

# DISCOVERY WASHER TRAINING MANUAL



## **CAUTION!**

READ THIS MANUAL CAREFULLY  
BEFORE DIAGNOSING OR SERVICING THIS PRODUCT.



**WM2688H\*M**

<b>Customer Service (and Part Sales)</b>	<b>(800) 243-0000</b>
<b>Technical Support (and Part Sales)</b>	<b>(800) 847-7597</b>
<b>USA Website</b>	<b><a href="http://us.lgservice.com">us.lgservice.com</a></b>
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<b>LG CS Academy</b>	<b><a href="http://lgcsacademy.com">lgcsacademy.com</a></b>

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**IMPORTANT SAFETY NOTICE**

The information in this training manual is intended for use by persons possessing an adequate background in electrical equipment, electronic devices, and mechanical systems. In any attempt to repair a major appliance, personal injury and property damage can result. The manufacturer or seller maintains no liability for the interpretation of this information, nor can it assume any liability in conjunction with its use. When servicing this product, under no circumstances should the original design be modified or altered without permission from LG Electronics. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury. If wires, screws, clips, straps, nuts, or washers used to complete a ground path are removed for service, they must be returned to their original positions and properly fastened.

**CAUTION**

To avoid personal injury, disconnect the power before servicing this product. If electrical power is required for diagnosis or test purposes, disconnect the power immediately after performing the necessary checks. Also be aware that many household appliances present a weight hazard. At least two people should be involved in the installation or servicing of such devices. Failure to consider the weight of an appliance could result in physical injury.

**ESD NOTICE**

Some of the electronic in appliances are electrostatic discharge (ESD) sensitive. ESD can weaken or damage the electronics in these appliances in a manner that renders them inoperative or reduces the time until their next failure. Connect an ESD wrist strap to a ground connection point or unpainted metal in the appliance. Alternatively, you can touch your finger repeatedly to a ground connection point or unpainted metal in the appliance. Before removing a replacement part from its package, touch the anti-static bag to a ground connection point or unpainted metal in the appliance. Handle the electronic control assembly by its edges only. When repackaging a failed electronic control assembly in an anti-static bag, observe these same precautions.

**REGULATORY INFORMATION**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna; Increase the separation between the equipment and the receiver; Connect the equipment to an outlet on a different circuit than that to which the receiver is connected; or consult the dealer or an experienced radio/TV technician for help.

**COMPLIANCE**

The responsible party for this device's compliance is LG Electronics Alabama, Inc.; 201 James Record Road, Huntsville, AL, 35824.

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## WM2688H\*M (Discovery Steam Washer)

<b>Contact Information</b>	2
<b>Safety Notices and Warnings</b>	3
<b>Contents</b>	4
Introduction	8
Specifications	8
Features	9
Serial Number Identification	11
Fuzzy Logic	12
Door Lock	12
Door Locked Lamp	12
Water Circulation	13
Parts Identification (Callout)	14
Accessories	15
Remote Monitor and Modem	16
<b>Installation</b>	17
Connections	18
Control Panel	19
Option Buttons	20
Program Chart	21
Before Performing Service	21
Detergent Dispenser	22
Direct Drive DC Motor	24
Hall Effect Sensor	25
<b>Test Mode</b> and Chart	26
Checking the Water Level Frequency	26
Error Display	27
<b>Diagnosis and Check List</b> (Abnormal Operation)	29
<b>Fault Diagnosis and Troubleshooting</b>	32
No Power	32
Vibration and Spin Noise	33
No Water Supply	34
Detergent Does Not Flow In	34
Liquid Detergent Does Not Flow In	35
Abnormal Sound	35
Heating Without Water	36

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<b>Fault Diagnosis and Troubleshooting (Continued)</b>	
Drain Malfunction	36
Wash Heater Trouble	37
Heating Continuously Above The Set Temperature	37
Will not Circulate Water	38
Spin Trouble	39
<b>dE</b> Error Code	39
<b>Disassembly and Repair</b>	40
Block Wiring Diagram	41
Control Panel	41
Main Board	42
Dispenser	43
Noise Filter	43
Front Cabinet Cover	44
Door	46
Door Switch	46
Pump	47
Heater	48
Thermistor	48
Foreign Object Between Drum and Tub	49
Interior Light	49
Motor	50
Tub and Drum	51
Damper	52
Turbo Steam Generator (TSG)	53
<b>Tips and Tricks</b>	55
<b>Exploded Views</b>	56
Exploded View (Cabinet and Control Panel)	56
Exploded View (Drum and Tub)	57
Exploded View (Dispenser)	58
<b>Parts List</b>	59

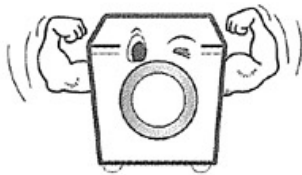
## INTRODUCTION

The *DISCOVERY* series of washers and dryers is the top of the line and includes every option and feature. Most notable are the steam generator and the LCD display.

## SPECIFICATIONS

ITEM	WM2688H*M	
COLOR	W:BLUE WHITE, N:NAVY BLUE	
POWER SUPPLY	AC 120 V, 60 Hz	
PRODUCT WEIGHT	192 lbs (87kg)	
ELECTRIC POWER CONSUMPTION	WASHING	280 W
	DRAIN MOTOR	80 W
	WASH HEATER	1000 W
REVOLUTION SPEED	WASH	46 rpm
	SPIN	0-1320 rpm
CYCLES	9	
WASH/RINSE TEMPERATURES	5	
SPIN SPEEDS	5	
OPTIONS	Prewash, Rinse+Spin, Extra Rinse, Water Plus, Stain Cycle	
WATER CIRCULATION	Incorporated	
OPERATIONAL WATER PRESSURE	14.5-116 psi (100-800 kPa)	
CONTROL TYPE	Electronic	
WASH CAPACITY [cu.ft]	3.47 (4.0 IEC)	
DIMENSIONS	27" (W) X 29 <sup>3</sup> / <sub>4</sub> " (D) X 38 <sup>11</sup> / <sub>16</sub> " (H), 50 <sup>13</sup> / <sub>16</sub> " (D, door open)	
DELAY WASH	up to 19 hours	
DOOR SWITCH TYPE	PTC + Solenoid	
WATER LEVEL	10 steps (by sensor)	
LAUNDRY LOAD SENSING	Incorporated	
ERROR DIAGNOSIS	Incorporated	
AUTO POWER OFF	Incorporated	
CHILD LOCK	Incorporated	
RLM ENABLE	Incorporated	
STEAM	Incorporated	

## FEATURES



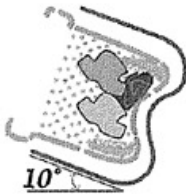
### LARGE CAPACITY

The larger drum (4.0 cu. ft.) allows washing of larger (heavier) loads and oversized items (comforters, curtains, blankets, etc.) There is less wrinkling and tangling of the laundry.



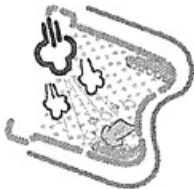
### DIRECT DRIVE

The brushless DC motor drives the drum directly without belts, pulleys, or transmissions. The maximum spin speed of 1,320 RPM extracts more water from the laundry, reducing drying times.



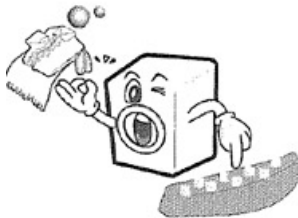
### TILTED DRUM/LARGE DOOR

The tilted drum (10°) and large door opening allow easier loading and unloading.



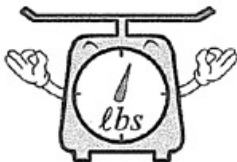
### STEAM WASHING/SteamFresh®

The steam feature works with the recirculating pump to increase washing performance while maintaining low energy and water usage. SteamFresh® removes wrinkles from dry clothes.



### ROLLER JETS and BALLS

The baffles pick up water as the drum turns and allow it to pour through the clothing as it tumbles. The balls enhance the washing performance while maintaining fabric care.



### AUTOMATIC LOAD DETECTION

The microprocessor reads the current required to turn the drum and determines the weight of the load. This input is used to make numerous decisions during the wash cycle.

## FEATURES, continued



### BUILT-IN HEATER

The internal heater helps maintain the water at its optimal temperature for selected cycles. The SANITARY cycle kills most common germs and bacteria.



### CHILD LOCK

This allows the user to lock the controls. Children then cannot play with the buttons and disturb the wash cycle.



### REMOTE LAUNDRY MONITOR

Available separately, the remote monitor displays the cycle and remaining time of the washer and dryer. It can be plugged in to any outlet in the house.



### LCD Display

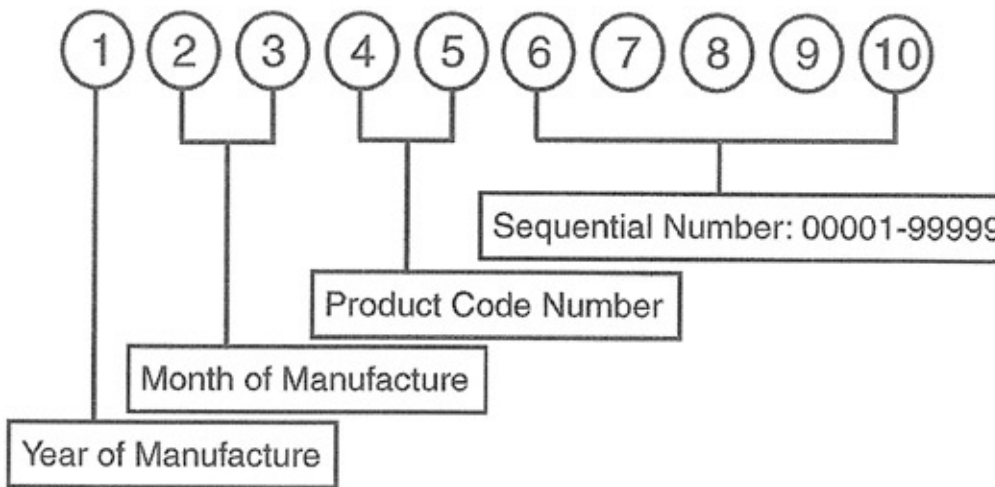
The bright display replaces numerous LEDs and shows instructions when the controls are set.



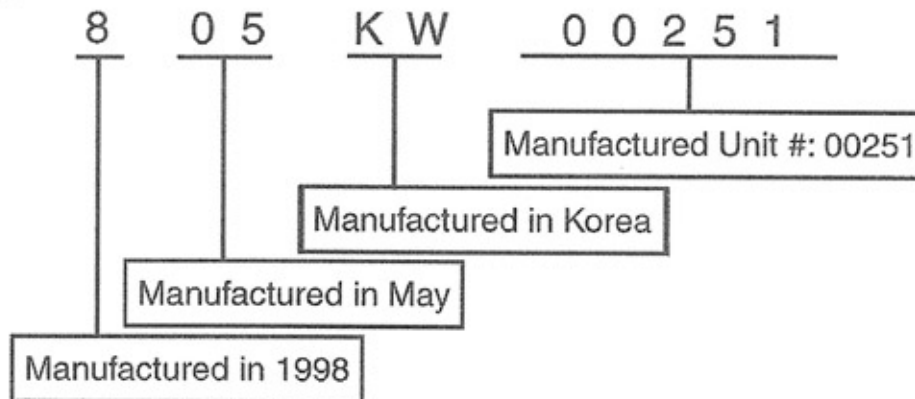
## SERIAL NUMBER IDENTIFICATION

The serial number is unique to each product. It gives information concerning the time and place of manufacture. The serial number is required to be paid for warranty service and to get the correct part in the event a running production change was made. Some models may have four (4) letters instead of two (2) for the product code number. The third and fourth letters are significant only to the manufacturing facility.

This chart will help you decode the serial number.

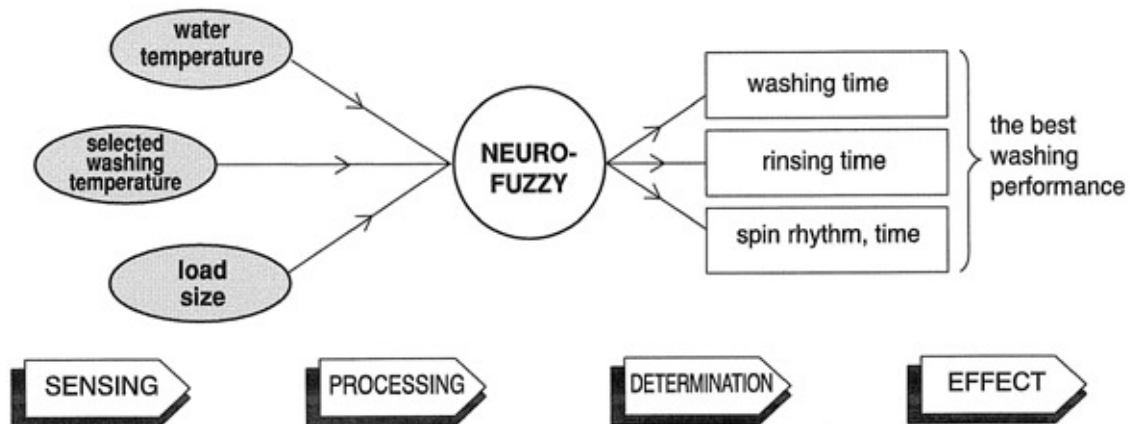


### Example



## FUZZY LOGIC

To get the best washing performance, the user selects one of the standard cycles. Sensors in the COMBO make an infinitely variable number of adjustments as the cycle progresses. Adjustments are automatically made for load size, incoming water temperature, soil level, rinses required, and other variables.



## DOOR LOCK

The door has an automatic, electrically operated lock system. When the machine is off or paused, the door can be opened by pulling it. When the machine is operating, the electric latch keeps the door closed.

The door cannot be opened:

- When the COMBO is operating
- When the power failed or the washer is unplugged (until the capacitor discharges and releases the lock)
- When the DOOR LOCK light is on
- When the drum is still turning

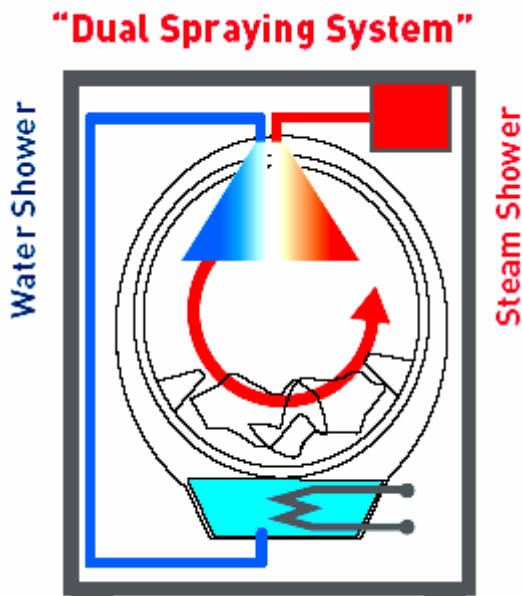
## DOOR LOCKED LAMP

The DOOR LOCK lamp lights:

- When the COMBO is operating
- When the water level sensor frequency is lower than 22.9 kHz
- When the temperature inside the tub is over 45° C (113°F)

## WATER CIRCULATION

The recirculation pump circulates the water during most of the cycle. During the WASH cycle, it runs continuously for the first 3 minutes and then intermittently throughout the cycle. During the RINSE cycle, it runs continuously as soon as the appropriate amount of rinse water has been added. This recirculated water enters the drum at the top of the door at a small shower head. This spray not only keeps the window and gasket clean, it allows the clothes to be soaked with detergent or rinse water more quickly and can be used to control an oversudsing event.



The recirculation pump is separate from the drain pump, but they are attached to opposite sides of the filter housing.

The steam is not pumped; it comes into the washer drum under its own pressure. When steam or the sanitary cycle is used, the door will remain locked until the laundry has cooled to a safe temperature.

The pumps and filter are located at the bottom left front corner. The filter can be unscrewed, cleaned, and replaced.



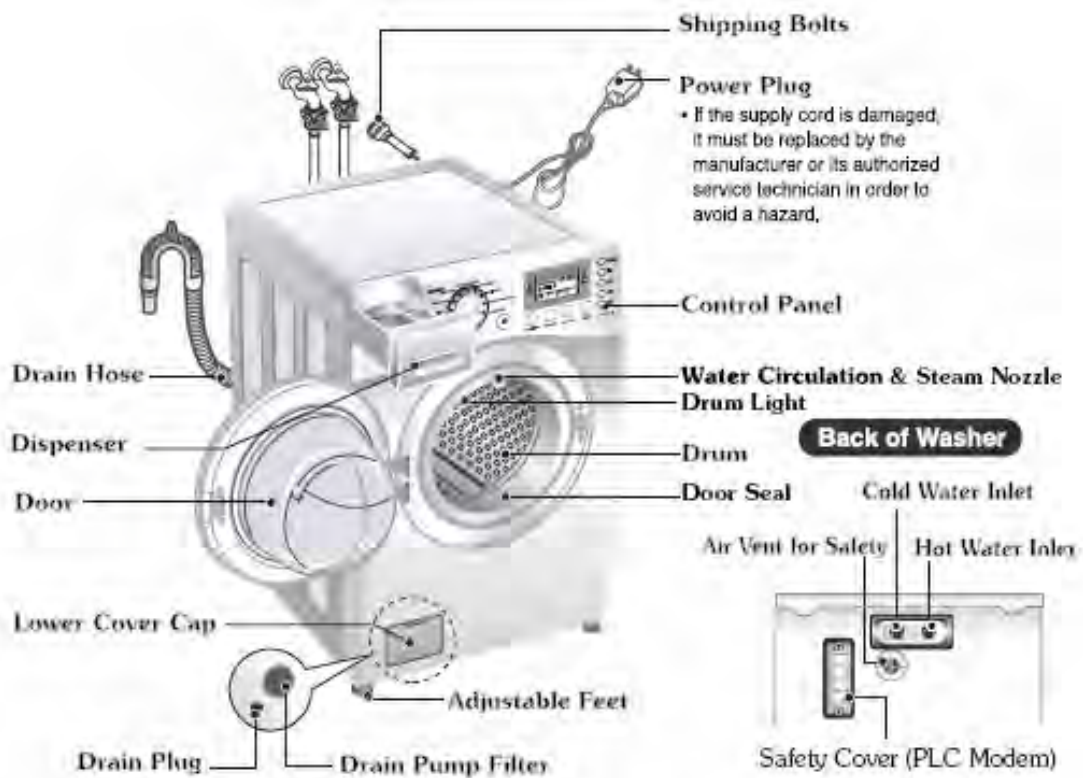
Use the small drain hose to evacuate the water remaining in the bottom of the tub before removing the filter.

