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22-0000 Plumbing O&M

# **Operations & Maintenance**

## **For**

***NEWTON  
ENRICHMENT***

Submitted by:

**Todd Young Plumbing**

**Operations Manuals Prepared by:**





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**Z812A4-XL**

**Zurn**

**Faucet (-xl), 4" Centerset, 'a' Spout, -4 Handle (lead Free)**

**205**



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# AquaSense AV™ ZEMS Series

Automatic Systems Sensor-Operated  
AquaVantage Flushometer

## Installation, Operation, Maintenance and Parts Manual

Patented and Patents Pending



### Sensor-Operated Exposed Systems

ZEMS6000AV  
ZEMS6000AV-2  
ZEMS6000AV-3  
ZEMS6001AV  
ZEMS6003AV

### Sensor-Operated Concealed Systems

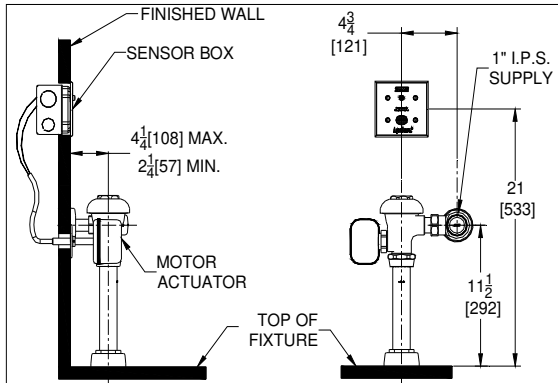
ZEMS6140AV  
ZEMS6142AV  
ZEMS6152AV  
ZEMS6190AV  
ZEMS6195AV  
ZEMS6197AV

#### LIMITED WARRANTY

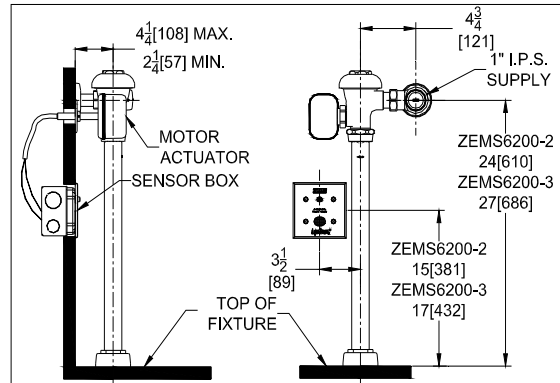
All goods sold hereunder are warranted to be free from defects in material and factory workmanship for a period of five years from the date of purchase. Decorative finishes warranted for one year. We will replace at no costs goods that prove defective provided we are notified in writing of such defect and the goods are returned to us prepaid at Sanford, NC, with evidence that they have been properly maintained and used in accordance with instructions. We shall not be responsible for any labor charges or any loss, injury or damages whatsoever, including incidental or consequential damages. The sole and exclusive remedy shall be limited to the replacement of the defective goods. Before installation and use, the purchaser shall determine the suitability of the product for his intended use and the purchaser assumes all risk and liability whatever in connection therewith. Where permitted by law, the implied warranty of merchantability is expressly excluded. If the products sold hereunder are "consumer products," the implied warranty of merchantability is limited to a period of three years and shall be limited solely to the replacement of the defective goods. All weights stated in our catalogs and lists are approximate and are not guaranteed.

### Valve Rough-In

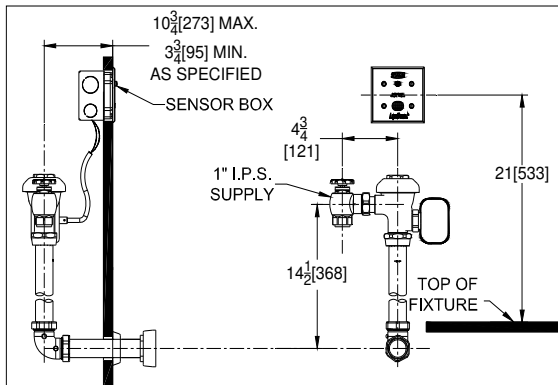
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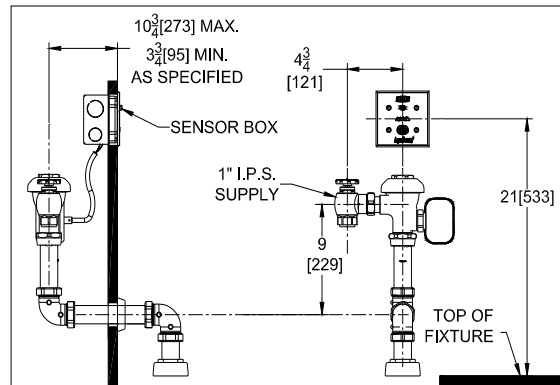
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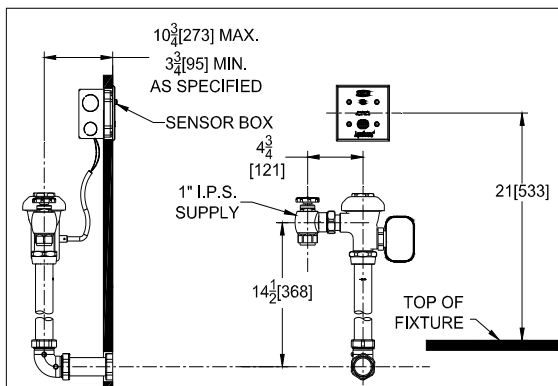
**Model ZEMS6140**



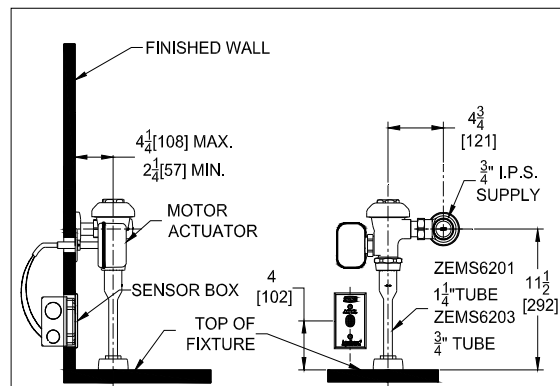
**Model ZEMS6142**



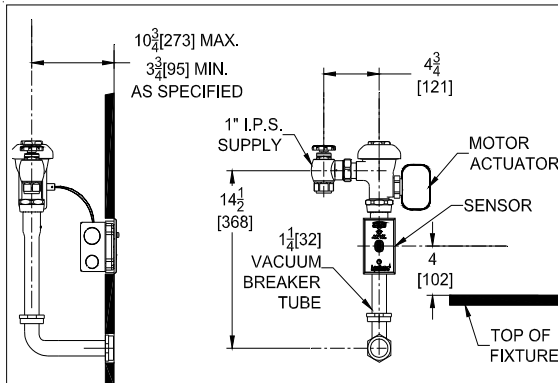
**Model ZEMS6152**



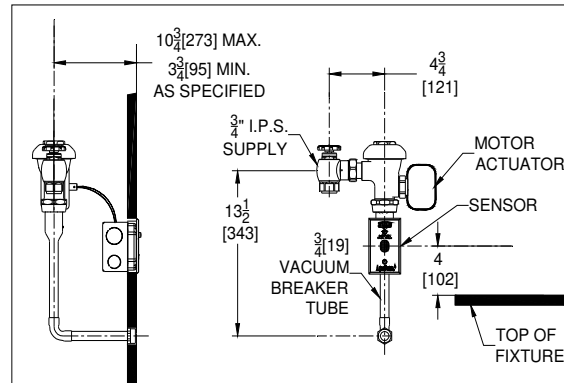
**Models ZEMS6001 and ZEMS6003**



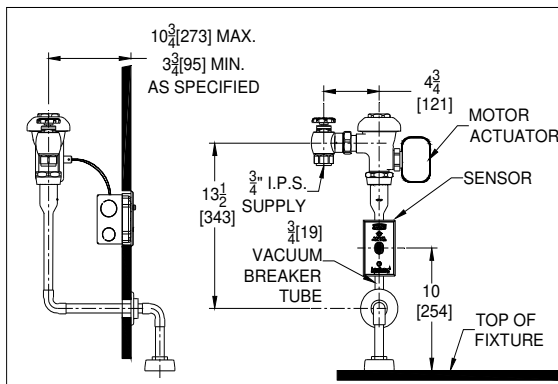
Model ZEMS6190



Model ZEMS6195



Model ZEMS6197



### PRIOR TO INSTALLATION

Prior to installing the Zurn Automatic Sensor-equipped Flushometer, install the items listed below as illustrated in Figures 1 through 3.

- 2-gang electrical box (4 x 4 x 2 1/8, use Steel City #52171-N box, and #52-C-18 device cover or equivalent for sensor with closet installs, or #52-C-14 reducing device or equivalent for sensor with urinal installs);
- Single-gang electrical outlet for plug-in power converter.
- Electrical wiring to the power converter outlet (120 VAC, 35 watts service required for each power converter used).
- Closet fixture.
- Zurn carrier system, Z1200 series or equal.

### IMPORTANT:

- All electrical wiring is to be installed in accordance with National/Local codes and regulations.
- All plumbing is to be installed in accordance with applicable codes and regulations.
- Water supply lines must be sized to provide an adequate volume of water for each fixture.
- Flush all water lines prior to making connections.
- Sensor units should not be located across from each other or in close proximity to highly reflective surfaces.
- Control Stop should never be opened to allow flow greater than fixture is capable of evacuating. In the event of valve failure, fixture must be able to handle a continuous flow.

## Electrical

### AC/DC Power Supply

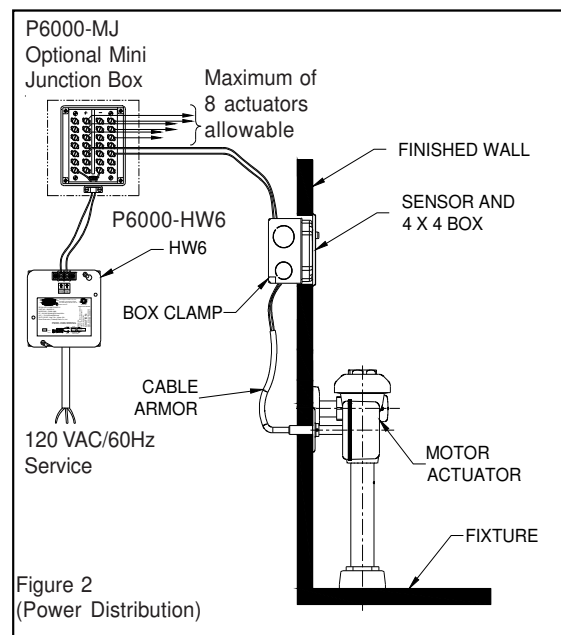
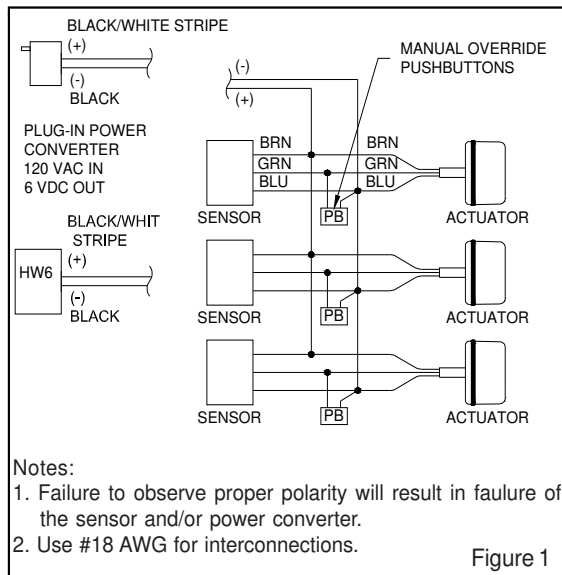
Install hardwired power supply or receptacle for the Zurn Power Converter in a convenient location. An optional mini junction box (P6000-MJ) is recommended to distribute power to each sensor location. It is also recommended that brown wire be used for the DC positive (+) of the supply and blue wire be used for the DC negative (-) of the supply. This matches the sensor and actuator wire colors.

**NOTE:** One Zurn P6000-HW6 or P6000-PC6 Power Converter can operate as many as eight Automatic Sensor equipped Flushometers. The Power Converter is supplied with a six-foot cord. If additional wire is needed from the Power Converter to the Flushometer(s), use #18 AWG for this (by others). **Do not supply power** to the Power Converter until installation of actuator, sensor and Flushometer is completed and checked. **Proper polarity must be observed or damage to one or all components will result.**

### Electrical Hook-up (Figure 1)

Be certain power is off to prevent damage to electrical components. Connect the sensor to the actuator and power converter exactly as shown in Figure 1.

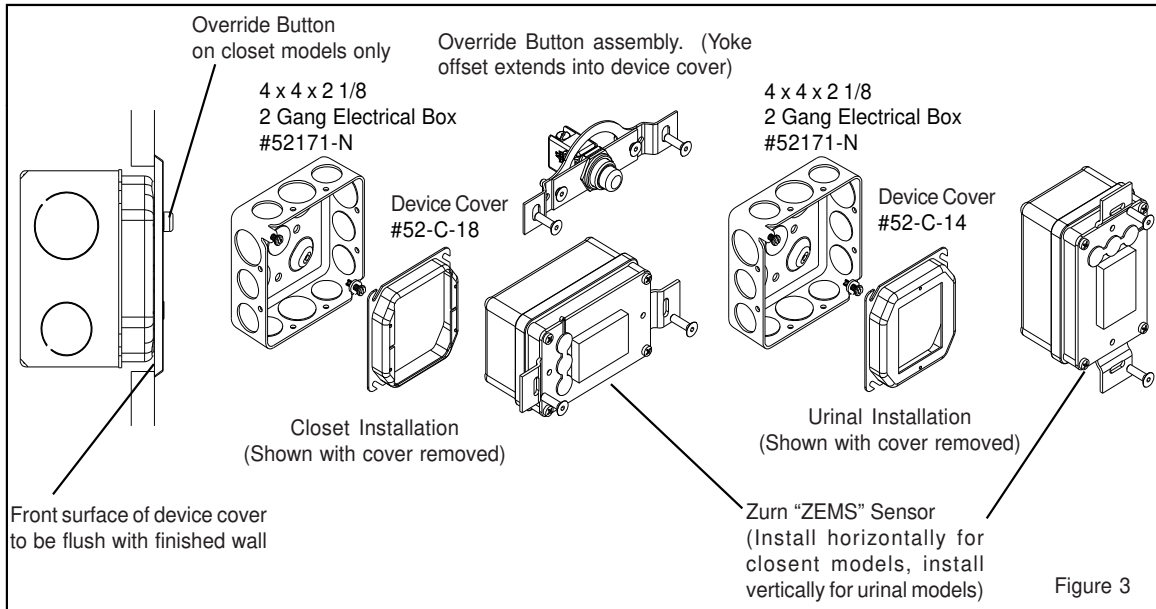
**Double check that power converter polarity is correct.**



### Sensor Installation

**Closet Models:** Install plaster ring so screw holes are on left and right side of box (as shown in Figure 3). Trim tiles to allow screw holes in plaster ring to show.

**Urinal Models:** Install reducing cover so screw holes are on top and bottom side of box (as shown in Figure 3). Trim tiles to allow screw holes in plaster ring to show.



#### STEP 1 – Locate sensor box

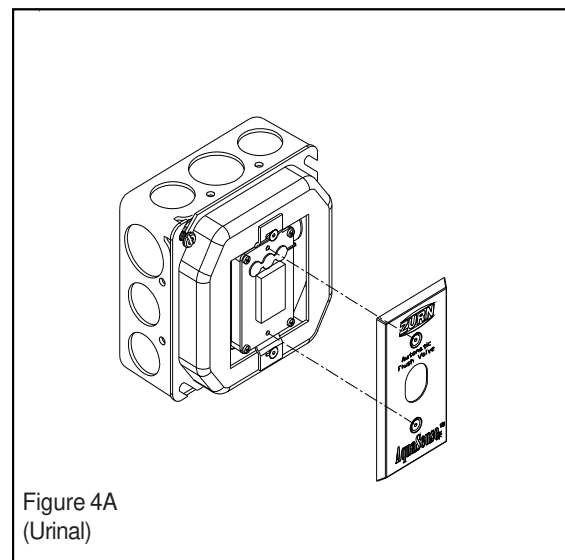
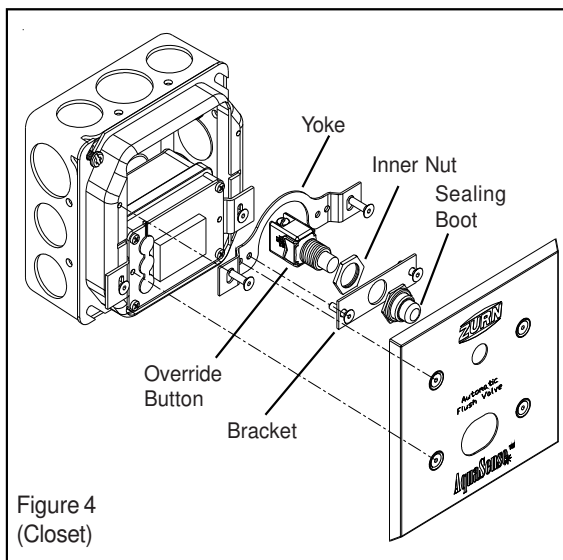
Locate sensor box in the wall according to model number as shown on pages 2 and 3.

#### STEP 2 – Mount Automatic Sensor (Figure 3)

Install the Zurn Automatic Sensor into the 2-gang electrical box using two (2) long screws provided. Ensure that wires from sensor case point up for closet installs and point to the right for urinal installs. The rubber push caps will be on the left side of the sensor for closet and at the top for urinal (See Figures 4 and 4A). The sensor lens faces outward from the finished wall.

#### STEP 3 – Mount Yoke and Override Button (Figure 4)

Install inner nut, bracket and sealing boot on threaded shaft of override push button. Mount bracket to yoke. Adjust the distance so that the override push button will protrude through the wall plate using the nuts on each side of bracket. Wire the override push button as per Figure 1. Mount the assembled yoke to the electrical box.

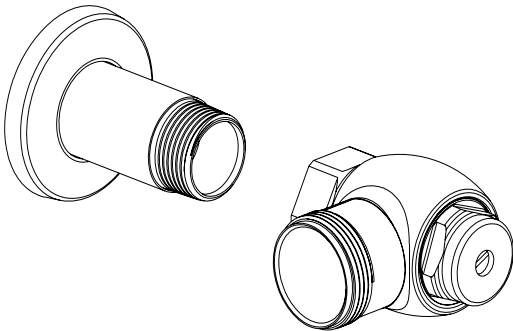


### Mechanical

The AquaVantage® design is optimized to operate between 25 and 80 psi (172 to 552 kPa) of water pressure (running). The minimum pressure required for the valve to work properly is determined by the fixture selected. Please consult fixture manufacturer for water pressure requirements. Protect the chrome or special finish of this flushometer during installation. **Do not use toothed tools to install or service the valve as this will damage the finish.** Also, see “Care and Cleaning” section of this manual.

#### Step 1

A. Install stop valve assembly using sweat solder adapter kit if applicable. Thread sealing compounds should be used on male NPT threads only.

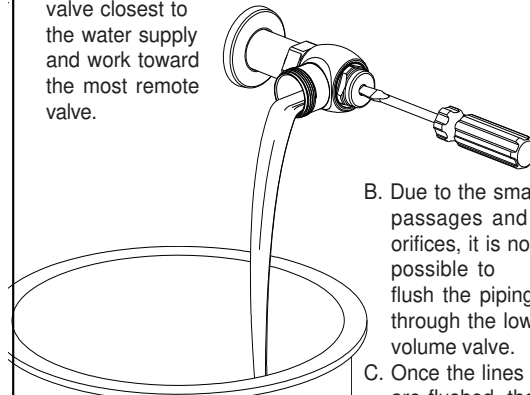


When all stops are connected to the water supply and water pressure is available, flush the supply piping to remove dirt, metal chips, etc., from system.

Figure 5

#### Step 2

A. Before the valve is installed, open each stop fully for a brief time and catch the water in a two gallon or larger bucket. For multiple installations, start with the stop valve closest to the water supply and work toward the most remote valve.



B. Due to the small passages and orifices, it is not possible to flush the piping through the low volume valve.

C. Once the lines are flushed, the valve can be installed.

Figure 6

#### Step 3

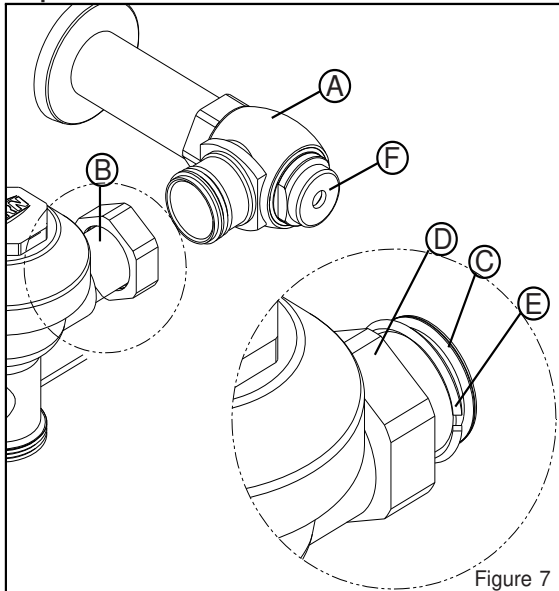


Figure 7

#### Attach Valve Body to Stop Valve

- 1.) Before the supply water is turned on, be sure all stop valves are closed off tight. The stop valves can be opened and closed by using the adjusting screw located at the center of the stop valve cap. Stop valve adjustments can only be made by using the adjusting screw. **It is not necessary to remove the stop valve cap (F) when making adjustments. If for any reason it becomes necessary to remove the stop valve cap, be certain the water is shut off at the main supply valve.**
- 2.) Prior to inserting the flush valve tailpiece (B) into stop valve (A), be certain that the O-ring seal (C) is located in O-ring seal groove at the end of the tailpiece and that the locking nut (D) and locking snap ring (E) are located as shown. Care should be taken not to damage the O-ring when inserting the tailpiece into the stop valve. If lubrication is needed, wetting the O-ring with water will be sufficient.
- 3.) Insert the flush valve tailpiece (B) into the stop valve (A) and hand tighten the lock nut (D) to the stop valve. Level the entire unit.

**Install Vacuum Breaker Flush Connection  
Models ZEMS6000, ZEMS6000-2, ZEMS6000-3, ZEMS6001,  
and ZEMS6003**

Slide the tube nut (H), spud nut (G), slip gasket, rubber gasket and spud escutcheon over the vacuum breaker tube and insert tube into fixture spud. Hand tighten tube nut to valve body and hand tighten spud nut onto fixture spud. Adjust the valve assembly for plumb. Tighten fixture spud nut (G), vacuum breaker tube nut (H) and lock nut (D) (fig. 7) with a wrench.

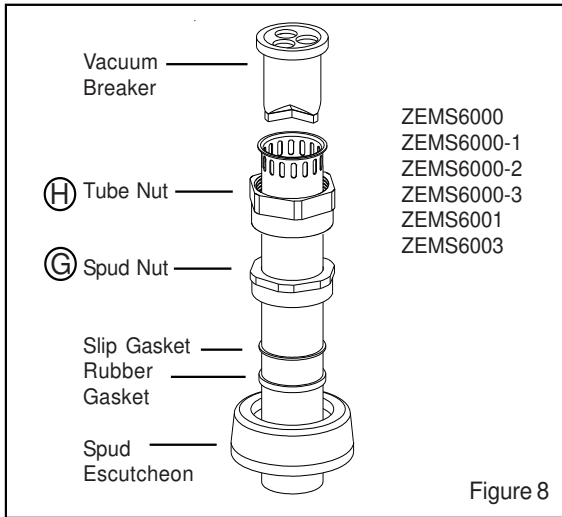


Figure 8

**Models ZEMS6140, ZEMS6142, ZEMS6152, ZEMS6190,  
ZEMS6195 and ZEMS6197 (Figure 9)**

**NOTE:** When cutting scored pipe, leave a minimum of 1-1/4" of scoring to ensure engagement with compression coupling.

Assemble pipe, elbows, couplings, slip washers, rubber gaskets and flanges as illustrated in Figure 7. Hand tighten all couplings. Once installation is completed, tighten all connections.

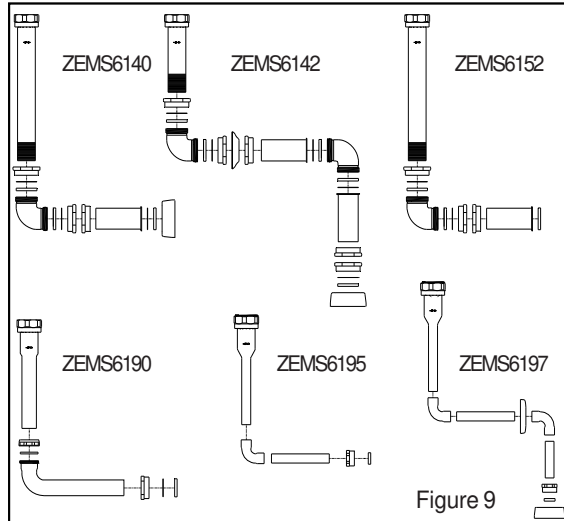


Figure 9

**Motor Actuator Installation (Figure 10)**

1. Drill 1-3/4" diameter hole per Figure 10.
2. Run "fish tape" from electrical box to 1-3/4" hole.
3. Install actuator escutcheon to the actuator pipe with setscrew toward actuator. Do not tighten setscrew at this time.
4. Pull actuator cable through hole with fish tape and back to sensor box. Secure armored cable to box with box clamp.
5. With escutcheon loose and handle port washer installed, push cable into wall. The actuator must be angled away from the valve body at this time until the actuator push rod clears the handle port flange. The actuator can now be mounted to the flush valve and tightened.
6. Push escutcheon back to wall and tighten setscrew.

**NOTE:** See Figure 2 for typical installation including optional mini junction box.

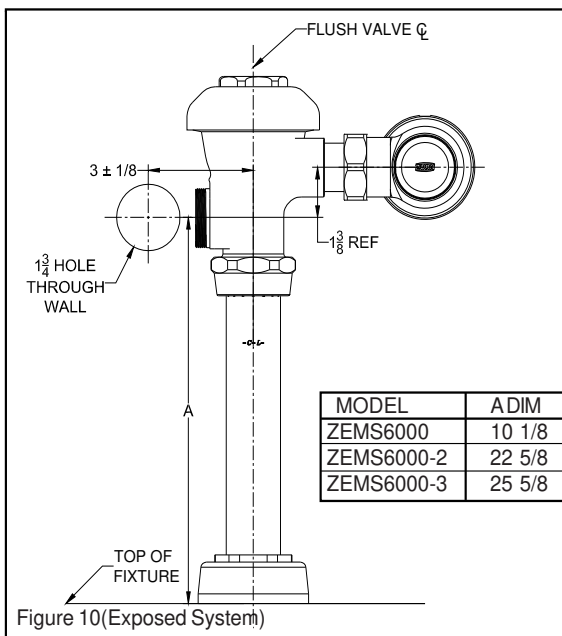


Figure 10(Exposed System)

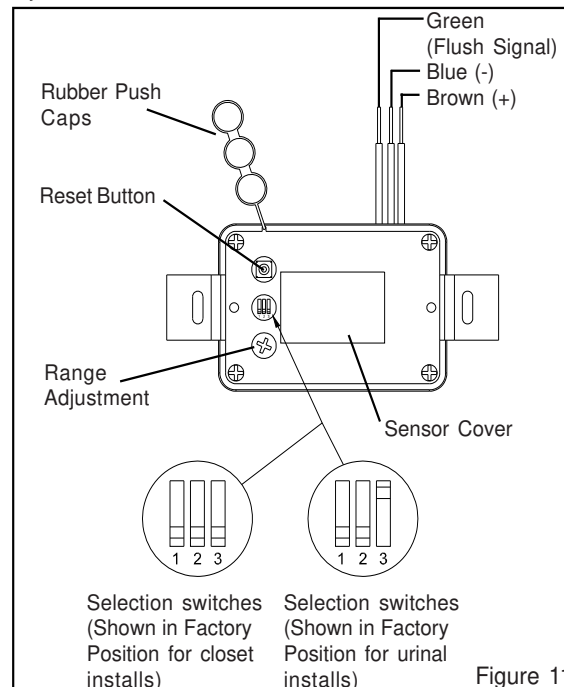


Figure 11

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### Test and Adjustment (Figure 11)

(Also see "Sensor Features")

Zurn Automatic Sensors are preset at the factory and provide the user with selectable options as follows:

Switch 1 – Automatic Flush (Factory setting is on.)

Switch 2 – Red/Green LED (Factory setting is on.)

Switch 3 – Courtesy Flush (Factory setting is on for closet.)  
(Factory setting is off for urinal)

- **Red/Green LED** – With power applied the red light will illuminate when an object is detected. The green light will momentarily illuminate after the object has been detected for a minimum of 8 seconds then leaves. The green light indicates the flushing sequence.
- **Range Adjustments** – The Zurn Automatic Sensors are factory set to operate at a range of 50". This range should be satisfactory for most installations. If the range is too short (i.e., not detecting the user) or too long, adjust the range.
- **To Make A Range Adjustment** – Remove the rubber push caps. The range adjustment is shown in Figure 12. Using a small screwdriver, turn the range adjustment clockwise to increase range (maximum range is 60") or counter clockwise to decrease range (minimum range is 12").

**Note: This adjustment device is fragile. Be careful not to apply excess force.**

**IMPORTANT NOTE:** Excessive water flow creates noise, while too little flow will not satisfy the needs of the fixture. Proper adjustment is made when:

1. The plumbing fixture is cleansed after each flush without splashing water out from the lip.
2. A quiet flushing cycle is achieved.

After adjustment: Replace the Zurn stop cap screw cover.

### CARE AND CLEANING INSTRUCTIONS

**Do not** use abrasive or chemical cleaners to clean Flushometers and actuators as they may dull the luster and attack the chrome or special decorative finishes. Use only mild soap and water, then wipe dry with a clean cloth or towel.

While cleaning the bathroom tile, the Flushometer and actuator should be protected from splattering of cleaner. Acids and cleaning fluids can discolor or remove chrome plating.

### Seasonal use.

Valves use in installations subject to shut down because of cold and freezing conditions should be maintained in the following manner. After the main supply has been shut off and the water drained from the system, remove the stop valve cap and stop internals to allow the water to drain from the flush valve and supply line.

**CAUTION:** Range adjustment rotates only 1/2 turn total from min. to max. Do not exceed this or sensor will be damaged. Stand in front of the Zurn Automatic Sensor at the desired distance; the red light will illuminate when you are within range. Repeat adjustment procedure until the desired range is obtained.

### • Switch Settings (Figure 11)

The three switches control the following options. They can be activated or deactivated by means of the switches (down is on, up is off).

**Switch 1 – Automatic Flush** – The unit will automatically flush 24 hours after last user.

**Switch 2 – Red/Green LED** – When an object is detected the Red LED illuminates. The Green LED illuminates while flushing.

**Switch 3 – Courtesy Flush** – When an object has been detected for two seconds, the unit flushes and goes into the normal mode. This is repeatable after 90 seconds.

**NOTE:** After the options have been selected the reset button **must** be pushed for sensor to accept selections. Make sure rubber push caps are securely installed after making adjustments to protect sensor from moisture.

### STEP 11 – Adjust Control Stop (Figure 6)

Adjust the control stop to meet the flow rate required for proper cleaning of the fixture. Open control stop counterclockwise one half turn from closed position. Activate Flushometer simulating a user. Adjust the control stop after each flush until the rate of flow delivered properly cleanses the fixture.

### SENSOR FEATURES (See Step 10 for instructions.)

**1. Courtesy Flush:** The Sensor will provide a courtesy flush two seconds after a person is first detected. The courtesy flush removes any residue from the fixture. The main flush will occur when the user steps away from the fixture. The courtesy flush can be manually activated/deactivated at any time.

**2. Automatic 8-Hour Flush:** The sensor will provide an automatic flush 8 hours after the last user. The automatic flush can be manually activated/deactivated at any time.

**3. Adjustable Range:** The viewing distance is adjustable from 12" to 60".

**A. Indicator Lights:** The sensor unit has two operation lights, red and green. The red light is lit when an object is detected. The green is lit when the user leaves view of the sensor and unit is flushing. The indicator lights can be manually activated/deactivated at any time.

**B. Function Light:** Abnormal reflection detection function. If an object is in the viewing range for more than 30 minutes the red LED will blink. Range readjustment may be required.

### C. Maintenance Override (For Maintenance Purposes):

The sensor may be disabled for 10 minutes by placing a magnet on the sensor lens for 3 to 5 seconds. After 10 minutes the sensor will automatically resume functioning. Placing a magnet on the sensor for one second will restore normal operation and also provide a flush. These features are often desired for cleaning purposes.



### Trouble Shooting

Problem	Possible Cause	Corrective Action
Valve will not operate.	1.) Stop valve is closed	1.) Open stop valve.
	2.) Supply valve is closed.	2.) Open supply valve.
	3) The electric wire(s) is not connected	3) Connect the wires.
	4) The surface of the infrared cover is stained.	4) Clean the surface of the sensor cover.
	5) There is a reflective surface in front of the sensor.	5) Remove the reflective surface from in front of the sensor.
	6) The detection range is not adjusted properly.	6) Adjust the detection range.
	7) Actuator fault	7) Contact distributor for replacement.
	8) Sensor fault	8) Contact distributor for replacement.
	9) No power provided by power supply	9) Replace power supply
No red LED with target in view	1) The electric wire(s) is not connected or sensor fault.	1) Connect the wires.
Green LED illuminates with target removed, but does not flush	1) Electric wire fault.	1) Verify wire connections
	2) Sensor fault	2) Replace sensor
Insufficient volume of water to adequately siphon fixture	1.) Stop valve is not open enough.	1.) Open stop valve for desired volume of water.
	2.) Urinal diaphragm installed in closet valve.	2.) Replace urinal diaphragm with proper closet piston.
	3.) Insufficient volume or pressure at supply.	3.) Consult fixture guide for minimum gallons per minute flow and running pressure for satisfactory performance.
Flush valve shuts off too quick.	1.) Damaged diaphragm.	1.) Install new P6000-ECA, P6000-EUA replacement kit.
	2.) Enlarged by-pass orifice.	1.) Install new P6000-ECA, P6000-EUA replacement kit.
Valve is short flushing	1.) Enlarged by-pass orifice.	1.) Install new P6000-ECA, P6000-EUA replacement kit.
	2.) Urinal piston installed in closet	2.) Replace urinal piston with proper closet piston.
Valve is flushing too long or not shutting off.	1.) Trip mechanism not seating properly due to foreign material between trip mechanism and seat.	1.) Disassemble parts and rinse thoroughly.
	2.) By-pass orifice is plugged or partially plugged.	2.) Examine by-pass orifice and clean if necessary being certain not to enlarge orifice opening.
	3.) Line pressure is not adequate to force trip mechanism to seal.	3.) Pressure is inadequate or has dropped below minimum operating range. Steps should be taken to increase the line pressure.
Water splashes out of fixture/	1.) Supply volume is more than is necessary.	1.) Adjust downward on control stop.
	2.) Lime accumulation on vortex or spreader holes of fixture.	2.) Remove the lime build up.
Flush is not considered quiet.	1.) Control stop may not be adjusted for quiet operation.	1.) Adjust the control stop for quiet operation keeping in mind the fixture evacuation requirements.
	2.) Fixture may be contributing to noise.	2.) Check noise created by fixture by placing a cover over the bowl opening to separate valve noise from bowl noise. If it is determined the fixture is too noisy, consult with fixture manufacturer.
	3.) Piping system may be source of noise.	3.) High pressure in the system can sometimes be controlled by the stop valve. Other sources of noise may be the absence of air chamber and shock arrestors, loose pipes, improper size pipes, etc. In these cases the building engineer should be consulted.

**Care of Chrome plated surfaces.**

The suggested cleaning of chrome plated surfaces is simply to clean them with soap and water then dry. Commercial cleaning compounds are never recommended.

**Seasonal use.**

Valves used in installations subject to shut down because of cold and freezing conditions should be maintained in the following manner. After the main supply has been shut off and the water drained from the system, remove the stop valve cap and stop internals to allow the water to drain from the flush valve and supply line.

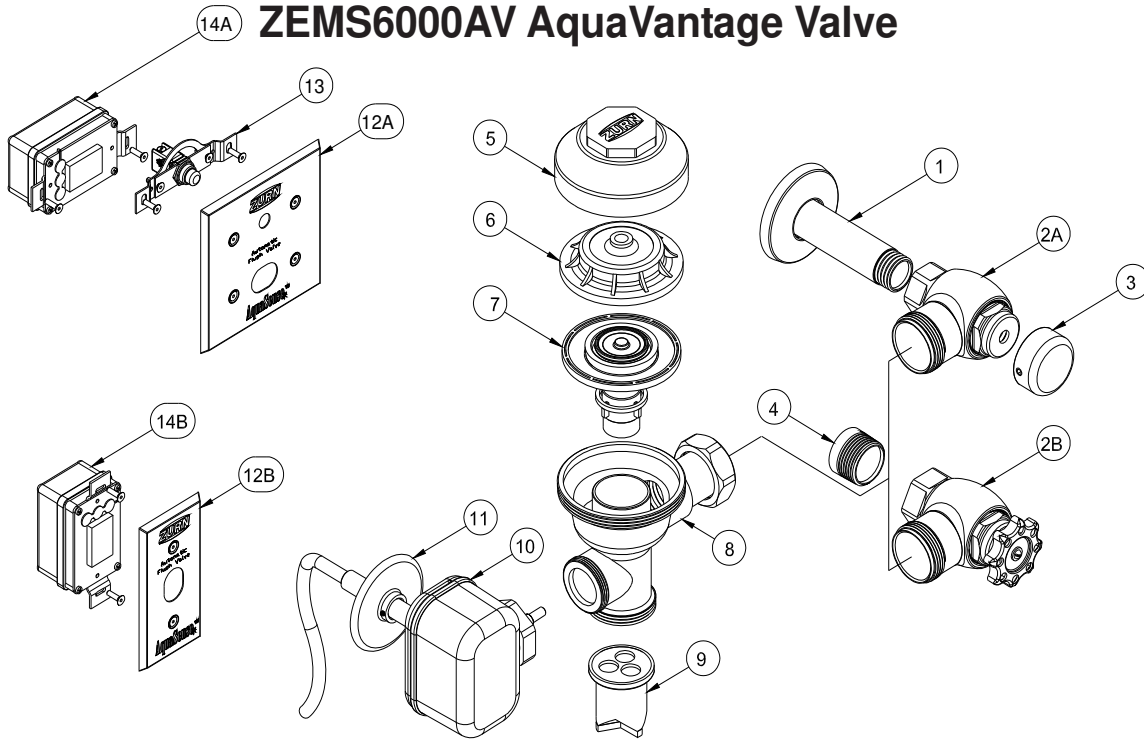
ZURN INDUSTRIES, LLC. ♦ COMMERCIAL BRASS OPERATION ♦ 5900 ELWIN BUCHANAN DRIVE ♦ SANFORD NC 27330  
Phone: 1-800-997-3876 ♦ Fax: 919-775-3541 ♦ World Wide Web: www.zurn.com  
In Canada: ZURN INDUSTRIES LIMITED ♦ 3544 Nashua Drive ♦ Mississauga, Ontario L4V1L2 ♦ Phone: 905-405-8272 Fax: 905-405-1292

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## ZEMS6000AV AquaVantage Valve

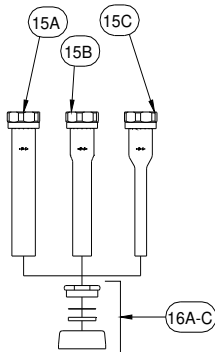
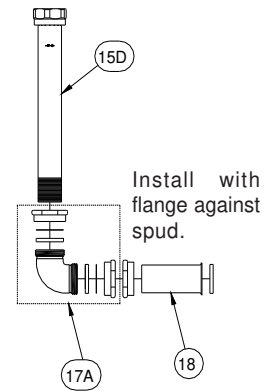
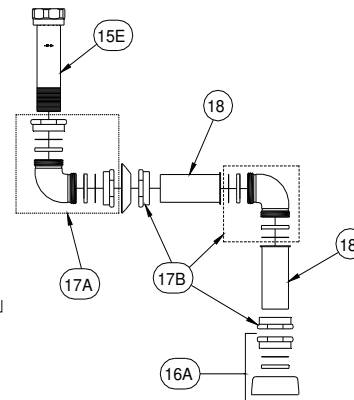
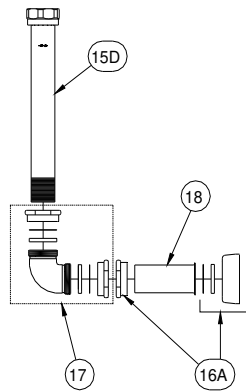


ZEMS6140

ZEMS6142

ZEMS6152

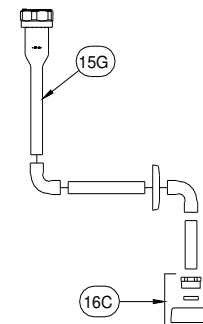
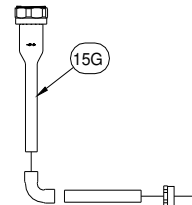
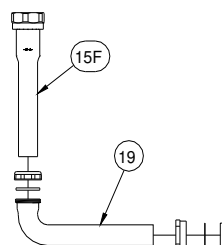
ZEMS6000  
ZEMS6000-1  
ZEMS6000-2  
ZEMS6000-3  
ZEMS6001  
ZEMS6003



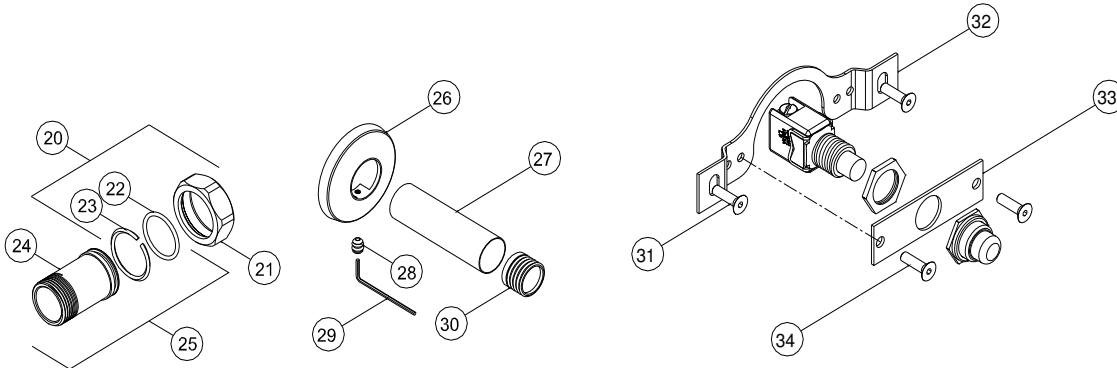
ZEMS6190

ZEMS6195

ZEMS6197



1.	P6000-YBYC	Cast Wall Escutcheon & Solder Kit	15C.	P6003-A-AA-CP	Breaker Assembly
2A.	P6000-D-SD	Stop Assembly			Chrome Plated 3/4" X 8 1/2" Vacuum
2B.	P6000-D-WH	Stop Assembly for Wheel Handle	15D.	P6000-1-A-AA-RB	Breaker Assembly
3.	P6000-VC	Vandal-Resistant Control Stop Cover			Rough Brass 1-1/2" X 12 1/2" Vacuum
4.	P6000-YBA	Sweat Solder Adapter	15E.	P6000-A-AA-RB	Breaker Assembly
5.	P6000-LL-CP	Valve Body Outside Cover			Rough Brass 1-1/2" X 5" Vacuum
6.	P6000-L	Valve Body Inside Cover	15F.	P6001-10-A-AA-RB	Breaker Assembly
7.	P6000-ECA-WS	Closest Repair Kit (3.5 gpf)			Rough Brass 1-1/4" X 10" Vacuum
	P6000-EUA-WS	Urinal Repair Kit (1.5 gpf)	15G.	P6003-10-A-AA-RB	Breaker Assembly
	P6000-ECA-WS1	Low Consumption Closet Kit (1.6 gpf)			Rough Brass 3/4" X 10" Vacuum
	P6000-EUA-WS1	Low Consumption Urinal Kit (1.0 gpf)	16A.	P6000-H	Breaker Assembly
	P6000-ECA-HET	High Efficiency Closet Kit (1.28 gpf)			1 1/2" Spud Coupling Assembly
8.	<i>Varies</i>	Valve Body	16B.	P6001-H	1 1/4" Spud Coupling Assembly
9.	P6000-B	Vacuum Breaker	16C.	P6003-H	3/4" Spud Coupling Assembly
10.	PEMS6000-HYM	ZEMS Actuator	17A.	P6000-QE3-RB	Rough Brass 1 1/2" Slip Elbow
11.	PEMS6000-G	ZEMS Escutcheon			Assembly
12A.	PESS6000-22	ZEMS Closet Sensor Plate	17B.	P6000-QE3-CP	Chrome Plated 1 1/2" Slip Elbow
12B.	PESS6000-22A	ZEMS Urinal Sensor Plate			Assembly
13.	PESS6000-24	ZEMS Closet Override Button	18.	<i>Varies</i>	Chrome Plated slotless tube
14A.	PEMS6000-26	ZEMS Closet Sensor	19.	<i>Varies</i>	Rough Brass Slip Elbow
14B.	PEMS6000-26A	ZEMS Urinal Sensor			
15A.	P6000-A-AA-CP	Chrome Plated 1-1/2" X 8 1/2" Vacuum			
		Breaker Assembly			
	P6000-2-A-AA-CP	Chrome Plated 1-1/2" X 21" Vacuum			
		Breaker Assembly			
	P6000-3-A-AA-CP	Chrome Plated 1-1/2" X 24" Vacuum			
		Breaker Assembly			
15B.	P6001-A-AA-CP	Chrome Plated 1-1/4" X 8 1/2" Vacuum			



20.	P6000-K	Tailpiece Coupling Assembly	28.	P6000-VC-SS	Setscrew for Cast Wall Escutcheon
21.	P6000-C32	Locking Nut	29.	P6000-VC-W-VP	5/64 Allen Wrench
22.	P6000-C31	Tailpiece O-Ring	30.	P6000-YB	Sweat Solder Adapter
23.	P6000-C30	Snap Ring	31.	PESS6000-28	Yoke Screw
24.	<i>Varies</i>	Tailpiece	32.	PESS6000-25	Yoke
25.	<i>Varies</i>	Adjustable Tailpiece Assembly	33.	PESS6000-23	Bracket
26.	P6000-VC	Cast Wall Escutcheon	34.	PESS6000-27	Bracket Screw
27.	P6000-YB-CVR	Supply Cover Tube			



*ZURN INDUSTRIES, LLC. ♦ COMMERCIAL BRASS OPERATION ♦ 5900 ELWIN BUCHANAN DRIVE ♦ SANFORD NC 27330  
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VENDOR PART	VENDOR	DESCRIPTION	PAGE
ZEMS6000AV-HET	Zurn	1.28 Gal Motorized Fv	18

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# AquaSense AV™

## ZEMS Series

Automatic Systems Sensor-Operated  
AquaVantage Flushometer

### Installation, Operation, Maintenance and Parts Manual

Patented and Patents Pending

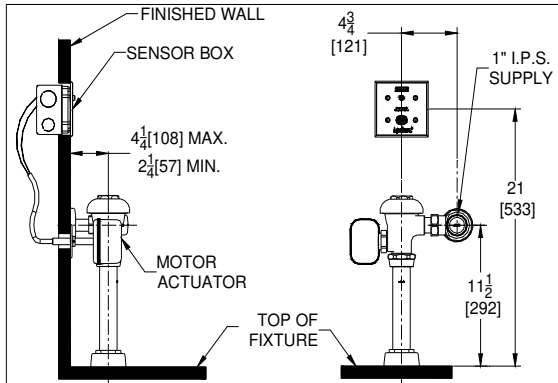
	
<p><b>Sensor-Operated Exposed Systems</b></p> <p>ZEMS6000AV ZEMS6000AV-2 ZEMS6000AV-3 ZEMS6001AV ZEMS6003AV</p>	<p><b>Sensor-Operated Concealed Systems</b></p> <p>ZEMS6140AV ZEMS6142AV ZEMS6152AV ZEMS6190AV ZEMS6195AV ZEMS6197AV</p>

**LIMITED WARRANTY**

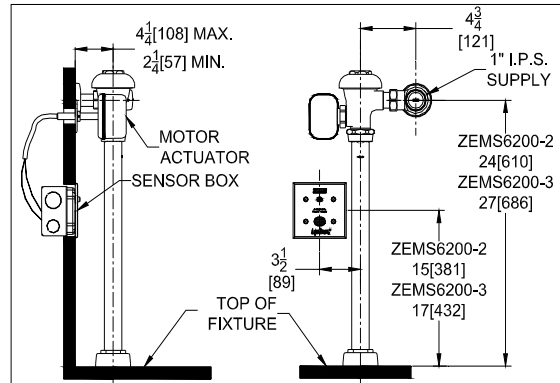
All goods sold hereunder are warranted to be free from defects in material and factory workmanship for a period of five years from the date of purchase. Decorative finishes warranted for one year. We will replace at no costs goods that prove defective provided we are notified in writing of such defect and the goods are returned to us prepaid at Sanford, NC, with evidence that they have been properly maintained and used in accordance with instructions. We shall not be responsible for any labor charges or any loss, injury or damages whatsoever, including incidental or consequential damages. The sole and exclusive remedy shall be limited to the replacement of the defective goods. Before installation and use, the purchaser shall determine the suitability of the product for his intended use and the purchaser assumes all risk and liability whatever in connection therewith. Where permitted by law, the implied warranty of merchantability is expressly excluded. If the products sold hereunder are "consumer products," the implied warranty of merchantability is limited to a period of three years and shall be limited solely to the replacement of the defective goods. All weights stated in our catalogs and lists are approximate and are not guaranteed.

### Valve Rough-In

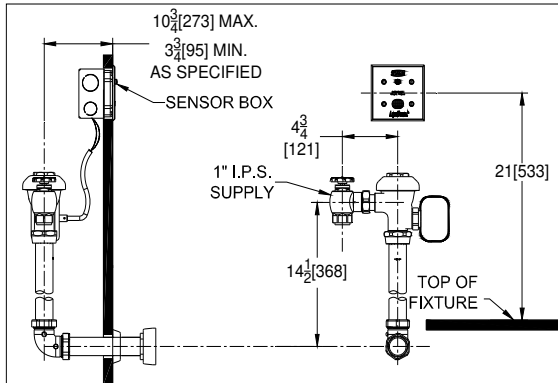
**Model ZEMS6000**



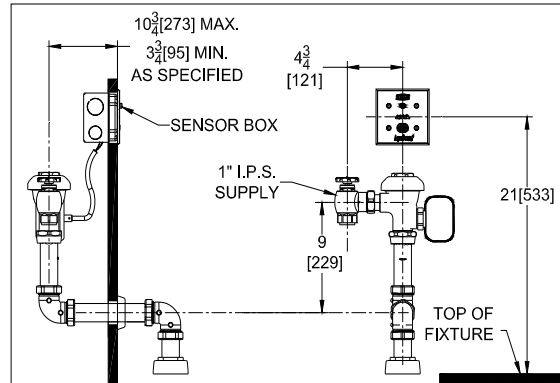
**Models ZEMS6000-2 and ZEMS6000-3**



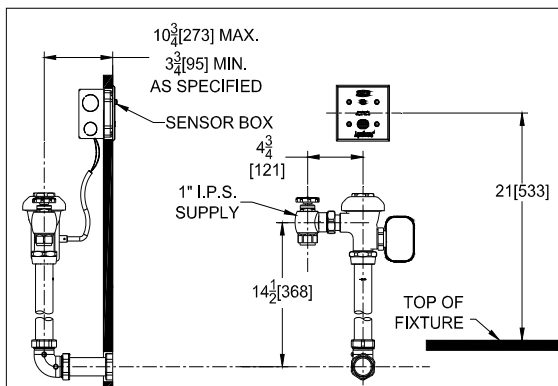
**Model ZEMS6140**



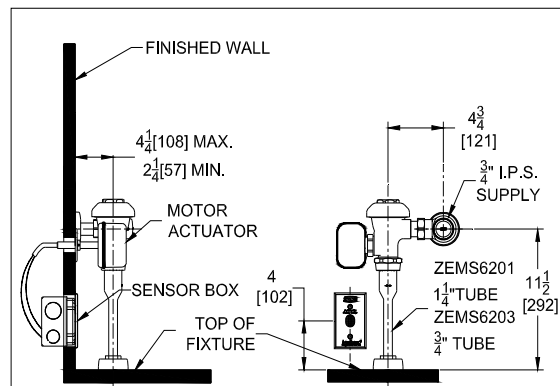
**Model ZEMS6142**



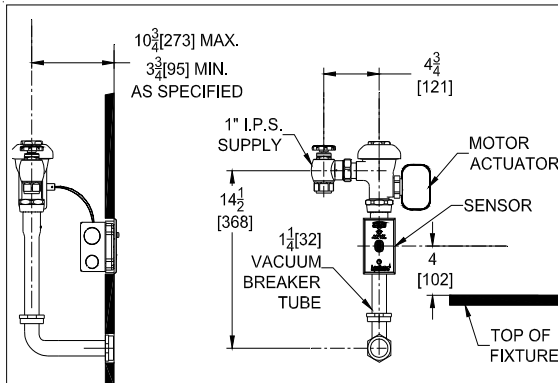
**Model ZEMS6152**



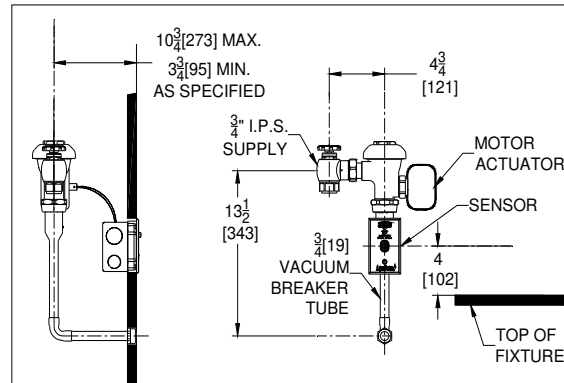
**Models ZEMS6001 and ZEMS6003**



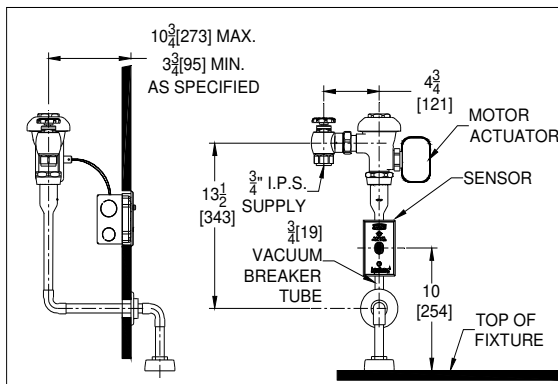
Model ZEMS6190



Model ZEMS6195



Model ZEMS6197



### PRIOR TO INSTALLATION

Prior to installing the Zurn Automatic Sensor-equipped Flushometer, install the items listed below as illustrated in Figures 1 through 3.

- 2-gang electrical box (4 x 4 x 2 1/8, use Steel City #52171-N box, and #52-C-18 device cover or equivalent for sensor with closet installs, or #52-C-14 reducing device or equivalent for sensor with urinal installs);
- Single-gang electrical outlet for plug-in power converter.
- Electrical wiring to the power converter outlet (120 VAC, 35 watts service required for each power converter used).
- Closet fixture.
- Zurn carrier system, Z1200 series or equal.

### IMPORTANT:

- All electrical wiring is to be installed in accordance with National/Local codes and regulations.
- All plumbing is to be installed in accordance with applicable codes and regulations.
- Water supply lines must be sized to provide an adequate volume of water for each fixture.
- Flush all water lines prior to making connections.
- Sensor units should not be located across from each other or in close proximity to highly reflective surfaces.
- Control Stop should never be opened to allow flow greater than fixture is capable of evacuating. In the event of valve failure, fixture must be able to handle a continuous flow.

## Electrical

### AC/DC Power Supply

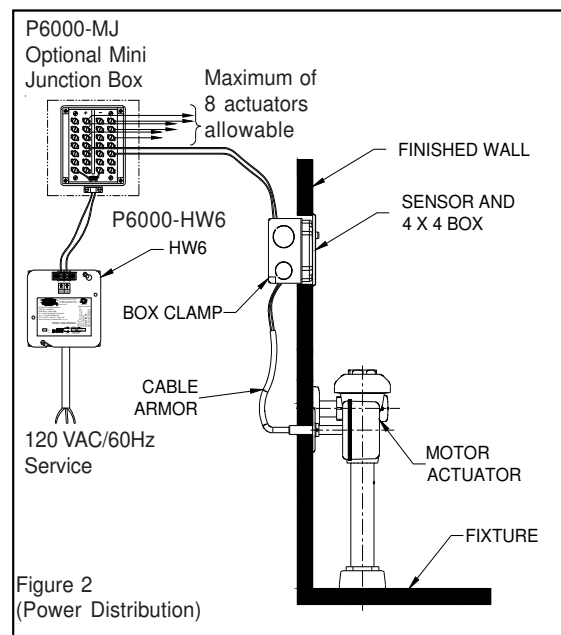
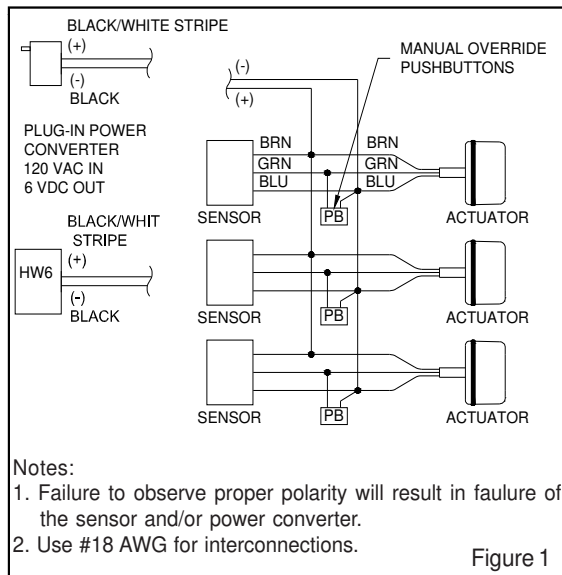
Install hardwired power supply or receptacle for the Zurn Power Converter in a convenient location. An optional mini junction box (P6000-MJ) is recommended to distribute power to each sensor location. It is also recommended that brown wire be used for the DC positive (+) of the supply and blue wire be used for the DC negative (-) of the supply. This matches the sensor and actuator wire colors.

**NOTE:** One Zurn P6000-HW6 or P6000-PC6 Power Converter can operate as many as eight Automatic Sensor equipped Flushometers. The Power Converter is supplied with a six-foot cord. If additional wire is needed from the Power Converter to the Flushometer(s), use #18 AWG for this (by others). **Do not supply power** to the Power Converter until installation of actuator, sensor and Flushometer is completed and checked. **Proper polarity must be observed or damage to one or all components will result.**

### Electrical Hook-up (Figure 1)

Be certain power is off to prevent damage to electrical components. Connect the sensor to the actuator and power converter exactly as shown in Figure 1.

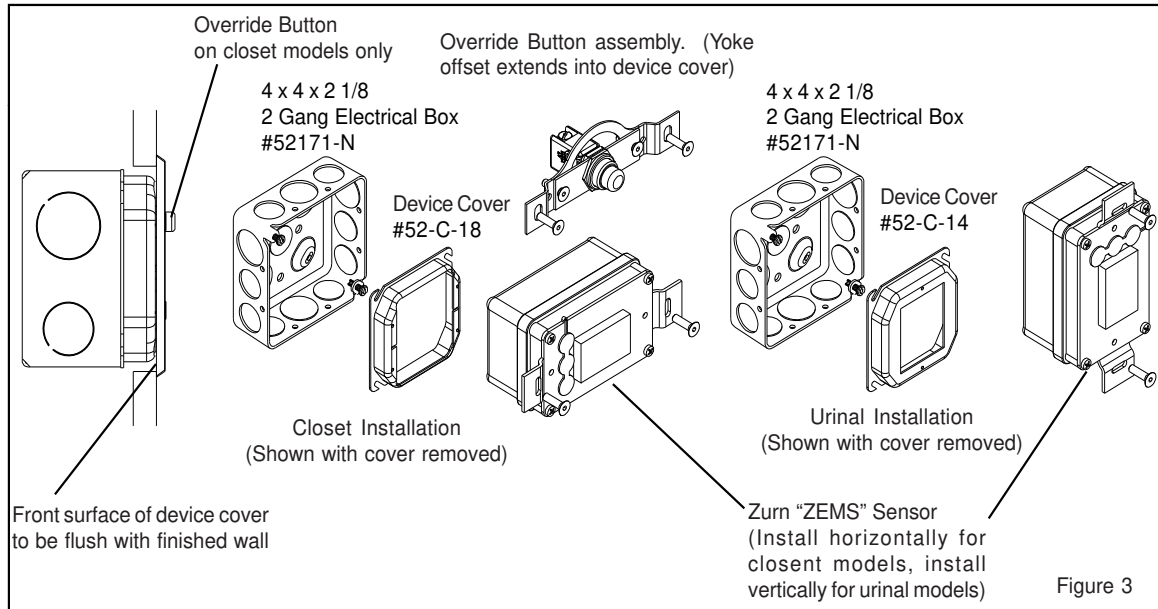
**Double check that power converter polarity is correct.**



### Sensor Installation

**Closet Models:** Install plaster ring so screw holes are on left and right side of box (as shown in Figure 3). Trim tiles to allow screw holes in plaster ring to show.

**Urinal Models:** Install reducing cover so screw holes are on top and bottom side of box (as shown in Figure 3). Trim tiles to allow screw holes in plaster ring to show.



#### STEP 1 – Locate sensor box

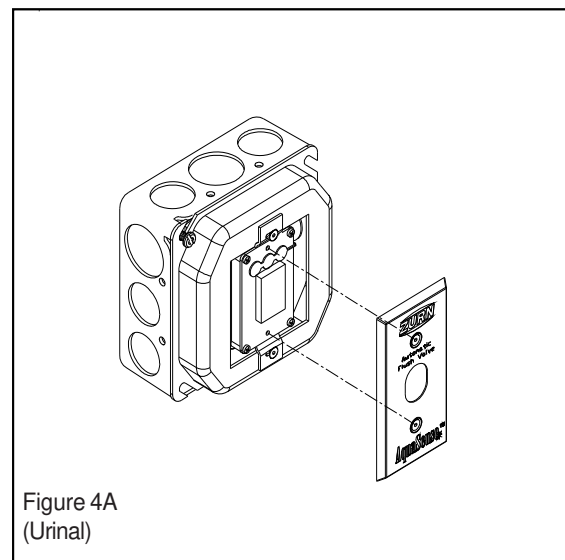
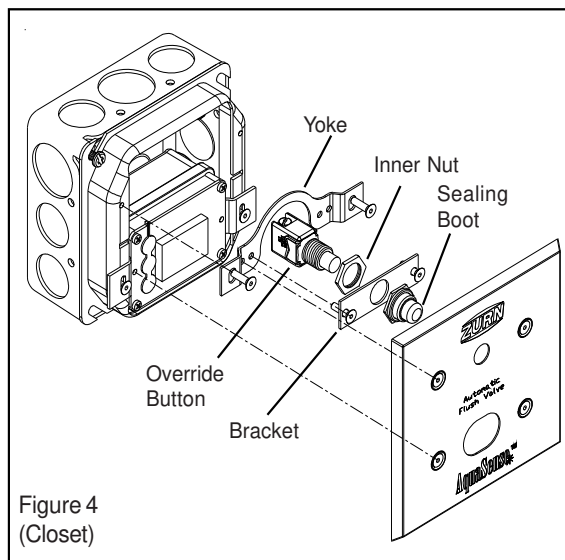
Locate sensor box in the wall according to model number as shown on pages 2 and 3.

#### STEP 2 – Mount Automatic Sensor (Figure 3)

Install the Zurn Automatic Sensor into the 2-gang electrical box using two (2) long screws provided. Ensure that wires from sensor case point up for closet installs and point to the right for urinal installs. The rubber push caps will be on the left side of the sensor for closet and at the top for urinal (See Figures 4 and 4A). The sensor lens faces outward from the finished wall.

#### STEP 3 – Mount Yoke and Override Button (Figure 4)

Install inner nut, bracket and sealing boot on threaded shaft of override push button. Mount bracket to yoke. Adjust the distance so that the override push button will protrude through the wall plate using the nuts on each side of bracket. Wire the override push button as per Figure 1. Mount the assembled yoke to the electrical box.

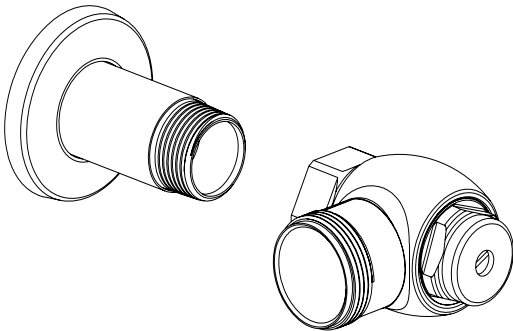


### Mechanical

The AquaVantage® design is optimized to operate between 25 and 80 psi (172 to 552 kPa) of water pressure (running). The minimum pressure required for the valve to work properly is determined by the fixture selected. Please consult fixture manufacturer for water pressure requirements. Protect the chrome or special finish of this flushometer during installation. **Do not use toothed tools to install or service the valve as this will damage the finish.** Also, see “Care and Cleaning” section of this manual.

#### Step 1

- A. Install stop valve assembly using sweat solder adapter kit if applicable. Thread sealing compounds should be used on male NPT threads only.

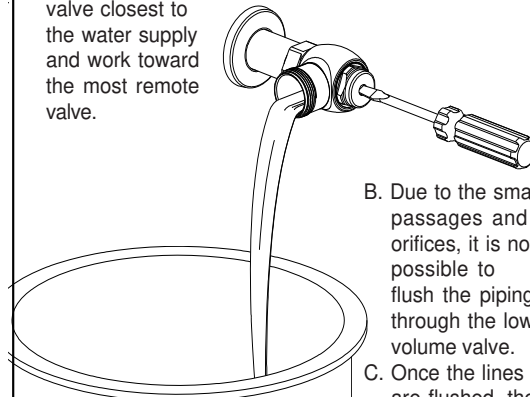


When all stops are connected to the water supply and water pressure is available, flush the supply piping to remove dirt, metal chips, etc., from system.

Figure 5

#### Step 2

- A. Before the valve is installed, open each stop fully for a brief time and catch the water in a two gallon or larger bucket. For multiple installations, start with the stop valve closest to the water supply and work toward the most remote valve.



- B. Due to the small passages and orifices, it is not possible to flush the piping through the low volume valve.  
C. Once the lines are flushed, the valve can be installed.

Figure 6

#### Step 3

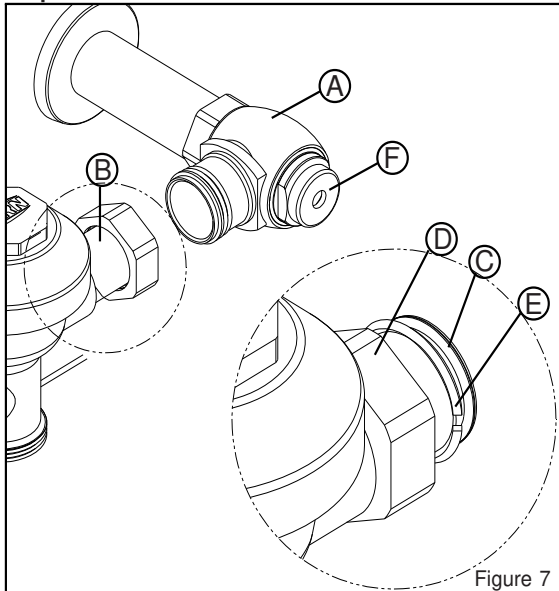


Figure 7

#### Attach Valve Body to Stop Valve

- 1.) Before the supply water is turned on, be sure all stop valves are closed off tight. The stop valves can be opened and closed by using the adjusting screw located at the center of the stop valve cap. Stop valve adjustments can only be made by using the adjusting screw. **It is not necessary to remove the stop valve cap (F) when making adjustments. If for any reason it becomes necessary to remove the stop valve cap, be certain the water is shut off at the main supply valve.**
- 2.) Prior to inserting the flush valve tailpiece (B) into stop valve (A), be certain that the O-ring seal (C) is located in O-ring seal groove at the end of the tailpiece and that the locking nut (D) and locking snap ring (E) are located as shown. Care should be taken not to damage the O-ring when inserting the tailpiece into the stop valve. If lubrication is needed, wetting the O-ring with water will be sufficient.
- 3.) Insert the flush valve tailpiece (B) into the stop valve (A) and hand tighten the lock nut (D) to the stop valve. Level the entire unit.

**Install Vacuum Breaker Flush Connection  
Models ZEMS6000, ZEMS6000-2, ZEMS6000-3, ZEMS6001,  
and ZEMS6003**

Slide the tube nut (H), spud nut (G), slip gasket, rubber gasket and spud escutcheon over the vacuum breaker tube and insert tube into fixture spud. Hand tighten tube nut to valve body and hand tighten spud nut onto fixture spud. Adjust the valve assembly for plumb. Tighten fixture spud nut (G), vacuum breaker tube nut (H) and lock nut (D) (fig. 7) with a wrench.

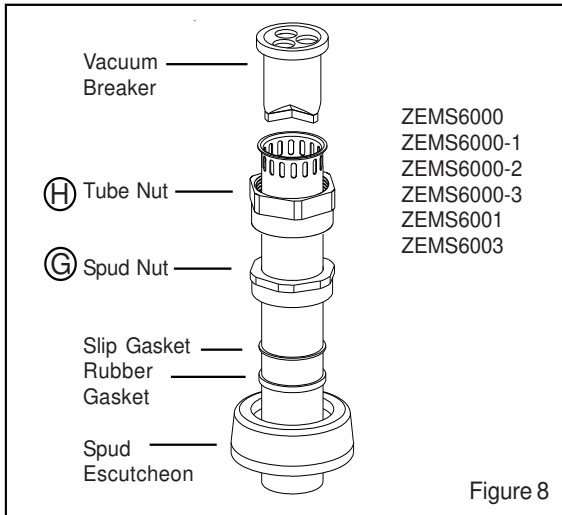


Figure 8

**Models ZEMS6140, ZEMS6142, ZEMS6152, ZEMS6190,  
ZEMS6195 and ZEMS6197 (Figure 9)**

**NOTE:** When cutting scored pipe, leave a minimum of 1-1/4" of scoring to ensure engagement with compression coupling.

Assemble pipe, elbows, couplings, slip washers, rubber gaskets and flanges as illustrated in Figure 7. Hand tighten all couplings. Once installation is completed, tighten all connections.

