

Quality People. Building Solutions.

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Date: 4/11/2023

Return Request: 4/21/2023

Project: Pine Bluff – 6th Avenue Plaza

Supplier: Sanders Supply

Submittal: Plumbing Fixtures

Submittal Number: 22 00 00-01

Drawing # and Installation: Plumbing Drawings

ARCHITECT

Taggart Architects
4500 Burrow Drive
North Little Rock, AR 72116
501-758-7443

ENGINEER

Brown Engineers
17200 Chenal Parkway #300
Little Rock, AR 72223
501-448-0100

GENERAL CONTRACTOR

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Conway, AR 72032
501-505-5800

MECHANICAL SUBCONTRACTOR

Comfort Systems USA (Arkansas), Inc.
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501-834-3320

Notes:

CSUSA PROJECT NO.

23-1009

jon@comfortar.com

6th Ave District

Pine Bluff, AR

Comfort Systems USA

North Little Rock, AR

Operation & Maintenance

Sanders Supply



Hot Springs, AR

May 9, 2024

6th Street Ave District O&M

Plumbing Fixture Schedule Index

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INSTALLATION INSTRUCTIONS

American Standard

MADERA 16-1/2" HEIGHT FLUSH VALVE FLOOR MOUNTED TOILETS

Model 3461, 3462, 3463, 3464, 3465, 3466

 Meets the American Disabilities Act Guidelines and ANSI A117.1 Requirements for the Physically Challenged

Thank you for selecting American Standard – the benchmark of fine quality for over 100 years. To ensure this product is installed properly, please read these instructions carefully before you begin. (Certain installations may require professional help.) Also be sure your installation conforms to local codes.

⚠ CAUTION: PRODUCT IS FRAGILE. TWO PEOPLE ARE RECOMMENDED FOR HANDLING TO AVOID BREAKAGE AND POSSIBLE INJURY!

NOTE: For proper operation product requires a minimum of 30 psi working line pressure

RECOMMENDED TOOLS AND MATERIALS

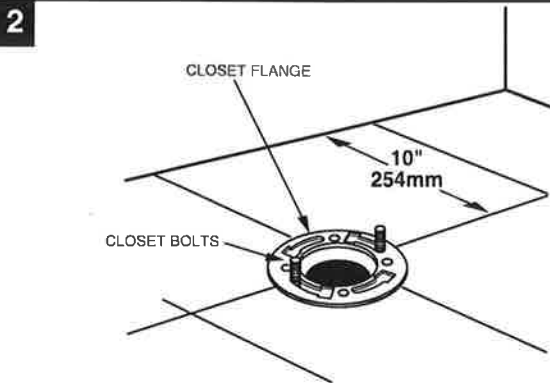
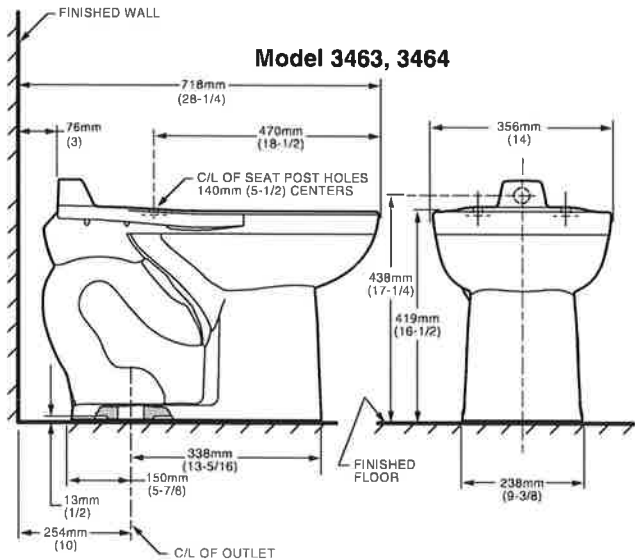
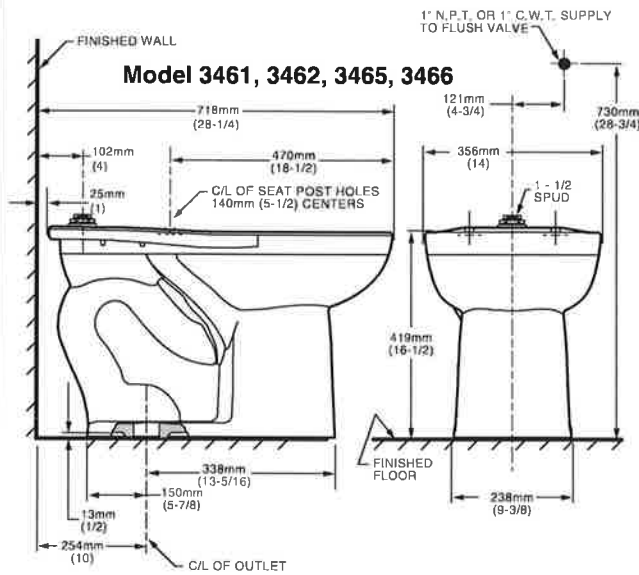
Putty Knife

Regular Screwdriver
Adjustable Wrench

Sealant
Tape Measure

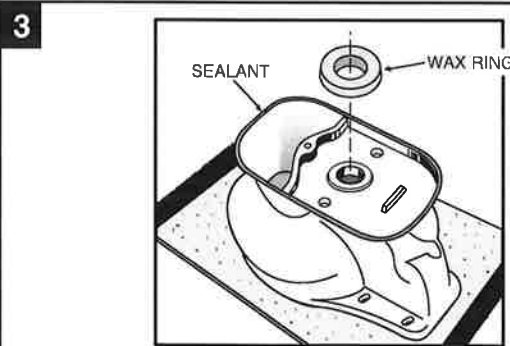
Carpenters Level
Flush Valve

1 Pictures may not exactly define contour of china



INSTALL CLOSET BOLTS

Install closet bolts in flange channel, turn 90°, and slide into place 6" (152 mm) apart and parallel to wall.

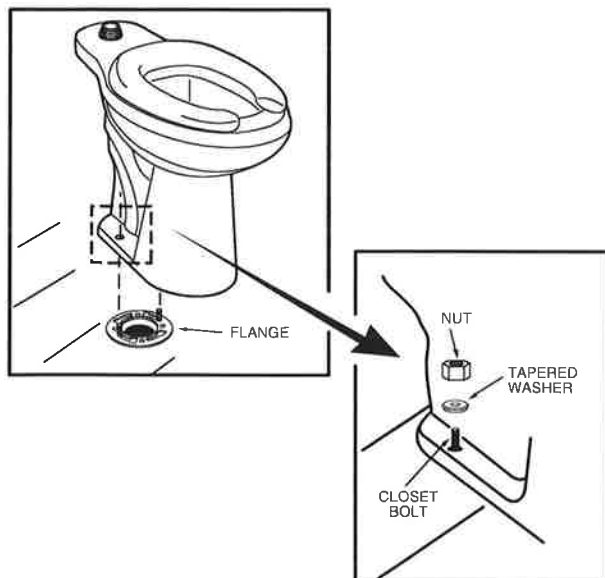


INSTALL WAX SEAL

Invert toilet on floor (cushion to prevent damage), and install wax ring evenly around waste flange (horn), with tapered end of ring facing toilet. Apply a thin bead of sealant around toilet base.

SAVE FOR FUTURE USE

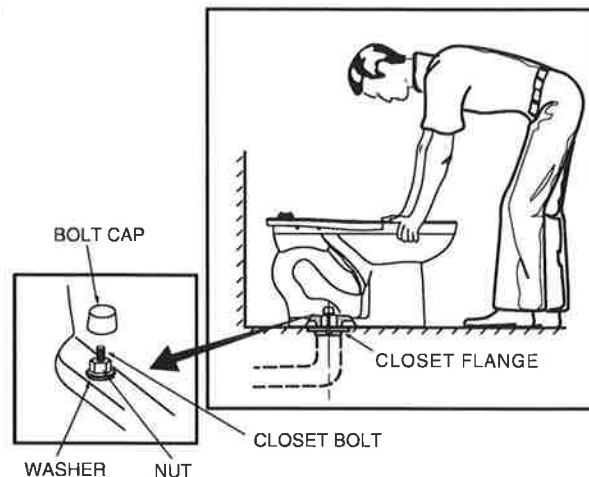
4



POSITION TOILET ON FLANGE

- Unplug floor waste opening and install toilet on closet flange so bolts project through mounting holes.
- Loosely install retainer washers and nuts. Side of washers marked "THIS SIDE UP" *must* face up!

5



INSTALL TOILET

- Position toilet squarely to wall and, with a rocking motion, press bowl down fully on wax ring and flange. Alternately tighten nuts until toilet is firmly seated on floor.



CAUTION:

DO NOT OVERTIGHTEN NUTS
OR BASE MAY BE DAMAGED!

- Install caps on washers. (If necessary, cut bolt height to size before installing caps.)
- Smooth off the bead of sealant around base. Remove excess sealant.

AMERICAN-STANDARD ONE-YEAR LIMITED WARRANTY

If inspection of this American-Standard plumbing product, within one year after its initial installation, confirms that it is defective in materials or workmanship, American-Standard will repair or, at its option, exchange the product for a similar model.

This warranty **does not apply** to local building code compliance. Since local building codes vary considerably, the purchaser of this product should check with a local building or plumbing contractor to insure local code compliance before installation.

This warranty **shall be void** if the product has been moved from its initial place of installation; if it has been subjected to faulty maintenance, abuse, misuse, accident or other damage; if it was not installed in accordance with American-Standard's instructions; or if it has been modified in a manner inconsistent with the product as shipped by American-Standard.

American-Standard's option to repair or exchange the product under this warranty does not cover any labor or other costs of removal or installation, **nor shall American-Standard be responsible for any other incidental or consequential damages attributable to a product defect or to the repair or exchange of a defective product, all of which are expressly excluded from this warranty.** (Some states or provinces do not allow the exclusion or limitation of implied warranties, so this exclusion may not apply to you.)

This warranty gives you specific legal rights. You may have other statutory rights that vary from state to state or from province to province, in which case this warranty does not affect such statutory rights.

For service under this warranty, it is suggested that a claim be made through the contractor or dealer from or through whom the product was purchased, or that a service request (including a description of the product model and of the defect) be sent to the following address:

In the United States:
American Standard Inc.
P.O. Box 6820
Piscataway, New Jersey 08855
Attention: Director of Consumer Affairs

For residents of the United States, warranty information may also be obtained by calling the following toll free number: (800) 442-1902
www.americanstandard-us.com

In Canada:
American-Standard
2480 Stanfield Road
Mississauga, Ontario
Canada L4Y 1S2

Toll Free: (800) 387-0369
www.americanstandard.ca

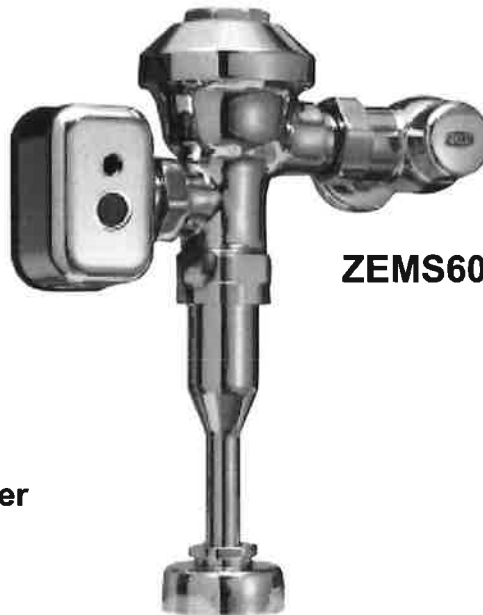
In Mexico:
Customer Service Manager
Ideal Standard, S.A. de C.V.
Via Morelos #330
Col. Santa Clara
Ecatepec 55540 Edo. Mexico
www.americanstandard.com.mx



AquaSense® AV
ZEMS-IS Series w/ HW6 Power
Converter
Automatic Sensor-Operated Exposed
Flushometer
Installation, Operation, Maintenance
and Parts Manual



ZEMS6000AV-IS



ZEMS6003AV-IS

Sensor Operated Exposed Flushometer
ZEMS6000AV-IS Closet
ZEMS6003AV-IS Urinal

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

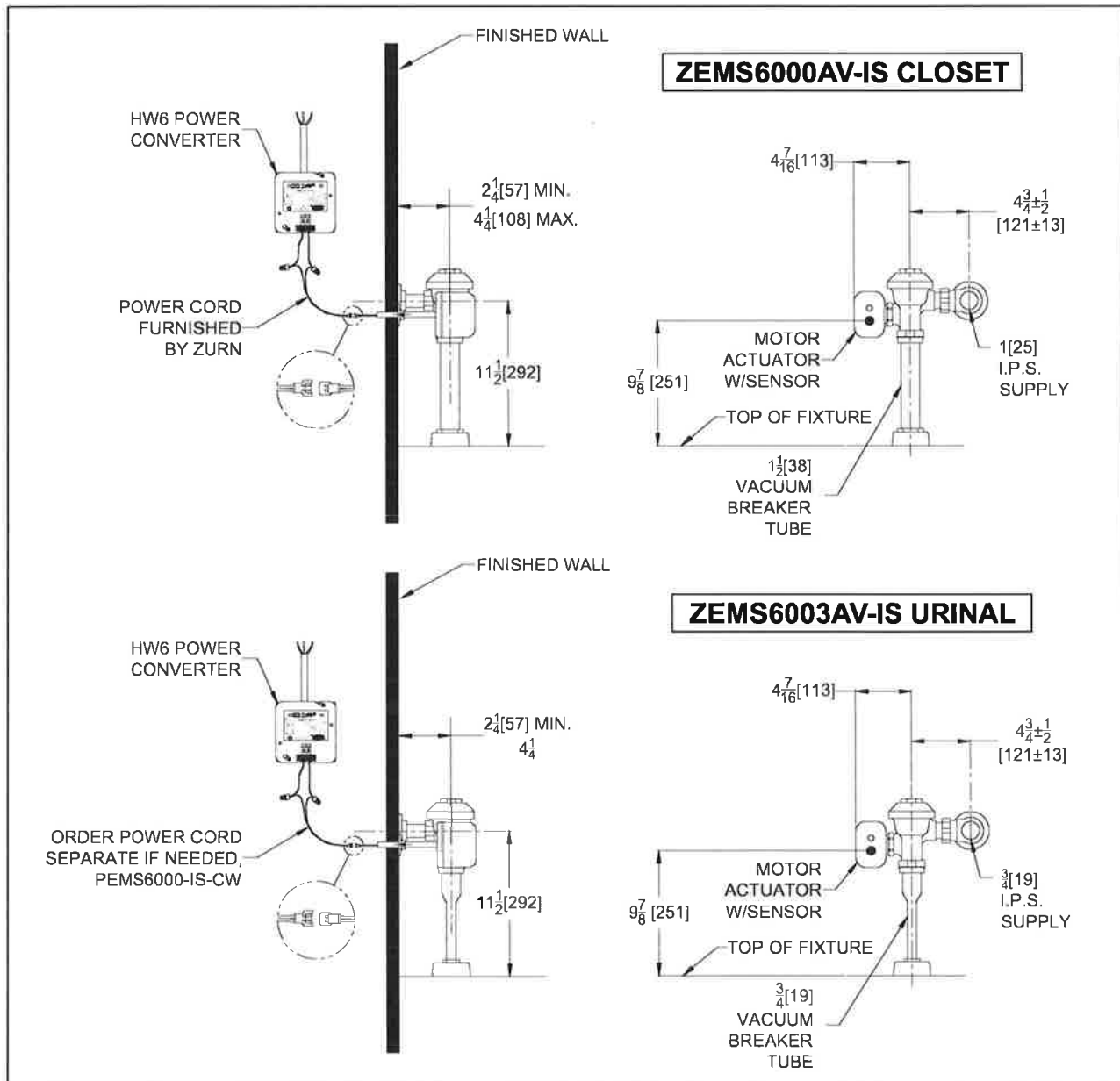
PRIOR TO INSTALLATION

Prior to installing the Zurn Automatic Sensor-equipped Flushometer, install the items listed below.

- All plumbing is to be installed in accordance with applicable codes and regulations.
- Water supply lines must be sized to supply 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.

The Zurn AquaVantage® valve is designed to operate over the entire pressure range recommended by plumbing fixture manufacturers and will produce a metered flush when activated.

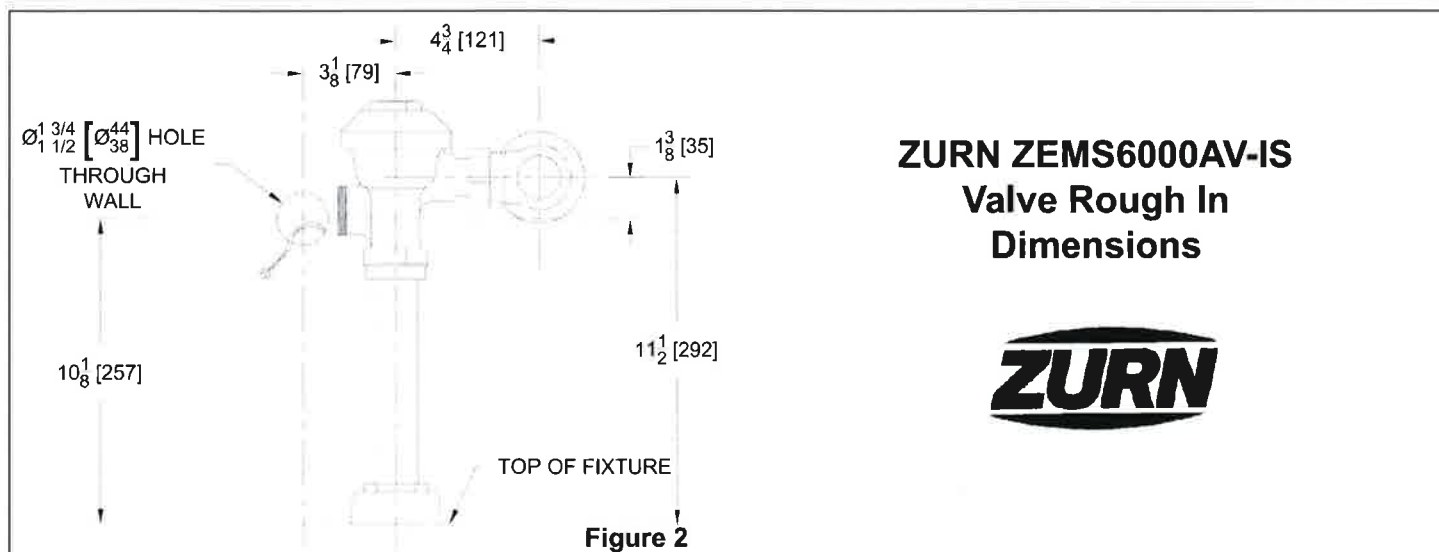
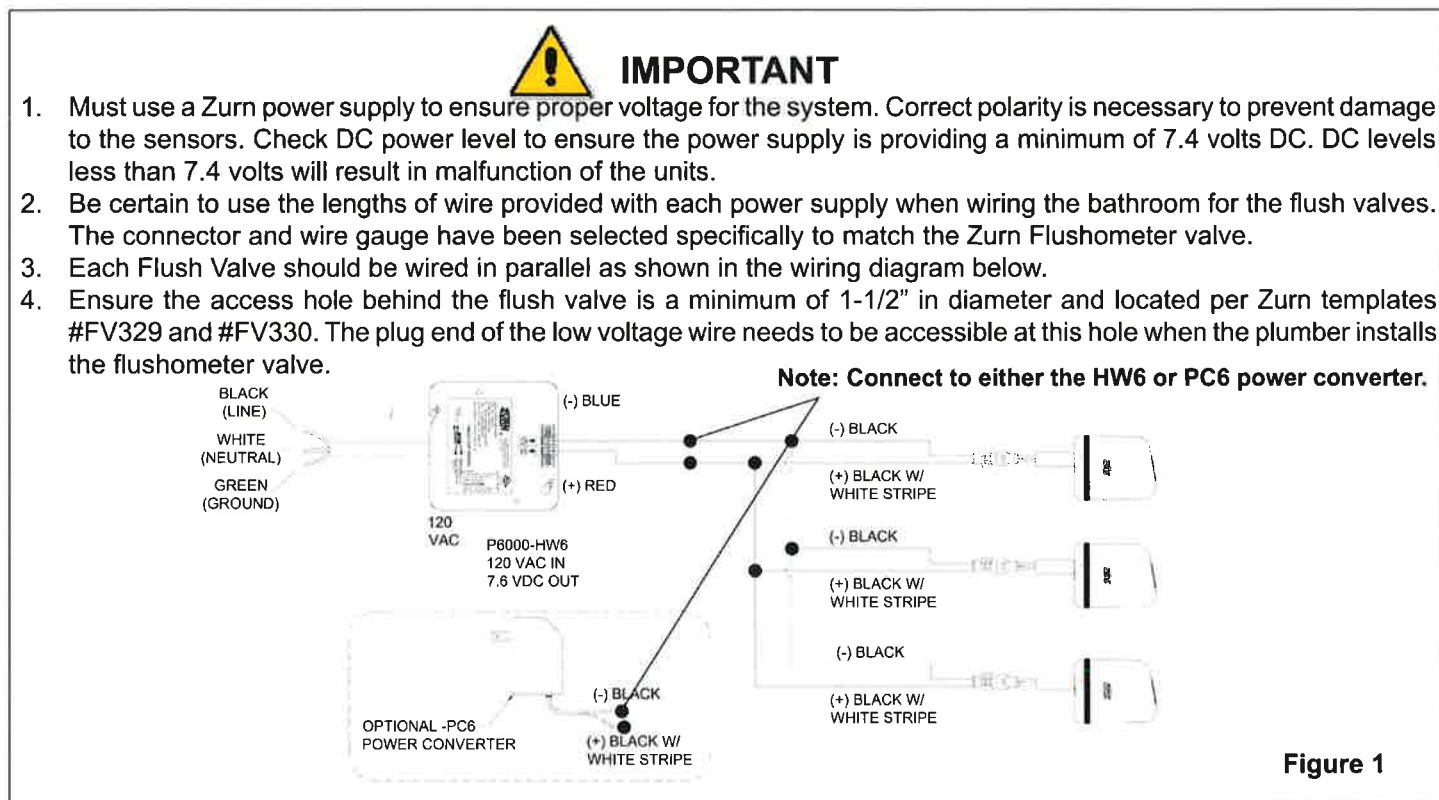
Protect the chrome or special finish of this AquaVantage® valve. **Do not use toothed tools to install or service the valve.** Also, see "Care and Cleaning" section of this manual.



TYPICAL INSTALLATION

HW6 Power Converter Installation (STEPS 1-4)

- The Zurn HW6 Power Converter shall be installed in accordance with National/Local electrical codes.
- The HW6 is shipped intergrated within a 4 11/16" X 4 11/16" X 2 1/8" electrical box.
- It is advisable to install the HW6 power supply in an accessible location, as close as possible to the flush valves it will power. Ideal location is behind an access panel, in a pipe chase, or above a drop ceiling. The greatest distance to any valve shall ideally be less than 20 ft., (40 ft. max.).
- The Zurn-HW6 Power Converter shall be direct wired with continuous 120VAC, 60Hz from the building supply.
- The HW6 can be used to power up to 8 ZEMS-IS flush valves.
- Enclosed with each valve is 1 (one) connecting wire to power ZEMS-IS actuator.
- The wire shall be wire nut connected to the low voltage red (+) and blue (-) leads from the power supply as shown in (Figure 1).
- The connecting wire is polarized. The black lead with white trace is (+) and connects to the red wire from the power supply. The plain black lead is (-) and connects to the blue lead on the power supply. **Do not cross wires as it will cause damage to the product!**
- Connecting wire shall be run from the power supply to the predrilled 1-1/2" diameter holes in the finished wall for final connection to the flush valves. (Figure 2)



STEP 5 - Control Stop Installation (Figure 5)

Install the Zurn control stop valve and wall escutcheon to the water supply line with the outlet positioned as required.

NOTE: For sweat solder applications, see recommended instructions included in the Zurn sweat solder kit.

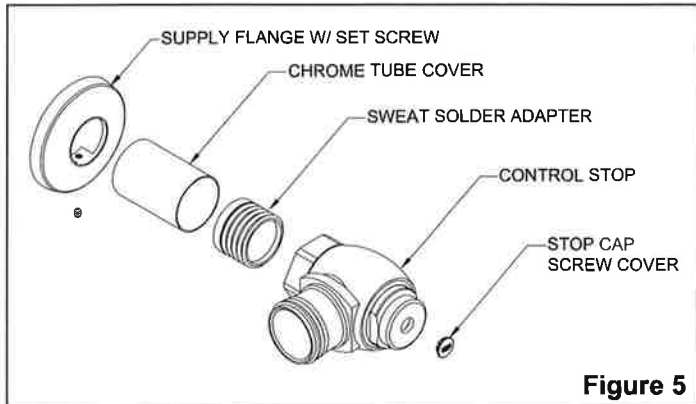


Figure 5

STEP 6 - Vacuum Breaker Flush Connection (Figure 6)

Place vacuum breaker and vacuum breaker disc in tube as shown. Slide the tube nut, spud nut, slip washer, rubber gasket and spud escutcheon over the vacuum breaker tube and insert tube into fixture spud. Hand tighten spud nut on to fixture spud.

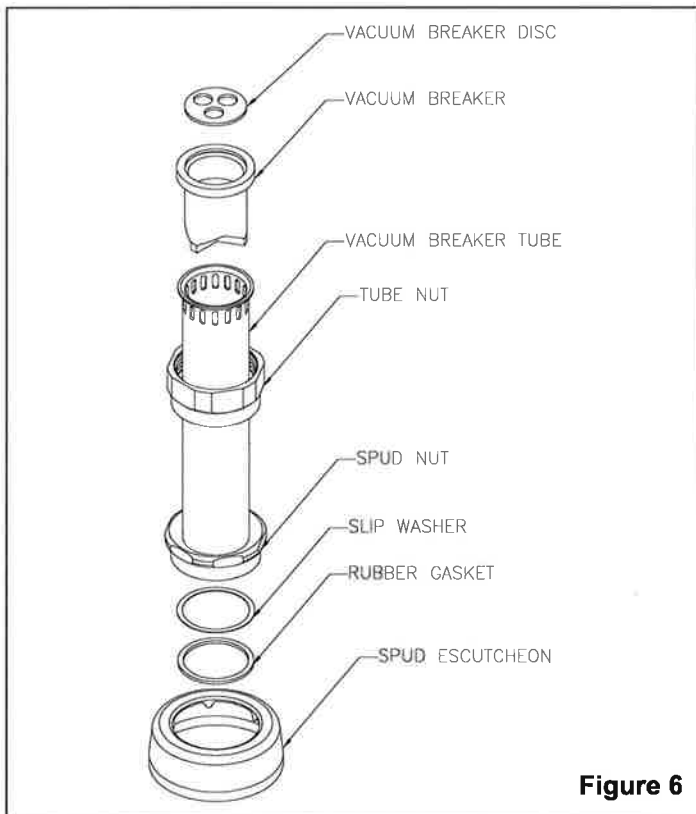


Figure 6

STEP 7 - Valve Installation (Figure 7)

Install valve to control stop with the bottom of the valve tilted slightly up towards you and leave the valve nut loose. Make sure not to damage o-ring on valve. Make sure vacuum breaker and vacuum breaker disc are properly installed within the flush tube. Rotate valve down over vacuum breaker tube and tighten tube nut to valve. After tube nut is tight, tighten valve nut to control stop.

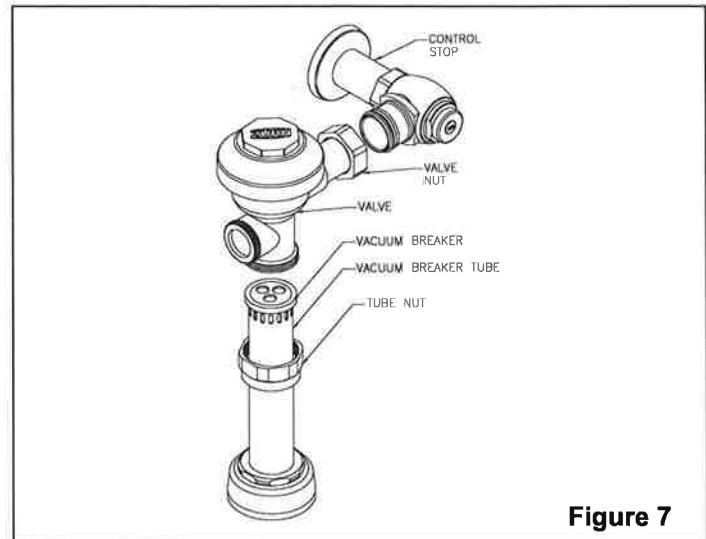


Figure 7

STEP 8 - Actuator Installation (Figure 8)

Slide wall flange over the chrome cover tube as shown. Connect the plug connector on the ZEMS-IS actuator with the DC power plug located within the access hole just behind the flush valve. Carefully tuck the wires back into the access hole. Install handle gasket into actuator nut and tighten actuator to valve. Push wall flange against wall and tighten set screw.

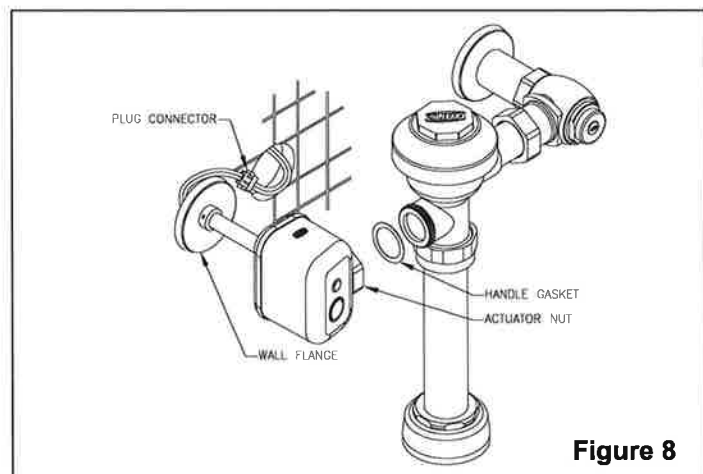


Figure 8

STEP 9 - Flush Out Supply Line (Figure 8)

Close control stop. Remove valve body cover and lift out trip mechanism. Reinstall internal cap and valve body cover. Turn on water supply to flush line of any debris or sediment. After completion, shut off control stop, remove cover and reinstall the trip mechanism. Install the internal cap and valve body cover wrench tight.

STEP 10 - CUSTOMIZED SENSOR RANGE SETTING

The ZEMS-IS 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-IS model. NOTE: If your ZEMS-IS actuator has a rubber override button, consult your local Zurn representative for customized sensor range setting procedure. 1-800-997-3876.

CALIBRATION INSTRUCTIONS FOR ZEMS-IS III

1. Obtain a target. SEE FIGURE 11.
2. PRESS and HOLD button for 10 seconds * 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.
7. Keep target steady - Unit will blink while calibrating.
8. After 15 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.
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.

STEP 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.

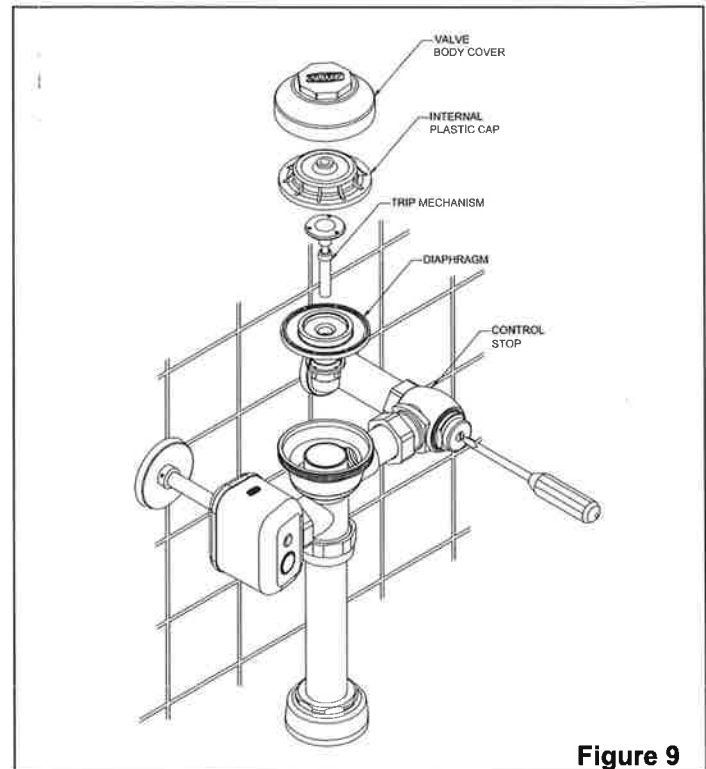


Figure 9

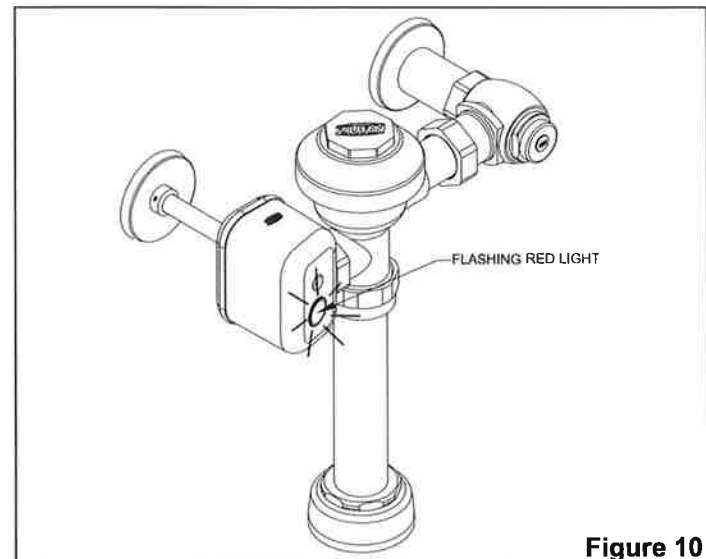


Figure 10

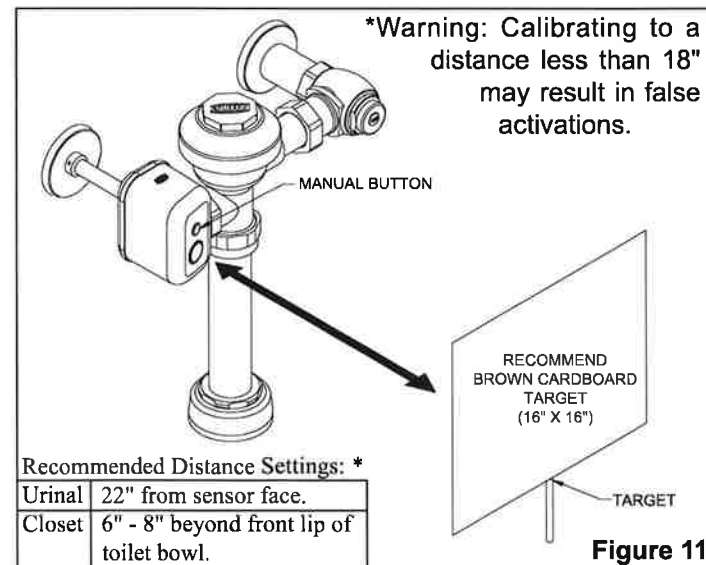


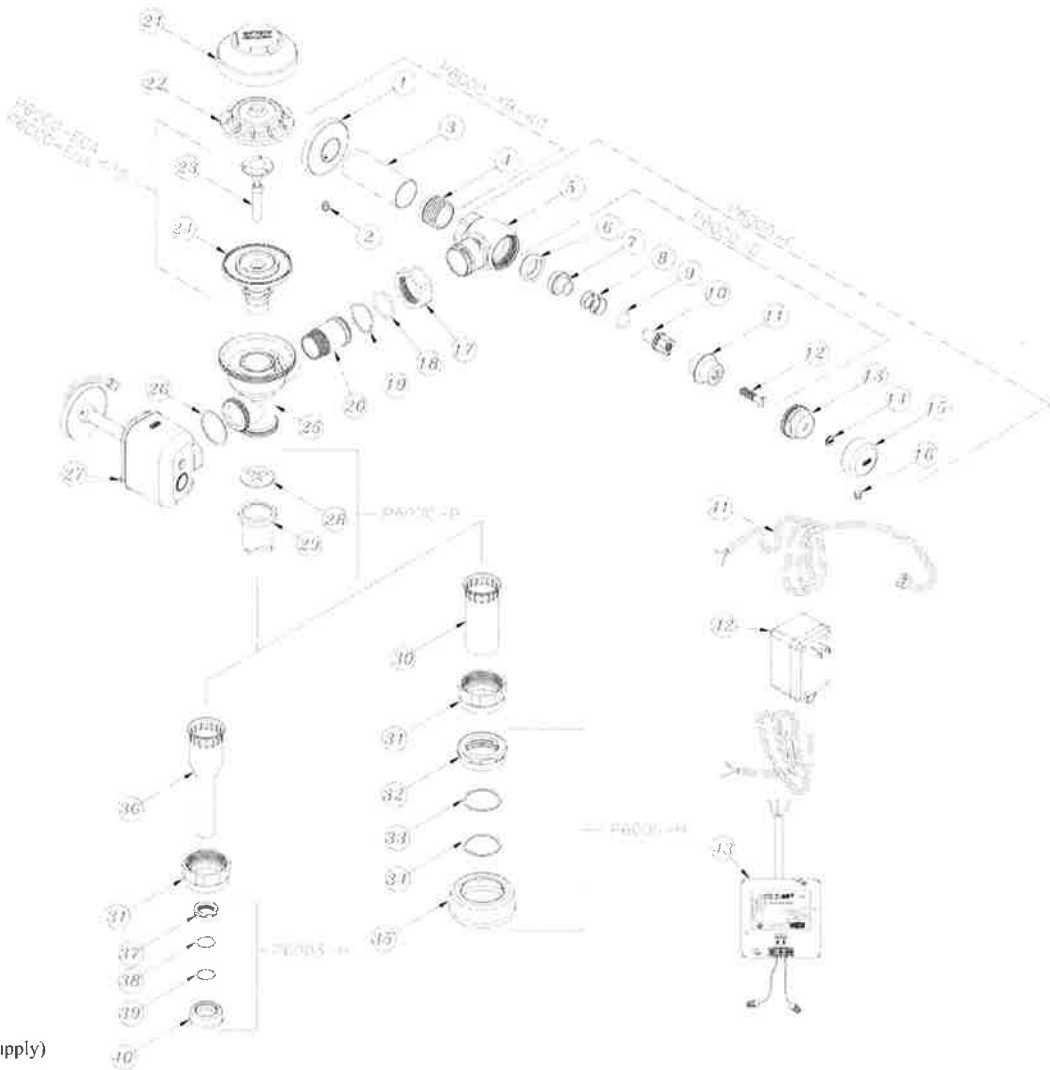
Figure 11



Aquavantage ZEMS-IS Parts Breakdown

Parts Identification

1. Cast Wall Escutcheon
2. Setscrew for Cast Wall Escutcheon
3. Supply Cover Tube
4. Sweat Solder Adapter
5. Stop Body
6. Piston Seal
7. Piston
8. Stop Spring
9. Guide O-Ring
10. Piston Guide
11. Guide Holder
12. Adjusting Screw
13. Stop Cap
14. Snap Cap Screw Cover
15. Vandal-Resistant Control Stop Cover
16. Setscrew for Control Stop Cover
17. Locking Nut
18. Tailpiece O-Ring
19. Snap Ring
20. Tailpiece
21. Valve Body Cover
22. Plastic cover
23. Trip Mechanism
24. Diaphragm Repair Kit
25. Valve Body
26. Gasket
27. ZEMS-IS Actuator Assembly
28. Vacuum Breaker Disc
29. Vacuum Breaker
30. 1-1/2" Vacuum Breaker Tube
31. Vacuum Breaker Tube Nut
32. 1-1/2" Spud Nut
33. 1-1/2" Spud Friction Washer
34. 1-1/2" Spud Sleeve
35. Spud Escutcheon
36. 3/4" Vacuum Breaker Tube
37. 3/4" Spud Nut
38. 3/4" Spud Friction Washer
39. 3/4" Spud Sleeve
40. 3/4" Spud Escutcheon
41. Power Cord
42. 120 VAC/6 VDC Plug-in Power Converter (Un-Regulated)
43. Power Converter P6000-HW6 (Regulated Supply)



Covers and Repair Kits	Product No.
Outside Cover - Item 21	P6000-LL
Inside Cover - Item 22	P6000-L
High Efficiency Closet Kit - 1.28 gal. flush	P6000-ECA-HET
Low Consumption Closet Kit - 1.6 gal. flush	P6000-ECA-WS1
Water Saving Closet Kit - 3.5 gal. flush	P6000-ECA-WS
Full Flow Closet Kit - 4.5 gal. flush	P6000-ECA-FF
Ultra Low Flow Urinal Kit - 0.125 gal. flush	P6000-EUA-ULF
Low Consumption Urinal Kit - 1.0 gal. flush	P6000-EUA-WS1
Water Saving Urinal Kit - 1.5 gal. flush	P6000-EUA-WS
Full Flush Urinal Kit - 3.0 gal. flush	P6000-EUA-FF

Repair Parts - Inside Parts	Product No.
Urinal Trip Mechanism - Item 23	P6000-EUA13
Closet Trip Mechanism - Item 23	P6000-ECA13

Aquavantage Rebuild Kits	Product No.
Closet and Urinal Rebuild Kits Include Items 18, 23, 24, 26, 28, 29	P6000-ECA-WS-RK
	P6000-ECA-WS1-RK
	P6000-ECA-HET-RK
	P6000-EUA-WS-RK
	P6000-EUA-WS1-RK
	P6000-EUA-ULF-RK

Actuator Assembly and Repair Kits	Product No.
Outside Cover - Item 21	PEMS6000-HYM-IS
Power Cord (Item 41)	PEMS6000-CW
120 VAC/7.6 VDC Plug-in Power Converter (Item 42)	P6000-PC6
Power Converter (Item 43)	P6000-HW6
Handle Gasket Includes Item 26	P6000-M10

Control Stop Repair Kit and Parts	Product No.
Control Stop Repair Kit for 1" and 3/4", Includes Items 6-12	P6000-D-SD
Seal Seat for 1" and 3/4", Includes Item 6	P6000-D42
Sweat Solder Adapter	P6000-YBA

Adjustable Tailpieces	Product No.
Adjustable Tailpiece for Standard Flush Valve Includes Items 18-20	P6000-J1
Tailpiece Locking Ring Includes Item 19	P6000-C30
Tailpiece O-Ring Includes Items 18	P6000-C31
Coupling Nut Includes Item 17	P6000-C32

Flush Connections and Spud Coupling Kits	Product No.
1-1/2" Flush Connection and Spud Coupling	P6000-H
3/4" Flush Connection and Spud Coupling	P6003-H
Vacuum Breaker Repair Kit Includes Items 28, 29	P6000-B
Spud Coupling Assembly (Specify Size)	P6000-HN



ZEMS-IS AQUAVANTAGE TROUBLE SHOOTING

Problem	Cause*	Corrective Action*
Valve will not operate.	<ol style="list-style-type: none"> 1.) Stop valve is closed 2.) Supply valve is closed. 	<ol style="list-style-type: none"> 1.) Open Stop valve. 2.) Open supply valve.
Insufficient volume of water to adequately flush fixture.	<ol style="list-style-type: none"> 1.) Stop valve not open enough. 2.) Urinal trip mechanism installed in closet kit. Urinal kit installed in closet valve, or 1.0 gal. urinal kit installed in place of 1.5 gal urinal kit. 3.) Insufficient volume or pressure at supply. 	<ol style="list-style-type: none"> 1.) Open stop valve for desired volume of water. 2.) Install appropriate parts or kit. 3.) If gauges are not available to measure supply pressure or volume of water at the valve, completely remove the working parts and open the stop valve to allow water to pass through the empty valve. If the water supply proves unsatisfactory, steps should be taken to increase the pressure and/or supply.
Flush valve does not activate after user leaves.	<ol style="list-style-type: none"> 1.) Sensor does not recognize a user. 2.) Power supply may be disrupted. 	<ol style="list-style-type: none"> 1.) Re-calibrate sensor per step 10. 2.) Check available voltage where escutcheon is attached to wall with DC voltmeter. 7.4-9 VDC is required.
Flush valve shuts off too quick.	<ol style="list-style-type: none"> 1.) Damaged or punctured diaphragm. 2.) Enlarged by-pass orifice. 3.) Cylinder guide assembly and diaphragm assembly are not tight. 4.) Enlarged by-pass orifice. 5.) Urinal trip mechanism (black) in closet flush valves. 	<ol style="list-style-type: none"> 1.) Install new replacement kit to remedy the problem. 2.) Install new replacement kit to remedy the problem. 3.) Screw the two assemblies hand tight. 4.) Install new Z6000-ECA, Z6000-EUA replacement kit to remedy the problem. 5.) Install closet trip mechanism (white).
Valve activates repeatedly when power is provided.	<ol style="list-style-type: none"> 1.) Insufficient DC power level (less than 7.4 volts DC) 	<ol style="list-style-type: none"> 1.) Upgrade the -HW6 power supply to the new ZURN power supply (greater than 7.4 volts DC) or replace the PC6 supply.
Valve is flushing too long or not shutting off.	<ol style="list-style-type: none"> 1.) Trip mechanism not seating properly due to foreign material between trip mechanism and retainer disc. 2.) By-pass orifice is plugged or partially plugged. 3.) Line pressure is not adequate to force trip mechanism to seal. 4.) Cracked cover. 	<ol style="list-style-type: none"> 1.) Disassemble parts and rinse thoroughly. 2.) Examine by-pass orifice and clean if necessary being certain not to enlarge orifice opening. 3.) Pressure is inadequate or has dropped below minimum operating range. Steps should be taken to increase the line pressure. 4.) Replace cover with new one.
Water splashes out of fixture.	<ol style="list-style-type: none"> 1.) Supply volume is more than is necessary. 2.) Lime accumulation on vortex or spreader holes of fixture. 	<ol style="list-style-type: none"> 1.) Adjust downward on control stop. 2.) Remove the lime build up within the fixture.
Flush is not considered quiet.	<ol style="list-style-type: none"> 1.) Control stop may not be adjusted for quiet operation 2.) Fixture may be contributing to noise 3.) Piping system may be source of noise. 	<ol style="list-style-type: none"> 1.) Adjust the control stop for quiet operation keeping in mind the fixture evacuation requirements. 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.) High pressure in the system can sometimes be controlled by the stop valve. Other sources of noise may be the absence of air chambers and shock arrester, 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.	<ol style="list-style-type: none"> 1.) Lens may be dirty. 2.) Power supply output is out of tolerance. 3.) Sensor is viewing stall door. 	<ol style="list-style-type: none"> 1.) Clean lens. 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.) Re-calibrate sensor per step 10.
Sensor assembly leaking	<ol style="list-style-type: none"> 1.) Sensor assembly is not tight. 	<ol style="list-style-type: none"> 1.) Tighten sensor assembly.

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 itself.



Rev. T | Date: 11/11/22 | C.N. No. 144844 | Prod./Dwg. No. FV343

Patent zurn.com/patents

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Warranty

Warranty Statement

All products are guaranteed against defects in material and workmanship for a period of one (1) year from date of purchase.

This guarantee does not apply to any compression molded wood, solid wood, decorator, or economy residential plastic toilet seats used in nonresidential installations, including hotels and motels. This guarantee does not apply to any toilet seats which are modified in any way or used on any type of installation or unit other than conventional water closets. We assume no liability for toilet seats modified or installed on anything other than conventional water closets.

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P-2

INSTALLATION INSTRUCTIONS CARE AND MAINTENANCE



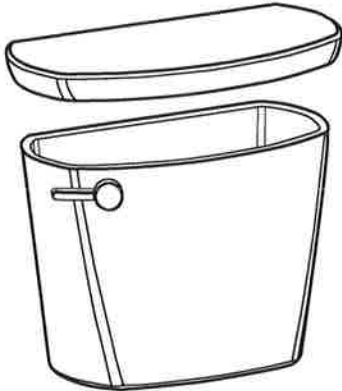
Cadet® PRO 2-piece Toilet Elongated and Round Front

Models 215AA, 215BA, 215AB, 215BB, 215FA, 215FC, 215CA, 215DA, 215CB, 215DB Series

Thank you for selecting American Standard - the benchmark of fine quality for over 100 years. To ensure this product is installed properly, please read these instructions carefully before you begin. (Certain installations may require professional help.) Also be sure your installation conforms to local codes.

⚠ CAUTION: PRODUCT IS FRAGILE. TO AVOID BREAKAGE AND POSSIBLE INJURY HANDLE WITH CARE!
NOTE: Pictures may not exactly define contour of china and components.

