WLC-4500-120VAC SUBMITTAL
Simplex Fill with Low Water Alarm

Waterline Controls®
Electronic Water Level Control Systems

480-905-1892
www.waterlinecontrols.com
info@waterlinecontrols.com

DESIGNED, MADE, AND TESTED IN THE USA
WITH DOMESTIC AND IMPORTED PARTS

NEW MORE RELIABLE TECHNOLOGY by Waterline Controls®

FOR SPECIFYING ENGINEERS WITH A TESTED and PROVEN TRACK RECORD in MRO APPLICATIONS for 10+ years.

Our controls can REPLACE ALL SENSOR and CONTROL TYPES in ALL water based applications.

We are NOT similar to float switches, capacitive, conductive, ultrasonic, or pressure transducers. Instead, we use a microprocessor controlled frequency state change detection method. Each probe has a frequency separate from all other probes in the array and will independently change state when touched by water. The state change of the frequency on each probe is monitored by a microprocessor which can perform multiple water level control functions. Using this method makes our sensors beyond Intrinsically safe!

Our advanced technology means a MORE RELIABLE, easy to operate, & longer lasting product!



WLC-4500-120VAC kit includes:
- NEMA 4X Controller
- 2 Power Relays
- 3045 Sensor with 50ft cable
- 18" PVC Stilling Chamber
- Stainless steel sensor mounting bracket and U-bolts and nuts

Features:
- 5 Year Limited Warranty with Life of product Technical Support
- Solid-state/electronic probes
- No float switches or mechanical moving parts
- Microprocessor Controlled Frequency State change detection
- Intrinsically safe – no high voltage in water
- NEMA 4X control enclosure with Intuitive LED indicators
- Dry contact connections for BMS/BAS
- Color coded sensor rods & wires for intuitive installation
- Test Push-button for output devices
- Power relays for valves, pumps, etc.
- Modular construction
- Extendable probes

Benefits:
- Complies with NFPA standards
- Permanently eliminate float switches
- Less than .1% failure rate in the field
- Sensor will not plate, foul, or deteriorate
- Flexibility in design to meet any scenario
- Minimal maintenance
- Never needs recalibration
- Stand-alone controls
- Limited lifetime warranty
- Fully Commercialized

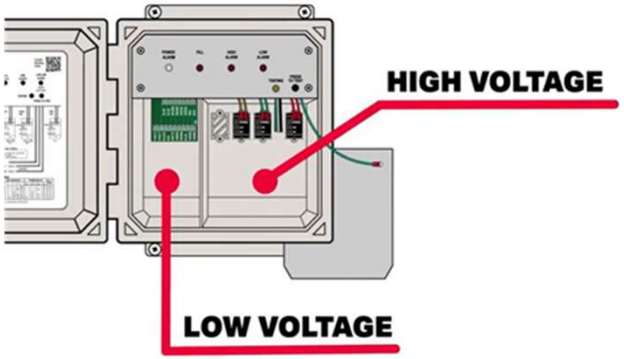
Sensor and Control Panel Pre-Installation Planning Guidelines

Sensor and Control Panel Considerations

- Use the metal of the cooling tower as a barrier from EMF interference (radar, cell, antenna or radio towers).
- Do NOT use the same power source or ground circuit of a VFD.
- Do NOT run the sensor cable parallel to VFD control wires or high voltage lines.
- If the control panel and/or sensor cannot be out of site of a VFD, then maintain at least 15 feet from VFD panels, wires.

Rules for High and Low voltage circuits

- Maintain at least 3" spacing between the sensor cable and high voltage lines.
- Do NOT run the sensor cable in the same conduit with high voltage lines.
- When crossing high voltage lines, cross them perpendicularly.
- Do NOT coil excess sensor cable.