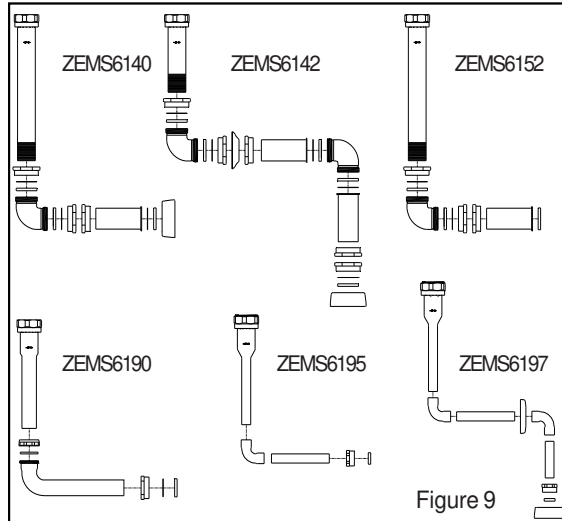


Figure 9

**Motor Actuator Installation (Figure 10)**

1. Drill 1-3/4" diameter hole per Figure 10.
2. Run "fish tape" from electrical box to 1-3/4" hole.
3. Install actuator escutcheon to the actuator pipe with setscrew toward actuator. Do not tighten setscrew at this time.
4. Pull actuator cable through hole with fish tape and back to sensor box. Secure armored cable to box with box clamp.
5. With escutcheon loose and handle port washer installed, push cable into wall. The actuator must be angled away from the valve body at this time until the actuator push rod clears the handle port flange. The actuator can now be mounted to the flush valve and tightened.
6. Push escutcheon back to wall and tighten setscrew.

**NOTE:** See Figure 2 for typical installation including optional mini junction box.

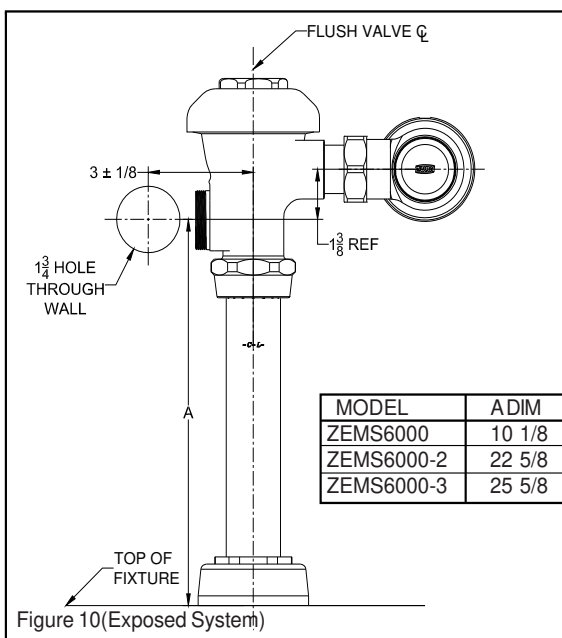


Figure 10(Exposed System)

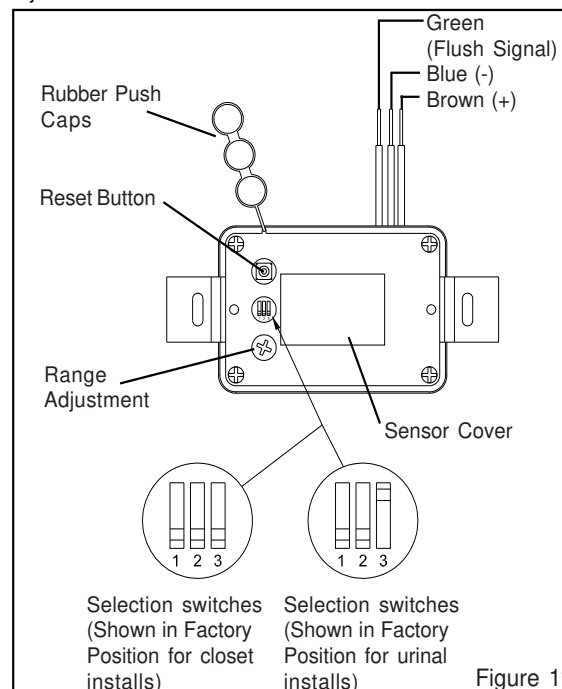


Figure 11

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### Test and Adjustment (Figure 11)

(Also see "Sensor Features")

Zurn Automatic Sensors are preset at the factory and provide the user with selectable options as follows:

Switch 1 – Automatic Flush (Factory setting is on.)

Switch 2 – Red/Green LED (Factory setting is on.)

Switch 3 – Courtesy Flush (Factory setting is on for closet.)  
(Factory setting is off for urinal)

- **Red/Green LED** – With power applied the red light will illuminate when an object is detected. The green light will momentarily illuminate after the object has been detected for a minimum of 8 seconds then leaves. The green light indicates the flushing sequence.
- **Range Adjustments** – The Zurn Automatic Sensors are factory set to operate at a range of 50". This range should be satisfactory for most installations. If the range is too short (i.e., not detecting the user) or too long, adjust the range.
- **To Make A Range Adjustment** – Remove the rubber push caps. The range adjustment is shown in Figure 12. Using a small screwdriver, turn the range adjustment clockwise to increase range (maximum range is 60") or counter clockwise to decrease range (minimum range is 12").

**Note: This adjustment device is fragile. Be careful not to apply excess force.**

**IMPORTANT NOTE:** Excessive water flow creates noise, while too little flow will not satisfy the needs of the fixture. Proper adjustment is made when:

1. The plumbing fixture is cleansed after each flush without splashing water out from the lip.
2. A quiet flushing cycle is achieved.

After adjustment: Replace the Zurn stop cap screw cover.

### CARE AND CLEANING INSTRUCTIONS

**Do not** use abrasive or chemical cleaners to clean Flushometers and actuators as they may dull the luster and attack the chrome or special decorative finishes. Use only mild soap and water, then wipe dry with a clean cloth or towel.

While cleaning the bathroom tile, the Flushometer and actuator should be protected from splattering of cleaner. Acids and cleaning fluids can discolor or remove chrome plating.

### Seasonal use.

Valves use in installations subject to shut down because of cold and freezing conditions should be maintained in the following manner. After the main supply has been shut off and the water drained from the system, remove the stop valve cap and stop internals to allow the water to drain from the flush valve and supply line.

**CAUTION:** Range adjustment rotates only 1/2 turn total from min. to max. Do not exceed this or sensor will be damaged. Stand in front of the Zurn Automatic Sensor at the desired distance; the red light will illuminate when you are within range. Repeat adjustment procedure until the desired range is obtained.

### • Switch Settings (Figure 11)

The three switches control the following options. They can be activated or deactivated by means of the switches (down is on, up is off).

**Switch 1 – Automatic Flush** – The unit will automatically flush 24 hours after last user.

**Switch 2 – Red/Green LED** – When an object is detected the Red LED illuminates. The Green LED illuminates while flushing.

**Switch 3 – Courtesy Flush** – When an object has been detected for two seconds, the unit flushes and goes into the normal mode. This is repeatable after 90 seconds.

**NOTE:** After the options have been selected the reset button **must** be pushed for sensor to accept selections. Make sure rubber push caps are securely installed after making adjustments to protect sensor from moisture.

### STEP 11 – Adjust Control Stop (Figure 6)

Adjust the control stop to meet the flow rate required for proper cleaning of the fixture. Open control stop counterclockwise one half turn from closed position. Activate Flushometer simulating a user. Adjust the control stop after each flush until the rate of flow delivered properly cleanses the fixture.

### SENSOR FEATURES (See Step 10 for instructions.)

**1. Courtesy Flush:** The Sensor will provide a courtesy flush two seconds after a person is first detected. The courtesy flush removes any residue from the fixture. The main flush will occur when the user steps away from the fixture. The courtesy flush can be manually activated/deactivated at any time.

**2. Automatic 8-Hour Flush:** The sensor will provide an automatic flush 8 hours after the last user. The automatic flush can be manually activated/deactivated at any time.

**3. Adjustable Range:** The viewing distance is adjustable from 12" to 60".

**A. Indicator Lights:** The sensor unit has two operation lights, red and green. The red light is lit when an object is detected. The green is lit when the user leaves view of the sensor and unit is flushing. The indicator lights can be manually activated/deactivated at any time.

**B. Function Light:** Abnormal reflection detection function. If an object is in the viewing range for more than 30 minutes the red LED will blink. Range readjustment may be required.

### C. Maintenance Override (For Maintenance Purposes):

The sensor may be disabled for 10 minutes by placing a magnet on the sensor lens for 3 to 5 seconds. After 10 minutes the sensor will automatically resume functioning. Placing a magnet on the sensor for one second will restore normal operation and also provide a flush. These features are often desired for cleaning purposes.



### Trouble Shooting

Problem	Possible Cause	Corrective Action
Valve will not operate.	1.) Stop valve is closed	1.) Open stop valve.
	2.) Supply valve is closed.	2.) Open supply valve.
	3) The electric wire(s) is not connected	3) Connect the wires.
	4) The surface of the infrared cover is stained.	4) Clean the surface of the sensor cover.
	5) There is a reflective surface in front of the sensor.	5) Remove the reflective surface from in front of the sensor.
	6) The detection range is not adjusted properly.	6) Adjust the detection range.
	7) Actuator fault	7) Contact distributor for replacement.
	8) Sensor fault	8) Contact distributor for replacement.
	9) No power provided by power supply	9) Replace power supply
No red LED with target in view	1) The electric wire(s) is not connected or sensor fault.	1) Connect the wires.
Green LED illuminates with target removed, but does not flush	1) Electric wire fault.	1) Verify wire connections
	2) Sensor fault	2) Replace sensor
Insufficient volume of water to adequately siphon fixture	1.) Stop valve is not open enough.	1.) Open stop valve for desired volume of water.
	2.) Urinal diaphragm installed in closet valve.	2.) Replace urinal diaphragm with proper closet piston.
	3.) Insufficient volume or pressure at supply.	3.) Consult fixture guide for minimum gallons per minute flow and running pressure for satisfactory performance.
Flush valve shuts off too quick.	1.) Damaged diaphragm.	1.) Install new P6000-ECA, P6000-EUA replacement kit.
	2.) Enlarged by-pass orifice.	1.) Install new P6000-ECA, P6000-EUA replacement kit.
Valve is short flushing	1.) Enlarged by-pass orifice.	1.) Install new P6000-ECA, P6000-EUA replacement kit.
	2.) Urinal piston installed in closet	2.) Replace urinal piston with proper closet piston.
Valve is flushing too long or not shutting off.	1.) Trip mechanism not seating properly due to foreign material between trip mechanism and seat.	1.) Disassemble parts and rinse thoroughly.
	2.) By-pass orifice is plugged or partially plugged.	2.) Examine by-pass orifice and clean if necessary being certain not to enlarge orifice opening.
	3.) Line pressure is not adequate to force trip mechanism to seal.	3.) Pressure is inadequate or has dropped below minimum operating range. Steps should be taken to increase the line pressure.
Water splashes out of fixture/	1.) Supply volume is more than is necessary.	1.) Adjust downward on control stop.
	2.) Lime accumulation on vortex or spreader holes of fixture.	2.) Remove the lime build up.
Flush is not considered quiet.	1.) Control stop may not be adjusted for quiet operation.	1.) Adjust the control stop for quiet operation keeping in mind the fixture evacuation requirements.
	2.) Fixture may be contributing to noise.	2.) Check noise created by fixture by placing a cover over the bowl opening to separate valve noise from bowl noise. If it is determined the fixture is too noisy, consult with fixture manufacturer.
	3.) Piping system may be source of noise.	3.) High pressure in the system can sometimes be controlled by the stop valve. Other sources of noise may be the absence of air chamber and shock arrestors, loose pipes, improper size pipes, etc. In these cases the building engineer should be consulted.

**Care of Chrome plated surfaces.**

The suggested cleaning of chrome plated surfaces is simply to clean them with soap and water then dry. Commercial cleaning compounds are never recommended.

**Seasonal use.**

Valves used in installations subject to shut down because of cold and freezing conditions should be maintained in the following manner. After the main supply has been shut off and the water drained from the system, remove the stop valve cap and stop internals to allow the water to drain from the flush valve and supply line.

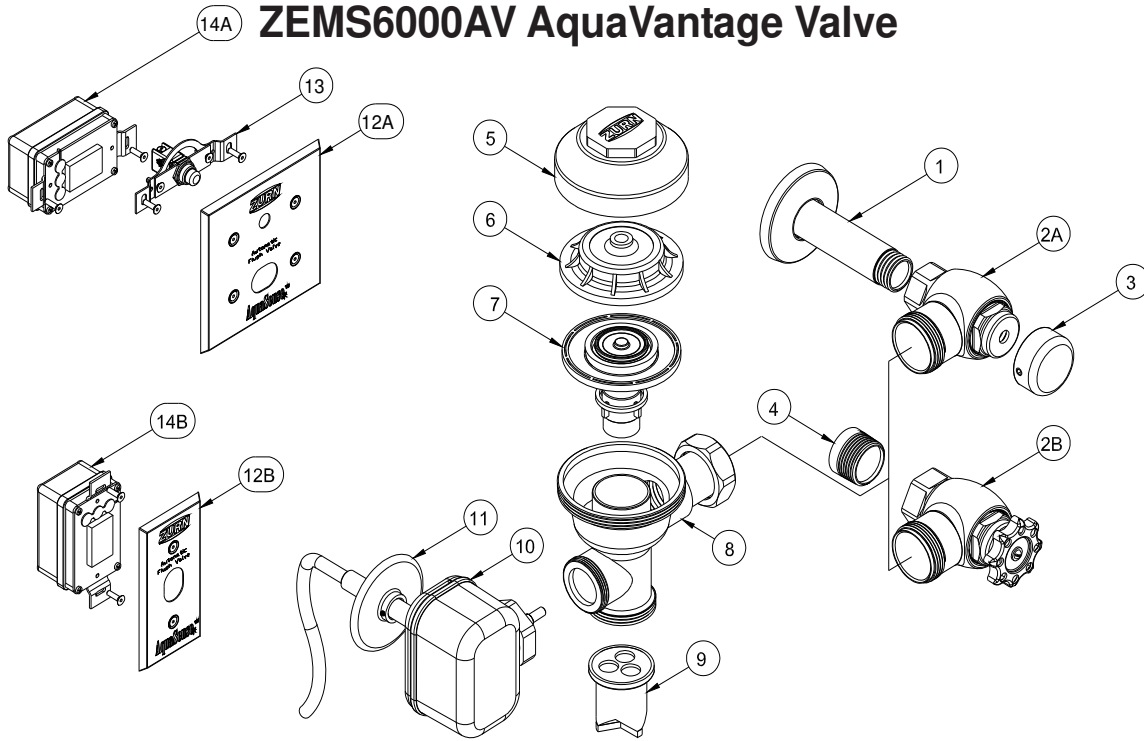
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## ZEMS6000AV AquaVantage Valve

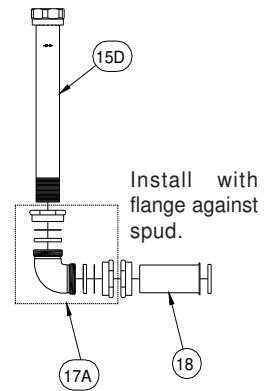
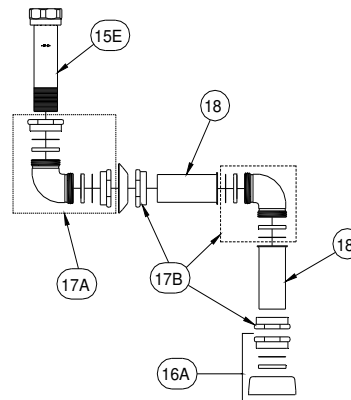
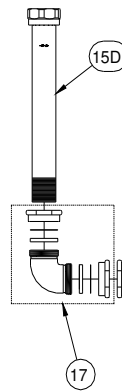


ZEMS6140

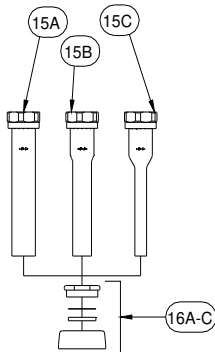
ZEMS6142

ZEMS6152

ZEMS6000  
ZEMS6000-1  
ZEMS6000-2  
ZEMS6000-3  
ZEMS6001  
ZEMS6003



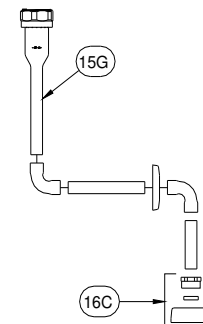
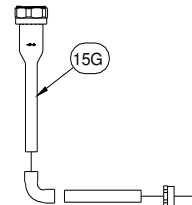
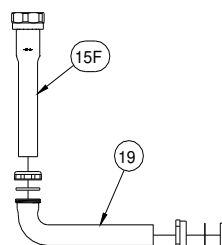
Install with  
flange against  
spud.



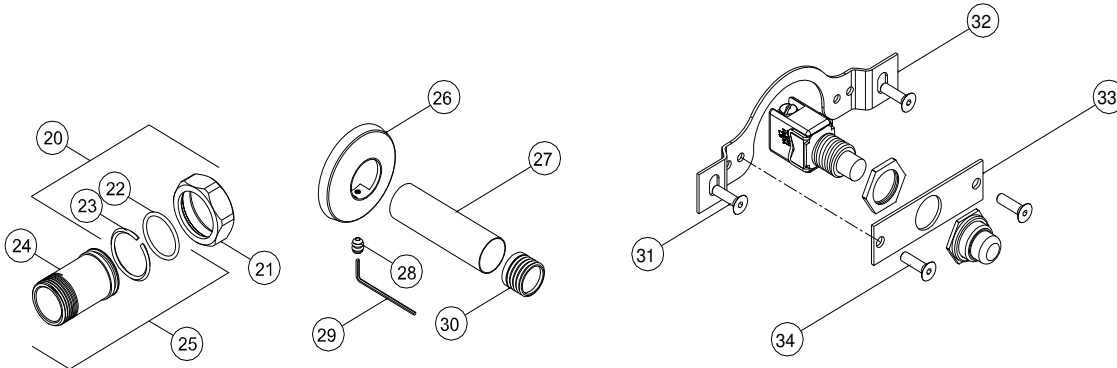
ZEMS6190

ZEMS6195

ZEMS6197



1.	P6000-YBYC	Cast Wall Escutcheon & Solder Kit	15C.	P6003-A-AA-CP	Breaker Assembly
2A.	P6000-D-SD	Stop Assembly			Chrome Plated 3/4" X 8 1/2" Vacuum
2B.	P6000-D-WH	Stop Assembly for Wheel Handle	15D.	P6000-1-A-AA-RB	Breaker Assembly
3.	P6000-VC	Vandal-Resistant Control Stop Cover			Rough Brass 1-1/2" X 12 1/2" Vacuum
4.	P6000-YBA	Sweat Solder Adapter	15E.	P6000-A-AA-RB	Breaker Assembly
5.	P6000-LL-CP	Valve Body Outside Cover			Rough Brass 1-1/2" X 5" Vacuum
6.	P6000-L	Valve Body Inside Cover	15F.	P6001-10-A-AA-RB	Breaker Assembly
7.	P6000-ECA-WS	Closest Repair Kit (3.5 gpf)			Rough Brass 1-1/4" X 10" Vacuum
	P6000-EUA-WS	Urinal Repair Kit (1.5 gpf)	15G.	P6003-10-A-AA-RB	Breaker Assembly
	P6000-ECA-WS1	Low Consumption Closet Kit (1.6 gpf)			Rough Brass 3/4" X 10" Vacuum
	P6000-EUA-WS1	Low Consumption Urinal Kit (1.0 gpf)	16A.	P6000-H	Breaker Assembly
	P6000-ECA-HET	High Efficiency Closet Kit (1.28 gpf)			1 1/2" Spud Coupling Assembly
8.	<i>Varies</i>	Valve Body	16B.	P6001-H	1 1/4" Spud Coupling Assembly
9.	P6000-B	Vacuum Breaker	16C.	P6003-H	3/4" Spud Coupling Assembly
10.	PEMS6000-HYM	ZEMS Actuator	17A.	P6000-QE3-RB	Rough Brass 1 1/2" Slip Elbow
11.	PEMS6000-G	ZEMS Escutcheon			Assembly
12A.	PESS6000-22	ZEMS Closet Sensor Plate	17B.	P6000-QE3-CP	Chrome Plated 1 1/2" Slip Elbow
12B.	PESS6000-22A	ZEMS Urinal Sensor Plate			Assembly
13.	PESS6000-24	ZEMS Closet Override Button	18.	<i>Varies</i>	Chrome Plated slotless tube
14A.	PEMS6000-26	ZEMS Closet Sensor	19.	<i>Varies</i>	Rough Brass Slip Elbow
14B.	PEMS6000-26A	ZEMS Urinal Sensor			
15A.	P6000-A-AA-CP	Chrome Plated 1-1/2" X 8 1/2" Vacuum			
		Breaker Assembly			
	P6000-2-A-AA-CP	Chrome Plated 1-1/2" X 21" Vacuum			
		Breaker Assembly			
	P6000-3-A-AA-CP	Chrome Plated 1-1/2" X 24" Vacuum			
		Breaker Assembly			
15B.	P6001-A-AA-CP	Chrome Plated 1-1/4" X 8 1/2" Vacuum			



20.	P6000-K	Tailpiece Coupling Assembly	28.	P6000-VC-SS	Setscrew for Cast Wall Escutcheon
21.	P6000-C32	Locking Nut	29.	P6000-VC-W-VP	5/64 Allen Wrench
22.	P6000-C31	Tailpiece O-Ring	30.	P6000-YB	Sweat Solder Adapter
23.	P6000-C30	Snap Ring	31.	PESS6000-28	Yoke Screw
24.	<i>Varies</i>	Tailpiece	32.	PESS6000-25	Yoke
25.	<i>Varies</i>	Adjustable Tailpiece Assembly	33.	PESS6000-23	Bracket
26.	P6000-VC	Cast Wall Escutcheon	34.	PESS6000-27	Bracket Screw
27.	P6000-YB-CVR	Supply Cover Tube			



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Phone: 1-800-997-3876 ♦ Fax: 919-775-3541 ♦ World Wide Web: [www.zurn.com](http://www.zurn.com)

In Canada: ZURN INDUSTRIES LIMITED ♦ 3544 Nashua Drive ♦ Mississauga, Ontario L4V1L2 ♦ Phone: 905-405-8272 Fax: 905-405-1292



FV38 Rev. D 2/27/12  
Page 12



VENDOR PART	VENDOR	DESCRIPTION	PAGE
ZEMS6003AV-ULF	Zurn	Zurn AquaVantage AV high efficiency 0.125 gpf flush valve for use with ultra low flow urinals	31



**AquaSense®**  
**ZEMS G2 Series**  
**Automatic Systems Sensor-Operated**  
**Flushometer**  
**Installation, Operation, Maintenance**  
**and Parts Manual**

			
<b>Sensor-Operated Exposed Systems</b>		<b>Sensor-Operated Concealed Systems</b>	
<b>ZEMS6000AV</b>	<b>ZEMS6200AV-3</b>	<b>ZEMS6140AV</b>	<b>ZEMS6190AV</b>
<b>ZEMS6200AV</b>	<b>ZEMS6001AV</b>	<b>ZEMS6240AV</b>	<b>ZEMS6290AV</b>
<b>ZEMS6000AV-2</b>	<b>ZEMS6201AV</b>	<b>ZEMS6152AV</b>	<b>ZEMS6195AV</b>
<b>ZEMS6200AV-2</b>	<b>ZEMS6003AV</b>	<b>ZEMS6252AV</b>	<b>ZEMS6295AV</b>
<b>ZEMS6000AV-3</b>	<b>ZEMS6203AV</b>	<b>ZEMS6153AV</b>	<b>ZEMS6197AV</b>
		<b>ZEMS6253AV</b>	<b>ZEMS6297AV</b>

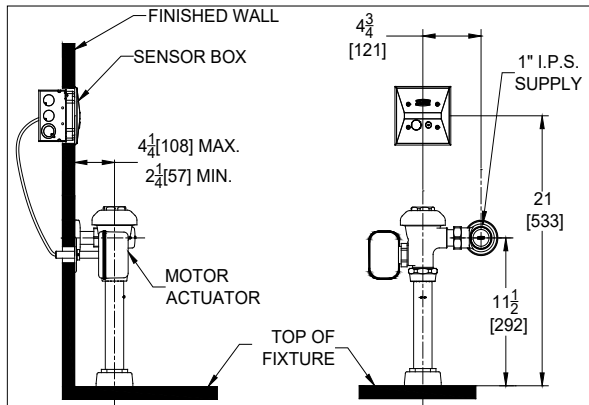
- ⚠ **WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)
- ⚠ **ADVERTENCIA:** Cáncer y daño reproductivo - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)
- ⚠ **AVERTISSEMENT:** Cancer et effets néfastes sur la reproduction - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

**LIMITED WARRANTY**

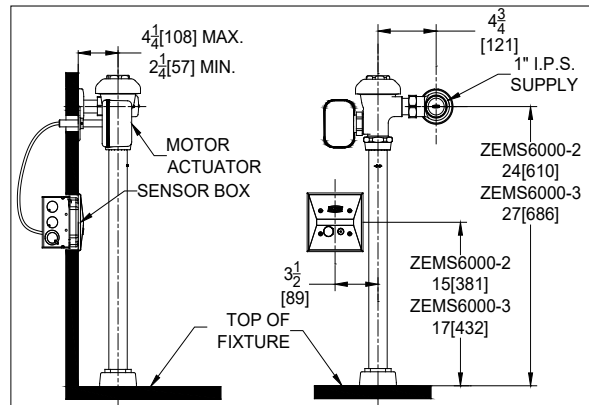
All goods sold hereunder are warranted to be free from defects in material and factory workmanship for a period of five years from the date of purchase. Decorative finishes warranted for one year. We will replace at no costs goods that prove defective provided we are notified in writing of such defect and the goods are returned to us prepaid at Sanford, NC, with evidence that they have been properly maintained and used in accordance with instructions. We shall not be responsible for any labor charges or any loss, injury or damages whatsoever, including incidental or consequential damages. The sole and exclusive remedy shall be limited to the replacement of the defective goods. Before installation and use, the purchaser shall determine the suitability of the product for his intended use and the purchaser assumes all risk and liability whatever in connection therewith. Where permitted by law, the implied warranty of merchantability is expressly excluded. If the products sold hereunder are "consumer products," the implied warranty of merchantability is limited to a period of three years and shall be limited solely to the replacement of the defective goods. All weights stated in our catalogs and lists are approximate and are not guaranteed.

**Valve Rough-In**

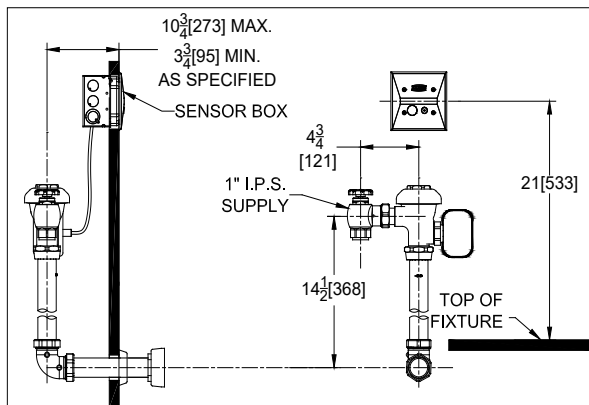
**Models**  
**ZEMS6000 and ZEMS6200**



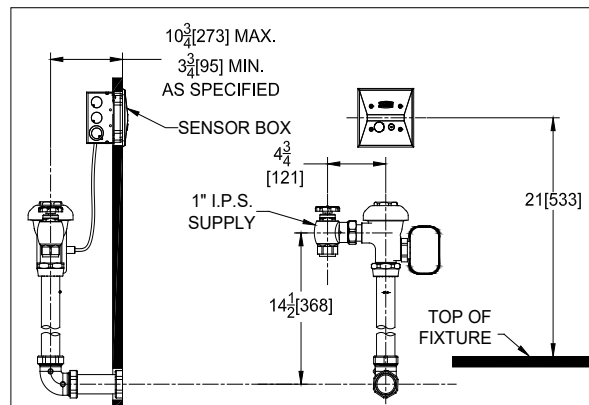
**Models**  
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**ZEMS6200-2, ZEMS6200-3**



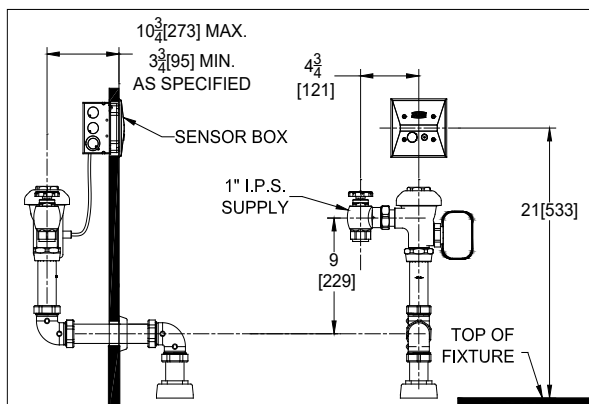
**Models**  
**ZEMS6140 and ZEMS6240**



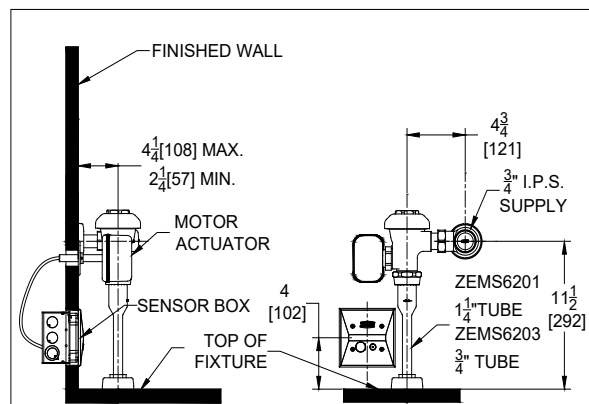
**Models**  
**ZEMS6152 and ZEMS6252**



**Models**  
**ZEMS6153 and ZEMS6253**



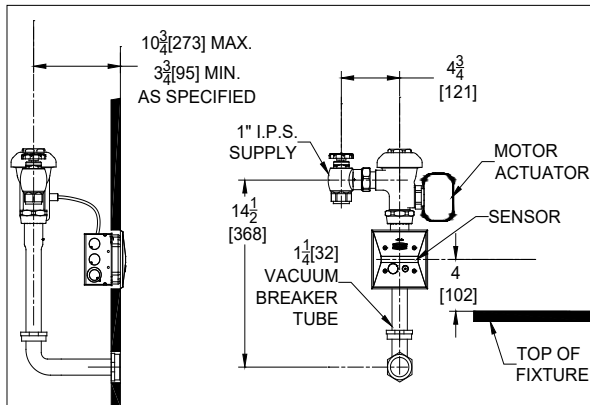
**Models**  
**ZEMS6001, ZEMS6003**  
**ZEMS6201, ZEMS6203**



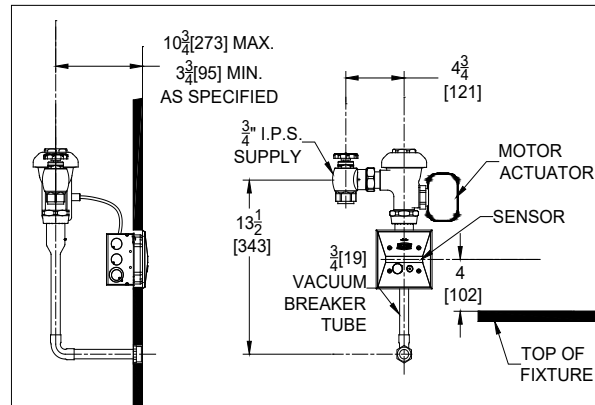
**NOTES:**  
**FOR INSTALLATIONS WITH GRAB BAR, CENTERLINE OF 4 X 4 BOX MUST BE A MINIMUM OF 4 INCHES ABOVE CENTERLINE OF GRAB BAR.**

## Valve Rough-In (Continued)

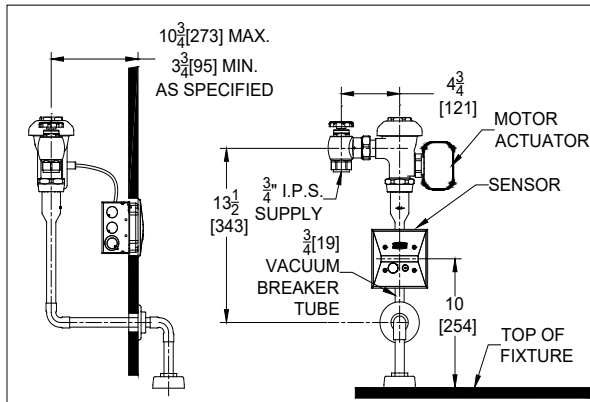
**Models**  
**ZEMS6190 and ZEMS6290**



**Models**  
**ZEMS6195 and ZEMS6295**



**Models**  
**ZEMS6197 and ZEMS6297**



## Prior to Installation

Prior to installing the Zurn Automatic Sensor-equipped Flushometer, install the items listed below as illustrated in Figures 1 through 3.

- 2-gang electrical box (4 x 4 x 2 1/8, use Steel City #52171-N box, and #52-C-18 device cover or equivalent for sensor with closet or urinal installs);
- Optional: Single-gang electrical outlet for plug-in power converter.
- Electrical wiring to the power converter outlet (120 VAC, 35 watts service required for each power converter used).
- Closet fixture.
- Zurn carrier system, Z1200 series or equal.

### Important:

- **ALL ELECTRICAL WIRING IS TO BE INSTALLED IN ACCORDANCE WITH NATIONAL/LOCAL CODES AND REGULATIONS.**
- **ALL PLUMBING IS TO BE INSTALLED IN ACCORDANCE WITH APPLICABLE CODES AND REGULATIONS.**
- **WATER SUPPLY LINES MUST BE SIZED TO PROVIDE AN ADEQUATE VOLUME OF WATER FOR EACH FIXTURE.**
- **FLUSH ALL WATER LINES PRIOR TO MAKING CONNECTIONS.**
- **SENSOR UNITS SHOULD NOT BE LOCATED ACROSS FROM EACH OTHER OR IN CLOSE PROXIMITY TO HIGHLY REFLECTIVE SURFACES.**
- **CONTROL STOP SHOULD NEVER BE OPENED TO ALLOW FLOW GREATER THAN FIXTURE IS CAPABLE OF EVACUATING. IN THE EVENT OF VALVE FAILURE, FIXTURE MUST BE ABLE TO HANDLE A CONTINUOUS FLOW.**

## Electrical

### AC/DC Power Supply

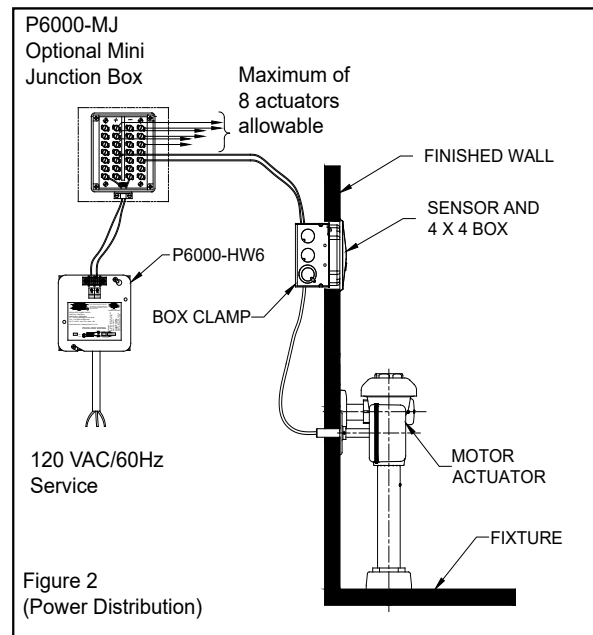
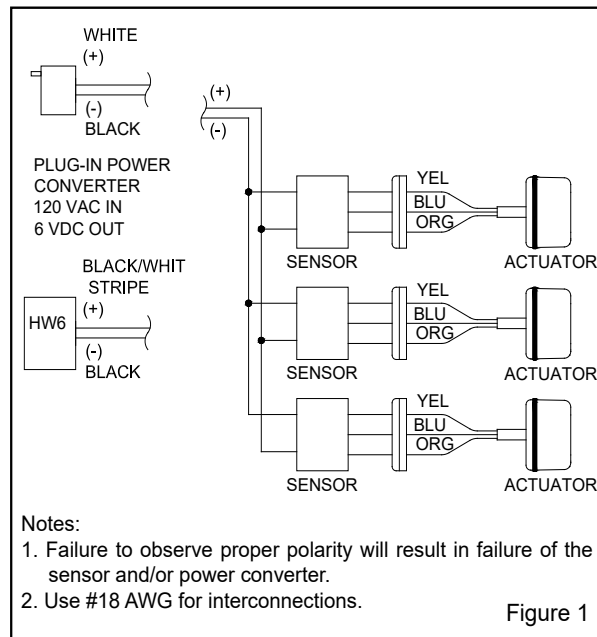
Install hardwired power supply (P6000-HW6) or receptacle for the Zurn Power Converter (P6900-ACA-BA) in a convenient location. An optional mini junction box (P6000-MJ) is recommended to distribute power to each sensor location.

**NOTE:** One Zurn P6000-HW6 can operate up to eight automatic sensor equipped flushometers, and the optional P6000-ACA-BA Power Converter can handle up to six flushometers and is supplied with a six-foot cord. If additional wire is needed from the Power Converter to the Flushometer(s), use #18 AWG (not provided). **Do not supply power** to the Power Converter until installation of actuator, sensor and Flushometer is completed and checked. **Proper polarity must be observed or damage to one or all components will result.**

### Electrical Hook-up (Figure 1)

Be certain power is off to prevent damage to electrical components. Connect the sensor to the actuator and power converter exactly as shown in Figure 1.

**Double check that power converter polarity is correct.**



## Sensor Installation

### STEP 1 – Locate Sensor Box

Locate sensor box in the wall according to model number as shown on pages 2 and 3. Install plaster ring so screw holes are on left and right side of box (as shown in Figure 3). Trim tiles to allow screw holes in plaster ring to show.

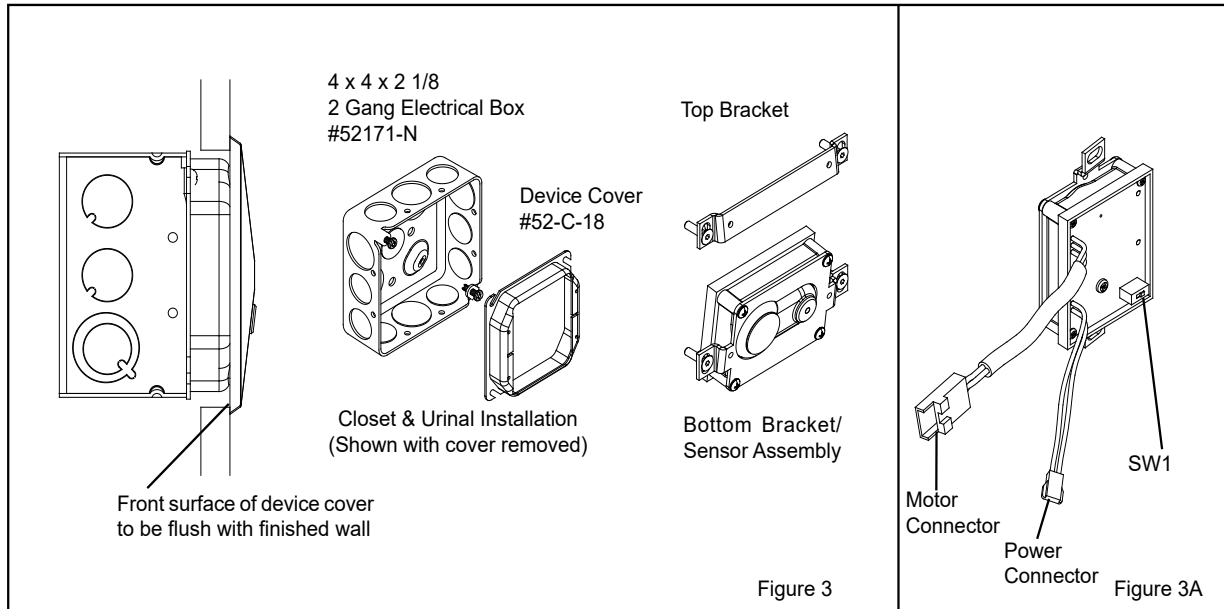
Note: Product is configured at time of shipment for a 168 hour trap seal flush (SW1 in OFF position on rear of sensor). If a 48 hour trap seal flush is desired, set SW1 to ON position. (Figure 3A)

### STEP 2 – Mount Automatic Sensor (Figure 3)

Install the Zurn Automatic Sensor into the lower half of the 2-gang electrical box using two (2) screws provided. Connect the 2-wire power cable and 3-wire actuator cable to sensor. Connectors are keyed to insure correct polarity. Ensure that the sensor is mounted in the orientation shown (with lens angled downward, see Figure 4).

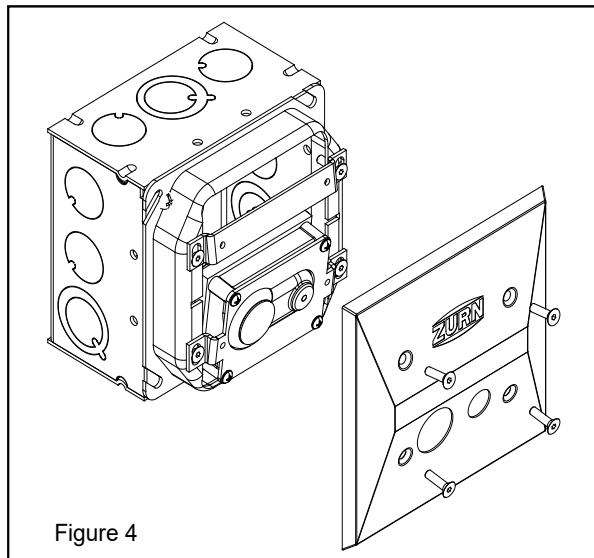
### STEP 3 – Install Top Bracket (Figure 3)

Fasten the Top Bracket to the electrical box using (2) screws provided. Ensure that bracket is mounted in the orientation shown (with face angled upward, see Figure 4).



### STEP 4 – Install Cover Plate (Figure 4)

Perform a trial fit of the Cover Plate and adjust positions of the sensor and top bracket as needed to ensure alignment of sensor lens, button, and cover screws. Fasten Cover Plate with (4) screws provided.



## Mechanical

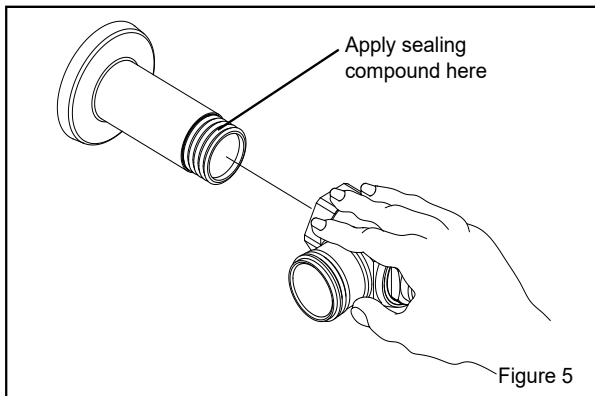
The AquaVantage® design is optimized to operate between 25 and 80 psi (172 to 552 kPa) of water pressure (running). The minimum pressure required for the valve to work properly is determined by the fixture selected. Please consult fixture manufacturer for water pressure requirements. Protect the chrome or special finish of this flushometer during installation. **Do not use toothed tools to install or service the valve as this will damage the finish.** Also, see “Care and Cleaning” section of this manual.

## Control Stop Installation Instructions

### STEP 1

Install control stop assembly by threading it onto water supply pipe and tightening with a smooth jawed wrench. Apply thread sealing compound or pipe tape to male NPT thread on sweat solder adapter only. See Figure 5.

Prior to turning on main water supply line ensure all stop valves are closed off tight by using a flathead screwdriver and turning the stop valve adjustment screw clockwise.

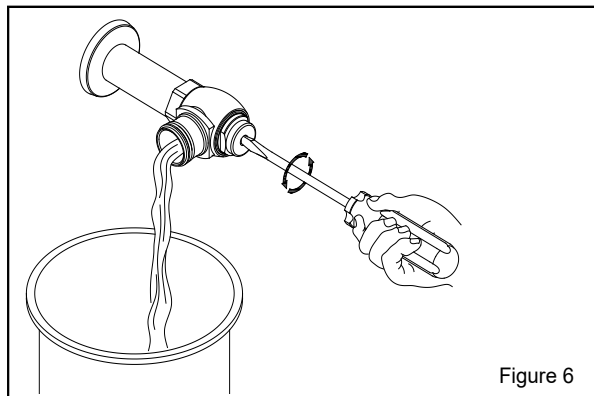


### STEP 2

When all stop valves are properly connected to the water supply line and water pressure is available open the control stop using a flathead screwdriver and turning the stop valve adjustment screw counter clockwise. See Figure 6.

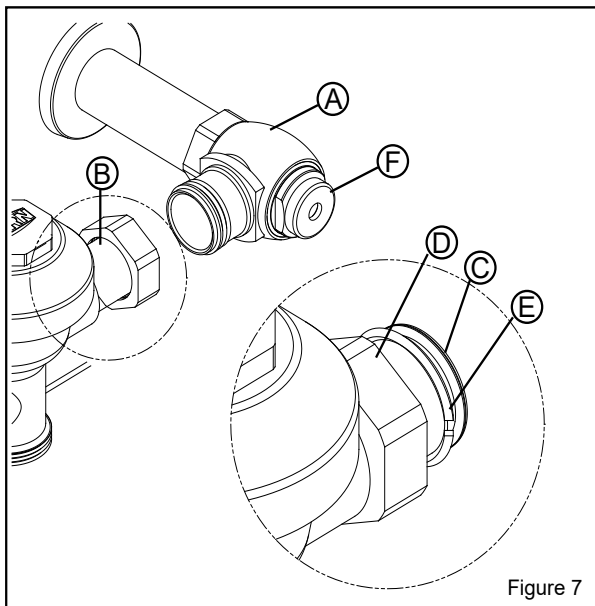
Allow the water supply line to flush any debris or sediment that may be present in the line.

Close the control stop once the lines are completely flushed.



## Flush Valve Installation

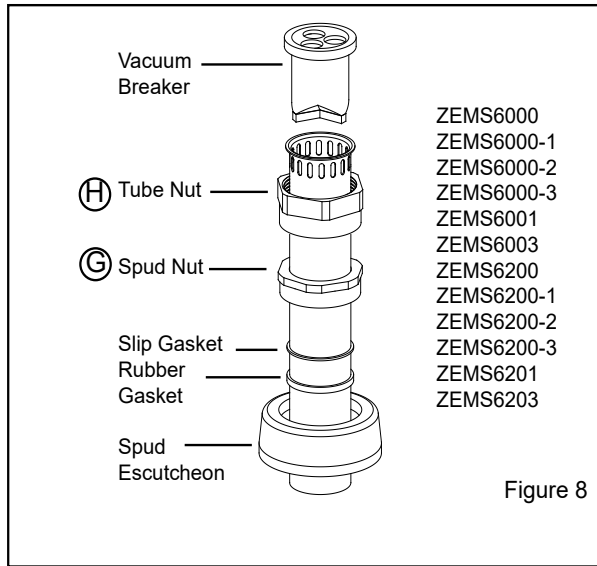
Prior to attaching flush valve to control inspect and verify that the O-ring seal is located within the O-ring groove at the tailpiece. Ensure the locking nut and locking snap ring are also present on the tailpiece. See Figure 7. Lubricate O-ring with water if necessary and insert flush valve tailpiece into the control stop valve. Tighten locking nut using a smooth jawed wrench.



## Install Vacuum Breaker Flush Connection

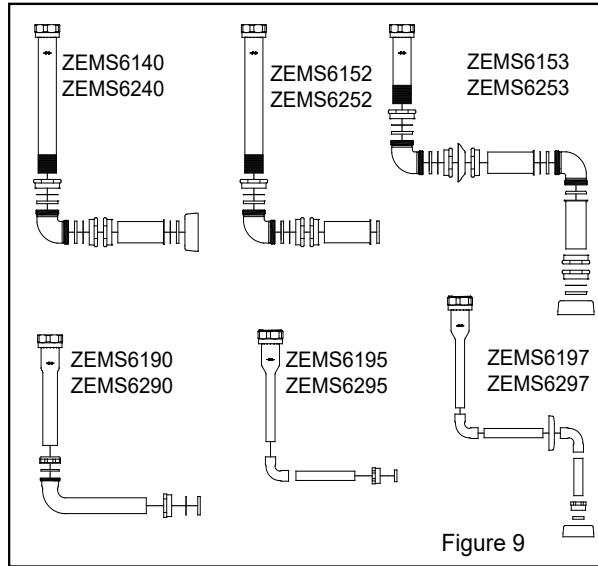
**Models ZEMS6000, ZEMS6000-2, ZEMS6000-3, ZEMS6001, ZEMS6003, ZEMS6200, ZEMS6200-2, ZEMS6200-3, ZEMS6201, and ZEMS6203**

Slide the tube nut (H), spud nut (G), slip gasket, rubber gasket and spud escutcheon over the vacuum breaker tube and insert tube into fixture spud. Hand tighten tube nut to valve body and hand tighten spud nut onto fixture spud. Adjust the valve assembly for plumb. Tighten fixture spud nut (G), vacuum breaker tube nut (H) and lock nut (D) (fig. 7 & 8) with a wrench.



**Models ZEMS6140, ZEMS6152, ZEMS6153, ZEMS6190, ZEMS6195, ZEMS6197, ZEMS6240, ZEMS6252, ZEMS6253, ZEMS6290, ZEMS6295 and ZEMS6297 (Figure 9)**

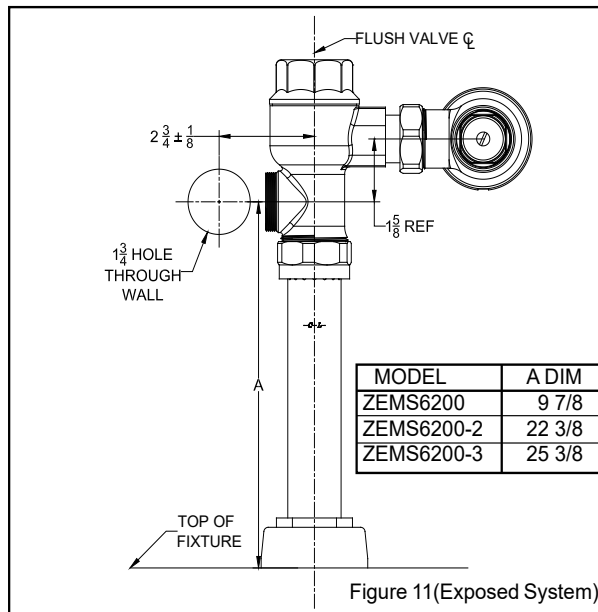
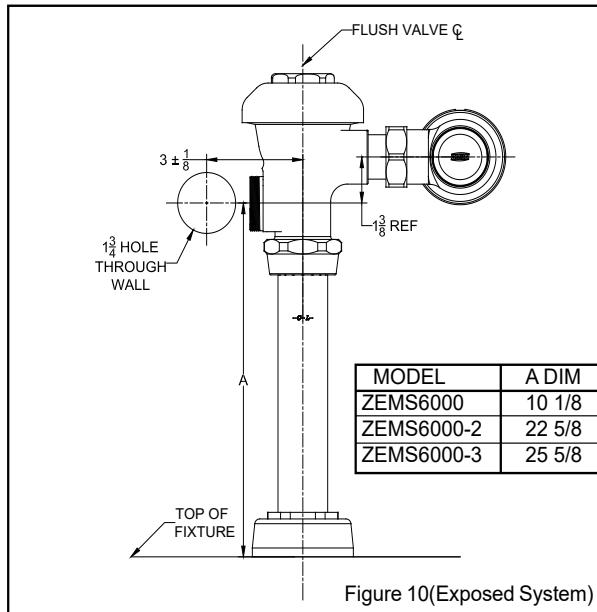
**NOTE:** When cutting scored pipe, leave a minimum of 1-1/4" of scoring to ensure engagement with compression coupling. Assemble pipe, elbows, couplings, slip washers, rubber gaskets and flanges as illustrated in Figure 9. Hand tighten all couplings. Once installation is completed, tighten all connections.



## Motor Actuator Installation

1. Drill 1-3/4" diameter hole per Figures 10 or 11.
2. Run "fish tape" from electrical box to 1-3/4" hole.
3. Install actuator escutcheon to the actuator pipe with setscrew toward actuator. Do not tighten setscrew at this time.
4. Pull actuator cable through hole with fish tape and back to sensor box. Secure cable to box with box clamp.
5. With escutcheon loose and handle port washer installed, push cable into wall. The actuator must be angled away from the valve body at this time until the actuator push rod clears the handle port flange. The actuator can now be mounted to the flush valve and tightened.
6. Push escutcheon back to wall and tighten setscrew.

**NOTE:** See Figure 2 for typical installation including optional mini junction box.



## Customized Sensor Range Setting

The ZEMS is factory set to accommodate most closet and urinal installations. If this factory setting does not accommodate your specific environment, follow steps below to customize your range settings for your specific ZEMS model.

### CALIBRATION INSTRUCTIONS FOR ZEMS G2

1. Obtain a target. SEE FIGURE 12.
2. PRESS and HOLD button for 10 seconds or until the LED turns solid.  
(\*Unit will blink four times and flush once while button is being held)
3. RELEASE finger after LED turns solid.
4. PRESS and HOLD button when LED starts blinking.
5. RELEASE finger when LED turns solid.
6. Set target at desired distance, (No less than 16") from sensor face and verify NO other objects are in view of sensor face.
7. Keep target steady - Unit will blink while calibrating.
8. After 30 seconds, calibration ends with a fast double blink or a solid LED for 5 seconds.
9. IF THE LED REMAINS SOLID FOR 5 SECONDS AFTER CALIBRATION, the calibration was NOT successful. REPEAT STEPS 2-8
10. For closet installations continue to "VERIFY CALIBRATION FOR CLOSET INSTALLATIONS".

### Verify Calibration for Closet Installations

1. Stand outside closet stall and close door and verify that sensor does not see stall door. If LED blink/flashes, recalibrate to a shorter range.
2. Slowly open door to closet stall while looking at ZEMS-IS sensor.
3. If led blinks while door is opening, recalibrate to a shorter range.  
FAILURE TO DO SO WILL RESULT IN GHOST FLUSHING.

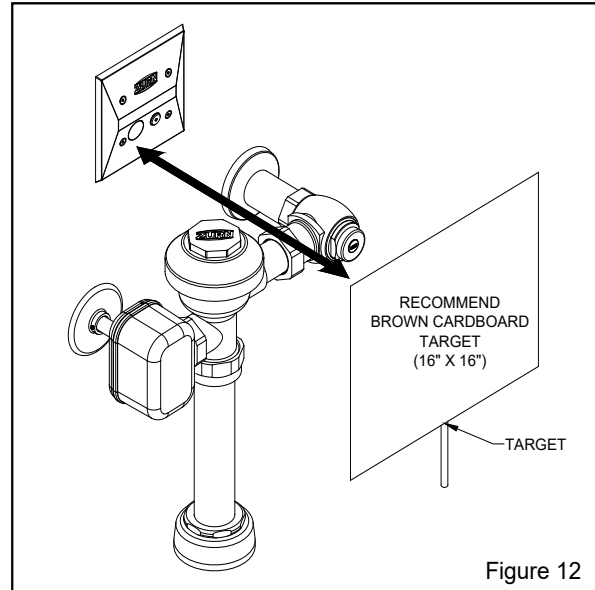


Figure 12

### Activating the Motor Actuator with the Sensor

To activate the motor actuator with the sensor, simply place a target in front of the sensor. A single red light will flash indicating the sensor has recognized the target. If the target stays in view for eleven seconds, two flashing red lights will occur. This indicates that the target has been in view for the required time and upon leaving the view, a signal will be sent to the motor actuator to flush the flush valve. NOTE: If the target does not stay in view for the required eleven seconds, a flush will not occur.

**IMPORTANT NOTE:** Excessive water flow creates noise, while too little flow will not satisfy the needs of the fixture. Proper adjustment is made when:

1. The plumbing fixture is cleansed after each flush without splashing water out from the lip.
2. A quiet flushing cycle is achieved.

After adjustment: Replace the Zurn stop cap screw cover.

### Care and Cleaning Instructions

**Do not** use abrasive or chemical cleaners to clean Flushometers, sensor, and actuators as they may degrade the sensor lens, dull the luster, and attack the chrome or special decorative finishes. Use only mild soap and water, then wipe dry with a clean cloth or towel.

While cleaning the bathroom tile, the Flushometer and actuator should be protected from splattering of cleaner. Do not use acids and cleaning fluids as they can damage the optics lens and chrome plating.

### Seasonal use.

Valves that are used in installations subject to shut down because of cold and freezing conditions should be maintained in the following manner.

1. Shut off the main supply.
2. Drained water.
3. Remove the stop valve cap and stop internals to allow the water to drain from the flush valve and supply line.

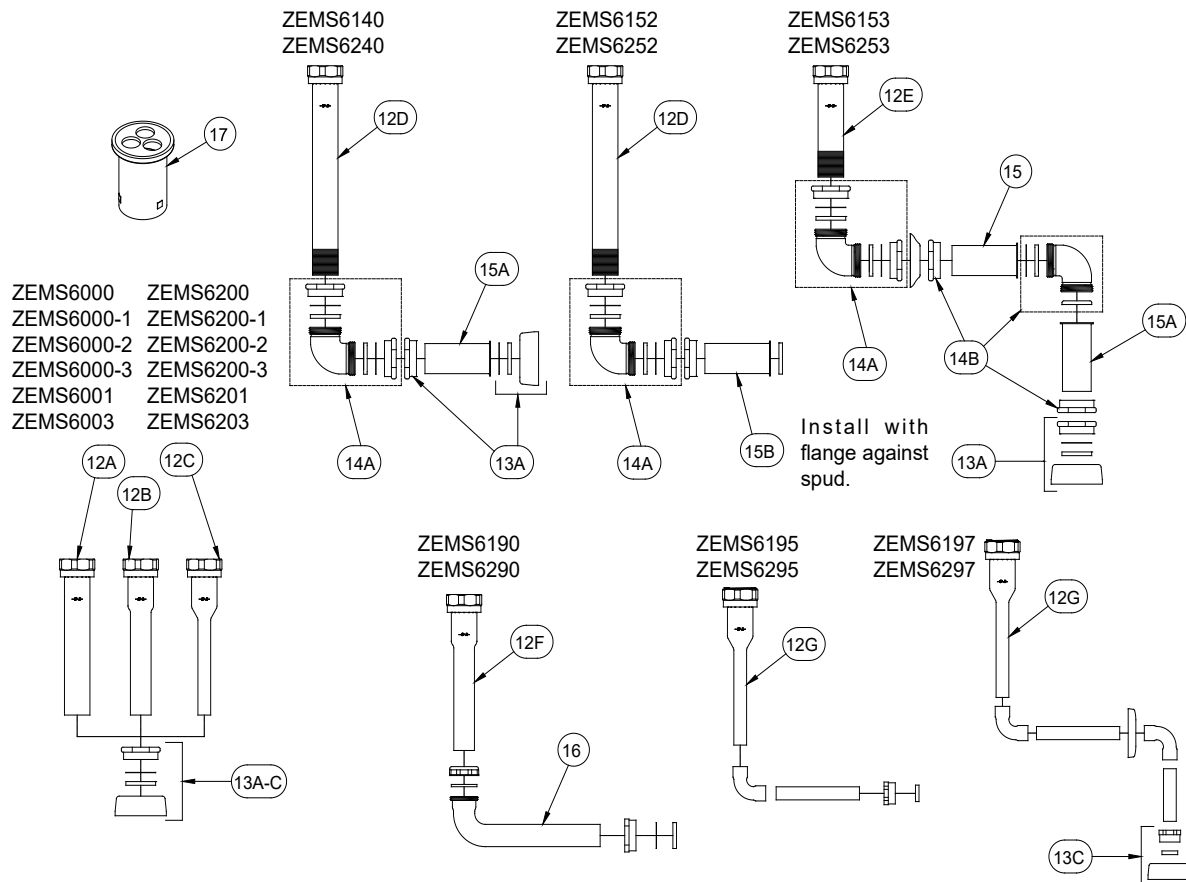
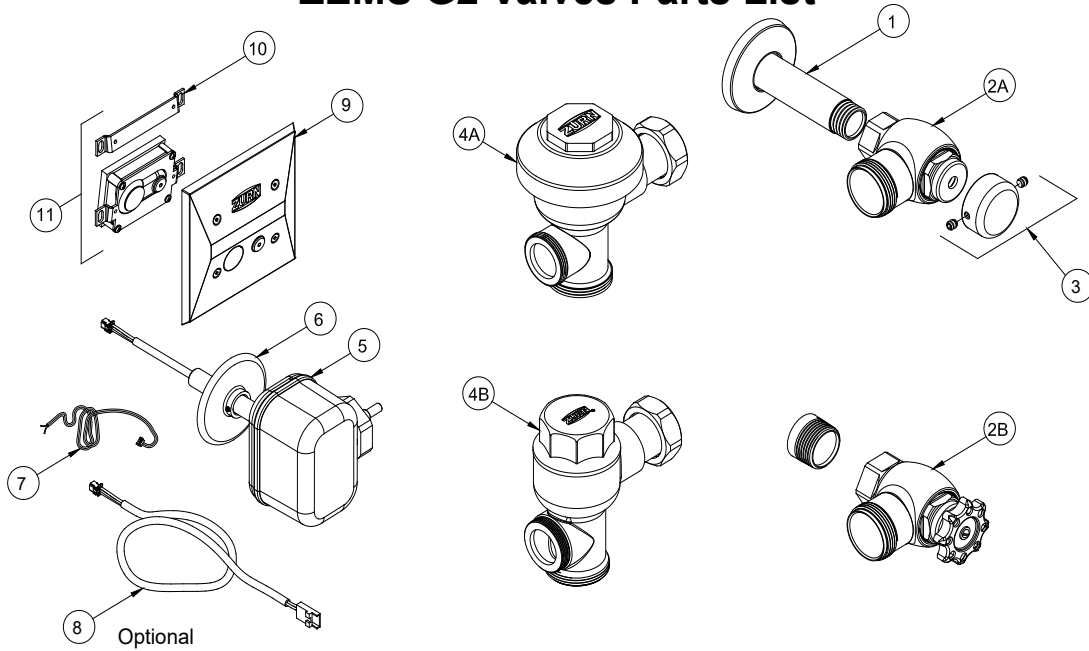


## ZEMS G2 Trouble Shooting

Problem	Possible Cause	Corrective Action
Valve will not operate.	1) Stop valve is closed	1) Open stop valve.
	2) Supply valve is closed.	2) Open supply valve.
	3) The electric wire(s) is not connected.	3) Connect the wires.
	4) Sensor lens may be dirty.	4) Clean lens.
	5) Reflective surface in front of sensor.	5) Remove the reflective surface from in front of the sensor.
	6) Detection range not adjusted properly.	6) Adjust the detection range.
	7) The infrared sensor or the actuator is out of order.	7) Contact distributor for replacement.
	8) Sensor fault	8) Replace sensor
	9) No power provided by power supply	9) Replace power supply
Flush valve does not activate after user leaves	1) Sensor does not recognize a user	1) Re-calibrate sensor per "Calibration Instructions" section.
	2) Power supply may be disrupted	2) Check available voltage where escutcheon is attached to wall with DC voltmeter. 7.4-9 VDC is required.
		3) Verify connection to actuator.
Repeated valve activation when power is provided	1) Insufficient DC power level (less than 7.4 volts DC)	1) Upgrade the -HW6 power supply to the new ZURN power supply (greater than 7.4 volts DC) or replace the ACA supply.
Insufficient volume of water to adequately siphon fixture	1) Stop valve is not open enough.	1) Open stop valve for desired volume of water.
	2) Urinal piston installed in closet valve.	2) Replace urinal piston with proper closet piston.
	3) Insufficient volume or pressure at supply.	3) Consult fixture guide for minimum gallons per minute flow and running pressure for satisfactory performance.
Valve is flushing too long or not shutting off.	1) Trip mechanism not seating properly due to foreign material between trip mechanism and seat.	1) Disassemble parts and rinse thoroughly.
	2) By-pass orifice is plugged or partially plugged.	2) Examine by-pass orifice and clean if necessary being certain not to enlarge orifice opening.
	3) Line pressure is not adequate to force trip mechanism to seal.	3) Pressure is inadequate or has dropped below minimum operating range. Steps should be taken to increase the line pressure.
Water splashes out of fixture/	1) Supply volume is more than is necessary.	1) Adjust downward on control stop.
	2) Lime accumulation on vortex or spreader holes of fixture.	2) Remove the lime build up.
Flush is not considered quiet.	1) Control stop may not be adjusted for quiet operation.	1) Adjust the control stop for quiet operation keeping in mind the fixture evacuation requirements.
	2) Fixture may be contributing to noise.	2) Check noise created by fixture by placing a cover over the bowl opening to separate valve noise from bowl noise. If it is determined the fixture is too noisy, consult with fixture manufacturer.
	3) Piping system may be source of noise.	3) High pressure in the system can sometimes be controlled by the stop valve. Other sources of noise may be the absence of air chamber and shock arrestors, loose pipes, improper size pipes, etc. In these cases the building engineer should be consulted.
Flush valve "ghost" flushes or activates randomly with no user present.	1) Sensor Lens may be dirty.	1) Clean lens.
	2) Power supply output is out of tolerance.	2) DC voltage must be between 7.4-9 volts. Check for power fault or malfunction in a unit or replace with a Zurn power converter.
	3) Sensor is viewing stall door.	3) Re-calibrate sensor per "Calibration Instructions" section.
Flush valve shuts off too quick.	<b>Diaphragm Valves</b>	
	1) Damaged diaphragm.	1) Install new P6000-ECA, P6000-EUA replacement kit.
	2) Enlarged by-pass orifice.	2) Install new P6000-ECA, P6000-EUA replacement kit.
	<b>Piston Valves</b>	
	1) Damaged piston.	1) Install new P6200-EC, P6200-EU replacement kit.
	2) Enlarged by-pass orifice.	2) Install new P6200-EC, P6200-EU replacement kit.
Valve is short flushing	<b>Diaphragm Valves</b>	
	1) Enlarged by-pass orifice.	1) Install new P6000-ECA, P6000-EUA replacement kit.
	2) Urinal piston installed in closet valve.	2) Replace urinal piston with proper closet piston.
	<b>Piston Valves</b>	
	1) Enlarged by-pass orifice.	1) Install new P6200-EC, P6200-EU replacement kit.
	2) Urinal piston installed in closet valve.	2) Replace urinal piston with proper closet piston.