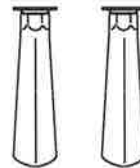
TANK 4188A and 4188B



EZ-INSTALL KIT INCLUDED WITH TANK



Tank To Bowl Gasket



Attachment Handles with Nuts (2)



Plastic Washers (2)

BOWL 3517A, 3517C, 3517F ELONGATED BOWL 3517B, 3517D ROUND FRONT



EZ-INSTALL KIT INCLUDED WITH BOWL



T-Bolts with Retainer (2)

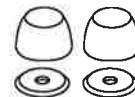


Bolt Caps (2)

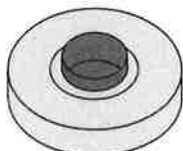


Bowl-To-Floor Knobs (2)

Also includes Standard Bolt Caps (2)



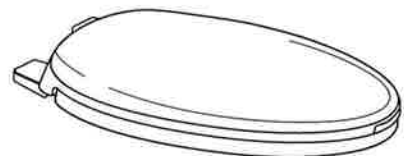
SOLD SEPARATELY



Wax Ring



Water Supply Line



Slow Close Toilet Seat

S A V E F O R F U T U R E U S E



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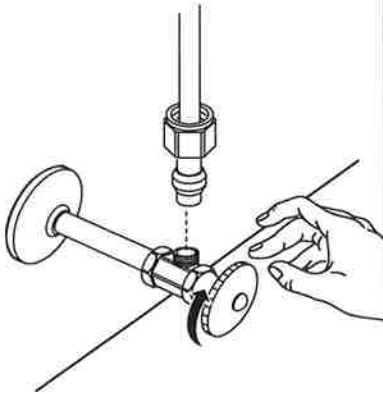
7301878-100 Rev. 4 8/19

7301878-100R4

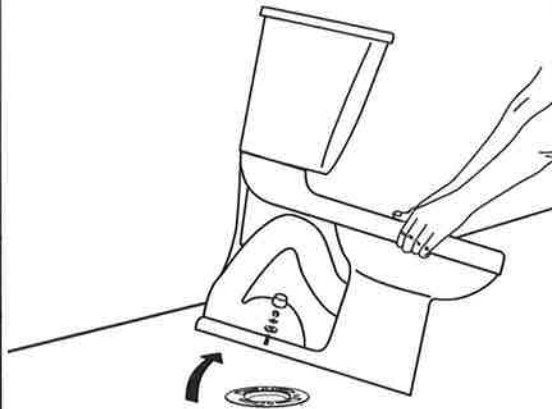
BEFORE YOU START:

If Removing An Existing Toilet

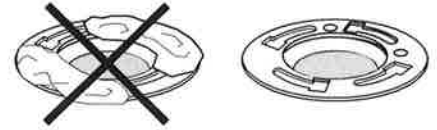
Turn Off Water Supply



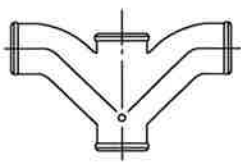
Flush to remove water from tank; sponge remaining water from bowl before removing toilet.



Clean Flange



⚠ Caution: If leaving floor flange open for more than 1-2 hours, cover flange to prevent escaping sewer gases.



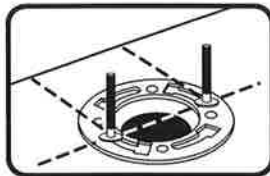
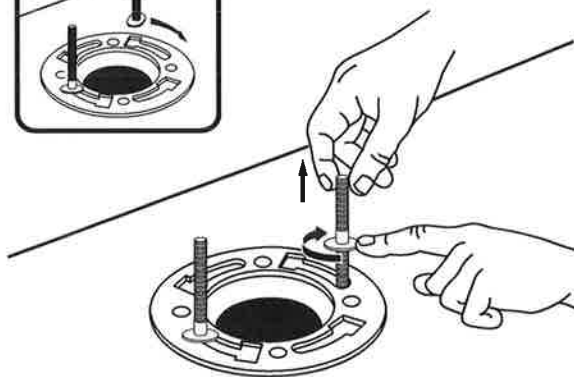
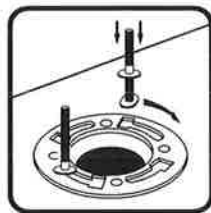
Recommended fitting type for back-to-back installations.

BACK-TO-BACK INSTALLATION

Depending upon your plumbing and venting conditions, the flow from the toilet in a back-to-back installation may create a vacuum on the system and draw water from the opposing bowl. The National Standards Plumbing Code prohibits the use of a cross fitting for drainage as throw over is possible. The code does approve a directional "Y" style fitting with proper venting to direct the water downward and away from the other toilet.

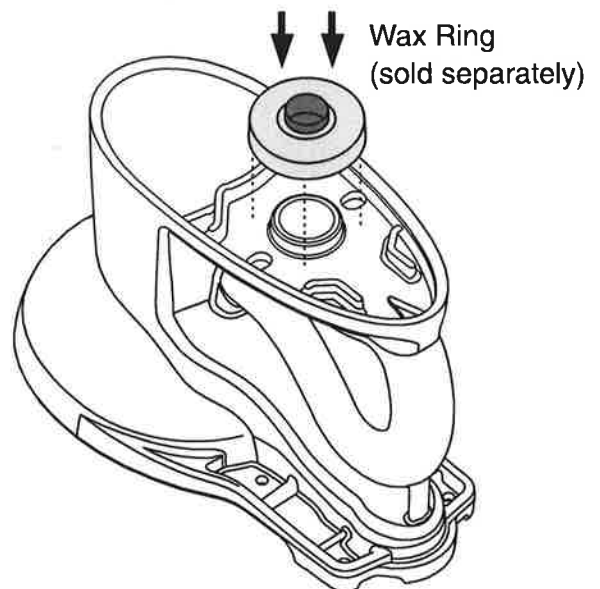
INSTALLATION INSTRUCTIONS:

1



2

Press firmly.



NOTE: 1/4" EZ-BOLTS INCLUDED.

IF 5/16" BOLTS ARE REQUIRED, PURCHASE SEPARATELY.

3

Apply weight evenly. Do not move after placement. Water tight seal may break.

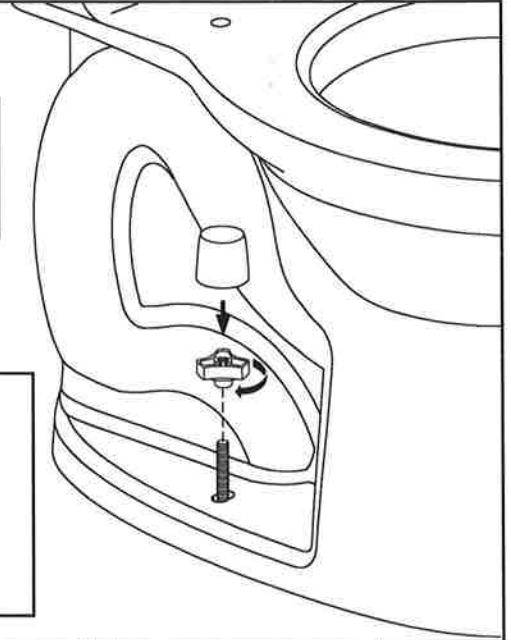


4

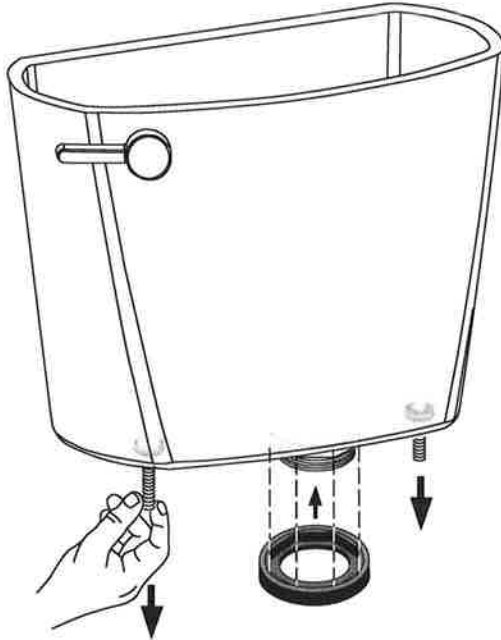
⚠ Hand tighten only. Do not overtighten.

NOTE: 1/4" EZ-BOLT AND CAP SHOWN.

IF 5/16" BOLT USE STANDARD DISK AND CAP INCLUDED.



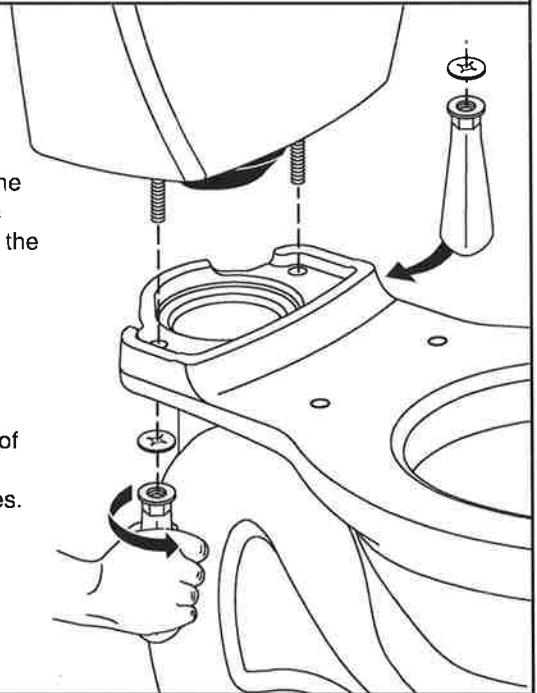
5



6

Tighten handles alternately until the tank contacts the front and back of the bowl achieving china-to-china contact.

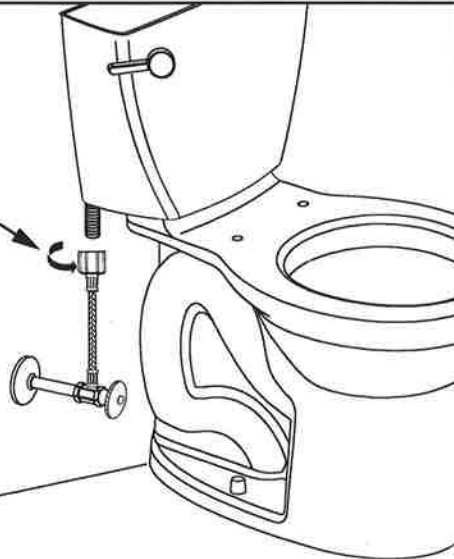
NOTE: To ease installation, push down on the top of the tank while tightening handles.



7

(A) Connect water supply line. (Sold separately) Hand tighten nut.

(B) Turn on water supply.

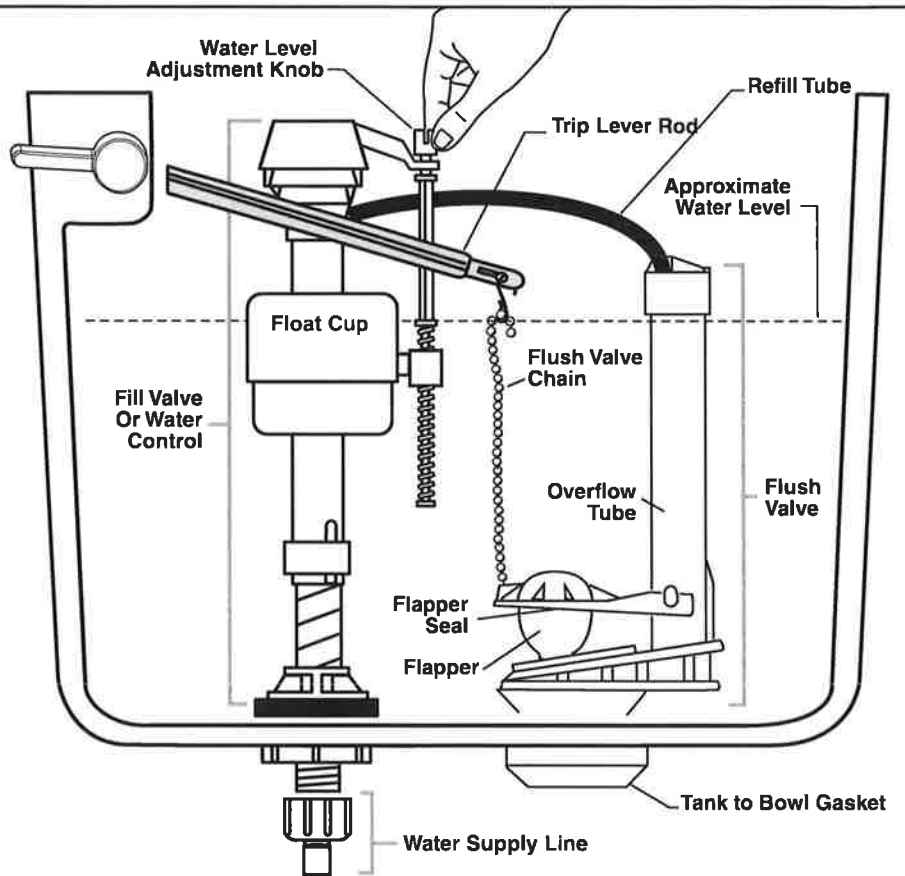
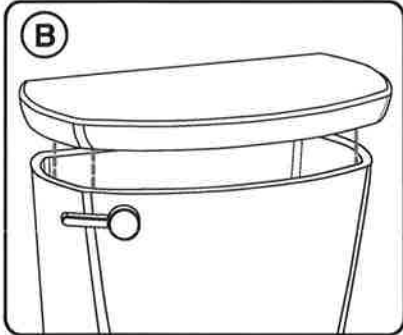


WARNING: Overtightening of water supply line nuts could result in breakage and potential flooding. If the connection leaks after hand tightening, replace the supply line. Do not use any type of sealant on the water supply connection. Use of plumber's putty, pipe dope, or any other type of sealant will void the warranty.

A

Adjust water level to level indicated on tank by turning water level adjustment knob to move float cup up or down.

B



CARE AND CLEANING

When cleaning your toilet, wash it with mild, soapy water, rinse thoroughly with clear water and dry with a soft cloth.

WARNING: Do not use in-tank cleaners. These products can seriously corrode fittings in the tank. This damage can cause leakage and property damage. American Standard shall not be responsible or liable for any damage caused by the use of in-tank cleaners.

TROUBLESHOOTING GUIDE - See Step 8 For Diagram

Problem	Possible Cause	Corrective Action
Does not flush	<ul style="list-style-type: none"> a. Water supply valve closed. b. Supply line blocked. c. Flush valve chain too loose or disconnected. d. Sand or debris lodged in water control. 	<ul style="list-style-type: none"> a. Open valve and allow water to fill tank. b. Shut off water supply, disconnect supply line and inspect all gaskets and washers. Reassemble. c. Readjust chain length as required. d. Shut off water supply. Remove cap and clean as per Fluidmaster maintenance instructions at: www.americanstandard-us.com/enews/fluidmasterguide.pdf
Poor or sluggish flush	<ul style="list-style-type: none"> a. Bowl water level too low. b. Supply valve partly closed. c. Partially clogged trapway and/or drain pipe and/or vent. d. Supply pressure too low. 	<ul style="list-style-type: none"> a. Check that refill tube is connected to water control and inserted into overflow tube without being kinked or damaged. b. Open supply valve fully. Be sure that proper supply tube size is used. c. Remove obstruction. Consult a plumber if necessary. d. Normal supply pressure must be at least 20 psi.
Toilet leaks	<ul style="list-style-type: none"> a. Poor supply line connection. b. Poor bowl to tank/floor connection. 	<ul style="list-style-type: none"> a. Review Step 7 of installation procedure. b. Review Step 1 through 6 of installation procedure.
Toilet does not shut off	<ul style="list-style-type: none"> a. Flapper seal leaking or deformed. b. Sand or debris lodged in water control. c. Flush valve chain too tight, holding flapper open. 	<ul style="list-style-type: none"> a. Clean debris from seal surface. Replace flapper seal as needed. See web for more info. b. Shut off water supply. Remove cap and clean as per Fluidmaster maintenance instructions at: www.americanstandard-us.com/enews/fluidmasterguide.pdf c. Readjust chain length as needed.
Toilet bowl rocks after installation	<ul style="list-style-type: none"> a. Wax ring not fully compressed. b. Floor not level. 	<ul style="list-style-type: none"> a. Retighten bowl-to-floor knobs. b. Use toilet shims and /or place a bead of caulk around the base of the toilet.

In the United States:

American Standard Brands
1 Centennial Ave
Piscataway, New Jersey 08854
Attention: Director of Customer Care
For residents of the United States, warranty information may also be obtained by calling the following toll free number: (800) 442-1902
www.americanstandard.com

In Canada:

LIXIL Canada, ULC
5900 Avebury Rd.
Mississauga, Ontario
Canada L5R 3M3
Toll Free: (800) 387-0369
www.americanstandard.ca

In Mexico:

American Standard B&K Mexico
S. de R.L. de C.V.
Via Morelos #330
Col. Santa Clara
Ecatepec 55540 Edo. Mexico
Toll Free: 01-800-839-1200
www.americanstandard.com.mx

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[Spec Catalog](#)

[Features & Benefits Videos](#)

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[Warranty](#)

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Warranty

Warranty Statement

All products are guaranteed against defects in material and workmanship for a period of one (1) year from date of purchase.

This guarantee does not apply to any compression molded wood, solid wood, decorator, or economy residential plastic toilet seats used in nonresidential installations, including hotels and motels.

This guarantee does not apply to any toilet seats which are modified in any way or used on any type of installation or unit other than conventional water closets. We assume no liability for toilet seats modified or installed on anything other than conventional water closets.

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P-3

Product Specs Sheets

Cover Page

Unlimited 60

Features

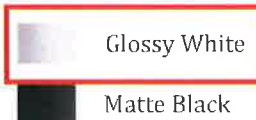
- Bathroom Sink
- Made of Ceramic
- Available in 2 Finishes: Glossy White and Matte Black
- With Overflow
- Wall Mount or Countertop (Vessel) Installation
- Available with One, Three (4" or 8" Spread), or No Faucet Hole
- Available with Soap Dispenser Hole Option to the Left or Right of Faucet Hole
- Made in Italy



Related Items:

- WSBC 53991 | Push Waste Drain
- WSBC 53922 | Decorative Trap

Finishes:



SKU# | Options:

- ~~Unlimited 60.00 WG | No Faucet Hole, Glossy White~~
- Unlimited 60.01 WG | Single Faucet Hole, Glossy White
- ~~Unlimited 60.02-4 WG | Three Faucet Hole 4" Spread, Glossy White~~
- Unlimited 60.03-8 WG | Three Faucet Hole 8" Spread, Glossy White
- Unlimited 60.02L WG | Soap Dispenser Hole (Left), Glossy White
- Unlimited 60.02R WG | Soap Dispenser Hole (Right), Glossy White
- Unlimited 60.00 BM | No Faucet Hole, Matte Black
- Unlimited 60.01 BM | Single Faucet Hole, Matte Black
- Unlimited 60.03-4 BM | Three Faucet Hole 4" Spread, Matte Black
- Unlimited 60.03-8 BM | Three Faucet Hole 8" Spread, Matte Black
- Unlimited 60.02L BM | Soap Dispenser Hole (Left), Matte Black
- Unlimited 60.02R BM | Soap Dispenser Hole (Right), Matte Black

Codes & Standards:

- ADA Compliant

* WS Bath Collections reserves the right to revise dimensions or information on this sheet without notice

Collection |
Unlimited

Model |
Unlimited 60

Dimensions Metric
1 inch = 2.54 cm
1 inch = 25.4 mm

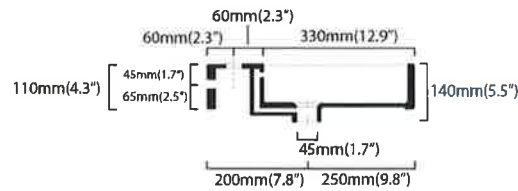
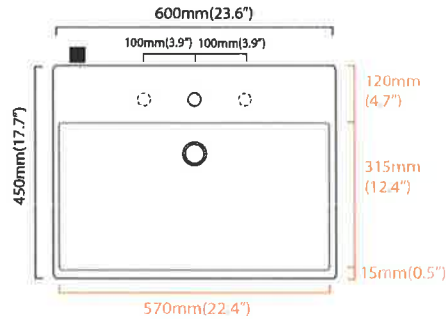
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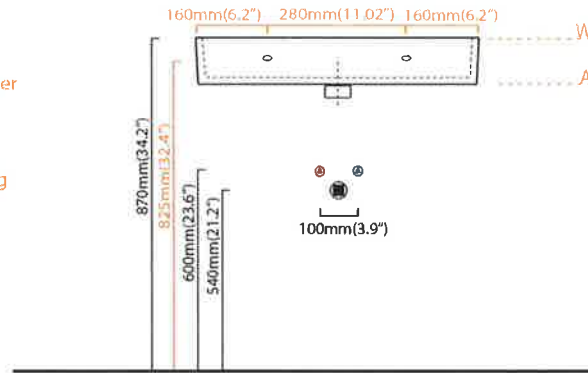
Unlimited 60

- = smaltato perimetralmente all glazed sides
- = non smaltato dietro unglazed behind

richiedi data dwg template request dwg



- U= sottopiano undercounter
- I= incasso inset
- A= appoggio freestanding
- W= sospeso wall hung



Collection | Unlimited

Model | Unlimited 60

Dimensions Metric

1 inch = 2.54 cm
1 inch = 25.4 mm

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We recommend the following items that work with your sink.


Unlimited 60

TRAPS




WSBC 53922
Our best seller

 Polished Chrome
WSBC: 53922.29

 Matte Black
WSBC: 53922.22



WSBC 5392

 Polished Chrome
WSBC: 5392.29



WSBC 53925

 Polished Chrome
WSBC: 53925.29



WSBC 53921
Space saving

 Polished Chrome
WSBC: 53921.29

 Matte Black
WSBC: 53921.22

DRAINS



WSBC 53991
Push waste drain (click clack)
with overflow

 Polished Chrome
WSBC: 53991.29

 Glossy White
WSBC: 53991.09

 Glossy Black
WSBC: 53991.18

 Matte White
WSBC: 53991.26

 Matte Black
WSBC: 53991.22

MOUNTING HARDWARE

Wall-mount installation

Vessel/ countertop installation



Bolts



Silicone (optional)

Collection
Unlimited

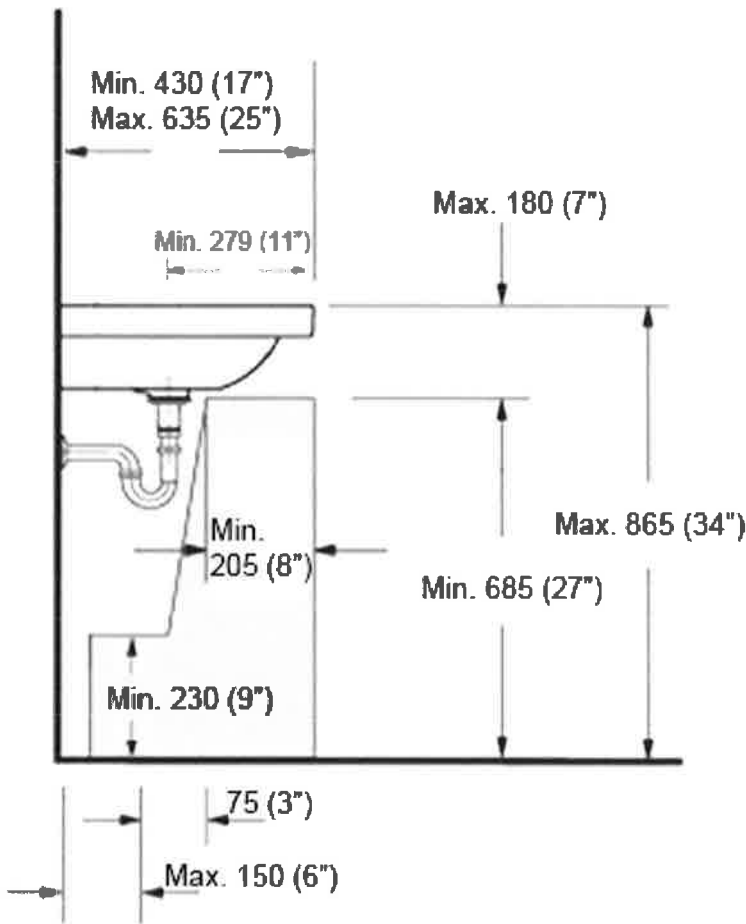
Model |
Unlimited 60

Dimensions Metric
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1 inch = 25.4 mm

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Recommended ADA Installation



Note: ADA Compliant when installed in accordance with ADA guidelines

<p>Collection Unlimited</p>	<p>Model Unlimited 60</p>	<p>Dimensions Metric <i>1 inch = 2.54 cm</i> <i>1 inch = 25.4 mm</i></p>	<p>WS[®] BATH COLLECTIONS 1051 Lea Drive - Collegeville, PA 19426 Tel. 215 513 9400 - Fax 610 831 0215 www.wsbatchcollections.com - info@wsbatchcollections.com</p>
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Installation Guide | Bathroom Sinks

Index

Bathroom Sink Type	Page
Wall Mount Bathroom Sinks	1-3
Vessel & Countertop Bathroom Sinks	4-5
Undermount Bathroom Sinks	6-7
Pedestal Bathroom Sinks	8-9

Note:

Installation guides show general instructions and may not depict your exact model in the figures and graphics. WS Bath Collections accepts no liability for any damage to the property; floor, walls, plumbing, sink, or personal injury during installation.

If you have any questions or need any additional help please do not hesitate to contact us.

**Installation
Instructions**

**Model |
Bathroom Sinks**

Dimensions Metric

*1 inch = 2.54 cm
1 inch = 25.4 mm*

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Before You Start Installation

We recommend that you consult with a professional if you are unfamiliar with installing this type of product. WS Bath Collections accepts no liability for any damage to the property; floor, walls, plumbing, sink, or personal injury during installation.

Follow up all local plumbing and building codes.

Getting Started

Insure that you have all the requires materials and tools for the installation.

Install sufficient backing behind the finished wall to provide adequate support to secure the mounting hardware (refer to diagram attached). If the studs do not align with the sink, proper wood blocking must be installed between the studs where the sink will mount.

Make sure that in-wall plumbing has already been prepared.

Unpack the new sink and inspect it for damage prior to installation.

Installation

1. Hold the sink up at the desired installation location. Ensure that the sink is level, then mark the location of the mounting holes on the back of the sink.
2. Drill pilot holes at the marked locations of the sink's mounting holes.
3. Insert the anchors into the drilled holes, screw in the mounting hanger bolts.
4. Move the sink back into position at the installation location.
5. Secure sink with washers and nuts. Be careful not to over tighten the bolts to avoid sink chips and cracks.
6. Proceed to installation of the drain, trap, water supply lines, and the sink faucet.
7. Complete the installation by applying a thin bead of silicone around the back of the sink where it meets the wall.

Tools You May Need



Pencil



Measuring Tape



Level



Silicone Sealant
100%



Stud Finder



Drill



Wrench



Bolt



Drywall Anchor

Note

WS Bath Collections reserves the right to make revisions in the design of products without notice.

**Installation
Instructions**

**Model |
Wall-mount Sinks**

Dimensions Metric

1 inch = 2.54 cm
1 inch = 25.4 mm

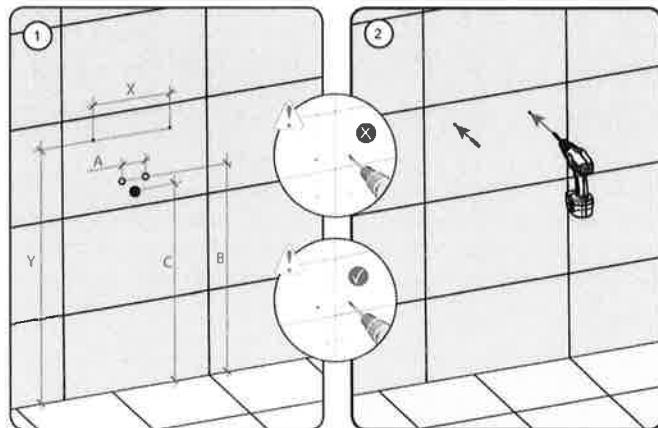
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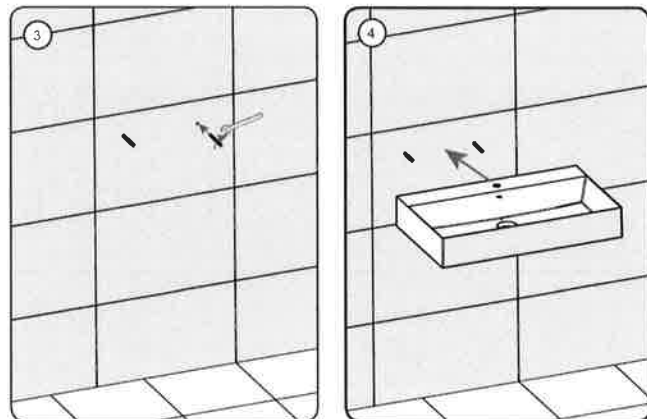
Wall-mount Sinks Installation Instructions

Installation Instructions & Diagrams

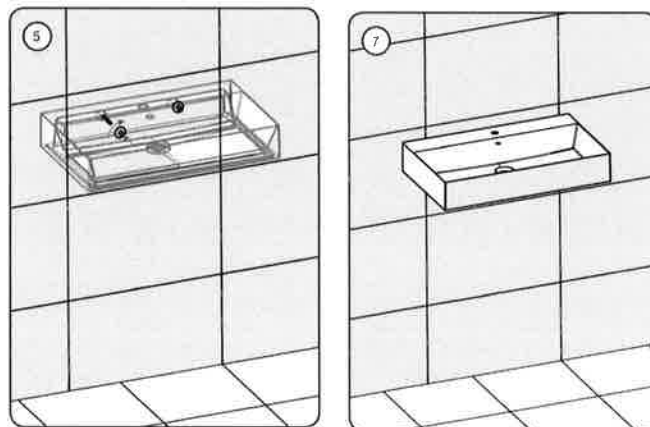
1. Hold the sink up at the desired installation location. Ensure that the sink is level, then mark the location of the mounting holes on the back of the sink.
2. Drill pilot holes at the marked locations of the sink's mounting holes.



3. Insert the anchors into the drilled holes, screw the mounting hanger bolts.
4. Move the sink back into position at the installation location.



5. Secure sink with washers and nuts. Be careful not to over tighten the bolts to avoid sink chips and cracks.
6. Proceed to installation of the drain, trap, water supply lines, and the sink faucet.
7. Complete the installation by applying a thin bead of silicone around the back of the sink where it meets the wall.



**Installation
Instructions**

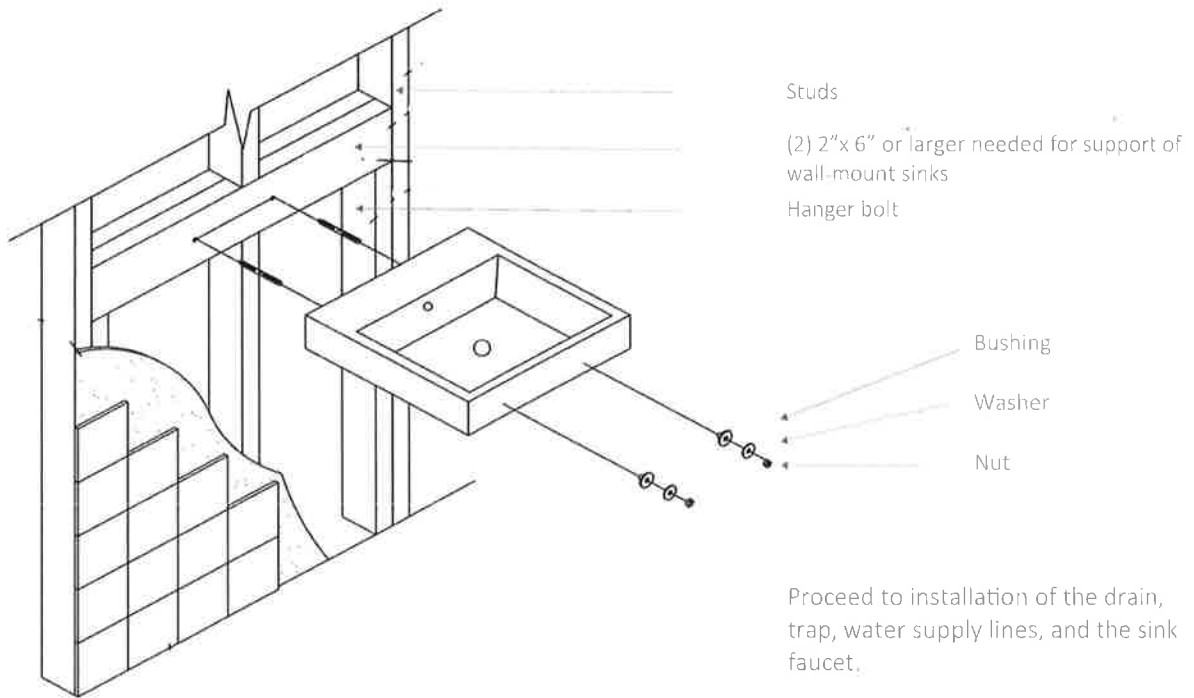
**Model |
Wall-mount Sinks**

Dimensions Metric

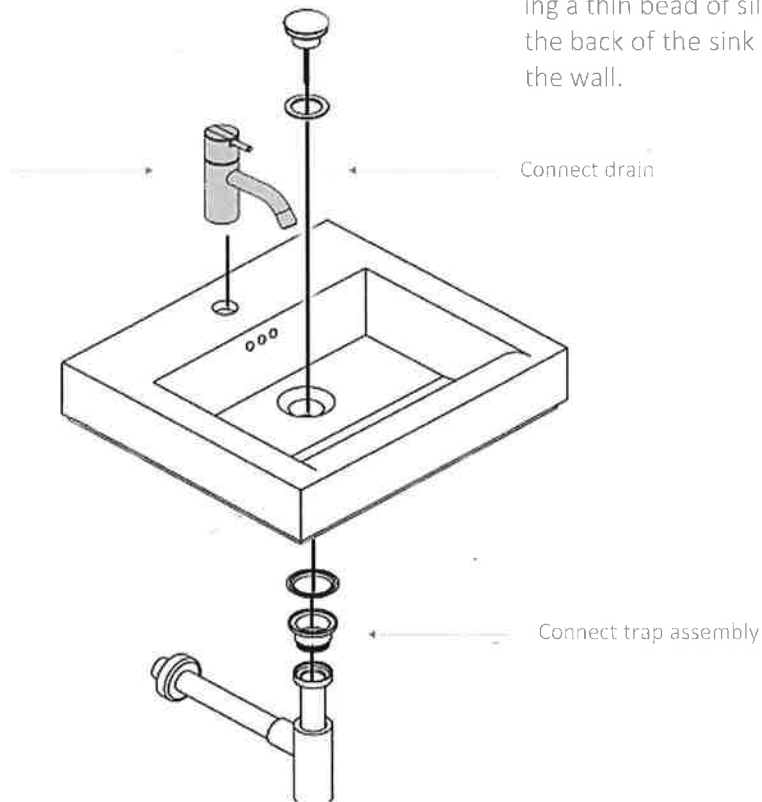
1 inch = 2,54 cm
1 inch = 25,4 mm

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For deck-mount faucets:
 Mount faucet and water supply lines



Complete the installation by applying a thin bead of silicone around the back of the sink where it meets the wall.

Installation Instructions

Model | Wall-mount Sinks

Dimensions Metric
 1 inch = 2.54 cm
 1 inch = 25.4 mm

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Before You Start Installation

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Follow up all local plumbing and building codes.

Getting Started

Insure that you have all the requires materials and tools for the installation.

Make sure that in-wall plumbing has already been prepared.

Unpack the new sink and inspect it for damage prior to installation.

WS Bath Collections reserves the right to make revisions in the design of products without notice.

Installation

1. Position the sink on the countertop at the installation location.
2. Trace the sink drain hole onto the countertop.
3. Remove the sink and set aside.
4. Drill a 2.2" (55 mm) hole at the marked location. Hole can be larger depending on the drain hole size of the specific sink or a cutout may be needed depending on specific configuration of the sink at its bottom.
5. Move the sink back into position at the countertop installation location.
6. Align the sink and drain body assembly with the drain hole in the countertop.
7. Lower the drain body through the countertop drain hole until the sink rests on the countertop.
8. Secure sink with drain, washers, and nuts. Be careful not to over tighten to avoid sinks chips and cracks.
9. Proceed to complete installation of the drain, trap, water supply lines, and the sink faucet.
10. Complete the installation by applying a thin bead of silicone around the sink where it meets the countertop.

Tools You May Need



Silicone Sealant
100%



Damp Cloth



Pencil



Drill



Jigsaw

Note

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**Installation
Instructions**

**Model |
Vessel & Countertop
Sinks**

Dimensions Metric

1 inch = 2.54 cm
1 inch = 25.4 mm

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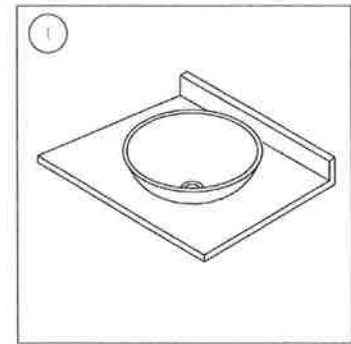
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Installation Instruction & Diagrams

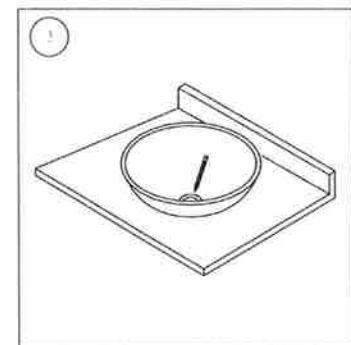
1. Position the sink on the countertop at the installation location.

Note:

Sink shown in round shape for illustration purpose only. Sink can be of any shape i.e. round, rectangular, among others.



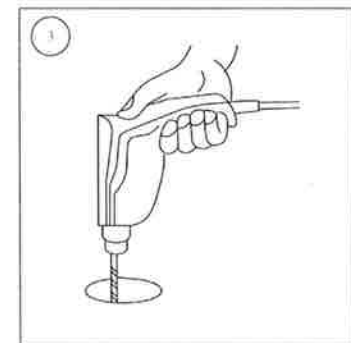
2. Trace the sink drain hole onto the countertop.
3. Remove the sink and set aside.



4. Drill a 2.2" (55 mm) hole at the marked location. Hole can be larger than 2.2" depending on the drain hole size of the specific sink.

Note:

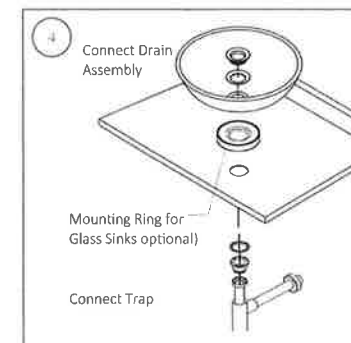
A larger hole may be needed depending on the drain hole size of the specific sink or A cut out may be needed instead of hole depending on the specific configuration of the sink at its bottom.



5. Move the sink back into position at the countertop installation location.
6. Secure sink with washer and nuts. Be careful not to over tighten the bolts to avoid sink chips and cracks.
7. Proceed to installation of the drain, trap, water supply lines, and the sink faucet.
8. Complete the installation by applying a thin bead of silicone around the sink where it meets the countertop.

Note:

Mounting ring can be used with glass sinks as a decorative piece (optional).



**Installation
Instructions**

**Model |
Vessel & Countertop
Sinks**

Dimensions Metric
1 inch = 2,54 cm
1 inch = 25,4 mm

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Before You Start Installation

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Follow up all local plumbing and building codes.

Getting Started

Insure that you have all the requires materials and tools for the installation.

Make sure that in-wall plumbing has already been prepared.

Unpack the new sink and inspect it for damage prior to installation.

WS Bath Collections reserves the right to make revisions in the design of products without notice.

Installation

1. Verify countertop or cabinet clearance.
2. Trace the template on the countertop. Cut out the opening along the inside edge of the line.
3. Clean the underside of the countertop and the rim of the sink.
4. Loosely install the clips.
5. Generously apply 100% silicone around the rim.
6. Hold the sink in place and rotate each clip over the rim. Evenly tighten the clips to secure.
7. Immediately wipe away any excess sealant.
8. Proceed to installation of the drain, trap, water supply lines, and the sink faucet.

Note

WS Bath Collections reserves the right to make revisions in the design of products without notice.

Tools You May Need



Hammer



Damp Cloth



Pencil



Drill



Damp Cloth



Safety Goggles



Silicone Sealant
100%



Epoxy



Pencil

**Installation
Instructions**

**Model |
Undermount Sinks**

Dimensions Metric

1 inch = 2.54 cm
1 inch = 25.4 mm

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**BATH
COLLECTIONS**

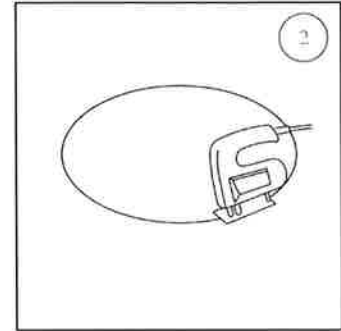
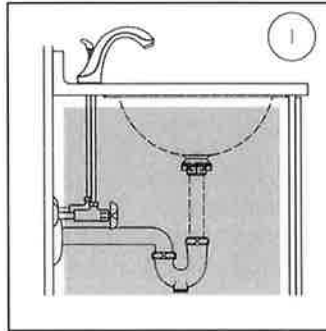
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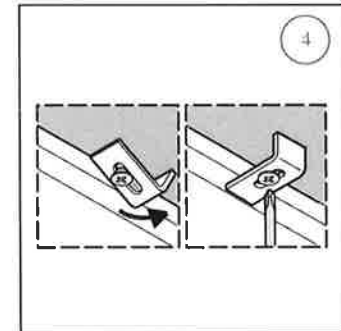
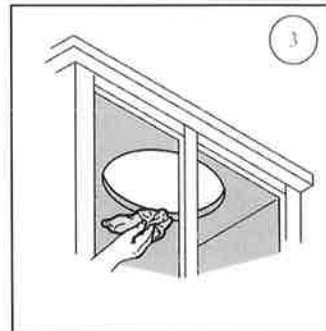
Undermount Sinks Installation Instructions

Installation Instructions & Diagrams

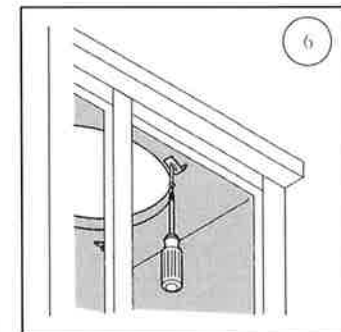
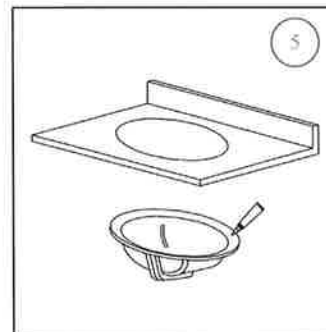
1. Verify countertop or cabinet clearance
2. Trace the template on the countertop. Cut out the opening along the inside edge of the line.



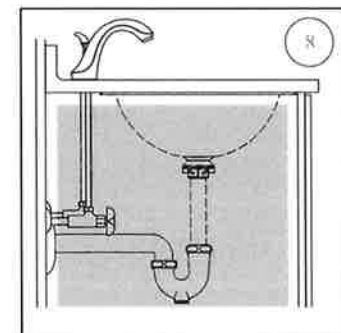
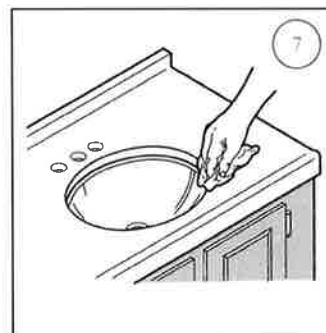
3. Clean the underside of the countertop and the rim of the sink.
4. Loosely install the clips.



5. Generously apply 100% silicone around the rim.
6. Hold the sink in place and rotate each clip over the rim. Evenly tighten the clips to secure.



7. Immediately wipe away any excess sealant.
8. Proceed to installation of the drain, trap, water supply lines, and the sink faucet.



**Installation
Instructions**

**Model |
Undermount Sinks**

Dimensions Metric

1 inch = 2.54 cm
1 inch = 25.4 mm

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Before You Start Installation

We recommend that you consult with a professional if you are unfamiliar with installing this type of product. WS Bath Collections accepts no liability for any damage to the property; floor, walls, plumbing, sink, or personal injury during installation.

Follow up all local plumbing and building codes.

Getting Started

Insure that you have all the requires materials and tools for the installation.

Install sufficient backing behind the finished wall to provide adequate support to secure the mounting hardware (refer to diagram attached). If the studs do not align with the sink, proper wood blocking must be installed between the studs where the sink will mount.

Make sure that in-wall plumbing has already been prepared.

Unpack the new sink and inspect it for damage prior to installation.

Installation

1. Hold the sink up and pedestal at the desired installation location. Ensure that the sink is level, then mark the location of the mounting holes on the back of the sink.
2. Drill pilot holes at the marked locations of the sink's mounting holes.
3. Insert the anchors into the drilled holes, screw in the mounting hanger bolts.
4. Move the sink and pedestal back into position at the installation location.
5. Secure sink with washers and nuts. Be careful not to over tighten the bolts to avoid sink chips and cracks.
6. Proceed to installation of the drain, trap, water supply lines, and the sink faucet.
7. Complete the installation by applying a thin bead of silicone around the back of the sink where it meets the wall.

Tools You May Need



Pencil



Measuring Tape



Level



Silicone Sealant
100%



Stud Finder



Drill



Wrench



Bolt



Drywall Anchor

Note

WS Bath Collections reserves the right to make revisions in the design of products without notice.

**Installation
Instructions**

**Model |
Pedestal Sinks**

Dimensions Metric

1 inch = 2.54 cm
1 inch = 25.4 mm

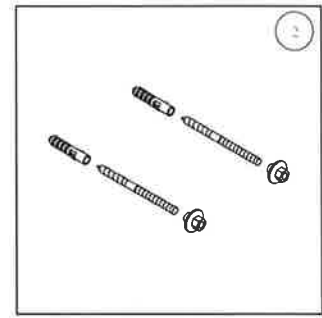
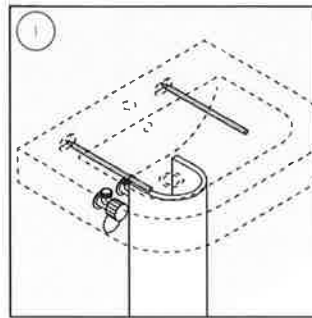
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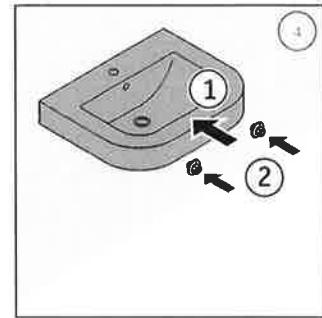
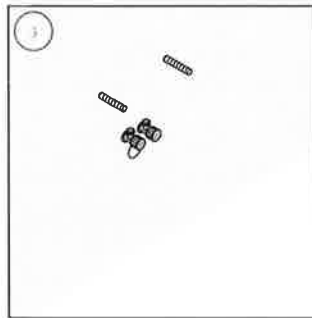
Pedestal Sinks Installation Instructions

Installation Instructions & Diagrams

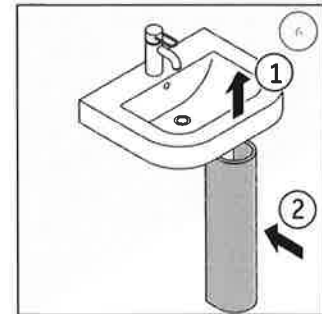
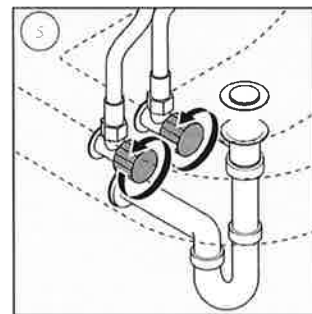
1. Hold the sink up and the pedestal at the desired installation location. Ensure that the sink is level, then mark the location of the mounting holes on the back of the sink.
2. Drill pilot holes at the marked locations of the sink's mounting holes.



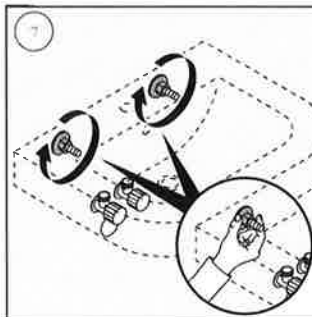
3. Insert the anchors into the drilled holes, screw the mounting hanger bolts.
4. Move the sink back into position at the installation location. Lightly secure the sink with washers and nuts.



5. Proceed to installation of the drain, trap, water supply lines, and the sink faucet.
6. Move the pedestal back into position. Lift the sink up and secure the pedestal underneath the sink.



7. Secure sink with washers and nuts. Be careful not to over tighten the bolts to avoid sink chips and cracks.
8. Complete the installation by applying a thin bead of silicone around the back of the sink where it meets the wall.



**Installation
Instructions**

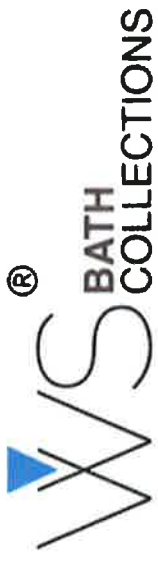
**Model |
Pedestal Sinks**

Dimensions Metric

1 inch = 2.54 cm
1 inch = 25.4 mm

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One-Year Limited Warranty

The Manufacturer warrants the products to be free of defects in materials and workmanship for one (1) year from date of purchases, excluding ordinary wear and tear. However, The Manufacturer does not warrant its products against defects due to; inappropriate or improper use or installation; failure to exercise normal maintenance; or the consequences of uses for which our products were not designed.

Our only liability, whether in tort, or in contract, under this warranty is to repair or replace goods that are returned to us, shipping charges prepaid, and are determined by us to be defective and qualify for repair or replacement. If they do not, we will notify Customer of estimated costs of repair or replacement involved and will obtain authorization prior proceeding.

In no event shall we be liable for any incidental or consequential damages hereunder or resulting from the sale or use of the product. This warranty extends to the original purchase and first consumer only.

WS Bath Collections would like to thank you for considering us for your bathroom project and are confident that you will be able to enjoy our products for many years to come!

