

**MAYTAG**

# **Maytag Commercial**

MAH14PD  
MAH14PN  
MAH14PR  
MAH14PS  
MAH20PD  
MAH20PN  
MAH20PR  
MAH20PS  
MAH21PD  
MAH21PS  
MAH21PN  
MAH21PR

**Neptune Commercial  
High Efficiency Washer  
Service Manual**

16022162

This manual replaces  
(16010276)

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## GENERAL SAFETY PRECAUTIONS

Information contained in this manual is intended for use by a qualified service technician familiar with proper and safe procedures to be followed when repairing an electrical appliance. All tests and repairs should be performed by qualified service technicians equipped with proper tools and measuring devices. All component replacements should be made by a qualified service technician using only factory approved replacement parts.

Improper assembly or adjustment may occur if service or repair is attempted by persons other than qualified service technicians or if parts other than approved replacement parts are used. Improper assembly or adjustment can create hazardous conditions.

There can be risk of injury or electrical shock while performing services or repairs. Injury or electrical shock can be serious or even fatal. Consequently, extreme caution should be taken when performing voltage checks on individual components of a product. **PLEASE NOTE:** Except as necessary to perform a particular step in servicing a product, the electrical power supply should **ALWAYS** be disconnected when servicing a product.

Further, this appliance **MUST** be properly grounded. Never plug in or direct wire an appliance unless it is properly grounded and in accordance with all local and national codes. See installation instructions that accompany the product for grounding this appliance.

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# INTRODUCTION

The information contained in this manual pertains to the service procedures involved in maintaining and/or servicing the Maytag horizontal washers "MAH14 , MAH20 and MAH21" models. These models are horizontal washers intended for use in commercial laundry facilities.

This manual can be used as a guide to assist in performance, installation, and servicing of the product. As on other front washer models, the importance of proper installation cannot be over emphasized. For additional information, refer to the installation instructions that accompanies each front load washer.

This manual is divided into sections covering the washer. Refer to those sections for general information. If additional information is required, contact your commercial distributor.

**Section 1** - Covers general information and electrical test equipment.

**Section 2** - Provides information on the location of components and service procedures. The purpose and functions of specific components will be covered.

**Section 3** - Provides information on programming and set-up procedures.

**Section 4** - Covers general troubleshooting using a list of general complaints.

**Section 5** - Provides specifications, and wiring diagram information.

**Section 6**- Product Definition: Models MAH21PD, PN, PR, PS

## MODELS COVERED IN THIS MANUAL

**MAH14PD  
MAH14PN  
MAH14PR  
MAH14PS  
MAH20PD  
MAH20PN  
MAH20PR  
MAH20PS  
MAH21PD  
MAH21PS  
MAH21PN  
MAH21PR**

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## SECTION 1. GENERAL INFORMATION

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### HOW TO ORDER PARTS

Replacement parts can be ordered from the authorized Maytag commercial distributor who sold the machine or from a commercial distributor designated service firm.

**IT IS STRONGLY RECOMMENDED THAT GENUINE FACTORY REPAIR PARTS BE USED. USE OF OTHER PARTS MAY HARM UNIT OR CAUSE OPERATIONAL PROBLEMS.**

When ordering parts from your distributor or you are contacting him regarding machine safety or service, always have the following information ready:

|                        |  |
|------------------------|--|
| Machine Model Number:  |  |
| Machine Serial Number: |  |
| Installation Date:     |  |

Consult the parts catalog for correct parts and further information if necessary, can be obtained from your authorized Maytag commercial distributor. Parts are subject to change without notice.

***My Distributor is:***

|                                       |  |
|---------------------------------------|--|
| Installation Date:                    |  |
| Distributor's Name:                   |  |
| Address:                              |  |
| City, State, Zip Code:                |  |
| Person To Contact & Telephone Number: |  |

---

### REQUIREMENTS

**NOTE: Proper installation is the responsibility of the purchaser.**

Checkpoints for proper installation:

- Properly grounded electrical outlet is required. Use 15 amp fuse or comparable circuit breaker for electrical service.

- Standpipe Drain System must be able to accept 1½" O.D. drain hose. Standpipe height of 36" is recommended.

**NOTE: If drain standpipe is in excess of 5 feet above floor level, install pump accessory kit, part number 22002136.**

- These units are not equipped with a siphon break, and the drain hose must be elevated to a minimum height of 24". A 36" high standpipe is recommended. For all installations, the drain hose must be supported by the drain hose strap on the back of the washer.
- Hot and Cold water faucets should be within four (4) feet of the back of the washer. This allows for quick access for immediate shut off of the water.
- Water heater should be set to deliver a minimum of 120° (49°C) hot water to the washer.
- Do not store or operate washer in temperatures below freezing. This can cause damage to the pump, hoses and other components.
- Water pressure of 20 - 120 P.S.I. is required to fill the washer in the appropriate time frame. Pressures of less than 20 P.S.I. may cause an extended or exceptionally long fill time. Refer to the troubleshooting section for more information regarding a solution for slow fill situations.
- Best performance is obtained with the washer installed on a solid floor. Wood floor constructions may need to be reinforced to minimize vibration from unbalanced load situations. Carpets and soft tile surfaces are also contributing factors in vibration and/or movement during the spin cycle. **Never install washer on platform or weak support structure.**

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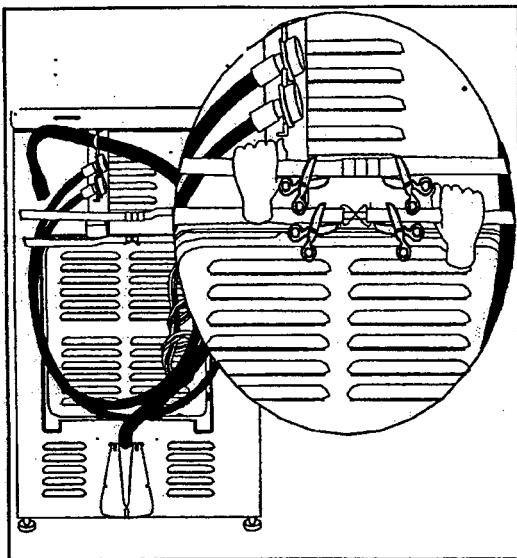
## UNCRATING INSTRUCTIONS

**NOTE: The following steps must be performed in the correct order to ease uncrating.**

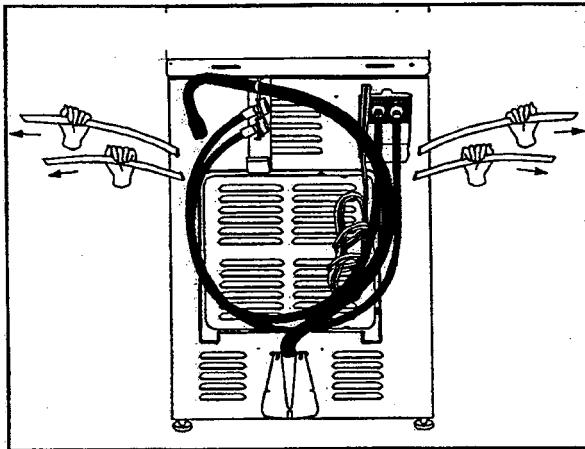
1. Remove the carton by cutting only marked areas of the carton. **CAUTION: Hoses are connected to the washer.**
  2. Carefully remove any packaging materials from the outside of the washer. **IMPORTANT: DO NOT cut the red straps securing the power cord and inlet hoses at this time.** They will be removed later during installation.
  3. Remove the accessory package from inside the tub.
  4. Remove the crate bottom from the washer
- 

## WASHER INSTALLATION

1. Two separate red shipping straps are used to secure the machine for shipping purposes and secure the power cord with the water inlet hoses. Removal of the straps must be performed in the following sequence:
  - a. Locate the metal buckles securing the red straps extending through slots in the rear wall of the cabinet. The buckles are positioned in the center of the red straps. Carefully cut the red straps, completely removing the metal buckles. **NOTE: Cut the straps as close to the buckles as possible.** Discard the metal buckles (*Figure 1-1*).
  - b. Grasp each loose strap individually and pull the strap to remove it from the cabinet. Discard the strap (*Figure 1-2*).

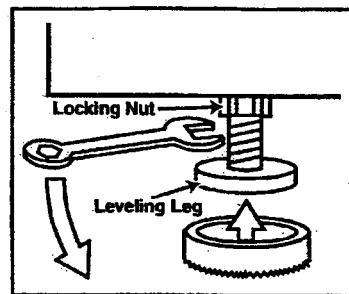


**Figure 1-1**



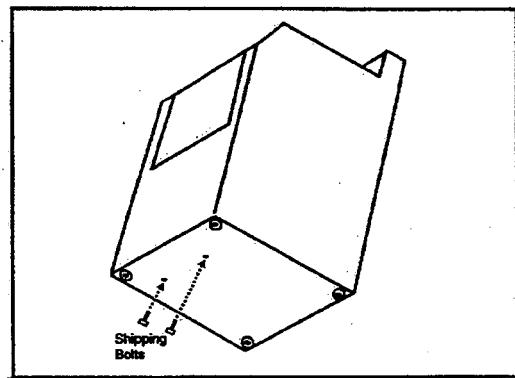
**Figure 1-2**

2. Tip washer slightly forward. Loosen rear leveling leg lock nuts. Tip washer back slightly to loosen front leveling leg lock nuts (**Figure 1-3**).
3. Locate the two (2) 1/2" hex-head shipping bolts extending up through the bottom of the base (**Figure 1-4**). The shipping bolts are near the center of the base toward the front of the washer. Remove both bolts, freeing the tub and suspension. Do not be alarmed should the tub assembly shift when the last bolt is removed. Some shifting of the tub is normal.



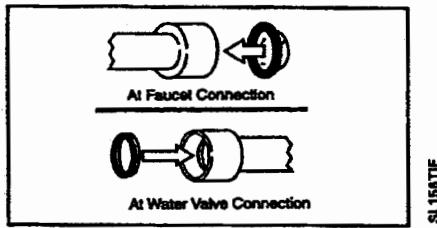
**Figure 1-3**

4. Slide the washer into position and check the levelness and stability of the washer. If necessary, slide the washer out of position to either raise or lower the leveling leg as required to level and stabilize the washer securely on all four legs. Slide the washer back into position to confirm levelness to the floor. When satisfied the washer is level, tighten the locking nuts up against the base of the washer. This will secure the leveling legs in place.



**Figure 1-4**

5. Install the rubber feet, found in the installation package, on all 4 legs (**Figure 1-3**).
6. Pull the drain hose vertically to the drain strap. Route the drain hose through the drain hose strap on the back of the washer and snap into the plastic hook of the strap.
7. Install gooseneck end of the drain hose into the drain standpipe. Be sure the connection is not airtight between the drain hose and the standpipe. Standpipe must be at least 24" high. 36" height is recommended.



**Figure 1-5**

SL158TIF

8. Connect inlet hoses to water supply using screen washers at faucet connections, with the domed screen facing the faucet.

With hoses attached to both the faucets and the water valve, turn on the water and check for leaks (*Figure 1-5*). **Note the H and C designations on the water valve bracket for the Hot and Cold hoses.**

**NOTE: Accessory inlet hoses are available in various lengths, up to 10 feet.**

**NOTE: For further information, consult the installation instructions that come with the product.**

## TEST EQUIPMENT

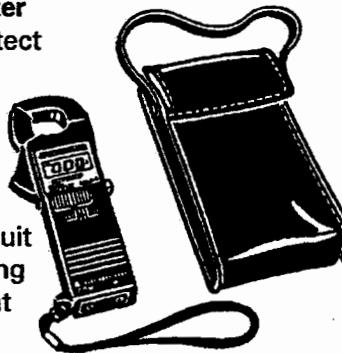
The equipment required to service Maytag products depends largely upon the conditions you encounter. Locating a malfunction will often require the use of electrical testing equipment along with other test equipment such as:



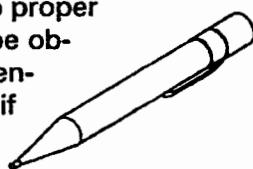
**Analog Test Meter**  
can be used to check for open or closed circuits, measure resistance, AC and DC volts, and temperature.

| DESCRIPTION        | PART NUMBER |
|--------------------|-------------|
| Analog Test Meter  | 20000005    |
| Digital Test Meter | 20001001    |
| Clamp-On Ammeter   | 20000002    |
| AC Voltage Sensor  | 20000081    |

**Clamp-On Ammeter**  
can be used to detect shorts. Overloads on the circuit breaker or fuse can be traced to either the washer or circuit breaker by checking the washer current draw.



**AC Voltage Sensor**  
can be used to alert you if AC voltage is present so proper safety precautions can be observed. The tip of the sensor will glow bright red if voltage is between 110-600 volts AC.



**Digital Test Meter**  
can be used to check for open or closed circuits, measure resistance, AC and DC volts, and temperature.



## ELECTRICAL TESTS



**Warning - Always shut off electrical power to the unit before beginning any service repair procedures.**

### Grounded Components

When performing service diagnostics, replacements and repairs, always check to determine whether all ground wires linking panel and components are reattached if removed.

### Voltage Checks

Generally, these checks will consist of taking readings at the wall receptacle to determine the availability of voltage to the product. Voltage checks on individual components of a product are not recommended due to the possibility of electrical shock. Component part testing is best accomplished through continuity checks with an Appliance Test Meter (*See Electrical Test Equipment*).

**NOTE: Use of the meter on voltage higher than the indicated range may cause permanent damage to the meter. To prevent damage, first select the highest range and then lower the range for readings which fall within the lower scale.**

#### Set up meter for use as follows:

1. Turn selector knob to desired meter function and appropriate range.
2. Plug black lead into socket marked black (-).
3. Plug red lead into socket marked red (+).
4. Place test leads into receptacle to determine voltage available.

### Wax Motor Check - Door Lock Mechanism

Check the wax motor for proper ohms resistance. This check should be made with the electrical supply disconnected from the washer. Remove the wire harness from the wax motor terminals and place the ohm meter probes on the terminals of the wax motor. The wax motor should have a resistance of approximately 950-1100 ohms at room temperature.

### Water Valve Test

Check the water valve for electrical continuity. This check should be made with the electrical supply disconnected from the washer. Remove the wire harness from the water valve terminals and place the ohm meter probes on the terminals of the water valve. The water valve solenoid coil should have a resistance between 500 - 1000 ohms. If no ohms are shown on the display of the electrical test meter, the solenoid coil has an open winding and the valve should be replaced.

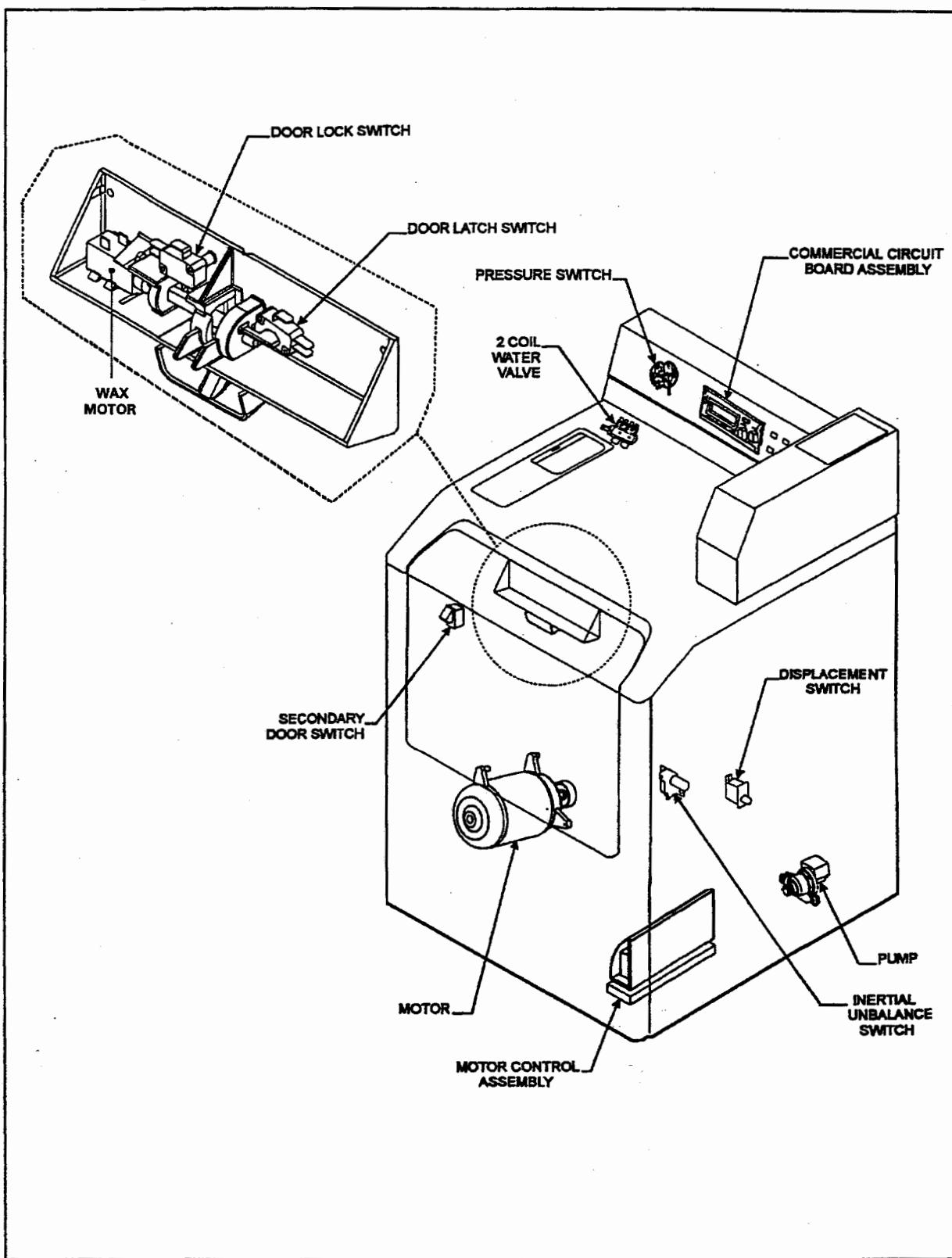
## Electrical Test Chart

| FUNCTION                                 | WIRE CONNECTIONS   | OHMS CHECK                    |
|--|--------------------|-------------------------------|
| Water Valve - HOT                        | OR52<br>WH57       | 500-1000                      |
| Water Valve - COLD                       | BU9<br>WH57        | 500-1000                      |
| Water Valve - BLEACH<br>(MAH20 Models)   | PK5<br>WH57        | 500-1000                      |
| Water Valve - SOFTENER<br>(MAH20 Models) | PU2<br>WH11        | 500-1000                      |
| Pump                                     | BK35<br>WH13 or 39 | 18                            |
| Wax Motor - Door Lock                    | BR14<br>WH13 or 57 | 950-1100                      |
| Pressure Switch -<br>Wash Level          | PU15 or 11<br>BR12 | Empty - Closed<br>Full - Open |
| Pressure Switch -<br>Rinse Level         | GY21<br>YL22       | Empty - Closed<br>Full - Open |

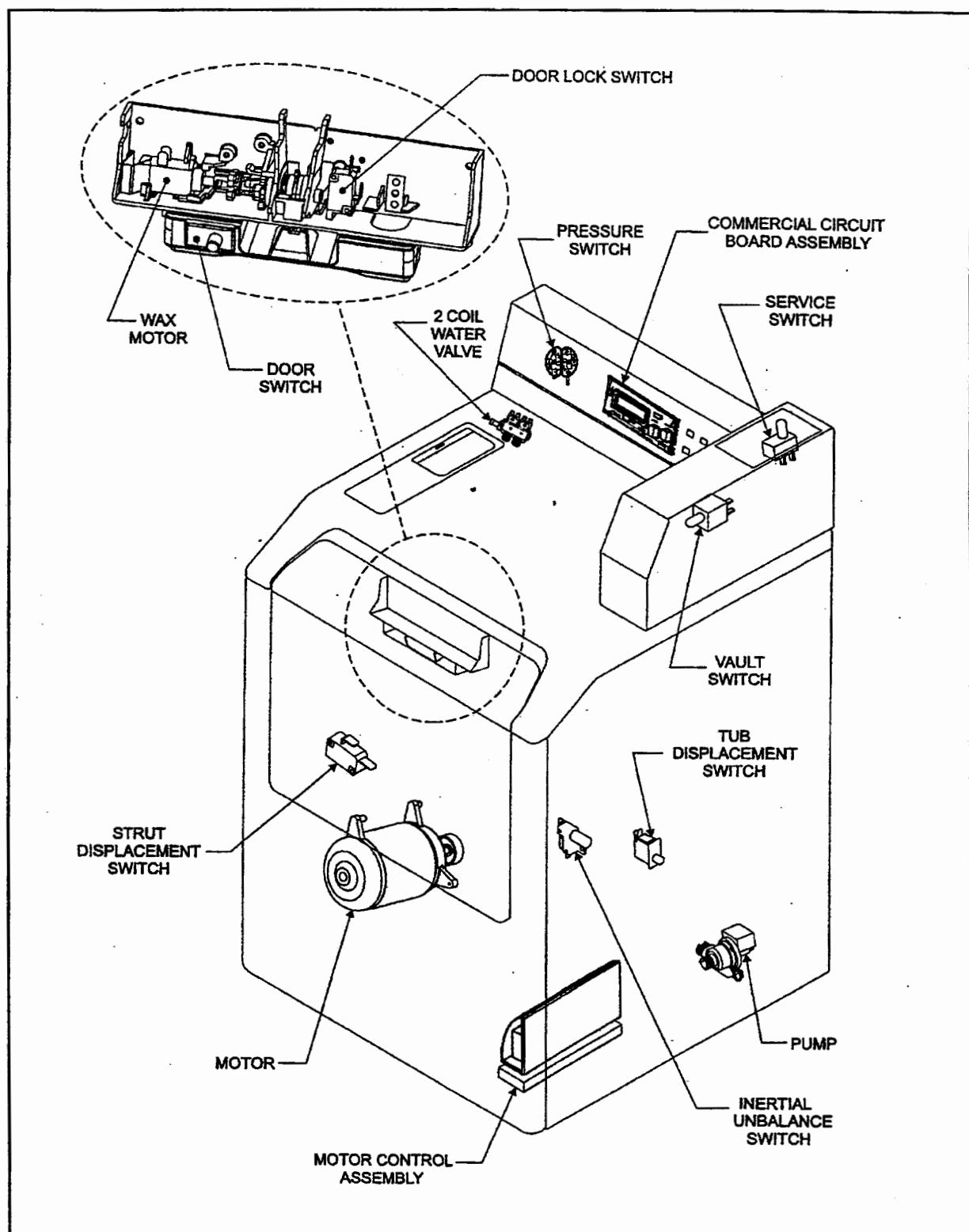
**NOTE:** *Wiring connections (color & number) can vary depending on model number.  
Consult the electrical schematic that comes with the product to ensure the correct wires are selected for the ohms test.*

## PLACEMENT OF COMPONENTS

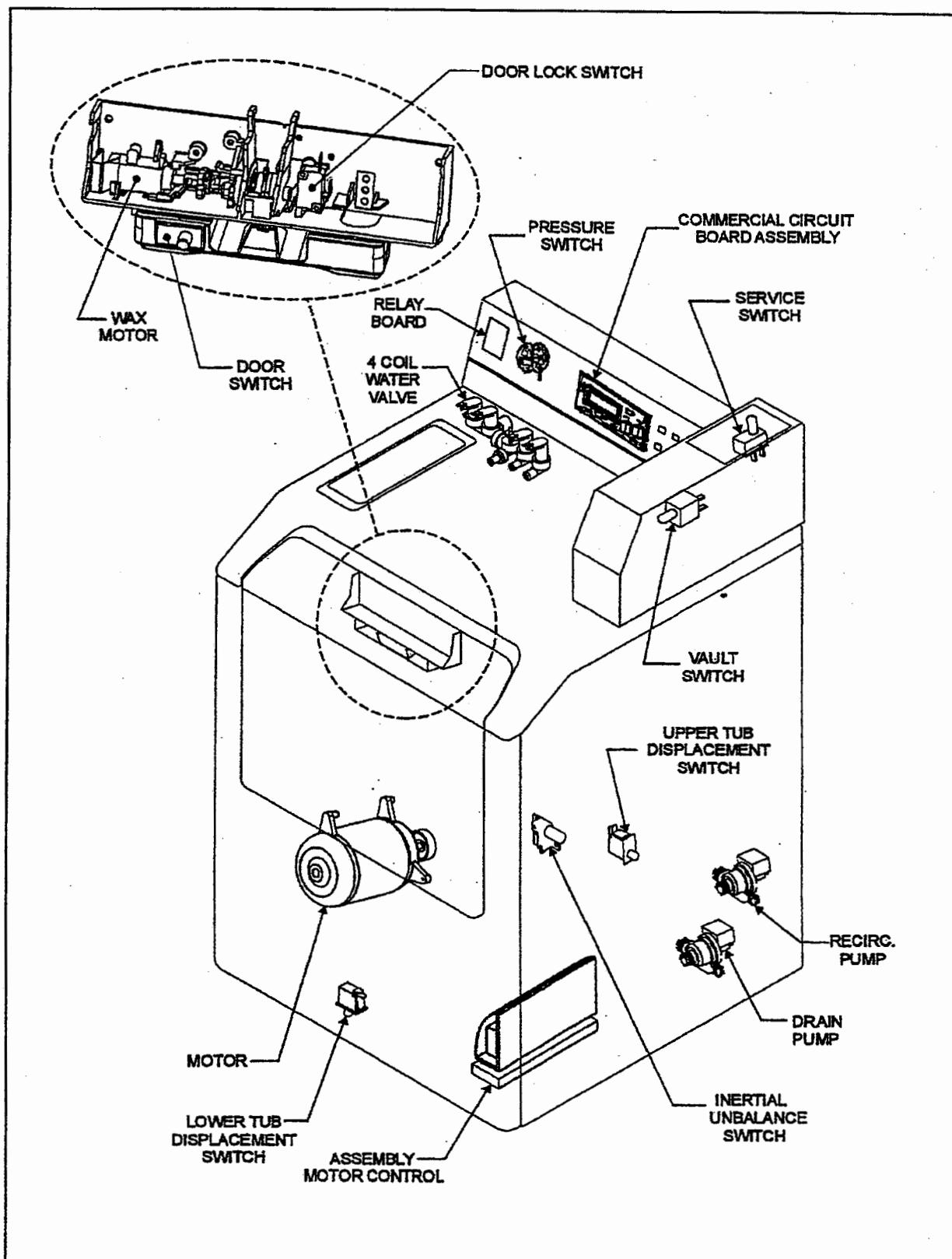
MAH14 (Original) Models



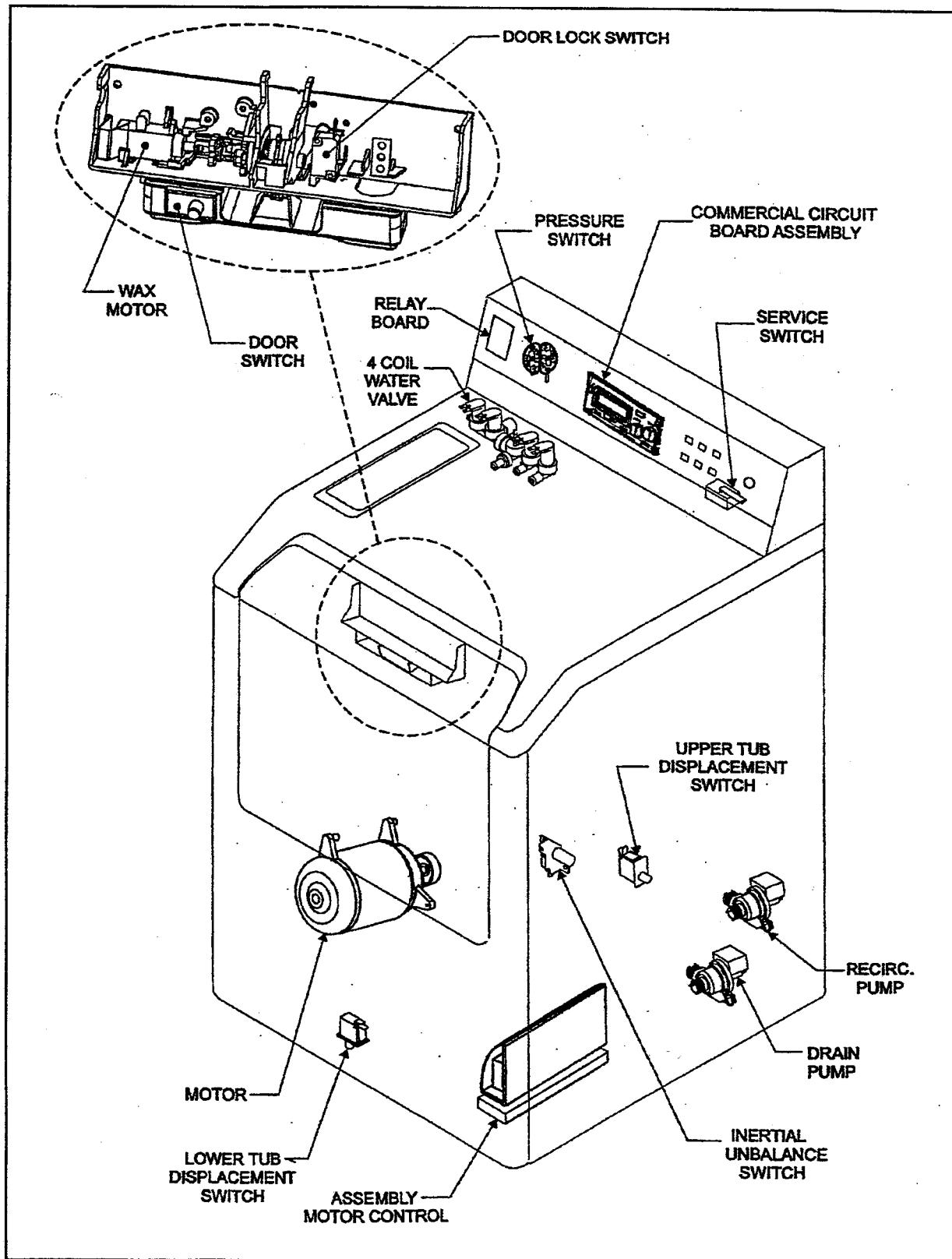
## MAH14 (Revised) Models



## MAH20 Models



## MAH20PN Models



## SECTION 2. SERVICE PROCEDURES

### CAUTION

- **Extreme caution should be taken when performing voltage checks due to the danger of electrical shock.**
- **Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected.**

### CONTROLS

The control section of the washer operates the fill components to bring water into the washer and the motor components to run the washer in a clockwise or counter clockwise direction. Sequencing of the various parts of each cycle is controlled by a microprocessor control board and relays.

#### Control Console

The control console is secured to the control housing by means of tamper resistant torx head screws located at the top ends of the aluminum control console. You will need part number 038227 torx bit (T20H) to remove these screws.

Power should be removed from washer for this procedure. Remove the two top end screws and carefully lay the control console forward (*Figure 2-1*). Use a protective cloth to minimize the chance of scratching the panel on the control console.

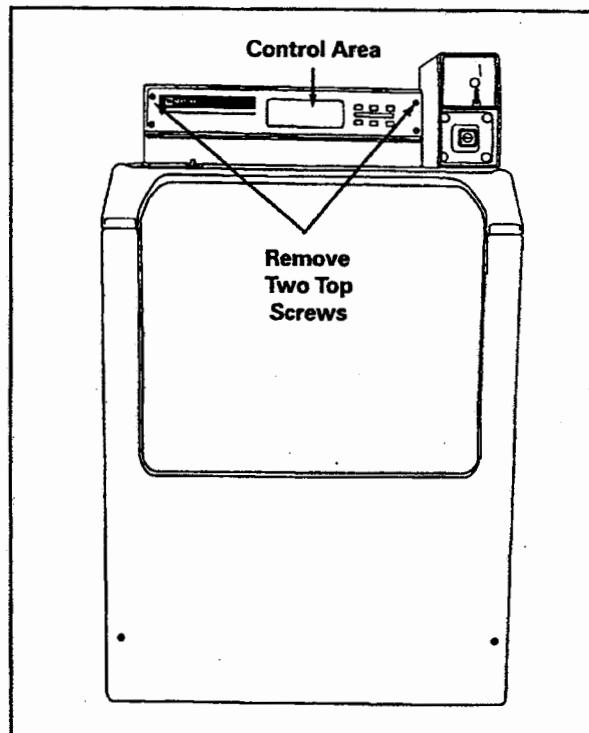


Figure 2-1

#### Microprocessor

All fill and run operations are controlled by a microprocessor control board and low voltage relays. Inputs from the door switch work in conjunction with a membrane "touch pad" selector to select and start cycles (*Figure 2-2*).

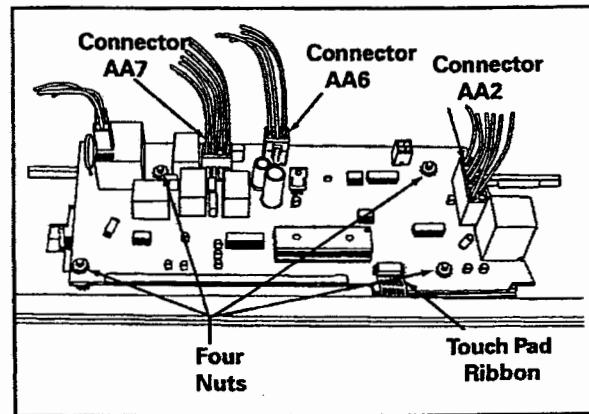


Figure 2-2

## Removal

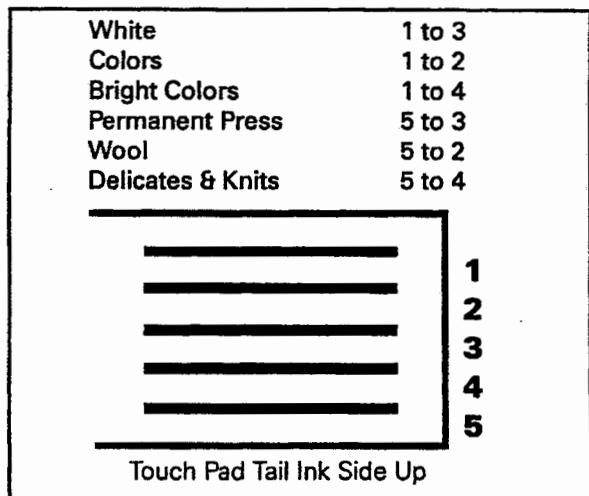
**Disconnect power to the machine before servicing.** The micro-processor control board is located at the right end of the control console and is secured by four nuts. To gain access the two top screws that hold the aluminum panel must be removed. Tip the console forward to expose the control board.

Observe the position of the harness connectors plugged into the microprocessor board. If you place the connector on backwards, the washer will not function.

## TOUCH PAD ASSEMBLY

The touch pad may be checked with an ohmmeter according to the following:

With the microprocessor board removed and the ribbon disconnected from the microprocessor board, the touch pad can be removed by removing two screws from the control console (*Figure 2-3*).



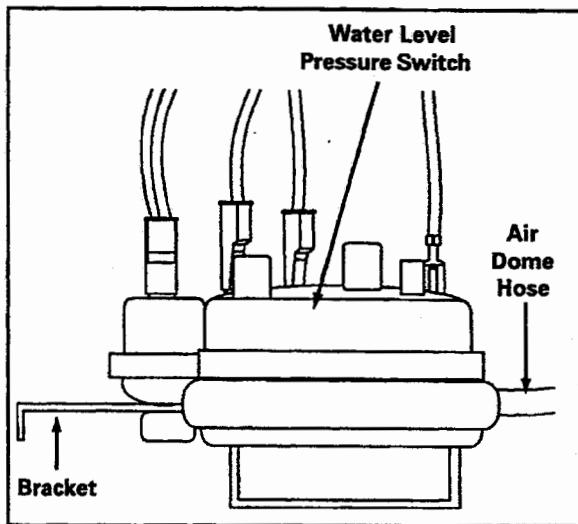
*Figure 2-3*

**NOTE: When replacing the touch pad, secure it first to the control console. Make sure the ribbon connector is properly inserted into the ribbon receptacle.**

Spacer sleeves are used on studs to aid in proper installation of the control board.

## WATER LEVEL SWITCH

The amount of water allowed into the washer is controlled by an air pressure operated water level control. In the control console area, the level pressure switch is mounted to a galvanized bracket secured to the rear of the console (*Figure 2-4*).



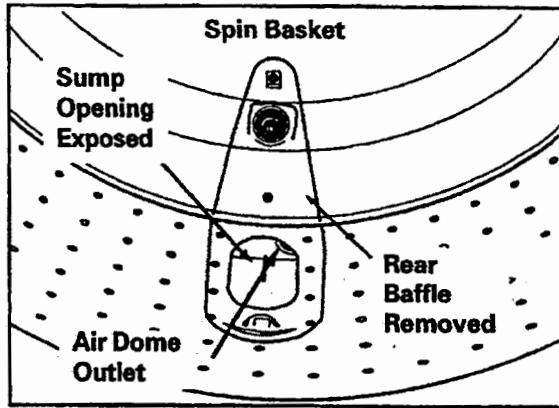
*Figure 2-4*

A rubber air dome hose connects between the pressure switch and the bottom of the outer water container (tub). During the fills, air trapped in the air dome hose is squeezed by rising water level up into the water level switch diaphragm chamber. At a preset point the increasing air pressure against the diaphragm will cause the switch to toggle from fill (*empty position*) to run (*full position*).

**No attempts should be made to adjust the water level control. The switch has been factory calibrated for a proper balance of conditions which MUST be maintained to ensure proper operation of the water level control. Field adjustment is NOT recommended.**

### **Removal:**

- 1. Disconnect power to the machine.**
- 2. Remove the control console. (See *Section on Control Console*).**
- 3. Slide the pressure switch upward away from the air dome hose. The mounting bracket for the pressure switch is secured to the rear control console area.**



**Figure 2-5**

## **AIR DOME HOSE**

The air dome hose connects the pressure switch to the air dome located in the sump area of the outer tub. Routing of the air dome hose passes down the rear wall of the cabinet to the rear sump area of the outer tub. Two holding clips retain the air dome hose to the cabinet away from the belt and pulley.

### **Removal From Console**

- 1. Disconnect power to the machine.**
- 2. Remove the console (See *Control Console*).**
- 3. Pull the air dome hose down through the "P" clip mounted to the rear wall of the washer cabinet.**

### **Removal From Outer Tub**

- 1. Disconnect power to the machine.**
- 2. From behind the outer tub, slide off the retainer clip securing the air dome hose to the rear spout of the outer tub.**
- 3. Remove one of the rear baffles.**
- 4. Grasp and lift the airdome hose from the sump area (Figure 2-5).**
- 5. Pull the air dome and hose out through the sump opening in the spin basket.**

### **Replacement/Routing**

- 1. Thread the narrow end of the hose through the air dome outlet in the rear of the outer tub (Figure 2-5). Apply alcohol to lubricate the hose to ease insertion into the outer tub air dome outlet.**

**NOTE: Using soap and water may lead to a potential leak.**

- 2. Secure the retainer clip on the outside ridge of the air dome hose.**
- 3. Push the bent end of the air dome down into the sump area, below the spin basket, making sure the flat rubber tab on the air dome is down inside the drain sump opening.**
- 4. The air dome hose is retained to the rear wall of the cabinet with two clips.**

**NOTE: A silver indicator mark is located approximately 20 inches away from the air dome. The indicator mark must be located under the lower clip to allow the correct amount of slack in the hose.**

- 5. Remove all slack in the hose between the upper and lower clips holding the air dome hose. This reduces the potential for noise.**

6. Route the air dome hose into the center rear hole in the top cover. Route toward the pressure switch and secure the hose to the pressure switch.

---

## METER CASE

The meter case houses the coin box and depending on the washer model a coin slide or coin drop assembly. The meter case is secured to the washer top by a twin-bolt mounting strap which connects the top and meter case together.

### Removal:

1. Disconnect power to the machine.
2. Two 5/16-18" hex nuts and lock washers thread onto the mounting strap studs inside the meter case. The coin box must be removed for access to the front hold down stud. The meter case access door must also be removed to gain access to the rear nut and stud. This will require a 9/16" socket.
3. Screws from inside the console housing, will need to be removed before the meter case can be removed. These screws secure the meter case to the console.

---

## SERVICE DOOR & COIN BOX MONITOR SWITCHES

The service door switch is mounted to a bracket located in the meter case under the service access door. Whenever the service door is closed, the switch plunger is depressed closing the switch. When the service door is lifted, the switch will open for access into the programming modes of the washer. To remove the switch from the meter case:

1. Disconnect power to machine.
2. Remove the 1/4" hex head screw securing the switch mounting bracket and lift the switch from the meter case.

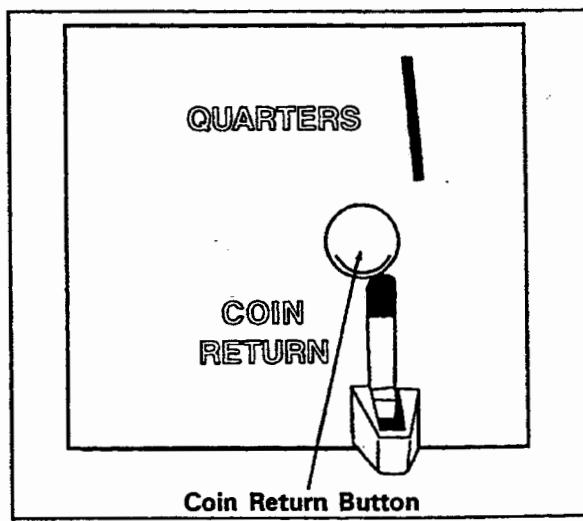
The coin box switch is located close to the bottom of the meter case and access to this switch can be gained through the service access door. When the coin box is in place, the plunger of the switch is depressed. If the switch is not closed the display on the microprocessor will flash continuously. For removal of this switch the coin box will need to be removed.

1. Disconnect power to the machine.
2. Remove service door and coin box.
3. From the service access side of the meter case, squeeze the two tabs on the coin box, and push the switch through towards the coin box side.
4. Reverse the procedures for reinstalling the coin box switch.

---

## COIN DROP ACCEPTOR

The coin drop acceptor is used only in the PD model washers. This is a mechanical coin drop assembly with a coin sensor attached. In normal use, occasional cleaning in hot water will be all that is needed to maintain reliable operation of the coin drop acceptor. The coin drop does not need to be oiled for this will only cause dust or dirt build up which could disrupt the operation of the acceptor (*Figure 2-6*).

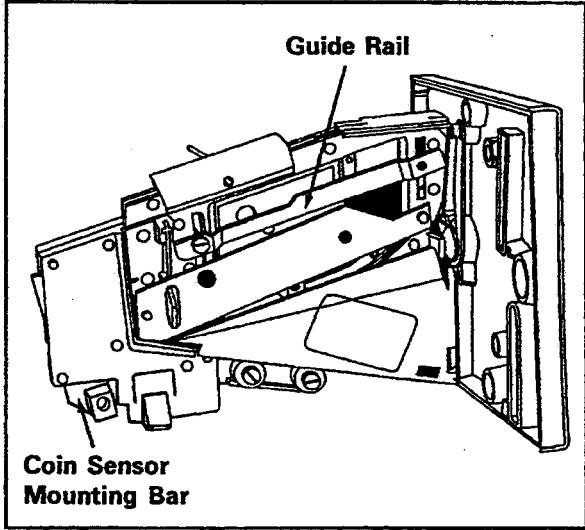


*Figure 2-6*

The coin drop assembly checks coins for diameter, thickness and magnetic properties.

