

# 27" Front Load Washer - Technical Information

## MAH9700A\*

- Due to possibility of personal injury or property damage, always contact an authorized technician for servicing or repair of this unit.
- Refer to Service Manual 16025909 for detailed installation, operating, testing, troubleshooting, and disassembly instructions.



### CAUTION

All safety information must be followed as provided in Service Manual 16025909.



### WARNING

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#### FEATURES

#### MAH9700A\*

Control	LED
Time Remaining Indicator	-
Wash tub	Stainless Steel
Capacity	3.3 cu.ft.
Baffles	3
Speed Combinations	Infinite
TumbleClean™ Wash System	-
<b>Speed/Fabric Program</b>	
Sanitary Cycle	-
Super Wash Cycle	-
Normal Cycle	-
Whites Cycle	-
Wrinkle Control Cycle	-
Colors Cycle	-
Delicates Cycle	-
Hand Wash Cycle	-
Quick Wash Cycle	-
Enviro Plus Cycle	-
<b>Option</b>	
Prewash Option	-
Stain Treat Option	-
Extra Rinse Option	-
Extended Spin Option	-
Rinse & Spin Option	-
Spin Only Option	-
Soil Level Selections	Heavy/Medium/Light

#### Spin Speed

Max Extract Plus	1200
High	1000
Medium	800
Gentle	600
Low	400
Drain Only	0
Water Level Control	IntelliFill™
Water Temperature Combinations	6
ATC (Energy Star®)	Warm Wash=105°/Warm Rinse=80°/Cold Wash=65°
Child Lock Option	-
Delay Start Option	19 Hours
End-of-Cycle Chime	High/Low/Off
Automatic Detergent Dispenser	Timed
Automatic Bleach Dispenser	Timed
Automatic Fabric Softener Dispenser	Timed
Self Cleaning Lint Removal	System
Suspension	2 Springs+4 Struts
Top	Powdercoat
Cabinet	Tri-Coat
Colors	W & M
<b>Dimensions</b>	
Width	27 in.
Height	38 in.
Depth	30.75 in.
Depth With Door Open 90°	50.875 in.






# Component Testing Procedures



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**NOTE:** See “Machine Control Board” on next page for pin and connector locations.

Illustration	Component	Test Procedure	Results
	Thermistor	Unplug harness connector and test from wire insertion side of connector. Pin #6 and Pin #3 of CN3.....	13K ohms @ 70F/21C (2.5V DC)
	Door Switch	Check voltage at Pin #6 and Pin #4 of CN3.....  Unplug harness connector and test from wire insertion side of connector. Pin #7 of CN10 and Pin #3 of CN5..... Pin #8 of CN10 and Pin #3 of CN5.....	Door Open = 5V DC Door Closed = 0V DC  60 ohms 60 ohms
	Water Sensor	Check voltage and frequency at Pin #6 and Pin #7 of CN3..... Check voltage and frequency at Pin #6 and Pin #8 of CN3.....	Reset water level = 2.5V DC, 25.8 KHz  Reset water level = 2.5V DC, 25.8 KHz
	Sump Sensor	Check voltage at Pin #4 and Pin #2 of CN8..... Check voltage at Pin #4 and Pin #3 of CN8.....	0V DC or 3.75V DC  0V DC or 3.75V DC
	Motor	Unplug harness connector and test from wire insertion side of connector. Pin #1 and Pin #2 of CN9..... Pin #1 and Pin #3 of CN9..... Pin #2 and Pin #3 of CN9..... Any 2 Pins (1,2,3) on Motor Connector	11.6 ohms 11.6 ohms 11.6 ohms 11.6 ohms
	Drain Pump	During drain check voltage at Pin #1 of CN5 and Pin #6 of CN10.....	120V AC
	Water Valves	Check voltage at Pin #1 and Pin #1,2,4 of CN10.....  Unplug harness connector and test from wire insertion side of connector. (Pre valve) Pin #3 of CN10 and Pin #2 of CN7..... (Hot valve) Pin #2 of CN10 and Pin #2 of CN7..... (Bleach valve) Pin #4 of CN10 and Pin #2 of CN7..... (Main valve) Pin #1 of CN10 and Pin #2 of CN7.....	120V AC when each valve operates  1100 ohms 1100 ohms 1100 ohms 1100 ohms
	AC Power	Check voltage at Pin #1 and Pin #3 of CN5.....  Check voltage at Pin #1 of CN5 and Pin #1 of CN6.....	120V AC  120V AC
	Heater Relay	During water heat check voltage at Pin #1 of CN5 and Pin #2 of RY9.....	120V AC
	Reactor	Unplug harness connector and test from wire insertion side.....	Less than 1 ohm
	MEMS Sensor	Check voltage at Pin #1 and Pin #5 of CN11.....  Check voltage at Pin #1 and Pin #4 of CN11.....	Approximately 2.5V (2.2V – 2.8V)  Approximately 2.5V (2.2V – 2.8V)