Updated October 2023



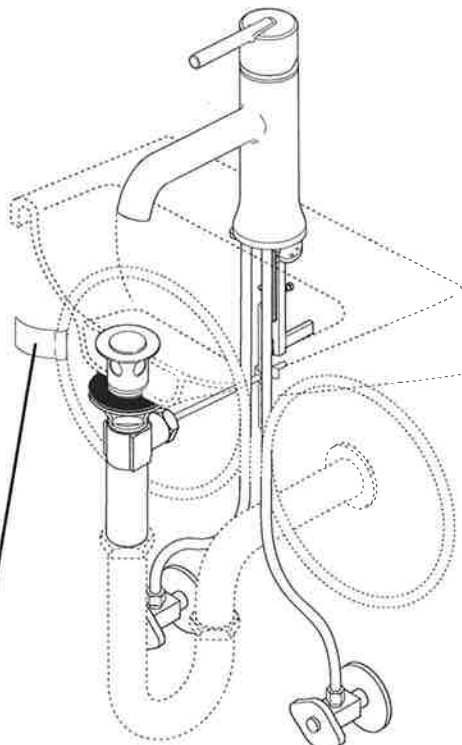
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106357



X00106357

1 HANDLE BATHROOM FAUCETS
GRIFOS PARA BAÑOS DE 1 MANIJA
ROBINETS DE SALLE DE BAIN À 1 MANETTE



Model number located here.
Número de modelo ubicado aquí.
Numéro de modèle situé ici.

MODEL/MODELO/MODÈLE _____

Register Online
Regístrese en línea
S'enregistrer en ligne
www.deltafaucet.com/registerme

To reference replacement parts and access additional technical documents and product info, visit www.deltafaucet.com

Para referencia sobre las piezas de repuesto y acceder a documentos técnicos adicionales e información del producto, visite www.deltafaucet.com

Pour obtenir la référence des pièces de rechange ainsi que pour avoir accès à d'autres documents techniques et renseignements sur le produit, allez à www.deltafaucet.com



1-800-345-3358
customerservice@deltafaucet.com

Read all instructions prior to installation.

CAUTION

Failure to read these instructions prior to installation may result in personal injury, property damage, or product failure. Manufacturer assumes no responsibility for product failure due to improper installation.

Lea todas las instrucciones antes de hacer la instalación.

ADVERTENCIA

El no leer estas instrucciones de instalación puede resultar en lesiones personales, daños a la propiedad, o falla en el funcionamiento del producto. El fabricante no asume ninguna responsabilidad por la falla del producto debido a una instalación incorrecta.

Veuillez lire toutes les instructions avant l'installation.

AVERTISSEMENT

L'omission de lire les présentes instructions avant l'installation peut entraîner des blessures, des dommages matériels ou le bris du produit. Le fabricant se dégage de toute responsabilité à l'égard d'un bris du produit causé par une mauvaise installation.

Image is for reference only.
La imagen es sólo para referencia.
L'image est fournie à titre indicatif seulement.

Cleaning and Care

Care should be given to the cleaning of this product. Although its finish is extremely durable, it can be damaged by harsh abrasives or polish. To clean, simply wipe gently with a damp cloth and blot dry with a soft towel.

Limpieza y Cuidado de su Llave

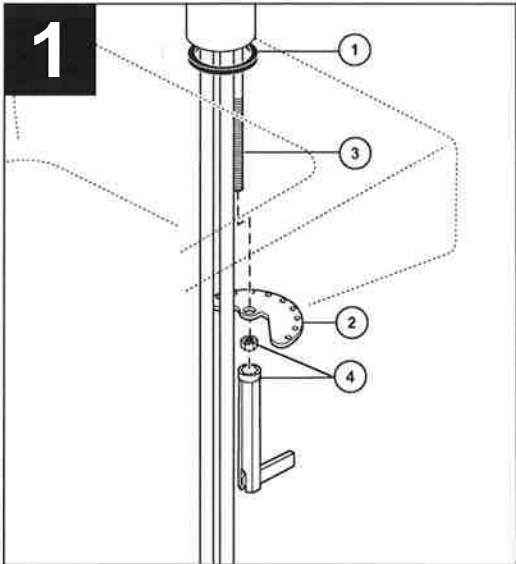
Tenga cuidado al ir a limpiar este producto. Aunque su acabado es sumamente durable, puede ser afectado por agentes de limpieza o para pulir abrasivos. Para limpiar su llave, simplemente frótelas con un trapo húmedo y luego séquela con una toalla suave.

Instructions de nettoyage

Il faut le nettoyer avec soin. Même si son fini est extrêmement durable, il peut être abîmé par des produits fortement abrasifs ou des produits de polissage. Il faut simplement le frotter doucement avec un chiffon humide et le sécher à l'aide d'un chiffon doux.

You may need
Usted puede necesitar
Articles dont vous pouvez avoir besoin:





SINGLE HOLE MOUNT INSTALLATIONS - YOUR INSTALL MAY BE ONE OF THE TWO STEPS SHOWN BELOW INSTALLATIONS

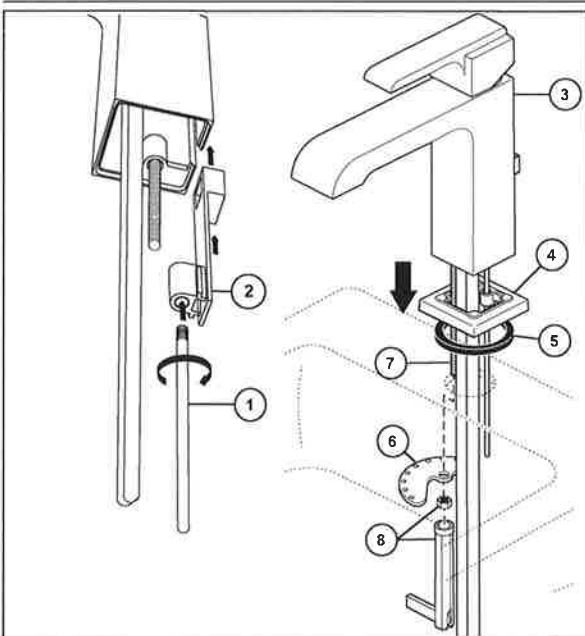
INSTALACIONES EN UN FREGADERO DE UN AGUJERO: UNO DE LOS DOS PASOS A CONTINUACIÓN PUEDE APLICARSE EN SU INSTALACIÓN

INSTALLATIONS DANS UN LAVABO À UN TROU – L'UNE DES DEUX ÉTAPES CI-DESSOUS PEUT S'APPLIQUER À VOTRE INSTALLATION

Slide single hole gasket (1) up over tubes and mounting stud. Slide tubes down through mounting hole and position faucet assembly on sink. Option: If surface is uneven, use silicone under the gasket. Place metal bracket (2) over mounting stud (3) under sink. Secure with mounting nut / wrench (4).

Deslice el empaque para un orificio (1) sobre los tubos y el perno de montaje. Deslice los tubos hacia abajo por el orificio de montaje y coloque el grifo en el lavamanos. Opcional: si la superficie es desigual, aplique sellador de silicona debajo del empaque/junta. Coloque el soporte de metal (2) sobre el perno de montaje (3) debajo del fregadero. Fije la válvula apretando la tuerca de montaje con una llave (4).

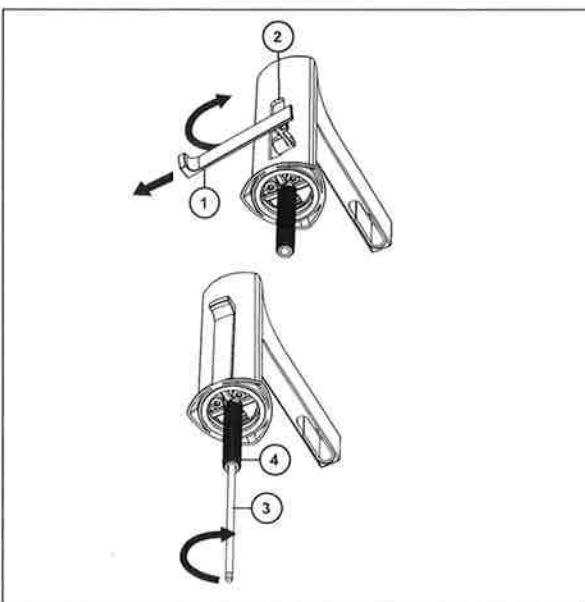
Glissez le joint plat à un trou (1) sur les tubes et le goujon de montage. Par le dessus, introduisez les tubes dans le trou de montage et positionnez le robinet sur le lavabo. Facultatif : Si la surface est inégale, appliquez du composé d'étanchéité à la silicone sous le joint plat. Placez le support en métal (2) sur le goujon de montage (3) sous le lavabo. Fixez le robinet en serrant l'écrou de montage avec une clé (4).



Thread lift rod (1) into slide (2) until finger tight. Use caution to not cross thread the lift rod. Install slide assembly into spout (3). Install base (4) and gasket (5) up over the supply tubes and mounting stud. Make sure the lift rod goes through guide hole. Install tubes down through mounting hole and position faucet, base and gasket on sink. Check the slide operation a few times to make sure it moves freely. **Option: If sink is uneven, use silicone under the gasket.** Place metal bracket (6) over mounting stud (7) under sink. Secure with mounting nut / wrench (8).

Enrosque la barra del desagüe (1) en el mecanismo deslizable (2) hasta que quede ajustada con los dedos. Tenga cuidado de no cruzar el enrosque de la barra del desagüe. Instale el herraje del mecanismo deslizable en el surtidor (3). Instale la base (4) y el empaque (5) sobre los tubos de suministro y el perno de instalación. Asegúrese de que la barra del desagüe pasa a través del agujero guía. Instale los tubos por el agujero de montaje y coloque el grifo en su sitio, la base y el empaque en el fregadero. Verifique el funcionamiento del mecanismo deslizable un par de veces para asegurar que se mueve libremente. **Opción: Si el fregadero está desnivelado, use silicona debajo del empaque.** Coloque el soporte de metal (6) sobre el perno de instalación (7) por debajo del lavamanos. Fije con la tuerca de instalación / llave de tuercas (8).

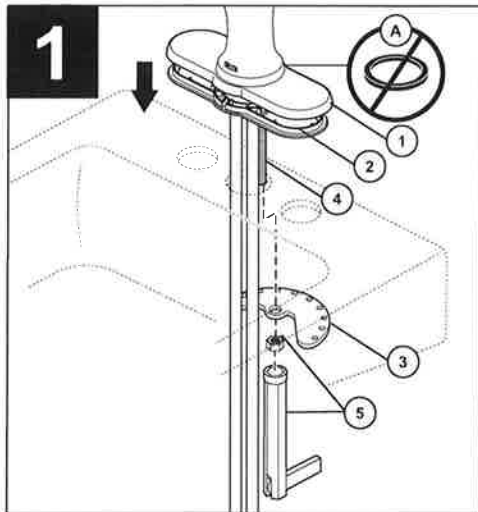
Vissez la tirette (1) dans le coulisseau (2) à la main. Prenez garde d'abîmer les filets de la tirette. Installez le coulisseau dans le bec (3). Faites glisser la base (4) et le joint (5) vers le haut sur les tubes d'alimentation et le goujon de montage. Assurez-vous de bien introduire la tirette dans le trou de montage. Introduisez les tubes dans le trou de montage, puis positionnez le robinet, la base et le joint d'étanchéité sur le lavabo. Vérifiez le coulisseau à quelques reprises pour vous assurer qu'il bouge librement. Facultatif : Si la surface du lavabo est inégale, appliquez du composé d'étanchéité à la silicone sous le joint d'étanchéité. Placez le support en métal (6) sur le goujon de montage (7) sous l'évier. Fixez-le en serrant l'écrou de montage avec la clé (8).



Insert finial (1) into spout slot (2) as shown. Rotate finial until it is aligned with spout slot. Insert lift rod (3) into the bottom of the mounting shank (4) and thread the lift rod into the bottom of the finial.

Inserte el pomo de remate (1) en la ranura del surtidor (2) como se muestra. Gire el pomo hasta que quede alineado con la ranura del surtidor. Inserte la barra del desagüe (3) en la parte inferior de la espiga de montaje (4) y enrosque la barra del desagüe en la parte inferior del remate.

Introduisez le fretel (1) dans la rainure du bec (2) comme le montre la figure. Tournez le fretel jusqu'à ce qu'il soit aligné avec la rainure du bec. Introduisez la tirette (3) dans la partie inférieure du manchon de montage (4) et vissez-la dans la partie inférieure du fretel.



OPTIONAL - THREE HOLE ESCUTCHEON INSTALLATIONS - YOUR INSTALL MAY BE ONE OF THE THREE STEPS SHOWN BELOW

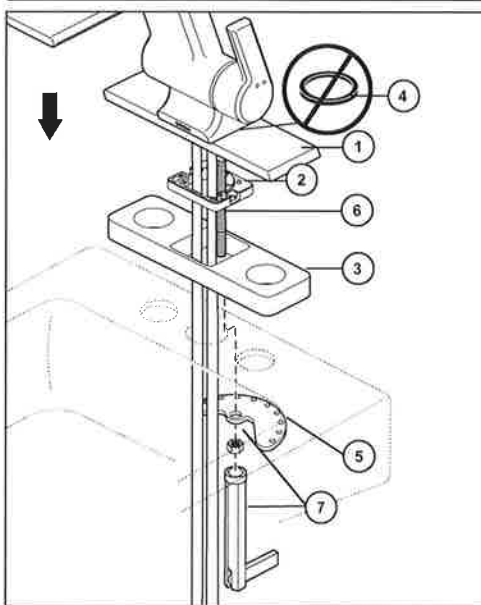
OPCIONAL: INSTALACIONES EN UNA PLACA DE GRIFO DE TRES AGUJEROS: UNO DE LOS TRES PASOS A CONTINUACIÓN PUEDE APLICARSE EN SU INSTALACIÓN

FACULTATIF – INSTALLATIONS DANS UN LAVABO À TROIS TROUS AVEC UNE PLAQUE DE FINITION - L'UNE DES TROIS ÉTAPES CI-DESSOUS PEUT S'APPLIQUER À VOTRE INSTALLATION

Slide escutcheon (1) and 3 hole gasket (2) up over tubes and mounting stud. Rubber gasket (A) is not required. Slide tubes down through mounting hole and position faucet, escutcheon and gasket on sink. **Option: If sink is uneven, use silicone under the gasket.** Place metal bracket (3) over mounting stud (4) under sink. Secure with mounting nut / wrench (5).

Deslice la placa de cubierta (1) y la junta plana de 3 orificios (2) sobre los tubos y el perno de montaje. No se requiere empaque de goma (A). Desde arriba, inserte los tubos en el orificio de montaje, luego coloque el grifo, la placa de cubierta y el empaque en el lavamanos. **Opcional: si la superficie del lavamanos es irregular, aplique sellador de silicona debajo del empaque.** Coloque el soporte de metal (3) en el perno de montaje (4) debajo del lavamanos. Asegure la válvula apretando la tuerca de montaje con una llave (5).

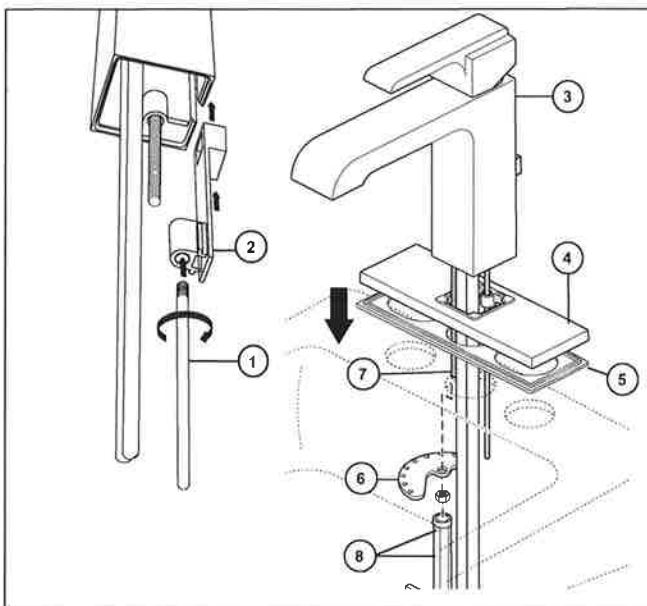
Glissez la plaque de finition (1) et le joint plat à 3 trous (2) sur les tubes et le goujon de montage. Le joint plat en caoutchouc (A) n'est pas requis. Par le dessus, introduisez les tubes dans le trou de montage, puis positionnez le robinet, la plaque de finition et le joint plat sur le lavabo. **Facultatif : Si la surface du lavabo est inégale, appliquez du composé d'étanchéité à la silicone sous le joint plat.** Placez le support en métal (3) sur le goujon de montage (4) sous le lavabo. Fixez le robinet en serrant l'écrou de montage avec une clé (5).



Slide escutcheon (1), base (2) and 3 hole gasket (3) up over tubes and mounting stud of faucet. Rubber gasket (4) is not required for 3 hole mounting. Slide tubes down through mounting hole and position faucet on sink. **Option: If sink is uneven, use silicone under the gasket.** Place metal bracket (5) over mounting stud (6) under sink. Secure with mounting nut / wrench (7).

Deslice el chapetón (1), empaque de agujero base (2) y 3 (3) hacia arriba sobre tubos y perno de montaje del grifo. Junta de goma (4) no es necesaria para el montaje de orificio 3. Deslice las tuberías hacia abajo por el agujero de la instalación y coloque la llave de agua, la chapa y el empaque en el lavamanos. **Opción: Si el lavamanos está desnivelado, use silicón por debajo del empaque.** Coloque el soporte de metal (5) sobre el perno de instalación (6) por debajo del lavamanos. Fije con la tuerca de instalación / la llave de tuercas (7).

Glisser l'écusson (1), le joint de base (2) et 3 trous (3) vers le haut plus de tubes et de la tige de fixation du robinet. Joint en caoutchouc (4) n'est pas nécessaire pour le montage de trou 3. Par le haut, introduisez les tubes dans le trou de montage et positionnez le robinet, la plaque de finition et le joint sur l'évier. **Facultatif : Si l'évier est inégal, appliquez du composé d'étanchéité à la silicone sous le joint.** Placez le support en métal (5) sur le goujon de montage (6) sous l'évier. Fixez-le en serrant l'écrou de montage avec la clé (7).

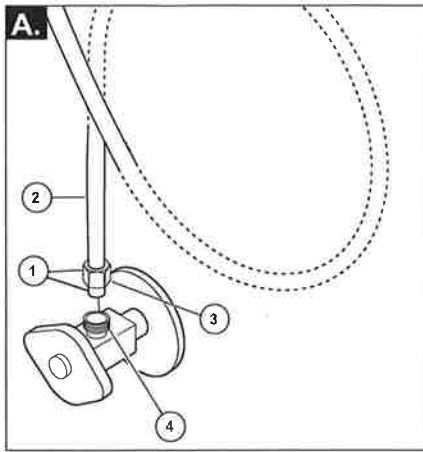


Thread lift rod (1) into Slide (2) until finger tight. Use caution to not cross thread the lift rod. Install Slide assembly into spout (3). Install escutcheon (4) and gasket (5) up over the supply tubes and mounting stud. Make sure the lift rod goes through guide hole. Install tubes down through mounting hole and position faucet, escutcheon and gasket on sink. Check the slide operation a few times to make sure it moves freely. **Option: If sink is uneven, use silicone under the gasket.** Place metal bracket (6) over mounting stud (7) under sink. Secure with mounting nut / wrench (8).

Enrosque la barra del desagüe (1) en la corredera (2) con la mano. Tenga cuidado de no cruzar las roscas de la barra. Instale el ensamble de la corredera en el surtidor (3). Coloque la placa de cubierta (4) y el empaque (5) sobre los tubos de suministro de agua y el perno de montaje. Asegúrese de que la barra entre en el orificio guía. Desde arriba, inserte los tubos en el orificio de montaje, luego coloque la válvula, la placa y el empaque en el lavamanos. Verifique el funcionamiento de la corredera varias veces para asegurar que se mueve libremente. **Opción: Si el lavamanos está desnivelado, aplique sellador de silicona debajo del empaque.** Coloque el soporte de metal (6) en el perno de montaje (7) debajo del lavamanos. Fije la válvula apretando la tuerca de montaje con una llave (8).

Vissez la tirette (1) dans le coulisseau (2) à la main. Prenez garde d'abîmer les filets de la tirette. Installez le coulisseau dans le bec (3). Montez la plaque de finition (4) et le joint plat (5) sur les tubes d'alimentation et le goujon de montage. Assurez-vous que la tirette pénètre dans le trou de guidage. Par le dessus, introduisez les tubes dans le trou de montage, puis positionnez le robinet, la plaque de finition et le joint plat sur le lavabo. Vérifiez le fonctionnement du coulisseau à quelques reprises pour vous assurer qu'il bouge librement. **Facultatif : Si la surface du lavabo est inégale, appliquez du composé d'étanchéité à la silicone sous le joint plat.** Placez le support en métal (6) sur le goujon de montage (7) sous le lavabo. Fixez le robinet en serrant l'écrou de montage avec une clé (8).

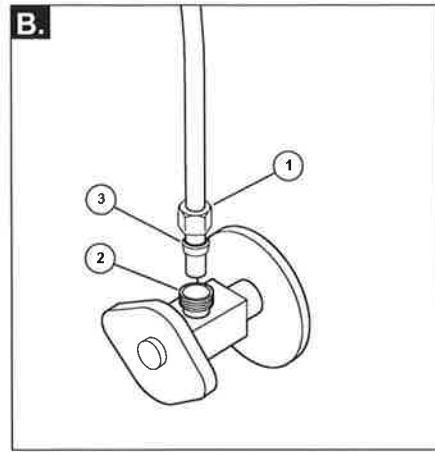
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OR

O

OU



A. Standard Connections

NOTICE

To avoid risk of property damage, Follow instructions for proper installation. Failure to follow these instructions may result in risk of property damage caused by leaking at this connection. Do not use pipe dope or other sealants on water line connections.

Ensure all fittings and end connections are free of debris. Faucet fittings (1) are 3/8" compression. Loop tubing (2) if it is too long. **Note: Recommended tubing minimum bend diameter is 8".** Secure metal nut (3) to supply valve connection (4). Turn nut until it feels snug. Then tighten nut at least 2 more turns with a wrench. Repeat for other tube. Turn on water, examine for leaks.

B. Custom Fit Connections

NOTICE

If you determine the PEX supply tubing for this faucet is too long and must be shorter to create an acceptable installation, be sure to read the instructions and plan ahead. When cutting the supply tubing the installer accepts the responsibility to do so in a way that allows a leak-free joint to be created. Delta is not responsible for tubing that is cut too short or cut in a way that will not allow for a leak-free joint. **DO NOT use a metal sleeve (ferrule) or gasket (supplied with faucet) in place of the plastic sleeve (ferrule) supplied, it may not create a leak-free joint. Do not use pipe dope or other sealants on water line connections.**

For custom fit installations, you must use plastic sleeves (ferrules) supplied with model and nuts included on supply lines. **Tube cut must be straight.** See plastic sleeve (ferrule) installation instructions found in and included in this document for more information.

Slide nut (1) over plastic sleeve (ferrule) (3). Start nut by hand onto supply valve connection (2) to prevent cross-threading. Turn nut until

it feels snug. Then tighten nut at least 2 more turns with a wrench. Repeat for other supply line. Turn on water, examine for leaks.

Potential Problems and Remedies

- **Tubing is not cut perpendicular to the axis of the tube:** carefully make an additional cut, being careful not to cut the tube too short.
- **Tubing is cut too short:** buy a coupling union and a replacement supply line that mate together from a store. The coupling union end intended to connect to the faucet must mate to the standard 3/8" connection nuts and plastic sleeves (ferrules) supplied with the faucet.
- **The plastic sleeve (ferrule) or connection nut is lost:** purchase a replacement nut and/or plastic sleeve (ferrule) that are designed to seal with PEX tubing.

A. Conexiones Estándares

AVISO

Para evitar el riesgo de daños a la propiedad, siga las instrucciones para una instalación adecuada. El incumplimiento de estas instrucciones puede resultar en arriesgar dañar la propiedad causado por fugas en esta conexión. No utilice compuestos para tuberías ni otros selladores en las conexiones de las líneas de agua.

Asegúrese de que todos los accesorios y las conexiones extremas estén libres de residuos. Los accesorios de la llave de agua (1) son de 3/8" compresión. Enlace el tubo (2) si es demasiado largo. **Nota: el diámetro mínimo recomendado de la curva del tubo es de 8".** Fije la tuerca metálica (3) a la conexión de la válvula de suministro (4). Gire la tuerca hasta que se sienta ajustada. Luego apriete la tuerca por lo menos 2 vueltas más con una llave de tuercas. Repita con el otro tubo. Abra el agua, examine para detectar fugas.

B. Conexiones Especiales

AVISO

Si determina que el tubo de suministro de PEX para esta llave de agua es demasiado largo y debe ser más corto para crear una instalación aceptable, asegúrese de leer las instrucciones y planificar con anticipación. Al cortar la tubería de suministro, el instalador acepta la responsabilidad de hacerlo de una manera que permita crear una junta libre de fugas. **NO use un manguito o funda de metal (casquillo) o el empaque (suministrado con la llave de agua) en lugar del manguito plástico (casquillo) suministrado, porque es posible no crear una conexión sin fugas. No use compuesto de tuberías ni otros selladores en las conexiones de la línea de agua.**

Para instalaciones hechas a la medida, debe usar manguitos plásticos (casquillos) suministrados con el modelo y las tuercas incluidas en las líneas de suministro. El corte del tubo debe ser recto. Consulte las instrucciones de instalación del manguito plástico (casquillo) que se encuentran y se incluyen en este documento para obtener más información.

Deslice la tuerca (A) sobre el manguito plástico (casquillo) (C). Coloque la tuerca a mano en la conexión de la válvula de suministro

(B) para evitar que se entrecrucen. Gire la tuerca hasta que se sienta ajustada. Luego apriete la tuerca por lo menos 2 vueltas más con una llave de tuercas. Repita con la otra línea de suministro. Abra el agua, examine para detectar fugas.

Averías potenciales y remedios

- **Si el tubo no se corta perpendicular al eje del tubo:** con cuidado haga un corte adicional, teniendo cuidado de no cortar el tubo demasiado corto.
- **Si la tubería se corta demasiado corta:** compre en una tienda una unión de acoplamiento y una línea de suministro de repuesto que se acoplen. El extremo de la unión del acoplamiento destinado a conectarse a la llave de agua/grifo debe acoplarse con las tuercas de conexión de 3/8" estándar y los manguitos plásticos (casquillos) suministrados con la llave de agua.
- **Si el manguito plástico (casquillo) o la tuerca de conexión se pierde:** compre una tuerca de repuesto y/o manguito plástico (casquillo) que estén diseñados para sellar con tubería PEX.

A. Branchements Standard

AVIS

Pour prévenir les risques de dommages matériels, respectez les instructions d'installation. L'omission de respecter ces instructions pourrait entraîner des dommages matériels causés par une fuite de ce raccord. N'utilisez pas de pâte lubrifiante ni d'autres produits d'étanchéité sur les raccords de cette conduite d'eau.

Assurez-vous que tous les raccords et les raccords d'extrémité sont exempts de corps étrangers. Ce robinet est muni de raccords (1) à compression de 3/8 po. Cintrer le tube (2) s'il est trop long. **Note :** Le diamètre de cintrage recommandé est de 8 po. Fixez l'écrou en métal (3) au raccord du robinet d'alimentation (4). Serrez l'écrou jusqu'à ce qu'il soit appuyé, puis faites au moins 2 tours supplémentaires avec une clé. Installez l'autre tube de la même manière. Rétablissez l'alimentation en eau et vérifiez l'étanchéité.

B. Branchements Spéciaux

AVIS

Si vous constatez que le tube d'alimentation en PEX de ce robinet est trop long et vous devez le sectionner pour faire une installation acceptable, lisez les instructions et prévoyez le coup. L'installateur qui sectionne le tube d'alimentation a la responsabilité de le faire d'une manière qui permettra la réalisation d'un joint étanche. Delta se dégage de toute responsabilité dans l'éventualité où le tube sectionné serait trop court ou ne permettrait pas la réalisation d'un joint étanche. **N'UTILISEZ PAS le manchon métallique (virole) ou le joint plat (fourni avec le robinet) à la place du manchon de plastique (virole) fourni. Le raccord pourra fuir. N'utilisez pas de pâte lubrifiante ni d'autres produits d'étanchéité sur les raccords de cette conduite d'eau.**

Pour les installations sur mesure, vous devez utiliser les manchons en plastique (viroles) fournis avec le modèle et les écrous qui se trouvent sur les tubes d'alimentation. Le tube doit être sectionné perpendiculairement à son axe. Pour obtenir plus de renseignements, veuillez consulter la section du présent document qui traite de l'installation du manchon en plastique (virole).

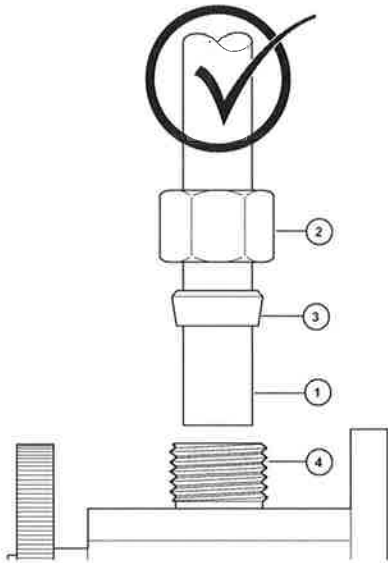
Glissez l'écrou (A) sur le manchon en plastique (virole) (C). Amorcez l'écrou à la main sur le raccord du robinet d'alimentation (B) pour ne

pas risquer de foirer le filets. Tournez l'écrou jusqu'à ce qu'il soit appuyé. Faites ensuite au moins deux tours supplémentaires à l'aide d'une clé. Branchez l'autre tube d'alimentation de la même manière. Rétablissez l'alimentation en eau et vérifiez l'étanchéité.

Problèmes et solutions possibles

- **Le tube n'est pas coupé perpendiculairement à l'axe du tube :** sectionnez le tube de nouveau minutieusement en vous assurant qu'il ne sera pas trop court.
- **Le tube a été sectionné et il est trop court :** achetez un raccord-union et un tube d'alimentation de rechange. L'extrémité du raccord-union doit être compatible avec les écrous de raccordement de 3/8 po et les manchons en plastique (viroles) fournis avec le robinet.
- **Le manchon en plastique (virole) ou l'écrou de raccordement a été perdu :** achetez un écrou et/ou un manchon en plastique (virole) conçus pour assurer l'étanchéité avec un tube en PEX.

Correct method
Método Correcto
Bonne méthode



NOTICE

Failure to use plastic sleeve (ferrule) in the correct orientation will result in disconnection and possible water damage.

1. Determine desired length of supply tube (1). Leave 1" or 2" of extra length to allow for easier installation and cut tube. Ensure cut is straight and burr free.
2. Slide nut (2) and plastic sleeve (ferrule) (3) onto cut supply tube. Ensure plastic sleeve (ferrule) is oriented as shown.
3. Insert supply tube into supply valve connection (4). Supply tube should touch bottom of hole inside supply valve.
4. Slide plastic sleeve (ferrule) down supply tube until it contacts the supply valve connection.
5. Slide nut over plastic sleeve (ferrule). Start nut by hand to prevent cross-threading. Turn nut until it feels snug. Then tighten nut at least 2 more turns with a wrench. Repeat for other supply line. Turn on water, examine for leaks.

AVISO

Si no utiliza el manguito plástico (casquillo) en la orientación correcta resultará en la desconexión y el posible daño por agua.

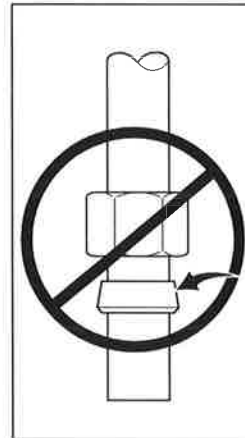
1. Determine el largo deseado del tubo de suministro (1). Agregue 1" ó 2" de más para permitir una instalación más fácil y corte el tubo. Asegúrese que el corte es recto y sin rebabas.
2. Deslice la tuerca (2) y el manguito plástico (casquillo) (3) en el tubo cortado de suministro. Asegúrese el manguito plástico (casquillo) está orientado, como se muestra.
3. Introduzca el tubo de suministro en la conexión de la válvula de suministro (4). El tubo de alimentación debe tocar el fondo del agujero dentro de la válvula de suministro.
4. Deslice el manguito plástico (casquillo) por el tubo de suministro hasta que tenga contacto con la conexión de la válvula de suministro. AVISO: Si no utiliza el manguito plástico (casquillo) en la orientación correcta resultará en la desconexión y el posible daño por agua.
5. Deslice la tuerca sobre el manguito plástico (casquillo). Coloque la tuerca a mano para evitar que se entrecrucen. Gire la tuerca hasta que se sienta ajustada. Luego apriete la tuerca por lo menos 2 vueltas más con una llave de tuercas. Repita con la otra línea de suministro. Abra el agua, examine para detectar fugas.

NOTE:

Si le manchon en plastique (bague) n'est pas installé correctement, le raccord peut se défaire et occasionner un dégât d'eau.

1. Coupez le tube d'alimentation (1) à la longueur désirée. Laissez 1 à 2 pouces de jeu pour faciliter l'installation. Faites une coupe d'équerre et enlevez les bavures.
2. Glissez l'écrou (2) et le manchon en plastique (bague) (3) sur le tube d'alimentation coupé. Assurez-vous que le manchon en plastique est orienté comme le montre la figure.
3. Introduisez le tube d'alimentation dans le raccord du robinet d'alimentation (4). Le tube doit toucher le fond du trou à l'intérieur du raccord du robinet d'alimentation.
4. Faites glisser le manchon en plastique (bague) dans le tube jusqu'à ce qu'il entre en contact avec le raccord du robinet d'alimentation.
5. Glissez l'écrou sur le manchon en plastique (virole). Amorcer l'écrou à la main pour ne pas risquer de foirer les filets. Tournez l'écrou jusqu'à ce qu'il soit appuyé. Faites ensuite au moins deux tours supplémentaires avec une clé. Branchez l'autre tube d'alimentation de la même manière. Rétablissez l'alimentation en eau et vérifiez l'étanchéité.

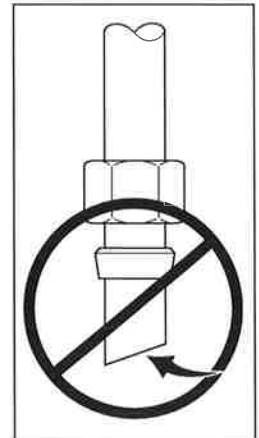
Incorrect Installation
Instalación Incorrecta
Installation Incorrecte



Do not install sleeve upside down.

No instale la manga boca abajo.

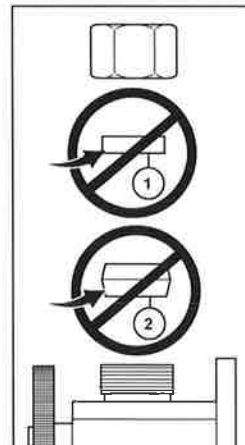
N'installez pas le manchon à l'envers.



Ensure cut is straight.

Asegúrese que el corte esté recto.

Assurez-vous que la coupe est droite.



Do not use gasket (1) supplied with PEX tubing or brass ferrule (2) supplied with valve stops.

No use empaque (1) suministrado con el tubería de PEX o el casquillo de bronce (2) suministrado con las válvulas de cierre.

N'utilisez pas le joint (1) fournie avec la tuyauterie de PEX ou la bague en cuivre (2) fournie avec les robinets d'arrêt.



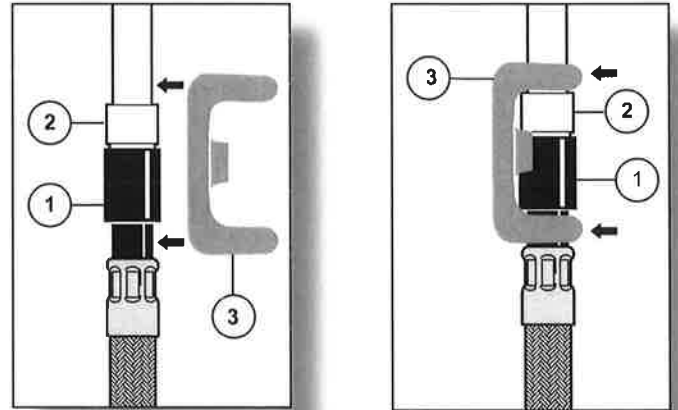
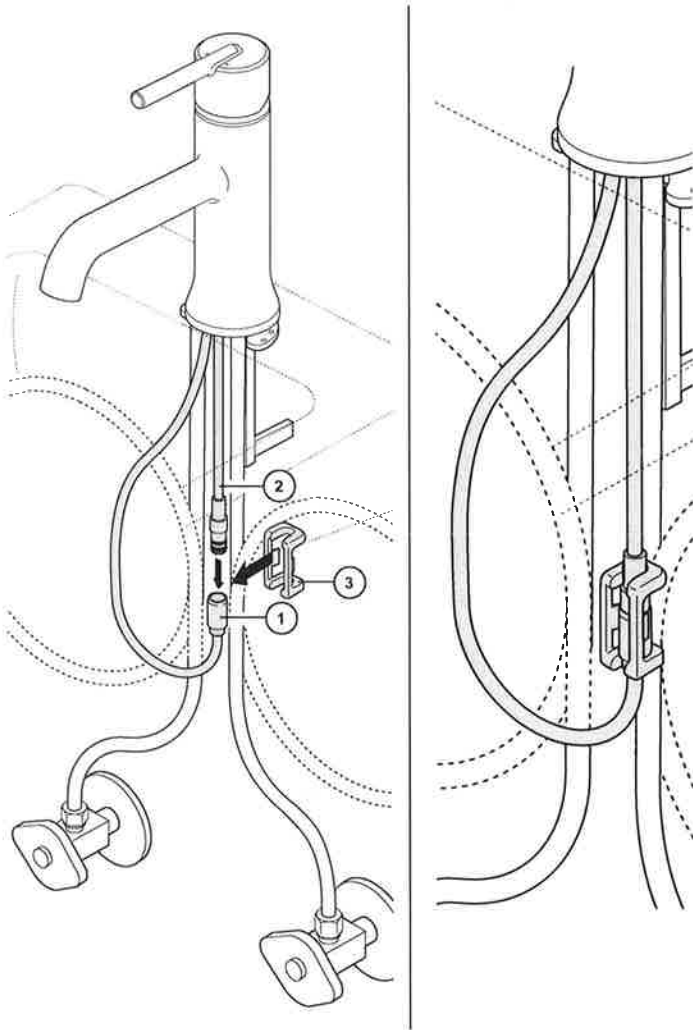
Ensure tube is fully inserted into stop before sliding sleeve down to engage top of fitting.

Asegúrese que el tubo este completamente introducido dentro del tope antes de deslizar la manga hacia abajo para encajar la parte superior del accesorio.

Assurez-vous que le tube est introduit entièrement dans le robinet d'arrêt avant de faire glisser le manchon vers le bas pour le fixer à la partie supérieure du raccord.

3

**HOSE CONNECTION NOT SUPPLIED ON ALL MODELS
 LAS CONEXIONES DE LAS MANGUERAS NO SE INCLUYEN CON TODOS LOS MODELOS
 RACCORD DE TUYAU SOUPLE NON LIVRÉ AVEC TOUS LES MODÈLES**



Connect outlet tube (1) to spout tube (2) with supplied clip (3). Pull on tube (1) to ensure it is firmly attached.

Conecte el tubo de salida (1) a la espita tubo (2) con el clip suministrado (3). Hale la manguera (1) para asegurarse de que esté bien conectado.

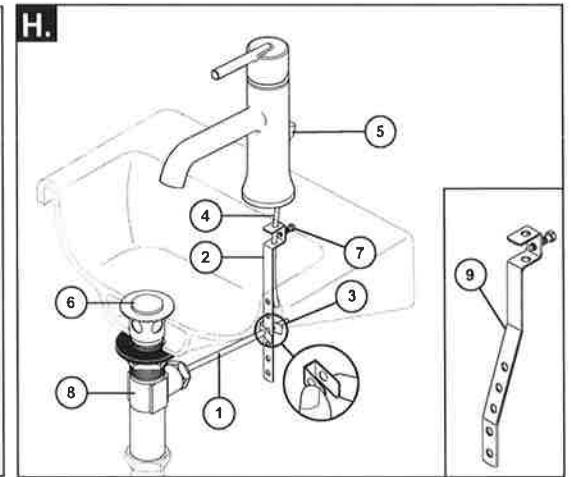
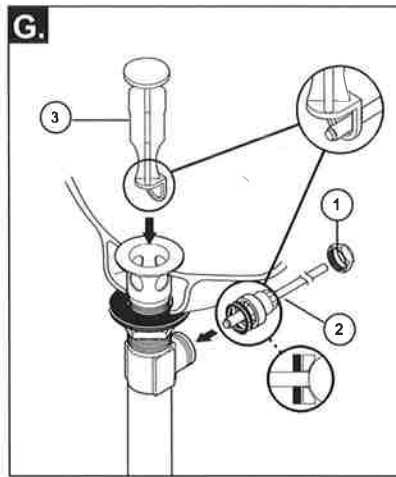
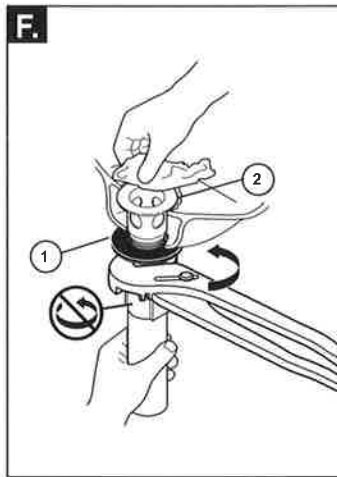
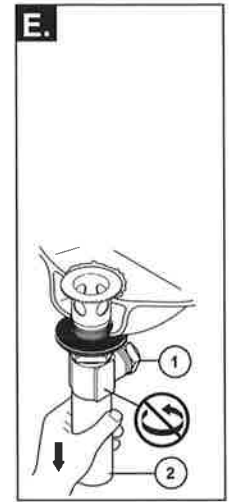
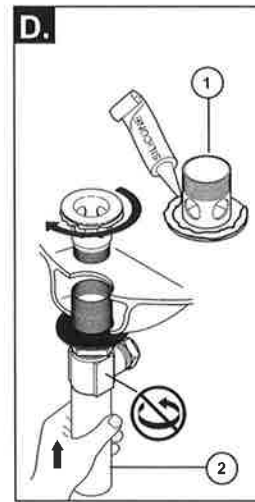
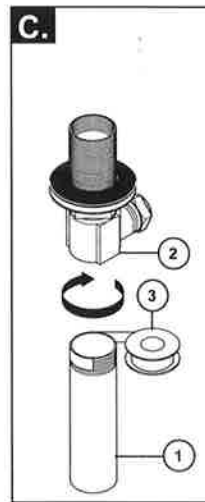
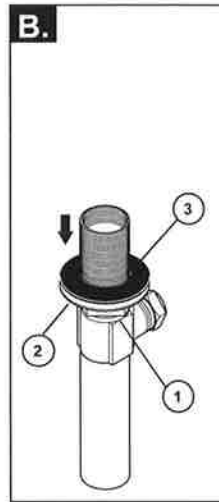
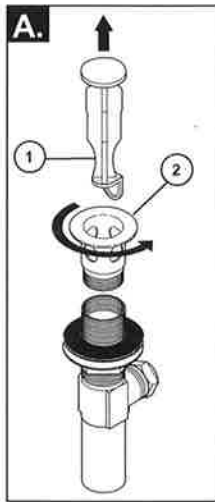
Connectez le tube de sortie (1) à bec tube (2) avec clip fourni (3). Tirez sur le tuyau (1) pour s'assurer qu'il est bien fixé.

4

IF YOUR BATHROOM FAUCET WAS SUPPLIED WITH A POP-UP OR GRID STRAINER, SELECT ONE OF THE INSTALLATIONS PROVIDED BASED ON YOUR TYPE OF DRAIN. (REFER TO INSTALLATIONS FOUND ON PAGES 7 - 10)

SI SU GRIFO DE BAÑO TIENE UN DESAGÜE AUTOMÁTICO O FILTRO DE REJILLA, SELECCIONE UNO DE LOS MÉTODOS DE INSTALACIÓN SEGÚN EL TIPO DE REFERENCIA. (CONSULTE LOS MÉTODOS DE INSTALACIÓN DESCRITOS EN LAS PÁGINAS 7 A 10.)

SI VOTRE ROBINET DE SALLE DE BAIN EST MUNI D'UN RENVOI MÉCANIQUE OU D'UNE CRÉPINE, SÉLECTIONNEZ UNE DES MÉTHODES D'INSTALLATION SELON LE TYPE DE RENVOI. (REPORTEZ-VOUS AUX MÉTHODES D'INSTALLATION DÉCRITES AUX PAGES 7 À 10.)



Metal Pop-Up

- A.** Remove stopper (1) and flange (2).
- B.** Screw nut (1) all the way down. Push washer (2) and gasket (3) down.
- C.** Remove tailpiece (1) from body (2), add plumber tape (3), replace tailpiece.
- D.** Apply silicone to underside of flange (1). Insert body (2) into sink. Screw flange (1) into body (2).

- E.** Pivot (1) must face faucet. Pull assembly (2) down firmly and hold in place. DO NOT TWIST.
- F.** Tighten nut/washer/gasket (1), clean off excess silicone (2). DO NOT TWIST.
- G.** Remove pivot nut (1). Install horizontal rod (2) and stopper (3) as non-removable. Hand tighten pivot nut (1) to provide free stopper movement.

- H.** Ensure the lift rod slider (5) is pulled all the way up and stopper (6) is pushed all the way down. Install lift rod (4) into strap (2) with the screw (7) facing the wall. Attach horizontal lift rod (1) to strap (2) using clip (3). The strap can be bent (9) to reach the horizontal arm on deep sink applications but should be kept straight as possible. Tighten screw (7). Connect pop-up assembly to drain (8).

Desagüe Automático de Metal

- A.** Quite el tapón (1) y el reborde (2).
- B.** Atornille la tuerca (1) completamente hasta abajo. Empuje la arandela/roldana (2) y el empaque (3) hacia abajo.
- C.** Quite el tubo de cola (1) del cuerpo (2), aplique cinta (3), coloque otra vez el tubo de cola.
- D.** Aplique silicón a la parte interior del reborde (1). Inserte el cuerpo (2) en el lavamanos. Atornille el reborde (1) en el cuerpo (2).

- E.** El pivote (1) debe de estar de frente a la llave. Hale el ensamble (2) hacia abajo firmemente y sujételo en sitio. NO LO GIRE.
- F.** Apriete la tuerca/arandela/empaque (1), limpie el exceso de silicón (2). NO LO GIRE.
- G.** Quite la tuerca del pivote (1). Instale la barra horizontal (2) y el tapón (3) de manera no extraíble. Apriete a mano la tuerca del pivote (1) para proporcionar el movimiento libre del tapón.

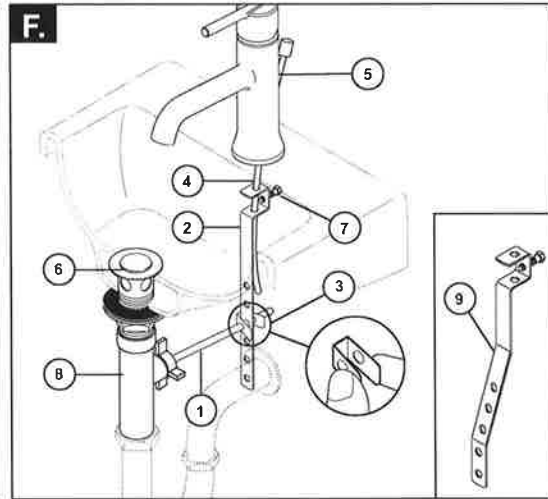
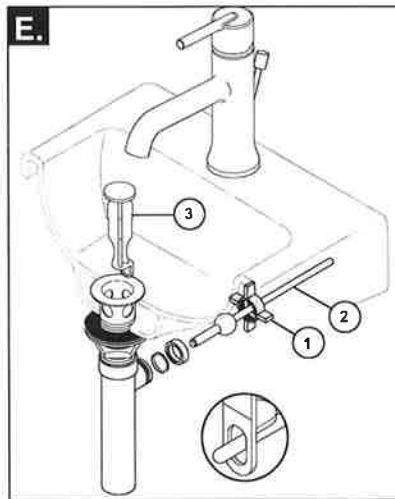
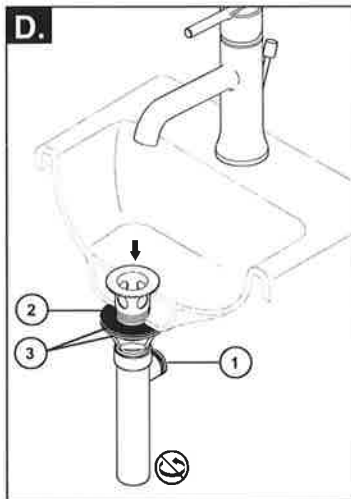
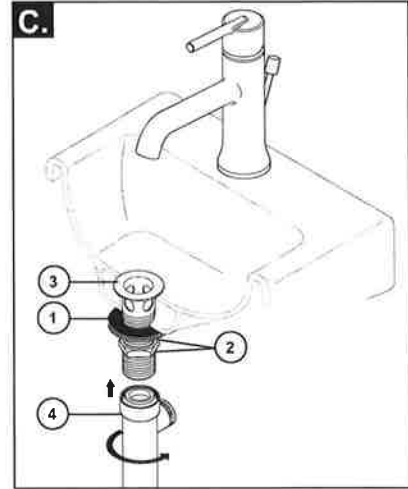
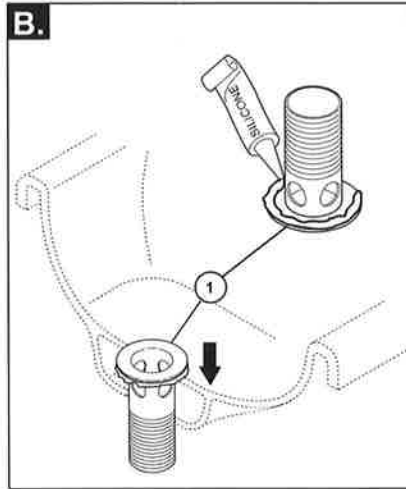
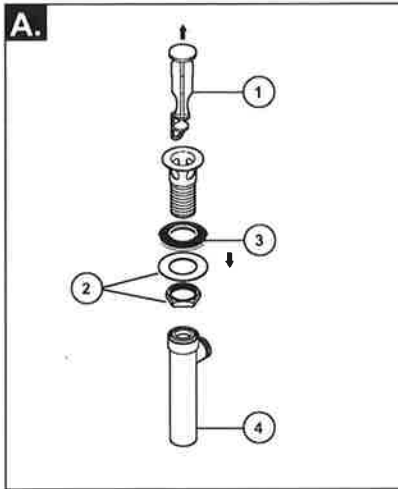
- H.** Asegúrese de que la corredera/pieza deslizable (5) y la barra del desagüe (6) están completamente presionadas al fondo. Instale la barra del desagüe (4) en la correa (2) con el tornillo (7) frente a la pared. Conecte la barra horizontal del desagüe (1) a la correa (2) utilizando el gancho (3). La correa se puede doblar (9) para alcanzar el brazo horizontal en aplicaciones para fregaderos profundos, pero debe mantenerse lo más recto posible. Apriete el tornillo (7). Conecte el ensamble del desagüe al drenaje (8).