The drain pump is on the left and exhausts the water via the gray corrugated hose.

The recirculating pump is on the right and recirculates water from the tub to the shower spray at the top of the door gasket via the smaller black hose.

## PARTS IDENTIFICATION

(Front of Washer)



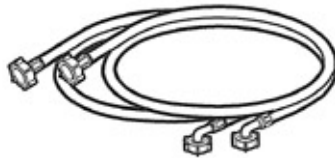
The air vent on the back of the machine must be left open and clear at all times.

If the washer is installed in a closet or closed laundry alcove, there must be sufficient clearance and ventilation. The closet should have a full louvered door with at least 800 square inches (0.5 m<sup>2</sup>) of open area for ventilation.

The washer requires a space of at least 1 inch (2.5 cm) between the wall and the machine on each side and at least 4 inches (10 cm) between the back of the washer and the wall. Additional space may be needed for servicing.

## ACCESSORIES

The washer comes with the two input hoses. The blue stripe is for cold water and the red stripe is for hot water. While the hoses are mechanically identical, it is critical to the performance of the washer to have the hot and cold hoses connected correctly.



Hot/Cold (1 each)  
Hose



Wrench



Tie strap (Option)  
to secure drain hose to standpipe,  
inlet hose, or laundry tub

The wrench is used to remove (and replace) the shipping bolts and to adjust the leveling feet. Be sure to leave it and encourage the customer to retain the wrench, the four shipping bolts, and the manual in a safe place in the event the washer requires service or the customer moves.

The shipping bolts **MUST BE REMOVED** before operating the washer. (See page 15.)

## REMOTE MONITOR and MODEM



The remote laundry monitor (RLM) allows the user to monitor the progress of both washer and dryer, provided they are equipped with a modem.



Remove the cover and install the modem on the back of the washer.

Save the small socket cover and screws in the event you need to remove the modem for some reason. The socket should be covered at all times.



Remove the cover and install the modem on the back of the dryer.

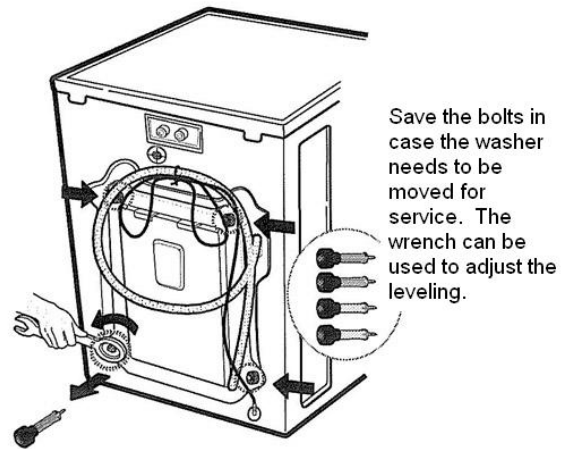
Save the small socket cover and screws in the event you need to remove the modem for some reason. The socket should be covered at all times.

After installation is complete, plug in the washer, dryer, and monitor, in that order. Turn on the washer and dryer. Press and hold the SET button on the monitor.

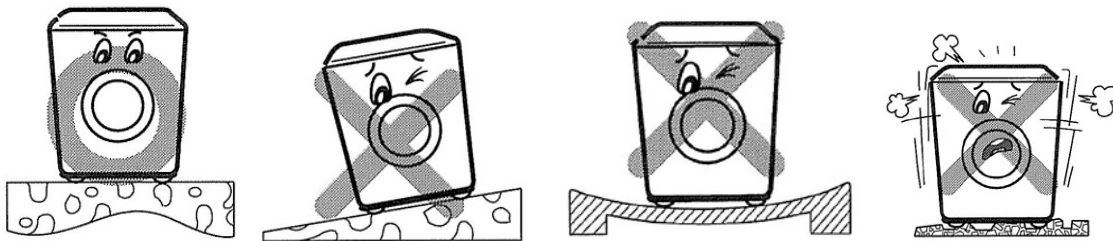


## INSTALLATION

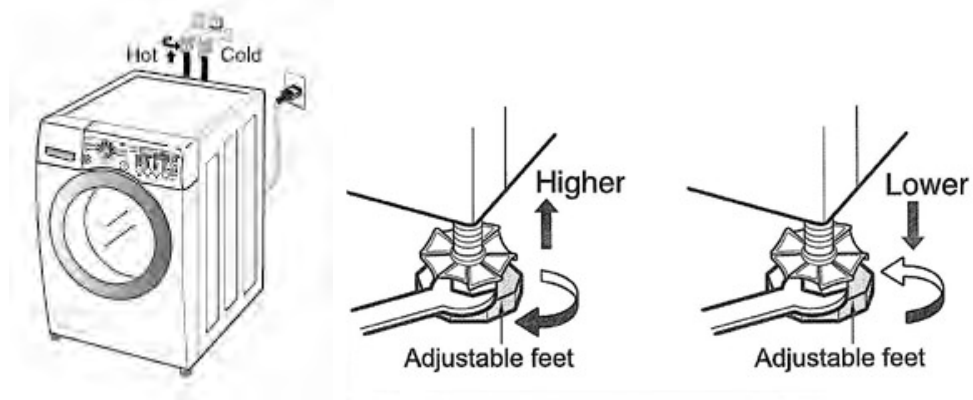
REMOVE THE SHIPPING BOLTS.



INSTALL THE WASHER ON A FIRM, FLAT SURFACE.

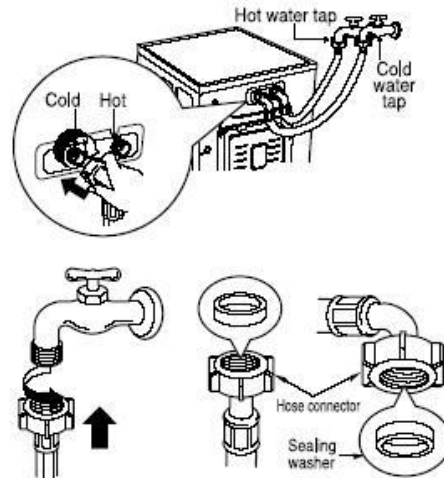


ADJUST THE FEET TO BE LEVEL.



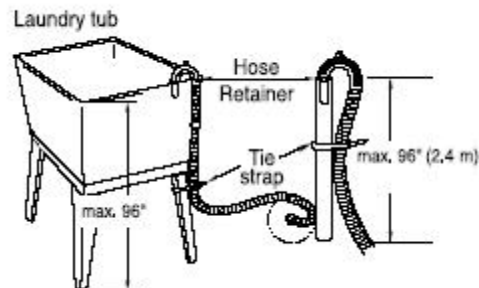
## CONNECTIONS

### WATER



Be sure the rubber washer is inside the hose end. Attach the hoses to the washer (red is HOT, blue is COLD). Tighten them firmly but don't strip the plastic threads on the washer connections.

### DRAIN



The drain pipe should be firmly attached to the standpipe or the laundry tub or sink where it drains. The pump has sufficient power to cause the pipe to move around when the water is expelled. The pump can lift the drain water a maximum of 96 inches (2.4 m), but there is no minimum height requirement. The vacuum breaker in the drain line will prevent drainage by gravity or siphoning. The hose can lay flat into a floor drain as long as the end of it is not submerged.

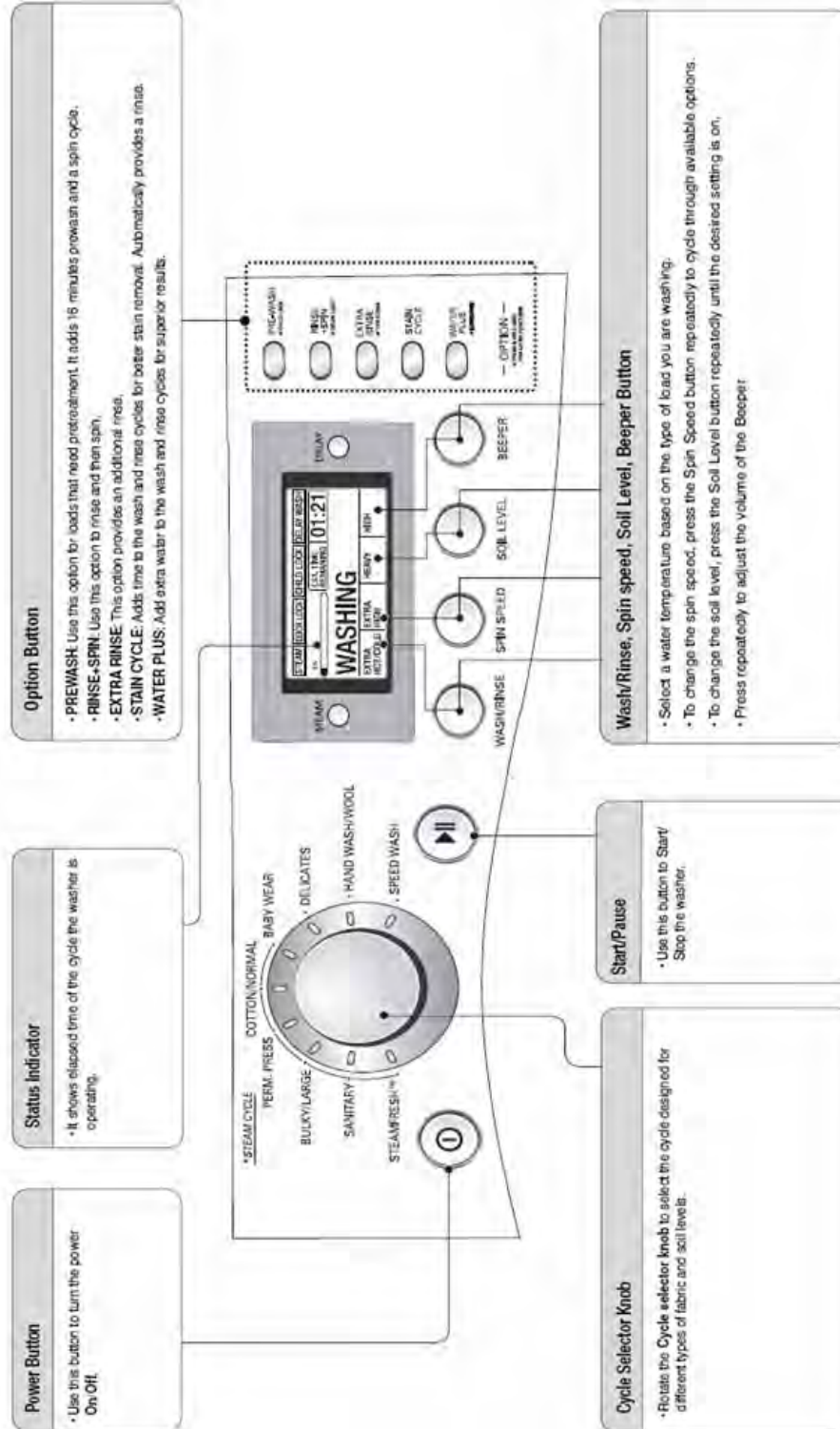
### ELECTRICAL

The steam washer requires a 120 VAC, 60 Hz., dedicated, 20-amp circuit.



# CONTROL PANEL

The control panel is located on the front of the Steam Washer. All options are available from the control panel.



## OPTION BUTTONS



**PRE-WASH**  
\* Child Lock

Press to add a pre-wash cycle.  
(Press and hold to select or deselect the Child Lock function)

**RINSE+SPIN**  
\* Drum Light

Press after power-up without selecting a cycle to rinse and spin **ONLY**, without washing!  
(Press and hold to turn the drum light on while the washer is operating.)

**EXTRA RINSE**  
\* Tub Clean

Press to add an extra rinse cycle.  
(Press and hold to run a tub cleaning cycle. The washer must be empty!)

**STAIN CYCLE**

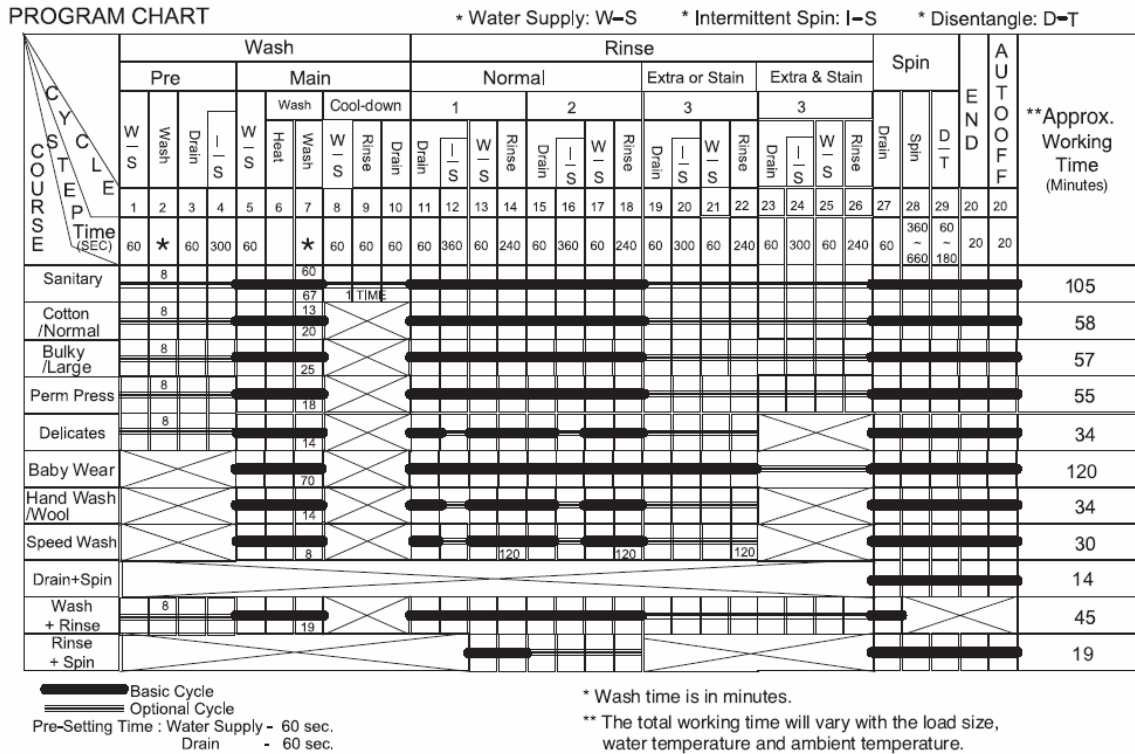
Press to add additional washing time.

**WATER PLUS**  
\* Language

Press to add extra water to the wash and rinse cycles.  
(Press this button with the washer OFF and then press POWER to access the language menu.)

To select the optional feature, follow the instructions in parentheses.

# PROGRAM CHART



This chart shows the components and their times of operation in the various wash cycles. The time estimates shown here are for the basic cycles before the fuzzy logic adjustments are made.

## BEFORE PERFORMING SERVICE

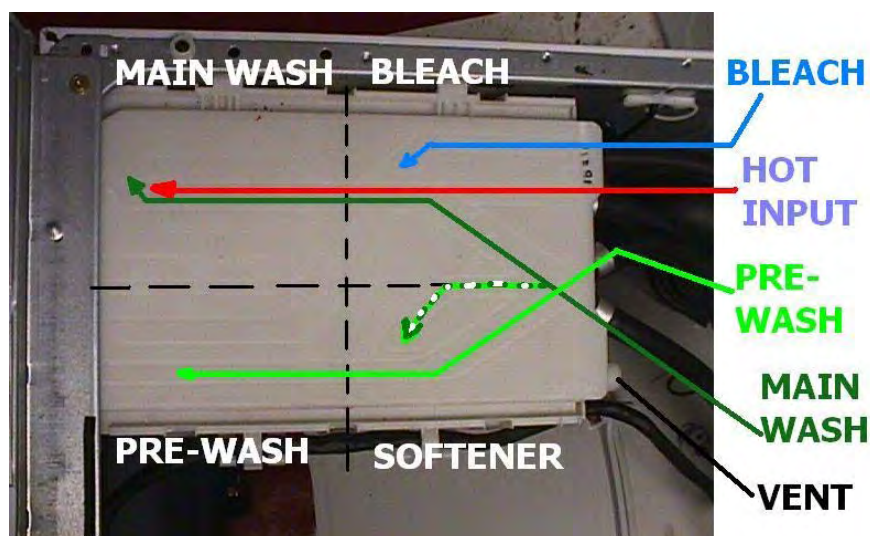
- Be careful to avoid electric shock when disconnecting parts for troubleshooting.
- Most terminals in the steam washer have 120 VAC or DC on them, sometimes even when the washer is off.
- The steam generator operates at a high temperature. Be careful when servicing it. It can be drained in place by removing the drain cap, but have a hose or a big towel ready to soak up the spillage.