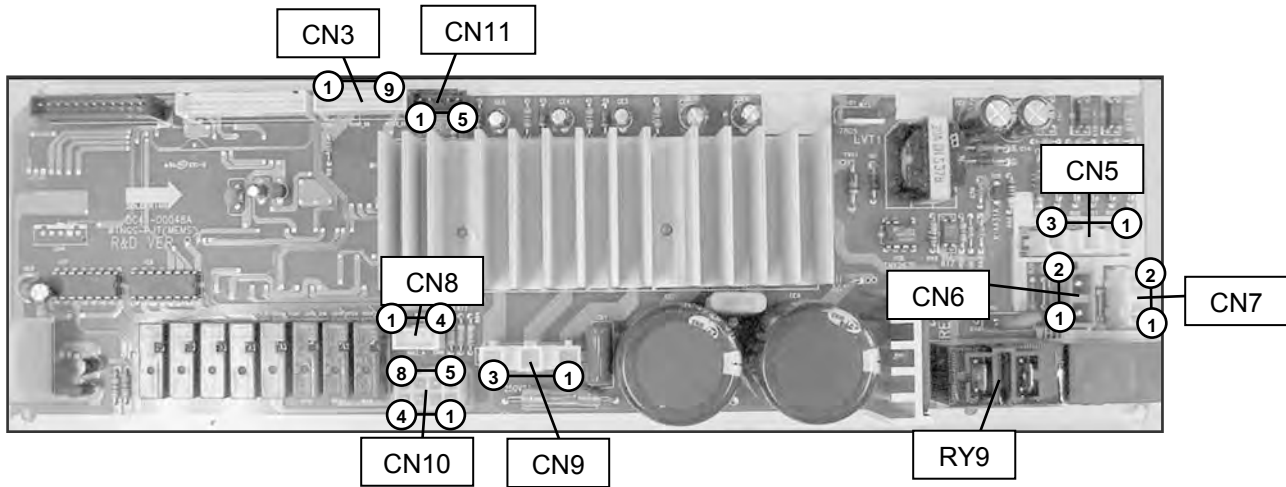
# Component Testing Procedures



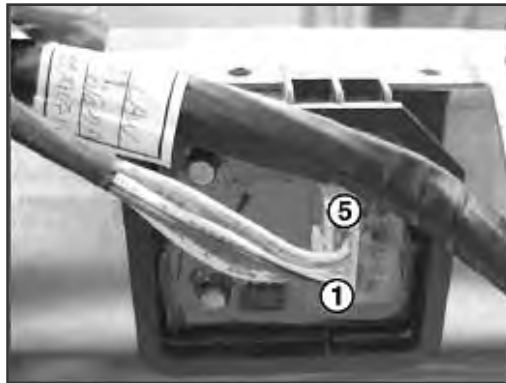
## WARNING

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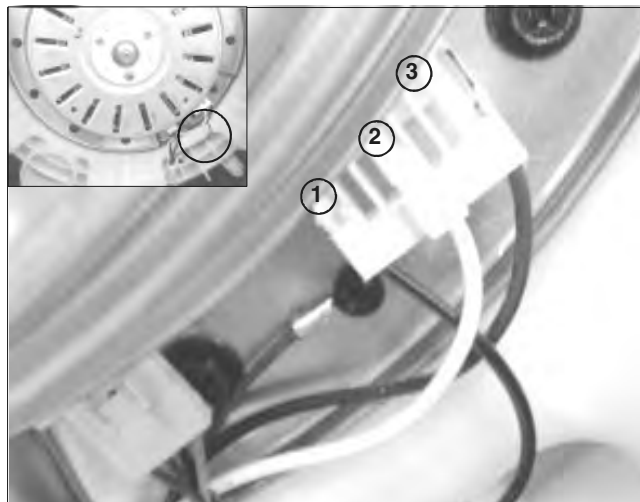
### Machine Control Board



### MEMS Sensor



### Motor



Normal resistance is approximately 11.6.0  $\Omega$  between any 2 pins (1,2 or 3) on motor

# Troubleshooting Procedures



## WARNING

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### Will Not Start

- Plug cord into live electrical outlet. Check for proper voltage.
- Check fuse or reset circuit breaker.
- Push any key to turn 'ON' the clothes washer and press the **Rotary Cycle Selector** knob to start the clothes washer.
- Close door and push the **Rotary Cycle Selector** knob to start the clothes washer.
- Check to see if the clothes washer is in a pause, soak or suds period in the cycle. Wait briefly and it may start. If washer is in suds period, "Suds" will display, instead of the time remaining.
- Check for restricted drain system. If there is an electrical problem in the drain system, "nd" error will occur after 15 minutes.
- Check water supply.
- Check the line screen and water valve screen.
- Check for loose connections at machine control board terminal connections CN5 and CN6 (See "Component Testing Procedures").
- Replace machine control board.

### Leaking

- Make sure inlet hose connections are not leaking. Check for rubber gasket damage due to over-tightening.
- Check standpipe for leak. Wrap a dry rag around the standpipe opening. If rag becomes wet, leak is fault of home plumbing. Be sure the standpipe is capable of accepting the incoming flow of water from the clothes washer.
- Make sure end of drain hose is correctly inserted and secured to drain standpipe.
- Check internal hose connections (fill, drain systems, dispenser hoses & clamps).
- Check rubber boot. Remove, reposition and reinstall, if necessary.
- Check for possible kinked dispenser to outer tub hose. Hot water pressurization may force door open.

### No Tumble

- Start normal cycle with an empty machine and allow a fill to check tumble.
- See **Board Output Test**, or **Quick Spin Test** (Before test, make sure that the tumbler is empty.)
- Check for loose connections at machine control board, pressure switch, motor, tach harness and motor control.

- Check motor windings resistance (See "Component Testing Procedures").  
At CN9, pins 1 & 3 = 11.6 ohms.  
Pins 1 & 2 = 11.6 ohms.  
Pins 2 & 3 = 11.6 ohms.
- Faulty main control board.
- Faulty motor.

### Will Not Spin

- Check to make sure the door is fully closed.
- Check for water left inside the clothes washer. If present, see **Will Not Drain**.
- See **Board Output Test** or **Quick Spin Test**. (Before test, make sure that the tumbler is empty.) If it doesn't tumble after the test above, check unbalanced load scenario, machine control board, and motor.
- Check for loose connections at pressure switch, motor, tach harness, motor control and machine control board terminal connections CN8, CN9, CN3 (See "Component Testing Procedures").
- Check motor windings resistance (See "Component Testing Procedures").  
At CN9, pins 1 & 3 = 11.6 ohms.  
Pins 1 & 2 = 11.6 ohms.  
Pins 2 & 3 = 11.6 ohms.

### No Water Fill

- Test water fill. See **Board Output Test**.
- Check to make sure water supply is turned on fully.
- Check electrical circuit and connections at the water valve, and pressure switch.
- Check for kinks in inlet hoses.
- Check for clogged inlet screens.
- Visually check hot, cold, pre and bleach valves separately for fill.
- Check for low water pressure. May be dependent on pressure entering home. Variations may occur due to usage in the home at the time machine is used.
- Check for frozen pipes and hoses.
- Check resistance of water valve coils (See "Component Testing Procedures"). Check pin #2 of CN7 with pin #1, 2, 3 or 4 of CN10. Normal is 1.18K ohms.
- Check for loose connections at the pressure switch or on the machine control board at CN3. (See "Component Testing Procedures").

