GE APPLIANCES
a Haier company

Technical Service Guide

January 2019

24 Inch Front Load Washer

GFW148SSM

31-9295

Safety Information

IMPORTANT SAFETY NOTICE

The information in this service guide is intended for use by individuals possessing adequate backgrounds of electrical, electronic, and mechanical experience. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

WARNING

To avoid personal injury, disconnect power before servicing this product. If electrical power is required for diagnosis or test purposes, disconnect the power immediately after performing the necessary checks.

RECONNECT ALL GROUNDING DEVICES

If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

Warranty

For Warranty Information:

1. Go to http://products.geappliances.com
2. Search the model number.
3. Click on the Literature tab.
4. Click on Use and Care Manual.
5. Locate the Warranty page.

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Safety Requirements

GE Factory Service Employees are required to use safety glasses with side shields, safety gloves and steel toe shoes for all repairs.

Brazing Glasses

Plano Type Safety Glasses

Prescription Safety Glasses

Safety Glasses must be ANSI Z87.1-2003 compliant

Dyneema®Cut Resistant Glove

Cut Resistant Sleeve(s)

Electrically Rated Glove and Dyneema® Cut Resistant Glove Keeper

Steel Toed Work Boot

⚠ WARNING

Prior to disassembly of the washer to access components, GE Factory Service technicians are REQUIRED to follow the Lockout / Tagout (LOTO) 6 Step Process:

Step 1 Plan and Prepare	**Step 4** Apply LOTO device and lock
Step 2 Shut down the appliance	**Step 5** Control (discharge) stored energy
Step 3 Isolate the appliance	**Step 6** “Try It” verify that the appliance is locked out

Nomenclature

Model Number

G F W 1 4 8 S S M 0 W W

Brand
P: Profile
G: GE
H: Hotpoint
A: Americana
M: Moffatt
Q: Haier
X: OEM/Private Label

Configuration
F: Front Load
T: Top Load - Rear Control
N: Top Load - Front Control
U: Unitized
K: DUO/Double Configuration
A: Accessory

Platform
W: Washer
Q: Combi
F: Pedestal

Series

Partner Type
H: Home Depot
L: Lowes
P: Premium
S: Standard
C: Contract
M: Mabe
I: International

Product Type
R: Riser
A: 2" Cover Top Load
B: 4" Top Load Cover
S: Standard/Stationary
P: Portable
C: 4" Cover w/ 1" Base
E: E Star

Model Year
L: 2017
M: 2018
N: 2019

Engineering Revision
Alpha or Numeric

Color
WW: White

The nomenclature breaks down and explains what the letters and numbers mean in the model number.

Serial Number

The first two characters of the serial number identify the month and year of manufacture. The letter designating the year repeats every 12 years.

Example: LA123456S = June, 2013

A – JAN	2024 – Z
D – FEB	2023 – V
F – MAR	2022 – T
G – APR	2021 – S
H – MAY	2020 – R
L – JUN	2019 – M
M – JUL	2018 – L
R – AUG	2017 – H
S – SEP	2016 – G
T – OCT	2015 – F
V – NOV	2014 – D
Z – DEC	2013 – A

The nomenclature tag is located behind the door on the upper left side and also on the back of the washer to the left of the water valves.

NOTE: The Mini Manual is located under the top cover, inside a plastic envelope that is taped to the top of the dispenser assembly.

Specifications

Windings and Coils Resistance Values	
Drain Pump	41±10%
Door Lock (Pin2, Pin 3)	50-100
Motor	14.2 (Single Phase)
Water Valves	990±10%
Water Heater	14.1 - 15.6
Water Temp Sensor	12,000 at 77 °F/25 °C

Pressure Sensor Frequency		
Course	**Water Height (Inches)**	**Frequency (Hz)**
Empty		42.88
Normal Wash	0.55"	40.8
Normal Rinse	0.63"	40.75
Quick Wash Wash	2.17"	39.89
Quick Wash Rinse	4.65"	38.50
Rinse Spin Rinse	3.74"	39.01
Tub Clean Wash	1.06"	40.51
Tub Clean Rinse	2.87"	39.49
Door Open	2.36	39.78
Overflow	8.23"	36.50
Inside drum Edge	0"	41.10
Kill Foam	0.39"	40.88

Thermistor Resistance

Temp °C	Temp °F	Approx. Ω (ohms)
-10°	14°	57.4417
-5°	23°	44.9731
0°	32°	35.4632
5°	41°	28.1563
10°	50°	22.502
15°	59°	18.0968
20°	68°	14.6421
25°	77°	11.9159
30°	86°	9.7435
35°	95°	8.0112
40°	104°	6.6216
45°	113°	5.5006
50°	122°	4.5914
55°	131°	3.8502
60°	140°	3.243
65°	149°	2.7431
70°	158°	2.3298
75°	167°	1.9865
80°	176°	1.7002
85°	185°	1.4604
90°	194°	1.2589
95°	203°	1.0888
100°	212°	0.9447

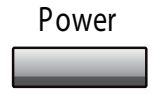
Speed Selected (Displayed)	Basket RPM
No Spin	0
Low	600 +/- 7 RPM
Medium	1000 +/- 7 RPM
High	1200 +/- 7 RPM
Max	1400 +/- 7 RPM

Consumer Help Indicator	
CHI is the way to communicate a simple remedy for some situations that the consumer can perform without the need to call for service. The chart below describes the helpful message the consumer may notice scrolling on the display when they return to start another load. The message below will provide a simple remedy that the consumer can quickly perform.	
"Spin" icon blinking	If an out-of-balance condition is detected by washer, the Spin icon will blink during the remaining portion of cycle and will stay illuminated for a short time after cycle stops. When this occurs, the washer is taking actions to correct the out-of-balance condition and complete cycle normally. In some cases, the washer may not be able to balance the load and spin up to full speed.

Control Features

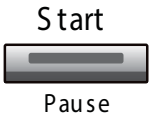
Quick Start

1. If the display is dark, press Power to "wake up" the display. If the display is active, press to put the washer in standby mode. **NOTE**: Pressing Power does not disconnect the appliance from the power supply.

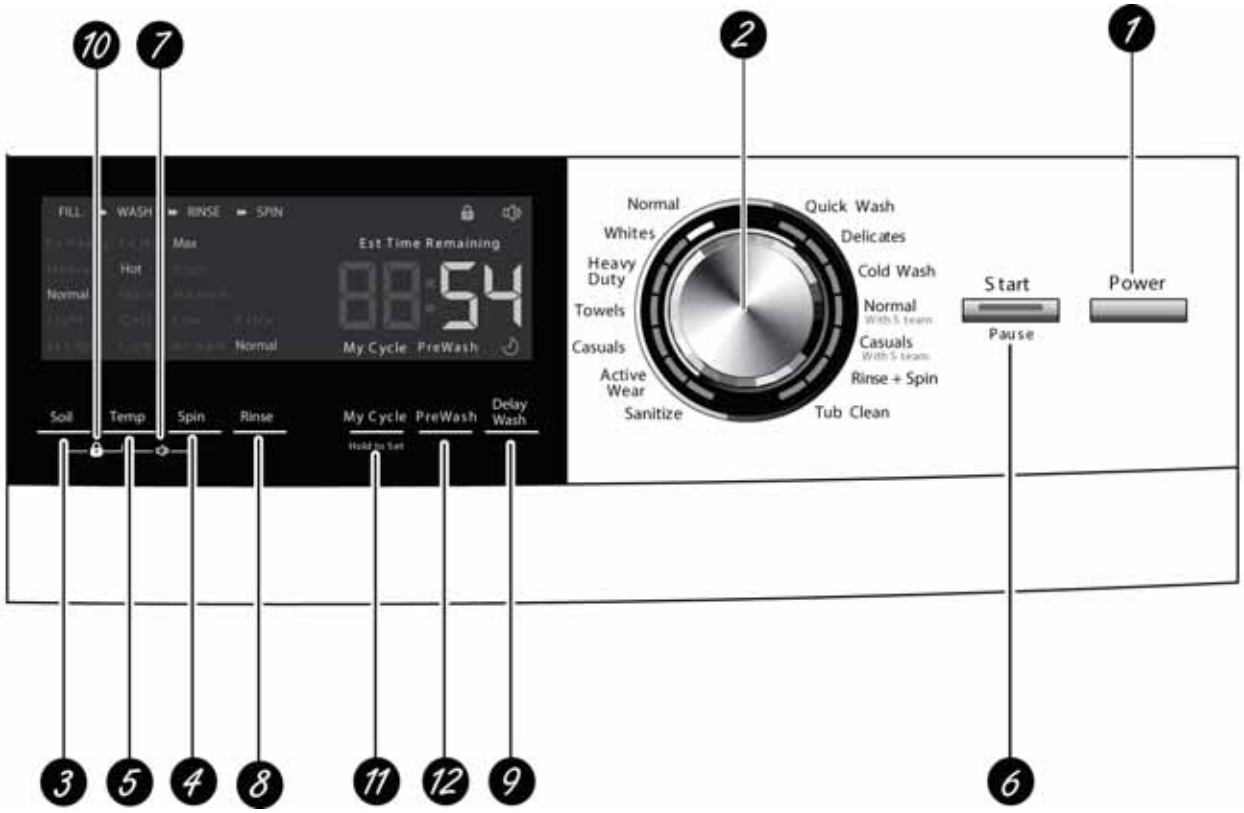


2. Select a wash cycle. Default options are set for each wash cycle. These defaults options can be changed.

3. After the wash cycle is selected, press the Start/Pause button.



Washer Features



1 Press Power to "wake up" the display. If the display is active, press Power to put the washer in standby mode. **NOTE**: Pressing Power does not disconnect the appliance from the power supply.

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2 Wash Cycles

The wash cycles are optimized for specific types of wash loads. The chart below will help match the wash setting with the loads. The Gentle Wash™ lifters lightly tumble the clothes into the water and detergent solution to clean the load.

Normal For heavily to lightly soiled colorfast cottons, household linens, work and play clothes.

Whites For heavily to lightly soiled white cottons, household linens, work and play clothes.

Heavy Duty For sturdy colorfast fabrics and heavily soiled garments, towels, and jeans.

Towels For items such as towels, sheets, pillowcases and dish rags.

Casuals For lingerie and special-care fabrics with light to normal soil. Provides gentle tumbling and soak during wash and rinse.

Active Wear For active sports, exercise and some casual wear clothes. Fabrics include modern technology finishes and fibers such as spandex, stretch and microfibers.

Sanitize For increased water temperature which will sanitize and kill more than 99.9% of many common bacteria found in home laundry. For best results, select the extra heavy soil setting when using the Sanitize cycle.

NSF Protocol P172
Sanitization Performance of Residential and Commercial, Family-Sized Clothes Washers

Quick Wash For lightly soiled items that are needed in a hurry. Cycle time is approximately 30 minutes, depending on the selected options.

Delicates For lingerie and special-care fabrics with light to normal soil. Provides gentle tumbling and soak during wash and rinse.

Cold Wash For bright and dark color garments.

Normal With Steam For heavily to lightly soiled colorfast cottons, household linens, work and play clothes.

Casuals With Steam For heavily to lightly soiled colorfast cottons, household linens, work and play clothes.

Rinse and Spin To quickly rinse out any items at any time.

Tub Clean To clean drum and reduce odor.

NOTE: Tub Clean is a special cycle used to clean the washer drum and reduce odor. DO NOT add garments to this cycle. Remove detergent cup and add one cup of bleach or other commercially available product manufactured for this purpose, such as Tide® Washing Machine Cleaner.

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3 Soil

Changing the **Soil** level increases or decreases the wash time to remove different amounts of soil.

To change the **Soil** level, press the **Soil** level button until the desired setting has been reached. Choose between Extra Light, Light, Normal, Heavy or Extra Heavy soil.

4 Spin

Changing the **Spin** setting changes the final spin speed of the cycles. Always follow the garment manufacturer's care label when changing the **Spin** setting.

To change the **Spin** setting, press the **Spin** setting button until the desired setting has been reached. Choose between No Spin, Low, Medium, High or Max.

Higher spin speeds are not available on certain cycles, such as Delicates.

Higher spin speeds remove more water from the clothes and will help reduce dry time, but may also increase the possibility of setting wrinkles on some fabrics.

5 Temp

Adjust to select the proper water temperature for the wash cycle. The rinse water is always cold to help reduce energy usage and reduce setting of stains and wrinkles.

Follow the fabric manufacturer's care label when selecting the wash temperature.

To change the wash temperature, press the **Temp** button until the desired setting has been reached. Choose between Cold, Cool, Warm, Hot or Extra Hot.

6 Start/Pause

Press to start a wash cycle. If the washer is running, pressing it once will pause the washer and unlock the door. This function can be used to add garments during a cycle. Press again to restart the wash cycle.

NOTE: If the washer is paused and the cycle is not restarted within 15 minutes, the current wash cycle will be cancelled.

NOTE: In some cases, the washer will drain first, then unlock the door when it is paused.

NOTE: The washer performs automatic system checks after pressing the **Start/Pause** button. Water will flow within 45 seconds or less. A sound may be heard when the door locks and unlocks before water flows; this is normal.

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7 Signal

When the light is on, the washer will beep at the end of the cycle and every time a button is pressed on the control panel.

To turn the signal off, press and hold the **Temp** and **Spin** buttons together for 3 seconds.

A sound is made to indicate the lock/unlock status.

8 Rinse

Changing **Rinse** will change the number of rinses the cycle will use. To change the rinse option, press **Rinse** until the desired setting has been reached. Choose between Normal, Extra and no rinse. In order to select no rinse, press the **Rinse** button until no lights are lit in the rinse window.

On **Rinse + Spin** cycle, a drain and spin cycle can be achieved by selecting no rinse.

9 Delay Wash

Use to delay the start of the washer.

1. Choose wash cycle and any options.
2. Press the **Delay Wash** button. Change the delay time in 1 hour increments (up to 24 hours) each time the **Delay Wash** button is pressed. Stop pressing the button when the desired time is displayed.
3. Press the **Start/Pause** button to start the countdown.

The countdown time will be shown in the **Est Time Remaining** (Estimated Time Remaining) display.

NOTES:

- If the door is opened while the washer is in **Delay Wash**, the count down time will stop the count down and the display will say “door”. The door must be closed and the **Start/Pause** button must be pressed to continue the delay time count down.
- User can delay the start of a washer cycle up to 24 hours.

The light on the button will light up when **Delay Wash** is on.

10 Control Lock

The user can lock the controls to prevent any selections from being made. The user can also lock or unlock the controls after a cycle has been started.

Children cannot accidentally start the washer by touching pads with this option selected.

To lock the washer, press and hold the **Soil** and **Temp** buttons together for 3 seconds.

To unlock the washer controls, press and hold the **Soil** and **Temp** buttons together for 3 seconds. A sound is made to indicate the lock/unlock status.

The Control Lock icon on the display will light up when it is on.

NOTE: The **Power** button can still be used when the machine is locked.

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11 My Cycle

To save a favorite cycle, set the desired settings for wash cycle, soil level, spin speed and wash temperature settings and hold down the **My Cycle** button for 3 seconds. A beep will sound to indicate the cycle has been saved.

To use a custom cycle, press the **My Cycle** button before washing a load.

To change the saved cycle, set the desired settings and hold down the **My Cycle** button for 3 seconds.

NOTE: When using **My Cycle**, wash options cannot be modified after the cycle has been started.

NOTE: If wash options with **My Cycle** are changed before starting the cycle, the **My Cycle** light will turn off and the user will be returned to the base cycle.

12 PreWash

Prewash is an extra wash before the main wash. Use it for heavily soiled clothes or for clothes with a care label that recommends prewashing before washing. Be sure to add liquid or powder high-efficiency detergent, or the proper wash additive to the prewash dispenser.

The **PreWash** feature will fill the washer with water (adding the prewash detergent), tumble the clothes, drain and spin. Then the washer will run the selected wash cycle.

NOTE: The **PreWash** is not selected automatically and must be selected before starting the cycle.

Wash Cycles

Items to Wash	Cycle & Cycle Time	Soil Level	Wash Temp	Spin Selection	Options Available	Cycle Details
Cycle for normal, regular, or typical use for washing up to a full load of normally soiled cotton clothing.	Normal	Extra Heavy Heavy **Normal** Light Extra Light	Extra Hot Hot **Warm** Cool Cold	**Max** High Medium Low No Spin	Prewash Extra Rinse Delay Wash My Cycle	Cycle for normal, regular, or typical use for washing up to a full load of normally soiled cotton clothing. Choose the Heavy or Extra Heavy soil level selection and Warm or Hot water temperature selection as appropriate for the clothes load for a higher degree of cleaning.
Whites and household linens.	Whites	Extra Heavy Heavy **Normal** Light Extra Light	Extra Hot Hot **Warm** Cool Cold	**Max** High Medium Low No Spin	Prewash Extra Rinse Delay Wash My Cycle	Cycle tailored to clean and brighten whites.
Towels, sheets, pillowcases and dish rags.	Towels	Extra Heavy Heavy **Normal** Light Extra Light	Extra Hot Hot **Warm** Cool Cold	**Max** High Medium Low No Spin	Prewash Extra Rinse Delay Wash My Cycle	Cycle designed for washing towels, sheets, pillowcases and dish rags. It is recommended that towels and sheets be washed separately for best care and washing performance.
Sturdy fabrics with heavy to medium soil.	Heavy Duty	Extra Heavy **Heavy** Normal Light Extra Light	Extra Hot Hot **Warm** Cool Cold	**Max** High Medium Low No Spin	Prewash Extra Rinse Delay Wash My Cycle	Incorporates multistep wash and soak periods combined with extended wash periods to effectively clean heavily to medium soiled sturdy fabrics.
Casual clothes, lightly soiled office wear.	Casuals	Extra Heavy Heavy **Normal** Light Extra Light	Extra Hot Hot Warm **Cool** Cold	Max **High** Medium Low No Spin	Prewash Extra Rinse Delay Wash My Cycle	Wash cycle tailored to care for casual clothes and office wear items.