Renvoi Mécanique en Métal

- A.** Enlevez la bonde (1) et la collerette (2).
- B.** Serrez l'écrou (1) pour le faire descend complètement. Poussez la rondelle (2) et le joint (3) vers le bas.
- C.** Enlevez le raccord droit de vidange (1) du corps (2), appliquez du ruban (3), puis remettez le raccord droit en place.
- D.** Appliquez du composé à la silicone sous la collerette (1). Introduisez le corps (2) dans lav-abo, puis vissez la collerette (1) dans le corps (2).

- E.** Le pivot (1) doit faire face au robinet. Tirez l'ensemble (2) vers le bas fermement et maintenez-le en place. PRENEZ GARDE DE LE TORDRE.
- F.** Serrez l'écrou contre la rondelle et le joint (1), puis enlevez le surplus de composé à la silicone (2). PRENEZ GARDE DE TORDRE LE PIVOT.
- G.** Enlevez l'écrou de rotule (1). Montez la tige horizontale (2) et la bonde (3) de manière que celle-ci ne puisse être enlevée. Serrez l'écrou de rotule (1) à la main de manière que la bonde puisse bouger librement.

- H.** Assurez-vous que le coulisseau de la tirette (5) est remonté au maximum et que la bonde (6) est abaissée au maximum. Installez la tirette (4) dans le feuillard (2) de manière que la vis (7) se trouve face au mur. Fixez la tirette horizontale (1) au feuillard (2) à l'aide de l'agrafe (3). Si le lavabo est profond, vous pouvez cintrer le feuillard (9) pour qu'il puisse atteindre le bras horizontal, mais il doit être aussi droit que possible. Serrez la vis (7). Raccordez le renvoi mécanique au tuyau de renvoi (8).



Pop-Up with Metal Flange and Plastic Tail Piece

- A.** Remove stopper (1), brass nut & washer (2), black gasket (3) and tail piece (4).
- B.** Apply silicone to underside of flange (1). Insert flange into sink.
- C.** Install black gasket (1), washer and brass nut (2) onto flange (3) from below sink but do not tighten brass nut (2). Screw on tail piece (4) and hand tighten.

- D.** With pivot (1) facing toward faucet, pull pop-up straight down into drain hole and secure gasket (2), brass nut and washer (3). **DO NOT TURN POP-UP WHILE TIGHTENING BRASS NUT OR SEALANT MAY NOT SEAL DRAIN.** Remove excess sealant.
- E.** Remove pivot nut (1). Install horizontal rod (2) and stopper (3) as non-removable. Hand tighten pivot nut (1) to provide free stopper movement.

- F.** Ensure the lift rod slider (5) is pulled all the way up and stopper (6) is pushed all the way down. Install lift rod (4) into strap (2) with the screw (7) facing the wall. Attach horizontal lift rod (1) to strap (2) using clip (3). The strap can be bent (9) to reach the horizontal arm on deep sink applications but should be kept straight as possible. Tighten screw (7). Connect pop-up assembly to drain (8).

Drenaje automático con brida de metal y la pieza de cola plástica

- A.** Quite el tapón (1), la tuerca de bronce y la arandela (2), el empaque negro (3) y la pieza de cola (4).
- B.** Aplique silicón por debajo de la brida (1). Introduzca la brida dentro del lavamanos.
- C.** Instale el empaque negro (1), la arandela y la tuerca de bronce (2) en la brida (3) desde la parte interior del lavamanos pero no apriete la tuerca de bronce (2). Atornille la pieza de cola (4) y apriete a mano.

- D.** Con el pivote (1) de frente a la llave, hale el Desagüe automático directamente hacia abajo dentro del drenaje y fije el empaque (2), la tuerca de bronce y la arandela (3). **NO GIRE EL DRENAJE AUTOMÁTICO MIENTRAS APRIETE LA TUERCA DE BRONCE O EL SELLADOR PUEDA NO SELLAR EL DRENAJE.** Quite el exceso de sellador.

- E.** Quite la tuerca del pivote (1). Instale la barra horizontal (2) y el tapón (3) de manera no extraíble. Apriete a mano la tuerca del pivote (1) para proporcionar el movimiento libre del tapón.

- F.** Asegúrese de que la corredera/pieza deslizante (5) y la barrita del desagüe (6) están completamente presionadas al fondo. Instale la barrita del desagüe (4) en la correa (2) con el tornillo (7) frente a la pared. Conecte la barrita horizontal del desagüe (1) a la correa (2) utilizando el gancho (3). La correa se puede doblar (9) para alcanzar el brazo horizontal en aplicaciones para fregaderos profundos, pero debe mantenerse lo más recto posible. Apriete el tornillo (7). Conecte el ensamblaje del desagüe al drenaje (8).

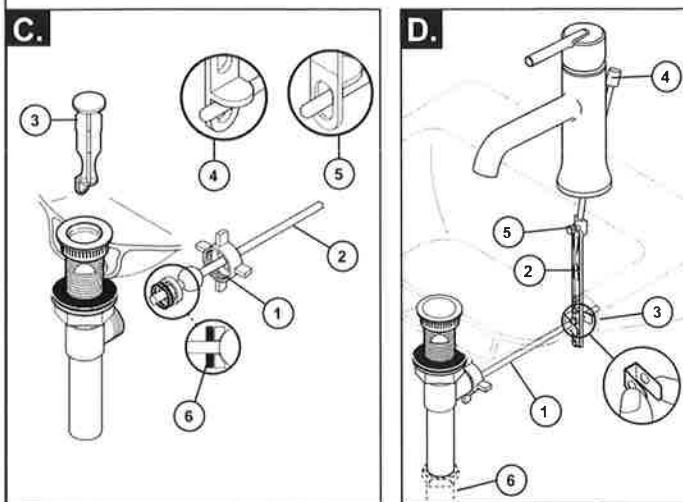
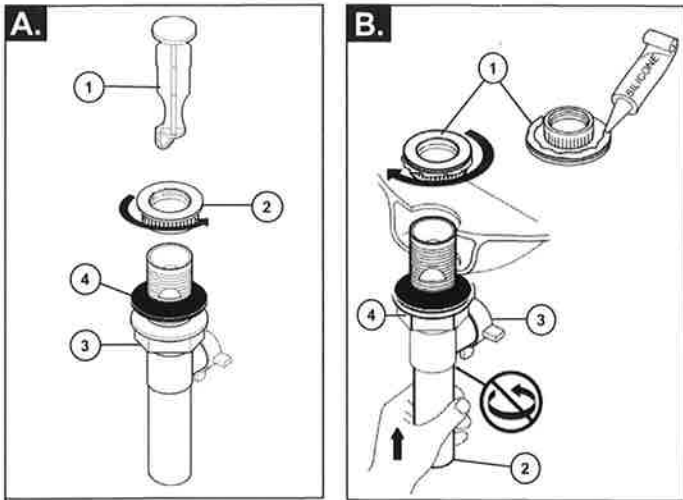
Renvoi mécanique avec collerette en métal et raccord droit de vidange en plastique

- A.** Enlevez la bonde (1), l'écrou en laiton et la rondelle (2), le joint noir (3) et le raccord droit de vidange (4).
- B.** Appliquez de composé à la silicone sous la collerette (1). Introduisez la collerette dans l'évier.
- C.** Montez le joint noir (1), la rondelle et l'écrou en laiton (2) sur la collerette (3) par dessous l'évier sans serrer l'écrou en laiton (2). Vissez le raccord droit de vidange (4) et serrez-le à la main.

- D.** Alors que le pivot (1) fait face au robinet, tirez le renvoi directement vers le bas dans l'orifice de l'évier, puis fixez le joint (2), l'écrou en laiton et la rondelle (3). **NE TOURNEZ PAS LE RENVOI PENDANT QUE VOUS SERREZ L'ÉCROU EN LAITON CAR LE COMPOSÉ À LA SILICONE POURRA NE PAS ASSURER L'ÉTANCHÉITÉ DU RENVOI.** Enlevez l'excès de composé d'étanchéité.

- E.** Enlevez l'écrou de rotule (1). Montez la tige horizontale (2) et la bonde (3) de manière que celle-ci ne puisse être enlevée. Serrez l'écrou de rotule (1) à la main de manière que la bonde puisse bouger librement.

- F.** Assurez-vous que le coulisseau de la tirette (5) est remonté au maximum et que la bonde (6) est abaissée au maximum. Installez la tirette (4) dans le feuillard (2) de manière que la vis (7) se trouve face au mur. Fixez la tirette horizontale (1) au feuillard (2) à l'aide de l'agrafe (3). Si le lavabo est profond, vous pouvez cintrer le feuillard (9) pour qu'il puisse atteindre le bras horizontal, mais il doit être aussi droit que possible. Serrez la vis (7). Raccordez le renvoi mécanique au tuyau de renvoi (8).



Plastic Pop-Up

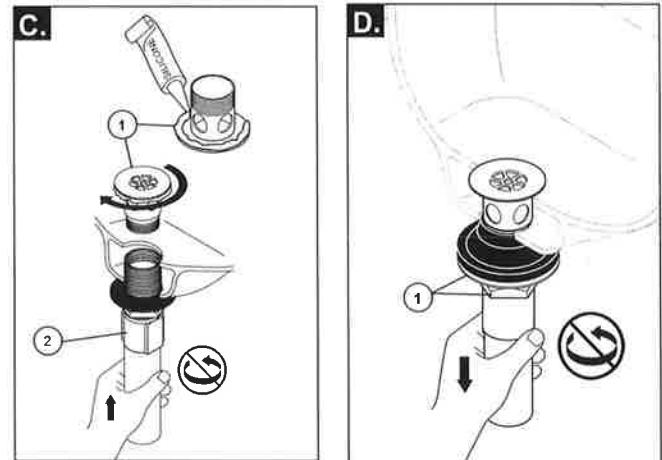
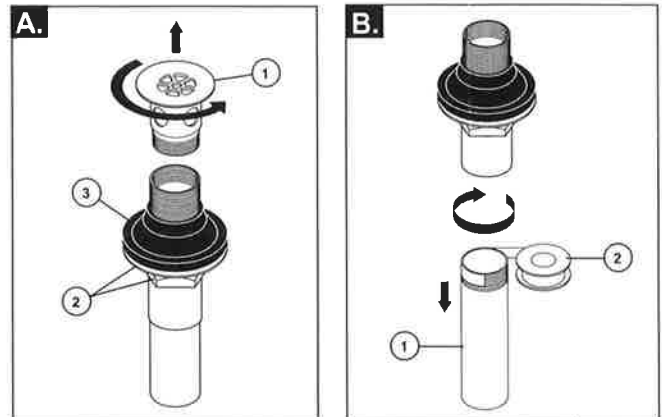
- Remove stopper (1) and flange (2). Screw nut (3) all the way down. Push black gasket (4) down.
- Apply silicone to underside of flange (1). Insert body (2) into sink. Screw flange onto body. Pivot hole (3) must face back of sink. Pull assembly down firmly and hold in place. **DO NOT TWIST.** Tighten nut (4), remove excess sealant.
- Remove pivot nut (1). Install horizontal rod (2) and stopper (3) as removable (4) or non-removable (5). Hand tighten nut (1). Gaskets (6) only required if supplied.
- Attach horizontal rod (1) to strap (2) using clip (3). Install lift rod (4), tighten screw (5). Connect assembly to drain (6).

Pop-Up de plástico

- Quite el tapón (1), y la brida (2). Atornille la tuerca (3) completamente hacia abajo. Empuje el empaque (4) hacia abajo.
- Aplique silicona a la parte inferior de la brida (1). Introduzca el cuerpo (2) dentro del lavamanos. Atornille la brida en el cuerpo. El hoyo del pivote (3) debe de estar cara hacia la parte posterior del lavamanos. Hale el ensamble hacia abajo firmemente y sostenga en sitio. No tuerza. Apriete la tuerca (4), quite el exceso de sellador.
- Quite la tuerca del pivote (1). Instale la barra horizontal (2) y el tapón (3) como desmontable (4) o fijo (5). Apriete la tuerca mano (1). Se requieren los empaques (6) solo cuando se incluyen.
- Conecte la barra horizontal (1) a la barra chata (2) usando el gancho (3). Instale la barra elevadora (4), apriete el tornillo (5). Conecte el ensamble al drenaje (6).

Pop-up en plastique

- Retirez la bonde (1) et la collerette (2). Vissez (3) l'écrou à fond. Poussez le joint (4) vers le bas.
- Appliquez du composé d'étanchéité à la silicone contre le dessous de la collerette (1). Introduisez le corps (2) dans l'évier. Le trou du pivot (3) doit faire face à l'arrière de l'évier. Tirez l'ensemble vers le bas et maintenez-le en place fermement. **N'EXERCEZ PAS DE TORSION.** Serrez l'écrou (4) et enlevez le composé d'étanchéité en trop.
- Retirez l'écrou du pivot (1). Installez la tige horizontale (2) et la bonde (3) de manière qu'elle soit amovible (4) ou non amovible (5). Serrez l'écrou (1) à la main. Les joints (6) sont requis seulement s'ils sont fournis.
- Fixez la tige horizontale (1) au feuillard (2) à l'aide de l'agrafe (3). Installez la tirette (4) et serrez la vis (5). Raccordez l'ensemble au tuyau d'évacuation (6).



Grid Strainer Installation

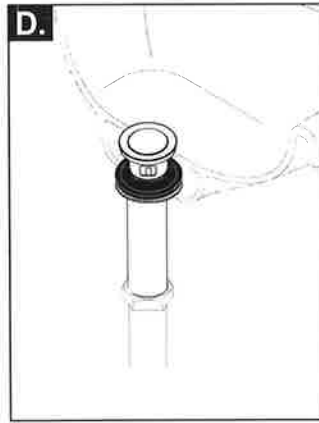
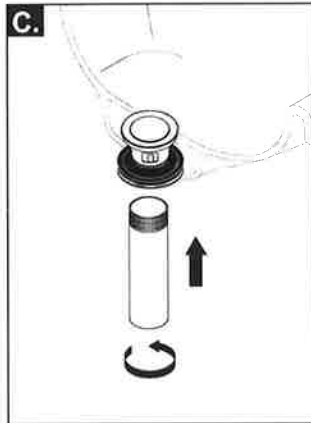
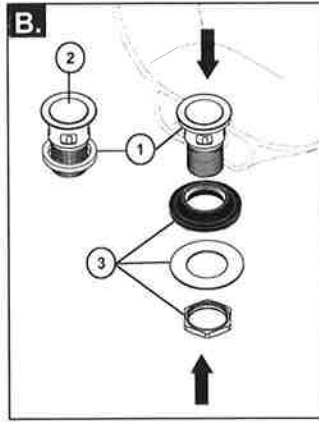
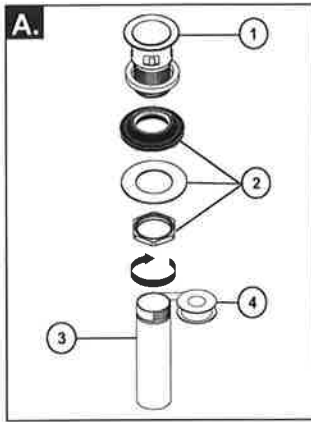
- Remove grid flange (1). Screw nut and washer (2) down as far as possible. Push gasket (3) down to nut and washer.
- Remove tailpiece (1) and apply plumber tape (2) to threads. Replace tailpiece.
- Apply silicone sealant to underside of grid flange (1). Insert grid strainer assembly (2) up through bottom of lavatory. Screw grid flange back on and secure.
- Pull grid strainer straight down into drain hole and secure gasket nut and washer (1). **DO NOT TURN GRID STRAINER WHILE TIGHTENING NUT OR SEALANT MAY NOT SEAL DRAIN. REMOVE EXCESS SEALANT.** Connect assembly to drain.

Instalación de la Rejilla Coladora

- Quite el reborde de la rejilla (1). Atornille la tuerca y la arandela (2) lo más posible. Empuje el empaque (3) hacia abajo, hacia la tuerca y la arandela.
- Quite el tubo de cola (1) y aplique cinta plomero (2) a las roscas. Coloque otra vez el tubo de cola.
- Aplique sellador de silicona a la parte de abajo del reborde de la rejilla (1). Inserte el ensamble de la rejilla-colador (2) hacia arriba por debajo del lavamanos. Atornille, otra vez, el reborde de la rejilla y fíjelo.
- Hale la rejilla colador directamente hacia abajo, que quede dentro del hoyo del drenaje, y fije la tuerca del empaque y la arandela (1). **NO GIRE LA REJILLA O EL SELLADO PUEDE NO SELLAR EL DRENAJE. LIMPIE EL EXCESO DE SELLADOR.** Conecte el ensamble al desagüe.

Installation de la crépine

- Retirez la collerette de la crépine (1). Vissez l'écrou avec la rondelle (2) autant ue possible. Abaissez le joint (3) contre l'écrou et la rondelle.
- Enlevez le raccord droit de vidange (1) et appliquez du ruban de plomberie (2) sur les filets. Remettez le raccord en place.
- Appliquez du composé à la silicone contre le dessous de la collerette de la crépine (1). Introduisez la crépine (2) dans l'orifice par le dessous du lavabo. Remettez la collerette en place et vissez-la à fond.
- Tirez la crépine vers le bas dans l'orifice et vissez l'écrou contre la rondelle et le joint (1). **D'ÉTANE FAITES PAS TOURNER LA CRÉPINE EN SERRANT L'ÉCROU CAR LE COMPOSÉ D'ÉTANCHÉITÉ POURRA PERDRE SON EFFICACITÉ. ENLEVEZ LE COMPOSÉ D'ÉTANCHÉITÉ EN TROP.** Fixez l'ensemble au renvoi.



Springloaded Pop-up Installation

- Remove Springloaded flange (1). Remove the gasket, washer and nut (2) from the assembly. Remove tailpiece (3) and apply plumber tape (4) to threads.
- Slide gasket (1) up to underside of springloaded flange (2). Insert flange and gasket into sink and secure with the black gasket washer and nut (3) from underneath the sink.
- Thread the tailpiece (1) into the bottom of the flange (2).
- Connect assembly to drain.

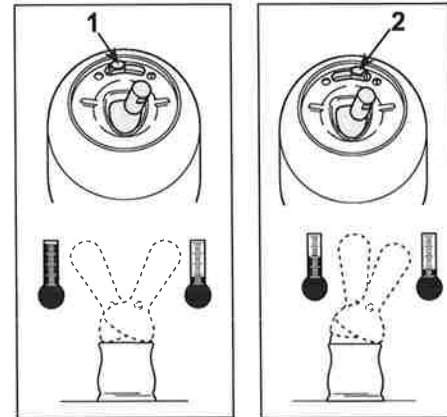
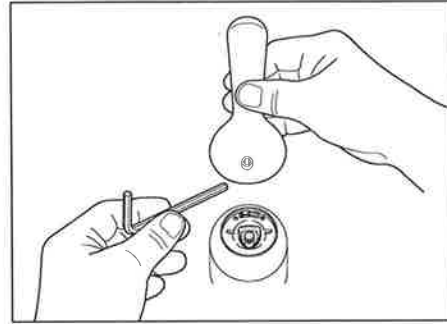
Instalación del desagüe automático de resorte

- Retire el collar de resorte (1) del desagüe automático. Retire el empaque, la arandela y la tuerca (2) del conjunto. Retire el tubo de drenaje (3) y aplique cinta de sellador (4) a las roscas.
- Deslice el empaque (1) contra la parte inferior del collar de resorte (2). Inserte la brida y el empaque del lavamanos, luego fíjelas con la arandela de sellado negra y la tuerca (3) debajo del lavamanos.
- Atornille el accesorio de drenaje derecho (1) en la parte inferior del collar (2).
- Conecte el ensamblaje al desagüe.

Installation du renvoi mécanique à ressort

- Enlevez la collerette à ressort (1). Retirez le joint plat, la rondelle et l'écrou (2) de l'ensemble. Enlevez le raccord droit de vidange (3) et appliquez du ruban d'étanchéité (4) sur les filets.
- Glissez le joint plat (1) contre le dessous de la collerette à ressort (2). Introduisez la collerette et le joint plat dans le lavabo, puis fixez-les avec la rondelle d'étanchéité noire et l'écrou (3) en dessous du lavabo.
- Vissez le raccord de vidange droit (1) dans la partie inférieure de la collerette (2).
- Raccordez l'ensemble au renvoi.

5



Setting The Handle Limit Stop (Optional) - not supplied with all faucets

Some faucets include an integrated handle limit stop that has two positions. Position 1, to the left, allows full handle motion (the full range between "all cold" to "all hot"). The faucet is set in position 1 in the factory. Position 2, to the right, allows half of the normal handle motion ("all cold" to "mixed hot/cold").

The handle limit stop can be adjusted by the homeowner once the faucet is installed. Setting the handle limit stop in position 2 may help to prevent scalding because it limits the amount of hot water in the mix; however, this handle limit stop will not always prevent scalding because it does not compensate for incoming pressure or sudden water temperature changes.

To change positions of the handle limit stop: remove the handle; move the valve stem to the all cold position so the water is on; change the position of the handle limit stop; turn off the water; reinstall the handle.

La configuración del tope del límite rotacional de la manija (opcional): no se suministra con todas las llaves de agua/grifos.

Algunos grifos incluyen un tope del límite rotacional de la manija integrado que tiene dos posiciones. Posición 1, a la izquierda, permite el movimiento completo de la manija (el rango completo entre "todo frío" y "todo caliente"). El grifo se encuentra en la posición de fábrica 1. La posición 2, a la derecha, permite la mitad del movimiento normal de la manija ("todo frío" a "mezclado frío/caliente").

Una vez que la llave de agua (grifo) se ha instalado, el límite rotacional de la manija puede ajustarse por el propietario de la residencia. Ajustando la manija de ajuste del tope del límite de la temperatura a la posición 2 puede ayudar a prevenir escaldaduras porque limita la cantidad de agua caliente en la mezcla; sin embargo, esta manija que limita la temperatura del agua no siempre prevendrá escaldaduras porque no compensa la presión del agua de entrada o cambios repentinos de la temperatura del agua.

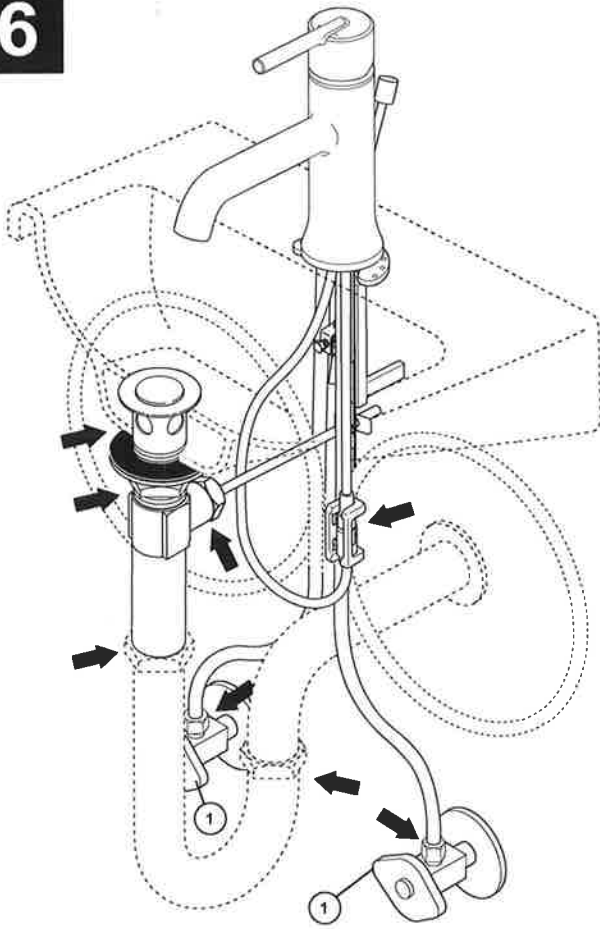
Para cambiar las posiciones de la manija que limitan la temperatura: quite la manija; cambie la posición de la espiga de la válvula a la posición totalmente fría de manera que el agua este abierta; cambie la posición de la manija que limita la temperatura; cierre el agua; reinstale la manija.

Réglage de la butée de température maximale (facultative) – non livrée avec tous les robinets

Certains robinets sont munis d'une butée de température maximale à deux positions. La position 1, à gauche, permet un déplacement de la manette sur toute la plage comprise entre les positions d'eau « la plus froide » et d'eau « la plus chaude ». La butée est réglée à la position 1 en usine. La position 2, à droite, permet un déplacement de la manette sur la moitié de la plage normale (entre la position d'eau « la plus froide » et la position d'eau « froide et chaude mélangée »).

Il est possible de régler la butée de température maximale de la manette au moment de l'installation du robinet. Un réglage à la position 2 peut empêcher l'ébullition parce que cette position limite la quantité d'eau chaude dans le mélange. Toutefois, ce réglage de la butée de température maximale de la manette ne constitue pas une garantie absolue contre l'ébullition parce qu'il n'offre aucune protection contre les fluctuations de la pression d'alimentation ou les changements de température soudains.

Pour modifier la position de la butée de température maximale de la manette : enlevez la manette; amenez l'obturateur à l'extrémité de la plage du côté eau froide pour faire s'écouler l'eau; modifiez la position de la butée de température maximale; fermez le robinet; réinstallez la manette.

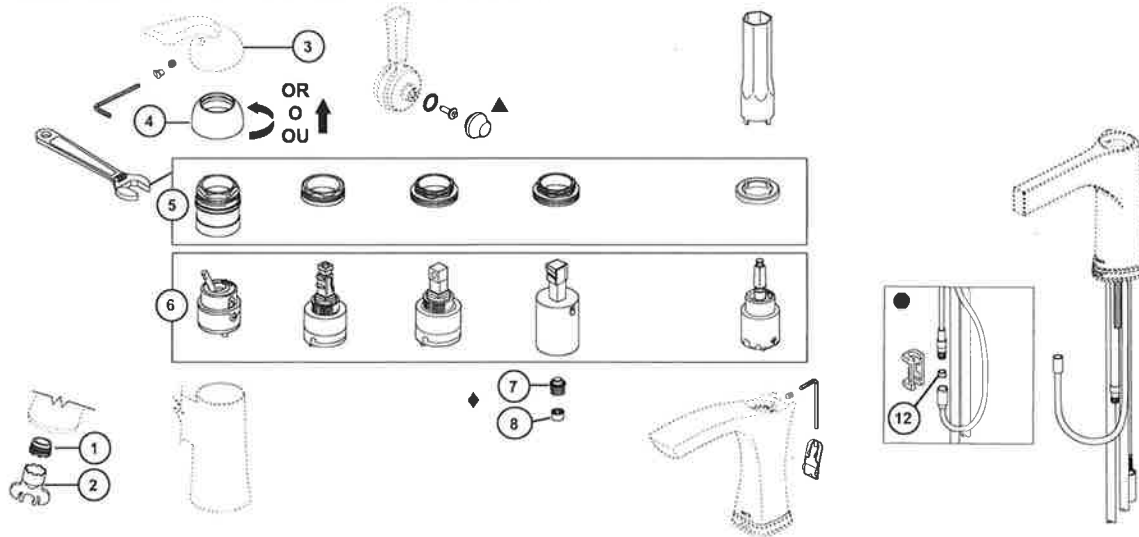
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Turn on hot and cold water supplies (1) and check all connections at arrows for leaks. Retighten if necessary, but do not overtighten.

Abra los suministros de agua caliente y fría (1) y examine todas las conexiones donde señalan las flechas por si hay filtraciones de agua. Apriete de nuevo si es necesario, pero no apriete demasiado.

Rétablissez l'alimentation en eau chaude et en eau froide (1) et vérifiez l'étanchéité de tous les raccords identifiés par une flèche. Resserrez les raccords au besoin, mais prenez garde de trop les serrer.

Maintenance / Mantenimiento / Entretien



If faucet exhibits very low flow:

- A. Remove aerator (1) with supplied wrench (2) and clean aerator.**
NOTE: Not all models are supplied with wrench & aerator.
- ◆ If your faucet does not have an aerator. **SHUT OFF WATER SUPPLIES.** Remove handle (3) and pull off trim cap (4). Remove bonnet nut (5). Remove valve cartridge (6). Remove adapter (7) using long nose pliers. Remove flow regulator (8) using an o-ring pick or similar tool. Clean any debris from inside surfaces of the flow regulator. When reinstalling parts, **make sure bonnet nut (5) is tightened securely with a wrench.***
 - Refer to **STEP 3** of installation instructions to flush debris at the outlet. Clean and reinstall the flow restrictor (12).
- B. SHUT OFF WATER SUPPLIES.** Replace valve cartridge (6). When reinstalling parts, make sure bonnet nut (5) is tightened securely with a wrench.*

If faucet leaks from under handle:

Remove handle and remove trim cap (4). Using a wrench, ensure bonnet nut (5) is tight.

- Remove cover & set screw (9), bonnet (5), glide ring and handle. Using provided wrench (10), ensure bonnet nut (5) is tight.*

▲ Remove handle finial (11), screw, handle (12) and bonnet nut (5). When reinstalling parts, ensure bonnet nut (5) is tight.

If leak persists—SHUT OFF WATER SUPPLIES. Replace valve cartridge (6). When reinstalling parts, make sure bonnet nut (5) is tightened securely with a wrench.*

If faucet leaks from spout outlet—SHUT OFF WATER SUPPLIES. Replace valve cartridge (6). When reinstalling parts, make sure bonnet nut (5) is tightened securely with a wrench.*

*** CAUTION: Failure to securely tighten bonnet nut with a wrench could result in water damage.**

Note: Do not attempt to disassemble cartridge (6). There are no repairable parts inside.

Si el flujo del grifo es muy bajo:

- A. Retire el aireador (1) con la llave suministrada (2) y límpielo.**
NOTA: La llave y el aireador no están incluidos con todos los modelos.
- ◆ Si su grifo no tiene aireador - **CIERRE LAS VÁLVULAS DE ALIMENTACIÓN.** Retire la manija (3) y la tapa del extremo (4). Retire la tuerca tapa (5). Retire el cartucho de la válvula (6). Retire el adaptador (7) con unos alicates de punta larga. Retire el regulador de flujo (8) con un extractor de juntas tóricas o una herramienta similar. Retire los objetos extraños de las superficies internas del regulador de flujo. Al reemplazar las piezas, **asegúrese de que la tuerca ciega (5) esté bien apretada con una llave.**
 - Consulte el **PASO 3** para obtener instrucciones de instalación para ver cómo eliminar residuos en la salida del tubo. Limpie el limitador de flujo (12) y vuelva a colocarlo en su lugar.
- B. CIERRE LOS SUMINISTROS DE AGUA.** Reemplace el cartucho de la válvula (6). Al reemplazar piezas, asegúrese de que la tuerca tapa (5) esté bien apretada con una llave de tuercas.*

Si el grifo gotea por debajo de la manija:

Retire la manija y retire la tapa de ajuste (4). Con una llave de tuercas, asegúrese de que la tuerca tapa (5) esté apretada.

- Retire la tapa y el tornillo de ajuste (9), el casquete (5), el anillo deslizante y la manija. Usando la llave inglesa que se incluye (10), asegúrese de que la tuerca tapa (5) esté apretada.*

▲ Retire el botón de la manija (11), el tornillo, la manija (12) y la tuerca tapa (5). Al reinstalar las piezas, asegúrese de que la tuerca tapa (5) esté apretada.

Si la fuga persiste, CIERRE LOS SUMINISTROS DE AGUA. Reemplace el cartucho de la válvula (6). Al reinstalar piezas, asegúrese de que la tuerca tapa (5) esté apretada de manera segura con una llave.*

Si el grifo gotea de la salida del surtidor, CIERRE LOS SUMINISTROS DE AGUA. Reemplace la válvula de cartucho (6). Al reinstalar piezas, con una llave inglesa, asegúrese de que la tuerca tapa (5) esté bien apretada.*

*** PRECAUCIÓN: Si no aprieta firmemente la tuerca tapa con una llave podría resultar en daños de agua.**

Nota: No intente desmontar el cartucho (6). No hay piezas reparables en el interior.

Si le débit du robinet est très faible :

- A. Enlevez l'aérateur (1) avec la clé fournie (2) et nettoyez-le.**
NOTE : La clé et l'aérateur ne sont pas livrés avec tous les modèles.
- ◆ Si votre robinet n'est pas muni d'un aérateur - **FERMEZ LES ROBINETS D'ALIMENTATION.** Retirez la manette (3) et le capuchon de finition (4). Enlevez l'écrou-chapeau (5). Enlevez la cartouche de soupape (6). Enlevez l'adaptateur (7) à l'aide d'une pince à long bec. Enlevez le régulateur de débit (8) à l'aide d'un extracteur de joint torique ou d'un outil semblable. Retirez les corps étrangers présents sur les surfaces internes du régulateur de débit. Au moment de la remise en place des pièces, **assurez-vous que l'écrou-chapeau (5) est serré solidement à l'aide d'une clé.***
 - Consultez **L'ÉTAPE 3** des instructions d'installation pour voir comment évacuer les corps étrangers par la sortie. Nettoyez le limiteur de débit (12) et remettez-le en place.
- B. FERMEZ LES ROBINETS D'ALIMENTATION.** Remplacez la cartouche de soupape (6). Au moment de la remise en place des pièces, assurez-vous que l'écrou-chapeau (5) est serré solidement avec une clé.*

Si le robinet fuit sous la manette :

Enlevez la manette, puis le capuchon de finition (4). À l'aide d'une clé, assurez-vous que l'écrou-chapeau (5) est serré.

- Enlevez le cache-vis et la vis de calage (9), le chapeau (5), l'anneau de glissement et la manette. À l'aide de la clé fournie (10), assurez-vous que l'écrou-chapeau (5) est serré.*

▲ Enlevez le fretel de la manette (11), la vis, la manette (12) et l'écrou-chapeau (5). Au moment de la remise en place des pièces, assurez-vous que l'écrou-chapeau (5) est serré.

Si la fuite persiste – FERMEZ LES ROBINETS D'ALIMENTATION. Remplacez la cartouche de soupape (6). Au moment de la remise en place des pièces, assurez-vous que l'écrou-chapeau (5) est serré solidement avec une clé.*

Si le robinet fuit par la sortie du bec – FERMEZ LES ROBINETS D'ALIMENTATION. Remplacez la cartouche de soupape (6). Au moment de la remise en place des pièces, assurez-vous que l'écrou-chapeau (5) est serré solidement avec une clé.*

*** ATTENTION : L'omission de serrer l'écrou-chapeau solidement avec une clé pourrait entraîner une fuite et des dommages matériels.**

Note : Ne tentez pas de démonter la cartouche (6). Il n'y a pas de pièces réparables à l'intérieur.

Limited Warranty on Delta® Faucets

Parts and Finish: All parts (other than electronic parts and batteries) and finishes of Delta® faucets purchased from authorized Delta sellers are warranted to the original consumer purchaser to be free from defects in material and workmanship for as long as the original consumer purchaser owns the home in which the faucet was first installed. For commercial purchasers, (a) the warranty period is ten (10) years for multi-family residential applications and (b) five (5) years for all other commercial applications, in each case from the date that the product is received by the original purchaser or their authorized representative (installation contractor, etc.). For purposes of this warranty, the term "multi-family residential application" refers to the purchase of the faucet from an authorized Delta seller by a purchaser who owns but does not live in the residential dwelling in which the faucet is initially installed, such as in a rented or leased single unit or multi-unit detached home (duplex or townhome), or a condominium, apartment building or community living center. The following installations are not considered multi-family residential applications, are excluded from the 10-year warranty and are subject to the 5-year warranty: industrial, institutional or other business premises, such as a dormitory, hospitality premises (hotel, motel or extended stay location), airport, educational facility, long- or short-term healthcare facility (hospital, rehabilitation center, nursing, assisted or staged-care living unit), public space or common area.

Parts and Finish for Delta® Recertified Faucets: Delta Faucet Company offers for sale online Delta® Recertified faucets. Delta® Recertified faucets only include faucets that have been certified as such by Delta Faucet Company. All parts (other than electronic parts and batteries) and finishes of these Delta® Recertified faucets are warranted to the original consumer purchaser to be free from defects in material and workmanship for ten (10) years from the date that the product is received by the original purchaser or their authorized representative (installation contractor, etc.). For commercial purchasers, the warranty period is one (1) year from the date that the product is received by the original purchaser or their authorized representative (installation contractor, etc.).

Electronic Parts: Electronic parts (other than batteries), if any, of Delta® faucets purchased from deltafaucet.com or authorized Delta sellers are warranted to the original consumer purchaser to be free from defects in material and workmanship for five (5) years from the date that the product is received by the original purchaser or their authorized representative (installation contractor, etc.) or, for commercial purchasers, for one (1) year from the date that the product is received by the original purchaser or their authorized representative (installation contractor, etc.). No warranty is provided on batteries.

What We Will Do: Delta Faucet Company will repair or replace, free of charge, during the applicable warranty period (as described above), any part or finish that proves defective in material and/or workmanship under normal installation, use and service. Delta Faucet Company may, in its sole discretion, use new, refurbished or recertified parts or products for such repair or replacement. If repair or replacement is not practical, Delta Faucet Company may elect to refund the purchase price in exchange for the return of the product. **These are your exclusive remedies.**

What Is Not Covered: Because Delta Faucet Company is unable to control the quality of Delta products sold by unauthorized sellers, unless otherwise prohibited by law, this warranty does not cover Delta products purchased from unauthorized sellers.

Any labor charges incurred by the purchaser to repair, replace, install or remove this product are not covered by this warranty. Delta Faucet Company shall not be liable for any damage to the faucet resulting from reasonable wear and tear, outdoor use, misuse (including use of the product for an unintended application), freezing water, abuse, neglect or improper or incorrectly performed installation, maintenance or repair, including failure to follow the applicable care and cleaning instructions. Delta Faucet Company recommends using a professional plumber for all installation and repair of faucets. We also recommend that you use only genuine Delta® replacement parts.

What You Must Do To Obtain Warranty Service or Replacement Parts: A warranty claim may be made and replacement parts may be obtained by calling 1 800 345 DELTA (3358) or by contacting us by mail or online as follows (please include your model number, date of original purchase and documentation of the date of receipt of the product by the original purchaser or their authorized representative (installation contractor, etc.)):

In the United States and Mexico:

Delta Faucet Company
55 E. 111th Street
Indianapolis, IN 46280
Attention: Warranty Service
www.deltafaucet.com/service-parts/contact-us

In Canada:

Masco Canada Limited, Plumbing Group
Technical Service Centre
350 South Edgeware Road
St. Thomas, Ontario, Canada N5P 4L1
Attention: Customer Service
<http://www.deltafaucet.ca/customersupport/assistance.html>

Proof of purchase (original sales receipt showing purchase date) and documentation of the date of receipt of the product by the original purchaser or their authorized representative (installation contractor, etc.) from the original purchaser must be made available to Delta Faucet Company for all warranty claims unless the purchaser has registered the product with Delta Faucet Company or the product is a Delta® Recertified product purchased from deltafaucet.com. This warranty applies only to Delta® faucets manufactured after January 1, 2019 and installed in the United States of America, Canada and Mexico.

Limitation on Duration of Implied Warranties: Please note that some states/provinces (including Quebec) do not allow limitations on how long an implied warranty lasts, so the below limitations may not apply to you. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, ANY IMPLIED WARRANTY, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE, IS LIMITED TO THE STATUTORY PERIOD OR THE DURATION OF THIS WARRANTY, WHICHEVER IS SHORTER.

Limitation of Special, Incidental or Consequential Damages: Please note that some states/provinces (including Quebec) do not allow the exclusion or limitation of special, incidental or consequential damages, so the below limitations and exclusions may not apply to you. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, THIS WARRANTY DOES NOT COVER, AND DELTA FAUCET COMPANY SHALL NOT BE LIABLE FOR, ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LABOR CHARGES TO REPAIR, REPLACE, INSTALL OR REMOVE THIS PRODUCT), WHETHER ARISING OUT OF BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, BREACH OF CONTRACT, TORT, OR OTHERWISE. DELTA FAUCET COMPANY SHALL NOT BE LIABLE FOR ANY DAMAGE TO THE FAUCET RESULTING FROM REASONABLE WEAR AND TEAR, OUTDOOR USE, MISUSE (INCLUDING USE OF THE PRODUCT FOR AN UNINTENDED APPLICATION), FREEZING WATER, ABUSE, NEGLIGENCE OR IMPROPER OR INCORRECTLY PERFORMED INSTALLATION, MAINTENANCE OR REPAIR, INCLUDING FAILURE TO FOLLOW THE APPLICABLE INSTALLATION, CARE AND CLEANING INSTRUCTIONS. Notice to residents of the State of New Jersey: The provisions of this warranty, including its limitations, are intended to apply to the fullest extent permitted by the laws of the State of New Jersey.

Additional Rights: This warranty gives you specific legal rights, and you may also have other rights which vary from state/province to state/province. This is Delta Faucet Company's exclusive written warranty and the warranty is not transferable.

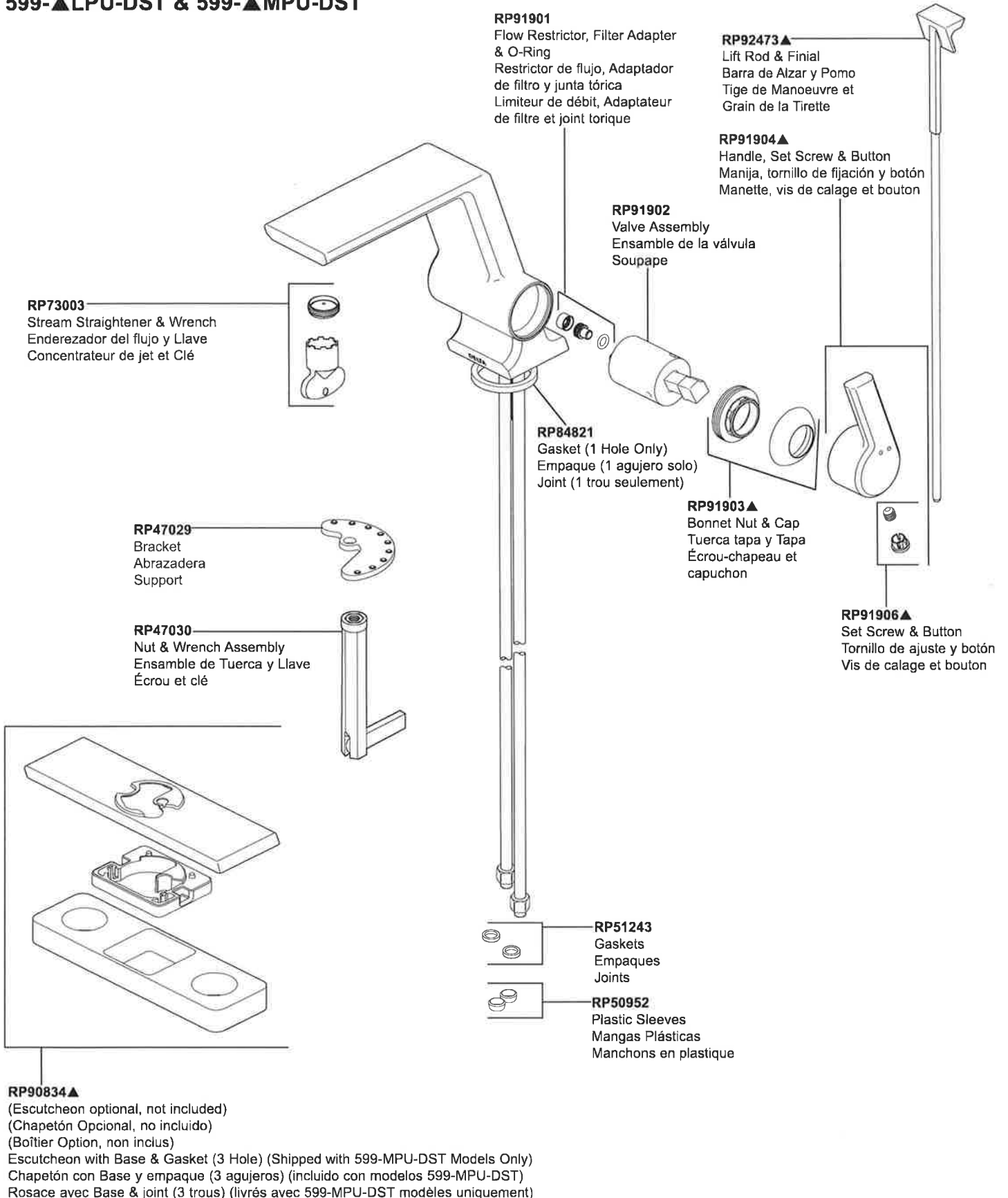
If you have any questions or concerns regarding our warranty, please contact us as provided above or view our Warranty FAQs at www.deltafaucet.com.

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PIVOTAL®

Models/Modelos/Modèles

599-▲LPU-DST & 599-▲MPU-DST

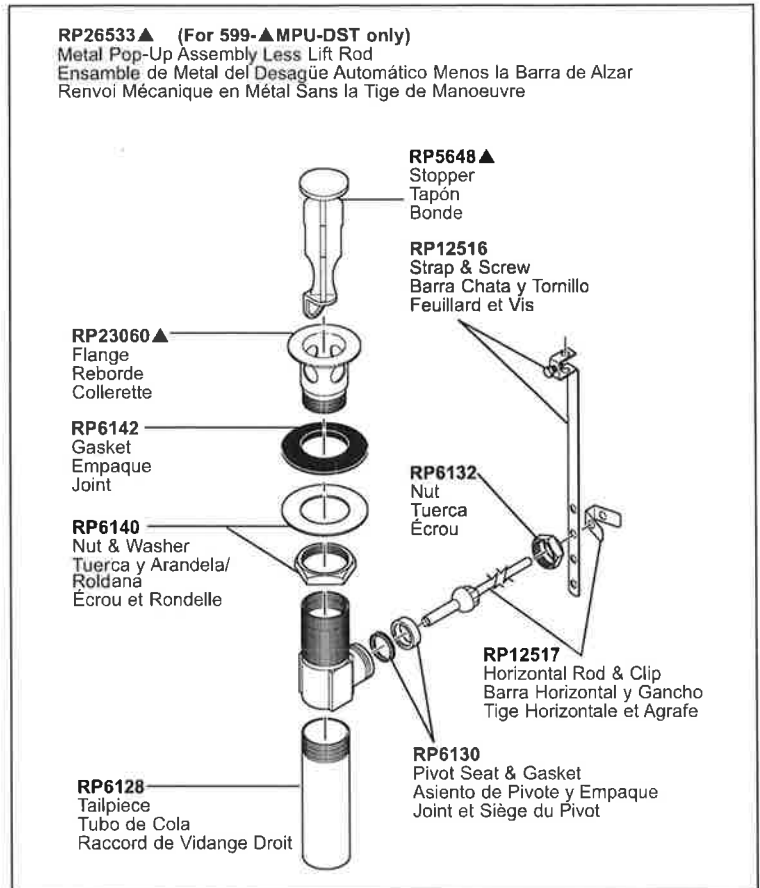


▲ Specify Finish / Especificque el Acabado / Précisez le Fini

PIVOTAL®

Models/Modelos/Modèles

599-▲LPU-DST & 599-▲MPU-DST



Other useful accessories that may be purchased separately.
Otros accesorios útiles que se pueden comprar por separado.
Autres accessoires utiles pouvant être achetés séparément.

RP63263

Adapters

3/8"-24 UNEF to 1/2"-20 UN &
3/8"-24 UNEF to 1/2"-14 NPSM

Adaptadors

3/8"-24 UNEF a 1/2"-20 UN &
3/8"-24 UNEF a 1/2"-14 NPSM

Adapteurs

3/8 po-24 UNEF à 1/2 po-20 UN et
3/8 po-24 UNEF à 1/2 po-14 NPSM



RP63264

Adapters (10) 3/8"-24 UNEF to 1/2"-20 UN

Adaptadors (10) 3/8"-24 UNEF a 1/2"-20 UN

Adapteurs (10) 3/8 po-24 UNEF à 1/2 po-20 UN



RP63265

Adapters (10) 3/8"-24 UNEF to 1/2"-14 NPSM

Adaptadors (10) 3/8"-24 UNEF a 1/2"-14 NPSM

Adapteurs (10) 3/8 po-24 UNEF à 1/2 po-14 NPSM





a Bead Industries, Inc. company

Warranty, Terms and Return Policies

TERMS: All sales are subject to credit approval. Terms are 2% ten days – net 30.

RETURNED GOODS: Requests for returning purchased items are subject to factory approval.

A Returned Goods Authorization (RGA) must be obtained from the factory prior to any return. Returned merchandise must be in their original cartons, listed in our current List Price Sheet and in clean saleable condition.

Restocking charge:

- Material that was shipped within 18 months of the return request is subject to a 25% restocking charge.
- Material that was shipped more than 18 months of the return request but less than 3 years is subject to a 50% restocking charge.
- Material returned more than 18 months after it was shipped is not subject to any stock rotation agreement.
- Material that was shipped more than 3 years before the return request is not returnable.
- Invoice dates as well as dates on packaging will control.