# ZURN

## ZEMS G2 Valves Parts List

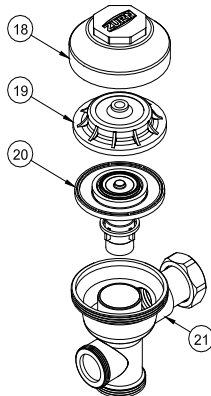




### ZEMS G2 Valve Parts List (Continues)

1.	P6000-YBYC	Closet Cast Wall Escutcheon & Solder Kit	12A.	P6000-A-AA-CP	Chrome Plated 1-1/2" X 8 1/2" Vacuum Breaker Assembly	
	P6003-YBYC	Urinal Cast Wall Escutcheon & Solder Kit		P6000-2-A-AA-CP	Chrome Plated 1-1/2" X 21" Vacuum Breaker Assembly	
2A.	P6000-C-SD-CP	Chrome Plated Closet Stop Assembly		P6000-3-A-AA-CP	Chrome Plated 1-1/2" X 24" Vacuum Breaker Assembly	
	P6003-C-SD-CP	Chrome Plated Urinal Stop Assembly	12B.	P6001-A-AA-CP	Chrome Plated 1-1/4" X 8 1/2" Vacuum Breaker Assembly	
	P6000-C-SD-RB	Rough Brass Closet Stop Assembly		12C.	P6003-A-AA-CP	Chrome Plated 3/4" X 8 1/2" Vacuum Breaker Assembly
	P6003-C-SD-RB	Rough Brass Urinal Stop Assembly	12D.	P6000-1-A-AA-RB	Rough Brass 1-1/2" X 12 1/2" Vacuum Breaker Assembly	
2B.	P6000-C-WH-CP	Chrome Plated Closet Stop Assembly for Wheel Handle	12E.	P6000-A-AA-RB	Rough Brass 1-1/2" X 5" Vacuum Breaker Assembly	
	P6003-C-WH-CP	Chrome Plated Urinal Stop Assembly for Wheel Handle	12F.	P6001-10-A-AA-RB	Rough Brass 1-1/4" X 10" Vacuum Breaker Assembly	
	P6000-C-WH-RB	Rough Brass Closet Stop Assembly for Wheel Handle	12G.	P6003-10-A-AA-RB	Rough Brass 3/4" X 10" Vacuum Breaker Assembly	
	P6003-C-WH-RB	Rough Brass Urinal Stop Assembly for Wheel Handle	13A.	P6000-H	1 1/2" Spud Coupling Assembly	
3.	P6000-VC	Vandal-Resistant Control Stop Cover	13B.	P6001-H	1 1/4" Spud Coupling Assembly	
4A.	Varies(Z60__Z61__)	Diaphragm Valve	13C.	P6003-H	3/4" Spud Coupling Assembly	
4B.	Varies(Z62__)	Piston Valve	14A.	P6000-QE3-RB	Rough Brass 1 1/2" Slip Elbow Assembly	
5.	PEMS6000-HYM-G2	ZEMS Actuator	14B.	P6000-QE3-CP	Chrome Plated 1 1/2" Slip Elbow Assembly	
6.	PEMS6000-G	ZEMS Escutcheon	15A.	P6000-QT1-xx	Chrome Plated Slotless Tube	
7.	PEMS6000-CWB-G2	Sensor Power Supply Cable	15B.	P6000-QT3-xx	Rough Brass Slotless Tube	
8.	PEMS6000-CW-G2	Motor-Sensor Connector Extension Cable, 24" (Optional) (Max 2 per installation)	16.	Varies	Rough Brass Slip Elbow	
9.	PEMS6000-22-G2	ZEMS Sensor Plate with fasteners	17.	P6000-B-HP	Vacuum Breaker	
10.	PEMS6000-22-KIT-G2	ZEMS Top Bracket with fasteners				
11.	PEMS6000-26-G2	ZEMS Sensor with top bracket and fasteners				

### Z6000 Series



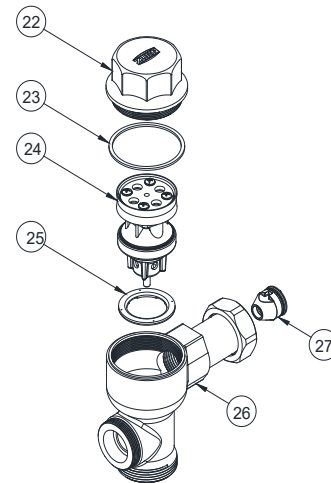
#### Diaphragm Valves (Z6000 Series)

18.	P6000-LL-CP	Chrome Plated Valve Body Outside Cover
	P6000-LL-RB	Rough Brass Valve Body Outside Cover
19.	P6000-L	Valve Body Inside Cover
20.	P6000-ECA-WS	Closet Repair Kit (3.5 gpf)
	P6000-ECA-WS1	Low Consumption Closet Kit (1.6 gpf)
	P6000-ECA-HET	High Efficiency Closet Kit (1.28 gpf)
	P6000-EUA-WS	Urinal Repair Kit (1.5 gpf)
	P6000-EUA-WS1	Low Consumption Urinal Kit (1.0 gpf)
	P6000-EUA-EWS	High Efficiency Urinal Kit (0.5 gpf)
	P6000-EUA-ULF	Pint Urinal Kit (0.125 gpf)
21.	P6000-19__	Valve Body

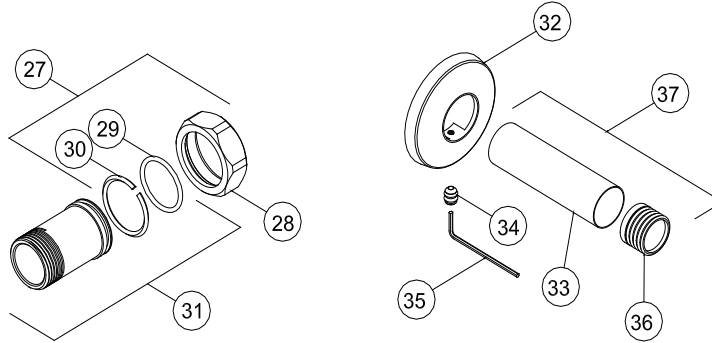
#### Piston Valves (Z6200 Series)

22.	P6200-LL-CP	Valve Body Cover
	P6200-LL-ULF-CP	.125 gpf Valve Body Cover
23.	P6200-LL-CG	Valve Body Cover Gasket
24.	P6200-EC-WS1	Low Consumption Closet Kit (1.6 gpf)
	P6200-EC-HET	High Efficiency Closet Kit (1.28 gpf)
	P6200-EU-WS1	Low Consumption Urinal Kit (1.0 gpf)
	P6203-EU-EWS	High Efficiency Urinal Kit (0.5 gpf)
	P6203-EU-ULF	Ultra Low Flush Kit (.125 gpf)
25.	P6000-S-30	Main Seat
	P6200-MS-ULF	.125 gpf Main Seat
26.	Varies	Valve Body
27.	PTR6203-FA-LF	Urinal 0.125/0.250 gpf Tailpiece filter

### Z6200 Series



**Valve Repair Parts List (Continues)**

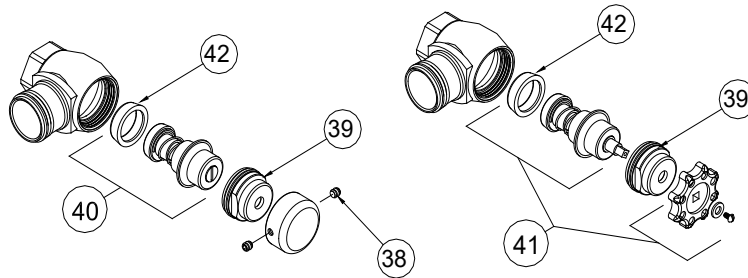


- 27. P6000-K
- 28. P6000-C32-CP  
P6000-C32-RB
- 29. P6000-C31
- 30. P6000-C30
- 31. P6000-J
- 32. P6000-YC  
P6003-YC

- Tailpiece Coupling Assembly
- Chrome Plated Locking Nut
- Rough Brass Locking Nut
- Tailpiece O-Ring
- Snap Ring
- Adjustable Tailpiece Assembly
- 1" Cast Wall Escutcheon
- 3/4" Cast Wall Escutcheon

- 33. P6000-YB-CVR  
P6003-YB-CVR
- 34. P6000-YC-SS
- 35. P6000-VC-W-VP
- 36. P6000-YBA  
P6003-YBA
- 37. P6000-YB  
P6003-YB

- 1" Supply Cover Tube
- 3/4" Supply Cover Tube
- Setscrew for Cast Wall Escutcheon
- 5/64 Allen Wrench
- 1" Sweat Solder Adapter
- 3/4" Sweat Solder Adapter
- 1" Sweat Solder Kit
- 3/4" Sweat Solder Kit



- 38. P6000-VC-SS
- 39. P6000-C34-CP  
P6000-C34-RB
- 40. P6000-D-SD
- 41. P6000-D-WH
- 42. P6000-D42

- Set Screw for Control Stop Cover
- Chrome Plated Stop Cap Bonnet
- Rough Brass Stop Cap Bonnet
- Stop Cap Internals
- Stop Cap Internals with Wheel Handle
- Stop Seat

Rev. E | Date: 11/11/2022 | C.N. No. 144845 | Prod./Dwg. No. FV582

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by **Zurn ELKAY** Water Solutions



VENDOR PART	VENDOR	DESCRIPTION	PAGE
Z6915-XL-ACA	Zurn	Aguasense 4" Base Centerset Sensor Faucet With 0.5 Gpm Aerator And 6 Vdc Plug-In Power Converter In Chrome	44



# AquaSense®

## Z6913-XL and Z6915-XL Series

Sensor-Operated Lavatory Faucets for Battery, Plug-In, or Hardwire Installations, Connected Installation, Operation, Maintenance, and Parts Manual



Z6913-XL



Z6915-XL



- ⚠ **WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)
- ⚠ **ADVERTENCIA:** Cáncer y daño reproductivo - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)
- ⚠ **AVERTISSEMENT:** Cancer et effets néfastes sur la reproduction - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

### LIMITED WARRANTY

All goods sold hereunder are warranted to be free from defects in material and factory workmanship for a period of three years from the date of purchase. Decorative finishes warranted for one year. We will replace at no costs goods that prove defective provided we are notified in writing of such defect and the goods are returned to us prepaid at Sanford, NC, with evidence that they have been properly maintained and used in accordance with instructions. We shall not be responsible for any labor charges or any loss, injury or damages whatsoever, including incidental or consequential damages. The sole and exclusive remedy shall be limited to the replacement of the defective goods. Before installation and use, the purchaser shall determine the suitability of the product for his intended use and the purchaser assumes all risk and liability whatever in connection therewith. Where permitted by law, the implied warranty of merchantability is expressly excluded. If the products sold hereunder are "consumer products," the implied warranty of merchantability is limited to a period of three years and shall be limited solely to the replacement of the defective goods. All weights stated in our catalogs and lists are approximate and are not guaranteed.

**NOTICE: READ ENTIRE MANUAL PRIOR TO INSTALLING PRODUCT.**

Rev: G | Date: 06/18/25 | C.N. No. 146960 | Prod./Dwg. No. FV806

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by **ZURN ELKAY** Water Solutions

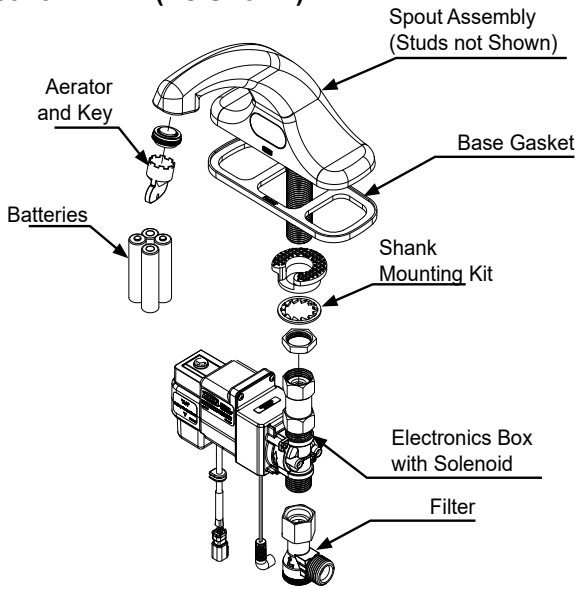


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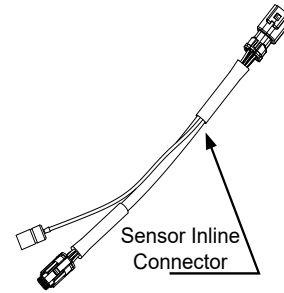
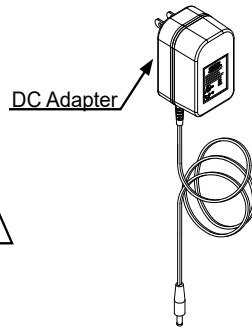
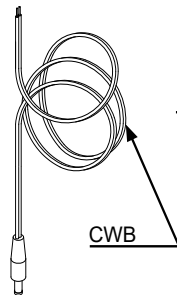
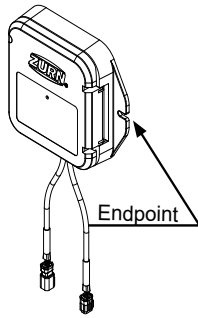
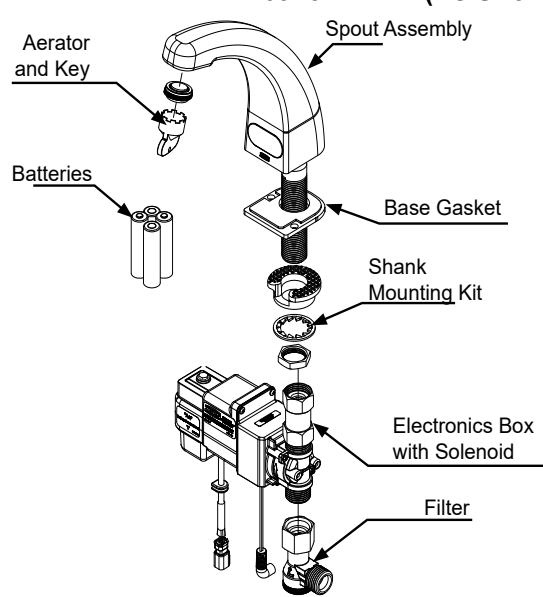


# Aqua Sense® Faucets Package Contents

Z6915-XL-W1 (As Shown)

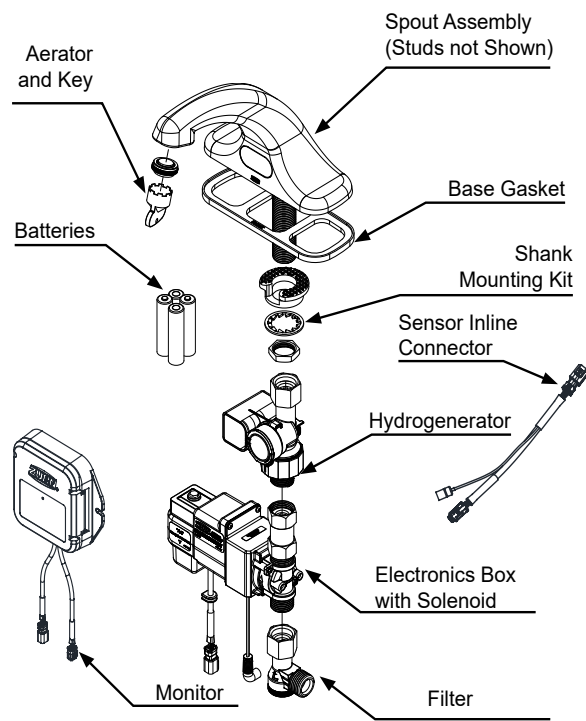


Z6913-XL-W1 (As Shown)

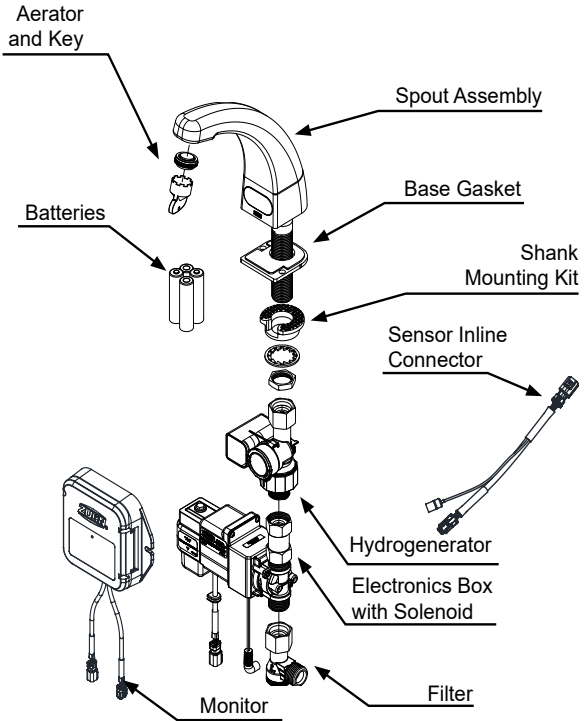




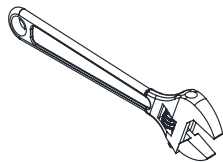
### Z6915-XL-W2 (As Shown)



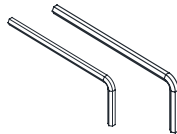
### Z6913-XL-W2 (As Shown)



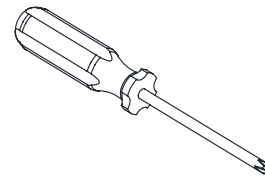
### Required Tools



Adjustable Wrench



3/32" & M3  
Hex Key Wrenches  
(Supplied)



Phillips Head  
Screwdriver

### Optional Accessories



Magic Magnet  
P6900-AT-MAG



## Overview:

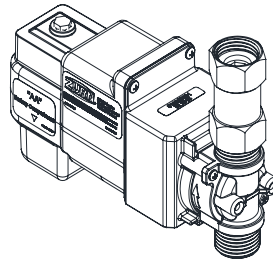
### -W1 & -W2 Only:

Zurn connected faucets transmit data 24/7 to the Zurn plumbSMART™\* web portal and mobile app. Proactively monitor your faucet activations and water usage, receive real-time alerts for preset high and low usage parameters, and access system data for trends and predictive maintenance anytime and anywhere.

### All Configurations:

AquaSense® sensor faucets are ideal for high-use applications where durability and hands-free operation are necessary. ADA compliant, battery powered, polished chrome-plated cast brass sensor faucet with infrared proximity sensor for retrofit and new construction. Unit is furnished with a standard 0.5 GPM aerator and mounting hardware.

Zurn Lead Free products (-XL) are designed and manufactured to comply with Section 1417 of the Safe Drinking Water Act (SDWA) which mandates the weighted average lead content of no more than 0.25% of the wetted surface.



Solenoid Valve Box

## Specifications (Solenoid Valve):

Power:	6 VDC Series [4 "AA" (Alkaline ONLY)] for faucet 6 VDC Series [4 "AA" (Lithium)] for -W2 monitor
Sensor Range:	Fixed
Operating Water Pressure:	10-125 psi
Operational Water Temperature:	33°F to 140°F (1°C to 60°C)
Aerator:	0.5 GPM Vandal-Resistant (Standard)

## Electronic Emission Notices (-W1/-W2):

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The following information refers to Zurn Smart Connected Products, types: -W1 and -W2. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference intended for use in non-residential/non-domestic environments. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:


- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an authorized dealer or service representative for help.

Zurn is not responsible for any radio or television interference caused by using other than specified or recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.



### Important Safety Information (All Configurations):

- Installer is responsible for ensuring the product is installed and conforms to all plumbing codes and ordinances.
- Do not convert or modify this Zurn product yourself. All warranties will be voided.
- Water supply lines must be sized according to building designer in order to provide adequate water supply for each fixture.
- Flush all water lines prior to making connections.

 *Warning: Do not connect an external power supply to the hydrogenerator's barrel jack connector. Doing so could reduce product performance or pose a fire hazard*

### Prior to Installation (All Configurations):

Before installing your Zurn® Aqua-Sense® Faucet, the items listed below should already be installed on site:

- Lavatory/sink
- Drain Line
- Hot and cold water supply line or pre-tempered water supply line.
- Installer/Service should not use pipe dope or teflon/thread sealant anywhere on this product, most notably threads and connection points.
- Care shall be taken when installing this product to prevent marring of any exposed or decorative surfaces.

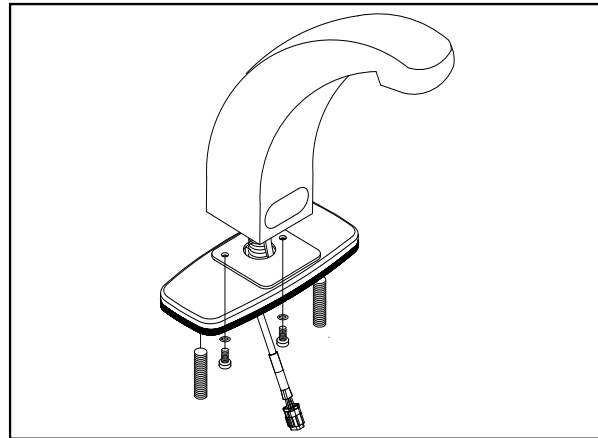
 *Be sure the sink/lavatory/basin is clear from any objects upon making the sensor to electronics connection.*

**NOTE:** The information in this manual is subject to change at any time without notice. Installations may be performed at different times of construction by different individuals. For this reason, these instructions should be left on-site with the facility or maintenance manager.

## Cover Plate Installation Instructions (All Configurations)

1. (For faucets with -CP4 or -CP8 suffix).

Pass sensor connector wire and shank through gasket. Align gasket with faucet bottom and press firmly together. Pass sensor connector and shank through cover plate and fasten to the faucet with the provided screws.



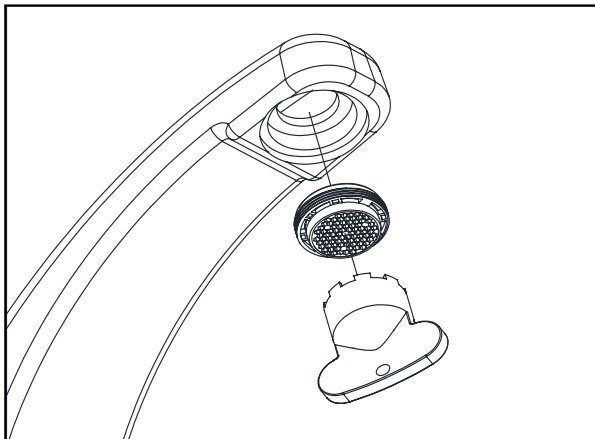
## Spout Installation Instructions (All Configurations)

**NOTE:** Before installation, turn off water supplies to existing faucet and remove faucet if replacing an existing device. Clean the faucet basin and clear away debris. Flush all supply lines before connecting the faucet. Failure to do so may result in debris clogging the inlets and/or internal control and mixing valve of the faucet.

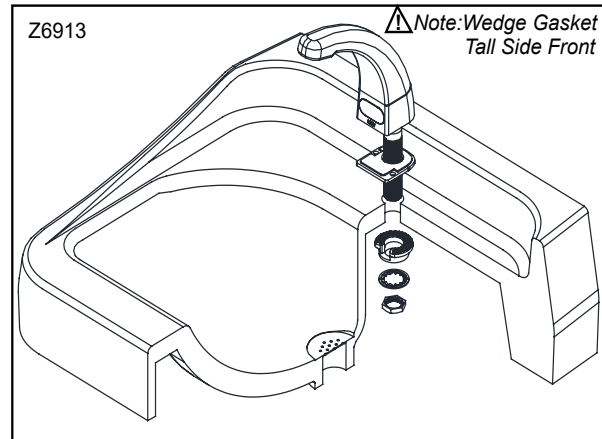
Note: Faucet location needs to be within 3 feet radius above electrical outlet for ACA configurations.

1. Carefully screw aerator into spout using included tool.

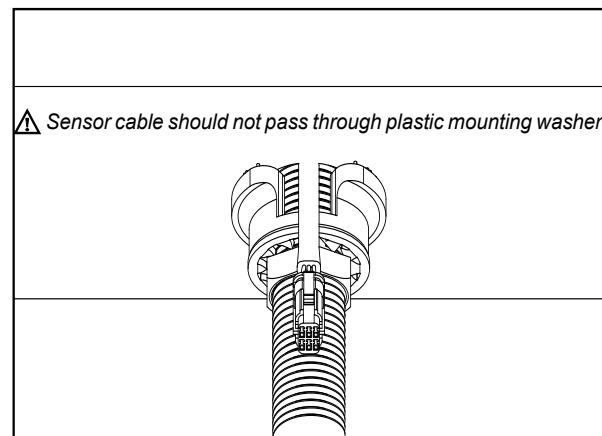
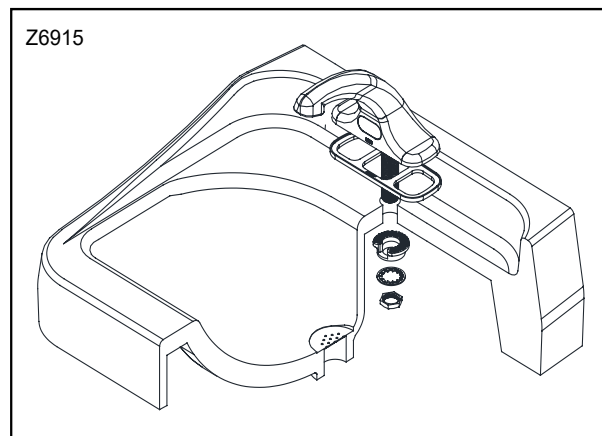
⚠ Take care to not pinch blue o-ring



2. Align the wedge base gasket onto spout shank base making sure the tall side is facing forward to angle the spout upward. Then insert spout shank through the lavatory and fasten below with the gapped plastic mounting washer, followed by the star washer and mounting nut.

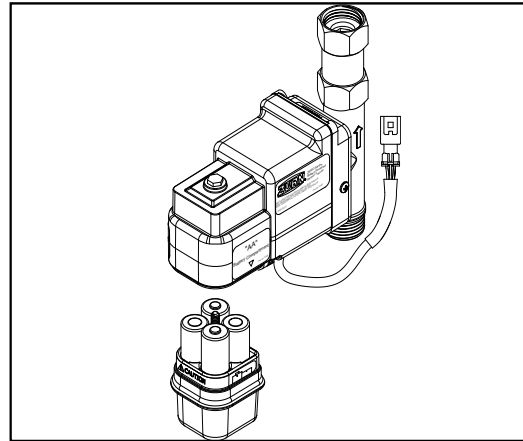
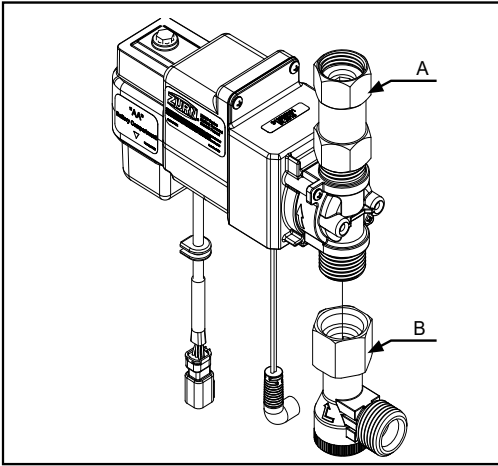


3. Ensure that slot gap in plastic washer is facing forward.

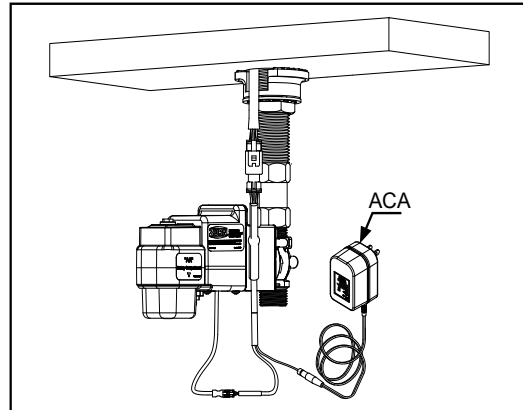
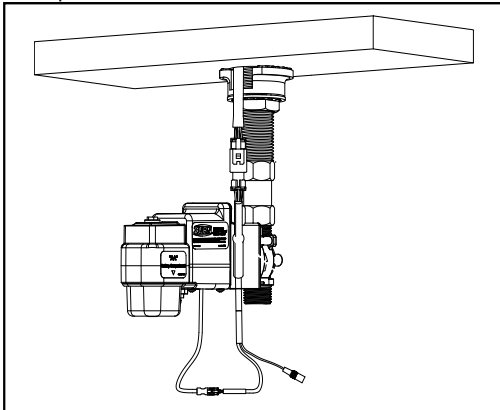


## Endpoint & Electronic Module Installation Instructions (-ACA/-CWB)

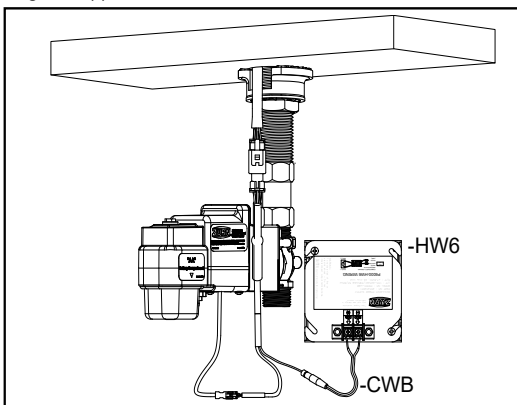
1. Remove the electronics module from box. Connect filter(B) to bottom of electronics module(A).
2. Open battery module using supplied Allen wrench and install supplied alkaline batteries in the electronics module.



3. Tighten electronics module assembly to shank and connect water line(s). Connect sensor inline connector to sensor cable from spout and to the electronic module
- 4a. Optional ACA version: Connect supplied inline connector and AC adapter



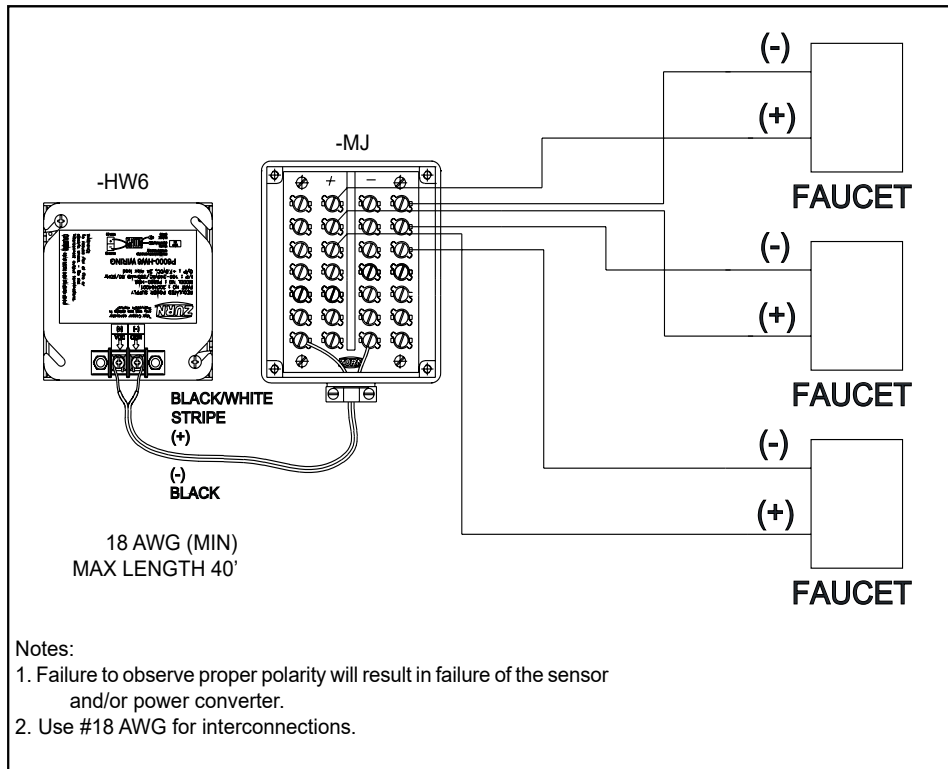
- 4b. Optional HW6 (Hardwired 6V) version: Connect supplied inline connector and hardwire adapter. When securing the CWB wires to the screw terminals on HW6 unit, the BLACK WITH DASHED MARKINGS should be connected to the Positive (+) terminal, and the SOLID BLACK wire should be connected to the Negative (-) terminal.



5. Turn on water supply(ies).

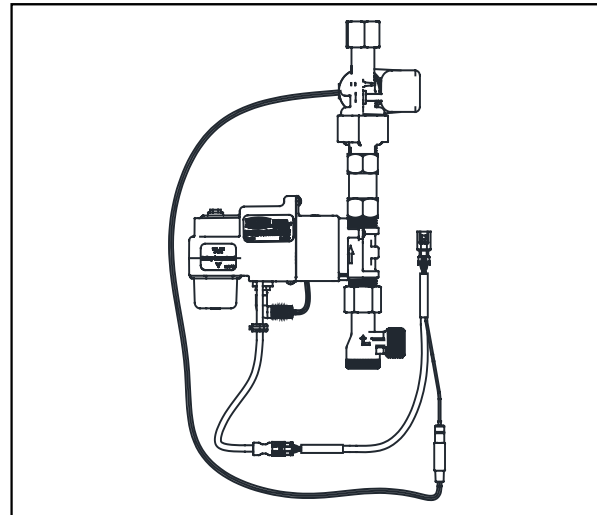
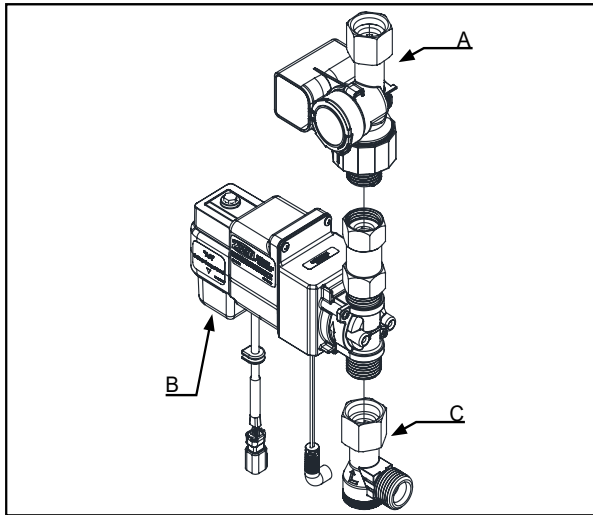
**Optional MJ unit (sold separately)**

Note: Do not connect more than 3 boxes to a single transformer

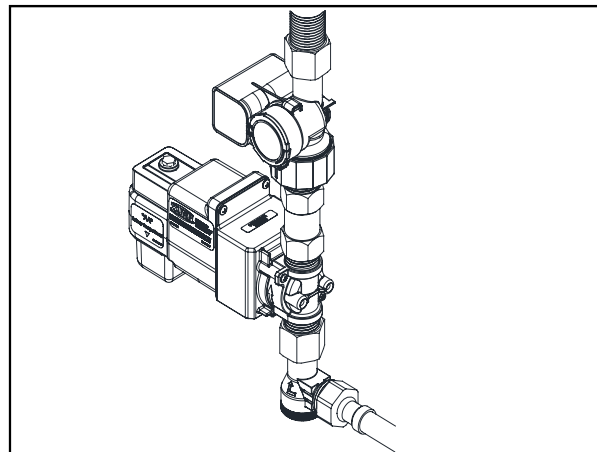
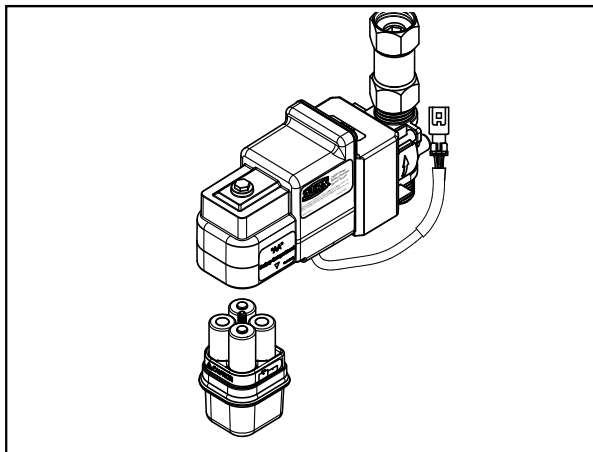


## Electronics Module Installation Instructions (-HYD)

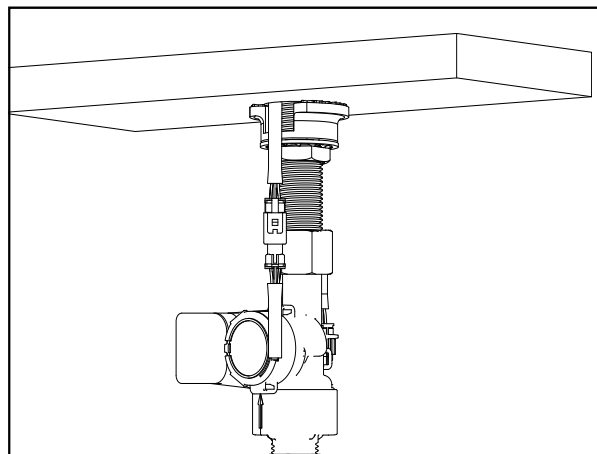
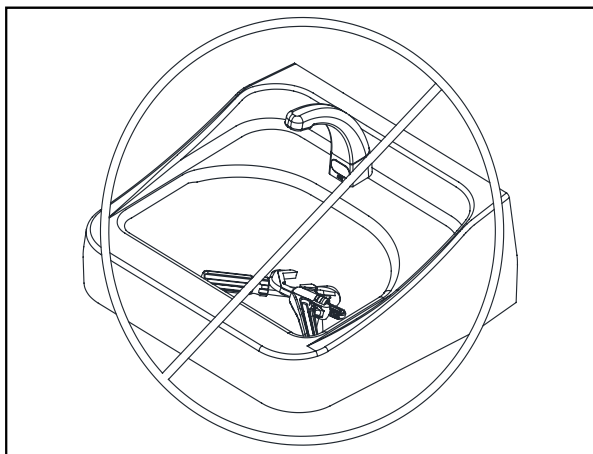
1. Connect hydrogenerator(A) downstream of electronics module(B) and filter(C) to bottom of electronics module.
2. Connect sensor inline connector to electronics module and hydrogenerator.



3. Open battery module using supplied Allen wrench and install supplied alkaline batteries in the electronics module.
4. Tighten electronics module assembly with hydrogenerator to shank and connect water line(s).

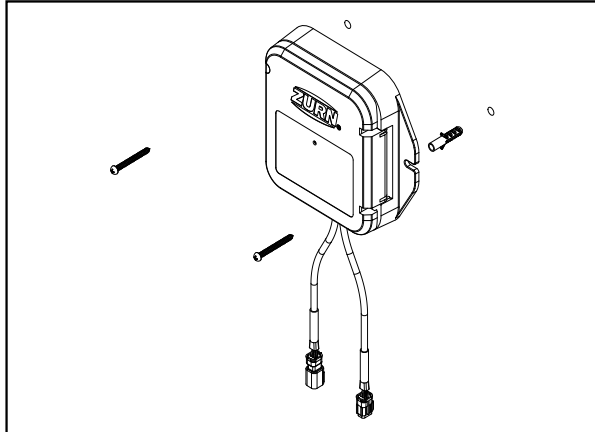


5. Ensure sink is clear of tools/debris and is in normal operating condition. Remove protective film from sensor lens if needed.
6. Turn on water supply(ies).
7. Connect sensor inline connector to sensor cable from spout.

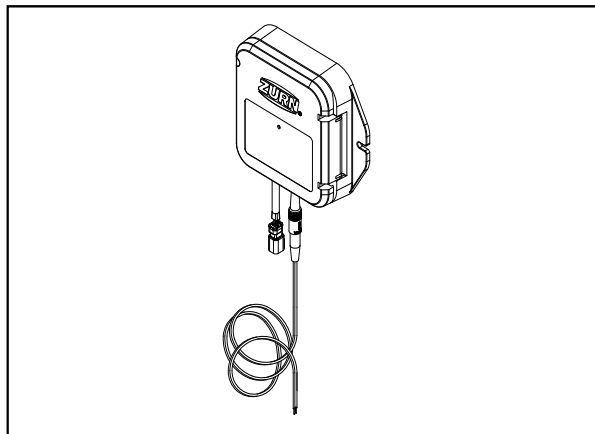


## Endpoint & Electronic Module Installation Instructions (-W1)

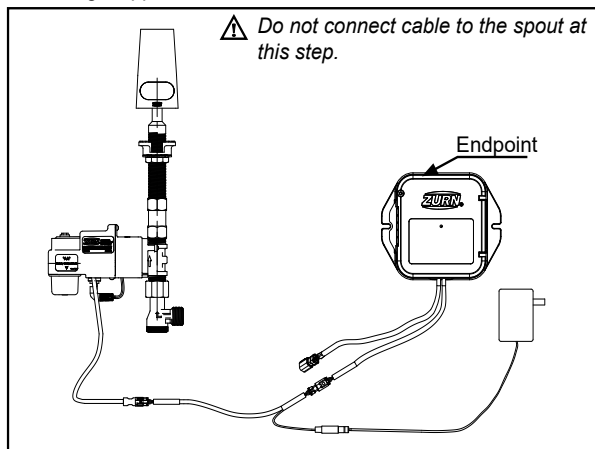
- 1.a. Install Monitor on wall surface within 2 feet radius of faucet with dry wall anchors & screws or doubled sided VHB tape.
- 1.b. For concealed wiring installation, drill 3/16" hole in wall surface for DC power cable, route wire-end through hole to HW6 unit. After routing, apply sealant around wire in hole.



3. Connect endpoint and DC power cable.

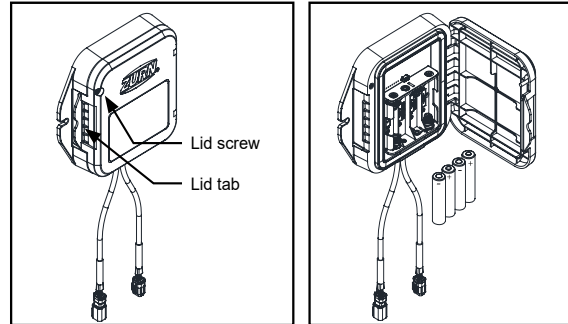


5. Connect endpoint and electronics module assembly using supplied sensor inline connector.

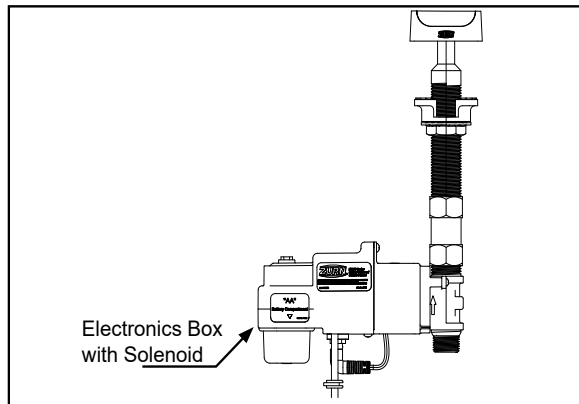


2. Loosen lid screw with supplied 3mm Allen wrench. Open lid and install supplied lithium batteries. Close lid and secure by pressing on the lid tab until it snaps into place. Then tighten lid screw.

*During initial installation, use the supplied lithium batteries. During subsequent battery changes, use either alkaline or lithium batteries; however, do not mix alkaline and lithium batteries together. During servicing or changing of batteries, wipe down monitor to ensure water does not enter the housing when the lid is opened.*

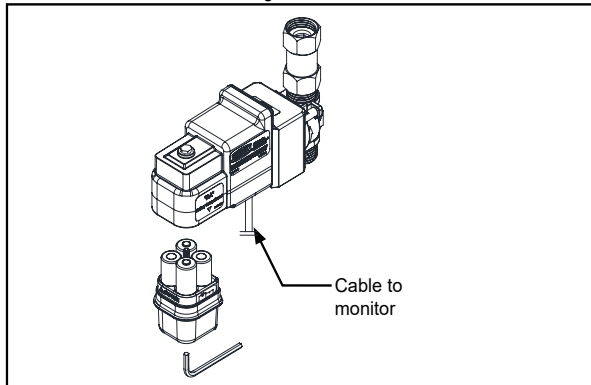


4. Tighten electronics module assembly to shank and connect water line(s).

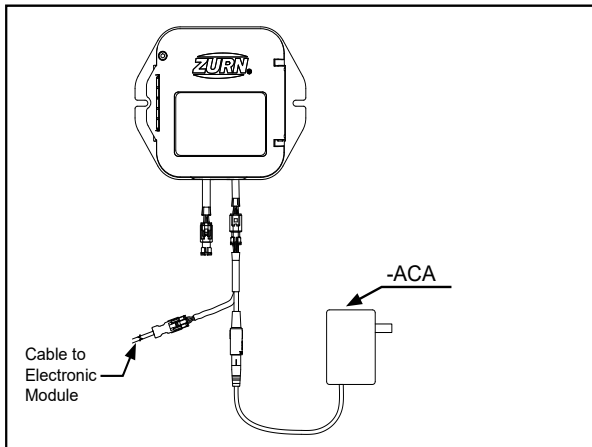


6. Open battery module using supplied 3mm Allen wrench and install supplied alkaline batteries in the electronics module. Then close and tighten battery module.

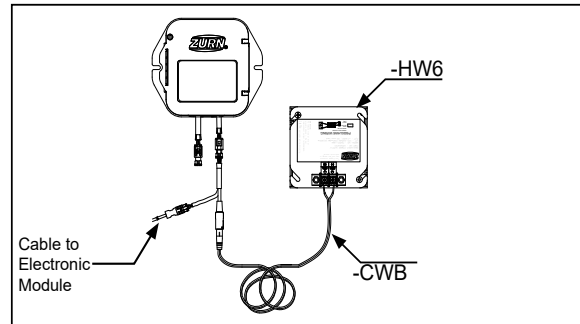
*During initial installation, use the supplied alkaline batteries. During subsequent battery changes, ONLY use alkaline batteries. Do not mix alkaline and lithium batteries together.*



7.a. ACA version: Plug in AC adapter to wall outlet.



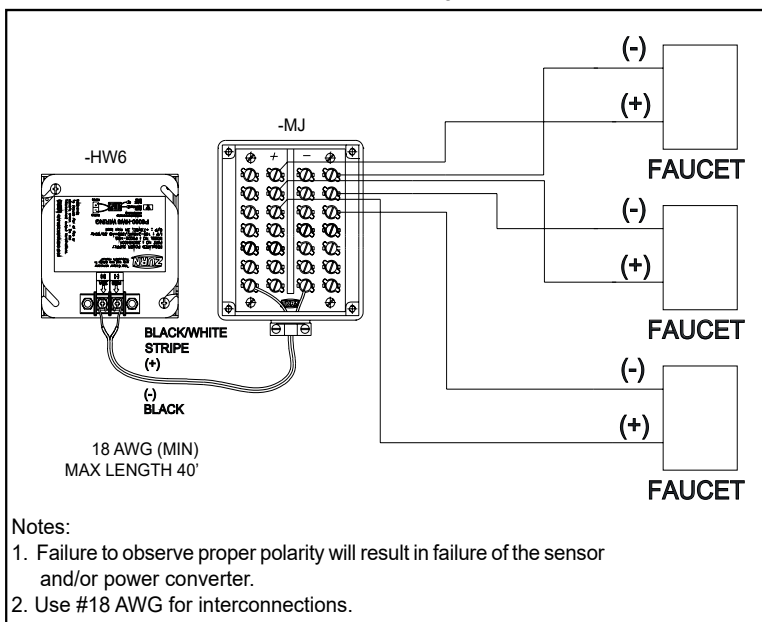
7.b. Optional HW6 version: Connect supplied inline connector and hardwire adapter. When securing the CWB wires to the screw terminals on HW6 unit, the BLACK WITH DASHED MARKINGS should be connected to the Positive (+) terminal, and the SOLID BLACK wire should be connected to the Negative (-) terminal.



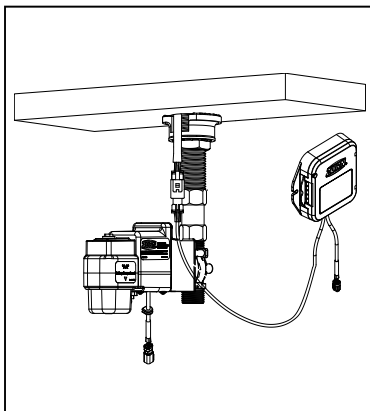
7.c.

**Optional MJ unit (sold separately)**

*Note: Do not connect more than 3 boxes to a single transformer*



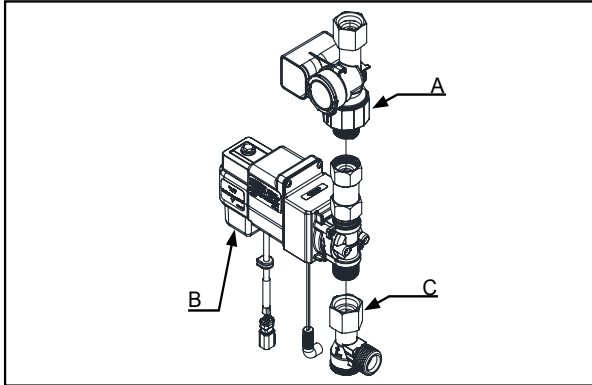
8.. Connect sensor cable from spout to monitor.



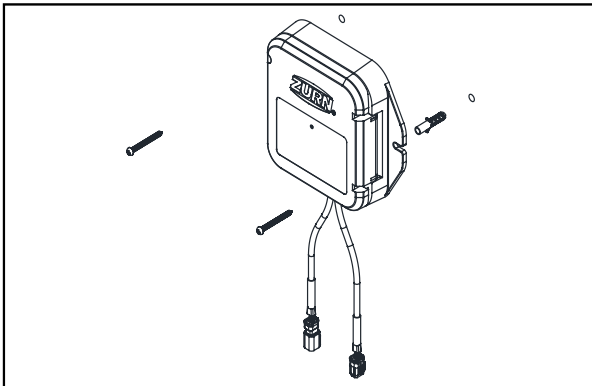
## Monitor & Electronic Module Installation Instructions (-W2)

1. Connect hydrogenerator(A) downstream of electronics module(B); connect the electronics module(B) downstream of filter(C).

**⚠** Do not connect the electronic module to spout.

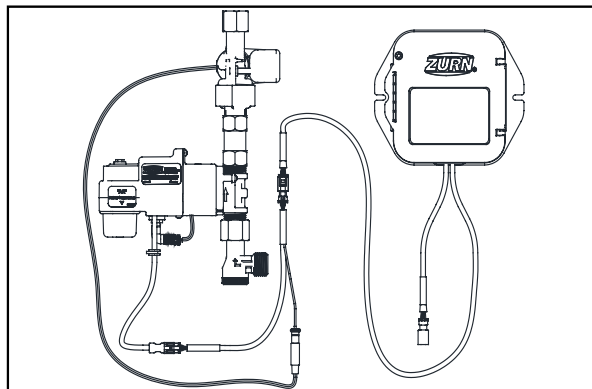


3. Install Monitor on wall surface within 2 feet radius of faucet with dry wall anchors & screws or doubled sided VHB tape.

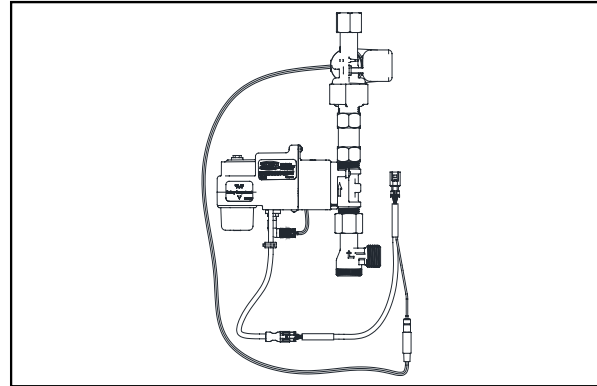


5. Connect monitor and electronics module assembly.

**⚠** Do not connect cable to the spout at this step.



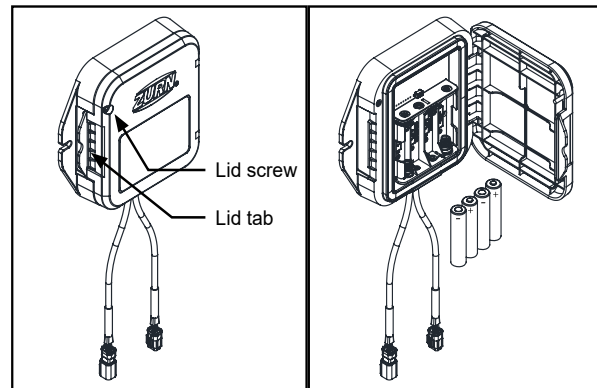
2. Connect sensor inline connector to electronics module and to the hydrogenerator.



4. Loosen lid screw with supplied 3mm Allen wrench. Open lid and install supplied lithium batteries. Close lid and secure by pressing on the lid tab until it snaps into place. Then tighten lid screw.

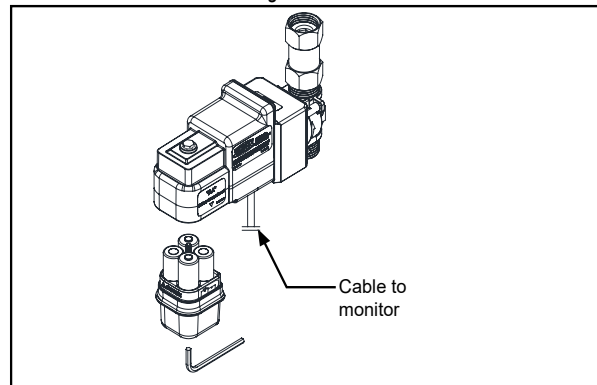
*During initial installation, use the supplied lithium batteries. During subsequent battery changes, use either alkaline or lithium batteries; however, do not mix alkaline and lithium batteries together.*

*During servicing or changing of batteries, wipe down monitor to ensure water does not enter the housing when the lid is opened.*

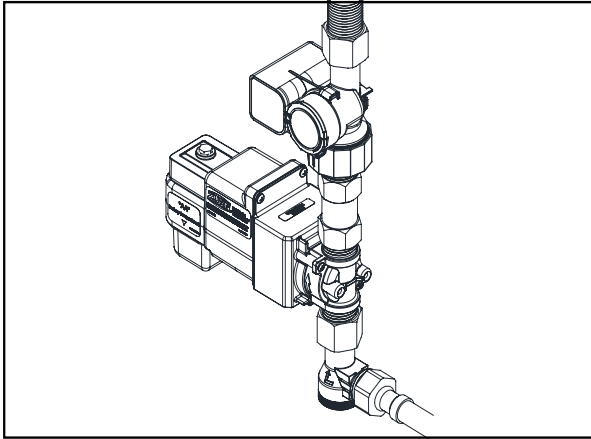


6. Open battery module using supplied 3mm Allen wrench and install supplied alkaline batteries in the electronics module. Then close and tighten battery module.

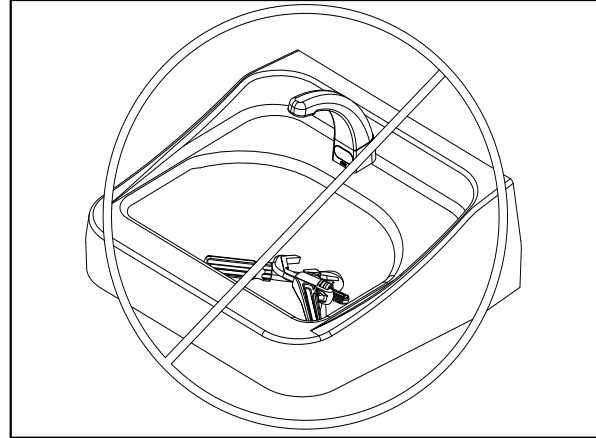
*During initial installation, use the supplied alkaline batteries. During subsequent battery changes, ONLY use alkaline batteries. Do not mix alkaline and lithium batteries together.*



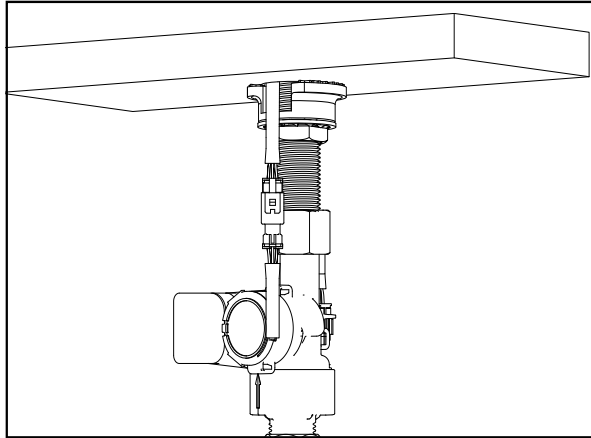
7. Tighten electronics module assembly with the hydrogenerator to shank and connect water line(s).



8. Ensure that sink is clear of tools/debris and is in normal operating condition. Remove protective film from sensor lens if one is present.  
9. Turn on water supply(ies).



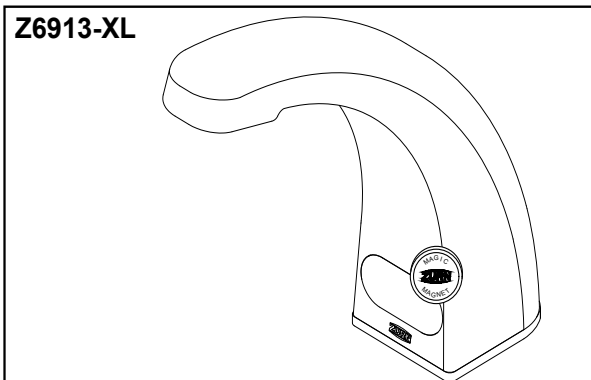
10. Connect sensor cable from spout to monitor.



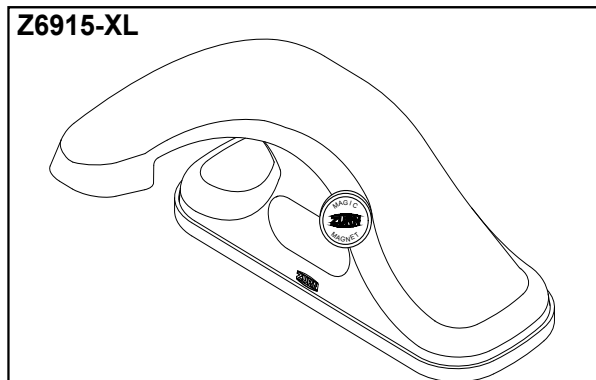
### Sensor Range Adjustment (All configurations when necessary)

1. Ensure that the faucet is installed and powered has been applied.
2. Place and hold the Magic Magnet (optional accessory: P6900-AT-MAG) in the upper right hand corner of the sensor as shown. An indicating light will activate when the magnet is correctly positioned.
3. Wait until the light starts to blink, then remove the magnet. (Faucet has entered the calibration mode.)
4. Place a target at the desired activation range in front of the faucet sensor. (Cardboard, hand, etc.)
5. Wait approximately 10 seconds during the calibration cycle. Do not move the target during this period.
6. Calibration is complete when the light stops blinking.
7. Confirm calibration distance by moving the target back, then slowly forward until the faucet activates at the desired calibration distance.

**Z6913-XL**



**Z6915-XL**





## Care and Cleaning Instructions (All Configurations)

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- Do not use any abrasive or chemical cleaners to clean the faucets. Do not use any cleaners with an acid base.
- If abrasives or chemicals are used it can lead to dulling of luster, attacking of chrome plating or decorative finishes.
- ONLY use mildly warm soapy water, and then wipe the device dry with a clean/soft towel or cloth.
- Upon cleaning other areas of the restroom be sure the sensor lenses are protected from other cleaning chemicals/solvents to prevent potential damages to the sensor and/or electronics.

## Gateway Instruction (-W1/-W2)

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### Step 1. Request Gateway:

You can request your Ethernet or LTE gateway by visiting

[Zurn.com/plumbsmart-gateway-request](https://Zurn.com/plumbsmart-gateway-request)

or call Zurn Customer Care at 1-844-987-6737

### Step 2. Cabling, Powering and Connecting Your Device:

1. Connect one end of the RJ45 Ethernet cable (supplied) to the gateway's Ethernet port and plug the cable's other end into the nearest wall port of the building's Ethernet network.
2. Connect the power supply to the power jack.
3. Wait for status LED to go from ON to double flash every second, the LoRa LED to turn ON solid, and the cell LED (if LTE enabled) to flash once every 3 seconds. Should take around 1-2 minutes depending on location. Your gateway is now ready to transmit data from your Zurn connected product.
4. Zurn Gateways have been set to DHCP by default. Please consult local IT support for possible additional access requirements for your network.

### Step 3. Determining General Location for the Zurn Gateway:

- Select a location central to all devices to be connected to this gateway. Ideal mapping of Gateway to connected devices will resemble a wagon wheel.
- Place the gateway as high as possible, such as near the top of a wall.
- Avoid obstructions. Thick walls and reflective surfaces, such as metal, weaken the signal between the gateway and other devices.
- The LoRa antenna is an omni-directional antenna, but for best results, mount the device so the LoRa antenna is in a vertical position near the top of a wall. We recommend conducting a site survey to test the signal strength in different locations before you mount the device.

### Step 4. Mounting the Zurn Gateway:

The device ships with a mounting bracket. You will also need:

- Four #6 screws with anchors
  - Screwdriver
  - Drill
1. Determine where you want to mount the device.
  2. Mark where you want the screws to go.
  3. Drill holes for the screws and insert anchors.
  4. Place the mounting bracket and secure it with screws.
  5. Attach the device to the bracket and rotate to lock into place.

## Register in plumbSMART (-W1/-W2)

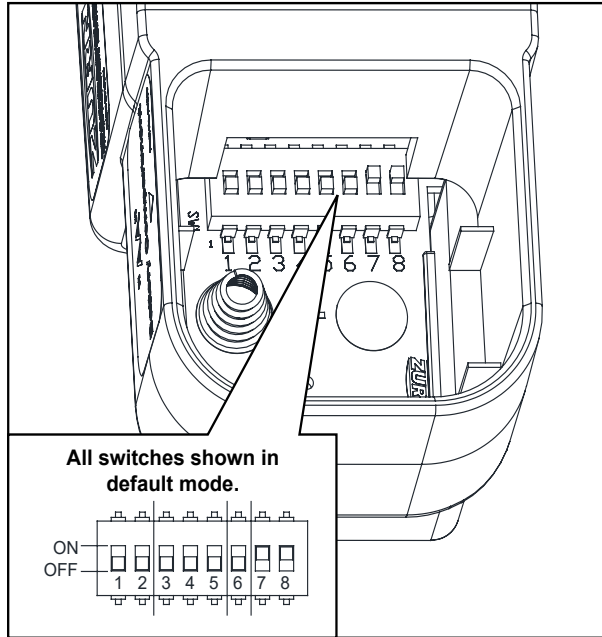
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NOTE: Instructions below are duplicated from registration card supplied with monitor

1. Install Zurn Connected Product(s)
2. Install Zurn Gateway per the Gateway Instructions Manual
3. Request plumbSMART Administrator Account at 844-987-6737
4. Zurn creates your Enterprise Account for you! (You will be required to identify your building location, number of floors, and number of rooms.)
5. Log in to [plumbsmart.zurn.com](https://plumbsmart.zurn.com)
6. Register each Connected Product in plumbSMART (Watch How-To Videos to Get Started. Located in the support section inside the portal.)

## Adjustable modes and features selection (-W2/-HYD)

To adjust features from default configuration, you must remove the battery tray. Once battery tray is removed you will see the switches.



Switch Position:	1	2	3	4	5	6	7	8
<b>Purge (Hours)</b>								
<b>Disable:</b>	<b>Off</b>	<b>Off</b>						
12:	On	Off						
24:	Off	On						
48:	On	On						
<b>Time (Seconds)</b>								
<b>30:</b>			<b>Off</b>	<b>Off</b>	<b>Off</b>			
5:			On	Off	Off			
10:			Off	On	Off			
15:			On	On	Off			
60:			Off	Off	On			
Less Time-out			On	Off	On			
<b>Mode Select</b>								
<b>Sensing Mode:</b>						<b>Off</b>		
<b>Metering Mode:</b>						On		
<b>Sensor Sensitivity</b>								
Low:							Off	
<b>Normal:</b>							On	
Mode A:								Off
<b>Mode B:</b>								On

Default switch positions/modes are shown in **bold**.

### Purge Features:

The purge switches can be configured for 4 modes of operation: Disabled (standard configuration), 12 hour, 24 hours, or 48 hours. Purge water flow duration is 2 minutes. Note: Purge activation occurs every switch selected time (0, 12, 24, or 48 hours) after last activation.

### Flow Time:

There are 6 optional time configurations: 30 seconds (standard), 5s, 10s, 15s, 60s, & "Less Time-out". The "Less Time-out" option actually ceases water flow (turns off) after 20 minutes to limit chance of water damage in the event a sink drain becomes blocked.

### Sensing Mode (DEFAULT):

During this mode the valve will shut off after hands are removed. If hands are not removed the time out delay will turn off the faucet (ex: standard configuration is 30 seconds).

### Metering Mode:

When hands are detected by the sensor, water will run for 'X' seconds (standard configuration is 30 seconds) before turning off.

### Sensor Sensitivity: (Default setting - Normal):

There are 4 sensitivity options, which can be selected to achieve the optimal detection performance related to the sink material, shape, & finish. The faucet sensor sensitivity is configured during pack-out but the mode can be changed upon installation to optimize the performance within the sink. Sensor sensitivity and sensor detection Modes A & B may be tried for various lighting conditions, sink materials and shape.

Switch 7 controls the sensitivity

- On (default) is normal sensitivity for most sinks providing max range.
- Off sets the sensor to a lower sensitivity level for sinks that cause false activation. The detection range maybe less for all hands.

Switch 8 controls sensor mode

- On (default) enables the mode that filters the effects of flowing in the bottom of problematic sinks. Detection maybe less for some hands.
- Off disables the filter mode, so detection is expanded deeper into the sink for max detection range for all hands. Some sinks may only be able to operate in this mode.

NOTE: After a configuration switch change has been made. Disconnect sensor cable from electronics box, wait 30 seconds, then reconnect sensor cable.



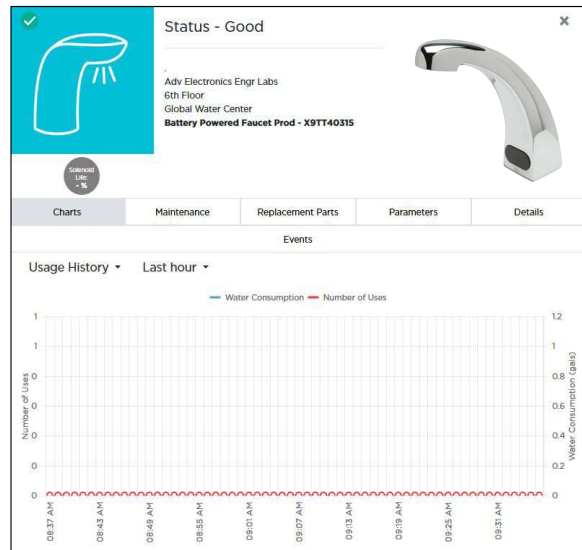


## Trouble Shooting: Faucet (Solenoid Valve)

Problem	Possible Cause	Corrective Action
Faucet is non-responsive	Battery voltage low.	Change out batteries
	Electronic box connector cable has bent or broken pins.	Check to see if pins are missing, bent, or broken. If yes, then the electronic box needs to be replaced
	Sensor lens could have surface damage, scratches, or deposit build ups.	Inspect the sensor lens. May require cleaning with a damp cloth or spout/sensor replacement
	Sensor lens could be obstructed by environmental factors such as highly reflective surfaces or bright lighting conditions.	<p>If this is the case, then adjust the dip switch settings for sensor sensitivity per the diagram on page 16 (switches 7 and 8). Direct sunlight could effect unit operation. Do not allow direct sunlight onto unit.</p> <p>If one mode does not help try one of the following:                      -switching 7 to Off to set the sensor to the lowest sensitivity level (detection range may be less for all hand types).                      -switching to alternate mode using switch 8; mode A or B depending on current configuration</p> <p>Reset sensor after dip switch changes.</p>
Faucet does not activate after initial installation	Check if protective film was removed from lens.	Check if protective film was removed from lens. If it was not, then remove it.
Water does not stop	Electronic box connector cable has bent or broken pins.	Check to see if pins are missing, bent, or broken. If yes, then the electronic box needs to be replaced
Ghost Activation	Sensor lens could be obstructed or environmental factors such as highly reflective surfaces and/or bright sunlight conditions could be present.	<p>Check/clean sensor lens of any debris or buildup and remove any obstructions. If sunlight or IR interference is a factor, refer to page 16 "Sensor Sensitivity" and adjust faucet for Mode B operation. Also, decreasing the sensitivity setting (switch 7) may help. If possible/needed, adjust lighting conditions and/or remove nearby reflective surfaces.</p> <p>Reset sensor after dip switch changes.</p>
Sensor faucet is leaking underneath the sink or counter	Mounting hardware is not tightened sufficiently (faucet shank, electronic box, supply hoses, etc).	Check and ensure the nuts and joints are tight and secure from the supply stop all the way to the faucet shank
	Missing the gasket located in the valve box nut where it assembles to the faucet shank.	Make sure the water supply stops are shut off. Check to ensure the gasket is installed and not damaged. If not installed, install gasket. If gasket is damaged, replace with new

For further assistance with troubleshooting visit <http://www.zurn.com>

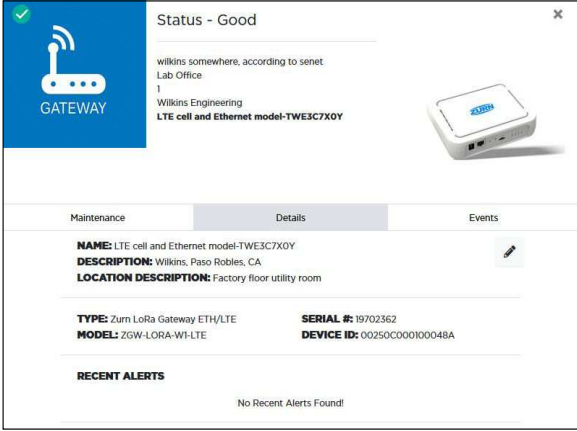
## Trouble Shooting: LoRa Monitor (-W1/-W2)

Problem	Corrective Action
<p>"Device Not Communicating" posted in plumbSMART</p> 	<p><b>Step 1</b> Verify LoRa Monitor electronics are plugged in / Verify batteries installed in LoRa Monitor electronics and have sufficient charge (whichever applies). Install new batteries, as needed. Alert on product's page in plumbSMART should clear within 1 hour or on next faucet activation. (Refresh web page by clicking on reload icon in the browser to clear the alert.)</p> <p><b>Step 2</b> If problem still present, verify gateway is within range of LoRa Monitor and functioning (see Gateway Troubleshooting section)</p> <p><b>Step 3</b> If problem is still present, verify plumbSMART subscription status on product page's Details tab is listed as "Activated"</p> <p><b>NETWORK:</b> Senet <b>SUBSCRIPTION STATUS:</b> <i>Activated</i> <b>LAST HEARD FROM:</b> 07/14/2020, 04:29 PM CDT</p> <p>If listed as "Deactivated", contact Zurn Customer Service at 1.855.ONE.ZURN (1.855.663.9876) for assistance.</p>
<p>"Status – Good" posted in plumbSMART and faucet not actuating</p> 	<p><b>Step 1</b> Verify LoRa Monitor's cables are connected to IR sensor and Faucet actuator electronics. Restore proper electrical connection, as needed.</p> <p><b>Step 2</b> Test activate the faucet.</p> <p>If problem persists, see Faucet Troubleshooting section in this guide for other steps.</p>
<p>"Status – Good" posted in plumbSMART and faucet actuates but usage event data not appearing in plumbSMART Charts</p> 	<p><b>Step 1</b> Verify gateway is powered and LoRa Status LED is ON. If not, apply power per Zurn Gateway Installation Guide or see Gateway Troubleshooting section in this guide for other steps.</p> <p><b>Step 2</b> If problem still present, verify plumbSMART subscription status on product page's Details tab listed as "Activated"</p> <p><b>NETWORK:</b> Senet <b>SUBSCRIPTION STATUS:</b> <i>Activated</i> <b>LAST HEARD FROM:</b> 07/14/2020, 04:29 PM CDT</p> <p>If listed as "Deactivated", contact Zurn Customer Service at 1.855.ONE.ZURN (1.855.663.9876) for assistance.</p> <p><b>Step 3</b> If problem still present, the LoRa Monitor electronics may be faulty. Contact Zurn Customer Service at 1.855.ONE.ZURN (1.855.663.9876) for assistance with additional troubleshooting steps and, if needed, unit replacement.</p>

For further assistance with troubleshooting, visit <https://plumbsmart.zurn.com/app/training>

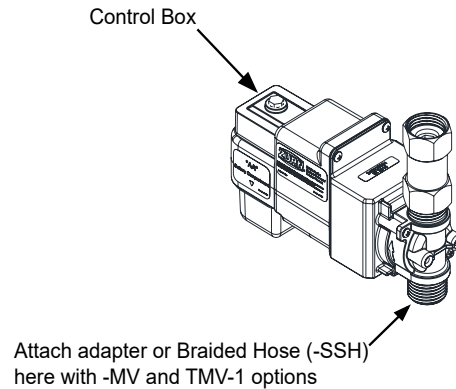


## Trouble Shooting: Gateway (-W1/-W2)

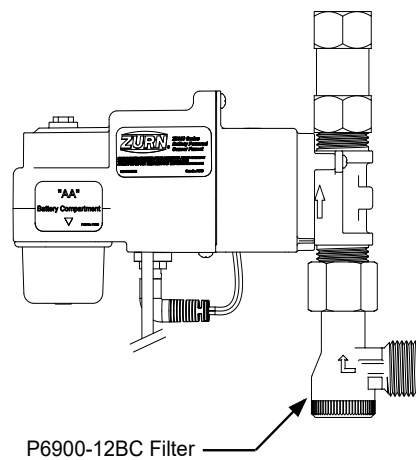
Problem	Corrective Action
<p>“Status – Good” posted in plumbSMART and faucet actuation event data not appearing in plumbSMART (&lt; 2 hours) or “Device Not Communicating” warning or severe alert posted in plumbSMART for all devices (&gt; 3 hours)</p> 	<p><b>Step 1</b> Verify gateway Status LED flashes twice every 2 seconds. If LED is OFF or ON solid, power cycle the gateway and wait for no more than 5 minutes for unit to initialize and connect.</p> <p><b>Step 2</b> After initialization is finished, LORA LED should turn ON solid within an additional minute.</p> <p><b>Step 3</b> If LORA LED does not turn ON solid and ethernet cable connected, contact facility IT administrator to modify port rules to allow Zurn gateway to access the internet via local router.</p> <p>If gateway model is ETH/LTE, visually verify SIM card is installed in designated slot on the side of gateway. If unit has a SIM card, then disconnect ethernet cable and power cycle the gateway and wait for unit to initialize and connect. LORA LED should turn ON solid after initialization.</p> <p><b>Step 4</b> If problem still present, move gateway closer to LoRa monitors and/or verify gateway mounting, orientation and connections comply with requirements listed in Zurn Gateway Installation Guide.</p> <p>Contact Zurn Customer Service at 1.855.ONE.ZURN (1.855.663.9876) for assistance with additional troubleshooting steps.</p>

For further assistance with troubleshooting, visit <https://plumbsmart.zurn.com/app/training>

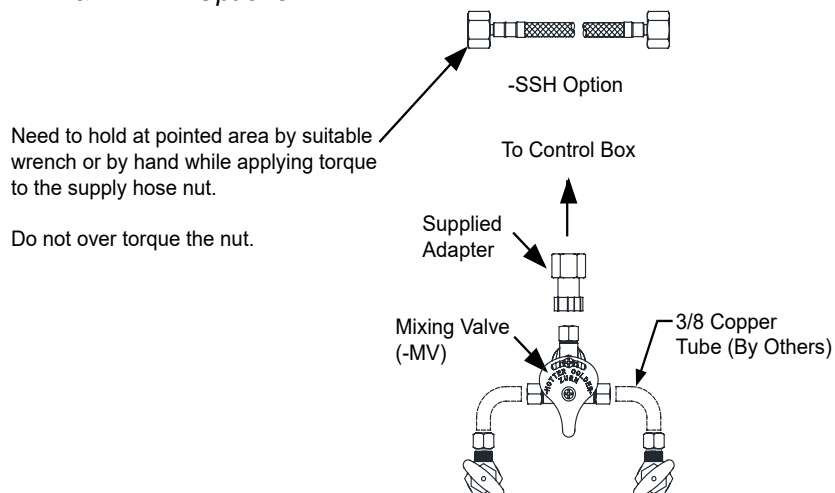
## Filter and Mixing Valve Installation (All Configurations)



*P6900-120BC,  
Filter in standard faucet installation*

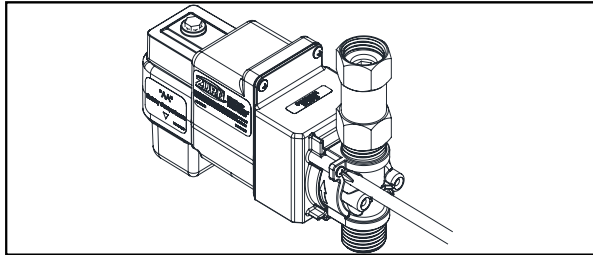


*P6900-MV-ADAP [Supplied Adapter]  
for -MV & -TMV-1 Options*

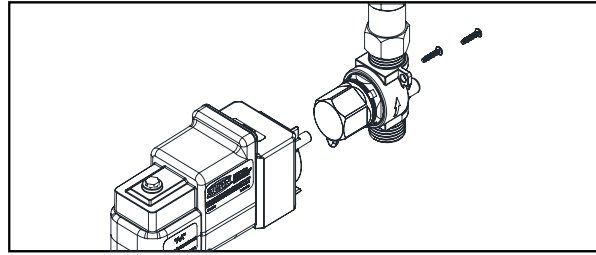


## Accessing the Solenoid (-W1/-W2/-HYD)

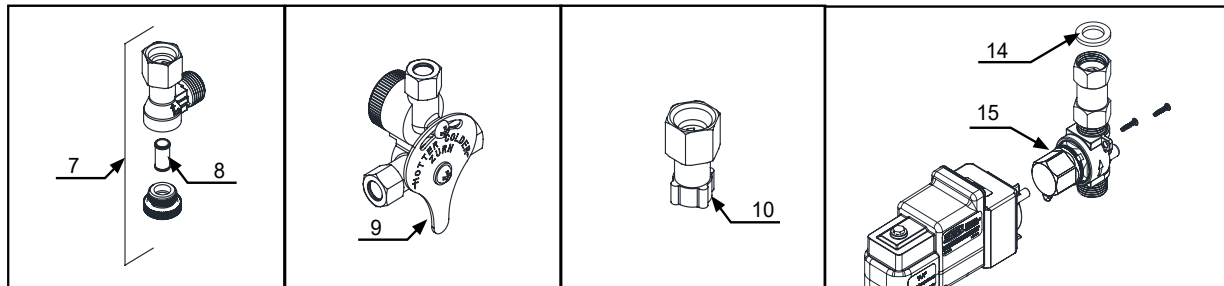
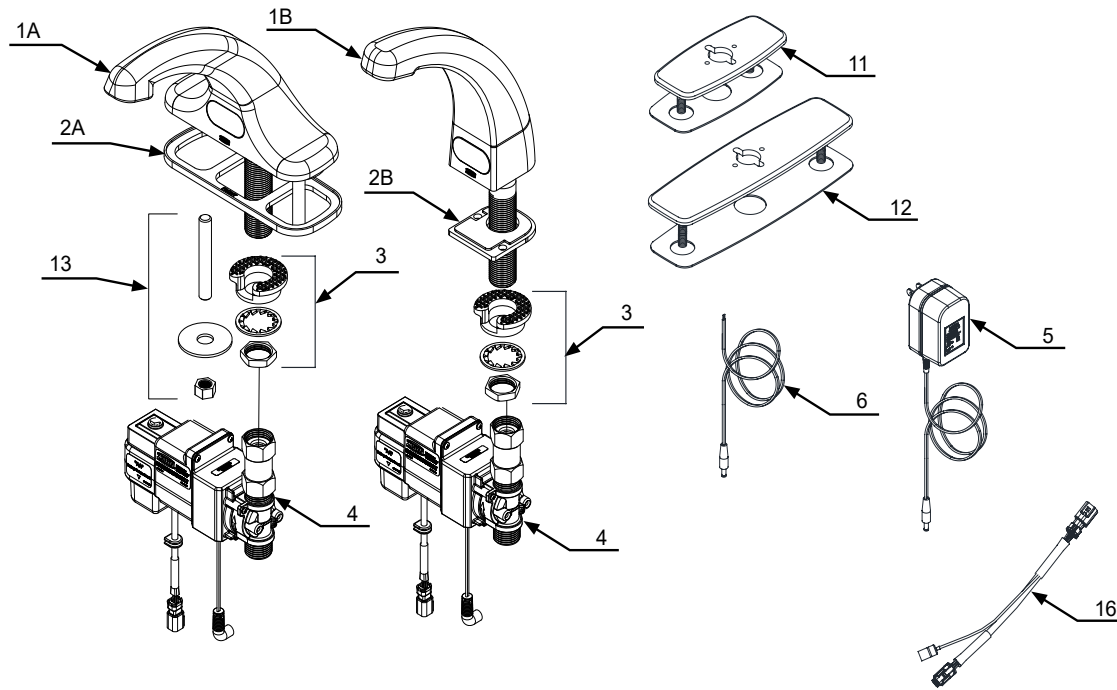
To service solenoid use Phillips head screw driver to remove the screws on both sides of the electronics box.