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Wash Cycles - Continued

Items to Wash	Cycle & Cycle Time	Soil Level	Wash Temp	Spin Selection	Options Available	Cycle Details
Medium to lightly soiled athletic wear items of technical or synthetic fabrics.	Active Wear	Extra Heavy **Heavy** Normal Light Extra Light	Extra Hot Hot Warm **Cool** Cold	Max **High** Medium Low No Spin	Prewash Extra Rinse Delay Wash My Cycle	Cycle designed for care of medium to lightly soiled active wear, athletic wear and technical fabrics.
Heavily soiled colorfast items with the need for sanitization.	Sanitize	Extra Heavy Heavy **Normal** Light Extra Light	**Extra Hot**	**Max** High Medium Low No Spin	Prewash Extra Rinse Delay Wash My Cycle	Use this cycle to eliminate 99.9% of bacteria from fabrics. Cycle uses an increased water temperature and a longer wash cycle to provide the sanitization benefit. A longer rinse is incorporated to remove contaminates. For best results, select the Extra Heavy soil selection if available. See **NOTE** on next page.
Cycle for normal, regular, or typical use for washing up to a full load of normally soiled cotton clothing using only cold water.	Cold Wash	Extra Heavy Heavy **Normal** Light Extra Light	**Cool** Cold	**Max** High Medium Low No Spin	Prewash Extra Rinse Delay Wash My Cycle	Cycle for normal, regular, or typical use for washing up to a full load of normally soiled cotton clothing. This is an energy saving cycle that uses cold water only to provide comparable wash performance to a warm water wash.
Cycle for heavily soiled colorfast laundry.	Stain Wash with Steam	Extra Heavy Heavy **Normal** Light Extra Light	Extra Hot Hot **Warm** Cool Cold	**Max** High Medium Low No Spin	Prewash Extra Rinse Delay Wash My Cycle	Add steam to the washer to assist with stain removal for heavily soiled colorfast laundry.
Cycle for heavily soiled casual's laundry.	Casuals with Steam	Extra Heavy Heavy **Normal** Light Extra Light	Extra Hot Hot Warm **Cool** Cold	Max **High** Medium Low No Spin	Prewash Extra Rinse Delay Wash My Cycle	Add steam to the washer to assist with stain removal for heavily soiled casual clothes and office wear items.

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Wash Cycles - Continued

Items to Wash	Cycle & Cycle Time	Soil Level	Wash Temp	Spin Selection	Options Available	Cycle Details
Small loads of lightly soiled items that are needed in a hurry.	Quick Wash	Extra Heavy Heavy Normal Light **Extra Light**	Hot **Warm** Cool Cold	**Max** High Medium Low No Spin	Prewash Extra Rinse Delay Wash My Cycle	For cleaning lightly soiled loads in the fastest time possible. Cycle time is approximately 33 minutes, depending on selected options.
For items that need only to be rinsed, use this cycle.	Rinse + Spin			**Max** High Medium Low No Spin	Prewash Extra Rinse Delay Wash My Cycle	To quickly rinse and spin out any items at any time. Utilizes a high speed spin to extract water from wet items. To achieve a drain and spin, deselect the Extra Rinse option. This cycle will dispense prewash detergent and fabric softener.
Cleaning the tub of residue and odor. No clothes to be washed using this cycle.	Tub Clean					**Recommended use of at least once per month** to clean the basket of residue and odor. **Never load laundry when using this cycle; laundry may become damaged.** Cycle incorporates a hot extended wash, intense agitation action and a flush out of the pump.

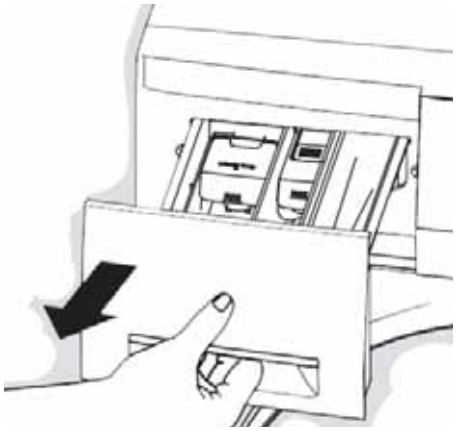
NOTE: The **Sanitize** cycle water temperatures CANNOT be changed. The **Sanitize** cycle is certified by NSF International, an independent third party testing and certification organization.

The **Sanitize** certification verifies that the cycle reduced 99.9% of bacteria typically found in residential laundry and that no significant contamination is transferred to subsequent washer loads. Only the **Sanitize** cycle has been designed to meet the requirements of NSF Protocol P172 for sanitizing effectiveness.

NSF Protocol P172
Sanitization Performance of Residential and Commercial, Family-Sized Clothes Washers

Using the Washer

Dispenser Drawer



Slowly open the dispenser drawer by pulling it out until it stops.

After adding laundry products, slowly close the dispenser drawer. Closing the drawer too quickly could result in early dispensing of the bleach, fabric softener or detergent.

Water may be seen in the bleach and fabric softener compartments at the end of the cycle. This is a result of the flushing/siphoning action and is part of the normal operation of the washer.

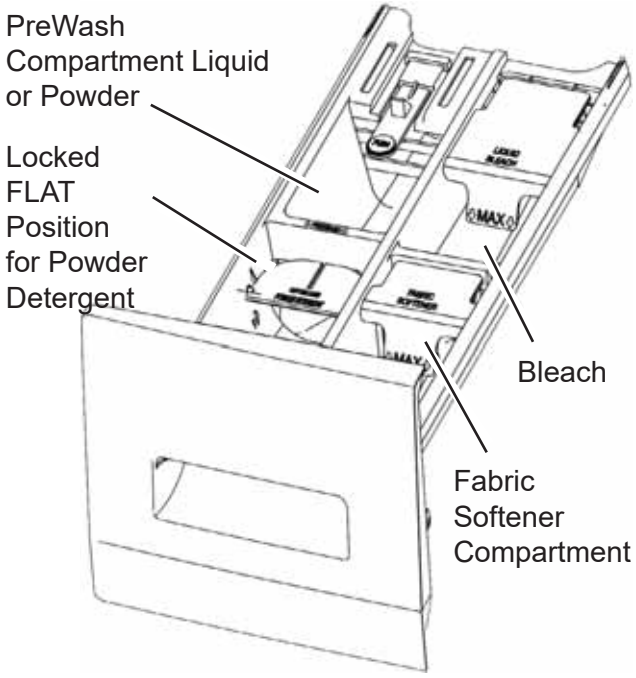
Use only HE High-Efficiency detergent.

Detergent Compartment

- **Only use high-efficiency detergent in this washer. Use the detergent manufacturer's recommended amount. DO NOT fill above the MAX line.**

The detergent compartment is in the left front of the dispenser drawer.

- **Powder Detergent**: Lock the detergent flap flat into it top position in the compartment. Make sure the flap is locked, the pour the suggested amount of powder detergent into the detergent dispenser.
- **Liquid Detergent**: Lock the detergent flap vertically into its center position in the compartment. Make sure the flap is locked, then pour the suggested amount of liquid detergent into the detergent dispenser.
- Add measured detergent to the left detergent compartment of the dispenser drawer.
- Detergent is flushed from the dispenser at the beginning of the wash cycle. Either powdered or liquid high-efficiency detergent can be used.
- Detergent usage may need to be adjusted for water temperature, water hardness, size and soil level of the load. Avoid using too much detergent in the washer since it can lead to over-sudsing and detergent residue being left on the clothes.



Fabric Softener Compartment

If desired, pour the recommended amount of liquid fabric softener into the compartment labeled "Fabric Softener."

Use only liquid fabric softener in the dispenser.

Dilute with water to the maximum fill line.

Do not exceed the maximum fill line. Overfilling can cause early dispensing of the fabric softener, which could stain clothes.

NOTE: Do not pour fabric softener directly on the wash load.

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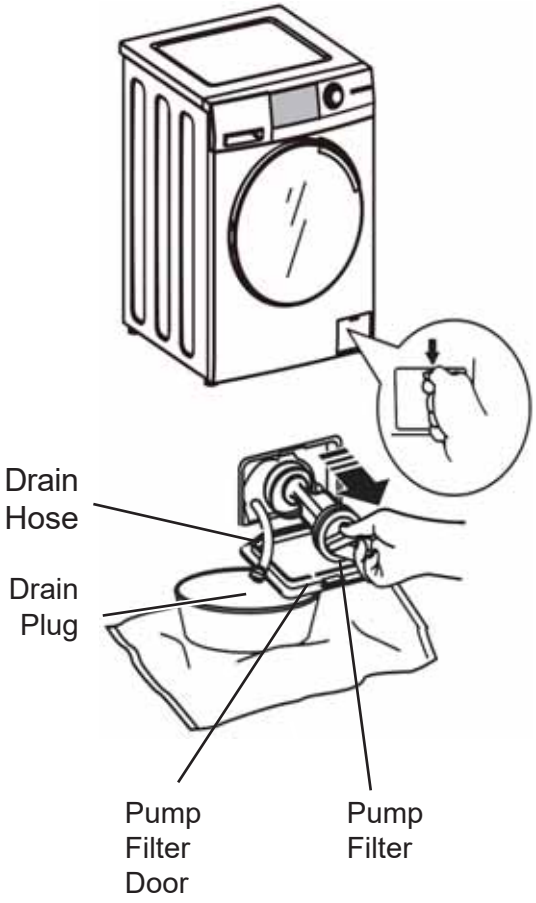
Drain Pump Filter

Clean EVERY MONTH to remove any items that may have been caught in the filter or housing.

Due to the nature of the front-load washer, it is sometimes possible for small articles to pass to the pump. The washer has a filter to capture lost items so they are not dumped to the drain. To retrieve lost items, clean out the pump filter.

1. Open the door on the bottom right of the front of the unit.
2. Twist the small white cap counterclockwise a quarter turn and unhook the small rubber hose. Pull the hose out of the hole and remove the white drain hose plug above a small pan to capture any water that may drain. Drain the excess water. Replace.
3. Unscrew the pump filter. Rinse off any debris. Replace.
4. Close the access door.



Washer Cycle Defaults

When a cycle is initially set, the default cycle settings are displayed. The following table displays the default selections for each cycle.

Cycle	Soil Level	Wash Temp	Rinse Selection	Spin Selection	Approx. Cycle Time
Normal	Normal	Warm	Normal	Max	107
Whites	Normal	Warm	Normal	Max	102
Towels	Normal	Warm	Normal	Max	46
Heavy Duty	Heavy	Warm	Normal	Max	127
Casuals	Normal	Cool	Normal	High	55
Active Wear	Heavy	Cool	Normal	High	59
Sanitize	Normal	Extra Hot	Normal	Max	150
Quick Wash	Extra Light	Warm	Normal	Max	28
Delicates	Normal	Cold	Normal	Medium	48
Cold Wash	Normal	Cold	Normal	Max	130
Stain Wash with Steam	Normal	Warm	Normal	Max	127
Casuals with Steam	Normal	Cool	Normal	High	117
Rinse + Spin	----------	----------	Normal	Max	26
Tub Clean	----------	----------	----------	----------	CLn

NOTE: Washer incorporates an adaptive fill algorithm which fills with only the amount of water to match the load size.

The spin cycle is designed to extract as much water and detergent as possible without harming fabrics. The available selection of spin speeds is controlled by cycle selection.

Speed Selected (Displayed)	Basket RPM
No Spin	0
Low	600 +/- 7 RPM
Medium	1000 +/- 7 RPM
High	1200 +/- 7 RPM
Max	1400 +/- 7 RPM

Demo Mode

In demo mode, the only components that will function are the control LEDs and the door lock. No other components will operate. The countdown display will run much faster than normal.

To Enter Demo Mode	To Exit Demo Mode
1. Press the Power button. 2. Within 30 seconds, turn the cycle knob to Tub Clean. 3. Press and hold Spin and My Cycle for 3 seconds. 4. Press Start. The door will lock, unlock and relock. 5. The cycle will count down and end. Door will unlock.	Washer will exit demo after display goes blank. It does not remain in demo mode. Pressing power or unplugging the washer will exit the demo mode as well.

Stacking Instructions

The GE 24 Inch washer is designed to allow certain models of the GE 24 Inch dryer to be placed on top (stacking). Dryer models that currently qualify for stacking are:

- GFT14ESSLWW

NOTE: If planning to stack the washer and dryer, order Stacking Kit (**Part #**: GE24STACK) to be used for this dryer. Kit is sold separately.

WARNING!

Make sure the dryer is unplugged.

More than two people are recommended to safely lift the dryer into and out of position.

Avoid damage to the existing utility services.

DO NOT place the washer on top of the dryer.

Location Requirements

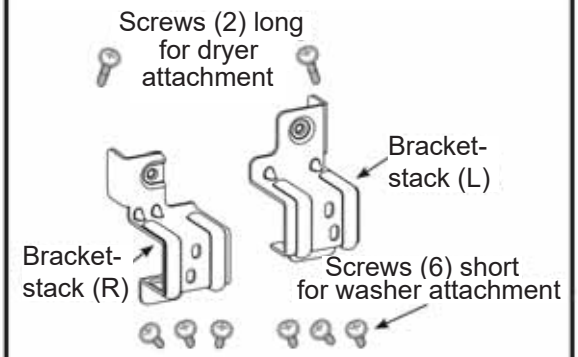
When installed in a location other than an alcove or closet, the minimal clearances to combustible surfaces and for air opening are: 1 inch on both sides, and 3 inches' front and rear, and 1 inch on top. Consideration must be given to provide adequate clearance for installation and service.

NOTE: If the dryer is approved for installation in an alcove or a closet, it will be stated on a label on the back.

When installed in an alcove or closet:

- The dryer MUST be vented to the outdoors.
- Minimum clearance between the dryer cabinet and the adjacent walls or other surfaces is 0 inches either side, and 3 inches' front and rear.
- Minimum vertical space from floor to overhead shelves, cabinets, ceilings, etc., is 67.7 inches.
- Closet doors must be louvered or otherwise ventilated and have at least 60 square inches of open area equally distributed. If the closet contains both a washer and a dryer, doors must contain a minimum of 120 square inches of open area equally distributed.

KIT CONTENTS
(GE APPLIANCES KIT #: GFA24KITL)



Tools Needed

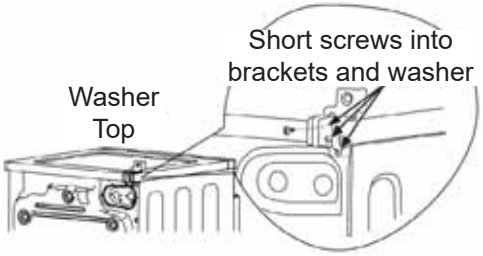
- Phillips-head Screwdriver 
- Level 
- Gloves 

Installation Preparation

1. Remove the packaging.
2. Flatten the product carton to use as a pad to lay the dryer down on its side. Continue using the carton to protect the finished floor in front of the installation location.

Install Bracket to Washer

1. Remove the washer top cap screw from the rear left. Align the left bracket holes with the top cap screw hole on the rear left of the unit and replace the screw. **NOTE**: Leave the screws loose so dryer hole alignment will be easier.
2. Drive the next screw through the bracket into the rear of the washer.
3. Repeat the above steps with the right side.

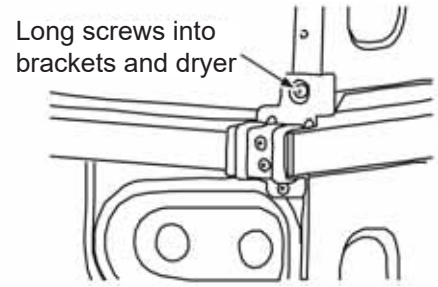


Install Dryer and Bracket on Dryer

WARNING
Disconnect power before installing. Failure to do so could result in serious injury or death.

WARNING
Excessive Weight Hazard
Failure to do so may result in back injury, other injury, or property damage.
- Use two or more people to install dryer.
- Avoid tipping and rupture of utility services.
- Dryer must be securely attached to the washer.
- DO NOT place the washer on top of the dryer.

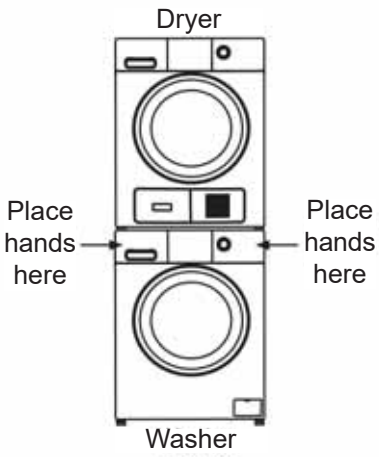
1. Lift the dryer on top of the washer. Protect the washer control panel with cardboard or other protection. Be sure to lift the dryer high enough to clear the washer control panel.
2. Align the holes in the bracket with the holes in the back of the dryer. Using a Phillips screwdriver, attach the two 1/2-inch tapping screws.
3. Tighten the dryer bracket screws; then tighten all stacking kit screws.



