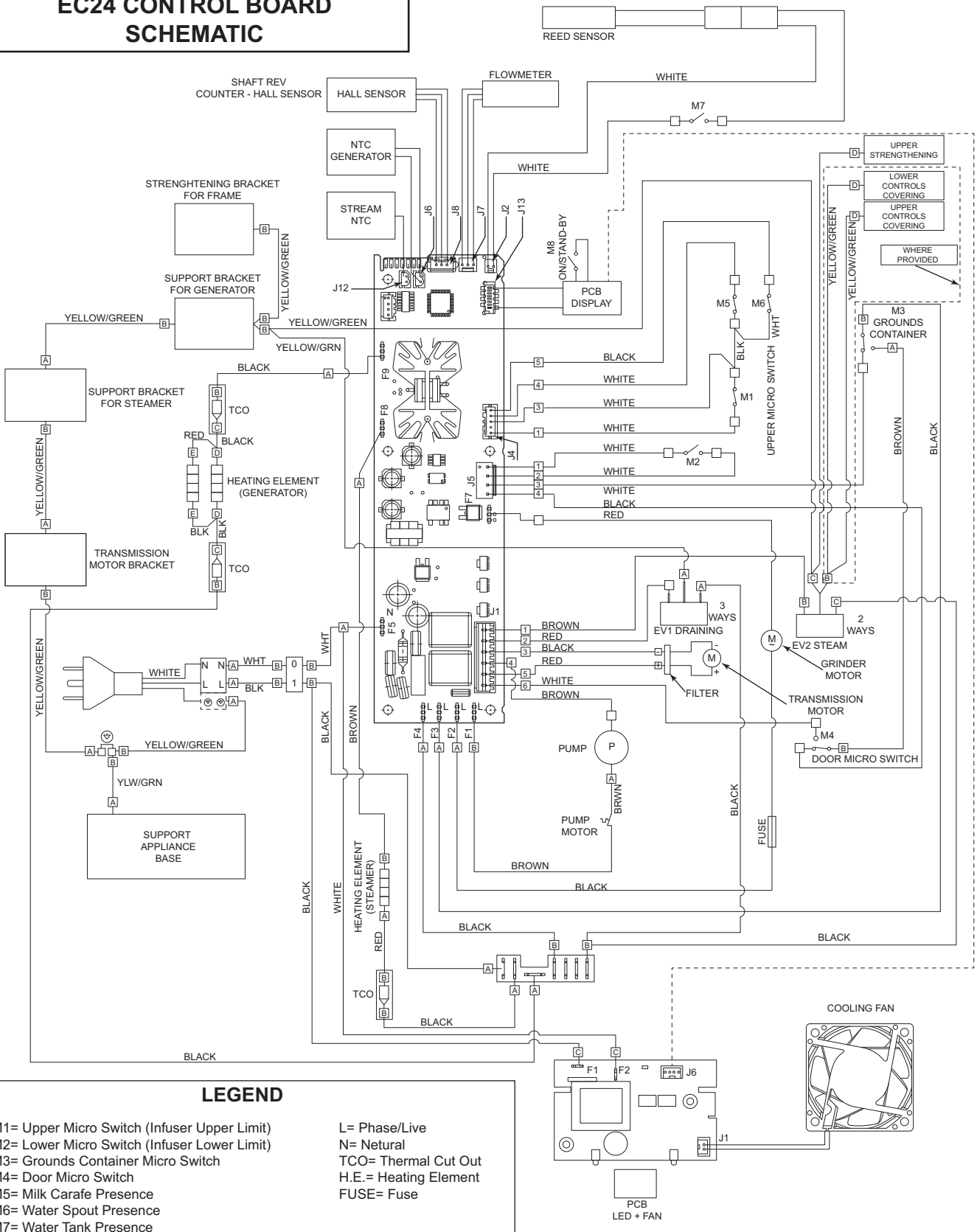
Test mechanic's valve again. If water is not discharged at this time replace generator assembly.

# Technical Data

Specifications and measurements in this section were provided by Wolf Appliance, Inc. and DeLonghi Group. As many as possible were confirmed by physical measurement. The specification is an approximation. Variations in voltage, temperature, material, and measurement technics will provide a range of possible readings. Generally if a reading is within ± 20% it is considered good. Voltage supply is assumed to be 120 VAC, 60 Hz for following readings. Confirming actual voltage to EC24 should be first test performed.

| Part Description | Temperature | Ohms | Watts |
|---|---|---|---|
| **NTC** | | | |
| NTC heating element - coffee | 208° F | 125k (@ 70°) | |
| NTC heating element - steam | 293° F | 125k (@ 70°) | |
| **TCO** | | | |
| #1 TCO heating element - coffee | 378° F | Continuity | |
| #2 TCO heating element - coffee | 378° F | Continuity | |
| #1 TCO heating element - steam | 604° F | Continuity | |
| #2 TCO heating element - steam | 604° F | Continuity | |
| ***Note:*** *Multiple configurations of TCOs is possible. There will be at least one TCO on each heating element.* | | | |
| **Heating Elements** | | | |
| Heating element - coffee #1 | | 23 | #1 - 600 |
| Heating element - coffee #2 | | 23 | #2 - 600 |
| Heating element - steam | | 14.5 | 1000 |
| **Pump** | | 1.6k | 52 |
| **Grinder** | | 16 | |
| **Reed Switch:** water bin installed | | 5 | |
| **Solenoids** | | | |
| 2-Way solenoid valve | | 430 | |
| 3-Way solenoid valve | | 430 | |
| **Micro Switches** | **Designation** | | |
| Infuser upper limit Micro Switch - NC | M1 | Continuity | |
| Infuser lower limit Micro Switch - NO | M2 | Continuity | |
| Grounds container Micro Switch - NO | M3 | Continuity | |
| Door Micro Switch: two position switch | M4 | Continuity | |
| White wire to brown wire - NO | | | |
| Black wire to brown wire - NC | | | |
| Milk carafe presence - NO | M5 | Continuity | |
| Water spout presence - NO | M6 | Continuity | |
| Water tank presence - NO | M7 | Continuity | |
| ***Note:*** *NO is normally open NC is normally closed* | | | |