With screws removed, the electronics box can slide off and allow access to the solenoid for service.



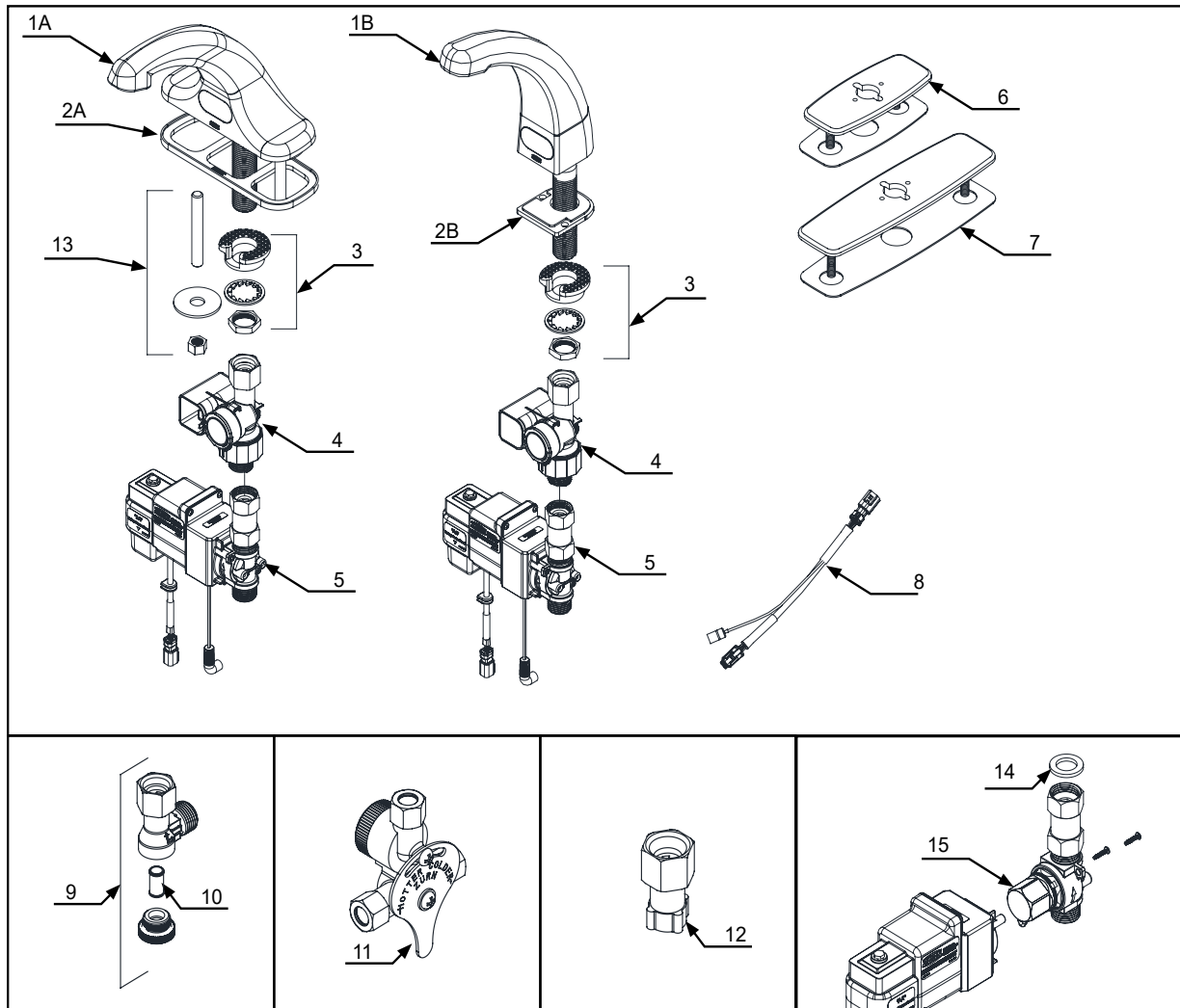
**Z6913-XL-ACA/CWB & Z6915-XL-ACA/CWB Parts List**



Description	Product No.
Item 1A: Z6915 Spout Assembly with Sensor	P6915-XL-2
Item 1B: Z6913 Spout Assembly with Sensor	P6913-XL-2
Item 2A: Z6915 Base Plate Gasket	P6915-42-WEDGE
Item 2B: Z6913 Base Plate Gasket	P6913-42-WEDGE
Item 3: Mounting Kit	P6900-43
Item 4: Electronics Box with Solenoid	P6950-XL-B-L-V2
Item 5: Plug-In Power Converter	P6900-ACA

Description	Product No.
Item 6: -CWB Pigtail	P6900-CWB
Item 7: Filter Kit	P6900-120BC
Item 8: Filter Screen	P6900-MV-7
Item 9: Mixing Valve with Filter	P6900-MV-XL
Item 10: Composite Mixing Valve Adapter	P6900-MV-ADAP
Item 11: 4" Cast Cover Plate w/Gasket	P6900-CP4
Item 12: 8" Cast Cover Plate w/Gasket	P6900-CP8
Item 13: Z6915 Mounting Stud Kit	P6915-MOUNTING-KIT
Item 14: Shank Connection Gasket	P6900-SG
Item 15: Solenoid Rebuilt Kit (Diaphragm and Plunger w/ Spring)	P6950-SRK-V2
Item 16: Sensor Inline Connector	P6950-XL-DC

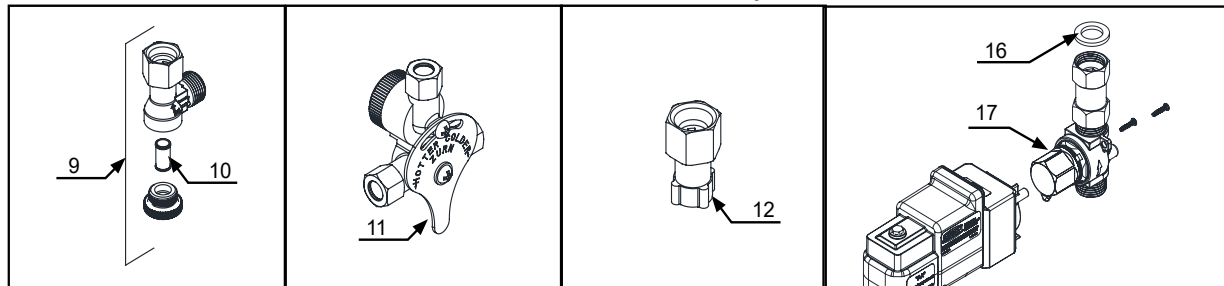
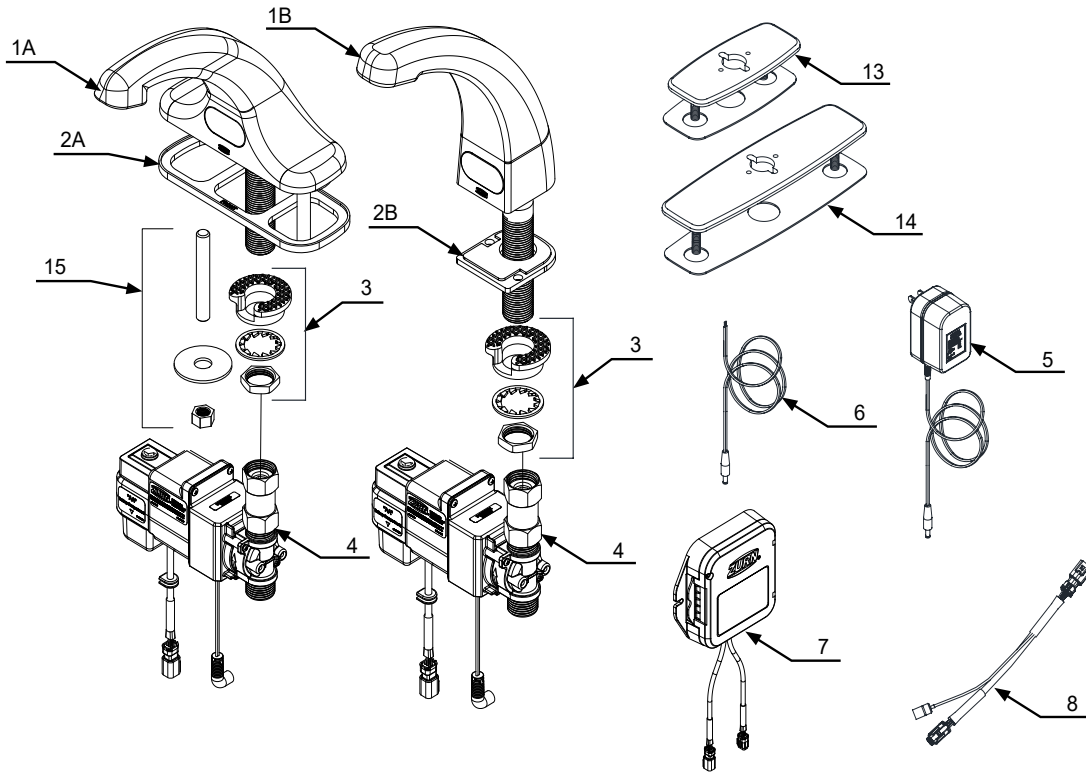
**Z6913-XL-HYD & Z6915-XL-HYD Parts List**



Description	Product No.
Item 1A: Z6915 Spout Assembly with Sensor	P6915-XL-2
Item 1B: Z6913 Spout Assembly with Sensor	P6913-XL-2
Item 2A: Z6915 Base Plate Gasket	P6915-42-WEDGE
Item 2B: Z6913 Base Plate Gasket	P6913-42-WEDGE
Item 3: Mounting Kit	P6900-43
Item 4: Hydrogenerator	P6900-HYD

Description	Product No.
Item 5: Electronics Box with Solenoid	P6950-XL-B-L-V2
Item 6: 4" Cast Cover Plate w/Gasket	P6900-CP4
Item 7: 8" Cast Cover Plate w/Gasket	P6900-CP8
Item 8: Sensor Inline Connector	P6950-XL-DC
Item 9: Filter Kit	P6900-120BC
Item 10: Filter Screen	P6900-MV-7
Item 11: Mixing Valve with Filter	P6900-MV-XL
Item 12: Composite Mixing Valve Adapter	P6900-MV-ADAP
Item 13: Z6915 Mounting Stud Kit	P6915-MOUNTING-KIT
Item 14: Shank Connection Gasket	P6900-SG
Item 15: Solenoid Rebuilt Kit (Diaphragm and Plunger w/ Spring)	P6950-SRK-V2

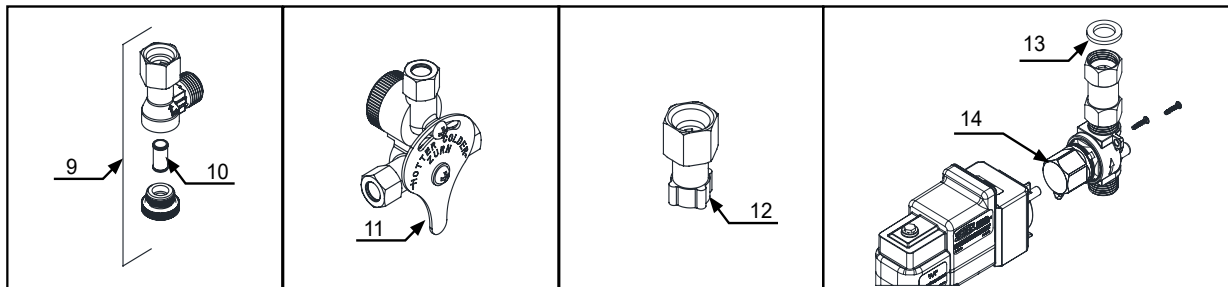
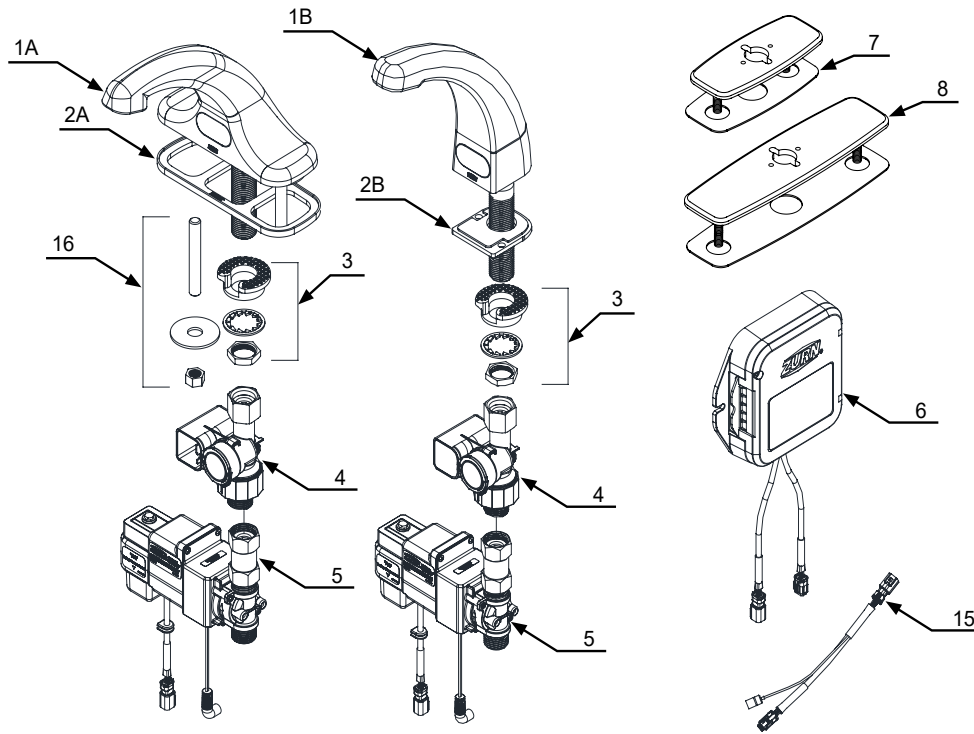
**Z6913-XL-W1 & Z6915-XL-W1 Parts List**



Description	Product No.
Item 1A: Z6915 Spout Assembly with Sensor	P6915-XL-2
Item 1B: Z6913 Spout Assembly with Sensor	P6913-XL-2
Item 2A: Z6915 Base Plate Gasket	P6915-42-WEDGE
Item 2B: Z6913 Base Plate Gasket	P6913-42-WEDGE
Item 3: Mounting Kit	P6900-43
Item 4: Electronics Box with Solenoid	P6950-XL-B-L-V2
Items 5-8: Smart Connected Faucet Retrofit Kit	P6900-RK-W2

Description	Product No.
Item 9: Filter Kit	P6900-120BC
Item 10: Filter Screen	P6900-MV-7
Item 11: Mixing Valve with Filter	P6900-MV-XL
Item 12: Composite Mixing Valve Adapter	P6900-MV-ADAP
Item 13: 4" Cast Cover Plate w/Gasket	P6900-CP4
Item 14: 8" Cast Cover Plate w/Gasket	P6900-CP8
Item 15: Z6915 Mounting Stud Kit	P6915-MOUNTING-KIT
Item 16: Shank Connection Gasket	P6900-SG
Item 17: Solenoid Rebuilt Kit (Diaphragm and Plunger w/ Spring)	P6950-SRK-V2

**Z6913-XL-W2 & Z6915-XL-W2 Parts List**



Description	Product No.
Item 1A: Z6915 Spout Assembly with Sensor	P6915-XL-2
Item 1B: Z6913 Spout Assembly with Sensor	P6913-XL-2
Item 2A: Z6915 Base Plate Gasket	P6915-42-WEDGE
Item 2B: Z6913 Base Plate Gasket	P6913-42-WEDGE
Item 3: Mounting Kit	P6900-43
Item 4: Hydrogenerator Assembly	P6900-HYD
Item 5: Electronics Box with Solenoid	P6950-XL-B-L-V2
Item 6: Smart Connected Faucet Retrofit Kit	P6900-RK-W2
Item 7: 4" Cast Cover Plate w/Gasket	P6900-CP4
Item 8: 8" Cast Cover Plate w/Gasket	P6900-CP8

Description	Product No.
Item 9: Filter Kit	P6900-120BC
Item 10: Filter Screen	P6900-MV-7
Item 11: Mixing Valve with Filter	P6900-MV-XL
Item 12: Composite Mixing Valve Adapter	P6900-MV-ADAP
Item 13: Shank Connection Gasket	P6900-SG
Item 14: Solenoid Rebuilt Kit (Diaphragm and Plunger w/ Spring)	P6950-SRK-V2
Item 15: Sensor Inline Connector	P6950-XL-DC
Item 16: Z6915 Mounting Stud Kit	P6915-MOUNTING-KIT



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Rev: G | Date: 06/18/25 | C.N. No. 146960 | Prod./Dwg. No. FV806

Patent [zurn.com/patents](http://zurn.com/patents)

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by **zurn ELKAY** Water Solutions



VENDOR PART	VENDOR	DESCRIPTION	PAGE
PG8EBF	Oasis	Electronic Bottle Filler / Barrier Free Water Cooler Combo	72



## VERSAFILLER®

### Model PWEBF (retro fit) and P\*EBF Family of Drinking Fountains/VersaFiller combo

### Installation Instructions



The Hands-Free VersaFiller is an extension of the Aqua Pointe® product line that mounts directly above Versacooler® I and II products. If the cooler outlet does not have two useable plugs, an outlet splitter will need to be used.

If installed onto a refrigerated cooler, chilled water can be dispensed through the VersaFiller. Otherwise, room temperature water will be dispensed.

The VersaFiller is shipped partially assembled.

On the combo units, the cooler is plumbed and ready to attach to the VersaFiller.

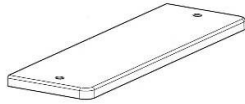
**When completed, the finished assembly will look like this:**



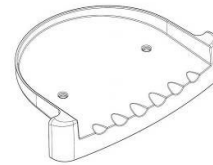
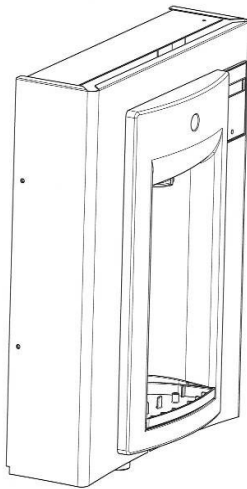
## Section 1: Getting Started

### What's Included:

(Top cap)

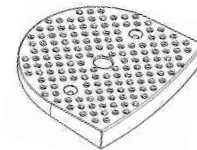
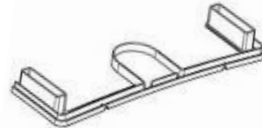


VersaFiller Hands-Free Sports Bottle Filler- (with wrapper, alcove and top cap installed onto the frame)



Drip tray

Gasket

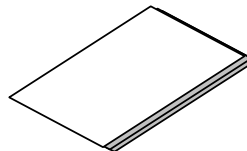


Anti splash grate

Quick connect tee fitting *(only required on split level units)*



38" of 1/4" OD plastic tubing with 19" of sponge tubing insulation *(included with "Versafiller ready" coolers)*



Installation instructions



Anti Splash grate screws (2)



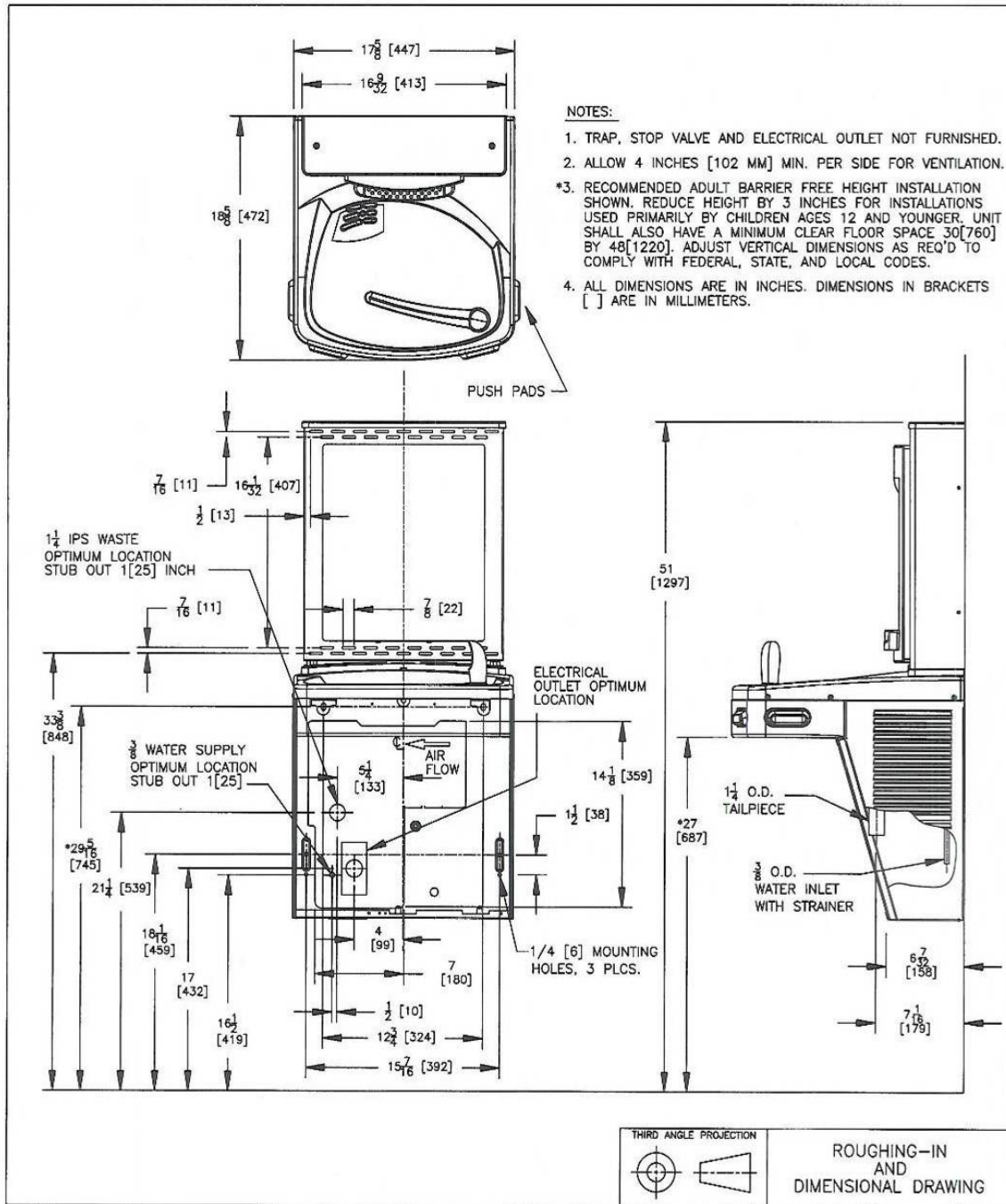
Snap bushing

### Tools required:

- 3/8" pilot drill and either a step drill bit up to 7/8" diameter that will drill through SS top or 7/8" diameter punch die (retrofit version only)
- Electric drill; wrench for punch die
- Small tubing cutter for copper tube
- 1/4" nut driver
- # 2 Phillips screw driver
- #15 torx bit driver

## Section 2: Rough In Drawing

### Oasis PWEBF: Versacooler® II Models PAC, P8AC with Hands-Free VersaFiller



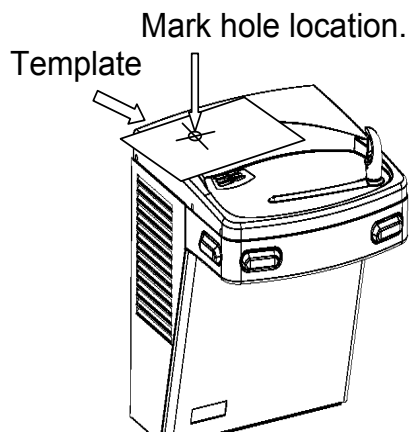


## Section 3: Installation

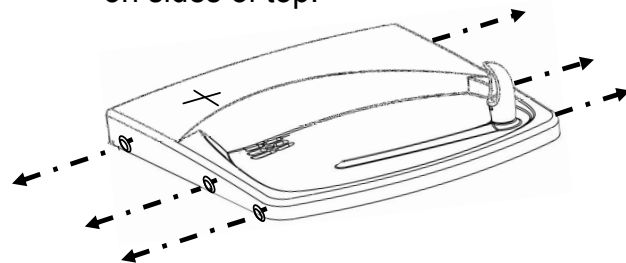
**Note: Proceed to Sect 3B Step 5 if the cooler is purchased “VersaFiller ready”.**

### **A: Drilling hole in the top for water line connection.**

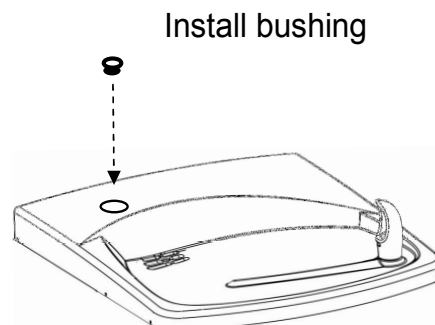
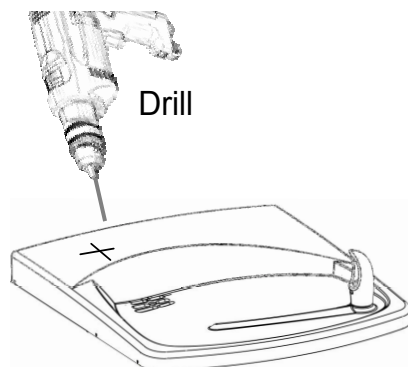
1. Disconnect power by UNPLUGGING unit. It might be necessary to remove the front panel to get access to the power.
2. Turn OFF water supply to the unit. It might be necessary to remove the front panel to access the water stop valve.
3. Place hole template onto cooler top so it is aligned with the left side of unit and wall. SEE NEXT PAGE FOR TEMPLATE
4. Mark hole location
5. Remove top from unit.



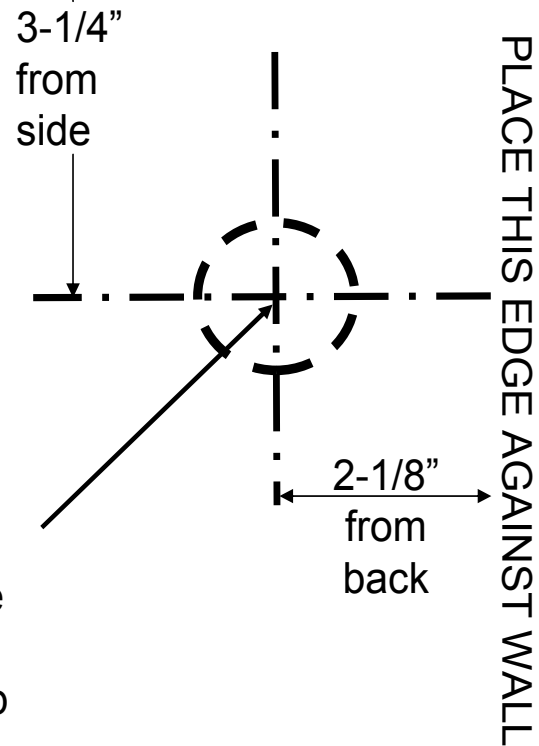
Remove top from cooler by removing six #15 torx head screws on sides of top.



6. Using a step drill bit or 7/8” punch die, make a 7/8” hole through top. You may want to drill a pilot hole to get these started.
7. Install snap bushing into hole to protect tubing from being cut.



ALIGN THIS EDGE WITH LEFT EDGE OF COOLER TOP



Mark this center point on the top. Remove the top from the cooler. Then create a  $7/8$ " diameter hole through the top at the marked center point (step drill bit or punch die).

USE THIS TEMPLATE TO MARK THE HOLE LOCATION ON COOLER TOP

## Section 3: Installation

### **B: Connecting the water line**

**Note: If you are retrofitting the Versafiller to an existing cooler, follow the instructions starting on the next page.**

For the single “Versafiller ready” cooler, the tube to connect to the Versafiller is found inside the access panel (the compressor compartment). This tube supplies cold water from the cooling tank to the Versafiller.

1/4" OD tube to connect  
to Versafiller



For split level “Versafiller ready” coolers, the tube to plumb in the Versafiller is packaged in the dummy unit.

Remove tube from bag.



First, remove plug from  
fitting on tank drain



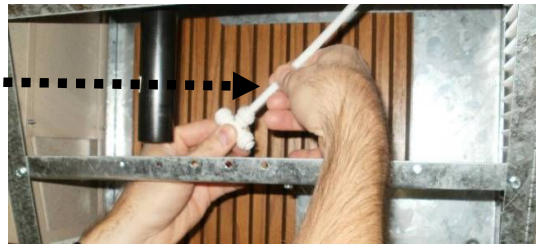
Next, insert end of  
tube into fitting.



The tee and tube to the Versafiller are packaged with the PWEBF unit. One branch of the tee will supply the valve on the dummy unit, the other branch of the tee will connect to the Versafiller.

If a filter is being installed, cut a piece of tubing about 3" long to insert flow switch right after filter and before tee. This allows Versafiller counter to accurately calculate amount of water passing through filter.

Tube to connect valve on dummy unit



Tube to connect Versafiller

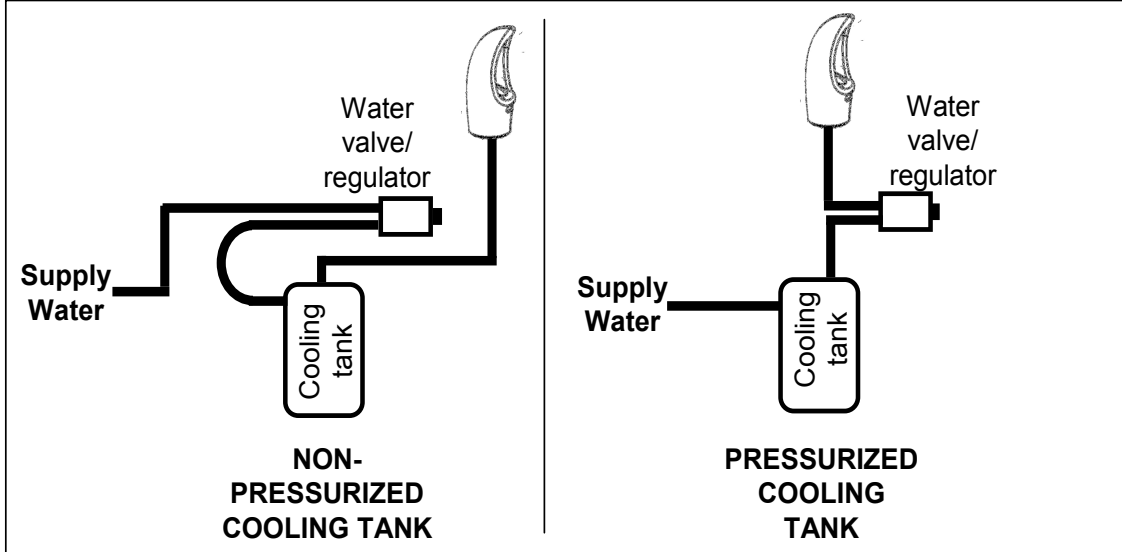
Tube to connect chilled water to dummy unit and Versafiller



Go to Step 5 "Final steps for both product families:"

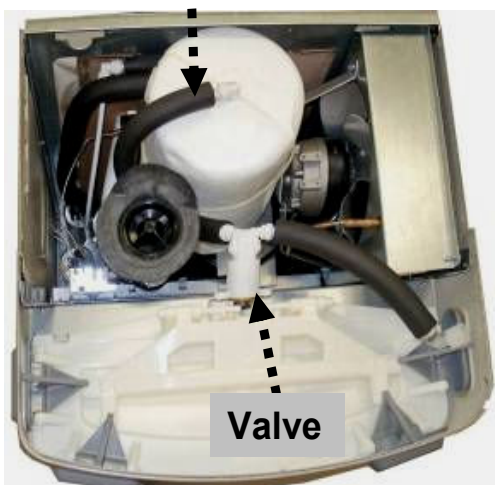
To retrofit the Versafiller to an existing unit, follow the instructions below:

If the cooling tank is non-pressurized, then go to the “Pressurizing the cooling tank” addendum section. Otherwise, proceed to step 1 below. Non-pressurized units are single units made since December of 2009. Refer to the schematic below to identify the system that you have.



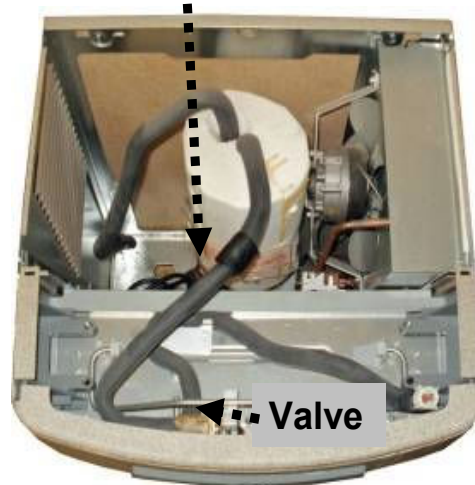
1. With the cooler top removed, find the tube going from the cooling tank outlet to the valve. The TEE fitting (supplied) will need to connect between the cooling tank and valve.

Outlet Tube (insulated plastic)



P8AC family

Outlet Tube (insulated copper)



P8AM family

**Section 3: Installation: For the P8AC Version: Versacooler II**

2. Disconnect tubing from the elbow on the valve.



3. Using the 38" piece of tubing provided, cut 6" and install it on the end of the TEE. Install the remaining tubing onto the branch of the TEE. Connect the other end of the TEE to the tank outlet tubing (tube that was disconnected from the elbow).



**TEE**

**32" tubing**

**6" tubing**

4. Route the TEE and tubing under the waste drain and connect the 6" length to the water valve elbow.



**Water  
valve  
elbow**

Go to Step 5 "Final steps for both product families:"

**Section 3: Installation: For the P8AM Version: Versacooler I**

2. Remove tar tape from the insulation on the outlet tube.



3. Pull back insulation and cut the copper tube with a tubing cutter. Cut where there is at least 1 inch of *straight* tubing on each side of the cut.



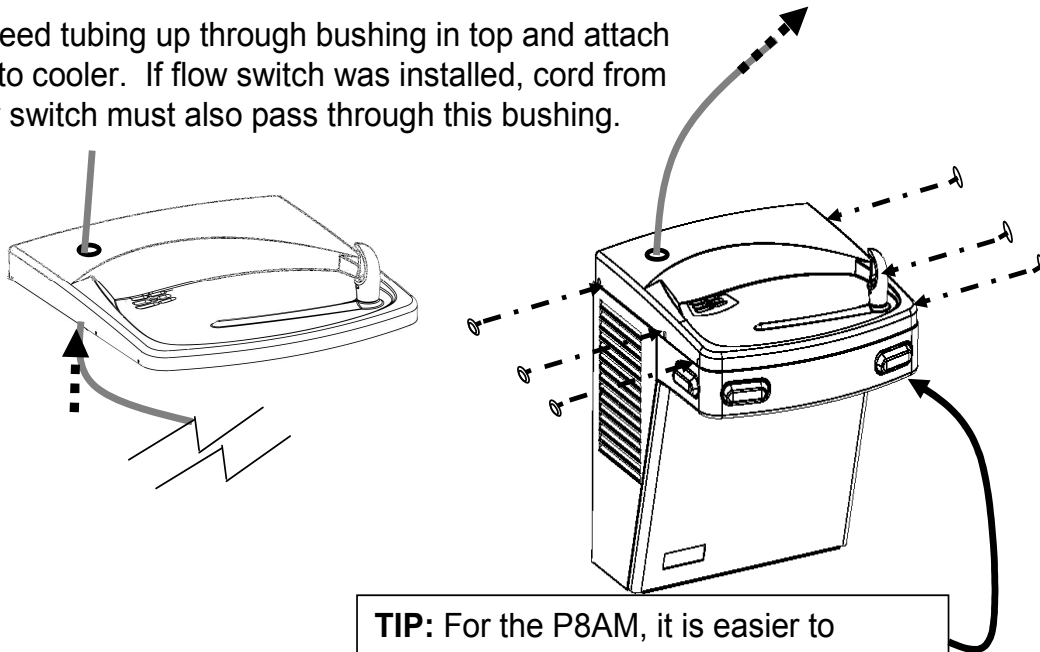
4. Install TEE fitting by connecting the copper tubing to each end. Then install the 32" piece of plastic tubing to the TEE branch.



**32" plastic tubing (supplied)**

### Section 3: Installation: **Final steps for both product families:**

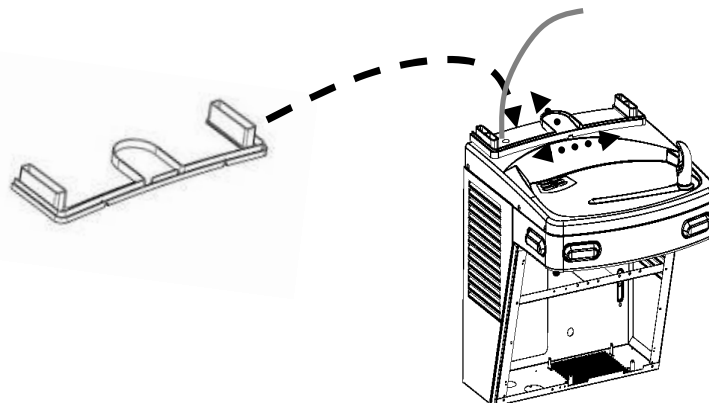
5. Feed tubing up through bushing in top and attach top to cooler. If flow switch was installed, cord from flow switch must also pass through this bushing.



**TIP:** For the P8AM, it is easier to connect the outlet tube to the bubbler if the front nose is removed.

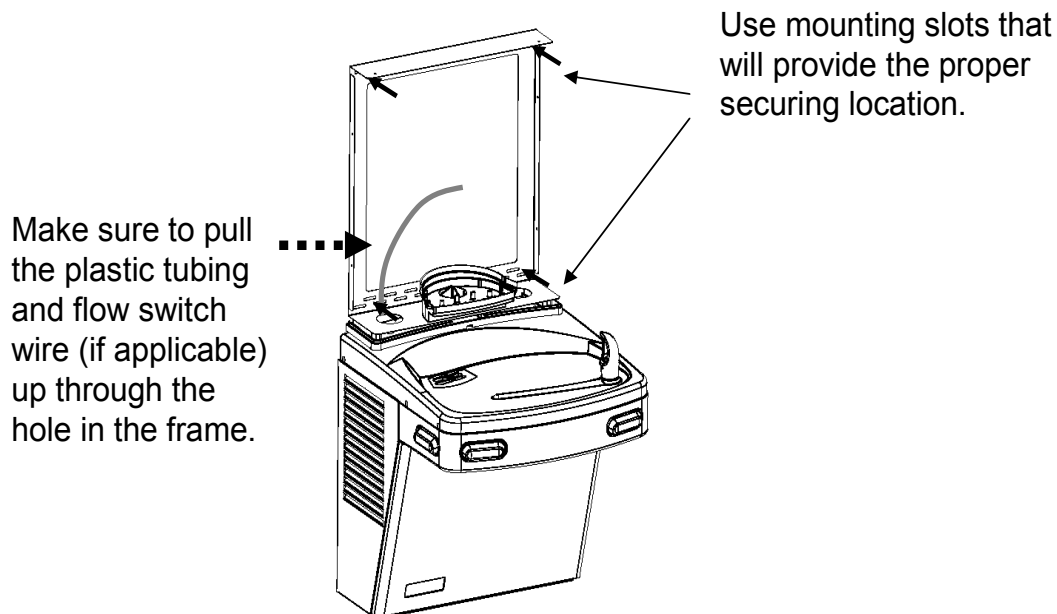
### **C: Mounting the frame to the wall**

1. Place rubber gasket on top of the cooler so it is centered left/right and against the wall.



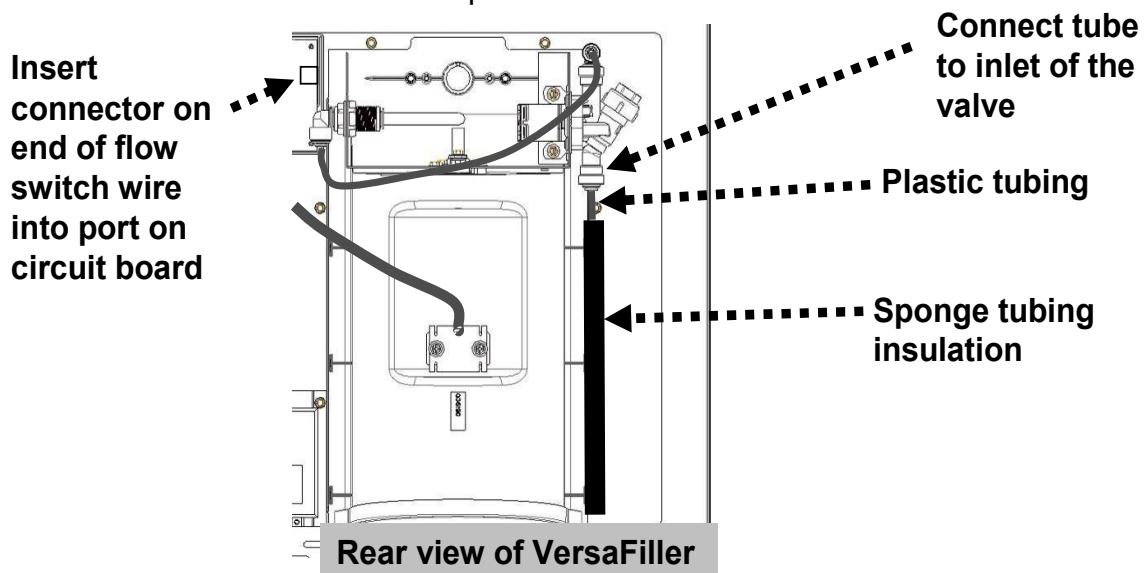
## Section 3: Installation

2. Set the wall frame onto the gasket. Center it left/right and push it against the wall and mark hole locations for wall fasteners. The gasket will set the frame at the proper height.



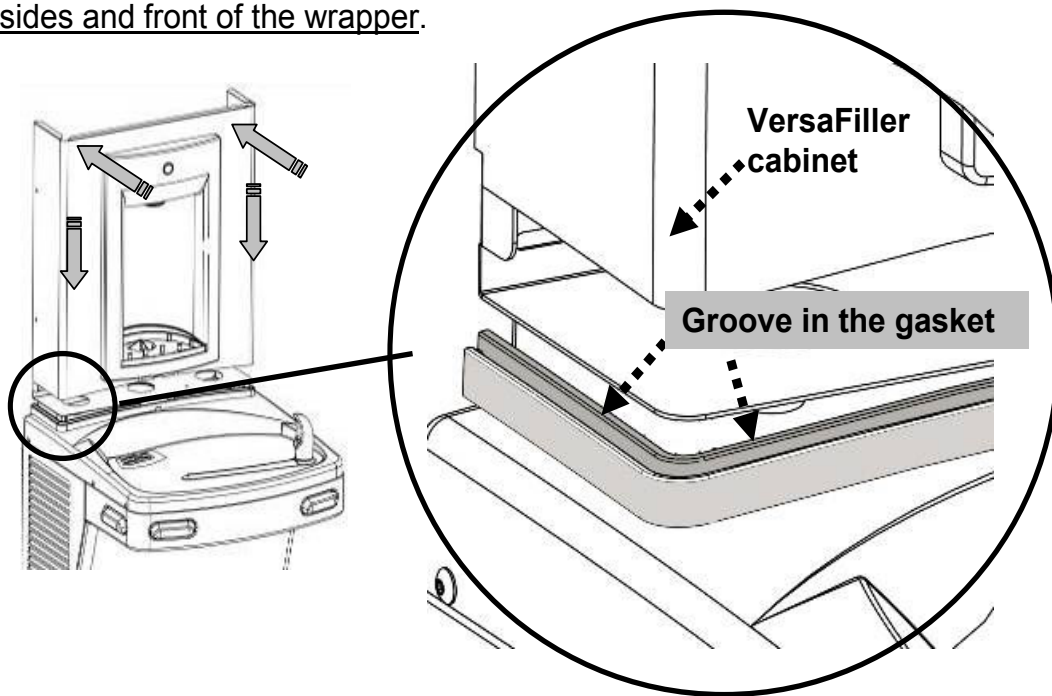
3. Secure frame to the wall with fasteners (not provided). Pull plastic tubing up through the hole in the frame.

4. Slide sponge tubing insulation over water line. Connect the tubing to the INLET of the solenoid on the back of the Hands-free VersaFiller assembly and flow switch connector into port on circuit board.

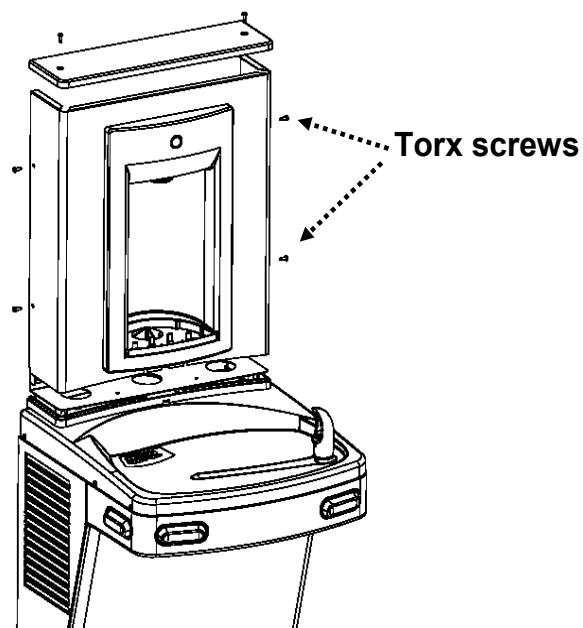


### Section 3: Installation

5. Set the VersaFiller cabinet into place. As you do, feed the terminals on the power supply power cord through the bushing on the cooler top. MAKE SURE the cabinet fits into the groove in the rubber gasket on both sides and front of the wrapper.

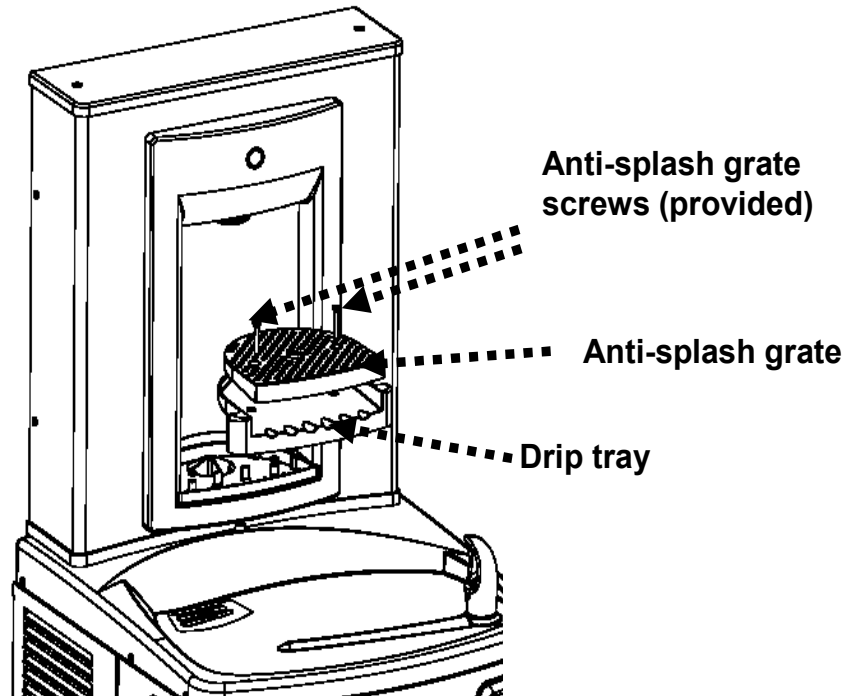


6. Attach VersaFiller assembly to the frame using four (4) torx screws. Leave the top cap off until after the program is set for this installation.



### Section 3: Installation

7. Install the drip tray and anti-splash grate into the alcove area and secure with the two (2) stainless steel phillips head screws.

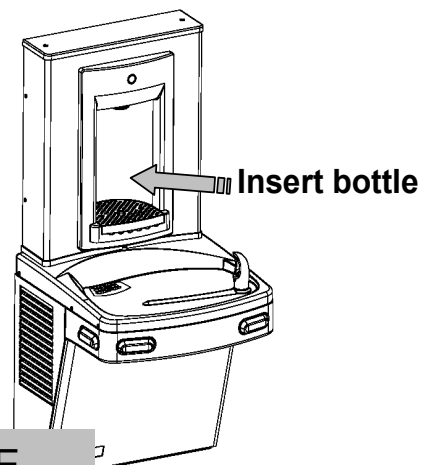


8. Connect male tab terminals from bottle filler power supply to female terminals on power cord. Make sure male tab is seated inside metal contacts of female terminal.

9. Plug in bottle filler cord. The program should be set up specific for that installation. See the program guide on the next page.

10. Turn ON water supply and check for leaks. Place a container in the alcove to release any trapped air from the system. Plug in the power cord and replace the front panel.

11. If everything works correctly, place the top cap back on the bottle filler and use the remaining two (2) torx screws to fasten it in place. Otherwise, calibrate the sensor per the instructions on the next page.



**INSTALLATION COMPLETE**



## Section 4: Set-up guide for bottle filler electronics

Factory default settings are for a(n):

- UNFILTERED unit
- 20 second maximum run time

You can change the program settings by entering the program mode. To change the program settings, use the following steps:

1. Top cap is set aside until program is complete. Remove top cap by unscrewing two (2) T15 torx screws if needed.
2. Reach hand down between frame and front of cabinet to gently press button sticking up from top of circuit board (Note: Circuit board runs on low voltage and will not shock you). A remote button is available. Remove wire tie bundling it inside bottle filler and feed it through hole in cooler top. You can then adjust program using button through access panel of cooler.
3. To enter program mode, press and hold button for about 3 seconds. When you hear a beep, let go of button. You are now in program mode. Pressing button for an instant will advance to next screen. It will revert back to operating mode if no button is pressed for 10 seconds.
4. When you enter program mode, display screen will read "UNFILTERED UNIT." To access settings for "FILTERED UNIT", press and hold button for about 3 seconds. Press button for an instant to advance to next menu item.
5. If you wish to reset filter life counter or bottle counter, press and hold button for 3 seconds in screen asking corresponding question.
6. Default capacity for filter life counter is 1250 gallons (to match Versafilter). Press and hold button 3 seconds in "FILTER CAPACITY OF..." screen to change setting to 3000 gallons (galaxi® green filter media).
7. "Bottle Filler Set\_time" screen is to adjust maximum run time once sensor is activated. Water flow will stop once container is removed from alcove, but this feature ensures very little water is wasted if someone tampers with dispenser.
8. Unit is calibrated at factory, but it is recommended that sensor be re-calibrated at each install. Also, if you are having problems with sensing of a bottle, try recalibrating it before calling for service. Press and hold button for 3 seconds to calibrate sensor in "INFRARED SENSITIVITY" screen.
9. Put top cap back on and fasten in place with two (2) torx screws.

## Addendum Section: Pressurizing Cooling Tank



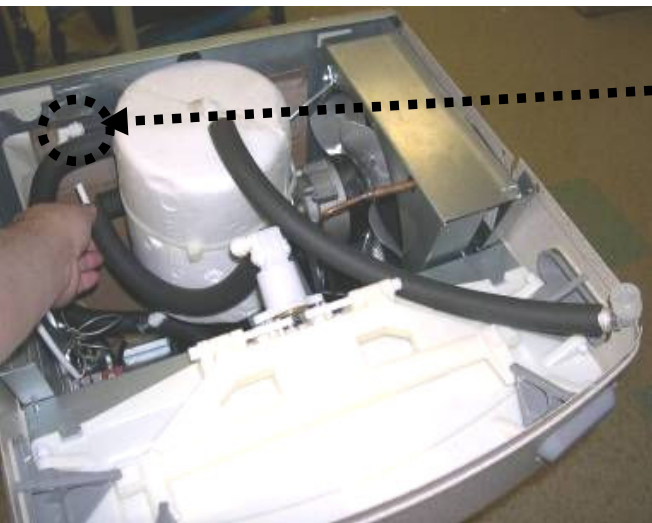
The water should already be turned OFF and the power disconnected.

Unit as it appears with top removed



### STEP 1

Unplug un-insulated water line from water valve inlet (JG elbow located left side of water valve facing the front of the cooler). Set tubing aside (careful to not contaminate water contact end).



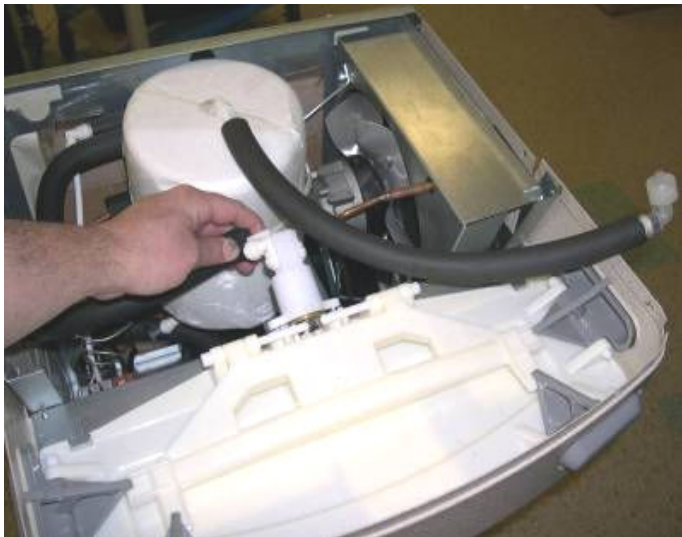
### STEP 2

Unplug tubing from JG elbow leading to cooling tank inlet.



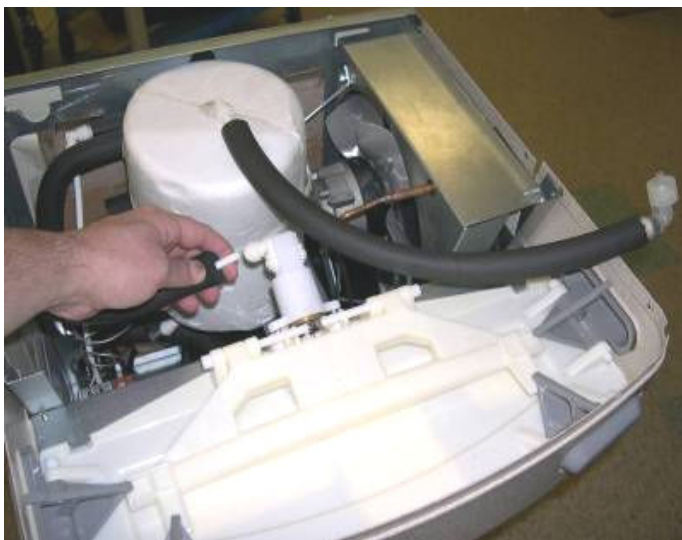
**STEP 3**

Plug un-insulated tubing that was removed in step 1 into JG elbow leading to the cooling tank from step 2.



**STEP 4**

Unplug tubing that is connected to the water valve outlet (JG elbow located on the right side of valve facing the cooler).



**STEP 5**

Connect tubing from step 4 to JG elbow on the left side of the valve.



### Step 6

Unplug JG tubing from the cooling tank outlet. Do not set it down.



### Step 7

Using tubing removed in step 6, plug into JG elbow on the right side of the valve. (be sure to rout the tubing under existing tubing installed in step 4 as shown)



### Step 8

Using tubing that is connected to the JG elbow left side of valve (done in step 4), and plug the other end to the JG fitting at the top of the cooling tank.

**Return to Section 3 B**  
**“Connecting the water line”**



## Electronics quick reference guide

- Press and hold button for 3 seconds to enter program mode or change program setting while in program mode.
- Choose “UNFILTERED UNIT” or “FILTERED UNIT” in program mode.
- “BOTTLE FILLER SET\_TIME” is adjustable from 10-20 seconds in program mode.
- To reset filter life counter, press and hold button at question “RESET ##### GALLON COUNT?” in program mode.
- To reset bottle counter, press and hold button at question “RESET ##### BOTTLE COUNT?” in program mode.
- Re-calibrate sensor at installation or if sensor doesn’t respond correctly. To re-calibrate, press and hold button at “INFRARED SENSITIVITY” screen in program mode.

### Accessories:

**Vandal resistant screw kit:** P/N 036704-001, includes torx bits and replacement screws for items 4 and 25.

**Gasket, Sunroc/Haws :** P/N 036689-101 (replaces item 10); [KIT P/N 036752-001](#)

**Gasket, Elkay/Halsey Taylor** P/N 036689-201 (replaces item 10) : [KIT P/N 036752-002](#)

P/N 030099-476 Rev. A    Date: 7/2013  
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**Oasis International**  
222 East Campus View Blvd.  
Columbus, OH 43235  
614-861-1350  
[www.oasiscoolers.com](http://www.oasiscoolers.com)





**C. MAINTENANCE**

The only maintenance operation required is the removal of dirt and lint from the condenser of the water cooler. Inspection should be made at 3-month intervals. Disconnect power supply cord, then clean condenser with small stiff non-wire brush when required. Observance of this procedure will ensure adequate air circulation through condenser so operation is efficient and economical.

**D. OVERLOAD PROTECTION (water cooler)**

Compressor motor, where used, is equipped with automatic reset protector which will disconnect motor from line in case of an overload.

**E. LUBRICATION (water cooler)**

This unit is equipped with a hermetically sealed compressor and requires no additional lubrication. The fan motor on this unit seldom needs oiling, but if required, a few drops of SAE 10 oil should be used.

**F. TO DISCONTINUE USE OF WATER COOLER AND WATER FOUNTAIN**

1. Close water shut off valve.
2. Provide container to catch water to be drained.
3. Disconnect the water supply line at the water cooler "WATER SUPPLY" tube. Disconnect water cooler "DRAIN/REMOTE COLD WATER" tube from water fountain "WATER IN" tube. Place container under water cooler "DRAIN/REMOTE COLD WATER" tube, then push and hold push button on the water cooler until water cooler is completely drained. Place container under water fountain "WATER IN" tube, then push and hold push button on the water fountain until water fountain is completely drained.
4. Disconnect the power supply cords.
5. Plug both water cooler "DRAIN/REMOTE COLD WATER" tube, and water fountain "WATER IN" tube.
6. ALWAYS DRAIN ALL WATER WHEN FREEZING TEMPERATURES ARE ANTICIPATED AND BEFORE SHIPPING THE WATER COOLER.

\*American With Disabilities Act

**WARNING**

The warranty and the Underwriters' Laboratory listing for this machine are automatically voided if this machine is altered, modified, or combined with any other machine or device. Alteration or modification of this machine may cause serious flooding and/or hazardous electrical shock or fire.

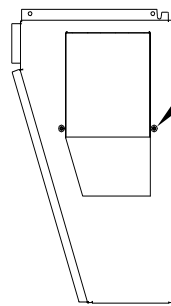
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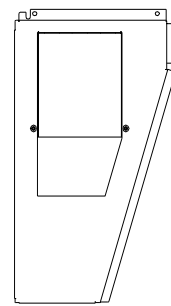
WATER FOUNTAIN  
RIGHT SIDE PANEL



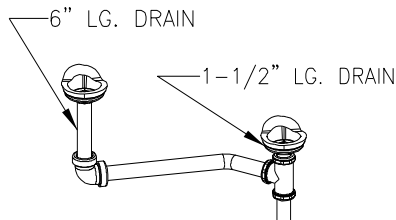
2 T15 TORX HEAD  
SCREWS (PROVIDED)

PATCH PLATE LOCATION  
FOR COOLER CONFIGURED  
FOR RIGHT SIDE LOW

WATER COOLER  
LEFT SIDE PANEL

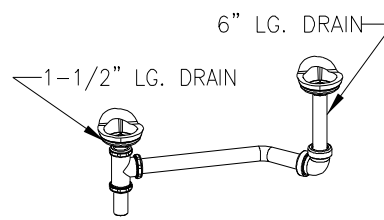


PATCH PLATE LOCATION  
FOR COOLER CONFIGURED  
FOR RIGHT SIDE HIGH



DRAIN CONFIGURATION  
RIGHT SIDE LOW

MOUNT DRAINS WITH PROVIDED  
1-1/4" LONG SCREWS

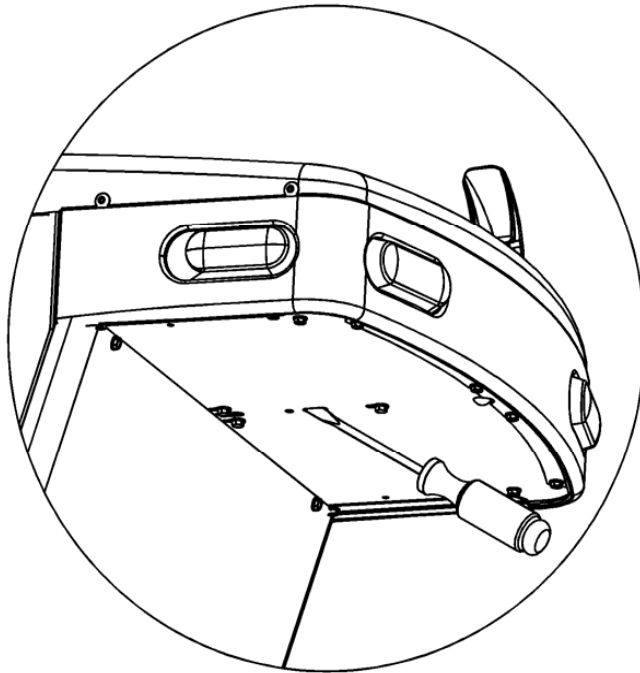


DRAIN CONFIGURATION  
RIGHT SIDE HIGH

MOUNT DRAINS WITH PROVIDED  
1-1/4" LONG SCREWS







To adjust stream height, insert a 1/8" Flat blade screwdriver into the slotted hole as shown. The screwdriver will engage the stream height adjuster in the cartridge plunger. Turn clockwise to increase stream height, or ccw to reduce stream height.

032386-048 Rev. A



VENDOR PART	VENDOR	DESCRIPTION	PAGE
CU199eN	Rinnai	Ext Com Ctwh 199K Btu 11Gpm Max With Valve	98

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# Rinnai®

COMMERCIAL

## Tankless Water Heater Installation and Operation Manual

### INTERNAL (INDOOR) MODELS:

CU199i (REU-N3237FFC-US)

CU160i (REU-N2530FFC-US)

### EXTERNAL (OUTDOOR) MODELS:

CU199e (REU-N3237WC-US)

CU160e (REU-N2530WC-US)



Full-length French and Spanish versions  
available online at [rinnai.us](http://rinnai.us)

SENSEI™



Place  
Model/Serial #  
Label Here  
*Located in Manual Bag*



ANSI Z21.10.3 • CSA 4.3

**⚠ WARNING** If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury, or death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS
  - Do not try to light any appliance.
  - Do not touch any electrical switch; do not use any phone in your building.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

**⚠ AVERTISSEMENT** Assurez-vous de bien suivre les instructions données dans cette notice pour réduire au minimum le risque d'incendie ou d'explosion ou pour éviter tout dommage matériel, toute blessure ou la mort.

- Ne pas entreposer ni utiliser d'essence ou ni d'autres vapeurs ou liquides inflammables à proximité de cet appareil ou de tout autre appareil.
- QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ :
  - Ne pas tenter d'allumer d'appareil.
  - Ne touchez à aucun interrupteur ; ne pas vous servir des téléphones se trouvant dans le bâtiment.
  - Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur.
  - Si vous ne pouvez rejoindre le fournisseur, appelez le service des incendies.
- L'installation et l'entretien doivent être assurés par un installateur ou un service d'entretien qualifié ou par le fournisseur de gaz.