Finalize the Installation

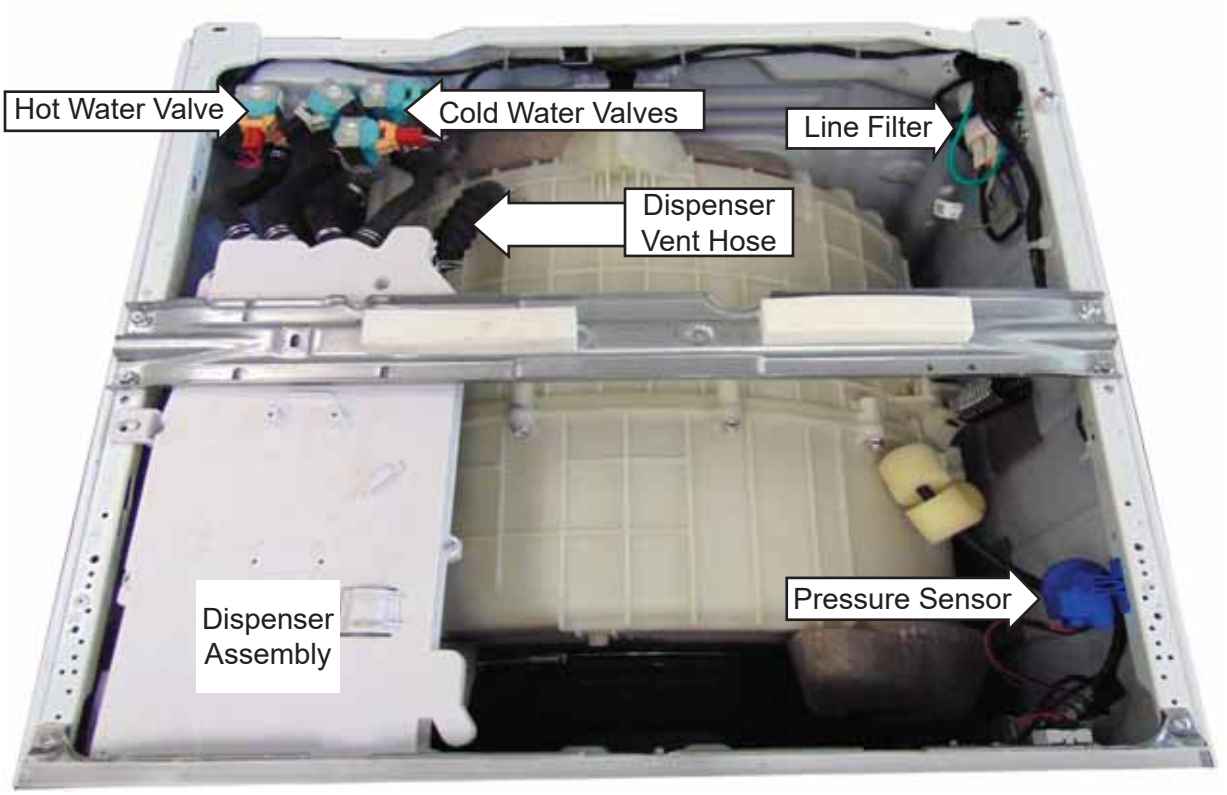
CAUTION
Do not push on the dryer once installed to the top of the washer. Pushing on the dryer may result in pinched fingers.

1. Refer to the washer Installation Instructions to complete the washer installation.
2. Refer to the dryer Installation Instructions to complete the dryer installation.
3. Carefully slide or walk the stacked washer and dryer into place. Use felt pads or other sliding device to assist moving and to protect flooring.

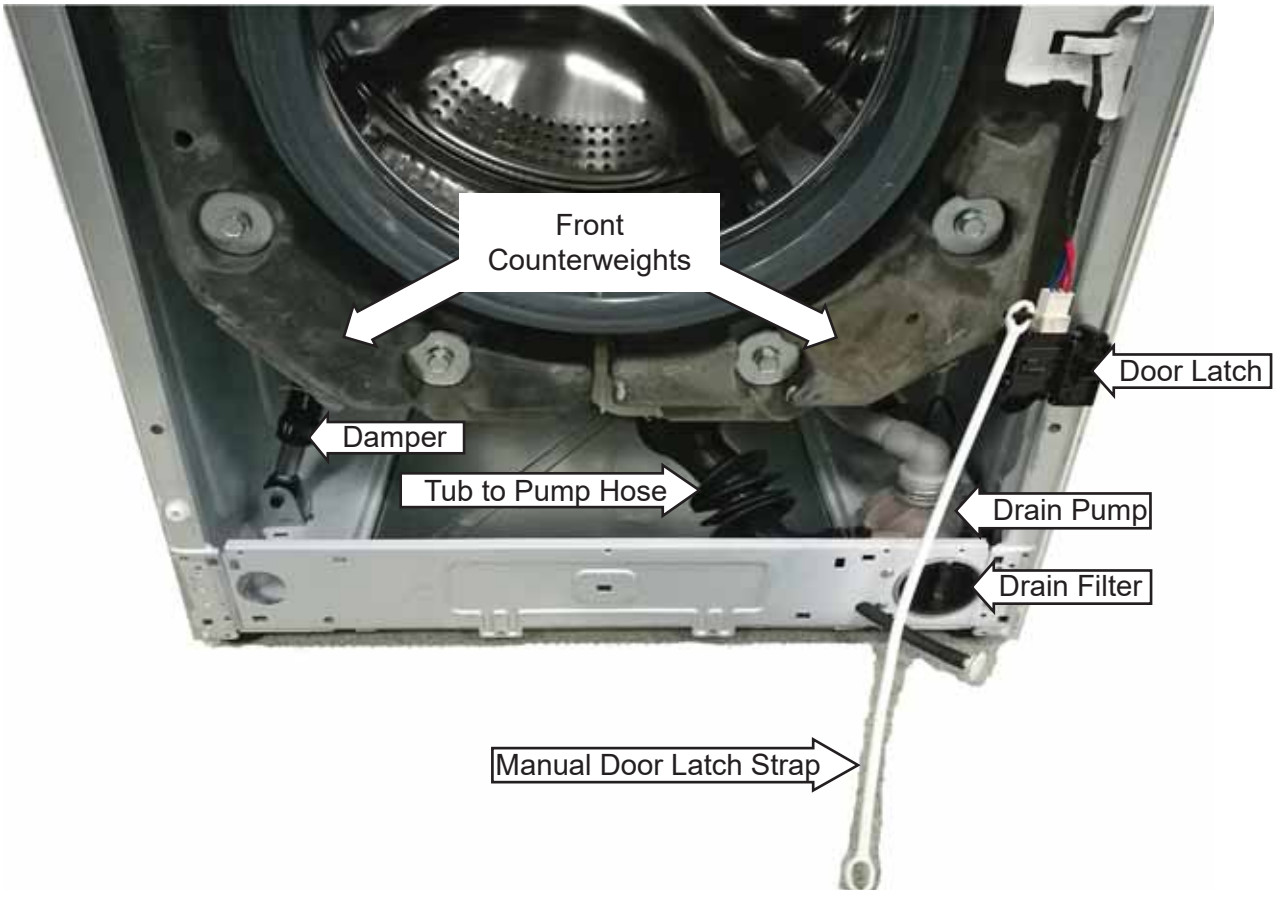


Component Locator Views

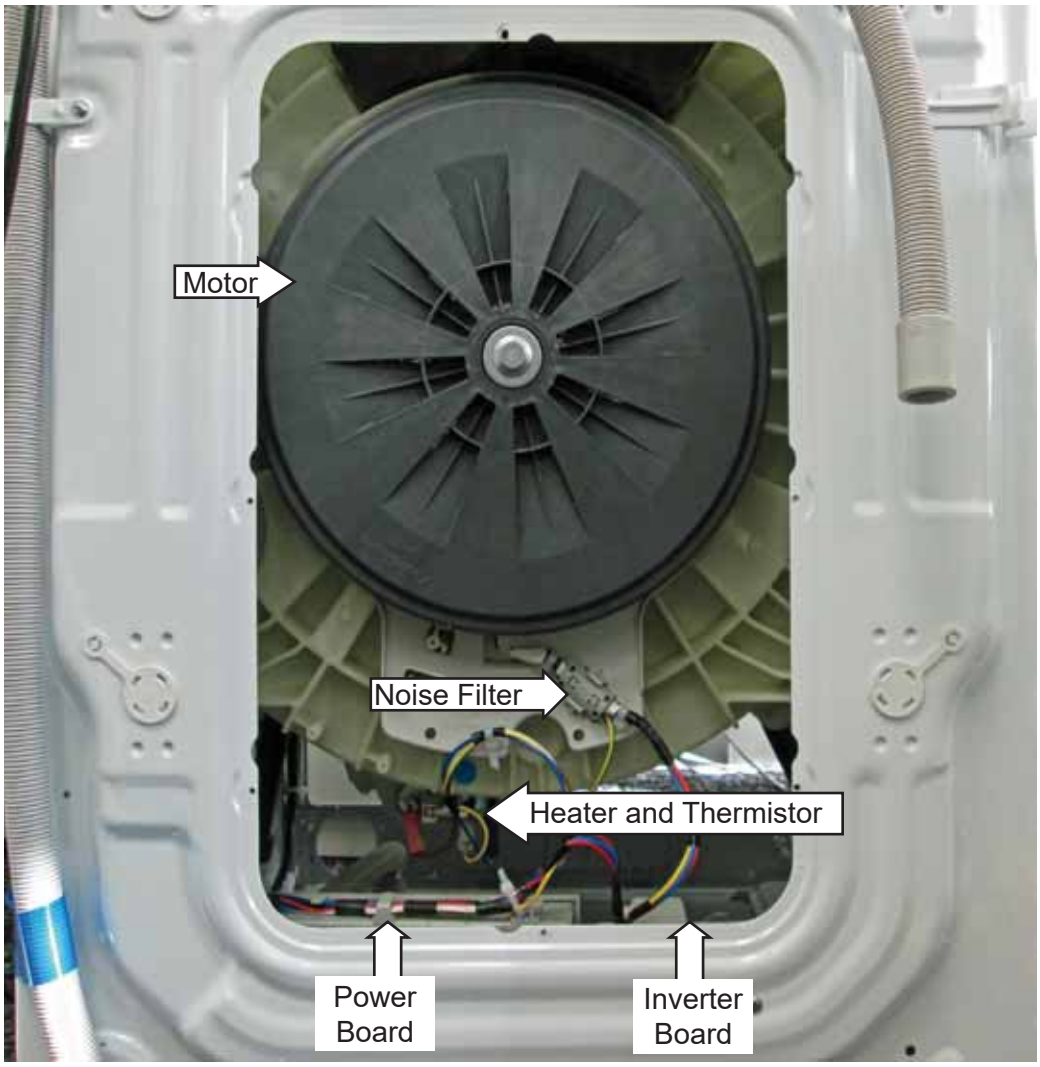
Top View



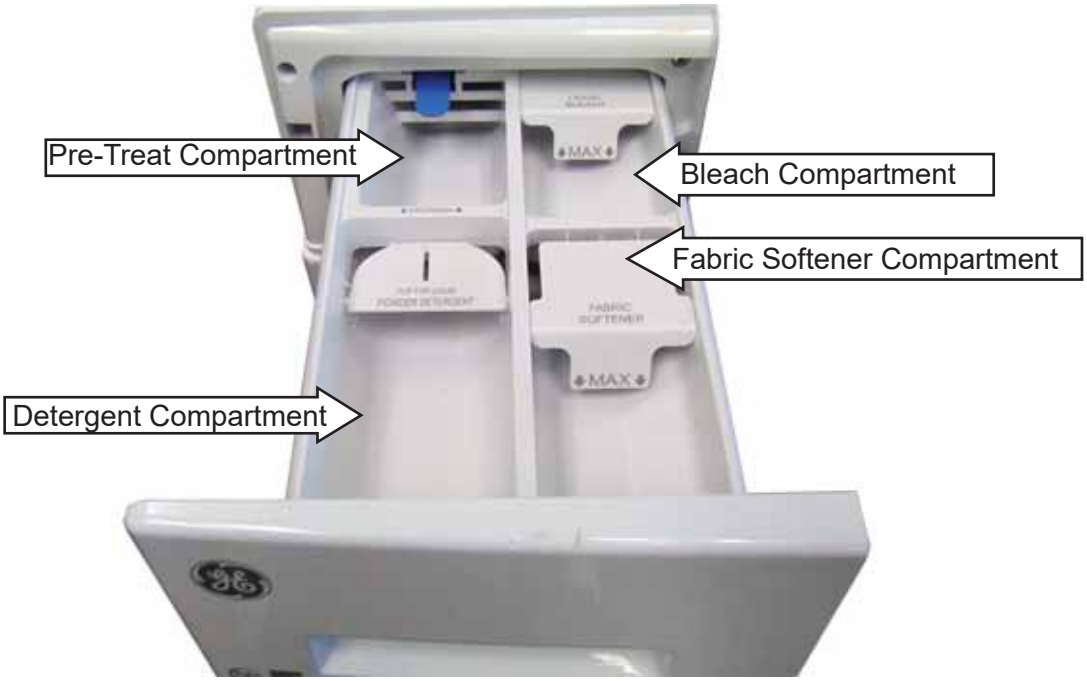
Front View



Rear View (Back Cover Removed)

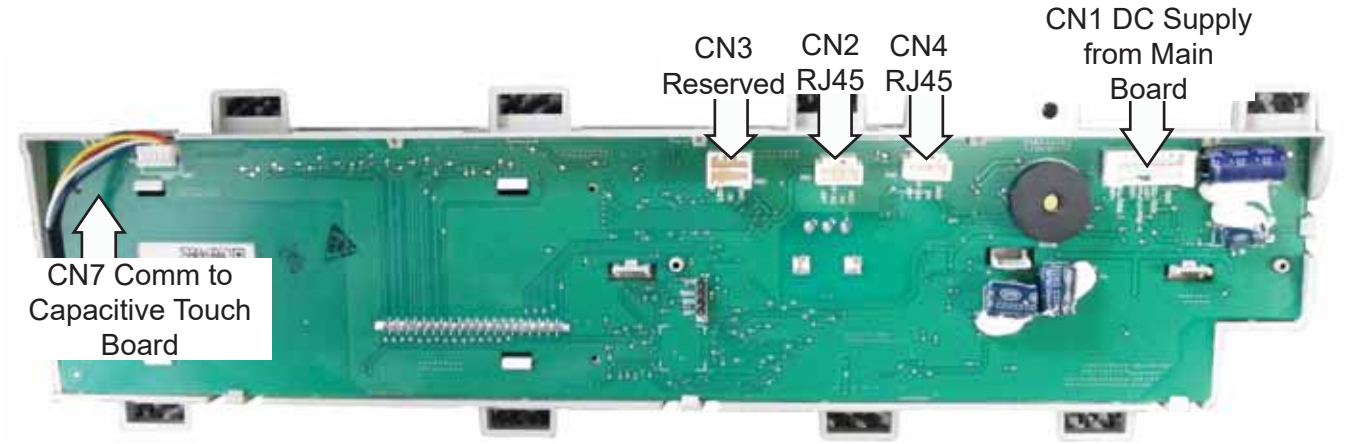


Dispenser View



Control Board Connections

User Interface (w/ Control Flipped Down)

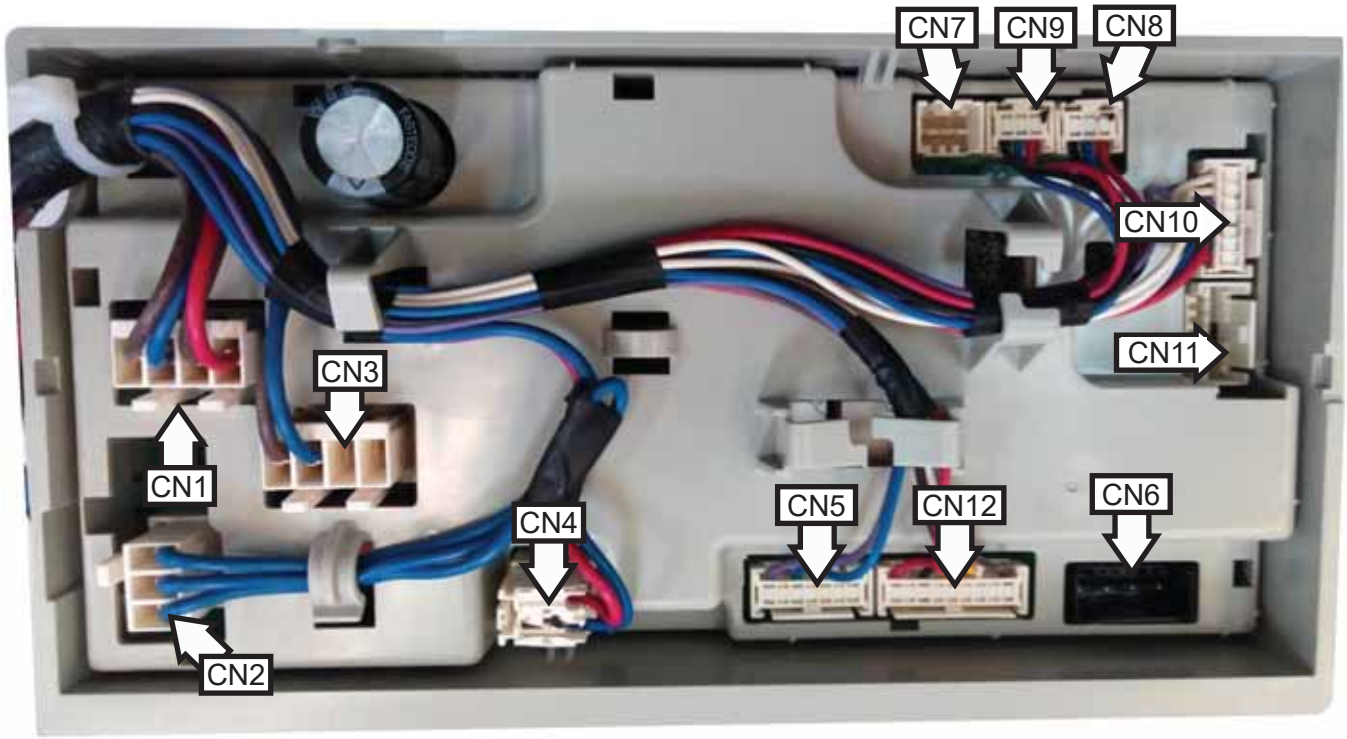


Sensor (Capacitance) Touch Board

(Comes w/ Control Panel)

Main Board

NOTE: Wire colors in the following pictures may not be the same as the machine being service.