# Troubleshooting Procedures



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### Tub Full of Suds

- Check for restricted drain system. See **Will Not Drain** and **Will Not Spin**.
- Check for loose wire connections at control board and pump.
- Use high efficiency or low sudsing detergent specially formulated for front load washers.
- Reduce detergent amount for that specific load size and soil level. Towel loads have a minimal amount of soil present and typically create more suds.
- Use drain pump and cold water to empty tub. See **Board Output Test**.
- Run the clothes washer through another complete cycle using the coldest water, tablespoon of salt and no detergent.

### Wet Clothes

- Very small clothes loads can cause unbalanced loads. Add additional towels.
- Excessive suds may have been present, due to not using high efficiency detergent. Reduce amount of detergent usage.
- See **Will Not Spin**.
- "Drain Only" or "Low" **Spin Speed** was selected.

### Will Not Lock

- Door not all the way closed or not properly aligned. Possible laundry load is too large to close door.
- Place washer into **Service Mode** and check for diagnostic codes 4, 18 & 22. See **Service Mode**.
- Check door lock system. See **Board Output Test**. Check the output voltage of door lock coil. If normal, change door lock switch. If not normal, change main control board. (See "Component Testing Procedures").
- Check electrical connections at door lock switch assembly and machine control board (CN10), (See "Component Testing Procedures").

### Will Not Unlock

- Push door closed to make sure nothing from inside is pressing against it, which may keep it from unlocking.
- Door locked from water level too high. Opening door will result in water draining from door opening.
- Check for water remaining in the drum. If water is present inside drum, see **Will Not Drain**.
- Check if temperature inside the drum is higher than 50°C/122°F. If there is no problem with temperature, check wiring of machine control board and door lock switch.

- Drain manually by removing drain hose clamp.
- Display shows "**L0**". Press **Power Off** button to turn off the washer and unplug and reconnect washer. Press any key to turn 'ON' the washer. If "**L0**" is displayed, machine control board and door lock switch should be checked.
- Place washer into **Service Mode** and check for diagnostic codes 4, 18 & 22. See **Service Mode**.
- Check electrical connections at door lock switch assembly and machine control board (CN10). (See "Component Testing Procedures").
- Check door lock system. See **Board Output Test**. Check the output voltage of door lock coil. If 120 V present, change door lock switch. If 120 V not present, change machine control board. (See "Component Testing Procedures").

### Will Not Drain

- Check for restricted drain system.
- In cold climates check for frozen drain hose.
- Check for 120 V at the pump when a spin cycle is selected.
- Check pump motor winding resistance (See "Component Testing Procedures"). Normal resistance is about 14.2 ohms ( $\pm 7\%$ ).
- Check that the machine control correctly senses the water level in the washer. See **Board Input Test**.
- Check drain pump. See **Board Output Test**.
- Check the machine control board connections at CN10 (Pin 6) for the pump. Should see 120 V. (See "Component Testing Procedures").
- Check tub to pump hose for twist in hose.

### Wrong Water Temperature

- Check that both faucets are turned on fully.
- Make sure water heater is set to deliver a minimum of 120°F (49°C) hot water at the tap. Also check water heater capacity and recovery rate.
- If the water heater is located a long distance from washer, the water line may need to be purged prior to starting wash cycle.
- Too Hot/Too Cold: This washer uses a reduced amount of water, while the control board meters the incoming flow to regulate the actual temperature of the water in the tub. This may appear to be significantly warmer/cooler than expected.
- Make sure the temperature selection is correct.
- Disconnect inlet hoses from the Water Valve and clean the valve screens of any debris.

# Troubleshooting Procedures



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### Vibration/Walking/Noise

- Check for proper load size and distribution.
- Check for proper installation.
- Verify unit has new motion sensor / control board.
- Check vent flappers for foam present on flapper.
- Check for loose pump to bracket screws.
- Check for stripped pump mounting bolts.
- Check location of top suspension springs.
- Check console for broken plastic locating tabs, check for front panel noise - add foam as needed.
- Check if debris is present in pump causing noise.
- Check dampers / inserts-front/grey, rear/green.
- Clean floor and check condition of rubber feet.
- Do Paper Test - Place paper strips under front feet of washer, pull them out while in **Quick Spin Test** at highest rpm. Adjust feet to hold paper.

### Rubber Feet Leaving Marks on Floor

- Use a pencil eraser to remove mark.
- Walk washer into location, do not drag.

### Additive Cups Full of Water

- A small amount of water in cups is normal.
- Remove and wash dispenser tray, removable cup, and rinse cap.
- Level washer.

### Buttons do not Respond

- Option and Function buttons respond differently according to each cycle.
- Child Lock feature has been selected. To disable feature press and hold **Wash/Rinse Temp** and **Spin Speed** simultaneously until a beep is heard.
- When display shows "End", only the **Power Off** button will function. Press **Power Off** and make new cycle selections.

### Consumer Information Codes

If the consumer observes codes on display, see table below.

LED Display	Description	Diagnostic code
nd	The water level fails to drop below the Low Water level reset within 15 minutes, before a spin begins.	1

LED Display	Description	Diagnostic code
LO	Door failed to unlock after 3 attempts.	2
nF	Continuous fill of 12 minutes. Total fill of 14 minutes.	3
FL	Door failed to lock after 3 attempts.	4
LE	Water sensor level fault.	8
OE	A fault is detected in the water level sensor. Data (frequency) shows the water level is at or above the overflow level.	E
E2	A key is sensed to be pressed more than 30 seconds, the key will be assumed to be stuck.	15
dc	Never exceeded 400 rpm due to an unbalanced load.	10
od	The door has not been opened after two complete wash cycles. Door switch was not seen open since the last two final spins.	17
dL	Open door lock switch with motor running.	18
dS	Door switch is read as open and the door locked switch is read as locked.	22
bE	Motor tach signal exists without motor running.	25
tE	Abnormal high/low temp or ohm resistance seen.	29
E3	Machine control is attempting to drive the motor but is not seeing any tach response. Visual check shows motor is not moving. (Locked, Hall Sensor fault).	2E
Sr	System Relay failure.	34
Hr	Heater Relay failure	36
3E	Over Current is detected. Motor won't turn.	3E
2E	Voltage for motor control bus is over specified limit.	91
2E	Voltage for motor control bus is under specified limit.	92

# Troubleshooting Procedures



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### Service Mode

**Service Mode** enables service personnel to verify the operation of the washing machine and diagnose problems. **Service Mode** can be entered in the middle of any wash cycle without interrupting the cycle. While in **Service Mode**, the technician can cancel the current cycle, set a continuous running mode, start a variety of special service tests and view diagnostic displays.