**Rinnai Customer Care 1-800-621-9419**

**[rinnai.us](http://rinnai.us)**





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# Thank You

Thank you for purchasing a Rinnai Tankless Water Heater. Before installing and operating this water heater, be sure to read these instructions completely and carefully to familiarize yourself with the water heater's features and functionality.

## If You Need Service

Contact your local dealer/distributor or call Rinnai Customer Care at 1-800-621-9419 Monday to Friday between 8 AM to 8 PM ET. Please have your full serial number or model number available for product- or service-related issues.

## To The Installer

- It is recommended that a licensed professional install the appliance, inspect it, and leak test it before use. The warranty may be voided due to any improper installation.
- The trained and qualified professional should have skills such as:
  - Gas sizing
  - Connecting gas lines, water lines, valves, and electricity
  - Knowledge of applicable national, state, and local codes
  - Installing venting through a wall or roof
  - Training in installation of tankless water heaters. Training on Rinnai Tankless Water Heaters is accessible at [www.trainingevents.rinnai.us](http://www.trainingevents.rinnai.us)
- Read all instructions in this manual before installing the water heater. The water heater must be installed according to the exact instructions in this manual.
- Proper installation is the responsibility of the installer.
- When installation is complete, leave this manual with the water heater (for internal/indoor units) or give the manual directly to the consumer.

## To The Consumer

- You must read the entire manual to properly operate the water heater and to have regular maintenance performed.
- Keep this manual for future reference.
- As when using any appliance generating heat, there are certain safety precautions you should follow. See section "1.2 Safety Precautions" for detailed safety precautions.
- Be sure your water heater is installed by a licensed installer.
- If installing in the state of Massachusetts, you must read section "6.5 Massachusetts State Gas Regulations" in this manual.

# 1. Safety

## **WARNING**

- If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury, or death.
- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS:
  - Do not try to light any appliance.
  - Do not touch any electrical switch; do not use any phone in your building.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.
- The warning signs in this manual are here to prevent injury to you and others. Please follow them explicitly.

## **AVERTISSEMENT**

- Assurez-vous de bien suivre les instructions données dans cette notice pour réduire au minimum le risque d'incendie ou d'explosion ou pour éviter tout dommage matériel, toute blessure ou la mort.
- Ne pas entreposer ni utiliser d'essence ou ni d'autres vapeurs ou liquides inflammables à proximité de cet appareil ou de tout autre appareil.
- QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ :
  - Ne pas tenter d'allumer d'appareil.
  - Ne touchez à aucun interrupteur ; ne pas vous servir des téléphones se trouvant dans le bâtiment.
  - Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur.
  - Si vous ne pouvez rejoindre le fournisseur, appelez le service des incendies.
- L'installation et l'entretien doivent être assurés par un installateur ou un service d'entretien qualifié ou par le fournisseur de gaz.
- Les panneaux d'avertissement de ce manuel sont ici pour éviter de vous blesser et d'autres personnes. Suivez-les explicitement.

## 1.1 Safety Symbols



Safety alert symbol. Alerts you to potential hazards that can kill or hurt you and others.



Indicates an imminently hazardous situation which, if not avoided, will result in personal injury or death.



Indicates a potentially hazardous situation which, if not avoided, could result in personal injury or death.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

## 1.2 Safety Precautions

The following precautions apply to the installer and consumer. Read and follow all instructions in this section.



**WARNING** DO NOT adjust the internal gas valve. The design is such that adjustment is not required. Warranty will be voided if the internal gas valve is adjusted.

- Before operating, smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- Keep the area around the appliance clear and free from combustible materials, gasoline, and other flammable vapors and liquids.
- Combustible construction refers to adjacent walls and ceiling and should not be confused with combustible or flammable products and materials. Combustible and/or flammable products and materials should never be stored in the vicinity of this or any gas appliance.
- Always check the water temperature before entering a shower or bath.
- To protect yourself from harm, before performing maintenance:
  - Turn off the electrical power supply by unplugging the power cord or by turning off the electricity at the circuit breaker. (The temperature controller does not control the electrical power.)
  - Turn off the gas at the manual gas control valve, usually located immediately below the water heater.
  - Turn off the incoming water supply. This can be done at the isolation valve immediately below the water heater or by turning off the water supply to the building.
  - Use only your hand to turn the manual gas control valve. Never use tools. If the manual gas control valve will not turn by hand, do not try to repair it; call a trained and qualified professional. Force or attempted repair may result in a fire or explosion.
- Do not use this appliance if any part has been under water. Immediately call a licensed professional to inspect the appliance and to replace any part of the control system and any manual gas control valve which has been under water.  
(*N'utilisez pas cet appareil s'il a été plonge dans l'eau, même partiellement. Faites inspecter l'appareil par une licence professionnelle et remplacez toute partie du système de contrôle et toute commande qui ont été plongés dans l'eau.*)
- Do not use substitute materials. Use only parts certified for the appliance.
- Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance.  
(*En cas de surchauffe ou si l'alimentation en gaz ne s'arrête pas, fermez manuellement le robinet d'arrêt de l'admission de gaz.*)
- Only trained and qualified professionals are permitted to adjust parameter settings.
- Do not use an extension cord or adapter plug with this appliance.
- Any alteration to the appliance or its controls can be dangerous and will void the warranty.
- Proper venting is required for the safe operation of this appliance.
- Flammable liquids such as cleaning solvents, aerosols, paint thinners, adhesives, gasoline and propane must be handled and stored with extreme care. These flammable liquids emit flammable vapors and when exposed to an ignition source can result in a fire hazard or explosion. Flammable liquids should not be used or stored in the vicinity of this or any other gas appliance.
- DO NOT operate the water heater without the front panel installed. The front panel should only be removed for service/maintenance or replacing internal components.
- BURN HAZARD. Hot exhaust and vent may cause serious burns. Keep away from the water heater. Keep small children and animals away from the water heater.
- Hot water outlet pipes leaving the water heater can be hot to touch.
- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.  
(*Ne pas entreposer ni utiliser d'essence ou ni d'autres vapeurs ou liquides inflammables à proximité de cet appareil ou de tout autre appareil.*)
- Install the vent system per local and national codes.
- Do not install this water heater above 10,200 ft (3,109 m).
- Do not obstruct combustion air to the water heater.
- Failure to properly vent this appliance can result in death, personal injury and/or property damage.
- Rinnai recommends that every home have a carbon monoxide (CO) alarm in the hallway near bedrooms in each sleeping area. Check batteries monthly and replace them annually.
- California law requires the following Proposition 65 warning to be provided:



### WARNING

This product can expose you to chemicals including lead, lead compounds and carbon disulfide which are known to the State of California to cause cancer, birth defects or other reproductive harm. For more information, visit [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).



## 2. About the Water Heater

---

### 2.1 Items Included

---

Unpack the Rinnai Tankless Water Heater package and verify the following contents are included. If any items are missing, contact your local dealer/distributor or call Rinnai Customer Care at 1-800-621-9419.

- Rinnai Tankless Water Heater
- Wall Mounting Bracket (for internal/indoor water heaters only)
- Pressure Relief Valve and Adapter
- Isolation Valve Kit (for quick isolation of the water heater for service and/or maintenance)
- Literature Bag
  - Tankless Water Heater Installation and Operation Manual (this manual)
  - Wall Mounting Bracket Template (for internal/indoor water heaters only)
  - Model/Serial Number Labels (with printed QR code)
- External Pump Cable (for external recirculation pump control)
- Controller Cable (for additional controller connection)
- Vent screens (x2) and vent screen screws (x2) (for internal/indoor water heaters only). The vent screen prevents debris and other objects from entering the terminal. One vent screen is for the intake; the other is for the exhaust
- Self-Tapping Screws (x2) (for internal/indoor water heaters only)

### 2.2 Items Needed for Installation (Not Included)

---

- |                             |  |
|-----------------------------|--|
| • Pipe wrenches (x2)        | • Level                                      |
| • Phillips Head screwdriver | • Soap or gas leak detector solution         |
| • Wire cutters              | • Approved venting                           |
| • Gloves                    | • Teflon tape (recommended) or pipe compound |
| • Safety glasses            | • Pipe insulation                            |




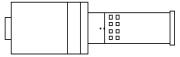
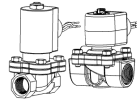

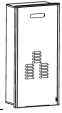






### 2.3 Items Not Required But May Be Useful

---

- |  |  |
|--|--|
| • Hammer drill with concrete bits        | • Electrical wire                        |
| • Saw                                    | • Concrete wall anchors                  |
| • Threading machine with heads and oiler | • Optional pipe cover                    |
| • Core drill with diamond head           | • PVC glue/cement and primer             |
| • Torch set                              | • 2 conductor 22 AWG wire for controller |
| • Copper tubing cutter                   | • Single gang electrical box             |
| • Steel pipe cutter                      | • Wire nuts                              |
| • Heat tape                              | • Unions and drain valves                |

## 2.4 Accessories

Numerous optional accessories are available for purchase for your Rinnai Tankless Water Heater. Listed below are some commonly purchased accessories. For a complete list of accessories, visit [www.rinnai.us](http://www.rinnai.us). For questions, or to purchase an accessory, contact your local Rinnai dealer/distributor or Rinnai Customer Care at 1-800-621-9419.

Product	Product Description	Image
Room Air Screen	Recommended air filter/screen for use in room air applications only.	
Condensate Neutralizer	Neutralizes the condensate generated by the water heater.	
ScaleCutter	Filters and reduces the amount of scale entering the water heater allowing for greater water heater longevity.	
ScaleCutter Refill Cartridge	Refill cartridge for the ScaleCutter filter assembly.	
Drain Down Kit	Provides freeze protection by immediately draining the water heater upon loss of power.	
Additional Controller	Additional controllers are available for user convenience.	
Recess Box	Allows an external (outdoor) water heater to be recessed into a wall.	
Pipe Cover	Encloses the piping below the water heater for aesthetic purposes.	
Control-R™ Wi-Fi Module (And Accessories)	Controls On-Demand recirculation, remotely adjust temperatures, and communicates with the service provider portal.  <small>The Control-R™ Wi-Fi Module and MC-195T-US controller are not compatible accessories and must not be installed together.</small>	
Recirculation Pump	A pump system can be incorporated with Rinnai Circ-Logic recirculation technology in a dedicated recirculation system.	
EZConnect™ Cable	Electronically connects two water heaters and allows them to function as one hot water source.	
Cascade Cable	Electronically connects up to 24 water heaters and enables them to function as one hot water source. Note: One cable is needed for each water heater.	
DPS/MIS Switch	<ul style="list-style-type: none"> <li>The DPS function provides domestic hot water priority for combination tankless water heater/air handler applications.</li> <li>The MIS function provides tankless water heater monitoring via systems such as BMS (Building Management System).</li> </ul>	



## 2.5 Specifications

		Internal (Indoor) Units		External (Outdoor) Units	
		CU199i	CU160i	CU199e	CU160e
Minimum Gas Consumption Btu/h		15,000			
Maximum Gas Consumption Btu/h		199,000	160,000	199,000	160,000
Flow Rate <sup>1</sup> (Min - Max)		0.26 - 9.8 GPM (1.0 - 37 L/min)	0.26 - 8.0 GPM (1.0 - 30 L/min)	0.26 - 9.8 GPM (1.0 - 37 L/min)	0.26 - 8.0 GPM (1.0 - 30 L/min)
Max Flow Rate with Parameter Adjustment		11 GPM (42 L/min)	9 GPM (34 L/min)	11 GPM (42 L/min)	9 GPM (34 L/min)
Weight		64 lb (29 kg)	62 lb (28 kg)	64 lb (29 kg)	62 lb (28 kg)
Sound level		49 dB	48 dB	53 dB	52 dB
Electrical Data	Normal	84 W	52 W	81 W	49 W
	Standby	1.3 W			
	Freeze Protection	148 W		152 W	
	Max Current	4 Amps			
	Fuse	10 Amps			
Temperature Setting		<ul style="list-style-type: none"> <li>Minimum: 98° F (37° C)</li> <li>Maximum: Default: 140° F (60° C) With Parameter Adjustment: 185° F (85° C)</li> </ul>			
By-Pass Flow Control		Electronic			
Gas Supply Pressure <sup>2</sup>	Natural	3.5 in. w.c. - 10.5 in. w.c.			
	Propane	8.0 in. w.c. - 13.5 in. w.c.			
Type of Appliance		Super-High-Efficiency (Condensing), Tankless, Temperature Controlled Continuous Flow Gas Hot Water System			
Ignition System		Direct Electronic Ignition			
Electric Connections		<ul style="list-style-type: none"> <li>Appliance: AC 120 Volts, 60Hz.</li> <li>Temperature Controller: DC 12 Volts (Digital)</li> </ul>			
Water Supply Pressure		<ul style="list-style-type: none"> <li>Minimum: 50 PSI (Recommended 60-80 PSI for maximum performance)</li> <li>Maximum: 150 PSI</li> </ul>			
Remote Control Cable		Non-Polarized Two Core Cable (Minimum 22 AWG)			
ENERGY STAR® Qualified		Yes			
Complies with South Coast Air Quality Management District 14 ng/J or 20 ppm NOx emission levels		Yes			

<sup>1</sup> Minimum flow may vary slightly depending on the temperature setting and the inlet water temperature. Minimum activation flow is 0.4 GPM (1.5 L/min).

<sup>2</sup> The maximum gas supply pressure must not exceed the value specified by the manufacturer.

Rinnai products are continually being updated and improved; therefore, specifications are subject to change without prior notice.

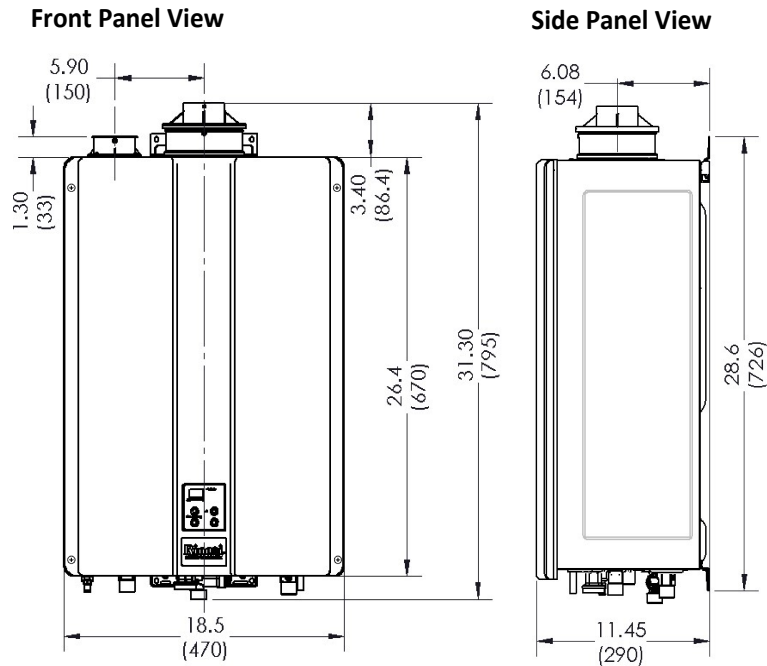
## 2.6 Dimensions

Measurements: in. (mm)

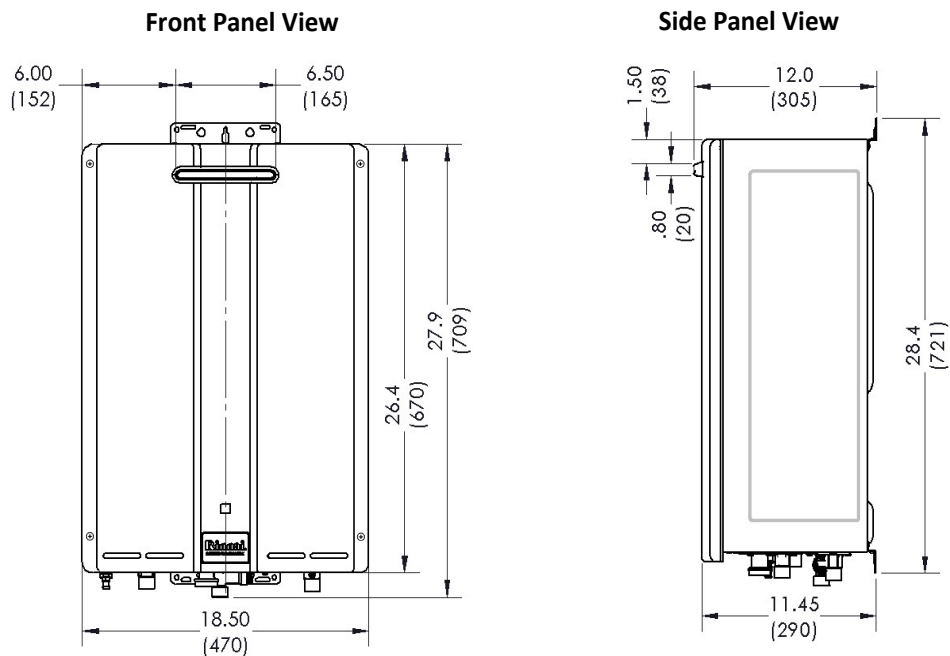
### Internal (Indoor) Models (CU199i and CU160i)

**Vent Connection:**

2 in. (51 mm) nominal  
PVC/Polypropylene or  
3 in./5 in. Concentric.

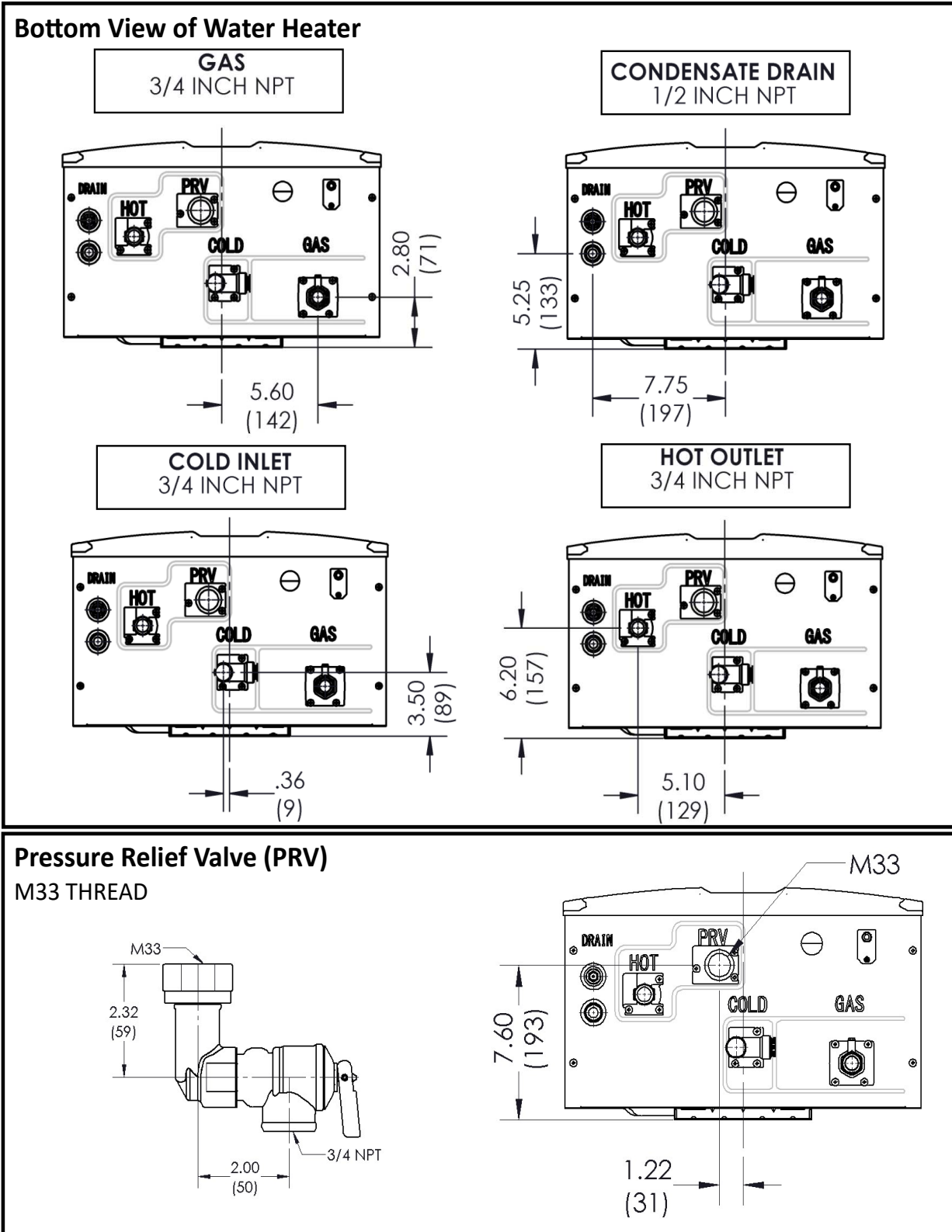


### External (Outdoor) Models (CU199e and CU160e)



## Connections (for Internal and External Water Heaters)

Measurements: in. (mm)



# 3. Install the Water Heater

## THIS SECTION IS INTENDED FOR THE INSTALLER

Installer qualifications: A trained and qualified professional must install the appliance, inspect it, and leak test the water heater before use. The warranty will be voided due to any improper installation. The trained and qualified professional should have skills such as: Gas sizing; Connecting gas lines, water lines, valves, and electricity; Knowledge of applicable national, state, and local codes; Installing venting through a wall or roof; and training in installation of tankless water heaters. Training for Rinnai Tankless Water Heaters is accessible online at [www.trainingevents.rinnai.us](http://www.trainingevents.rinnai.us).

### 3.1 Installation Guidelines

When installing the water heater, follow these guidelines:

- This water heater is suitable for combination water heating and space heating and not suitable for space heating applications only.
- The installation must conform with local codes or, in the absence of local codes, with the *National Fuel Gas Code, ANSI Z223.1/NFPA 54*, or the *Natural Gas and Propane Installation Code, CSA B149.1*.
- The appliance, when installed, must be electrically grounded in accordance with local codes or, in the absence of local codes, with the *National Electrical Code, ANSI/NFPA 70*, or the *Canadian Electrical Code, CSA C22.1*.
- The appliance and its main gas valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psi (3.5 kPa) (13.84 in W.C.). For system testing at pressures less than or equal to 1/2 psi (3.5 kPa) (13.84 in W.C.) the appliance must be isolated from the gas supply piping by closing its individual manual shutoff valve.
- You must follow the installation instructions and those in section “3.5 Vent the Water Heater” for adequate combustion air and exhaust.
- If a water heater is installed in a closed water supply system, such as one having a backflow preventer in the cold water supply line, means shall be provided to control thermal expansion. Contact the water supplier or local plumbing inspector on how to control thermal expansion.
- Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance.  
*(En cas de surchauffe ou si l'alimentation en gaz ne s'arrête pas, fermez manuellement le robinet d'arrêt de l'admission de gaz.)*
- Combustion air must be free of chemicals, such as chlorine or bleach, that produce fumes. These fumes can damage components and reduce the life of your appliance.

#### DO NOT

- ❌ DO NOT install the following internal (indoor) water heaters outdoor: CU160i and CU199i
- ❌ DO NOT install the following external (outdoor) water heaters indoor: CU160e and CU199e
- ❌ DO NOT install the water heater in an area where water leakage of the unit or connections will result in damage to the area adjacent to the appliance or to lower floors of the structure. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the water heater. The pan must not restrict combustion air flow.
- ❌ DO NOT install the water heater in an area with negative air pressure.
- ❌ DO NOT obstruct the flow of combustion and ventilation air.
- ❌ DO NOT use this appliance in an application such as a pool or spa heater that uses chemically treated water. This appliance is suitable for filling large or whirlpool spa tubs with potable water.
- ❌ DO NOT use substitute parts that are not authorized for this appliance.



### 3.2 Choose an Installation Location

When selecting an installation location, you must ensure that clearances will be met and that the vent length will be within required limits. Consider the installation environment, water quality, and need for freeze protection. Requirements for the gas line, water lines, electrical connection, and condensate disposal can be found in their respective installation sections in this manual.

#### Water Quality Guidelines

This section provides information on the importance of water quality to the Rinnai Tankless Water Heater. The information is intended to serve as general guidelines only and is not a complete list of water quality guidelines.

Consideration of care for your water heater should include evaluation of water quality. The water must be potable, free of corrosive chemicals, sand, dirt, or other contaminants. It is up to the installer to ensure the water does not contain corrosive chemicals or elements that can affect or damage the Rinnai Tankless Water Heater. Water that contains chemicals exceeding the levels below can damage the Rinnai Tankless Water Heater. Replacement of components due to water quality damage is not covered by the warranty.

Contaminant	Maximum Level
Total Hardness	Up to 200 mg/L
Aluminum *	Up to 0.2 mg/L
Chlorides *	Up to 250 mg/L
Copper *	Up to 1.0 mg/L
Dissolved Carbon Dioxide (CO2)	Up to 15.0 mg/L
Iron *	Up to 0.3 mg/L
Manganese *	Up to 0.05 mg/L
pH *	6.5 to 8.5
TDS (Total Dissolved Solids) *	Up to 500 mg/L
Zinc *	Up to 5 mg/L

\* Source: Part 143 National Secondary Drinking Water Regulations

If you install this water heater in an area that is known to have hard water or that causes scale build-up, the water must be treated and may require a more frequent flushing schedule.

This water heater includes a service indicator (Service Soon, 55). When selected in the parameter settings, an 55 code will display on the controller indicating that it is time to flush and service the water heater. Scale build-up is caused by hard water and can be accelerated if the water heater is set at a high temperature.

Rinnai offers Southeastern Filtration’s “ScaleCutter Water Conditioning System” that offers superior lime scale prevention and corrosion control by feeding a blend of control compounds into the cold water supply.

#### Environment

Air surrounding the water heater, venting, and vent termination(s) is used for combustion and must be free of any compounds that cause corrosion of internal components. These include corrosive compounds that are found in aerosol sprays, detergents, bleaches, cleaning solvents, oil based paints/varnishes, and refrigerants. The air in beauty shops, dry cleaning stores, photo processing labs, and storage areas for pool supplies often contains these compounds. Therefore, it is recommended that external (outdoor) models be used for these locations where possible. In applications utilizing room air where there are high levels of particulates, Rinnai offers a room air screen. The water heater, venting, and vent termination(s) should not be installed in any areas where the air may contain these corrosive compounds.

## Internal (Indoor) Water Heaters

- Install the water heater as far away as possible from any air inlet vents. Corrosive fumes, sometimes found in hair/nail salons, spas, or other industries exposed to toxic fumes, may be released through these vents when not in operation. Chemicals that are corrosive in nature should not be stored or used near the water heater or vent termination. This requirement applies to internal (indoor) and external (outdoor) water heaters.
- In coastal regions, the water heater should be installed so that it is sheltered/protected from exposure to sea breeze. Exposure to salty spray or breeze can cause corrosion of the water heater.
- ✗ DO NOT install the water heater in areas where combustion air might be contaminated with chemicals.
- ✗ DO NOT use room air in applications where the indoor air is corrosive. Install the water heater as direct vent in a sealed closet so that it is protected from the potential of contaminated indoor air.

## External Water Heaters and Vent Terminations

- Install the water heater as far away as possible from exhaust vent hoods and dryer vents.
- In coastal regions, the water heater should be installed so that it is sheltered/protected from exposure to sea breeze. Exposure to salty spray or breeze can cause corrosion of the water heater.
- Damage and repair due to corrosive compounds in the air is not covered by warranty.
- Install the water heater as far away as possible from any air inlet vents. Corrosive fumes, sometimes found in hair/nail salons, spas, or other industries exposed to toxic fumes, may be released through these vents when not in operation. Chemicals that are corrosive in nature should not be stored or used near the water heater or vent termination. This requirement applies to internal (indoor) and external (outdoor) water heaters.

## Freeze Protection

Make sure that in case of freezing weather the water heater and its water lines are protected to prevent freezing. Damage due to freezing is not covered by the warranty.

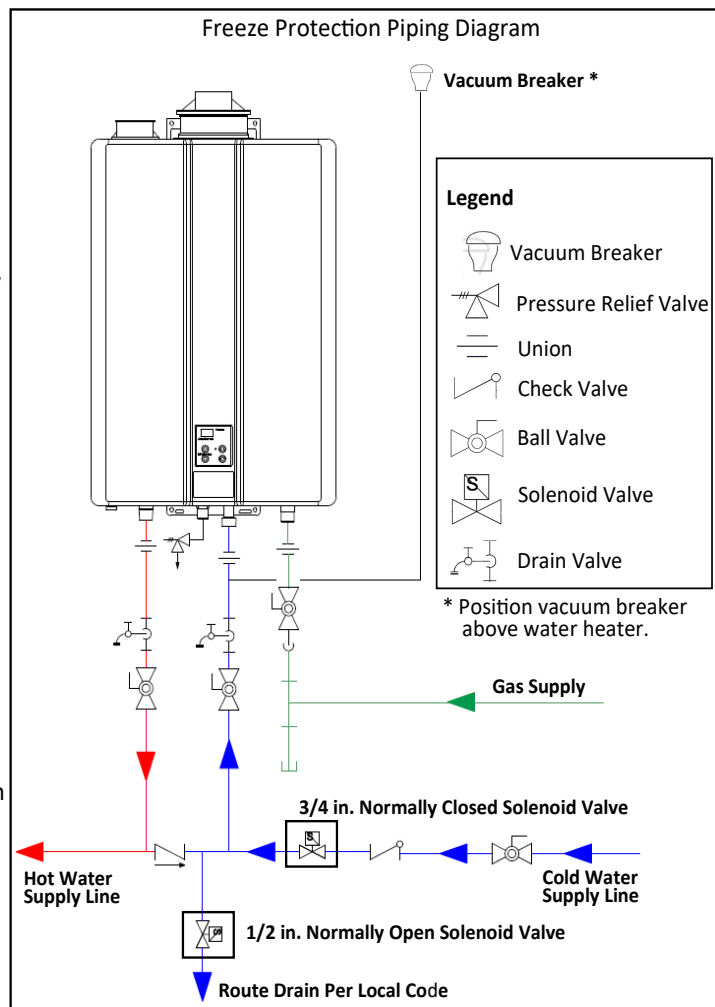
When connected to a 120-volt power supply, the water heater will not freeze when the outside air temperature is as cold as  $-22^{\circ}\text{F}$  ( $-30^{\circ}\text{C}$ ) for internal (indoor) models or  $-4^{\circ}\text{F}$  ( $-20^{\circ}\text{C}$ ) for external (outdoor) models, when protected from direct wind exposure. Because of the “wind-chill” effect, any wind or circulation of the air on the water heater will reduce its ability to protect itself from freezing.

In the event of a power failure and/or gas interruption at temperatures below freezing, the water heater should manually be drained of all water to prevent freezing damage. In addition, drain the condensate trap, drain line and pressure relief valve.

Loss of freeze protection may result in water damage from a burst heat exchanger or water lines.

The water heater may be drained manually. However, it is highly recommended to install the optional Drain Down Kit accessory that will enable the water heater to immediately drain upon loss of power (the condensate trap and pressure relief valve are not affected by the Drain Down Kit and must be manually drained).

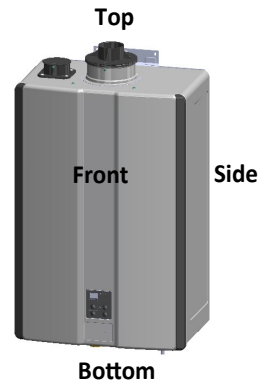
The freeze protection features will not prevent the external piping and valves from freezing. It is recommended that hot and cold water pipes be insulated. Pipe cover enclosures may be packed with insulation for added freeze protection.



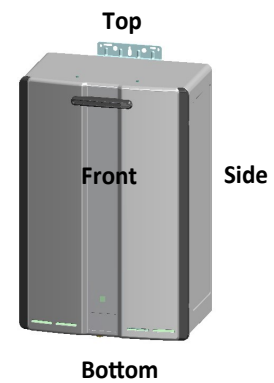
## CLEARANCES

<b>Top</b>	2 in. (51 mm) <i>0 in from vent components</i>
<b>Bottom/Ground</b>	12 in. (305 mm)
<b>Front</b>	0 in. <i>Clearance for servicing is 24 in. (610 mm) in front of water heater</i>
<b>Back</b>	0 in.
<b>Sides (Left and Right)</b>	2 in. (51 mm) <i>Add 0.25 in. (6.35 mm) for recess box</i>
<b>Vent</b> <i>(Internal/Indoor Models)</i>	0 in.
<b>Front Exhaust</b> <i>(External/Outdoor Models)</i>	24 in. (610 mm)

### INTERNAL (INDOOR) MODELS



### EXTERNAL (OUTDOOR) MODELS



## INSTALLATION LOCATION CHECKLIST

Use this checklist to ensure you have selected the correct location for the water heater.

<input type="checkbox"/>	The water heater is not exposed to corrosive compounds in the air.
<input type="checkbox"/>	The water heater location complies with the required clearances.
<input type="checkbox"/>	The planned combustion air and exhaust termination locations meet the required clearances.
<input type="checkbox"/>	The water supply does not contain chemicals or exceed total hardness that will damage the heat exchanger.
<input type="checkbox"/>	A standard 3 prong 120 VAC, 60 Hz properly grounded wall outlet (for internal/indoor models) or other 120 VAC, 60 Hz source is available.
<input type="checkbox"/>	The installation must conform with local codes or, in the absence of local codes, with the <i>National Fuel Gas Code, ANSI Z223.1/NFPA 54</i> , or the <i>Natural Gas and Propane Installation Code, CSA B149.1</i> .

### 3.3 Mount the Internal (Indoor) Water Heater to the Wall

**You Will Need:**

- Rinnai Tankless Water Heater (Internal/Indoor Model)
- Wall Mounting Bracket

**Supplied by Installer:**

- Level
  - 4 screws for mounting bracket installation
  - Screws for top and bottom bracket installation
- Use appropriate screws for type of wall construction.*

**1**

Hold the wall mounting bracket up against the wall and use a level to make sure the bracket is even. Proper operation requires the water heater to be level.

Level

Wall Mounting Bracket

**2**

Use 4 screws to secure the wall mounting bracket to the wall (2 screws on far left side and 2 screws on far right side). Use the appropriate screws for the wall construction to secure the mounting bracket to the wall between two studs.

**3**

Insert the water heater top bracket into the wall mounting bracket. Make sure the wall mounting bracket is sturdy and can hold the weight of the water heater before you fully let go.

Water Heater Right Side

**4**

Securely screw the top and bottom brackets into the wall, making sure the screws are flush with the wall.

- Use any of the holes in the top and bottom brackets.
- Make sure the securing method is sufficient to support the weight of the water heater. Refer to the water heater weight in section "2.5 Specifications."

**IMPORTANT:** The water heater must be installed in an upright position. Do not install the water heater upside down or on its side.

Top Bracket

Bottom Bracket

### 3.4 Mount the External (Outdoor) Water Heater to the Wall

**You Will Need:**

- Rinnai Tankless Water Heater  
(External/Outdoor Model)

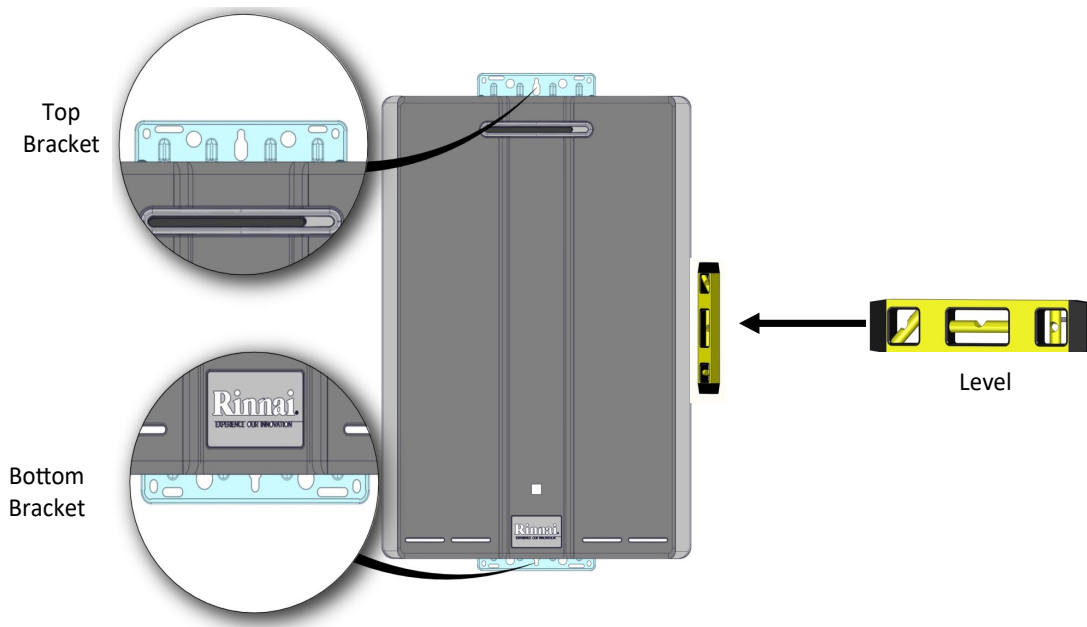
**Supplied by Installer:**

- Level
- Screws for top and bottom bracket installation  
*Use appropriate screws for type of wall construction.*

Instructions: Securely screw the top and bottom brackets into the wall, making sure the screws are flush with the wall.

- Use any of the holes in the top and bottom brackets.
- Use a level (placed horizontally or vertically) to make sure the water heater is straight. Proper operation requires the water heater to be level.
- Make sure the securing method is sufficient to support the weight of the water heater. Refer to the water heater weight in section “2.5 Specifications.”

**IMPORTANT:** The water heater must be installed in an upright position. Do not install the water heater upside down or on its side.










## 3.5 Vent the Water Heater

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### Guidelines

- Internal water heaters can be installed as direct vent or non-direct vent applications.
- When installed as Direct Vent, refer to the “Direct Vent Approved Vent Manufacturers and Products” section (within the “1. Direct Vent” section) for a complete list of approved vent manufacturers and products.
- When installed as Non-Direct Vent (Room Air), the vent must be Category IV and of a type listed by a national recognized testing agency.
- Exhaust must be directly vented to the outside. Combustion air can be provided from outside (Direct Vent) or from room air (Non-Direct Vent).
- If using room air (non-direct vent) for combustion, ensure the required volume of indoor air is available according to the National Fuel Gas Code, ANSI Z223.1/NFPA 54.
- Avoid dips or sags in horizontal vent runs by installing supports per the vent manufacturer’s instructions.
- Support horizontal vent runs every 4 ft (1.2 m) and all vertical vent runs every 6 ft (1.83 m) or as per vent manufacturer’s instructions or local code requirements.
- Venting should be as direct as possible with a minimum number of pipe fittings.
- For manufactured vent systems, vent connections must be firmly pressed together so that the connections form an air tight seal. Follow the venting manufacturer’s instructions.
- Refer to the PVC/CPVC manufacturer for appropriate fittings, solvents or joining methods.
- The vent piece connected to the water heater must be secured with 1 self-tapping screw.
- Refer to the instructions of the vent system manufacturer for component assembly instructions.
- If the vent system is to be enclosed, it is suggested that the design of the enclosure shall permit inspection of the vent system. The design of such enclosure shall be deemed acceptable by the installer or the local inspector.
- Any issues resulting from improper vent installation will not be covered by warranty.

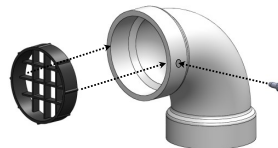
### **WARNING**

-  DO NOT use cellular core PVC/CPVC.
-  DO NOT use Radel, ABS, or galvanized material to vent this appliance.
-  DO NOT cover non-metallic vent pipe and fittings with thermal insulation.
-  DO NOT combine vent components from different manufacturers.
-  DO NOT reduce the vent diameter. Vent diameter cannot be less than 2 in. (51 mm).
-  DO NOT connect the venting system with an existing vent or chimney.
-  DO NOT common vent with the vent pipe of any other manufacturer’s water heater or appliance. Rinnai water heaters can only be common vented with Schedule 40 PVC/CPVC or with a Rinnai certified common vent system.

## Venting Installation Sequence

1. Install the water heater.
2. Determine the termination method—horizontal or vertical, concentric, or twin pipes, etc.
3. Determine proper location for wall or roof penetration for each termination.
4. Install termination assembly as described in this manual or in the vent manufacturer’s installation instructions.
5. Install air and vent piping from water heater to termination.
6. Slope horizontal exhaust run towards the water heater 1/4 in per foot. DO NOT slope combustion air pipe towards water heater.
7. Install vent supports and brackets allowing for movement from expansion, or as per vent manufacturer’s instructions or local code requirements.
8. Install vent screen (supplied with water heater) on PVC combustion air and exhaust termination elbows as illustrated below.

- Press vent screen inside of termination piece/elbow.
- Secure vent screen to the elbow with screw provided.



## Termination Considerations

Check to determine whether local codes supersede the following clearances:

- Avoid termination locations near a dryer vent.
- Avoid termination locations near commercial cooking exhaust.
- Avoid termination locations near any air inlets.
- You must install a vent termination at least 12 in above the ground or anticipated snow level.

The vent for this appliance shall not terminate:

- Over public walkways.
- Near soffit vents or crawl space vents or other area where condensate or vapor could create a nuisance or hazard or cause property damage.
- Where condensate or vapor could cause damage or could be detrimental to the operation of regulators pressure relief valves, or other equipment.

Listed below are important considerations for locating vent termination under a soffit (ventilated or unventilated or eave vent; or to a deck or porch):

- Do not install vent termination under a soffit vent such that exhaust can enter the soffit vent.
- Install vent termination such that exhaust and rising moisture will not collect under eaves. Discoloration to the exterior of the building could occur if installed too close.
- Do not install the vent termination too close under the soffit where it could present recirculation of exhaust gases back into the combustion air part of the termination.

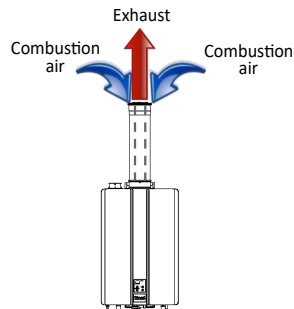
## Select a Vent Type

Three types of venting options are available:

### 1 Direct Vent *(Concentric Pipe and Twin Pipe)*

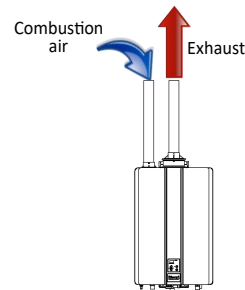
#### Concentric Pipe

Combustion air and exhaust vent directly through a single concentric connection. Hot exhaust exits through the interior tube, while combustion air enters through the outer layer.



#### Twin Pipe

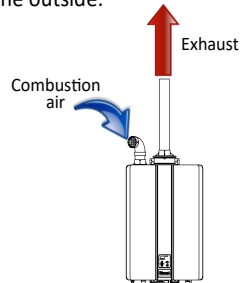
Combustion air and exhaust vent directly through separate penetrations.



### 2 Non-Direct Vent *(Room Air and External)*

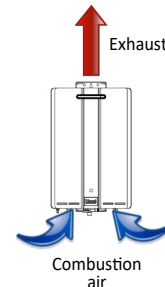
#### Room Air

Room air is used for combustion while exhaust vents to the outside.



#### External (Outdoor)

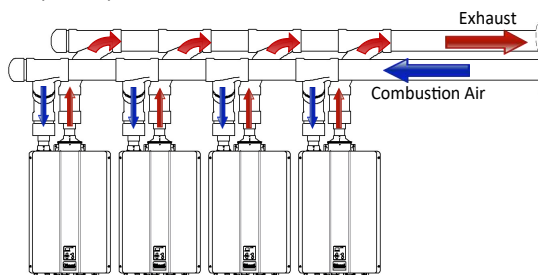
External (outdoor) water heater.



### 3 Common Vent *(Indoor Units Only. Direct Vent and Non-Direct/Room Air Vent)*

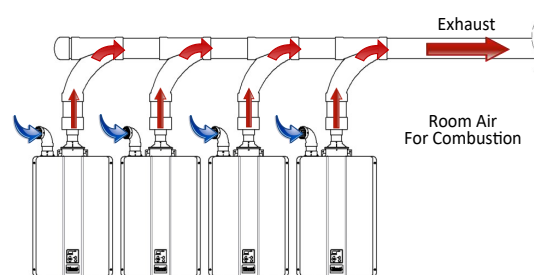
#### Direct Vent

Multiple water heaters sharing a combustion air header and a separate exhaust header that vents directly through separate penetrations to the outside.



#### Non-Direct (Room Air) Vent

Multiple water heaters using room air for combustion while sharing an exhaust header that vents directly to the outside.



# 1 Direct Vent *(Concentric Pipe and Twin Pipe)*

## Direct Vent Approved Vent Manufacturers and Products

Following is a list of vent components and terminations for Direct Vent installations. Install the correct venting for your model according to the venting manufacturer's instructions and the guidelines below. The information below is correct at time of publication and is subject to change without notice. Contact the vent manufacturer for questions related to the vent system, products, part numbers and instructions.

Manufacturer	Phone	Web Site
Ubbink	800-621-9419	www.rinnai.us
Centrotherm	877-434-3432	www.centrotherm.us.com
Heat-Fab	800-772-0739	www.heatfab.com
Metal Fab	800-835-2830	www.metal-fabinc.com
IPEX	U.S.: 800-463-9572 Canada: 866-473-9462	www.ipexamerica.com www.ipexinc.com
DuraVent	800-835-4429	www.duravent.com
Royal	800-232-5690	www.royalbuildingproducts.com
Ecco Manufacturing	877-955-4805	www.eccomfg.com
DiversiTech	800-995-2222	www.diversitech.com

Manufacturer	Manufacturer Part Number	Product Description	Diagram	Horizontal	Vertical	Equivalent Length (ft)
<b>2 in./4 in. CONCENTRIC VENT TERMINATIONS</b>						
<b>UBBINK</b>	229011NPP	2/4 Condensing Horizontal Termination Kit 8.7 in.		✓		5
	229012NPP	2/4 Condensing Horizontal Termination Kit 12 in.				
	229013NPP	2/4 Condensing Horizontal Termination Kit 21 in.				
	224356NPP	2/4 Condensing Roof Discharge Termination 20 in. above roof			✓	5
	710202NPP	2/4 Condensing 90 Degree Diverter Nose <i>(Use with Wall Terminal)</i>		✓		5
710215NPP	2/4 Condensing 45 Degree Diverter Nose <i>(Use with Wall Terminal)</i>		✓		5	
<b>IPEX</b>	196005, 197040	FGV Concentric Vent Kit (16 in. length)		✓	✓	20
	196105, 197033	FGV Concentric Vent Kit (28 in. length)		✓	✓	20
	196125	FGV Concentric Vent Kit (40 in. length)		✓	✓	20










**1** Direct Vent (Concentric Pipe and Twin Pipe)

Manufacturer	Manufacturer Part Number	Product Description	Diagram	Horizontal	Vertical	Equivalent Length (ft)
<b>2 in./4 in. CONCENTRIC VENT TERMINATIONS (Continued)</b>						
<b>ROYAL</b>	52CVKGV6502	PVC Concentric Vent Kit 2 in. x 16 in.		✓	✓	20
	52CVKGV6502-28	PVC Concentric Vent Kit 2 in. x 28 in.		✓	✓	20
	52CVKGV6502-40	PVC Concentric Vent Kit 2 in. x 40 in.		✓	✓	20
<b>CENTROTHERM</b>	ICRT2439	2 in. x 4 in. Concentric Roof Termination			✓	20
<b>DURAVENT</b>	2PPS-VKL/VK-TCL	2 in. x 4 in. Vertical Termination Cap Kit-Concentric			✓	20
	2PPS-HKL	2 in. x 4 in. Horizontal Termination Kit-Concentric		✓		20
<b>ECCO</b>	190288	2 in. x 4 in. Concentric Horizontal Termination		✓		5
	190295	2 in. x 4 in. Concentric Vertical Termination			✓	5
<b>DIVERSITECH</b>	CVENT-2	2 in. x 4 in. Concentric Horizontal Termination		✓	✓	20








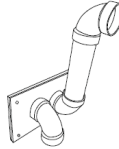



**1** Direct Vent (Concentric Pipe and Twin Pipe)

Manufacturer	Manufacturer Part Number	Product Description	Diagram	Horizontal	Vertical	Equivalent Length (ft)
<b>3 in./5 in. CONCENTRIC VENT TERMINATIONS</b>						
<b>UBBINK</b>	223174PP 223176PP 223177PP	3/5 Condensing Horizontal Termination Kit 8.7 in. 3/5 Condensing Horizontal Termination Kit 12 in. 3/5 Condensing Horizontal Termination Kit 21 in.		✓		5
	223186PP	3/5 Condensing Horizontal Diverter Termination Kit 19 in.		✓		16
	224047PP	3/5 Condensing Raised Horizontal Termination Kit		✓		24
	184162PP	3/5 Condensing Roof Discharge Termination 20 in. above roof			✓	5
	<b>IPEX</b>	196006, 197009	FGV Concentric Vent Kit 3 in. x 20 in.		✓	✓
196106, 197107		FGV Concentric Vent Kit 3 in. x 32 in.		✓	✓	20
196116, 197117		FGV Concentric Vent Kit 3 in. x 44 in.		✓	✓	20
<b>ROYAL</b>	52CVKGV6503 (PVC)/ 52CVKGVSF9003 (CPVC)	PVC/CPVC Concentric Vent Kit 3 in. x 20 in.		✓	✓	20
	52CVKGV6503-32 (PVC)/ 52CVKGVSF9003-32 (CPVC)	PVC/CPVC Concentric Vent Kit 3 in. x 32 in.		✓	✓	20
	52CVKGV6503-44 (PVC)/ 52CVKGVSF9003-44 (CPVC)	PVC/CPVC Concentric Vent Kit 3 in. x 44 in.		✓	✓	20
<b>HEAT-FAB</b>	SC03HT	Horizontal Termination Adapter		✓		20
	SC03VT	Vertical Termination Adapter			✓	20
<b>CENTRO-THERM</b>	ICRT3539	3"/5" Concentric Roof Termination PPs-UV			✓	20








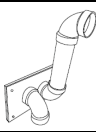



**1** Direct Vent (Concentric Pipe and Twin Pipe)

Manufacturer	Manufacturer Part Number	Product Description	Diagram	Horizontal	Vertical	Equivalent Length (ft)
<b>3 in./5 in. CONCENTRIC VENT TERMINATIONS (Continued)</b>						
<b>METAL-FAB</b>	3CGRLSV	Vertical Adapter			✓	1
	3CGRLSH	Horizontal Adapter		✓		6
	3CGRVT	Vertical Termination			✓	5
	3CGRHT	Horizontal Termination		✓		16
<b>DURAVENT</b>	3PPS-VKL/VK-TCL	3 in. x 5 in. Vertical Termination Cap Kit-Concentric			✓	20
	3PPS-HKL	3 in. x 5 in. Horizontal Termination Kit-Concentric		✓		20
<b>ECCO</b>	190388	3 in. x 5 in. Concentric Horizontal Termination		✓		5
	190395	3 in. x 5 in. Concentric Vertical Termination			✓	5
<b>DIVERSITECH</b>	CVENT-3	3 in. x 5 in. Concentric Horizontal Termination		✓	✓	20

**1** Direct Vent *(Concentric Pipe and Twin Pipe)*

Manufacturer	Manufacturer Part Number	Product Description	Diagram	Horizontal	Vertical	Equivalent Length (ft)
<b>2 in. TWIN PIPE TERMINATIONS</b>						
<b>CENTROTHERM</b>	ISELL0287UV	2 in. 87° Long PPS-UV		✓		6
	ISTT0220	2 in. Termination Tee		✓		6
	ISLPT0202	2 in. Low Profile Wall Termination		✓		5
<b>DURAVENT</b>	2PPS-HTPL	2 in. Twin Pipe Termination		✓		10
	2PPS-HSTL	2 in. Single Horizontal Termination		✓		6
	2PPS-TBL	2 in. Black UV Resistant Tee		✓		5
<b>IPEX</b>	196984	FGV PVC Low Profile Termination Kit		✓		5
	081216	FGV PVC Wall Termination Kit		✓		16
<b>ROYAL</b>	52SWVKGVS6502	PVC Side Wall Vent Kits		✓		5
	52WTVKGVS6502	PVC Wall Vent Kits		✓		16
<b>DIVERSITECH</b>	HVENT-2	2 in. Low Profile Horizontal Vent Kit		✓		5

**1** Direct Vent *(Concentric Pipe and Twin Pipe)*

Manufacturer	Manufacturer Part Number	Product Description	Diagram	Horizontal	Vertical	Equivalent Length (ft)
<b>3 in. TWIN PIPE TERMINATIONS</b>						
<b>CENTROTHERM</b>	ISELL0387UV	3 in. 87° Long PPS-UV		✓		6
	ISTT0320	3 in. Termination Tee		✓		6
	ISLPT0303	3 in. Low Profile Wall Termination		✓		5
<b>DURAVENT</b>	3PPS-HTPL	3 in. Twin Pipe Termination		✓		10
	3PPS-HSTL	3 in. Single Horizontal Termination		✓		5
	3PPS-TBL	3 in. Black UV Resistant Tee		✓		6
<b>IPEX</b>	196985	FGV PVC Low Profile Termination Kit		✓		5
	081219	FGV PVC Wall Termination Kit		✓		16
<b>ROYAL</b>	52SWVKGVS6503	PVC Side Wall Vent Kits		✓		5
	52WTVKGVS6503	PVC Wall Vent Kits		✓		16
<b>DIVERSITECH</b>	HVENT-3	3 in. Low Profile Horizontal Vent Kit		✓		5

### VARIOUS 2 in. OR 3 in. SCHEDULE 40 PVC/CPVC TERMINATIONS

Air Filter Screen		✓	✓	N/A
Tee		✓	✓	5
90° Elbow		✓	✓	5
45° Elbow		✓	✓	2.5

Approved PVC/CPVC Vent and Air Piping Material			
Item	Material	Standard for Installation in North America	
		United States	Canada
<b>Thermoplastic Piping Materials</b>			
Vent or Combustion Air Intake Pipe and Fittings	PVC Schedule 40	ANSI/ASTM D1785	Thermoplastic vent pipe must be certified to ULC S636. Intake pipe may be of the materials listed in this table.
	PVC-DWV	ANSI/ASTM D2665	
	CPVC Schedule 40	ANSI/ASTM F441	
PVC Pipe Cement and Primer	PVC	ANSI/ASTM D2564	
	CPVC Schedule 40	ANSI/ASTM F493	
<b>PVC Vent Screens</b>			
Termination Vent Screens	Polyethylene	<ul style="list-style-type: none"> <li>• 2 in. Vent Screens (included in carton box) (IPEX Part Number: 196050)</li> <li>• 3 in. Vent Screens (IPEX Part Number: 196051)</li> </ul>	

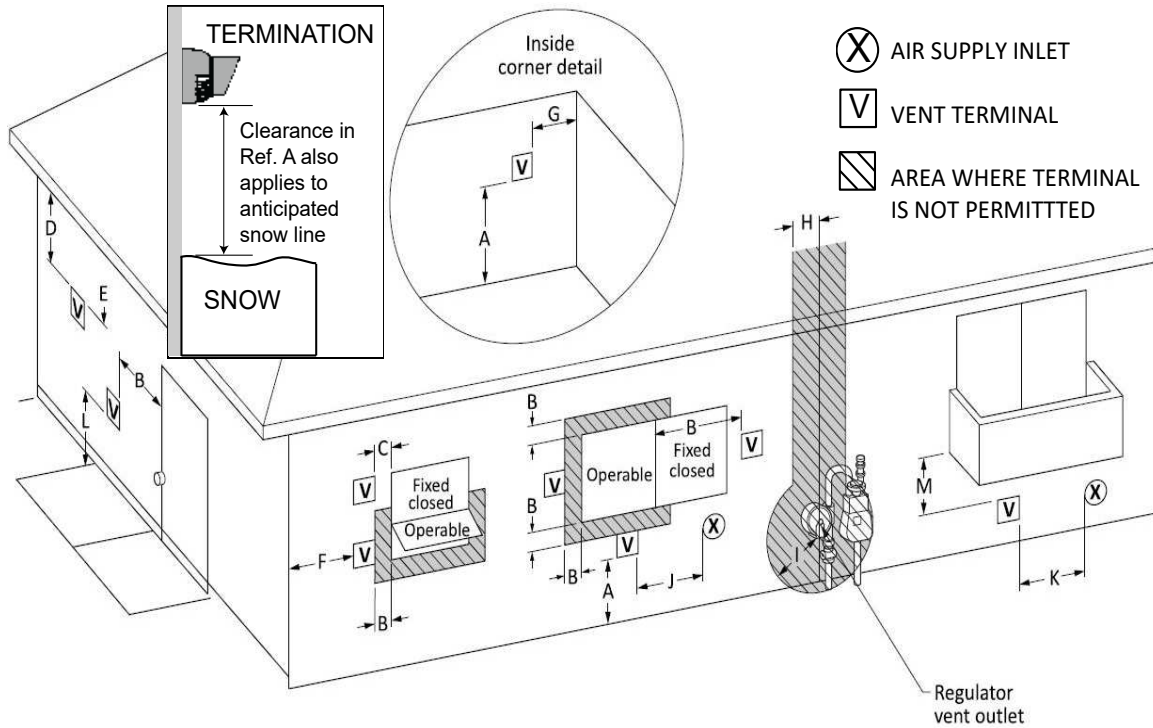
Exhaust piping must be of solid core material. Refer to the PVC/CPVC manufacturer for appropriate fittings, solvents or joining methods.

### APPROVED VENTING MATERIALS BY MANUFACTURER

Manufacturer	Vent Material
Ubbink	PVC (Outer Vent), Polypropylene (Inner Vent)
Centrotherm	Polypropylene
Heat-Fab	Metal
Metal Fab	Metal
IPEX	PVC/CPVC
DuraVent	Polypropylene
Royal	PVC
ECCO Manufacturing	Polypropylene
DiversiTech	PVC/CPVC

# 1 Direct Vent (Concentric Pipe and Twin Pipe)

## Direct Vent Termination Clearances (For Concentric and Twin Pipe)



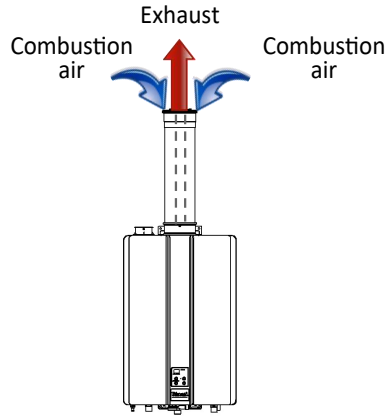
Ref	Description	Canadian Installations (CSA B149.1)	U.S. Installations (ANSI Z223.1 /NFPA 54)
		Direct Vent (Indoor Unit)	Direct Vent (Indoor Unit)
A	Clearance above grade, veranda, porch, deck, or balcony	12 in. (30 cm)	12 in. (30 cm)
B	Clearance to window or door that may be opened	36 in. (91 cm)	12 in. (30 cm)
C	Clearance to permanently closed window	*	*
D	Vertical clearance to ventilated soffit, located above the terminal within a horizontal distance of 2 ft (61 cm) from the center line of the terminal	*	*
E	Clearance to unventilated soffit	*	*
F	Clearance to outside corner	*	*
G	Clearance to inside corner	*	*
H	Clearance to each side of center line extended above meter/regulator assembly	*	*
I	Clearance to service regulator vent outlet	Above a regulator within 3 ft (91 cm) horizontally of the vertical center line of the regulator vent outlet to a maximum vertical distance of 15 ft (4 m)	*
J	Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other appliance	36 in. (91 cm)	12 in. (30 cm)
K	Clearance to a mechanical air supply inlet	6 ft (1.83 m)	3 ft (91 cm) above if within 10 ft (3 m) horizontally
L	Clearance above paved sidewalk or paved driveway located on public property	7 ft (2.13 m) [1]	*
M	Clearance under veranda, porch, deck, or balcony	12 in. (30 cm) [2]	*

<b>Clearance to opposite wall is 24 in. (60 cm).</b>	
<p>[1] A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.</p> <p>[2] Permitted only if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.</p>	<p>* Clearances are in accordance with local installation codes and the requirements of the gas supplier. (<i>Dégagement conforme aux codes d'installation locaux et aux exigences du fournisseur de gaz.</i>)</p>

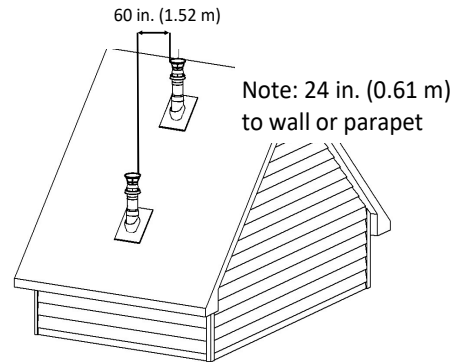
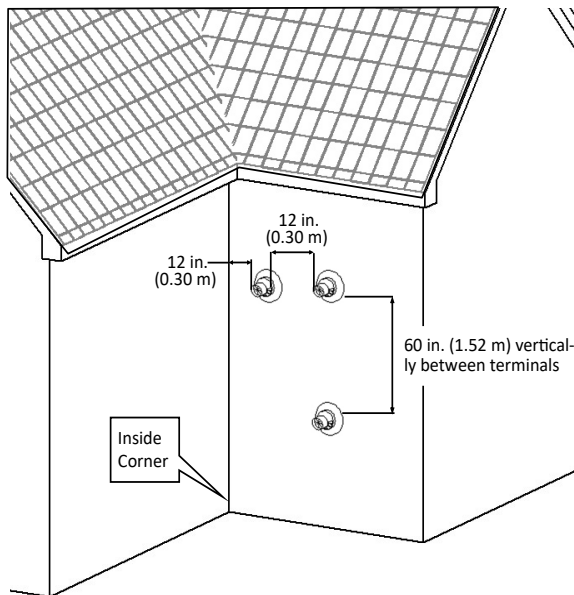
**1** Direct Vent (Concentric Pipe)

Concentric Pipe Overview

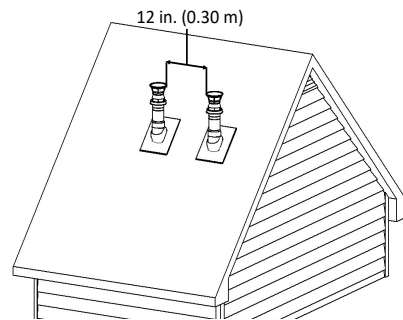
Combustion air and exhaust vent directly through a single concentric connection. Hot exhaust exits through the interior tube, while combustion air enters through the outer layer.



Concentric Pipe Termination Clearances



Between terminals at different levels



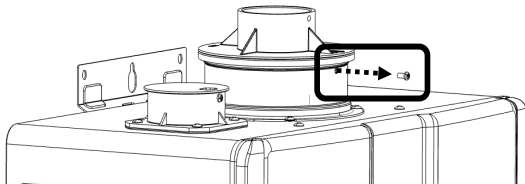
Between terminals at same level

All terminations (horizontal and/or vertical) must terminate 12 in. (0.30 m) above grade or anticipated snow level.

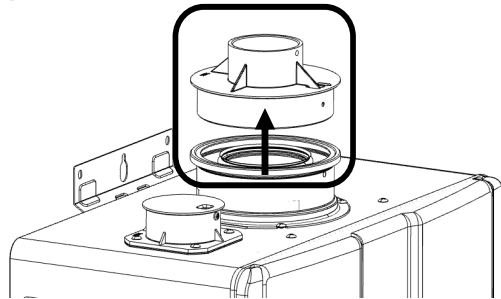
# 1 Direct Vent (Concentric Pipe)

## Concentric Pipe Installation Instructions

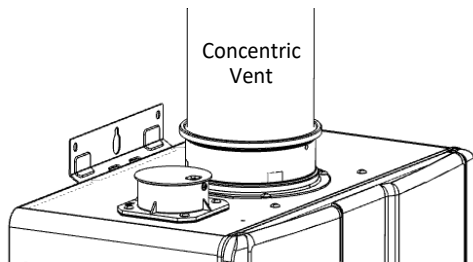
- 1 Remove and discard screw from concentric flue connection.



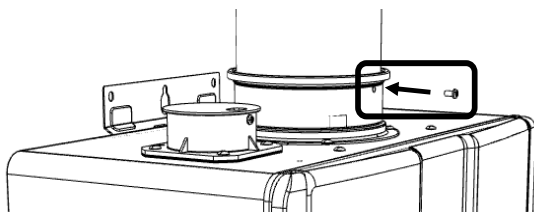
- 2 Remove exhaust adapter ring (discard for concentric venting configurations).



- 3 Install the concentric vent. Ensure it is properly seated.

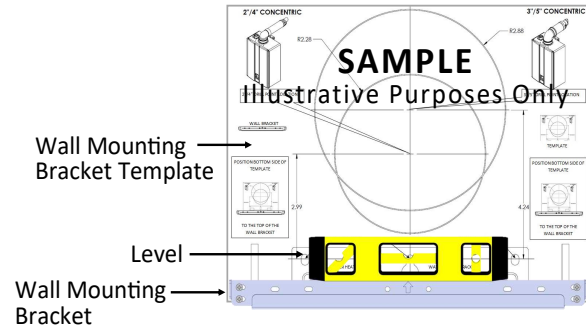


- 4 Secure the vent pipe to the concentric flue connection with the supplied screw.



## Mount Concentric Pipe Through Wall

If venting through an exterior wall, align the wall mounting bracket template (located in literature bag) to the wall and follow the instructions on the template for appropriate vent hole location. Use a level to make sure the wall mounting bracket is even and level.



## Concentric Pipe Example Vent Applications

Horizontal Wall Terminations	Vertical Roof Terminations
<p><b>2 in. x 4 in.</b></p>	<p><b>2 in. x 4 in. and 3 in. x 5 in.</b></p>
<p><b>3 in. x 5 in.</b></p>	

## Concentric Pipe Maximum Vent Length

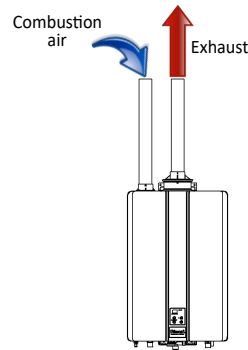
Concentric Vent Maximum Equivalent Length		
Vent Sizes	2 in. X 4 in.	3 in. X 5 in.
Vent Lengths	65 ft (20 m)	150 ft (46 m)
<ul style="list-style-type: none"> <li>• 45° elbow is equivalent to 3 ft (1 m)</li> <li>• 90° elbow is equivalent to 6 ft (2 m)</li> </ul>		

**Important:** Install the venting termination according to the diagrams and instructions in this manual. Slope the venting 1/4 in. per foot toward the appliance according to the vent manufacturer's installation instructions. Dispose of condensate per local codes.

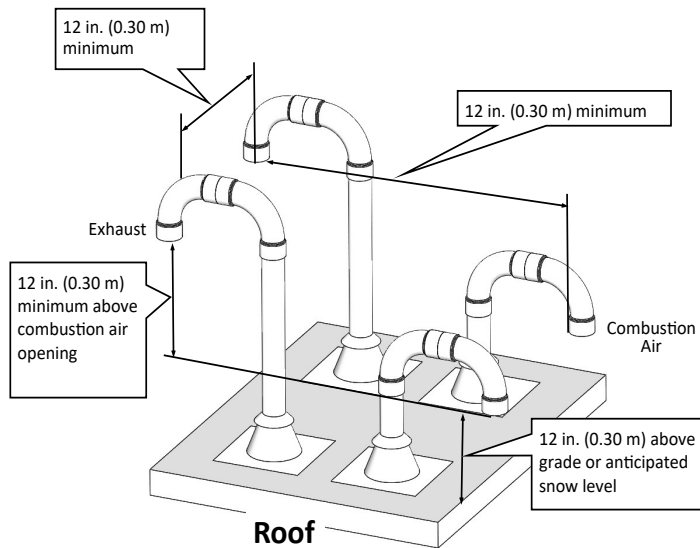
**1** Direct Vent (Twin Pipe)

Twin Pipe Overview

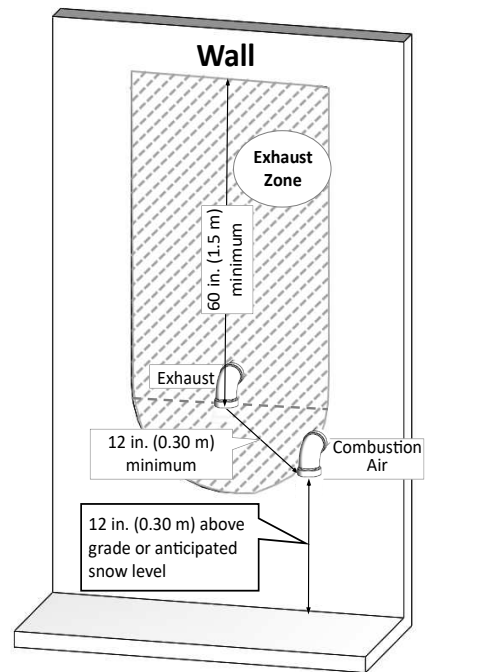
Combustion air and exhaust vent directly through separate penetrations.



Twin Pipe Termination Clearances



**Twin Pipe Vertical Termination of Multiple Water Heaters**



Combustion air termination not permitted in shaded area

**Horizontal Vent and Combustion Air Piping**

For illustration purposes only. Listed equivalent length is based on worst case scenario of 3 X 90° elbows or 18 equivalent ft.

## 1 Direct Vent (Twin Pipe)

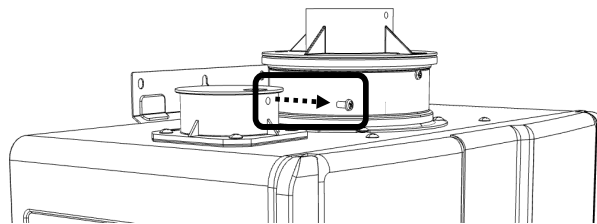
### Twin Pipe Installation Instructions

The water heater is equipped with a 2 in. (51 mm) pipe connection. With the use of a pipe reducer, installers can use a 3 in. (76 mm) pipe for the combustion air and exhaust.

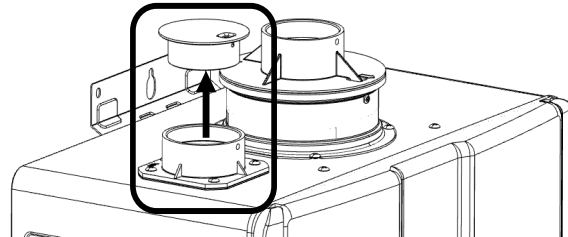
#### **⚠ WARNING**

**DO NOT** apply PVC glues, solvents, or cleaners to the water heater's combustion air or exhaust gasket connections. Failure to correctly assemble the components according to these instructions may result in property damage, personal injury, or death.

- 1 Remove and discard the screw from the combustion air vent connection.