CN1	Board Line Voltage from Filter And Out to Door Lock (Board Switch Neutral to Lock)
CN2	Board Neutral in from Filter, Line Out to Door Latch Assembly
CN3	Line Out to Water Heater
CN4	Line Voltage Supply Out to Inverter
CN5	Out to Drain Pump
CN6	Reserved
CN7	DC Voltage Supply to User Interface Board
CN8	DC Voltage Out to Inverter Board and Communication Between Main and Inverter Boards
CN9	Reserved
CN10	Water Temperature Sensor, Door Switch, Water Level Sensor
CN11	Reserved
CN12	Water Valves

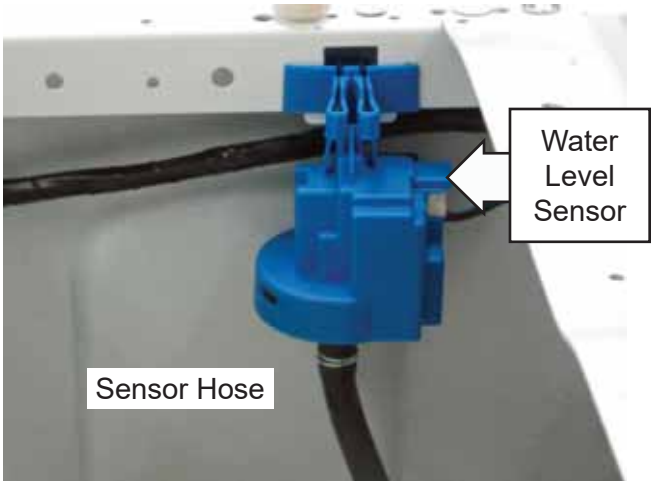
Inverter Board

P101	Line and Neutral
P171	Voltage Out to Stator
P232	12 VDC Comm and Ground In from Main Board

Fill System

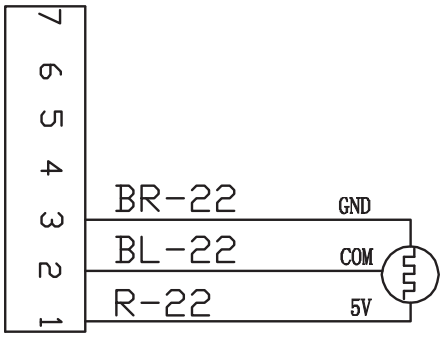
Water Level Pressure Sensor

The water level sensor is connected by a hose to an air chamber near the bottom of the outer tub and operates by a frequency (kHz) signal to the UI (User Interface) Board.



The frequency is monitored by the Main Board, which turns off the water valves when the desired water level is achieved.

Sensor frequency can be read at the **red** and **blue** wires to the sensor, (or pin 1 and pin 2) from the CN10 connector on the User Interface board.



- When the water level rises in the washer tub, air is trapped in the air chamber. As the water level rises, the air pressure in the air chamber increases.
- The pressure is translated into an electrical signal (frequency) by the water level sensor.
- The frequency will vary, depending upon water level.
- This frequency can be measured at the water level sensor between the **red** and **blue** wires.

Water Levels

The wash water level is approximately 1-inch deep at the bottom center of the wash basket.

Pressure Sensor Frequency		
Course	**Water Height (Inches)**	**Frequency (Hz)**
Empty		42.88
Normal Wash	0.55"	40.8
Normal Rinse	0.63"	40.75
Quick Wash Wash	2.17"	39.89
Quick Wash Rinse	4.65"	38.50
Rinse Spin Rinse	3.74"	39.01
Tub Clean Wash	1.06"	40.51
Tub Clean Rinse	2.87"	39.49
Door Open	2.36	39.78
Overflow	8.23"	36.50
Inside drum Edge	0"	41.10
Kill Foam	0.39"	40.88

The drain pump will be activated when the main PC board detects frequency under 36 Hz (flood protection). In flood protection mode, the pump will run until reset the level is reached. Flood protection is active even in the idle mode, as long as the door is closed.

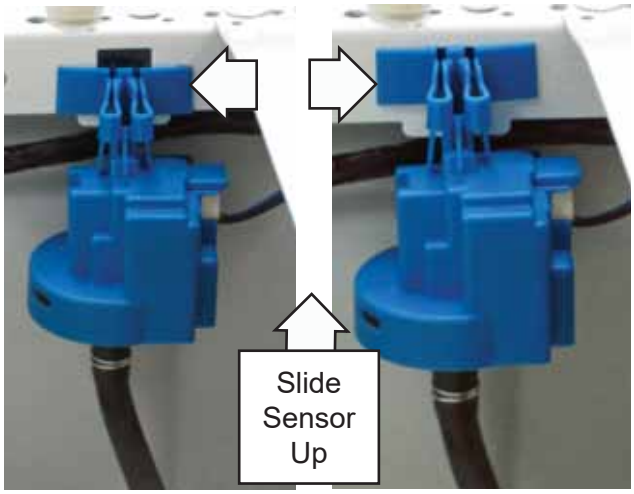
Operation of the water level sensor can be checked by using Service Test mode t05 (see the **Service Mode Test** in the **Diagnostics** section of this guide.)

Specific failures associated with the water level sensor can initiate fault codes E1, E4, E8, and FA (see the **Fault Codes** section in this service guide.)

The water level sensor is located inside the cabinet, right side toward the front. The sensor is held in place with two tabs that are inserted into a rectangular cutout in the right side cabinet brace.

Pressure Sensor Removal

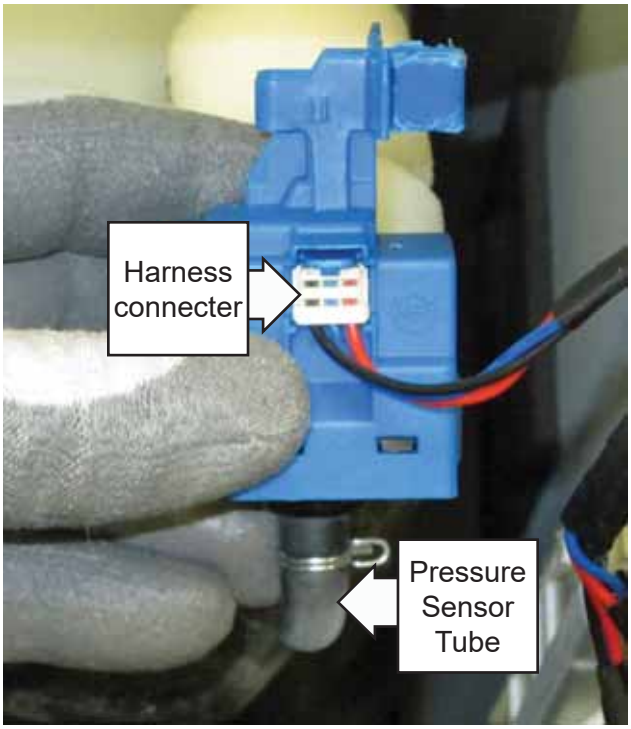
1. Remove the top cover (see **Top Cover** in the **Cabinet and Structure** section in this service guide.)
2. Side the sensor up.



3. Pinch the top of the sensor and push slightly toward the rear of the washer until the tab comes out of the opening.

4. Pull the sensor forward to release the rear tab from the opening.

5. Disconnect the pressure tube and harness connecter from the sensor.



Water Valves

There are two water valve assemblies, a single hot water valve and a triple cold water valve.

The hot water valve consists of a valve body and one solenoid coil.

The triple water valve consists of a valve body, a main cold water solenoid coil, and two cold water solenoid coils for bleach, pretreat and fabric softener dispenser operation.

Both valves are located at the rear of the cabinet and each is held in place with two Phillips-head screws. Each valve is only available as a complete assembly.

All 4 valves have a flow rate of 2.6 GPM.

Each solenoid coil has an approximate resistance value of 1.0k ohms.

Operation of the water valves can be checked by using Service Test mode t05 (see the **Service Mode Test** in the **Diagnostics** section of this guide.)

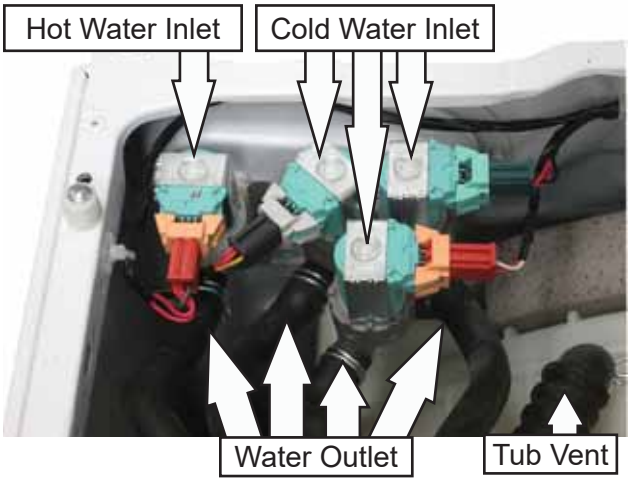
Failures associated with the water valves can initiate Fault Code E4 (see the **Fault Codes** section in this service guide.)

Water Valve Removal

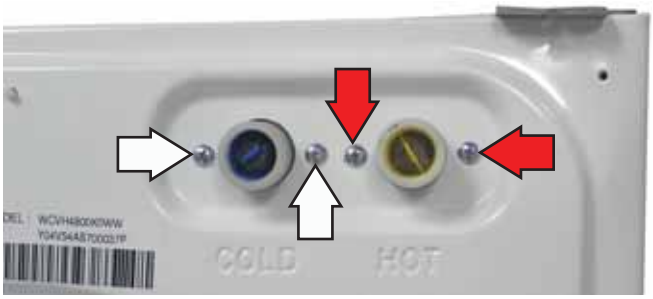
1. Remove the top cover (see **Top Cover** in the **Cabinet and Structure** section in this service guide.)
2. Disconnect the wire harness(es) from the solenoid coil(s).
3. Note the location of the valve outlet hoses and disconnect the hose(s):

NOTE: The valve outlet hose(s) can be difficult to remove.

4. Squeeze the clamp and slide it back.
5. If necessary, carefully break the hose loose by inserting a small flat-blade screwdriver under the hose to break the seal.
6. Remove the hose.



7. Remove the two Phillips-head screws that attach the valve to the cabinet.



NOTE: Red arrows indicate hot water valve screws.

Dispenser Assembly

The dispenser assembly provides automatic dispensing of detergent, prewash, bleach and fabric softener as long as the user fills the compartments prior to starting the washer.

The products added to the dispenser are diluted with water before they are dispensed into the wash tub. This is accomplished by the water valves and a plastic conveyer snapped to the top of the dispenser that directs the outputs from the valves to the detergent, prewash, bleach and softener chambers.

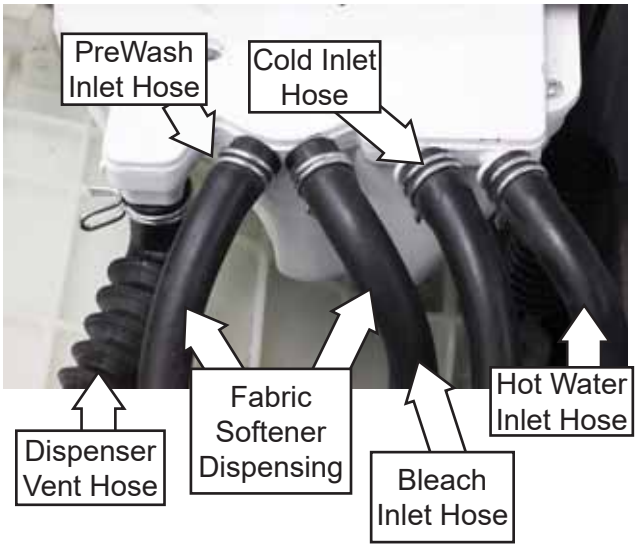
The bleach cup will always and automatically fill near the end of every wash cycle before going into rinse. There is no consumer selection for this function.

The dispenser assembly utilizes one tab that positions the assembly to the left and front braces.

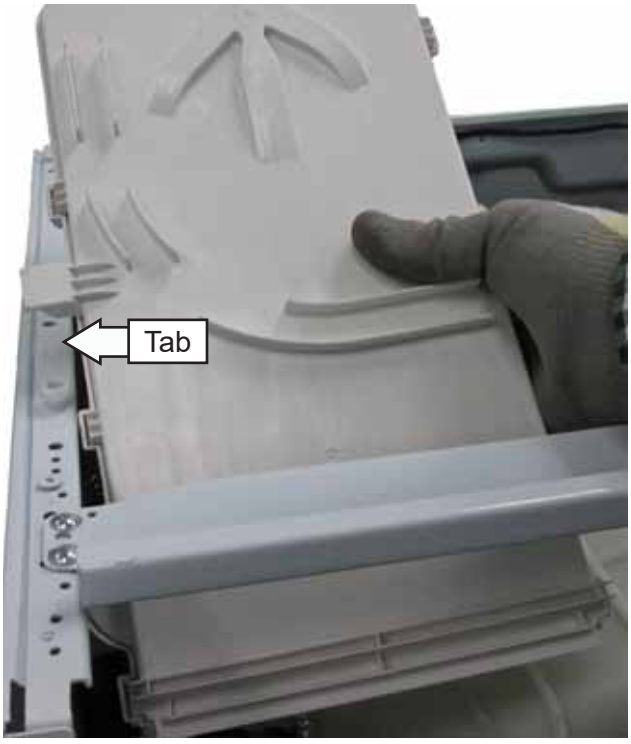
Dispenser Assembly Removal

1. Remove the top cover and control panel (see **Top Cover** and **Control Panel** in the **Cabinet and Structure** section of this service guide).
2. Squeeze the large hose clamp and slide it down onto the tub fill hose.
3. Remove the tub fill hose from the dispenser box.

4. Remove the inlet and the dispenser vent hoses from the dispenser:
5. Squeeze each clamp and slide it back.
6. If necessary, carefully break each hose loose by inserting a small flat-blade screwdriver under the hose to break the seal.
7. Remove the hoses.



8. Slide box toward the rear to disengage tab from the side rail.



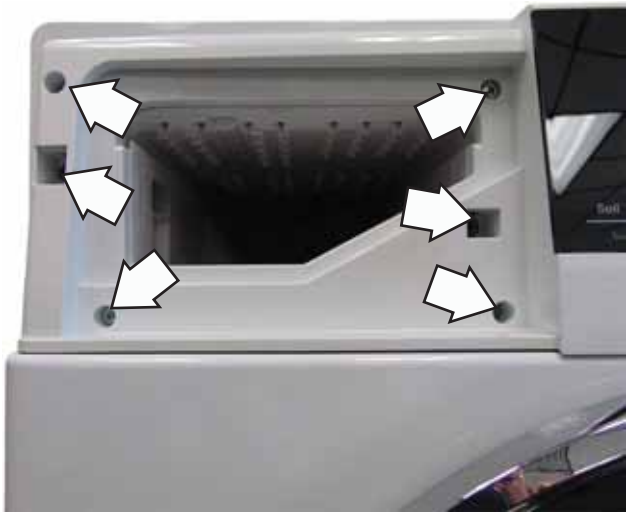
Control Panel

The control panel is held in place with six Phillips-head screws behind the dispenser drawer and two tabs on the right side of the control panel.

Control Panel Removal

1. Pull the dispenser out to the stop position.
2. Press down on the lock tab, then pull the dispenser out from the control panel.

3. Remove the six Phillips-head screws from the control panel dispenser recess.



4. Pull the control panel out slightly and raise the left side of the control panel upwards. This will disengage the top left side tab.
5. Pull the control panel up and off from the front panel and disconnect the harness. This allows access to the front RJ45 connector.