There is a coin return button that can be pressed if the coin jams in the coin acceptor. When it is pressed, the button presses against a tab which is pushed to one side spreading the coin acceptor plates apart. This allows the coin to fall and roll into the coin return bail area. The face plate has a coin bail (*arched area for coin*) which is located at the base of coin return slot. The face plate can be removed from the coin acceptor by removing the two screws from the back side of the face plate.

The coin sensor is mounted to a bar located at the back of the coin acceptor. There is a time period for a coin to pass the coin sensor. If the coin fails to pass through the coin sensor at a certain speed then the microprocessor may assume someone is tampering with the machine or it is a non-valid coin. The sensor will then go into a standby mode and not accept any more coins. The coin sensor is set in position at the time of manufacturing for the proper reading of coins (*Figure 2-7*).



*Figure 2-7*

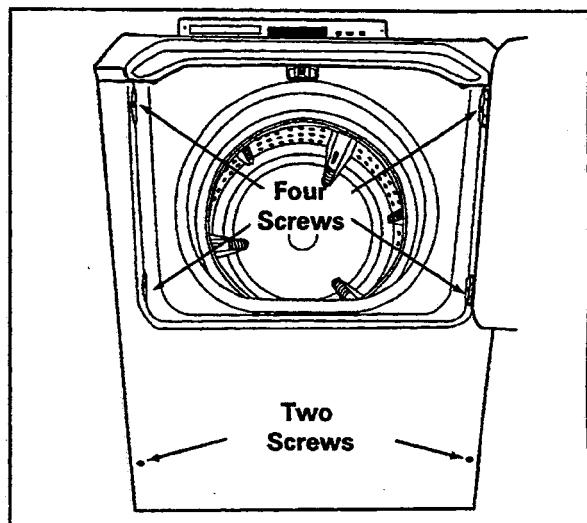
A guide rail on the left side of the coin drop assembly is adjustable (*both at the front and rear*) to accept proper diameter coins, yet reject oversized coins. Adjust the front pin in the guide rail to just miss the quarter and

tighten the front guide rail screw. Set the back guide rail pin to just allow the quarter by, and tighten the back guide rail screw.

## FRONT PANEL

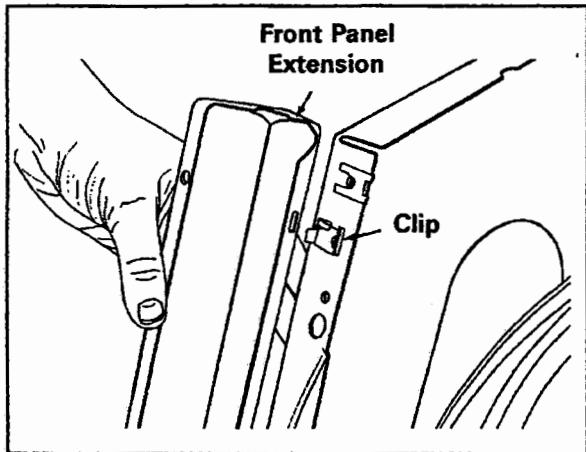
### Removal:

1. Disconnect power to the machine.
2. Open the door and remove the four screws along the inside lip of the door opening. Two screws are located vertically on either side of the door opening. These screws secure the front panel to the front shroud assembly (*Figure 2-8*).



*See Figure 2-8*

3. Close the door and remove the two screws (T25H Torx) securing the front panel to the lower side flanges of the cabinet assembly on original models only.
4. To remove the front panel, twist the upper right and left panel extensions inward to disengage from clips located on the cabinet flange (*Figure 2-9*).
5. Tilt the top of the front panel away from the machine and lift the panel off the two clips retaining the front panel to the base frame. Set the front panel away from the machine.

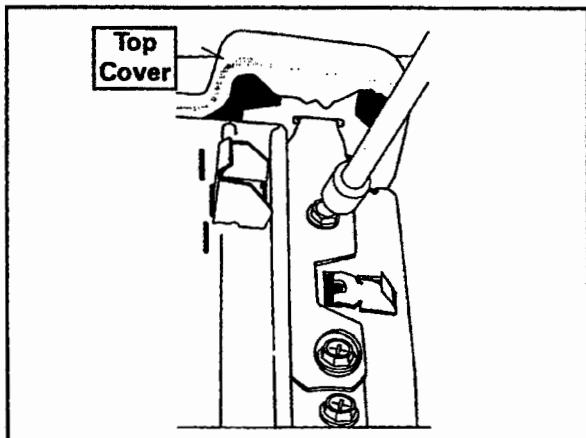


**Figure 2-9**

## TOP COVER

### Removal

1. Disconnect power to the machine.
2. Remove the front panel (*See Front Panel Removal*).
3. Remove the six screws that fasten the dispenser cover to the top cover.
4. Remove security hooks by removing the 5/16" hex screws that secure the hook to the cabinet flange. To disengage hook, swing the hook away from the door area (*Figure 2-10*).



**Figure 2-10**

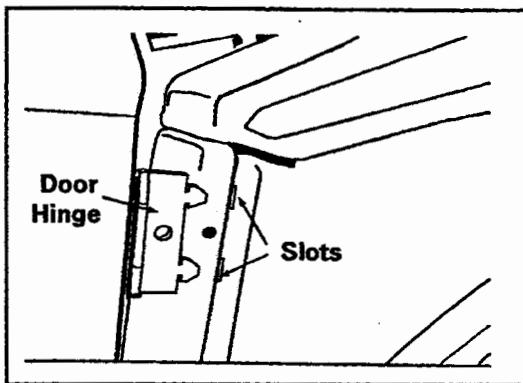
5. Lift the front of the top cover and tilt the top cover toward the rear of the machine.

## DOOR ASSEMBLY

The door assembly is reversible and simple to remove. The door assembly contains an inertial vibration damper that is comprised of a steel plate suspended with springs. The damper is "tuned" to cancel specific vibration frequencies during machine spin operation.

### Door Assembly Removal:

1. Disconnect power to the machine.
2. Open the door and remove the center screw of each hinge secured (*Figure 2-11*).



**Figure 2-11**

3. Grasp the door with both hands and lift the door in the hinge area slightly and draw the door assembly away from the machine. This will disengage the hinges from the slots in the shroud.

### Door Assembly Reversal:

1. Repeat the above steps, plus remove the corresponding plastic spacers on the opposite side of the door opening.
2. Remove the hinges from the door and relocate them to the other side of the door.
3. Remount the door into the new slots and secure with one screw into each hinge.
4. Mount the plastic spacers onto the side where the hinges were previously to cover the hinge slots in the front shroud.

## Door Disassembly:

1. Remove ten screws located across the bottom and along either side of the door panel. The top edge of the outer panel is folded over the inner door plug.

## Cabinet Vibration Absorber

The purpose of the cabinet vibration absorber is to provide a dampening effect to the washer during the spin cycle. By dampening the machine vibration, the washer is able to maintain and achieve optimum spin performance. The stabilizer is attached to the inner door plug with two screws (*Figure 2-12*).

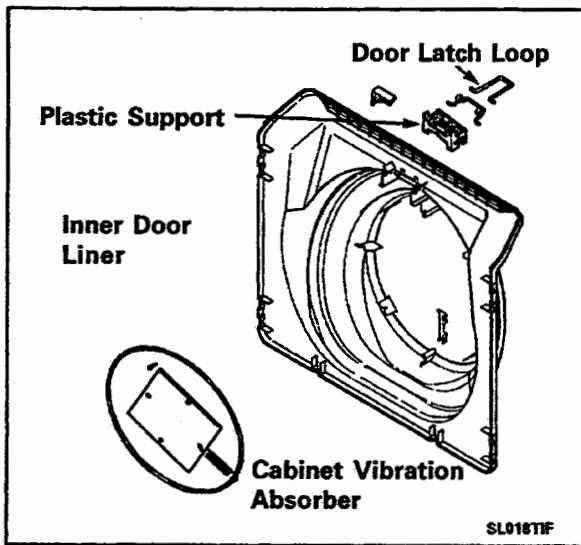


Figure 2-12

## Door Latch Loop

The door latch loop is secured to the inner door plug by a plastic spacer snapped into the door liner. A spring retains the loop in the proper position to align with the door lock mechanism when the door is closed.

## DOOR LOCK MECHANISM

The purpose of the door lock mechanism is to secure the door during the Spin Cycle (*Figures 2-13 & 2-14*). When the door is shut,

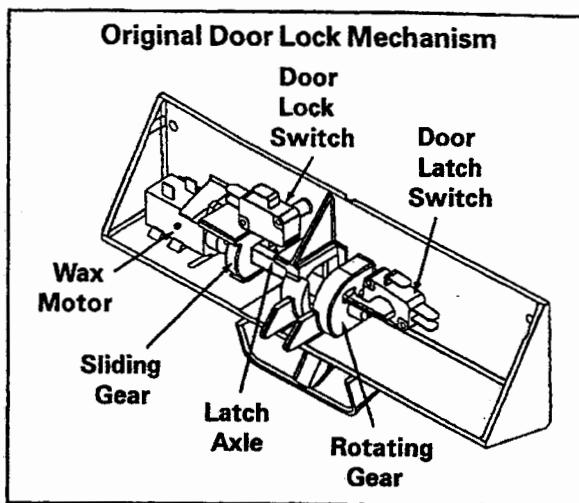


Figure 2-13

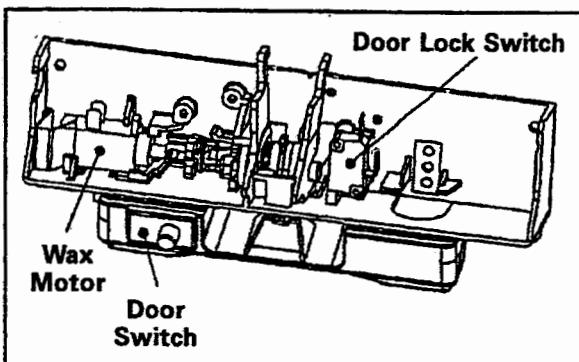


Figure 2-14

the wire loop on the door engages the rotating gear in the door lock mechanism. Just into the cycle, 120VAC is applied to the wax motor. The piston in the wax motor will extend, pushing the latch axle, sliding gear and rotating gear from left to right. As the rotating gear travels to the right, the gear is now positioned behind a retaining wall in the switch support. The retaining wall provides the support necessary to prevent the rotating gear from rotating and releasing the wire loop of the door.

At the end of the cycle, voltage is no longer applied to the wax motor and the wax motor will cool, thus relaxing the piston on the wax motor. The latch axle is then pulled from right to left, along with the sliding gear and rotating gear. Thus, the rotating gear is pulled from behind the retaining wall in the switch support, allowing the rotating gear to be in a position to rotate if necessary, should the door be opened.

The two door latch switches in the door lock mechanism inform the machine microprocessor control when the door is shut, latched, and when the door is securely locked.

An **Emergency Access Cord** is attached to the sliding gear, and can be pulled, should the wax motor fail in the extended position and entry into the washer is necessary. To gain access to the cable, removal of the dispense bezel is necessary. Once removed, the cable is exposed. By carefully applying a steady pull of the filament cord, the wax motor is overridden and the rotating gear is pulled away, right to left, from the retaining wall in the switch support. Thus, allowing the rotating gear to release the wire loop of the door.

#### **Wax Motor Check - Door Lock Mechanism**

Check the wax motor for electrical continuity. This check should be made with the electrical supply disconnected from the washer. Remove the wire harness from the wax motor terminals and place the ohm meter probes on the terminal of the wax motor. The wax motor should have a resistance of approximately 950-1100 ohms.

#### **Lock Mechanism Removal:**

1. Disconnect power to the machine.
2. Remove the front panel and raise the top cover to expose the door lock mechanism. (*See section on Front Panel and Top Cover.*)
3. Remove the wires from the latch and lock switches.
4. Remove two 5/16" hex-head screws that secure the switch support to the metal shroud support.

#### **Switch & Wax Motor Removal:**

1. Spread the retaining tabs to remove.

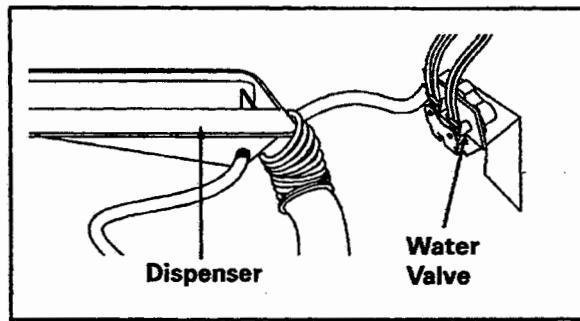
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#### **DISPENSER ASSEMBLY (MAH14 Models)**

The dispenser assembly is located in the left hand side of the top cover. The water flushes the bay area and dispenses the fabric softener, bleach and detergent into the wash load (*Figure 2-15*).

##### **Removal of Dispenser:**

1. Disconnect power to the machine.
2. Remove three screws securing the dispenser cover to the top cover.
3. Remove the three remaining screws exposed when the dispenser cover is removed.
4. Remove the front panel and top cover. (*See Section on Front Panel and Top Cover Removal.*)

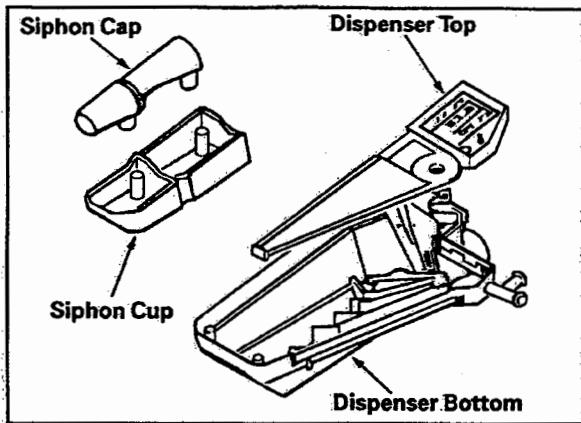


**Figure 2-15**

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#### **DISPENSER ASSEMBLY (MAH20 Models)**

The dispenser assembly is located in the left hand side of the top cover. Three bays dispense the fabric softener, bleach and detergent into the wash load. When a specific fluid is required, the water is directed into that bay. As water fills the bay, the fluid level rises. When the fluid reaches a specific height, it is siphoned out into the dispenser injector hose to the wash load (*Figure 2-16*).



**Figure 2-16**

## REMOVAL

1. Disconnect power to the machine.
2. Remove the siphon cup and cap.
3. Remove the four screws securing the dispenser bezel and assembly to the top cover.
4. Remove the front panel and top cover (*See Front Panel & Top Cover Removal*).
5. Disconnect the hoses attached to the dispenser assembly.
6. While lifting, rotate the dispenser assembly 90 degrees in a counterclockwise direction.

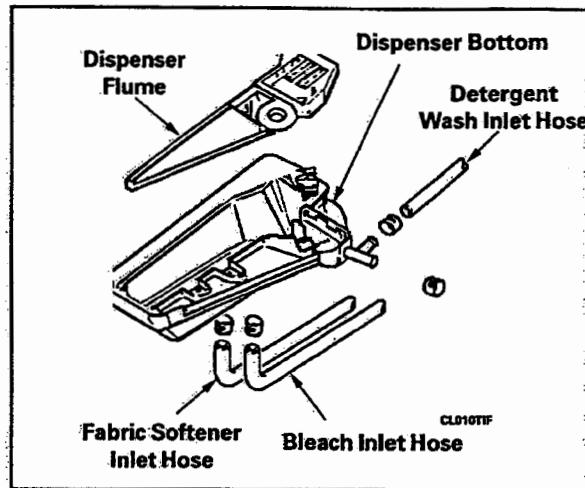
**NOTE:** *The two tabs on the side wall of the dispenser bottom may break off if the above procedure is not followed properly.*

## DISPENSER ASSEMBLY FUNCTION (MAH20 MODELS)

The system uses a 4 coil water valve with designated inlet hoses leading to each dispensing cup. The 4 coil water valve operates like a 2 coil water valve. The two water valve coils are individually dedicated to dispensing water through the bleach and fabric softener dispensing cups. When either valve is open, part of the flow will be routed through the dispenser cup. A portion of the

flow will still be routed through the detergent wash area.

As a result of this revision, a new dispenser bottom, water valve and hoses were introduced (*Figure 2-17*).

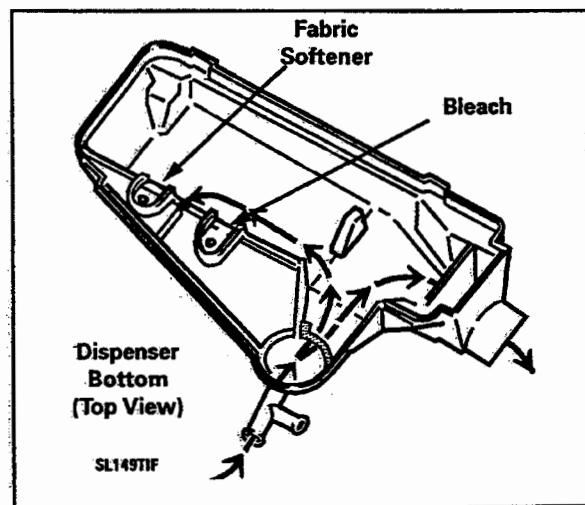


**Figure 2-17**

## OPERATION:

When Bleach or Fabric Softener is required to dispense, the dedicated solenoid on the water valve is activated. Water is directed to dedicated spouts on the dispenser bottom (*Figure 2-18*).

Inside the dispenser bottom, water is directed into the designated channels leading to the siphon cup assembly.



**Figure 2-18**

---

## **WATER VALVE (MAH14 MODELS)**

If the washer won't fill properly, make the following checks before replacing the water valve.

- **Disconnect power to the machine.**
- Check faucets to make sure they are turned on.
- Check screens in the inlet hoses at faucets and at inlet of water valve. Be sure they are not clogged.
- Check water level control. Be sure the air dome tube is attached properly.
- Check water valve coils for continuity. The coil should have a resistance of between 500-900 ohms. If no ohms are shown on the display of the electrical test meter, the solenoid coil has an open winding and the valve should be replaced.

### **Rear Removal of Water Valve:**

1. **Disconnect power to the machine.**
2. Shut-off the water to the inlet hoses and remove the hose from the water valve.
3. Remove the two 5/16" hex-head screws securing the water valve bracket to the cabinet.
4. While dropping the bracket down slightly, slide the bracket to the right. This will allow the injector hose to clear the rear cabinet.
5. Rotate the left side of the bracket away from the washer, while withdrawing the bracket away from the cabinet.
6. Remove the wire harness from the water valve coils (*Blue wires-Cold; Orange wires-Hot*) and the clamp from the injector.

7. Remove two 5/16" hex-head screws securing the valve to the mounting bracket.

### **Front Removal of Water Valve:**

1. **Disconnect power to the machine.**
2. Shut-off the water to the inlet hoses and remove the hoses from the water valve connections.
3. Remove the front panel and raise the top cover to expose the upper rear cabinet area. (*See Section on Front Panel and Top Cover Removal.*)
4. Remove two 5/16" hex head screws securing the water valve bracket to the cabinet.
5. Remove the wire harness from the water valve coils (*Blue wires-Cold; Orange wires-Hot*) and the clamp from the injector hose.

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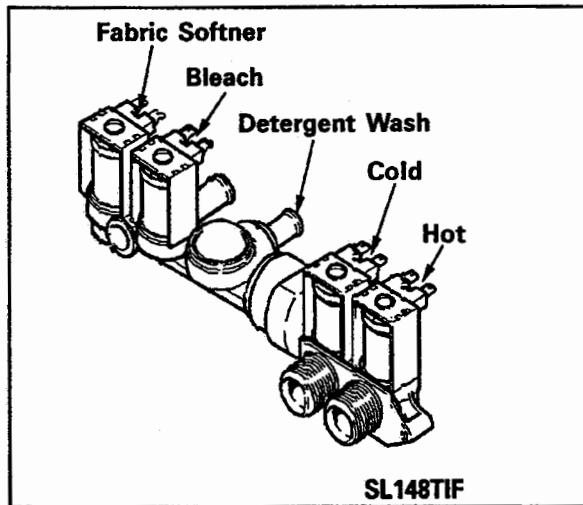
## **WATER VALVE (MAH20 MODELS)**

The water valve is accessible from the front of the machine or by removing the dryer. The flow rate of the dispenser is 3 gpm.

### **Removal**

1. **Discontinue power and water to the machine.**
2. Remove the front panel and lift the top cover.
3. Remove the wire harness connections to the water valve solenoids.
4. Loosen and remove the hose clamps on the inlet hoses leading away from the water valve.
5. Locate and loosen the valve mounting screw by turning the screw at least three full turns.

**NOTE: The mounting screw serves as a locating pin to hold the valve in position on the mounting bracket. By partially removing the screw, the water valve can now be slid to the left and removed from the bracket (Figure 2-19).**

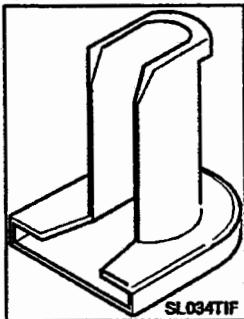


**Figure 2-19**

6. Carefully lift the valve with the inlet hoses attached and direct the inlet hoses through the openings in the valve mounting bracket.
7. The hoses can be crimped or the water shut off at the faucets. Place a towel below the valve and remove the inlet hoses from the water valve.
8. To reinstall, reverse the aforementioned procedure.

#### **FRONT WATER FLUME INJECTOR**

As water is filling the dispenser assembly, water is also diverted to a hose leading to the front of the outer tub. As the water enters the top of the outer tub through the hose, it passes through a water flume. The flume directs the water toward the front of the tub to saturate the clothes load (Figure 2-20).



**Figure 2-20**

#### **Removal**

1. Disconnect power to the machine.
2. Remove the front panel (See **Front Panel Removal**).
3. Remove the front shroud assembly (See **Front Shroud Assembly Removal**).
4. Remove the outer tub cover (See **Outer Tub Cover Removal**).
5. Remove the hose clamp and injector hose from the spout on the front upper area of the outer tub.
6. In order to provide sufficient space to remove the injector, place a 5/8" - 3/4" wedge between the spinner and the outer tub.
7. Pinch the two tabs exposed on the outer edge of the outer tub spout and press the injector into the tub. Reverse the previous steps to replace the injector.

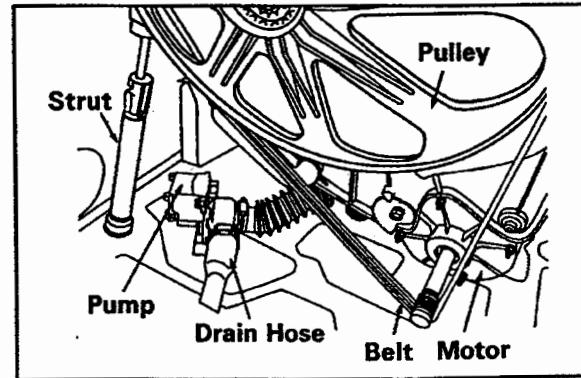
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#### **REAR ACCESS PANEL**

The removal of the access panel, allows access to the rear components of the washer (Figure 2-21).

#### **Removal:**

1. Disconnect power to the machine.
2. Remove the four hex-head screws surrounding the access panel.



**Figure 2-21**

## PUMP ASSEMBLY

The pump assembly is mounted to the right rear area of the base.

### Removal

1. Disconnect power to the machine.
2. Spread a towel below the drain hoses prior to loosening the hose clamps. This will catch any residual water left in the hoses and sump area.
3. Remove the hose clamps and hoses from the pump.
4. Remove the wiring harness from the pump motor terminals.
5. Rotate the pump assembly in a counter-clockwise direction. The support legs of the pump are slotted to engage in keyed slots in the base. Reverse the steps to remount the pump (*Figure 2-22*).

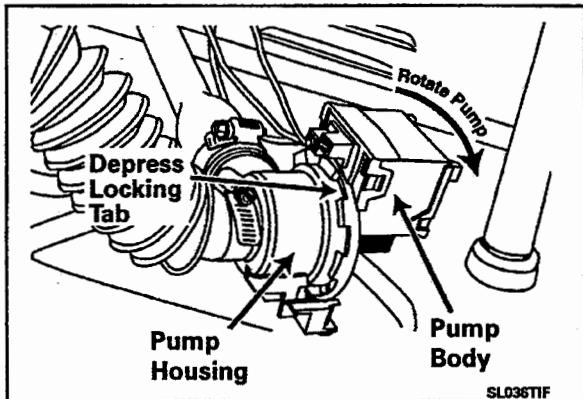


Figure 2-22

**NOTE:** *Torx screws are used on later models instead of the "locking tabs."*

### Cleaning the Pump

The pump assembly can also be disassembled without removing the hoses from the pump (*Figure 2-23*).

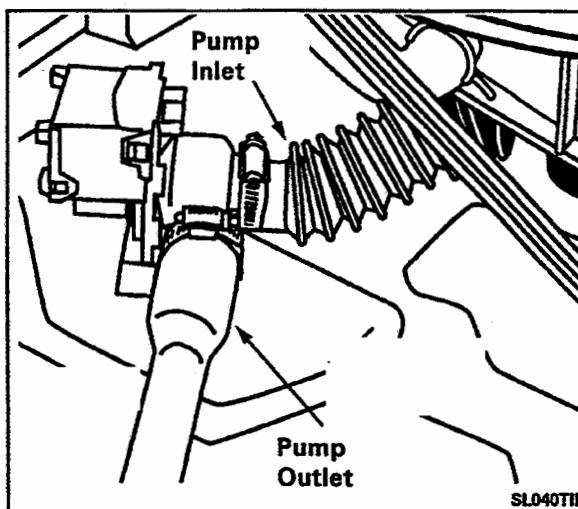


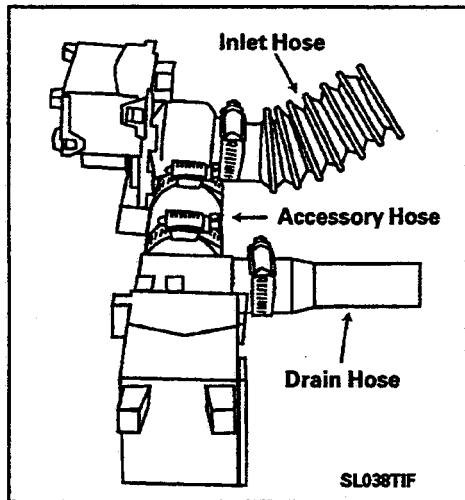
Figure 2-23

1. Depress the locking tab or remove the torx screws (T15) on the face of the pump housing.
2. Rotate the block portion of the pump containing the motor windings toward the front of the washer. This will disengage the locking tabs of the pump housing from the pump face.
3. Carefully remove the pump body away from the housing. Now, the drain impeller is exposed for cleaning.

## INSTALLATION - PUMP ACCESSORY KIT

1. Disconnect power to the machine.
2. Disconnect the drain hose from the existing pump in the washer.
3. Attach the accessory connector to the pump drain outlet and secure with the clamp found in the kit.

- Position the second pump near the first pump and connect the accessory connector to the sump intake of the second pump. Secure with the clamp in the kit (*Figure 2-24*).



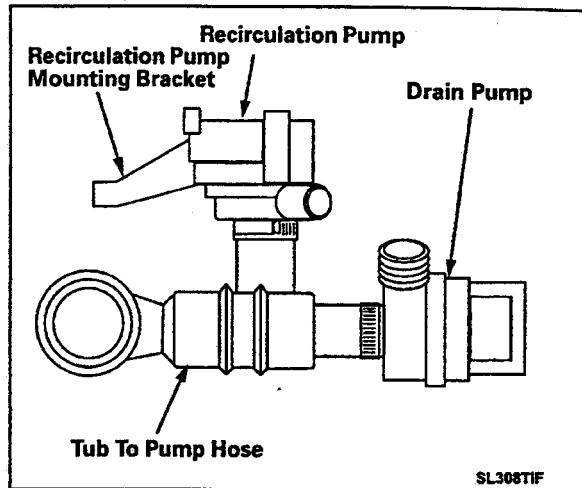
*Figure 2-24*

- Connect the drain hose to the drain outlet of the second pump. Secure with a clamp.
- The second pump assembly is not secured to the washer's base frame.
- Installation is complete.

#### RECIRCULATION PUMP (MAH20 Models)

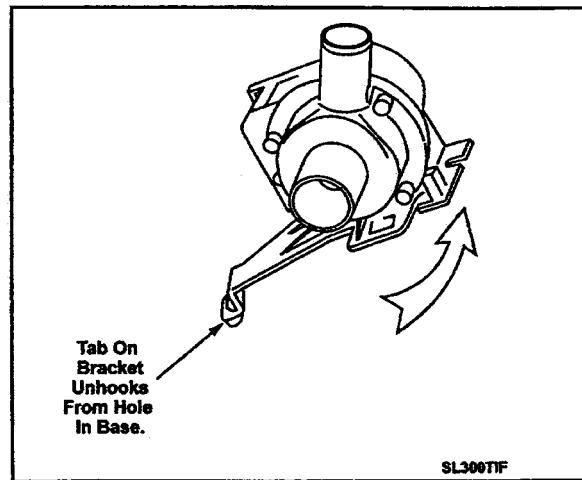
The Recirculation Pump is accessible from the front or the rear of the machine. The pump is connected in series with the outer tub pump hose and the drain hose (*Figure 2-25*).

- Disconnect power and water to the machine.
- Remove the front panel.
- Lay a towel under the tub to pump hose and loosen the clamp on the pump connection to the hose.



*Figure 2-25*

- Loosen the clamp on the detergent hose connected to the side of the recirculation pump.
- Lift the recirculation pump at an angle to disengage the locating tab of the mounting bracket from the baseframe (*Figure 2-26*).



*Figure 2-26*

- To remove the pump from the mounting bracket, pull down on the mounting tabs and slide the pump off the mounting bracket (*Figure 2-27*).

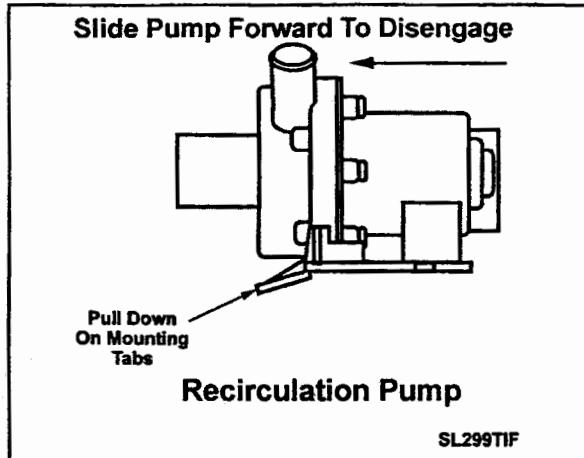


Figure 2-27

## DETERGENT HOSE

The detergent hose leads from the recirculation pump up the rear of the washer cabinet and leads to the top of the outer tub assembly. The hose provides a path for the water to recirculate from the lower part of the outer tub assembly to the enter on top of the outer tub assembly (Figure 2-28).

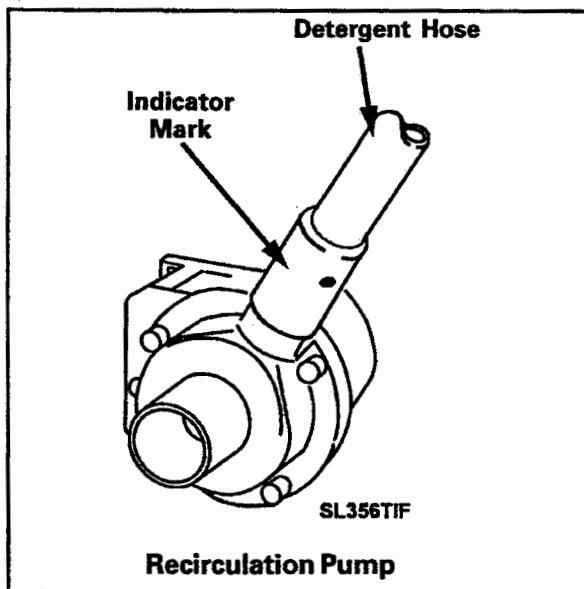


Figure 2-28

**Note:** Small indicator marks are painted on the hose to locate and properly position the metal mounting clips onto the hose.

## Removal

1. Disconnect power to the machine.
  2. Remove the detergent hose from the recirculation pump.
- NOTE: Indicator mark on hose for reinstallation.**
3. Locate the rear mounting clip on the detergent hose in the access panel opening and slide the clip off the cabinet flange (Figure 2-29).

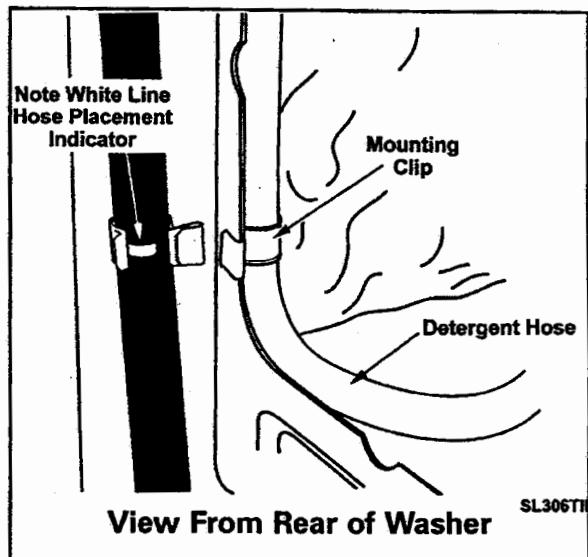
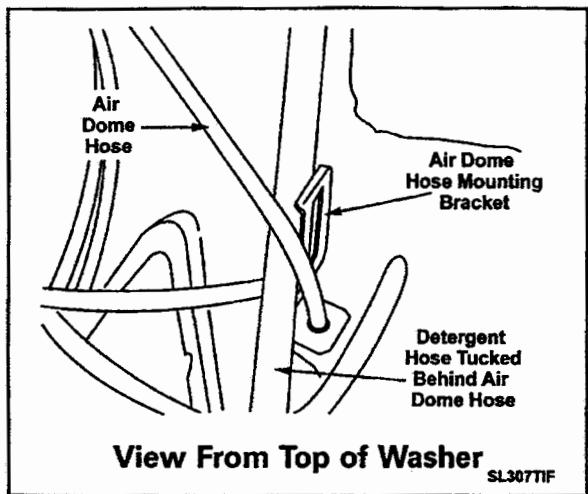


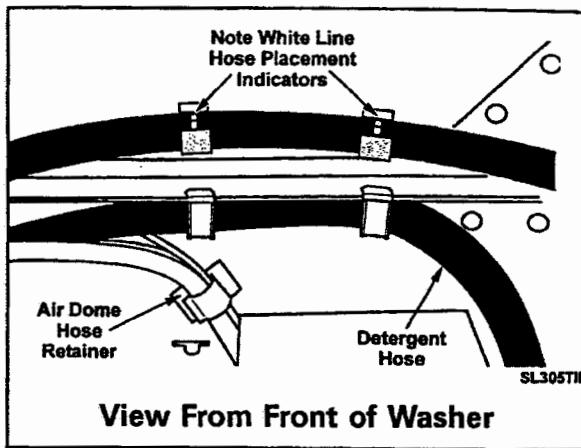
Figure 2-29

**NOTE: When reinstalling clip to cabinet ensure the clip is approximately 1 inch up from the inside corner of the access opening to prevent kinking of the hose.**

4. Follow the detergent hose vertically up to the air dome hose mounting bracket. The detergent hose is tucked behind the air dome hose (Figure 2-30).
5. The detergent hose then goes vertically to the upper right rear flange of the cabinet and is retained by two metal clips. Indicators are on the hose showing the proper positioning of the clips on the hose.

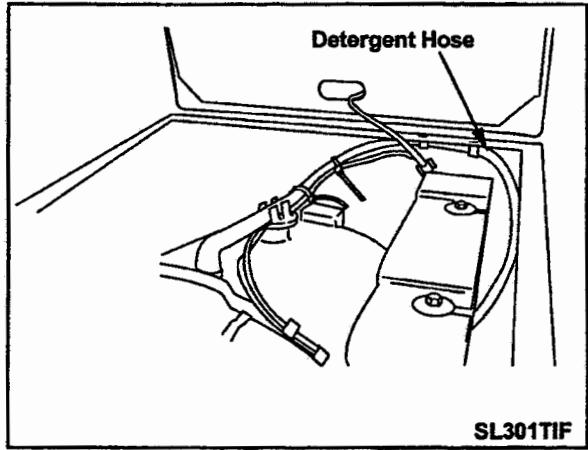


**Figure 2-30**

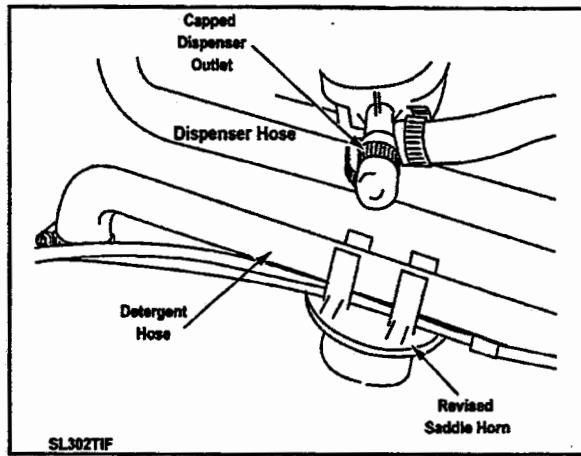


**Figure 2-32**

**NOTE:** *The upper left clip should be positioned directly above the top air dome hose retainer. (See Figure 2-31 & 2-32)*



**Figure 2-31**



**Figure 2-33**

**NOTE:** *The upper wire harness for the unbalance circuit is snapped into the saddle horn with the detergent hose.*

6. The detergent hose turns 90 degrees toward the front of the washer and passes through the saddle horn on the top of the outer tub. Unsnap the hose from the saddle horn (See Figure 2-33).
7. The saddle horn is secured to the top of the outer tub with a screw.

8. Loosen the clamp on the detergent hose on the outer tub and remove the hose.
9. To reinstall, reverse the removal steps taking note of the indicators on the hose in reference to the mounting clips, making sure the hose does not kink above the recirculation pump.

## Drain Hose

The drain hose attaches to the pump and is routed through the lower rear wall of the cabinet. The drain hose is protected externally by a shield.

### Removal:

1. Disconnect power to the machine.
2. Remove the four 5/16" hex-head screws securing the access panel to the rear wall of the cabinet.
3. Remove the 5/16" hex-head screw securing the drain hose shield, then remove the shield (*Figure 2-34*).

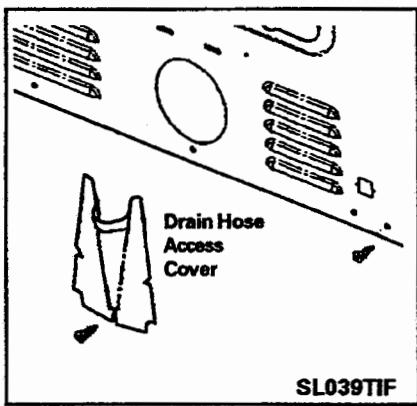


Figure 2-34

4. With access into the machine compartment, spread a towel under the connection of the drain hose to the pump. Loosen the clamp and remove the drain hose (*Figure 2-35*).

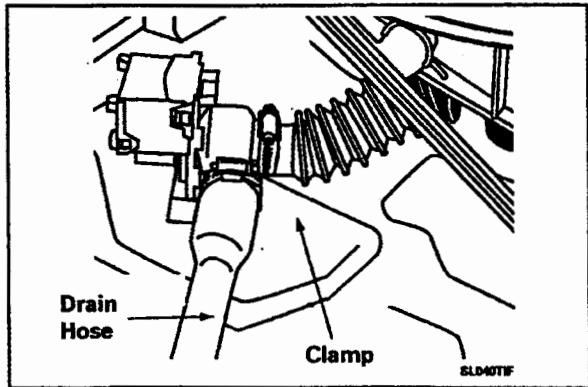


Figure 2-35

5. Reverse the previous steps for replacement.

## SHROUD ASSEMBLY

The shroud assembly connects the sides of the cabinet together across the front for stability. It also provides support for the door assembly, front panel and door lock mechanism. To gain access to the components behind the shroud, the assembly should be removed as a whole assembly.

### Removal of Complete Shroud Assembly:

1. Disconnect power to machine.
2. Remove the front panel and raise the top cover to expose the shroud assembly. (*See Section on Front Panel and Top Cover Removal.*)
3. With the door open, reach in and unsnap the boot gasket around the inside perimeter of the door opening.
4. Leave the door in the shroud, tape the door closed.
5. Removal and replacement of screws in the following order is necessary to provide proper alignment of the parts. Failure to do so, will hinder removal and replacement of the shroud (*Figure 2-36*).

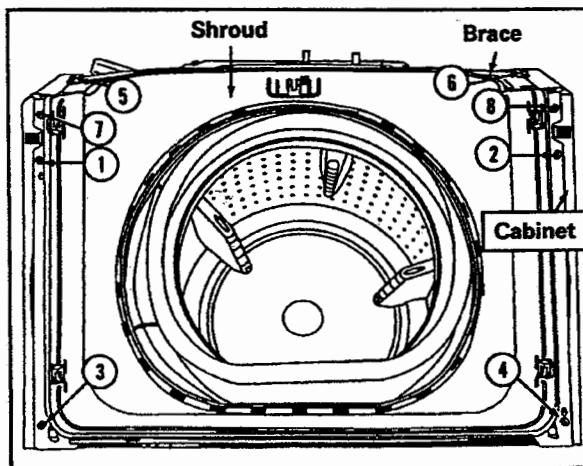


Figure 2-36

- Carefully lift and stand the shroud assembly on top of the tub. Then lean the assembly against the top cover. The wire harness on the left side of the upper cabinet is long enough to do this. When replacing the shroud, be sure to place the harness under the upper flange of the cabinet to prevent wires being pinched.

---

## BAFFLES

The baffles in the spin basket distribute the clothes during the tumbling action of the washer.

### Removal

- Disconnect power to the machine.**
- The three rear baffles within the spin basket are removed by removing the two crosshead screws securing each baffle from inside the spin basket.
- The three front baffles within the spin basket are removed by removing the two  $\frac{1}{4}$ " hex head screws from outside of the spin basket. To gain access, remove the outer tub cover. The front baffle mounting screws can now be reached through the sump area, using a flat ratchet with a  $\frac{1}{4}$ " drive socket.

---

## DOOR BOOT

The door boot rubber gasket provides a seal between the outer tub assembly and the front shroud. The boot seal is secured to the front shroud by locking tabs on the boot seal, which engage with slots in the shroud. Attachment to the outer tub is by a wire loop stretched around the perimeter of the opening in the outer tub cover and secured with a spring.

### Removal

- Disconnect power to the machine.**
- Remove the front shroud (*See Front Shroud Assembly Removal*).
- Using one of the two front support suspension springs, grasp the hook of the boot clamp spring. With the other hand, press the wire loop into the door boot. This will brake the wire into the door boot and not allow the wire to slip.

**NOTE:** *Be careful not to bend or crease the wire loop. If the wire loop becomes bent, the result will be a potential leak upon replacement of the boot seal onto the outer tub cover.*

- Pull the boot clamp spring hook toward the wire loop and disengage the spring from the wire loop.
- Carefully remove the wire loop from the lip of the outer tub cover.

**NOTE:** *Note the orientation ribs on the outer tub cover and the locating notches in the door boot seal lip.*

- Unsnap the locking tabs of the door boot around the inside perimeter of the door shroud (*Figure 2-37*).