## DISPENSER

The dispenser drawer is a multi-chambered reservoir that allows the user to add all the appropriate laundry additives before starting the cycle. It has a place for pre-wash detergent, main wash detergent, fabric softener, and bleach. Powdered or liquid detergents may be used, but softener and bleach must be liquids. Detergents should carry the **HE** designation. Do not use regular detergents in the washer or oversudsing will occur.



The top of the dispenser box is shown here.



The dispenser works by using various solenoids to apply water to different compartments. The liquid products are dispensed from a siphon box. As the appropriate chamber is flooded, the box fills and the water flushes the laundry product into the tub. It is mixed with water before contacting the laundry to prevent spotting or damaging the fabric.

Notice that the pre-wash and main wash fill tubes enter the dispenser at an angle. If one or the other fill valve is opened, the water goes into the appropriate detergent compartment. However, if they are opened simultaneously, the streams deflect and dispense the softener. Some water may run through the main and pre-wash compartments, but since the detergent has already been dispensed in an earlier part of the cycle, this is of no consequence.

If liquid detergent is added to the pre-wash box, it will run immediately into the tub. This does not affect the operation of the cycle. To use liquid detergent in the main wash, place the detergent siphon box in the main wash compartment. Otherwise, the main wash liquid detergent will run into the tub along with the pre-wash detergent, causing oversudsing in the pre-wash and no cleaning in the main wash.

The siphon boxes are designed to hold a liquid laundry product until the appropriate time for dispensing into the load. When the box fills with water, it begins to discharge its contents into the washer fill stream. Once the siphon action has started, it will continue until the siphon box has emptied itself. Use only regular viscosity bleaches and softeners; the ultra versions are usually much thicker and do not dispense well, if at all.



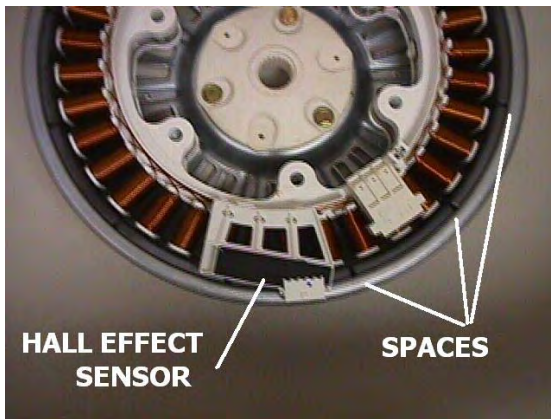
By the end of any cycle, water will have run through all of the dispenser compartments, preventing any cross-contamination of subsequent loads.



## DIRECT DRIVE MOTOR

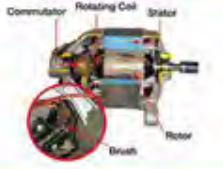
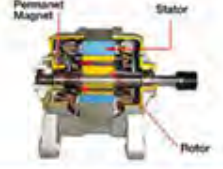

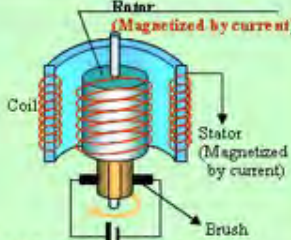
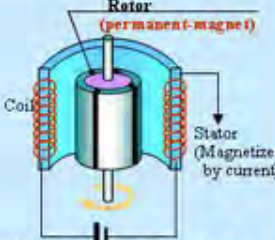
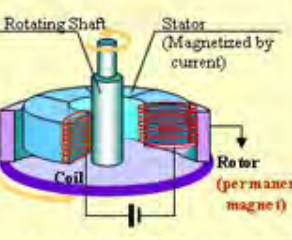


The motor is a direct-drive, brushless, DC motor. It is attached to the drum via a splined shaft, eliminating belts, pulleys, transmissions, and the inherent problems associated with them. The rotor is attached to the shaft by one large bolt.

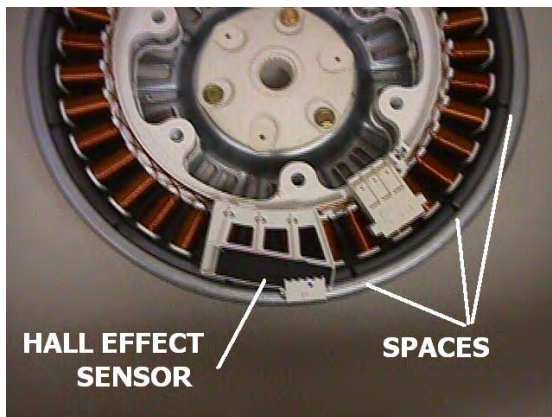


The DC motor can be driven from stopped to maximum speed in infinite steps in either direction. There are 36 poles on the stator; 12 permanent magnets spaced around the rotor. There are no brushes to wear out. Unlike a more traditional brushless motor, the rotor surrounds the stator rather than being attached to it. A Hall Effect sensor determines the speed and direction of the motor. It also can read that the load is off balance when the drum speed fluctuates.

## DIRECT DRIVE MOTOR

Universal AC Motor	BLDC Motor	Direct Drive Motor
		
 <p>Brush delivers electricity to rotate the coiled Rotor.</p>	 <p>Rotor is a permanent magnet. It does not need a Brush.</p>	 <p>Permanent magnet Rotor and Multi-coiled Stator are big and powerful enough to replace the pulley.</p>
<ul style="list-style-type: none"> <li>● Brush makes Friction Noises</li> <li>● Coiled rotor needs electricity.</li> <li>● Brush abrades and needs replacement.</li> </ul>	<ul style="list-style-type: none"> <li>★ No Friction Noises</li> <li>★ Rotor doesn't need electricity</li> <li>★ No brush replacement</li> </ul>	<ul style="list-style-type: none"> <li>★ Powerful &amp; Reliable control</li> <li>★ Minimum vibration &amp; noise</li> <li>★ Optimum energy consumption</li> </ul>

## HALL EFFECT SENSOR



The Hall Effect sensor is easily removed and replaced. You'll have to remove the rotor and stator to access the sensor. When replacing the rotor, you'll probably need a helper to hold the drum in place when you push the rotor onto the shaft. Otherwise, the drum may move forward enough to make replacing the bolt difficult. The helper can also hold the drum from turning while you tighten the bolt.



Before going to this trouble, check the connector on the main board. It is the red connector closest to the heat sink. Pull the connector off and verify the board is receiving a signal from the sensor.

## TEST MODE

The steam washer must be empty and off to enter the test mode.

1. Press and hold SPIN SPEED and SOIL LEVEL.
2. Press POWER.
3. Press START/PAUSE to cycle through the test modes. (See chart.)

Number of times the Start/Pause button is pressed	Check Point	Display Status
None	Turns on all lamps and locks the door.	<b>QC TEST MODE</b>
1 time	Tumble clockwise.	rpm (42~50)
2 times	Low speed Spin.	rpm (55~65)
3 times	High speed Spin.	rpm (125~135)
4 times	Inlet valve for prewash turns on.	Water level frequency (25~65)
5 times	Inlet valve for main wash turns on.	Water level frequency (25~65)
6 times	Inlet valve for hot water turns on.	Water level frequency (25~65)
7 times	Inlet valve for steam turns on.	Water level frequency (25~65)
8 times	Inlet valve for bleach turns on.	Water level frequency (25~65)
9 times	Tumble counterclockwise.	rpm (42~50)
10 times	Heater turns on for 3 sec.	Water temperature
11 times	Circulation pump turns on.	Water level frequency (25~65)
12 times	Drain pump turns on.	Water level frequency (25~65)
13 times	Water level Sensor for Steam	Water level frequency of TSG(0~255)
14 times	Steam Heater turns on for 1.2 sec.	TSG temperature
15 times	Off	-

## CHECK THE WATER LEVEL FREQUENCY

\* Press the WASH/RINSE and SOIL LEVEL button simultaneously.








• The digits indicate the water level frequency.

So, for example a display indicating 058, a Water level frequency of  $20+(58 \times 0.1) = 25.8$  kHz



## ERROR DISPLAY

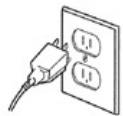








- If you press the START/PAUSE button when an error is displayed, any error except **PE** will disappear and the machine will go into the pause status.
- In case of **PE** , **tE** ,  if the error is not resolved within 20 sec., or the in case of other errors, if the error is not resolved within 4 min., power will be turned off automatically and the error code will blink. But in the case of **FE** , power will not be turned off.

	ERROR	SYMPTOM	CAUSE
1	WATER INLET ERROR		<ul style="list-style-type: none"> <li>• Correct water level (246) is not reached within 8 minutes after water is supplied or it does not reach the preset water level within 25 minutes.</li> </ul>
2	IMBALANCE ERROR		<ul style="list-style-type: none"> <li>• The load is too small.</li> <li>• The appliance is tilted.</li> <li>• Laundry is gathered to one side.</li> <li>• Non-distributable things are put into the drum.</li> </ul>
3	DRAIN ERROR		<ul style="list-style-type: none"> <li>• Not fully drained within 10 minutes.</li> </ul>
4	OVER FLOW ERROR	<b>FE</b>	<ul style="list-style-type: none"> <li>• Water is overflowing (water level frequency is over 213). If <b>FE</b> is displayed, the drain pump will operate to drain the water automatically.</li> </ul>
5	PRESSURE SENSOR ERROR	<b>PE</b>	<ul style="list-style-type: none"> <li>• The SENSOR SWITCH ASSEMBLY is out of order.</li> </ul>
6	DOOR OPEN ERROR		<ul style="list-style-type: none"> <li>• Door not all the way closed.</li> <li>• Loose electrical connections at the door switch and PWB Assembly.</li> <li>• The DOOR SWITCH ASSEMBLY is out of order.</li> </ul>
7	HEATING ERROR	<b>tE</b>	<ul style="list-style-type: none"> <li>• The THERMISTOR is out order.</li> </ul>






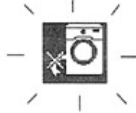


continued on next page

	ERROR	SYMPTOM	CAUSE
8	LOCKED MOTOR ERROR	<b>LE</b>	<ul style="list-style-type: none"> <li>• The connector (3-pin, male, white) in the MOTOR HARNESS is not connected to the connector (3-pin, female, white) of STATOR ASSEMBLY.</li> <li>• The electric contact between the connectors (3-pin, male, white) in the MOTOR HARNESS and 4-pin, female, white connector in the MAIN PWB ASSEMBLY is bad or unstable.</li> <li>• The MOTOR HARNESS between the STATOR ASSEMBLY and MAIN PWB ASSEMBLY is cut (open circuited).</li> <li>• The hall sensor is out of order/defective.</li> </ul>
10	EEPROM ERROR	<b>EE</b>	<ul style="list-style-type: none"> <li>• EEPROM is out of order. Displayed only when the START/PAUSE button is first pressed in the QC Test Mode.</li> </ul>
11	POWER FAILURE	<b>PF</b>	<ul style="list-style-type: none"> <li>• The washer experienced a power failure.</li> </ul>


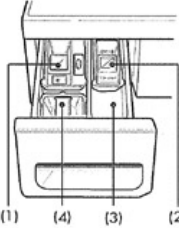
## DIAGNOSIS and CHECK LIST (Abnormal Operation)

SYMPTOM	GUIDE FOR SERVICE CALL
<p>No power</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p>Is the power plug connected firmly to 120 V AC outlet?</p> <p style="text-align: center;">↓ YES ↓</p> <p>Power failure? or Breaker opened? Is the outlet controlled by a switch?</p> <p style="text-align: center;">↓ NO ↓</p> <p style="text-align: center;">Visit to service.</p> </div> <div style="width: 35%; text-align: center;">     </div> </div>
<p>Water inlet trouble</p> 	<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p>Is  displayed?</p> <p style="text-align: center;">↓ YES ↓</p> <p>Is the tap opened?</p> <p style="text-align: center;">↓ YES ↓</p> <p>Is the tap frozen?</p> <p style="text-align: center;">↓ NO ↓</p> <p>Is the water supply shut-off?</p> <p style="text-align: center;">↓ NO ↓</p> <p>Is filter in the inlet valve clogged with foreign material?</p> <p style="text-align: center;">↓ NO ↓</p> <p style="text-align: center;">Visit to service.</p> </div> <div style="width: 35%; text-align: center;">             <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Clean the filter of inlet valve</p>  </div> </div> </div>

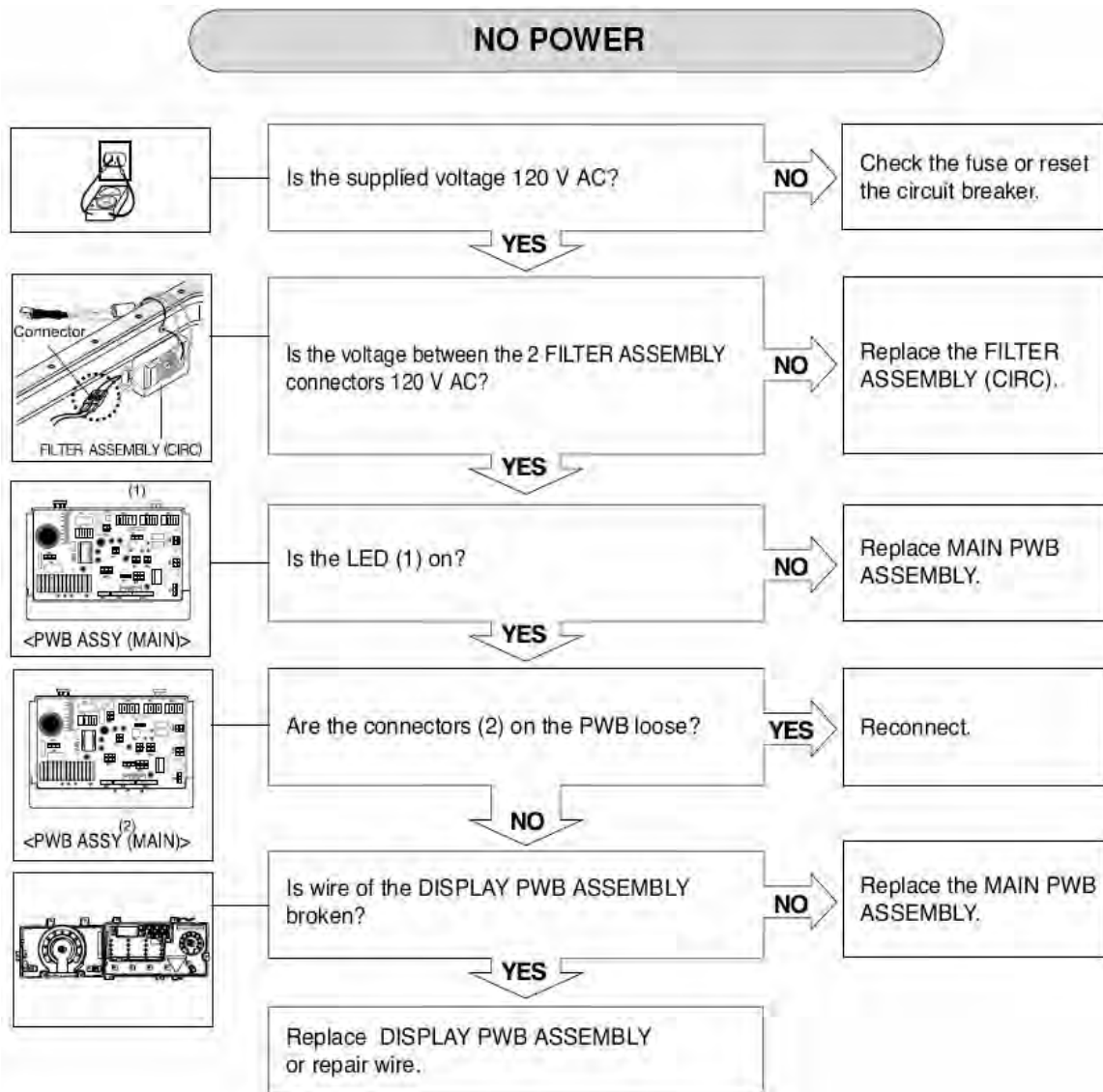
**DIAGNOSIS and CHECK LIST (Abnormal Operation, continued)**

SYMPTOM	GUIDE FOR SERVICE CALL
<p>Door error</p> 	<p>Started with door opened? </p> <p>YES →</p> <p>NO ↓</p> <p>Close the door. </p> <p>Was the load too large?</p> <p>YES → Avoid overloading.</p> <p>NO ↓</p> <p>Clicking sound is heard once or twice, when the START/PAUSE button is pressed to start the cycle?</p> <p>NO ↓</p> <p>Visit to service.</p> <p>Check if the door switch is OK.</p>
<p>Drain trouble</p> 	<p>Is  displayed? </p> <p>YES ↓</p> <p>Is the drain pump filter clogged with foreign material such as pins, coins, etc? YES → Clean up the filter. </p> <p>NO ↓</p> <p>Is the drain hose frozen, kinked, or crushed? </p> <p>NO ↓</p> <p>Visit to service.</p>