The restocking charge may be reduced if a new order of equal value is placed at the time the RGA is requested:

- 25% may be reduced to 15%
- 50% may be reduced to 35%

MINIMUM RETURN POLICY:

Return requests less than \$200 net will be charged \$50 processing fee in lieu of any restocking charge.

INVOICE:

We reserve the right to invoice all merchandise at prices in effect at time of shipment.

NO MINIMUM ORDER:

Orders less than \$200 list will be invoiced at list price less 35% (.65 multiplier).

McGuire Manufacturing Co., Inc.

60 grandview court • cheshire • ct • 06410

tel 203-699-1801 • fax 203-699-1813

mcguiremfg.com

customerservice@mcguiremfg.com

FREIGHT:

We will pay freight on shipments within the continental United States when the order (pre-tax) totals more than \$2200 net. We select the method of shipment and carrier when we pay the freight.

Limited Warranty Information

McGuire Manufacturing Co., Inc. (McGuire) warrants its product to be free from defects in material and workmanship for the period indicated below by product type measure from the date of purchase:

ITEM	WARRANTY PERIOD
Brass products	15 years
ProWrap	5 years
Eco P-Traps, Eco Strainers and Valve Strainers	1 year
Stainless Steel products	1 year
Lite Commercial P-Traps	1 year

McGuire's sole responsibility will be to replace, at no additional charge, any product which proves to be defective within the applicable warranty period. Shipping costs for product located outside the continental United States will be the sole responsibility of the customer. Duties and taxes, if levied, shall be the sole responsibility of the customer.

The above Limited Warranty shall not apply if the product has been damaged due to abuse, misuse, improper installation, accident, or other cause not within McGuire's control.

THE ABOVE LIMITED WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY. ALL OTHER WARRANTIES ARE DISCLAIMED, WHETHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MCGUIRE BE RESPONSIBLE OR LIABLE FOR ANY SPECIAL INCIDENTAL, OR CONSEQUENTIAL DAMAGES OR LOSSES ARISING FROM THE USE OF THIS PRODUCT.

McGuire may, at its option, alter the contents of this LIMITED WARRANTY at anytime. These changes will affect products manufactured after the effective date of this policy.

McGuire Manufacturing Co., Inc.

60 grandview court • cheshire • ct • 06410

tel 203-699-1801 • fax 203-699-1813

mcguiremfg.com

customerservice@mcguiremfg.com

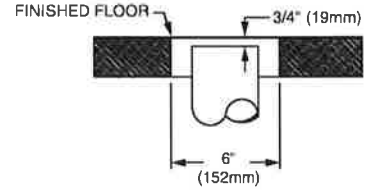
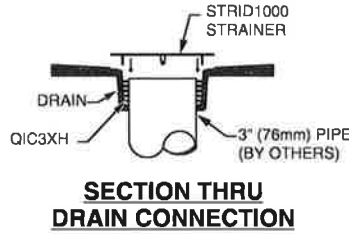
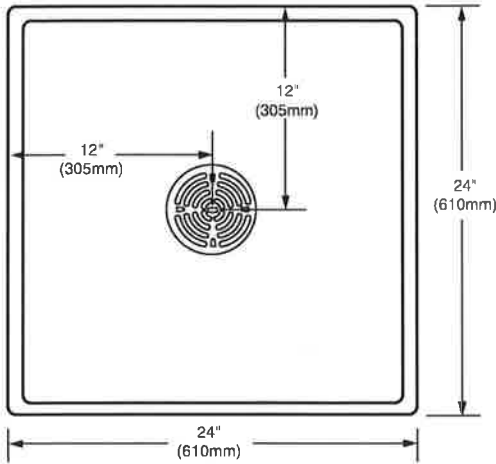
P-4

Installation Instructions

MSBID2424

FIAT
PRODUCTS

ROUGH-IN DETAILS

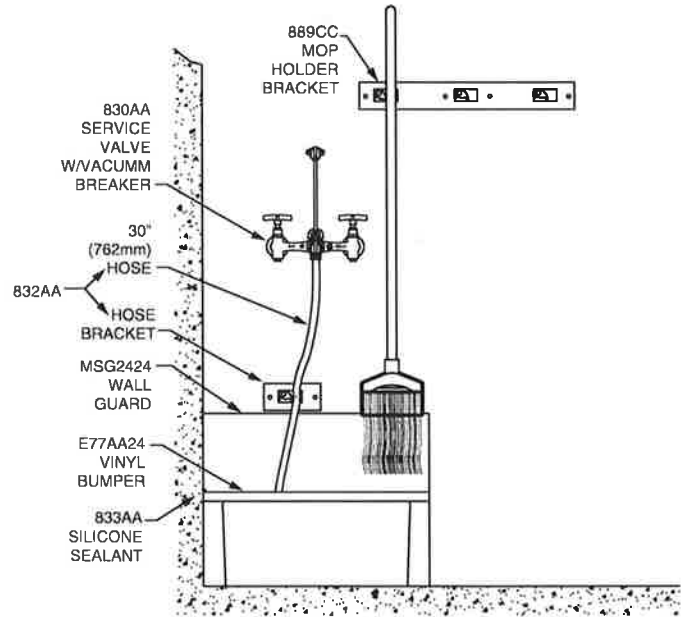


INSTRUCTIONS

1. Level basin and shim as necessary.
2. Drain to be connected to 3" I.P.S. with QIC3XH gasket.
3. Lubricate QIC quick drain connector with liquid soap. Stretch over pipe with letters facing up and push down as far as possible.
4. Apply silicone sealant at all points where basin meets wall.
5. Do not install strainer until room is ready for use to prevent loss or damage.

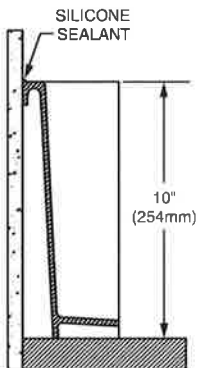
CONTENTS OF MSBID2424100

QTY	DESCRIPTION	PART NUMBER
1	MOP BASIN	00245100100
1	QIC3XH RUBBER GASKET	QIC3XH000
1	STRID1 STRAINER PLATE	STRID1000
1	INSTRUCTION SHEET	710071-100

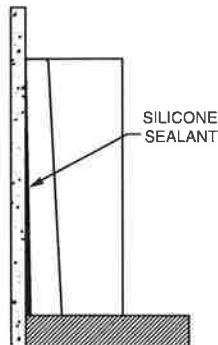


OPTIONAL EQUIPMENT

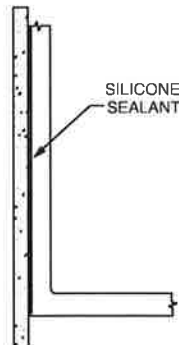
Installation Note : QIC32 Quick Drain Connector for 2" pipe or QIC3SN Quick Drain Connector for cast iron soil pipe **must** be ordered separately.



**AGAINST CONCRETE
BLOCK OR WALL
BOARD (FINISHED
OR UNFINISHED)**



FRONT VIEW



TOP VIEW

**FIAT PRODUCTS
CUSTOMER SERVICE**

833-549-2887
www.fiatproducts.com

MAINTENANCE RECOMMENDATIONS

To maintain lasting quality of this molded stone mop basin, periodically clean with any liquid detergent.

Dulled areas and light scratches may be removed by rubbing with an automotive type body cleaning compound such as Dupont No. 7 paste cleaner followed by a light application of liquid wax such as Johnson's "J" wax.

When necessary, plaster and other foreign materials can be scraped away with a sharpened soft wood stick. One of the powder type detergents such as Spic 'n Span may be used dry on a damp cloth to provide mild abrasive action to the residual foreign material.

FIAT PRODUCTS® LIMITED ONE YEAR WARRANTY

FIAT Products, LLC offers a limited warranty on FIAT Products to the original Purchaser consumer, both residential and commercial. These products shall be free of defects in material and workmanship for a period of One Year.

Under this warranty FIAT Products will, at its sole discretion, upon receipt of a written claim and proof of purchase, either (1) repair the product, (2) replace the product or any part therein with a FIAT Product of equal or similar type and size, or (3) refund to the consumer the wholesale price of the product received by FIAT Products. If FIAT Products elects to refund the wholesale price to the consumer, FIAT Products shall have no further obligation to its wholesale customer, or any contractor with respect to such product. Goods proven to be defective will be replaced after proper inspection, but no claims for damages incurred or for work done thereon will be allowed. Replacements when supplied will be shipped at no cost to the consumer.

This warranty **does not apply** to local building code compliance. Since local building codes vary considerably, the purchaser of the product should check with a local building or plumbing contractor to ensure local code compliance before installation.

This warranty **will be void** if:

1) the product has been moved from its initial place of installation; 2) if it has been subjected to faulty maintenance, abuse, misuse, accident or other damage; 3) if it was not installed in accordance with FIAT Products instructions; or 4) if it has been modified in a manner inconsistent with the product as shipped by FIAT Products.

This warranty **DOES NOT COVER** any damages caused by the use of non-approved cleaners, improper installations or excessive abuse.

FIAT Products' right to repair or exchange the product under this warranty does not cover any labor or other costs of removal or installation including any costs of any surround material such as tile or marble.

FIAT Products is not responsible for any other incidental or consequential damages attributed to a product defect or to the repair or exchange of a defective product, all of which are expressly excluded from this warranty. (Some states or provinces do not allow the exclusion or limitation of implied warranties, so this exclusion may not apply to you.)

This warranty gives you specific rights. You may have other statutory rights that may vary from state to state or province to province, in which case this warranty does not affect such statutory rights.

In the United States & Canada:

FIAT Products, LLC
4515 E. 139th Street
Grandview, MO 64030

Attention: Customer Care Manager

www.fiatproducts.com

THIS WARRANTY IS NOT TRANSFERABLE FROM ORIGINAL CONSUMER PURCHASER.



Limited One Year Warranty

T&S warrants to the original purchaser (other than for purposes of resale) that such product is free from defects in material and workmanship for a period of one (1) year from the date of purchase. During this one-year warranty period, if the product is found to be defective, T&S shall, at its options, repair and/or replace it. To obtain warranty service, products must be returned to...

*T&S Brass and Bronze Works, Inc.
Attn: Warranty Repair Department
2 Saddleback Cove
Travelers Rest, SC 29690*

Shipping, freight, insurance, and other transportation charges of the product to T&S and the return of repaired or replaced product to the purchaser are the responsibility of the purchaser. Repair and/or replacement shall be made within a reasonable time after receipt by T&S of the returned product. This warranty does not cover items which have received secondary finishing or have been altered or modified after purchase, or for defects caused by physical abuse to or misuse of the product, or shipment of the products.

Any express warranty not provided herein, and any remedy for Breach of Contract which might arise, is hereby excluded and disclaimed. Any implied warranties of merchantability or fitness for a particular purpose are limited to one year in duration. Under no circumstances shall T&S be liable for loss of use or any special consequential costs, expenses or damages.

Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. Specific rights under this warranty and other rights vary from state to state.

P/N: 098-009518-45 Rev.2
Date: 05-15-06
Drawn: TEH
Checked: DHL 07-13-06
Approved: JHB 07-13-06

Installation and Maintenance Instructions



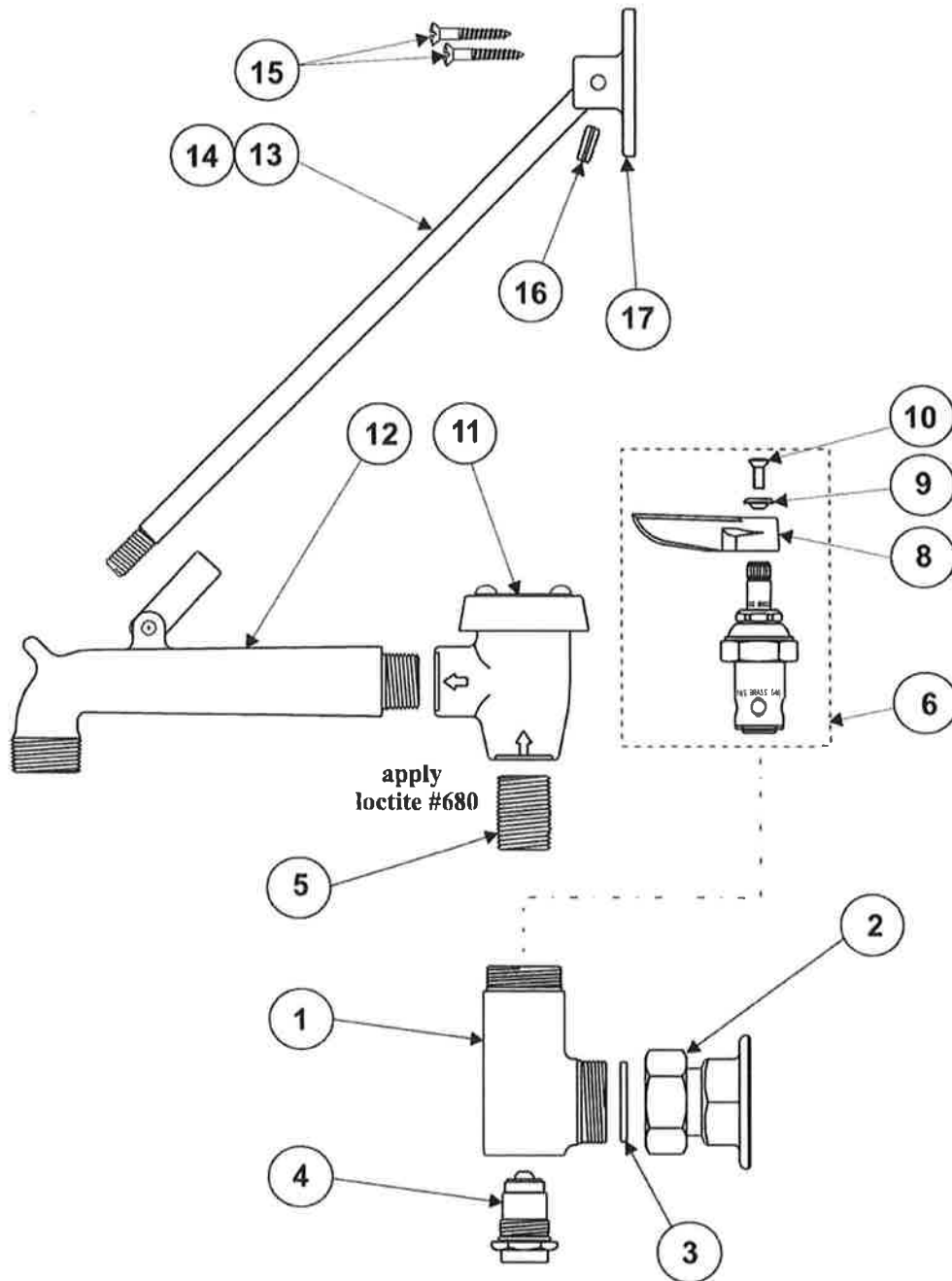
Surgical Sink and Service Sink Faucets with Built-In Stops B-0665-BST Series

**Deutsch: Installations- und
Wartungsanleitun-
gen**

**Español: la Instalación y las
Instrucciones de
Mantenimiento**

**Français: les Instructions
d'Installation et
d'Entretien**

Exploded View




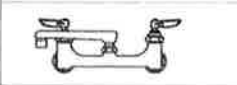
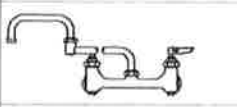



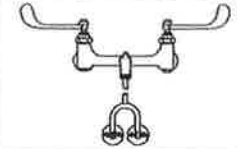
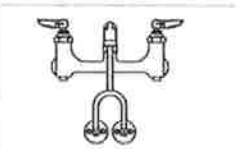
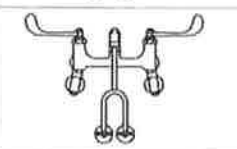
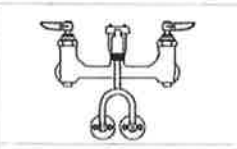
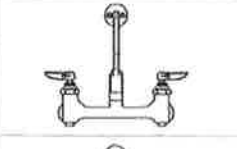
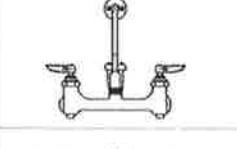
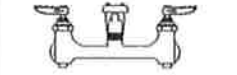
* Some items are listed for instructional purposes and may not be sold as separate parts.

Part Number Guide

Service Sink Faucet Assemblies

1	Asm, Base Faucet Body, Faucet	B-0665-BSTP *
2	Asm, Flange Coupling	002893-40
3	Washer, Coupling Flange	001019-45
4	Asm, BST Spindle & Insert	163A
5	Nipple, Close 1/2 HWL	002534-25
6	Asm, Eterna w/ Spring Checks & Handle (Cold) Asm, Eterna w/ Spring Checks & Handle (Hot)	002711-40 002712-40
8	Handle, Lever (Blank)	001638-45
9	Index, Button (Red / Hot) Index, Button (Blue / Cold)	001661-45 001660-45
10	Screw, Handle	000922-45
11	Asm, Vacuum Breaker, 1/2"	B-0969
12	Spout	*
13	Asm, Upper Nozzle Support	009546-40
14	Rod, Support	005060-40
15	Screw, Wall Mount	000915-45
16	Pin, Coiled 3/16" x 1/2" S.S.	004713-25
17	Flange	003007-40

Models with Built-In Stops (-BST)

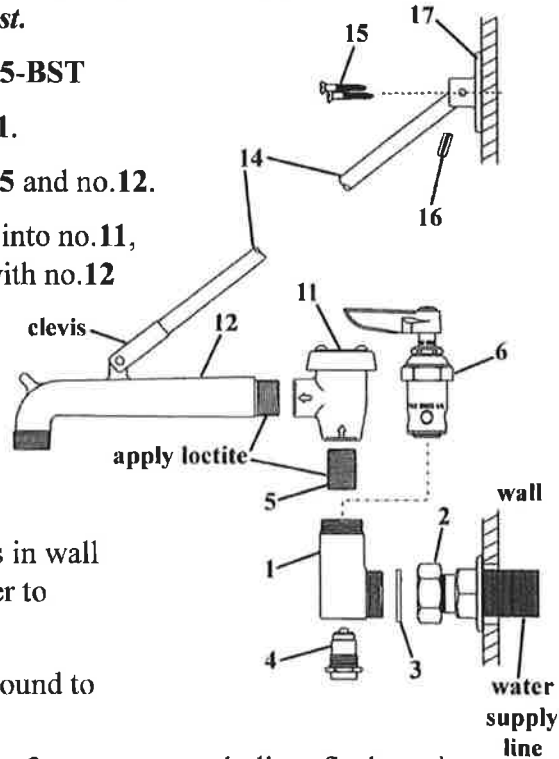
	B-0230-BST Sink mixing faucet with 18" swing nozzle; lever handles
	B-0231-BST Sink mixing faucet with 12" swing nozzle; lever handles
	B-0232-BST Sink mixing faucet with 16" swing nozzle; lever handles
	B-0234-BST Sink mixing faucet with 6" cast spout; lever handles
	B-0265-BST Combo sink faucet w/ 18" double-joint swing nozzle
	B-0266-BST Combo sink faucet w/ 15" double-joint swing nozzle
	B-0267-BST Combo sink faucet w/ 12" double-joint swing nozzle
	B-0330-BST Combo sink faucet w/ rigid gooseneck; lever handles
	B-0331-BST Combo sink faucet w/ swivel gooseneck; lever handles
	B-0350-BST Surgical sink fct w/rigid gooseneck; 6" WH; rosespray
	B-0351-BST Surgical sink fct w/rigid gooseneck; 6" WH; stream reg.
	B-0352 & -04 Surgical sink fct w/rigid GN; 6" & 4" WH; rosespray
	B-0353 & -04 Surgical sink fct w/rigid GN; 6" & 4" WH; stream reg.
	B-0363 Service sink fct w/VB nozzle; 6" WH; bottom brace
	B-0650-BSTP Service sink fct w/pail hook nzl; btm brace; polished
	B-0650-BSTR Service sink fct w/pail hook nzl; btm brace; rough
	B-0652 Service sink fct; 6" wrist-action handles; bottom brace
	B-0655-BSTP Service sink fct w/VB nozzle; bottom brace; polished
	B-0655-BSTR Service sink fct w/VB nozzle; bottom brace; rough
	B-0657-BST Service sink fct w/VB nozzle; 6" WH; bottom brace
	B-0660-BSTP Service sink fct w/pail hook nozzle; top brace; polished
	B-0660-BSTR Service sink fct w/pail hook nozzle; top brace; rough
	B-0665-BSTP Service sink fct w/VB & pail hook; top brace; polished
	B-0665-BSTR Service sink fct w/VB & pail hook; top brace; rough
	B-0674-BSTP Service sink fct w/VB & pail hook nozzle; polished
	B-0674-BSTR Service sink fct w/VB & pail hook nozzle; rough

General Instructions

Note: This is a general instructional example of units using -BST. Nozzles should be installed on unit first.

Nozzle Installation: ex. model B-0665-BST

1. Remove no.6 from both sides of no.1.
2. Apply Loctite #680 to threads of no.5 and no.12.
3. Insert no.12 into no.11. Thread no.5 into no.11, then rotate no.11 into no.1 until tight with no.12 facing front of sink.
4. Replace no.6 into no.1 following nozzle installation.



Faucet Installation:

5. Shut off water supply and drain lines. Drill (2) two 7/8" [2.2 cm] holes in wall or backsplash of sink, 8" [20 cm] center to center, where you are installing no.1.
6. Apply teflon tape or pipe joint compound to threads of water supply lines.
7. Remove no.2 from no.1 and attach no.2 to water supply lines flush against wall. Tighten by hand. *Trim supply lines if necessary.*
8. Attach no.1 to no.2, adjusting center to center fit by turning no.2 if needed. *Make sure no.3 remains in place.* Tighten no.2 firmly with a wrench.
9. Turn on water supply and check for leaks.

Upper Nozzle Support Installation:

10. Attach no.14 to no.12 by screwing no.14 into *clevis* on no.12.
11. Position no.17 against wall. Mark holes and secure no.17 to wall using no.15.

Adjusting Built-in Stops:

Insert a screwdriver to adjust no.4 at the base of no.1 on each side. *Water should be turned on for this procedure.*

Close Stop
turn clockwise



Open Stop
turn counter-clockwise

no.4 adjusting screw



Bottom view of faucet body and Built-in Stop

P-5



SERVICE MANUAL

Troubleshooting Guide and Instructions for Service
(To be performed ONLY by qualified service providers)

Ultra High Efficiency Water Heater with ICON and Integrated Control Systems



Models Covered:

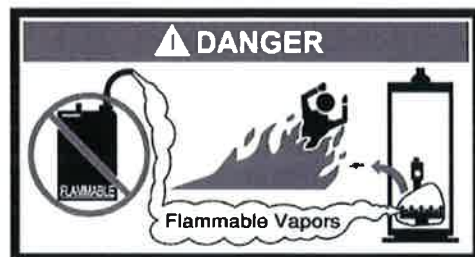
SECTION 1 (PG. 9): SERIAL NUMBERS "XC-" (MAR. 2021) AND LATER:

60T125(E)*(N,X)(A)(2); 60T150(E)*(N,X)(A)(2);
60T199(E)*(N,X)(A)(2); 100T150(E)*(N,X)(A)(2);
100T199(E)*(N,X)(A)(2); 100T250(E)*(N,X)(A)(2);
100T300(E)*(N,X)(A)(2)

SECTION 2 (PG. 53): SERIAL NUMBERS "XL-" (NOV. 2021) AND LATER W/ -895 DESIGNATOR:

60T125(E)*(N,X)(A)(2); 60T150(E)*(N,X)(A)(2);
60T199(E)*(N,X)(A)(2); 100T150(E)*(N,X)(A)(2);
100T199(E)*(N,X)(A)(2)

(* Denotes warranty years



As required by the state of California Proposition 65.

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manufactured in the United States using
the finest raw materials and components
from around the world.

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Determining the Age of Your Water Heater

SERIAL NUMBER SECTION: The first two characters represent the year and month of manufacture. The remainder of the serial is a sequential production number, seven digits in length before December 2007 (DM), and eight digits in length after.

Example:

J C 16433183

J = Built in the year 2012

C = Built in the month of March

The remainder of the serial is just a sequential number

Production Year	
A = 1984 or 2004	L = 1994 or 2014
B = 1985 or 2005	M = 1995 or 2015
C = 1986 or 2006	N = 1996 or 2016
D = 1987 or 2007	P = 1997 or 2017
E = 1988 or 2008	S = 1998 or 2018
F = 1989 or 2009	T = 1999 or 2019
G = 1990 or 2010	W = 2000 or 2020
H = 1991 or 2011	X = 2001 or 2021
J = 1992 or 2012	Y = 2002 or 2022
K = 1993 or 2013	Z = 2003 or 2023

Production Month	
A = January	G = July
B = February	H = August
C = March	J = September
D = April	K = October
E = May	L = November
F = June	M = December

For the year column, we do not use the letters: I, O, Q, R, U, V

For the month column we do not use the letters: I & N - Z

Due to a computer error, there were some OA serial water heaters manufactured. They were built in January of 1997.

Determining the Designator of Your Water Heater

DESIGNATOR SECTION: See special product type designator in this location on the rating plate. If "D/N:" line is blank, then there is no designator.

Example in red box:

BRADFORD WHITE CORPORATION www.bradfordwhite.com 11
 200 LAFAYETTE STREET MIDDLEVILLE MI 49333 USA
 Model No: EF100T199E3N2
 Serial No: XK48743746 **D/N: -895**
 Capacity : 100 US gal Recovery: 238.8 gph
 378.5 liters Type: NATURAL GAS
 Input: 199999(Btu/hr)
 Gas Pressure Manifold : -0.05(InWC)
 120V 60 Hz Less than 12 amps
 Alcove Installation, Combustible Floors:
 Min Clearances from Combustible Construction
 0" (Sides/Rear) 0" (Top) 0" (Vent Conn)
 For use only with Automatic Flue Device Part
 No. N/A FOLLOW INSTALLATION INSTRUCTIONS
 AUTOMATIC STORAGE TANK / CIRCULATING TANK
 CATEGORY IV
 ANSI Z21.10.3-2017/CSA 4.3-2017
 Pressure: Test 300 psi, Working 150 psi
 COMPLIES W/JURISDICTIONS HAVING 14ng/J NOx REGS



BRADFORD WHITE CORPORATION www.bradfordwhite.com 11
 200 LAFAYETTE STREET MIDDLEVILLE MI 49333 USA
 Model No: EF100T199E3N2
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 Capacity : 100 US gal Recovery: 238.8 gph
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 ANSI Z21.10.3-2017/CSA 4.3-2017
 Pressure: Test 300 psi, Working 150 psi
 COMPLIES W/JURISDICTIONS HAVING 14ng/J NOx REGS



Introduction

The Ultra High Efficiency Water Heater is designed to deliver a high thermal efficiency rating in a quiet running unit with venting options that allow for installation flexibility. Several technologically advanced design features are incorporated in the design that will require additional knowledge on the part of the qualified service provider. The information in this manual will instruct service and maintenance professionals on the function, proper diagnosis and repair of The Ultra High Efficiency Water Heater.

The Ultra High Efficiency Water Heater uses a Low NOx premix power burner located at the top of the water heater to direct a turbulent flame down into a submerged combustion chamber. This turbulence causes a thorough mixing of gas and air for optimum combustion. The combustion gases then travel through a three-pass flue system keeping the gases moving at a high velocity. The combination of high turbulence and velocity results in an optimum transfer of heat from the flue gases into the water.

Burner operation is controlled using an electronic ignition module. The module monitors the status of the electronic thermostat, vent temperature limit switch, vent system pressure switches, a flame sensor to control output voltage to blower motor, igniter/spark rod, and gas valve. The module contains programming which determines the sequence of operation and timings for purge periods, trial for ignition, flame sensing, and lockout. The module will also provide diagnostic information to help in determining the cause of system lockouts.

The contents in this manual are detailed informational tools to assist in the proper diagnosis of the Ultra High Efficiency Water Heater operational faults. Please read this service manual completely and provide as much information regarding the Ultra High Efficiency Water Heater operation and installation specific concerns.

How to Use this Manual

It is intended for this manual to be used by qualified service personal for the primary purpose of troubleshooting analysis and repair of the Ultra High Efficiency Water Heater. Understanding the sequence of operation section of this manual will contribute greatly to troubleshooting this product.

An Installation Checklist is shown towards the end of this manual. Compare the installation against the installation check list to confirm all requirements are met.

A Service Report is shown towards the end of this manual. Completing this form will assist in the troubleshooting efforts. Should you need to call for technical support, please provide the information shown on this form to the support technician to insure accurate troubleshooting.

Troubleshooting begins with System Observation to determine failure mode as indicated by the LED status of the ignition module. Troubleshooting continues with Failure Modes and Probable Cause, directing the service provider to a series of test procedures to determine root cause of failure. Component replacement procedures directly follow the test procedures for a given component.

In some difficult to diagnose conditions, it may be necessary to isolate the heater from the vent system to determine root cause. Contact Technical Support immediately if diagnosis is not determined using the methods described in this Service Manual.

Tools Required for Service

- Manometer:** Two types available, a liquid "U" tube type or a digital (magna-helic) type. This device is used to measure gas and/or air pressures and vacuum.
- Multi-Meter:** A digital type is strongly recommended. This device is used to measure electrical values. The meter you select must have the capability to measure volts AC, volts DC, Amps, micro-amps and ohms.
- Thermometer:** Used to measure water temperature. An accurate thermometer is recommended.
- Water Pressure Gage:** Used to measure water supply pressure. Also used to determine tank pressure by adapting to the drain valve of the heater.
- Jumper Leads:** A length of wire (12" min.) with alligator clip at both ends.
- Various Hand Tools:** Pipe wrench, channel locks, open end wrench set, 12" crescent wrench, Allen wrench set, Torx bit set, screwdrivers (common & Phillips), long reach (12") magnetic tip Phillips head screwdriver #2 tip, 1/4" nut driver, pliers (common & needle nose), socket set including a 1-1/16 deep well socket, wire cutters, wire strippers, wire crimpers, torpedo level, small shop vac, step ladder, and flashlight.

Vent Tables

Maximum Vent Length

Table 3 - Maximum Vent Length (Combined Maximum Length for Intake and Exhaust)

	60T-125		60T-150 100T-150		60T-199 100T-199	
2" Vent Pipe	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent
Max. Intake Length	15 ft (4.5 m)	N/A	15 ft (4.5 m)	N/A	15 ft (4.5 m)	N/A
Max. Exhaust Length	15 ft (4.5 m)	30 ft (9.2 m)	15 ft (4.5 m)	30 ft (9.2 m)	15 ft (4.5 m)	30 ft (9.2 m)

	60T-125 100T-150		60T-150 100T-199		60T-199 100T-250		100T-300	
3" Vent Pipe	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent
Max. Intake Length	60 ft (18.3 m)	N/A	50 ft (15.2 m)	N/A	40 ft (12.2 m)	N/A	30 ft (9.2 m)	N/A
Max. Exhaust Length	60 ft (18.3 m)	120 ft (36.5 m)	50 ft (15.2 m)	100 ft (30.5 m)	40 ft (12.2 m)	80 ft (24.3 m)	30 ft (9.2 m)	60 ft (18.3 m)

4" Vent Pipe	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent
Max. Intake Length	85 ft (25.9 m)	N/A	75 ft (22.8 m)	N/A	65 (19.8 m)	N/A	55 (16.7 m)	N/A
Max. Exhaust Length	85 ft (25.9 m)	170 ft (51.8 m)	75 ft (22.8 m)	150 ft (45.7 m)	65 (19.8 m)	130 (39.6 m)	55 (16.7 m)	110 (33.5 m)

	60T-125		60T-150		60T-199		100T-150	
6" Vent Pipe	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent
Max. Intake Length	85 (25.9 m)	N/A	75 (22.8 m)	N/A	65 (19.8 m)	N/A	85 (25.9 m)	N/A
Max. Exhaust Length	85 (25.9 m)	170 ft (51.8 m)	75 (22.8 m)	150 (45.7 m)	65 (19.8 m)	130 (39.6 m)	85 (25.9 m)	170 (51.8 m)

	100T-199		100T-250		100T-300	
6" Vent Pipe	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent
Max. Intake Length	75 (22.8 m)	N/A	65 (19.8 m)	N/A	60 (18.3 m)	N/A
Max. Exhaust Length	75 (22.8 m)	150 (45.7 m)	65 (19.8 m)	130 (39.6 m)	60 (18.3 m)	120 (36.6 m)

Unbalanced Direct Vent Systems
Air intake **CAN NOT** exceed exhaust by more than 30 feet.

WARNING!

The 100T250 and 100T300 models are **NOT** approved for 2 inch diameter vent pipe. Venting with 2 inch pipe on these models may result in damage to the water heater or cause an unsafe condition. **DO NOT** use 2 inch vent or air intake pipe on 100T250/300 models.

Notes:

- 1) Multiply the total number of 90° elbows (intake and exhaust) by 5 feet. **Do NOT** include the termination fittings or 3" condensate elbow.
- 2) Multiply the total number of 45° elbows (intake and exhaust) by 2 ½ feet.
- 3) Add this to the total length of straight pipe - intake and exhaust.
- 4) The sum total of all elbows and straight pipe - intake and exhaust must not exceed maximum lengths from tables above.

Venting Tables Cont.

Example: 100T199

A 3" balanced direct vent system has 30 feet of straight exhaust pipe and 30 feet of straight intake pipe. It has 3- 90° elbows in the exhaust and 3- 90° elbows in the intake. It has 1- 45° elbow in the exhaust and 1- 45° elbow in the intake.

Therefore:

6- 90° elbows x 5 feet = 30 feet.

2- 45° elbows x 2½ feet = 5 feet.

60 feet of straight pipe + 30 feet + 5 feet = 95 feet.

System is within "Maximum Combined Length" from table above.

NOTICE

For installations in Canada, field supplied vent piping must comply with CAN/CGA B149.1 (latest edition) and be certified to the Standard For Type BH, Class II, 65°C, Gas Venting Systems, ULC S636. Components of this listed system shall not be interchanged with other vent systems or unlisted pipe/fittings. All components and specified primers and cements of the certified vent system must be from a single system manufacturer and not intermixed with other system manufacturer's vent system parts. The supplied vent connector and vent termination are certified under ULC S636 and are also certified as part of the water heater. Refer to the following tables for approved venting materials, primers, and cements. All approved primers and cements are to be used within their marked time limitations.

Approved Venting Materials

For installations in the US only

- PVC DWV (ASTM D-2665)
- PVC Sch. 40 (ASTM-D1785)
- CPVC Sch. 40 (ASTM-F441, ASTM-D2846)
- PVC and CPVC (UL 1738, ULC S636)
- ABS Sch. 40 DWV (ASTM-D2661)
- Polypropylene (UL 1738, ULC S636)
- Stainless Steel (UL 1738, ULC S636)

For installations in CANADA

- ULC S636 approved PVC for flue gas venting rated Class II, 65°C
- ULC S636 approved CPVC for flue gas venting rated Class II, 65°C
- ULC S636 approved Polypropylene for flue gas venting rated Class II, 65°C
- Stainless Steel (ULC S636)

Approved Primers and Cements

For installations in the US only

- PVC and CPVC Primer (ASTM-F656)
- PVC Cement (ASTM D-2564)
- CPVC Cement (ASTM F493)
- ABS Primer and Cement (ASTM D-2235)

For installations in CANADA

- ULC S636 approved Primer and Cement for flue gas venting rated Class II, 65°C

NOTICE

Use of cellular core PVC (ASTM F891), cellular core CPVC, or Radel® (polyphenosulfone) in non-metallic venting systems is prohibited and covering non-metallic venting with thermal insulation is prohibited.

NOTICE

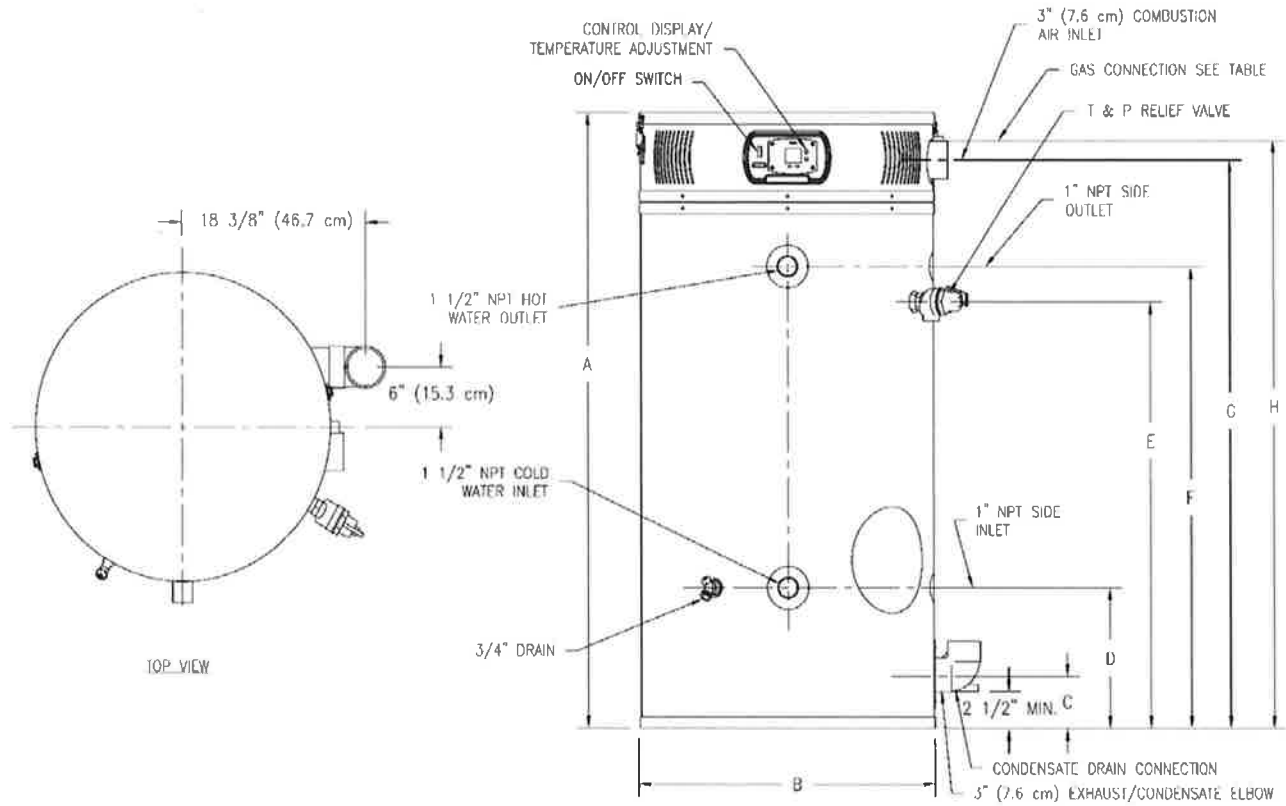
Before beginning installation of any vent pipe, read the vent pipe manufacturer's installation instructions.

DO NOT install the water heater in any location where the ambient temperature may fall below freezing. Water heater **must** be protected from freezing downdrafts during shutdown periods.

Provide protection of the building materials from degradation by flue gases from the exhaust vent terminal.

Section 1: Serial Numbers "XC-" (March 2021) and Later

Specifications



Model No.	Input Rate BTU/hr	1 st Hr. Del Gal @ 100 °F Rise	Recovery GPH at Degree Rise			Stg. Capacity US Gal	Therm. Efficiency %
			40°F	100°F	140°F		
60T125	125,000	187	363.6	145.5	103.9	60	96.0
60T150	150,000	211	422.7	169.1	120.8	60	93.0
60T199	199,999	265	557.6	223	158	60	92.0
100T150	150,000	250	450.5	180.2	129	100	97.0
100T199	199,999	309	597	236.8	171	100	97.0
100T250	250,000	364	734.8	293.9	210	100	96.0
100T300	300,000	405	836.4	334.5	239	100	92.0

Model No.	DIMENSIONS (INCHES)												
	A Height	B Dia.	C Floor to Vent Outlet	D Floor to Inlet Water Conn.	E Floor to T&P Valve Conn	F Floor to Outlet Water Conn	G Floor to Air Intake	H Floor to Gas Conn	Front Water Conn Dia	Space Heating Conn Dia	Gas Conn Dia (NPT)	T&P Valve Open (NPT)	Shipping Weight (lbs)
60T125	57	28 1/4	5	13	40	42 1/4	52 1/2	53 1/2	1 1/2	1	3/4	3/4	570
60T150	57	28 1/4	5	13	40	42 1/4	52 1/2	53 1/2	1 1/2	1	3/4	3/4	570
60T199	57	28 1/4	5	13	40	42 1/4	52 1/2	53 1/2	1 1/2	1	3/4	3/4	570
100T150	77 5/8	28 1/4	5	13	60	62 1/4	73 1/8	74 3/4	1 1/2	1	3/4	3/4	900
100T199	77 5/8	28 1/4	5	13	60	62 1/4	73 1/8	74 3/4	1 1/2	1	3/4	3/4	900
100T250	77 5/8	28 1/4	5	13	60	62 1/4	73 1/8	74 3/4	1 1/2	1	3/4	1	900
100T300	77 5/8	28 1/4	5	13	60	62 1/4	73 1/8	74 3/4	1 1/2	1	3/4	1	900

Icon System

Features of ICON System Module

- Water heater digital display on control board for setting and displaying the temperature setpoint. Pressing temperature UP and DOWN buttons changes the temperature setpoint. Temperature format may be displayed in °F or °C.
- Single control board with plug in wiring controls temperature, ignition, and blower operation.
- Plug in wiring reduces chance of miswiring.
- Burner ignition with direct spark ignition – A high voltage spark jumps from the spark rod to the burner surface to ignite the gas.
- Water heater digital display will show diagnostic codes in the event the water heater needs servicing. Aids in diagnosing and servicing the water heater.
- Water heater digital display can show previous error code history to further aid in servicing the water heater.

Power Supply	Dedicated 120 VAC, 60 Hz, 15A
Gas Supply	Minimum ¾" NPT (schedule 40 black iron pipe recommended)
Approved Gas Type	Natural or Propane. Unit must match gas type supplied.
Gas Pressure (Nat & L.P.)	Natural: 14" W.C. maximum static, 4.5" W.C. minimum running (recommended 7" W.C. min running) L.P. (Propane): 14" W.C. maximum static, 8" W.C. minimum running (recommended 11" W.C. min running)
Venting System	Power vent, balanced direct vent or unbalanced direct vent. See vent tables on page 8.
Approved Vent Materials	PVC, CPVC, Polypropylene, or Stainless Steel
Minimum Clearance for Servicing	18" from top, 24" from front, 4" sides and rear.
Maximum Water Supply Pressure	150 PSI
Thermostat Sensor	11,900 Ohms @ 70°F, ECO opens @ 207°F Max., ECO close @ 120°F Min. Redundant sensor for ECO. Sensor inside well for easy replacement of
Control Display	Digital display, 24 volts. Temperature Range: 70-180°F. Used to set tank temperature (°F or °C), show operating status, display error codes, error code history, limit maximum setpoint temperature.
Control Board	Operates from 24 volt from transformer. Controls tank temperature, ignition functions, combustion blower. See ignition timings in sequence of operation for ICON Control.
Transformer	120VAC primary, 24VAC secondary, 40VA.
Spark Rod Igniter	0.22" nominal gap to the burner surface.
Flame Sensor Output	Minimum 1 micro amp, typical range 5 to 30 micro amps.
Gas Valve	Negative regulation, 24 VAC, ½" PSI max., 4.5" W.C. Minimum running inlet.
Vent Safety Switch	Normally closed, opens @ 350°F, manual reset.
Blocked Vent Pressure Switch	24VAC, normally closed, opens when pressure increases to +2.70 W.C.
Blower	120VAC, 60Hz, 1-4 amps

Sequence of Operation

1. Thermostat calls for heat.
2. Combustion blower starts at a reduced rpm for a “soft” start light off.
3. Blower pre-purge period of approximately 15 seconds.
4. Ignition control board runs an internal verification safety check for approximately 15 seconds.
5. Trial for ignition (approximately 5 seconds per trial, 3 trials total):
 - a. Spark establishing period (3 seconds), gas valve opens, sparks from spark rod to ground rod, igniting the fuel air mixture at the burner surface.
 - b. Burner on, flame proving period (2 seconds). Requires a minimum of 1 microamp through the flame sense rod to prove flame.
 - c. If the blocked vent pressure switch contacts (normally closed) are open, then the ignition sequence will not start and error code “67” (pressure switch failed to close/open or vent safety switch failed to close/open) will flash once on the digital display. The unit will then go into pre-purge/“Hold” while the unit is waiting for the issue to be corrected. If the issue continues to occur, the digital display with flash error code “137” (pressure switch is open, or vent safety switch is open) while the unit is waiting to restart (5 minutes) the normal sequence of operation.
6. Once the flame signal is verified, the blower will remain at the “soft” start RPM for 5 seconds to stabilize the flame.
7. Steady state operation – Burner continues to operate until:
 - a. The thermostat circuit opens, gas valve closes, and blower continues to operate for 30 second post-purge period.
 - b. If the blocked vent pressure switch contacts open (normally closed) while the burner is on, then the gas valve closes, and the unit will retry a normal sequence of operation. If issue remains on restart, the unit will go into recycle as described in 5c.
8. Thermostat is satisfied.
9. Gas valve closes and burner is extinguished.
10. Blower post purge for 30 seconds at maximum RPM.

Sequence of Operation

Lockout Conditions

The system will go into lock out mode for the following reasons:

1. ERROR CODE 110

- a. Control board will go into soft lockout if the main burner cannot be lit or fails to prove flame after 3 ignition trials. The water heater digital display indicates a lockout condition by showing error code 110 with "Service Needed" on the control board's digital display. Refer to error codes in the diagnostic section of this Service Manual. In a soft lockout condition, the control will wait for 15 minutes and then make 3 more attempts to light the main burners. Soft lockout reset is accomplished by depressing the lower right button under "Reset" for 3 seconds.

2. ERROR CODE 80

- a. If the temperature at the top of the tank should exceed 207°F, then the high limit control will shut off the burner and the water heater will go into a hard lockout. Error code 80 will be shown on the control board's digital display. The control board can only be reset in the Service Mode, which is detailed in the ICON System Troubleshooting section of this Service Manual (pg 15).

3. ERROR CODE 67

- a. If the exhaust terminal becomes blocked or the condensate elbow fails to drain condensate, the normally closed exhaust pressure switch will open, the gas valve will close, and error code 67 will appear on the digital display. When the condition is corrected, the error code will disappear, and the water heater will resume normal operation. No resetting of the control board is needed for the pressure switch error code.
- b. If the vent safety switch located near the exhaust pressure switch should open, the gas valve will close, the blower will post-purge, and error code 67 will appear on the control board's digital display. The lockout condition will reset once the problem is corrected and the switch is reset. Refer to Vent Safety Switch Testing and Replacement in this Service Manual (pg 49).
- c. The pressure switch and temperature switch are wired in series. As a result, the water heater will not function unless both switches are operational.

Building Management System (BMS)

All water heaters with ICON Systems can be equipped with a gateway kit that will facilitate a Building Management System (BMS) connection to Modbus or Bacnet®. This kit is sold separately and is not factory installed. A full installation, operation, and troubleshooting manual is provided with the gateway kit.

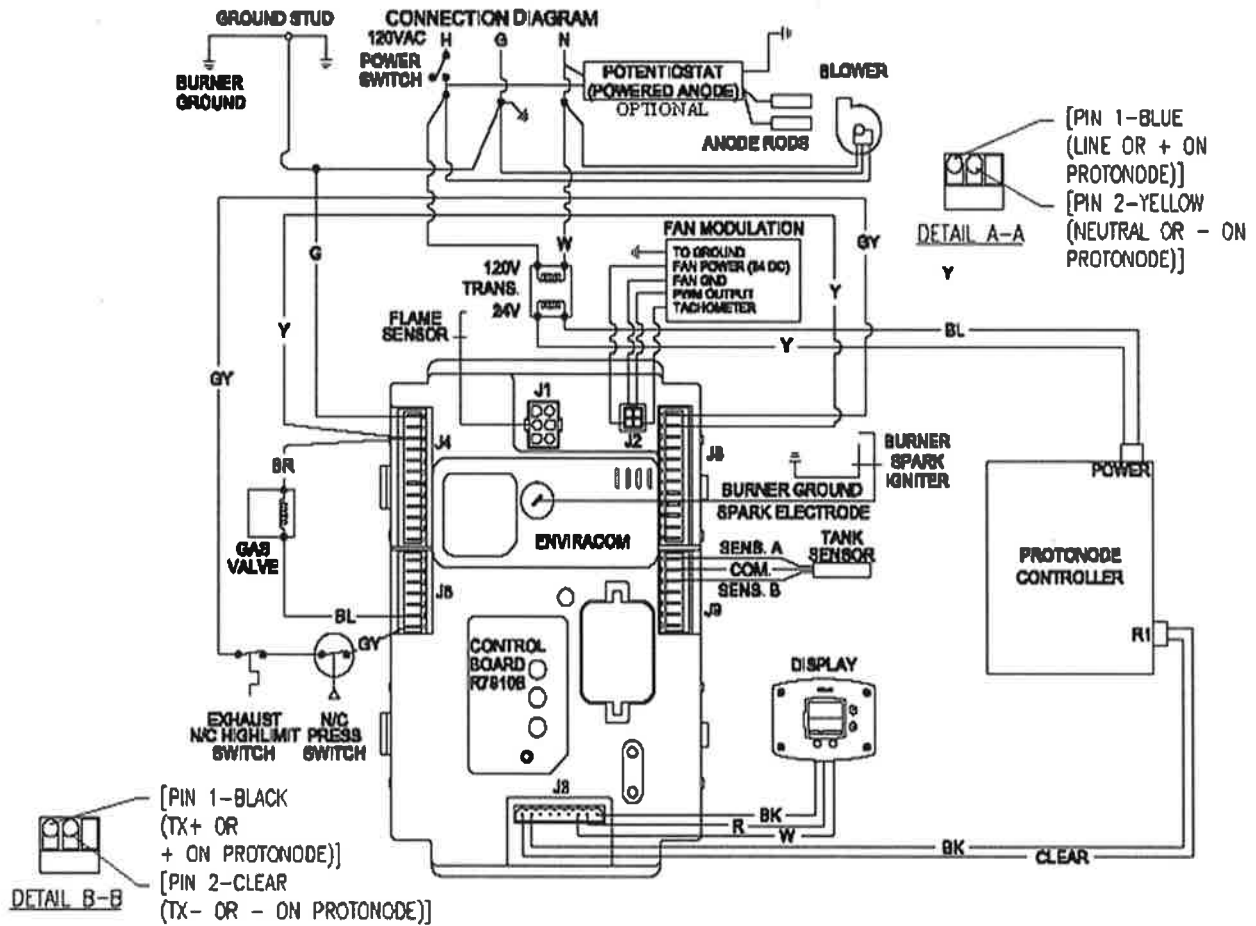
⚠ CAUTION

Before beginning any Troubleshooting operations listed below, please note that the gateway kit and BMS may need to be disconnected from the heater. Please ensure this has been completed before proceeding with any troubleshooting operation that may be impacted by settings in the BMS.