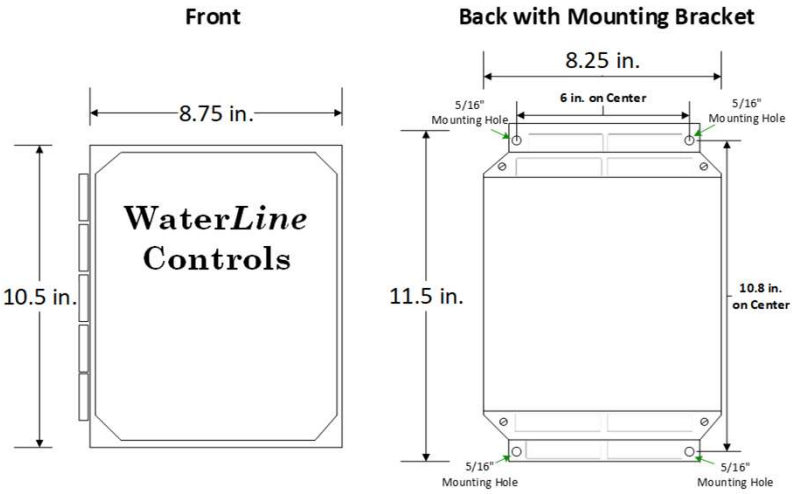


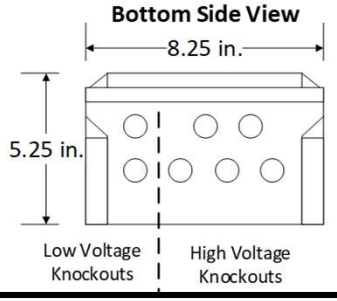
Sensor Cable Length

- The sensor cable comes in 50-foot increments, starting at 50ft. Order the cable longer than you need it. The sensor cable should be cut to fit. Be sure to leave enough slack (1 ½ times the length of the longest rod) in the sensor cable in the event the sensor needs to be removed for maintenance or inspection. If a sensor cable splice is necessary, contact Waterline Controls to order a splice box enclosure.
- Install the sensor cable in earth grounded metal conduit separate from the earth grounded metal electrical conduit housing high voltage lines. In those cases where running separate conduit is not plausible then follow the rules for high and low voltage circuits. Do NOT zip tie the sensor cable to conduit carrying high voltage lines.

Control Panel

- Provide a dedicated 15 to 20-Amp circuit to the control panel. Do NOT share the ground or neutral with other circuits and by no means should the circuit for a VFD be used.
- We recommend placing the control panel as close to the cooling tower as possible, keeping it above the water basin and out of sight of any Variable Frequency Drives (VFD).
- The control panel should be mounted in a convenient location where water spray will not impinge upon the unit and at a height above the tank overflow level to prevent water from feeding into the sensor wire conduit.
- Plan to mount the control panel where the low voltage wire crosses (perpendicularly) the least number of high voltage circuits.





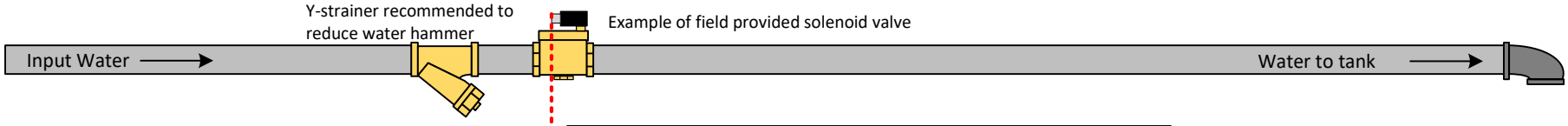
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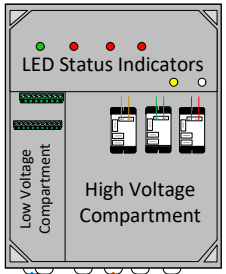
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OVERVIEW





Solenoid valve relay output

Low Alarm relay output

120 VAC to High Voltage compartment

Sensor Cable to Low Voltage compartment

Connections to Building Automation/Management System
Controller Dry contacts are SPST (Form A) relays rated 2 A @ 30 VDC
2 wire connections for each function
2 wire connection for fault condition

Dashed lines represent field provided cables & wiring

Options and Accessories:

- Audible Alarm with Silencer Switch
- Steady or Flashing Beacon
- Extension Rod kits
- 240 VAC Power Relays
- Power Supply for 24 VDC solenoid valves
- Solenoid Valves
- Motorized Ball Valves
- Y-Strainers