### Enter / Exit Service Mode

To enter **Service Mode** press the **Chime** and **Extra Rinse** keys for 3 seconds or until the control beeps.

**NOTE:** The washer must be 'ON' before **Service Mode** can be entered.

The motor speed will be displayed when started (motor not running display will be "0"). The present state of the machine will not be changed (i.e., the current cycle in progress will not be interrupted and only the display will change). All LED's will be turned 'OFF' except the **Door Lock** LED; it will continue to display the condition of the door lock.

To exit **Service Mode**:




- 1) Press **Chime** and **Extra Rinse** keys for 3 seconds again, or
- 2) Press **Power Off** button, or
- 3) Unplug the machine.






To pause while in **Service Mode**:

Pressing the **Rotary Cycle Selector** knob while running a test will pause the individual test.

### Access Service Tests and Diagnostic Features while in Service Mode.

The following table summarizes special tests and features available in **Service Mode**, along with methods of activation and cancellation. A more detailed description of each test can be found in the text following the table. Reference the text or symbol indicated in the "Test or Display" column, with the text and symbols indicated in the text following the quick reference table for a more detailed explanation.

Test or Display	To Start (or Hold)	To Cancel (or resume)
 <b>Quick Spin Test</b>	Press <b>Delay</b> and <b>Rinse &amp; Spin</b>	Press <b>Delay</b> and <b>Rinse &amp; Spin</b> or press <b>Power Off</b>
 <b>Hold Quick Spin Test</b> step	Press <b>Rotary Cycle Selector</b> (during test)	Press <b>Rotary Cycle Selector</b>
 <b>Fast Time-Down Test / Advance</b> to next step	Press <b>Wash/Rinse Temp</b> to start test. Press <b>Wash/Rinse Temp</b> during cycle to advance.	Press <b>Power Off</b>

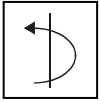
Test or Display	To Start (or Hold)	To Cancel (or resume)
 <b>Quick Service Cycle</b>	Press <b>Wash/Rinse Temp</b> and <b>Soil Level</b>	Press <b>Power Off</b> (also exits <b>Service Mode</b> )
Hold <b>Quick Service Cycle</b> Step	Press <b>Rinse &amp; Spin</b> and <b>Spin Only</b> together	Press <b>Rinse &amp; Spin</b> and <b>Spin Only</b>
 <b>LED/Switch Test</b>	Press <b>Delay</b> for 3 seconds (then individual buttons to test) Turn <b>Rotary Cycle Selector</b> clockwise, the LED's around it will be toggled. Turn <b>Rotary Cycle Selector</b> counterclockwise, the 7-segment LED's toggle. Press <b>Rotary Cycle Selector</b> , all of the LED's around the <b>Rotary Cycle Selector</b> will be toggled.	Press <b>Power Off</b> twice after starting test
 <b>Board Input Test</b>	Press <b>Spin Only</b>	Press <b>Spin Only</b>
 <b>Board Output Test / System Check</b>	Press <b>Spin Speed</b>	Press <b>Power Off</b> .
 <b>Diagnostic Code Display (Initial)</b>	Press <b>Rinse &amp; Spin</b> – displays 'd'	Press <b>Rinse &amp; Spin</b> again
<b>All Diagnostic Codes</b>	Rotate <b>Rotary Cycle Selector</b> either direction	N/A
<b>Cycle Count No. for Diagnostic Code</b>	Press and hold <b>Rotary Cycle Selector</b> , while diagnostic code is displayed	Release <b>Rotary Cycle Selector</b> (returns to diagnostic code display)
<b>Clear All Diagnostic Codes</b>	Press <b>Delay</b> and <b>Chime</b> together while displaying diagnostic codes	N/A
<b>Display Software Version</b>	Press <b>Soil Level</b> .	Press <b>Soil Level</b> .
<b>Cycle Count</b>	Press <b>Chime</b>	N/A

# Troubleshooting Procedures



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### Quick Spin Test

While in **Service Mode**, press **Delay** and **Rinse & Spin** keys to start a **Quick Spin Test**.

**Spin Test. Quick Spin Test** steps follow:

- Start spinning, and after reaching a maximum spin speed.
- Stay at maximum spin speed for 2 minutes and stop **Quick Spin Test**.



### Hold Quick Spin Step

If the **Rotary Cycle Selector** knob is pressed during the **Quick Spin Test**, the machine will hold at the next highest index speed for 10 minutes. At the end of 'Hold' time, the machine will resume and finish the **Quick Spin Test**. To cancel the 'Hold' and allow the **Quick Spin Test** to continue, press the **Delay** and **Rinse & Spin** keys.



### Fast Time Down Test

While any test or cycle is running in **Service Mode**, pressing the

**Wash/Rinse Temp** key will advance the program to the next cycle stage. Cycle stages are located at key locations in the machine operation. As the program is advanced it will index as follows: The end of each fill (the same as the beginning of a tumble session for Wash, or Rinse); at the beginning of a drain session; at the beginning of a spin session (at this position, check the water level, if over reset level, drain first before entering the spin function); at the beginning of a fill session; at the beginning of Bleach fill; at the beginning of Fabric Softener fill; and every 3 minutes during the tumble sessions (Wash and Rinses).