**DIAGNOSIS and CHECK LIST (Abnormal Operation, continued)**

SYMPTOM	GUIDE FOR SERVICE CALL
<p>Suds overflow from the appliance. (In this condition, wash and spin do not operate normally)</p>	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 60%;"> <p>Is a HE (High Efficiency) detergent used?</p> <p style="text-align: center;">↓ YES ↓</p> <p>Is the proper amount of detergent used as recommended?</p> <p style="text-align: center;">↓ YES ↓</p> <p style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;">Recommend to reduce the amount of detergent.</p> <ul style="list-style-type: none"> <li>* This appliance has an automatic suds sensing function which prevents overflow.</li> <li>* When excessive suds are sensed, the suds removing implementations such as drain, water input, pause will operate, without rotating the drum.</li> </ul> </div> <div style="width: 35%; text-align: center;">  </div> </div>
<p>Liquid laundry products do not flow in.</p>	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 60%;"> <p>Is liquid laundry product put in the correct compartment of the dispenser?</p> <p style="text-align: center;">↓ YES ↓</p> <p>Is the cap clogged?</p> <p style="text-align: center;">↓ YES ↓</p> <p style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;">Explain proper use of liquid laundry products.</p> <p style="text-align: center;"><b>Clean the compartment.</b></p> </div> <div style="width: 35%; text-align: center;">  <p style="font-size: small;">(1) Liquid chlorine Bleach Compartment (2) Liquid fabric Softener Compartment (3) Prewash Compartment (4) Main Wash Compartment</p> </div> </div>
<div style="display: flex; flex-wrap: wrap; justify-content: center; gap: 10px;"> <div style="border: 1px solid black; padding: 2px 5px; font-weight: bold;">FE</div> <div style="border: 1px solid black; padding: 2px 5px; font-weight: bold;">LE</div> <div style="border: 1px solid black; padding: 2px 5px; font-weight: bold;">PE</div> <div style="border: 1px solid black; padding: 2px 5px; font-weight: bold;">tE</div> </div>	<p style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center; width: fit-content; margin: 0 auto;">Visit to service.</p>

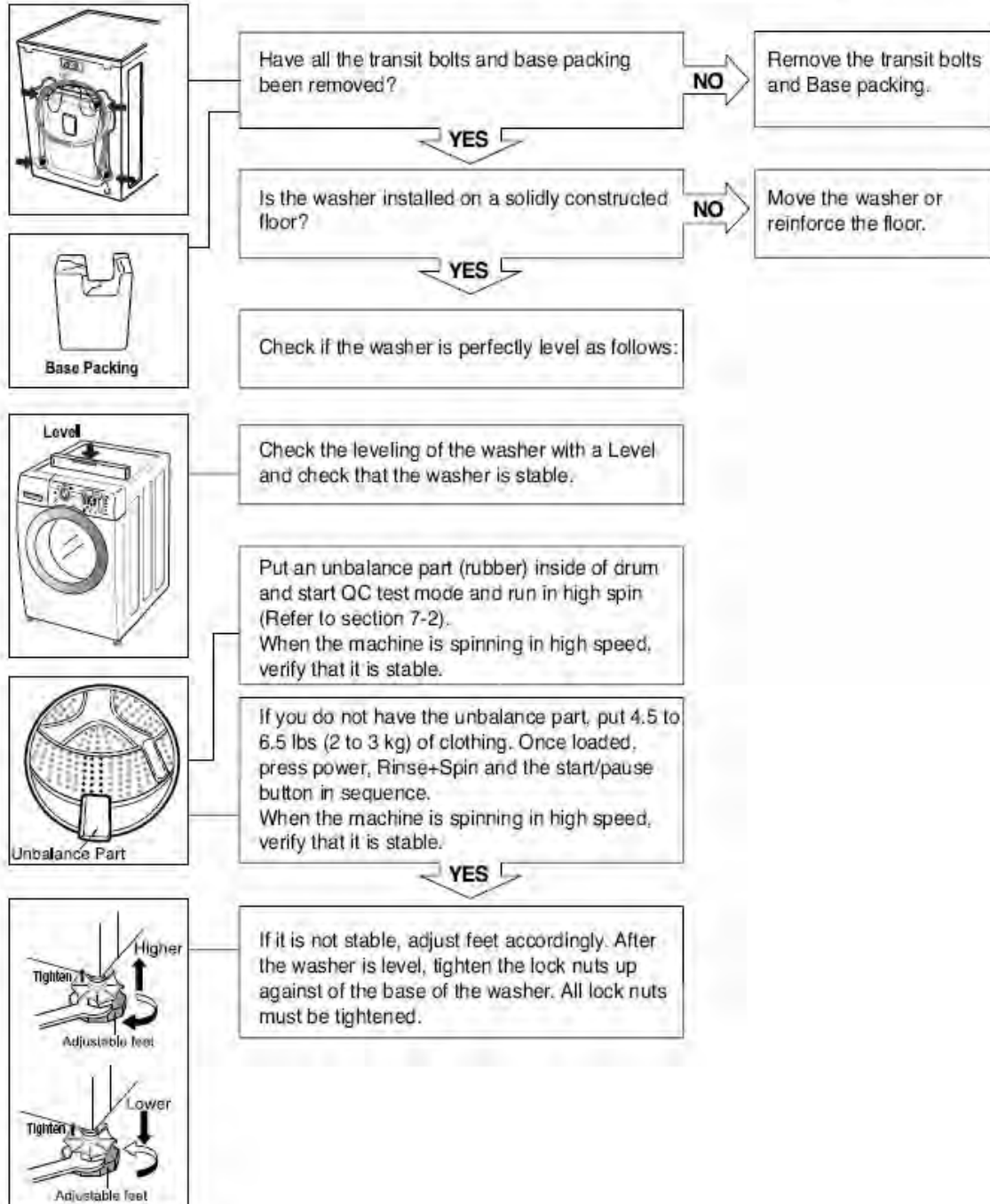
## FAULT DIAGNOSIS and TROUBLESHOOTING



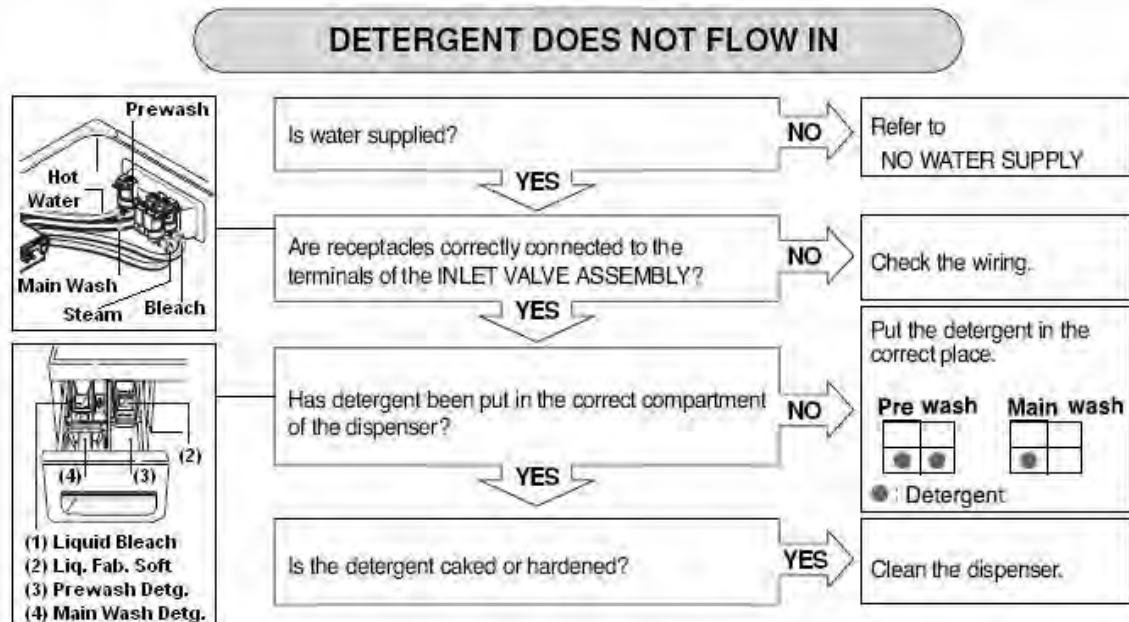
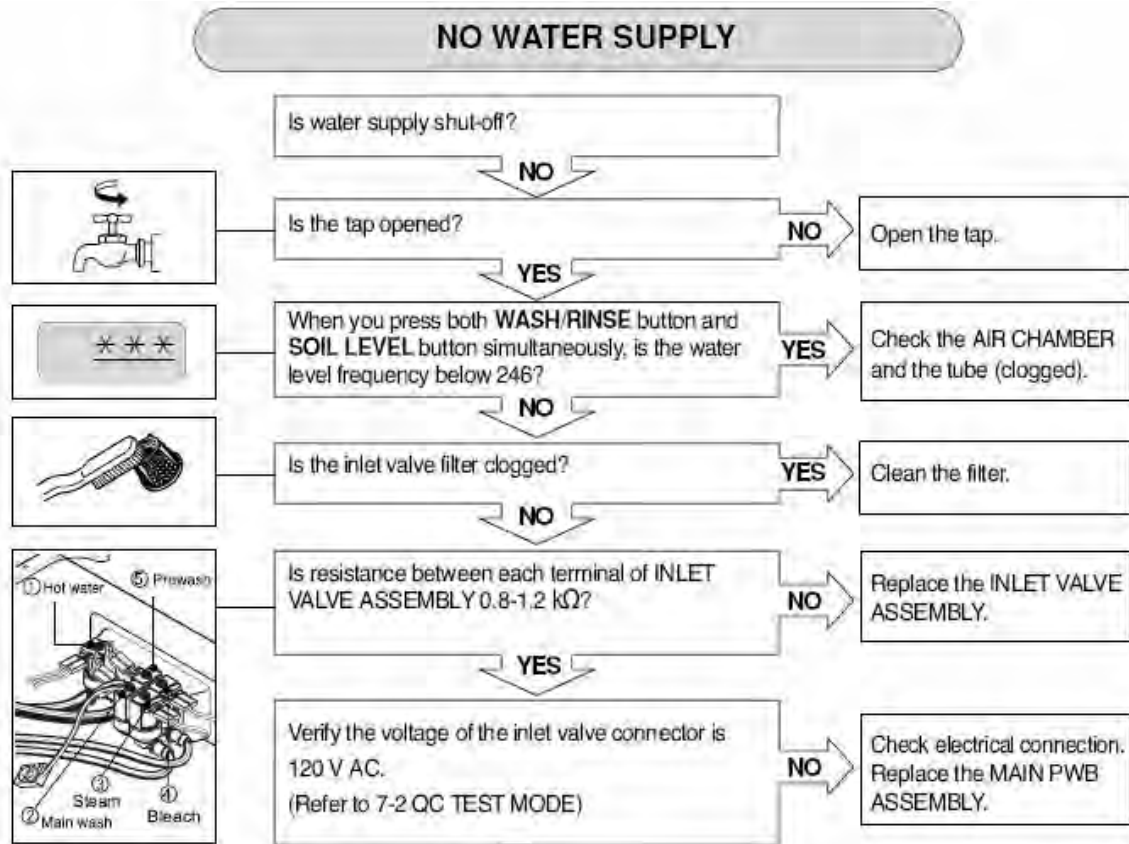


## DIAGNOSIS/TROUBLESHOOTING (continued)

### VIBRATION & NOISE IN SPIN



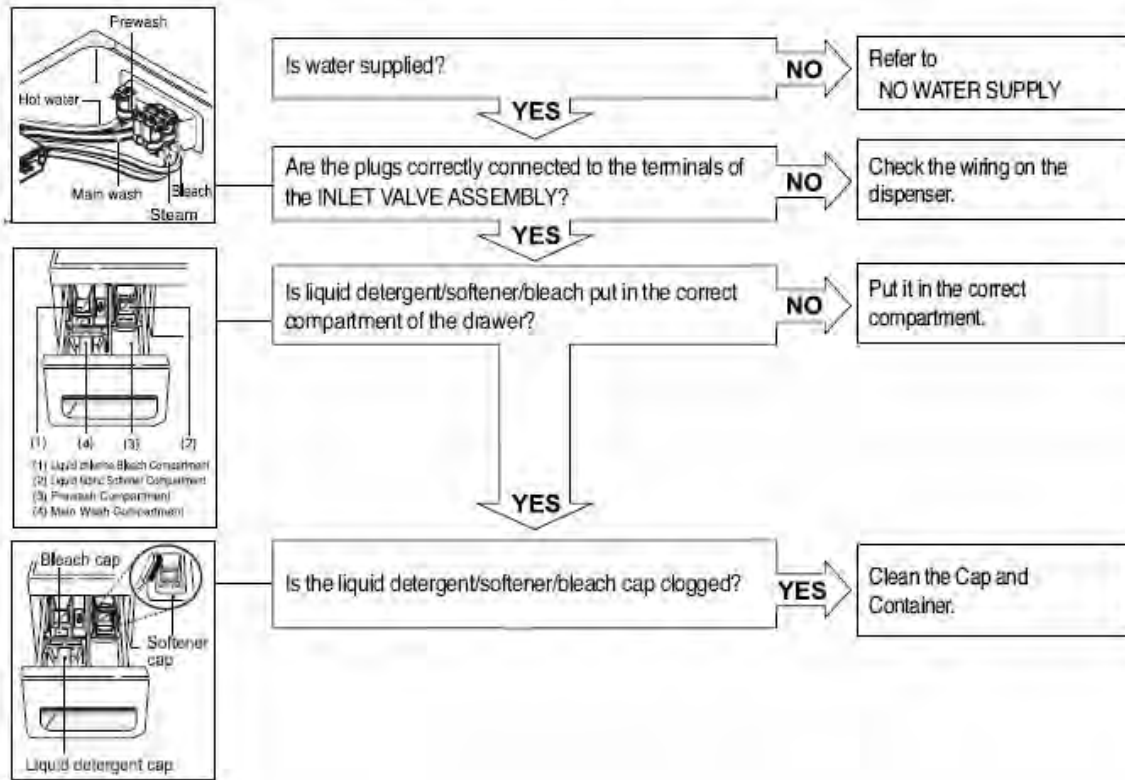
## DIAGNOSIS/TROUBLESHOOTING (continued)