Sequence of Operation (SOO)

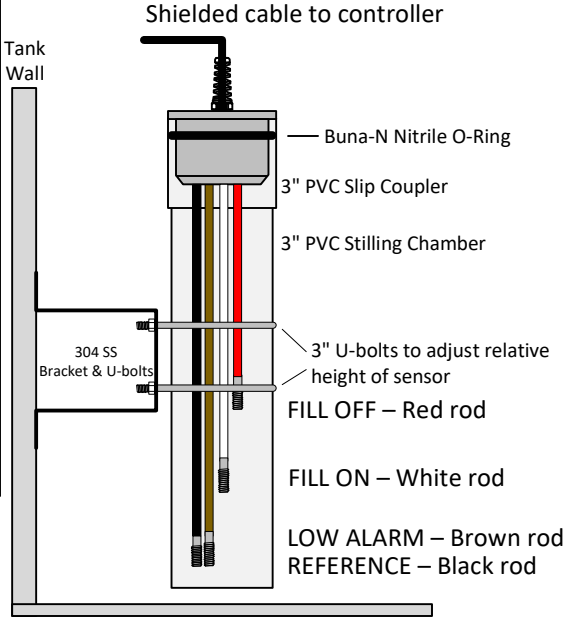
FUNCTION 1: FILL ON/OFF
The RED AND WHITE rods are a differential function. When the water level falls below the WHITE rod, the FILL LED status indicator, power relay, and dry contact are active.

When the water level contacts the RED rod, the FILL LED status indicator, power relay, and dry contact are inactive and remain inactive until water level falls below the WHITE rod.

FUNCTION 2: LOW ALARM
When the water level contacts the BROWN rod, LOW ALARM LED status indicator, dry contact, and power relay are inactive.

When the water level falls below the BROWN rod, LOW ALARM LED status indicator, dry contact, and power relay are active.

3045 Sensor
See Sensor Specifications page for details



Sensor shown with Side Wall Mount.
Other mounting options available.

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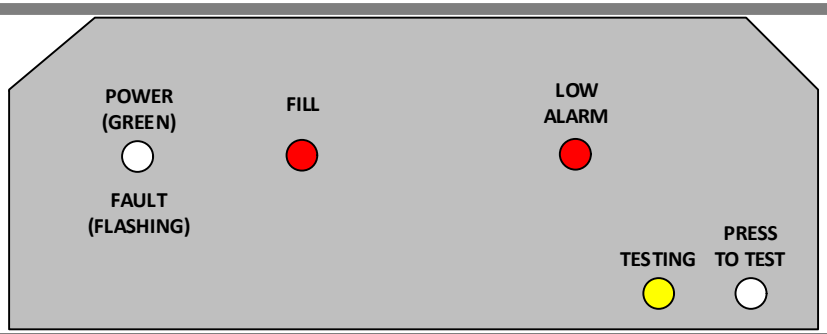
PHYSICAL WIRING CONNECTIONS

LOW VOLTAGE NORMALLY OPEN DRY CONTACT CONNECTIONS WILL CLOSE ON ALARM.
FAULT RELAY IS NORMALLY CLOSED AND WILL OPEN ON POWER LOSS.

BUILDING AUTOMATION WIRES CONNECT TO THIS TERMINAL BLOCK
EACH RELAY RATED: 2.0A @ 30 VDC MAX

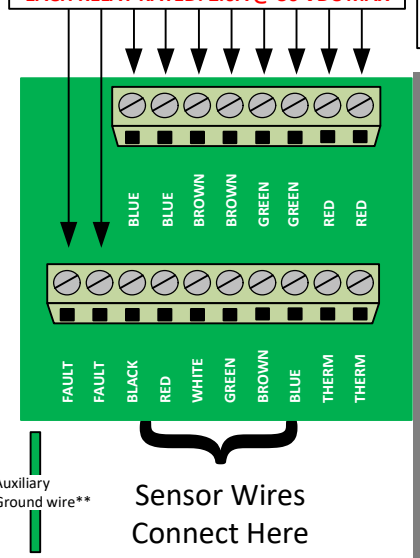
CAUTION:
EXCEEDING RELAY RATINGS COULD MAKE THE DRY CONTACTS FAIL AND VOID THE WARRANTY