(Continued Next Page)

Top Cover

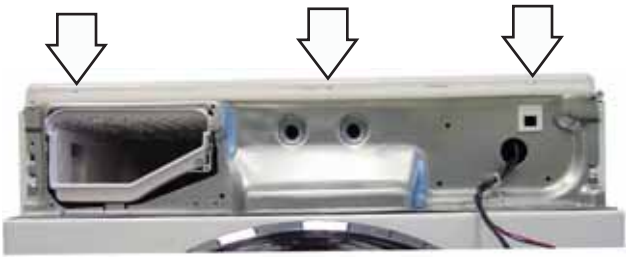
WARNING: Sharp edges may be exposed when servicing the washer. Use caution to avoid injury and wear Kevlar gloves or equivalent protection.

NOTE: Combined Phillips-head and metric hex-head screws can be utilized throughout this appliance. Either a Phillips screwdriver or metric wrench can be used to extract or install these screws.

Removal of the top cover provides access to the dispenser, water valves, water level sensor, two RJ45 connector housings and line filter.

Top Cover Removal

1. Remove the control panel (see **Control Panel Removal** under **Control Panel** in this section of this service guide)
2. Remove three Philips-head screws at the front of the top cover.



3. Pull the top cover forward to disengage the rear guide posts and then lift up.

Door

The door is NOT reversible and comes as a complete assembly (hinge included). The door hinge is attached to the front panel with two Phillips-head screws and two hooks that engage the two cutouts in the front panel.

Door Components Removal

1. Remove the two Phillips-head screws that hold the hinge to the front panel. The door will stay in place.
2. Lift the door and hinge 1/4 inch to disengage the hinge hooks from the front panel.

Tub Gasket

The tub gasket provides a watertight seal between the front panel and the outer tub. The front of the tub gasket is secured to the front panel flange by a wire clamp located in the fold of the gasket. The back of the tub gasket is attached to the outer tub lip with a wire and bolt gasket clamp.

Tub Gasket Removal

These instructions show that the door gasket (boot) can be installed without removing the front panel and front counter weights.

1. Open the door and remove the outer gasket clamp. Grasp the wire clamp spring located at the bottom of the tub gasket using pliers. Pull down and away from the gasket.

Wire Gasket
Clamp Spring

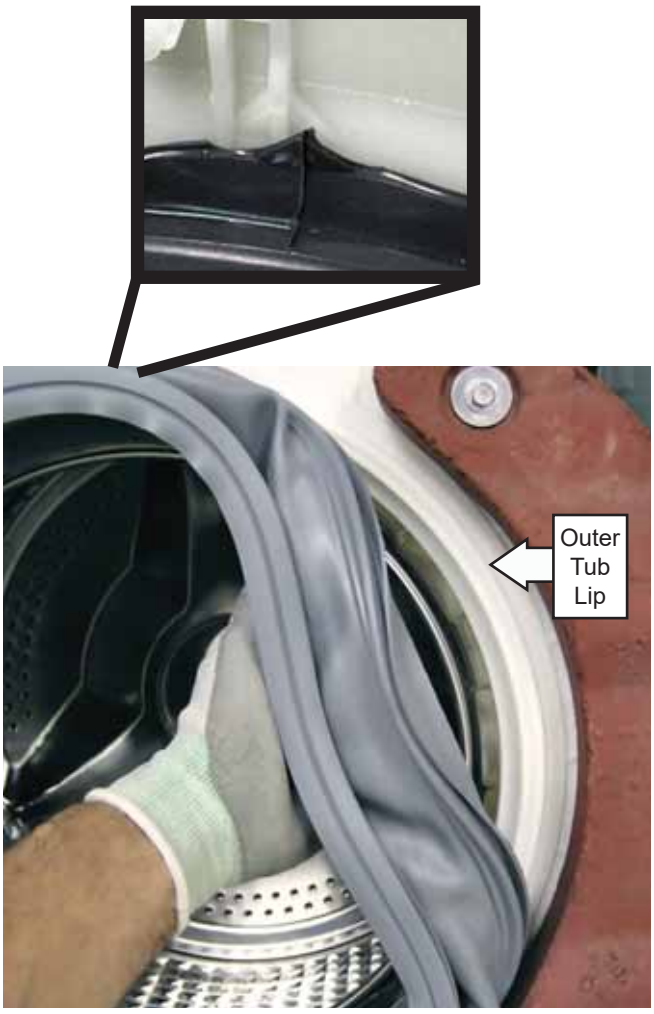
2. Remove the top cover for better access to the inner gasket clamp (see **Top Cover** in the **Cabinet and Structure** section of this service guide).

3. Remove the inner clamp using a socket (turning counter-clockwise), then pull the clamp and the gasket through the door opening of the front panel.

(Continued Next Page)

Tub Gasket Reinstallation

1. Insert the gasket over the lip of the tub, ensuring that the gasket arrow is lined up with the arrow at the top of the tub.



2. Ensure that the gasket is securely seated over the tub lip. It is tight, but this can be done without removing the front counterweights.

3. Ensure that the gasket does not rub the basket by rotating the basket. If it rubs the basket, make adjustments as needed before installing the inner clamp.

4. Fold the gasket toward the inside of the basket to make it easier to install the inner clamp.

5. Reinstall the inner clamp into the groove so that the clamp adjuster is positioned approximately at the 11 o'clock position.

(Continued Next Page)

6. Reinstall the gasket over the lip of the front panel ensuring it is flat against the front panel.

7. With the spring of the wire clamp at the bottom of the tub gasket (boot), insert the wire clamp into the lip of the gasket.

8. Using pliers, pull the spring of the wire clamp, stretching it so the rest of the wire clamp can be inserted into the lip of the gasket.

9. Again, ensure the gasket is still seated flat against the front panel. If not, make necessary adjustments.

Door Lock

The door lock contains a solenoid-operated locking and unlocking mechanism.

The door locks when a cycle is entered. The basket will rotate both directions, then unlocks. The door will then re-lock rotate and fill. The door remains locked until the end of the cycle or if the pause button is pressed.

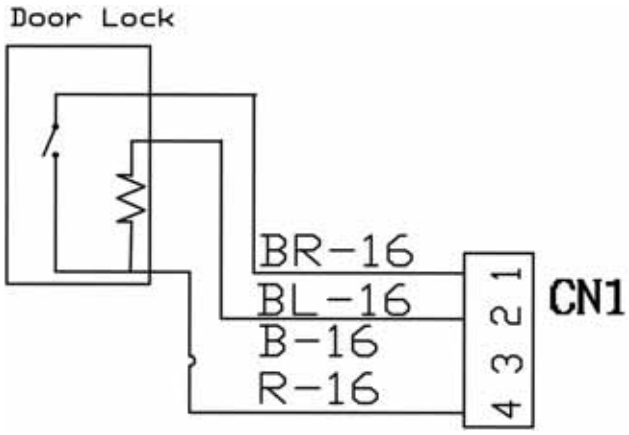
The door will not open when:

- Water temperature is above 131°F (55°C)
- Wash basket is rotating

From the CN1 connector on the main board, line voltage comes from the **brown** wire, through the solenoid coil of the lock assembly, and then back to the main board via the **blue** wire.

To lock the door, the board switches neutral on the **blue** wire, instantly (split second pulse) activating the solenoid. The solenoid has a resistance value between 50 ohms and 100 ohms.

The lock circuit closes, sending voltage to the board on the **red** wire, and communicating that the door is locked.



This also supplies line voltage to the Inverter Board.

The door lock is attached to the front panel with two Phillips-head screws. The door lock is accessed from the front of the washer when the right side of the gasket is partially pulled back.

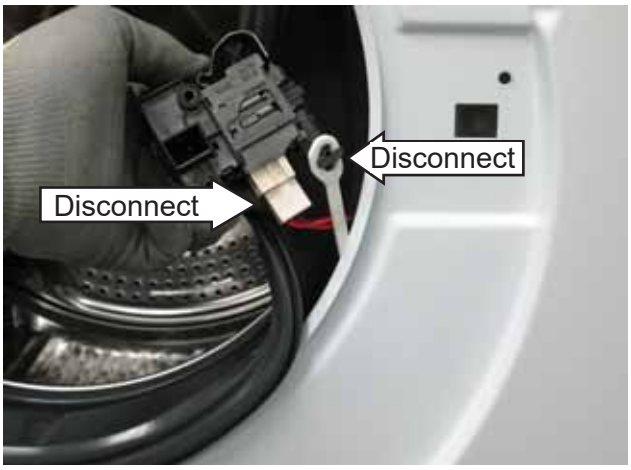
Door Lock Removal

1. Remove the outer tub gasket clamp by removing the wire clamp from the gasket.

2. Pull the right side of the gasket away from the front panel.
3. Remove the two Phillips-head screws that attach the door lock to the front panel.

(Continued Next Page)

4. Pull the door lock to the opening and disconnect the harness connecter and the manual door latch release strap.



NOTE: The door latch is solenoid activated. It can remain locked after the power is removed.

To manually unlock door:

1. Open the drain cleanout access door.
2. Pull downward on the manual door latch release strap.

Front Panel

The front panel is inserted into three hooks that are attached to the bottom of the cabinet and held in place with four Phillips-head screws. A gasket provides a watertight seal between the front panel and outer tub. The front of the gasket is secured to the front panel flange by a spring and wire located in the fold of the gasket. The door lock and door sensing switch are attached to the front panel.

Front Panel Removal

NOTE: The following step will require raising the front of the washer. It may be helpful to use a prop block (**Part #**: WX05X10027) to safely raise the washer.

1. Remove the Control Panel (see **Control Panel** in the **Cabinet and Structure** section of this service guide). Remove the top cover (see **Top Cover** in the **Cabinet and Structure** section of this service guide).
2. Remove the top cover (see **Top Cover** in the **Cabinet and Structure** section of this service guide).
3. Raise the front of the washer.
4. Remove the four Phillips-head screws at the bottom of the front panel.

5. Open the drain cleanout access door.

(Continued Next Page)

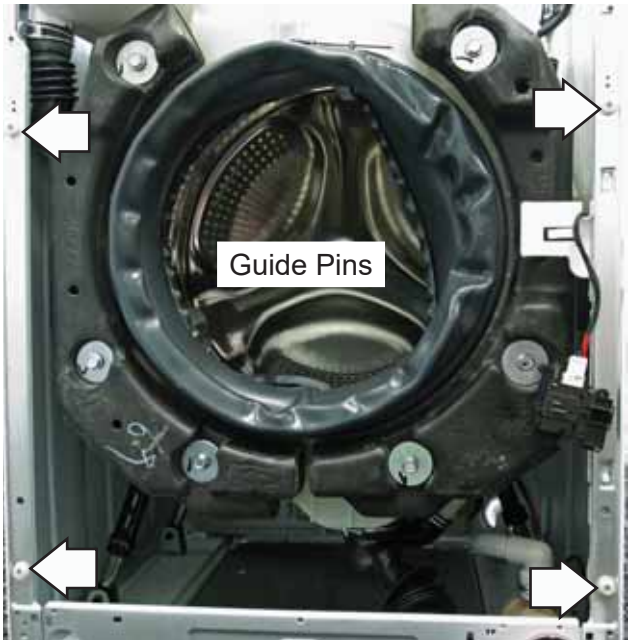
6. Pull the drain pump drain tube out and ensure all water is removed from the drain pump. (Have a small pan or towel to catch the water.)

7. Remove the two screws securing the drain cleanout to the front panel and remove the drain cleanout compartment.

8. Remove the two Phillips-head screws that attach the top of the front panel to the cabinet.

9. Open the door and remove two Phillips-head screws securing the door latch assembly to the front panel. Also remove the front tub gasket clamp securing the tub gasket to the front panel (see **Tub Gasket Removal** under **Tub Gasket** in this section of the service guide.)

10. Push the tub gasket (boot) to the inside of the drum and lift the front panel up and away from the guide pins.

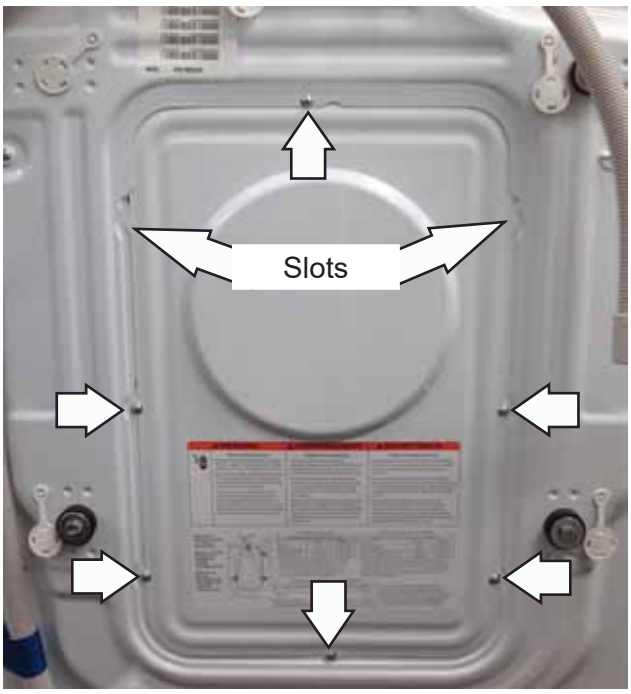


Back Cover

The back cover must be removed to access the heater, thermistor, main board, and motor.

Back Cover Removal

The back cover is attached to the washer with six Phillips-head screws. Pull the bottom of the panel outward slightly and slide downward through the slots to remove from the underside.



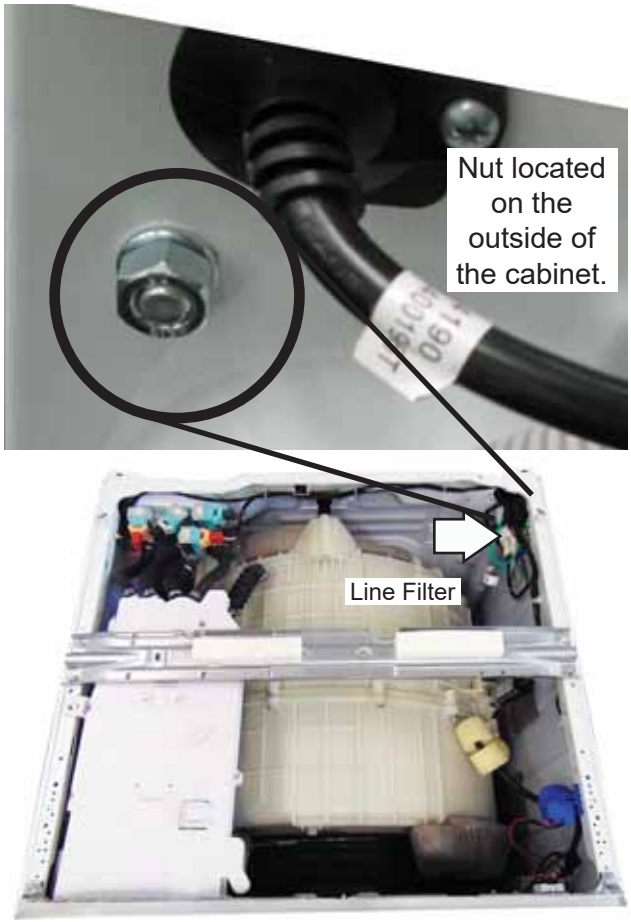
Line Filter

The line filter helps to smooth out any fluctuations in voltage, protecting the control board and providing more reliable operation. The line filter is installed inside the cabinet and is attached to the right side rear cabinet.

To check the line filter, look for the outer surface to be damaged by heat or a power surge. The filter resistance should be approximately 0 Ω (ohms) between the **black** wire terminals and 0 Ω (ohms) between the **white** wire terminals.

Line Filter Removal

1. Remove the top cover (see **Top Cover** in the **Cabinet and Structure** section of this service guide).
2. Remove the 1/2-inch hex-nut and lock washer that attaches the line filter to the right rear cabinet.

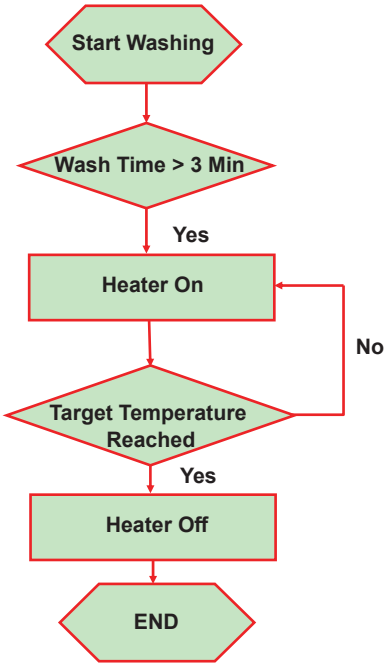


3. Pull the line filter from the rear cabinet.
4. Disconnect the input and output wire harness.

Heater Assembly

- The heater operates only when **Sanitize** or **Tub Wash** is selected.
- The control does not pause to allow the heater to heat the wash water to the sanitize temperature.

Heater Algorithm



The heater assembly is located below the motor, and is accessed from the rear of the washer.

The heater assembly is held in place by a bracket attached to the outside of the outer tub, and a 10-mm hex-nut which presses a rubber gasket against the tub opening.

When the 10-mm hex-nut is tightened, it squeezes the rubber gasket between two mounting plates to seal the heater assembly to the opening of the tub.

The 10-mm hex-nut is set from the factory at 35 to 40 in. lb. of torque.