BMS Mapping

Map Descriptor Name	Modbus Register	Read/Write	BACnet Object ID	Note
Demand source	00006	Read	001	Current demand source: 0 = Unknown 1 = No source demand 2 = CH 3 = DHW 4 = Lead Lag slave 5 = Lead Lag master 6 = CH frost protection 7 = DHW frost protection 8 = No demand due to burner switch (register 199) turned off 9 = DHW storage 10 = Reserved 11 = Warm weather shutdown 12 = Hot standby
Firing rate	00008	Read	002	Actual firing rate (% or RPM)
Fan speed	00009	Read	003	RPM
Flame signal	00010	Read	004	0.01V or 0.01 μ A precision (0.00-50.00V)
Tank temperature sensor	00012	Read	005	-40°-130° (0.1°C precision)
Appliance setpoint	00017	Read	006	-40°-130° (0.1°C precision)
Burner status	00032	Read	007	0 = Disabled 1 = Locked out 2-3 = Reserved 4 = Anti-short cycle 5 = Unconfigured safety data 6-33 = Reserved 34 = Standby Hold 35 = Standby Delay
Lockout code	00034	Read	008	0 = No lockout 1-4096
Appliance status	00080	Read	009	0 = Unknown 1 = Disabled 2 = Normal 3 = Suspended
DHW priority count	00082	Read	010	Countdown of time when DHW has priority over CH (secs). Applicable when DHW priority time is enabled.
Burner run time	00130/00131	Read	011	Hours
Controller cycle count	00142/00145	Read	012	0-999,999
Controller run time	00144/00145	Read	013	Hours
Alarm reason	0035	Read	014	0 = None 1 = Lockout 2 = Alert 3 = Other
DHW setpoint	0453	Read/Write	015	40°-130° (0.1°C precision)

BMS Wiring Diagram



NOTICE

The Building Management System (BMS) is only compatible with units that have ICON controllers.

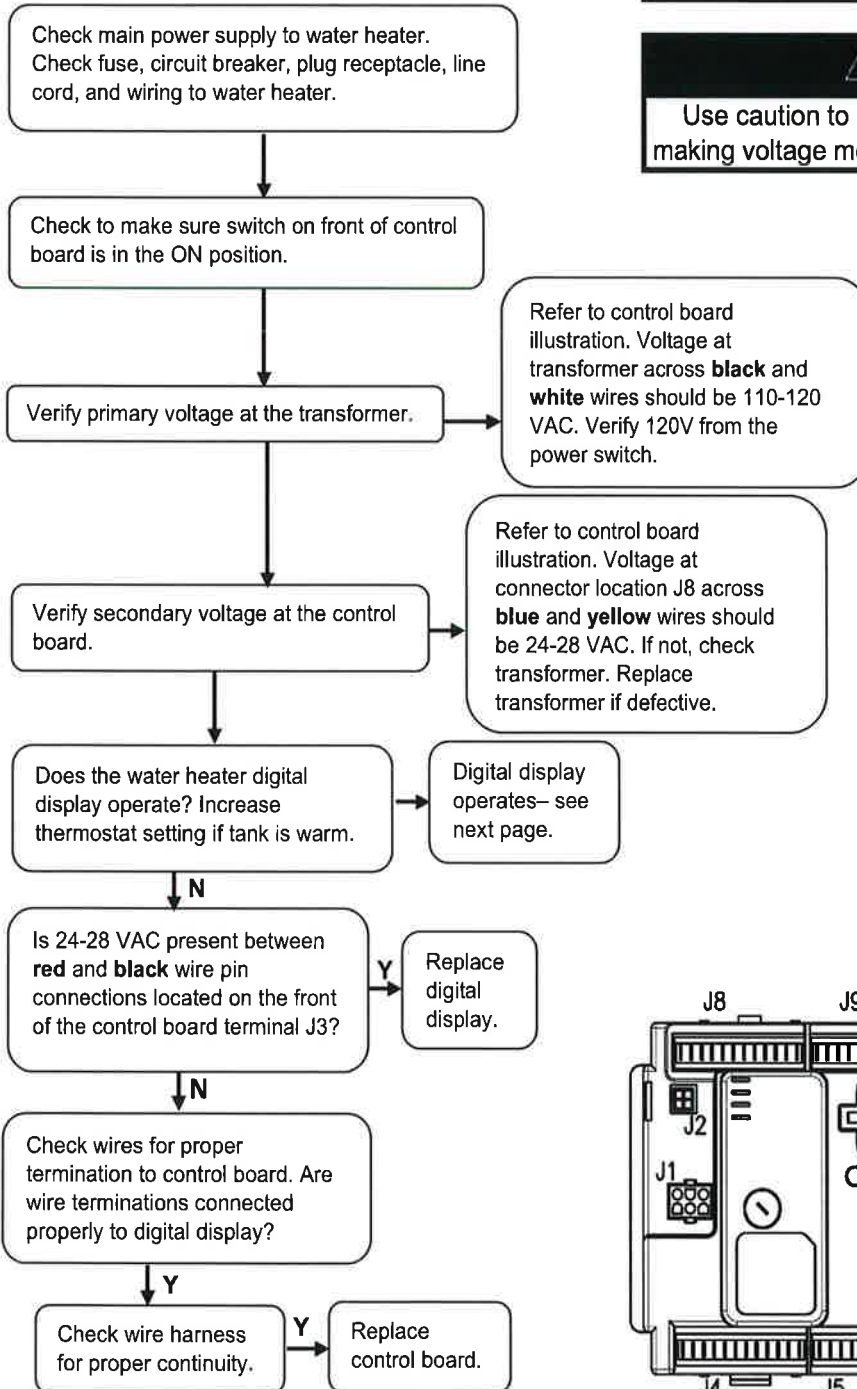
Part	Bradford White Part Number
BMS Gateway Installation Kit	415-53943-00

Troubleshooting

System Observation

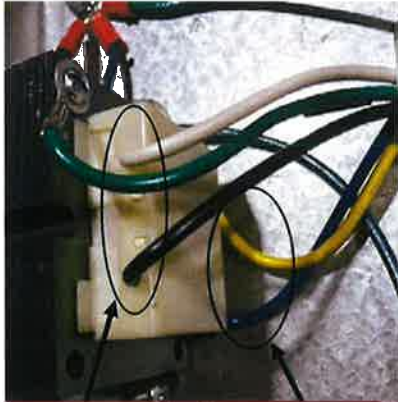
Water Heater Fault: Water heater does **NOT** operate.

Display Error Code: Water heater digital display does **NOT** operate - blank display.



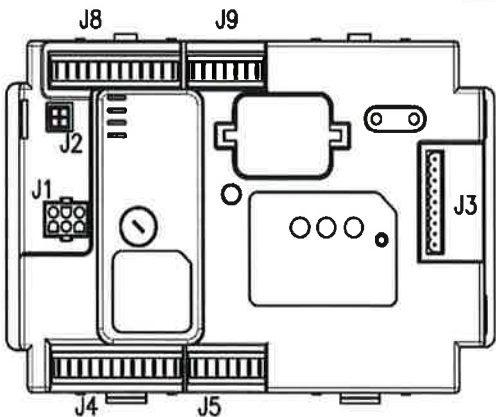
WARNING
120 volt potential exposure. Use caution making voltage checks to avoid personal injury.

CAUTION
Use caution to **NOT** damage connectors when making voltage measurements or jumping terminals.



Black & White wires

Yellow & Blue wires



ICON Control Board Schematic

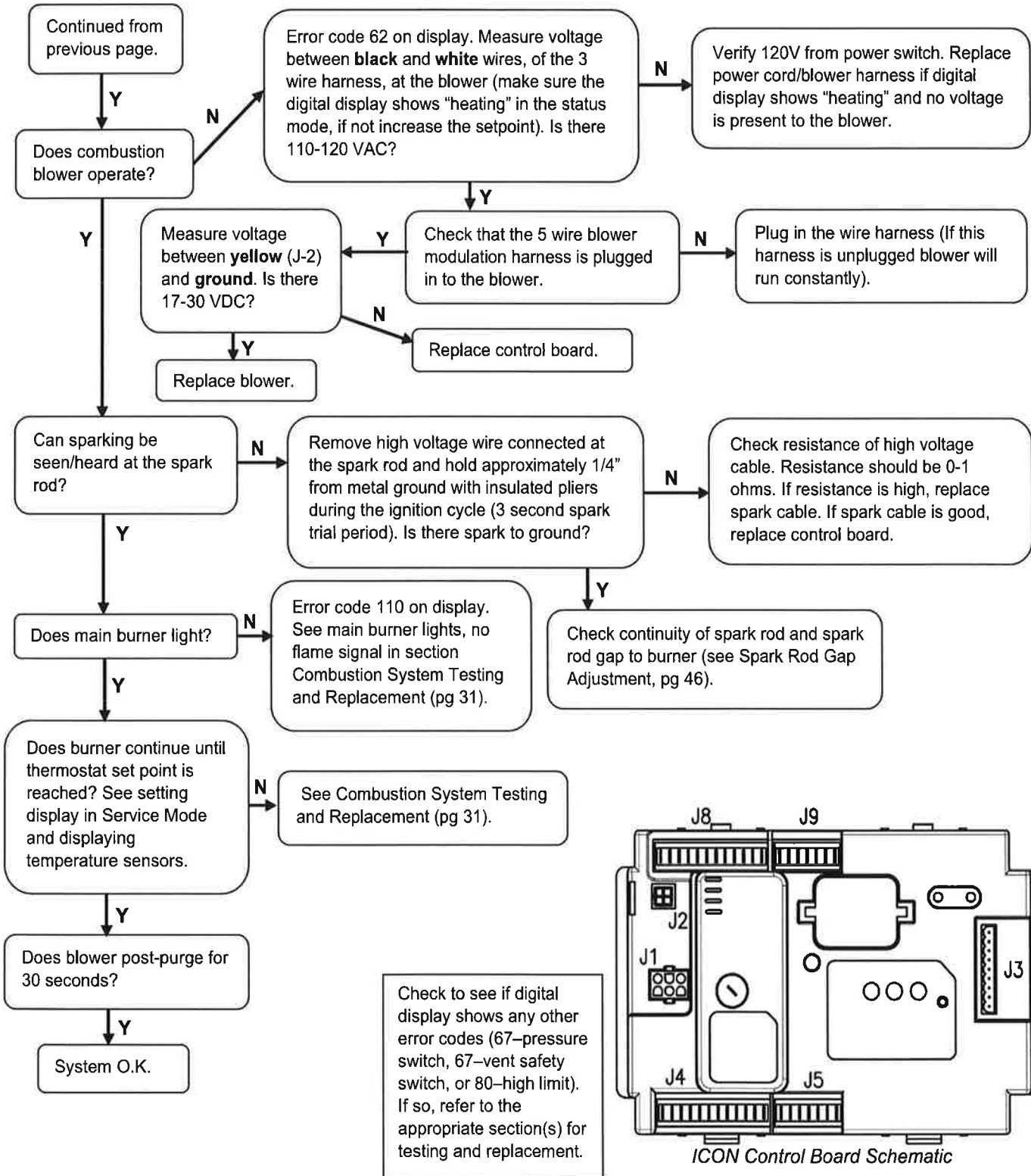
Troubleshooting

⚠ CAUTION

Use caution to **NOT** damage connectors when making voltage measurements or jumping terminals.

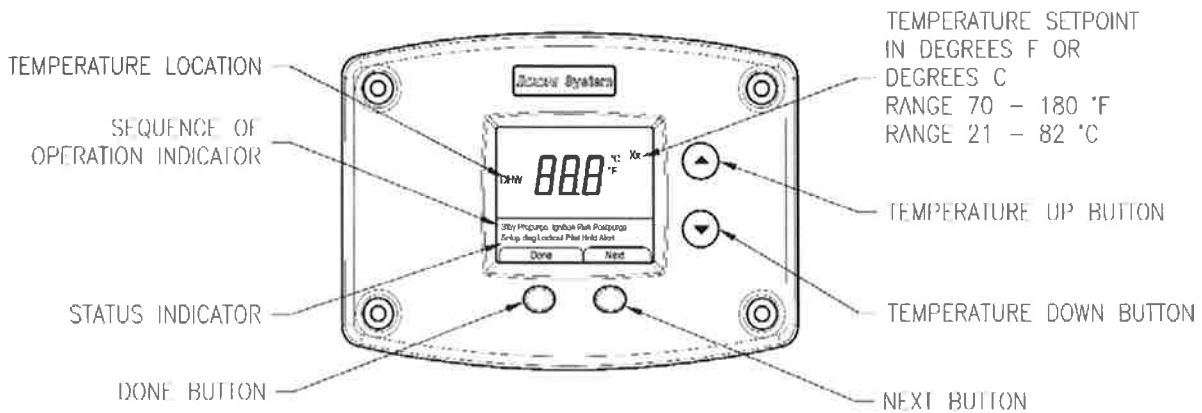
⚠ WARNING

120 volt potential exposure. Use caution making voltage checks to avoid personal injury.



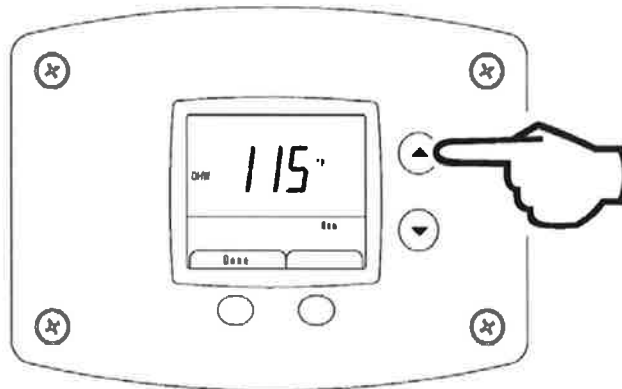
Display Control

Water Heater Display and Control Buttons

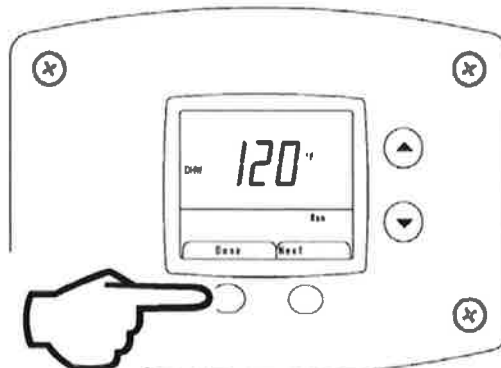


To Increase Temperature Setpoint

Step 1. Press and hold "Temperature Up" button until desired setpoint temperature appears on the display.



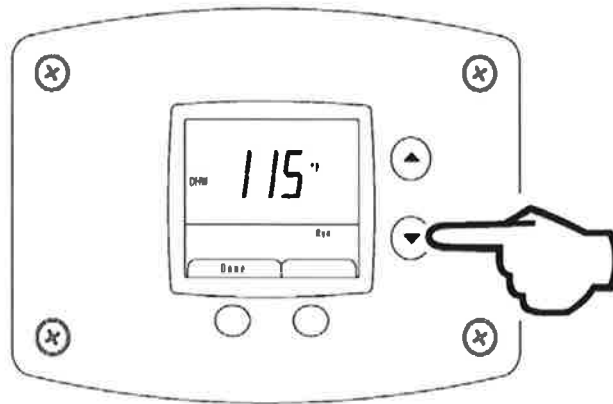
Step 2. Press "DONE" button for new setting to take effect immediately. If the "DONE" button is not pressed, the new temperature setting will take effect in approximately 10 seconds.



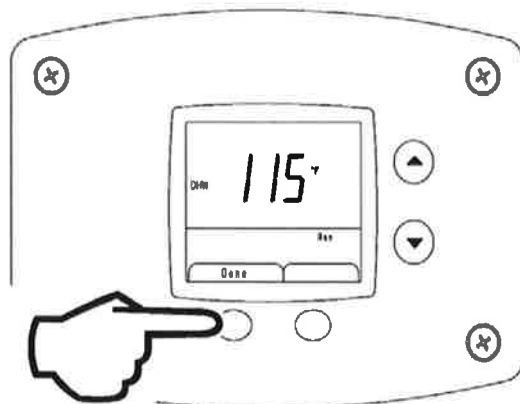
PRESS DONE BUTTON FOR SETTING TO TAKE EFFECT IMMEDIATELY

To Decrease Temperature Setpoint

Step 1. Press and hold "Temperature Down" button until desired setpoint temperature appears on the display.



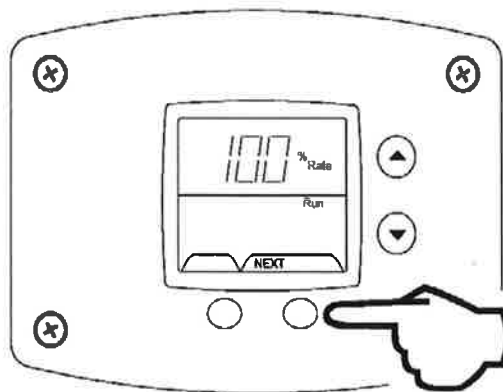
Step 2. Press "DONE" button for new setting to take effect immediately. If the "DONE" button is not pressed, the new temperature setting will take effect in approximately 10 seconds.



PRESS DONE FOR SETTING TO
TO TAKE EFFECT IMMEDIATELY

To View Combustion Rate

Step 1. Select Next while viewing DHW Setpoint in User Mode to access Rate screen. Rate will only be displayed while the burner is operating.

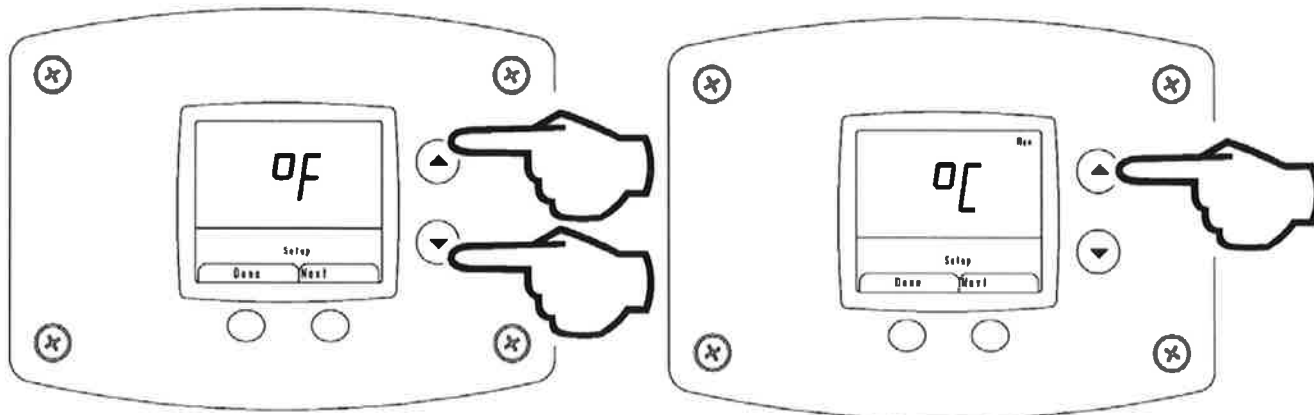


Step 2. Select Next to go back to the DHW Setpoint screen.

To Change Temperature Format in Display from °F to °C or °C to °F

Step 1. Enter "Set-Up Mode" by pressing both UP/DOWN buttons together for 3 seconds.

Step 2. Use the arrows to select between °F and °C



Step 3. Press done to return to main screen or timeout/change will occur in one minute.

An energy cut out (ECO) is incorporated in the sensor and control board which will shut off all gas supply to the burner if the water heater temperature exceeds 207°F (93°C). Should the ECO function (open), the water temperature should be reduced to approximately 120°F (49°C) and call a qualified service agent to place the water heater in operation. The water heater must have the problem corrected by a qualified service person before putting the water heater back in operation. It is recommended that all service work be performed by a qualified service agency.

If the water heater is to remain idle for 30 days or more or is subjected to freezing temperatures while shut off, the water heater and piping should be fully drained (See "To Drain the Water Heater") and the drain valve should be left fully open.

⚠ WARNING

Hydrogen gas can be produced in an operating water heater that has not had water drawn from the tank for a long period of time (generally two weeks or more). **HYDROGEN GAS IS EXTREMELY FLAMMABLE.** To prevent the possibility of injury under these conditions, we recommend the hot water faucet to be open for several minutes at the kitchen sink before you use any electrical appliance which is connected to the hot water system. If hydrogen is present, there will be an unusual sound such as air escaping through the pipes as hot water begins to flow. **DO NOT smoke or have open flame near the faucet at the time it is open.**

⚠ WARNING

DO NOT run out of propane gas. Damage to the water heater may occur.

Troubleshooting

Accessing Diagnostic Mode on the Water Heater Display

(FOR SERVICE PERSONNEL ONLY)

The display has a Diagnostic Mode to access information in aiding servicing of the water heater. This procedure is for service and installation personnel only. To enter the Diagnostic Mode, follow the steps illustrated below:

WARNING

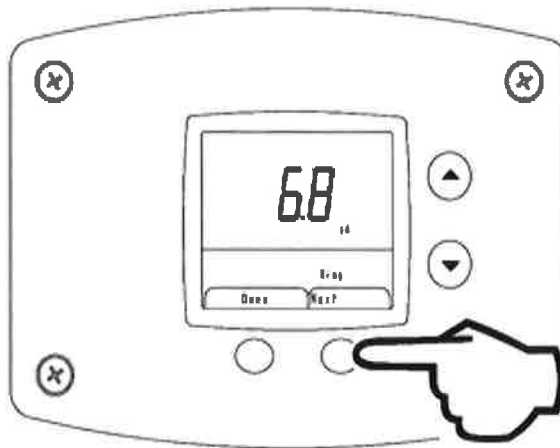
The following procedure is for **service and installation personnel ONLY**. Resetting lockout conditions without correcting the malfunction can result in a hazardous condition.

Step 1. Press and hold the lower right button under “Next” in the lower right display for at least 3 seconds. You must be in user mode on the DHW temp screen to access diagnostic mode. If in user mode on the view rate screen, you cannot access diagnostic mode.

NOTICE

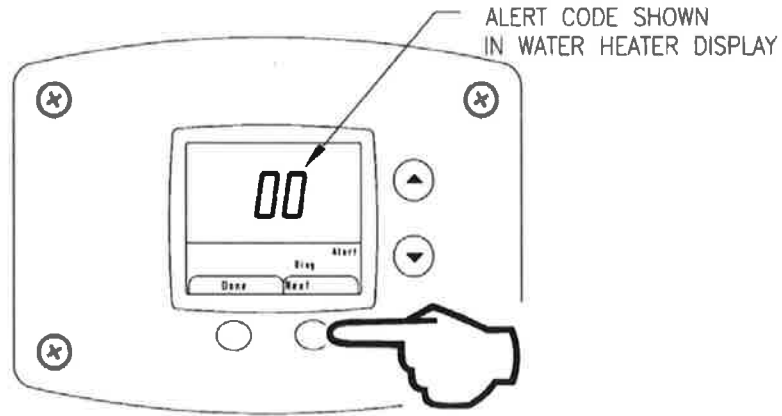
The screens will stay in the Diagnostic Mode for 12.5 minutes after the last button press for viewing unless “Done” button is pressed to exit Diagnostic Mode.

Step 2. In the first screen of diagnostic mode the display will show the flame sense current in microamps when the burner is operating.

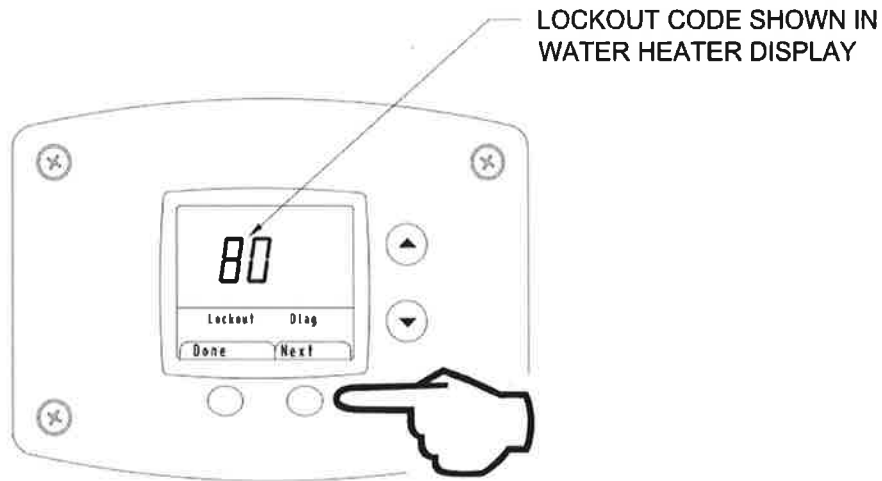


PRESS NEXT BUTTON FOR
3 SECONDS TO ENTER

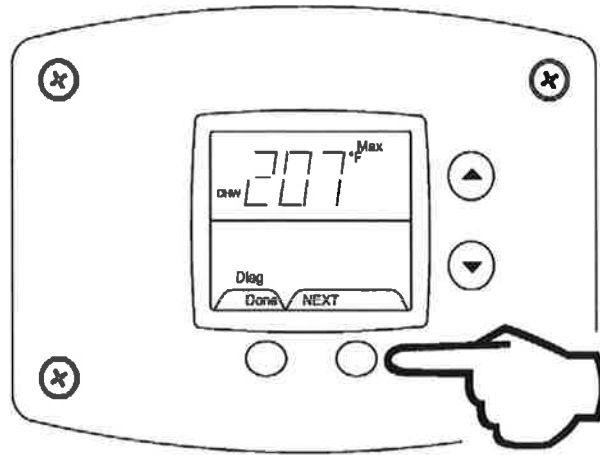
Step 3. Press the lower right "Next" button. The display will flash and show the number of any alert codes. These are **not** currently used.



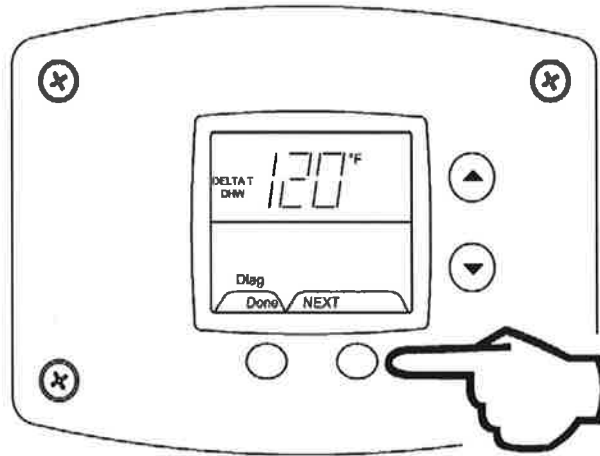
Step 4. Press lower right "Next" button. The display will flash and show the number of any Lockout codes. If there are no lockouts, the display will show 00. If there are multiple lockout codes "Next" will scroll through them.



Step 5. Press "Next", the display will show "DHW MAX". This is the maximum allowable temperature that the unit can get to before a lockout occurs.



Step 6. Press Next, display will show “DELTA T DHW”, this is the real time temperature reading of the tank.



Step 7. Press “Done” to exit Diagnostic Mode and return to the DHW setpoint in User Mode.

DIAGNOSTIC ERROR CODES AND TROUBLESHOOTING PROCEDURES FOR EF MODELS WITH ICON SYSTEMS CONTROL

NOTICE

The ICON control system can produce soft and hard lockouts. Soft lockouts are displayed if active and are not stored in Diagnostic Mode history. The control will periodically attempt to resume normal operation when in soft lockout conditions. If the system resumes normal operation a soft lockout will clear instantly; hard lockouts will display if active and require manual reset. Up to ten previous Hard lockouts are logged chronologically (newest first) in Diagnostic Mode history.

Error Code	Definition of Code	Cause of Problem and Actions Taken to Correct
No code – blank display	No power to the unit or switch is off.	<ul style="list-style-type: none"> • Check power supply to the water heater. • Make sure water heater is plugged in and the breaker is on. • Check if there is 120 volts power supply to the LINE connections on the control board. • Verify 24 volts at display. • Check for loose wires, defective transformer. • Check wire harness connections from display to the control board.
9,22	Low flame sense signal	<ul style="list-style-type: none"> • Check microamp output of flame sense • Inspect flame sensor and wire • Inspect burner for debris
49	Voltage too low or high	<ul style="list-style-type: none"> • Measure the incoming line voltage. • Voltage should be 115-125 volts. • If the voltage is not within this range or there is drastic fluctuation, then have the incoming power supply checked. • If the line voltage is satisfactory, check the output from the transformer to make sure it is 22-26 volts. • Replace transformer or wiring if defective.
53	AC Inputs phase reversed	<ul style="list-style-type: none"> • Check the module and display connections. • Check the module power supply and make sure that frequency, voltage and VA capacity of the transformer meet specifications. • Check to make sure the wiring connections on the control module from terminals J4-10 and J8-2 are connected together.
62	Fan speed not proved	<ul style="list-style-type: none"> • Check the pulse width modulation (PWM) wire harness connection from the blower to the control module. • Make sure the pin terminals make solid contact. • Measure the resistance of each wire in the wire harness from the terminal ends. • Replace wire harness if defective. • If value remains out of range, this hold will change to lockout 123 (defined below)
67	Normally closed vent safety circuit opened	<ul style="list-style-type: none"> • Check wiring to the normally closed blocked vent pressure switch and vent limit switch. • Use a voltmeter to find out if either the pressure switch or the high limit switch has opened. • If so, determine the cause (blocked vent terminal, clogged condensate drain, high temperature in compartment). • If limit switches are closed, check wiring for shorts. • Measure continuity. • If limit switches and wiring check O.K., replace control module.

Error Code	Definition of Code	Cause of Problem and Actions Taken to Correct
80	High Limit (Overheat Condition)	<ul style="list-style-type: none"> • Check the wiring from the water temperature sensor to the control module. • Measure the resistance of each outside wire to the center wire. Measure the tank temperature and compare with the chart below. • If either outside wire has a much different resistance reading, replace the sensor. • Make sure the sensor is securely held inside the well with the clip. • If the problem persists and the sensor and wiring check O.K., then replace the control module.
93	Water temperature sensor fault	<ul style="list-style-type: none"> • Appears after alert 172, defined below. • Check the water temperature sensor wire harness from the sensor to the control module. • Make sure there are no loose connections to the control plug. • Check the resistance reading from each of the outside wires to the center (common) wire. Measure the tank temperature and compare with the chart below. • If the ohm readings are not fairly close, replace the sensor. • Replace the control module if the problem persists and the sensor and wire connections are not defective.
105	Flame detected out of sequence	<ul style="list-style-type: none"> • Check to see if flame is present inside the combustion chamber before or after the ignition cycle. • If so, check to make sure the gas valve is wired correctly. • Check for voltage at the gas valve connection. • Replace the gas valve if defective. • If no flame is visible outside of the ignition sequence/run cycle, then make sure the flame sensor is wired to the correct terminal. • Make sure the ignition cable is not crossing the flame sensor wire or ignition ground wires. • If problem persists and all other checks have been verified, replace the control module.
109, 110	Ignition Failure Occurred.	<ul style="list-style-type: none"> • Burner failed to light or stay lit after 4 retries. • Hold condition – will reattempt ignition after 15 minute waiting period. A log will be stored in service history. • Check gas valve wiring and gas valve operation during the ignition cycle. • If burner lights but quickly goes out, check the flame sensor wire or the flame sensor. • If the flame sensor rod is badly corroded with deposits, clean with sandpaper or replace. • Check the inlet gas supply to make sure the pressure is sufficient and does not drop after the gas valve opens. • Make sure the combustion blower is operating during the ignition and run cycle. • Check the venting system to make sure the inlet and exhaust terminals and venting system is not blocked.
122,123	Light-off Rate Proving Failed	<ul style="list-style-type: none"> • If blower speed is not verified from the PWM (Pulse Width Modulation) signal within 5 minutes, the previously described error code "62" changes from a hold condition to this lockout code condition • Check the harness and pin terminals for a good connection to the control module. • Replace the blower or control module if the wire harness is good.
137	Normally closed vent safety	<ul style="list-style-type: none"> • Refer to code 67

Error Code	Definition of Code	Cause of Problem and Actions Taken to Correct
	circuit opened	
172	Water temperature sensor resistance invalid	<ul style="list-style-type: none"> • Hold 93 will be displayed if this value remains out of range • Measure the resistance of the water temperature sensor and compare it with the tank temperature using the chart below (Reference Appendix A - Sensor Resistance at Various Temperatures on pg. 29).
NOTE		<ul style="list-style-type: none"> • If there is no display, check primary/secondary voltage • Before troubleshooting always verify the following <ul style="list-style-type: none"> ○ Gas inlet pressure ○ Static to dynamic gas pressure drop ○ No vent and intake restrictions ○ All wire connections are tight ○ No grounded wires or missing grounds ○ No water leaks

Service Procedure I

Thermostat Circuit Testing and Replacement

IMPORTANT NOTE: This procedure assumes a cool tank.

Condition: Water heater not operating. Digital display shows error code 93 (sensor reading faulty).

Unplug or disconnect electrical power to the water heater.

Check continuity of wire harness to sensor. Resistance of harness should be close to 0 ohms. Replace wire harness if high resistance is measured (over .5 ohms). Check wires for intermittent connections, shorts, and/or frayed insulation. Replace if necessary.

If wire harness is O.K., check sensor resistance detailed in Appendix A: Sensor Resistance at Various Temperatures (pg 29). Replace sensor if needed.

Turn power ON to water heater. Run water heater through heating cycle and verify proper operation. Sensor temperature can be viewed when burner shuts off (see section on viewing the digital display in Service Mode).

Condition: Water heater not operating. Digital display shows error code 80 high water temperature (over 207°F).

⚠ WARNING
DO NOT reset the digital display from the hard lockout state without correcting the cause of the overheating condition.

Turn power OFF. Draw water to cool tank below 120°F.

Check sensor. Sensor is held in place with a clip fastened to the well (see image). Check sensor wire for potential damage or breaks in the wire insulation. Is the sensor fully inserted into the well?

If sensor clip is damaged replace clip. Replace sensor if damaged.

Continued on next page.

Check sensor resistance (see Appendix A: Sensor Resistance, pg 29).

⚠ WARNING

120 volt potential exposure. Use caution making voltage checks to avoid personal injury.

⚠ CAUTION

Use caution to **NOT** damage connectors when making voltage measurements or jumping terminals.

Checking continuity of sensor across the two black wires (disconnected from control board)



Sensor clip shown properly installed



The sensor is located next to the top outlet location

Service Procedure I

Thermostat Circuit Testing and Replacement (Continued)

Continued from previous page.

Condition: Water heater not operating. Digital display shows error code 80 high water temperature (over 207°F) (continued from previous page).

Once cause of overheating condition has been diagnosed and corrected, the control board may be reset.

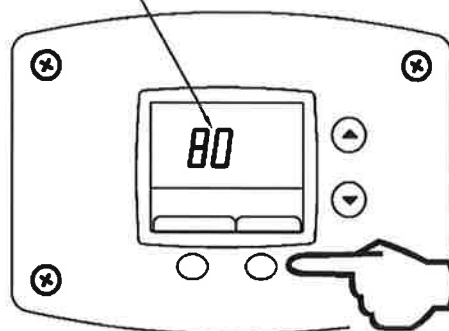
- Reconnect and switch on power to the water heater.
- Press button under "Reset" and hold for 3 seconds.
- Set thermostat to the desired setting.
- Water heater will start.
- Monitor temperatures for one complete heating cycle making sure the maximum tank temperature remains below 207°F.

WARNING

DO NOT operate the water heater without verifying that the overheating condition has been corrected.

This water heater is equipped with a manual reset type gas shutoff device designed to shut off the gas to the burners if excessive water temperature occurs. To reset the control, press the lower right button under "RESET" in the display for 3 seconds.

Error code 80 indicates high limit lockout condition



Step 1: Press for 3 seconds to reset control.

Service Procedure I

Thermostat Circuit Testing and Replacement (Continued)

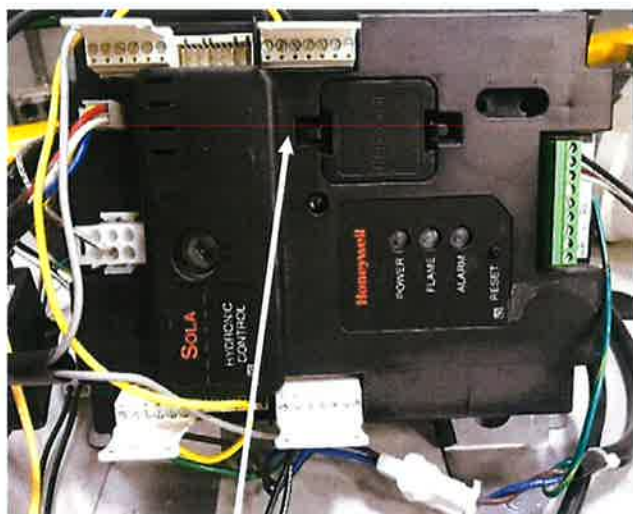
Thermostat Sensor (Thermistor) Replacement Procedure

1. Position main power switch to "OFF."
2. Disconnect (unplug) water heater from 120 volt power source.
3. Unlatch and remove top surround cover from top of the water heater.
4. Fold back insulation by top outlet location to expose temperature sensor.
5. Disconnect temperature sensor from control board (see images below).
6. Unclip sensor from well and pull sensor to remove, **DO NOT** remove well.
7. Install new sensor completely into well and reinstall sensor clip.
8. Connect temperature sensor to control.
9. Fold insulation back into place. Be sure there are **NO** wires in contact with burner.
10. Restore 120 volt power supply and water supply to water heater, check and repair any leaks found. Confirm proper operation following the lighting instructions on the lighting instruction label, or the lighting instructions located in the Installation and Operating Manual.
11. Replace the surround cover on the top of the water heater.



WARNING

120 volt potential exposure. Use caution making voltage checks to avoid personal injury.



Disconnect sensor harness from control board



Sensor clip shown properly installed

Service Procedure I

Thermostat Circuit Testing and Replacement (Continued)

Appendix – A Sensor Resistance at Various Temperatures

Be careful when making voltage measurements or jumping terminals NOT to damage or deform connectors or connector pins.

Draw water from the Temperature and Pressure Relief Valve. Compare the Temperature with Temperature Ohms Chart below.

Example: If temperature of the sensor is 84 °F, then the resistance through the sensor would be 8449 (see shaded area).
NOTE: Sensor resistance increases as the temperature falls.

In Degrees F										
°F	0	1	2	3	4	5	6	7	8	9
40	26109	25400	24712	24045	23399	22771	22163	21573	21000	20445
50	19906	19383	18876	18383	17905	17440	16990	16553	16128	15715
60	15314	14925	14548	14180	13823	13477	13140	12812	12494	12185
70	11884	11592	11308	11032	10763	10502	10248	10000	9760	9526
80	9299	9078	8862	8653	8449	8250	8057	7869	7685	7507
90	7333	7165	7000	6839	6683	6531	6383	6238	6098	5961
100	5827	5697	5570	5446	5326	5208	5094	4982	4873	4767
110	4663	4562	4464	4368	4274	4183	4094	4006	3922	3839
120	3758	3679	3602	3527	3453	3382	3312	3244	3177	3112
130	3048	2986	2925	2866	2808	2752	2697	2643	2590	2538
140	2488	2439	2391	2344	2298	2253	2209	2166	2124	2083
150	2043	2004	1966	1928	1891	1856	1820	1786	1753	1720
160	1688	1656	1625	1595	1566	1537	1509	1481	1454	1427
170	1402	1376	1351	1327	1303	1280	1257	1235	1213	1191
180	1170	1150	1129	1110	1090	1071	1053	1035	1017	999
190	982	965	949	933	917	901	886	871	857	842
200	828	814	801	788	775	762	749	737	725	713

Service Procedure I

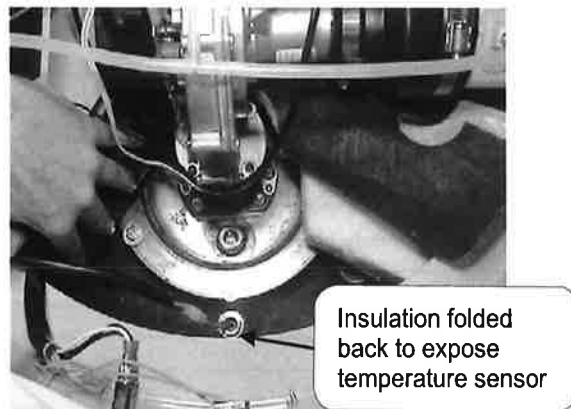
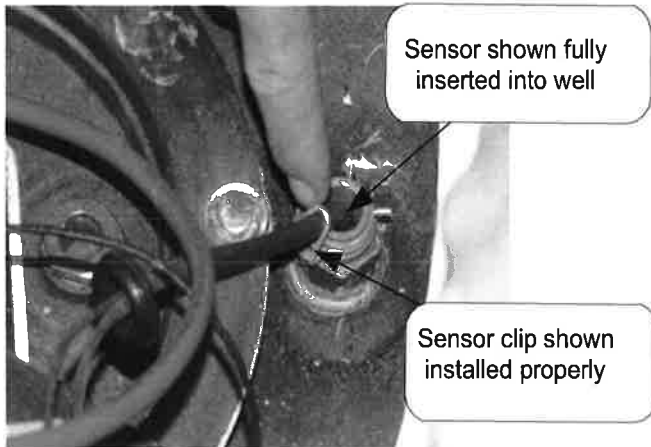
Thermostat Circuit Testing and Replacement (Continued)

Thermostat Sensor (Thermister) Replacement Procedure

1. Position main power switch to OFF.
2. Disconnect (unplug) the water heater from 120 volt power source.
3. Unlatch and remove the top of the surround cover from the top of the water heater.
4. Fold back the insulation just in front of the burner to expose the temperature sensor (see image at right).
5. Disconnect temperature sensor from harness (see images at right).
6. Unclip the sensor from the well and pull the sensor to remove, do NOT remove the well.
7. Install the new sensor completely into the well and reinstall the sensor clip.
8. Fold the insulation back into place. Be sure there are no wires in contact with the burner.
9. Restore 120 volt power supply and water supply to the water heater, check and repair any leaks found. Confirm proper operation following the lighting instruction label or the lighting instruction located in the Installation and Operating Instruction Manual.
10. Replace the surround cover on the top of the water heater.

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.



Service Procedure II

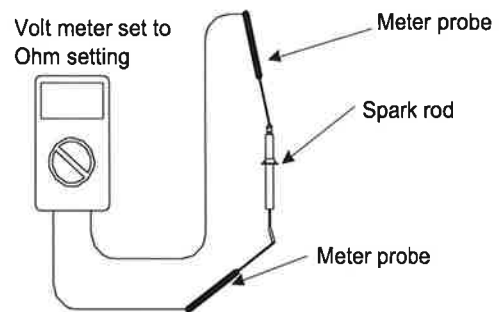
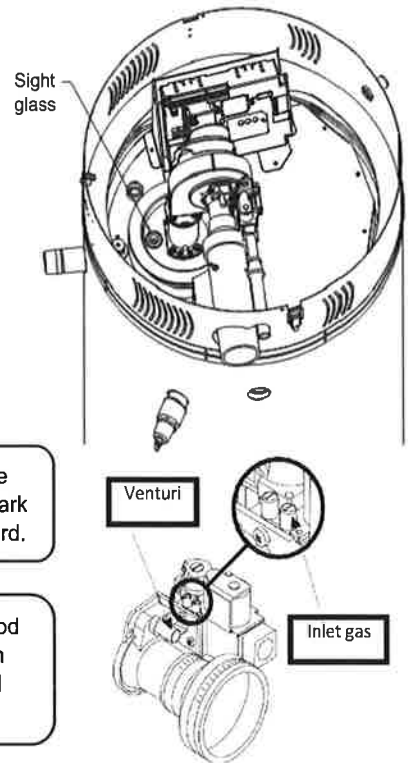
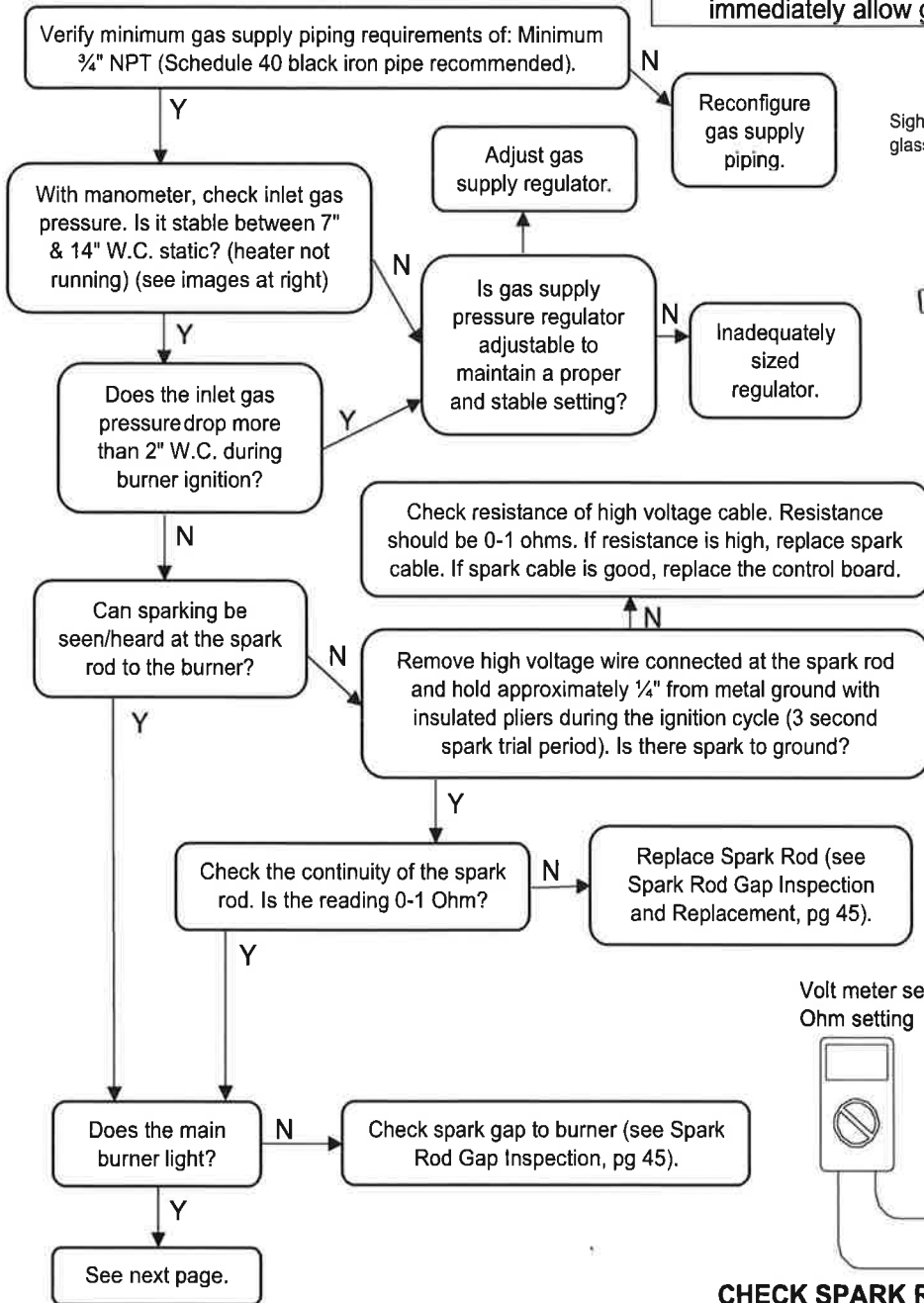
Combustion System Testing and Replacement

Observe burner operation through the sight glass located on the combustion insert mounting flange. Normal burner operation should ignite smoothly, without evidence of coughing or huffing upon ignition. The burner flame should be a blue flame near the burner surface in a uniform flame pattern. Occasional yellow or white streaks are normal.

Note: On higher input models using metal fiber mesh burner a red glow from the burner surface is normal.

⚠ WARNING
120 volt potential exposure. Use caution making voltage checks to avoid personal injury.

⚠ WARNING
Removing screw from inlet gas pressure tap will immediately allow gas to flow from pressure tap.