BAS TERMINAL CONNECTIONS
RED PAIR = FILL
GREEN PAIR = NOT USED
BROWN PAIR = LOW ALARM
BLUE PAIR = NOT USED



CONTROL UNIT RATING
VOLTS: 120VAC (50/60 Hz)
AMPS: 0.5A
WATTS: 60W

240VAC MODEL ALSO AVAILABLE



Auxiliary Ground wire**

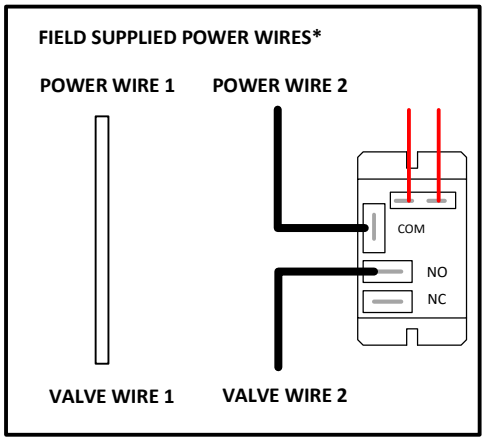
Sensor Wires Connect Here

Connect Shield Drain wire to Black sensor wire then connect to terminal block



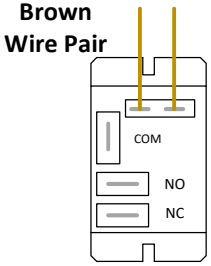
LOW VOLTAGE RACEWAY FOR SENSOR AND BAS/BMS/FIRE PANEL WIRES

EXAMPLE OF CONNECTING A SOLENOID VALVE

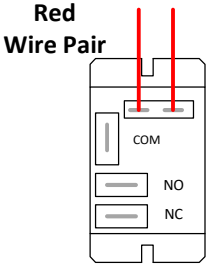


* CAN BE 120VAC, 24VAC OR 24VDC
WHEN CONNECTED THIS WAY, A NORMALLY CLOSED SOLENOID VALVE WILL OPEN WHEN THE CONTROLLER CALLS FOR FILL

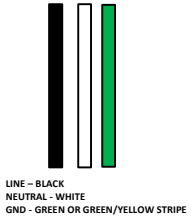
Colored wire pairs are relay connections to PCB



Low Alarm Power Relay



Fill Power Relay



Solenoid valves are field connected to the Fill Power Relay as shown in the diagram to the left.

NOTE: This control panel does not provide power to devices.

HIGH VOLTAGE POWER RELAYS
Form C – SPDT
Rated 40A @ 120VAC
Relay terminals are ¼" male spade

240VAC High Voltage Power Relays also available

**Auxiliary Ground wire is provided for applications where an additional grounding connection to the Black sensor wire may help reduce electrical interference caused by noisy AC power or EMI. It does not replace the required equipment grounding conductor.

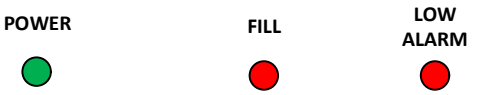
HIGH VOLTAGE COMPARTMENT

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FUNCTIONAL DIAGRAMS

LED STATUS INDICATORS



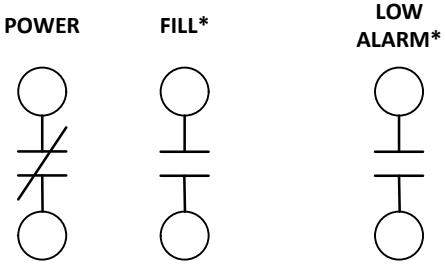
GREEN = POWER ON OFF = POWER LOSS RED/GREEN ALTERNATING = FAULT	RED = ACTIVE OFF = INACTIVE

The Power LED will be off on power loss, Green when powered on and Flashing on Fault conditions.

A fault condition occurs if water is detected on the rods out of order. Example: water detected on High Alarm but not on Low Alarm.