(Continued Next Page)

Heating Element Specifications:

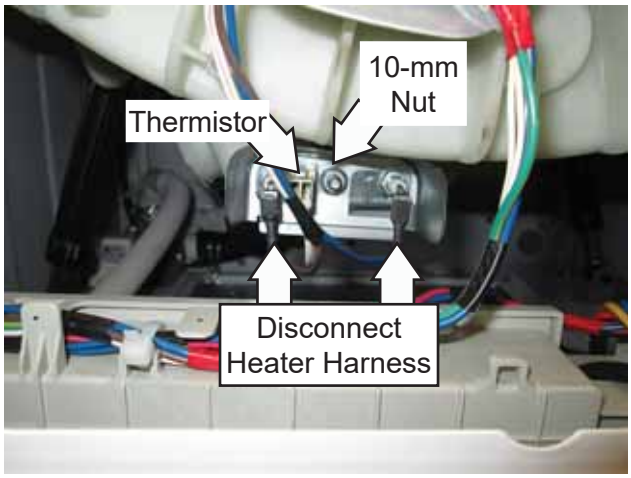
- 120 VAC
- 1,000 watts
- Approximately 8.3 amps
- Approximately 14.1~15.6 Ω (ohms)

Operation of the heater assembly can be checked by using service test mode t08 (see the **Service Mode Test** in the **Diagnostics** section of this guide).

Specific failures associated with the heater assembly can initiate fault codes F4 (see **Fault Codes** section in this service guide).

Heater Removal

1. Drain the washer using the pump drain hose (see **Using The Washer** in the **Control Features** section of this service guide).
2. Remove the back cover (see **Back Cover** in the **Cabinet and Structure** section of this service guide).
3. Disconnect the thermistor harness connecter.
4. Disconnect the **brown** and **blue** wires from the heater.



5. Loosen the 10-mm hex-nut until it is flush with the end of the stud.
6. Push inward on the 10-mm hex-nut to relax the rubber gasket.
7. Grasp and pull the heater straight out from the outer tub.

Heater Installation

When reinstalling the heater, ensure that it slides into the heater support bracket attached to the inside of the tub as shown below.

1. Seat the heater assembly in the tub opening.
2. Install the 10-mm hex-nut and use a torque wrench to tighten the 10-mm hex-nut to 35 to 40 in. lb. of torque.
3. **CAUTION**: Proper torque must be applied to the 10-mm hex-nut to assure a proper seal. Under-torqueing could cause water leakage; over-torqueing could cause the tub to crack.
4. Connect the thermistor wire harness.
5. Connect the **brown** and **blue** wires to the heater.

Thermistor

The control uses a water temperature sensor (thermistor) to regulate the wash water temperature.

To determine the temperature of the incoming water, the washer control measures the difference between the voltage sent and the voltage returned from the water temperature sensor. The washer control then makes temperature adjustments by activating the appropriate water valve.

Temperature Setting	Water Temperature
Tap Cold	Tap Cold
Cold	60°F +/- 5°F
Warm	90°F +/- 5°F
Hot	110°F +/- 5°F
Extra Hot	Water Heater Set Temperature °F +/- 5°F
Extra Hot Sanitize/Tub Clean	160°F +/- 5°F Turns on Heater

The thermistor has a negative temperature coefficient (as temperature increases, resistance decreases).

Resistance can be measured at the thermistor wire harness. Make sure to disconnect the wire harness to isolate the thermistor before taking resistance readings.

Temp °C	Temp °F	Approx. Ω (ohms)
-10°	14°	57.4417
-5°	23°	44.9731
0°	32°	35.4632
5°	41°	28.1563
10°	50°	22.502
15°	59°	18.0968
20°	68°	14.6421
25°	77°	11.9159
30°	86°	9.7435
35°	95°	8.0112
40°	104°	6.6216
45°	113°	5.5006
50°	122°	4.5914
55°	131°	3.8502
60°	140°	3.243
65°	149°	2.7431
70°	158°	2.3298
75°	167°	1.9865
80°	176°	1.7002
85°	185°	1.4604
90°	194°	1.2589
95°	203°	1.0888
100°	212°	0.9447

Operation of the thermistor can be checked by using Service Test mode t08 (see the **Service Mode Test** in the **Diagnostics** section of this guide).

Specific failures associated with the thermistor can initiate fault code F3 (see **Fault Codes** section in this service guide).

The thermistor is part of the heater assembly. If the thermistor is bad, replace the heater assembly.

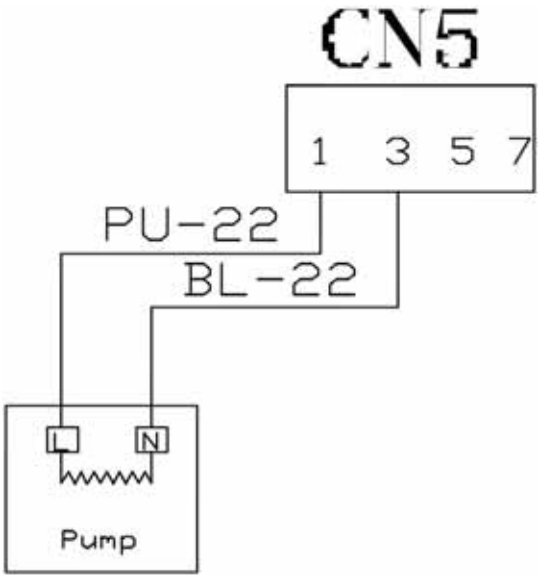
Drain System

Drain Pump

The pump consists of a 120 VAC, 60 Hz motor, impeller, impeller housing, and a removable strainer that helps prevent foreign objects from entering the pump impeller and drain outlet.

- The pump runs whenever the washer is in the spin function of a cycle.
- The pump runs if the water level sensor detects frequency under 36 kHz (overflow level), and the washer is plugged in (see **Water Level (Pressure) Sensor** in the **Fill System** section of this service guide**).**
- The pump is capable of eliminating 7.8 gallons per minute.
- Recommended minimum standpipe diameter is 1 1/4 inches.
- Standpipe minimum height is 30 inches, measured from the floor at the washer location.
- Standpipe maximum height is 96 inches, measured from the floor at the washer location.
- The pump motor has an approximate resistance value of 41 Ω (ohms).

The resistance can be checked from the Main Board, connecter CN5 **purple** wire pin 1 to 3 **blue** wire pin 3.

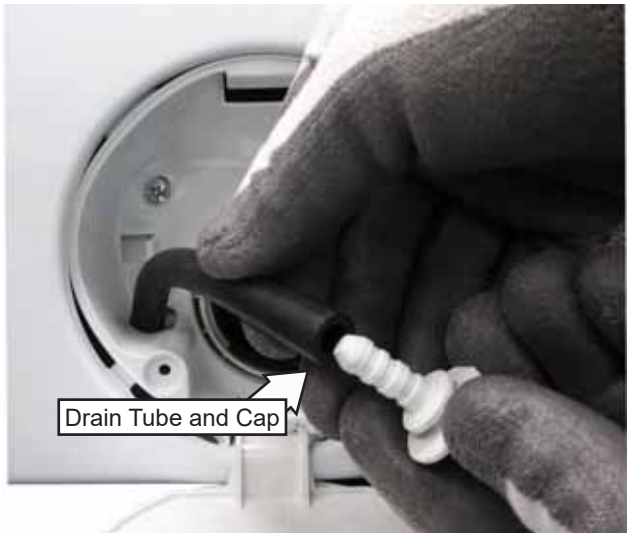


Operation of the drain pump can be checked by using Service Test mode t07 (see the **Service Mode Test** in the Diagnostics section of this guide.)

Specific failures associated with the drain pump can initiate Fault Code E1 (see **Fault Codes** section in this service guide.)

The drain pump is attached to the front of the chassis with three Phillips-head screws.

Before the drain pump is removed, utilize the drain tube to drain off excess water in the pump and drain hose.



Extend the tube out and remove the tube cap over a shallow pan to catch the water.

Caution: Under some conditions, up to one quart of water may drain out when the pump drain hose plug is removed.

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Turn the drain pump filter counterclockwise, then pull out. Remove any debris from the pump filter.

Drain Pump Removal

1. Remove the front panel (see **Front Panel** in the **Cabinet and Structure** section of this service guide).
2. Remove the tub to pump hose and drain hose from the drain pump.
3. Disconnect the harness connecters from the drain pump.
4. Remove three Phillips-head screws securing the drain pump to the front lower frame and lift the pump out from the cabinet. The drain tube will pull through the frame without the cap in the tube.

Electronics

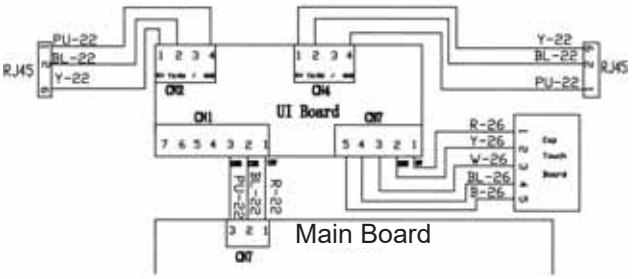
User Interface Board (UI)

The User Interface (UI) board receives commands from the capacitive touch board when the consumer activates the machine and makes cycle selections. It also receives communication from the pressure sensor. Once the Start button is pressed, it sends the selections made to the main control board.

UI Board Diagnosing

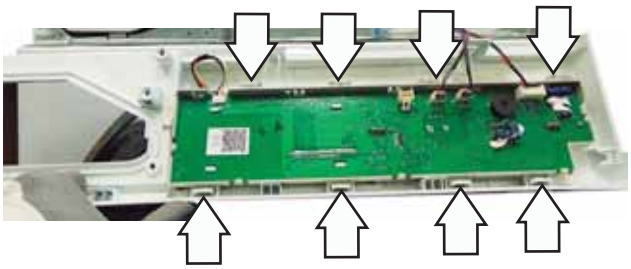
Check for 12 VDC to the UI board from the Main Board between the **red** and **black** wires at the CN1 connector. If voltage is not present, check the harness and connecters between the two boards. If the integrity of the harness and connecters is good, replace the Main Board.

If voltage is found at the CN1 connecter on the user interface board, but nothing lights up, replace the UI board.

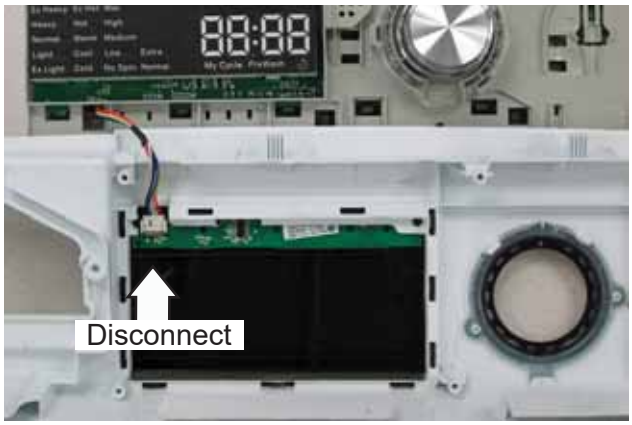


User Interface Removal (UI)

1. Remove the control panel (see **Control Panel** in the **Cabinet and Structure** section of this service guide).
2. Place the control panel face down on a protective surface.
3. Unclip positive clips that attach the UI Board to the control panel.



4. Remove the UI from the control panel carefully as to not damage the harness to the Sensor Touch Board.
5. Disconnect the harness from the Sensor Touch Board. The Cycle Select knob can be removed and transferred to the new UI Board. A flat-blade screwdriver may be needed to pry the knob off carefully.



Capacitive Touch Board

The capacitive touch board allow the consumer to make desired selections for the wash cycle they are running. If the capacitive touch board does not function, the control panel assembly will need to be replaced.

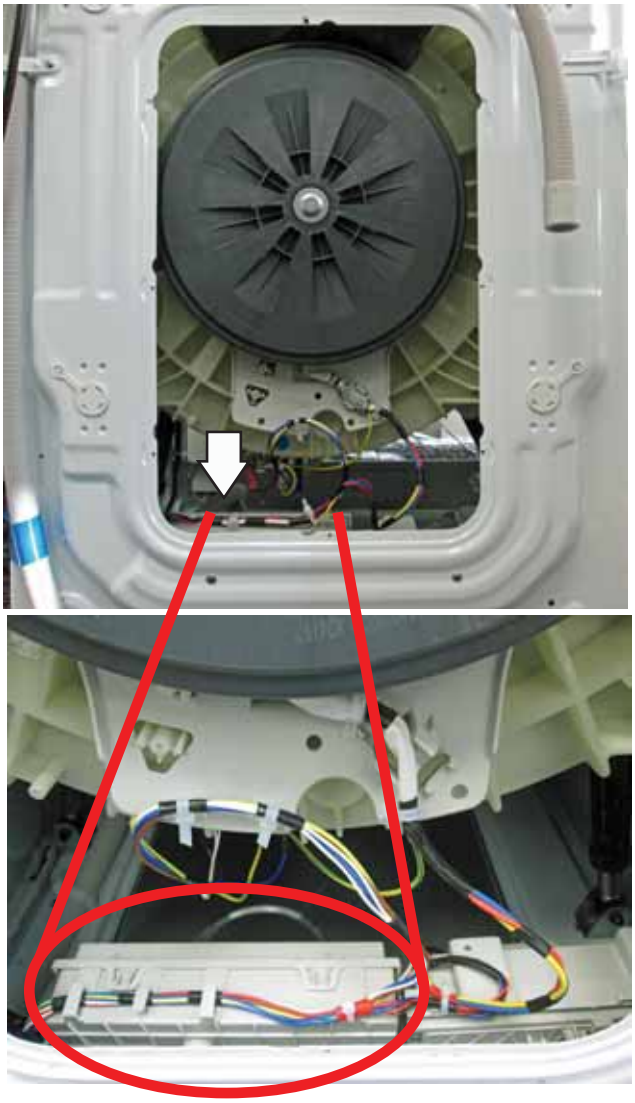
Capacitive Touch Board Diagnosing

Check for 5 VDC between the **red** and **yellow** wires at the CN1 connector on the capacitive touch board. If voltage is present, replace the control panel assembly. If voltage is not present, check the DC voltage to the user interface board. If voltage is present, replace the user interface board. If voltage is not present, check the DC voltage from the main board to the user interface board. If voltage is present, check the integrity of the harness and connectors. If good, replace the user interface board. If voltage is not present, replace the main board.

NOTE: The replacement control board assembly includes the Sensor Touch Board wire harness. The wire harness cannot be ordered as a separate part. When reassembling, ensure that the harness does not get pinched or damaged.

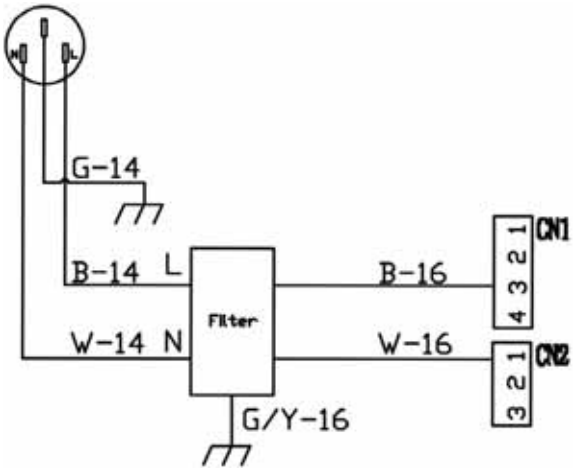
Main Board

The Main Board powers the User Interface and Inverter boards. The main control board receives commands from the User Interface Board and controls washer operation, communicating with the UI and Inverter through low voltage pulses. The Main Board is enclosed in a protective housing and cover located inside the cabinet, at the back of the washer cabinet. From the rear it is the board on the left.



Main Board Diagnosing

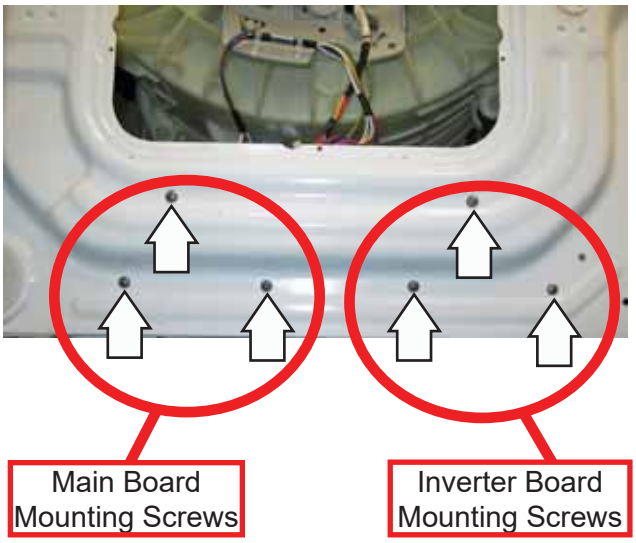
Check for 120 VAC at the outlet. If voltage is there, check the input and output AC voltage at the line filter. If voltage is found going into the line filter but not coming out, replace the line filter. If AC voltage is coming out of the filter, check for 120 VAC between the **black** wire at CN1 connecter to the **white** wire at the CN2 connecter on the Main Board. If no voltage is found, check the wire harness and connecter integrity. If voltage is found at the Main Board, replace the board.



Main Board Removal

1. Remove the back cover (see **Back Cover** in the **Cabinet and Structure** section of this service guide).
2. Remove the three Phillips-head screws that attach the Main Board to the rear of the cabinet.

NOTE: Because of the tightness of the harness, it might help to remove the inverter board screws as well to assist with main board removal.



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3. Lift up the Main Board box to unhook it from the rear of the cabinet and rotate it over to access the clips securing the cover to the box.