### Quick Service Cycle

While in **Service Mode**, pressing the **Wash/Rinse Temp** and **Soil Level** keys for

3 seconds will start a **Quick Service Cycle**. This will be a quick check of all systems. If display shows "od" then open and close door. Pressing **Spin Speed** key will advance to the next cycle. The following steps are performed: Display shows "SC".

1. Hot water for 5 seconds and then turn off.
2. Cold water for 5 seconds and then turn off.
3. Bleach valve for 5 seconds and then turn off.
4. Softener dispenser using cold water and bleach water for 5 seconds and then turn off.
5. Turn 'ON' Cold valves until the control detects proper water level. During this time, tumble at 45 rpm for 5 seconds in a clockwise direction, pause for 2 seconds, tumble at 45 rpm for 5 seconds in a counterclockwise direction, pause for 2 seconds. Continue pattern until the water level is detected.

Minimum time for this segment to be 5 seconds. After water height is achieved, continue tumble pattern for another 14 seconds. If the washer is equipped, turn 'ON' heater for first 5 seconds of this tumble pattern. Advance the washer to next step if water is not connected to machine.

6. Drain and spin to maximum speed. Machine will achieve maximum speed using the safest, fastest method.
7. Display a "PA" (Passed) continuously for 5 seconds if no diagnostic codes were logged during the test. Washer will return to the normal **Service Mode** at the end of the 10 second period.

The "SC" in the display will blink as an indication of failure, and continue blinking until the **Quick Service Cycle** test has reached the end. Any diagnostic code logged during this test will result in failure of the test, but will not necessarily stop the test. During the **Quick Service Cycle**, pressing the **Spin Speed** key will advance to the next step. Pressing the **Rinse & Spin** and **Spin Only** keys will suspend the machine at the current step for up to 10 minutes or until **Delay** and **Chime** keys are pressed. All LED's should flash 'ON' and 'OFF' while the system is suspended or on hold.



### LED/Switch Test

While in **Service Mode**, press the **Delay** key to start a **LED/Switch Test**. All the LED's can be toggled or slewed by pressing the key associated with the LED or set of LED's. All keys (including the **Power Off** button) must be pressed within 5 minutes for this test to pass. "PA" will be displayed for five (5) seconds once all keys have been pressed and the test is completed. Following 20 seconds of inactivity at any point, this test will exit without any display. The **Power Off** button must be pressed twice within 30 seconds to cancel this test.

Switch	Action
<b>Delay</b>	Press once
<b>Chime</b>	Press 3 times
<b>Extra Rinse</b>	Press once
<b>Soil Level</b>	Press 3 times
<b>Spin Speed</b>	Press 6 times
<b>Wash/Rinse Temp</b>	Press 6 times
<b>Rinse &amp; Spin</b>	Press once
<b>Spin Only</b>	Press once
<b>Prewash</b>	Press once
<b>Stain Treat</b>	Press once
<b>Extended Spin</b>	Press once
<b>Rotary Cycle Selector</b>	Rotate 1 full revolution clockwise
<b>Rotary Cycle Selector</b>	1 position counterclockwise
<b>Rotary Cycle Selector</b>	Press once
<b>Power Off</b>	Press once

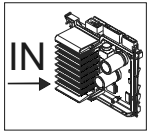


# Troubleshooting Procedures



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### Board Input Test

While in **Service Mode**, pressing the **Spin Only** key will begin the **Board Input Test**. This test turns on a specified output

after a key press. Pressing the **Spin Only** key again cancels the test. (Display shows "in").

While in **Service Mode** follow chart to check respective function.

- When the **Rotary Cycle Selector** knob is set to "Super Wash" and the **Rotary Cycle Selector** knob is pressed, the door position will be displayed: "0P" if open, "CL" if closed.
- When the **Rotary Cycle Selector** knob is set to "Normal" and the **Rotary Cycle Selector** knob is pressed, the Lock position will be displayed: "UL" if unlocked, "L0" if locked.
- When the **Rotary Cycle Selector** knob is set to "Whites" and the **Rotary Cycle Selector** knob is pressed, the High water level will be displayed: "0" if below level, "1" if above level. The High water level is defined as the over flow water level.
- When the **Rotary Cycle Selector** knob is set to "Wrinkle Control" and the **Rotary Cycle Selector** knob is pressed, the Medium water level will be displayed: "0" if below level, "1" if above level. The Medium water level is defined as the minimum water level needed such that the heater can be turned 'ON' (only MAH8700\* and MAH9700\* models have heaters).
- When the **Rotary Cycle Selector** knob is set to "Colors" and the **Rotary Cycle Selector** knob is pressed, the Low water level will be displayed: "0" if below level, "1" if above level. The Low water level is defined as the reset water level.
- When the **Rotary Cycle Selector** knob is set to "Hand Wash" and the **Rotary Cycle Selector** knob is pressed, the level of Tub unbalance will be displayed: "UC" if balanced, "U0" if unbalanced. "U0" will be displayed during the time when the machine is correcting for the unbalance; e.g. slowing down to redistribute the load or to get to a lower spin speed. Once the situation has been corrected (i.e. the load has begun tumbling or the lower speed has resulted in an acceptable amount of balance); "UC" will once again be displayed.
- When the **Delay** key is pressed, the water temperature will be displayed in Degrees F (Fahrenheit).
- When the **Rotary Cycle Selector** knob is set to "Delicates" and the **Rotary Cycle Selector** knob is pressed, the water temperature will be displayed in degrees C (Celsius).

- When the **Rotary Cycle Selector** knob is set to "Sanitary", and the **Rotary Cycle Selector** knob is pressed, the water level frequency will be displayed. "2560" means 25.60 Hz (washer empty). Frequency value drops as water rises.

While performing the **Board Input Test** in **Service Mode**, follow this quick reference chart to check respective functions.