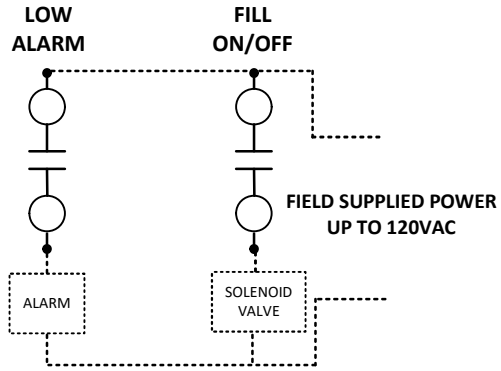
The Status Indicator LEDs will be Red when active and off when inactive.

LOW VOLTAGE DRY CONTACTS TO BUILDING AUTOMATION SYSTEM



EACH DRY CONTACT IS A FORM (A) SPST RELAY
RATED 2A @ 30VDC

HIGH VOLTAGE POWER RELAYS



Example of connecting devices to the Normally Open terminal of the power relays

NOTE: This control panel does not provide power to external devices such as solenoid valves.

------ Field provided wiring and devices

PRODUCT FUNCTION TRUTH TABLE

MODEL	BMS DRY CONTACTS						POWER RELAY				
	FAULT/POWER LOSS	FILL		LOW ALARM		BAS WIRES	FILL		LOW ALARM		SELF TEST
WLC-4500	X	X		X		6	X		X		X

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SENSOR SPECIFICATIONS

- 6 Conductor 18AWG Solid Core Copper wire with Overall Aluminum Foil and Drain wire providing 100% coverage against low frequency RFI.
- 0.33" diameter cable with 0.045" Black PE Jacket.
- Standard Sensor Cable length is 50 ft. with a maximum Sensor Cable length of 200 ft.
- Cable lengths over 200 ft. and up to 900 ft. require a separately purchased slice kit.
- Please call for any cable lengths over 900 ft.

Probe/Rod			
Color	**Function**	**Standard Length**	
Red	**Fill Off**	**A**	**14-7/8"**
White	**Fill On**	**B**	**16-3/8"**
Brown	**Low Water Alarm**	**C**	**17"**
Black	**Reference**	**C**	**17"**

NOTE: Custom lengths are available with a submitted Sensor Approval form



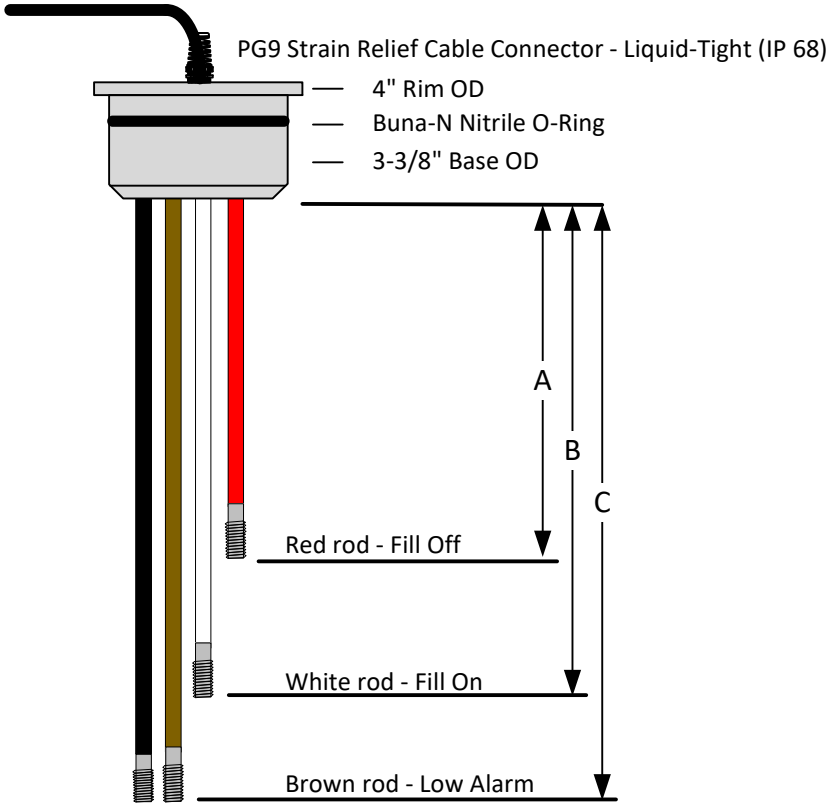
EXT45 Extension Rod Kit contains:
(4) 45.5" Color coded 304L rods
(4) Heat shrinks
(4) Coupler Nuts
(8) Jam Nuts