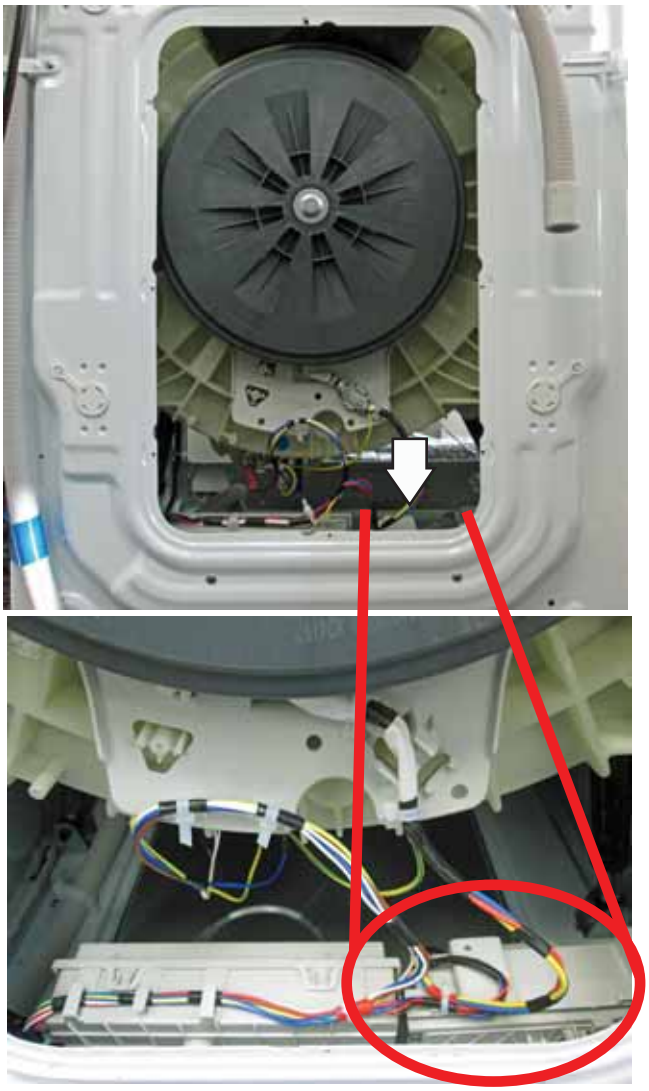
4. Disengage the harness from the box.

5. Unclip four clips that secure the board access cover to the main board.

6. Once the box is opened, disconnect all harness connections and remove the board.

Inverter Board

The Inverter Board converts AC to a high DC voltage to power the drive motor. It also receives a lower DC communication voltage from the main board which will make the motor rotate back and forth for agitation, or ramp up to a high speed spin. The Inverter Board is enclosed in a protective housing and cover located inside the cabinet, at the back of the washer cabinet. From the rear, it is the board on the right.



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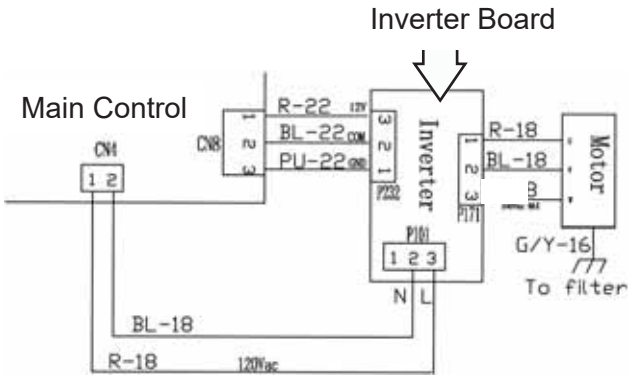
Inverter Diagnosing

The inverter receives 120 VAC from the main board at the CN1 connecter **red** and **blue** wires. It then converts the 120 VAC to a variation voltage 0 - 340 VDC that goes out to the stator. This voltage can be read between any 2 wires at the CN2 connecter.

USE CAUTION if testing for this voltage. Use electrically rated gloves. The best practice would be to read the resistance between any two wires that connect to the stator. This should read approximately 14.2 Ω (ohms) for a single phase. If proper resistance is found and the inverter has 120 VAC at the P101 connector, replace the inverter.

The inverter also receives commands from the main board at the P232 connecter. The voltage here is 12 VDC.

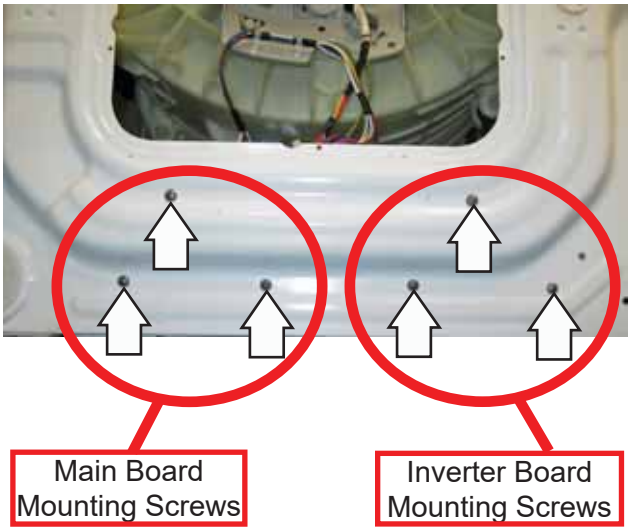


Inverter Board Removal

1. Remove the back cover (see **Back Cover** in the **Cabinet and Structure** section of this service guide).

2. Remove the three Phillips-head screws that attach the Main Board to the rear of the cabinet.

NOTE: Because of the tightness of the harness, it might helpful to remove the main board screws as well as the inverter mounting screws to assist with the inverter board removal.



3. Lift up the Main Board box to unhook it from the rear of the cabinet.

4. Disconnect the harness from the inverter board.

5. Unclip four clips that secures the board access cover to the inverter board.

6. Disconnect the remaining harness connecters.

Drive System

Motor Assembly

The washer has a direct-drive, pulse-width modulation motor that does not utilize a belt, transmission, or mechanical brake.

The motor assembly is composed of a coil-wound stator and permanent-magnet rotor.

The motor speed and torque varies when the pulse width modulated voltage from the inverter changes frequency.

The motor turns in the opposite direction when the inverter reverses electrical polarity to the motor. The RPM's are measured through the current draw and is what shows in the display during testing in service mode. There is no hall sensor.

Stator Diagnosing

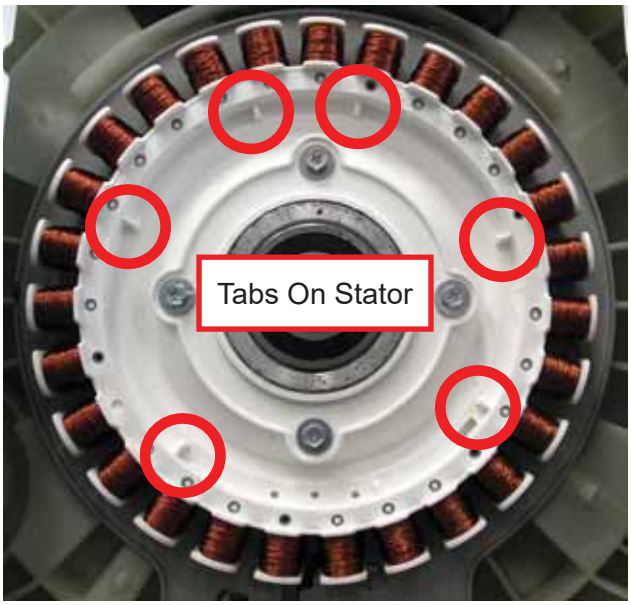
Resistance can be measured at the stator wire connector. The stator windings have an approximate resistance value of 14.2 Ω between any two of the three wires. If resistance is missing from any one of the phases, replace the stator.

- **Red** to **Yellow**: 14.2 Ω (ohms)
- **Red** to **Blue**: 14.2 Ω (ohms)
- **Yellow to Blue**: 14.2 Ω (ohms)

Motor Assembly Removal

1. Remove the back cover (see **Back Cover** in the **Cabinet and Structure** section of this service guide).
2. Remove the 15-mm bolt that secures the rotor to the basket shaft. Use a thin shaft screwdriver between the fins of the rotor to the tabs on the stator. It will hold the rotor stationary. Be careful not to crack the rotor.

NOTE: Use a rubber mallet, if needed, to tap the wrench to break the bolt free.



3. Being careful not to pinch fingers, pull the rotor from the shaft of the basket.

NOTE: When retightening the rotor bolt, the bolt should be snug plus a quarter of a turn.

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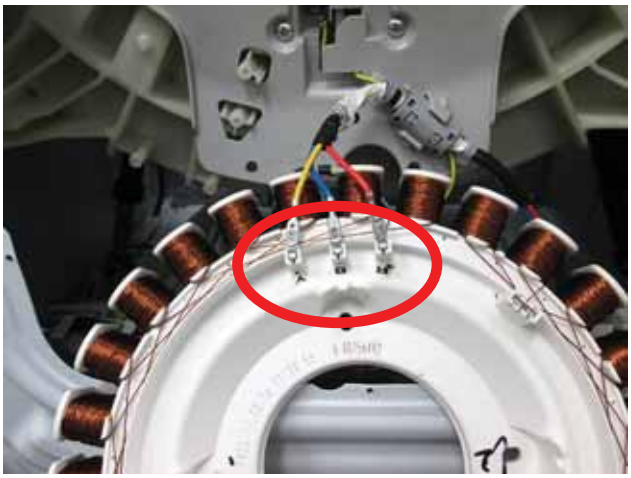
4. Remove the four 10-mm stator mounting screws and carefully pull the stator away from the outer tub so as not to damage the stator wire connection.

NOTE: The wire color positions are molded onto the stator. The picture below has been enhanced to show the markings location.



Operation of the motor assembly can be checked by using Service Test modes t09 and t10 (see the **Service Mode Test** in the **Diagnostics** section of this guide).

Specific failures associated with the motor assembly can initiate fault codes F701, F702, F703 F707 and F709 (see **Fault Codes** section in this service guide).

Suspension and Tub Assembly

Dampers

There are three dampers securing the tub to the bottom chassis. There are two dampers on the left side, and one damper on the right side. Each of the three dampers are attached to the outer tub with a plastic removable pin. The bottom of each damper has a metal bracket with a non-removable steel roll pin in it. The bracket is secured to the bottom of the chassis with a 13-mm hex-head bolt.

Damper Removal

1. Remove the back cover (see **Back Cover** in the **Cabinet and Structure** section of this service guide).
2. Remove the front panel (see **Front Panel** in the **Cabinet and Structure** section of this service guide).

3. Lean the washer back to access and remove the 13-mm hex-head bolt from the bottom of the washer that secures the damper to the chassis.
4. Remove the plastic pin from the top of the damper that secures it to the tub. The tab on the pin needs to be pushed in for the pin to come out. A socket works well to hold the tab in while pulling the pin out.

5. Remove the damper from the washer.

NOTE: The right side dampers are different from the left side damper. Take note of what side the damper came from if removing all of the dampers.

Outer Tub Assembly

The outer tub assembly is constructed in two halves and contains the wash basket. The bearing and seal assembly is part of the outer tub rear half. The outer tub assembly is supported by two suspension springs and three dampers. Each spring is located between the top of the tub assembly and a cabinet top brace, one on each side. Washer stabilization is achieved by the use of three dampers that are located between the bottom of the tub assembly and chassis, two on the left side and one on the right side.

Outer Tub Assembly Removal

Removing the outer tub assembly requires it to be taken apart while still in the cabinet. This can be done by following the instructions below.

1. Ensure that the washer is empty using the pump drain hose. It would be best to have something to catch the water from the tub and hose.

2. Remove the top cover, control panel, front panel and back cover (see **Top Cover**, **Control Panel**, **Front Panel**, and **Back Cover** in the **Cabinet and Structure** section of this service guide).

3. Disconnect the **green** ground wire, and the **blue** and **brown** wires from the heater, and the thermistor connecter. Also, disengage the harness wire ties from the stator shield.

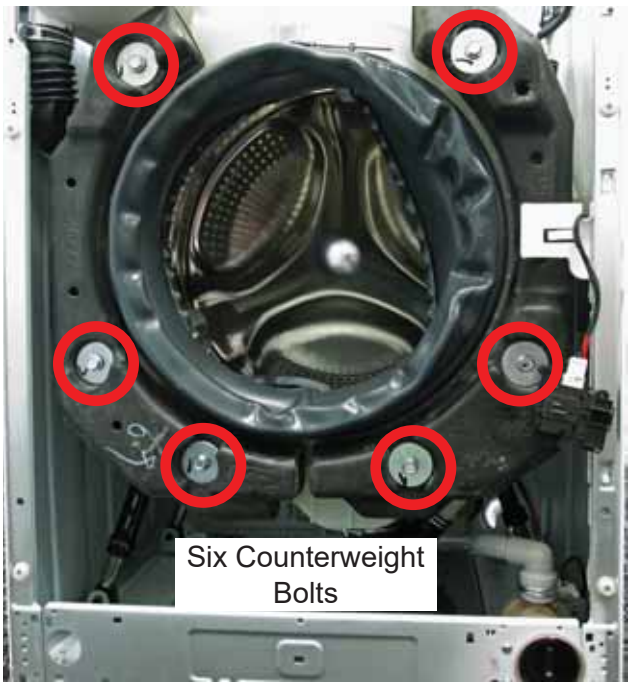
4. Remove the rotor and stator, taking care not to damage the stator harness connections (see **Motor Assembly Removal**, in the **Drive System** section of this service guide, under **Motor Assembly**).

5. Disconnect the harness from the stator.

6. Remove the two front counter weights by removing the six 1/2-inch bolts securing the weights to the tub. There are mounting guide posts molded onto the tub so the weights will not fall when the bolts are removed.

CAUTION: The counter weights are approximately 15 pounds each, and could cause injury if dropped on fingers or toes.

7. Remove the tub fill and the dispense vent hoses from the tub (see **Dispenser Assembly Removal** in the **Dispenser Assembly** section of this service guide).



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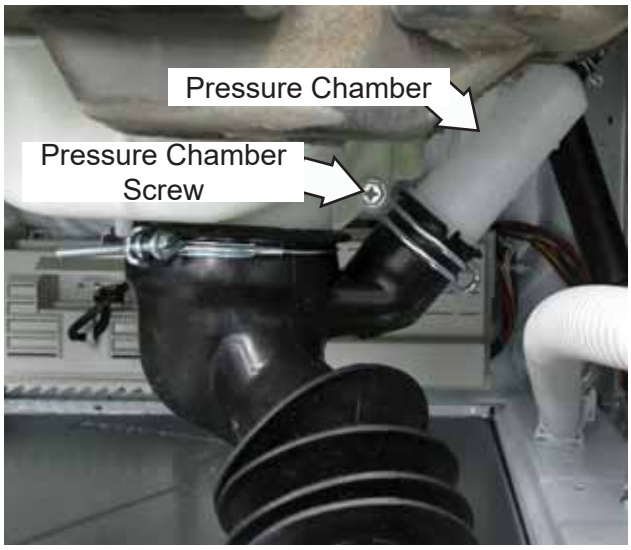
8. Remove the tub to drain pump hose from the tub and pressure chamber. A screw clamp secures the tub to pump hose to the tub. The pressure chamber hoses are secured with spring clamps.

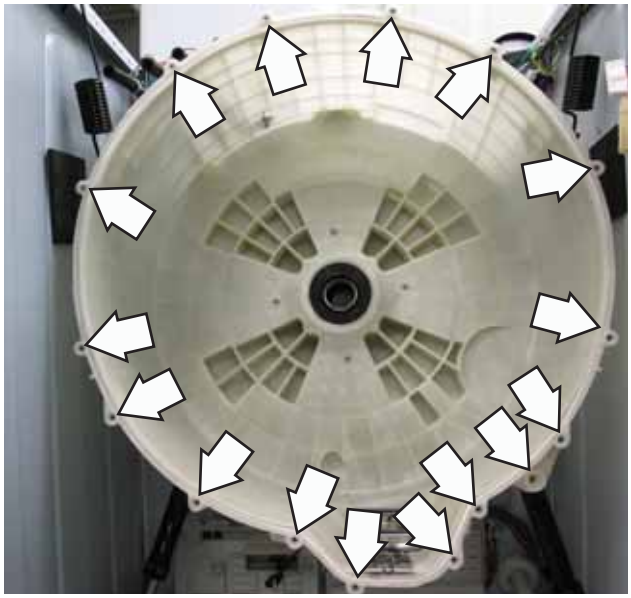


NOTE: The pressure chamber is replaceable by removing one screw and then sliding the chamber up to disengage it from the tub.

9. Disengage the right front damper from the tub (see **Dampers** in the **Suspension and Tub Assembly** section of this service guide).

10. Remove the sixteen 10-mm bolts securing the tub front half to the tub rear half.

11. Slide the inner basket out of the rear half of the tub.



NOTE: The tub seal and bearing is pressed into the rear half of the tub. To replace them, the rear tub half will need to be replaced.