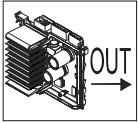
Selection	Function	Display
<b>Rotary Cycle Selector</b> set to " <u>Super Wash</u> ". Press <b>Rotary Cycle Selector</b> .	Door position	"0P" or "CL"
<b>Rotary Cycle Selector</b> set to " <u>Normal</u> ". Press <b>Rotary Cycle Selector</b> .	Lock state	"UL" or "L0"
<b>Rotary Cycle Selector</b> set to " <u>Whites</u> ". Press <b>Rotary Cycle Selector</b> .	High water level	"0" if below level. "1" if above level.
<b>Rotary Cycle Selector</b> set to " <u>Wrinkle Control</u> ". Press <b>Rotary Cycle Selector</b> .	Medium water level	"0" if below level. "1" if above level.
<b>Rotary Cycle Selector</b> set to " <u>Colors</u> ". Press <b>Rotary Cycle Selector</b> .	Low water level	"0" if below level. "1" if above level.
<b>Rotary Cycle Selector</b> set to " <u>Hand Wash</u> ". Press <b>Rotary Cycle Selector</b> .	Tub balance	"UC" if Balanced. "U0" if Unbalanced
Press <b>Delay</b> key.	Water temperature	Degrees F
<b>Rotary Cycle Selector</b> set to " <u>Delicates</u> ". Press <b>Rotary Cycle Selector</b> .	Water temperature	Degrees C
<b>Rotary Cycle Selector</b> set to " <u>Sanitary</u> ". Press <b>Rotary Cycle Selector</b> .	Water Level Frequency(Hz)	"2560" (empty). Frequency drops as water rises.

# Troubleshooting Procedures



## WARNING

To avoid risk of electrical shock, personal injury or death; disconnect power to washer before servicing, unless testing requires power.



### Board Output Test

While in **Service Mode**, pressing the **Spin Speed** key will begin the **Board Output Test**. This test turns 'ON' a specified output after a key press. Pressing the **Spin Speed** key again

cancels the test. Only one output can be 'ON' at any time. All outputs will be turned 'OFF' after five (5) minutes of inactivity.

- When the **Rotary Cycle Selector** knob is set to "Super Wash" and the **Rotary Cycle Selector** knob is pressed, the main relay will be toggled (either from 'ON' to 'OFF' or from 'OFF' to 'ON').
- When the **Rotary Cycle Selector** knob is set to "Normal" and the **Rotary Cycle Selector** knob is pressed, the hot water valve will be turned 'ON'. This output will remain 'ON' until the **Rotary Cycle Selector** knob is pressed again to turn 'OFF' the output. The control will not allow the machine to fill past the High water level.
- When the **Rotary Cycle Selector** knob is set to "Wrinkle Control" and the **Rotary Cycle Selector** knob is pressed, the cold water valve will be turned 'ON'. This output will remain 'ON' until the **Rotary Cycle Selector** knob is pressed again to turn 'OFF' the output. The control will not allow the machine to fill past the High water level.
- When the **Rotary Cycle Selector** knob is set to "Delicates" and the **Rotary Cycle Selector** knob is pressed, the bleach valve will be turned 'ON'. This output will remain 'ON' until the **Rotary Cycle Selector** knob is pressed again to turn 'OFF' the output. The control will not allow the machine to fill past the High water level.
- When the **Rotary Cycle Selector** knob is set to "Hand Wash" and the **Rotary Cycle Selector** knob is pressed, the pre wash valve will be turned 'ON'. This output will remain 'ON' until the **Rotary Cycle Selector** knob is pressed again to turn 'OFF' the output. The control will not allow the machine to fill past the High water level.
- When the **Rotary Cycle Selector** knob is set to "Quick Wash" and the **Rotary Cycle Selector** is pressed, the drain pump will be turned 'ON'. This output will remain 'ON' until the **Rotary Cycle Selector** knob is pressed again to turn 'OFF' the output.
- Pressing the **Delay** key will turn 'ON' the motor and the **Delay** LED. This output and the LED will remain 'ON' until the **Delay** key is pressed again to turn 'OFF' the output. When activated, the machine will tumble for 5 seconds in the CW direction, pause for 2 seconds, tumble in the CCW direction for 5 seconds, pause for 2 seconds; repeating this pattern until **Delay** key is pressed again to turn 'OFF' the tumbling.

**Note:** All tumble speeds are assumed to be 45 rpm.

- Pressing the **Chime** key will unlock the door and turn 'ON' all the LED's above the **Chime** key. This output will attempt to unlock one time, if safe to do so.
- Pressing the **Wash / Rinse Temp** key will lock the door and all the **Wash / Rinse Temp** LED's will turn 'ON'. Pressing the **Chime** key will unlock the door and the all the **Chime** LED's will turn 'ON'.
- When the **Rotary Cycle Selector** knob is set to "Whites" and the **Rotary Cycle Selector** knob is pressed, the bleach valve and the cold water valve will be turned 'ON'

to check the fabric softener fill. This output will remain 'ON' until the **Rotary Cycle Selector** knob is pressed again to turn 'OFF' the output. The control will not allow the machine to fill past the High water level.

- Pressing the **Rinse & Spin** key will turn 'ON' the heater if the water level is above the Heater Safety Level. If the water level is below the Heater Safety Level, a warning beep will be given and the heater will not be turned 'ON'. The heater output will remain 'ON' until the "Rinse & Spin" key is pressed again to turn 'OFF' the output.

While performing the **Board Output Test** in **Service Mode**, follow this quick reference chart to check respective function.