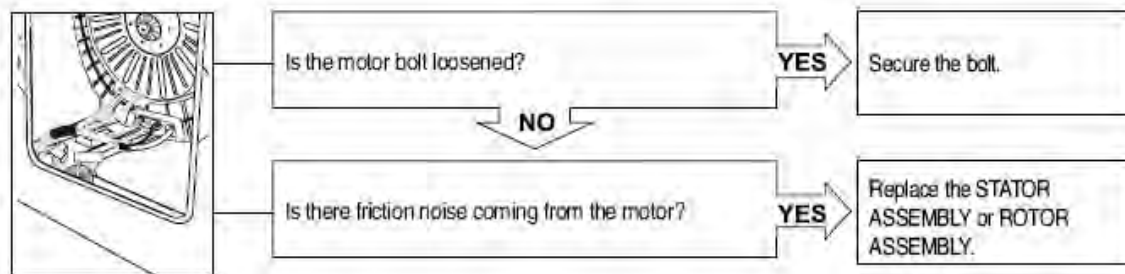


## DIAGNOSIS/TROUBLESHOOTING (continued)

### LIQUID DETERGENT/SOFTENER/BLEACH DOES NOT FLOW IN

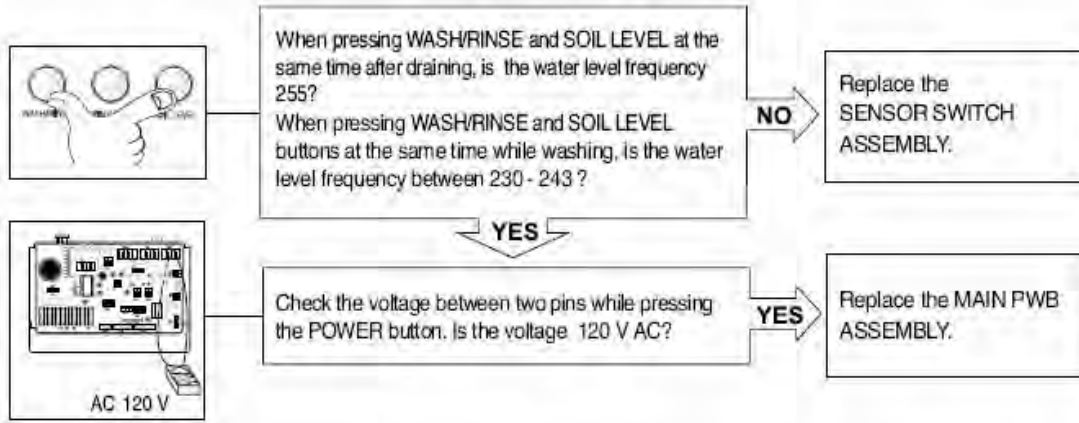


### ABNORMAL SOUND

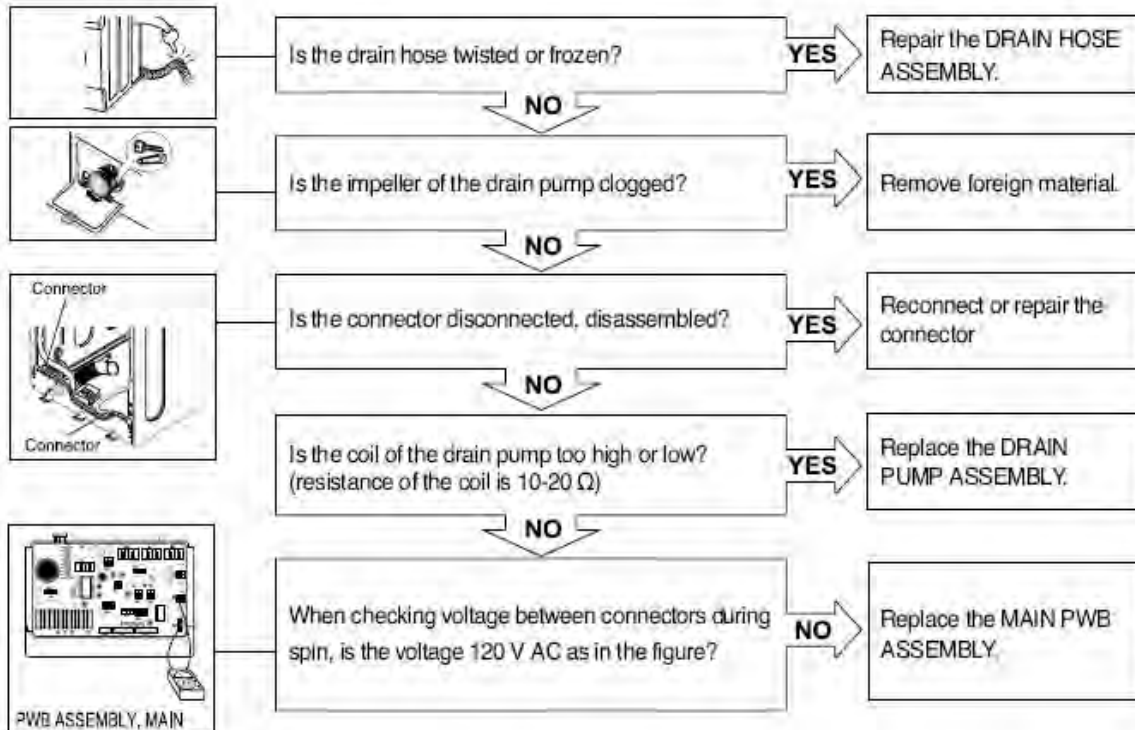


## DIAGNOSIS/TROUBLESHOOTING (continued)

### HEATING WITHOUT WATER

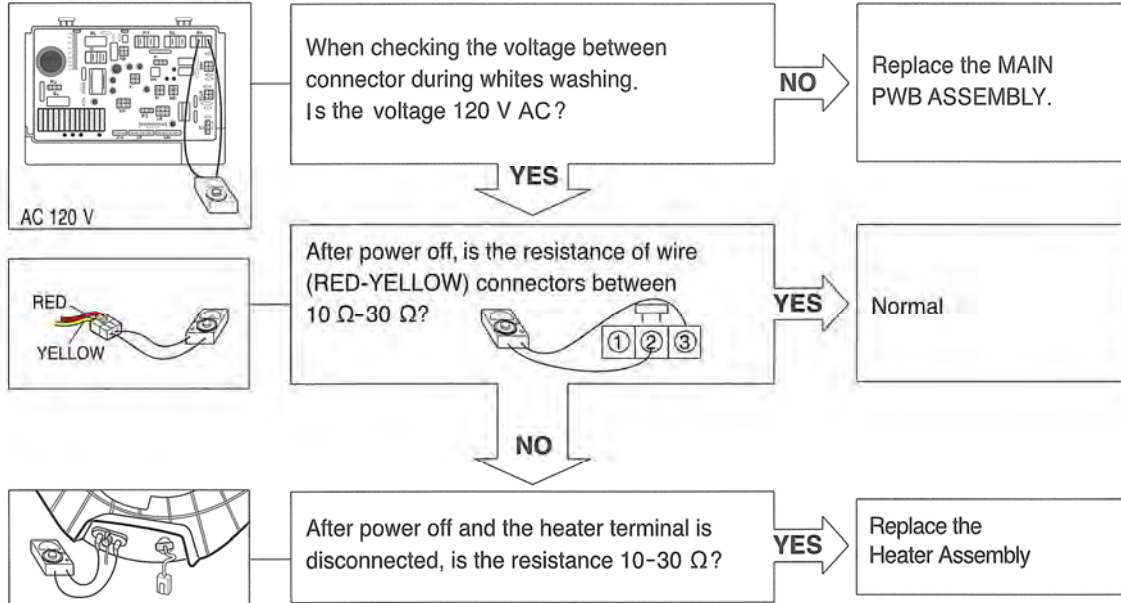


### DRAIN MALFUNCTION

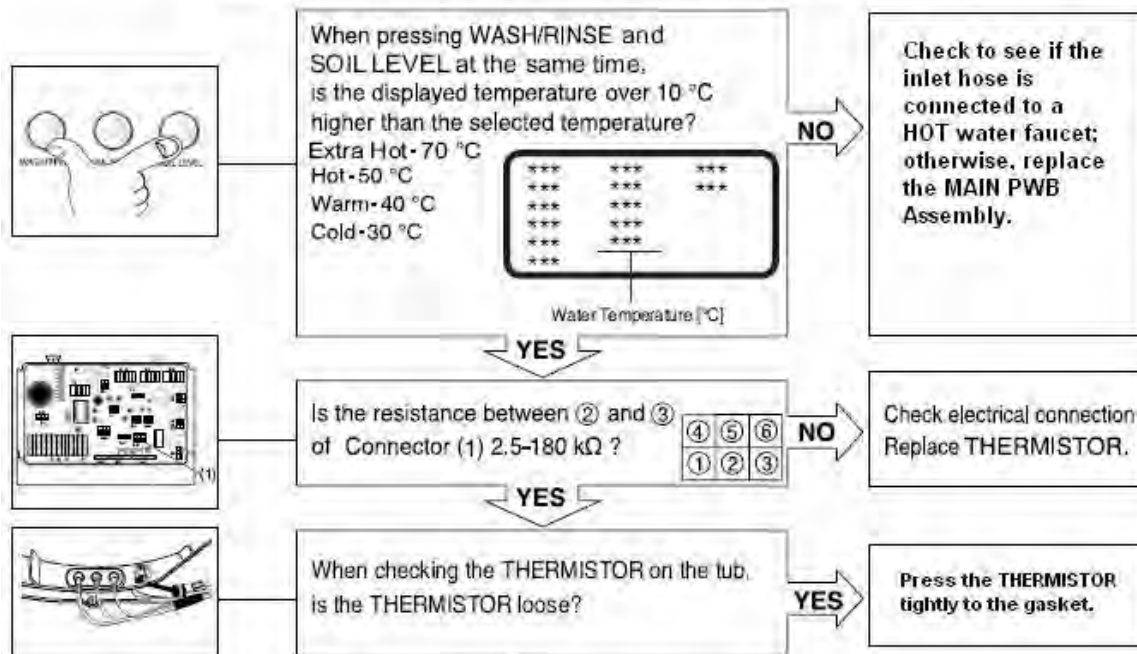


## DIAGNOSIS/TROUBLESHOOTING (continued)

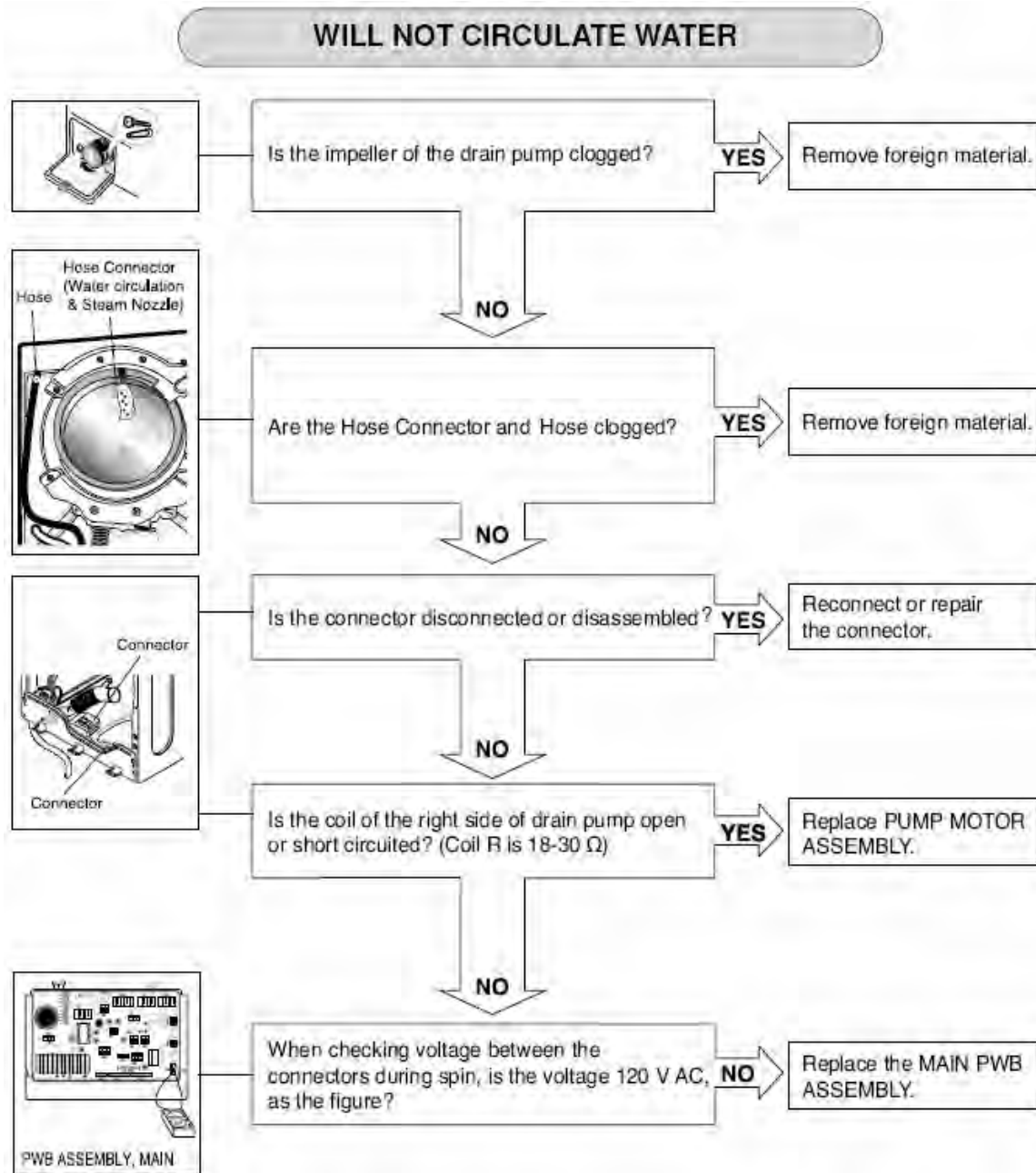
### WASH HEATER TROUBLE



### HEATING CONTINUOUSLY ABOVE THE SET WATER TEMPERATURE



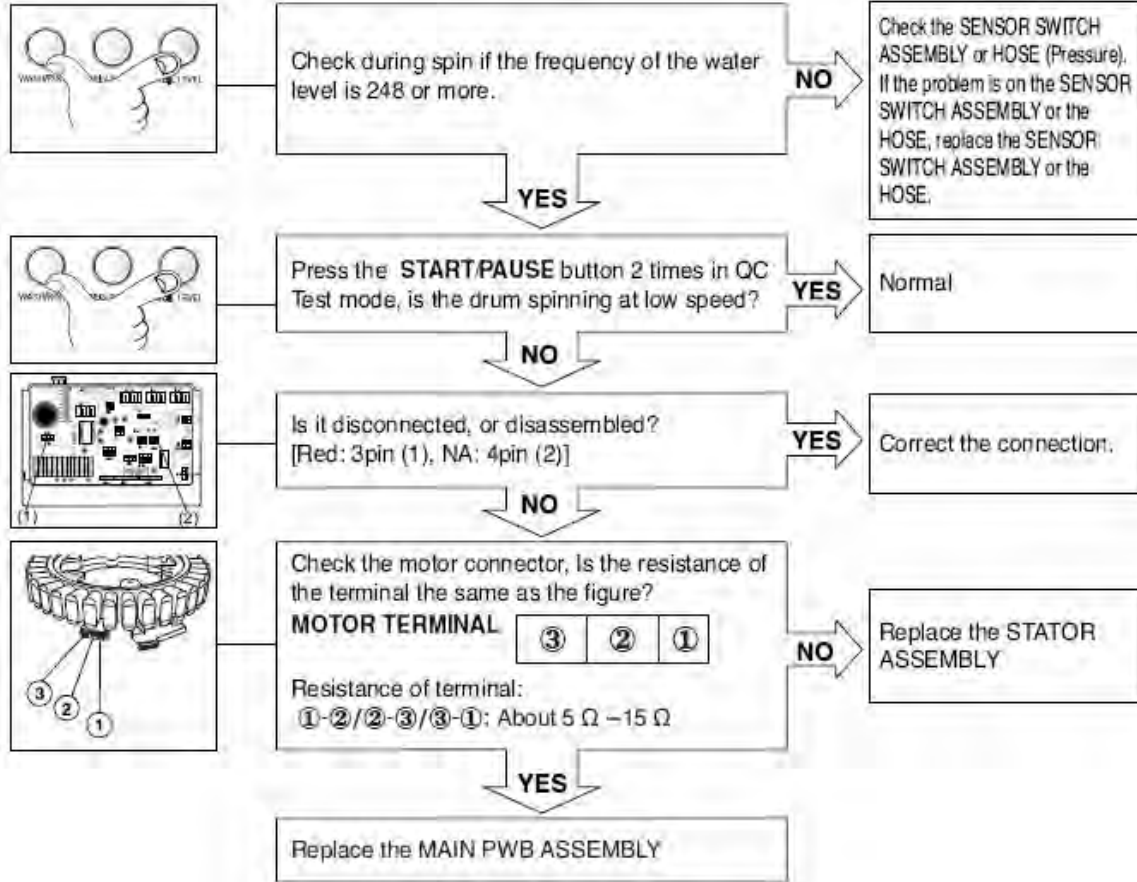
**DIAGNOSIS/TROUBLESHOOTING (continued)**



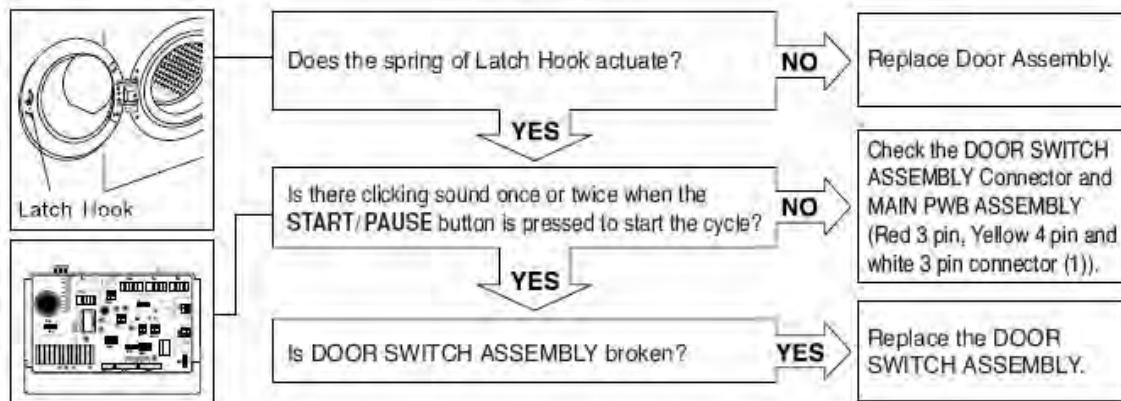


## DIAGNOSIS/TROUBLESHOOTING (continued)

### SPIN TROUBLE



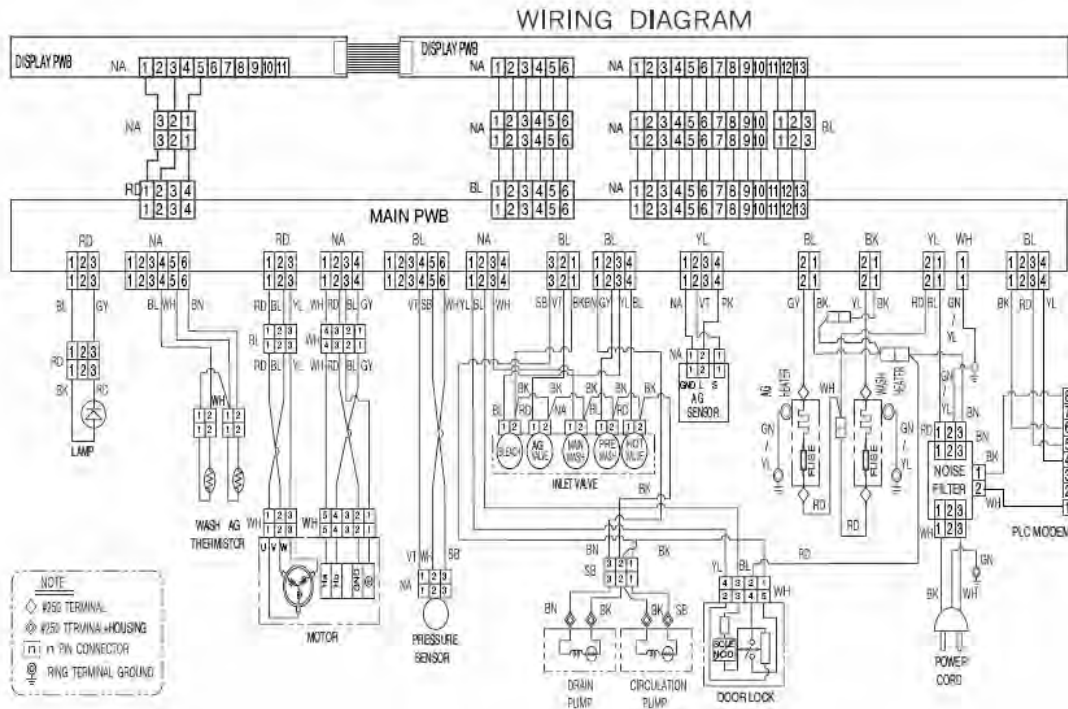
### DE ERROR



## DISASSEMBLY and REPAIR

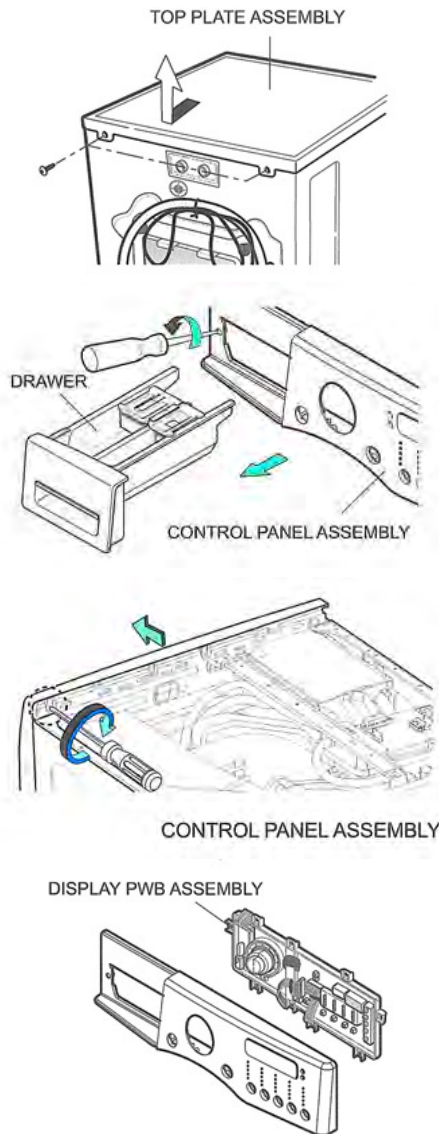
The following pages will show the instructions for disassembly, repair, replacement of parts, and re-assembly. Many times, electrical components may be tested by connecting the appropriate meter to the leads or connectors on the main PC Board. (Refer to the block wiring diagram, below.) Proper diagnosis will eliminate unnecessary labor and expedite repairs.