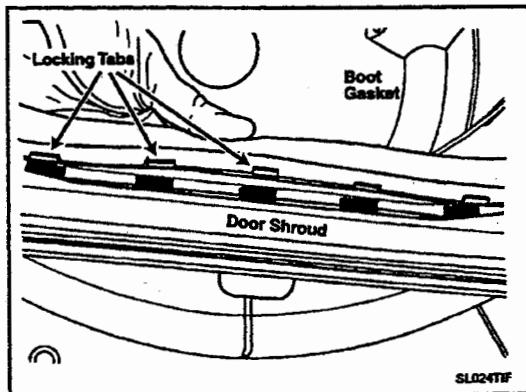


Figure 2-37

## Replacement

1. Align the door boot with the D-shape toward the front with the flat of the D toward the bottom. Also, locate the large tab toward the top center of the shroud.
2. Stretch the rear lip of the door boot onto the tub cover.
3. Move the rear door boot lip along the face of the tub cover until the locator notches in the door boot align with the locator ribs in the tub cover. Check alignment of the six rib marks and reposition if necessary. This is necessary in order to have the locking tabs on the inside perimeter of the door boot align with the corresponding tabs on the front shroud.
4. Carefully loop the wire loop with spring around the lip of the outer tub cover and place the spring at the 11:00 o'clock position, just left of the top rib of the outer tub cover. Hook the end of the spring over the nearest tub cover clip to hold the spring and wire in position for final hookup to the other end of the wire loop.
5. Using either the hold down bracket or the outer tub spring, grasp the hook end of the spring and apply pressure on the clamp wire into the door boot.
6. Pull the spring hook toward the wire loop, to engage the spring with the wire loop.
- NOTE: Be careful not to bend or crease the wire loop. If the wire loop becomes bent, the result will be a potential leak upon replacement of the boot seal onto the outer tub cover.**
7. Reposition the front shroud on the front of the washer and secure (*See Front Shroud*).
8. Pull the front edge of the door boot and locate the widest locking tabs, located at the 12, 4 & 8 o'clock positions. Insert the locking tabs into the large interlocking slots in the shroud. (Spraying the surface with window cleaner or a soap solution aids reinsertion of the tabs into the plastic front shroud.) Press the thick rubber section of the door boot into the groove in the shroud so the locking tabs engage in the slots.
9. Press the remaining locking tabs into the perimeter of the shroud.

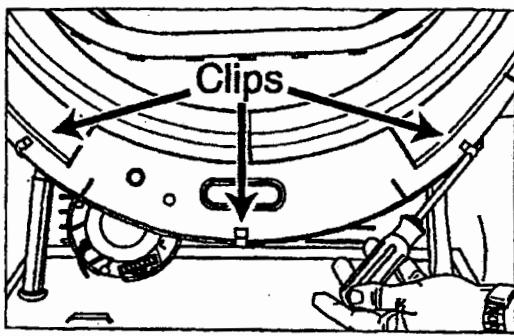
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## OUTER TUB COVER

The outer tub cover has a gasket seal embedded in the outer flange of the cover to seal the cover to the outer tub. The cover is secured to the outer tub by means of twelve (12) locking clips evenly spaced around the perimeter of the cover. When the outer tub cover is removed, access to the sump area and the front injector flume is possible.

### Removal

1. **Disconnect power to the machine.**
2. Remove the front shroud and shroud bridge support assembly (*See Front Shroud Assembly Removal*).
3. Using a flat-bladed screwdriver, slide under the clip and pry to remove. Remove the remaining clips from the outer tub cover (*Figure 2-38*).
4. Remove the cover from the outer tub. This exposes the sump area on the floor of the outer tub and the water injector flume on top of the outer tub.

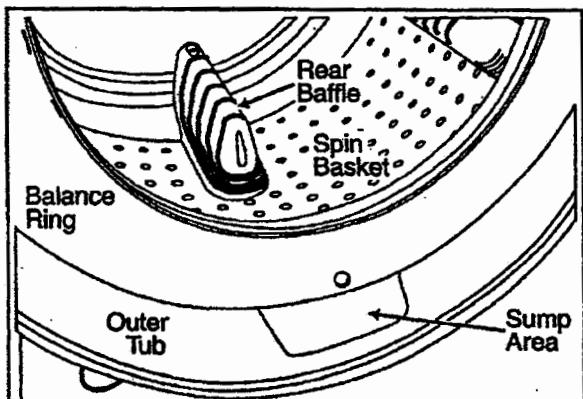


**Figure 2-38**

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### SPIN BASKET ASSEMBLY w/BALANCE RING

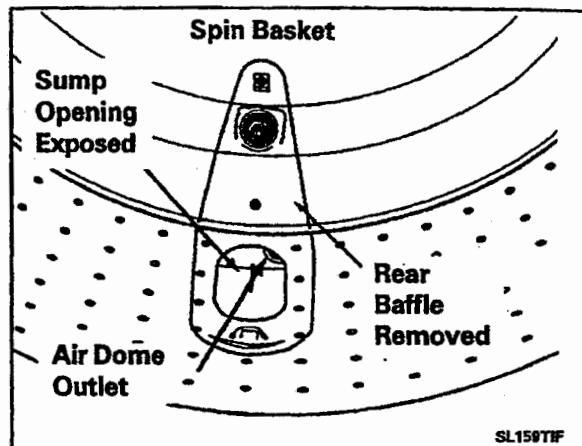
The balance ring is securely fastened to the spin basket and cannot be obtained as a separate repair part. To obtain, order spin basket assembly complete. The balance ring is filled with a calcium chloride solution and baffles within the ring allow the fluid to disperse within the ring evenly. By rotating the spin basket, you can hear the fluid dispersing within the baffles of the balance ring. This sound is normal (*Figure 2-39*).



**Figure 2-39**

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The spin basket is mounted to the spinner support by means of threaded studs on the support extending through the spin basket and secured with nuts. The mounting nuts are concealed under the rear baffles (*Figure 2-40*).

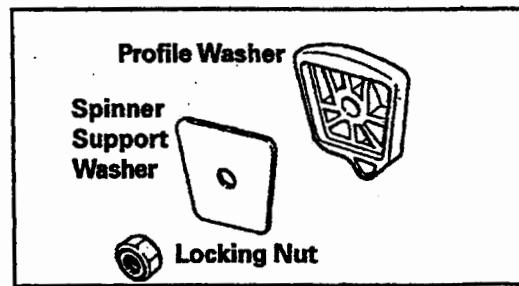


**Figure 2-40**

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### Removal

1. Disconnect power to the machine.
2. Remove the front panel, top cover, front shroud, outer tub cover and rear baffles (*See Front Panel, Top Cover, Front Shroud, Outer Tub Cover and Rear Baffle Removal*).
3. To separate the spinner tub support from the spinner, remove the three rear baffles within the spin basket by removing the two screws securing each baffle (*See Baffle Removal*).
4. Remove the three locking type nuts (1/2" socket) securing the spin basket to the spider assembly (*Figure 2-41*).



**Figure 2-45**

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5. Remove the spin basket by lifting it off the threaded bolts of the spinner support.

- When replacing the spin basket onto the spinner support, replace the washers under the three locking type nuts. Secure the  $\frac{1}{2}$ " nuts firmly.

## DRIVE PULLEY

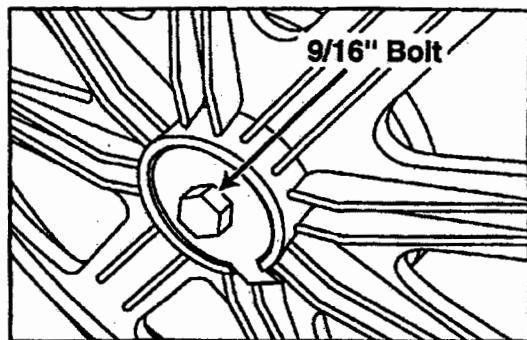
The drive pulley can be reached from behind the rear access panel of the washer. The pulley is secured to the shaft of the spider assembly by a bolt. The direction of pulley rotation controls the spin action of the spin basket.

### Removal

- Disconnect power to the machine.
- Remove the rear access panel from the washer to access the pulley area.
- Remove the bolt and the spider shaft will be exposed. Carefully slide the pulley off the spider shaft, using a "rocking/side-to-side" motion. If the pulley has a snug fit, use your Spanner Wrench to apply enough leverage to pry the pulley off the shaft (**Figure 2-42**).

### Replacement

- Slide pulley on shaft.
- Insert new tabbed washer and secure the bolt with a  $9/16$ " socketed ratchet wrench (33 ft. lbs. torque).



**Figure 2-42**

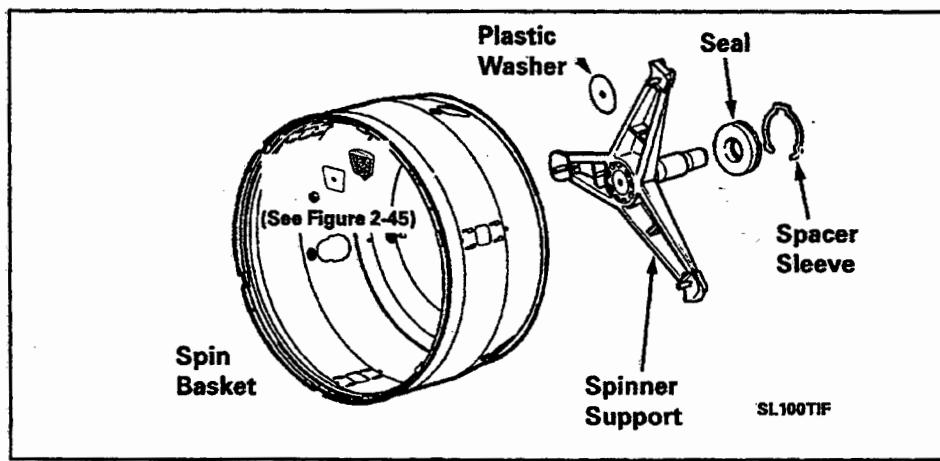
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**NOTE:** *If the washer is cupped, flip the washer on the pulley so the cupped portion extends away from the shaft. Failure to do so can result in a binding of the spinner support shaft and seals.*

## SPINNER TUB SUPPORT

The spinner tub support attaches to the spin basket and the shaft of the spider extends through a seal system to the exterior of the outer tub with a pulley attached to the end of the shaft (**Figure 2-43**). This assembly supports the spin basket and transfers the rotation of the drive pulley directly to the rotation of the spin basket.

**NOTE:** *When the spinner tub support is removed, the shaft seal system should be replaced.*



**Figure 2-43**

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## Removal

1. Disconnect power to the machine.
2. Remove the front panel, top cover, front shroud and outer tub cover (*See Front Panel, Top Cover, Front Shroud and Outer Tub Cover Removal*).
3. Remove the drive pulley (*See Pulley Removal*).
4. With the pulley removed, the spin basket with the spider shaft can be pulled from the front of the outer tub assembly.
5. To separate the spinner tub support from the spinner, remove the three rear baffles within the spin basket by removing the two screws securing each baffle (*See Baffle Removal*).
6. Remove the three locking nuts (1/2" socket) securing the spin basket to the spider assembly.
7. Remove the shaft seal (*Figure 2-44*).

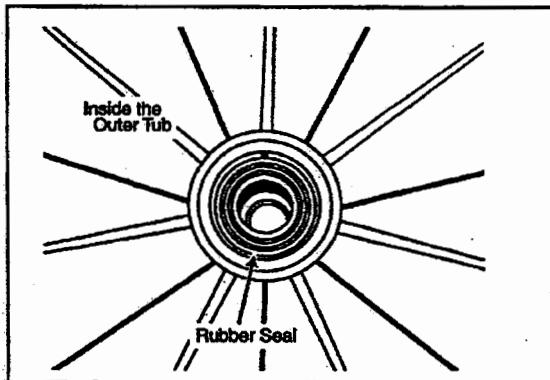


Figure 2-44

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## Replacement

1. Reverse the previous steps.
2. **IMPORTANT: Secure the three locking nuts (1/2" socket) on the spinner tub support studs.**

## SEAL SYSTEM

A multi-lipped water seal is positioned on the tub support shaft leading to the outer tub bearing. This prevents water inside the tub from reaching the bearings. The water seal is accessed by removing the tub support shaft. It is comprised of a stainless steel seal face positioned on the tub support shaft, which mates with a rubber gasket. Grease on the face of the rubber gasket provides lubricant for the steel seal face. The steel seal face provides the rotating seal surface against the circular rubber ribs in the face of the rubber seal. This makes for three rib contacts at various diameters, providing three seals.

## Removal

1. Disconnect power to the machine.
2. Remove the spinner tub support with spinner (*See Spinner Tub Support Removal*).
3. With a flat bladed screwdriver, pry the seal carefully off the tub support shaft (*Figure 2-45*).
4. Reach into the inside of the outer tub bearing area and remove the rubber seal. Discard both the steel seal washer and the rubber seal (*Figure 2-44*).
5. Position the spacer, replacement rubber seal and steel seal washer into the outer tub bearing area (*Figure 2-45*).

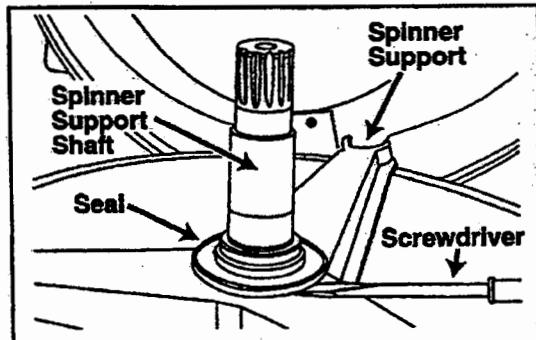


Figure 2-45

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- Position the spinner with spinner support shaft into the outer tub and insert the shaft through the seal in the rear of the outer tub until the spinner support shaft seats into place.
- Reposition the drive pulley with tabbed washer onto the spinner support shaft. Insert the retaining bolt and tighten securely (33 ft. lbs. torque). This will draw the shaft and seals into proper alignment.

## OUTER TUB ASSEMBLY

The outer tub assembly is suspended from two springs positioned toward the upper front of the cabinet and supported in the rear by two struts which are secured to the base frame. Two counter weights are mounted to the outer tub from above and below the tub. The aluminum bearing housing retains both inner and outer bearings for the spinner tub support shafts (Figure 2-46).

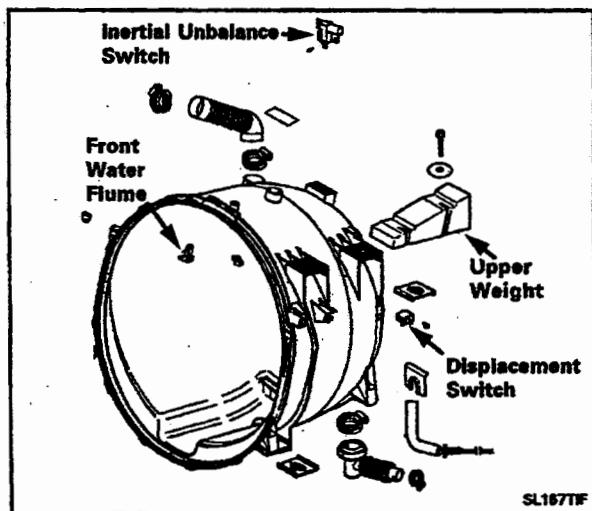


Figure 2-46

## BEARINGS

The bearings are not repairable or replaceable. Replacement of the complete outer tub assembly is required.

## COUNTER WEIGHTS

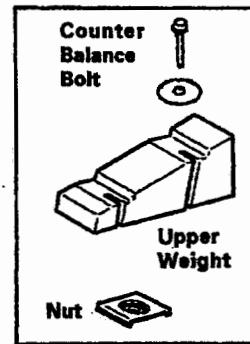
Two counter weights are secured to the outer tub assembly. One is secured to the top of the tub assembly and the other is secured to the bottom of the tub assembly.

### Removal of Upper Weight:

- Disconnect power to the machine.

- Lift top cover (See Top Cover).

- Remove the two  $\frac{1}{2}$ " counter balance bolts securing the weight to the top of the outer tub assembly.



**NOTE: The bolts screw into two nuts below the weight, under the tub mounting pad (Figure 2-47).**

Figure 2-47

### Removal of Lower Front Weight:

- Remove the front panel (See Front Panel).
- Remove the two bolts securing the weight to the outer tub assembly. Use a 9/16" socket (Figure 2-48).

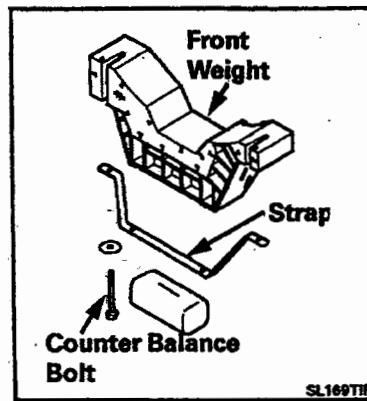
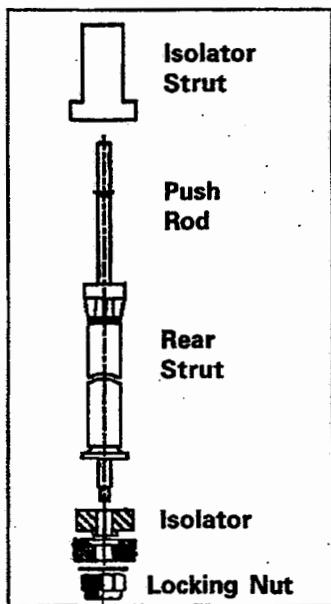


Figure 2-48

- Lower the front weight and guard against hitting the motor control microprocessor board mounted to the base assembly.

## STRUT ASSEMBLY

Two struts are mounted to the base and inserted into rubber isolators in the rear of the outer tub assembly. The struts provide suspension support to the outer tub assembly (*Figure 2-49*).



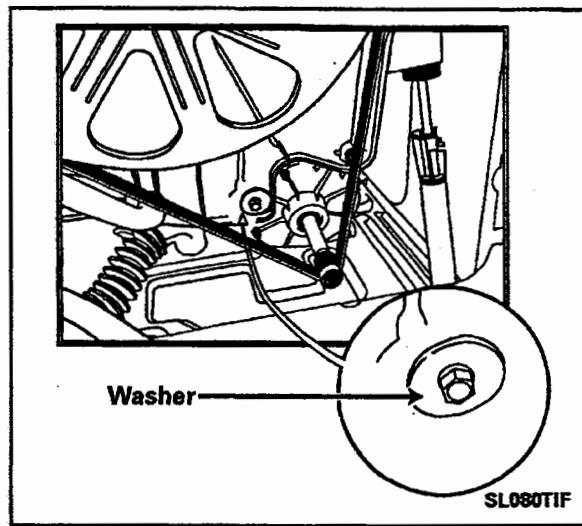
*Figure 2-53* SL1170TIF

- With the washer standing upright, roll the washer forward and off the struts, which mount into the rubber isolators inserted into the rear of the outer tub.

- To Reinstall: Reverse the previous steps.

## BELT

The drive belt has six (6) ribs which mate with the face of the motor pulley. The belt encircles the motor pulley and also the drive pulley of the spinner (*Figure 2-50*).



*Figure 2-50*

### Removal

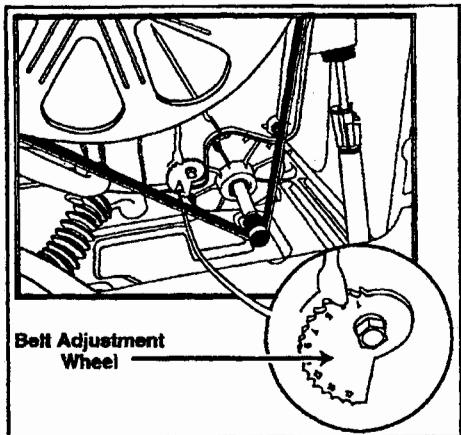
- Disconnect power to the machine.
- Remove the front panel, top cover and front shroud (*See Front Panel and Front Shroud Removal*).
- Disconnect dispenser hoses and injector hose connections to the outer tub.
- Lean the cabinet of the washer forward to access the two locking nuts that secure the struts to the bottom of the base frame assembly. Use an 8mm or 1/2" socket. Remove the locking nuts and lower strut washers.

### Removal

- Disconnect power to the machine.
- Roll the belt off the drive pulley and remove from the motor pulley.

### Adjustment (Original)

Check belt tension. If loose, remove the belt, loosen the belt adjustment wheel bolt and rotate the wheel one notch in a clockwise rotation. Check belt tension again. The belt should experience no more than 1" deflection when depressed toward the inside (*Figure 2-51*).



**Figure 2-51**

### Adjustment (Revised)

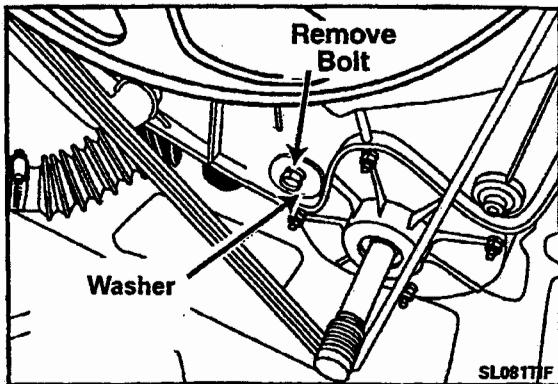
- No adjustment is necessary. The belt is designed to stretch and adapt to proper adjustment between the drive pulley and the motor pulley (*See Figure 2-50*).

## MOTOR

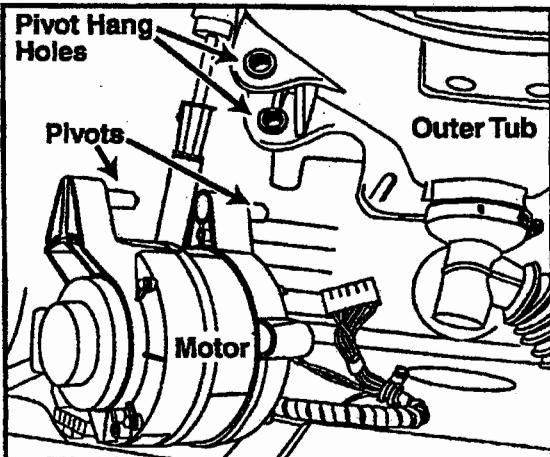
The drive motor is hinged into the left bottom area of the outer tub and secured to the outer tub by the bolt on the belt adjustment wheel. A slot in the mounting bracket of the outer tub allows the motor to pivot and allows adjustment of the drive belt tension.

### Removal

- Disconnect power to the machine.**
- Remove the front panel, rear access panel and the front weight (*See Front Panel & Rear Access Removal*).**
- From the rear, locate and remove the motor mounting bolt securing the washer to the outer tub (*Figure 2-52*).**
- Lift the motor slightly to disengage the belt from the motor pulley. Grasp the motor and slide it carefully from the pivot hang holes in the outer tub. Place motor on the base frame (*Figure 2-53*).**
- From the front, remove the wire harnesses from the back of the motor.**



**Figure 2-52**



**Figure 2-53**

### Replacement

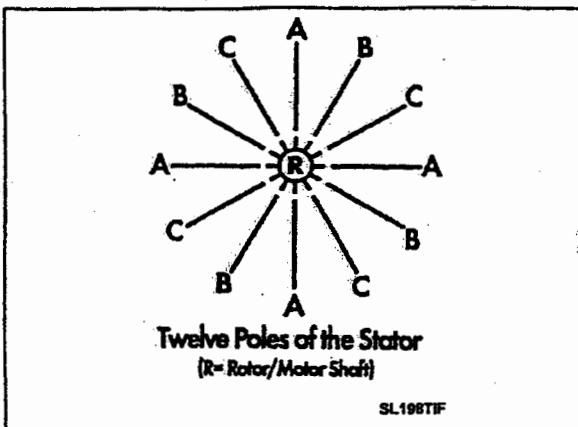
- Reverse the previous procedures to remount the motor.

**NOTE: Prior to hanging the motor, reconnect motor wire harnesses and ground wire.**

- Prior to hanging the motor on the outer tub, check the positioning of the rubber motor mounts.

## DRIVE MOTOR

The drive motor is a switched reluctance type motor. The basic operating principle of the switched reluctance motor is direct magnetic attraction between the stationary electromagnetic coils (stator) and a specially configured rotor or armature (*Figure 2-54*). The rotor is made up of stacked plates or laminations mounted on a center shaft. The shape of



**Figure 2-54**

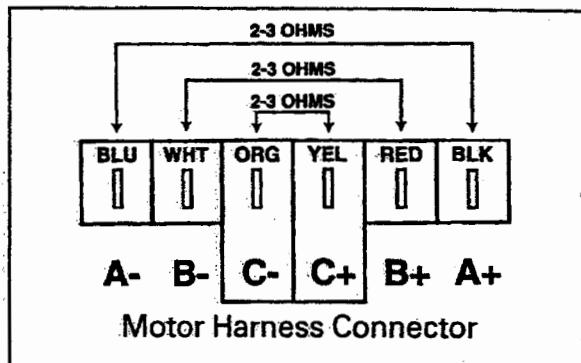
these laminations are characteristic of the switched reluctance motor. The rotor, when viewed from the end of the rotor, has "teeth" much like a gear. These "teeth," or pole pieces, are pulled as the result of direct current power through the stator coils.

Multiple stator coils are positioned around the rotor and are connected in three different phased "sets" of paired coils.

Magnetic attraction causes the rotor poles to turn toward the coils. The electronic motor control board switches the magnetic field off just as the rotor pole piece approaches and then turns on another set of coils further ahead. It is this switching action of motor phases that determines direction and rotational speed of the rotor (and shaft). The motor control board changes the 120 VAC voltage line input to 170 VDC, and distributes the current phases to the stator coil sets in sequence to the drive motor.

The following illustration shows the motor terminals for each of the coils involved. The letters with positive and negative symbols indicate the motor phase circuitry of the terminals.

Refer to section titled "Motor Control" for board identification of A, B and C terminal/harness identification (**Figure 2-55**). Also, see the wiring schematic for harness identification.



**Figure 2-55**

## MOTOR CONTROL BOARD & TESTING

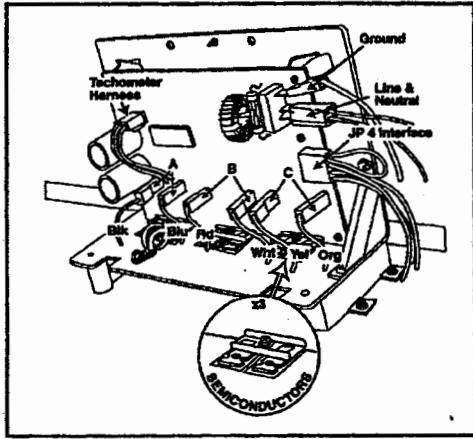
The motor control board receives 120 VAC voltage from the dryer line cord and distributes DC voltage to the drive motor. The motor control converts the voltage from single phase to 3 phase for the drive motor.

Another purpose of the motor control is to monitor the drive motor speed through a tachometer circuit linking the motor control board to a tachometer on the drive motor. This is a 3-wire circuit comprised of a Black, Blue and White wire harness. Failure of this circuit will cause the motor to start jerking in place or accelerate rapidly for up to 5 seconds. This occurs whenever the tachometer in the drive motor is trying to locate the proper shutter and sensor sequence. For example, if the tachometer signal is lost from the motor control to the machine control just prior to spin, the motor will ramp up for 5 seconds then stop.

### Motor & Motor Control Test

1. Disconnect power to the machine & connect a power test cord to the Line & Neutral terminals of the Motor Control board. (**Figure 2-56**).
2. Remove JP4 Interface connector wire harness on front end of motor control board.

3. Plug in the power test cord to a 120 VAC power source. The motor control will immediately execute a test routine and the motor should run, rotating the spinner at 50 rpm.
4. If the motor runs, and the spinner rotates at the proper RPM speed, the problem lies outside of the motor and motor control circuit. Disconnect power to the washer and reconnect the JP4 Interface connector to the motor control.
5. If the motor does not run:
  - a. Check the 10 amp fuse located on the control board, either visually or with an ohm meter. If bad, replace motor control/wire harness assembly completely (*Figure 2-56*).
6. Unplug the washer power cord and replace Motor Control Board connector JP4 when finished.



*Figure 2-56*

### **Motor Phase Test**

It is possible for the motor to still run, under light loads, when one of the phases of the motor is nonfunctional. A symptom would be the motor being noisier, possibly creating a growling noise. Also, because it is out of phase, the motor torque is less. This could result in a customer complaint that the load is not spinning out properly or it does not tumble consistently with a large load. (*See also Section 4: Troubleshooting*).

To gain access to the Motor Control Board terminals: (*Figure 2-56*)

1. Disconnect power to the machine.
2. Remove the two screws securing the Motor Control Assembly to the base and unsnap the two twist lock wire ties restraining the motor to motor control board harness base.
3. Remove the green ground wire, Line & Neutral wires and the JP4 connector from the Motor Control Board.
4. Carefully lift the front end of the motor control board to disengage the rear locking tabs from the slots in the base. Slowly drag the Motor Control Board with motor harness attached, toward the front of the washer and lay in front of the washer.
5. Remove the screw securing the splash shield covering the face of the Motor Control Board. Pivot the splash shield with top screw in the Motor Control Board metal frame, allowing the plastic shield to become an electrical shield between the Motor Control board and the base.
6. Connect the power test cord to the Ground wire, Line 1 and Neutral wires. (Leave the JP4 connector off the board.) (*Figure 2-56*).

7. **Check Phase C** by disconnecting the yellow or orange wire at the Motor Control board. Plug in the motor test cord into the wall socket. If the motor operates with a slight growling sound, phases A and B are operating correctly. Reconnect phase C and test with phase B disconnected. If the motor does not run properly, phase A or B is not functioning. Perform the motor windings check (*See Motor Windings Check and Table 1*).
  
8. **Check Phase B** by disconnecting the white or red wire at the Motor Control board. Plug in the motor test cord into the wall socket. If the motor operates with a slight growling sound, phases A and C are operating correctly. Reconnect phase B and test with phase A disconnected. If the motor does not run properly, phase A or C is not functioning. Perform the motor windings check (*See Motor Windings Check and Table 1*).
  
9. **Check Phase A** by disconnecting the black or blue wire at the Motor Control board. Plug in the motor test cord into the wall socket. If the motor operates with a slight growling sound, phases B and C are operating correctly. Reconnect phase A and test with phase B disconnected. If the motor does not run properly, phase A or B is not functioning. Perform the motor windings check (*See Motor Windings Check and Table 1*).

| PHASE | WIRE COLORS      | MOTOR CONDITION | RESULT/SOLUTION  |
|-------|------------------|-----------------|--|
| C     | Yellow or Orange | Runs            | -Phases A&B are operating correctly.<br>(Check Phase A and B). |
|       |                  | Does Not Run    | -Phase A or B is non-functional.<br>Replace the motor.         |
| B     | White or Red     | Runs            | -Phases A&C are operating correctly.<br>(Check Phase A and C). |
|       |                  | Does Not Run    | -Phase A or C is not-functional.<br>Replace the motor.         |
| A     | Black or Blue    | Runs            | -Phases B&C are operating correctly.<br>(Check Phase B and C). |
|       |                  | Does Not Run    | -Phase B or C is non-functional.<br>Replace the motor.         |

*Table 1*

## Tachometer Circuit Diagnostics

The tachometer system of the motor is comprised of a plastic wheel called a shutter, and an optical sensor (*Figure 2-57*). The shutter is mounted to the end of the motor shaft under the plastic endbell covering of the motor. The edge of the shutter resembles a "picket fence" with different size "pickets." The pattern consists of six different "pickets" which are repeated eight times. An optical sensor is mounted to one side of the shutter and monitors the "pickets" as they pass through the sensor.

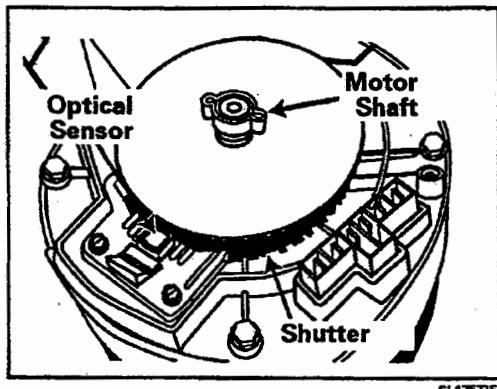


Figure 2-57

As the "pickets" pass through the sensor field, signals are generated and are transmitted to the motor control board through the tachometer wire harness (*Figure 2-58 and 2-59*).

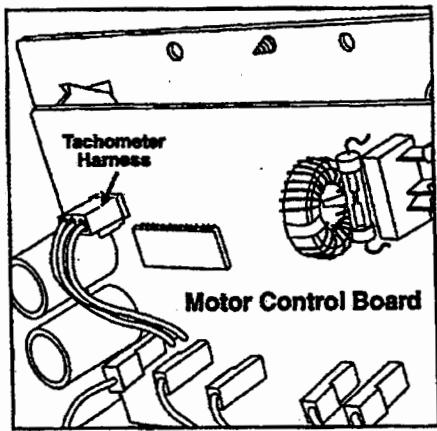


Figure 2-58

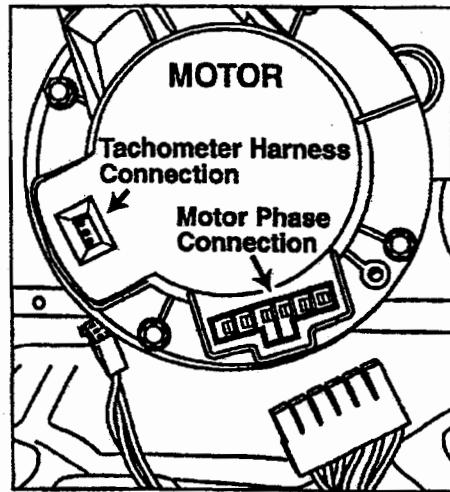


Figure 2-59

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The motor control monitors the signals and communicates this information to the machine control. The purpose of this signal is to tell the motor when to energize each winding in the motor and to tell the machine control the actual motor speed.

**Note:** *If the machine control board does not receive an input signal from the motor control/tachometer circuit (JP4 connector), the motor speed will rapidly accelerate for 5 seconds then shut down. The machine control will sense a "locked rotor" condition and the motor will stop. If the motor control does not receive an input signal from the motor, the motor will "jerk" for 5 seconds then shut down.*

1. Inspect the motor control wire harness for integrity of the connections on both ends. The harness is comprised of a White, Blue and Black wire.
2. Disconnect power to the machine & connect a power test cord to the Line & Neutral terminals of the Motor Control board (*Figure 2-56*).
3. Press the Start/Off button. The unit will be powered up without activating the motor. Leave the tachometer harness on the motor control and insert the meter probes into the backside of the tachometer harness.

**Table 2** indicates voltage checks of the tachometer harness between the motor and motor control board.

| Tachometer Wire Checks              | Voltage Found   | Condition Of Component   |
|-------------------------------------|---|--------------------------|
| White to Black (From Motor Control) | 11 VDC ( $\pm 2.5$ VDC)   | Good Motor Control Board |
| White To Black (From Motor Control) | 0 VDC   | Bad Motor Control Board  |
| White To Black (From Motor Control) | + 13 VDC or <9 VDC  | Bad Motor                |
| Blue to Black (From Drive Motor)    | No change in DC volts as motor is turned slowly                 | Bad Motor                |
| Blue to Black (From Drive Motor)    | Voltage changes from 0 - 5 VDC volts as motor is turned slowly. | Good Motor               |

**Table 2**

## UNBALANCE CONTROL SYSTEM

The unbalance control system is comprised of the inertial switch, outer tub displacement switch, strut displacement switch and a cabinet vibration sensor mounted to the machine control board. The three switches are wired in series on a 24 VDC circuit, monitored by the machine control board. The sensor is mounted on the machine control board.

Software in the machine control board will begin monitoring the switches when the spin speed reaches 90 rpm. The inertial unbalance switch monitors outer tub vibrations above 150 rpm.

Inside the door is a cabinet vibration absorber designed to counter the vibration of the tub and serve as a tuned absorber for the whole washer.

Whenever a displacement switch is tripped, the machine stops and redistributes the clothes load. This involves a three (3) second pause, followed by a five (5) second reverse tumble (47-49 rpm) to redistribute the clothes load. The washer will pause again for three (3) seconds, then start the Distribution Profile again. To redistribute the load, the machine tumbles the load (50-90 rpm) and again attempts to pass through critical (about 150 rpm). The machine will try to redistribute twice as the washer attempts to spin at 800 rpm.

Once the load is properly redistributed and the speed reaches above 500 rpm, the inertial switch and cabinet vibration sensor are used. If the inertial switch or sensor is activated, the washer will drop in spin speed, based upon which level of spin speed the switch activation takes place. See (**Table 3**) outlining the spin speed categories and the corresponding reduced speeds. If the switches are not activated, the final spin speed will reach a maximum speed of approximately 850 rpm and then drop down to find the optimum performance level, based upon readings taken by the cabinet vibration sensor. The up and down cycling of the motor may confuse the consumer, however, the machine is searching for the optimum spin speed for optimum performance.

| <u>RPM</u>    | <u>FUNCTION</u>                                   |
|---------------|---|
| 47 .....      | Tumble  |
| 47-85 .....   | Distribution                                      |
| 90-250 .....  | Accelerate Through Critical                       |
| 250-499 ..... | Accelerate Through Critical                       |
| 500-575 ..... | High Speed Acceleration<br>- WILL DROP TO 450 RPM |
| 600-675 ..... | High Speed Acceleration<br>- WILL DROP TO 555 RPM |
| >675 .....    | High Speed Acceleration<br>- WILL DROP TO 650 RPM |
| 750-800 ..... | <b>TOP SPIN SPEED</b>                             |

**Table 3**

## Tub Displacement Switch

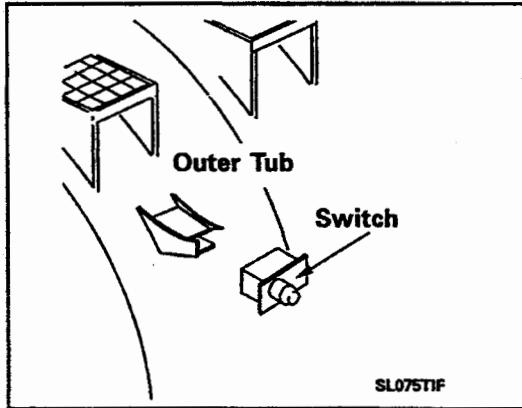
The tub displacement switch is located on the upper right hand side of the outer tub, below the top concrete weight, between the outer tub and the cabinet. The switch senses the outer tub touching the cabinet side as the machine passes through critical. When this switch is tripped, the machine stops and redistributes the load.

### Testing the Tub Displacement Switch

1. **Discontinue power to the machine.**
2. Place ohm meter leads across the two terminals of the switch. Depress the button on the switch. If the contacts open, the switch is good. If not, replace the switch.

### Removal

1. **Disconnect power to the machine.**
2. Remove the front panel and lift the top cover (*See Front Panel Removal*).
3. The switch is located on the upper right hand side of the outer tub assembly, directly behind the right upper front suspension spring (*Figure 2-60*).
4. Remove the screw and flat washer securing the switch in place.
5. Using a flat-bladed screwdriver, pry the switch body from the outer tub.



**Figure 2-60**

## Strut Displacement Switch

The strut displacement switch is clipped to the top of the left rear strut. The switch senses the outer tub bottoming out on the strut as the machine accelerates above 90 rpm. This is caused by the twisting motion of the outer tub. This switch is needed in addition to the tub displacement switch because the twisting motion may not trip the outer tub displacement switch. Primary cause for activation would be an unbalance at the front and rear of the spinner on opposite sides.

The strut displacement switch is wired in series with the tub displacement switch and causes the same type of redistributions.

### Testing the Displacement Switch

1. **Discontinue power to the machine.**
2. Place ohm meter leads across the two terminals of the switch. Depress the button on the switch. If the contacts open, the switch is good. If not, replace the switch.

## Inertial Unbalance Switch

The inertial unbalance switch is located on the upper right hand side of the outer tub, in front of the top concrete weight. The switch consists of a moving weight in the switch body, pressing against switch contacts. If unbalance of the outer tub becomes too erratic, the moving weight will open the contacts in the switch. When the machine controller senses the switch opening, the machine controller will reduce the spin speed to 650, 550, or 450 rpm depending on the current speed closest to the level spin speed (i.e. 625 rpm trip would drop to 550 rpm *Table 3*).

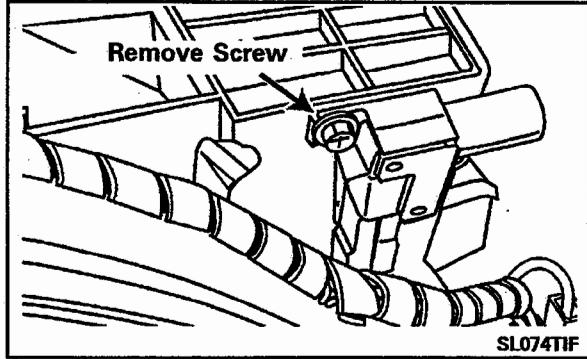
### Testing the Inertial Unbalance Switch:

Testing of the switch may prove difficult. The switch will not open unless the switch is jerked side to side creating a "G" force of 8 - 9 Ft. lbs.

1. **Disconnect power to the machine.**
2. Place ohm meter leads across the two terminals of the inertial switch. Jerk the switch side to side. If the contacts do not open easily, the switch is good. If the switch contacts are open or easily tripped, replace the switch.

### Removal

1. **Disconnect power to the machine.**
2. Remove the front panel and lift the top cover (*See Front Panel Removal*).
3. The switch is located on the upper right hand side of the outer tub assembly.
4. Remove the two screws securing the switch to the outer tub assembly (*Figure 2-61*).



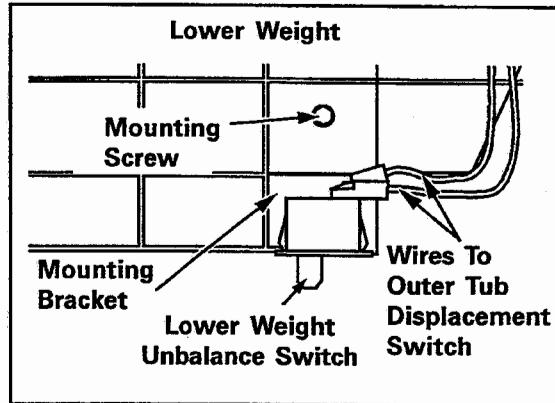
**Figure 2-61**

### Lower Weight Unbalance Switch

The switch is located on the lower right front corner of the lower weight. The switch consists of a push-button, normally closed, switch wired in series with the outer tub displacement and inertial unbalance switches.

### Testing the Weight Unbalance Switch

1. **Disconnect power to the machine.**
2. Place ohmmeter leads across the two terminals of the switch. Depress the button on the switch. If the contacts open, the switch is good. If not, replace the switch (*See Figure 2-62*).



**Figure 2-62**

### Cabinet Vibration Sensor

The cabinet vibration sensor is a piezo electric strip mounted to the lower left corner of the machine control board. With a mass attached to the end of the strip, the machine controller monitors the cabinet vibration as the machine reaches top speed. The machine controller uses the vibration sensor to attempt to spin the washer at the optimum speed with the least amount of vibration. Optimum speed changes from machine to machine due to: changes in mass of the absorber; changes in spring rate of the absorber; and changes in the pulley - belt ratio. It can also change from run to run due to the size of the clothes load and type of floor. The sensor finds the optimum speed on every run. The optimum speed will be between 750 and 850 rpm.