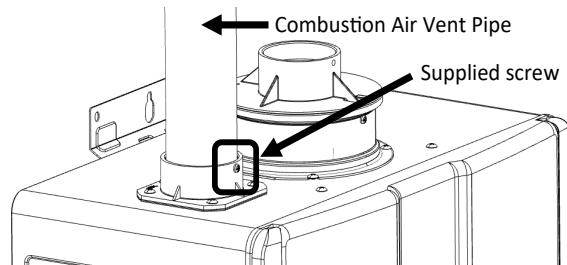


- 2 Remove and discard the combustion air vent cap.



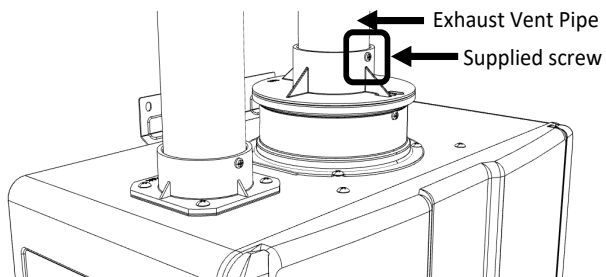
- 3 Install the combustion air vent pipe. Ensure it is properly seated.

Secure the combustion air vent pipe to the combustion air vent connection with the supplied screw.



- 4 Install the exhaust vent pipe. Ensure it is properly seated.

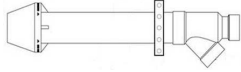

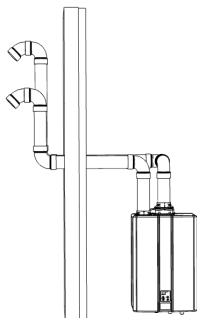
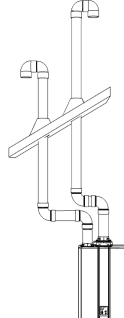
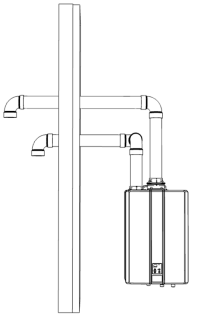
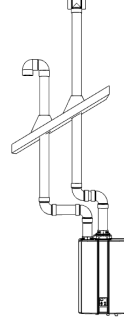
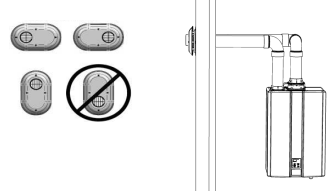
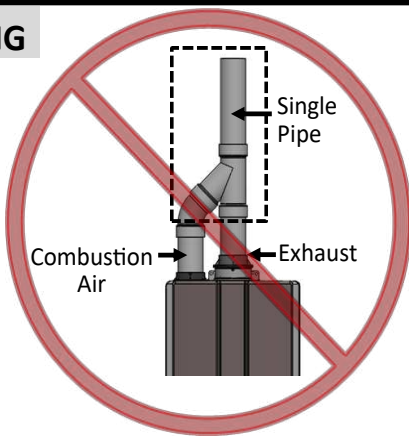
Secure the exhaust vent pipe to the exhaust adapter ring with the supplied screw.



**1** Direct Vent (Twin Pipe)

**Twin Pipe Example Vent Applications**

Slope horizontal exhaust 1/4 in. per foot towards the water heater. **DO NOT** slope combustion air pipe towards the water heater.

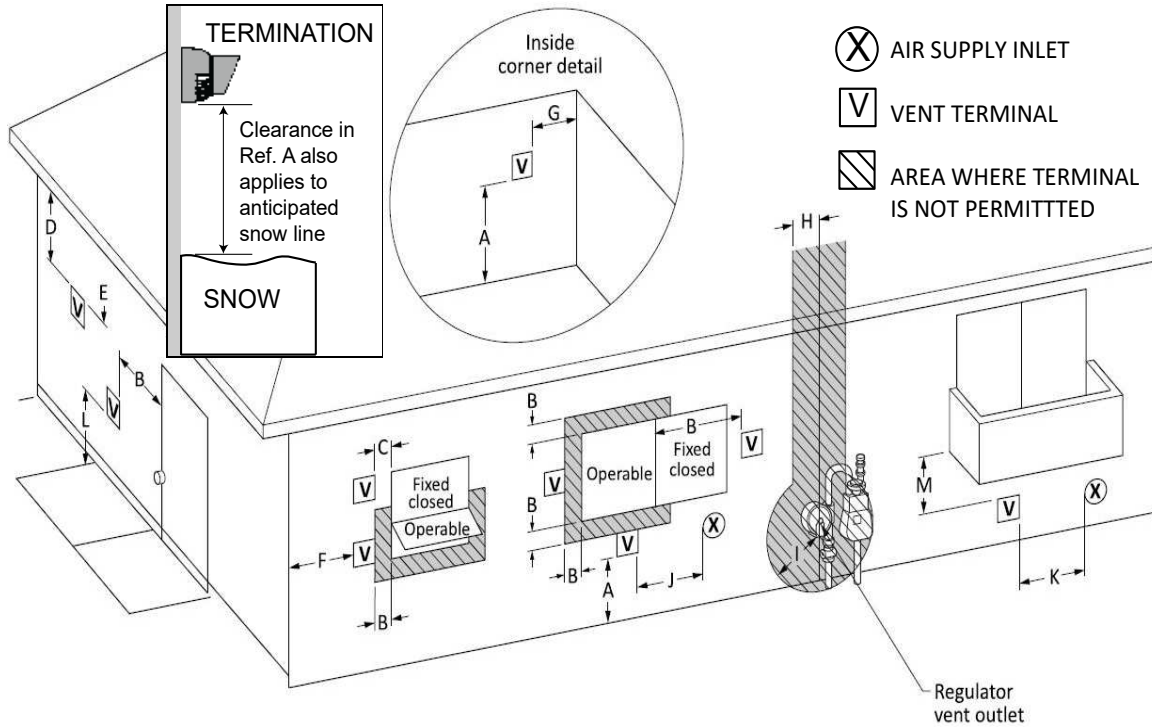
<p>This configuration <b>requires</b> the use of a Concentric Vent Termination</p> <p>2 in. or 3 in. PVC/CPVC IPEX / Royal Concentric Side Wall Termination Configuration</p> 	<p>This configuration <b>requires</b> the use of a Concentric Vent Termination</p> <p>2 in. or 3 in. PVC/CPVC IPEX /Royal Concentric Vertical Termination Configuration</p> 
<p>2 in. or 3 in. Schedule 40 PVC/CPVC Snorkel Termination Configuration</p> 	<p>2 in. or 3 in. Schedule 40 PVC/CPVC Standard upside down "U" Vertical Termination Configuration</p> 
<p>2 in. or 3 in. Schedule 40 PVC/CPVC Elbow or Tee Side Wall Termination Configuration</p> 	<p>2 in. or 3 in. Schedule 40 PVC/CPVC Tee Vertical Termination Configuration</p> 
<p>2 in. or 3 in. PVC Low Profile Termination Configuration</p> 	<p><b>WARNING</b></p> <p>Exhaust and combustion air <b>MUST NOT</b> be brought together into a single PVC pipe using a pipe fitting.</p> 

**Twin Pipe Maximum Vent Length**

Twin Pipe Maximum Equivalent Length Table		
Vent Sizes	2 in. (51 mm)	3 in. (76 mm)
Vent Lengths	65 ft (20 m)	150 ft (46 m)
<ul style="list-style-type: none"> <li>45° elbow is equivalent to 3 ft (1 m)</li> <li>90° elbow is equivalent to 6 ft (1.83 m)</li> </ul>		

**2 Non-Direct Vent (Room Air and External)**

**Room Air and External Termination Clearances**



Ref	Description	Canadian Installations (CSA B149.1) Other than direct vent (Outdoor unit and/or Room Air)	U.S. Installations (ANSI Z223.1 /NFPA 54) Other than direct vent (Outdoor unit and/or Room Air)
A	Clearance above grade, veranda, porch, deck, or balcony	12 in. (30 cm)	12 in. (30 cm)
B	Clearance to window or door that may be opened	36 in. (91 cm)	4 ft (1.2 m) below or to side of opening; 1 ft (300 mm) above opening
C	Clearance to permanently closed window	*	*
D	Vertical clearance to ventilated soffit, located above the terminal within a horizontal distance of 2 ft (61 cm) from the center line of the terminal	*	*
E	Clearance to unventilated soffit	*	*
F	Clearance to outside corner	*	*
G	Clearance to inside corner	*	*
H	Clearance to each side of center line extended above meter/regulator assembly	*	*
I	Clearance to service regulator vent outlet	Above a regulator within 3 ft (91 cm) horizontally of the vertical center line of the regulator vent outlet to a maximum vertical distance of 15 ft (4 m)	*
J	Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other appliance	36 in. (91 cm)	4 ft (1.2 m) below or to side of opening; 1 ft (300 mm) above opening
K	Clearance to a mechanical air supply inlet	6 ft (1.83 m)	3 ft (91 cm) above if within 10 ft (3 m) horizontally
L	Clearance above paved sidewalk or paved driveway located on public property	7 ft (2.13 m) [1]	7 ft. (2.13 m)
M	Clearance under veranda, porch, deck, or balcony	12 in. (30 cm) [2]	*

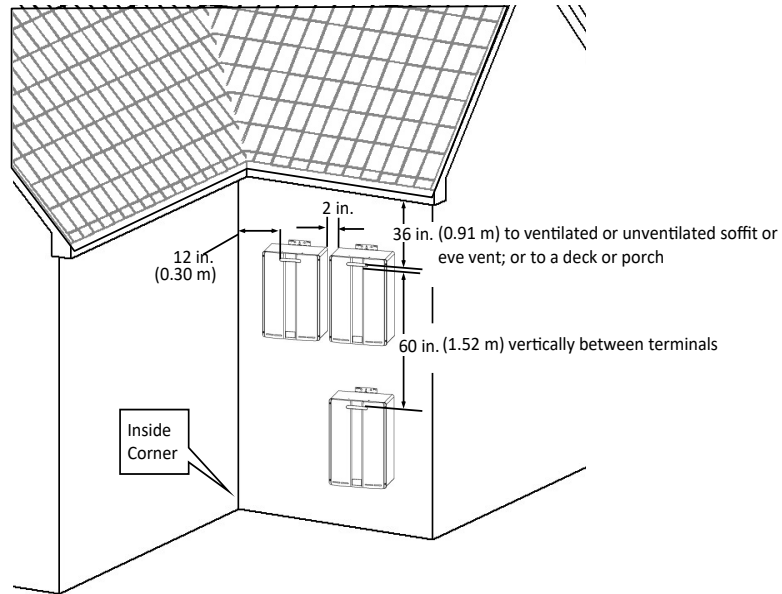
<b>Clearance to opposite wall is 24 in. (60 cm).</b>	
<p>[1] A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings. [2] Permitted only if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.</p>	<p>* Clearances are in accordance with local installation codes and the requirements of the gas supplier. (<i>Dégagement conforme aux codes d'installation locaux et aux exigences du fournisseur de gaz.</i>)</p>

**2** Non-Direct Vent (Room Air and External)

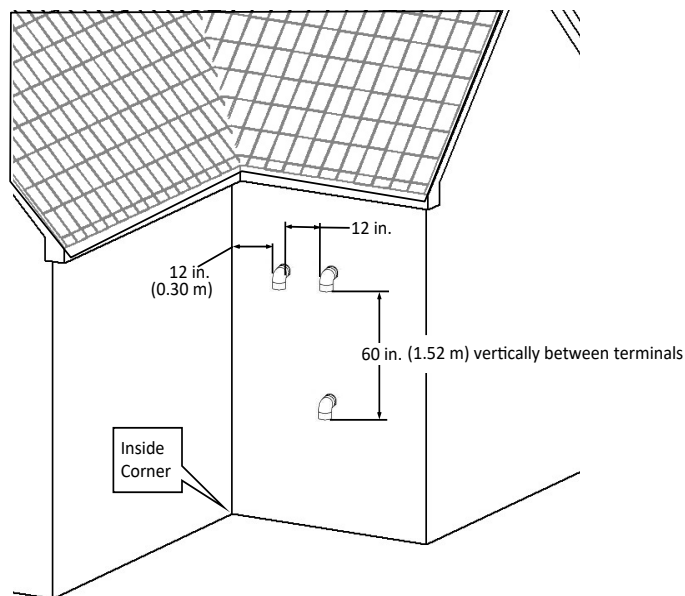
**NOTE:** Installation of Non-Direct Vent (Room Air) must use listed category IV venting.

**NOTE:** All terminations (horizontal and/or vertical) must terminate 12 in. above grade or anticipated snow level.

Termination Clearances for External (Outdoor) Water Heaters



Exhaust Termination Clearances for Internal (Indoor) Room Air Applications



## 2 Non-Direct Vent (Room Air)

### Combustion Air

#### **WARNING**

This water heater requires adequate combustion air for ventilation and dilution of flue gases. Failure to provide adequate combustion air can result in unit failure, fire, explosion, serious bodily injury or death. Use the following methods to ensure adequate combustion air is available for correct and safe operation of this water heater.

**Important:** Combustion air must be free of corrosive chemicals. Do not provide combustion air from corrosive environments. Appliance failure due to corrosive air is not covered by warranty.

For applications containing corrosive indoor air, this appliance must be installed as direct vent. DO NOT use room air in applications where combustion air contains acid forming chemicals such as sulfur, fluorine and chlorine. These chemicals have been found to cause rapid damage and decay and can become toxic when used as combustion air in gas appliances. Such chemicals can be found in, but not limited to bleach, ammonia, cat litter, aerosol sprays, cleaning solvents, varnish, paint and air fresheners. Do not store these products or similar products in the vicinity of this water heater.

#### **Unconfined Space**

An unconfined space is defined in *National Fuel Gas Code, ANSI Z223.1/NFPA 54* as "a space whose volume is not less than 50 cubic feet per 1000 Btu/hr (4.8 m<sup>3</sup> per kW per hour) of the aggregate input rating of all appliances installed in that space. Rooms communicating directly with the space in which the appliances are installed, through openings not furnished with doors, are considered a part of the unconfined space." If the "unconfined space" containing the appliance(s) is in a building with tight construction, additional outside air may be required for proper operation. Outside air openings should be sized the same as for a confined space.

#### **Confined Space**

A confined space is defined in the *National Fuel Gas Code, ANSI Z223.1/NFPA 54* as "a space whose volume is less than 50 cubic feet per 1000 Btu/hr (4.8 m<sup>3</sup> per kW per hour) of the aggregate input rating of all appliances installed in that space." Examples include a small room, closet, alcove, utility room, etc. A confined space must have two combustion air openings. Size the combustion air openings based on the BTU input for all gas utilization equipment in the space and the method by which combustion air is supplied.

**Using Indoor Air For Combustion:** When using air from other room(s) in the building, the total volume of the room(s) must be of adequate volume (Greater than 50 cubic feet per 1000 Btu/hr). Combustion air openings between joining rooms must have at least 1 square inch of free area for each 1000 Btu/h, but not less than 100 square inches each.

#### **Using Outdoor Air For Combustion**

Outdoor air can be provided to a confined space through two permanent openings, one commencing within 12 in. (0.30 m) of the top and one commencing within 12 in. (0.30 m) of the bottom, of the confined space. The openings shall communicate to the outside by one of two ways.

When communicating directly with the outdoors through horizontal ducts, each opening shall have a minimum free area of 1 in<sup>2</sup>/2000 Btu/hr (1100 mm<sup>2</sup>/kW) of total input rating of all appliances in the confined space.

Note: If ducts are used, the cross sectional area of the duct must be greater than or equal to the required free area of the openings to which they are connected.

## 2 Non-Direct Vent (Room Air)

Combustion Air (Continued)

### Louvers and Grills

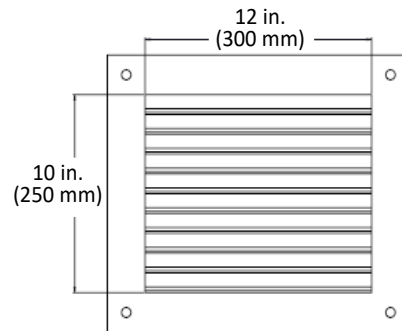
When sizing the permanent opening consideration must be taken for the design of the louvers or grills to maintain the required free area required for all gas utilizing equipment in the space. If the free area of the louver or grill design is not available, assume wood louvers will have 25% free area and metal louvers or grills will have 75% free area. Under no circumstance should the louver, grill or screen have openings smaller than 1/4 in.

Example: Wood: 10 in x 12 in x 0.25 = 30 in<sup>2</sup>

Metal: 10 in x 12 in x 0.75 = 90 in<sup>2</sup>

### Location

To maintain proper circulation of combustion air two permanent openings (one upper, one lower) must be positioned in confined spaces. The upper shall be within 12 in. (0.30 m) of the top of the confined space and the lower opening shall be within 12 in. (0.30 m) of the bottom of the confined space. Openings must be positioned as to never be obstructed.



### NOTICE

Combustion air provided to the appliance should not be taken from any area of the structure that may produce a negative pressure (i.e. exhaust fans, powered ventilation fans).

### WARNING

TO PREVENT POSSIBLE PERSONAL INJURY OR DEATH DUE TO ASPHYXIATION, COMMON VENTING WITH OTHER MANUFACTURER'S INDUCED DRAFT APPLIANCES IS NOT ALLOWED.

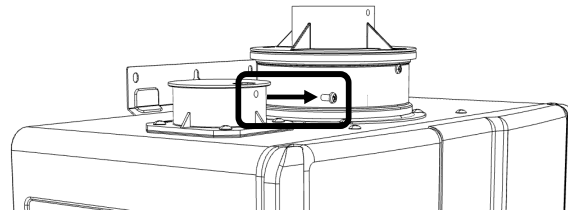
### Checklist for Combustion Air and Venting Requirements

- Verify all combustion air opening sizes are correct.
- Ensure that the Combustion Air Requirements are followed that will provide sufficient combustion air for the appliance.
- DO NOT use room air for combustion in applications where the indoor air is corrosive.
- Verify that adequate combustion air is available for all appliances installed in the space.
- Installation complies with *National Fuel Gas Code, ANSI Z223.1/NFPA 54* as well as local and state regulations therein.

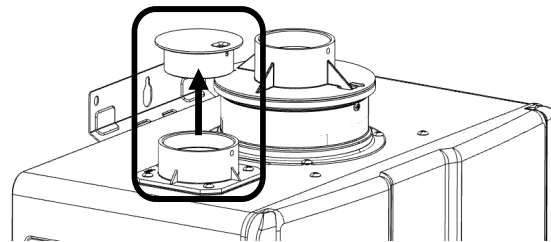
**2** Non-Direct Vent (Room Air)

Non-Direct Vent (Room Air) Installation Instructions

- 1** Remove and discard screw from combustion air vent connection.

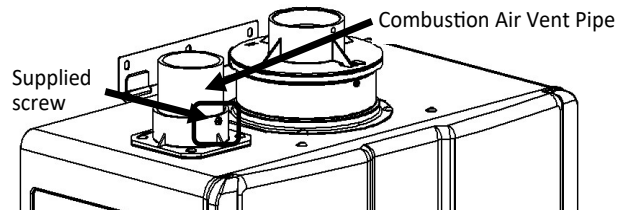


- 2** Remove and discard the combustion air vent cap.



- 3** Install the combustion air vent pipe. Ensure it is properly seated.

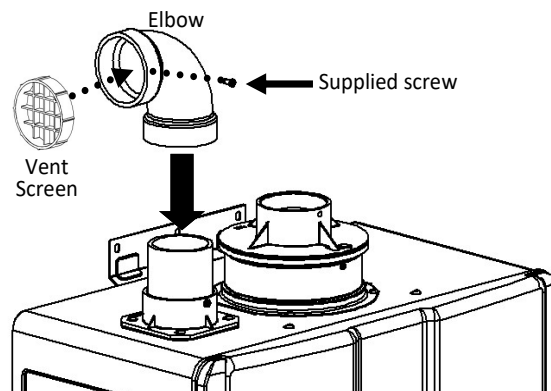
Secure the combustion air vent pipe to the combustion air vent connection with the supplied screw.



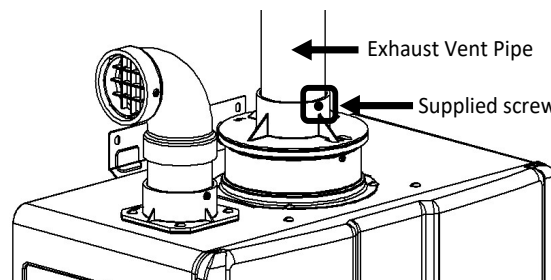
- 4** Place the vent screen or room air screen inside elbow and secure with the supplied screw. Use the room air screen for environments where room air is dusty.

- Note:
- 2 in. vent screen supplied with water heater.
  - Room air screen is available as an accessory.

Glue elbow to the combustion air PVC vent pipe per manufacturer's instructions.

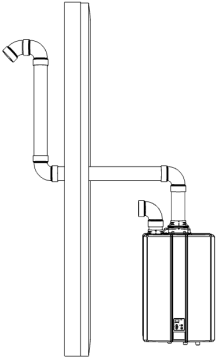
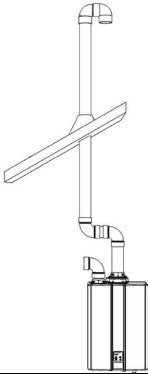
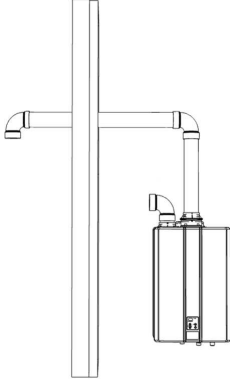
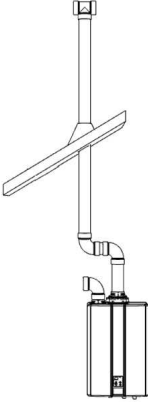
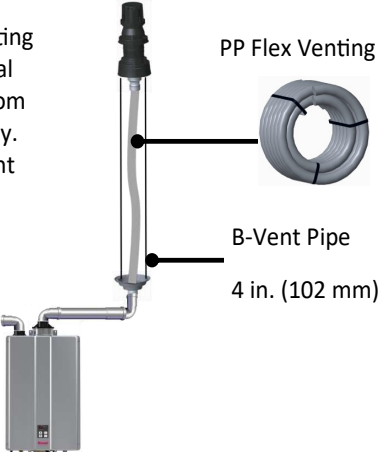


- 5** Install the exhaust vent pipe. Ensure it is properly seated. Secure the exhaust vent pipe to the exhaust adapter ring with the supplied screw.



**2** Non-Direct Vent (Room Air)

Non-Direct Vent (Room Air) Example Vent Applications

<p>2 in. or 3 in. Schedule 40 PVC/CPVC Snorkel Termination Configuration</p> 	<p>2 in. or 3 in. Schedule 40 PVC/CPVC Standard Upside Down "U" Vertical Termination Configuration</p> 
<p>2 in. or 3 in. Schedule 40 PVC/CPVC Elbow or Tee Side Wall Termination Configuration</p> 	<p>2 in. or 3 in. Schedule 40 PVC/CPVC Tee Vertical Termination Configuration</p> 
<p>Ubbink flexible venting approved for vertical non-direct vent (room air) applications only. Refer to the flex vent manual for further details.</p>  <p>PP Flex Venting</p> <p>B-Vent Pipe</p> <p>4 in. (102 mm)</p>	

Slope horizontal exhaust 1/4 in. per foot towards the water heater.

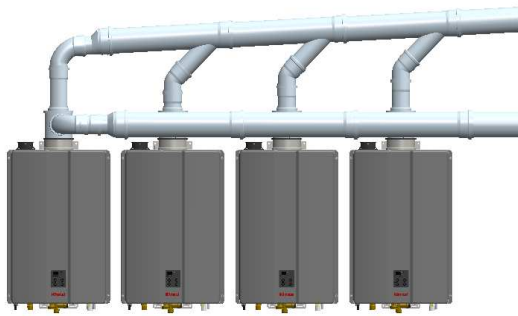
Non-Direct Vent (Room Air) Maximum Vent Length

Room Air Maximum Equivalent Length Table			
Vent Sizes	2 in. (51 mm)	3 in. (76 mm)	2 in. (51 mm) Ubbink Flex
Vent Lengths	65 ft (20 m)	150 ft (46 m)	50 ft (15 m)
<ul style="list-style-type: none"> <li>45° elbow is equivalent to 3 ft (1 m)</li> <li>90° elbow is equivalent to 6 ft (2 m)</li> </ul>			

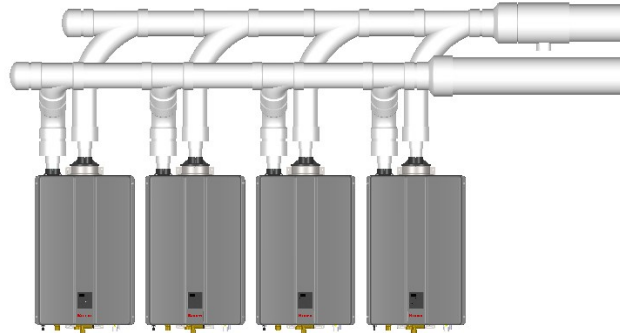
### 3 Common Vent *(Indoor Units Only. Direct Vent and Non-Direct/Room Air Vent)*

Common venting allows multiple Rinnai Tankless Water Heaters to share the same vent system.

Rinnai water heaters can only be common vented with Schedule 40 PVC/CPVC or with the Rinnai certified common vent system.



Example: Rinnai Common Venting



Example: Schedule 40 PVC/CPVC  
Common Venting

#### General Guidelines

When installing Common Vent, follow these guidelines:

- Use only the materials listed in this manual for vent, air intake pipe, and fittings. Failure to comply with this warning could result in property damage, personal injury, or death.
- When cutting vent components, ensure that the cuts are straight.
- Chamfer and deburr all edges before installing the components.
- Vent joints must not leak. Confirm gas tight connections of every vent joint.
- Before operating the water heater(s), ensure vent system is clean and free of debris.
- Vent system must be supported according to the vent manufacturer's installation instructions.
- Venting should be as direct as possible with a minimum number of fittings.
- The common vent system must only be installed by a trained and qualified professional.

#### COMMON VENT TERMINATION CLEARANCES

- Vent termination per ANSI Z223.1/NFPA 54. For clearances not specified in ANSI Z223.1/NFPA 54, clearances are in accordance with local installation codes and the requirements of the gas supplier.
- Refer to section "3.5 Vent the Water Heater" for additional clearance requirements specific to the installation application.

#### **WARNING**

- ❌ DO NOT slope the combustion air pipe toward unit. Failure to comply with this warning could result in property damage, personal injury, or death.
- ❌ DO NOT apply PVC/CPVC glues, solvents, or cleaners to the tankless water heater's intake or exhaust gasket connections. Failure to correctly assemble the components according to these instructions may result in property damage, personal injury, or death.

#### DO NOT

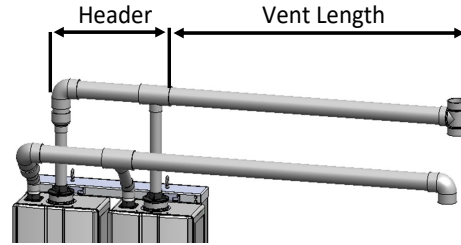
- ❌ DO NOT obstruct combustion air flow or exhaust gas flow in the venting system.
- ❌ DO NOT install the water heater in an area with negative air pressure.
- ❌ DO NOT combine the common vent system with existing vents, chimneys, or vent pipes connected to other water heaters, boilers or appliances.
- ❌ DO NOT common vent different Rinnai models in a single common vent system.
- ❌ DO NOT use cellular core PVC/CPVC, Radel, ABS or galvanized materials.
- ❌ DO NOT combine vent components from different manufacturers.



## Common Vent Maximum Equivalent Vent Lengths

For the table below:


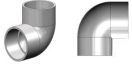
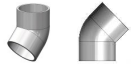
- Header is the main vent pipe into which several vents connect.
- Vent Length is the distance from the end of the header to the vent termination.
- Maximum vent length starts at the end of the header system.
- Use 10 ft (3 m) as equivalent vent length for 90° elbows.
- For use with SENSEI™ internal (indoor) tankless water heaters only.



Common Vent Maximum Equivalent Vent Length Rinnai Common Vent System or Schedule 40 PVC/CPVC						
Water Heater Model	# Water Heaters	Max System BTU/HR	HEADER DIAMETER			
			3 in.	4 in.		6 in.
			3 in. Vent Diameter	4 in. Vent Diameter	6 in. Vent Diameter	6 in. Vent Diameter
RU199i (REU-N3237FF-US) CU199i (REU-N3237FFC-US) RUR199i (REU-NP3237FF-US)	2	398,000	65 ft	150 ft	150 ft	150 ft
	3	597,000		65 ft		
	4	796,000			70 ft	
	5	995,000				
	6	1,194,000				
	7	1,393,000				
	8	1,592,000				
	9	1,791,000				
	10	1,990,000				
	11	2,189,000				
	12	2,388,000				
	RU160i (REU-N2530FF-US) CU160i (REU-N2530FFC-US) RUR160i (REU-NP2530FF-US)	2	320,000	90 ft	150 ft	
3		480,000		65 ft		
4		640,000				
5		800,000				
RU180i (REU-N2934FF-US)	2	360,000	65 ft	150 ft	150 ft	150 ft
	3	540,000		65 ft		
	4	720,000			70 ft	
	5	900,000				
	6	1,080,000				
	7	1,260,000				
	8	1,440,000				
	9	1,620,000				
	10	1,800,000				
	11	1,980,000				
	12	2,160,000				
	RU130i (REU-N2024FF-US)	2	260,000	90 ft	150 ft	
3		390,000		65 ft		
4		520,000				
5		650,000				
6		780,000				

## Common Vent Terminations

### Various 3 in., 4 in. and 6 in. Schedule 40 PVC/CPVC Terminations

Product Description	Diagram	Horizontal	Vertical	Equivalent Length (ft)
Tee		✓	✓	10
90° Elbow		✓	✓	10
45° Elbow		✓	✓	5

### Rinnai Common Vent Terminations (Ubbink C-Vent)

Manufacturer	Phone	Web Site
Ubbink	800-621-9419	www.rinnai.us

Part Number	Product Description	Diagram	Horizontal	Vertical	Equivalent Length (ft)
790096 790095	CVent Roof Termination 6 in. CVent Roof Termination 4in.			✓	5
790125	CVent Roof Termination 3 in.			✓	5
790094 790093 90124	CVent Wall Terminal Kit 6 in. CVent Wall Terminal Kit 6 in. CVent Wall Terminal Kit 6 in.		✓		5
780061 780060	Intake Rain Cap 6 in. Intake Rain Cap 4 in.			✓	N/A
790098 790097	Exhaust Flue Rain Cap 6 in. Exhaust Flue Rain Cap 4 in.			✓	N/A

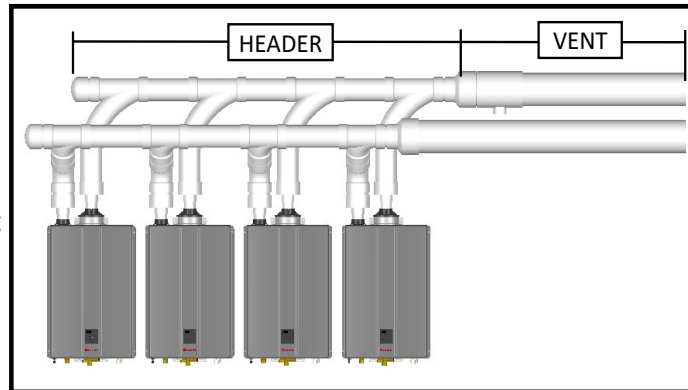
### Schedule 40 PVC/CPVC Common Vent Guidelines

**WARNING** PVC solvents (primer and glue) can be extremely flammable. Vapors may cause a flash fire or explosion resulting in property damage, personal injury or death.

- Keep solvents away from heat, sparks, flames and all other sources of ignition.
- Do not solder, cut or weld until all vapors have dissipated.
- PVC solvents are heavier than air causing them to settle at low points of the system.
- Before Using PVC solvent
  - Disconnect power to the water heater.
  - Remove the front cover of the water heater.
  - Ensure areas around the water heater and PVC venting are all well ventilated.
  - Allow all vapors to dissipate before applying power to the system or introducing any other source of ignition.

When installing PVC/CPVC Common Vent, follow these guidelines:

- Avoid sharp bends or tees in the vent system. These vent components create additional restrictions that could reduce performance of the water heaters.
- PVC combustion air and exhaust should terminate with elbow or tee pointing down. This will stop unwanted moisture from entering the vent system.
- Fire rated penetrations shall be firestopped. Contact your vent supplier or local firestop manufacturer for appropriate firestop methods.



PVC/CPVC Common Vent Installation

- Examine all vent components for damage prior to installation.
- PVC/CPVC vent systems must be free to expand and contract. Refer to the vent manufacturer's installation instructions for appropriate support methods.
- PVC/CPVC venting must include unrestricted vent movement through walls, ceilings, and roof penetrations.
- Use only PVC/CPVC primer and cement approved for use by the vent manufacturer.
- Refer to vent manufacturer's installation instructions for proper joint assembly procedures and products.
- PVC/CPVC common venting should include a condensate drain and trap between the header and vent length. Condensate trap must include a loop that can hold 6 in. (15 cm) of water. See "PVC/CPVC Common Vent Installation" illustration on this page.

**DO NOT**

- ✗ DO NOT mix vent pipe, fittings or joining methods from different vent manufacturers.
- ✗ DO NOT attempt to repair damaged vent. Damaged vent components must be replaced.
- ✗ DO NOT use short radius elbows in the common vent system.


ACCEPTABLE	ACCEPTABLE	NOT ACCEPTABLE
90° Elbows, Long Sweep	90° Elbows, Short Sweep	90° Elbows, Close Turn

## Connecting Multiple Water Heaters (Cascade Communication)

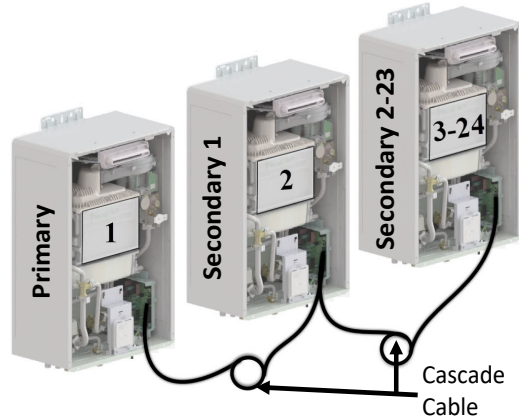
With use of cascade cable(s) up to 24 water heaters can be electronically connected. This connection will rotate water heater operation order to ensure equal usage among the entire system and enables all water heaters connected to modulate operation and function as one hot water source.

**NOTE:** For proper operation, do not combine different models with cascade communication.

**Cascade Cable Required:**

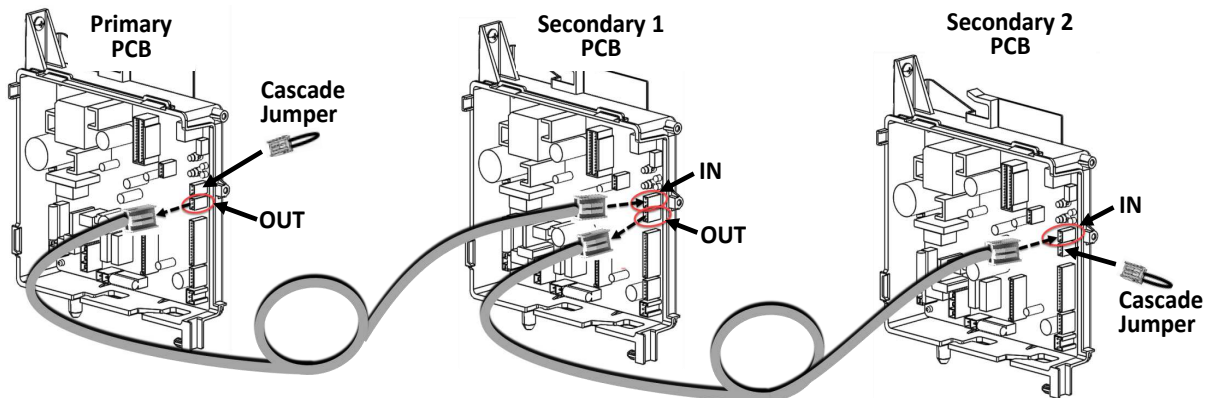
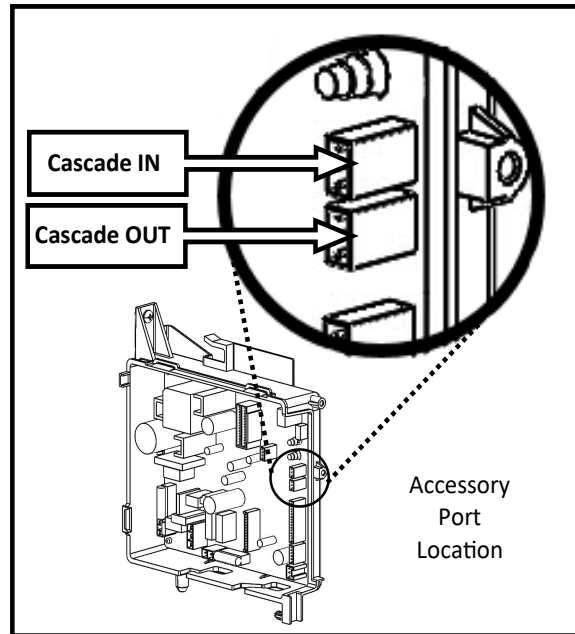


- Cable length: 26 ft (8 m)  
**OR**
- Cable Length: 10 ft (3 m)
- One cable required for each water heater.
- Includes 1 cable and 2 cascade jumpers.



### Cascade Cable Assembly

1. Connect one end of the Cascade Cable to the “Cascade OUT” accessory port on the PCB.
2. Connect the other end of the cascade cable to the “Cascade IN” accessory port on the PCB of the next water heater.
3. Repeat steps 1 and 2 for each subsequent water heater in the system.
4. Connect the “Cascade Jumper” (Included with the cascade cable) to the open accessory ports.
5. Proceed to “Programing Cascade Communication” on the following page.



## Programming Cascade Communication

### Parameter Settings (Cascade Communication)

Refer to the parameter setting section of this manual for instructions on how to access and change parameter settings.

SETTING #	SETTING DESCRIPTION	SELECTION					
		a	b	c	d	e	f
08	Cascade	Secondary (1-23)	Primary				
09	Units in Standby (Cascade)	1	2	3	4	5	6

#### 08 Cascade:

**Primary:** Select the water heater intended to be the Primary water heater for cascade communication. Set the parameter setting for this water heater to “Primary” (08b).

NOTE: Controller will display the set temperature for the system.

**Secondary:** Factory Default setting for each water heater is set to “Secondary”. Parameter adjustment is only needed on the water heater identified as “Primary”.

NOTE: Controller will display “- - -”.

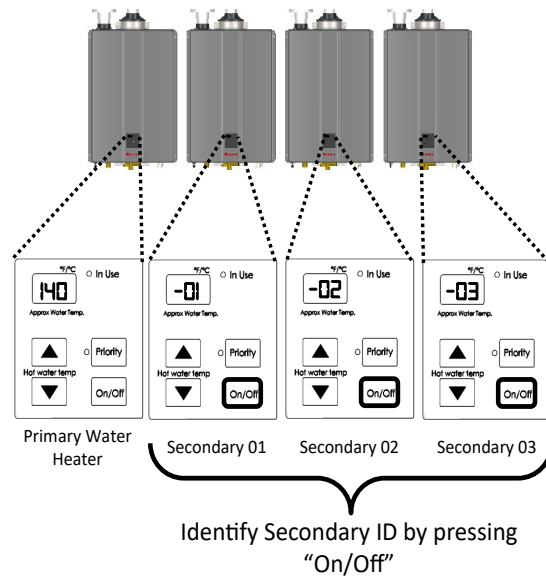
#### 09 Units in Standby:

Adjust the parameter setting of the primary unit to set the number of water heaters in standby. Standby units will maintain operation with the water flow control valve in the open position. The remaining water heaters will maintain the water flow control valve in the closed position.

### Setting Secondary ID

After identifying the “Primary” water heater in the parameter settings, set the Secondary ID for all remaining water heater in the system by pressing the “On/Off” button on the controller.

When ID setting is successful, the controller display will change from “- - -” to the newly set ID number.



## 3.6 Connect the Water Supply

### Guidelines

- The piping (including soldering materials) and components connected to this appliance must be approved for use in potable water systems.
- Purge the water line to remove all debris and air. Debris will damage the water heater.
- The appliance must not be connected to a system that was previously used with a non-potable water heating appliance.
- Ensure that the water filter on the water heater is clean and installed.
- DO NOT introduce toxic chemicals such as those used for boiler water treatment to the potable water used for space heating.

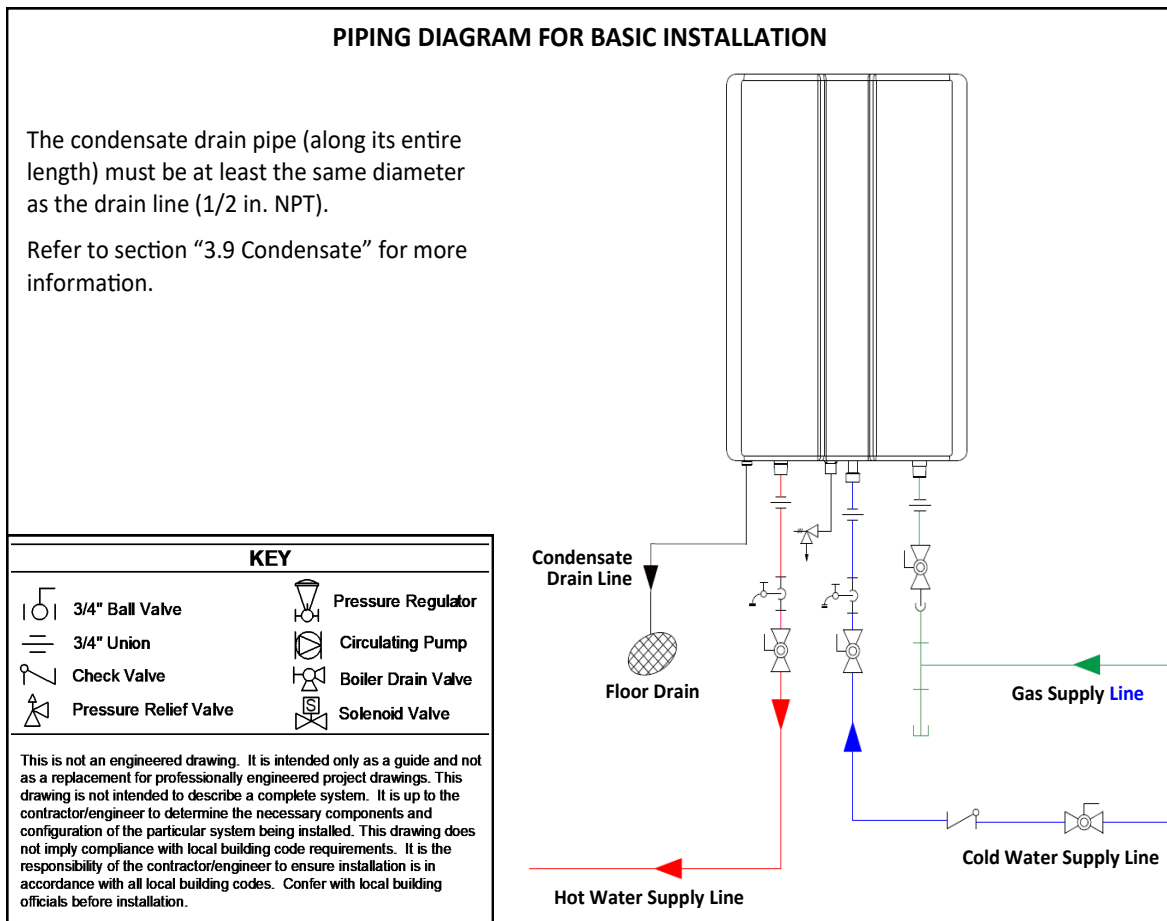
### Instructions

To connect the water supply, follow the instructions below.

**IMPORTANT:** Water connections to the water heater should follow all state and local plumbing codes.

If this is a standard installation, refer to the “Piping Diagram for Basic Installation” below.

1. Plumb the cold water supply line to the water heater on the 3/4 in. MNPT connection at the bottom of the water heater marked “COLD.”
2. Plumb the hot water supply line to the 3/4 in. MNPT connection marked “HOT.”
3. If a pipe cover will be installed, make sure water lines to the water heater fit within the confinements of the pipe cover.

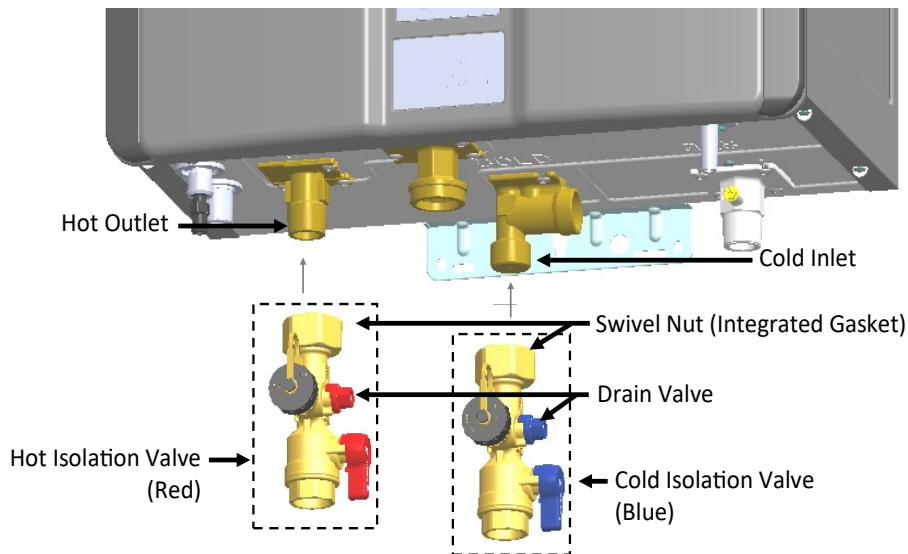


### 3.7 Install the Isolation Valves


Isolation valves (included with water heater) provide the ability to isolate the water heater from the structure's plumbing and allow quick and easy access to flush the heat exchanger. The supplied isolation valves meet *American National Standard (ANSI Z21.10.3) / Canadian Standard (CSA 4.3)* and are ANSI/NSF 61 approved for potable water.

To install isolation valves:

1. Position the **Hot Isolation Valve (Red)** below the **Hot Outlet** side of the water heater.
2. Hand tighten the **Swivel Nut** of the **Hot Isolation Valve (Red)** to the **Hot Outlet** side of the water heater.
3. Rotate the **Drain Valve** to an accessible position. With a wrench, tighten the **Swivel Nut** to the water heater.
4. Repeat steps 1 - 3 for the **Cold Isolation Valve (Blue)**.
5. Connect the **Cold Isolation Valve (Blue)** to the **Cold Water Supply Line**.
6. Connect the **Hot Isolation Valve (Red)** to the **Hot Water Supply Line**.
7. Ensure that both **Drain Valves** are in the closed position before turning on water supply.






### 3.8 Pressure Relief Valve

 **WARNING** Water discharged from the pressure relief valve could cause severe burns instantly or death from scalds.

#### Guidelines

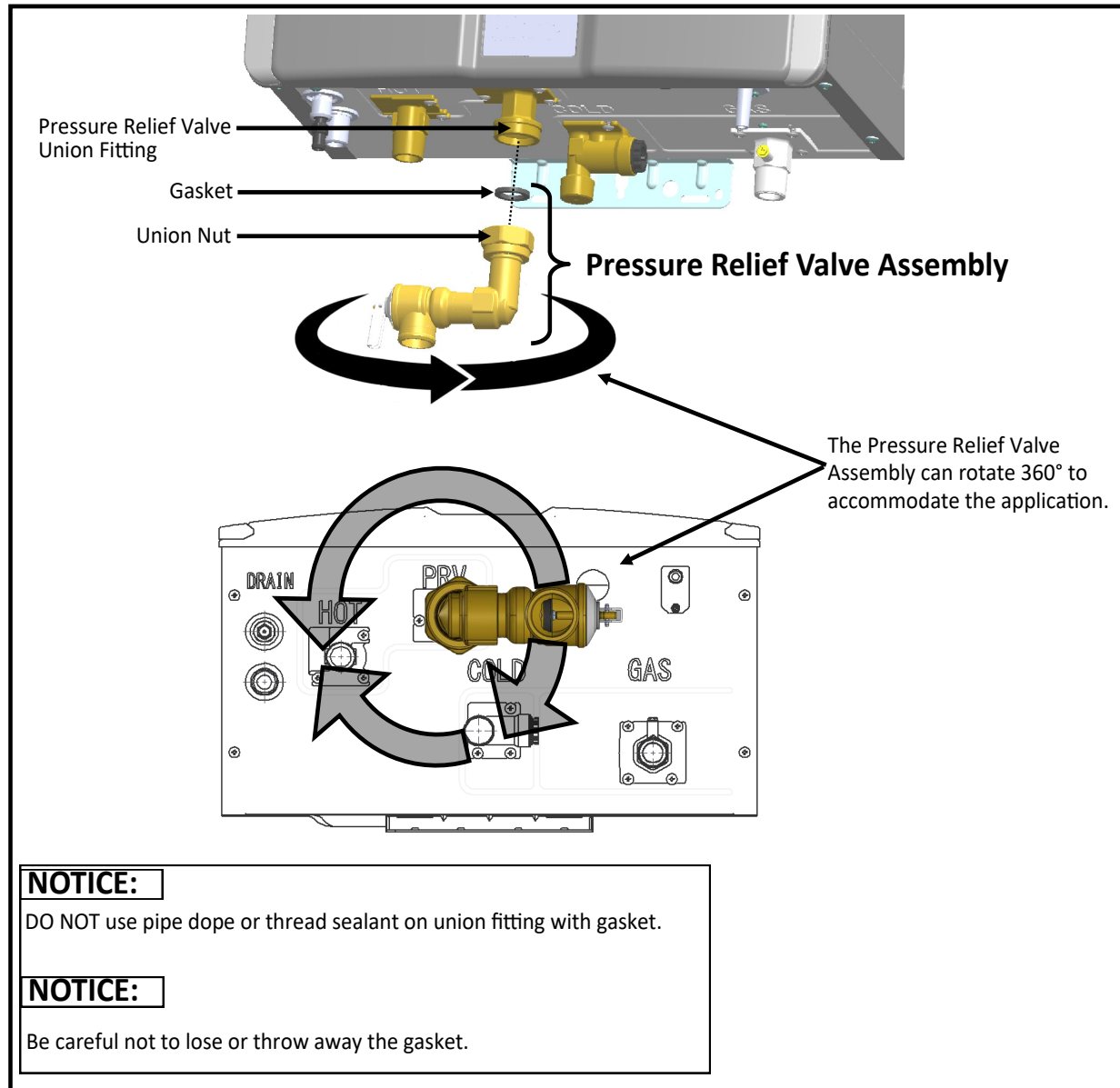
An approved pressure relief valve is required by the *American National Standard (ANSI Z21.10.3)* for all water heating systems and shall be accessible for servicing. When connecting a pressure relief valve, follow the guidelines below:

- The pressure relief valve must comply with the standard for *Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems ANSI Z21.22* and /or the standard *Temperature, Pressure, Temperature and Pressure Relief Valves and Vacuum Relief Valves, CAN1-4.4*.
  - The pressure relief valve must be rated up to 150 psi and to at least the maximum Btu/hr of the appliance.
  - The discharge from the pressure relief valve should be piped to the ground or into a drain system per local codes.
  - The pressure relief valve must be manually operated once a year to check for correct operation.
  - The discharge line from the pressure relief valve should pitch downward and terminate 6 in. (152 mm) above drains where discharge will be clearly visible.
  - The discharge end of the line shall be plain (unthreaded) and a minimum of 3/4 in. nominal pipe diameter. The discharge line material must be suitable for water at least 180° Fahrenheit.
  - The pressure relief valve is assembled to the pressure relief valve adapter as illustrated on the next page. DO NOT place any other valve or shut off device between the pressure relief valve and the water heater.
  - If a pressure relief valve discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation. Do not plug the pressure relief valve.
  - The *American National Standard (ANSI Z21.10.3)* does not require a combination temperature and pressure relief valve for this appliance. However, local codes may require a combination temperature and pressure relief valve.
  - Protect pressure relief valve and pressure relief valve discharge line from freezing. Do not plug or restrict flow of the pressure relief valve.
-  DO NOT plumb the pressure relief valve with the condensate drain; both must be plumbed independently to drain.
  -  DO NOT plug the pressure relief valve and do not install any reducing fittings or other restrictions in the relief line. The pressure relief line should allow for complete drainage of the valve and the line.
  -  DO NOT place any other valve or shutoff device between the pressure relief valve and the water heater.

## Pressure Relief Valve Installation Instructions

To install the pressure relief valve, follow the steps below.

1. On the bottom of the tankless water heater, hand tighten the **Pressure Relief Valve Assembly** and **Gasket** to the **Pressure Relief Valve Union Fitting**.
2. Rotate the **Pressure Relief Valve Assembly** to the desired accessible position. With a wrench, tighten the **Union Nut** to the **Pressure Relief Valve Union Fitting**.



### 3.9 Condensate

#### Condensate Guidelines

To prevent condensate damage, follow these guidelines:

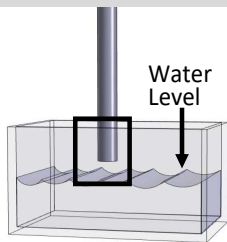
- Do not plumb the condensate drain with the pressure relief valve; both must be plumbed independently to drain.
- All condensate must drain and be disposed of according to local codes.
- Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose.
- The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line (1/2 in. MNPT).
- Condensation drain lines installed in areas that are subject to freezing temperatures should be wrapped with an approved supplemental heat source. Install per manufacturer's instructions.
- Slope the condensate drain lines toward the inside floor drain or condensate pump.
- For external (outdoor) installations, to minimize freezing of the condensate, run the condensate drain line through an interior wall or between insulation and an interior wall.
- If a floor drain is not available or the drain is above the level of the condensate drain, a condensate pump should be installed.
- A condensate neutralizer kit is available from Rinnai. The kit allows condensate to flow through neutralizing media that raises the pH of the condensate to a level that will help prevent corrosion of the drain and public sewer system. Refer to section "2.4 Accessories" for more information.
- The condensate drain pipe should be as short as possible and have a downward pitch.
- The condensate trap will automatically prime (self-prime) during operation of the water heater as condensate forms. Condensate draining from the water heater indicates that the trap is full and that there is no blockage in the condensate drain. It is not necessary to add water to the condensate trap.

- The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances.



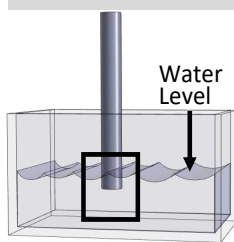
**CORRECT**

Pipe open to atmosphere



**NOT CORRECT**

Pipe submerged in water

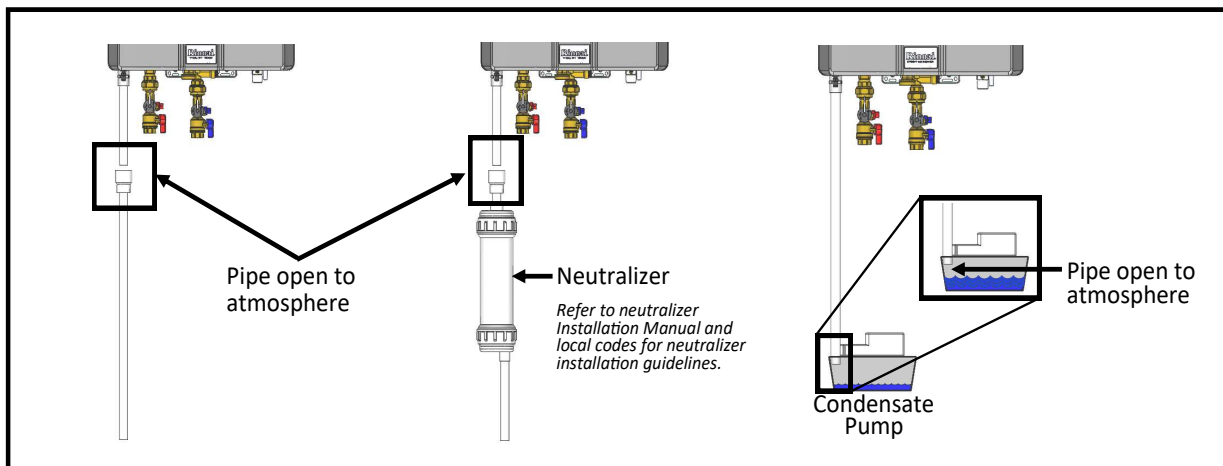


**DO NOT**

- **DO NOT connect the condensate drain line with an air conditioning evaporator coil drain.**
- **Water heaters have an integrated condensate trap. DO NOT install an external condensate trap.**



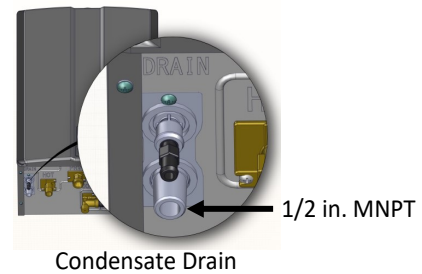
**EXTERNAL TRAP NOT REQUIRED**



## Condensate Drain Pipe Connection

To connect the condensate drain pipe:

1. Apply thread sealant to 1/2 in. MNPT condensate drain port.
2. Thread 1/2 in. NPT fitting onto condensate drain port.
3. Follow the steps in the next section: "Condensate Pump Safety Switch Wiring."

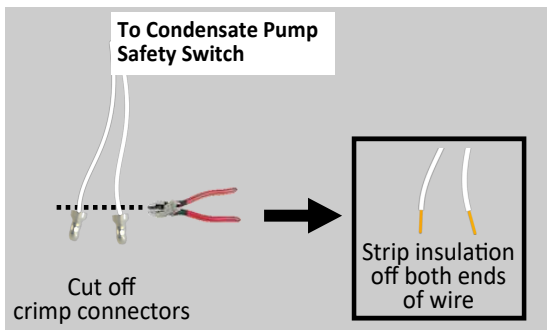


## Condensate Pump Safety Switch Wiring

**IMPORTANT:** The steps in this section must conform with local codes and the guidelines established by the National Electrical Code (NEC).

The condensate pump (if installed) should be wired to deactivate the water heater in the event the condensate pump fails.

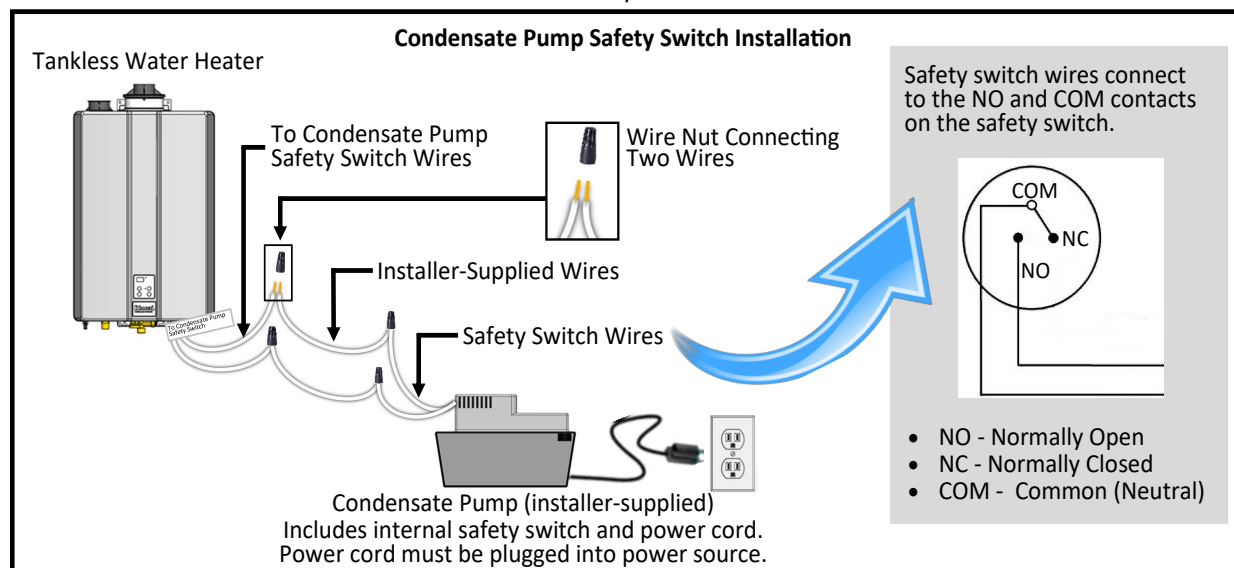
1. Disconnect power from the water heater.
2. Open the water heater cover and locate two white wires labeled "To Condensate Pump Safety Switch."
3. Cut crimp connectors off white wires and strip the insulation off of the two ends.
4. Select an appropriate length of wire (18 AWG or greater) and strip the insulation off the ends. Follow the wiring guidelines established by the National Electrical Code (NEC).



5. With wire nuts or other approved wire connectors, connect the "To Condensate Pump Safety Switch" wires to the normally open contacts on the condensate pump (see image below).
6. Reconnect power to the water heater and press the "On/Off" button on the controller.

### Test Operation

1. Test the operation of the shut off switch by unplugging the condensate pump and filling the condensate reservoir with water until the float switch closes the circuit.
2. Turn on the water heater.
3. The water heater displays diagnostic code "25."
4. Plug in the condensate pump in and confirm condensate is flowing out of the reservoir.
5. Turn off the water heater by pressing the "On/Off" button on the controller. Wait five seconds then turn the power back on. This will clear the diagnostic code.



### 3.10 Connect the Gas Supply

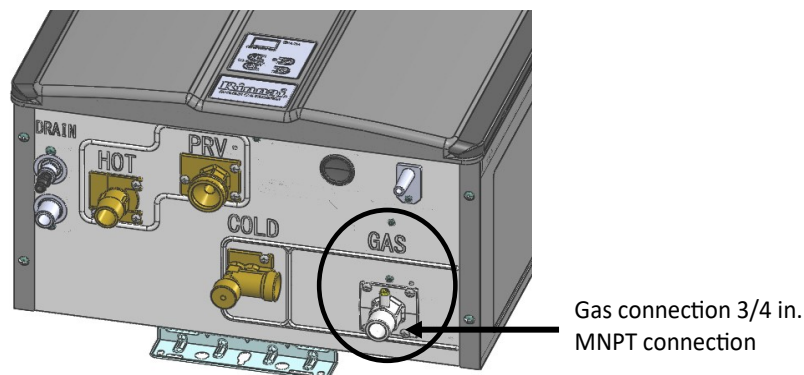
#### **! WARNING**

- A licensed professional must install the gas supply.
- Turn off 120V power supply.
- Turn off the gas.
- Gas is flammable. Do not smoke or provide other ignition sources while working with gas.
- Do not turn on the water heater or gas until all fumes are gone.

#### Instructions

To connect the gas supply, follow the instructions below:

1. Install a manual gas control valve in the gas supply line to the water heater. A union can be used on the connection above the shut off valve for the future servicing or disconnection of the water heater.
2. Check the type of gas and gas supply pressure before connecting the water heater. If the water heater is not of the gas type that the building is supplied with, DO NOT connect the water heater. Contact the dealer for the proper water heater to match the gas type.
3. Check the gas supply pressure immediately upstream at a location provided by the gas company. Supplied gas pressure must be within the limits shown in section "2.5 Specifications" with all gas appliances operating.
4. Before placing the appliance in operation, all joints including the heater must be checked for gas tightness by means of soap, gas leak detector solution, or an equivalent nonflammable solution, as applicable. (Since some leak test solutions, including soap and water, may cause corrosion or stress cracking, the piping shall be rinsed with water after testing, unless it has been determined that the leak test solution is non-corrosive.)
5. Use approved connectors to connect the water heater to the gas line. Purge the gas line of any debris before connection to the water heater.
6. Any compound used on the threaded joint of the gas piping shall be a type that resists the action of liquefied petroleum gas (propane/LPG).
7. The gas supply line shall be gas tight, sized, and so installed as to provide a supply of gas sufficient to meet the maximum demand of the heater and all other gas consuming appliances at the location without loss of pressure. If in doubt about the size of the gas line, refer to the "Gas Pipe Sizing Reference Tables" section on the next page.
8. Perform a leak and pressure test prior to operating the water heater. If a leak is detected, do not operate the water heater until the leak is repaired.





## Gas Pipe Sizing Reference Tables

The gas supply must be capable of handling the entire gas load required at the location. Gas line sizing is based on gas type, the pressure drop in the system, the gas pressure supplied, and gas line type. For gas pipe sizing, refer to the National Fuel Gas Code, ANSI Z223.1/NFPA 54, or the Natural Gas and Propane Installation Code, CSA B149.1

For some tables, you will need to determine the cubic feet per hour of gas required by dividing the gas input by the heating value of the gas (available from the local gas company). The gas input needs to include all gas products at the location and the maximum Btu usage at full load when all gas products are in use.

Use the table for your gas type and pipe type to find the pipe size required. The pipe size must be able to provide the required cubic feet per hour of gas or the required Btu/hour.

The information below is provided as an example. The appropriate table from the applicable code must be used.

**GAS PIPE SIZING CALCULATION WORKSHEET**

Instructions: Enter values in empty boxes.

Rinnai Model Gas Input:  
 A  Btu/hr

Additional Appliance Total Gas Input:  
 B  Btu/hr

Heating Value of Gas:  
 C  Btu/ft<sup>3</sup>

Cubic Feet Per Hour (CFH):

$$(CFH) = \frac{A + B}{C}$$

(CFH) =

**ANSWER:** CFH =  ft<sup>3</sup>/hr

## Natural Gas

Pressure Drop 0.5 in. w.c.				
Information in table obtained from NFPA 54, ANSI Z223.1 - 2015.	Schedule 40 Metallic Pipe			
	Inlet Pressure:		Less than 2 psi	
	Specific Gravity:		0.60	
	Nominal Pipe Size (in.)			
	1/2	3/4	1	1 1/4
Length in ft (meters)	Capacity in Cubic Feet of Gas per Hour			
10 (3)	172	360	678	1,390
20 (6)	118	247	466	957
30 (9)	95	199	374	768
40 (12)	81	170	320	657
50 (15)	72	151	284	583
60 (18)	65	137	257	528
70 (21)	60	126	237	486
80 (24)	56	117	220	452
90 (27)	52	110	207	424
100 (30)	50	104	195	400

**EXAMPLE**

Rinnai Model Gas Input:  
 A  Btu/hr

Additional Appliance Total Gas Input:  
 B  Btu/hr

Heating Value of Gas:  
 C  Btu/ft<sup>3</sup>

Cubic Feet Per Hour (CFH):

$$(CFH) = \frac{A + B}{C}$$

(CFH) =

**ANSWER:** CFH =  ft<sup>3</sup>/hr

For this example, the pipe diameter must be at least 3/4 in. pipe size and 10 ft (3 m) in length.



### Natural Gas

Pressure Drop 3.0 in. w.c.				
Intended use: Initial supply pressure of 8.0 in. w.c. or greater.	Schedule 40 Metallic Pipe			
	Inlet Pressure:	Less than 2 psi		
Information in table obtained from NFPA 54, ANSI Z223.1 - 2015.	Specific Gravity: 0.6			
		Nominal Pipe Size (in.)		
	1/2	3/4	1	1 1/4
Length in ft (meters)	Capacity in Cubic Feet of Gas per Hour			
10 (3)	454	949	1,790	3,670
20 (6)	312	652	1,230	2,520
30 (9)	250	524	986	2,030
40 (12)	214	448	844	1,730
50 (15)	190	397	748	1,540
60 (18)	172	360	678	1,390
70 (21)	158	331	624	1,280
80 (24)	147	308	580	1,190
90 (27)	138	289	544	1,120
100 (30)	131	273	514	1,060

**EXAMPLE**  
Rinnai Model Gas Input:

A  Btu/hr

Additional Appliance total Gas Input:

B  Btu/hr

Heating Value of Gas:

C  Btu/ft<sup>3</sup>

Cubic Feet Per Hour (CFH):

$$(CFH) = \frac{A + B}{C}$$

$$(CFH) = \frac{199,000 + 65,000}{1,000}$$

**ANSWER:**

CFH =  ft<sup>3</sup>/hr

For this example, the pipe diameter must be at least 1/2 in. nominal pipe size and 20 ft (6 m) in length.

### Propane (Undiluted)

Pressure Drop 0.5 in. w.c.				
Information in table obtained from NFPA 54, ANSI Z223.1 - 2015.	Schedule 40 Metallic Pipe			
	Inlet Pressure:	11 in. w.c.		
	Specific Gravity: 1.50			
	Nominal Inside Pipe Size (in.)			
	1/2	3/4	1	1 1/4
Length in ft (meters)	Capacity in Thousands of Btu per Hour			
10 (3)	291	608	1,150	2,350
20 (6)	200	418	787	1,620
30 (9)	160	336	632	1,300
40 (12)	137	287	541	1,110
50 (15)	122	255	480	985
60 (18)	110	231	434	892
80 (24)	101	212	400	821
100 (30)	94	197	372	763

**EXAMPLE**  
Rinnai Model Gas Input:

A  Btu/hr

Additional Appliance Total Gas Input:

B  Btu/hr

Total Gas Input:

$$\text{Total Gas Input} = A + B$$

$$\text{Total Gas Input} = 199,000 + 65,000$$

**ANSWER:**

Total Gas Input =  Btu/hr

For this example, the pipe diameter must be at least 1/2 in. nominal pipe size and 10 ft (3 m) in length.