### BLOCK WIRING DIAGRAM





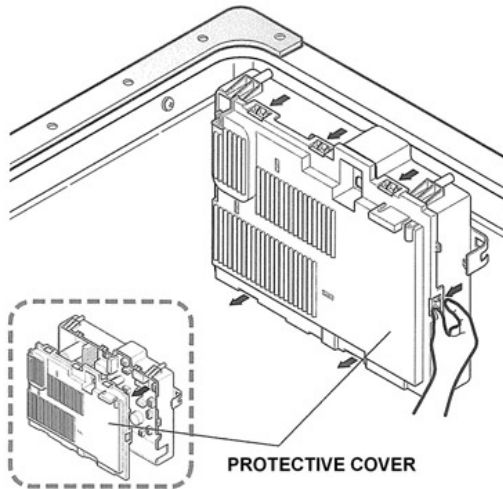
## DISASSEMBLY/REPAIR (Control Panel)



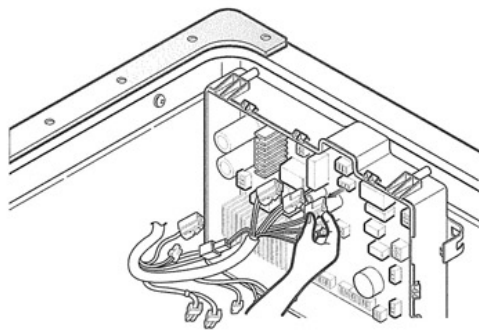
1. Remove two screws on the back of the top plate.
2. Pull the top plate backward and lift, as shown.
3. Remove the detergent drawer.
4. Remove two screws behind the detergent drawer.
5. Disconnect the connector for the Display PWB.
6. Remove one screw from the corner of the control panel.
7. Lift the top away from the support rail and pull the control panel up and away to remove.
8. Remove eight screws to separate the control panel and PWB.
9. Reassembly is the reverse of these steps.

## DISASSEMBLY/REPAIR (Main Board)

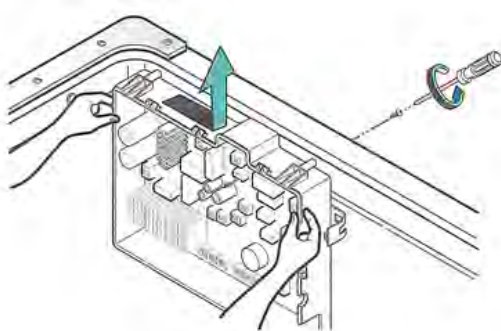
Often, you can diagnose a failed part by removing its connector on the main board and connecting the tester to the leads in the connector. (See page 54.)



1. Disconnect the POWER connector and the Water Level Sensor Switch.
2. Remove the protective cover. Press the plastic tabs out of the way to remove the cover. The main board is potted, so no repairs to it are possible.



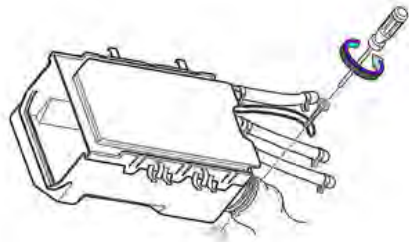
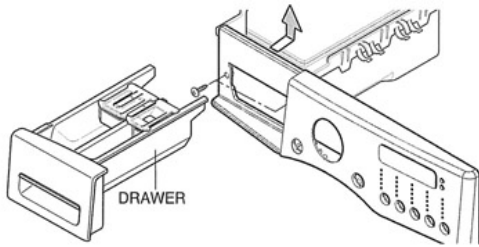
3. Disconnect the connectors on the main board. They are all different, keyed, and color-coded to prevent incorrect connection.
4. Pull the wires out of the way.



5. Remove one screw on the back of the washer to release the main board housing.
6. Remove the main board by sliding it to the right and lifting it up.

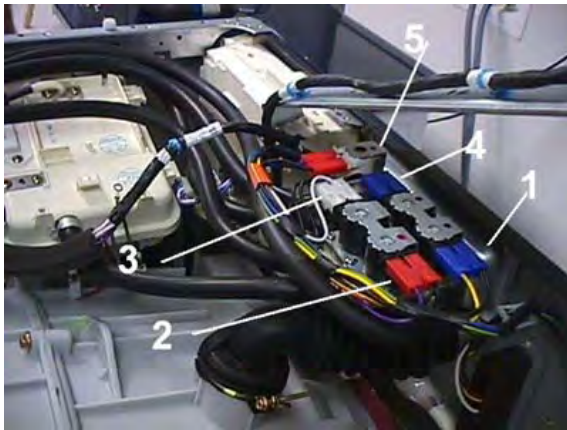
Replacement is accomplished by pressing it toward the back of the washer and sliding it toward the left.

## DISASSEMBLY/REPAIR (Dispenser)



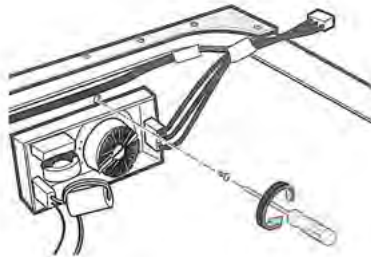
1. Remove the top plate.  
(See page 39.)
2. Remove the dispenser drawer.
3. Remove two screws to release the dispenser.
4. Loosen the clamp on the large hose that runs from the dispenser to the drum.

Have an old towel handy to stuff under the dispenser to soak up any spillage.



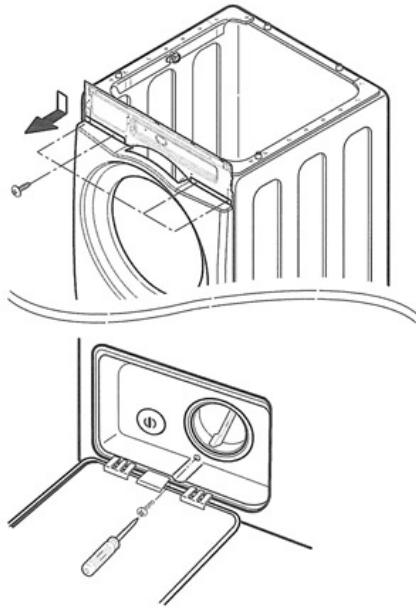
5. Disconnect the connector from the solenoid. Make a note of the color codes and connections.
- #1 Blue; yellow and black wires
  - #2 Red; violet and black wires
  - #3 White; white and black wires
  - #4 Blue; gray and black wires
  - #5 Red; blue and black wires (hot)
6. Remove two screws from the back of the cabinet

## DISASSEMBLY/REPAIR (Noise Filter)



1. Remove the connectors from the noise filter.
2. Remove the screw from the top bracket.

## DISASSEMBLY/REPAIR (Front Cabinet Cover)



1. Remove the top plate.  
(See page 39.)
2. Remove the control panel.  
(See page 39.)
3. Remove four screws that secure the front panel.
4. Remove the screw that secures the filter cover.



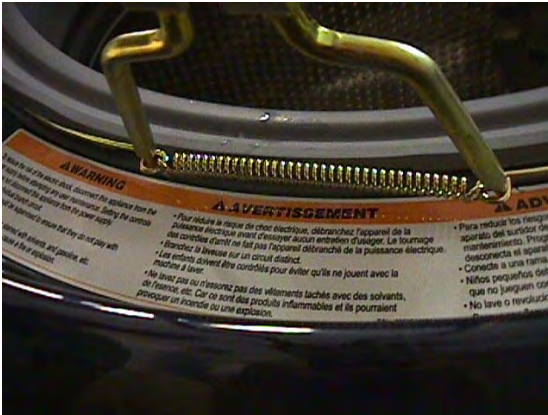
5. Use a flat screwdriver or a putty knife to loosen the filter cover and pull it out.
6. Stick the screwdriver into the cover slot and pry it out sideways to free it.



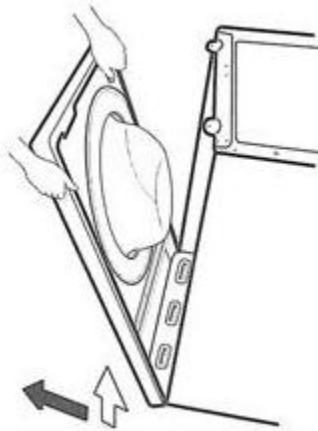
7. Drain the sump by pulling out the little hose by the filter cover. Let the water (maybe as much as a quart) drain into a shallow pan. Don't pull the hose out so far you kink it or the water will not flow.



## DISASSEMBLY/REPAIR (Front Cabinet Cover, continued)



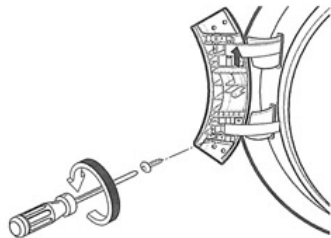
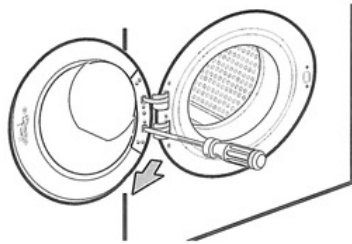
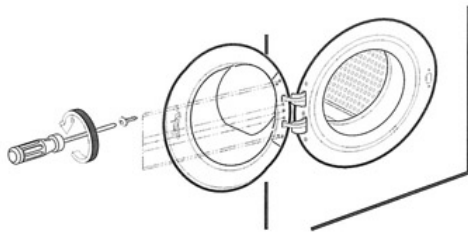
8. Open the door.
9. Remove the clamp using special tool 383EER4001A.



10. Lean the cabinet front forward, being careful to avoid breaking the glass. The door is HEAVY.
11. Disconnect the door switch connector. (Remember to replace it upon reassembly.)
12. Lift the door and front cover off the cabinet base as an assembly. Lay it face down on a blanket or some other protective surface.



## DISASSEMBLY/REPAIR (Door)

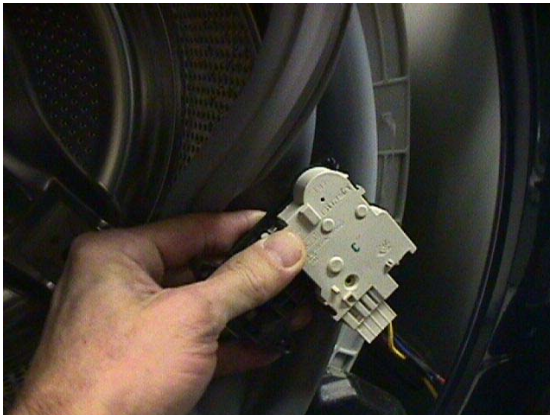


Removing the door with the front cover still on the machine.

1. Open the door.
2. Remove seven screws from the hinge cover.
3. Pry off the hinge cover with a flat screwdriver.
4. Remove the screw at the bottom of the hinge.
5. Lift the door off the hinge.

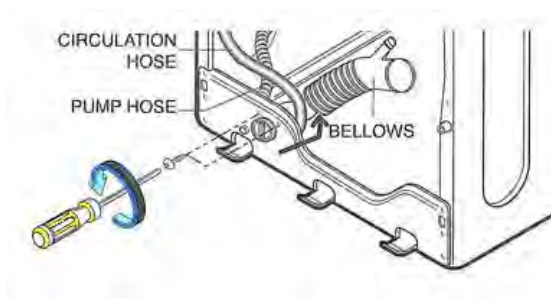
**CAUTION!** The door is HEAVY!

## DISASSEMBLY/REPAIR (Door switch removal)



1. Open the door.
2. Remove the gasket clamp using special tool 383EER4001A.
3. Remove the two screws holding the switch.
4. Push the gasket aside to remove the switch.
5. Unplug the switch to change it.
6. Make sure the wires don't fall back in before you can replace the switch.

## DISASSEMBLY/REPAIR (Pump)



1. Remove the front cabinet. (See page 39.)
2. Drain the water from the sump. (See page 42.)
3. Remove the clamps and hoses.
4. Remove two screws and push the pump backward and up.
5. Press down the plastic tab on the base to slide the pump assembly backward.

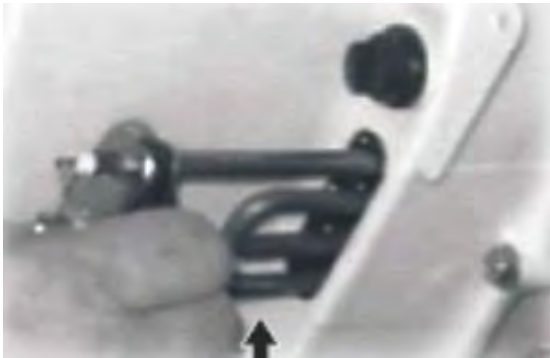


6. You can tilt the pump in either direction to remove/replace the individual pumps without having to remove the tub.

Have a towel handy to catch the spillage.

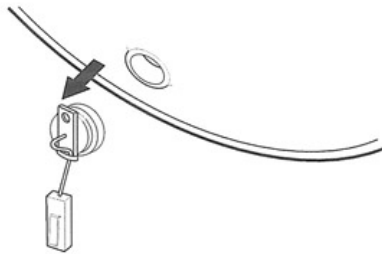


## DISASSEMBLY/REPAIR (Heater)



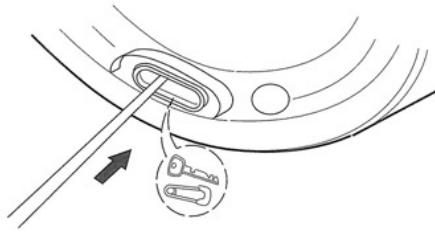
1. Remove the front cabinet. (See page 39.)
2. Drain the water from the sump. (See page 42.)
3. Remove the push-on connectors from the heater.
4. Remove the nut that holds the ground wire. Then loosen but **do not remove** the nut that secures the heater clamp and pull the heater out. You may have to wiggle it to release the gasket.

## DISASSEMBLY/REPAIR (Thermistor)



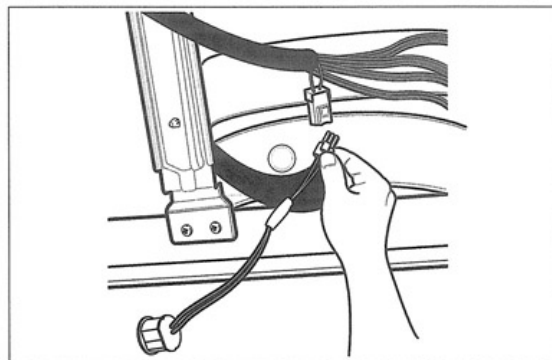
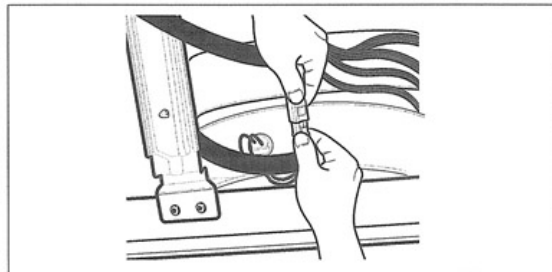
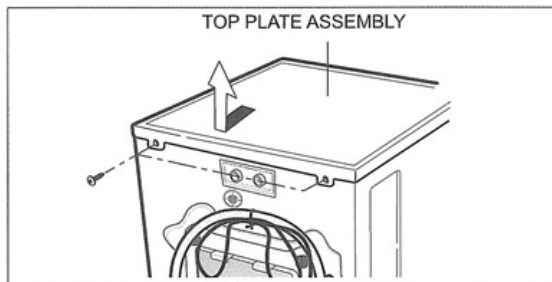
1. Remove the front cabinet. (See page 39.)
2. Drain the water from the sump. (See page 42.)
3. Unplug the white connector.
4. Hold the bracket and pull the thermistor out.