## Relay Board

The relay board supplies output voltage to the external chemical injection pumps, but also sends power to the bleach/softener water valves and recirculating pump. Wires from the external pumps are routed through the back of the console and connected to the terminal block on the relay board. (See Figure 2-63)

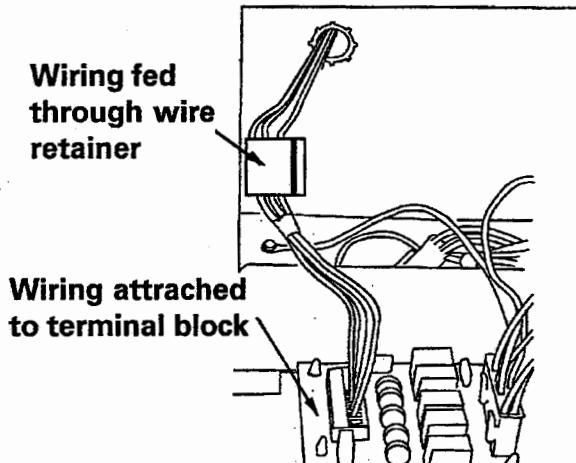


Figure 2-63

This terminal block has connections for four chemical supply outputs and additional connections for the "Chart" which is used by the chemical supply companies. The "Chart" connection, known as "Chart Stop Selection" is used when two or more machines are connected to the same bulk dispenser (external chemical supply) pump unit. If the bulk dispenser is in use by another machine, this is used to "pause" the time advance of the machine until the dispenser is available. The chemical supply outputs provide 120 Volts (L1, the common is neutral side). While there are only four chemical supply outputs there are a total of five relays on the relay board. The fifth relay is used for the recirculation pump. (See Figure 2-64)

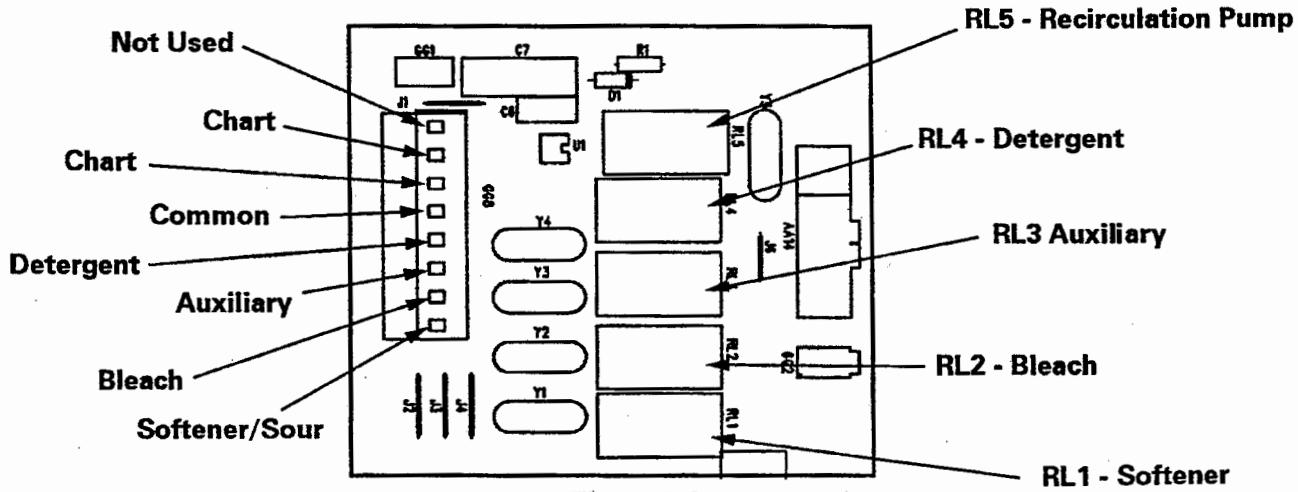


Figure 2-64

## SECTION 3. PROGRAMMING AND SET-UP PROCEDURES

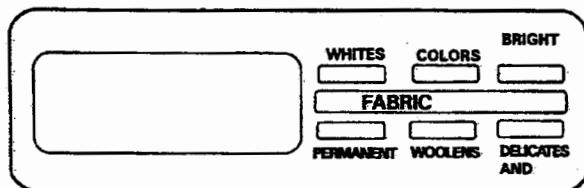
### CONTROL SET-UP PROCEDURES

#### IMPORTANT

Read all instructions before operating.

#### Introduction

The lower fabric setting pads and the digital display are used to set-up the controls (See *Figure 3-1*).

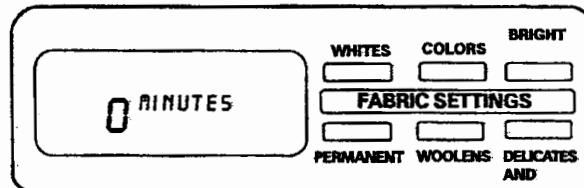


*Figure 3-1*

Following is a step by step procedure which may be used to change control settings.

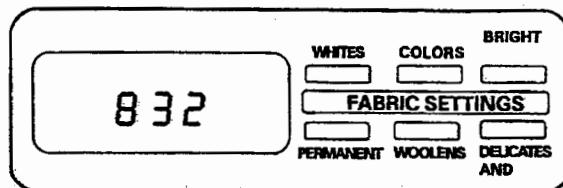
#### How To Read The Display

After the unit has been installed and plugged in, the display will show "0" minutes remaining (*See Figure 3-2*).



*Figure 3-2*

The display can contain four (4) numbers and/or letters and a decimal point following the first character. The far left character and the decimal point are used to indicate one (1) of several set-up codes available for use in programming the appliance. The other digits are used to provide information about the code set-up shown (*See Figure 3-3*).



*Figure 3-3*

#### How To Use The Key Pads To Program The Controls

1. The **Permanent Press** key pad is used to advance within the codes permitting adjustment for programming. Pressing the key pad will change the characters by one (1) increment. Rapid adjusting is possible by holding the key pad down.
2. The **Woolens** key pad will advance you through the codes that are set-up in the appliance. (Pressing the key pad will advance you through the programmed codes.) Holding the key pad down will automatically advance through programs at a rate of one (1) increment per second.
3. The **Delicates & Knits** key pad is used to select options for Cycle Count, Money Count and Special Pricing. This is essentially an "OFF" or "ON" selection.

---

**START OPERATING SET-UP**

Insert access door key, turn and lift to remove access door.

*You are now ready to enter the set-up mode.*

**NOTE: Units are preset at the factory. The washer is set for a 12 minute wash, plus two (2) rinses for \$1.75.**

---

**SET-UP CODES (Original MAH14PD)**

| CODE |         | EXPLANATION  |
|------|---------|--|
| 607  | 6<br>07 | <b>REGULAR CYCLE PRICE</b><br>Represents the number of coins. See value of Coin 1 and Coin 2. Adjustable from 0-39 coins by pressing the <u>Permanent Press</u> key pad.<br><br>Press <u>Woolens</u> key pad once to advance to next code.<br><br>PS MODELS ONLY: Represent the number of push-in actuations of the coin slide to start the machine. We recommend "601" setting. |
| 710  | 7<br>10 | <b>WASH LENGTH CYCLE</b><br>This is the number of minutes for <u>Wash</u> . Adjustable from 8-20 minutes by pressing the <u>Permanent Press</u> key pad.<br><br>Press <u>Woolens</u> key pad once to advance to next code.   |
| 802  | 8<br>02 | <b>RINSE CYCLES</b><br>Represents the total number of rinses. The last digit is number of rinses from 2 or 3.<br><br>Advance the Rinse option by pressing <u>Permanent Press</u> key pad.<br><br>Press <u>Woolens</u> key pad once to advance to next code.  |
| 900  | 9       | <b>CYCLE COUNTER OPTION</b><br>If "OC" is selected as the option it may not be deselected "00."<br><br>00 Not Selected or "OFF."<br><br>OC Selected or "ON." Press <u>Delicates &amp; Knits</u> key pad three times to select "ON." Once "ON" is selected it cannot be changed.<br><br>Press <u>Woolens</u> key pad once to advance to next code.                                |
| 1.00 | 1.      | <b>MONEY COUNTER OPTION</b><br>If "OC" is selected as the option it may be deselected "00."<br><br>00 Not Selected or "OFF."<br>OC Selected or "ON." Press <u>Delicates &amp; Knits</u> key pad three  |

| <b>CODE</b> | <b>EXPLANATION</b>   |
|-------------|--|
|             | times to select "OC" and three times to deselect "00." Reset counter by going from "OFF" to "ON."  |
|             | Press <u>Woolens</u> key pad once to advance to next code.   |
| 2.00        | 2. <b>SPECIAL PRICING OPTION.</b>  |
|             | This option can be selected "SP" or deselected "00."   |
| 00          | Not Selected or "OFF."   |
| SP          | Selected or "ON." Press <u>Delicates &amp; Knits</u> key pad once to select "SP."  |
|             | Steps "3." thru "9." codes are skipped if mode "2.00" is selected.   |
|             | Press <u>Woolens</u> key pad once to advance to next code.   |
| 3.07        | 3. <b>SPECIAL CYCLE PRICE</b>  |
| 07          | Represents the number of coins. Adjustable from 0 - 39 by pressing the <u>Permanent Press</u> key pad.   |
|             | Press <u>Woolens</u> key pad once to advance to next code.   |
| 4.          | "This number is not used."   |
| 5.00        | 5. <b>MINUTES</b>  |
| 00          | This is the selection "MINUTES" of the time of day clock. Adjustable from 0 to 59 by pressing the <u>Permanent Press</u> key pad.  |
|             | Press <u>Woolens</u> key pad once to advance to next code.   |
| 6.00        | 6. <b>HOUR</b>   |
| 00          | This is the selection "HOUR" of the time of day clock using military time (24 hour clock). Adjustable from 00 to 23 by pressing the <u>Permanent Press</u> key pad.                        |
|             | Press <u>Woolens</u> key pad once to advance to next code.   |
| 7.00        | 7. <b>SPECIAL PRICING STARTING HOUR</b>  |
| 00          | This is the selection of the hour using military time (24 hour clock) that the Special Pricing will "begin." Adjustable from 00 to 23 by pressing the <u>Permanent Press</u> key pad.      |
|             | Press <u>Woolens</u> key pad once to advance to next code.   |
| 8.00        | 8. <b>SPECIAL PRICING STOPPING HOUR</b>  |
| 00          | This is the selection of the hour using military time (24 hour clock) that the <i>Special Pricing</i> will "stop." Adjustable from 0 to 23 by pressing the <u>Permanent Press</u> key pad. |
|             | Press <u>Woolens</u> key pad once to advance to next code.   |

| CODE |    | EXPLANATION   |
|------|----|---|
| 9.10 | 9. | <b>SPECIAL PRICE DAYS</b>   |
|      | 10 | Represents the day of the week and if special pricing is to occur on that day. The middle digit is the day of the week, and the last digit is "0" for <u>not selected</u> or "S" for <u>selected</u> .  |
|      |    | For example:<br>9.10 Special pricing not selected.<br>9.1S Special pricing selected for that individual day.  |
|      |    | Press the <u>Delicates &amp; Knits</u> key pad once to select "0" and once for "S."   |
|      |    | Press <u>Permanent Press</u> key pad to advance to next day of the week.  |
|      |    | You must exit on current day of the week, for the special pricing to occur on the correct day. <u>Refer to chart for Special Price Days</u> .   |
|      |    | Press <u>Woolens</u> key pad once to advance to next code.  |
| A.00 | A. | <b>VAULT VIEWING</b>  |
|      |    | Once selected (SC), this option may be deselected (00).   |
|      | 00 | Not Selected or "OFF."  |
|      | SC | Selected or "ON."   |
|      |    | Press <u>Delicates &amp; Knits</u> key pad once to select "SC." The money and/or cycle counter will be viewable when the vault is opened. If "00" is selected, the service door will need to be opened to activate, to view the money and/or cycle counter. |
|      |    | Press <u>Woolens</u> key pad once to advance to next code.  |
| b.05 | b. | <b>VALUE OF COIN 1 (QUARTER DROP)</b>   |
|      | 05 | Represents the number of nickels given to the <u>value of each coin</u> in code 607 "regular cycle price" or "special cycle price."   |
|      |    | For example: b.05 equals five nickels or one quarter.<br>b.20 equals twenty nickels or one dollar.  |
|      |    | Press <u>Permanent Press</u> key pad to advance from 1 to 199 in nickels.   |
|      |    | Press <u>Woolens</u> key pad once to advance to next code.  |

| CODE | EXPLANATION  |
|------|--|
|      | <p><b>PS MODELS ONLY:</b> Represents the total vend price in nickels.<br/>For example: b.30 equals \$1.50.</p>   |
| C.20 | <p><b>VALUE OF COIN 2 (CANADIAN DOLLAR DROP)</b></p> <p>Represents the number of nickels given to the <u>value of each</u> Canadian Dollar dropped in the dollar coin slot.</p> <p>For example:<br/>C.20 equals twenty nickels or one Canadian dollar.<br/>C.40 equals forty nickels or two Canadian dollars.</p> <p>Press <u>Permanent Press</u> key pad to advance from 1 to 99 in nickels.</p> <p>Press <u>Woolens</u> key pad once to advance to next code.</p>                |
| d.00 | <p><b>COIN SLIDE OPTION</b></p> <p>Once selected (CS) this option may be deselected (00).</p> <p>00      Not Selected or "OFF."<br/>CS      Selected or "ON."</p> <p>Press <u>Delicates &amp; Knits</u> key pad once to select "00" when coin drop is used, and "CS" for models <u>not</u> using coin drops.</p> <p>Press <u>Woolens</u> key pad once to advance to the beginning of the program mode.</p>   |
| E.00 | <p><b>ADD COIN OPTION</b></p> <p>When selecting this option, it is either "ON" or "OFF." This option causes the customer display to show the number of coins (coin 1) to enter, rather than the dollars-and-cents-amount.</p> <p>00      Not Selected or "OFF."<br/>AC      Selected or "ON."</p> <p>Press <u>Delicates &amp; Knits</u> key pad 3 times for this selection.</p> <p>Press <u>Woolens</u> keypad once to advance to next mode.</p>                                   |
| F.00 | <p><b>ENHANCED PRICING OPTION.</b></p> <p>00      Not Selected <b>"OFF."</b><br/>CP      Cycle-Based pricing enabled. This option allows configuration of different prices for cold, warm, and hot water cycles.<br/>Su      Super Cycle pricing enabled. This option allows customers to upgrade cycles by depositing extra money. Set-up codes "H." and "h," will only display when this option is enabled.</p> <p>Press <u>Woolens</u> keypad once to advance to next code.</p> |

| CODE |     | EXPLANATION  |
|------|-----|--|
| H.01 | H.  | <b>SUPER CYCLE UPGRADE PRICE</b> (skipped unless Super Cycle Pricing is enabled).  |
|      | 01  | This represents the number of coin 1 required to upgrade a base cycle to a super cycle. By pressing <u>Permanent Press</u> key pad you can choose from 0-39.<br><br>Press <u>Woolens</u> key pad once to advance to next code.   |
| h.01 | h.  | <b>SUPER CYCLE TYPE</b> (skipped unless Super Cycle pricing is enabled).   |
|      | 01  | This represents the Super Cycle upgrade option.<br>Press <u>Permanent Press</u> key pad to step through upgrade option.<br>1-3 as follows:<br>01 - Enhanced wash, extra 3 minutes of wash tumble in addition to the programmed wash time.<br>02 - 3rd rinse for all cycles, final warm rinse for white, colors, and delicate knits.<br>03 - Both 01 and 02.<br><br>Press <u>Woolens</u> key pad once to advance to next cycle. |
| J.Cd | J.  | <b>COIN/DEBIT OPTION.</b>  |
|      | Cd. | Both Selected.   |
|      | C__ | Coins Only.  |
|      | _d  | Debit Card Only.   |
|      |     | Press <u>Delicates &amp; Knits</u> key pad three times to select option in which to start washer.  |
|      |     | Press <u>Woolens</u> key pad once to advance to next cycle.  |
| L.00 | L.  | <b>PRICE SUPPRESSION</b><br>Price Suppression would be selected if no cycle price is to be displayed. This option causes the customer display to show "Add" or "Available" rather than the amount of money to add. (Used mainly in debit card installation.)   |
|      | 00  | Not selected or " <u>OFF</u> ".  |
|      | PS  | Selected or " <u>ON</u> ".   |
|      |     | Press <u>Delicates &amp; Knits</u> key pad once to select "00" for price to be displayed, and " <u>PS</u> " for no price to be displayed.  |
|      |     | Press <u>Woolens</u> key pad once to advance to next cycle.  |
| n.CE | n.  | <b>CLEAR ESCROW OPTION</b>   |
|      |     | When " <u>CE</u> " is selected, the amount remaining in escrow will be "cleared;" 30 minutes after the end of the cycle or the last coin is deposited,   |

| CODE     | EXPLANATION  |
|----------|--|
|          | whichever is later.  |
| 00<br>CE | Not selected or " <u>OFF</u> ."<br>Selected or " <u>ON</u> ."  |
|          | Press <b><u>Delicates &amp; Knits</u></b> key pad to select "00" or "CE."  |
|          | Press <b><u>Woolens</u></b> key pad once to advance to next cycle.   |
| 0.Sd     | 0. <b>SUDS DETECT OPTION</b><br>When selected, this option allows automatic customer selection of the wash cycle to optimally handle severe cases of over-sudsing.   |
| 00<br>Sd | Not selected or " <u>OFF</u> ."<br>Selected or " <u>ON</u> ."  |
|          | Press the <b><u>Delicates &amp; Knits</u></b> key pad to select "00."  |
|          | Press <b><u>Woolens</u></b> key pad once to advance to the next cycle.   |
| p. E     | p. <b>MAX EXTRACT OPTION.</b>  |
| 00<br>E  | Not selected or shake out.<br>Selected.  |
|          | Press <b><u>Delicates &amp; Knits</u></b> key pad once to select "00" or "E." When "E" is selected, the washer will spin at maximum spin speed during that cycle, eliminating as much water from clothing as possible. If "00" is selected the washer will tumble, have intermediate slower spins, a shorter maximum spin speed length, and will add approximately 3 minutes to the cycle length.                  |
|          | Press <b><u>Woolens</u></b> key pad once to advance to next code.  |
| r.800    | r. <b>TOP SPIN SPEED RPM.</b>  |
| 800      | Represents the RPM of spin speed.  |
|          | Press <b><u>Delicates &amp; Knits</u></b> key pad to select (600, 650, 700, or 800) for cycles ( <b><u>Whites, Colors, and Bright Colors and Permanent Press</u></b> ). If 800 rpm is selected, the spin speed can range from 750-800 rpm during the spin cycle. This is done to minimize vibration. If other cycles ( <b><u>Woolens, Delicates and Knits</u></b> ) are chosen, the maximum spin speed is 500 rpm. |

## SET-UP CODES (Enhanced MAH14PD, PS and MAH14PN, PR, MAH20PD, PR, PS)

| <b>CODE</b> | <b>EXPLANATION</b> |  |
|-------------|--------------------|--|
| 607         | 6                  | <b>REGULAR CYCLE PRICE</b>   |
|             | 07                 | Represents the number of quarters (coin 1); may adjust from 0-39. (See<br>VALUE OF COIN 1).<br>Advance from 0-39 by pressing <u>Permanent Press</u> . Presently set for 7<br>quarters = \$1.75       |
|             |                    | <b>PR/PN Models Only:</b> Presently set for 0 quarters.  |
|             |                    | <b>PS MODELS ONLY:</b> Represents the number of push-in actuations of the<br>actuations of the coin slide to start the machine.<br>601 setting would represent one coin slide actuation.             |
|             |                    | Press <u>Woolens</u> key pad once to advance to next code.   |
| 714         | 7                  | <b>WASH LENGTH</b>   |
|             | 14                 | This is the number of minutes for WASH. Unit comes from the factory<br>pre-set with 14 minutes. Choose from 8-20 minutes by pressing the<br><u>Permanent Press</u> key pad.                          |
|             |                    | Note: Adjusting the wash time down to the minimum of eight minutes will<br>make suds detection inoperable. Proper suds detection requires about 10<br>minutes of wash time.                          |
|             |                    | Press <u>Woolens</u> key pad once to advance to next code.   |
| 800         | 8                  | <b>ADDITIONAL RINSE OPTION</b>   |
|             | 00                 | This option is either SELECTED "ON" or NOT SELECTED "OFF".   |
|             | Ar                 | Not Selected "OFF".<br>Selected "ON".  |
|             |                    | Press <u>Delicates &amp; Knits</u> key pad once for this selection.  |
|             |                    | Press <u>Woolens</u> key pad once to advance to next code.   |
| 900         | 9                  | <b>CYCLE COUNTER OPTION</b>  |
|             | 00                 | This option is either SELECTED "ON" or NOT SELECTED "OFF".   |
|             | 0C                 | Not Selected "OFF".<br>Selected "ON" and not able to be deselected. Press <u>Delicates &amp; Knits</u><br>key pad 3 consecutive times to select "ON". Once selected "ON" it cannot<br>be deselected. |
|             |                    | Press <u>Woolens</u> key pad once to advance to next code.   |
| 1.00        | 1.                 | <b>MONEY COUNTER OPTION</b>  |
|             | 00                 | This option is either SELECTED "ON" or NOT SELECTED "OFF".   |
|             | 0C                 | Not Selected "OFF".<br>Selected "ON".  |

| CODE | EXPLANATION   |
|------|---|
|      | <p>Press <b><u>Delicates &amp; Knits</u></b> key pad 3 consecutive times to select "ON" and 3 consecutive times to remove (Not Selected "OFF".) Counter resets by going from "OFF" to "ON".</p>   |
|      | <p>Press <b><u>Woolens</u></b> key pad once to advance to next code.</p>  |
| C0   | <p>Selected "ON" and not able to be deselected. To select "ON" and not able to be deselected, first select "ON", then within two seconds press <b><u>Delicates &amp; Knits</u></b> twice, Permanent Press once, and exit the set-up mode.</p> |
| 2.00 | <p><b>2. SPECIAL PRICING OPTIONS</b><br/>This option is either SELECTED "ON" or NOT SELECTED "OFF".</p>   |
| 00   | <p>Not Selected "OFF".</p>  |
| SP   | <p>Selected "ON".</p>   |
|      | <p>Press <b><u>Delicates &amp; Knits</u></b> key pad once for this selection.</p>   |
|      | <p>If SPECIAL PRICING OPTION IS selected, you have access to codes 3. thru 9.</p>   |
|      | <p>Press <b><u>Woolens</u></b> key pad once to advance to next code.</p>  |
|      | <p>Options to use if SPECIAL PRICING is selected.</p>   |
| 3.07 | <p><b>3. SPECIAL CYCLE PRICE</b><br/>Represents the number of quarters (coin 1); may adjust from 0-39. (See VALUE OF COIN 1).<br/>Advance from 0-39 by pressing <b><u>Permanent Press</u></b>. Presently set for 7 quarters = \$1.75.</p>     |
|      | <p>PR/PN Models Only: Presently set for 0 quarters.</p>   |
|      | <p>Press <b><u>Woolens</u></b> key pad once to advance to next code.</p>  |
| 5.00 | <p><b>5. TIME-OF-DAY CLOCK, MINUTES</b><br/>This is the TIME-OF-DAY CLOCK, minute setting; select 0-59 minutes by pressing PERMANENT PRESS key pad.</p>   |
|      | <p>Press <b><u>Woolens</u></b> key pad once to advance to next code.</p>  |
| 6.00 | <p><b>6. TIME-OF-DAY CLOCK, HOURS (NOTE: Uses military time or 24 hr. clock)</b><br/>This is the TIME-OF-DAY CLOCK, hour setting; select 0-23 hours by pressing <b><u>Permanent Press</u></b> key pad.</p>                                    |
|      | <p>Press <b><u>Woolens</u></b> key pad once to advance to next code.</p>  |
| 7.00 | <p><b>7. SPECIAL PRICE START HOUR (NOTE: Uses military time or 24 hr. clock)</b><br/>This is the start hour; 0-23 hours. Select START HOUR by pressing <b><u>Permanent Press</u></b> key pad.</p>   |
|      | <p>Press <b><u>Woolens</u></b> key pad once to advance to next code.</p>  |
| 8.00 | <p><b>8. SPECIAL PRICE STOP HOUR (NOTE: Uses military time or 24 hour clock).</b><br/>This is the stop hour; 0-23 hours. Select STOP HOUR by pressing <b><u>Permanent Press</u></b> key pad.</p>  |

| CODE | EXPLANATION  |
|------|--|
|      | Press <u>Woolens</u> key pad once to advance to next code.   |
| 9.00 | <p>9. <b>SPECIAL PRICE DAY</b><br/>           10 This represents the day of the week and whether special pricing is selected for that day. A number followed by "0" indicates no selection that particular day (9.10). A number followed by an "S" indicates selected for that day (9.1S).</p> <p>Days of the week (1-7) are selected by pressing <u>Permanent Press</u> key pad.</p>  |
|      | Press <u>Woolens</u> key pad once to advance to next code.   |
| A.00 | <p>A. <b>VAULT VIEWING OPTION</b><br/>           00 This option is either selected "ON" or not selected "OFF".<br/>           SC Not selected "OFF".<br/>           Selected "ON".</p> <p>Press <u>Delicates &amp; Knits</u> key pad once for this selection. When selected, the money and/or cycle counts will be viewable (if counting is selected), when the coin box is removed.</p>   |
|      | Press <u>Woolens</u> key pad once to advance to next code.   |
| b.05 | <p>b. <b>VALVE OF COIN 1</b><br/>           05 This represents the value of coin 1 in number of nickels. 05 = \$0.25.<br/>           By pressing <u>Permanent Press</u> key pad you have the option of 1-199 nickels.<br/>           Example: b.30 is equal to \$1.50.</p> <p><b>PS Models Only:</b> Represents the total vend price in nickels.</p> <p>Example: b.30 is equal to \$1.50.</p>  |
|      | Press <u>Woolens</u> key pad once to advance to next code.   |
| C.20 | <p>C. <b>VALUE OF COIN 2</b><br/>           20 This represents the value of coin 2 in number of nickels. 20 = \$1.00.</p> <p><b>PR/PN Models Only:</b> Presently set for \$0.25.</p> <p>By pressing <u>Permanent Press</u> key pad you have the option of 1-199 nickels.</p>   |
|      | Press <u>Woolens</u> key pad once to advance to next code.   |
| d.00 | <p>d. <b>COIN SLIDE OPTION</b><br/>           00 This option is either selected "ON" or not selected "OFF".<br/>           CS Not selected "OFF".<br/>           Selected "ON".</p> <p>Press <u>Delicates &amp; Knits</u> key pad 3 consecutive times for this selection. When coin slide mode is selected, set b. equal to value of slide in nickels. Set step 6 (regular cycle price) and step 3. (special cycle price) to number of slide operations. If the installer sets up "CS" on a coin drop model, it will not register coins.</p> |
|      | Press <u>Woolens</u> key pad once to advance to next code.   |

| CODE |    | EXPLANATION   |
|------|----|---|
| E.00 | E. | <b>ADD COINS OPTION</b><br>This option is either selected "ON" or not selected "OFF".<br>This option causes the customer display to show the number of coins (coin 1) to enter, rather than the dollars-and-cents amount.   |
|      | 00 | Not selected "OFF".   |
|      | AC | Selected "ON".<br>Press <b><u>Delicates &amp; Knits</u></b> key pad 3 consecutive times for this selection.   |
|      |    | Press <b><u>Woolens</u></b> key pad once to advance to next code.   |
| F.00 | F. | <b>ENHANCED PRICING OPTION</b>  |
|      | 00 | Not selected "OFF".   |
|      | CP | Cycle-Based pricing enable. This option allows configuration of different prices for cold, warm, and hot water cycles.  |
|      | Su | Super Cycle pricing enabled. This option allows customers to upgrade cycles by depositing extra money. Setup codes "H." and "h." will only display when this option is enabled.<br>Press <b><u>Delicates &amp; Knits</u></b> key pad once for this selection.   |
|      |    | Press <b><u>Woolens</u></b> key pad once to advance to next code.   |
| H.01 | H. | <b>SUPER CYCLE UPGRADE PRICE</b> (Skipped unless super cycle pricing is enabled).   |
|      | 01 | This represents the number of coin 1 required to upgrade a base cycle to a super cycle. Advance from 0-39 by pressing Permanent Press key pad.  |
|      |    | Press <b><u>Woolens</u></b> key pad once to advance to next code.   |
| h.01 | h. | <b>SUPER CYCLE TYPE</b> (Skipped unless super cycle pricing is enabled)   |
|      | 01 | This represents the super cycle upgrade option.<br>Press <b><u>Permanent Press</u></b> key pad to setp through upgrade options 1-3 as follows:<br>01 - enhanced wash, extra 3 minutes of wash tumble in addition to the programmed wash time.<br>02 - extra rinse for all cycles, final warm rinse for WHITES, COLORS, and Delicates & Knits.<br>03 - both 01 and 02. |
|      |    | <b>MAH20 Models:</b> 02 - extra rinse for all cycles will be cold water.  |
|      |    | Press <b><u>Woolens</u></b> key pad once to advance to next code.   |
| J.Cd | J. | <b>COIN/DEBIT OPTION</b>  |
|      | Cd | Both coin & debit selected.   |
|      | C_ | Coins selected, debit disabled.   |
|      | _d | Debit Card selected, coins disabled.<br>Press <b><u>Delicates &amp; Knits</u></b> key pad 3 consecutive times for this selection.   |
|      |    | <b>PN Models Only:</b> Must be set for <u>_d</u> .  |
|      | Ed | Enhanced debit is self-selected when a Generation 2 card reader is installed in the washer. The Ed option cannot be manually selected or deselected.  |

| CODE  | EXPLANATION  |
|-------|--|
|       | Press <u>Woolens</u> key pad once to advance to next code.   |
| L.00  | <p>L. <b>PRICE SUPPRESSION OPTION</b><br/> This option causes the customer display to show "ADD" or "AVAILABLE" rather than the amount of money to add. (Used mainly in debit installations.)</p> <p>00 Not selected "OFF".<br/> PS Selected "ON".</p> |
| n.CE  | <p>n. <b>CLEAR ESCROW OPTION</b><br/> When selected, money held in escrow for 30 minutes without further escrow or cycle activity will be cleared.</p> <p>00 Not selected "OFF".<br/> CE Selected "ON".</p>  |
|       | Press <u>Delicates &amp; Knits</u> key pad once to advance to next code.   |
|       | Press <u>Woolens</u> key pad once to advance to next code.   |
| o.Sd  | <p>o. <b>SUDS DETECT OPTION</b><br/> When selected, this option allows automatic customization of the wash cycle to optimally handle severe cases of sudsing.</p> <p>00 Not selected "OFF".<br/> Sd Selected "ON".</p>                                 |
|       | Press <u>Delicates &amp; Knits</u> key pad once for this selection.  |
|       | Press <u>Woolens</u> key pad once to advance to next code.   |
| p.E   | <p>p. <b>MAX EXTRACT OPTION</b><br/> Not selected "OFF". Emphasis on wrinkle avoidance through "FLUFF" final spins.</p> <p>E Selected 'ON'. Emphasis on maximum water extraction through "Max Extract" final spins.</p>                                |
|       | Press <u>Delicates &amp; Knits</u> key pad once to advance to next code.   |
|       | Press <u>Woolens</u> key pad once to advance to next code.   |
| r.800 | <p>r. <b>TOP SPIN SPEED RPM</b><br/> This can be altered between the following spin speeds: 600 rpm, 650 rpm, 700 rpm, 800 rpm. Step between speeds by pressing Permanent Press. Presently set for 800 rpm.</p>  |
|       | Press <u>Woolens</u> key pad once to advance to next code.   |
| U.00  | <p>U. <b>PENNY INCREMENT OFFSET</b><br/> This represents the penny increment price offset used in generation 2 (enhanced debit).</p> <p><b>PR Models:</b> Choose from 0-4 pennies by pressing the <u>Permanent Press</u> key pad.</p>                  |
|       | Press <u>Woolens</u> key pad once to advance to next code.   |

| CODE  |           | EXPLANATION  |
|---|-----------|--|
| A1.00   | A1.<br>00 | <b>PREWASH LENGTH</b><br>This is the number of minutes of Prewash. The prewash is followed by a one minute tumble drain. Choose from 0-10 minutes by pressing the <u>Permanent Press</u> key pad.<br><br>Press <u>Woolens</u> key pad once to advance to next code.    |
| A2.04   | A2<br>04  | <b>FINAL SPIN LENGTH</b><br>This is the number of minutes of final high speed spin when the max extract option is selected. Choose from 3-10 minutes by pressing the <u>Permanent Press</u> key pad.<br><br>Press <u>Woolens</u> key pad once to advance to next code. |
| <b>EXIT FROM SET-UP MODE</b>  |           |  |
| <u><b>PD/PS Models:</b></u> Reinstall access door.<br><u><b>PN Models:</b></u> Turn service key to "RUN".<br><u><b>PR Models:</b></u> Remove power, open console, reinsert plug into AA1, close console, and apply power. |           |  |

## SPECIAL PRICING DAYS

In reference to the "Special Price Days" the following will appear when programming that sequence: (The number "5" is read as an "S" to represent special pricing in effect.)

| Not Selected | Selected | Day Number | Day of Week |
|--------------|----------|------------|-------------|
| 9.10         | 9.15     | Day 1      | Sunday      |
| 9.20         | 9.25     | Day 2      | Monday      |
| 9.30         | 9.35     | Day 3      | Tuesday     |
| 9.40         | 9.45     | Day 4      | Wednesday   |
| 9.50         | 9.55     | Day 5      | Thursday    |
| 9.60         | 9.65     | Day 6      | Friday      |
| 9.70         | 9.75     | Day 7      | Saturday    |

**NOTE:** Remember you must show current day of week before preceding to next code.

## Cycles and Money Counter Options

The following will appear if you selected "0C" in the cycle counter option "900." This is a "***View Only***" and cannot be altered.

When cycle counter is selected, the numbers will "***flash***" in sequence.

***Example:***

|                    |   |           |
|--------------------|---|-----------|
| 100                | Represents number of cycles in HUNDREDS | 102 = 200 |
| 200                | Represents number of cycles in ONES     | 225 = 25  |
| Total = 225 Cycles |   |           |

Press **Woolens** key pad once to advance to next code.

The following will appear if you selected "0C" in the money counter option "1.00." This is a "***View Only***" and cannot be altered. The money counter can be reset by going to OFF (00) and ON (0C).

When money counter option is selected, the numbers will flash in sequence.

***Example:***

***Example:***

|                  |                               |           |
|------------------|-------------------------------|-----------|
| 300              | Number of dollars in HUNDREDS | 302 = 200 |
| 400              | Number of dollars in ONES     | 425 = 25  |
| 500              | Number of CENTS               | 575 = 75  |
| Total = \$225.75 |                               |           |

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## WASHER DIAGNOSTIC MODE

The mode is entered by depressing **Delicates & Knits** key pad for one second while in any of the set-up modes one through six or with a diagnostic code present. Diagnostic codes are cleared on entry and all display segments should flash.

If a diagnostic code persists, it must be corrected before the diagnostic cycle will start. With all segments flashing, the diagnostic cycle is started by depressing the **Woolens** key pad.

---

## Field Diagnostic Cycle

With the entire display flashing this cycle is started by pressing the Woolens key which is in the middle of the bottom row. This cycle provides a quick verification that the cold and hot water valves, pump, and motor are working. It is also a method to quickly get into a drain and spin to remove water from the machine if desired.

| FIELD DIAGNOSTIC CYCLES                                    |
|--|
| 15 Second hot fill while tumbling, "HOT WASH" displayed    |
| 15 Second cold fill while tumbling, "COLD RINSE" displayed |
| 12 Second drain, "RINSE" displayed                         |
| 60 Second 300 rpm spin, "RINSE SPIN" displayed             |
| 30 Second 70 rpm spin, "RINSE SPIN" displayed              |
| 60 Second 400 rpm spin, "RINSE SPIN" displayed             |
| 240 Second 800 rpm spin, "RINSE SPIN" displayed            |
| 60 Second static drain, "RINSE" displayed                  |
| 60 Second no fill tumble, "RINSE" displayed                |

Pressing the "Delicates & Knits" key will exit diagnostic mode and cancel a diagnostic cycle in process.

---

## Cycle Credit

With the entire display flashing a cycle may be credited by pressing slow (*CC will display*). When the service mode is exited "Select Cycle", will be displayed unless the end-of-cycle door opening is required.

---

## Operational Diagnostic Cycle

With the entire display flashing, this cycle is started by pressing the WHITES keypad. This cycle provides more typical full length fills, tumbles, and drains allowing for a more thorough analysis of machine operation including pressure switch behavior.

---

## Quick Spin Cycle (MAH20 Models)

With the entire display flashing, this cycle is started by pressing the COLORS key. This cycle provides a method to quickly drain and spin (remove water from the machine) if desired.

## DIAGNOSTIC CODES

If the set-up mode is entered and one of the following circumstances has occurred, the appropriate diagnostic code will be in the display.

MAH14PD, PS (Series 10-13):

| DIAGNOSTIC CODES-Original  |   |
|--|---|
| d4   | Washer door sense error circuit failure on control board (machine non-functional).  |
| d5   | Blocked coin 1 or coin drop control circuit failure (machine non-functional).   |
| d7   | Slow fill detected; maximum fill time or max. continuous fill time reached, cycle paused, but can be re-started (machine functional). |
| d8   | Slow drain detected (machine functional).   |
| d9   | Low voltage detected; less than 90 volts AC for 8 seconds (machine functional).   |
| d10  | Door lock sense error spins inhibited until corrected (machine functional).   |
| d11  | Motor speed error detected; cycle paused, but can be returned (machine functional).   |
| d13  | Blocked coin 2 or coin drop control circuit failure (machine non-functional).   |
| NOTE: Non-Functional - machine will not operate.<br>Functional - machine will operate. |   |

MAH14PD, PS (Series 14), MAH14PR, PN and MAH20:

| DIAGNOSTIC CODES-Enhancements |  |
|-------------------------------|--|
| d4                            | Washer door sense error on control board or due to power line interference (cycles and customer display disabled until diagnostic code is manually cleared).   |
| d5                            | Blocked coin 1 or coin drop control circuit failure (coin recognition and price display disabled while blockage persists).<br><b>PN Models Only (MAH14):</b> Set-up mode 6 should be set to 00 for free cycle operation. Set-up mode J. should be set to _d to prevent coin drop diagnostic codes. |
| d7                            | Slow fill detected during previous cycle (cycle paused but can be re-started).   |
| d8                            | Last drain was slow.   |
| d9                            | Voltage detected below 90vac for 8 seconds.  |
| d10                           | Door lock sense error or due to power line interference (spins inhibited until corrected).   |
| d11                           | Motor speed error detected (cycle paused but can be re-started).   |
| d13                           | Blocked coin 2 or coin drop control circuit failure (coin recognition and price display disabled while blockage persists).   |
| d16                           | Not receiving communications from installed debit card reader in Generation 2 debit mode.  |

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## HELP MODE

### (Original MAH14PD, PS):

This mode is entered by pressing the **"Permanent Press"** keypad while in special pricing option mode 2.XX (or while dAS displays if operating with Maytag Data Acquisition set-up). In help mode, **"Woolens"** can be used to advance through three help codes (displayed as 1h.XX, 2h.XX, and 3h.XX), the extended fill option (displays hF00 when not selected, hF0F when selected), the software revision, the spinner rpm (displays **"Spin"** XXX), the relative amount of power being requested of the motor (displays P XXX), and the relative amount of unbalance in the system (displays U XXX). Pressing **"Delicates & Knits"** while any of the help codes are displayed clears the three help codes. Pressing **"Delicates & Knits"** while the extended fill option is displayed selects or deselects that option. When selected, the time allowed for filling to the wash level prior to the cycle being paused is doubled. Press the **"Permanent Press"** keypad at anytime to exit help mode.

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## HELP MODE (Enhancements)

This mode is entered by pressing the PERMANENT PRESS keypad while in special pricing option mode 2.XX (or while dAS displays if operating with Maytag Data Acquisition setup). In help mode, WOOLENS can be used to advance through three help codes (displayed as 1h.XX, 2h.XX, and 3h.XX, see "HELP CODES"), the extended fill option (displays hF00 when not selected, hF0F when selected), the software revision, the spinner rpm (displays SPIN XXX), the relative amount of power being requested of the motor (displays P XXX), the relative amount of unbalance in the system (displays U XXX), and the number of seconds before the line relay is allowed to turn on again (displays L XXX). Pressing DELICATES & KNITS while any of the help codes are displayed clears the three help codes. Pressing DELICATES & KNITS while the extended fill option is displayed selects or deselects that option. When selected, the time allowed for filling to the washer level prior to the cycle being paused is doubled. Press the PERMANENT PRESS key at any time to exit the help mode.

---

## HELP MODE SYMBOLS

In the help mode, other display symbols and elements are mapped to reflect the state of various inputs and outputs as follows:

### MAH14 Models:

|                    |  |
|--------------------|--|
| WASH               | Water sensed at water level              |
| *                  | Low voltage present (below about 90 vac) |
| RE                 | Redistributing due to out-of-balance     |
| CIRCLE Above Digit | Door closed                              |
| DOOR LOCKED        | Door sensed locked                       |
| COLD               | Cold water relay on                      |
| HOT                | Hot water relay on                       |
| SOFTENER           | Door lock relay on                       |
| BLEACH             | Drain relay on                           |

## MAH20 Models:

|                    |  |
|--------------------|--|
| WASH               | Water sensed at water level              |
| *                  | Low voltage present (below about 90 vac) |
| UNBALANCE          | Redistributing due to out-of-balance     |
| CIRCLE Above Digit | Door closed                              |
| DOOR LOCKED        | Door sensed locked                       |
| COLD               | Cold water relay on                      |
| HOT                | Hot water relay on                       |
| OR                 | Door lock relay on                       |
| AVAILABLE          | Drain relay on                           |
| BLEACH             | Bleach dispense relay on                 |
| SOFTENER           | Softener dispense relay on               |
| RE                 | Recirculation pump relay on              |

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## HELP CODES

- (8) Motor sensed not turning during wash cycle. Perform motor diagnostic testing.
- (F) Suds lock possible or machine overload with clothing, spinning at less than 500 RPM during final spin (clothes will be wet).
- (10) Motor sensed not turning during spin cycle. Washer will retry the spin cycle. Perform motor diagnostic testing.
- (17) Door was not locked at the end of the final spin. Check door lock and wiring.
- (19) Water level was reached during the wash cycle, but water level was not maintained during cycle. "Slow fill" or water draining out of tub, "d7" in diagnostic codes.
- (1b) slow fill, water level never reached. Resulting in water valve being turned off during pause in cycle. "d7" in diagnostic codes.
- (1d) Unbalance within a spin at greater than 500 RPM and less than 675 RPM, during the final spin cycle. Check unbalance switches and suspension. Check for unbalanced load of clothing.
- (2A) Motor on a full power for 15 seconds during the final spin at 500 RPM and less than 675 RPM, probably due to a large load of clothing. Machine will spin at a slower speed than programmed. Possibly due to loss of phase winding in motor. Perform motor diagnostic testing.
- (2F) Shut down due to motor speed error during spin. "d11" in diagnostic codes. Perform motor diagnostic testing.
- (30) Shut down due to motor speed error during wash cycle. "d11" in diagnostic codes. Perform motor diagnostic testing.
- (31) Spin cycle was delayed due to wash level being sensed for more than 60 seconds at the start of the spin. "d8" in diagnostic codes. Check drain pump and drain hose. Perform motor diagnostic testing.
- (32) Unbalance at less than 500 RPM during the final spin. Spin cycle was stopped. Washer will have wet clothes. Check unbalance switches and suspension. Check for unbalanced load of clothing.
- (33) Suds detected during wash cycle.
- (34) Spinning below 85 RPM too long during the spin cycle. "d11" in diagnostic codes. Perform motor diagnostic testing.