# EC24 CONTROL BOARD SCHEMATIC

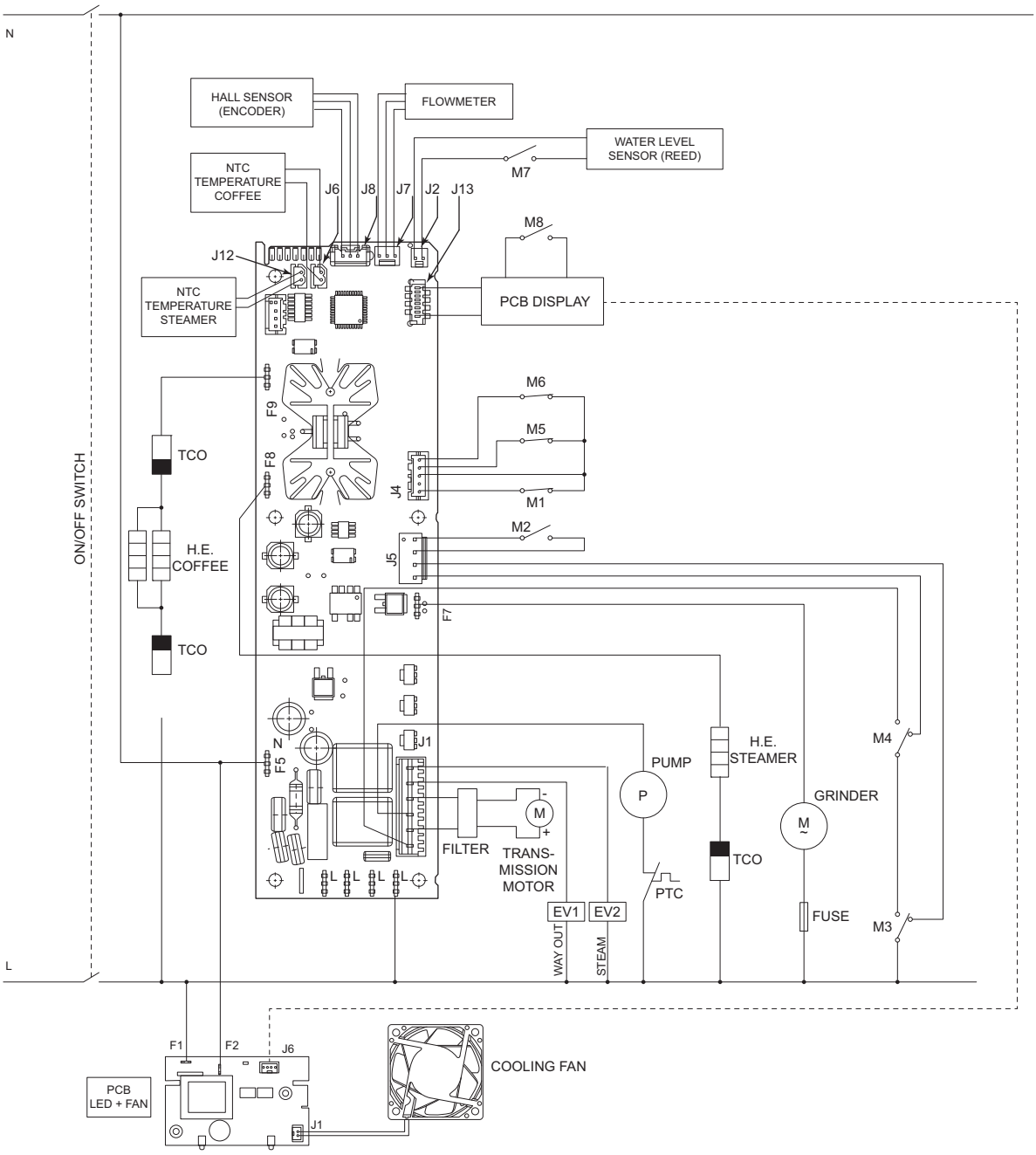



## LEGEND

M1= Upper Micro Switch (Infuser Upper Limit)
M2= Lower Micro Switch (Infuser Lower Limit)
M3= Grounds Container Micro Switch
M4= Door Micro Switch
M5= Milk Carafe Presence
M6= Water Spout Presence
M7= Water Tank Presence
M8= Micro Switch - On/Stand-By - Control Button
EV1= 3-Way Solenoid Valve
EV2= 2-Way Solenoid Valve

L= Phase/Live
N= Netural
TCO= Thermal Cut Out
H.E.= Heating Element
FUSE= Fuse

## EC24 THEORTICAL OUTLINE SCHEMATIC




### LEGEND

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**WATER CIRCUIT**