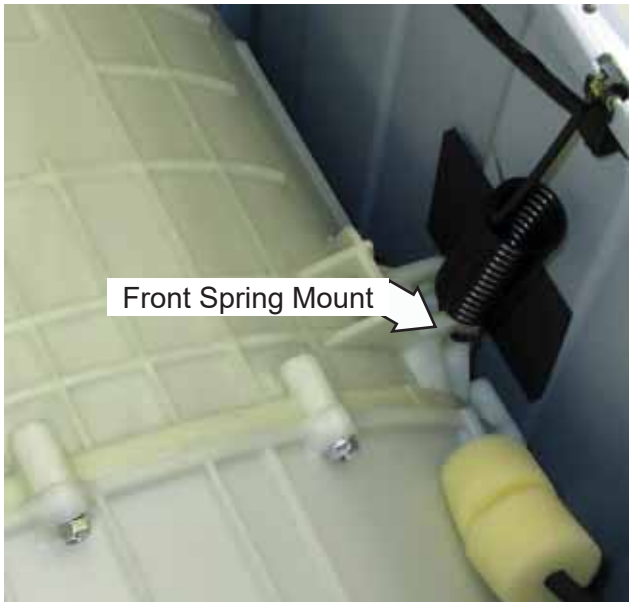
12. The basket baffles can be remove by removing two Phillips-head screws and sliding the baffle toward the front of the basket and pulling out.

13. Disconnect the dispenser vent hose from the tub (see **Dispenser Assembly Removal** in the **Dispenser Assembly** section of this service guide).

14. Disengage the two remaining dampers from the rear half of the tub.

15. Disengage the springs supporting the rear half of the tub and remove the rear tub half.

NOTE: Both the right and left springs connect to the tub in the front openings of the molded tub spring mounts. For proper balance, ensure that the springs are reinstalled in the original mounts.



Diagnostics

The washer control has a service mode that can be utilized by the service technician in order to test critical components and to access fault codes. This service mode will help the service technician to quickly identify failed or improper operation of washer components.

Diagnostic Guide

Before testing the washer operation using the service mode, check the following:

1. Is the power cord firmly plugged into the outlet?
2. Has the house fuse or circuit breaker trip or blown?
3. Are both the hot and the cold water faucets open and are the hoses not kinked or clogged?
4. Before opening the washer to access electrical components, remove power to the washer.
5. Check all connections. Look for broken or loose wires, failed terminal, or wires not pressed into connections thoroughly.
6. Check and clean connectors in common areas where the possibility of corrosion can occur.

Service Mode

To **ENTER** Service Mode: Within 30 seconds after power on, and while pressing and holding the **Rinse** and **Spin** buttons, rotate the Cycle knob more than six clicks.

General Navigation:

Upon entering the service mode, the SSD will display the first test number t01.
Rotating the knob counterclockwise (CCW) decrements the test number in the display.
Rotating the knob clockwise (CW) increments the test numbers in the display.
Once the test number is selected, pressing ***START/PAUSE*** begins the selected test.

To **EXIT** Service Mode: Press the **Power** button.

Service Mode	Description
t01 User Interface Model ID Configuration	Check the software version.
t02 Fault codes	Check for any fault codes reported by the controls.
t03 Software Version Display	Displays UI Board software version.
t04 User interface test	Verifies all LEDs operate correctly.
t05 Water valve and dispenser test	Verifies operation of the individual water valves.
t06 Water level sensor test	Fills to overflow water level, then pumps out water.
t07 Drain Pump test	Test drain pump.
t08 Heater and Thermistor Test	Test the heater and thermistor. The estimated temperature by Fahrenheit is displayed to SSD.
t09 Tumble Test	Verifies washer tumbles (i.e.: Wash Cycle).
t10 Spin Test	Verifies washer spins. **NOTE:** No out of balance detection will be performed here, so the washer will spin up regardless of the out of balance that is placed in the drum.

Service Mode Test

Service Mode Test		Sequence	
t01	User Interface model ID configuration	Press Start/Pause	Press once to display current User Interface model configuration
		Rotate Knob	Rotate knob to correct model ID
		Press/Hold Start/ Pause	Press and hold the Start/Pause button for 3 seconds to set the new model ID Configuration
		Press Power	Returns to Service Mode screen
t02	Fault Codes	Press Start/Pause	Displays fault codes
		Rotate Knob	Displays saved fault codes in sequence
		Press/Hold Start/ Pause	Press and hold the Start/Pause button to clear highlighted fault code
		Press Power	Returns to Service Mode screen
t03	Software Version Display	Press Start/Pause	Display User Interface board software version
		Press Start Pause	Power board software version
		Press Start/Pause	Motor controller board software version
		Press Power	Returns to Service Mode screen
t04	User Interface test	Press Start/Pause	Turn on all LEDs
		Button Presses	Press any button except Power button. Will beep while buttons are pressed.
		Press Power	Returns to Service Mode screen
t05	Water valve test Verifies dispenser motor operation. This test may display water level frequency during test.	Press Start/Pause	Turn on Cold 1 water valve. "PrE" will be displayed. Flushes Prewash Compartment. Press Start/Pause to turn off.
		Press Start/Pause	Turn on Hot water valve. "Hot" will be displayed. Flush main wash compartment. Press Start/Pause to turn off.
		Press Start/Pause	Turn on Cold 2 water valve. "cold" will be displayed. Flush main wash compartment. Press Start/Pause to turn off.
		Press Start/Pause	Turn on Cold 3 water valve. "bIEA" will be displayed. Flush Bleach compartment. Press Start/Pause to turn off.
		Press Start/Pause	Turn on both Cold 1 and Cold 3 water valves. Display will show "SoFt". Flush Fabric Softener compartment. Press Start/Pause to turn off.
		Press Power	Returns to Service Mode screen
t06	Water level sensor test Fills to overflow level then drains.	Press Start/Pause	Turn on the cold water valve, the water level frequency continues updating on SSD
		Press Power	Drain and return to Service Mode screen

Service Mode Test		Sequence	
t07	Drain Pump test	Press Start/Pause	Turn on the drain pump
		Press Power	Returns to Service Mode screen
t08	Heater and Thermistor test	Press Start/Pause	On entry, the control will display the estimated temperature (0°F), turn on the cold valve and heater is turned on for a maximum of 5 minutes. The water temperature sensor test displays the water temperature trend in the display, if the sensor is reading falling temperature from the baseline it will flash the numbers in the display, if it senses raising temperatures it will solid the numbers in the display.
		Press Power	Returns to Service Mode screen
t09	Tumble test	Press Start/Pause	Basket tumbles. Displays motor speed and motor voltage.
		Press Power	Returns to Service Mode screen
t10	Spin test	Press Start/Pause	Displays “Low” and “current” rpm "600" in the display.
		Press Start/Pause	Displays “Medium” and “current” rpm "1000" in the display.
		Press Start/Pause	Displays “High” and “current” rpm "1200" in the display.
		Press Start/Pause	Displays “Max” and “current” rpm "1400" in the display. Will spin for approximately 30 second then coast to stop.
		Press Power	Returns to Service Mode screen
NOTE: Ensure the basket is empty during the spin test. Out of balance detection sensing is NOT used while in service mode.			

Fault Codes

Fault Code	Description	Trigger Condition	Action
E0	No Fault	Displayed in Service Mode only when there are no faults to display.	• Displayed when no faults are found.
E1	Drain Timeout/ Slow Drain	In drain step, after 6 minutes if still has not reached the empty level. In spin step, water Level Frequency > 41.30KHz for 4 minutes.	• Check for proper installation and proper standpipe height. • Check drain filter for blockage. Clean. • Check pressure sensor frequency (Hz) and pressure sensor hose. • Check resistance of the drain pump and voltage to the pump. 120 VAC • If voltage is present and the pump does not operate, replace pump. • If voltage is not present, check harness and connectors. • If harness and connector are good, replace the main control board.
E2	Door Lock/ Unlock Failure	When control tries to lock/unlock door, there is no door unlock/lock signal	• Check if the door is closed. • Check door lock resistance from pin 2 to pin 3. Should be between 50-100 ohms at room temperature. Replace lock if bad. • Check main control board voltage to door lock. • Check wiring between door lock and main control board.
E4	Fill Timeout/Slow Fill	In fill step, after 360 seconds if water level has still not reached target level. After 180 seconds water level is still below empty level. In adaptive fill step, after 360 seconds if wash level is still not reached.	• Check house water supply is on. • Check/clean hose screens. • Check pressure sensor frequency (Hz) and pressure sensor hose. • Check for proper voltage to the valve. 120 VAC. • Check valve coil resistance. Should read approximately 1k ohms. • If above is correct, replace valve.

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Fault Code	Description	Trigger Condition	Action
E8	Flood Protect Drain Occurred	While washer is in the powered on state. Any time the overflow level is detected and stays on 20 seconds.	• Check valves for any signs of leaks. • Check pressure sensor frequency (Hz) and pressure sensor hose. • If frequency is not correct or no frequency, check wire harness and/or replace sensor. • If above is checks good, replace the main control board.
FA	Water Level Sensor Failure	Pressure sensor frequency out of range (30KHz~45KHz).	• Check water level sensor frequency (Hz) and water level sensor hose. • If frequency is not correct or no frequency, check wire harness and/or replace sensor. • If the above check good, replace the main control board.
FC0	UI Board Communication Circuit Failure	Communication data (self Tx self Rx) not detected within 5 seconds.	• Check the wire integrity between the UI board and the main control board. • Clear the fault and run the cycle. If fault persists and reappears, replace the UI board.
FC1	UI Board and Inverter PCB Comm. Fault	Communication data not detected within 30 seconds.	• Check the integrity of the wiring between inverter board and UI board. • Clear the fault and run the cycle. If fault persists and reappears, replace the inverter board.
FC2	UI Board and Main Board Communication Fault	Communication data not detected within 30 seconds.	• Check the integrity of the wiring between main control board and UI board. • Clear the fault and run the cycle. If fault persists and reappears, replace main control board.
F3	Water Temperature Sensor Open/ Short	A/D value < 5 or A/D value > 245 for 5 seconds.	• Check temperature sensor resistance using the table in this manual, if not in range, replace heater. • Check harness and connections. • If above check good, replace the main control board.
F4	Heat System Fault	If the temperature raises less than 37°F for 10 minutes and the water temperature does not reach the target temperature at the end of the heating step	• Check integrity of wiring and connections between main control board and heater assembly. • Using ohmmeter, measure heater resistance, it should read 13~16 ohms at room temperature. If not in range, replace heater assembly. • If heater is in range, replace the main control board.
F701	Door lock fault	Motor stall. Motor is being driven and average current is less than 10mA for 3 seconds.	• Run a spin test in service mode to verify motor operation. • If no movement, check rotor, stator, harness and connecters for damage. • If above components are good, replace inverter board.

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Fault Code	Description	Trigger Condition	Action
F702	Lost Phase	One or more stator windings open circuit. During start up procedure, measured current in any sensor is less than defined value* and the rotor has rotated at least 90°. During spin state, measured current in any sensor is less than defined value* for 10 seconds. *Defined value depends on applied motor.	• Check stator, harness and connecters for damage. • Replace if necessary.
F703	Over Trip/Over Current	Motor current over the set limit (20A)	• Check whether drum is easy to tumble. • Check stator, harness and connecters for damage. • Check invertor board. Replace if necessary.
F704	Motor Current Circuit Fault	Internal fault on controller's current sensing circuitry. Failure detectable when motor is in idle state for at least 6 seconds.	• Run a spin test in service mode to verify motor operation. • If no movement, replace invertor board.
F706	Under Voltage	Motor supply voltage too low. (<160 VAC)	• Enter service mode to run motor spin test, make sure it is working. • Ensure correct AC voltage range (102V to 132 VAC) to the Inverter. • If no voltage, check harness and connectors for damage. • If voltage is good but still does not run, replace main control board / Inverter board.

NOTE: It's important to note that fault codes should only be used to help identify those components which require testing. Never replace a part based solely on a fault code. The control can generate a false fault if the right conditions exist. Use the code only as a reference and always check the component before replacing.

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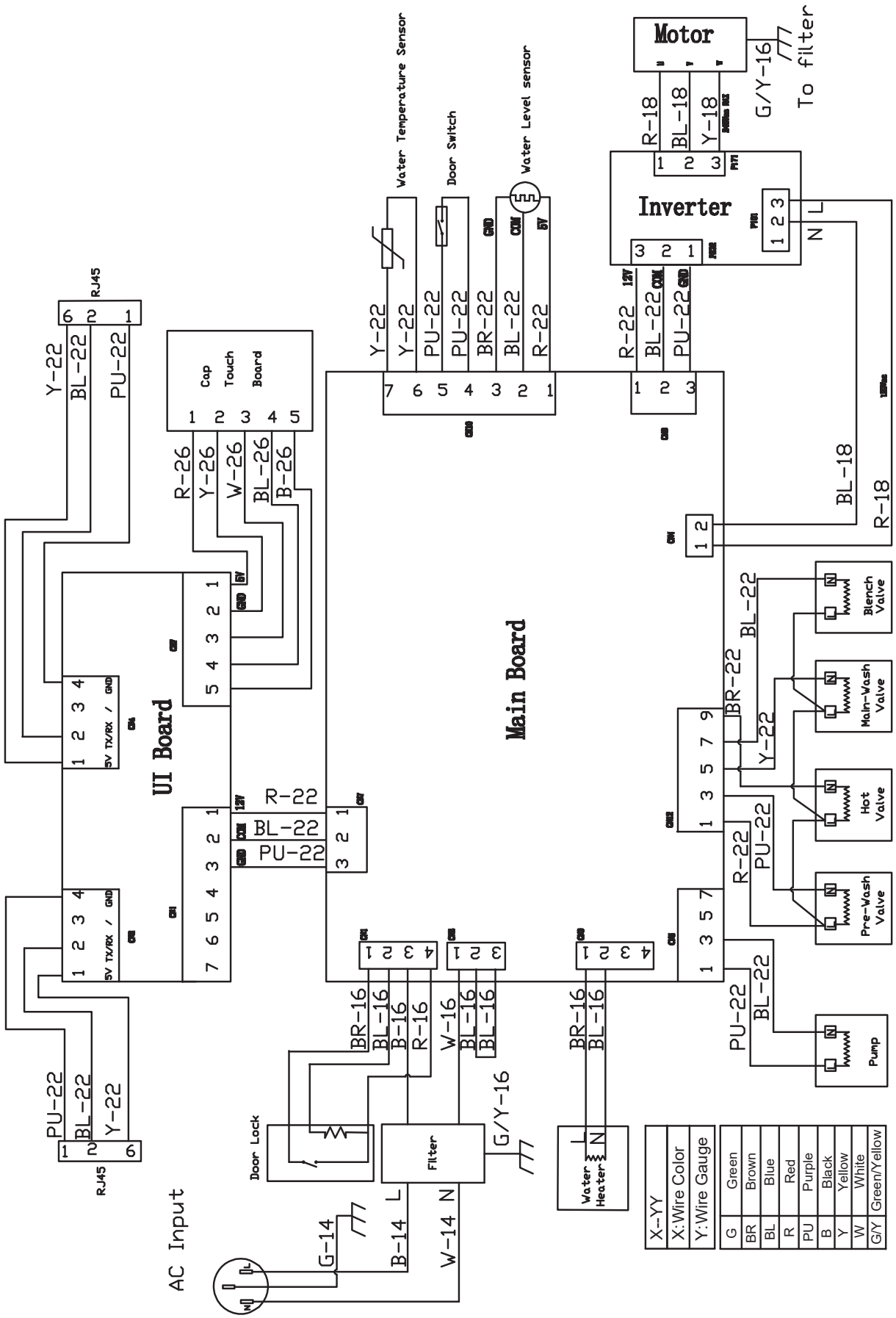
Fault Code	Description	Trigger Condition	Action
F707	Motor Overheated	Stator winding over temperature (> 338°F) for 5 seconds.	• Check whether drum is easy to tumble. • Check stator, harness and connecters for damage. • Check invertor board. Replace if necessary.
F708	IMP Overheated	Inverter over temperature (> 221°F) for 5 seconds	• Check whether drum is easy to tumble. • Check that motor has no signs of over temperature. • Reset inverter board by unplugging washer for 30 seconds. Run a drain and spin by selecting Rinse+Spin cycle and select no rinse by pressing Rinse until both Extra and Normal lights turn off. • Enter Service Mode and check that fault has cleared. • If fault persists, or unit does not spin, replace inverter board.
F709	Drive System Self Check Fault	MCU failed self-check. One fault over the checking process (ROM, RAM, CPU Registers, Stack, Clock) triggers the fault. The self-checking is continuously performed by MCU.	• Run a spin test in service mode to verify motor operation. • If no movement, check rotor, stator, harness and connecters for damage. • If above components are good, replace inverter board.
FV	Main Board Over Voltage	When Connected to power, voltage is higher than 160 VAC	• Check if the voltage is higher than 160V. • If voltage is normal, replace the main control board.
FP	Main Board Self Check Failed	MCU failed self-check. One fault over the checking process (ROM, RAM, CPU Registers, Stack, Clock, AD) triggers the fault. The self-checking is continuously performed by MCU.	• Check door lock, door switch, water temperature sensor. • Check harness and connections. • If above is checks good, replace the main control board.

Schematic


Motor
To filter
Inverter
Water Temperature Sensor
Door Switch
Water Level sensor
Cap Touch Board
UI Board
Main Board
Blench Valve
Main-Wash Valve
Hot Valve
Pre-Wash Valve
Pump
Door Lock
Filter
Water Heater
AC Input
X-YY
X:Wire Color
Y:Wire Gauge
G Green
BR Brown
BL Blue
R Red
PU Purple
B Black
Y Yellow
W White
G/Y Green/Yellow

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