- (35) Tumbling above 50 RPM too long during the wash cycle. "d11" in diagnostic codes. Perform motor diagnostic testing.
- (36) Motor not slowing down after 120 seconds of coasting down after reaching 300 RPM. "d11" in diagnostic cycle. Perform motor diagnostic testing.
- (37) Motor running too fast during tumble cycle. Could be due to the belt slipping or belt not on basket pulley. "d11" in diagnostic cycle. Perform motor diagnostic testing.
- (39) Motor still running after 120 seconds of coasting down after an unbalance. "d11" in diagnostic cycle. Perform motor diagnostic testing.
- (40) Motor running faster than 85 RPM and the door is not locked. Check wiring or intermittent door lock. Perform motor diagnostic testing. Possibly due to switching noise (normal operation).
- (71) Debit card reader messaging problem. Consult debit card reader's manufacturing trouble shooting information.
- (74) Debit card reader messaging problem. Consult debit card reader's manufacturing trouble shooting information.
- (75) Debit card reader messaging problem. Consult debit card reader's manufacturing trouble shooting information.

## GENERAL USER INFORMATION

**BLANK DISPLAY** - This condition indicates the appliance is inoperative. Enter set-up mode to view diagnostic code.

**"0 MINUTES" SHOWING IN DISPLAY** - This condition indicates the appliance cannot be operated. Coins dropped or debit inputs during this condition will be stored in escrow but cannot be used until normal operation is restored by opening and closing the door. If a door switch fails, it must be replaced before normal operation can be restored.

**COLD START (initial first use)** - Appliance is programmed at the factory as follows:

|        |        |                                  |
|--------|--------|----------------------------------|
| Washer | 14     | minute wash period               |
|        | 3      | rinses (extra rinse not enabled) |
|        | \$1.75 | wash price (PD models)           |
|        | \$0.00 | wash price (PR models)           |

**WARM START (after power failure)** - A few seconds after power is restored, if a cycle was in progress at the time of the power failure, "RESELECT CYCLE" will flash in the display, indicating the need for a key press to restart the washer or dryer. While the washer cycle can immediately be restarted,

the washer motor will not run until power has been present for two minutes.

**DOOR LOCK** - Locking of the door will be initiated once the wash level has been satisfied in the initial fill. The door will remain locked until near the end of a cycle or until approximately 2 minutes after a power interruption or cycle cancellation via service mode.

**DEBIT CARD READY** - This appliance is debit card "cable" ready. It will accept a variety of debit card systems; but does NOT come with a debit card reader. Refer to the debit card reader manufacturer for proper machine set-up. In models converted to a Generation 1 debit card system, debit pulses represent the equivalent of one coin.

**DISPLAY** - After the unit has been installed and plugged in, the display will show "0 MINUTES." Once the unit has been plugged in and the door opened and closed, the display will show the price. In units set for free cycles, the display will flash "SELECT CYCLE."

**PRICING** - After the door is opened following the completion of a cycle, the display indicates the cycle price (unless set for free operation). As coins are dropped or debit inputs arrive, the display will change to lead the user through the initiation of a cycle.

**FREE CYCLES** - This is established by setting the cycle price to zero. When this happens "SELECT CYCLE" will appear rather than a cycle price.

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### TO OPERATE WASHER

1. Insert coins until "SELECT CYCLE" flashes in display.

**PR Models:** A debit card is required rather than coins. In Enhanced Debit mode, the card balance will also display when a debit card is inserted into the reader.

2. Door must be closed before cycle selection is made.
3. Press fabric setting keypad for the wash cycle desired. After the cycle is started, the time will display and count down.
4. When a cycle is interrupted by opening the door, the selected cycle will remain in display. Also, "RESELECT CYCLE" will flash in display. To restart the washer, close door and press desired fabric setting keypad.

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### PROGRAMMING INSTRUCTIONS FOR MAH20PN MODELS

For more information other than what is listed in this section, please see "*PN Commercial Installation and Setup Instructions manual P/N 16010066*". This manual covers the setup and programming procedures for the MAH20PN. The manual can be obtained from your commercial distributor or

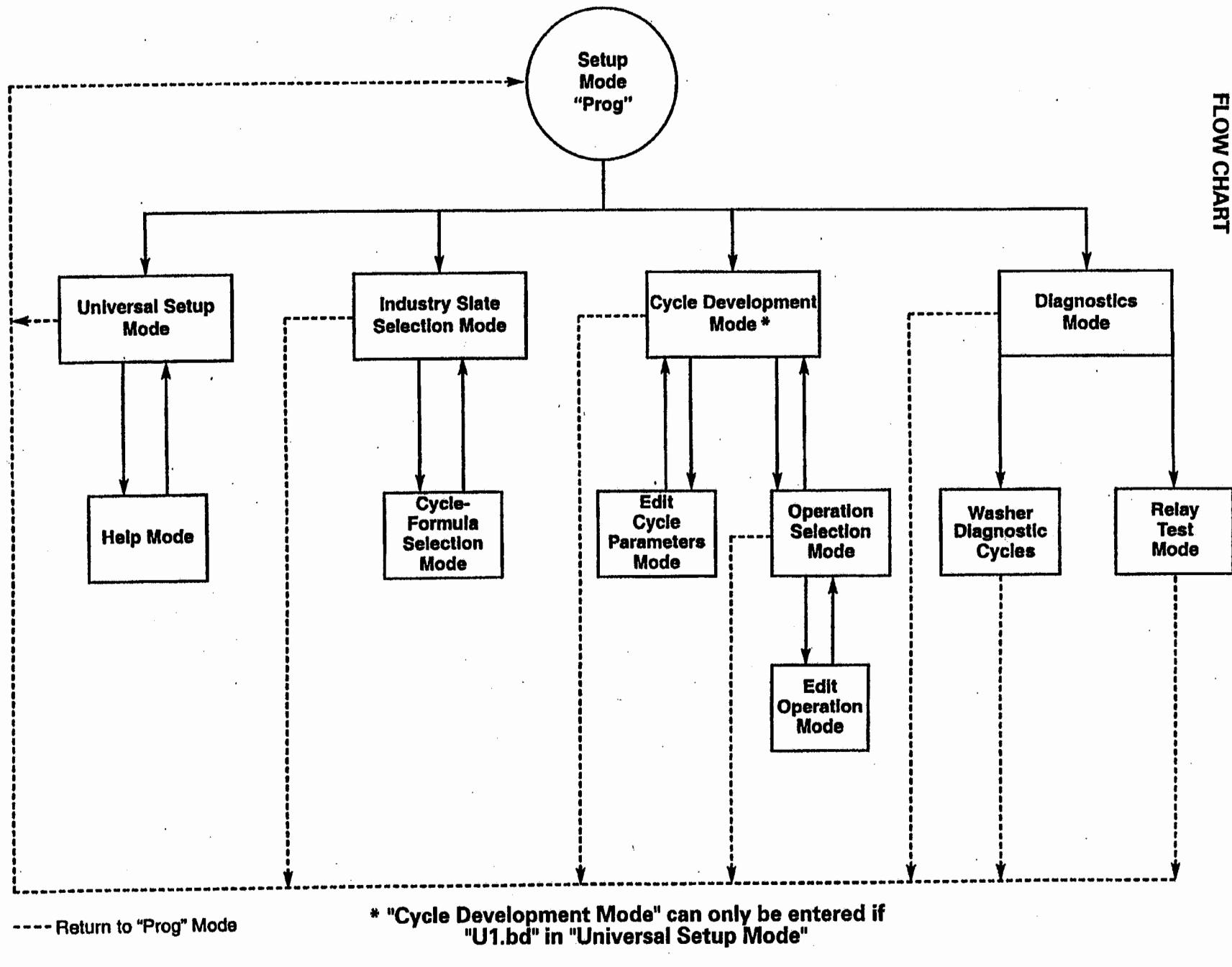
Maytag Appliance Sales Company  
Customer Service,  
240 Edwards Street,  
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423-472-3333

## Quick Reference

| Modes                    | Display | Description   |
|--------------------------|---------|---|
| Setup (Programming)      | Prog    | When the service key is turned to "PROGRAM", the " <u>Setup Mode</u> " (" <u>Prog</u> " Mode) is entered. This mode is only to access other modes.  |
| Diagnostic Code Display  | d4      | If a diagnostic code exists it will be displayed first. Codes can be cleared by entering " <u>Diagnostics Mode</u> " (holding lower right keypad) or advance to " <u>Prog</u> " Mode by pressing lower middle keypad. |
| Universal Setup          | U1.00   | Bulk Dispensing (external chemical supply)<br>Option (00 - deselected, bd - selected)   |
|                          | U2.00   | Variable Cold Temperature (00-09)   |
|                          | U3.00   | Variable Warm Temperature (00-09)   |
|                          | U4.00   | Chart Stop Selection (00 - disabled, nC - normally closed, no - normally open)  |
|                          | U5.Sd   | Suds Detect Option (00 - deselected, Sd - selected)<br>Note: Applies only if bulk dispensing [external chemical supply] option is deselected.   |
|                          | 1.000   | Cycle 1 Count   |
|                          | 2.000   | Cycle 2 Count   |
|                          | 3.000   | Cycle 3 Count   |
|                          | 4.000   | Cycle 4 Count   |
|                          | 5.000   | Cycle 5 Count   |
|                          | 6.000   | Cycle 6 Count   |
| Industry Slate Selection | SL.1    | Industry Slate Selection (1-9)  |
| Cycle-Formula Selection  | C1.28   | Cycle Formula Selection (Cycles C1-C6) (Formulas 1-33)  |
| Cycle Development        | cn.01   | Cycle Number Selection (01-06)  |
|                          | 01.Su   | Cycle 1, Step 1, Operation Selected is Suds   |
|                          | 02.Cr   | Cycle 1, Step 2, Operation Selected is Carryover Step   |
|                          | 03.r1   | Cycle 1, Step 3, Operation Selected is Rinse  |
|                          | 04.r1   | Cycle 1, Step 4, Operation Selected is Rinse  |
|                          | 05.SF   | Cycle 1, Step 5, Operation Selected is Softener   |
|                          | 06.FE   | Cycle 1, Step 6, Operation Selected is Final Extract  |
|                          | 07.--   | Cycle 1, Step 7, No Operation Selected  |
|                          | 08.--   | Cycle 1, Step 8, No Operation Selected  |
|                          | 09.--   | Cycle 1, Step 9, No Operation Selected  |
|                          | 10.--   | Cycle 1, Step 10, No Operation Selected   |
|                          | 11.--   | Cycle 1, Step 11, No Operation Selected   |
|                          | 12.--   | Cycle 1, Step 12, No Operation Selected   |
|                          | 13.--   | Cycle 1, Step 13, No Operation Selected   |

| Modes                 | Display | Description  |
|-----------------------|---------|--|
| Operation Selection   | 01.Su   | Step Number (1-13)   |
| Edit Operation        | oPSu    | Operation Name   |
|                       | tt.11   | Tumble Time (2-15 minutes)   |
|                       | Ft.05   | Fill Temperature (01 - cold; 02 - variable cold; 03 - warm; 04 - variable warm; 05 - hot)  |
|                       | FL.Lo   | Fill Level (Lo - Low; Hi - High)   |
|                       | do._d   | Dispense Output Selection: _d = detergent; _b = bleach; _S = softener; _A = auxiliary; db - detergent/bleach; dA = detergent/auxiliary; SA = softener/auxiliary; -- = none |
| Edit Cycle Parameters | E1.03   | Detergent Signal Duration (0-31 seconds)   |
|                       | E2.20   | Bleach Signal Duration (0-31 seconds)  |
|                       | E3.20   | Softener Signal Duration (0-31 seconds)  |
|                       | E4.05   | Auxiliary Signal Duration (0-31 seconds)   |
|                       | E5.tA   | Reduced-Tangle Option (00 - deselected, tA - selected)   |
|                       | E6.Hi   | Wash Action Option (Lo - Low, Hi - High)   |
|                       | E7.00   | Fragile Option (00 - deselected, Fr - selected)  |
|                       | E8.07   | Final Extract Speed (00 = 0, 01 = 70, 02 = 100, 03 = 300, 04 = 400, 05 = 500, 06 = 700, 07 = 800 RPM)  |
|                       | E9.04   | Final Spin Time (0-7 minutes)  |
|                       | EA.00   | Intermediate Spin Speed (00 = 0, 01 = 70, 02 = 100, 03 = 300 RPM)  |
|                       | Eb.00   | Intermediate Spin Time (0-7 minutes)   |
| Help Mode             | 1h.0    | Help Code #1   |
|                       | 2h.0    | Help Code #2   |
|                       | 3h.0    | Help Code #3, Press the <u>Permanent Press</u> (lower left) keypad to clear all help codes.  |
|                       | hF.00   | Extended Fill Time Option (00 - deselected, EF - selected) - Press the <u>Permanent Press</u> (lower left) keypad to enable/disable Extended Fill Time.                    |
|                       | 01      | Softward Version (view only)   |
|                       | 800     | Tumble RPM (view only)   |
|                       | P 0     | Power Delivered to Motor (view only)   |
|                       | U 0     | Amount of Unbalance in the System (view only)  |
|                       | L 0     | Line Relay Countdown Until Re-start Occurs (view only)   |
| Relay Test Mode       | rt      | Relay Testing  |

## FLOW CHART



## **Slates**

| <b>Slate 1: General (default)</b> |                 |                                |                |
|-----------------------------------|-----------------|--------------------------------|----------------|
| <b>Keypad Button</b>              | <b>Formulas</b> | <b>Descriptions of Formula</b> | <b>Minutes</b> |
| Whites                            | Formula 28      | Hot Water Wash                 | 37.5           |
| Colors                            | Formula 29      | Warm Water Wash                | 37.5           |
| Bright Colors                     | Formula 30      | Cold Water Wash                | 37.5           |
| Permanent Press                   | Formula 31      | Warm Water Wash                | 37.5           |
| Woolens                           | Formula 32      | Cold Water Wash                | 37.5           |
| Delicates & Knits                 | Formula 33      | Warm Water Wash                | 37.5           |

| <b>Slate 2: Hotel and Motel With Food Service</b> |                 |                                    |                |
|---|-----------------|------------------------------------|----------------|
| <b>Keypad Button</b>                              | <b>Formulas</b> | <b>Descriptions of Formula</b>     | <b>Minutes</b> |
| Whites  | Formula 2       | White Sheets                       | 46.5           |
| Colors  | Formula 8       | Cotton or Blended Table Linen      | 55             |
| Bright Colors                                     | Formula 10      | 100% Polyester Colored Table Linen | 50             |
| Permanent Press                                   | Formula 5       | Delicate                           | 43.5           |
| Woolens   | Formula 4       | Rags and Mops                      | 65             |
| Delicates & Knits                                 | Formula 6       | Stain Treatment                    | 62.5           |

| <b>Slate 3: Hotel and Motel Without Food Service</b> |                 |   |                |
|--|-----------------|---|----------------|
| <b>Keypad Button</b>                                 | <b>Formulas</b> | <b>Descriptions of Formula</b>                      | <b>Minutes</b> |
| Whites   | Formula 1       | White Sheets  | 46.5           |
| Colors   | Formula 2       | White Towels  | 46.5           |
| Bright Colors  | Formula 3       | Combination Formula Whites, Colored Sheets & Towels | 41.5           |
| Permanent Press                                      | Formula 4       | Rags and Mops                                       | 65             |
| Woolens  | Formula 5       | Delicate  | 41.5           |
| Delicates & Knits                                    | Formula 6       | Stain Treatment                                     | 62.5           |

| <b>Slate 4: Health Care With Food Service</b> |                 |                                       |                |
|---|-----------------|---------------------------------------|----------------|
| <b>Keypad Button</b>                          | <b>Formulas</b> | <b>Descriptions of Formula</b>        | <b>Minutes</b> |
| Whites  | Formula 11      | Health Care Sheets and Towels         | 52             |
| Colors  | Formula 8       | Cotton or Blended Colored Table Linen | 55             |
| Bright Colors                                 | Formula 5       | Delicate                              | 41.5           |
| Permanent Press                               | Formula 6       | Stain Treatment                       | 62.5           |
| Woolens                                       | Formula 4       | Rags and Mops                         | 65             |
| Delicates & Knits                             | Formula 10      | 100% Polyester Colored Table Linen    | 50             |

| <b>Slate 5: Health Care Without Food Service</b> |                 |  |                |
|--|-----------------|--|----------------|
| <b>Keypad Button</b>                             | <b>Formulas</b> | <b>Descriptions of Formula</b>           | <b>Minutes</b> |
| Whites   | Formula 11      | Health Care Sheets and Towels            | 52             |
| Colors   | Formula 12      | Diapers                                  | 69.5           |
| Bright Colors                                    | Formula 5       | Delicate                                 | 41.5           |
| Permanent Press                                  | Formula 6       | Stain Treatment                          | 62.5           |
| Woolens  | Formula 4       | Rags and Mops                            | 65             |
| Delicates & Knits                                | Formula 13      | Health Care Light Soil Sheets and Towels | 47             |

| <b>Slate 6: Food Service</b> |                 |                                       |                |
|------------------------------|-----------------|---------------------------------------|----------------|
| <b>Keypad Button</b>         | <b>Formulas</b> | <b>Descriptions of Formula</b>        | <b>Minutes</b> |
| Whites                       | Formula 7       | Cotton or Blended White Table Linen   | 60.5           |
| Colors                       | Formula 8       | Cotton or Blended Colored Table Linen | 55             |
| Bright Colors                | Formula 9       | 100% Polyester White Table Linen      | 55             |
| Permanent Press              | Formula 10      | 100% Polyester Colored Table Linen    | 50             |
| Woolens                      | Formula 4       | Rags and Mops                         | 65             |
| Delicates & Knits            | Formula 6       | Stain Treatment                       | 62.5           |

| <b>Slate 7: Fast Food Service</b> |                 |                                |                |
|-----------------------------------|-----------------|--------------------------------|----------------|
| <b>Keypad Button</b>              | <b>Formulas</b> | <b>Descriptions of Formula</b> | <b>Minutes</b> |
| Whites                            | Formula 14      | Fast Food Medium Towels        | 44.5           |
| Colors                            | Formula 15      | Fast Food Heavy Towels         | 63.5           |
| Bright Colors                     | Formula 16      | Fast Food Medium Soil Uniforms | 41.5           |
| Permanent Press                   | Formula 17      | Fast Food Heavy Soil Uniforms  | 53             |
| Woolens                           | Formula 4       | Rags and Mops                  | 65             |
| Delicates & Knits                 | Formula 6       | Stain Treatment                | 62.5           |

| <b>Slate 8: Athletic, Health Club and Beauty Salon</b> |                 |   |                |
|--|-----------------|---|----------------|
| <b>Keypad Button</b>                                   | <b>Formulas</b> | <b>Descriptions of Formula</b>                            | <b>Minutes</b> |
| Whites   | Formula 18      | Light to Medium Soil Sport Uniforms, Gym Clothes & Towels | 52             |
| Colors   | Formula 19      | Heavy Soil, Baseball, Football, Soccer                    | 63             |
| Bright Colors  | Formula 20      | Cold Wash, No Bleach Basketball and Delicates             | 44.5           |
| Permanent Press  | Formula 4       | Rags and Mops   | 65             |
| Woolens  | Formula 6       | Stain Treatment   | 62.5           |
| Delicates & Knits                                      | Formula 21      | Towels with Hair  | 71.5           |

| <b>Slate 9: Shirt Laundry</b> |                 |                                |                |
|-------------------------------|-----------------|--------------------------------|----------------|
| <b>Keypad Button</b>          | <b>Formulas</b> | <b>Descriptions of Formula</b> | <b>Minutes</b> |
| Whites                        | Formula 22      | Hot Wash Shirts                | 47.5           |
| Colors                        | Formula 23      | Warm Wash Shirts               | 47.5           |
| Bright Colors                 | Formula 24      | Cold Wash Shirts               | 47.5           |
| Permanent Press               | Formula 25      | Shirts - Starch Only           | 17.5           |
| Woolens                       | Formula 26      | Hot Wash Shirts - With Starch  | 58             |
| Delicates & Knits             | Formula 27      | Warm Wash Shirts - With Starch | 58             |

## Diagnostics Mode

### Diagnostic Test Display:

To enter "Diagnostics Mode": press **Delicates & Knits (lower right)** keypad for 1 second while in "Program" Mode (displays "Prog") or anytime a diagnostics code is present. On entry to "Diagnostics Mode" the entire display will flash, any cycle in process will be cancelled and diagnostic codes will be cleared. If a diagnostic code persists, it must be corrected before the following options are permitted.

There are two possible ways to initiate machine activity from "Diagnostics Mode" as follows:

**Washer Operational Diagnostic Cycle** - With the entire display flashing, this cycle is started by pressing the **Whites (upper left)**

keypad. This cycle provides more typical full length fills, tumbles, drains, pump and dispenser operation allowing for a more thorough analysis of machine operation including pressure switch behavior. Pressing the **Delicates & Knits (lower right)** keypad will exit "Diagnostics Mode", cancel a diagnostics mode and cancel a diagnostic cycle in process.

**Relay Test Mode** - With the entire display flashing, the relay test mode is entered by pressing the **Permanent Press (lower left)** keypad (displays "rt"). This test mode provides a means of testing the external dispensers. Pressing each keypad once will toggle the relay output. Output will be indicated in the display. (*See chart below for keypad functions.*)

| Keypad Button                   | Display     | Description                      |
|---------------------------------|-------------|----------------------------------|
| Whites (upper left)             | "DETERGENT" | Detergent Dispense Relay         |
| Colors (upper middle)           | 'BLEACH'    | Bleach Dispense Relay            |
| Bright Colors (upper right)     | "SOFTENER"  | Softener Dispense Relay          |
| Permanent Press (lower left)    |             | Enters and Exits Relay Test Mode |
| Woolens (lower middle)          | "RE"        | Recirculation Pump Relay         |
| Delicates & Knits (lower right) | "SOAK"      | Auxiliary Dispense Relay         |

### Diagnostic Codes:

| Code | Description  |
|------|--|
| d4   | Door error sensed on control board or due to power line interference (cycles and customer display are disabled until diagnostic code is manually cleared). |
| d7   | Slow fill detected during previous cycle; fill time greater than 6 minutes (cycle paused but can be restarted).  |
| d8   | Last drain was slow (drain time greater than 2 minutes).   |
| d9   | Voltage detected below 90VAC for 8 seconds.  |
| d10  | Door lock error sensed or due to power line interference (spins inhibited until corrected).  |
| d11  | Motor speed error detected (cycle paused but can be re-started).   |

---

## Help Mode

This mode is entered from the "Universal Setup Mode". To get to "Universal Setup Mode", press the Whites (upper left) keypad when in "Program" Mode ("Prog" displays). When in universal setup mode (u1.XX displays), press the Delicates & Knits (lower right) keypad to get into "Help Mode". In "Help Mode", Woolens (lower middle) keypad can be used to advance through three help codes (displayed as 1h.XX, 2h.XX and 3h.XX) the extended fill option (displays hF00 when not selected, hF0F when selected), the software revision, the spinner rpm (displays SPIN XXX), the relative amount of power being requested of the motor (displays P XXX), the relative amount of unbalance in the system (displays U XXX), and the number of seconds before the line relay is allowed to turn on again (displays L XXX). Pressing the Permanent Press (lower left) keypad while any of the help codes are displayed clears the three help codes. Pressing the Permanent Press (lower left) keypad while the extended fill option is displayed selects or deselects that option. When selected, the time allowed for filling to the wash level prior to the cycle being paused is doubled.

In "Help Mode", other display symbols and elements are mapped to reflect the states of various inputs and outputs as follows:

| Display                | Description                          |
|------------------------|--------------------------------------|
| <b>WASH</b>            | Water sensed at wash level           |
| *                      | Low voltage present (below 90VAC)    |
| <b>UNBALANCE</b>       | Redistributing due to out-of-balance |
| ° (circle above digit) | Door sensed closed                   |
| <b>DOOR LOCKED</b>     | Door sensed locked                   |
| <b>COLD</b>            | Cold water relay on                  |
| <b>HOT</b>             | Hot water relay on                   |
| <b>OR</b>              | Door lock relay on                   |
| <b>AVAILABLE</b>       | Drain relay on                       |
| <b>ADD</b>             | Chart stop input sensed              |
| <b>DETERGENT</b>       | Detergent relay on                   |
| <b>BLEACH</b>          | Bleach relay on                      |
| <b>SOFTENER</b>        | Softener relay on                    |
| <b>SOAK</b>            | Auxiliary relay on                   |
| <b>RE</b>              | Recirculation pump relay on          |

Exit back to "Universal Setup Mode" by pressing Delicates & Knits (lower right) keypad.

Exit from "Universal Setup Mode" back to "Prog" Mode by pressing Whites (upper left) keypad.

Return service key to "Run" position to return to normal operation.

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**NOTES:**

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**Section 3. Programming and Set-Up Procedures**

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## SECTION 4. TROUBLESHOOTING

### GENERAL INFORMATION

The malfunction of an electrical circuit cannot easily be diagnosed unless you first understand how it functions when operating normally.

### COMPONENTS

There are two basic categories for electrical components, switches and loads.

A switch controls the current path to a load component. Door switches, water level switches and relays are examples of switching components.

An electrical load uses electricity to perform some function. Motors convert electricity to magnetic fields and then to mechanical motion. Solenoids use magnetic fields to push or pull. Lamps convert electricity to light.

The schematic wiring diagram is followed much like a road map. The lines represent the wiring connections between components. Connections in the wiring are indicated by a small dot. If the lines cross, but no dot is present at the intersection, there is no connection. As much as possible, switches are shown in their normal or most common configuration.

**Use CAUTION when working with live circuits.**

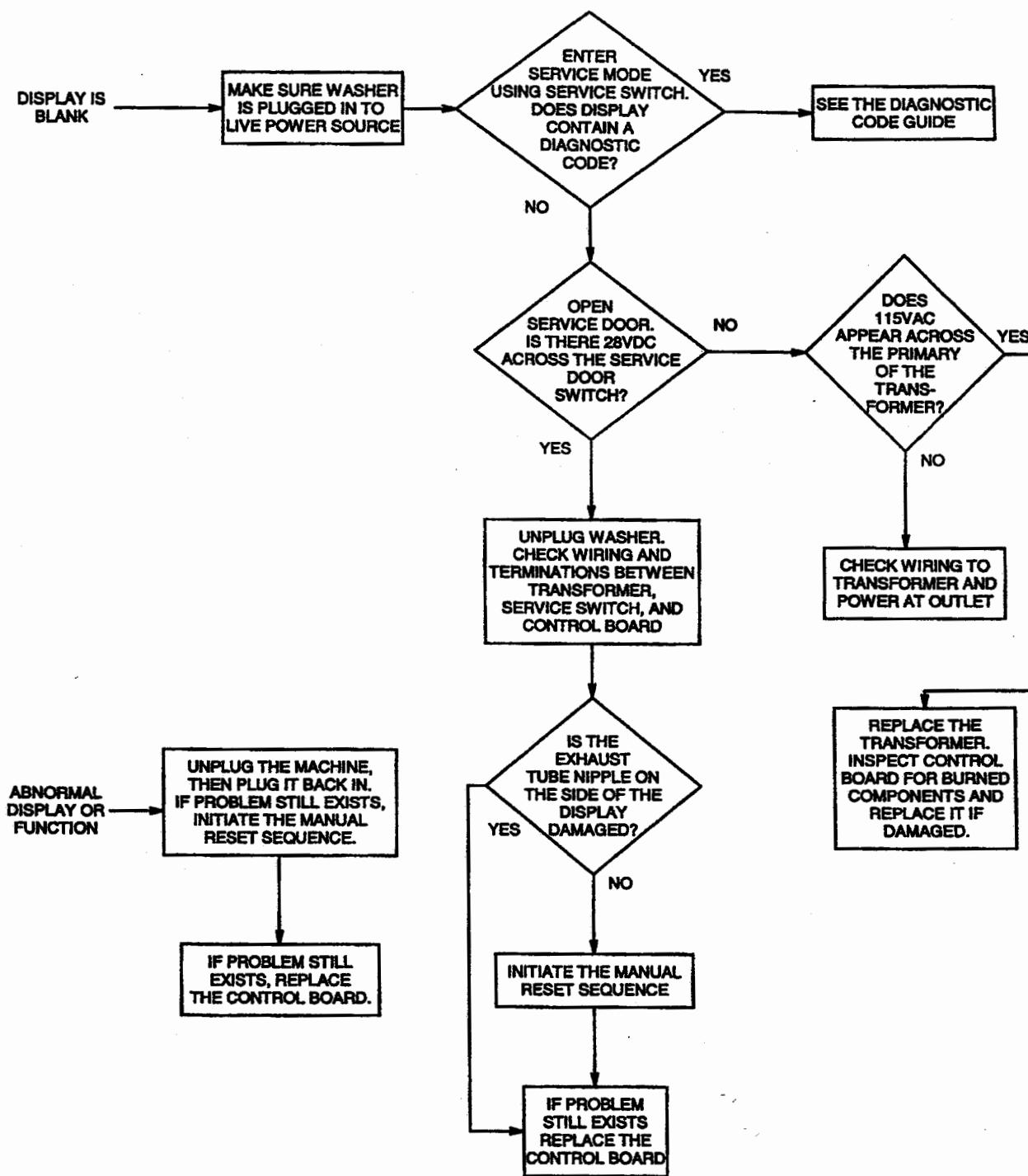
**EXTREME CAUTION should be taken when performing voltage checks due to danger of possible electrical shock.**

**Resistance or continuity testing is done with the product disconnected from power.**  
**Failure to do so can result in damage to your meter.**

### CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

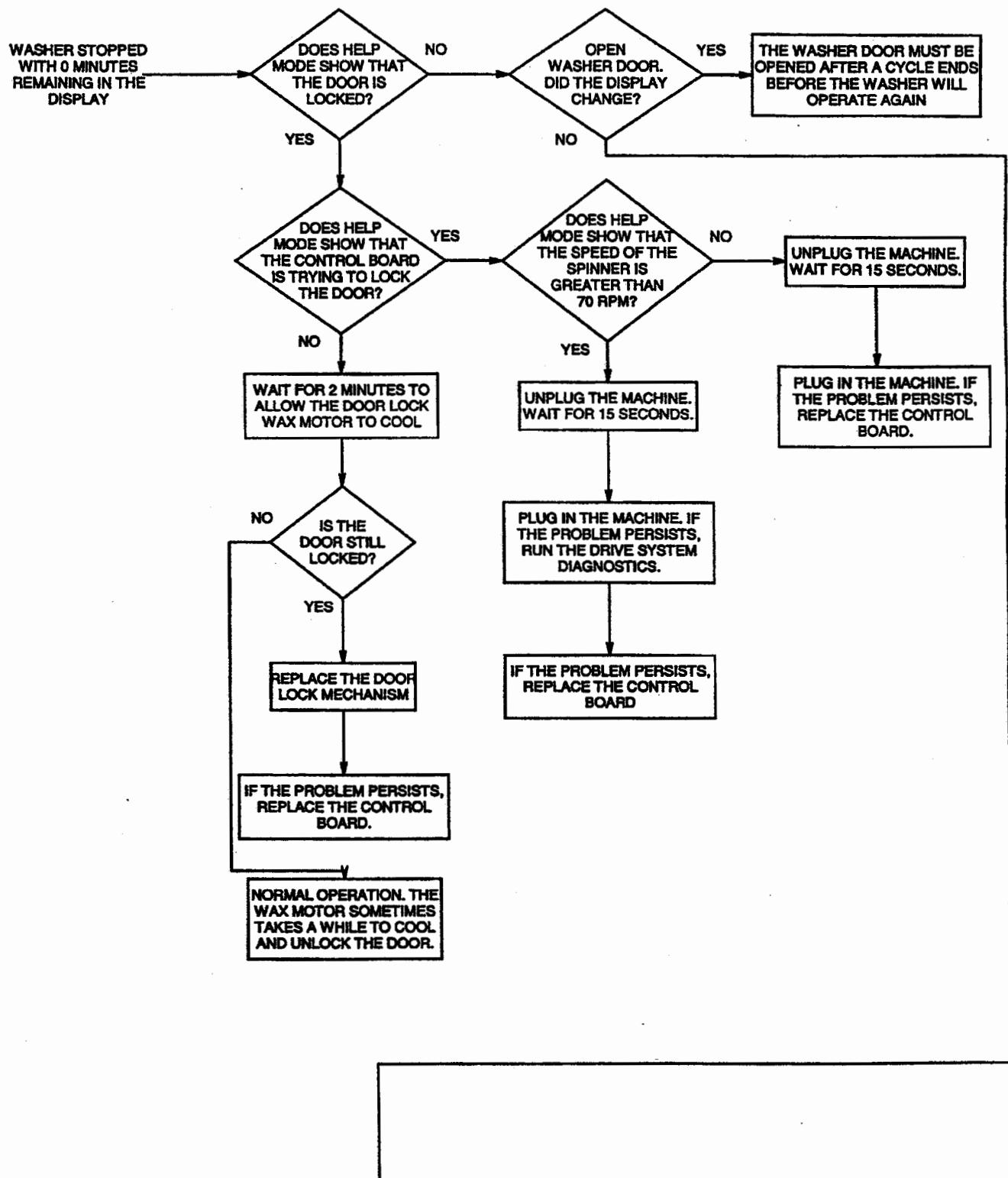
## TROUBLESHOOTING FLOW CHART



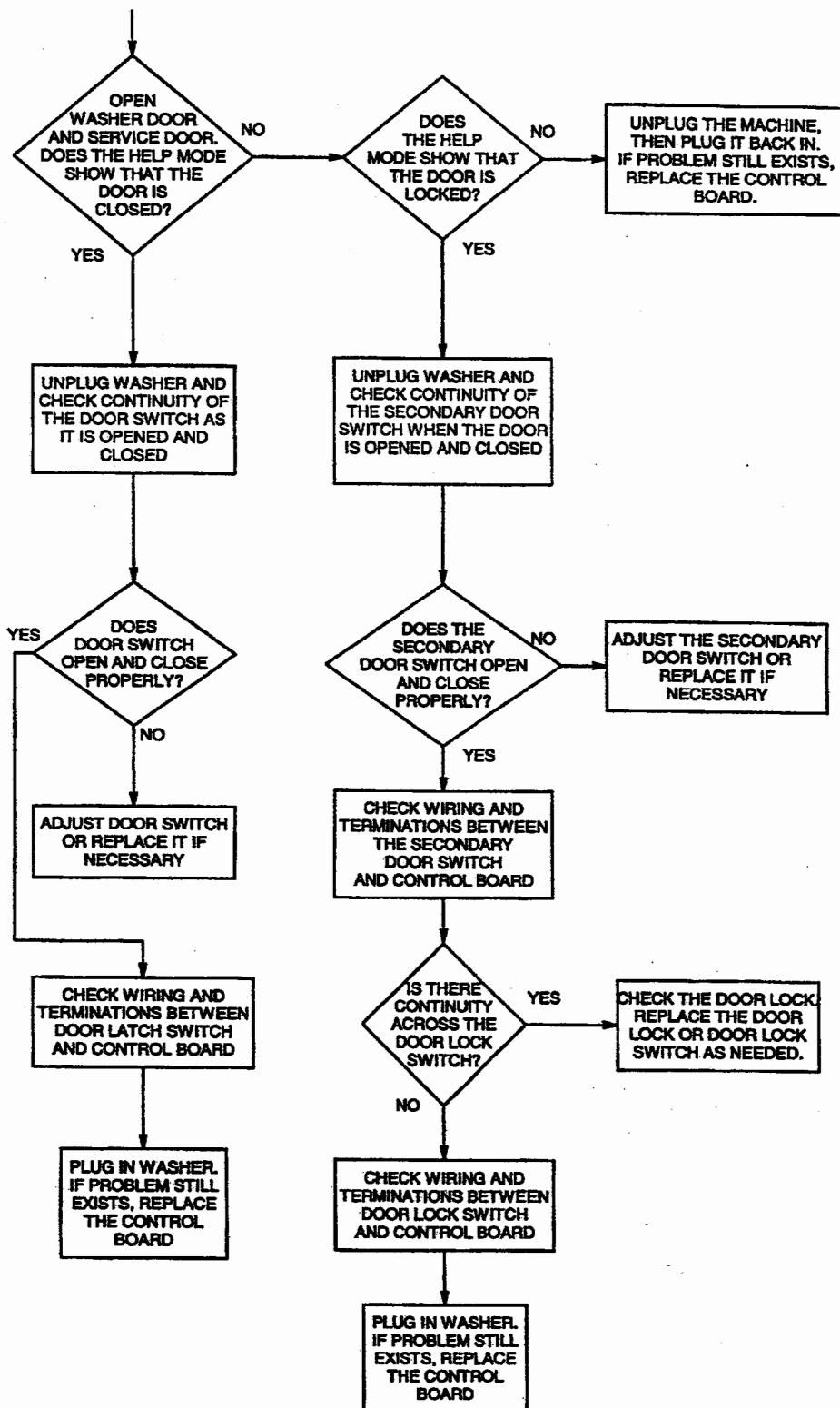
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## TROUBLESHOOTING FLOW CHART



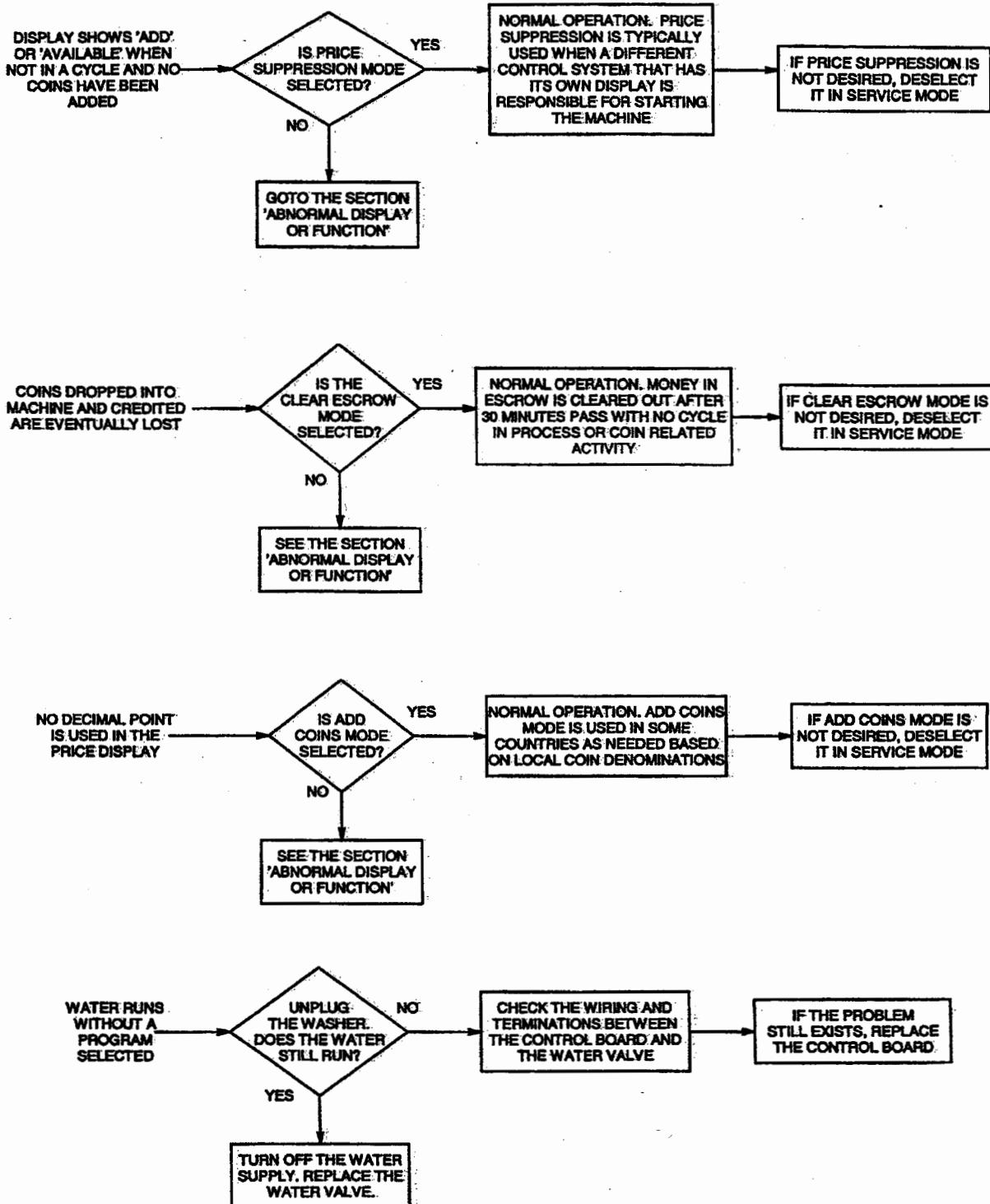
## TROUBLESHOOTING FLOW CHART



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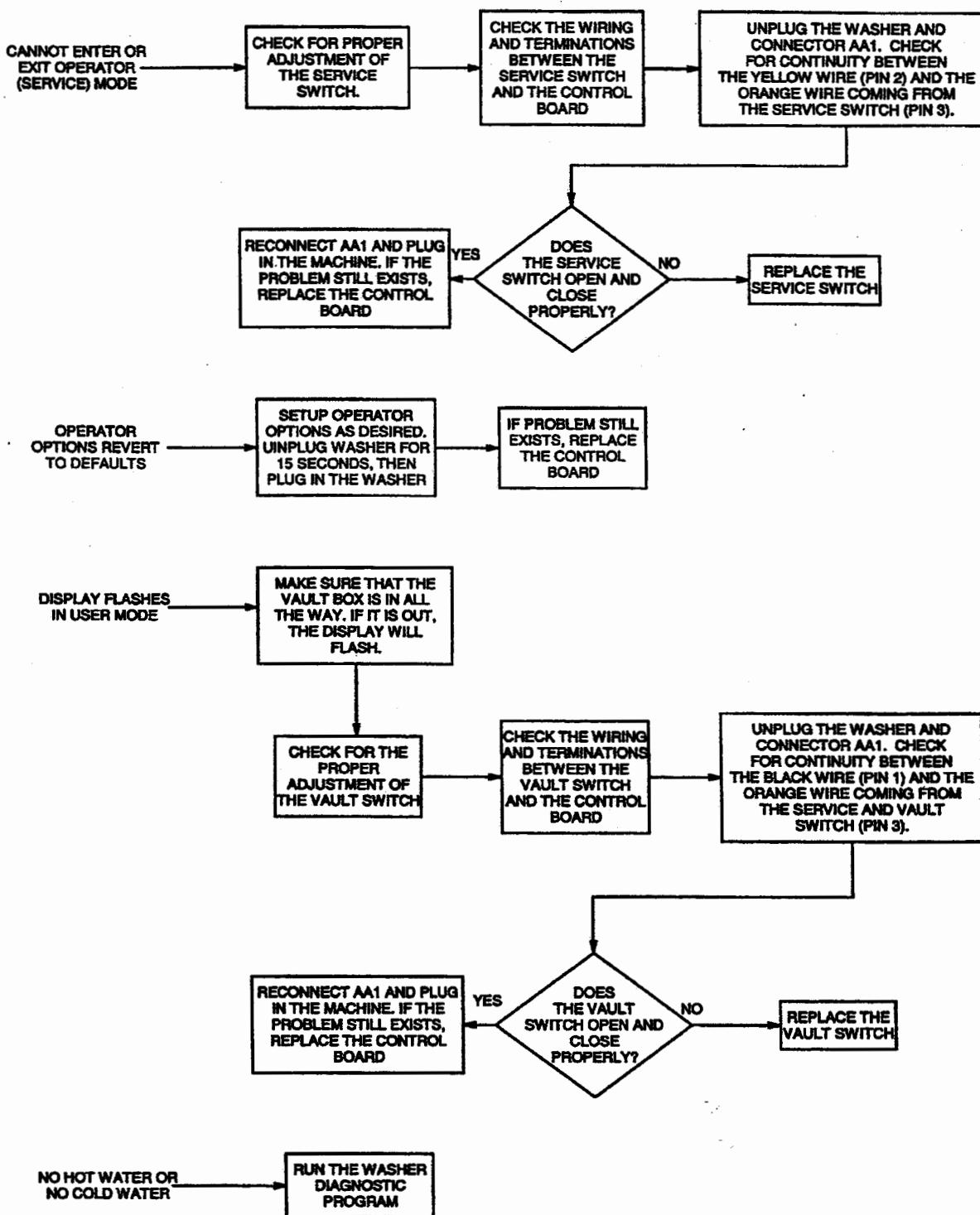
## TROUBLESHOOTING FLOW CHART