### 3.11 Connect the Power Supply

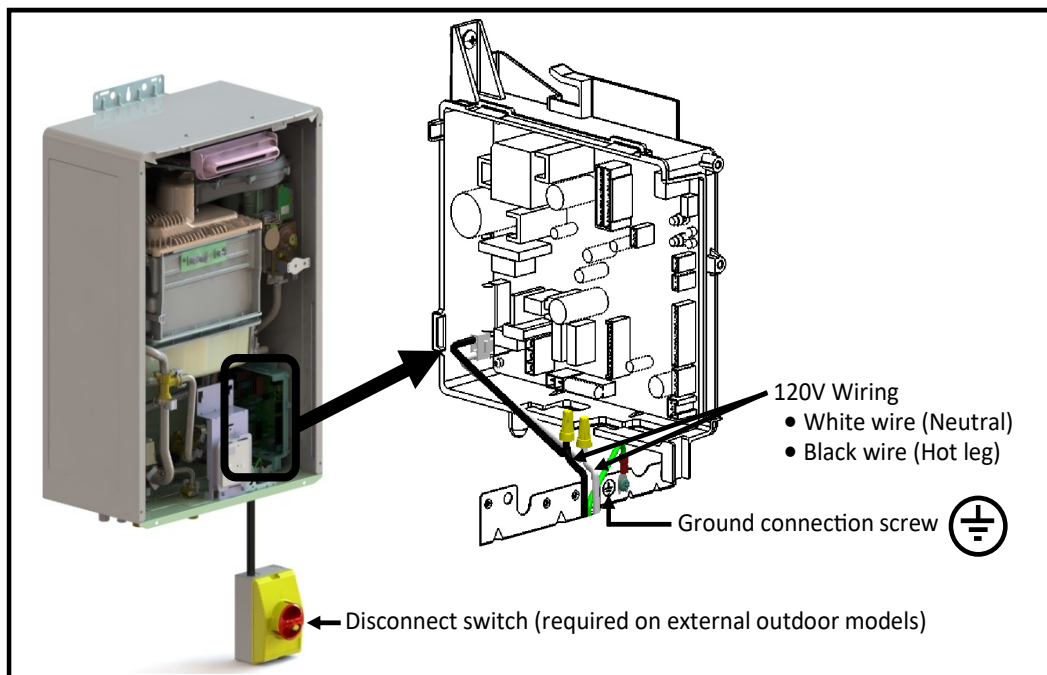
#### **WARNING**

- Do not use an extension cord or adapter plug with this appliance.
- The water heater must be electrically grounded in accordance with local codes and ordinances or, in the absence of local codes, in accordance with the National Electrical Code, ANSI/NFPA No. 70.
- Indoor water heaters are equipped with a three-prong (grounding) plug for your protection against shock hazard and should be plugged directly into a properly grounded three-prong receptacle. Do not cut or remove the grounding terminal from this plug.

#### Guidelines

When connecting the power supply, follow these guidelines:

- Do not rely on the gas or water piping to ground the water heater. Ground locations are provided inside the water heater.
- The water heater requires 120 VAC, 60 Hz power from a properly grounded circuit.
- If using the 5 ft (1.5 m) power cord (supplied with internal/indoor water heaters), plug it into a standard 3 prong 120 VAC, 60 Hz properly grounded wall outlet.
- On external (outdoor) models, a disconnect switch must be provided and installed for the incoming 120 VAC power. The switch should be a type that is suitable for outdoor use. Check the National Electrical Code, ANSI/NFPA 70 and your local codes for a proper switch type to use in your area. Power connections must be protected from the weather and flexible cords must use an appropriate strain relief.
- The wiring diagram is located on the inside of the water heater front cover.



#### Post-Power Supply Connection Checklist

- Confirm that the electricity is supplied from 120 VAC, 60 Hz power source and is in a properly grounded circuit.
- Confirm that an extension cord or an adapter plug has **NOT** been used with the water heater.

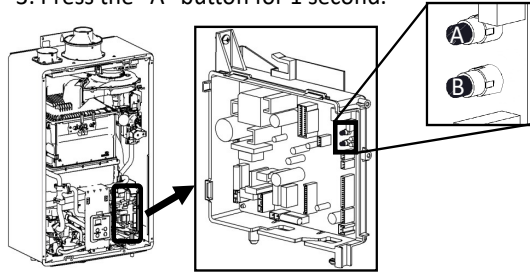
### 3.12 Parameter Settings

**WARNING** DO NOT adjust parameter settings unless specifically instructed to do so.

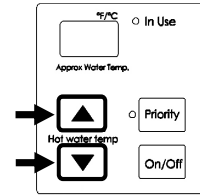
Certain elements of the installation may require adjusting the parameters of the tankless water heater.

**To adjust the parameters:**

1. Locate the PC Board (lower right side of unit).
2. Locate the two push buttons (A and B) on the PC Board.
3. Press the "A" button for 1 second.

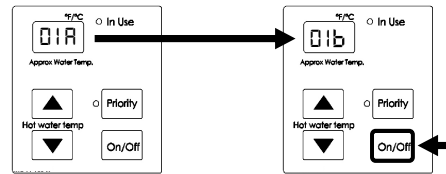


4. Use the ▲ (Up) and ▼ (Down) buttons on the controller to select a setting number (see Parameter Settings Table below).



5. Once the desired setting number is selected, use the "On/Off" button on the controller to change the selection for the setting number.

**Example:** Display will change from 01A to 01b for Maximum Temperature setting (as shown below).



6. To exit the parameters, press the "A" button for 1 second.

**Parameter Settings Table**

Default is **A** for all settings below except i0, i2, i3, and i4 which are factory set.

SETTING #	SETTING DESCRIPTION	SELECTION					
		A	b	C	d	E	F
i1	Maximum Set Temperature	140° F	185° F				
i2	High Altitude (Installation Location)	0 - 2,000 ft (0 - 610 m)	2,001 - 5,400 ft (610 - 1,585 m)	5,401 - 7,700 ft (1,585 - 2,347 m)	7,701 - 10,200 ft (2,347 - 3,109 m)		
i3	Service Soon <sup>1</sup>	Disabled	0.5 Year	1 Year	2 Years		
i4	Recirculation Settings	No Recirculation	Recirculation (Dedicated)				
i5	Recirculation Mode <sup>2</sup>	Economy	Comfort				
i6	Control Switch	BMS <sup>3</sup>	Air Handler (AH)				
i7	Units in Standby (EZ Connect)	2	1				
i8	Cascade	Secondary	Primary				
i9	Units in Standby (Cascade) <sup>4</sup>	1	2	3	4	5	6
i0	Gas Type (Factory Set)	NG	LPG				
i1	Maximum Flow Rate <sup>5</sup>	Standard	High				
i2	Water Heater Model (Factory set values and not adjustable)	Commercial without Pump (CU)					
i3		CU199 (REU-N3237)		CU160 (REU-N2530)			
i4		Internal (Indoor)	External (Outdoor)				

<sup>1</sup> See section "3.13 Service Indicator (Service Soon, 55)" for more information.

<sup>2</sup> Setting i5 is available only if setting i4 b is selected.

**Economy mode** cycles the pump less often, using less energy to maintain the circulation loop temperature.

**Comfort mode** cycles the pump more frequently, ensuring the loop temperature remains higher (but also uses more energy).

<sup>3</sup> BMS = Building Management System

<sup>4</sup> Setting i9 is available only if setting i8 b is selected.

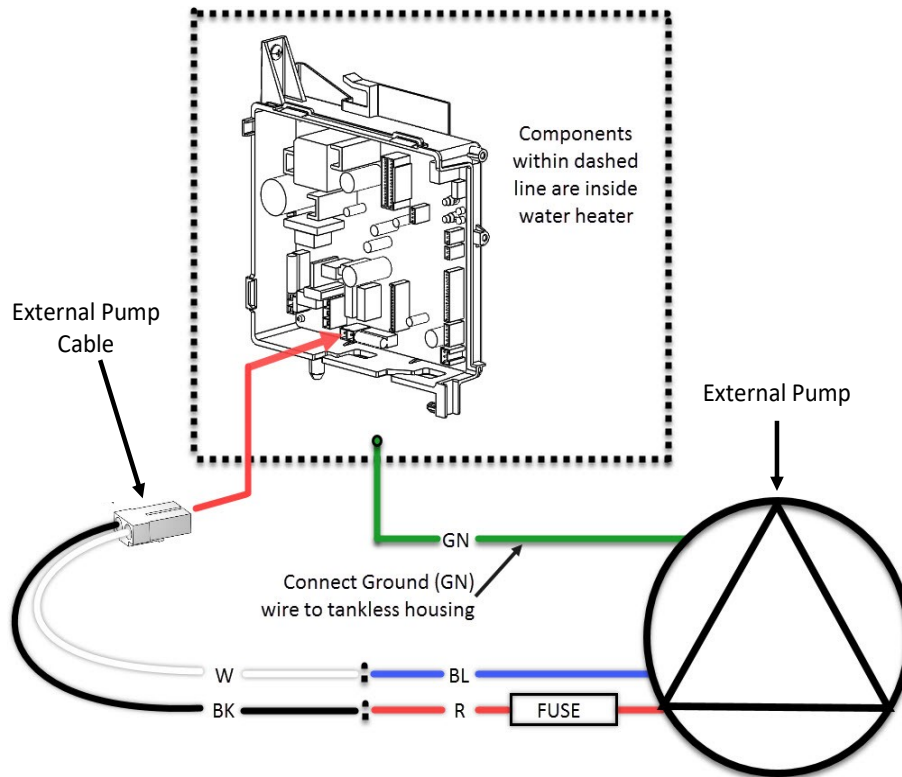
<sup>5</sup> Selecting "High" will increase the water flow rate to the maximum capacity.

### 3.13 External Pump with Circ-Logic

Rinnai SENSEI™ Tankless Water Heaters include Circ-Logic technology that offers the comfort and convenience of instant hot water with the use of an external recirculation pump. Circ-Logic controls the on/off sequence and operation cycles of the external recirculation pump through the programming of the tankless water heater’s parameter settings. In commercial settings, the external pump cable is included with the tankless water heater. Circ-Logic operates in either Economy or Comfort mode based on the parameter settings of the water heater.

- **Economy Mode**—Cycles the pump less often, using less energy to maintain the circulation loop temperature.
- **Comfort Mode**—Cycles the pump more frequently, ensuring the loop temperature remains higher (but also uses more energy).

	Rinnai Set Temperature												
	140	135	130	125	120	115	110	108	106	104	102	100	98
	Typical Pump OFF Intervals (Minutes)												
<b>Economy</b>	18	20	22	24	28	32	38	40	44	48	52	56	62
<b>Comfort</b>	9	10	11	12	14	16	19	20	22	24	26	28	31



### 3.14 Service Indicator (Service Soon, 55)

This water heater includes a service indicator (Service Soon, 55). When selected in the parameter settings, an 55 code will display on the controller indicating that it is time to flush and service the water heater.

- Selection is installers preference based on water conditions or other factors that may influence the suggested interval of service.
- See the parameter settings section of this manual for selectable service intervals.
- If Service Soon (55) appears on the controller displayed contact you local service provider to flush and service the water heater. (see 5.3 Flushing the Heat Exchanger)
- Service Soon will appear again when the time reach to the interval by setting from reset.

**To reset Service Soon(55)**  
Press the ON/OFF button 5 times

NOTE: Service Soon (55) will display on the controller again when the water heater reaches the interval selected in the parameter settings.

### 3.15 Post-Water Heater Installation Checklist

Complete the following checklist when water heater installation is complete. You should be able to answer YES to each question. If you answer NO to any question, installation is not complete. Refer to the applicable section in the Rinnai Tankless Water Heater Installation and Operation Manual for additional information.

For assistance, contact your local dealer or distributor, or call Rinnai Customer Care at 1-800-621-9419.

<b>Reference the Rinnai Tankless Water Heater Installation and Operation Manual For Additional Information on the Items Below</b>		
<b>1</b>	<b>INSTALLATION LOCATION</b>	<b>YES NO</b>
	Have you verified the unit, vent and air intakes meet the clearance requirements?	<input type="checkbox"/> <input type="checkbox"/>
<b>2</b>	<b>COMBUSTION AIR &amp; VENTING</b>	<b>YES NO</b>
	Have all corrosive compounds been removed from around the combustion air inlet of the tankless water heater?	<input type="checkbox"/> <input type="checkbox"/>
	Have you followed the combustion air requirements to provide sufficient combustion air for the tankless water heater?	<input type="checkbox"/> <input type="checkbox"/>
	Are the correct venting products for the installed model being utilized?	<input type="checkbox"/> <input type="checkbox"/>
	Have you installed the vent screen(s) for PVC vent applications?	<input type="checkbox"/> <input type="checkbox"/>
	Have you verified the vent system does not exceed maximum length?	<input type="checkbox"/> <input type="checkbox"/>
<b>3</b>	<b>PLUMBING</b>	<b>YES NO</b>
	Have the water lines been purged of all debris and the filter cleaned?	<input type="checkbox"/> <input type="checkbox"/>
	Have you verified the hot and cold water lines to the tankless water heater are not interchanged?	<input type="checkbox"/> <input type="checkbox"/>
	Does the water supply to the heater have adequate pressure? Is it free of chemicals? Did you verify it does not exceed total hardness that will damage the heat exchanger?	<input type="checkbox"/> <input type="checkbox"/>
	Have you verified that no toxic chemicals were introduced to the potable water?	<input type="checkbox"/> <input type="checkbox"/>
	Did you drain the tankless water heater if not intended to be used immediately?	<input type="checkbox"/> <input type="checkbox"/>
	Have water quality issues (if any) been addressed?	<input type="checkbox"/> <input type="checkbox"/>
	Have you performed the leak and pressure test for the tankless water heater and plumbing system?	<input type="checkbox"/> <input type="checkbox"/>
<b>4</b>	<b>ISOLATION VALVES</b>	<b>YES NO</b>
	Are the isolation valves (included with the tankless water heater) installed?	<input type="checkbox"/> <input type="checkbox"/>



3.14 Post-Water Heater Installation Checklist Continued

<b>5 PRESSURE RELIEF VALVE (PRV)</b>		<b>YES</b>	<b>NO</b>
Does the PRV comply with the standard for <i>Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems ANSI Z21.22</i> , and/or the standard <i>Temperature, Pressure, Temperature and Pressure Relief Valves and Vacuum Relief Valves, CAN1-4.4</i> ?		<input type="checkbox"/>	<input type="checkbox"/>
Did you verify the PRV is rated up to 150 psi and (at least) the maximum Btu/hr of the tankless water heater?		<input type="checkbox"/>	<input type="checkbox"/>
Is the discharge from the PRV piped to the ground or into a drain system as per local codes?		<input type="checkbox"/>	<input type="checkbox"/>
Is the discharge line from the PRV pitched downward and does it terminate 6 in. (152 mm) above the drains?		<input type="checkbox"/>	<input type="checkbox"/>
Is the discharge end of the line plain (unthreaded) and a minimum of 3/4 in. diameter?		<input type="checkbox"/>	<input type="checkbox"/>
Is the discharge line material suitable for at least 180° F water?		<input type="checkbox"/>	<input type="checkbox"/>
Did you take measures to protect the PRV and PRV discharge line from freezing?		<input type="checkbox"/>	<input type="checkbox"/>
Have you verified the PRV is <b>not</b> plumbed with the condensate drain line?		<input type="checkbox"/>	<input type="checkbox"/>
Have you verified the PRV is <b>not</b> plugged and that reducing fittings, valves, or other restrictions are not installed in the relief line?		<input type="checkbox"/>	<input type="checkbox"/>
<b>6 CONDENSATE DRAIN</b>		<b>YES</b>	<b>NO</b>
If the condensate pump is installed, is it wired to deactivate the tankless water heater in the event of failure? For more information, refer to the “Condensate Pump Safety Switch Wiring” section of the manual.		<input type="checkbox"/>	<input type="checkbox"/>
Did you verify the condensate drain pipe is as short as possible and has a downward pitch toward the drain or condensate pump?		<input type="checkbox"/>	<input type="checkbox"/>
Is all condensate drained and disposed of as per local codes?		<input type="checkbox"/>	<input type="checkbox"/>
Did you use <b>ONLY</b> corrosion resistant materials for the condensate drain lines?		<input type="checkbox"/>	<input type="checkbox"/>
Did you verify the condensate drain pipe along its entire length is at least the same diameter as the drain line (1/2 in. NPT)?		<input type="checkbox"/>	<input type="checkbox"/>
Did you check to ensure the condensation drain lines are protected from freezing?		<input type="checkbox"/>	<input type="checkbox"/>
If a floor pump is not available or the drain is above the level of the condensate drain, did you install a condensate pump?		<input type="checkbox"/>	<input type="checkbox"/>
Have you verified the condensate drain line is not plumbed with the pressure relief valve?		<input type="checkbox"/>	<input type="checkbox"/>
Have you confirmed the condensate drain line is not connected with an air conditioning evaporator coil drain?		<input type="checkbox"/>	<input type="checkbox"/>
Have you verified an external condensate trap is not installed? (This tankless water heater has an integrated condensate trap.)		<input type="checkbox"/>	<input type="checkbox"/>
Have you confirmed the end of the condensate drain pipe is open to atmosphere?		<input type="checkbox"/>	<input type="checkbox"/>
<b>7 GAS SUPPLY</b>		<b>YES</b>	<b>NO</b>
Did you verify the gas system is appropriately sized?		<input type="checkbox"/>	<input type="checkbox"/>
Did you verify the water heater is rated for the gas type supplied?		<input type="checkbox"/>	<input type="checkbox"/>
Have you performed a gas line and connection leak test?		<input type="checkbox"/>	<input type="checkbox"/>
Did you install a manual gas control valve in the gas line to the water heater?		<input type="checkbox"/>	<input type="checkbox"/>
Is the inlet gas pressure within limits?		<input type="checkbox"/>	<input type="checkbox"/>
Did you purge the gas line of any debris before connecting the water heater?		<input type="checkbox"/>	<input type="checkbox"/>

# 4. Operate the Water Heater

## 4.1 Safety Precautions

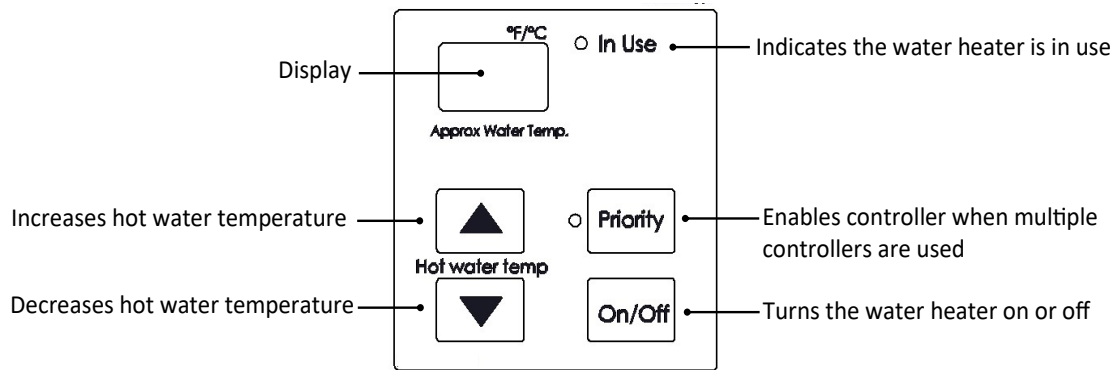
<b>⚠ WARNING</b>	<b>If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury, or death.</b>
<ul style="list-style-type: none"> <li>Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.</li> <li>Before operating, smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.</li> <li>WHAT TO DO IF YOU SMELL GAS           <ul style="list-style-type: none"> <li>Do not try to light any appliance.</li> <li>Do not touch any electrical switch; do not use any phone in your building.</li> <li>Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.</li> <li>If you cannot reach your gas supplier, call the fire department.</li> </ul> </li> <li>Installation and service must be performed by a qualified installer, service agency or the gas supplier.</li> </ul>	

<b>⚠ AVERTISSEMENT</b>	<b>Assurez-vous de bien suivre les instructions données dans cette notice pour réduire au minimum le risque d'incendie ou d'explosion ou pour éviter tout dommage matériel, toute blessure ou la mort.</b>
<ul style="list-style-type: none"> <li>Ne pas entreposer ni utiliser d'essence ou ni d'autres vapeurs ou liquides inflammables à proximité de cet appareil ou de tout autre appareil.</li> <li>Avant d'opérer, sentir le gaz autour de la zone de l'appareil. Assurez-vous de sentir à côté du sol car certains gaz sont plus lourds que l'air et se déposeront sur le sol.</li> <li>QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ :           <ul style="list-style-type: none"> <li>Ne pas tenter d'allumer d'appareil.</li> <li>Ne touchez à aucun interrupteur ; ne pas vous servir des téléphones se trouvant dans le bâtiment.</li> <li>Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur.</li> <li>Si vous ne pouvez rejoindre le fournisseur, appelez le service des incendies.</li> </ul> </li> <li>L'installation et l'entretien doivent être assurés par un installateur ou un service d'entretien qualifié ou par le fournisseur de gaz.</li> </ul>	

- Keep the area around the appliance clear and free from combustible materials, gasoline, and other flammable vapors and liquids.
- Do not use this appliance if any part has been under water. Immediately call a licensed professional to inspect the appliance and to replace any part of the control system and any gas control which has been under water. *(N'utilisez pas cet appareil s'il a été plongé dans l'eau, même partiellement. Faites inspecter l'appareil par un licence professionnelle et remplacez toute partie du système de contrôle et toute commande qui ont été plongés dans l'eau.)*
- Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance. *(En cas de surchauffe ou si l'alimentation en gaz ne s'arrête pas, fermez manuellement le robinet d'arrêt de l'admission de gaz.)*
- Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, do not try to repair it, call a licensed professional. Force or attempted repair may result in a fire or explosion.
- This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. DO NOT try to light the burner by hand.
- Do not use an extension cord or an adapter plug with this appliance.
- Any alteration to the appliance or its controls can be dangerous and will void the warranty.
- If you install this water heater in an area that is known to have hard water or that causes scale build-up the water must be treated and/or the heat exchanger flushed regularly. Rinnai provides a "Scale Control System" that offers superior lime scale prevention and corrosion control by feeding a blend of control compounds into the water supply. Damage and repair due to corrosive compounds in the air is not covered by warranty.
- Keep the combustion air vent pipe location free of chemicals, such as chlorine or bleach, that produce fumes. These fumes can damage components and reduce the life of your appliance. Damage and repair due to scale in the heat exchanger is not covered by warranty.
- Always check the water temperature before entering a shower or bath.
- Do not adjust the parameter settings unless specifically instructed to do so.

## 4.2 Controller

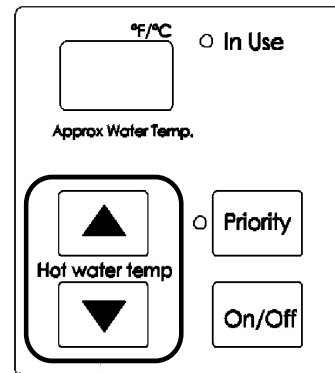
The controller panel allows you to adjust the water temperature, lock the controller on a set temperature, and view diagnostic information.



### Setting the Controller to Mute

To eliminate the beeps when keys are pressed, press and hold both the ▲ (Up) and ▼ (Down) buttons at the same time until a beep is heard (approximately 3 seconds). Then, release both buttons.

To turn on the beeps, repeat the above steps.

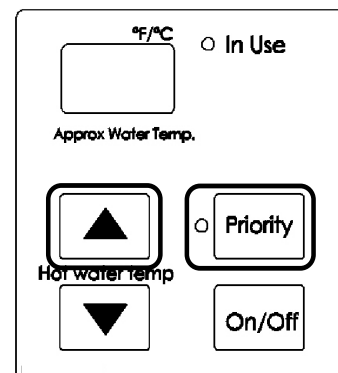


### Locking the Controller

1. To lock the internal controller, press and hold down the "Priority" button.
2. While holding down the "Priority" button, press the ▲ (Up) button until a beep is heard (approximately 5 seconds). Then, release both buttons at the same time.
3. **LOC** appears in the display indicating the controller is locked.

**Note:** The display flashes between **LOC** and the set temperature to indicate the controller is locked.

To unlock the controller, follow the above steps.



### 4.3 Setting the Temperature

This water heater requires a minimum flow rate to operate. This rate can be found on the specification page in this manual. In some cases when you are not getting hot water or if the water alternates between hot and cold, it is due to the water flow being below or close to the minimum flow rate. Increasing the flow rate should resolve these problems in these cases.

If you are experiencing issues with higher temperature settings, then reduce the temperature setting. Selecting a temperature closer to that which is actually used at the faucet will increase the amount of hot water being delivered to the faucet, due to less cold water mixing at the fixture.

	<p><b>DANGER</b> Water temperatures over 125° F (52° C) can cause severe burns or scalding resulting in death.</p> <p>Hot water can cause first degree burns with exposure for as little as:</p> <ul style="list-style-type: none"> <li>3 seconds at 140° F (60° C)</li> <li>20 seconds at 130° F (54° C)</li> <li>8 minutes at 120° F (49° C)</li> </ul> <p>Children, disabled, or elderly are at highest risk of being scalded. Feel water before bathing or showering.</p>
--	---

**NOTICE** While any hot water is being provided, the temperature setting can only be adjusted between 98° F and 110° F.

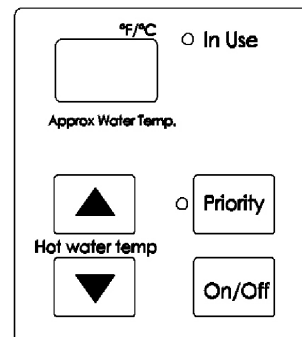
**NOTICE** Check local codes for the maximum water temperature setting allowed when used in nursing homes, schools, day care centers, and all other public applications.

**NOTICE** If a newly installed water heater with a controller has not been powered for at least 6 hours then the temperature will return to the default setting of 104° F (40° C) if power is interrupted.

**NOTICE** There may be a variation between the temperature displayed on the temperature controller and the temperature at the tap due to weather conditions or the length of pipe to the water heater.

The controller buttons shown below are located on the outside front panel for internal (indoor) water heaters. For external (outdoor) water heaters, open the front panel to access the controller buttons.

1. If the water heater is off, press the “On/Off” button to turn on.
2. The “Priority” button enables a controller if multiple controllers are being used. If the “Priority” light is off, then press the “Priority” button on the temperature controller. The orange “Priority” light will glow indicating that this controller is controlling the temperature and that the water heater is ready to supply hot water. The priority can only be changed while no hot water is running.
3. Press the ▲ (Up) or ▼ (Down) buttons to obtain the desired temperature setting.



All hot water sources are able to provide water at this temperature setting until it is changed again at this or another temperature controller.

## Available Temperatures with an Internal Controller

The water heater can deliver water at only one temperature setting at a time. The available temperatures are provided below. A temperature lower than 98° F (37° C) can be obtained at the tap by mixing with cold water.

To change the temperature scale from Celsius to Fahrenheit or vice versa, press and hold the “On/Off” button on the controller for 5 seconds while the water heater is OFF.

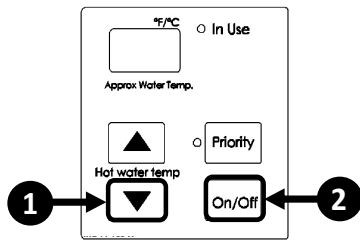
Temperature Settings																	
Parameter Setting <b>A</b>	°F	98	100	102	104	106	108	110	115	120	125	130	135	140*			
	°C	37	38	39	40	41	42	43	46	49	52	54	57	60			
Parameter Setting <b>B</b>	°F	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
	°C	43	46	49	52	54	57	60	63	66	68	71	74	77	79	82	85

These models have a default maximum temperature of 140° F (60° C) and an option to increase the maximum temperature to 185 °F (85 °C) with parameter adjustment. Refer to section “3.12 Parameter Settings” for further details.

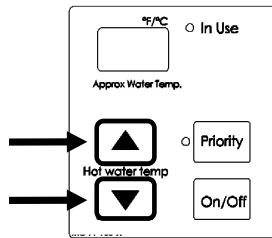
## 4.4 Performance Data

### To Obtain Performance Data:

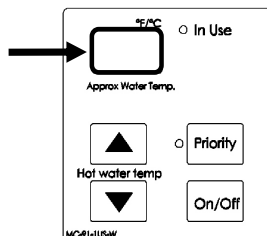
1. Press and hold the ▼(Down) button.
2. While holding the ▼(Down) button for 2 seconds, press and hold the “On/Off” button (hold both buttons simultaneously).



3. Use the ▲(Up) and ▼(Down) buttons to scroll to the desired information described in the Performance Data Table.



4. To exit performance data, repeat step 2 above.
5. When complete, the set temperature appears in the display.



### Performance Data Table

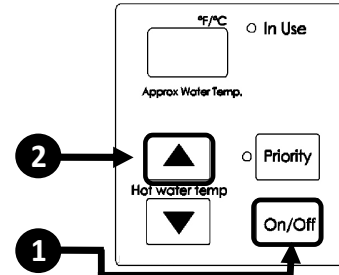
#	DATA	UNIT
01	Water Flow Rate	x0.1 gal/min
02	Outgoing Temperature	°F
03	Combustion Hours	x100 Hours
04	Combustion Cycles	*
05	Fan Frequency	Hz
06	Additional Controllers Connected	*
07	Water Flow Control Position	0=mid, 1=Open, 2=Closed
08	Inlet Temperature	°F
09	Fan Current	x10 mA
10	Total Bath Fill Amount	Gallons
11	HEX Outlet Temperature	°F
12	By-Pass Flow Control Position	Degrees of opening
15	Freeze Protection Temperature (Indoor Units Only)	°F
17	Freeze Protection Temperature (Outdoor Units Only)	°F
19	Pump Hours	x100 Hours
20	Pump Cycles	*
21	Exhaust Temperature	°F

\* Refer to the Technical Data Sheet located on the inside front cover of the water heater for additional information.

## 4.5 Diagnostic Codes

### To display diagnostic codes:

1. Turn off the water heater by pressing the “On/Off” button.
2. Press and hold the “On/Off” for 2 seconds and then the ▲ (Up) button simultaneously.
3. The last nine maintenance codes display and flash one after the other.
4. To exit diagnostic codes and return the water heater to normal operation, press and hold the “On/Off” button for 2 seconds and then the ▲ (Up) button simultaneously.
5. Turn on the water heater by pressing the “On/Off” button.



**WARNING** Some of the checks below should be performed by a licensed professional. Consumers should never attempt any action that they are not qualified to perform.

<p><b>03</b> <b>Power interruption during bath fill</b> <b>(Water will not flow when power returns)</b></p> <ul style="list-style-type: none"> <li>• Turn off all hot water taps. Press ON/OFF twice.</li> </ul>	<p><b>12</b> <b>No Flame</b></p> <ul style="list-style-type: none"> <li>• Check that the gas is turned on at the water heater, gas meter, or cylinder.</li> <li>• If the system is propane, make sure that gas is in the tank.</li> <li>• Ensure flame rod wire is connected.</li> <li>• Ensure gas type and inlet gas pressure is correct.</li> <li>• Bleed all air from gas lines.</li> </ul>
<p><b>05</b> <b>By-Pass Flow Control</b></p> <ul style="list-style-type: none"> <li>• Measure resistance values of the by-pass flow control.*</li> <li>• Replace By-Pass flow control device.</li> </ul>	<p><b>14</b> <b>Heat Exchanger Overheat</b></p> <ul style="list-style-type: none"> <li>• Measure resistance of Overheat Switch.*</li> <li>• Check heat exchanger surface for hot spots which indicate blockage due to scale build-up.</li> <li>• Refer to instructions in manual for flushing heat exchanger. Hard water must be treated to prevent scale build up or damage to the heat exchanger.</li> <li>• Ensure it is not in forced Hi setting.</li> </ul>
<p><b>10</b> <b>Air Supply or Exhaust Blockage/Condensate Trap is Full</b></p> <ul style="list-style-type: none"> <li>• Ensure condensate line is not blocked.</li> <li>• Ensure internal air filter is clean with no obstructions. (Indoor Water Heaters Only)</li> <li>• Ensure High Altitude setting. (See Parameter Settings)</li> <li>• Ensure Combustion air and Exhaust vents are not blocked and approved venting materials are being used. (Indoor Water Heaters Only)</li> <li>• Ensure vent length is within limits. (Indoor Water Heaters Only)</li> <li>• Check fan for debris and ensure wheel turns freely.</li> <li>• Verify check valve is not stuck between fan casing and burner body.</li> </ul>	<p><b>15</b> <b>Venturi Control</b></p> <ul style="list-style-type: none"> <li>• Ensure the Venturi motor is operating correctly.*</li> <li>• Replace gas valve assembly.</li> <li>• Clear diagnostic code by resetting the main power supply to the water heater.</li> </ul>
<p><b>11</b> <b>No Ignition (Heater Not Turning On)</b></p> <ul style="list-style-type: none"> <li>• Check that the gas is turned on at the water heater, meter, or cylinder.</li> <li>• If the system is propane, make sure that gas is in the tank.</li> <li>• Ensure gas type and inlet gas pressure are correct.</li> <li>• Bleed all air from gas lines.</li> <li>• Check the ground wire for the PC Board.</li> <li>• Ensure flame rod wire is connected.</li> <li>• Ensure igniter is operational.*</li> <li>• Check gas solenoid valves for open or short circuits.*</li> <li>• Verify gas orifice is correct.</li> </ul>	<p><b>15</b> <b>High Outgoing Temperature</b> <b>(safety shutdown because water heater is too hot)</b></p> <ul style="list-style-type: none"> <li>• Confirm fan motor is functioning correctly.</li> <li>• Replace the gas valve assembly.</li> </ul>
	<p><b>17</b> <b>Venturi Blockage</b></p> <ul style="list-style-type: none"> <li>• First, follow the recommended solutions for Diagnostic Code 10.</li> <li>• If the Code 10 solutions do not correct the problem, ensure the Venturi is not blocked.</li> <li>• Please call Rinnai technical department.</li> </ul>
	<p><b>19</b> <b>Electrical Grounding</b></p> <ul style="list-style-type: none"> <li>• Check all components for electrical short.</li> </ul>

\* See “Electrical Diagnostics” on Technical Data Sheet located on inside front cover of water heater.

<p><b>19 Electrical Grounding</b></p> <ul style="list-style-type: none"> <li>• Check all components for electrical short.</li> </ul>	<p><b>63 Recirculation Low Flow</b></p> <ul style="list-style-type: none"> <li>• Ensure bypass plug is removed and bypass filter is installed. (COV Mode)</li> <li>• Ensure both the inlet water filter and bypass filter are clean and free of debris.</li> <li>• Ensure Parameter setting are correctly set for recirculation mode.</li> <li>• Ensure Pump supply voltage.</li> <li>• Ensure air is removed from the recirculation line.</li> </ul>
<p><b>21 Data Transfer Error</b></p> <ul style="list-style-type: none"> <li>• If the PCB has been replaced, ensure the data transfer process has been completed.</li> </ul>	<p><b>65 Water Flow Control</b></p> <ul style="list-style-type: none"> <li>• Measure resistance values of the water flow control.*</li> <li>• The water flow control valve has failed to close during the bath fill function. Immediately turn off the water and discontinue the bath fill function. Contact a licensed professional to service the appliance.</li> </ul>
<p><b>25 Condensate Pump (Accessory)</b></p> <ul style="list-style-type: none"> <li>• Confirm wire connections and harness are good.</li> <li>• Ensure condensate reservoir is empty and condensate pump is operating.</li> </ul>	<p><b>70 PC Board</b></p> <ul style="list-style-type: none"> <li>• Replace PC Board</li> </ul>
<p><b>32 Outgoing Thermistor</b></p> <p><b>33 Heat Exchanger Thermistor</b></p> <ul style="list-style-type: none"> <li>• Check sensor wiring for damage.</li> <li>• Measure resistance of sensor.*</li> <li>• Clean sensor of scale build-up.</li> <li>• Replace sensor.</li> </ul>	<p><b>71 Solenoid Valve Circuit</b></p> <ul style="list-style-type: none"> <li>• Ensure dip switch on PC board is in the OFF position.</li> <li>• Ensure gas control wire is not loose or damaged.</li> <li>• Ensure heater circuit is not grounded.</li> <li>• Replace PC Board.</li> </ul>
<p><b>38 Exhaust Thermistor</b></p> <p><b>41 Freeze Protection Thermistor</b></p> <ul style="list-style-type: none"> <li>• Check sensor wiring for damage.</li> <li>• Measure resistance of sensor.*</li> <li>• Replace sensor.</li> </ul>	<p><b>72 Flame Rod</b></p> <ul style="list-style-type: none"> <li>• Check flame rod and wire for damage.</li> <li>• Verify HEX is not leaking.</li> </ul>
<p><b>51 Inlet Thermistor</b></p> <ul style="list-style-type: none"> <li>• Check sensor wiring for damage.</li> <li>• Measure resistance of sensor.*</li> <li>• Clean sensor of scale build-up.</li> <li>• Replace sensor.</li> </ul>	<p><b>55 (55) Service Soon (Flush Heat Exchanger)</b></p> <ul style="list-style-type: none"> <li>• <b>55</b> is a time-based service indicator set during installation. See section “3.12 Parameter Settings” for additional details on setting and changing the <b>55</b> indicator.</li> <li>• <b>55</b> indicates that it is time for service. The heat exchanger should be flushed to prevent damage (refer to section “5.3 Flushing the Heat Exchanger” for more information). <b>Hard water must be treated to prevent scale build-up or damage to the heat exchanger.</b></li> <li>• To reset the <b>55</b> code, push the <b>On/Off</b> button on the temperature controller 5 times in 5 seconds.</li> </ul>
<p><b>52 Gas Valve</b></p> <ul style="list-style-type: none"> <li>• Check flame rod and wire for damage.</li> <li>• Check gas solenoid valve for open or short circuit.*</li> <li>• Replace gas valve assembly.</li> <li>• Please call Rinnai technical department</li> </ul>	<p><b>NO CODE - Nothing happens when water flow is activated</b></p> <ul style="list-style-type: none"> <li>• Verify you have at least the minimum flow rate required to fire unit.</li> <li>• Measure the resistance of the water flow control sensor.*</li> <li>• Clean inlet water supply filter.</li> <li>• On new installations ensure hot and cold water lines are not reversed.</li> </ul>
<p><b>54 High Exhaust Gas Temperature</b></p> <ul style="list-style-type: none"> <li>• Ensure Heat Exchanger fins are clean and not blocked.</li> <li>• Confirm inlet water temperature is not too high.</li> <li>• Clear diagnostic code by resetting the main power supply to the water heater.</li> </ul>	<p><b>5E Cascade Diagnostic Display (Commercial units only)</b></p> <ul style="list-style-type: none"> <li>• With cascade connections, display will flash between “SE” and the selected set temperature when an error code is displayed on any secondary unit .</li> </ul>
<p><b>61 Combustion Fan</b></p> <ul style="list-style-type: none"> <li>• Check the motor wire harness for loose or damaged connections.</li> <li>• Measure resistance of motor wire harness. *</li> <li>• Ensure the combustion fan spins freely.</li> </ul>	<p>The diagram shows a digital display with 'FF' and '°F/C' indicators. Below the display are three buttons: '▲' (Up), '▼' (Down), and 'On/Off'. Arrows labeled 1, 2, and 3 point to these buttons respectively. To the right of the buttons are two radio buttons labeled 'In Use' and 'Priority'.</p>
<p><b>FF Maintenance Indicator</b></p> <ul style="list-style-type: none"> <li>• Placeholder in Diagnostic code history indicating that a service provider performed maintenance or service.</li> <li>• Enter this code after performing service by pressing ▲ (Up) , ▼ (Down) and On/Off simultaneously.</li> <li>• FF is visible on the monitor.</li> </ul>	

\* See “Electrical Diagnostics” on Technical Data Sheet located on inside front cover of water heater.

# 5. Maintain the Water Heater

This water heater must be inspected annually by a licensed professional. Repairs and maintenance shall be performed by a licensed professional. The licensed professional must verify proper operation after servicing.

## ⚠ WARNING

To protect yourself from harm, before performing maintenance:

- Turn off the electrical power supply by unplugging the power cord or by turning off the electricity at the circuit breaker. (The temperature controller does not control the electrical power.)
- Turn off the gas at the manual gas control valve, usually located immediately below the water heater.
- Turn off the incoming water supply. This can be done at the isolation valve immediately below the water heater or by turning off the water supply to the building.

## ⚠ WARNING

Keep the appliance area clear and free from combustible materials, gasoline, and other flammable vapors and liquids.

## 5.1 Maintenance

The following maintenance items are required for the proper operation of your water heater.

The appliance must be inspected annually by a licensed professional. Repairs and maintenance shall be performed by a licensed professional. The licensed professional must verify proper operation after servicing.

### CLEANING

It is imperative that control compartments, burners, and circulating air passageways of the appliance be kept clean. Check burner flame for proper color. Once ignited, the flame must cover the surface of the burner. The flame must burn with a clear, blue, stable flame. If the flame does not have this appearance, complete the following steps:

1. Turn off and disconnect electrical power. Allow to cool.
2. Remove the front panel by removing four screws.
3. Use a vacuum to remove dust from the main burner and fan blades. Do not use a wet cloth or spray cleaners on the burner. Do not use volatile substances such as benzene and thinners; they may ignite or fade the paint.
4. Use soft dry cloth to wipe cabinet.

### VENT SYSTEM

The vent system should be inspected at least annually for blockages or damage. If the vent is blocked contact a licensed professional.

### MOTORS

Motors are permanently lubricated and do not need periodic lubrication. However you must keep fan and motor free of dust and dirt by cleaning annually.

### TEMPERATURE CONTROLLER

Use a soft damp cloth to clean the temperature controller. Do not use solvents.

### LIME/SCALE BUILD-UP

Scale build-up is caused by hard water and can be accelerated if the water heater is set at a high temperature. Refer to section “5.3 Flushing the Heat Exchanger” for more information. Refer to section “Water Quality Guidelines” to determine if your water needs to be treated or conditioned. **The water must be potable, free of corrosive chemicals, sand, dirt, or other contaminants. It is up to the installer to ensure the water does not contain corrosive chemicals or elements that can affect or damage the Rinnai Tankless Water Heater. Water that contains chemicals exceeding the levels described in the Water Quality Guidelines sections of this manual can damage the Rinnai Tankless Water Heater. Replacement of the heat exchanger due to water quality damage is not covered by the warranty.**

### SNOW ACCUMULATION

- Keep the area around flue terminal free of snow and ice. The water heater will not function properly if the combustion air or exhaust vent pipes are impeded (blocked or partially blocked) by obstructions.
- Keep the condensate drain line free of snow and ice. Ensure the line is not blocked or clogged and that condensate is flowing freely.

### COASTAL INSTALLATIONS

Installations located in or near coastal areas may require additional maintenance due to corrosive airborne ocean salt. If corrosion is observed on the body of the water heater, the water heater shall be inspected to ensure proper operation and if necessary, repaired or replaced.

### FILTERS

- **Water Filter** — Clean the inlet water filter by closing the cold and hot water inlet isolation (shut-off) valves. Put a bucket under the filter at the bottom of the water heater to catch any water that is contained inside the unit. Unscrew the water filter. Rinse the filter to remove any debris. Install the filter and open the isolation valves.
- **Air Filter** — See section “5.2 Cleaning and Inspecting the Air Filter” for more information.

### PRESSURE RELIEF VALVE

Operate the pressure relief valve manually once a year. In doing so, it will be necessary to take precautions with regard to the discharge of potentially scalding hot water under pressure. Ensure discharge has a safe place to flow. Contact with your body or other property may cause damage or harm.

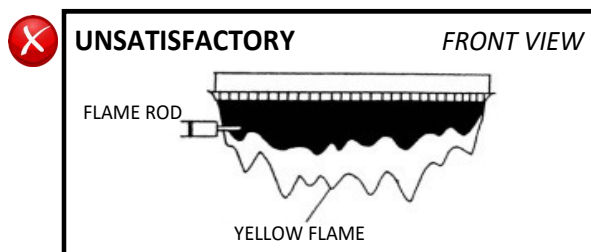
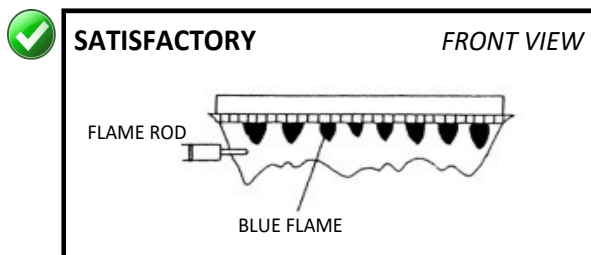
### WARNING

Testing the pressure relief valve should only be performed by a licensed professional. Water discharged from the pressure relief valve could cause severe burns instantly or death from scalds.

### VISUAL INSPECTION OF FLAME

Verify proper operation after servicing. The burner must flame evenly over the entire surface when operating correctly. The flame must burn with a clear, blue, stable flame. See the parts breakdown of the burner for the location of the view ports.

The flame pattern should be as shown in the images below:



### FREEZE PROTECTION

Make sure in case of freezing weather that the water heater and its water lines are adequately protected to prevent freezing. Damage due to freezing is not covered by the warranty. Refer to the “Freeze Protection” section (Section 3.2 **Choose an Installation Location > Freeze Protection**). The water heater may be drained manually. However, it is highly recommended that drain down solenoid valves be purchased and installed, which will automatically drain the water heater if power is lost. (The condensate trap drain plug and Pressure Relief Valve are not affected by the auto drain down solenoid valves and will have to be manually opened.)

### WINTERIZATION

The following recommendations are intended to suggest practices that are effective for winterizing the water heater. They should be used as a guide only. No liability is assumed for any issues resulting from the use of this information.

**Note:** See section “5.4 Draining the Water Heater” for detailed instructions on:

- Draining the water heater
- Running a low volume of water through the water heater to prevent freezing
- Steps to take when the water heater or external pipes have frozen
- **Gas**  
Shut off the gas to the water heater. It is generally preferable to shut off the gas service to the entire location if gas is not going to be used.
- **Water**
  - Shut off the cold water supply to the water heater. It is generally preferable to shut off the water to the entire location if water is not going to be used.
  - Drain the water heater by opening the drain valves on the cold water line and hot water line.
  - Open several hot water taps and remove the filter assembly at the water inlet in order to allow room for expansion in case there is water in the lines that freeze.
- **Condensate**  
Drain the condensate using the condensate drain port on the bottom of the water heater.
- **Electric**  
Disconnect the power supply by either unplugging the electrical cord or by turning off the circuit breaker to the water heater to prevent potential damage from irregular power surges or interruptions.

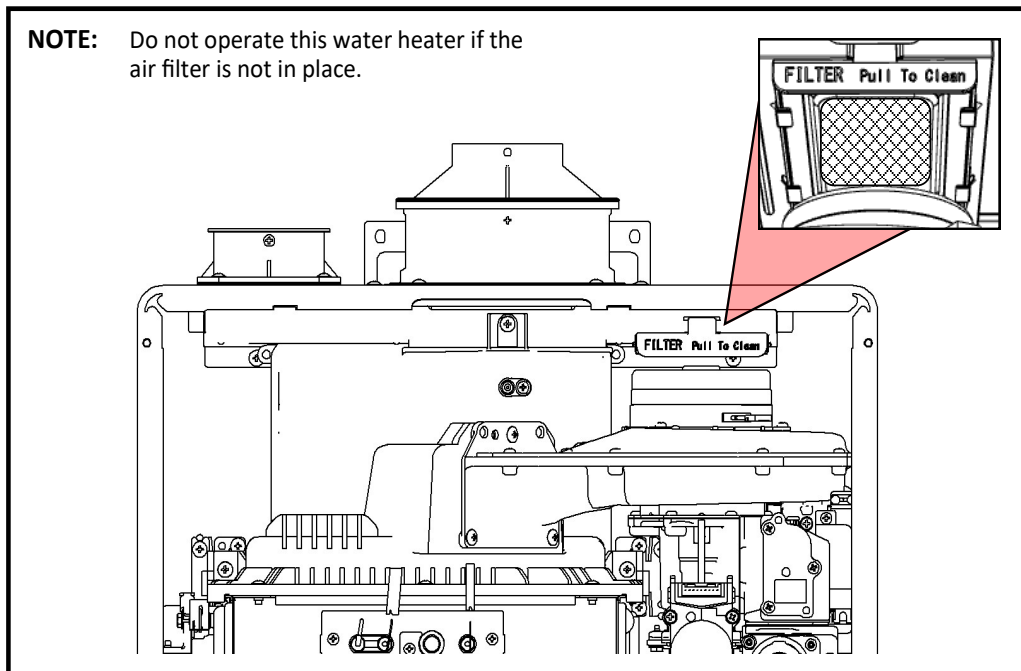
## 5.2 Cleaning and Inspecting the Air Filter *(Indoor Units Only)*

### INSPECTION

- To maintain optimum performance, periodically inspect the air filter.
- If the air filter appears to have lint and/or dust build up, follow the cleaning procedure described below.
- If the air filter appears damaged, contact a trained and qualified professional for a replacement air filter assembly.

### CLEANING

1. Power OFF the water heater
  - Push the “On/Off” button located on the right-hand side of the controller.
  - The display will go blank when the power is off.
2. Remove the front panel.
  - Remove four screws securing the front panel.
  - Remove the front panel and locate the filter at the upper right-hand corner of the water heater.
  - Remove the air filter by pulling out the “FILTER Pull to Clean” tab.
3. Clean the Air Filter
  - With mild dish soap and a soft bristle brush, scrub the filter area of the air filter door.
  - With clean water, rinse the soap off the filter.
4. Dry the Air Filter
  - With a lint free towel, dry the air filter.
5. Inspect and Replace the Air Filter
  - Inspect the air filter for any debris that may restrict air flow to the water heater.
  - If the filter still appears dirty repeat the cleaning steps.
  - Replace the air filter.
6. Power ON the water heater.



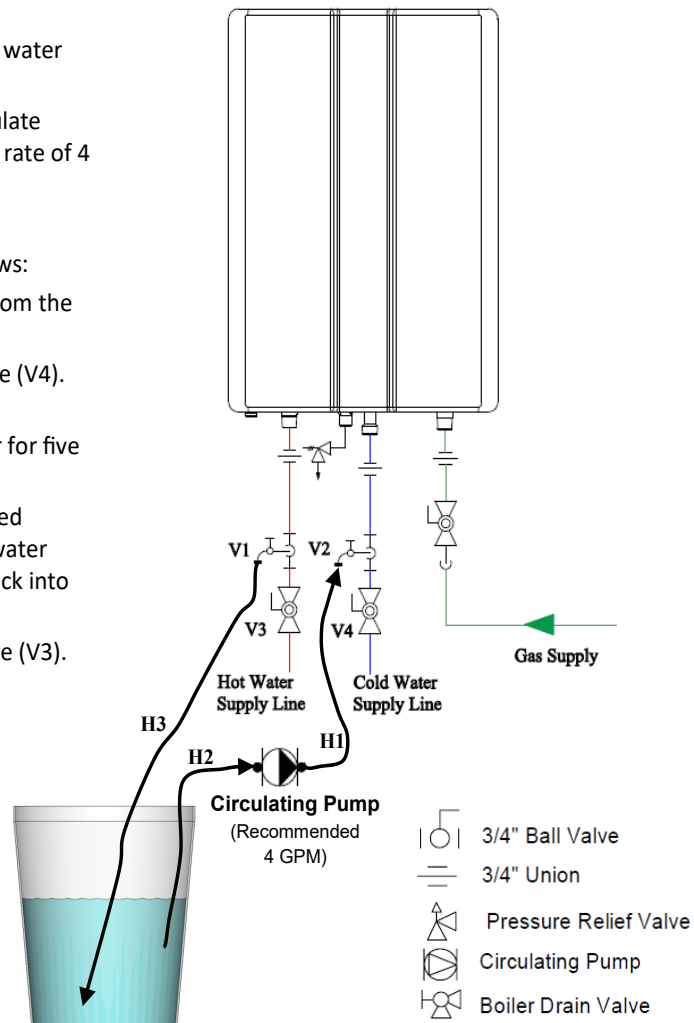
## 5.3 Flushing the Heat Exchanger

This water heater includes a service indicated/reminder (Service Soon, 55). When selected in the parameter settings, an 55 code will display on the controller indicating that it is time to flush and service the water heater. Failure to flush the appliance will cause damage to the heat exchanger. Damage caused by lime build-up is not covered by the water heater's warranty. Rinnai strongly recommends installation of isolation valves to allow for flushing of the heat exchanger.

1. Turn off power at the controller.
2. Disconnect electrical power to the water heater.
3. Close the shutoff valves on both the hot water and cold water lines (V3 and V4).
4. Connect pump outlet hose (H1) to the cold water line at service valve (V2).
5. Connect drain hose (H3) to the hot water line at service valve (V1).
6. Pour four gallons of undiluted virgin, food grade, white vinegar into pail.
7. Place the drain hose (H3) and the hose (H2) to the pump inlet into the cleaning solution.
8. Open both service valves (V1 and V2) on the hot water and cold water lines.
9. Operate the pump and allow the vinegar to circulate through the water heater for at least 1 hour at a rate of 4 gallons per minute (15.1 liters per minute).
10. Turn off the pump.
11. Rinse the vinegar from the water heater as follows:
  - a. Remove the free end of the drain hose (H3) from the pail. Place in sink or outside to drain.
  - b. Close service valve (V2) and open shutoff valve (V4). Do not open shutoff valve (V3).
  - c. Allow water to flow through the water heater for five minutes.
  - d. Close shutoff valve (V4). When unit has finished draining remove the in-line filter at the cold water inlet and clean out any residue. Place filter back into unit and open valve (V4).
  - e. Close service valve (V1) and open shutoff valve (V3).
12. Disconnect all hose
13. Restore electrical power to the water heater.

**NOTE:**

Scale build-up will affect the performance of the water heater. Water should be treated. Rinnai offers Southeastern Filtration's "ScaleCutter Water Conditioning System" that offers superior lime scale prevention and corrosion control by feeding a blend of control compounds into the cold water supply.



## 5.4 Draining the Water Heater

**WARNING** To avoid burns, wait until the equipment cools down before draining the water. The water in the appliance will remain hot after it is turned off.

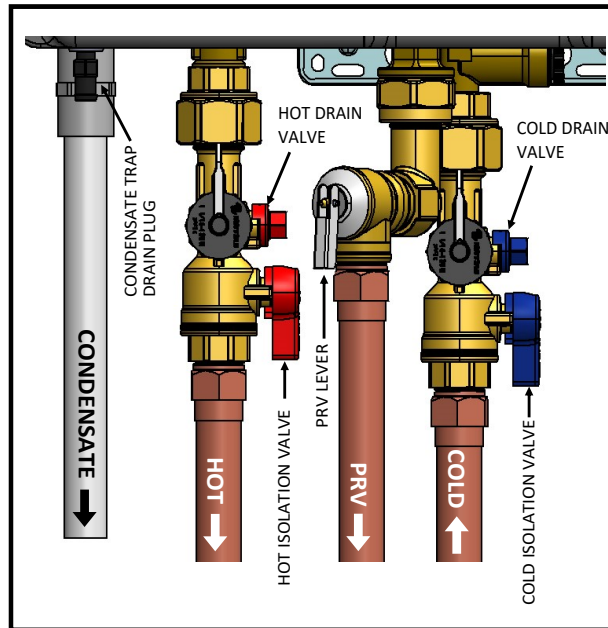
If the water heater is not going to be used during a period of possible freezing weather, it is recommended that the water inside the water heater be drained.

### To manually drain the water:

1. Shut off cold water supply and gas supply.
2. Turn off the temperature controller.
3. Disconnect the power to the water heater.
4. Close the hot and cold isolation valves.
5. Open the pressure relief valve (PRV) lever.
6. Open the hot and cold drain valves.
7. Remove the condensate trap drain plug and allow to drain.
8. Remove the pump drain plug (*only for pump version*).

### To resume normal operation:

1. Confirm that the gas supply is turned off, all taps are closed and PRV lever is closed.
2. Insert the condensate trap drain plug.
3. Close the hot and cold drain valves.
4. Open the cold and hot water isolation valves.
5. Open a tap and confirm that water flows, and then close.
6. Connect power to the water heater.
7. After confirming that the temperature controller is off, turn on the gas supply.
8. Turn on the temperature controller.

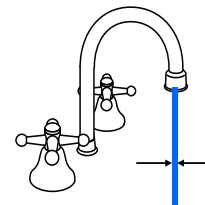


Piping Diagram

### Running a low volume of water through the water heater to prevent freezing:

If the temperature exceeds the ability of the water heater to freeze protect itself, or if power is lost, the following steps may prevent the water heater and external piping from freezing. Units connected with EZConnect™ (2-unit link) should be drained to prevent freezing if not in use.

1. Turn the water heater off.
2. Close the gas supply valve.
3. Turn on a hot water tap to flow water about 0.1 gal/min (0.4 L/min) or where the stream is about 0.2 in. (5 mm) thick.

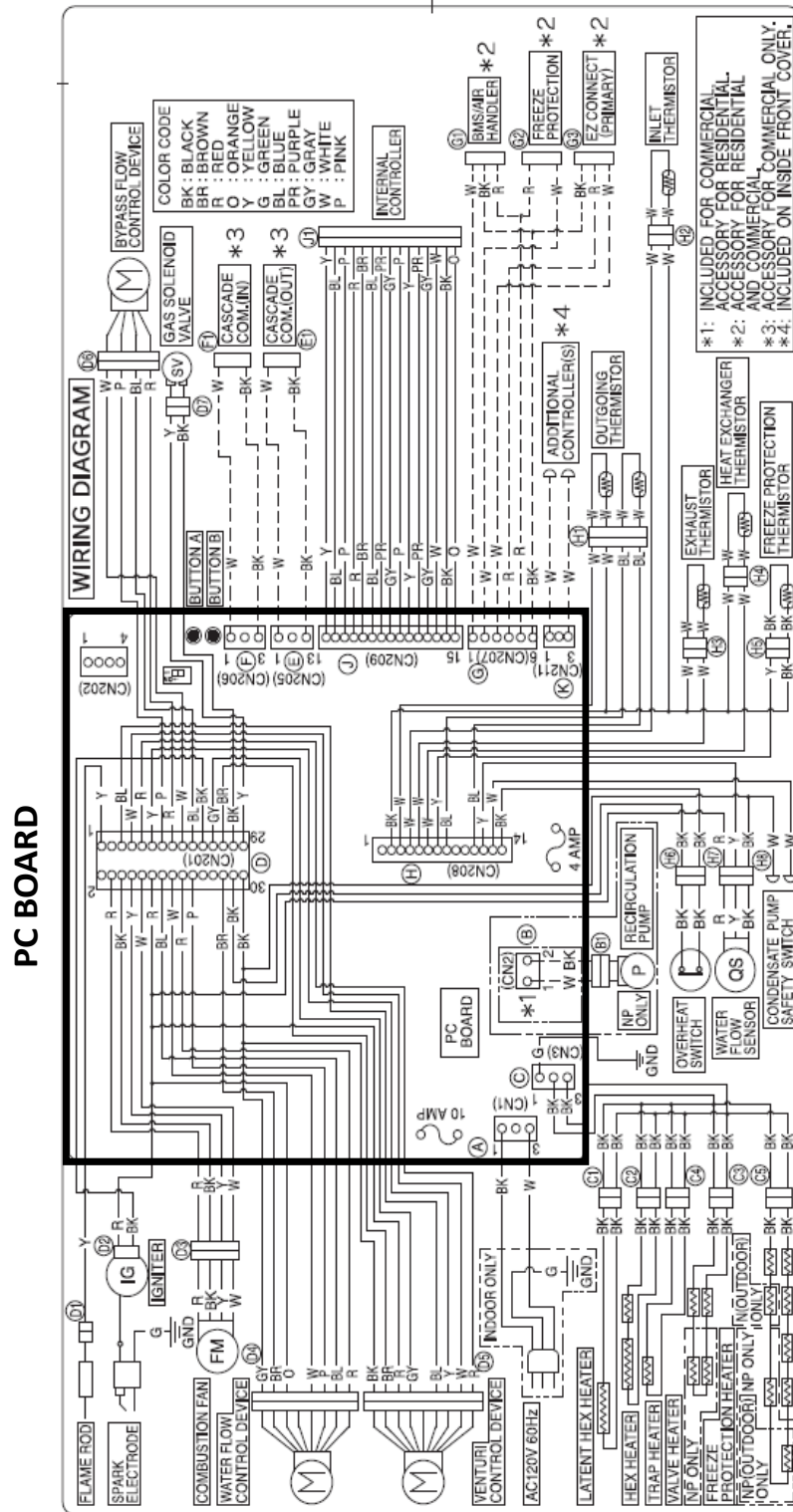


### When the water heater or external piping has frozen:

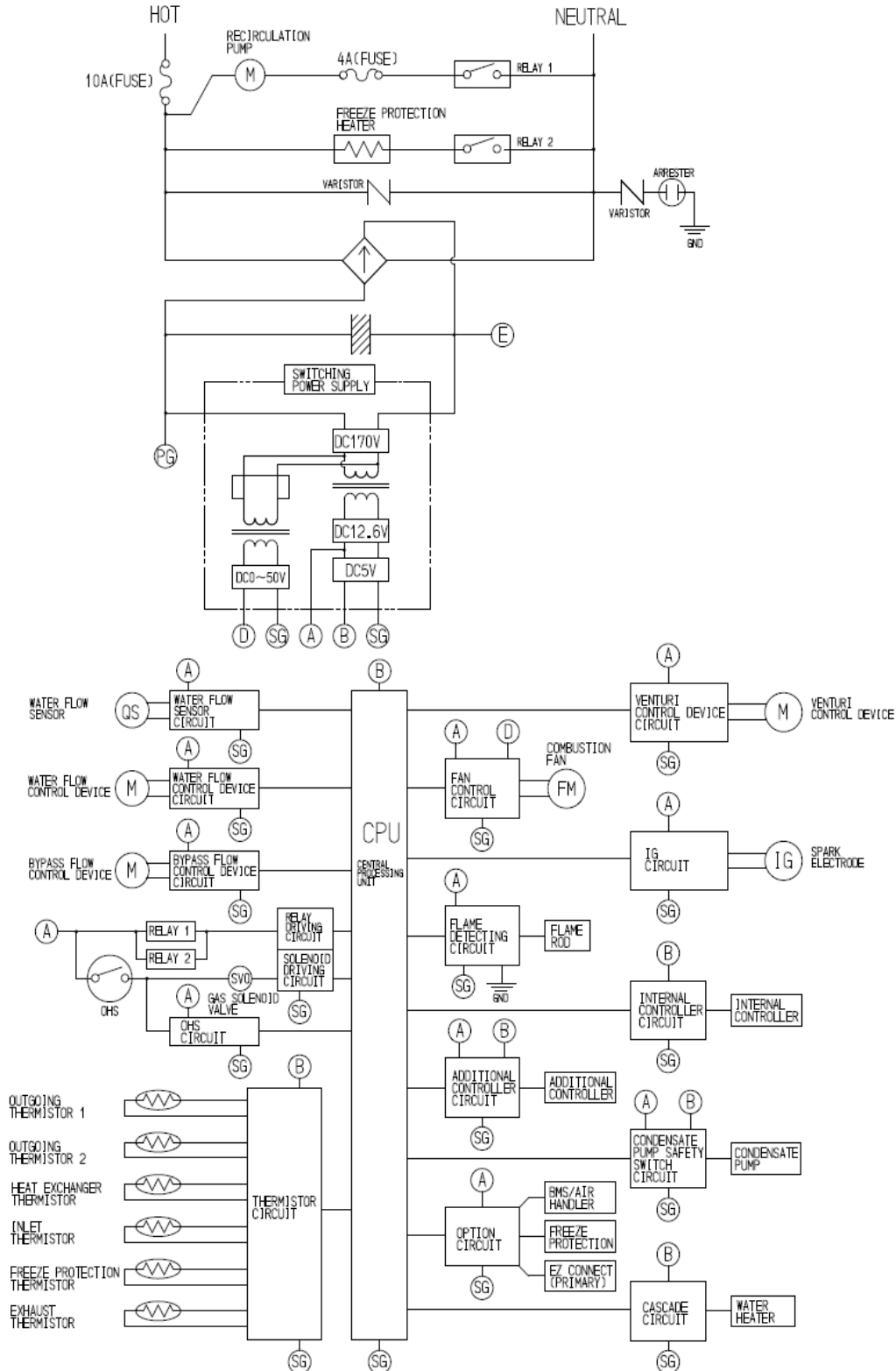
1. Do not operate the water heater if it or the external piping is frozen.
2. Close the gas and water valves and turn off the power.
3. Wait until the water thaws. Check by opening the water supply valve.
4. Check the water heater and the piping for leaks.

# 6. Appendices

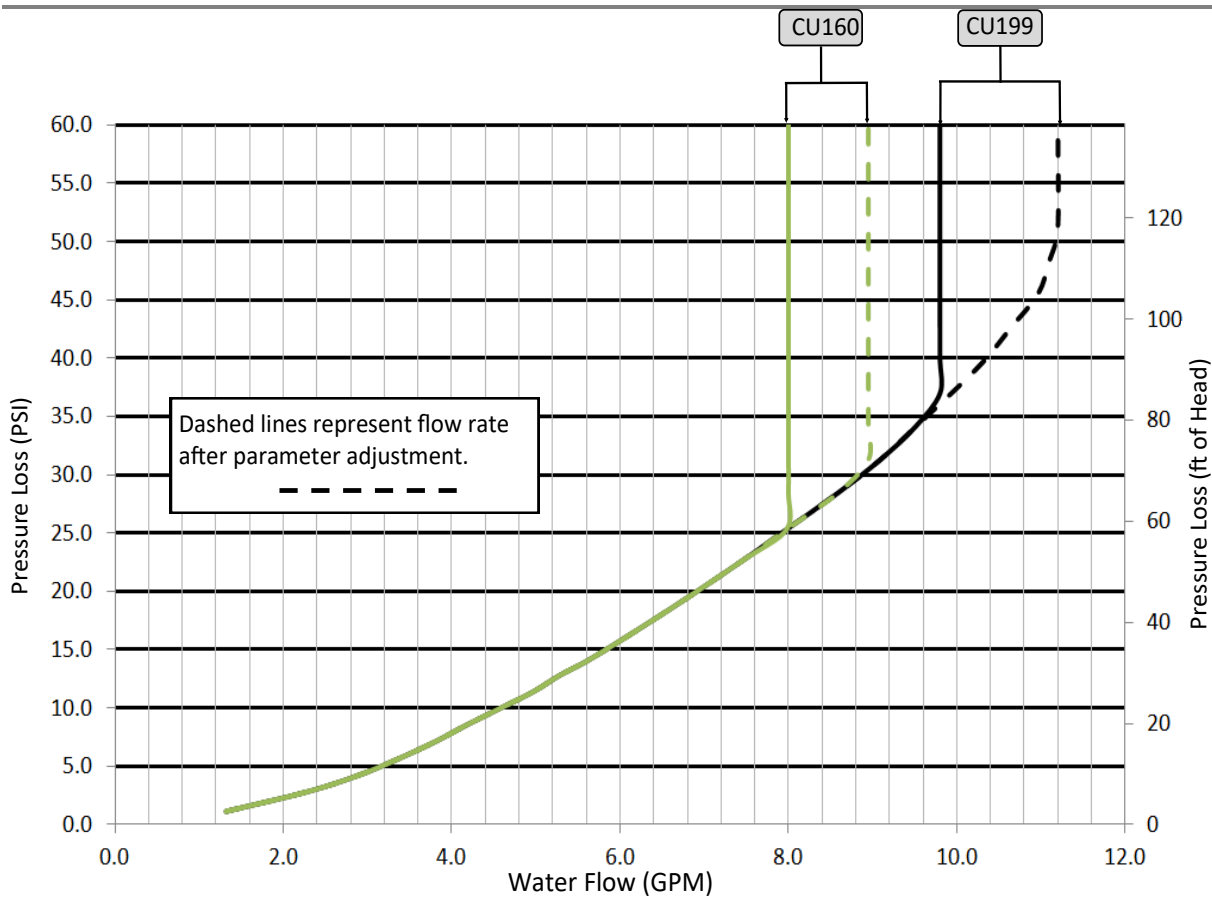
## 6.1 Wiring Diagram



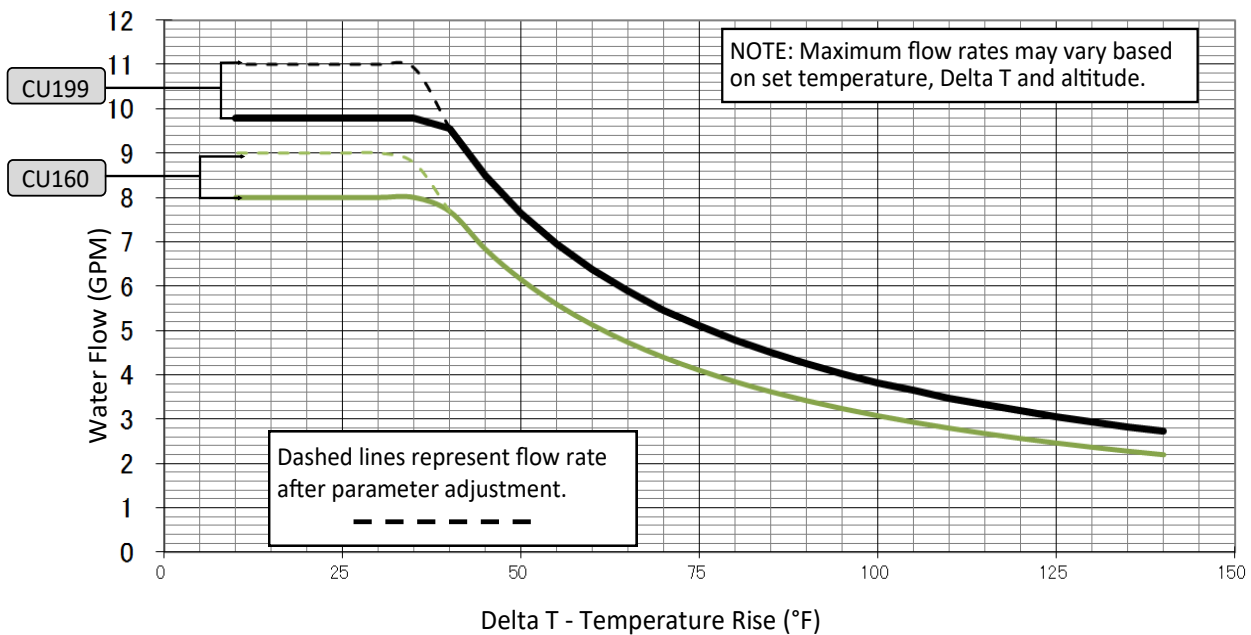
## 6.2 Ladder Diagram



### 6.3 Pressure Drop and Water Flow Curves



The chart below applies only to incoming water temperatures of 70° F (21° C) or less. For incoming water temperatures greater than 70° F (21° C), please contact Rinnai.

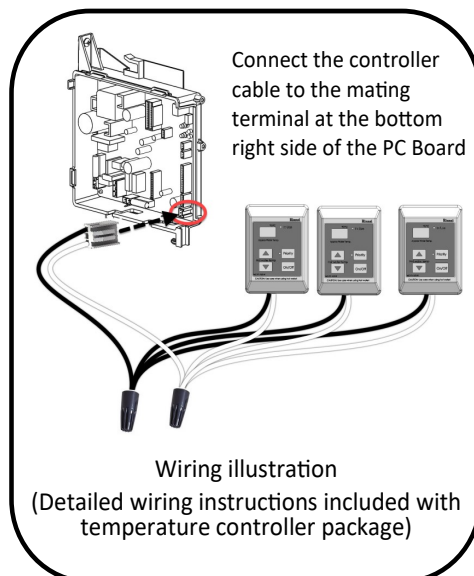
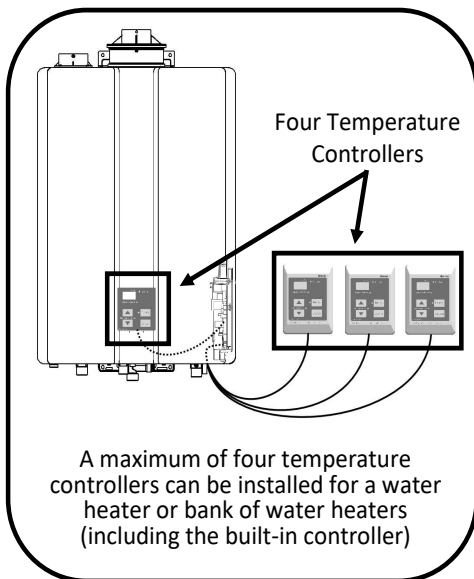


## 6.4 Guidelines for Additional Temperature Controllers

All Rinnai Tankless Water Heaters are equipped with an integrated digital temperature controller that allows for a precise water temperature set-point. Additional digital temperature controllers are available as accessories and must be purchased separately (detailed installation steps included with purchase).