CHECK SPARK ROD RESISTANCE

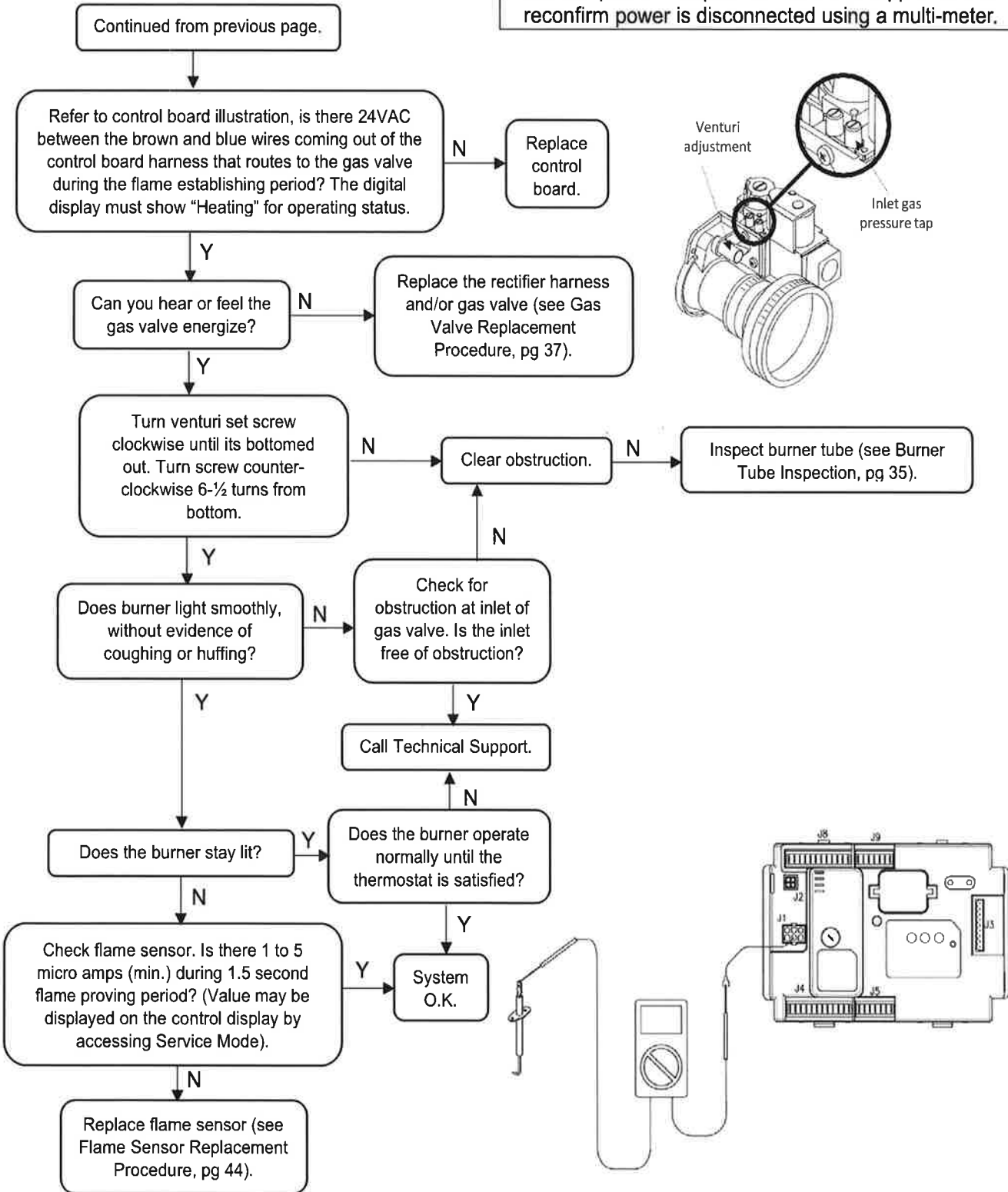
Service Procedure II

Combustion System Testing and Replacement (Continued)

Observe burner operation through the sight glass located on the combustion insert mounting flange. Normal burner operation should ignite smoothly, without evidence of coughing or huffing upon ignition. The burner flame should be a blue flame near the burner surface in a uniform flame pattern. Occasional yellow or white streaks are normal.

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.



Service Procedure II

Combustion System Testing and Replacement (Continued)

Combustion System Removal Procedure

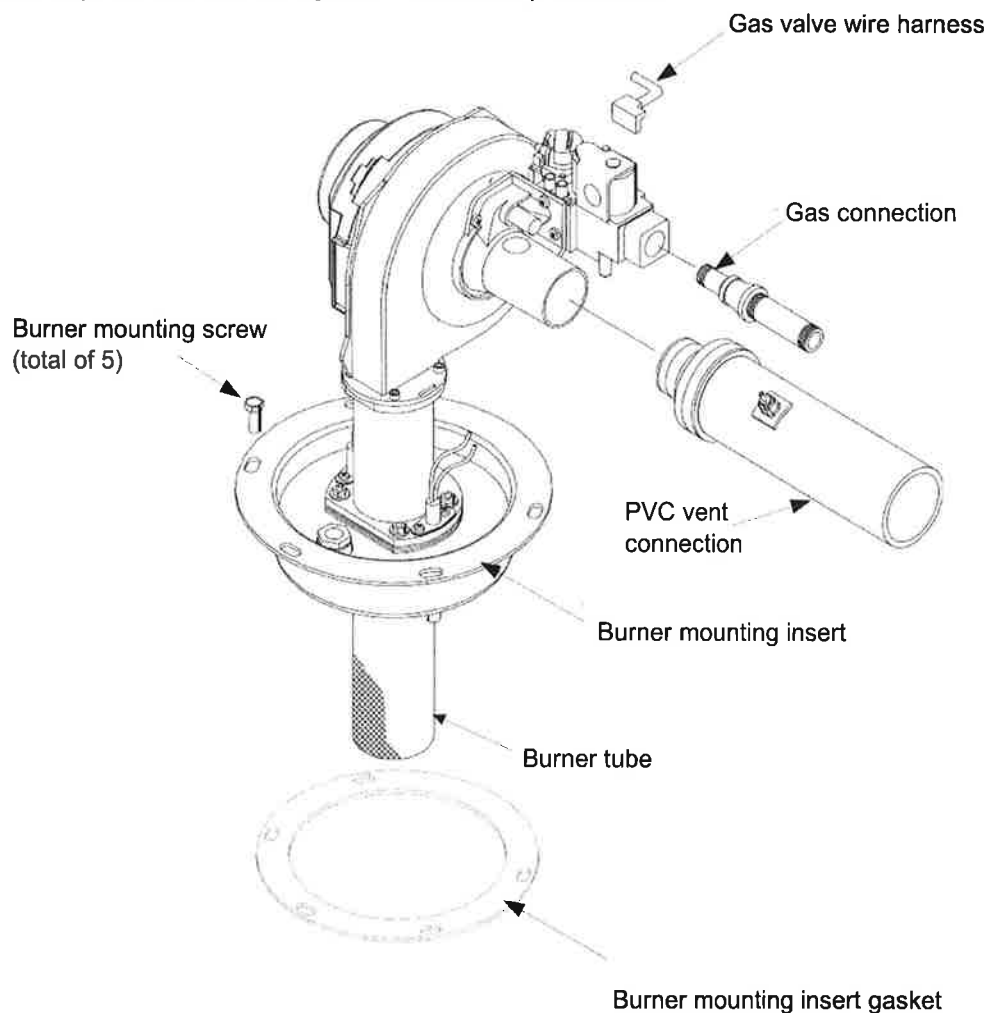
1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120 volt power source.
3. Turn OFF gas supply to the water heater.
4. Unlatch and remove the surround cover from the top of the water heater.
5. From the gas valve, disconnect the gas connection, PVC venting, silicone tubing, and wire harness.
6. Disconnect the wire harnesses, flame sensor, and blower. Then disconnect the high voltage cable from the spark rod connection.
7. Remove the 5 bolts (1/2" socket) holding the burner mounting insert in place.
8. Carefully remove combustion assembly with gasket from the water heater.
9. See next page for combustion system installation procedure.

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.

⚠ WARNING

Heater components may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.



Service Procedure II

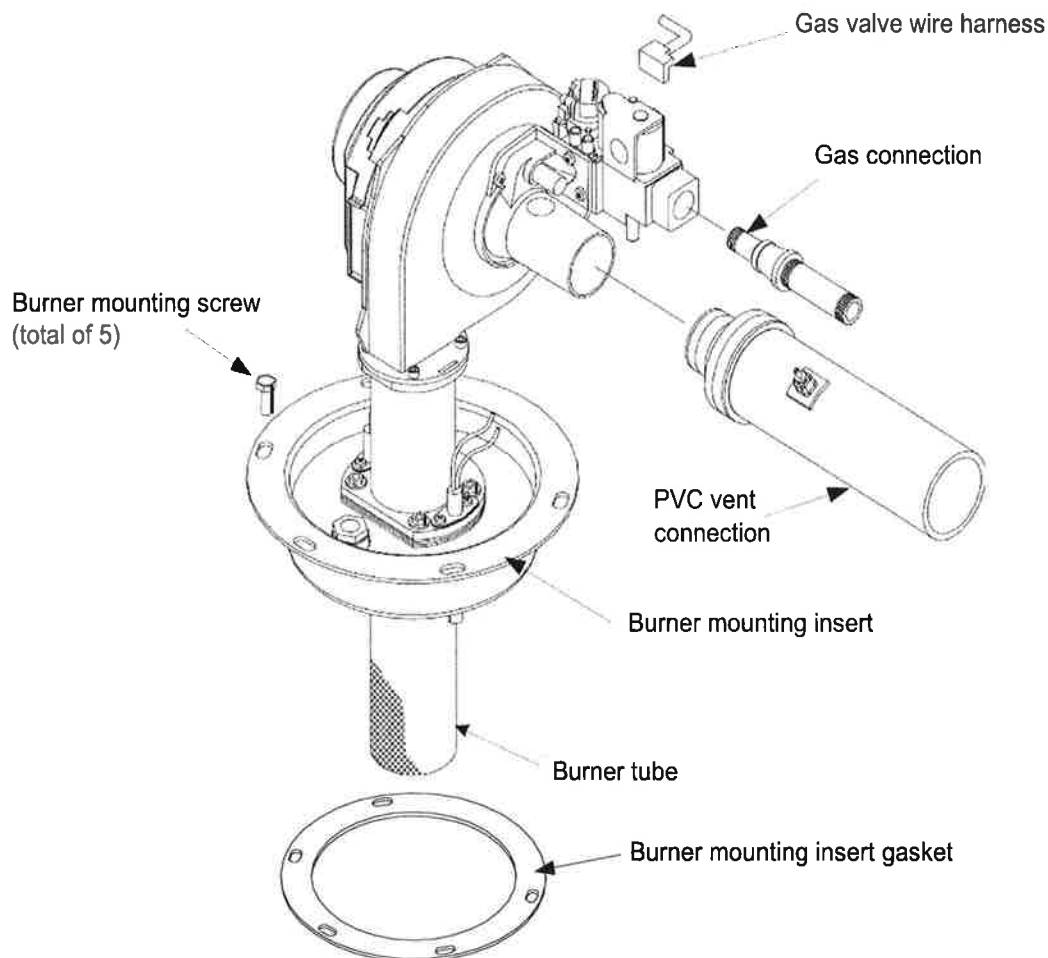
Combustion System Testing and Replacement (Continued)

Combustion System Removal Procedure

1. Fully inspect burner mounting insert gasket for the following:
 - a) Tears
 - b) Missing material
 - c) Cracks
 - d) Dirt or debris
 - e) Other imperfections that would inhibit proper seal

If gasket is NOT affected by any of the above, gasket replacement is not required.

2. Install combustion assembly using new gasket or fully inspected gasket from step 1. Secure combustion assembly at the burner mounting insert using screws from step 6 on previous page. Tighten screws evenly.
3. Reconnect wire harnesses to igniter or high voltage cable to spark rod, flame sensor, blower, and gas valve.
4. Reconnect PVC venting, gas supply and silicone tubing to gas valve. Turn on gas supply to heater and check for gas leaks, repair any gas leaks found.
5. Restore 120 volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instruction located in the Installation and Operating Instruction Manual.
6. Replace the surround cover on the top of the water heater.



Service Procedure III

Burner Tube Inspection and Replacement

Burner Tube Removal Procedure

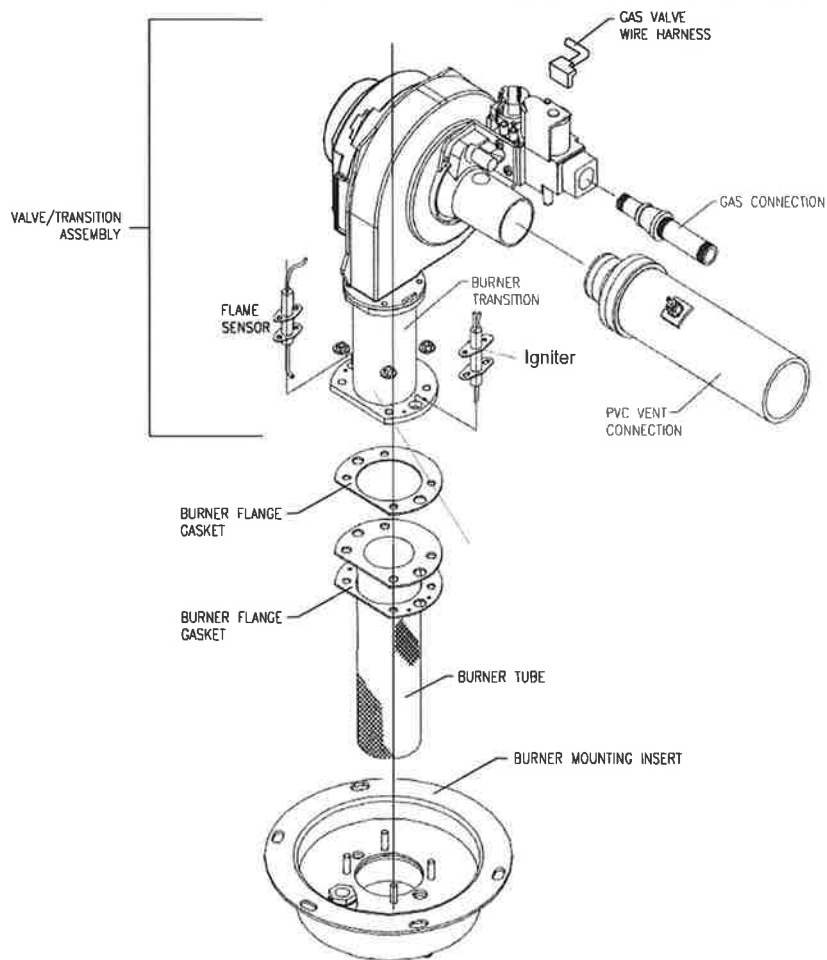
1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120 volt power source.
3. Turn OFF gas supply to the water heater.
4. Unlatch and remove the surround cover from the top of the water heater.
5. From the gas valve, disconnect the gas connection, PVC venting, silicone tubing, and wire harness.
6. Disconnect the wire harness from the blower assembly.
7. Remove the two screws holding each the igniter and flame sensor in place (long reach magnetic Phillips screwdriver). Carefully remove igniter and flame sensor from combustion assembly.
8. Remove the 4 nuts (7/16" wrench) holding the burner transition in place. Lift the blower/gas valve transition assembly from burner mounting insert, remove gasket and set aside.
9. Remove burner tube from burner mounting insert. See next page for burner tube inspection procedure.

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.

⚠ WARNING

Heater components may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.



Service Procedure III

Burner Tube Inspection and Replacement (Continued)

Burner Tube Inspection

1. **Inspect burner tube as follows (ceramic fiber mesh burner, water heaters prior to serial number "CK"):**
 - a) Visually inspect ceramic fiber mesh; mesh should be uniform in appearance without large gaps, tears, or fraying. Mesh should have uniform pattern allowing for unrestricted gas flow.
 - b) Gently squeeze burner tube, Burner tube should feel firm without any soft areas around the sides or at the bottom.
 - c) Visually inspect inside burner tube, Burner tube should be intact with no areas of deterioration. Ports should be free of any debris.
2. **Inspect burner tube as follows (metal fiber mesh burner, water heaters with "CK" serial number or later):**
 - a) Outer fiber mesh should be uniform with no tears or deterioration.
3. If burner tube is affected by any of the above, replacement is required. Refer to burner tube replacement procedure below.

⚠ WARNING

Heater components may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.

Burner Tube Replacement Procedure

Note: New metal fiber mesh burner is the replacement burner for the ceramic fiber sock burner. The length of burner will **NOT** be the same as the previous ceramic burner. Provide the model and serial number for the correct replacement burner.

1. Fully inspect burner flange gaskets, igniter and flame sensor gaskets for the following:
 - a) Tears
 - b) Missing material
 - c) Cracks
 - d) Dirt or debris
 - e) Other imperfections that would inhibit proper sealIf gaskets are NOT affected by any of the above, gasket replacement is not required.
2. Install burner tube with gaskets into burner mounting insert. Be sure gasket surfaces are free of debris.
3. Reconnect the blower/gas valve/transition assembly to burner mounting insert. Secure using nuts from step 8 on previous page.
4. Carefully reinstall flame sensor with gasket and igniter with gasket and secure with screws from step 7 on previous page. Reconnect wire harnesses to sensor and igniter.
5. Reconnect wire harnesses to blower motor and to the gas valve.
6. Reconnect PVC venting, gas supply and silicone tubing to gas valve. Turn on gas to heater and check for gas leaks, repair any gas leaks found.
7. Restore 120 volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instruction located in the Installation and Operating Instruction Manual.
8. Replace the surround cover on the top of the water heater.

Service Procedure IV

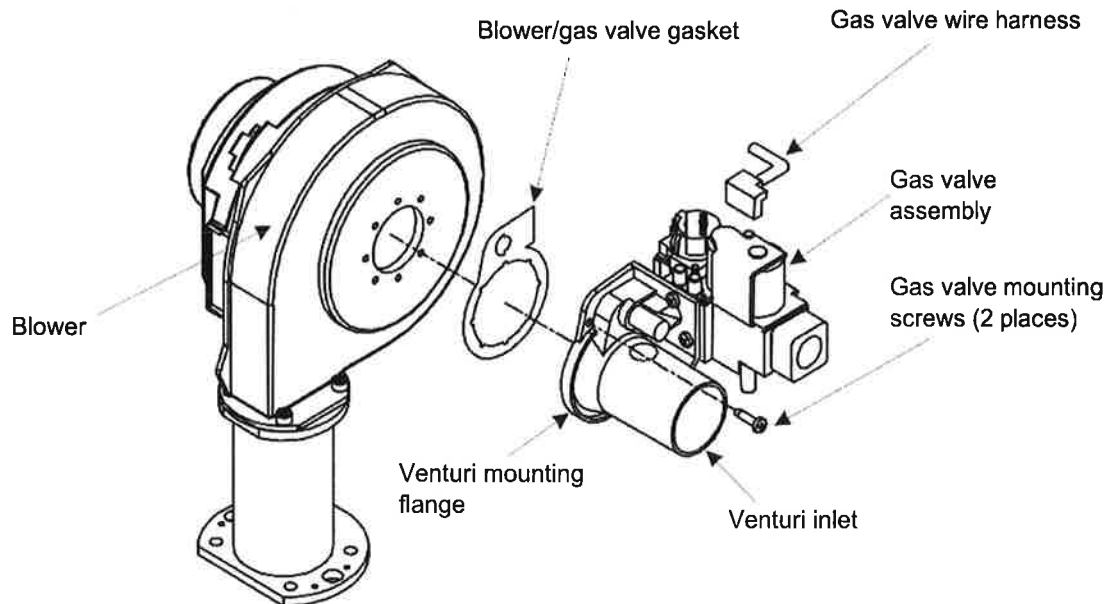
Gas Valve Replacement

Gas Valve Replacement Procedure

⚠ WARNING

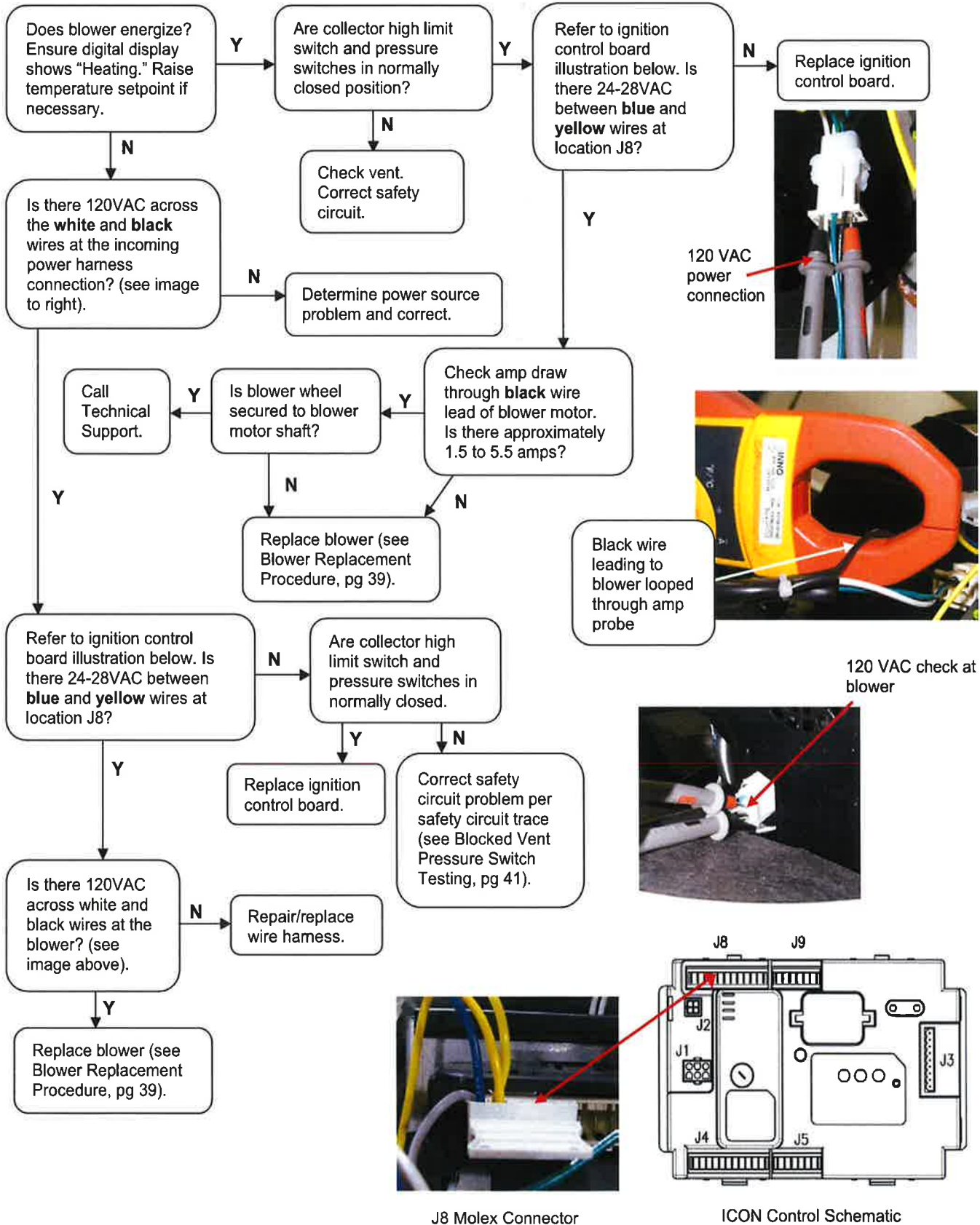
120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.

1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120 volt power source.
3. Turn OFF gas supply to water heater.
4. Unlatch and remove the surround cover from the top of the water heater.
5. From the gas valve, disconnect the gas connection, PVC venting, wire harness, and silicone tubing.
6. Remove the two gas valve mounting screws (Torx bit) located on the venturi mounting flange and remove gas valve from water heater.
7. Remove any residual gasket material from blower and venturi mounting flange.
8. Install new gas valve with new gasket provided. Secure gas valve in place using screws from step 6.
9. Reconnect PVC venting, gas supply, silicone tubing, and wire harness to the gas valve. Turn ON gas supply to heater and check for gas leaks, repair any gas leaks found.
10. Restore 120 volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instruction located in the Installation and Operating Instruction Manual.
11. Replace the surround cover on the top of the water heater.



Service Procedure V

Blower Testing and Replacement



Service Procedure V

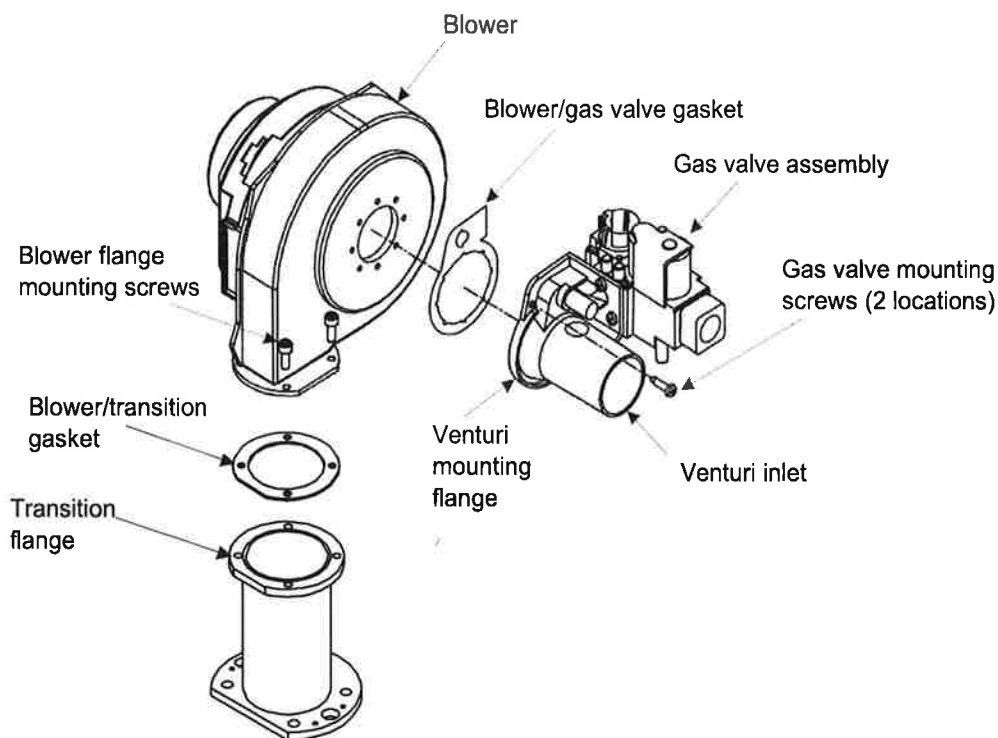
Blower Testing and Replacement (Continued)

Blower Replacement Procedure

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.

1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120 volt power source.
3. Turn OFF gas supply to water heater.
4. Unlatch and remove surround cover from top of heater.
5. Disconnect wire harness from blower.
6. Disconnect intake vent and gas supply from gas valve assembly.
7. Remove the two gas valve mounting screws (Torx bit) located on the venturi mounting flange.
8. Remove the four blower flange mounting screws (5/32 Allen wrench) and remove blower from transition flange.
9. Remove any residual gasket material from venturi mounting flange and transition flange.
10. Install new blower with new gasket provided. Secure blower in place using screws from step 8.
11. Reconnect gas valve assembly to blower with new gasket provided. Secure gas valve in place using screws from step 7.
11. Reconnect intake vent and gas line to gas valve assembly and check for gas leaks repair any leaks found.
13. Reconnect wire harness to blower assembly. Restore 120 volt power supply and gas supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instructions located in the Installation and Operating Instruction Manual.
14. Replace the surround cover on the top of the water heater.



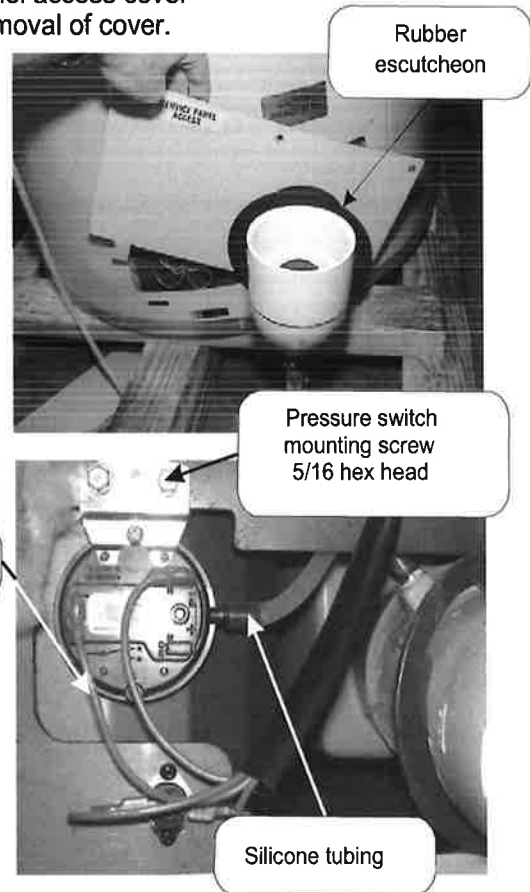
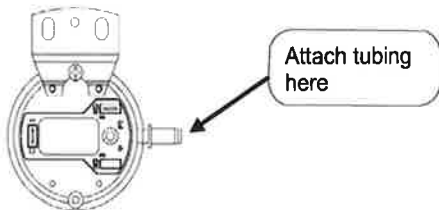
Service Procedure VI

Exhaust Pressure Switch Testing and Replacement

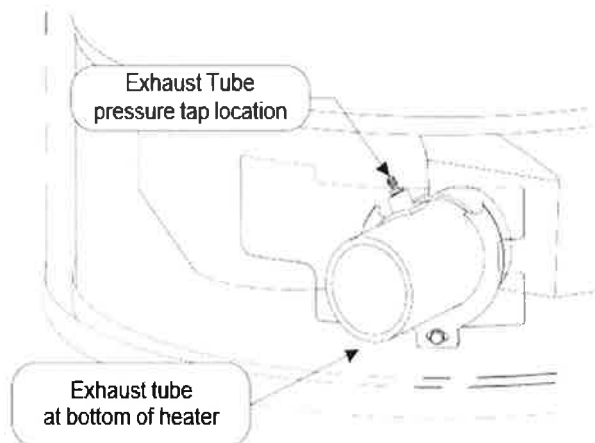
Exhaust Pressure Switch Replacement Procedure

1. Position main power switch to OFF.
2. Loosen adhesive backed rubber escutcheon from service panel access cover and slide escutcheon back along exhaust pipe to allow for removal of cover.
3. Remove screws from service panel access cover (1/4" nut driver) and remove cover from heater (see images at right).
4. Disconnect silicone tubing and wire leads from pressure switch (see images at right).
5. Remove pressure switch mounting screws (5/16" wrench) and remove the pressure switch.
6. Assemble new pressure switch to heater using screws from Step 5.
7. Reconnect wire leads. **Note:** Wire leads are interchangeable with either terminal.
8. Reconnect silicone tubing to pressure switch as follows:

- a. Exhaust pipe tubing connects to the pressure switch port.



9. Restore 120 volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instructions located in the Installation and Operating Instruction Manual.
10. Reinstall the service panel access cover and rubber escutcheon.



Service Procedure VI

Blocked Vent Pressure Switch Testing and Replacement (Continued)

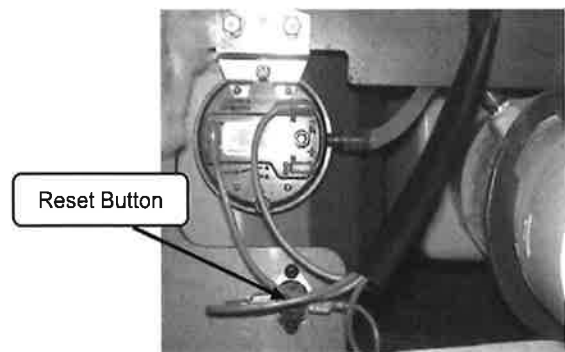
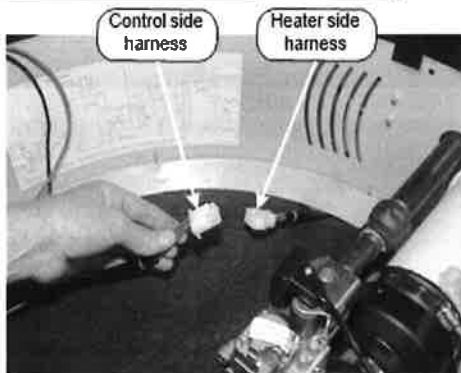
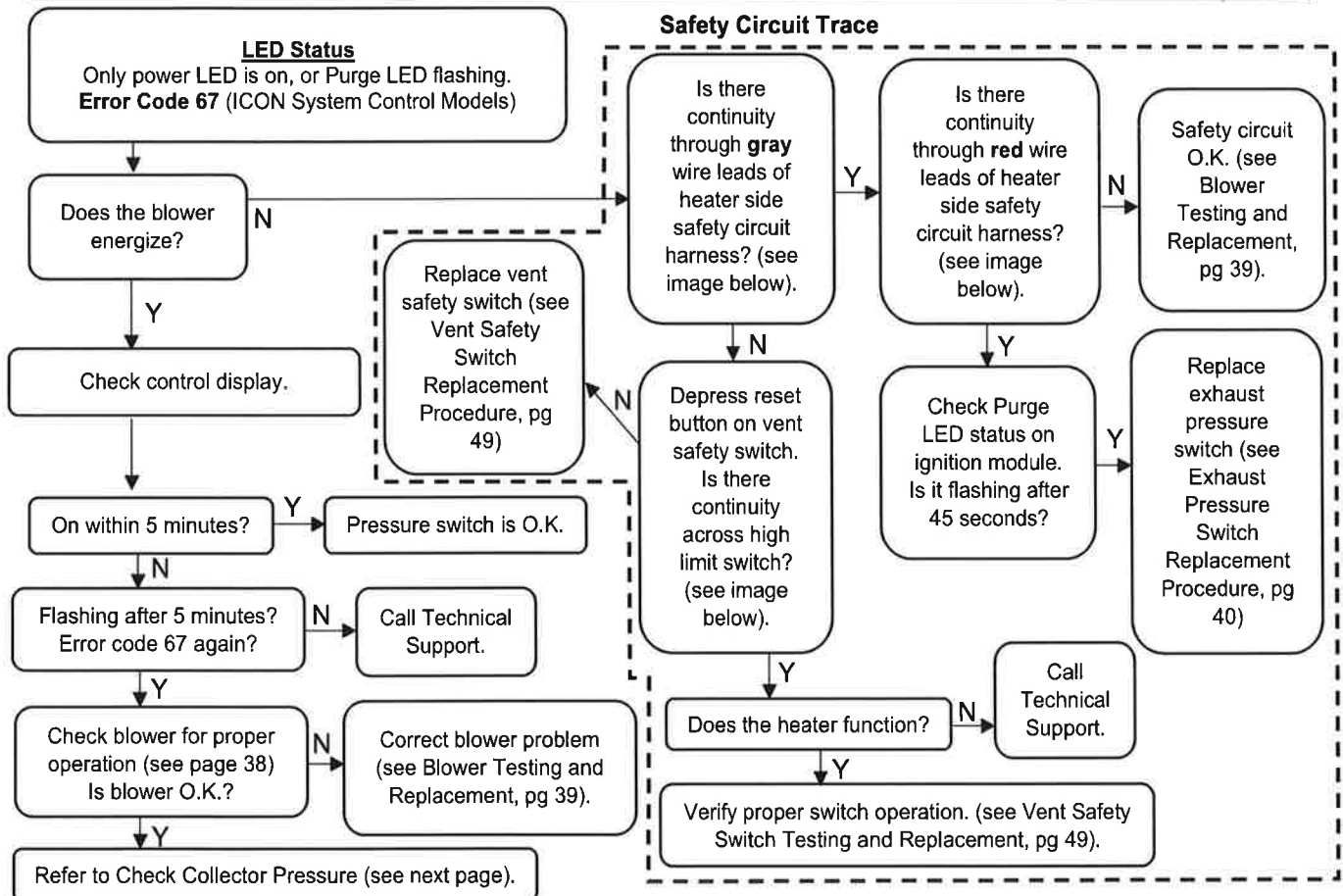
⚠ WARNING

120 volt potential exposure. Use caution making voltage checks to avoid personal injury.

⚠ WARNING

Make sure exhaust collector compartment is not overheating (350°F) before resetting vent safety switch. If there is evidence the collector compartment is overheating, call Technical Support.

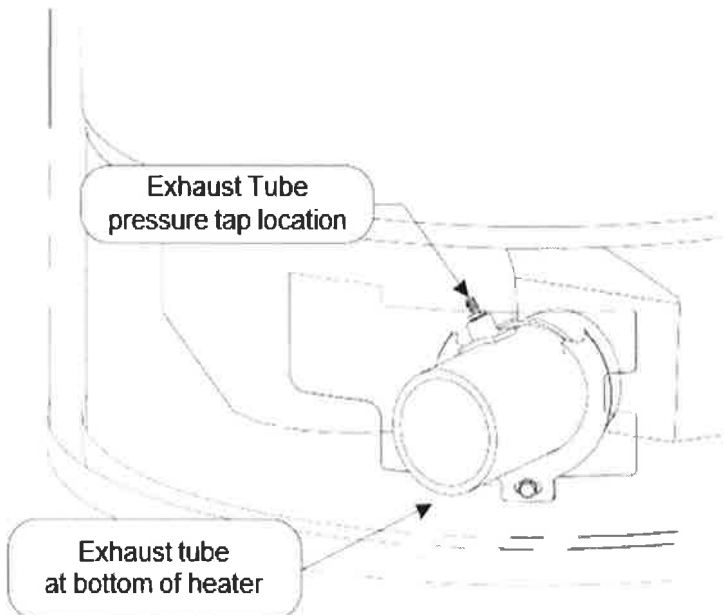
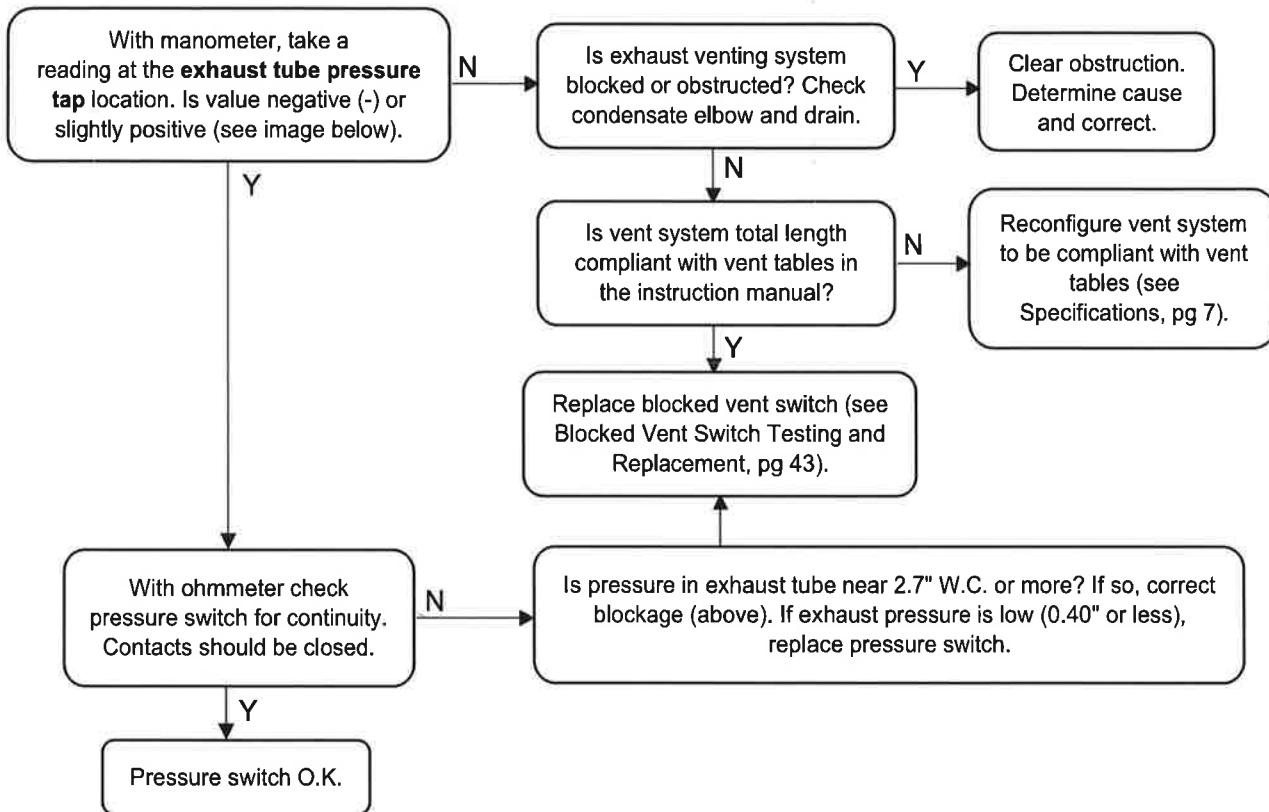
Sequence of Operation: The blocked vent pressure switch monitors the pressure in the exhaust tube. The switch contacts are normally closed and will not open unless there is a blockage in the exhaust venting or terminal (snow, ice, debris). If the blocked vent pressure switch contacts open after the thermostat initiates the blower, the blower will remain on for to 5 minutes waiting for the contacts to close. If the contacts remain open, the blower will stop, and error code 67 will appear on the display.



Service Procedure VI

Blocked Vent Pressure Switch Testing and Replacement (Continued)

Check Exhaust Tube Pressure

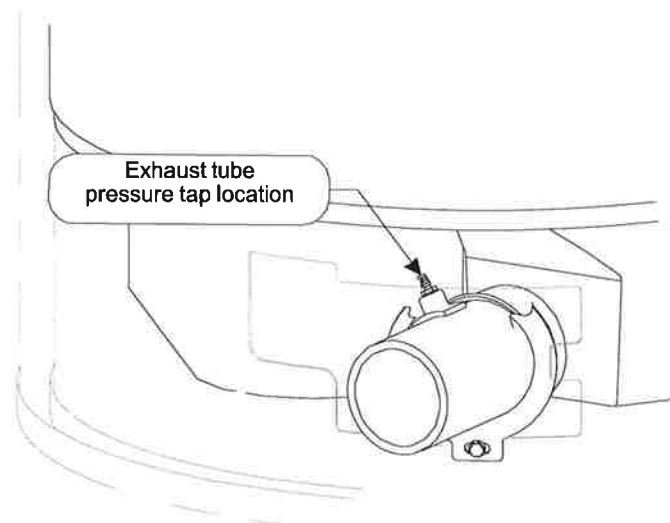
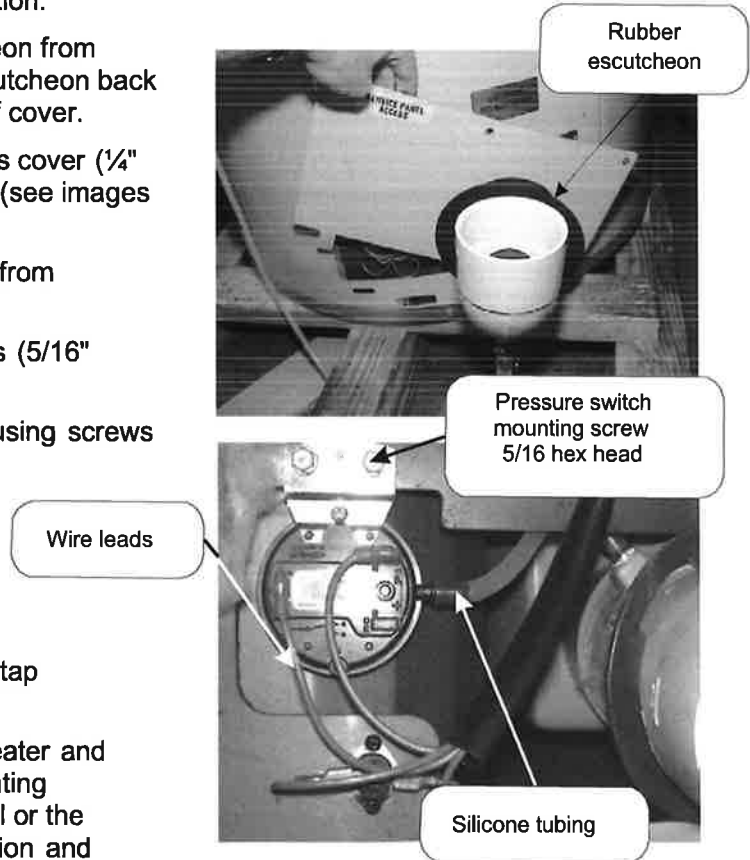


Service Procedure VI

Blocked Vent Pressure Switch Testing and Replacement (Continued)

Exhaust Pressure Switch Replacement Procedure

1. Position main power switch to "OFF" position.
2. Loosen adhesive backed rubber escutcheon from service panel access cover and slide escutcheon back along exhaust pipe to allow for removal of cover.
3. Remove screws from service panel access cover ($\frac{1}{4}$ " nut driver) and remove cover from heater (see images at right).
4. Disconnect silicone tubing and wire leads from pressure switch (see images at right).
5. Remove pressure switch mounting screws ($\frac{5}{16}$ " wrench) and remove pressure switch.
6. Assemble new pressure switch to heater using screws from Step 5.
7. Reconnect wire leads. **Note:** Wire leads are interchangeable with either terminal.
8. Reconnect silicone tubing to pressure switch as follows:
 - a. Exhaust pipe tubing connects to single tap located on switch.
9. Restore 120 volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instructions located in the Installation and Operating Instruction Manual.
10. Reinstall service panel access cover and rubber escutcheon.

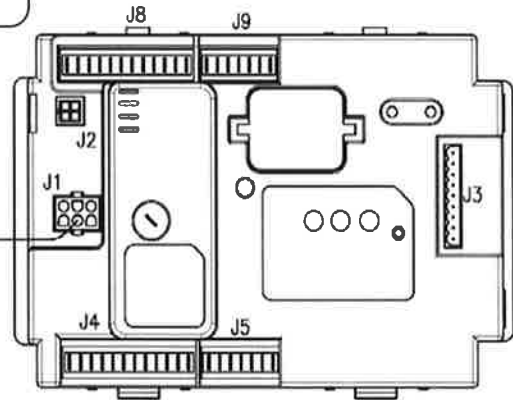
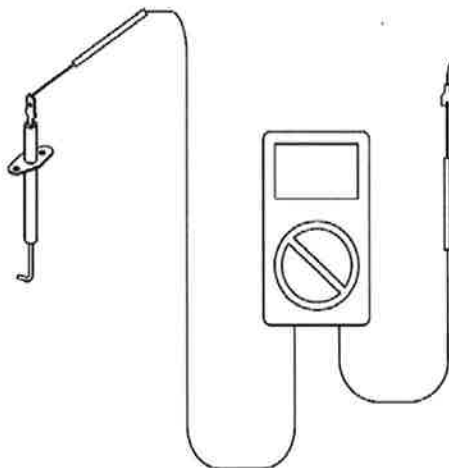
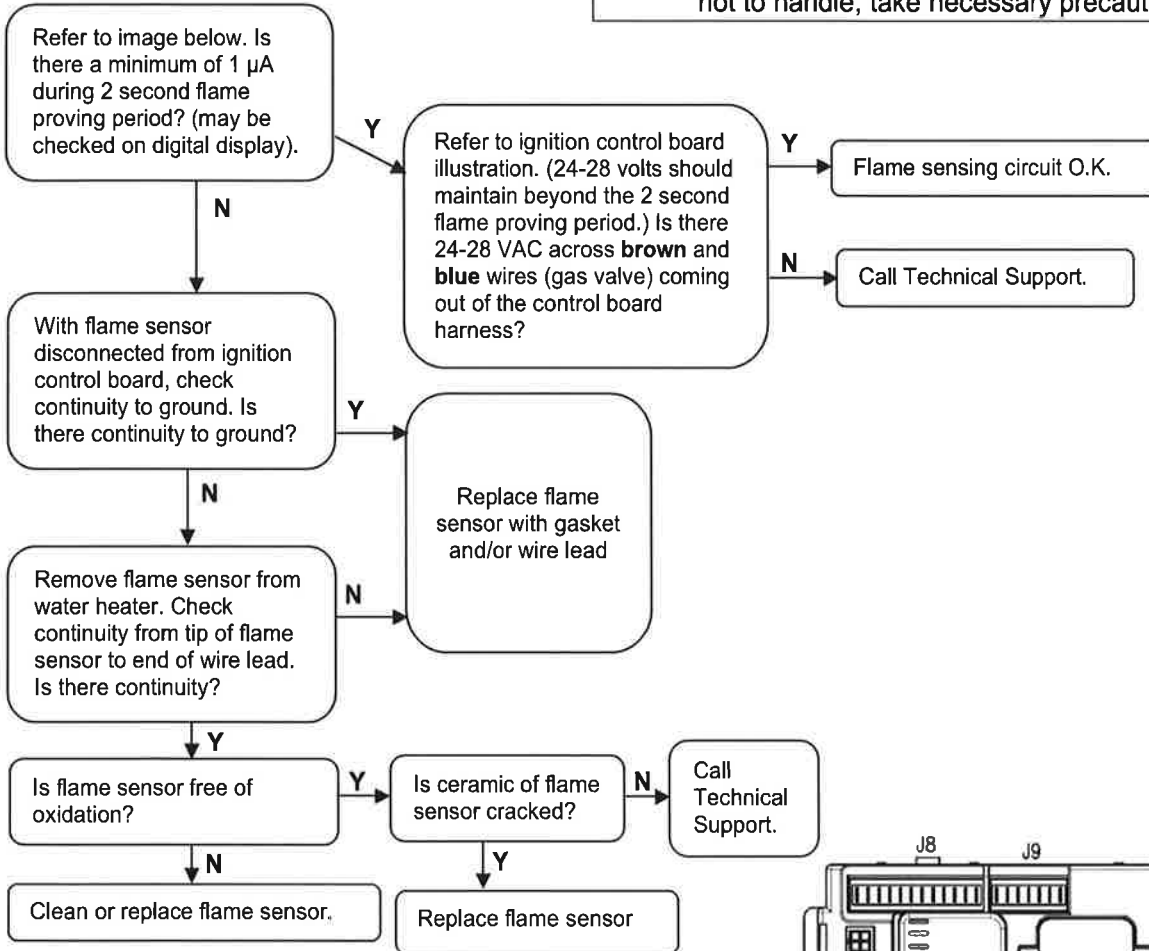


Service Procedure VII

Flame Sensor Testing and Replacement

Flame Sensor Testing Procedure

⚠ WARNING
 120 volt potential exposure. Use caution making voltage checks to avoid personal injury. Flame sensor may be too hot to handle, take necessary precautions.