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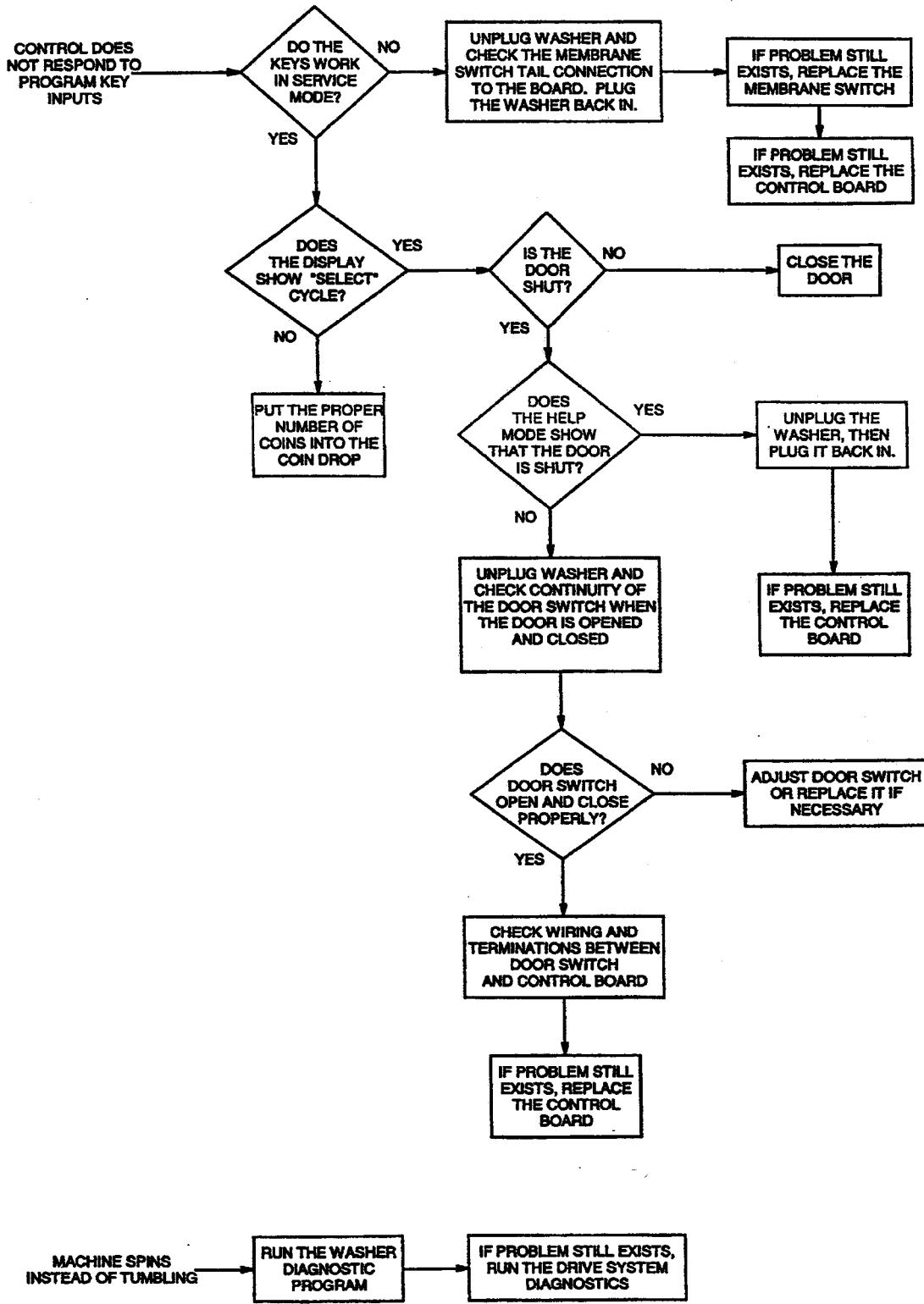
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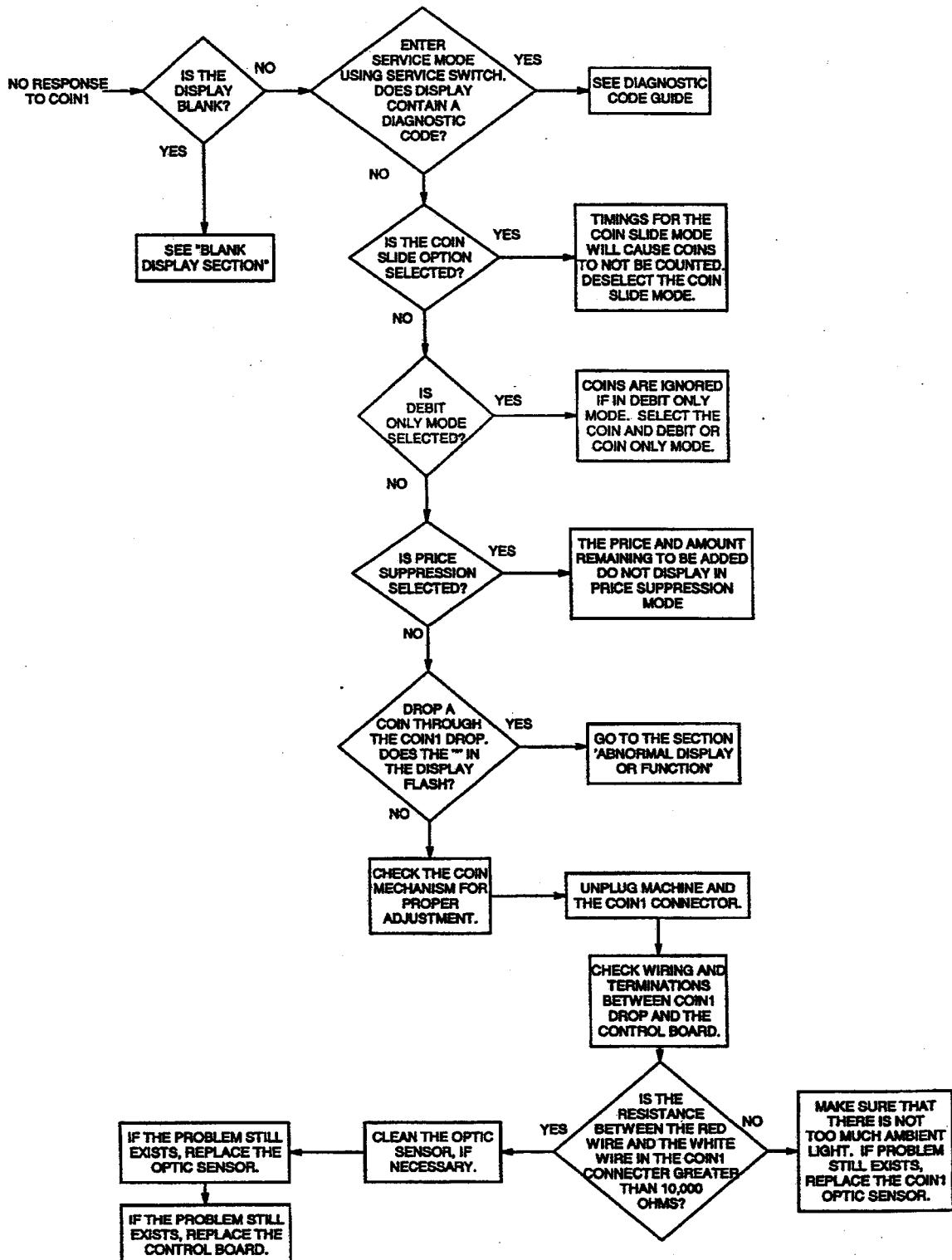
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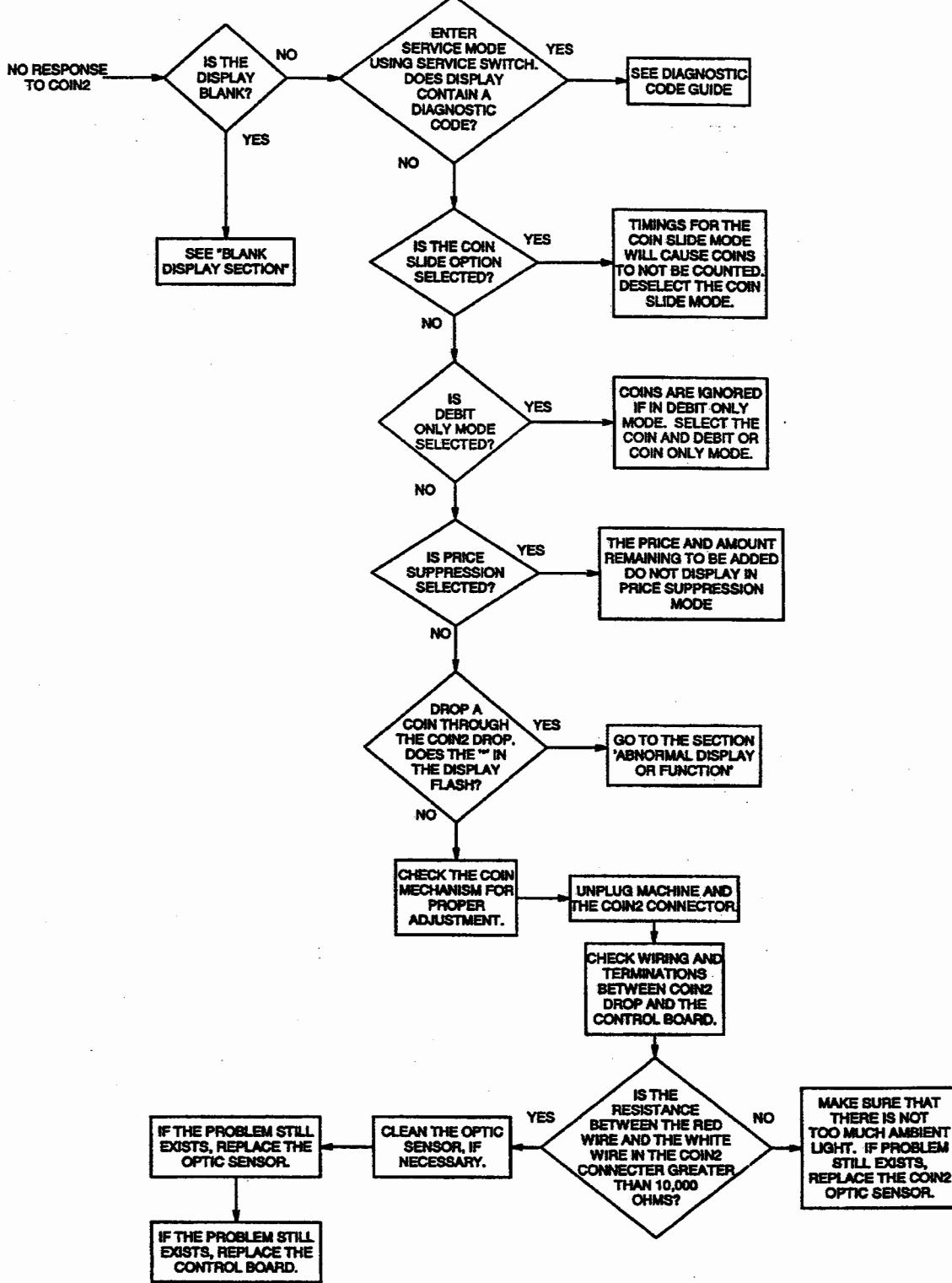
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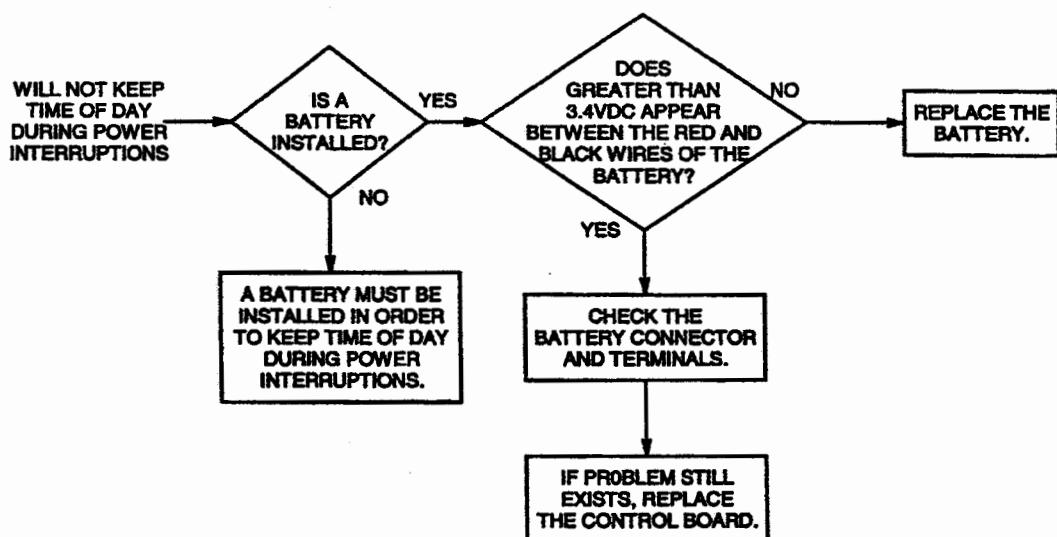
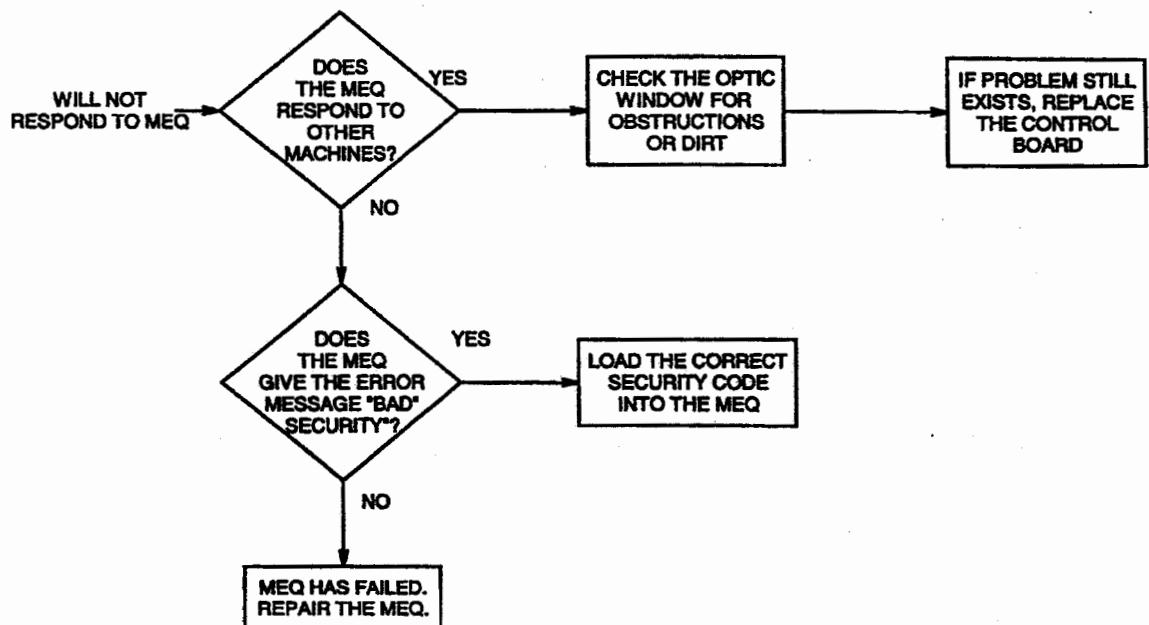
## TROUBLESHOOTING FLOW CHART



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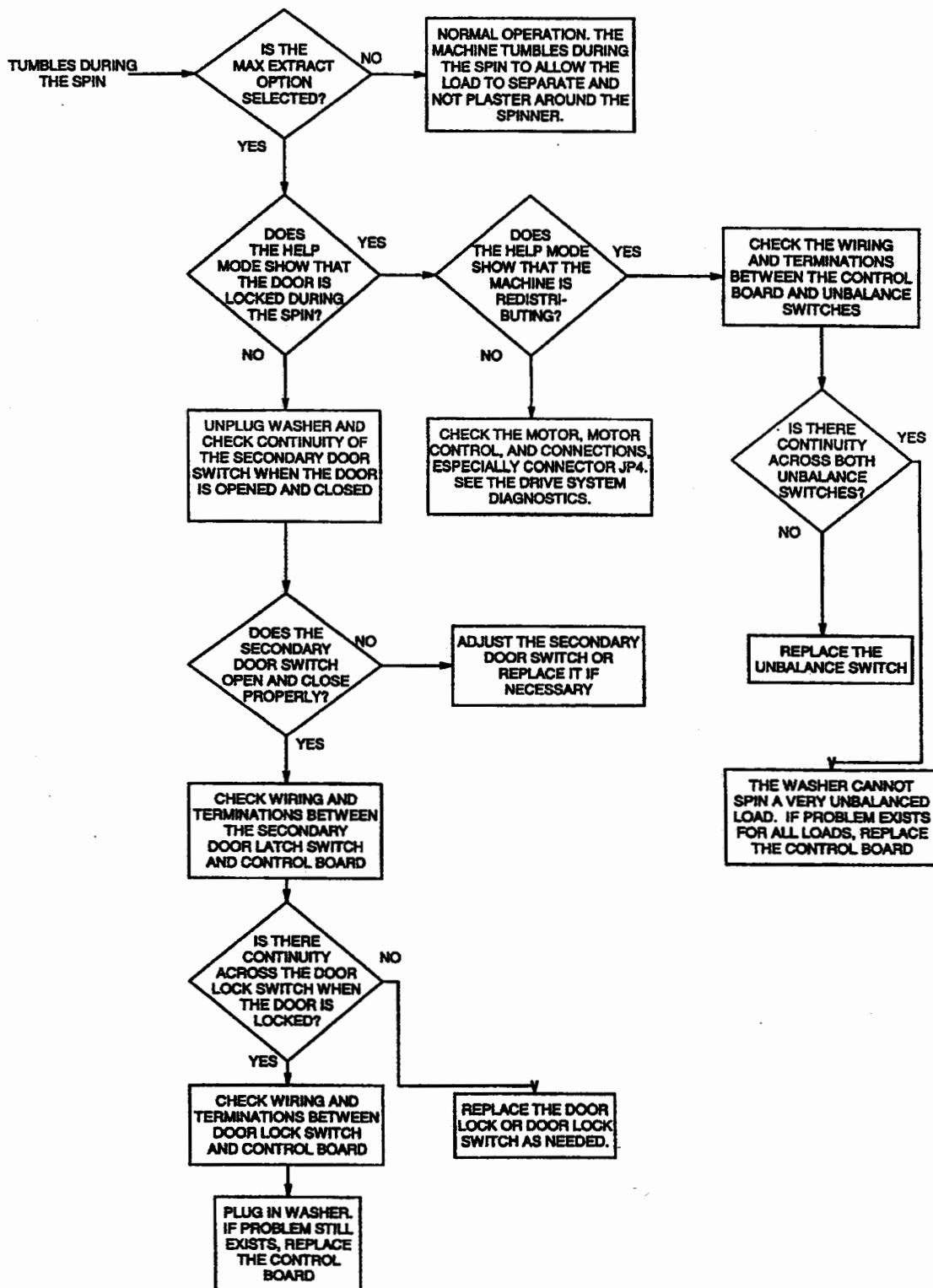
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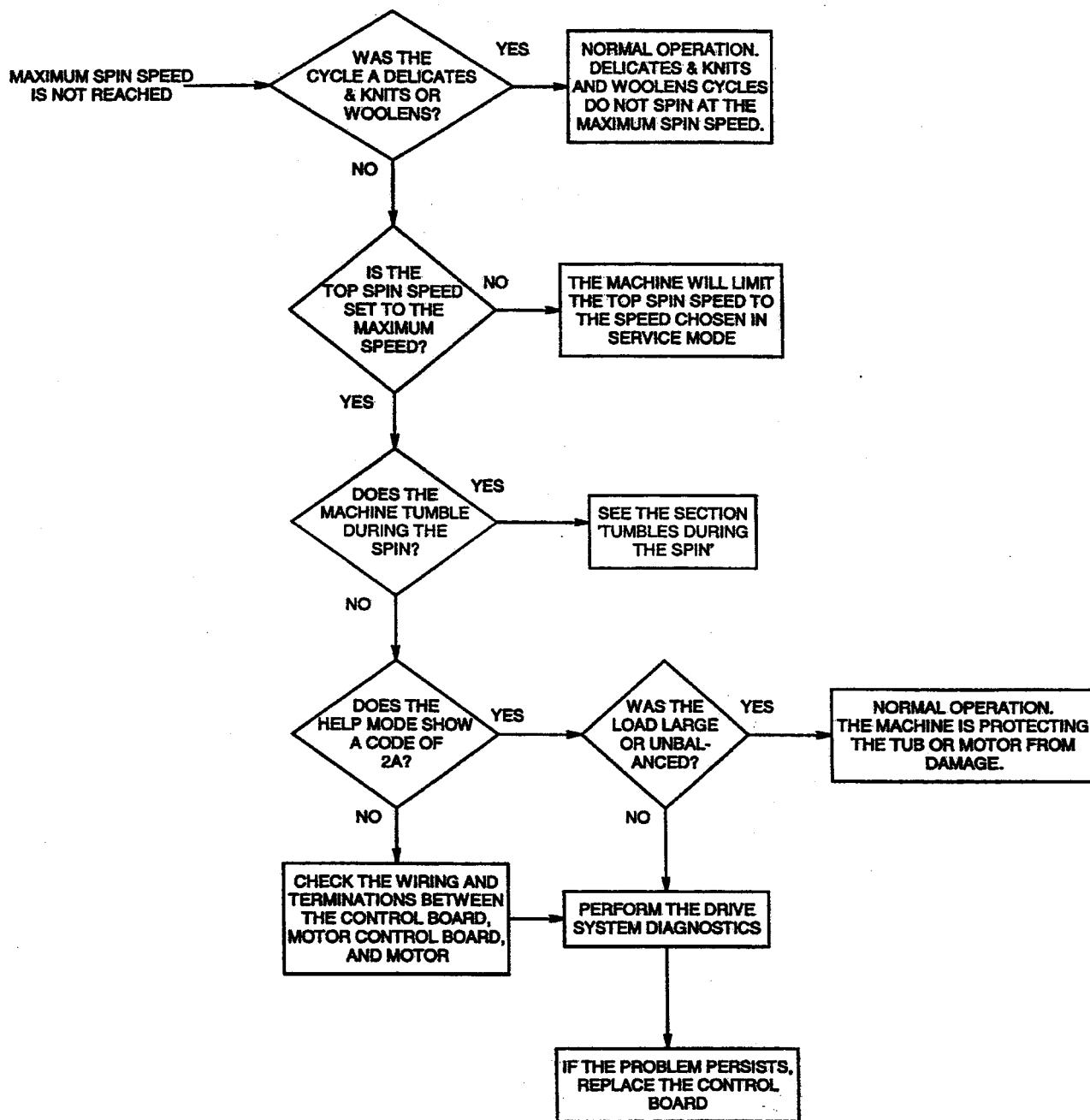
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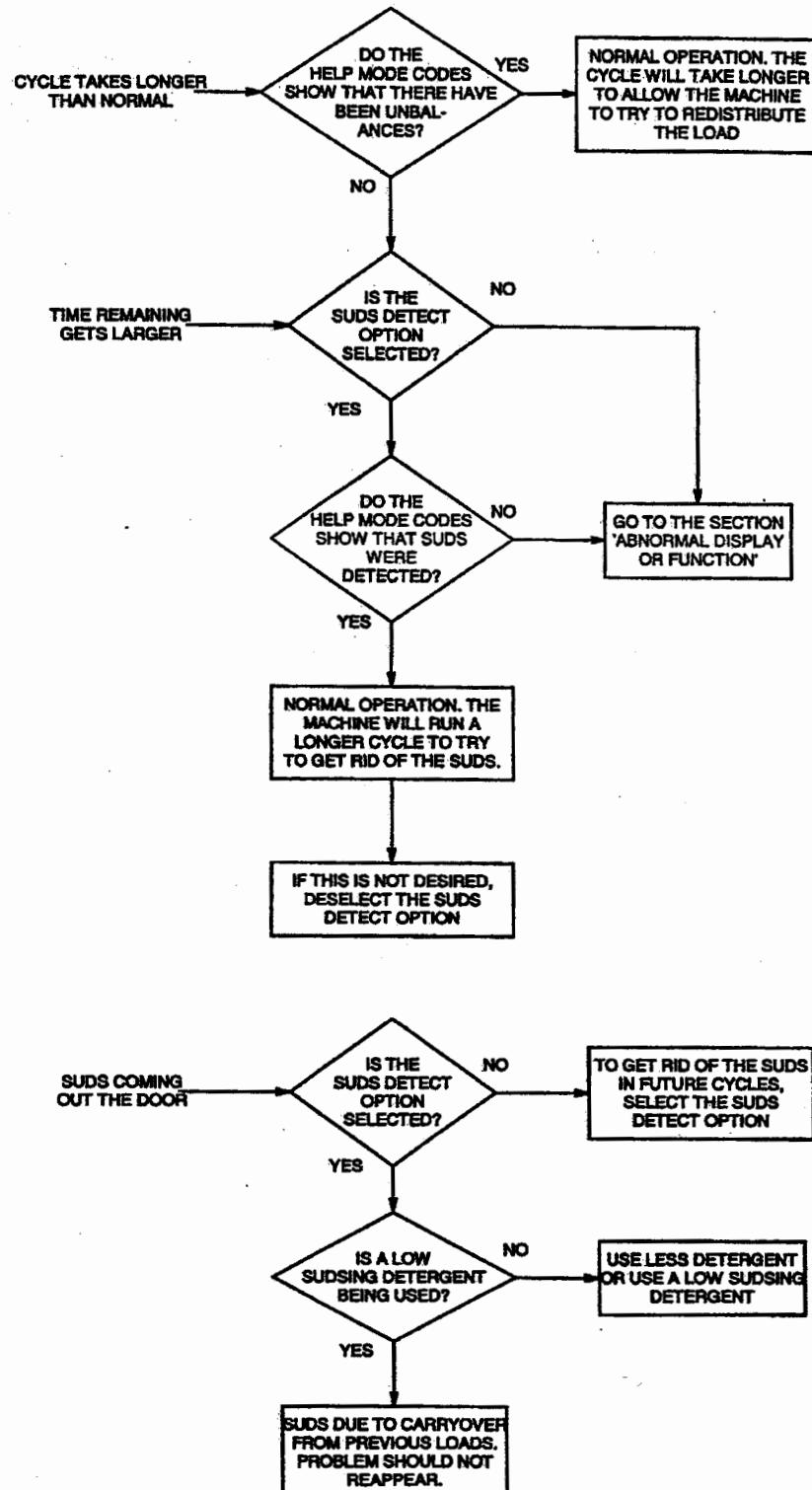
## TROUBLESHOOTING FLOW CHART



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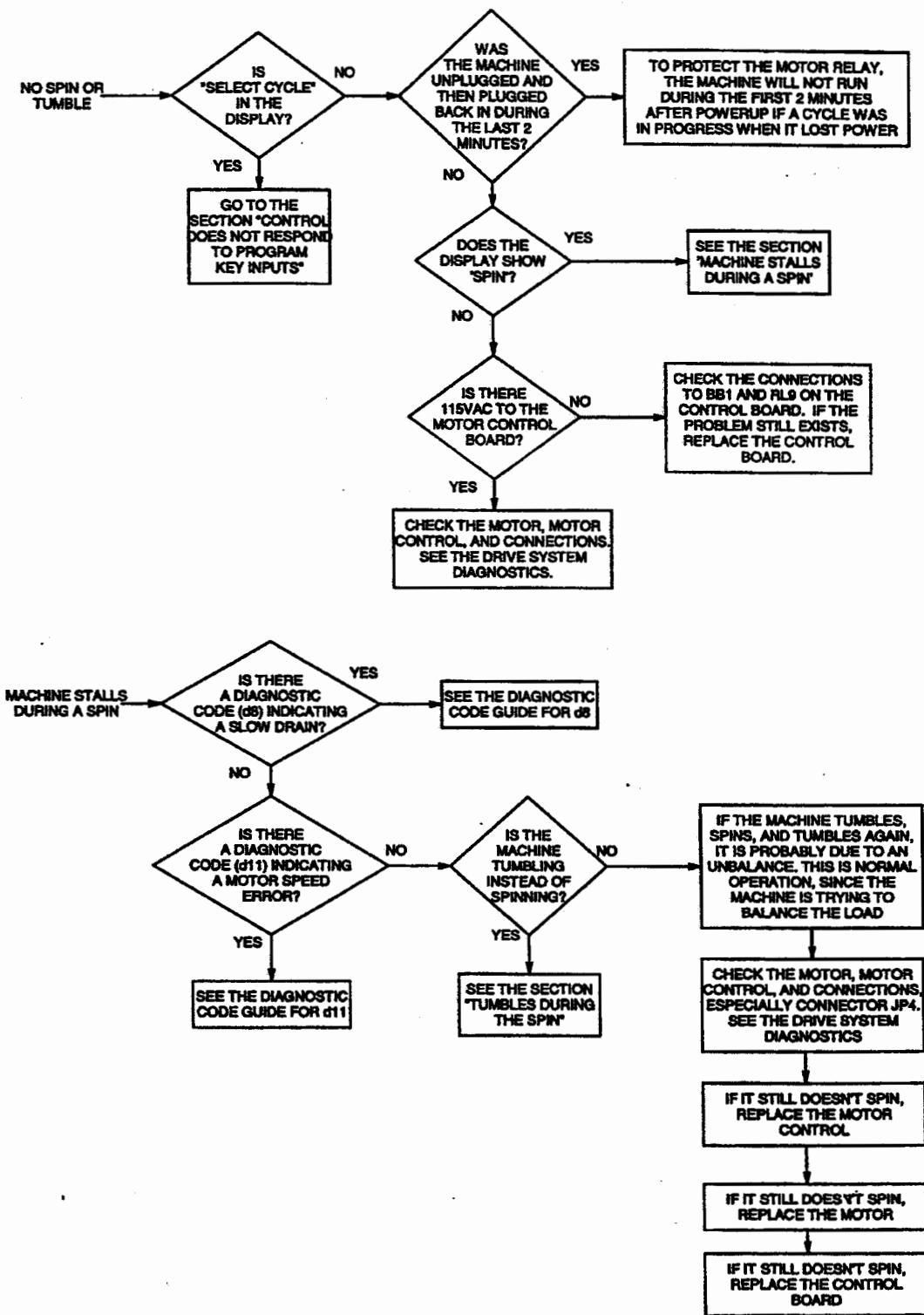
## TROUBLESHOOTING FLOW CHART



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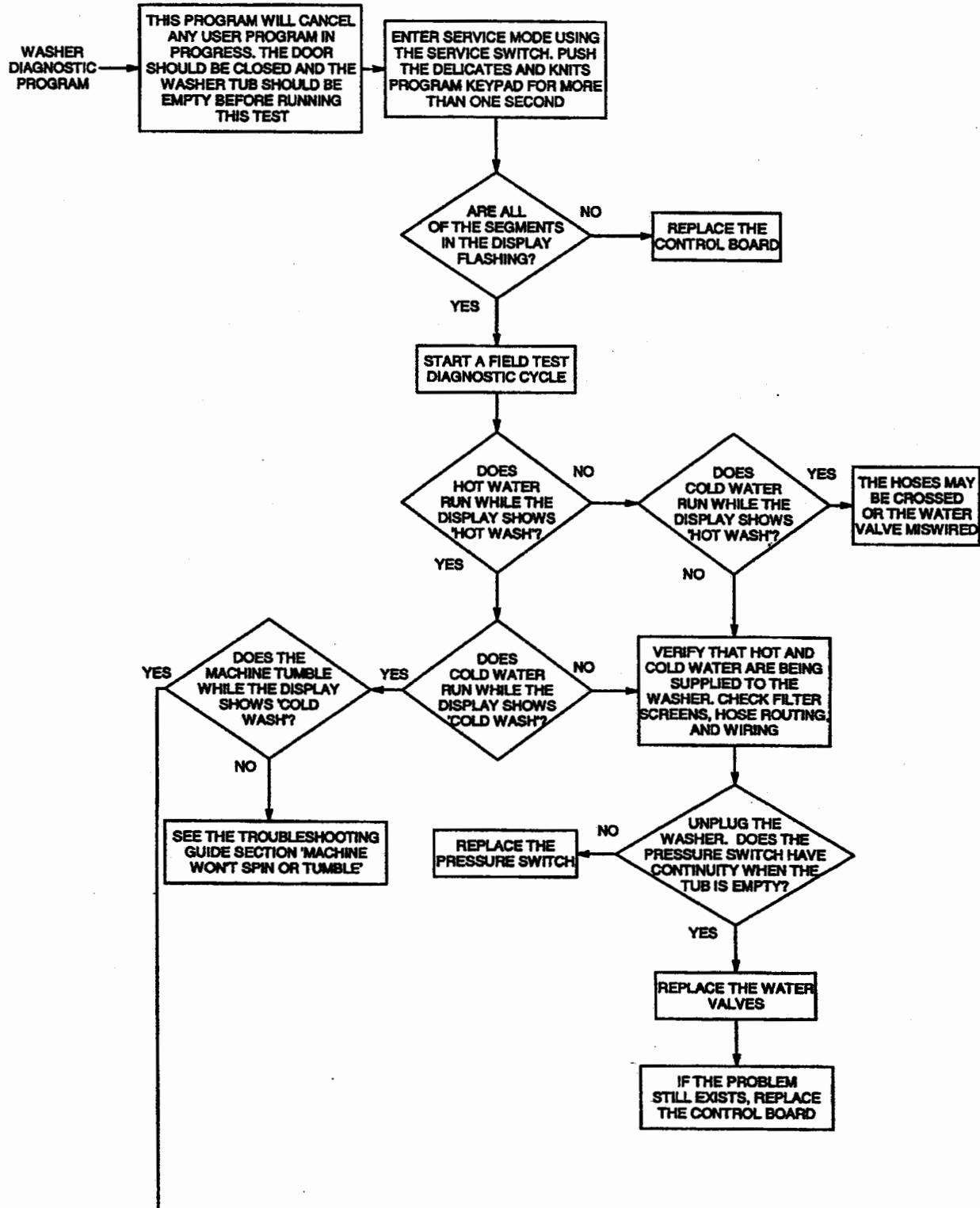
## TROUBLESHOOTING FLOW CHART



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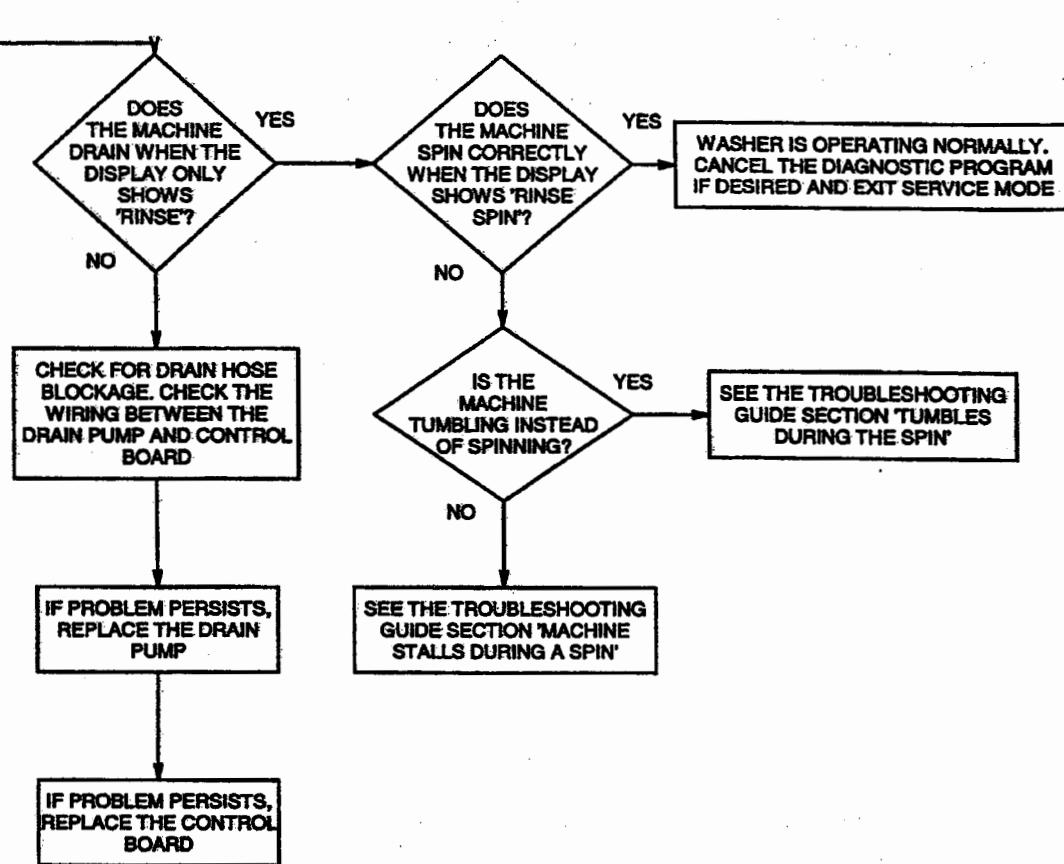
## FIELD DIAGNOSTIC CHARTS



### CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

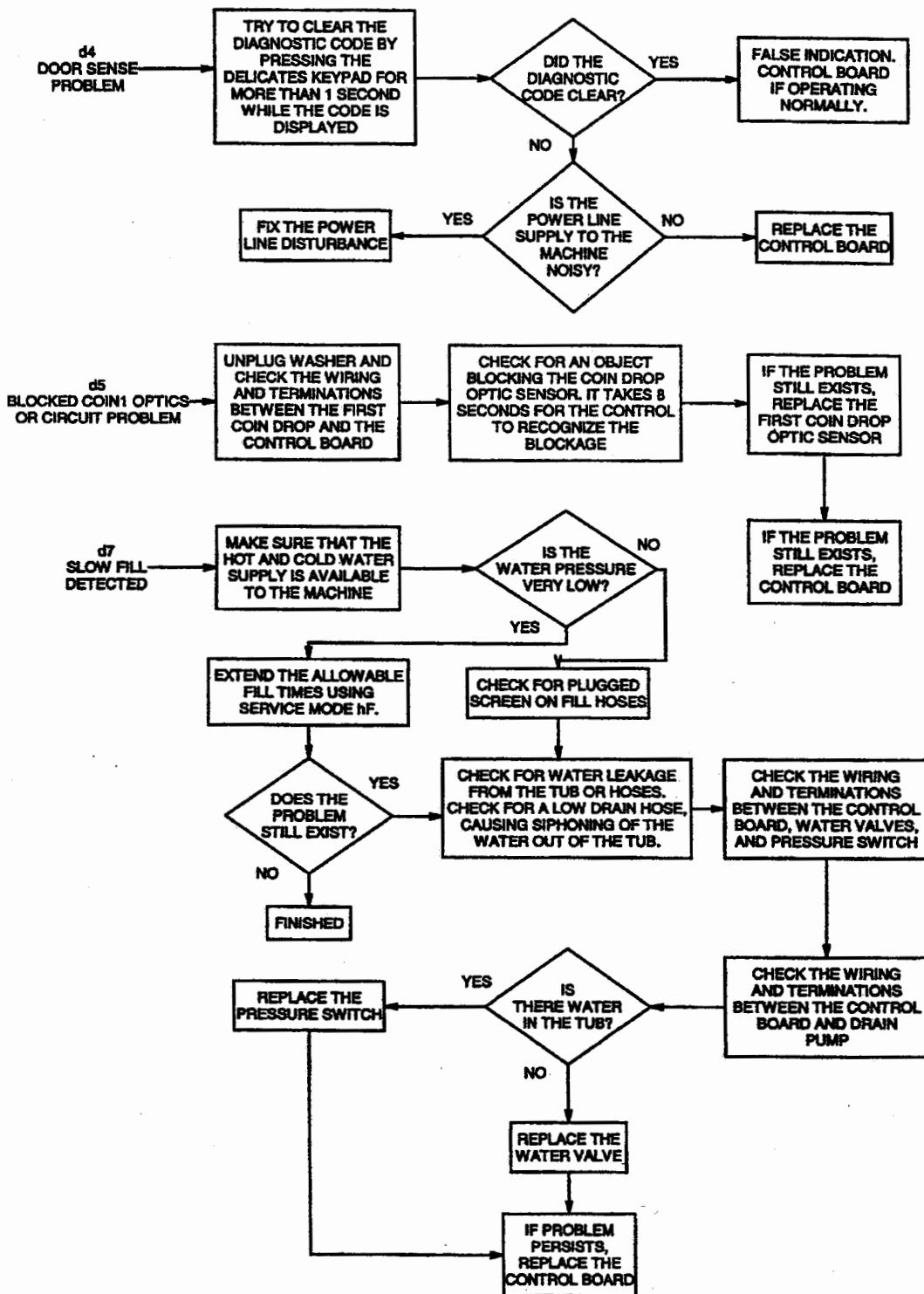
## FIELD DIAGNOSTIC CHARTS



### CAUTION

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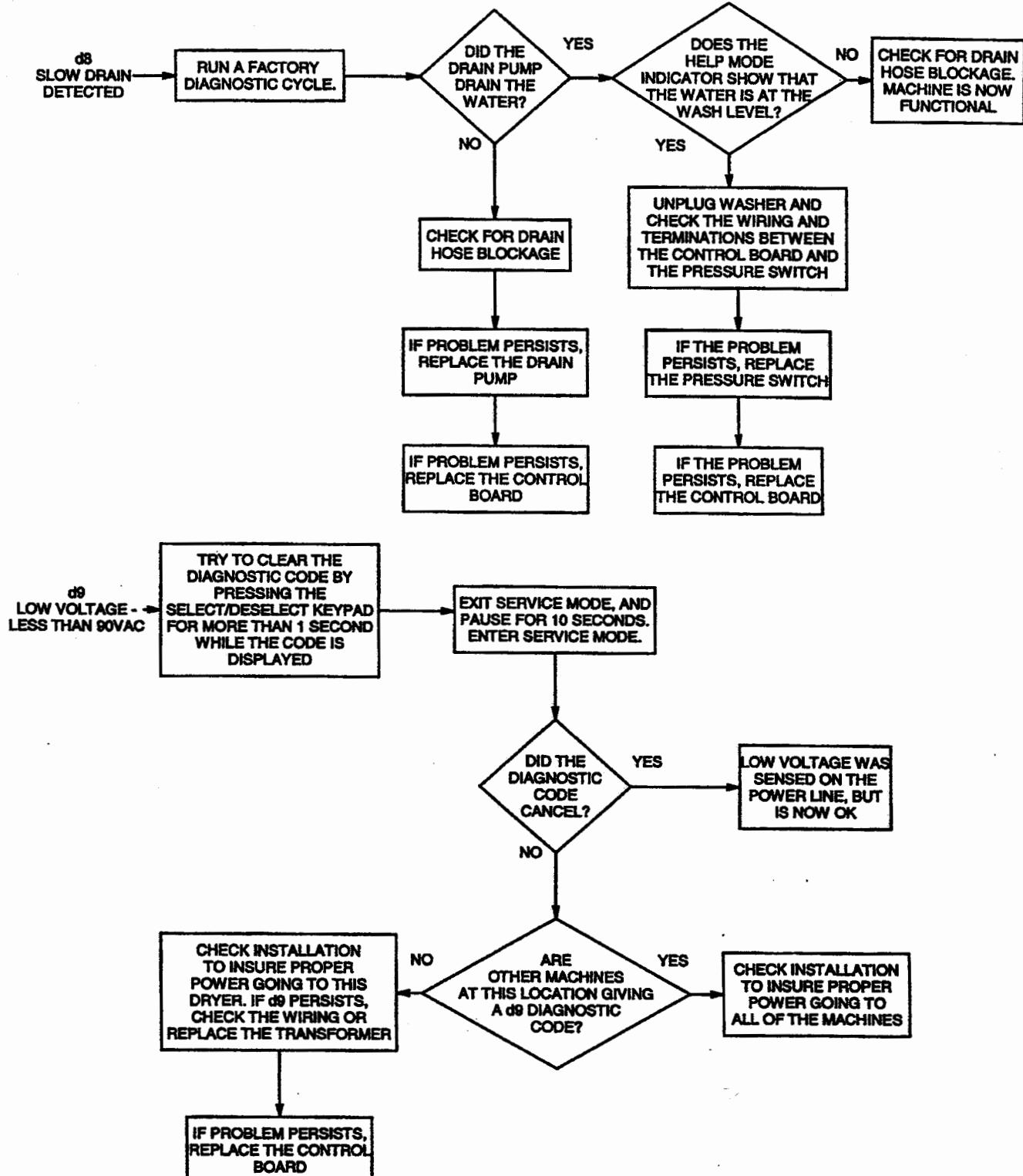
## DIAGNOSTIC CODE GUIDES



### CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

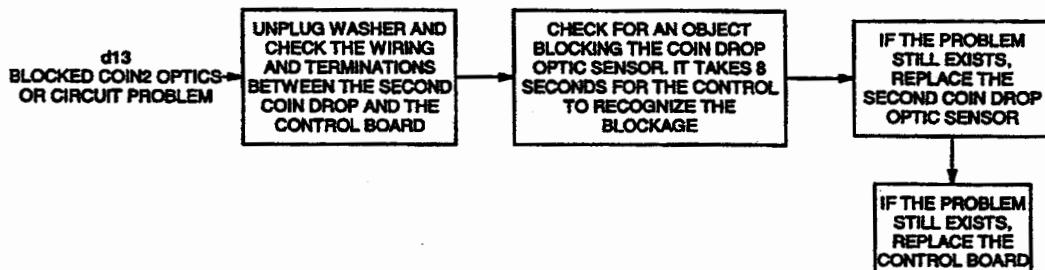
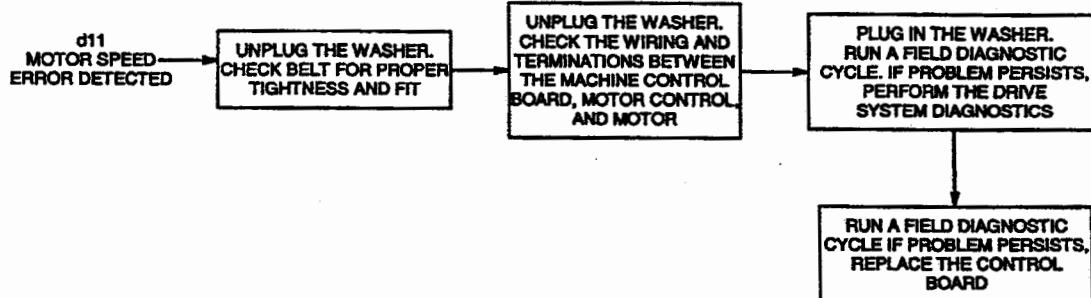
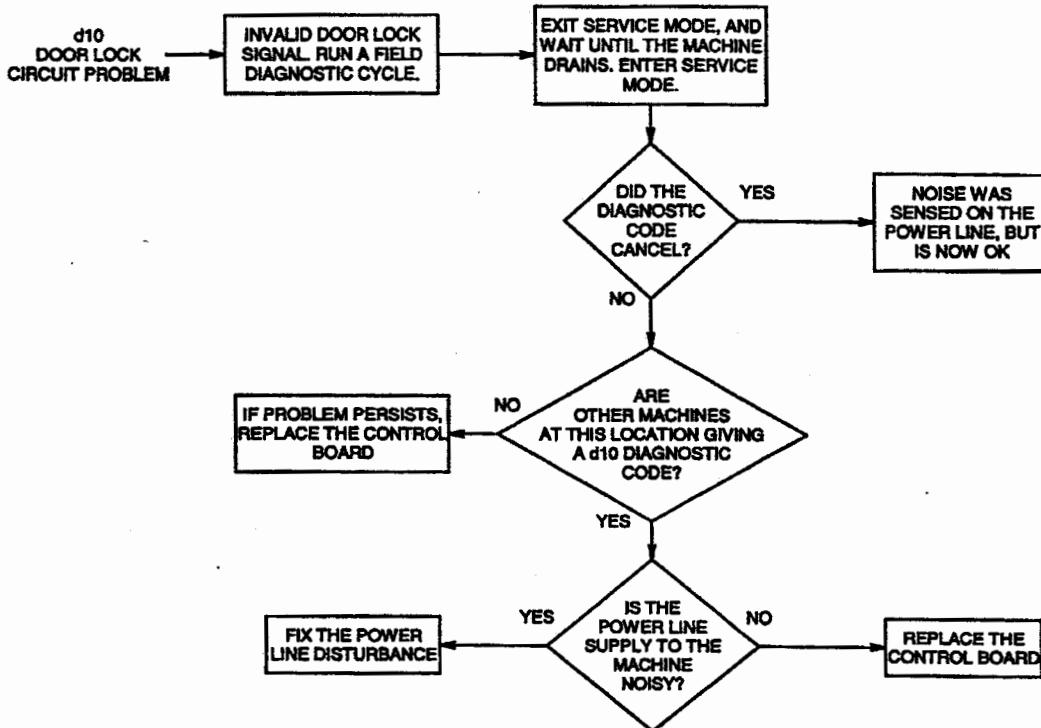
## DIAGNOSTIC CODE GUIDES



### CAUTION

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## DIAGNOSTIC CODE GUIDES



### CAUTION

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## NOTES

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Section 4. Troubleshooting

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## SECTION 5. SPECIFICATIONS & SCHEMATICS

|                                 |   |  |  |
|---------------------------------|---|--|--|
| <b>CAPACITY</b>                 | 2.9 Cubic Feet  |  |  |
| <b>ELECTRICAL</b>               | 120 volts, 60 Hz; Requires 15 amp circuit breaker or fused electrical supply. Power cord must be connected to a properly grounded and polarized outlet.   |  |  |
| <b>MOTOR</b>                    | Switched Reluctance Motor controlled by a microprocessor motor control board. Motor pulley ratio (motor to spinner RPM) 14 to 1.  |  |  |
| <b>POWER USAGE</b>              | Motor Input:      During Wash Tumble - 150 Watts<br>During Rinse Tumble - 175 Watts<br>Top Spin - 800 Watts<br>(Wattage readings taken with no clothes in spinner.)   |  |  |
| <b>TUMBLER SPEED</b>            | Wash Tumble      47-51 RPM<br>Rinse Tumble      47-51 RPM<br>High Speed Spin      800 RPM ( $\pm$ 50 RPM based upon optimum spin performance.)  |  |  |
| <b>WATER USAGE</b>              | Water pressure should be 20-120 p.s.i. (1.06-8.44 kg/cm) at inlet hose connection. Total water usage is approximately 18-24 gallons; varies with clothes load.  |  |  |
| <b>HOSE LENGTHS</b>             | Four-foot inlet hoses with inlet washers and attaches to water valve. Drain hose attaches to pump and will accommodate 36" drain stand pipe.  |  |  |
| <b>SCREW &amp; BOLT TORQUES</b> | Bolt, Counter Weight      8 ft. lbs.      ( $\pm$ 3 ft.lbs)<br>Bolt, Spin Pulley      33 ft.lbs      ( $\pm$ 3 ft. lbs)<br>Bolt, Belt Adjuster      90 in. lbs      ( $\pm$ 10 in. lbs)<br>Screw, Front Baffle      25 in. lbs      ( $\pm$ 1 in. lbs)<br>Screw, Rear Baffle      18.5 in. lbs      ( $\pm$ 1 in. lbs)<br>Clamp, Hoses      15 in. lbs      ( $\pm$ 4 in. lbs)<br>Nuts, Spinner Support      18 ft. lbs      ( $\pm$ 2 ft. lbs)<br>Nuts, Suspension Struts      7 ft. lbs      ( $\pm$ 1 ft. lbs) |  |  |

### WATTAGES

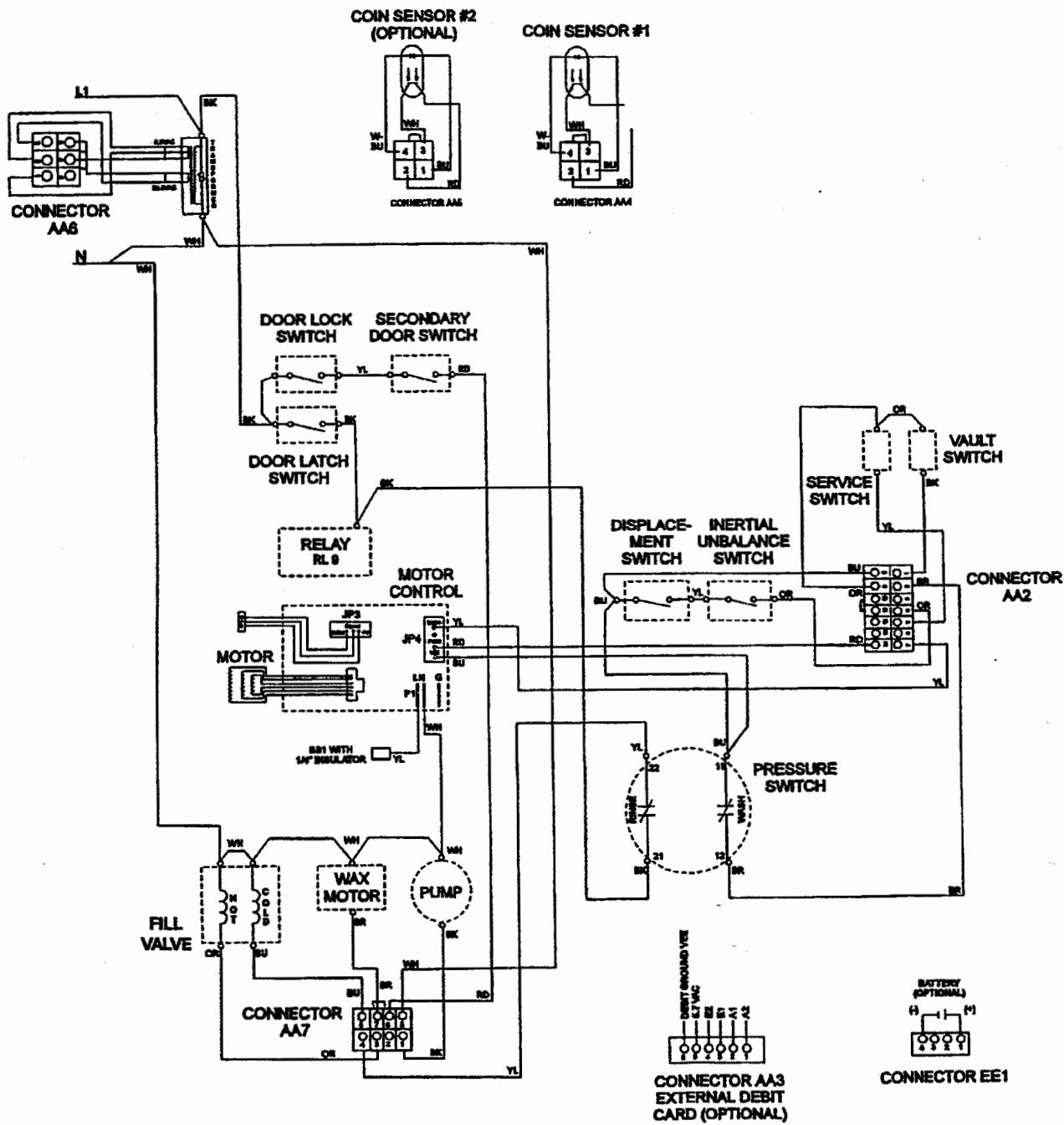
The following wattages are with no load:

| <u>Function</u>                 | <u>Wattages</u> |
|---------------------------------|-----------------|
| Tumbling (empty) & water fill   | 50-70           |
| Tumbling (full wash level)      | 110-120         |
| Tumbling (full rinse level)     | 140-150         |
| Draining (no tumble) with water | 45-50           |
| Draining (no tumble) no water   | 30-35           |
| Spinning (100 rpm)              | 85-90           |
| Spin Acceleration (100-200 rpm) | 130-150         |
| Spinning (400 rpm)              | 160-170         |
| Spinning (850 rpm)              | 400-410         |

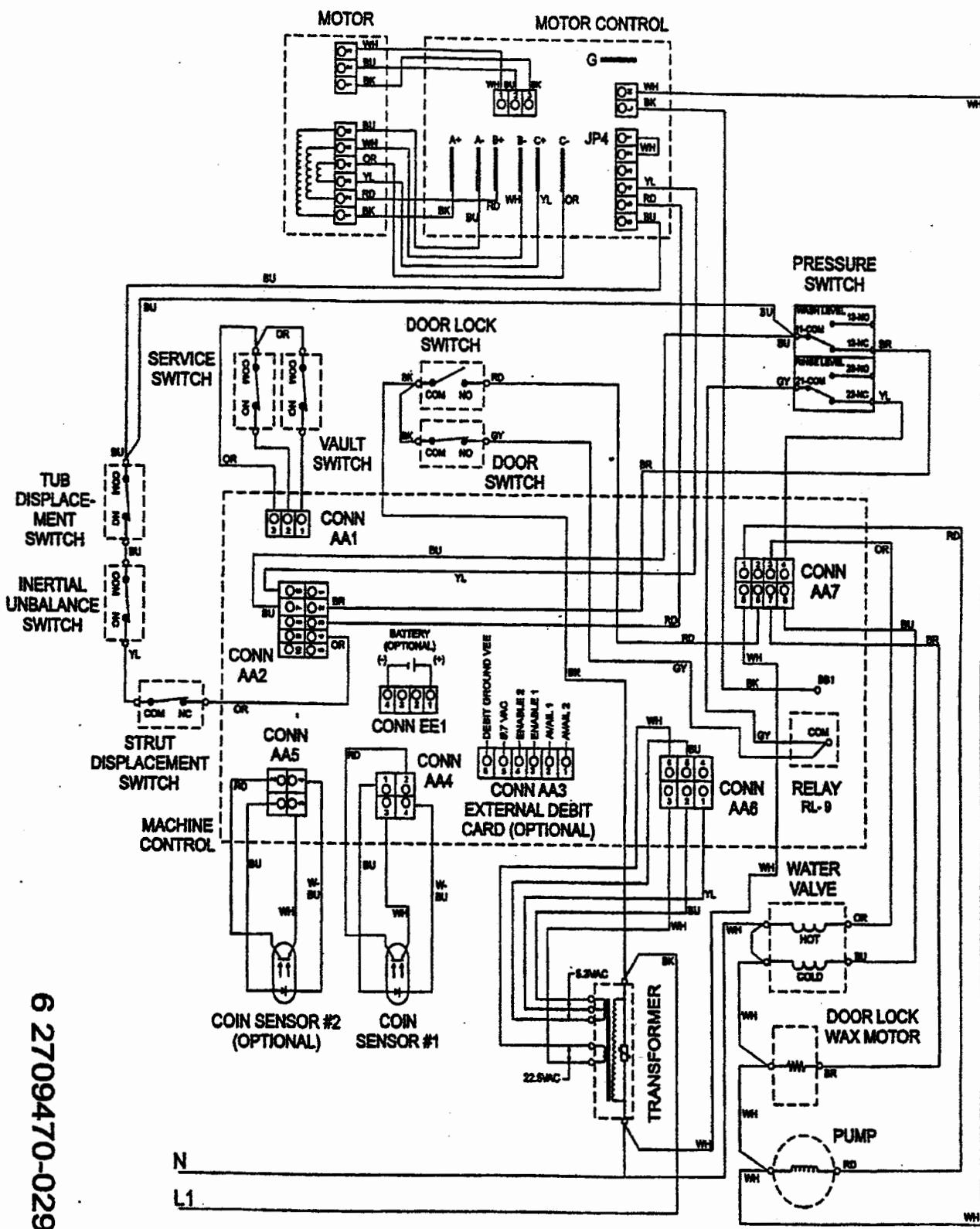
# WIRING SCHEMATIC

The Wiring and Electrical Schematics are packed in every commercial washer. The schematics are located inside the control console. Remember to return the schematic to the original location for future reference. The schematic for MAH14 PD & PS models is shown below:

## MAH14 WIRING SCHEMATIC (Original)



# WIRING SCHEMATIC MAH14PD MAH14PS (1st Revision)



6 2709470-0298

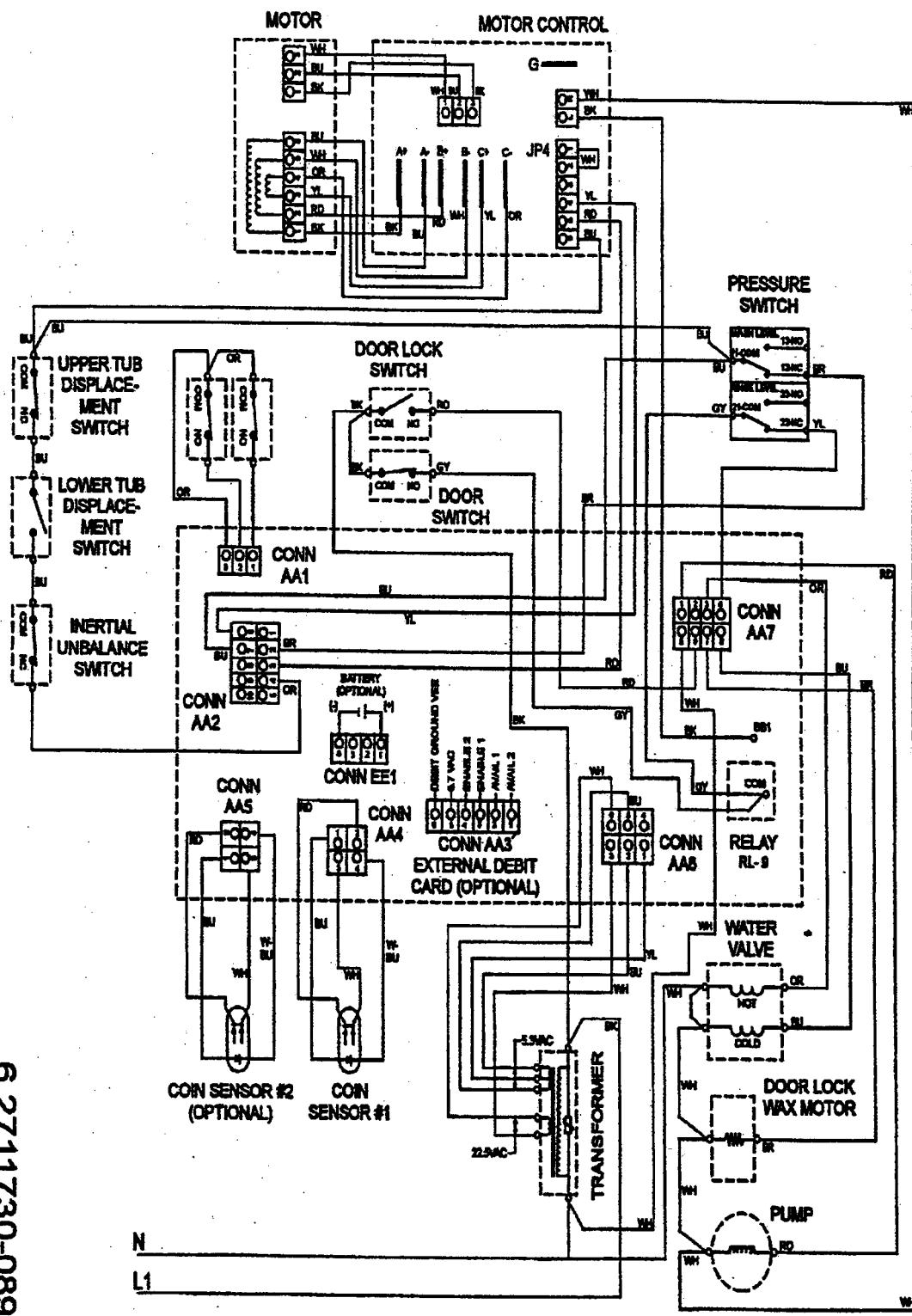
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Section 5. Specifications & Schematics

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WIRING SCHEMATIC MAH14PD MAH14PS (2nd Revision)



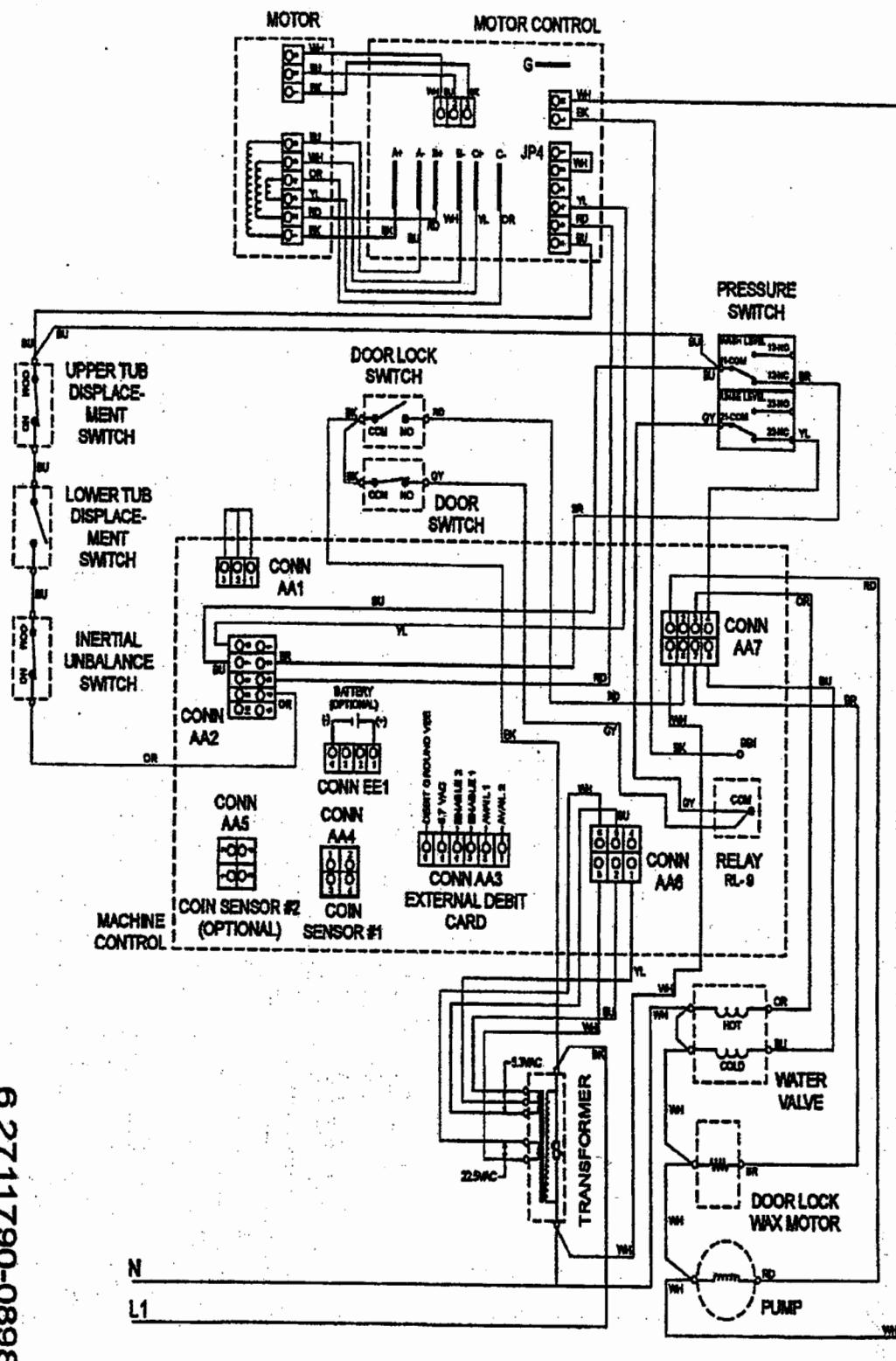
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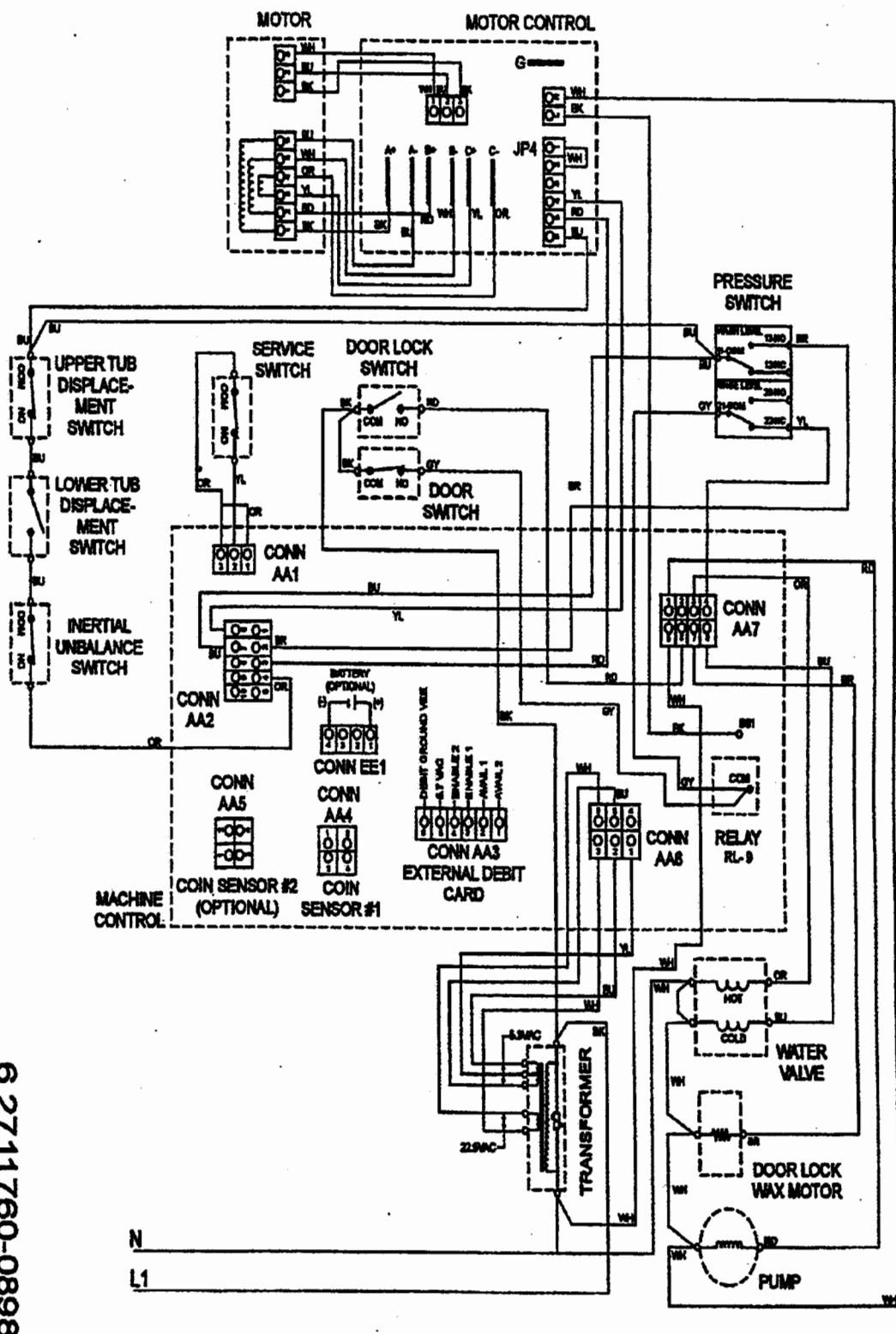
Section 5. Specifications & Schematics

5-4

## WIRING SCHEMATIC MAH14PR

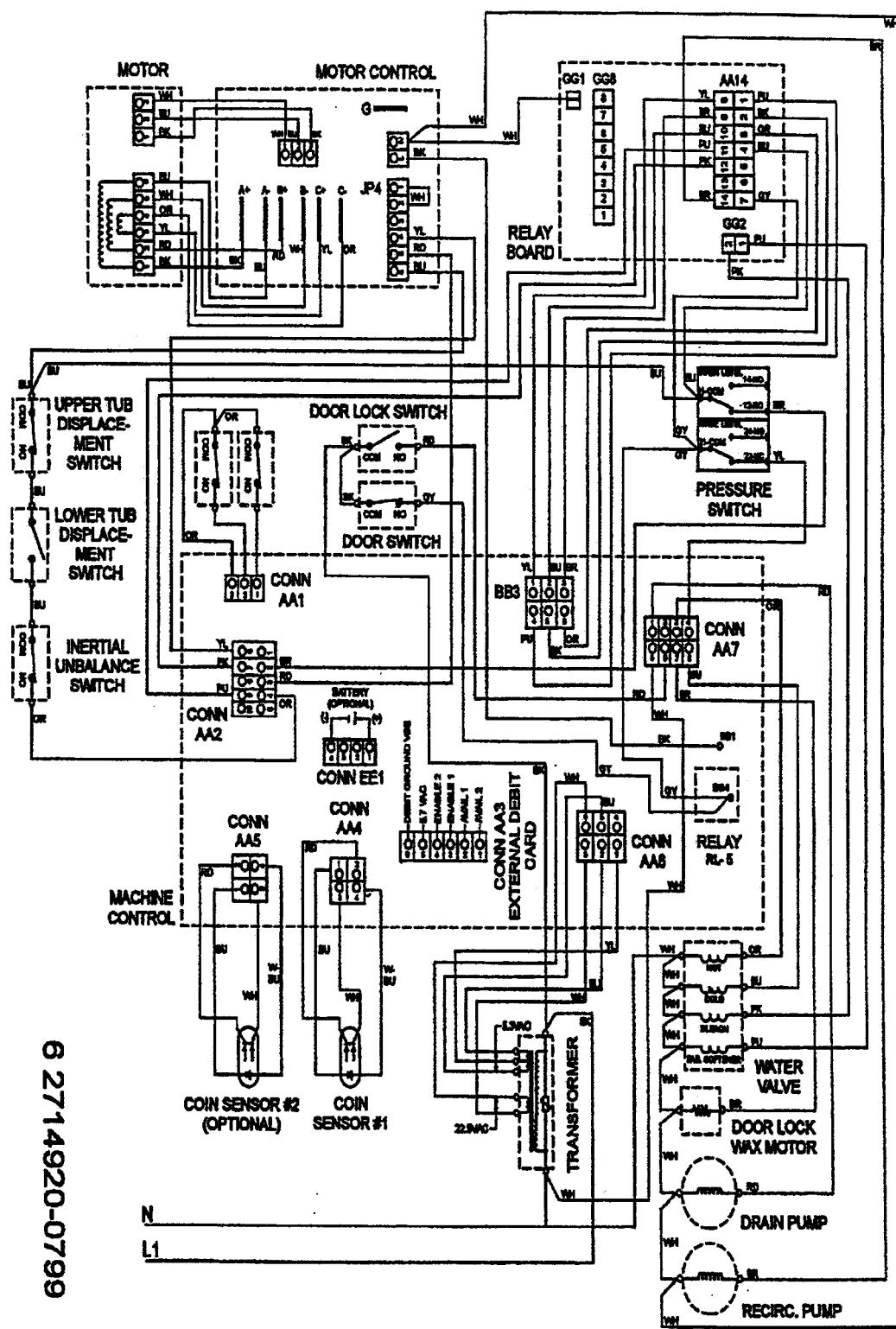


## WIRING SCHEMATIC MAH14PN

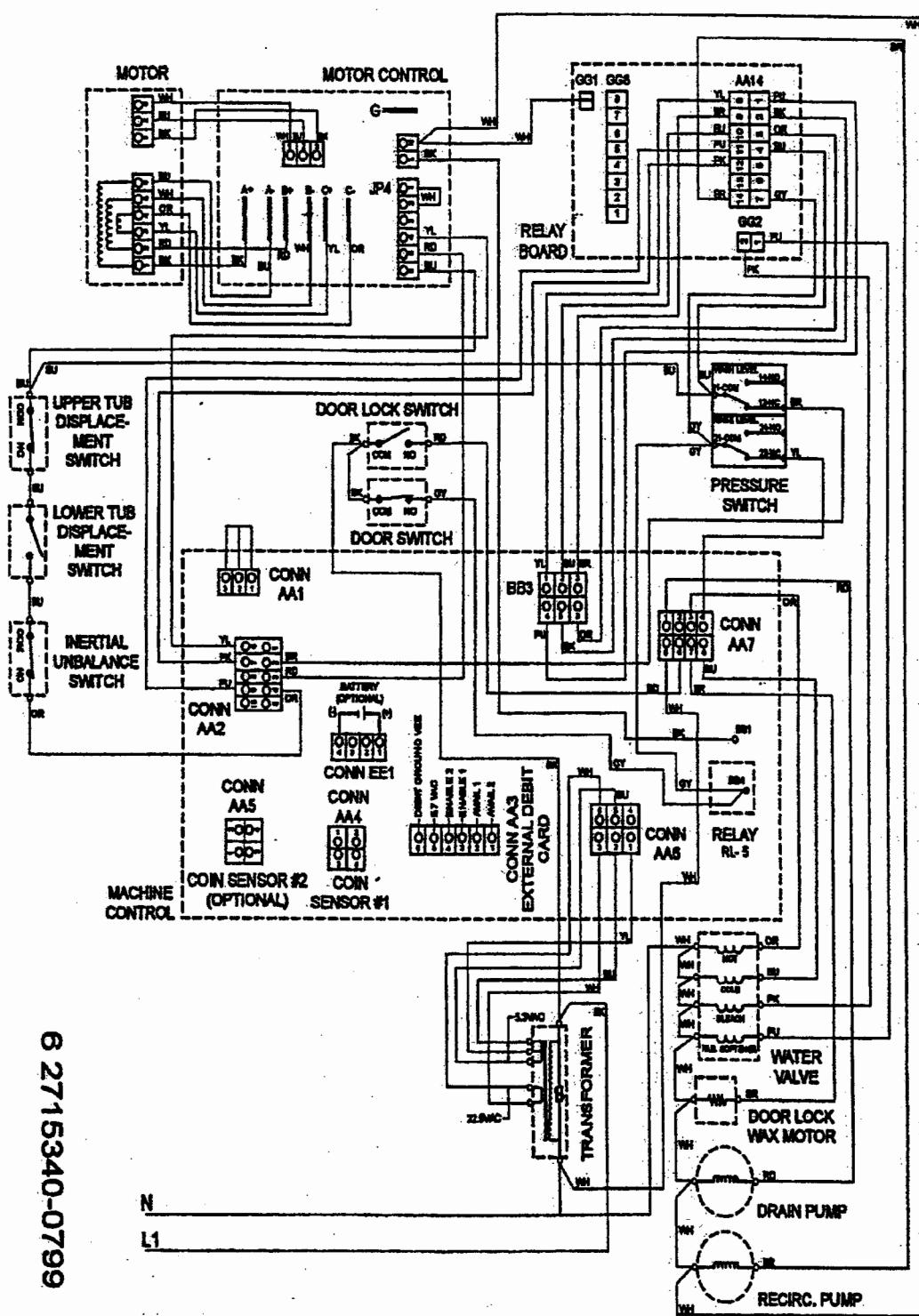


62711760-0898

## WIRING SCHEMATIC MAH20PD MAH20PS

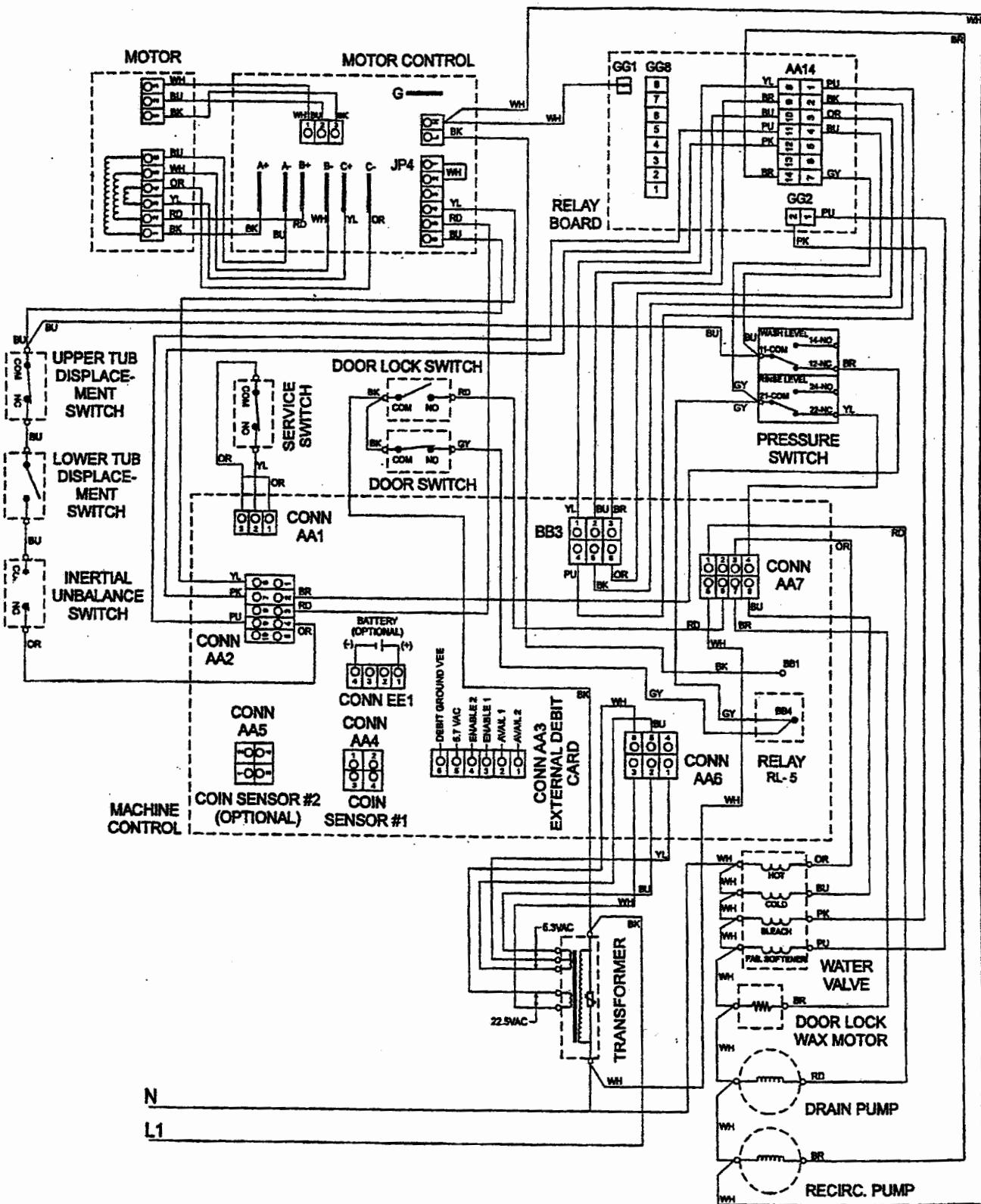


## WIRING SCHEMATIC MAH20PR



6 2715340-0799

## WIRING SCHEMATIC MAH20PN



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Section 5. Specifications & Schematics  
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## SECTION 6. PRODUCT DEFINITION: MODELS MAH21PD, PN, PR, PS

The model MAH21 is similar to the MAH20 washer, with the following exceptions:

- The door locking mechanism was changed from a wax motor to a solenoid, resulting in faster locking and unlocking of the door. However, a wax motor is installed in the door lock mechanism for the sole purpose of unlocking the door in the event of a power failure. **Figure 2**
- The water level pressure switch was relocated from the console to the top of the drain pump, thus eliminating the airdome hose. **Figure 6**
- New detergent dispenser system. **Figure 10**
- A sump cover is placed directly above the sump area which catches detergent and allows for a better mixing of the detergent with the wash water, and serves as a strainer. This eliminates the separate recirculation pump. **Figure 8**
- At series 14 a different drive motor system was introduced. The operation will be similar but the motor and motor control board are different. **Figure 11**
- New machine control board with 1000 rpm capability. **Figure 10**

## PRESSURE SWITCH

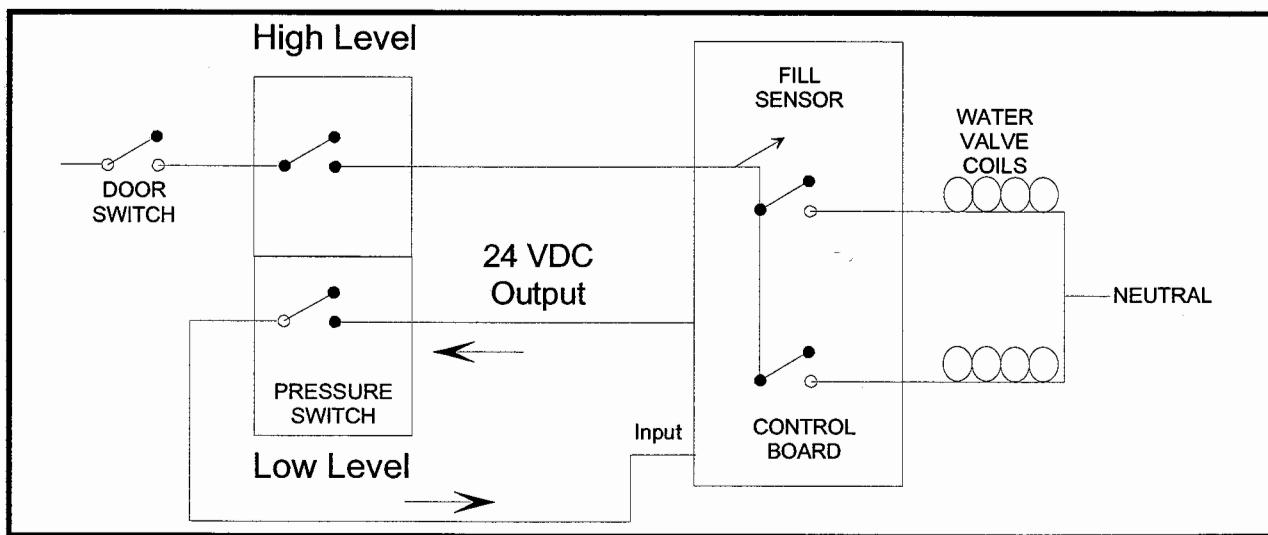
### PRESSURE SWITCH INPUT

The pressure switch is a two level pressure switch. (**Figure 1**) The low level contacts provide a path for a 24 VDC circuit, the high level contacts provide an electrical path for 120 VAC to the water valve relays on the board.