Selection	Component	Function
<b>Rotary Cycle Selector</b> set to " <u>Super Wash</u> ". Press <b>Rotary Cycle Selector</b> .	Main Relay	'ON' to 'OFF' or 'OFF' to 'ON'.
<b>Rotary Cycle Selector</b> set to " <u>Normal</u> ". Press <b>Rotary Cycle Selector</b> .	Hot Water Valve	1 <sup>st</sup> press valve 'ON'. 2 <sup>nd</sup> press valve 'OFF'.
<b>Rotary Cycle Selector</b> set to " <u>Wrinkle Control</u> ". Press <b>Rotary Cycle Selector</b> .	Cold Water Valve	1 <sup>st</sup> press valve 'ON'. 2 <sup>nd</sup> press valve 'OFF'.
<b>Rotary Cycle Selector</b> set to " <u>Delicates</u> ". Press <b>Rotary Cycle Selector</b> .	Bleach Valve	1 <sup>st</sup> press valve 'ON'. 2 <sup>nd</sup> press valve 'OFF'.
<b>Rotary Cycle Selector</b> set to " <u>Hand Wash</u> ". Press <b>Rotary Cycle Selector</b> .	Pre Wash Valve	1 <sup>st</sup> press, valve 'ON'. 2 <sup>nd</sup> press, valve 'OFF'.
<b>Rotary Cycle Selector</b> set to " <u>Quick Wash</u> ". Press <b>Rotary Cycle Selector</b> .	Drain Pump	1 <sup>st</sup> press Drain Pump 'ON'. 2 <sup>nd</sup> press Drain Pump 'OFF'.
Press <b>Delay</b>	Motor	1 <sup>st</sup> press Motor on. 2 <sup>nd</sup> press Motor 'OFF'.
Press <b>Chime</b>	Door Lock	1 Attempt to unlock.
Press <b>Wash / Rinse Temp</b>	Door Lock	Lock Door
<b>Rotary Cycle Selector</b> set to " <u>Whites</u> ". Press <b>Rotary Cycle Selector</b> .	Bleach Valve and Cold Water Valve	1 <sup>st</sup> press, Fabric Softener Fill. 2 <sup>nd</sup> press, valves 'OFF'
Press <b>Rinse &amp; Spin</b>	Heater	1 <sup>st</sup> press, heater 'ON' if water level high enough. 2 <sup>nd</sup> press, heater 'OFF'.

# Troubleshooting Procedures



## WARNING

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### Display Diagnostic Codes

The diagnostic code display can be toggled 'ON' and 'OFF' from **Service Mode** by pressing the **Rinse & Spin** key and rotating the **Rotary Cycle Selector** knob. The display will show a "d".

Rotating the **Rotary Cycle Selector** knob in either direction will cycle through the list of codes one code at a time with no wrap. Once an initial direction is selected by the user (either Clockwise or Counterclockwise), subsequent movements of the knob in the same direction will show older codes. If the user changes direction and turns the **Rotary Cycle Selector** knob in the opposite direction, the more recent code will be displayed. If rotation is continued to the limits of the list, the display will remain at the top or the end of the list. A pair of dashes "- -" will be displayed at the end of the list of codes, when the control reaches the top, it will again show "d".

A code generated during the current cycle will be displayed with the **Spin Speed** LED turned 'ON'. If no cycle is currently running, a code generated during the previous cycle will be displayed with the **Spin Speed** LED turned 'ON'.

### Access Other Features

While a diagnostic code is displayed, if the **Rotary Cycle Selector** knob is pressed and held, the machine will display the number of cycles since the diagnostic code occurred.

### Clear Diagnostic Codes

To clear the diagnostic codes list, press the **Delay** and **Chime** keys for 3 seconds while viewing the list.

### Diagnostic Codes

Diag. Code	Description	Trigger	Action to be taken
1	No Drain	The water level fails to drop below the Low Water level reset within 15 minutes, before a spin begins.	Displays "nd". See <b>Will Not Drain</b> "Troubleshooting Procedures".
2	The door fails to unlock	Door failed to unlock after 3 attempts	Displays "LO". See <b>Will Not Unlock</b> "Troubleshooting Procedures".
3	No Fill	Continuous fill of 12 minutes. Total fill of 14 minutes.	Displays "nF". See <b>No Water Fill</b> "Troubleshooting Procedures".

Diag. Code	Description	Trigger	Action to be taken
4	The door/lid fails to lock	Door failed to lock after 3 attempts	Displays "FL". See <b>Will Not Lock</b> "Troubleshooting Procedures".
5-7	Not Used		
8	Water level sensor fault.	Input signal from water level sensor is out of range, Washer will beep and pause the wash cycle.	Displays "LE". See <b>No Water Fill</b> "Troubleshooting Procedures".
9	Not Used		
10	Unbalance or cabinet hit detected during final spin, which prevented the spinner from exceeding 400 rpm	Never exceeded 400 rpm due to an unbalanced load.	Will display "dc" See <b>Wet Clothes</b> "Troubleshooting Procedures".
E	Water sensor level fault.	Water level in the machine is believed to be above the overflow level. When this condition is detected, the machine will automatically begin pumping water out until it falls below the overflow level.	First check to see that water valve is not stuck. If water valve is OK, check water level sensor.
11	Will not remember machine settings	Difficulty in reading memory	See <b>Clear Diagnostic Codes</b> . Disconnect and reconnect the washer power cord at power supply outlet. If condition still exists, replace machine control board.
12-14	Not Used		

# Troubleshooting Procedures



## WARNING

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Diag. Code	Description	Trigger	Action to be taken
15	Stuck Key	A key is sensed to be pressed more than 30 seconds, the key will be assumed to be stuck.	Display "E2". See <b>LED/Switch Test</b> . Check connection of keypad to control board. Replace console if necessary.
17	Door/Lid switch was not seen open since the last two final spins	The door has not been opened after two complete wash cycles. Door switch was not seen open since the last two final spins.	Will display "od". If door open sensed, error will clear. Check door lock.
18	Detected door lock switch open during cycle when not expected.	Open door lock switch with motor running.	Check for loose wire connections. Clear the diagnostic code and recheck; if reoccurs, see <b>Door Lock Test</b> . Check door lock system. See <b>Board Output Test</b> . Check the output voltage of door lock coil. If normal, change door lock switch. If not normal, change Machine Control Board.
19-21	Not Used		
22	Door/lid switch detected open during cycle (when not paused).	Door switch is read as open and the door locked switch is read as locked.	See <b>Door Lock Test</b> "Troubleshooting Procedures".
23-24	Not Used		
25	Motor tach signal exists without motor running.	Tach signal exists without torque command or when not expected.	Displays "bE". Replace Motor Control Board.
26-28	Not Used		
29	Sump thermistor failure (Optional)	Abnormal high/low temp or ohm resistance seen	Displays " tE". - Loose or pinched wires. - Bad sump thermistor.
30-33	Not Used		

Diag. Code	Description	Trigger	Action to be taken
2E	Motor Drive failure (Locked, Hall sensor fault)	Machine control is attempting to drive the motor but is not seeing any tach response. Visual check shows motor is not moving.	Display "E3" Evaluate wire harness for loose or unhooked connections. If machine has separate motor control, perform self diagnostic motor test. See <b>"Board Output Test"</b> .
34	System Relay failure	Machine control does not see relay open when it should.	Display "Sr". Replace machine control board.
35	Not Used		
3E	Motor failure (Over current)	Over Current is detected. Motor won't turn.	Displays "3E". Check the motor windings, the speed sensor, wiring connections, or Control Board.
40-49	Not Used		
91	Voltage for motor control bus is over specified limit	Voltage for motor control bus is over limit	Display "2E". Replace Machine Control Board.
92	Voltage for motor control specified limit	Voltage for motor control bus is under specified limit.	Display "2E". Replace Machine Control Board.