Optional Extension rod kits are available to extend each rod by 45.5" Extension rods threaded at each end to allow for any depths and are cut in the field during sensor installation.

PART # SENSOR-EXT45-45.5in

NOTE: Sensor rods cannot be removed from sensor head

3045 Sensor
3" UV-Inhibited ABS Slip Plug sensor head is rated to -4°F to 176°F



- All rods are 304L stainless steel with 1/4-20 threaded ends.
- Irradiated Polyolefin Heat Shrink Tubing.
- Sensor rods can be extended using an Extension Rod kit accessory.
- Sensor rods and wires are Intrinsically safe with circuit limited signals.

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5 Year Limited Warranty - Water*Line* Controls®

The 5 Year Limited Warranty is extended to the original consumer purchaser of this Water*Line* Controls® product manufactured by Water*Line* Controls®, Scottsdale, Arizona. Water*Line* Controls® warrants the unit, including the parts and components thereof, to be free of defects in material and workmanship under normal use and service conditions. This warranty does not cover plumbing or normal replacement items and parts, including gaskets and O-rings. Water*Line* Controls® does not cover improper installation of the unit or its parts. If you have any questions regarding the installation of your WaterLine Controls® unit, please feel free to contact us. **Be sure to include the serial number of your unit.**

The 5 Year Limited Warranty commences on the date of installation. Parts discovered to have manufacturing defects within 1 Year of installation shall be replaced at no charge to the original consumer. Defects discovered after one year and up to the fifth year following the installation, shall be replaced at a fee of $275.00 per item. Water*Line* Controls® will repair or replace, at its option, a unit or part proved to be defective within the warranty period and under the conditions of this 5 Year Limited Warranty.

This 5 Year Limited Warranty does not apply if the failure is caused or contributed by any of the following: power surges, acts of God, power failure or reduction of power supplied to the unit, unusual atmospheric conditions, improper handling, improper storage, winter freezing, abuse, improper installation, unsuitable application, lack of reasonable and necessary maintenance, natural disasters, or repairs/alterations made or attempted by other than Water*Line* Controls® or an Authorized Technician approved by Water*Line* Controls®.

The consumer must deliver or ship the unit or warranty parts freight prepaid to Water*Line* Controls®. Authorization to return an item to Water*Line* Controls® must be obtained from Water*Line* Controls® Customer Service Department at 480-905-1892. For further assistance with this process please contact the Customer Service Department. Be sure you insure your shipment against loss or damage in transit.

Water*Line* Controls® is not responsible for the cost of removal of the unit or parts of the unit, damages due to removal, or any other expenses incurred, including in shipping the unit or parts to or from Water*Line* Controls® or its closest Authorized Service Center or the installation of the repaired or replaced unit. The consumer must bear these expenses.

THIS 5 YEAR LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL SUCH OTHER WARRANTIES ARE DISCLAIMED EXCEPT TO THE EXTENT ANY IMPLIED WARRANTY MAY BE IMPOSED BY STATE CONSUMER LAW. ANY SUCH IMPLIED WARRANTY IMPOSED BY STATE CONSUMER LAW IS LIMITED IN DURATION TO ONE (1) YEAR FROM THE DATE OF INSTALLATION. IN NO EVENT SHALL WATER*LINE* CONTROLS BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OR ANY NATURE OR KIND OR FOR DAMAGES TO PERSONS OR PROPERTY, INCLUDING ANY DAMAGE RESULTING FROM THE USE OF THE UNIT WITH A SUBSTANDARD WATER CIRCULATION OR SUPPLY SYSTEM.

Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you.

This limited warranty is valid only in the United States of America and Canada.

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