During wash fill, the low level of the pressure switch is sensed (with 24 VDC) and provides an indication to the control board that

the water level has satisfied the low level setting. Once satisfied, the 24 VDC circuit is opened. The board then opens the water valve relays and shuts off the water valves.

The high level contacts are used mainly for the suds detection routine and also for high level settings in the MAH21PN model.



**Figure 1**

## DOOR LOCK SOLENOID

The Door Lock/Unlock Solenoid signal is a pulse sent to a push-pull solenoid in the door lock assembly. The solenoid is attached to a lever which moves a slider in the mechanism to lock and unlock the door. The solenoid has two coils, one for locking and one for unlocking.

### DOOR LOCK Door Lock Operation

When the door is closed, the hoop on the door enters the opening at the bottom of the door lock assembly and meshes with fingers on the rotating cam. As the cam is rotated back past center a strong spring toggles the cam to the back thus drawing the door tightly closed. At the same time, the door inner liner presses an actuator button on the door lock assembly. This actuator causes a rocker arm to release the door switch button. The door switch (which is a single pole, double throw switch) toggles to the door-closed position.

At this time nothing further happens until a cycle is started.

When a cycle is started the main control board will first energize the wax motor (it is located at the right side of the door lock assembly). The wax motor operation does not cause the door to lock. The main purpose is to assure release of the door lock in the event of a power failure.

Approximately two minutes after the door is closed, cycle is started, and water level reached, the control sends a pulse of 120 volt AC to the door-locking coil of the solenoid.

The solenoid pulls the locking lever to the left which in turn pushes the slider to the right to block the rotating cam (which locks the door). As the locking lever moves it also actuates the door-locked (spin enable) switch.

If a door lock solenoid fails, the door will not lock; the door lock switch would not be made. After several attempts to lock the door fail, the control will "flutter" the "DOOR LOCKED" display and then would pause the cycle. RESELECT CYCLE would be displayed.

One of the new features on the MAH21 control is a "notification" to the user when the door is not locked for any reason. The words "DOOR LOCKED" in the display will blink rapidly or "flutter". A "d17" will be posted in the diagnostic codes when a machine is unlocked at the beginning of final spin. A help code of "17" will be posted when machine determines door should be locked, but verifies it is not.

The door lock sequence will be repeated for a number of times (up to seven) in an attempt to lock the door. Should that fail, the cycle will be paused and "RESELECT CYCLE" will be posted in the display. The power will be removed from the wax motor. As the wax motor cools the piston will be drawn back which will result in the door lock slider being pushed back to the left and to the unlocked position.

At the end of the cycle, as the coast-down from spin begins, power is removed from the wax motor. After the "shake-out sequence" the control sends a 120 volt AC pulse to the door release coil. The solenoid will push the locking lever to the right into the unlocked position. This pulls the slider away from the rotating cam, releases the door-locked switch and unlocks the door. The door may then be pulled open.

Depending on how quickly the wax motor cools, the actual release of the door can be from either the wax motor or the door release solenoid.

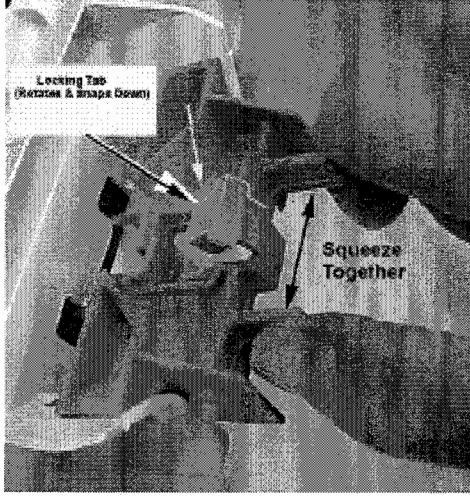
## SERVICE PROCEDURES

### DOOR LATCH HOOP

The latch hoop was redesigned, eliminating the latch hoop support and spring.

#### Removal

1. Remove the door assembly from the washer.
2. Disassemble the door assembly by removing the outer door panel.
3. Locate the locking tab on the door latch hoop and pry the tab up. **Figure 2**
4. Squeeze the side tabs to disengage the locating pins on the sides of the latch hoop from the door liner.

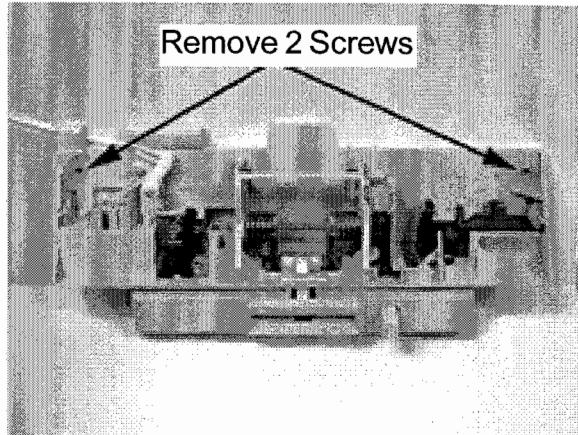


**Figure 2**

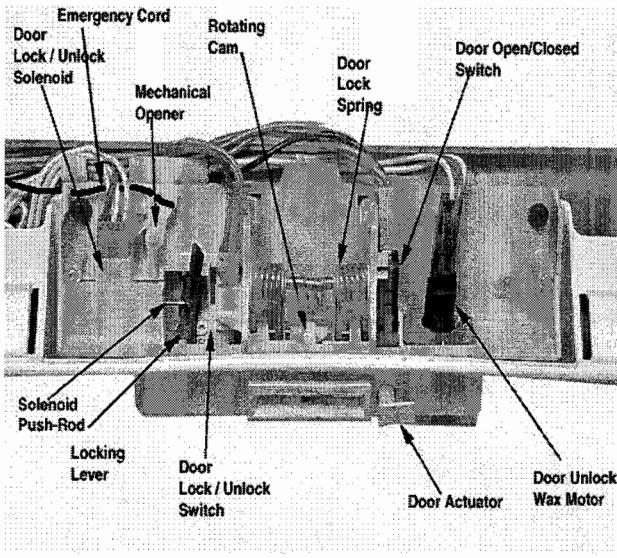
### DOOR LOCK MECHANISM

#### Removal

1. Disconnect power to the washer.
2. Remove the front panel, dispenser bezel and lift the top cover to expose the door lock assembly.
3. Remove the individual wire harnesses from the assembly and the two mounting screws. **Figure 3**
4. Roll the top of the door lock assembly forward and lift from the front shroud assembly.

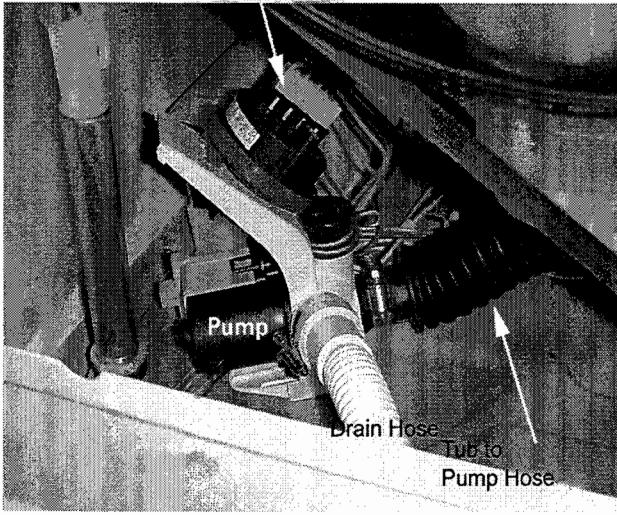


**Figure 3**



### REAR ACCESS PANEL

#### Pressure Switch

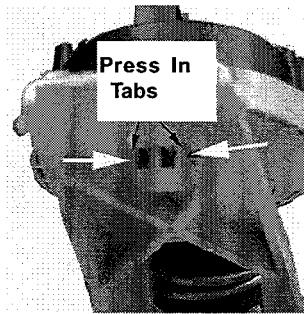


## PRESSURE SWITCH

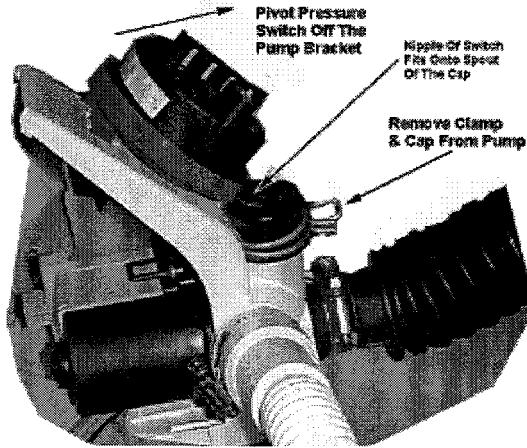
The pressure switch was relocated from the console and mounted to a bracket extension molded as part of the pump assembly. A vertical outlet on the pump has a rubber cap positioned over the outlet with a spout and is clamped into position. The nipple of the pressure switch is inserted into the rubber spout. Pressurization in the vertical outlet of the pump actuates the pressure switch and determines proper fill levels.

### Removal

1. Disconnect power to washer.
2. Remove the rear access panel or the front panel to access the pressure switch.
3. Place a towel beneath the pump.
4. Remove the plastic bag covering the pressure switch. Press in the locking tabs on the back of the pressure switch and remove the pressure switch off the pump bracket. **Figure 6**
5. Grasp the pressure switch and lift the nipple of the pressure switch from the pump cap. **Figure 7**



**Figure 6**



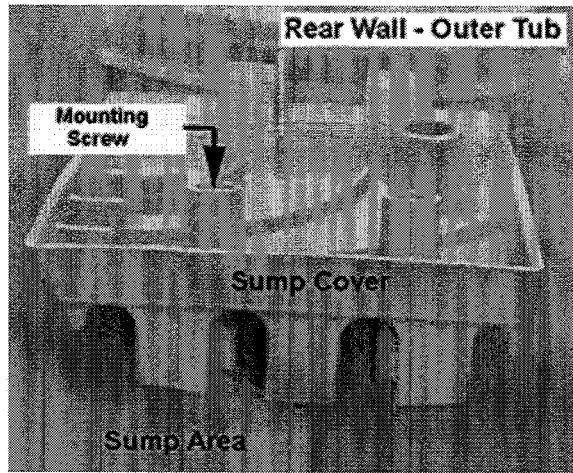
**Figure 7**

## SUMP COVER

The sump cover is located in the lower rear area of the outer tub assembly, directly above the sump area and the drain outlet. The purpose of the sump cover is to capture the detergent dispensed into the top dispenser. During normal operation, the sump cover is flushed of detergent during the wash cycle.

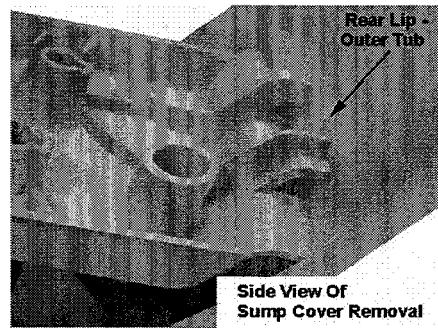
### Removal

1. Remove the front panel, tub cover and the spinner.
2. Remove the mounting screw securing the cover to the outer tub. **Figure 8**



**Figure 8**

3. Lift the front of the sump cover and disengage from rear lip of outer tub. **Figure 9**



**Figure 9**

# DISPENSER

A new dispenser system was introduced at series 13. The four coil inlet water valve on the rear of the washer changed to a two coil water valve and a two coil water valve was integrated onto the dispenser. Below is a drawing of the new dispenser system.

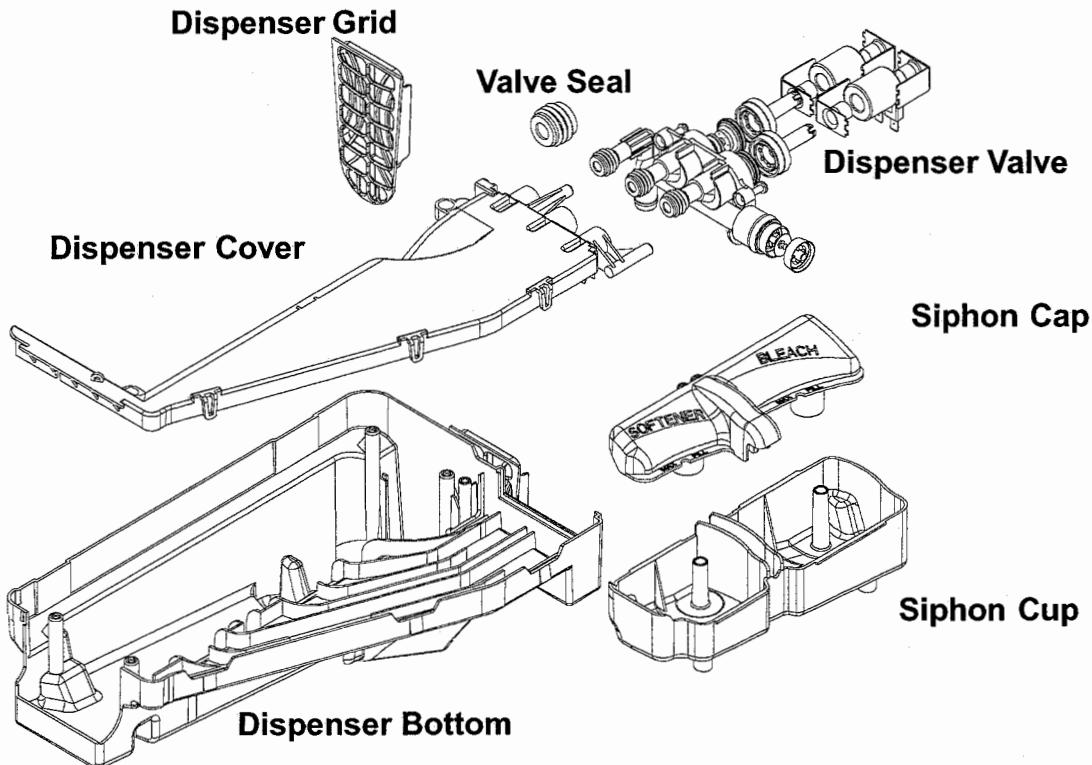


Figure 10

## MOTOR and MOTOR CONTROL

A new motor and motor control was introduced at series 14. Below are drawings depicting the new motor drive system. Diagnostics are similar to the previous motor and motor control board with the exception of a revised motor connector harness as depicted below.

See Figure 10

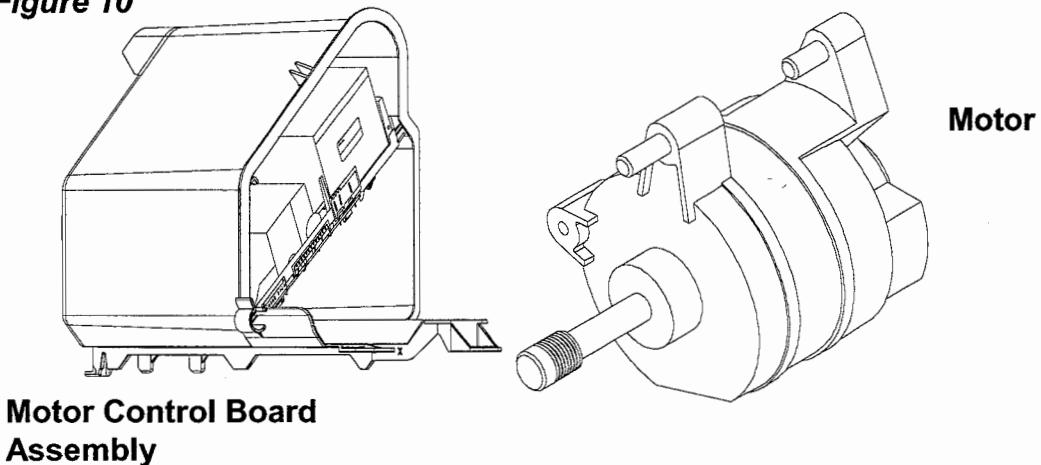


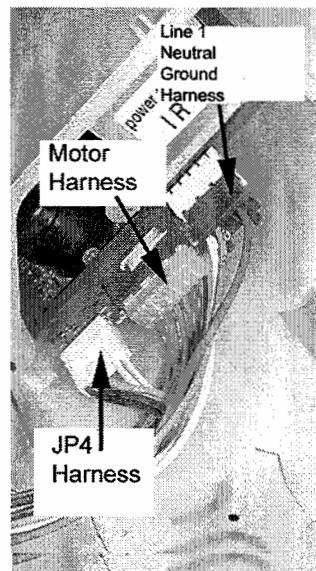
Figure 11

## **Motor and Motor Control Test**

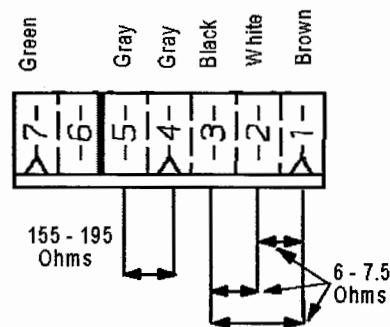
1. Disconnect power to the washer.
2. Remove the front panel and pull the JP4 Connector from the motor control board.
3. Reconnect the washer power cord to supply voltage. Make sure the door is closed. Select a cycle and the motor control will immediately execute a test routine and motor should run, rotating the spinner at 50 rpm.
4. **If the motor runs**, and spinner rotates at the proper speed, the problem lies outside of the motor and motor control circuit. Disconnect power to the washer and reconnect the JP4 connector to the motor control.
5. **If motor does not run:** Check for 120 VAC at the motor control board harness.

**If voltage is present**, then problem lies with the motor and motor control system.

- Check for loose electrical connections at motor, and motor control board.
- Check phase windings of the motor. If motor windings are good, replace the motor control board. **Figure 13**



**Motor Control Board/JP4 Connector**



**Schematic – Motor Harness**

# TROUBLESHOOTING GUIDE

## Leaking

- Make sure supply hose connections are not leaking. Check for rubber gasket damage due to overtightening.
- Make sure end of drain hose is correctly inserted and secured to drain facility.
- Avoid overloading which can push the door partially open.
- Check internal hoses and hose connections
- Check tub cover. Remove, reposition and reinstall the tub cover seal. Seal seam must be at the top of the tub cover.
- Check for damaged door boot.

## No Tumble

- Washer does not tumble for the first 30 seconds after the door has been opened and closed.
- Check for loose connections at machine control board, motor control board and motor.
- Perform ***Motor and Motor Control Test.***
- Washer does not tumble during some drains and rinse fills.

## No Water Fill

- Check to make sure water supply turned on fully.
- Normal water level is only 2.5 to 5 inches inside the spinner.
- Check for kinks in inlet hoses.
- Check for clogged inlet screens.
- Visually check hot and cold separately at dispenser for proper flows.
- Check wire connections at control board.

## Noisy

- Clothes washer should be leveled properly.
- Weak floors can cause vibration and walking.
- Check for loose lower front weight
- Be sure rubber feet are installed on leveling legs.

- Check that the leveling leg lock nuts are tightened.
- If complaint is a high-pitched noise during fill then disconnect supply hoses and clean screens.
- Check for proper spring placement of outer tub support springs.
- Check struts.

## Tub is completely full of suds

- Run the clothes washer through another complete cycle using cold water and no more detergent.
- Reduce detergent amount for that specific load size and soil level.
- Use high efficiency or low sudsing detergent specially formulated for front load washers.
- Check for restricted drain system.
- Check for loose wire connections at control board and pump.
- Check to see if belt fell off motor and pulley.

## Wet Clothes

- Very small clothes loads can cause unbalances - add additional towels.
- Excessive suds may have been present. Check for diagnostic code 16.
- Check unbalance harness connections at all switches and at main harness connection on top of outer tub assembly.
- Inertial unbalance switch tripped too soon, resulting in lower spin speeds.
- Check for restricted drain system.

## Will Not Lock

- Door not all the way closed.
- Check electrical connections at lock assembly and machine control board.
- Check lock assembly.

### **Will Not Unlock Door**

- Unplug power cord and wait 2 minutes to see if machine unlocks.
- Check for door locked switch circuit to be closed at machine control.
- Check for loose electrical connections at door lock and at machine control board.
- Manually open door lock by pulling emergency cord, then check door lock assembly.

### **Will Not Start**

- If display is not lit, check for proper voltage at power outlet.
- Make sure door is fully closed.
- Plug cord into live electrical outlet.
- Check fuse or reset circuit breaker.

### **Will Not Drain**

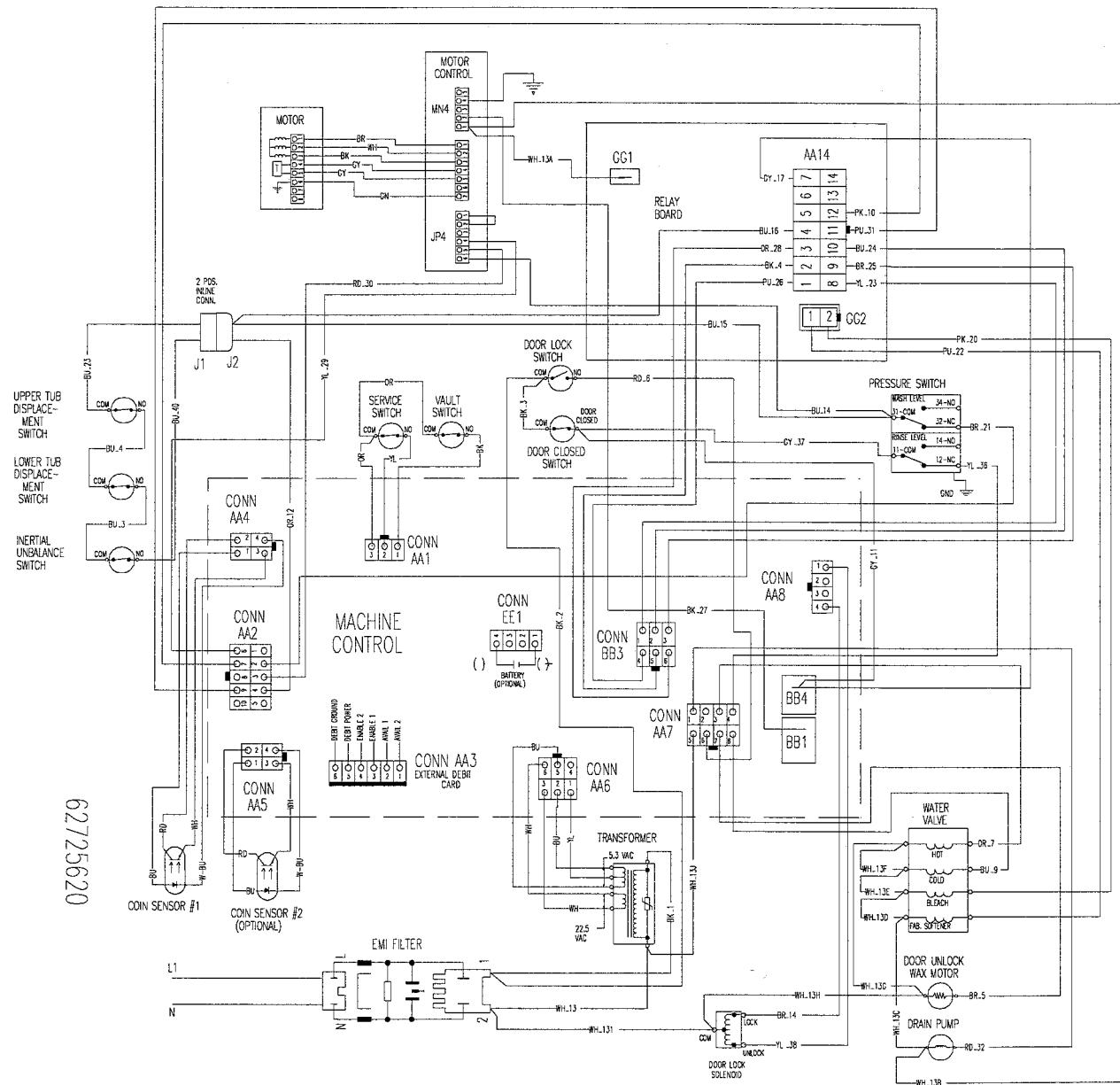
- Check for restricted drain system.
- Check for 120 VAC at the pump when a spin cycle is selected.

### **Wrong Water Temperature**

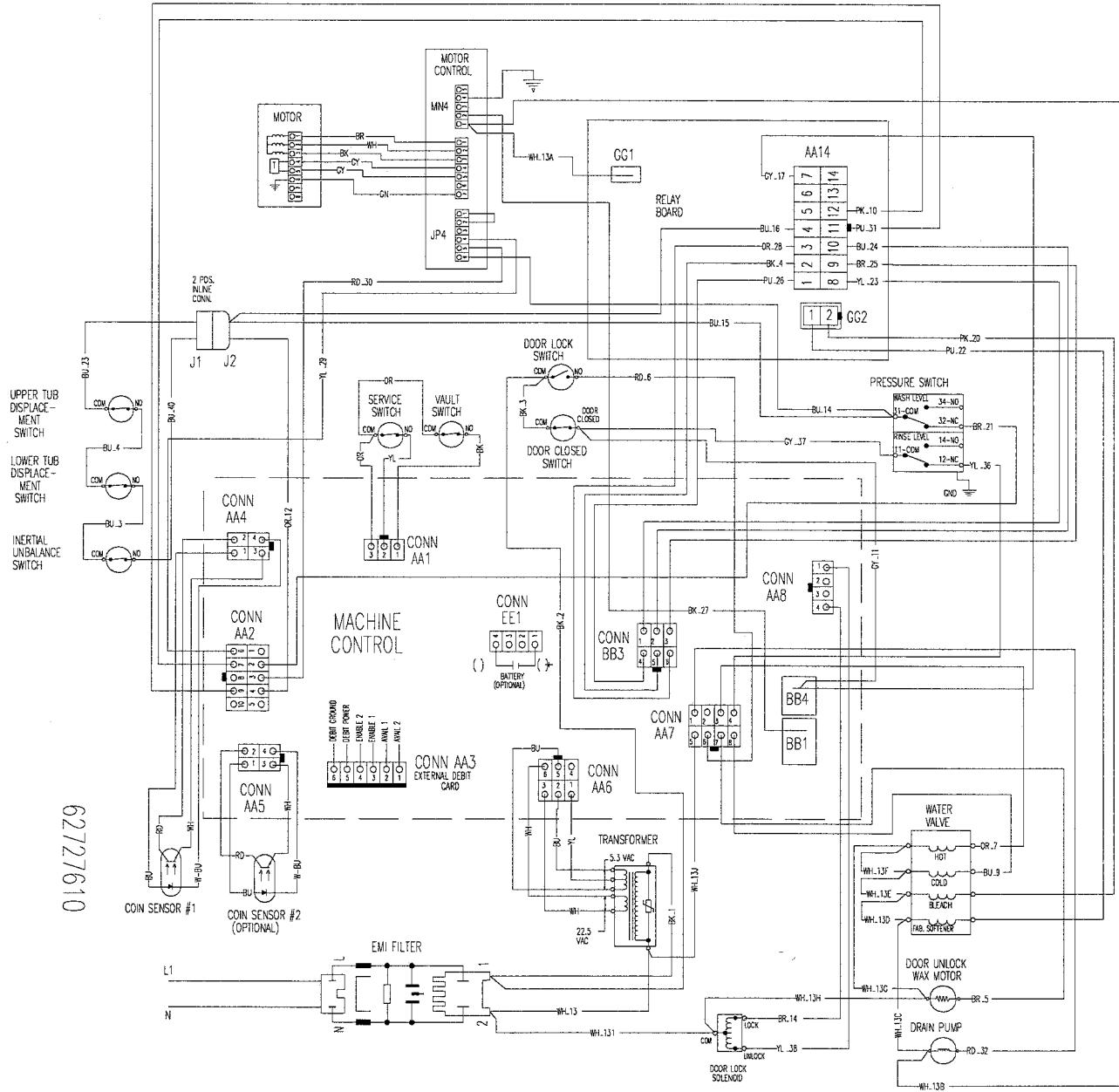
- Are both faucets on fully?
- Make sure temperature selection is correct.
- Make sure hoses are connected to correct faucets and inlet connections.
- Check the water heater.
- If the water heater is located a long distance from washer, water line may need to be purged prior to starting wash cycle.
- Disconnect inlet hoses and clean screens.

# WIRING INFORMATION

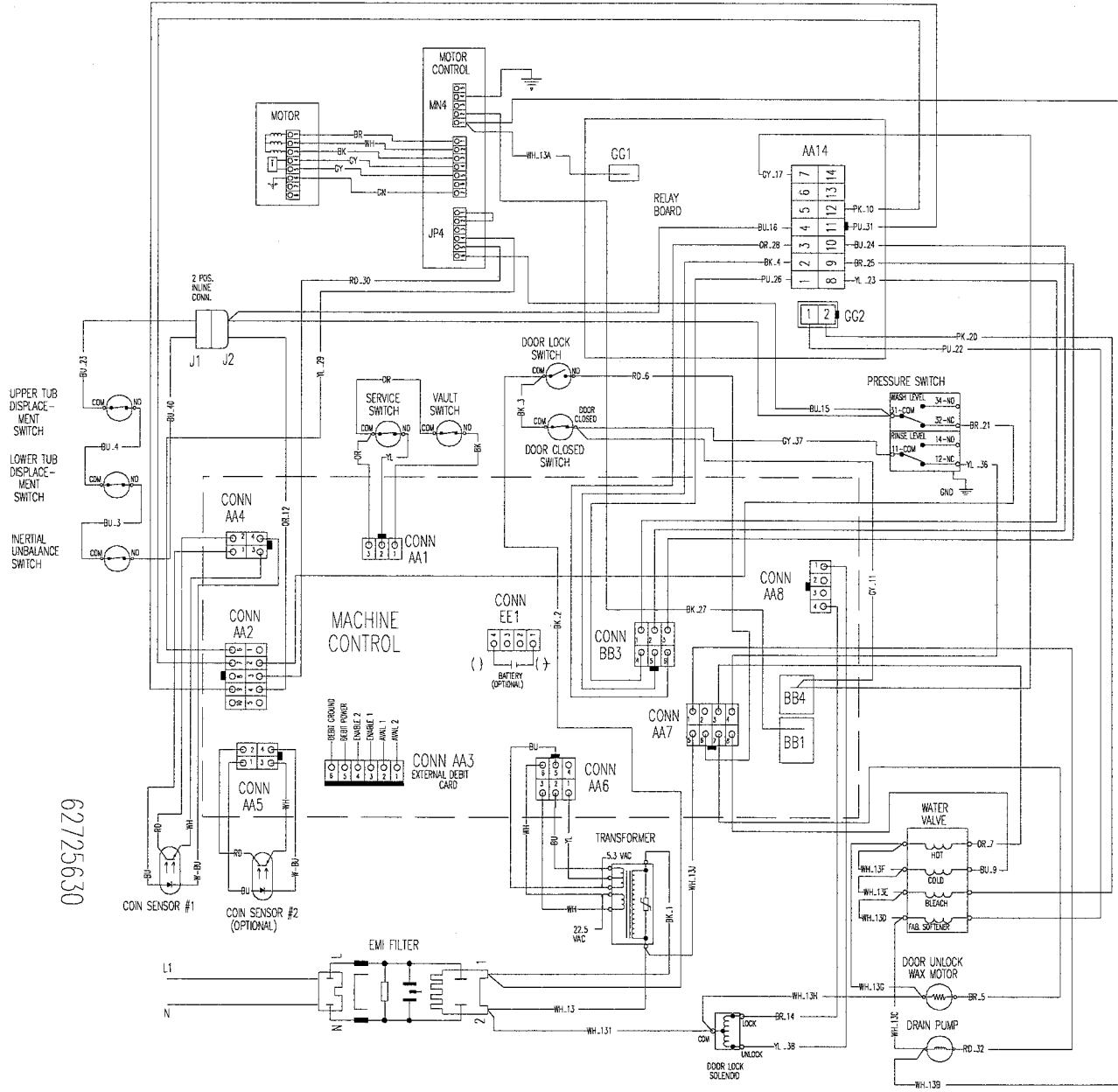
## MAH21PD,PS SERIES 10-13



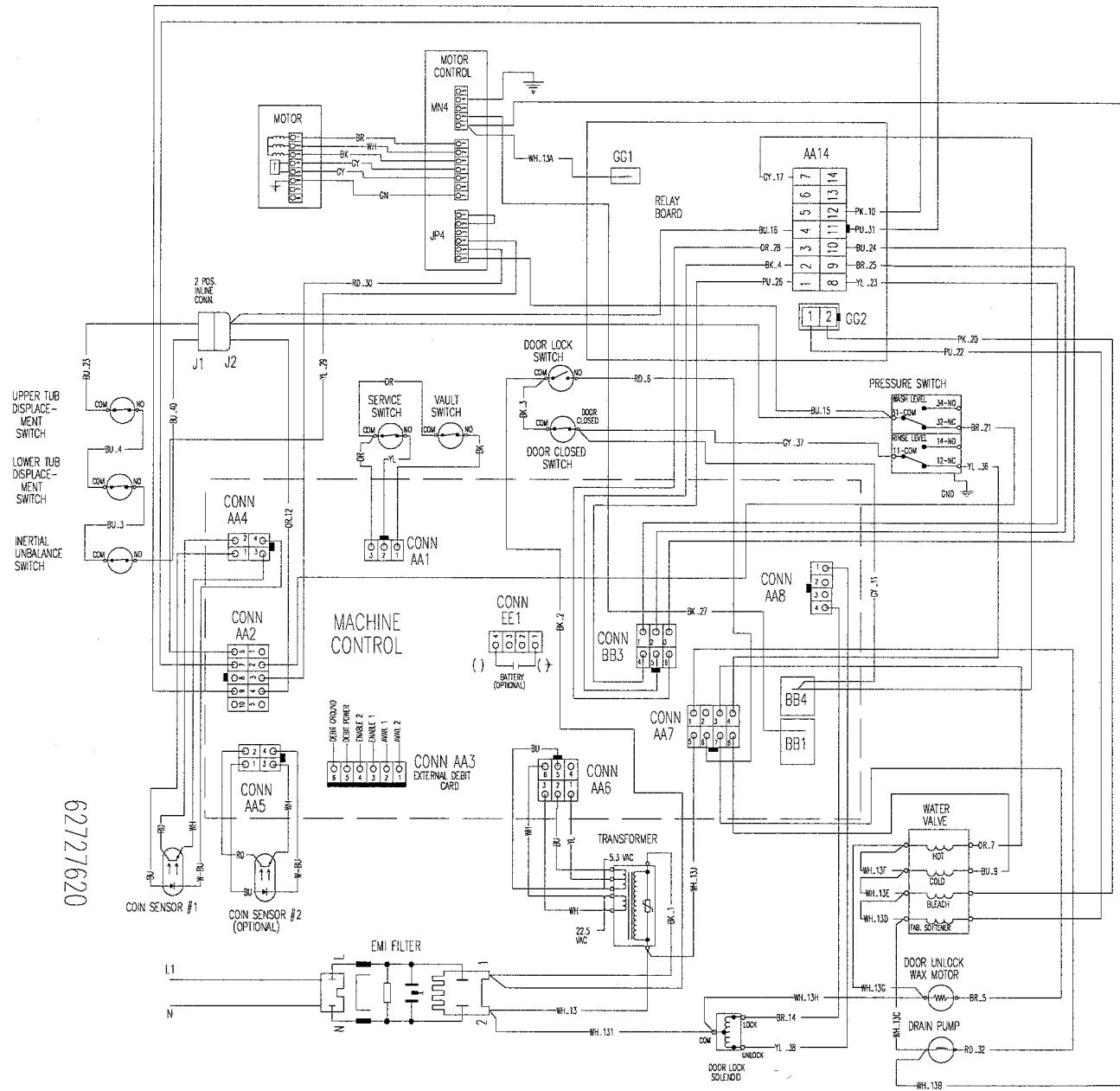
# MAH21PD,PS SERIES 14



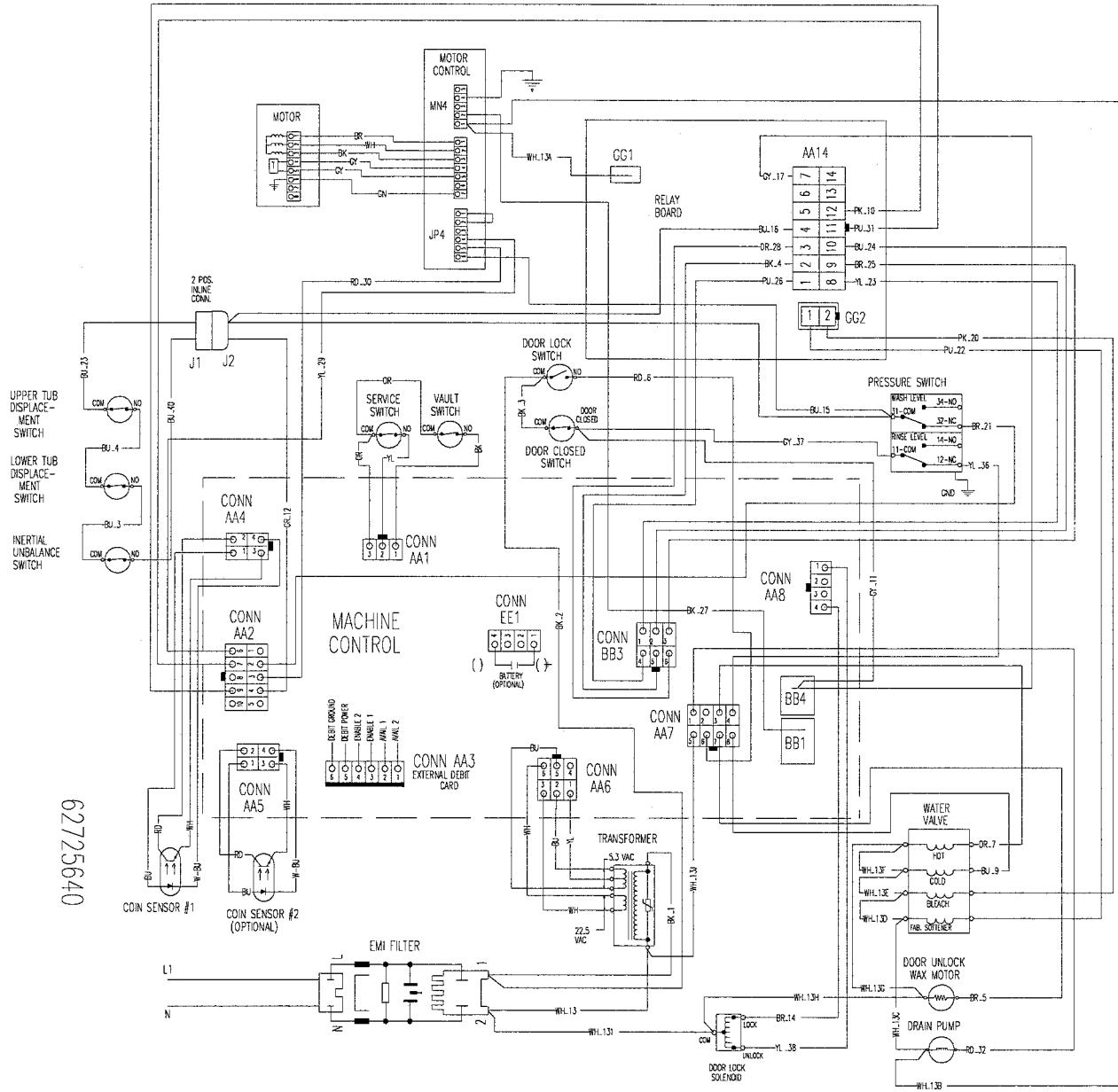
# MAH21PN SERIES 10-13



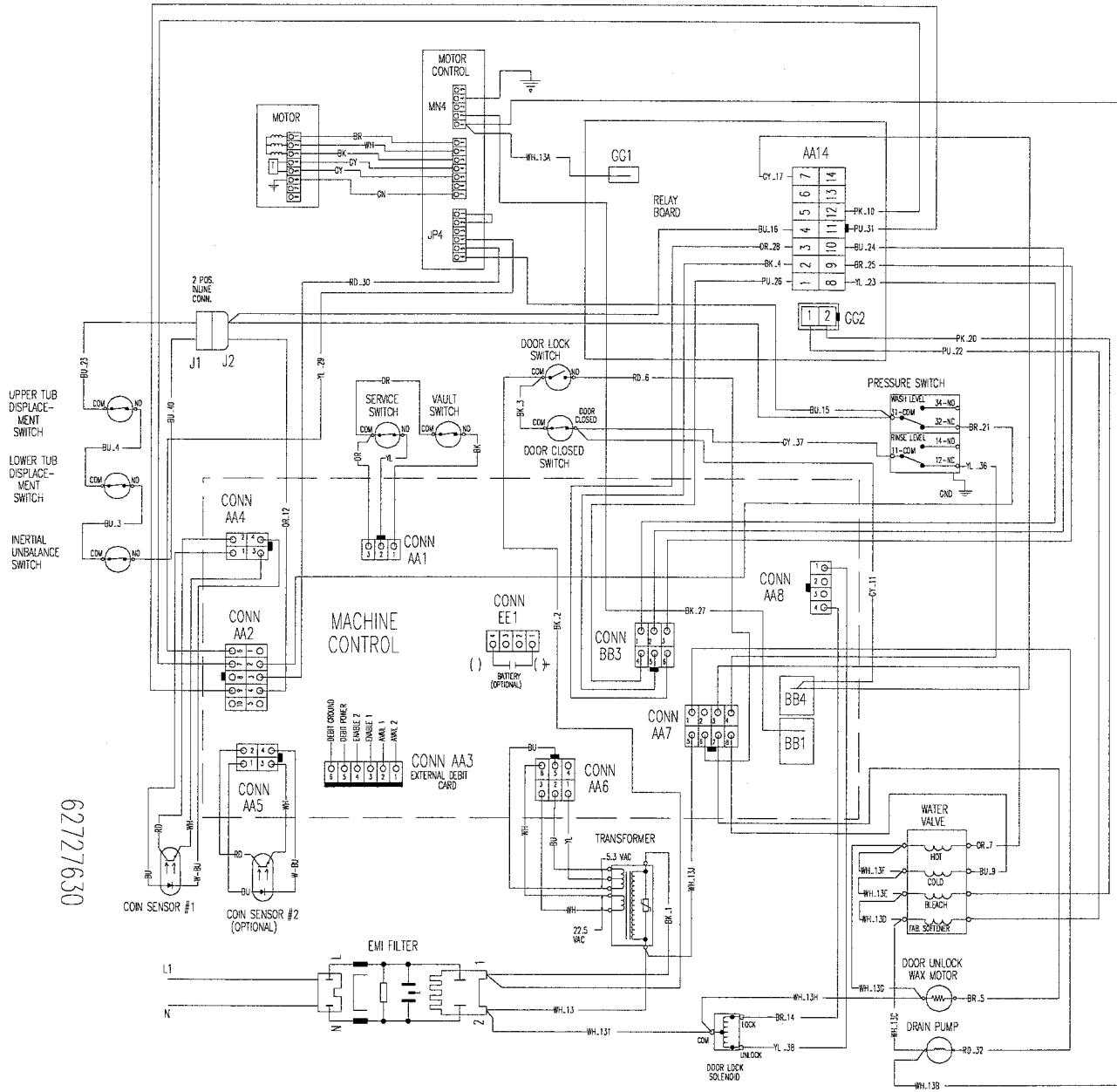
# MAH21PN SERIES 14



# MAH21PR SERIES 10-13



# MAH21PR SERIES 14





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