### Exit Service Mode

To exit:

- 1) Press **Chime** and **Extra Rinse** keys for 3 seconds again, or
- 2) Press the **Power Off** key, or
- 3) Unplug the machine. After five (5) minutes of inactivity (user key presses) in **Service Mode**, the machine will exit the **Service Mode** and resume normal operations. Pressing the **Power Off** key will completely exit **Service Mode**. If a cycle is running, cancel the cycle. Pressing the **Rotary Selector** knob while running a test will pause the individual test, while remaining in **Service Mode**. A power loss during **Service Mode** will cancel this mode.

# Wiring Schematics



## WARNING

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Course	Water Temp (Unit : Deg.C) Setting Wash/Rinse	Water Temp (Unit : Deg.C) heater on/off	Time (minute)										Total
			Water Filling with Tumbling	Heating		Cooling / Untangling	Drain	SPIN		Water Filling	RINSE		
			Soaking	Washing				Intermittent 1	Intermittent 2			Final	
Sanitary	E/H/C(N)	142/151	2	3	69	(1)	(1)	(6)	(6)	(7)	2	4	110
	C/C(N)		2	3	24	1	(1)	(6)	(6)	(7)	2	4	
Super Wash	C/C	61/70	2	3	24	1	(1)	(6)	(6)	(7)	2	4	90
	W/C	95/106	2	3	24	1	(1)	(6)	(6)	(7)	2	4	
	W/W	95/106	2	3	24	1	(1)	(6)	(6)	(7)	2	4	
	H/C(N)	120/129	2	3	24	(1)	(1)	(6)	(6)	(7)	2	4	
Normal	C/C(N)		2	(3)	(13)	1	(1)	(6)	(6)	(7)	2	4	54
	C/C	61/70	2	3	13	1	(1)	(6)	(6)	(7)	2	4	
	W/C	95/106	2	3	13	1	(1)	(6)	(6)	(7)	2	4	
	W/W	95/106	2	3	13	1	(1)	(6)	(6)	(7)	2	4	
Whites	H/C(N)	120/129	2	3	13	(1)	(1)	(6)	(6)	(7)	2	4	60
	C/C(N)		2	(3)	(6)	1	(1)	(6)	(6)	(7)	2	4	
	C/C	61/70	2	3	6	1	(1)	(6)	(6)	(7)	2	4	
	W/C	95/106	2	3	6	1	(1)	(6)	(6)	(7)	2	4	
Wrinkle Control	W/W	95/106	2	3	6	1	(1)	(6)	(6)	(7)	2	4	45
	H/C(N)	120/129	2	3	6	(1)	(1)	(6)	(6)	(7)	2	4	
	C/C(N)		2	(3)	(16)	1	(1)				2	4	
	C/C	61/70	2	3	16	1	(1)				2	4	
Colors	W/C	95/106	2	3	16	1	(1)				2	4	56
	W/W	95/106	2	3	15	1	(1)	(6)	(6)	(7)	2	4	
	H/C(N)	120/129	2	3	15	1	(1)	(6)	(6)	(7)	2	4	
	C/C(N)		2	3	15	(1)	(1)	(6)	(6)	(7)	2	4	
Delicate	C/C(N)		2		(6)		(1)	(6)	(6)	(7)	(2)	(5)	45
	C/C	61/70	(2)		6		(1)	(6)	(6)	(7)	(2)	(5)	
	W/C	95/106	(2)		6		(1)	(6)	(6)	(7)	(2)	(5)	
	W/W	95/106	(2)		6		(1)	(6)	(6)	(7)	(2)	(5)	
Hand Wash	H/C(N)	120/129	(2)		6		(1)	(6)	(6)	(7)	(2)	(5)	45
	C/C(N)		(2)		(8)		(1)	(6)	(6)	(7)	(2)	(4)	
	C/C	61/70	(2)		8		(1)	(6)	(6)	(7)	(2)	(4)	
	W/C	95/106	(2)		8		(1)	(6)	(6)	(7)	(2)	(4)	
Quick Wash	W/W	95/106	(2)		8		(1)	(6)	(6)	(7)	(2)	(4)	29
	H/C(N)	120/129	(2)		8		(1)	(6)	(6)	(7)	(2)	(4)	
	C/C(N)		(2)		8		(1)	(6)	(6)	(7)	(2)	(4)	
	C/C	61/70	2	(3)	(4)	1	(1)				2	2	
Enviro Plus	W/C	95/106	2	3	4	1	(1)				2	2	45
	W/W	95/106	2	3	4	1	(1)				2	2	
	H/C(N)	120/129	2	3	4	(1)	(1)				2	2	
	C/C(N)		2	(3)	(10)	1	(1)	(3)	(3)	(7)	2	4	
Presoak	C/C	61/70	2	3	10	1	(1)	(3)	(3)	(7)	2	4	25
	W/C	95/106	2	3	10	1	(1)	(3)	(3)	(7)	2	4	
	W/W	95/106	2	3	10	1	(1)	(3)	(3)	(7)	2	4	
	H/C(N)	120/129	2	3	10	(1)	(1)	(3)	(3)	(7)	2	4	

# Wiring Schematics



## WARNING

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**NOTE: Series 10 – 16** do not have connector CN11 or MEMS PCB originally.

### Series 17