## DISASSEMBLY/REPAIR (Object between tub and drum)



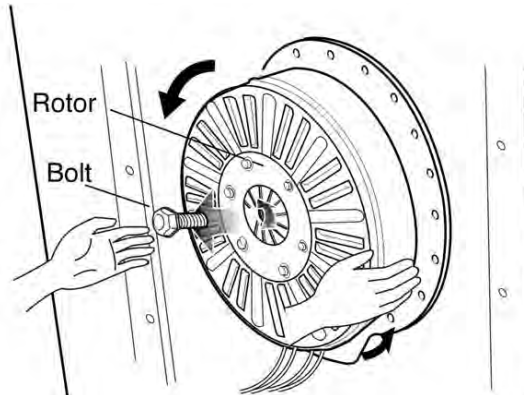
1. Remove the top cover. (See page 39.)
2. Remove the front cabinet cover. (See page 39.)
3. Remove the heater. (See page 46.)
4. Fish out the foreign object(s) using a wire or bar.

## DISASSEMBLY/REPAIR (Interior light)



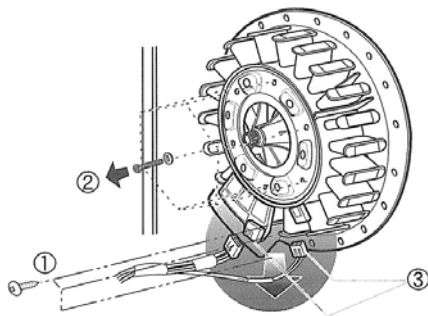
1. Remove the top cover. (See page 39.)
2. Separate the connector near the lamp.
3. Remove the lamp assembly and lead wire from the gasket.
4. Replacement is the reverse of this procedure.

## DISASSEMBLY/REPAIR (Motor)

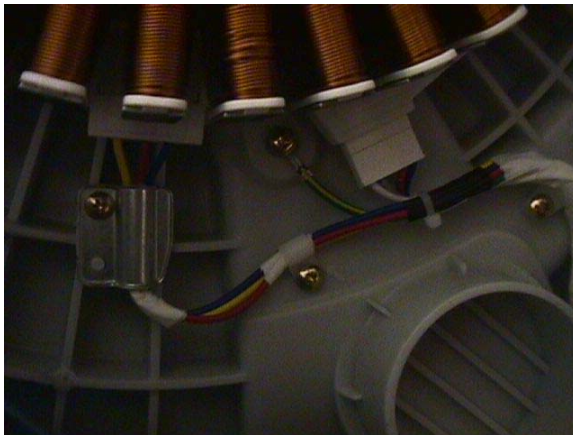


For technical information concerning the direct drive DC motor, refer to page 22.)

1. Remove the back cover.
2. Remove the large bolt in the center shaft. (Your helper can hold the inside of the drum.)
3. Pull the rotor off the shaft.



1. Remove two screws from the tub bracket.
2. Remove six bolts on the stator.
3. Unplug two connectors on the stator.
4. Pull the stator off the shaft.



5. When re-installing, the clamps and the ground screw must be installed and the connectors pressed into place before the rotor is bolted onto the shaft.



## DISASSEMBLY/REPAIR (Tub and Drum)



Removing the tub/drum assembly is major surgery. It is much lighter if you remove the weights and the motor. Generally speaking, you'll have to remove all that anyway.

1. Remove the motor.  
(See page 48.)
2. Drain the water from the sump.  
(See page 42.)
3. Remove the control panel.  
(See page 39.)
4. Remove the front cabinet.  
(See page 39.)
5. Disconnect all hoses and electrical connections.
6. Separate the three dampers.  
(See page 50.) You can remove just one end now and the other one after the drum is out.
7. Pry apart the spring retainer clip.
8. Carefully lift the tub up off the springs and remove it from the machine.
9. Unbolt the bolts around the circumference of the seam. Separate the halves. Be careful to avoid damaging the gasket. Do not pry on the surfaces between the halves.



## DISASSEMBLY/REPAIR (Damper)



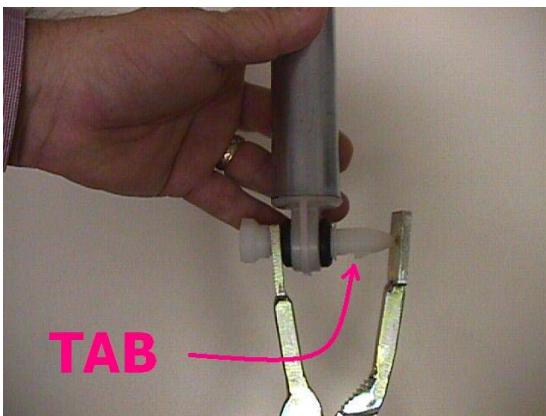
1. Disconnect the dampers from the tub and the base. (See photos, left.)

Be sure to press in the safety tab before pushing the pin out of the damper. You can use a socket to hold the tab in while you squeeze the pin with the special tool 383EER4003A.



2. The flat end of the tool goes on the small end and the split end allows the head end to pass through while the pin is pushed out.

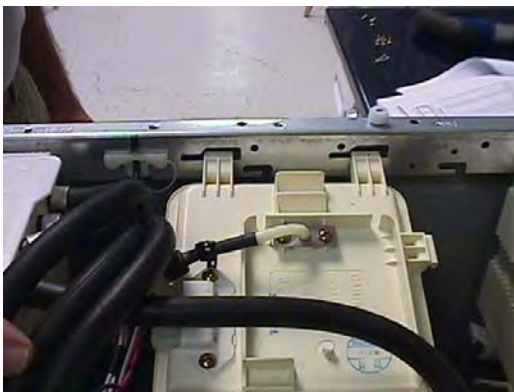
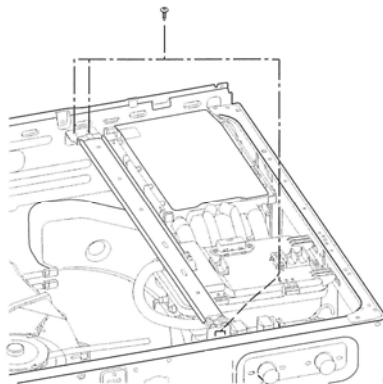
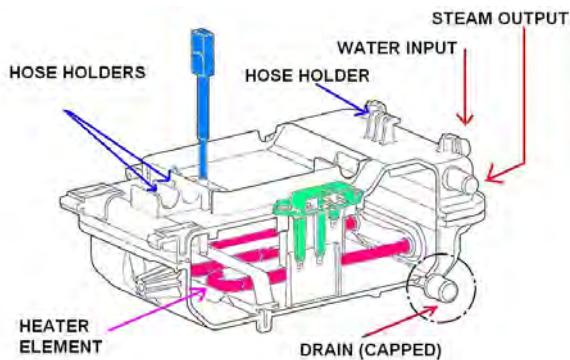
The color and/or appearance of the damper may vary by model.



3. Use special tool 383EER4003A to remove the damper pins. If you are replacing the dampers, you'll have to remove both ends. If you are removing the tub for major repair work, disconnect the damper ends at the base and leave the other ends connected until you remove the tub. When putting the tub back into the machine, connect the dampers to the tub first. It is much easier that way.
4. Be careful not to pull the dampers apart while they are disconnected.

## DISASSEMBLY/REPAIR (Turbo Steam Generator)

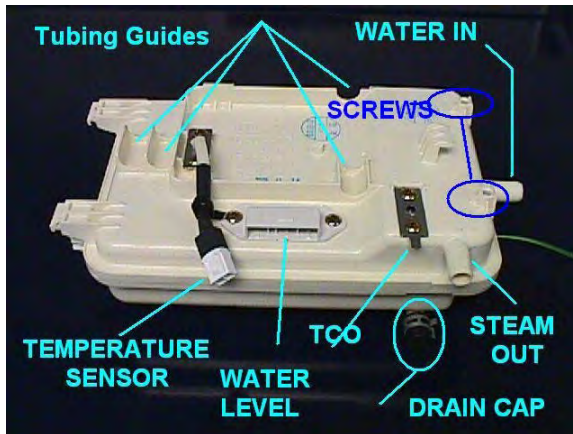
The TSG (Turbo Steam Generator) is supplied as an assembly only; parts like the sensor, thermistor, or heater cannot be replaced individually. Diagnosis is limited to determining malfunction and replacing as an assembly. The steam generator does not have to be removed from the machine to be drained. Be sure to let the water cool to avoid a burn. Have a hose available to slip onto the connector or a large towel to catch the water so it doesn't run down into the machine cabinet. If you remove the steam generator before draining it, be sure to avoid tipping it and spilling the water.



1. The steam generator can be removed as an assembly for diagnosis and replacement.
2. Unplug the washer.
3. Disconnect all electrical connections, including ground.
4. Drain the water. (You can drain the water later and it is easier.)
5. Remove all the cable straps by squeezing the tabs and pulling them out. They can be reused.
6. Remove the four screws holding the support rail in place and two screws attaching the steam generator.
7. Disconnect the hoses (water input and steam output.)
8. Push the steam generator toward the back of the washer to release it from the side rail. You can then remove it for draining, inspection, and replacement.

It is sold as an assembly and is not repairable.





1. When the TSG is installed in the washer, the hoses to the dispenser should fit into the tubing guides.



2. Be particularly careful when removing and replacing the water input hose to the steam generator. There is a check valve that fits into the input port. The valve sometimes comes off and is stuck in the hose. This could cause the water not to flow, which would cause the steam generator to malfunction.



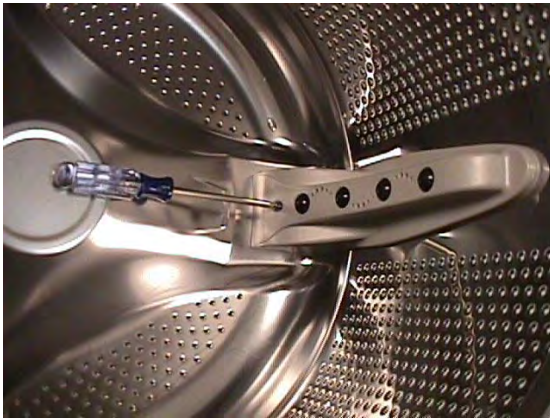
3. Pull the check valve out of the hose gently and replace it into the water input port. Then slide the hose onto the port and install the clamp.

## TIPS and TRICKS



### HOSES

When replacing the large hoses, be sure to avoid getting the lip turned under the hose clamp. This will damage the hose and cause a leak. The large hoses have notches on the ends to index them on the connectors. Be sure the notch is pushed down all the way on the index boss.



### BAFFLES

You can replace the baffle and rollers without having to remove the drum. Unscrew the retaining screw at the back of the baffle. Slide it toward the front of the washer to remove it. You can unscrew the retainer inside the baffle to replace the roller balls.



### MUSHROOM VALVE

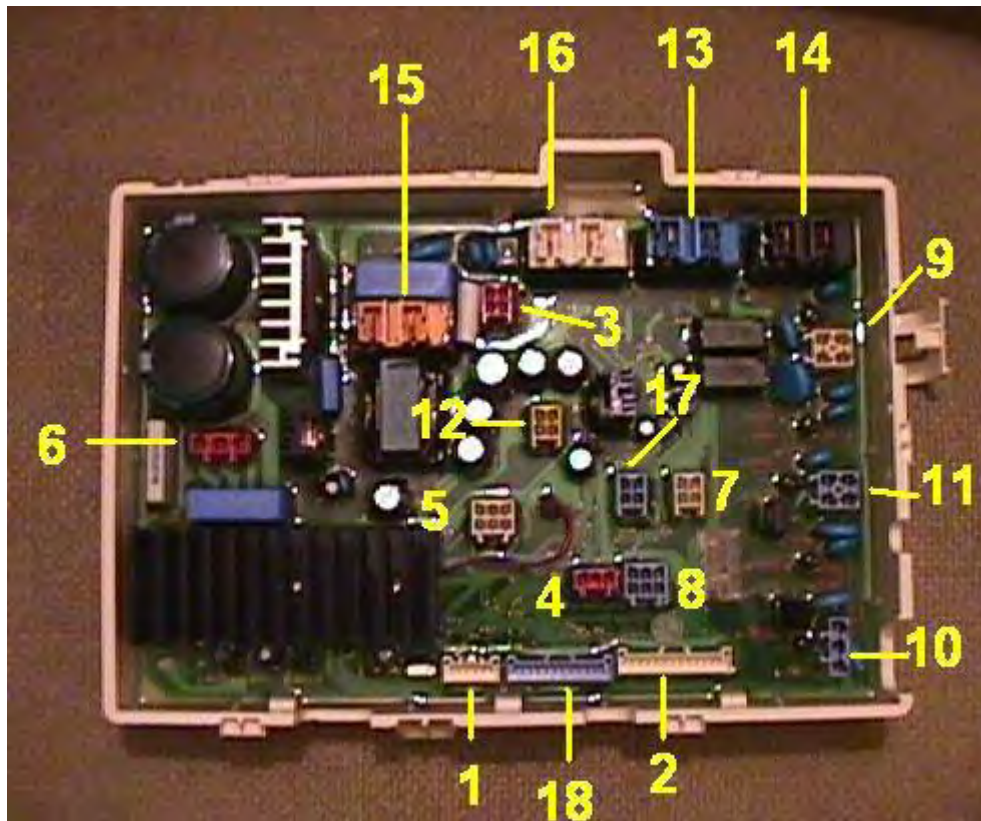
Be sure the mushroom is in place before attaching the hose. If the stem is too long, it will contact the drum and make significant noise when the drum turns.

### BALL (Off Balance) SENSOR

There isn't one. This function is handled by the microprocessor and the hall sensor.