### Wiring

A maximum of four temperature controllers can be installed for a water heater or bank of water heaters; this includes the controller built into a Rinnai Tankless Water Heater. Controllers can only be wired in parallel; they cannot be wired in series.



### Cable Lengths and Sizes

The temperature controller cable should be a non-polarized two-core cable with a minimum gauge of 22 AWG. The maximum cable length from each temperature controller to the water heater depends on the total number of wired controllers connected to the water heater.

Number of Wired Controllers	Maximum Cable Length for Each Controller to Water Heater
1	328 ft (100 m)
2	164 ft (50 m)
3 or 4 *	65 ft (20 m)

\* Only three additional controllers can be wired to the water heater.

### Location

- The temperature controller should be out of reach of small children.
- Avoid locations where the temperature controller may become hot (near an oven or radiant heater).
- Avoid locations in direct sunlight. The digital display may be difficult to read in direct sunlight.
- Avoid locations where the temperature controller could be splashed with liquids.
- Do not install in locations where the temperature controller can be adjusted by the public.



## 6.5 Massachusetts State Gas Regulations

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### FOR GAS MODELS SOLD IN MASSACHUSETTS

#### NOTICE BEFORE INSTALLATION:

This direct-vent appliance must be installed by a properly trained licensed professional. If you are not properly trained, you must not install this unit.

#### IMPORTANT: In the State of Massachusetts (248 CMR 4.00 & 5.00):

For all side wall horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side wall exhaust vent termination is less than 7 ft above finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:

1. **INSTALLATION OF CARBON MONOXIDE DETECTORS.** At the time of installation of the side wall horizontal vented gas fueled equipment, the installing plumber or gasfitter shall observe that a hard wired carbon monoxide detector with an alarm and battery back-up is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professionals for the installation of hard wired carbon monoxide detectors
  - A. In the event that the side wall horizontally vented gas fueled equipment is installed in a crawl space or an attic, the hard wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.
  - B. In the event that the requirements of this subdivision can not be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.
2. **APPROVED CARBON MONOXIDE DETECTORS.** Each carbon monoxide detector as required in accordance with the above provisions shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.
3. **SIGNAGE.** A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of 8 ft above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment. The sign shall read, in print size no less than one-half (1/2) inch in size, **"GAS VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS."**
4. **INSPECTION.** The state or local gas inspector of the side wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08(2)(a)1 through 4.



## 6.6 Warranty

### Limited Warranty for SE+ Series Models

- Internal (Indoor) Models: CU199i and CU160i
- External (Outdoor) Models: CU199e and CU160e

#### What Is Covered?

The Rinnai Standard Limited Warranty covers any defects in materials or workmanship when the product is installed and operated according to Rinnai written installation instructions, subject to the terms within this Limited Warranty document. This Limited Warranty applies only to products that are installed correctly in the United States and Canada. Improper installation may void this Limited Warranty. It is recommended that a trained and qualified professional who has attended a Rinnai installation training class complete your installation. This Limited Warranty coverage, as set out in the table below, extends to the original purchaser and subsequent owners, but only while the product remains at the site of the original installation and terminates if the product is moved or reinstalled at a new location.

Item	Period of Coverage (from date of purchase)
Heat Exchanger	8 Years <sup>[1]</sup>
All Other Parts and Components	5 Years
Reasonable Labor	1 Year

<sup>[1]</sup>The heat exchanger warranty is 8 years or 12,000 operation hours, whichever occurs first.

Note: The integrated controller has a 1 year warranty on parts.

#### What Will Rinnai Do?

Rinnai will repair or replace the covered product or any part or component that is defective in materials or workmanship as set forth in the above table. Rinnai will pay reasonable labor charges associated with the repair or replacement of any such part or component during the term of the labor warranty period. All repair parts must be genuine Rinnai parts. All repairs or replacements must be performed by a qualified professional who is properly trained to do the type of repair.

Replacement of the product may only be authorized by Rinnai at its sole discretion. Rinnai does not authorize any person or company to assume for it any obligation or liability in connection with the replacement of the product. If Rinnai determines that repair of a product is not possible, Rinnai may replace the product with a comparable product at Rinnai's sole discretion. The warranty claim for product parts and labor may be denied if a component or product returned to Rinnai is found to be free of defects in material or workmanship; damaged by improper installation, use or operation; or damaged during return shipping.

#### How to Obtain Service

For the name of a trained and qualified professional, please contact your place of purchase, visit the Rinnai website ([www.rinnai.us](http://www.rinnai.us)), call Rinnai at 1-800-621-9419 or write to Rinnai at 103 International Drive, Peachtree City, Georgia 30269.

Proof of purchase is required to obtain warranty service. You may show proof of purchase with a dated sales receipt, or by registering within 30 days of purchasing the product. To register your Rinnai Tankless Water Heater, please visit [www.rinnai.us](http://www.rinnai.us). For those without internet access, please call 1-800-621-9419. Receipt of registration by Rinnai will constitute proof-of-purchase for this product. Registration of product installed in new home construction may be verified with a copy of the closing papers provided by the initial home buyer. However, registration is not necessary in order to validate this Limited Warranty.



### What Is Not Covered?

This Limited Warranty does not cover any failures or operating difficulties due to the following:

- Accident, abuse, or misuse
- Alteration of the product or any component part
- Misapplication of this product
- Improper installation (such as but not limited to)
  - Product being installed in a corrosive environment
  - Condensate damage
  - Improper venting
  - Incorrect gas type
  - Incorrect gas or water pressure
  - Absence of a drain pan under the appliance
- Improper maintenance (such as but not limited to scale build-up, freeze damage, or vent blockage)
- Incorrect sizing
- Any other cause not due to defects in materials or workmanship
- Problems or damage due to fires, flooding, electrical surges, freezing or any acts of God
- Any damage caused by poor water quality
- Operating the water heater with anything other than potable water at all times
- Force majeure

There is no warranty coverage on product installed in a closed loop application, commonly associated with space heating only applications.

This Limited Warranty does not apply to any product whose serial number or manufacture date has been defaced.

This Limited Warranty does not cover any product used in an application that uses chemically treated water such as a pool or spa heater.

### Limitation on Warranties

No one is authorized to make any other warranties on behalf of Rinnai America Corporation. Except as expressly provided herein, there are no other warranties, expressed or implied, including, but not limited to warranties of merchantability or fitness for a particular purpose, which extend beyond the description of the warranty herein.

Any implied warranties of merchantability and fitness arising under state law are limited in duration to the period of coverage provided by this Limited Warranty, unless the period provided by state law is less. Some states do not allow limitations on how long an implied Limited Warranty lasts, so the above limitation may not apply to you.

Rinnai shall not be liable for indirect, incidental, special, consequential or other similar damages that may arise, including lost profits, damage to person or property, loss of use, inconvenience, or liability arising from improper installation, service or use. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you.

This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

[www.rinnai.us/warranty](http://www.rinnai.us/warranty)



# 7. Notes

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# Notes

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# Notes

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Learn more about Rinnai high-performance Tankless Water Heaters, Hybrid Water Heating Systems, Boilers, Vent-Free Fan Convectors and EnergySaver® Direct Vent Wall Furnaces at:

[rinnai.us](http://rinnai.us) | [rinnai.ca](http://rinnai.ca)

# Rinnai®

Rinnai America Corporation • 103 International Drive, Peachtree City, GA 30269  
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Local, state, provincial, federal and national fuel gas codes must be adhered to prior to and upon installation.

10000504(05)

8/2019



VENDOR PART	VENDOR	DESCRIPTION	PAGE
RE240LN6-1	Bradford White	Residential Lowboy Electric Water Heater	179

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## ELECTRIC WATER HEATER

A Spanish language version of these instructions is available by contacting the manufacturer listed on the rating plate.

La version espanola de estas instrucciones se puede obtener al escribirle a la fábrica cuyo nombre aparece in la placa de especificaciones.

### INSTALLATION & OPERATION INSTRUCTION MANUAL

**THE WARRANTY ON THIS WATER HEATER IS IN EFFECT ONLY WHEN THE WATER HEATER IS INSTALLED AND OPERATED IN ACCORDANCE WITH LOCAL CODES AND THESE INSTRUCTIONS. THE MANUFACTURER OF THIS HEATER WILL NOT BE LIABLE FOR ANY DAMAGE RESULTING FROM FAILURE TO COMPLY WITH THESE INSTRUCTIONS. READ THESE INSTRUCTIONS THOROUGHLY BEFORE STARTING.**

*For your family's comfort, safety and convenience, it is recommended this water heater be installed and serviced by a plumbing professional.*



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**Locating the Water Heater ..... 4**

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**Thermostat Adjustment ..... 16**

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### CONGRATULATIONS!

**You have just purchased one of the finest water heaters on the market today!**

**This installation, operation and instruction manual will explain in detail the installation and maintenance of your new Electric Water Heater. We strongly recommend that you contact a plumbing professional for the installation of this water heater.**

**We require that you carefully read this manual, as well as the enclosed warranty, and refer to it when questions arise. If you have any specific questions concerning your warranty, please consult the plumbing professional from whom your water heater was purchased. For your records we recommend that you write the model, serial number and installation date of your water heater in the maintenance section in the back of this manual.**

**This manual should be kept with the water heater.**



## GENERAL INFORMATION

This electric water heater's design is certified by INTERTEK (ETL) and listed in accordance with UL 174. CETL listed in accordance with Canadian National Standard C22.2, No. 110-M90.

Water heaters with a capacity of 19 gallons through 119 gallons are evaluated by INTERTEK in accordance with Part 280.707(d) (1) of HUD Mobile Home Construction and Safety Standards for Energy Efficiency. For mobile home installations, these water heaters must be installed in accordance with Section 3280.709 of HUD Mobile Home Construction and Safety Standards for Installation of Appliances.

This water heater must be installed in accordance with local codes. In the absence of local codes, install this water heater in accordance with the N.E.C. Reference Book (latest edition).

The warranty for this water heater is in effect only when the water heater is installed, adjusted, and operated in accordance with these Installation and Operating Instructions. The manufacturer will not be held liable for damage resulting from alteration and/or failure to comply with these instructions.

This water heater has been designed and certified for the purpose of heating potable water. The installation and use of this water heater for any purpose other than the heating of potable water, may cause damage to the water heater and create a hazardous condition and nullify the warranty.

### **⚠ CAUTION**

Incorrect operation of this appliance may create a hazard to life and property and will nullify the warranty.

Do not use this appliance if any part has been submerged in water. The plumbing professional responsible for the installation of this water heater should be contacted to inspect the appliance and to replace any part of the control system, including thermostat, which has been submerged in water.

Make sure that the rating plate on the water heater is referenced for certainty that the correct voltage is being supplied to the water heater.

### **⚠ DANGER**

Do not store or use gasoline or other flammable, combustible, or corrosive vapors and liquids in the vicinity of this or any other appliance.

**General Information continued-**

A sacrificial anode(s) is used to extend tank life. Removal of any anode, for any reason, except for inspection and/or replacement, will nullify the warranty. In areas where water is unusually active, an odor may occur at the hot water faucet due to a reaction between the sacrificial anode and impurities in the water. If this should happen, an alternative anode(s) may be purchased from the supplier that installed this water heater. This will minimize the odor while protecting the tank. Additionally, the water heater should be flushed with appropriate dissolvers to eliminate any bacteria.

**IMPORTANT**

Before proceeding, please inspect the water heater and its components for possible damage. **DO NOT** install any damaged components. If damage is evident, please contact the supplier where the water heater was purchased or the manufacturer listed on the rating plate for replacement parts.

**INSTALLATION****Locating the Water Heater****⚠ WARNING**

Water heaters are heat producing appliances. To avoid damage or injury, there shall be no materials stored against the water heater and proper care shall be taken to avoid unnecessary contact (especially by children) with the water heater. **UNDER NO CIRCUMSTANCES SHALL FLAMMABLE MATERIALS, SUCH AS GASOLINE OR PAINT THINNER BE USED OR STORED IN THE VICINITY OF THIS WATER HEATER OR ANY LOCATION FROM WHICH FUMES COULD REACH THE WATER HEATER.**

**This water heater MUST be installed indoors out of the wind and weather.**

**This water heater shall NOT be installed in any location where gasoline or flammable vapors are likely to be present, unless the installation is such to eliminate the probable ignition of gasoline or flammable vapors.**

The location this water heater is to be installed is of utmost importance. Before installing this water heater, consult the installation section of these instructions. After reading these installation and operating instructions, select a location for the water heater where the floor is level and is easily accessible to a power supply and water connections. It is recommended that the water heater be located near the center of greatest hot water usage to prevent heat loss through the pipes.

**DO NOT locate the water heater where water lines could be subjected to freezing temperatures. Locate the water heater so that access panels and drain valves are accessible.**



### ***Locating The Water Heater continued-***

Some models are not equipped with a drain valve. For those models, install a drain tee in the cold water inlet as close as practical to the water heater.

Water heater corrosion and component failure can be caused by the heating and breakdown of airborne chemical vapors. Examples of some typical compounds that are potentially corrosive are: spray can propellants, cleaning solvents, refrigerator and air conditioning refrigerants, swimming pool chemicals, calcium or sodium chloride, waxes and process chemicals. These materials are corrosive at very low concentration levels with little or no odor to reveal their presence.

**NOTE: DAMAGE TO THE WATER HEATER CAUSED BY EXPOSURE TO CORROSIVE VAPORS IS NOT COVERED BY THE WARRANTY. DO NOT OPERATE THE WATER HEATER IF EXPOSURE HAS OR WILL OCCUR. DO NOT STORE ANY POTENTIALLY CORROSIVE COMPOUNDS IN THE VICINITY OF THE WATER HEATER.**

This water heater must be located in an area where leakage of the tank or water line connections and the combination temperature and pressure relief valve will not result in damage to the area adjacent to the water heater or to lower floors of the structure. When such locations cannot be avoided, a suitable drain pan must be installed under the water heater. The drain pan must have a minimum length and width of at least 4 in. (10.2 cm) greater than the diameter of the water heater. The drain pan, as described above, can be purchased from your plumbing professional. The drain pan must be piped to an adequate drain. The piping must be pitched for proper drainage.

## **CLEARANCES**

1. Minimum clearance to combustible material is 0 inches for the Top, Sides, Front, and Rear of this water heater. However, it is recommended that **at least 18 inches (45.7 cm) from the Top, and 24 inches (61 cm) from the Front**. Clearance for servicing may be reduced down to minimum clearance to combustible material, but service time and effort may be greatly increased.
2. Increase distances to provide clearances for servicing.

To comply with NSF requirements this water heater is to be:

- a) Sealed to the floor with sealant, in a smooth and easily cleanable way, or
- b) Installed with an optional leg kit that includes legs and/or extensions that provide a minimum clearance of 6" beneath the water heater.

**Note: For California installation this water heater must be braced, anchored, or strapped to avoid falling or moving during an earthquake. See instructions for correct installation procedures. Instructions may be obtained from DSA Headquarters Office, 1102 Q Street, Suite 5100, Sacramento, CA 95811.**



## Water Connections

**NOTE: BEFORE PROCEEDING WITH THE INSTALLATION, CLOSE THE MAIN WATER SUPPLY VALVE.**

After shutting the main water supply valve, open a faucet to relieve the water line pressure to prevent any water from leaking out of the pipes while making the water connections to the water heater. After the pressure has been relieved, close the faucet. The COLD water inlet and HOT water outlet are identified on top of the water heater. The fittings at the cold water inlet and hot water outlet are dielectric waterway fittings with 3/4" NPT tapered male threads. Make the proper plumbing connections between the water heater and the plumbing system in the house. Install a shut-off valve in the cold water supply line.

### **⚠ CAUTION**

If sweat fittings are to be used, DO NOT apply heat to the nipples on top of the water heater. Sweat the tubing to the adapter before fitting the adapter to the water connections. It is imperative that heat is not applied to the nipples containing a plastic liner.

### **IMPORTANT**

**FAILURE TO INSTALL AND MAINTAIN A NEW, LISTED 3/4" X 3/4" TEMPERATURE-PRESSURE RELIEF VALVE WILL RELEASE THE MANUFACTURER FROM ANY CLAIM WHICH MIGHT RESULT FROM EXCESSIVE TEMPERATURE AND PRESSURES.**

If this water heater is installed in a closed water supply system, such as the one having a back-flow preventer in the cold water supply, provisions shall be made to control thermal expansion. DO NOT operate this water heater in a closed system without provisions for controlling thermal expansion. Your water supplier or local plumbing inspector should be contacted on how to control this situation.

After installation of the water lines, open the main water supply valve and fill the water heater. While the water heater is filling, open several hot water faucets to allow air to escape from the water system. When a steady stream of water flows through the faucets, close them and check all water connections for possible leaks. **NEVER OPERATE THE WATER HEATER WITHOUT FIRST BEING CERTAIN IT IS FILLED WITH WATER.**

**Water Connections continued-****⚠ WARNING**

For protection against excessive temperatures and pressure, install temperature and pressure protective equipment required by local codes, but not less than a combination temperature and pressure relief valve certified by a nationally recognized testing laboratory that maintains periodic inspection of production of listed equipment or materials, as meeting the Requirements for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22, and the Standard CAN1-4.4 Temperature, Pressure, Temperature and Pressure Relief Valves and Vacuum Relief Valves. The combination temperature and pressure relief valve shall be marked with a maximum set pressure, not to exceed the maximum working pressure of the water heater. The combination temperature and pressure relief valve shall also have an hourly rated temperature steam BTU discharge capacity not less than the hourly input rating of the water heater.

Install the combination temperature and pressure relief valve into the opening provided and marked for this purpose on the water heater

Note: Some models may already be equipped or supplied with a combination temperature and pressure relief valve. Verify that the combination temperature and pressure relief valve complies with local codes. If the combination temperature and pressure relief valve does not comply with local codes, replace it with one that does. Follow the installation instructions above on this page.

Install a discharge line so that water discharged from the combination temperature and pressure relief valve will exit within six (6) inches (15.3 cm) above, or any distance below the structural floor and cannot contact any live electrical part. The discharge line is to be installed to allow for complete drainage of both the temperature and pressure relief valve and the discharge line. The discharge opening must not be subjected to blockage or freezing. DO NOT thread, plug or cap the discharge line. It is recommended that a minimum of four (4) inches (10.2 cm) be provided on the side of the water heater for servicing and maintenance of the combination temperature and pressure relief valve.

Do not place a valve between the combination temperature and pressure relief valve and the tank

**Water Connections continued-****⚠ WARNING**

Hydrogen gas can be produced in a hot water system served by this water heater that has not been used for a long period of time (generally two weeks or more). Hydrogen gas is extremely flammable. To reduce the risk of injury under these conditions, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present, there will probably be an unusual sound such as air escaping through the pipe as the water begins to flow. There should be no smoking or open flame near the faucet at the time it is open.

**⚠ CAUTION**

**INCREASING THE THERMOSTAT SETTING ABOVE THE PRESET TEMPERATURE MAY CAUSE SEVERE BURNS AND CONSUME EXCESSIVE ENERGY. HOTTER WATER INCREASES THE RISK OF SCALD INJURY.**

**Water Connections continued-**

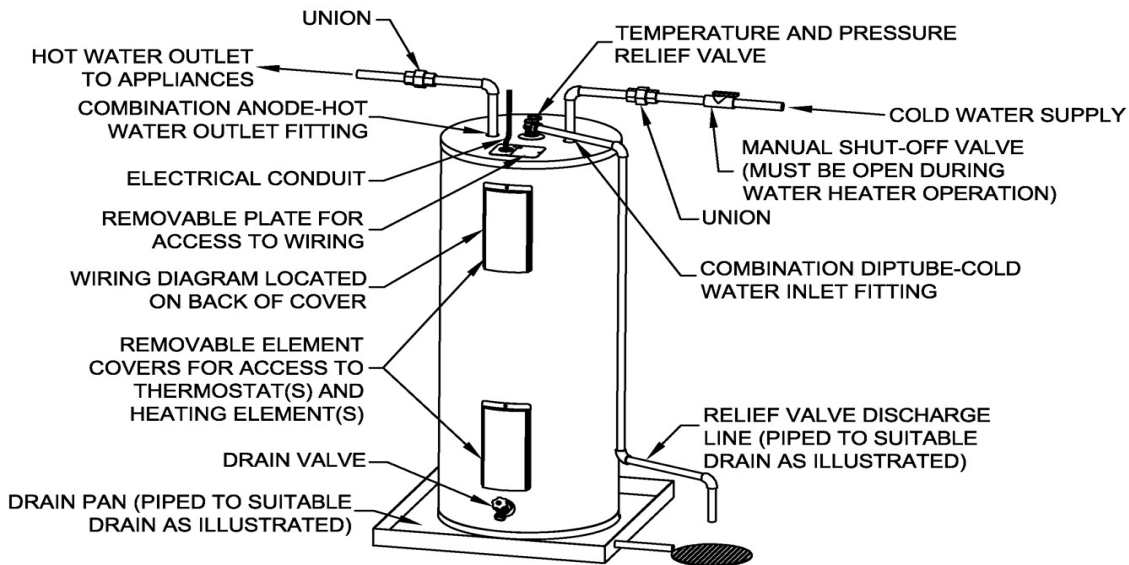
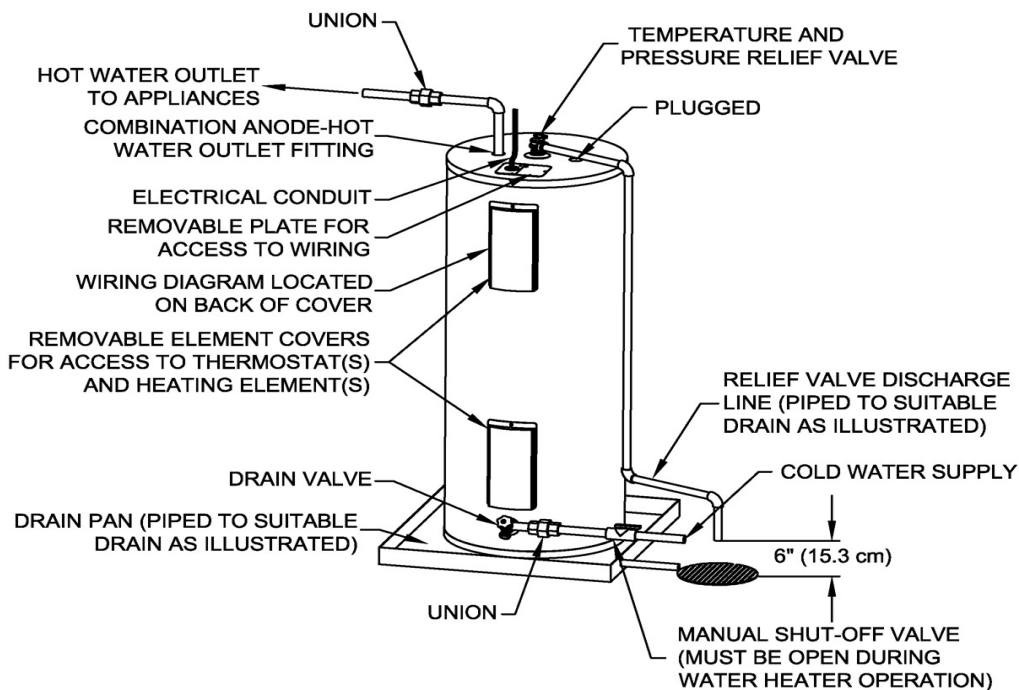
This water heater can deliver scalding temperature water at any faucet in the system. Be careful whenever using hot water to avoid scalding injury. Certain appliances, such as dishwashers and automatic clothes washers, may require increased temperature water. By setting the thermostat on this water heater to obtain increased temperature water required by these appliances, you may create the potential for scald injury. To protect against injury, you should install an ASSE approved mixing valve in the water system. This valve will reduce point of discharge temperature by mixing cold and hot water in branch supply lines. Such valves are available from the manufacturer of this water heater or a local plumbing supplier. Please consult with a plumbing professional.

	<p>Water temperature over 125°F (52°C) can cause severe burns instantly or death from scalds.</p> <p>Children, disabled and elderly are at highest risk of being scalded.</p> <p>Review this instruction manual before setting temperature at water heater.</p> <p>Feel water before bathing or showering.</p> <p>Temperature limiting valves are available.</p>

<b>APPROXIMATE TIME/TEMPERATURE RELATIONSHIPS IN SCALDS</b>	
120°F (49°C)	More than 5 minutes
125°F (52°C)	1½ to 2 minutes
130°F (54°C)	About 30 seconds
135°F (57°C)	About 10 seconds
140°F (60°C)	Less than 5 seconds
145°F (63°C)	Less than 3 seconds
150°F (66°C)	About 1½ seconds
155°F (68°C)	About 1 second

**Water Connections continued-**
**Upright Models (See Figures 1A & 1B)**

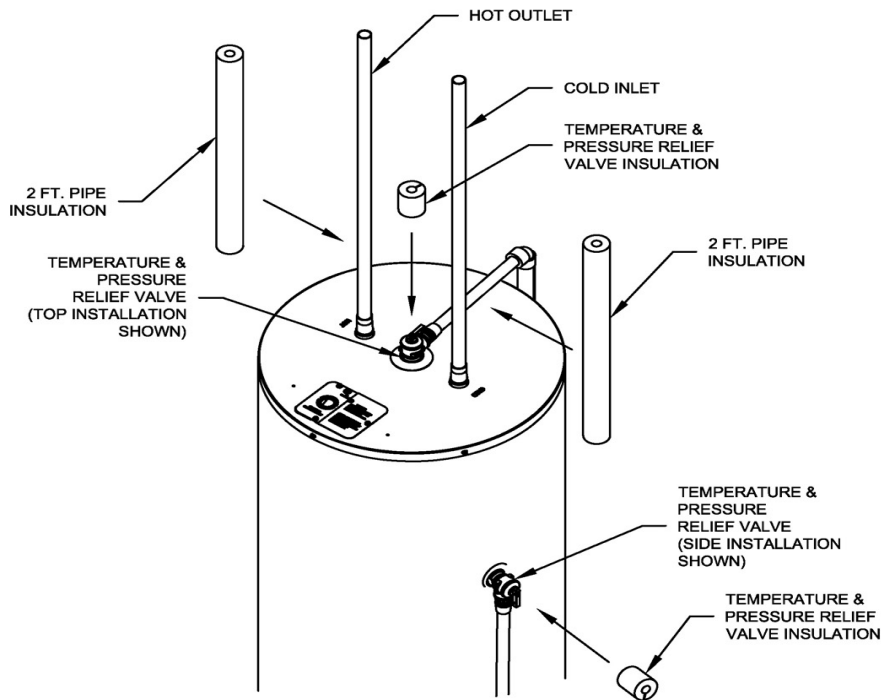
The hot and cold water connections are identified on the top of the water heater (See figure 1A). For bottom inlet models (-503 models), the cold water inlet is located on the side of the drain valve (see figure 1B). Connect the hot and cold water lines to the installed nipples using unions. Install a listed temperature-pressure relief valve in the opening on the side of the water heater.


**Figure 1A (Top Inlet Models)**

**Figure 1B (Bottom Inlet Models)**

*Water Connections continued-*

**INSTALLATION INSTRUCTIONS FOR INLET/OUTLET  
PIPE INSULATION & TEMPERATURE/PRESSURE  
RELIEF VALVE INSULATION**

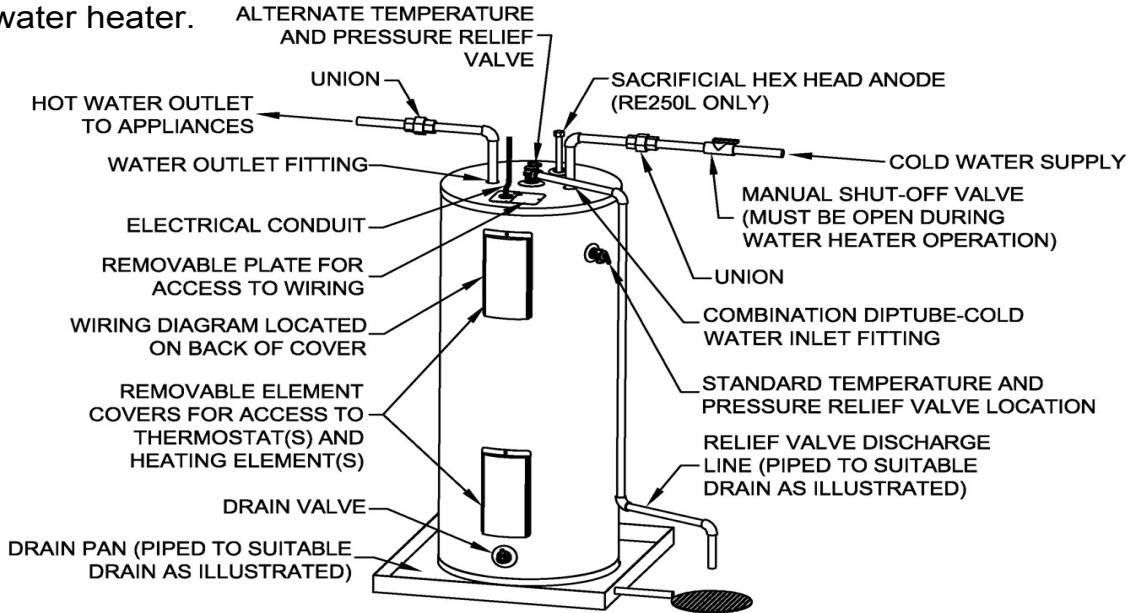
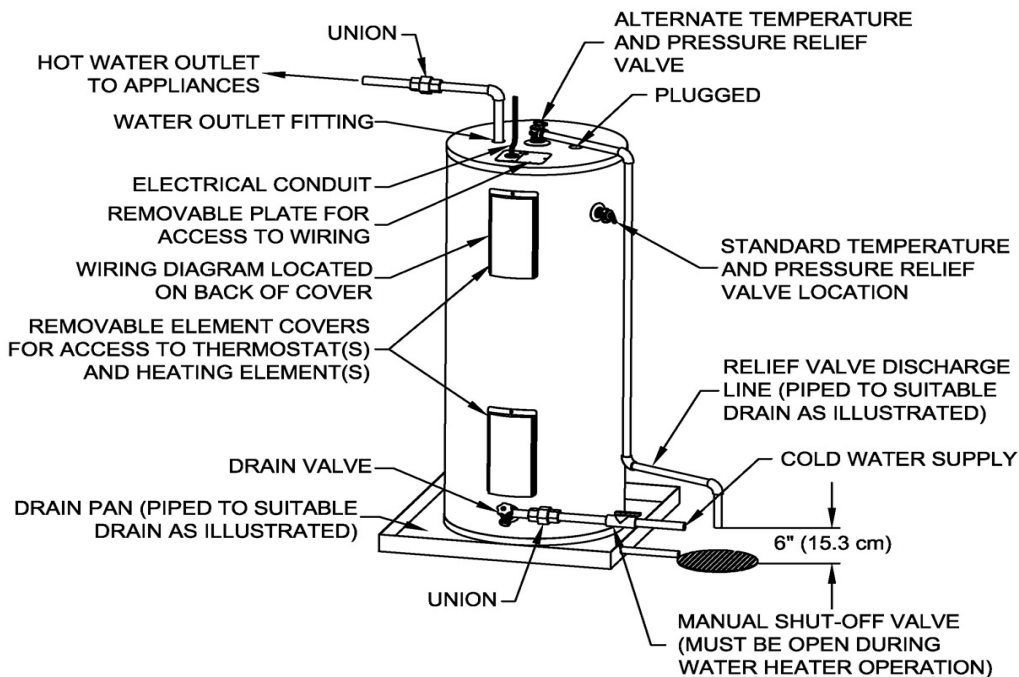
1. If included, install 2 ft. pipe insulation over both cold and hot outlet pipes.
2. If included, install temperature & pressure relief valve insulation over temperature & pressure relief valve.



Note: The water heater may only have one T&P location.

**Water Connections continued-**
**Lowboy Models (See Figures 2A & 2B)**

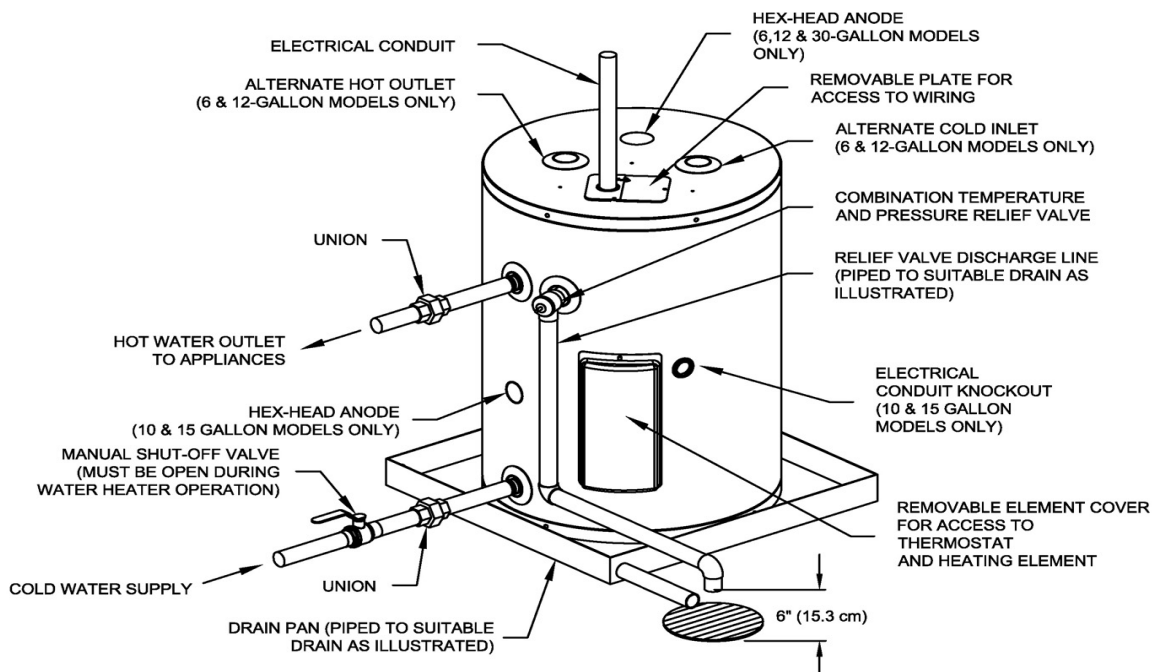
The hot and cold water connections are identified on the top of the water heater (See figure 2A). For bottom inlet models (-503 models), the cold water inlet is located on the side of the drain valve (see figure 2B). Connect the hot and cold water lines to the installed nipples using unions. Install a listed temperature-pressure relief valve in the opening on the side of the water heater.


**Figure 1A (Top Inlet Models)**

**Figure 2B (Bottom Inlet Models)**

### Water Connections continued- Utility Models (See Figure 3)

All utility models are supplied with inlet and outlet nipples located in a plastic bag attached to the water heater. The hot and cold water locations are identified on the side of the water heater. Apply appropriate amount of thread sealant to the provided nipples and install nipples into the side of the tank. For 20 gallon utility models, install the supplied anode/nipple combination at the HOT outlet location. Connect the hot and cold water lines to the nipples using unions. Install a listed temperature-pressure relief valve in the opening on the side of the water heater. Install a vacuum relief anti-siphon device in the cold water inlet line when using side cold water connection.

The 6 and 12 gallon models are equipped for installation with either side or top water connections. They are shipped from the factory with the alternate top connections plugged. The alternate top inlet is supplied with a dip tube. If the top water connections are needed, remove pipe plugs from the alternate top connections, apply appropriate amount of thread sealant to the provided nipples and install nipples in desired top location. Apply appropriate amount of thread sealant to the pipe plugs and install pipe plugs in the side locations. Install a vacuum relief anti-siphon device in the cold water inlet line when using side cold water connection.



**Figure 3**



### Electrical Connections

Before any electrical connections are made, be sure that the water heater is full of water and that the manual shut-off valve in the cold water supply line is open. Check the rating plate and wiring diagram before proceeding. This electric water heater was built and wired in accordance with the INTERTEK testing approvals requirements. The temperature limiting device is of the manual reset, trip-free type and has been factory installed to interrupt all ungrounded power supply conductors in the event of thermostat failure. Thermostats are factory set and wired in accordance with the wiring diagram fastened to the inside of the top access panel. The plumbing supplier in your area ordered this heater wired at the factory to comply with existing area codes, but local utility codes may require or allow other circuitry. Consult your local power company to determine the correct electrical hook-up in order to meet local utility and building codes and in order to obtain the most economical rates. Also check to find out if you are required to obtain a permit before starting the installation. The following chart shows the recommended fuse size for the maximum water heater wattage. The maximum wattage and rated voltage are shown on the water heater data plate. The water heater must be well grounded. A green ground screw is provided at the electrical connection point for connecting a ground wire. Ground screw on 10 & 15-gallon models is located under the removable element cover.

Recommended Fuse size					
Max. Watts	Voltage				
	120v	208v	240v	277v	480v
1000	15A	10A	10A	10A	10A
1250	15A	10A	10A	10A	10A
1500	20A	10A	10A	10A	10A
2000	25A	15A	15A	10A	10A
2500	30A	15A	15A	15A	10A
3000	35A	20A	20A	15A	10A
3500	---	25A	20A	20A	10A
4000	---	25A	25A	20A	15A
4500	---	30A	25A	25A	15A
5000	---	30A	30A	25A	15A
5500	---	35A	30A	25A	15A
6000	---	40A	35A	30A	20A



## GENERAL OPERATION

**Before closing the switch to allow electric current to flow to the water heater, make certain that the water heater is full of water and that the cold water inlet valve is open. Complete failure of the heating element(s) will result if they are not totally immersed in water at all times. Failure of the element(s) due to dry-firing is not covered by warranty.**

When the switch is closed, the operation of this electric water heater is automatic. The thermostats are preset to the "HOT" setting to provide a water temperature of approximately 120°F (49°C) to reduce the risk of scald injury.

### CAUTION

Scalding may occur within five (5) seconds at a temperature setting of 140°F (60°C).

Care must be taken whenever using hot water to avoid scalding injury. Certain appliances require high temperature hot water (such as dishwashers and automatic clothes washers).

#### TO FILL THE WATER HEATER

1. Close the water heater drain valve (if provided) by inserting a standard flat head screwdriver into the slot and turning clockwise.
2. Open the cold water supply shut-off valve.
3. Open several hot water faucets to allow air to escape from the system.
4. When a steady stream of water flows from the faucets, the water heater is filled. Close the faucets and check for water leaks at the water heater drain valve, combination temperature and pressure relief valve and the hot and cold water connections.

#### TO DRAIN THE WATER HEATER

Should it become necessary to completely drain the water heater, make sure you follow the steps below:

1. Disconnect the power supply to the water heater. Consult the plumbing professional or electric company in your area for service.
2. Close the cold water supply shut-off valve.
3. Open the drain valve (if provided) on the water heater by inserting a standard flat head screwdriver into the slot and turning counter-clockwise. The drain valve has threads on the end that will allow connection of a standard hose coupling. For those models not equipped with a drain valve, disconnect cold water inlet piping at a convenient connection location as close to an adequate drain as possible.

#### **CAUTION! THIS WATER MAY BE HOT.**

4. Open a hot water faucet to allow air to enter the system.

To refill the water heater, refer to "TO FILL THE WATER HEATER."

## Thermostat Adjustment

### ⚠ CAUTION

Before adjusting thermostat(s), turn off power supply to the water heater.

The temperature of the water can be changed by adjusting the thermostat(s). Before any work is done on the water heater, disconnect all power to the water heater by opening the switch at the main electrical circuit breaker or fuse box. Remove the access panels or front panel on table tops, fold the insulation outward away from the controls. Set the thermostat(s) to the desired water temperature using a screwdriver to move the thermostat dial. The thermostat has been factory preset to approximately 120°F (49°C). Rotate the temperature dial clockwise to increase water temperature. Replace the insulation making sure that the controls are well covered and that the plastic terminal shield has not been displaced; replace the access panel. The water heater is now ready for operation and the main switch can be closed.

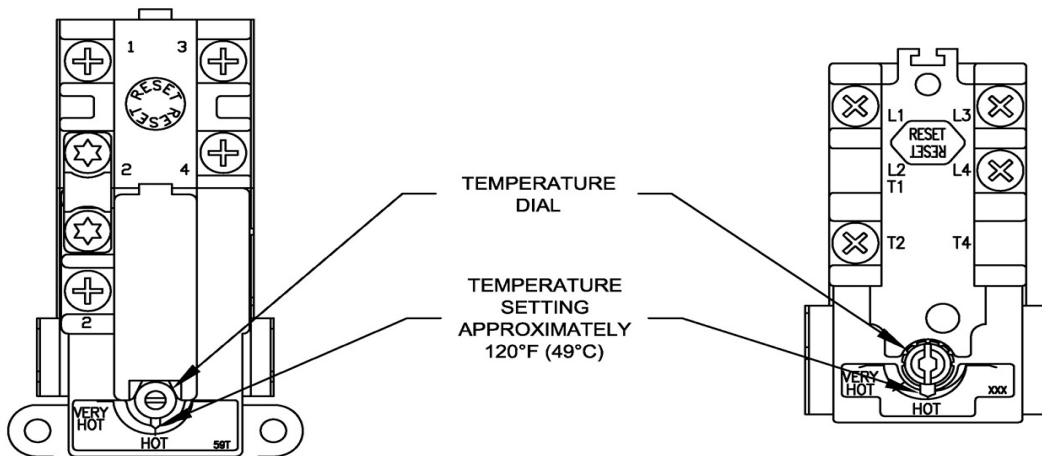


Figure 4

### ⚠ CAUTION

Hotter water increases the risk of scald injury. Scalding may occur within five (5) seconds at a temperature setting of 140°F (60°C). To protect against hot water injury, install an ASSE approved mixing valve in the water system. This valve will reduce point of discharge water temperatures by mixing cold and hot water in branch water lines. A licensed plumbing professional or local plumbing authority should be consulted.

Note: This water heater is equipped with an energy cut out device to prevent overheating. Should overheating occur, turn off the electrical supply to the water heater and contact a qualified service technician.



## MAINTENANCE

### IMPORTANT

The water heater should be inspected at a minimum of annually by a qualified service technician for damaged components. **DO NOT** operate this water heater if any part is found damaged.

Shut off the electric power whenever the water supply to the water heater is off. Shut off the electric power and water supply, drain the water heater completely to prevent freezing whenever the building is left unoccupied during the cold weather months. In order to insure efficient operation and long tank life, drain the water heater at least once a month through the drain valve until the water runs clear. Failure to do this may result in noisy operation and lime and sediment buildup in the bottom of the tank. Check the temperature-pressure relief valve to insure that the valve has not become encrusted with lime. Lift the lever at the top of the valve several times until the valve seats properly without leaking and operates freely.

### WARNING

When lifting lever of temperature-pressure relief valve, hot water will be released under pressure. Be certain that any released water does not result in bodily injury or property damage. The magnesium anode rod should be inspected periodically and replaced when necessary to prolong tank life.

The following maintenance should be performed by a qualified service technician at the minimum periodic intervals suggested below. In some installations, the maintenance interval may be more frequent depending on the amount of use and the operating conditions of the water heater. Regular inspection and maintenance of the water heater will help to insure safe and reliable operation.

1. Annually, check the operation of the thermostat(s).
2. Bi-annually, check the seal around the heating elements for leaks. If there is any sign of leaking, disconnect the power supply to the water heater and contact the plumbing professional that installed this water heater or a qualified service technician.

**Maintenance continued-**

3. At least once a year, check the combination temperature and pressure relief valve to insure that the valve has not become encrusted with lime. Lift the lever at the top of the temperature-pressure relief valve several times until the valve seats properly without leaking and operates freely.

**⚠ WARNING**

When lifting lever of temperature-pressure relief valve, hot water will be released under pressure. Be certain that any released water does not result in bodily injury or property damage.

4. If the combination temperature and pressure relief valve on the appliance discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation. Do not plug the combination temperature and pressure relief valve outlet for any reason.
5. Monthly, drain off a gallon of water from the water heater to remove silt and sediment.

**⚠ WARNING**

**THIS WATER MAY BE HOT.**

6. A combination sacrificial anode rod/hot water outlet nipple has been installed to extend tank life. The anode rod should be inspected periodically (every 2 years) and replaced when necessary to prolong tank life. Water conditions in your area will influence the time interval for inspection and replacement of the anode rod. Contact the plumbing professional who installed the water heater or the manufacturer listed on the rating plate for anode replacement information. The use of a water softener may increase the speed of anode consumption. More frequent inspection of the anode is needed when using softened (or phosphate treated) water.

**⚠ CAUTION**

**FOR YOUR SAFETY, DO NOT ATTEMPT TO REPAIR THERMOSTAT(S), HEATING ELEMENTS, OR ELECTRICAL WIRING. REFER SUCH REPAIRS TO A QUALIFIED SERVICE TECHNICIAN.**



**Maintenance continued-**

Contact your local plumbing supplier or plumbing professional for replacement parts or contact the company at the address displayed on the rating plate of the water heater.

For faster and better service, please provide the part name, model, and serial number(s) of the water heater(s) when ordering parts.

**READ THE WARRANTY FOR A FULL EXPLANATION OF THE LENGTH OF TIME THAT PARTS AND THE WATER HEATER ARE WARRANTED.**

Manufactured under one or more of the following U.S. Patents: 5,277,171; 5,341,770; 5,372,185; 5,485,879; 5,574,822; 5,596,952; 5,660,165; 5,682,666; 5,761,379; 5,943,984; 5,954,492; 5,988,117; 6,056,542; 6,142,216; 6,442,178; 6,684,821; 6,935,280; 7,063,132; 7,063,133; 7,007,748; 7,270,087; 7,334,419; 7,337,517; 7,409,925; 7,458,341; 7,559,293; 7,621,238; 7,634,976; 7,650,859; 7,665,210; 7,665,211; 7,699,026; 7,866,168; 7,900,589; 7,971,560; 7,992,526; 8,082,888; 8,146,772; Other U.S. and Foreign patent applications pending.  
Current Canadian Patents: 2,092,105; 2,107,012; 2,108,186; 2,112,515; 2,143,031; 2,239,007; 2,262,174; 2,314,845; 2,409,271; 2,476,685; 2,504,824; 2,548,958

Complete the following information and retain for future reference:

Model No: \_\_\_\_\_

Serial No: \_\_\_\_\_

Service Phone Days: \_\_\_\_\_ Nights: \_\_\_\_\_

Address: \_\_\_\_\_

Supplier: \_\_\_\_\_

Supplier Phone No: \_\_\_\_\_



## NOTES



VENDOR PART	VENDOR	DESCRIPTION	PAGE
28T9	Delta Commercial	28C / T9 Two Handle 8" Wall Mount Service Sink Faucet - Rough Chrome	200



**PLEASE LEAVE THIS  
INSTRUCTION SHEET WITH THE  
INSTALLED FAUCET**

**28T9**

WRITE PURCHASE MODEL NUMBER HERE FOR  
FUTURE REFERENCE  
ESCRIBA EL NÚMERO DEL MODELO COMPRADO AQUÍ  
PARA REFERENCIA FUTURA  
POUR RÉFÉRENCE FUTURE, INSCRIVEZ CI-DESSUS  
LE N° DE MODÈLE DU PRODUIT ACHETÉ

#### **MAINTENANCE**

When performing routine maintenance, do not void your warranty by installing non-genuine parts. Use only authorized Cambridge Brass parts.

#### **CARE INSTRUCTIONS**

This CAMBRIDGE BRASS faucet is designed & engineered in accordance with the highest quality and performance standards. With proper care it will give years of trouble free service. Care should be given to the cleaning of this product. Although its finish is extremely durable, it can be **DAMAGED** by **ACIDIC CLEANERS** (eg. cleaners designed specifically for vitreous lavatories and water closets), **HARSH ABRASIVE** or **POLISH**. To clean, simply wipe with a damp cloth and blot dry with a soft cloth.

**S. V. P., LAISSEZ CETTE FICHE D'INSTRUCTIONS AVEC LA ROBINETTERIE NOUVELLEMENT INSTALLÉE**

#### **ENTRETIEN**

*Lorsqu'un entretien de routine est effectué, n'annulez pas votre garantie en installant des pièces qui ne sont pas d'origine. Utiliser seulement des pièces Cambridge Brass.*

#### **INSTRUCTIONS DE NETTOYAGE**

*Cette robinetterie Cambridge Brass a été dessinée et conçue en conformité avec les plus hauts standards de qualité et de performance. Un entretien adéquat apportera plusieurs années d'usage sans problème. Une attention particulière devrait être apportée au nettoyage de ce produit. Bien que le fini soit extrêmement durable, il peut être endommagé par des nettoyeurs contenant des acides (ex: nettoyeurs conçus spécifiquement pour les lavabos et toilettes en porcelaine vitrifiée), des abrasifs ou pour le polissage. Pour nettoyer, essuyer simplement avec un chiffon humide et assécher avec un chiffon doux.*

**DEJE ESTA HOJA DE INSTRUCCIÓN CON LA LLAVE INSTALADA**

#### **MANTENIMIENTO**

Quando haga el mantenimiento habitual, no anule su garantía instalando piezas no genuinas. Sólomente use piezas autorizadas Cambridge Brass.

#### **INSTRUCCIONES PARA EL CUIDADO**

Esta llave CAMBRIDGE BRASS está diseñada y fabricada de acuerdo con los estándares más altos de calidad y funcionamiento. Con el cuidado apropiado le dará años de servicio sin problemas. Debe de darle cuidado a la limpieza de este producto. Aunque su acabado es extremadamente resistente, puede **DANARSE** con **LIMPIADORES ÁCIDOS** (ej. limpiadores diseñados específicamente para laboratorios vítreos e inodoros), **ABRASIVOS ÁSPEROS** o **PULIMENTO**. Para limpiar simplemente pásele un trapo húmedo y seque con un paño suave.

### SERVICE SINK FAUCET

#	PART #	DESCRIPTION
1	060027A	Cross handle with screw, red & blue index
2	060034A	Stem structure complete with renewable seat
3	060056A	Pail brace complete
4	060302A	Vacuum Breaker Repair Parts Kit
5	060058A	Integral stop stem cartridge complete
6	060198A W16538	Single shank kit Shank fibre washer

### ROBINETTERIE POUR ÉVIER DE SERVICE

#	N° PIÈCE	DESCRIPTION
1	060027A	Manette en croix avec vis et ind. rouge et bleu
2	060034A	Cartouche d'obturation complète avec siège remplaçable
3	060056A	Support de bec avec crochet pour seau
4	060302A	Nécessaire de pièces de réparation pour casse-vidé
5	060058A	Cartouche d'obturation complète pour robinet d'arrêt incorporé
6	060198A W16538	Ensemble de raccord d'accouplement simple Rondelle de fibre pour raccord d'accouplement

### LLAVE/GRIFO PARA EL LAVADERO DE SERVICIO

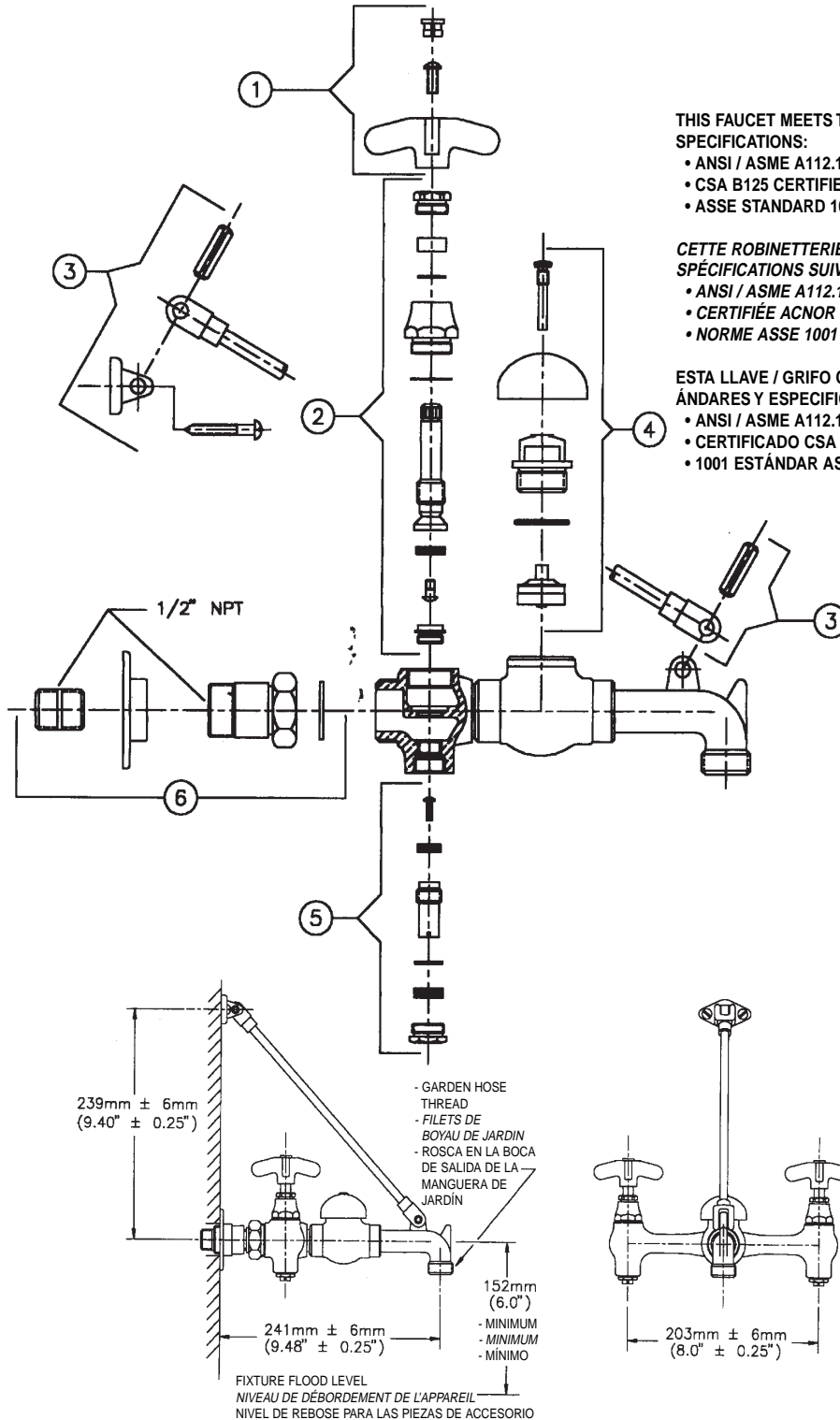
#	PARTE	DESCRIPCIÓN
1	060027A	Manija en cruz con tornillo, índice rojo y azul
2	060034A	Estructura de la espiga completa con asiento renovable
3	060056A	Barra Sujetadora
4	060302A	Juego de heramientas de Reparación para el Rompevavio
5	060058A	Cartucho de espiga con tope integral completo
6	060198A W16538	Juego de piezas para espiga sencilla Arandela de fibra para la espiga



SERVICE SINK FAUCET

ROBINETTERIE POUR ÉVIER DE SERVICE

LLAVE/GRIFO PARA EL LAVADERO DE SERVICIO



THIS FAUCET MEETS THE FOLLOWING STANDARDS AND SPECIFICATIONS:

- ANSI / ASME A112.18.1M
- CSA B125 CERTIFIED
- ASSE STANDARD 1001
- CSA B64.1.1
- IAPMO LISTED

CETTE ROBINETTERIE EST CONFORME AUX NORMES ET SPÉCIFICATIONS SUIVANTES:

- ANSI / ASME A112.18.1M
- CERTIFIÉE ACNOR B125
- NORME ASSE 1001
- ACNOR B64.1.1
- ENRIGISTRÉE IAPMO

ESTA LLAVE / GRIFO CUMPLE CON LOS SIGUIENTES ESTÁNDARES Y ESPECIFICACIONES:

- ANSI / ASME A112.18.1M
- CERTIFICADO CSA B125
- 1001 ESTÁNDAR ASSE
- CSA B64.1.1
- REGISTRADO EN LAPMP

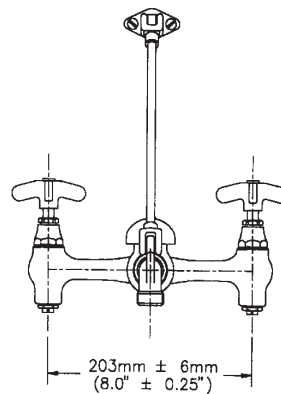
239mm ± 6mm  
(9.40" ± 0.25")

- GARDEN HOSE  
THREAD  
- FILETS DE  
BOYAU DE JARDIN  
- ROSCA EN LA BOCA  
DE SALIDA DE LA  
MANGUERA DE  
JARDIN

241mm ± 6mm  
(9.48" ± 0.25")

152mm  
(6.0")  
- MINIMUM  
- MINIMUM  
- MINIMO

FIXTURE FLOOD LEVEL  
NIVEAU DE DÉBORDEMENT DE L'APPAREIL  
NIVEL DE REBOSE PARA LAS PIEZAS DE ACCESORIO





#### WARRANTY

Delta Faucet, 420 Burbrook Place, London, Ontario, Canada N6A 4L6, warrants to the original purchaser that products manufactured by it, will be free from defects in material, finish and/or workmanship for a period of five (5) years from date shown on purchaser's invoice.

Delta Faucet will, at its' option, repair or replace any part which proves to be defective in material and/or workmanship during the warranty period under normal installation, water and service conditions, and use. If Delta Faucet concludes that the returned part was manufactured by Delta Faucet and is, in fact, defective, then Delta Faucet will honour the warranty stated herein.

LABOUR CHARGES AND/OR DAMAGES INCURRED IN THE INSTALLATION, REPAIR OR REPLACEMENT AS WELL AS CONSEQUENTIAL, SPECIAL, INDIRECT OR PUNITIVE DAMAGES CONNECTED THEREWITH ARE EXCLUDED AND WILL NOT BE PAID BY DELTA FAUCET.

THIS IS THE EXCLUSIVE WARRANTY MADE BY DELTA FAUCET WHICH DOES NOT MAKE ANY OTHER WARRANTY OF ANY KIND, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty is for commercial products only from Delta Faucet and Cambridge Brass and is void for any damage to the product due to misuse, abuse, neglect, accident, improper installation, any use violative of instructions furnished by Delta Faucet or any use of replacement parts other than genuine Delta Faucet parts.

#### GARANTIE

*Delta Faucet, 420 Burbrook Place, London, Ontario, Canada, N6A 4L6, garantit à l'acheteur original que les produits qu'elle fabrique seront exempts de défauts de matériaux, finition ou fabrication pendant une période de cinq (5) ans à compter de la date indiquée sur la facture remise à cet acheteur.*

*Delta Faucet s'engage, à sa discrétion, à remplacer ou réparer toute pièce présentant un défaut de matériau ou de fabrication pendant la durée de la garantie, étant entendu que les conditions d'installation, la qualité de l'eau et les conditions de service, ainsi que l'utilisation sont normales. Si Delta Faucet arrive à la conclusion que le produit retourné a bien été fabriqué par Delta Faucet et présente bien un défaut, la présente garantie sera honorée.*

*LES FRAIS DE MAIN-D'OEUVRE ET/OU DOMMAGES LIÉS À L'INSTALLATION, AUX RÉPARATIONS OU AU REMPLACEMENT, AINSI QUE LES DOMMAGES DIRECTS, INDIRECTS, DE NATURE SPÉCIALE OU DISSUASIFS EN DÉCOULANT, SONT EXCLUS ET NE FERONT L'OBJET D'AUCUN PAIEMENT DE LA PART DE DELTA FAUCET.*

*LA PRÉSENTE GARANTIE EST LA SEULE QUI SOIT EXPRESSÉMENT OFFERTE PAR DELTA FAUCET, ET LA COMPAGNIE N'OFFRE AUCUNE AUTRE GARANTIE DE QUELQUE NATURE QUE CE SOIT, Y COMPRIS AUCUNE GARANTIE IMPLICITE AYANT TRAIT À LA QUALITÉ MARCHANDE OU À L'UTILISATION DU PRODUIT POUR UN USAGE PARTICULIER.*

*Certains états n'admettent pas l'exclusion ou la limitation des dommages directs ou indirects, de sorte que l'exclusion ou la limitation ci-dessus peuvent ne pas vous concerner.*

*Cette garantie ne s'applique qu'aux produits commerciaux offerts par Delta Faucet Company et Cambridge Brass et devient nulle et sans effet pour tout dommage aux produits, dû à une mauvaise utilisation, de la négligence, un accident, une installation inadéquate, toute utilisation contrevenant aux règles fournies par Delta Faucet ou tout usage de pièces de rechange autres que les pièces d'origine de Delta Faucet.*

#### GARANTÍA

Delta Faucet, ubicada en 420 Burbrook Place, London, Ontario, Canada N6A 4L6, le garantiza al comprador original que los productos fabricados por esta compañía, estarán libres de defectos de material, acabado y/o fabricación por un período de cinco (5) años a partir de la fecha indicada en la factura del comprador.

Delta Faucet, a su discreción, reparará o reemplazará cualquier pieza que muestre estar defectuosa en material y/o fabricación, durante el período de garantía, bajo instalación, condiciones de agua, servicio y uso normal. Si Delta Faucet determina que la parte devuelta fue fabricada por Delta Faucet y está realmente defectuosa, entonces Delta Faucet reconocerá esta garantía.

LOS CARGOS POR LA LABOR Y/O DAÑOS INCURRIDOS EN LA INSTALACIÓN, REPARACIÓN O REPUESTO, COMO TAMBIÉN DAÑOS INCIDENTALES Y CONSECUENTES, ESPECIALMENTE DAÑOS INDIRECTOS O PUNITIVOS, CONECTADOS CON ESTOS ESTÁN EXCLUIDOS Y NO SERÁN PAGADOS POR DELTA FAUCET.

ESTA ES UNA GARANTÍA EXCLUSIVA OFRECIDA POR DELTA FAUCET, QUE NO HACE CUALQUIER OTRA GARANTÍA DE CUALQUIER TIPO, INCLUYENDO CUALQUIER GARANTÍA IMPLÍCITA MERCANTIL O DE CONVENIENCIA PARA UN PROPÓSITO PARTICULAR.

Algunos estados no permiten la exclusión o limitación de daños incidentales o consecuentes, de manera que la limitación o exclusión arriba escrita pueda no aplicarle.

Esta garantía es sólo para productos comerciales de Delta Faucet y Cambridge Brass y es nula por cualquier daño causado al producto por mal uso, abuso, negligencia, accidente, instalación inapropiada, cualquier uso que viole las instrucciones proporcionadas por Delta Faucet, o cualquier uso de piezas de repuesto que no sean las genuinas de Delta Faucet.

Box 5750, 420 Burbrook Place,  
London, Ontario, Canada N6A 4L6  
Tel. 1-800-567-3300 (ENG.)  
Tél. 1-800-265-9425 (FR.)

Box 40980, 55 East 111th Street  
Indianapolis, Indiana, 46280  
Tel. (317) 848-1812  
Website: [www.deltafaucet.com](http://www.deltafaucet.com)



<b>VENDOR PART</b>	<b>VENDOR</b>	<b>DESCRIPTION</b>	<b>PAGE</b>
Z812A4-XL	Zurn	Faucet (-xl), 4" Centerset, 'a' Spout, -4 Handle (lead Free)	205

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# AQUASPEC® FAUCETS

MODEL - Z81200-XL SERIES

4" [102] CENTERSET



## TECHNICAL INFORMATION

**FLOW:** 2.2 GPM [8.3 L] PRESSURE COMPENSATING AERATOR**MAXIMUM PRESSURE:** 125 PSI**MAXIMUM TEMPERATURE:** 180°F**HANDLE NUT TORQUE:** 15-20 FT-LBS**CARTRIDGE STYLE:** QUARTER TURN CERAMIC DISK  
(CAN USE ZURN METERING CARTRIDGE)

\*OTHER AERATORS AVAILABLE BY REQUEST

**⚠ WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)**⚠ ADVERTENCIA:** Cáncer y daño reproductivo - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)**⚠ AVERTISSEMENT:** Cancer et effets néfastes sur la reproduction - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

## INSTALLATION INSTRUCTIONS

1. REMOVE FAUCET BODY FROM CARTON AND APPLY PLUMBERS PUTTY TO UNDERSIDE OF BODY
2. PLACE FAUCET ON SINK AND REMOVE MOUNTING NUTS (ITEM #7) FROM BAG G68042.
3. HAND TIGHTEN MOUNTING NUTS FROM UNDER SINK. MAKE SURE FAUCET IS CENTERED PROPERLY. DO NOT OVER TIGHTEN.
4. ATTACH LAVATORY SUPPLIES TO FAUCET WITH RISER NUTS (ITEM #8).
5. OPTIONAL: POP-UP (-P)  
GRID STRAINER (-G)  
ADA OFFSET GRID DRAIN (-GH)  
INSTALL POP-UP OR GRID STRAINER IN SINK OUTLET AND PLUMB WASTE CONNECTION.
6. INSTALL SPOUT INTO BASE AND TIGHTEN NUT (SEE VIEWS FOR SWING/RIGID CONNECTION). REFER TO "140° SWING INSTALLATION INSTRUCTIONS" FOR RESTRICTED SWING CONNECTION.
7. TURN WATER SUPPLY ON AND OPERATE FAUCET CHECKING FOR LEAKS.
8. IT MAY BE NECESSARY TO SHUT WATER OFF AND REMOVE CARTRIDGES TO CLEAN SUPPLY LINES. CARTRIDGES CAN BE REMOVED BY FIRST REMOVING THE HANDLES. COLOR INDEXES CAN BE REMOVED BY INSERTING A PIN INTO THE HOLE ON THE UNDERSIDE OF THE HANDLE. AFTER THE HANDLES HAVE BEEN REMOVED, UNSCREW THE HANDLE NUTS AND PULL UP ON THE CARTRIDGE.
9. REPLACE CARTRIDGES IN BODY AND HAND TIGHTEN HANDLE NUTS. PLACE HANDLES ON THE CARTRIDGE STEM AND LOCATE THEM AS DESIRED. TIGHTEN HANDLE NUT TO 15-20 FT-LBS OF TORQUE.
10. REPLACE HANDLE SCREWS AND COLOR INDEX BUTTONS.
11. INSTALL AERATOR INTO FAUCET AND HAND TIGHTEN. IT MAY BE NECESSARY TO UNSCREW AND CLEAN AERATOR AT START-UP.

## MAINTENANCE

1. YOUR ZURN AQUASPEC FAUCET HAS A HIGHLY POLISHED NICKEL CHROME PLATED FINISH. CLEAN WITH SOAP AND WATER OR A MILD CLEANER WHICH IS SAFE FOR CHROME PLATING. DO NOT USE ACIDS OR TOILET BOWL CLEANER AS THEY WILL DAMAGE THE FINISH.
2. AQUASPEC FAUCETS CONTAIN CERAMIC DISK CARTRIDGES WHICH REQUIRE NO MAINTENANCE. TO REMOVE THE CARTRIDGE, SHUT THE WATER OFF, LOOSEN THE HANDLE NUTS AND PULL UP ON THE CARTRIDGE.

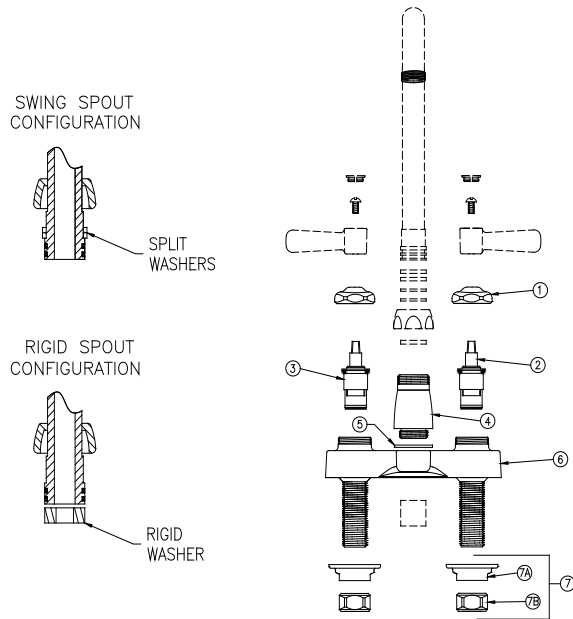
PAGE 1 OF 2



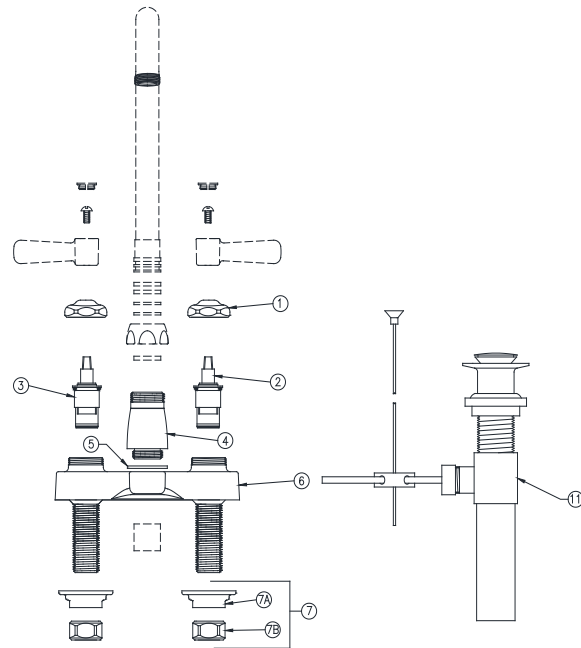
## REPLACEMENT PARTS

COLD WATER CARTRIDGE	59517005
HOT WATER CARTRIDGE	59517006
INDEX BUTTONS	G60500

Z812A1-XL PICTURED



Z812A1-XL-P PICTURED



Item	Part Number	Description	Qty.
1	59440001	Handle Nut	2
2	59517005	Short Cold Cartridge XL	1
3	59517006	Short Hot Cartridge XL	1
4	60467005	Base XL	1
5	58155019	O-Ring	1
6	60454004	4" Centerset Gooseneck Body XL	1
7	G68042	Mounting Nut	1
8	G68043	1/2" NPSM Riser Nut	1

Item	Part Number	Description	Qty.
1	59440001	Handle Nut	2
2	59517005	Short Cold Cartridge XL	1
3	59517006	Short Hot Cartridge XL	1
4	60467005	Base XL	1
5	58155019	O-Ring	1
6	60454004	4" Centerset Gooseneck Body XL	1
7	G68042	Mounting Nut	1
8	G68043	1/2" NPSM Riser Nut	1
9	60505001	Pop-up Drain Assembly	1