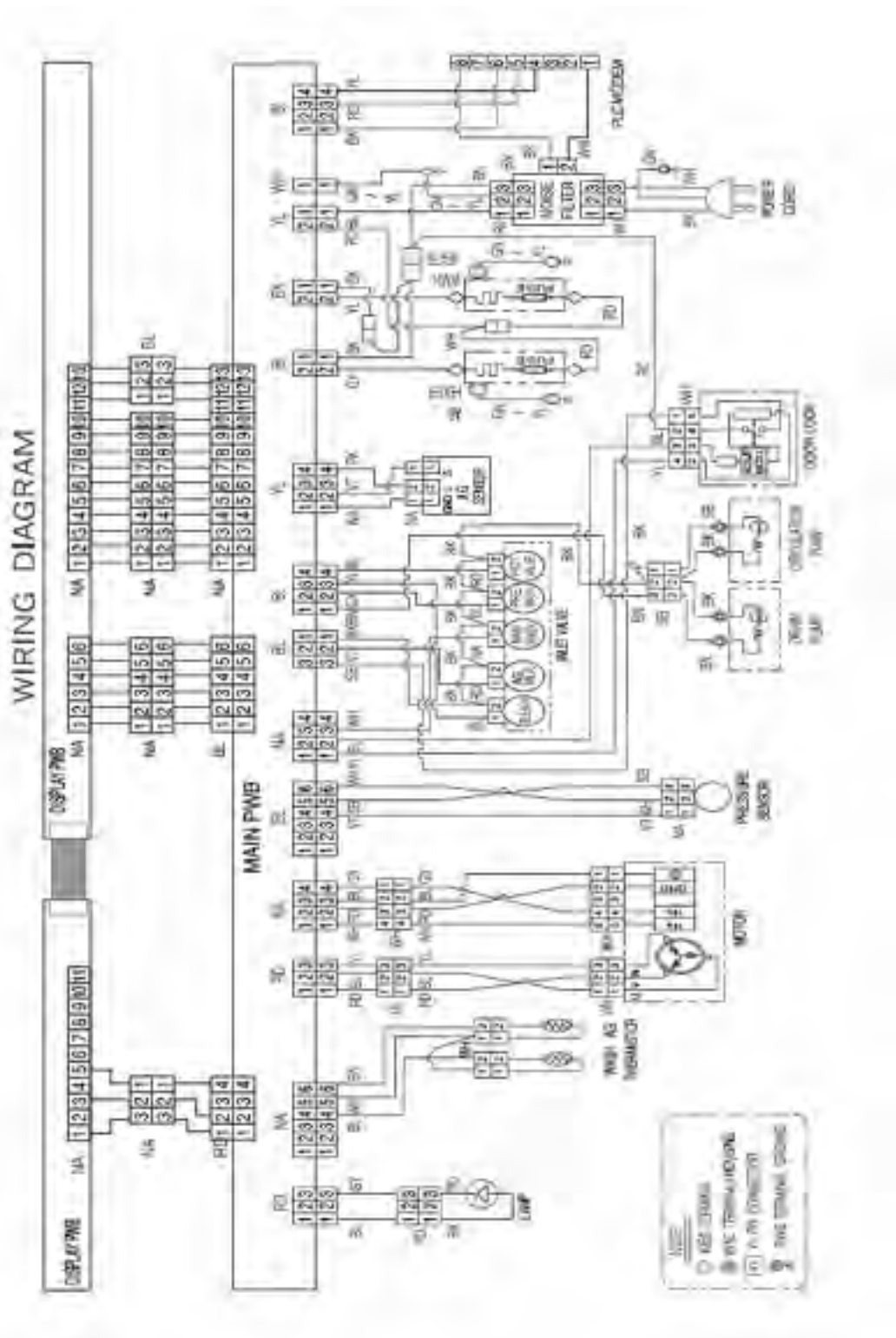
## MAIN BOARD



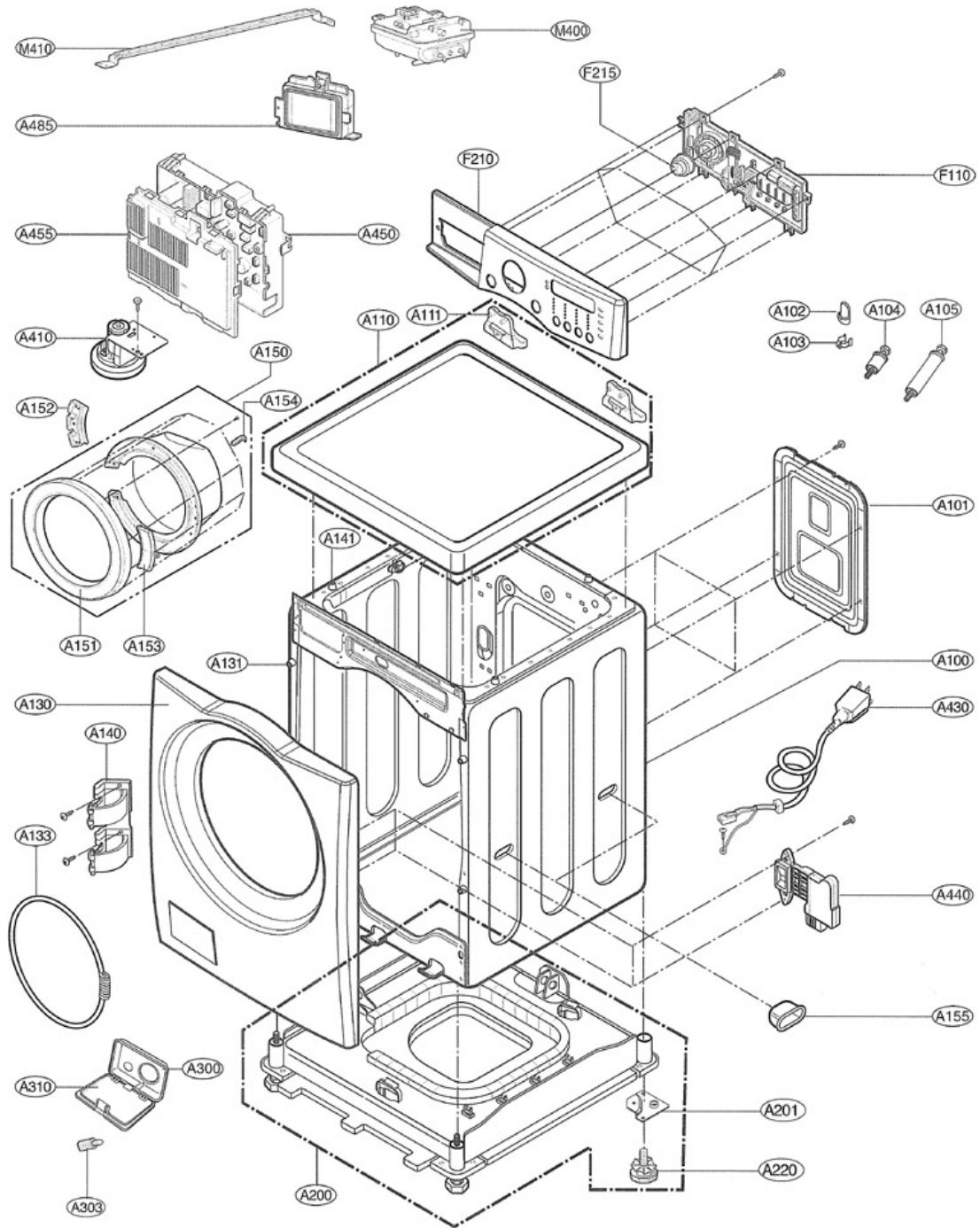
The connector colors and functions are listed below as a guide. Remember, sometimes there may be a running production change. Refer to the wiring diagram. (NA = natural or cream, SB = sky blue, BL = blue, BK = black)

- |    |                                |     |                              |
|----|--------------------------------|-----|------------------------------|
| 1. | NA, to display board           | 10. | BL, fill valves              |
| 2. | NA, to display board           | 11. | BL, fill valves              |
| 3. | RD, modem, display to control  | 12. | YL, steam level sensor       |
| 4. | RD, lamp                       | 13. | BL, steam heater             |
| 5. | NA, wash and steam thermistors | 14. | BK, wash heater              |
| 6. | RD, motor control              | 15. | YL, noise filter             |
| 7. | NA, Hall effect sensor         | 16. | WH, noise filter, ground     |
| 8. | BL, pressure sensor            | 17. | NA, modem, control to socket |
| 9. | NA, door lock                  | 18. | BL, LEDs (not on all models) |

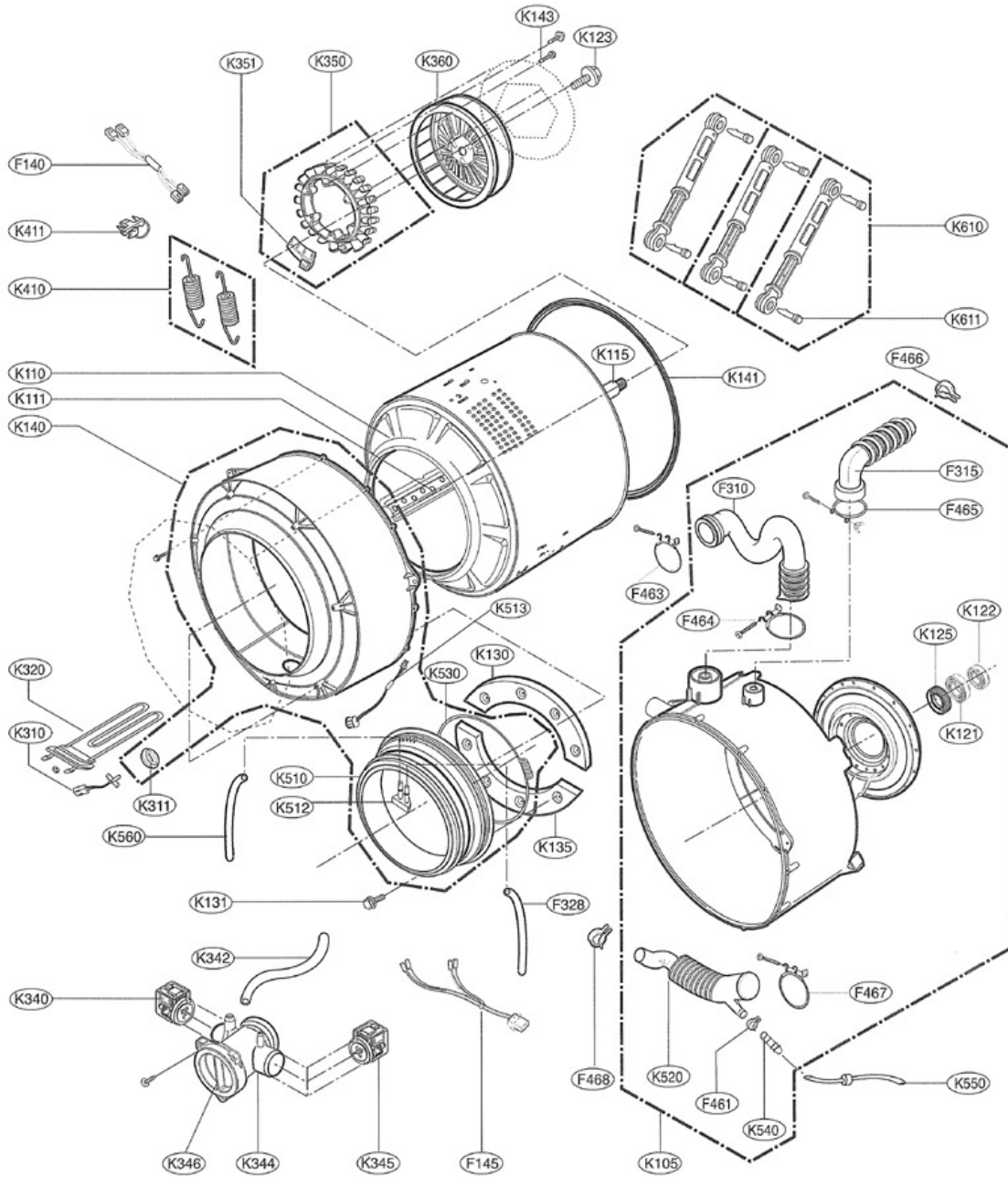
# WIRING DIAGRAM



# EXPLODED VIEW – Cabinet and Control Panel

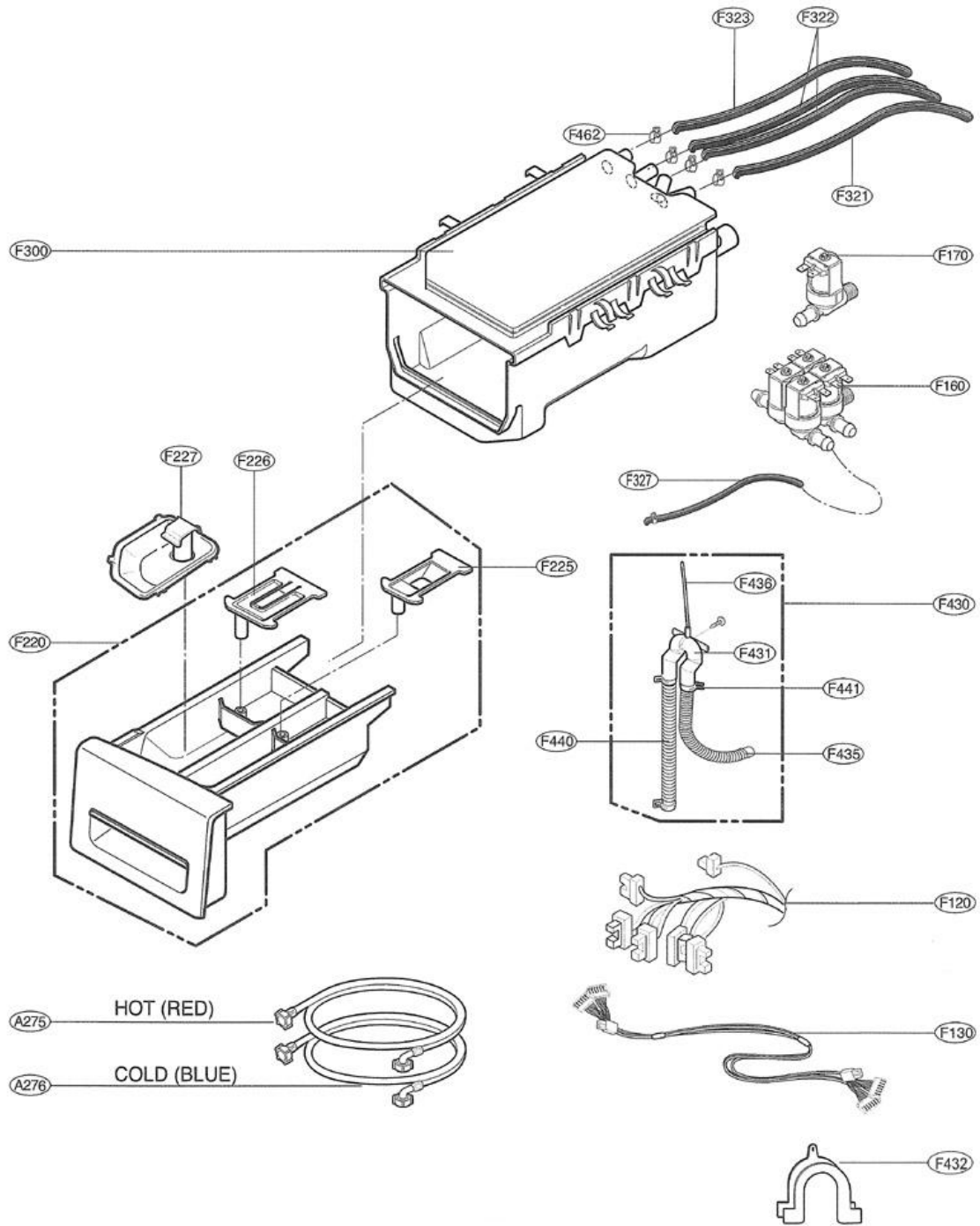


# EXPLODED VIEW – Drum and Tub Assembly





# EXPLODED VIEW – Dispenser Assembly





## PARTS LIST

Loc #	Part No	Description
	3829ER3041A	Owner's Manual
	3890EZ3612A	Outer Box
	3W20018B	Wrench
	3828ER3048Q	Service Manual
A100	3091ER0004P	Cabinet Assembly
A101	3550ER1028A	Rear Cover
A102	4830ER3001A	Bushing
A102	4830ER3001A	Bushing
A103	4930ER3014A	Holder
A104	4011FR3159E	Shipping Bolt, Upper (Short)
A105	4011FR3159D	Shipping Bolt, Lower (Long)
A110	3457ER1006C	Top Plate Assembly
A111	4810ER3021A	Hinge
A130	3550ER0039A	Front Cabinet Cover
A131	4930ER4005A	Guide
A133	2W20017E	Gasket Clamp
A140	4775ER2002A	Hinge Assembly
A141	4930ER4018A	Guide
A150	3581ER1012A	Door Assembly
A151	3212ER1037C	Door Frame, Inner
A152	3212ER1036A	Door Frame, Outer
A153	3650ER2006A	Door Handle
A154	4026ER4004A	Door Latch Hook
A155	3650FA3488M	Hand Hold Cover
A200	3041ER0001C	Base Assembly
A201	4810ER3006A	Base Leg Bracket
A220	4779ER3002A	Leg Assembly
A275	5215FD3715G	Inlet Hose (Hot, Red)
A276	5215FD3715H	Inlet Hose (Cold, Blue)
A300	3110ER2013B	Case
A303	5006ER3009A	Drain Assembly
A310	5006ER2008E	Drain Cover
A410	6601ER1006E	Switch Assembly
A430	6411ER1005K	Power Cord Assembly
A440	6601ER1004C	Door Switch/Lock
A450	6871ER1062D	Main PCB

<b>Loc #</b>	<b>Part No</b>	<b>Description</b>
A455	3550ER1032A	Main PCB Cover
A485	6201EC1006B	Line Noise Filter
F110	6871ER2020B	Display PCB
F120	6877ER1044C	Display Wiring Harness
F130	6850ER2002B	Flat Cable
F140	6877ER1016F	Wiring Harness
F145	6877ER3003B	Wiring Harness
F160	5220FR2008F	Inlet Valve, Cold (Quadruple)
F170	5220FR2006H	Inlet Valve, Hot (Single)
F210	3721ER1279A	Control Panel
F215	4941ER3005A	Control Knob
F220	3721ER1274D	Dispenser Drawer Assembly
F225	5006ER3014B	Siphon Cap, Softener
F226	5006ER3018A	Siphon Cap, Bleach
F227	3891ER2003A	Siphon Box, Detergent (Liquid)
F300	4925ER1015B	Dispenser Assembly
F310	4738ER1004B	Bellows
F315	4738ER2002A	Bellows
F321	5214ER4001R	Inlet Hose
F322	5214ER4001J	Inlet Hose
F323	5214ER4002F	Inlet Hose
F326	5214ER4002F	Inlet Hose
F327	5214FR4006F	Inlet Hose
F328	5214FR4006R	Connecting Hose
F430	5215ER2002G	Drain Hose Assembly
F431	4932FR3156A	Drain Hose Connector (Vacuum Break)
F432	3W50712A	Drain Hose Hanger
F435	5214FD3663E	Drain Hose, Vacuum Break to Drain
F436	5214FR4125S	Inlet Hose, Vacuum Break to Tub
F436	5214FR4125S	Hose, Vacuum Break
F440	5214FR3188K	Drain Hose, Pump to Vacuum Break
F441	4861FR3068C	Clamp
F461	4861FR3068E	Clamp
F462	4861FR3068A	Clamp
F463	4860FR3092D	Clamp
F464	4860FR3092C	Clamp
F465	4860FR3092D	Clamp
F466	4861FR3068E	Clamp
F467	4860FR3092C	Clamp
F468	4861FR3068E	Clamp

<b>Loc #</b>	<b>Part No</b>	<b>Description</b>
F560		Hose
K105	3045ER0048B	Outer Tub Assembly (Rear Half)
K110	3045ER1017A	Drum Assembly
K111	4433ER1005A	Baffle/Roller Assembly
K115	4434ER0001A	Spider (Drive Assembly)
K121	4280FR4048N	Ball Bearing
K122	4280FR4048J	Ball Bearing
K123	4040FR4051C	Main Bolt
K125	4036ER2004A	Main Bearing Seal
K130	4866ER0007A	Balance Weight, Lower
K131	1SZZER4002A	Screw, Custom for Weights
K135	4866ER0004A	Balance Weight, Upper
K140	3551ER0026B	Outer Tub Assembly (Front Half)
K141	4036ER4001B	Gasket
K143	4011FA4353B	Bolt, Standard
K310	6322FR2046F	Thermistor, NTC
K311	4036FR4050A	Gasket
K320	5301FR1158J	Heater Assembly
K340	4681EA2001D	Drain Pump Motor
K342	5214FR4006L	Recirculating Hose
K344	3108ER1001A	Pump Casing
K345	4681EA2001C	Recirculating Pump Motor
K346	383EER2001A	Filter/Cover Assembly
K350	4417FA1994G	Stator Assembly
K351	6501KW2002A	Hall Effect Sensor Assembly
K360	4413EA1002B	Rotor Assembly
K410	4970FR2084P	Tub Support Spring
K411	4930FR3040A	Spring Holder
K510	4986ER0004C	Gasket
K512	4932ER3007A	Dual Nozzle
K513	6913ER4001A	Lamp
K520	4738ER1002A	Bellows
K530	4861ER2001D	Clamp Assembly

K540	3504ER3002A	Air Chamber
K550	5214FR4125N	Inlet Hose
K610	383EER3001J	Damper Assembly
K611	4433ER0001A	Damper Pin
M400		Turbo Steam Generator
M410	3210ER1318A	Support Rail

383EER4001A	GASKET PLIER (SPECIAL TOOL)
383EER4003A	DAMPER PLIER (SPECIAL TOOL)
383EER4004A	GASKET PLIER (SPECIAL TOOL)
5214FR3018D	DRAIN HOSE EXTENSION (5 FEET)

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