ICON Control Board Schematic

Service Procedure VIII

Spark Rod Gap Adjustment and Replacement

Spark Rod Gap Inspection and Adjustment

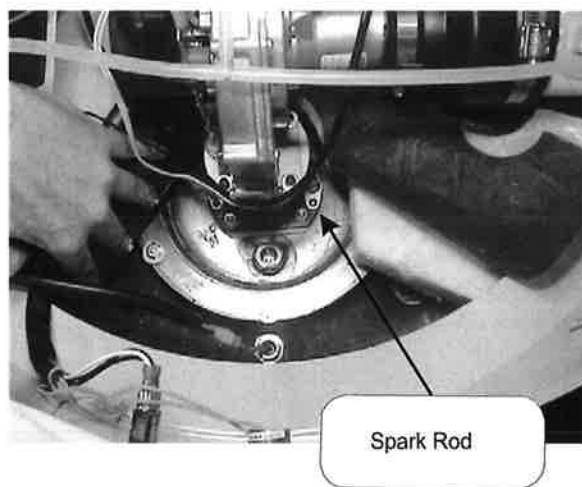
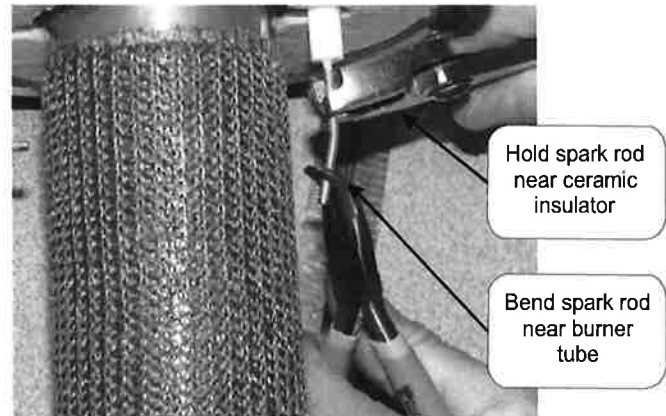
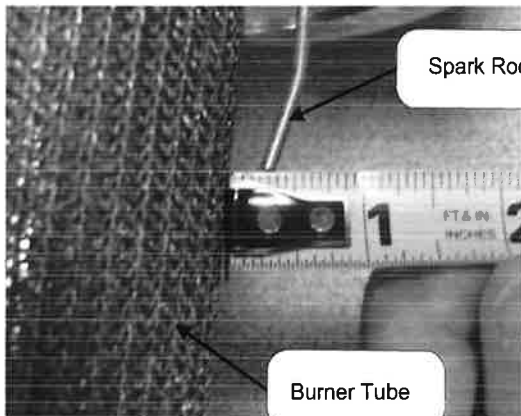
1. Remove combustion system as described in Combustion System Removal Procedure (pg 33).
2. Measure spark gap between the spark rod and burner tube. Acceptable spark gap is between 3/16"-1/4" (see images below).
3. If spark gap is not between 3/16" - 1/4", the spark rod may be carefully bent by supporting the end near the ceramic insulator with pliers and bending the end near the burner tube with needle nose pliers (see image below).
4. Ensure and verify spark gap is between 3/16"-1/4" after bending.
5. Reinstall the combustion system per Combustion System Replacement Procedure (pg 33) and check several ignitions to ensure the burner lights smoothly.

⚠ WARNING

Spark gap must be set to 3/16" to 1/4". Failure to set and verify proper spark gap may result in a delayed ignition resulting in damage to the water heater.

⚠ CAUTION

Use caution while performing these steps to prevent stressing or cracking the ceramic insulator.



Service Procedure VIII

Spark Rod Gap Adjustment and Replacement (Continued)

Spark Rod Replacement Procedure

1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120-volt power source.
3. Unlatch and remove the surround cover from the top of the water heater.
4. Fold back insulation in front of combustion assembly to expose spark rod (see image at right).
5. Disconnect the wire lead from the spark rod.
6. Remove the 2 mounting screws (magnetic tip, long reach Phillips screwdriver) and remove spark rod and gasket from the transition base flange.
7. Remove any residual gasket material from transition base flange.
8. Install new spark rod with new gasket provided using screws from step 6. Arrange spark rod with hook towards burner (off-center mounting hole towards the front of the water heater).
9. Remove combustion system following Combustion System Removal Procedure (pg 33) and verify spark gap following Spark Rod Gap Adjustment and Replacement (pg 45).
10. Reassemble combustion system following Combustion System Replacement Procedure (pg 33).
11. Fold insulation back into place. Be sure no wires are in contact with burner flange.
12. Restore 120-volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instructions located in the Installation and Operating Instruction Manual.
13. Replace the surround cover on the top of the water heater.

⚠ WARNING

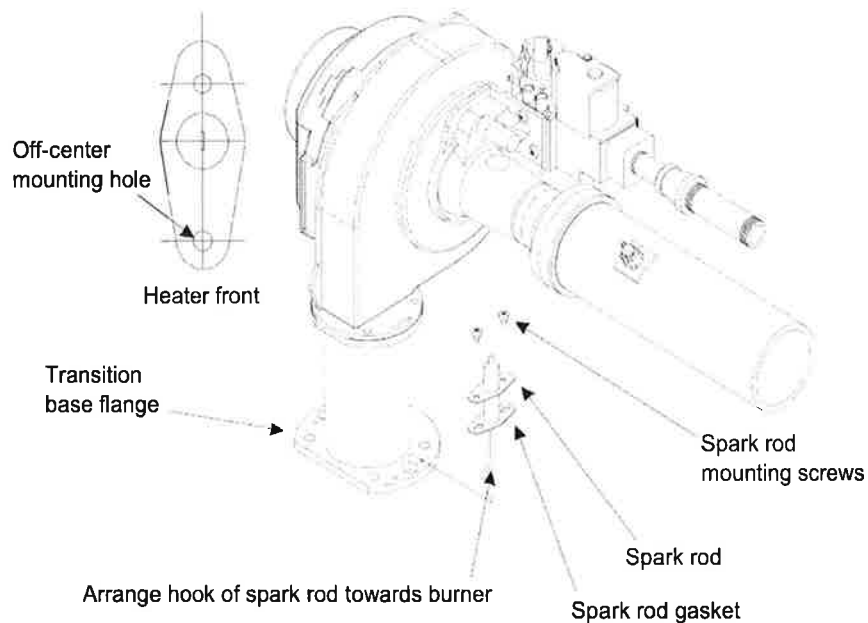
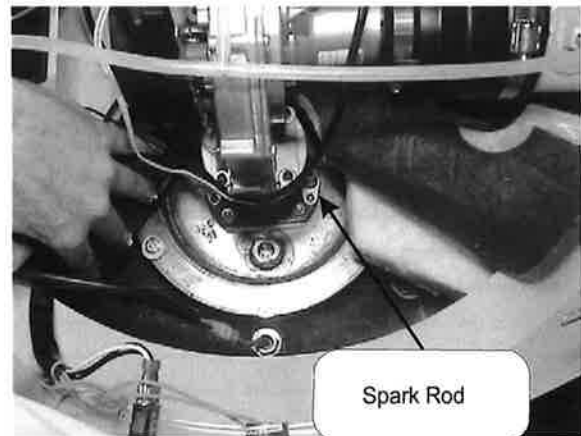
120-volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multimeter.

⚠ CAUTION

If spark rod is replaced for any reason, the combustion system **MUST** be removed and the spark gap to the burner measured and adjusted properly.

⚠ WARNING

Spark gap must be set to 3/16" to 1/4". Failure to set and verify proper spark gap may result in a delayed ignition resulting in damage to the water heater.



Service Procedure IX

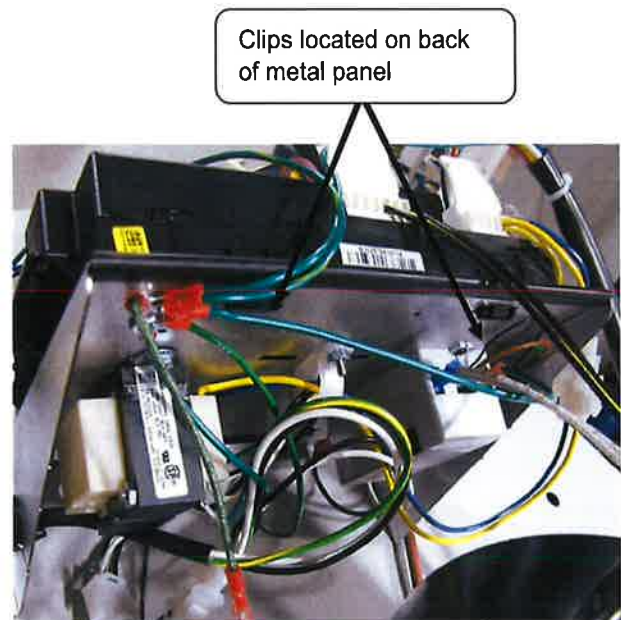
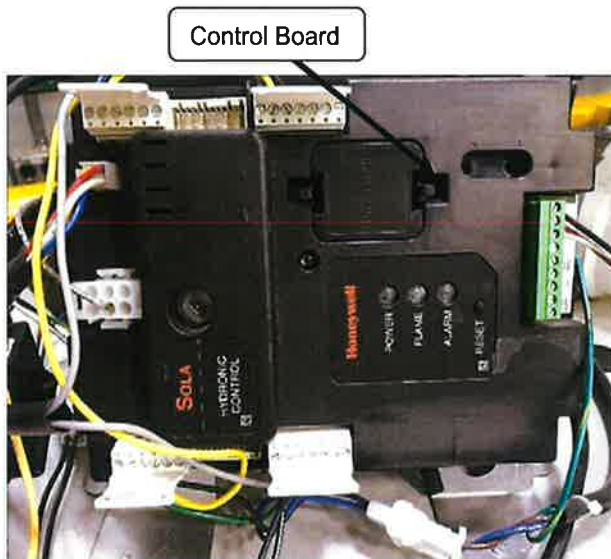
Ignition Module/Control Board Replacement

Control Board Replacement

1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120-volt power source.
3. Unlatch and remove top surround cover from top of water heater.
4. Locate the control board.
5. Carefully disconnect all wire connections from the control board.
Note: It may be necessary to identify wires for proper re-connection.
6. Depress the plastic tabs on the top back side of the control board first.
7. Tilt the control board and slide control board hook tabs from slots in the metal panel (see images below).
8. Replace the control board and all wire connections.
9. Restore 120-volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label, or the lighting instructions located in the Installation and Operating Manual.
10. Replace surround cover on the top of the the water heater.

⚠ WARNING

120-volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multimeter.



Service Procedure X

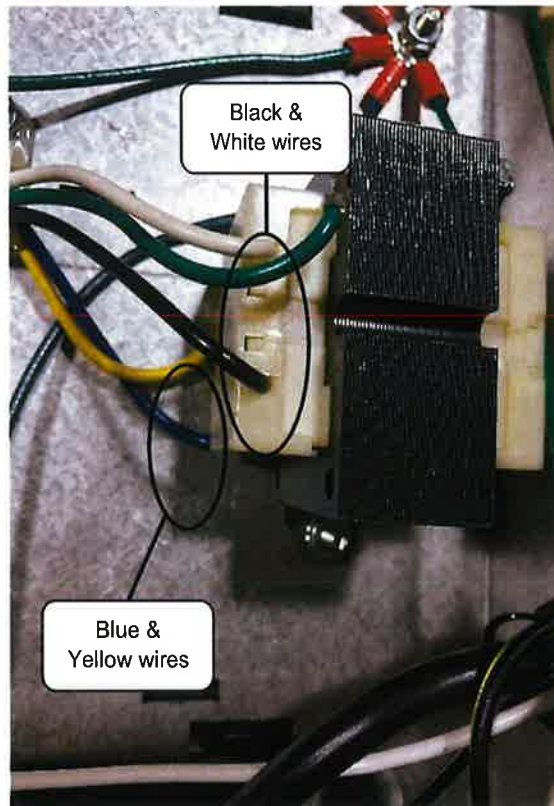
Transformer Replacement

Transformer Replacement Procedure

1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120-volt power source.
3. Unlatch and remove surround cover from top of water heater.
4. Disconnect primary leads (**black** and **white**) and secondary leads (**blue** and **yellow**) from the transformer (connections are different sizes to prevent interchanging).
5. Remove the 2 nuts (7/16" nut driver) holding the transformer in place and remove transformer from control board (see image below).
6. Install new transformer and secure in place with screws from step 5.
7. Reconnect primary and secondary wires to the transformer (leads are different sizes to prevent interchanging).
8. Restore 120-volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label, or the lighting instructions located in the Installation and Operating Manual.
9. Replace the surround cover on the top of the water heater.

⚠ WARNING

120-volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multimeter.



Service Procedure XI

Vent Safety Switch Testing and Replacement

⚠ WARNING

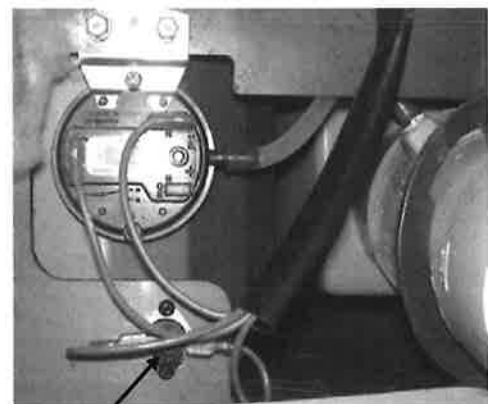
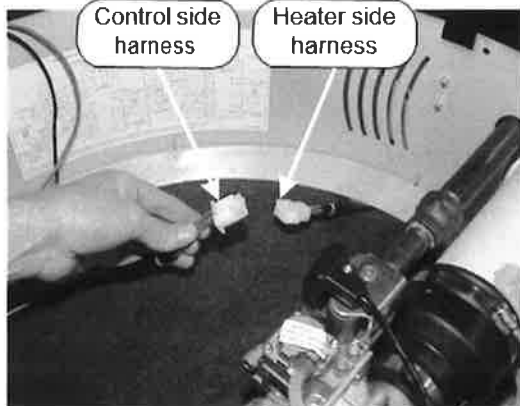
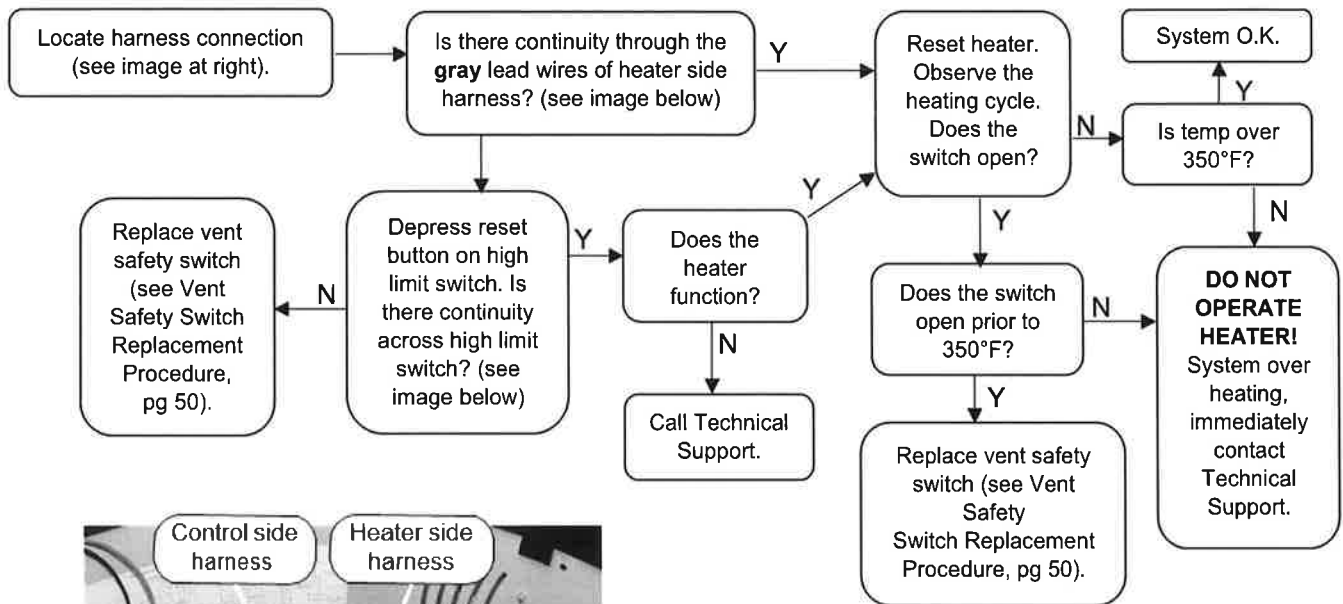
120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multimeter.

⚠ WARNING

Make sure the exhaust collector compartment is not overheating (350°F) before resetting vent safety switch. If there is evidence the collector compartment is overheating, call Technical Support.

Sequence of Operation

Error code 67 will display indicating an open circuit for the vent safety switch. Determine if temperature has reached 350°F before resetting switch and restoring operation. If evidence of extreme temperature is present, call Technical Support.



Reset Button

Service Procedure XI

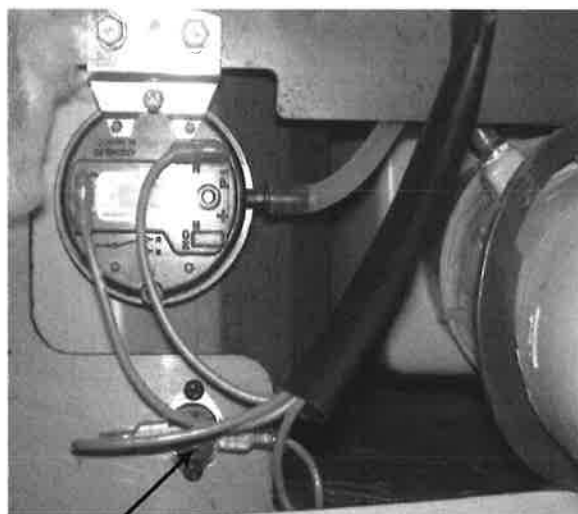
Vent Safety Switch Testing and Replacement (Continued)

Vent Safety Switch Replacement Procedure

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multimeter.

1. Position main power switch to OFF.
2. Loosen the adhesive backed rubber escutcheon from the service panel access cover and slide the escutcheon back along the exhaust pipe to allow for removal of cover (see photos below).
3. Remove the screws from service panel access cover (1/4" nut driver) and remove the cover from the water heater (see images below)
4. Disconnect the wire leads from the vent safety switch (see image below).
5. Remove the 2 switch mounting screws (Phillips screwdriver) and nuts (5/16 wrench) and remove the switch from the water heater.
6. Install new switch using the screws from step 5.
7. Reconnect the wire leads.
Note: Wire leads are interchangeable with either switch terminal.
8. Restore 120 volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instruction located in the Installation and Operating Instruction Manual.
9. Reinstall the service panel access cover and the rubber escutcheon.



Service Procedure XII

Flue Baffle Inspection and Replacement

▲ WARNING

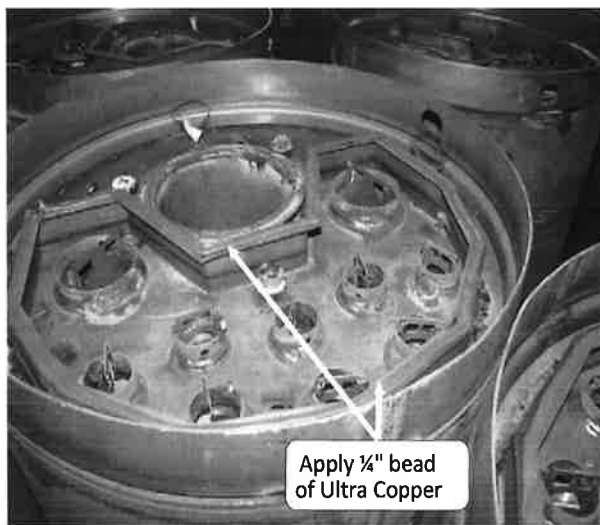
Heater components may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.

Flue Baffle Inspection and Replacement

1. Disassemble heater per Disassembly Procedure for Access to Anodes and Flue Baffles.
2. Remove flue baffles from heater using pliers (8 two inch (2") baffles & 2 four inch (4") baffles).
3. Visually inspect flue baffles. Flue baffles should show signs of oxidation, this is normal. If the oxidation has deteriorated any portion of the flue baffle, replacement is recommended. If any restrictors are missing, replacement is recommended.
4. Upon completion of inspection or subsequent replacement, reinstall flue baffles into heater.
5. Reinstall collector cover per Collector Cover Installation Procedure.
6. Reinstall collector insulation and control panel, reconnect control panel wire harnesses.
7. Restore 120 volts to water heater and verify proper heater operation following the instructions on the lighting instruction label or the lighting instruction located in the Installation and Operating Instruction Manual.
8. Replace the surround cover on the top of the water heater.

Collector Cover Installation Procedure

1. Remove old silicone from top surface of collector flange and collector cover.
2. Apply ¼" bead of Ultra Copper Silicone around entire collector flange surface. Allow caulk to "cure" for 10 minutes.
3. Carefully reinstall collector cover, tighten screws evenly.
4. Allow a minimum of 6 hours before putting heater back in service.



Service Procedure XIII

Procedure for Access to Magnesium Anodes & Flue Baffles

⚠ WARNING

Heater components may be HOT when performing the following steps in this procedure.

⚠ WARNING

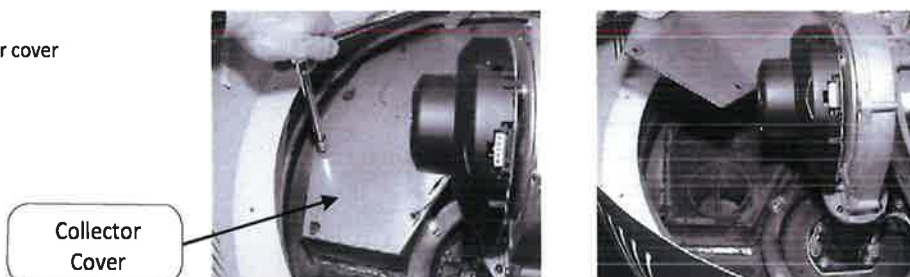
120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.

- Step 1. Position main power switch to "OFF".
- Step 2. Disconnect (Unplug) water heater from 120 Volt power source.
- Step 3. Un-latch & remove surround cover from top of heater.
- Step 4. Disconnect wire harnesses to allow for removal of control panel.
Note: Where ever possible, rather than disconnecting at the control panel, follow wire harness away from control panel and disconnect at control component location.
- Step 5. Remove the three control panel mounting screws (1/4" nut driver) and remove control panel from the water heater (see photos below).

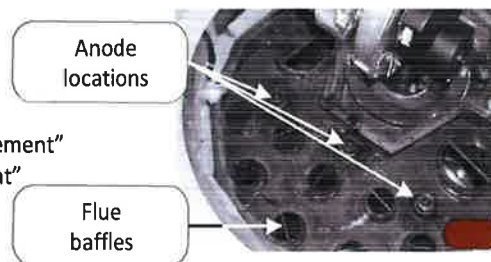


- Step 6. Completely remove insulation (two pieces) from top of heater to expose collector cover

- Step 7. Remove all collector cover screws (5/16" socket) and remove collector cover (see photos at right).



- Step 8. Photo 44 shows heater with collector cover removed allowing access to anode rods and flue baffles.
a) for anode service, see "Anode Inspection and Replacement"
b) for flue baffle service, see "Flue Baffle Inspection and Replacement"
c) for powered anode service, see "Powered Anode Replacement"



Service Procedure XIV

Magnesium Anode Inspection and Replacement

Heater components and stored water may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.

Step 1. Turn off water supply and drain water heater.

Step 2. Disassemble water heater per “Disassembly Procedure for Access to Anodes & Flue Baffles”.

Step 3. Locate and remove anode rods from heater (1-1/16 hex socket).

Step 4. Visually inspect anode rod. Anode rod should show signs of depletion, this is normal. If the depletion is ½ of the original diameter (approximately ¾" diameter), replacement is recommended. If any of the steel core of the anode is exposed, replacement is recommended.

Step 5. Upon completion of inspection or subsequent replacement, apply thread sealing tape or other thread compound to threads of anode and reinstall into heater. Restore water supply and check for and repair any leaks found.

Step 6. Reinstall collector cover per “Collector Cover Installation Procedure”.

Step 7. Reinstall collector insulation and control panel, reconnect control panel wire harnesses.

Step 8. Restore 120 volts to water heater and verify proper heater operation following the instructions on the lighting instruction label or the lighting instruction located in the installation and operating instruction manual.

Step 9. Replace surround cover on top of water heater.

Service Procedure XV

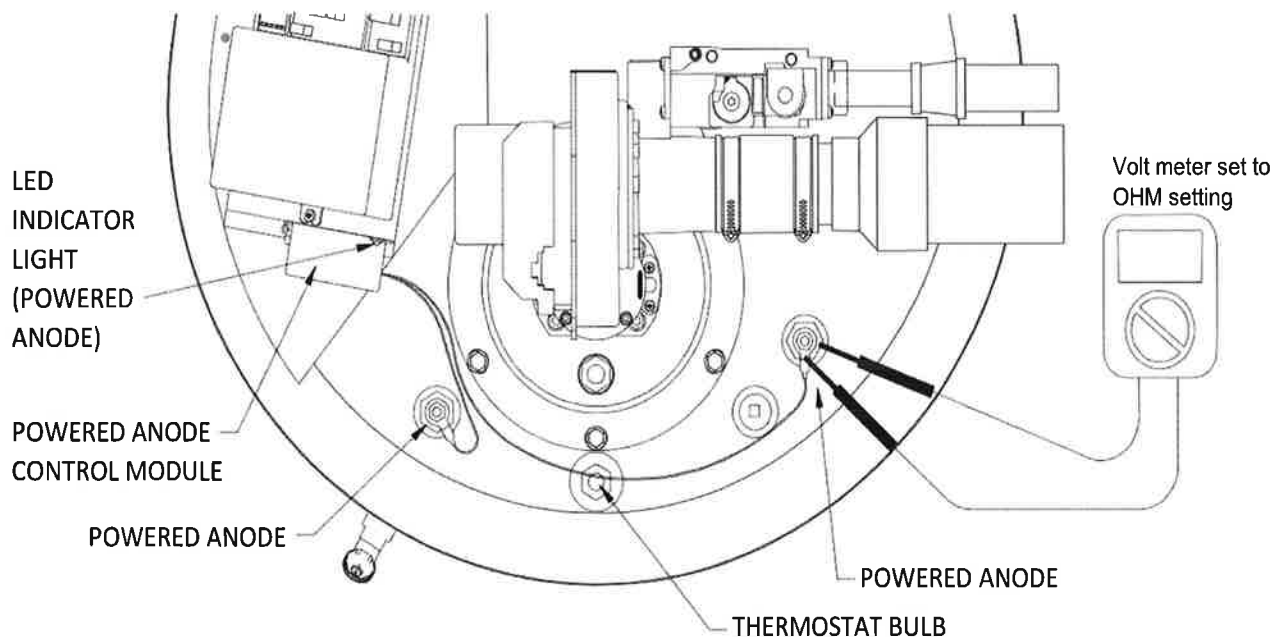
Powered Anode Replacement (If Applicable)

⚠ WARNING!

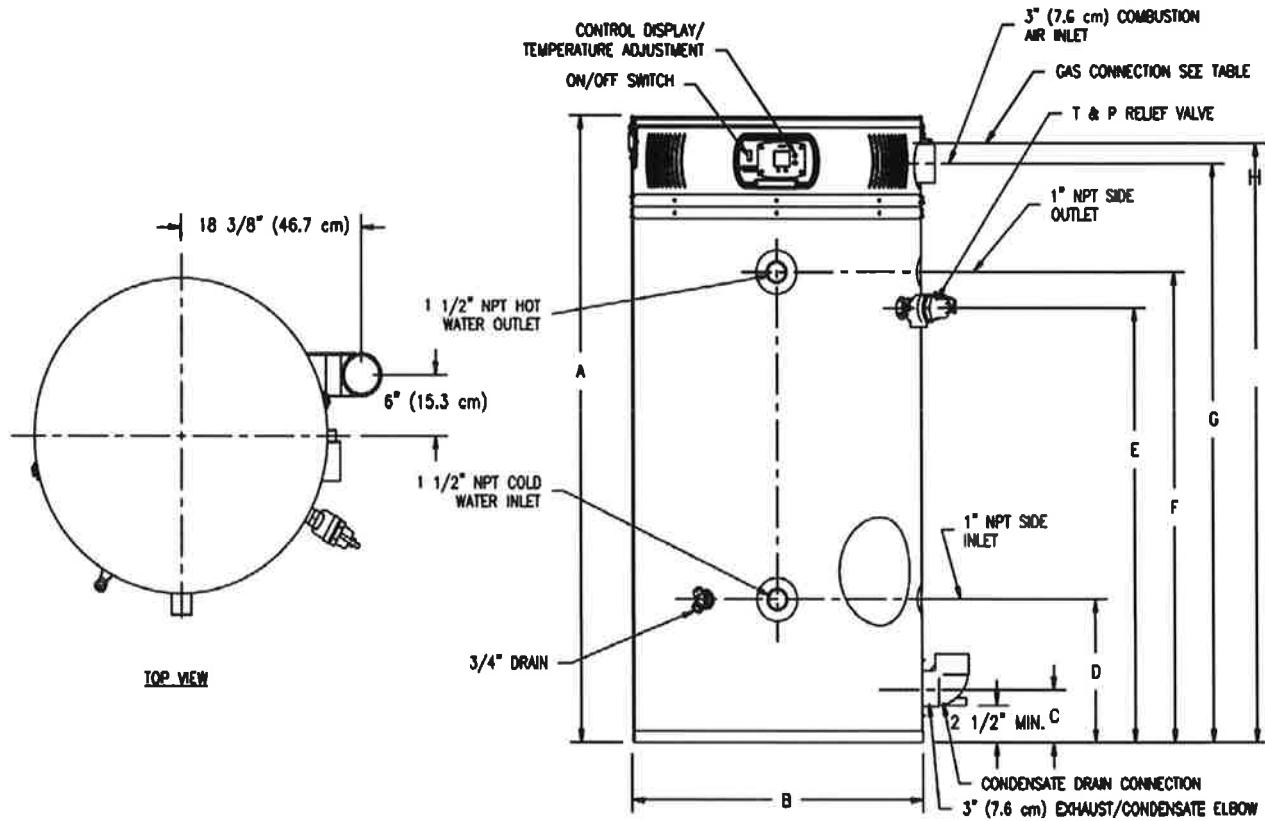
Water heater components may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.

The powered anode control module is located on the vertical side of the control panel inside the surround panel. The control has a LED indicator light to show the status of operation. When the tank is filled with water and the power supply is on the water heater, the light should have a steady green glow to indicate that protection current is flowing and operating normally. If the indicator light is not glowing, the power supply to the water heater or powered anode system is disconnected.

1. Check the power supply or wire connections to the powered anode control.
2. Indicator light diagnostic codes:
 - a. If the control is flashing red, then there is a malfunction with the powered anode system. Make sure there are no bare spots in the wire insulation to the powered anode rods.
3. Check all electrical connections. The powered anode rods are insulated from the water heater tank in the bushing.
 - a. With an ohmmeter, check continuity between the powered anode terminal and the bushing. There should not be continuity. If there is continuity, replace the powered anode assembly.



Section 2: Serial Numbers "XL-" (Nov. 2021) and Later with -895 Designator Specifications



Model No.	Input Rate BTU/hr	1 st Hr. Del Gal @ 100 °F Rise	Recovery GPH at Degree Rise			Stg. Capacity US Gal	Therm. Efficiency %
			40°F	100°F	140°F		
60T125	125,000	187	363.6	145.5	103.9	60	96.0
60T150	150,000	211	422.7	169.1	120.8	60	93.0
60T199	199,999	265	557.6	223	158	60	92.0
100T150	150,000	250	450.5	180.2	129	100	97.0
100T199	199,999	309	597	238.8	171	100	97.0

Model No.	DIMENSIONS (INCHES)												
	A Height	B Dia.	C Floor to Vent Outlet	D Floor to Inlet Water Conn.	E Floor to T&P Valve Conn	F Floor to Outlet Water Conn	G Floor to Air Intake	H Floor to Gas Conn	Front Water Conn Dia	Space Heating Conn Dia	Gas Conn Dia (NPT)	T&P Valve Open (NPT)	Shipping Weight (lbs)
60T125	57	28 1/4	5	13	40	42 1/4	52 1/2	53 1/2	1 1/2	1	3/4	3/4	570
60T150	57	28 1/4	5	13	40	42 1/4	52 1/2	53 1/2	1 1/2	1	3/4	3/4	570
60T199	57	28 1/4	5	13	40	42 1/4	52 1/2	53 1/2	1 1/2	1	3/4	3/4	570
100T150	77 5/8	28 1/4	5	13	60	62 1/4	73 1/8	74 3/4	1 1/2	1	3/4	3/4	900
100T199	77 5/8	28 1/4	5	13	60	62 1/4	73 1/8	74 3/4	1 1/2	1	3/4	3/4	900

Integrated Control System

Serial numbers XL- (November 2021) and after with -895 designator

Features of Integrated Control System

- Attractive digital water heater display on control panel for setting and displaying the temperature setpoint. Pressing temperature UP and DOWN buttons changes the temperature setpoint. The same water heater display is used on all models. Temperature setpoint may be displayed in °F or °C.
- Single control board with plug in wiring controls temperature, ignition, and blower operation.
- Reduced number of parts for servicing and wiring.
- Burner ignition with direct spark ignition – A high voltage spark jumps from the spark rod to the burner surface to ignite the gas. Eliminates burned out igniter replacements.
- Water heater display will show diagnostic codes in the event the water heater needs servicing. Aids in diagnosing and servicing the water heater.
- The display can show previous error code history to further aid in servicing the water heater.

Power Supply	Dedicated 120 VAC, 60 Hz, 15A
Gas Supply	Minimum ¾" NPT (schedule 40 black iron pipe recommended)
Approved Gas Type	Natural or Propane. Unit must match gas type supplied.
Gas Pressure (Nat & L.P.)	Natural: 14" W.C. maximum static, 4.5" W.C. minimum running (recommended 7" W.C. min running) L.P. (Propane): 14" W.C. maximum static, 8" W.C. minimum running (recommended 11" W.C. min running)
Venting System	Power vent, balanced direct vent or unbalanced direct vent. See vent tables on page 9.
Approved Vent Materials	PVC, CPVC, Polypropylene, or Stainless Steel
Minimum Clearance for Servicing	18" from top, 24" from front, 4" sides and rear.
Maximum Water Supply Pressure	150 PSI
Thermostat Sensor	11,900 Ohms @ 70°F, ECO opens @ 200°F Max., ECO close @ 120°F Min. Redundant sensor for ECO. Sensor inside well for easy replacement of sensor.
Control Display	Digital display, 24 volts. Temperature Range: 70-180°F. Used to set tank temperature (°F or °C), show operating status, display error codes, error code history, limit maximum setpoint temperature.
Control Board	Operates from 24 volt from transformer. Controls tank temperature, ignition functions, combustion blower. See ignition timings in sequence of operation for Integrated Control.
Transformer	120VAC primary, 24VAC secondary, 40VA.
Spark Rod Igniter	0.22" nominal gap to the burner surface.
Flame Sensor Output	Minimum 1 micro amp, typical range 5 to 30 micro amps.
Gas Valve	Negative regulation, 24 VAC, ½" PSI max., 4.5" W.C. Minimum running inlet.
Vent Safety Switch	Normally closed, opens @ 350°F, manual reset.
Blocked Vent Pressure Switch	24VAC, normally closed, opens when pressure increases to +2.70 W.C.
Blower	120VAC, 60Hz, 1-4 amps

Sequence of Operation

1. Thermostat calls for heat.
2. Combustion blower starts.
3. Blower pre-purge period of 30 seconds.
4. Trial for Ignition (5 seconds, 3 trials).
 - a. Flame establishing period (3 seconds), gas valve opens, sparks from spark rod to burner surface to ignite the gas.
 - b. Burner on, flame proving period (2 seconds). Requires a minimum of 0.8 microamp through flame sense rod to prove flame.
 - c. If either blocked vent safety switch contacts (normally closed) or blocked vent pressure switch contacts (normally closed) are open, then the ignition sequence will not start and an error code 29 (Pressure switch failed to close or open) will be shown on the display.
5. Steady State Operation: Burner continues to operate until:
 - a. Thermostat circuit opens, gas valve closes, blower continues to operate for 30 second post-purge period.
 - b. If the normally closed blocked vent pressure switch opens, the gas valve closes, the blower continues to operate indefinitely and error code 29 will be displayed after a couple minutes with "Service Needed", "Pressure Switch".
 - c. If the normally closed 1st Pass Collector vent safety switch opens, the gas valve closes, the blower post-purges, then shuts off with error code 26 displayed in a lockout condition.
6. Thermostat satisfied.
7. Gas valve closes, burner extinguished.
8. Blower post purge for 30 seconds.

Lockout Conditions

The system will go into lock out mode for the following reasons:

1) ERROR CODE 62 or 63

Control board will go into "Soft Lockout" if the main burner cannot be lit or fails to prove flame after 3 ignition trials. The water heater display indicates a lockout condition by showing an error code number (62 or 63) with "Service Needed" in the control display window. Refer to error codes in the diagnostic section of this Service Manual. In a "Soft Lockout" condition, the control will wait for 60 minutes and then make 3 more attempts to light the main burners. Soft lockout reset is accomplished by depressing the lower right button under "Reset" for 3 seconds.

2) ERROR CODE 65

If the top of the tank should exceed 200°F, then the high limit control will shut off the burner and the water heater will go into a "Hard Lockout". Error code 65 will be shown in the water heater display. The control can only be reset in the "Service Mode," which is detailed in the "Troubleshooting" section of this Service Manual.

3) ERROR CODE 29

If the exhaust terminal becomes blocked or the condensate elbow fails to drain condensate, the normally closed exhaust pressure switch will open, the gas valve closes, and error code 29 will appear on the control display. When the condition is corrected, the error code will disappear, and the water heater will resume normal operation. No resetting of the control display is needed for the pressure switch error code.

4) ERROR CODE 26

If the vent safety switch located near the exhaust pressure switch should open, the gas valve will close, the blower will post-purge and error code 26 will appear on the display. The lockout condition will reset once the problem is corrected, and the switch reset. Refer to "Vent Safety Switch Testing and Replacement" in this Service Manual.

Troubleshooting

Water Heater Fault: Water heater does not operate.
Display Error Code: Water heater does not operate – blank display.

⚠ WARNING

120 volt potential exposure. Use caution making voltage checks to avoid personal injury.

Check main power supply to water heater – fuse, circuit breaker, plug receptacle, line cord, or wiring to water heater.

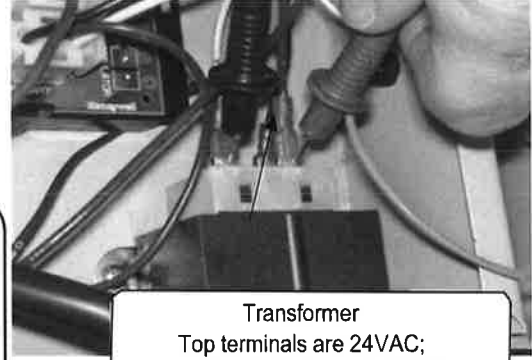
⚠ CAUTION

Use caution to not damage connectors when making voltage measurements or jumping terminals.

Check to make sure switch on front of control panel is in the ON position.

Verify primary voltage at the control board.

Refer to control board illustration. Voltage at primary pins **P2(1) & P2(3)** will be 110-120. If not, check line in pins **P3(1) & P3(4)**. Check line cord with volt meter. Replace line cord if defective.



Verify secondary voltage at the control board.

Refer to control board illustration. Voltage at secondary pins **P4(1) & P4(2)** will be 24 VAC. If not, check transformer. Replace transformer or wire harness.

Does the water heater display operate? Does the combustion blower start to operate? Increase thermostat setting if the tank is warm.

Is 24VAC present between **red & black wire pin connections** on the back of the control display?

Check wires for proper termination to control display. Are wire terminations connected properly to control display?

Replace control display.

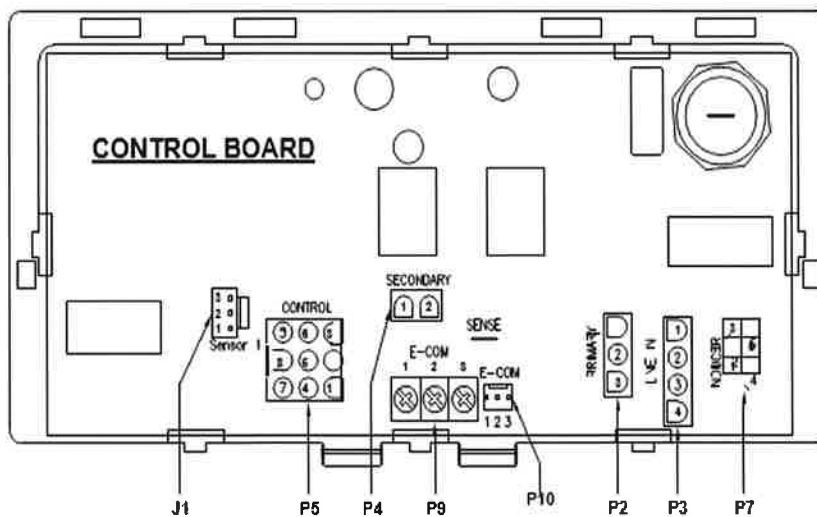
Display operates – see next page.

Is 24VAC present between E-COM screw terminal **P9(2) & P9(3)** on the control board.

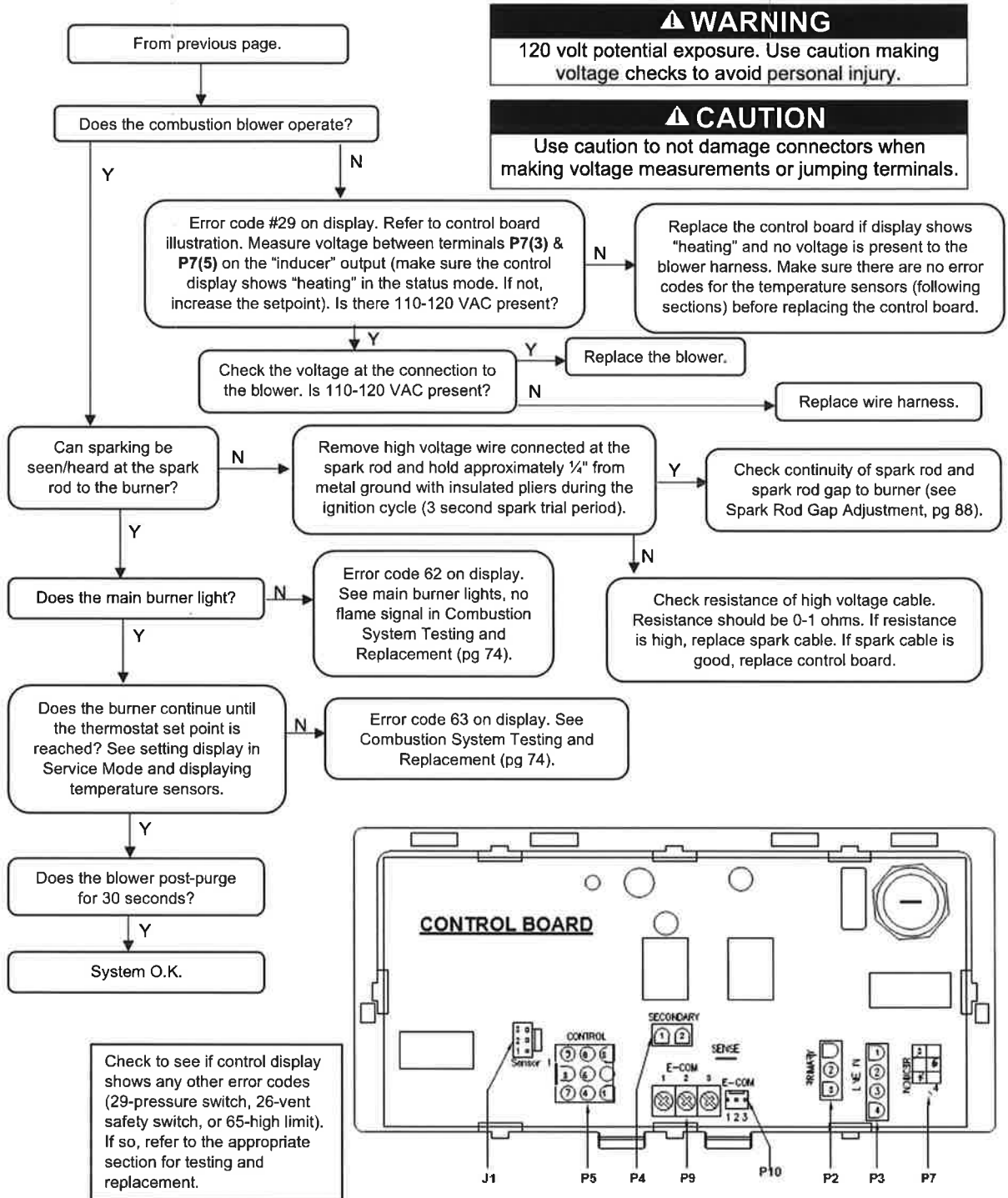
Make proper wire terminations.

Check wire harness for proper continuity.

Replace control board.



Troubleshooting



⚠ WARNING
120 volt potential exposure. Use caution making voltage checks to avoid personal injury.

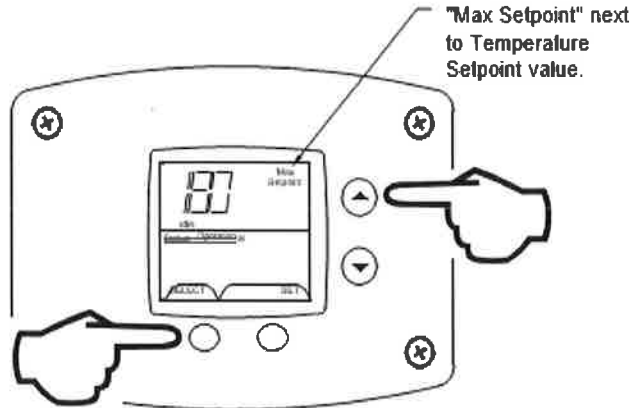
⚠ CAUTION
Use caution to not damage connectors when making voltage measurements or jumping terminals.

Troubleshooting

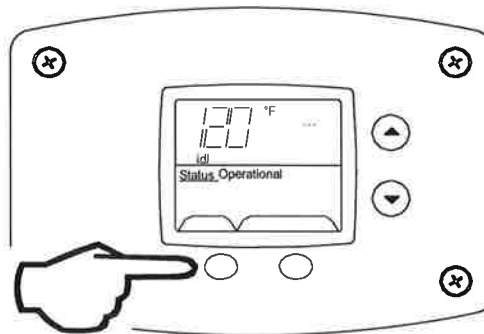
Accessing Service Mode on Control Display (FOR SERVICE PERSONNEL ONLY)

The display has a "service mode" for changing the maximum setpoint and accessing information in aiding servicing of the water heater. This procedure is for service and installation personnel only. To enter the Service Mode, follow the steps illustrated below:

Step 1: Press Select and Temperature Up buttons together and hold for 3 seconds until "Max Setpoint" is shown in the display.

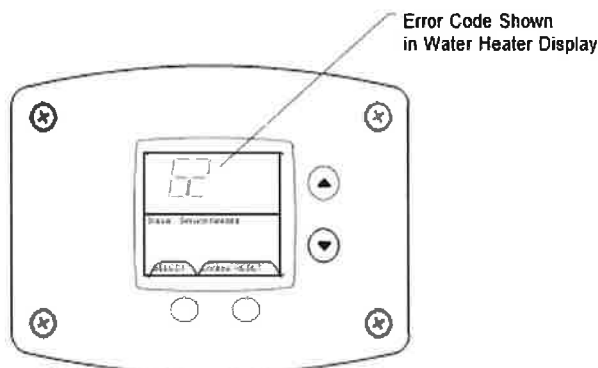


Step 2: Pressing Select button will change display to next mode.



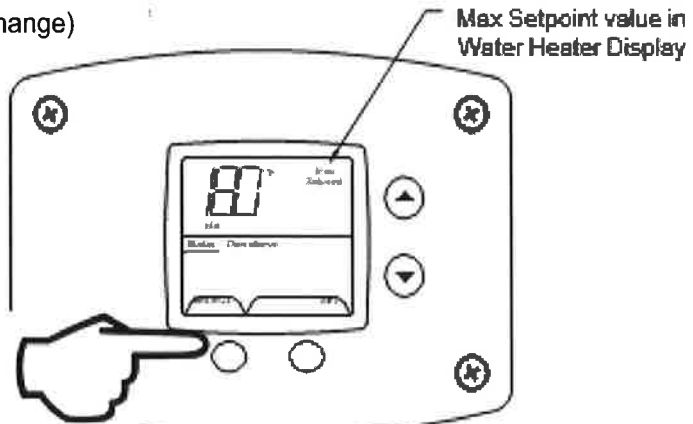
The following is the sequence of modes available in Service Mode by pressing the Select button.

Error Code Number (Display/Reset). This is only shown if there is an operating error in the User Mode.

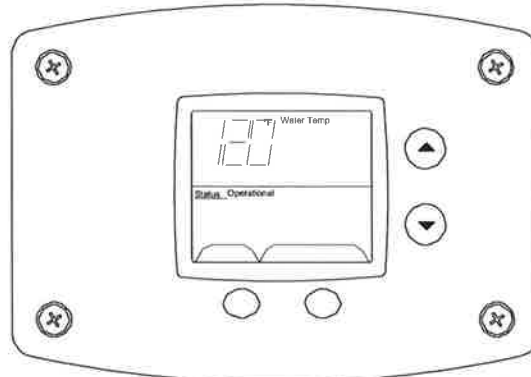


Sequence of Modes continued-

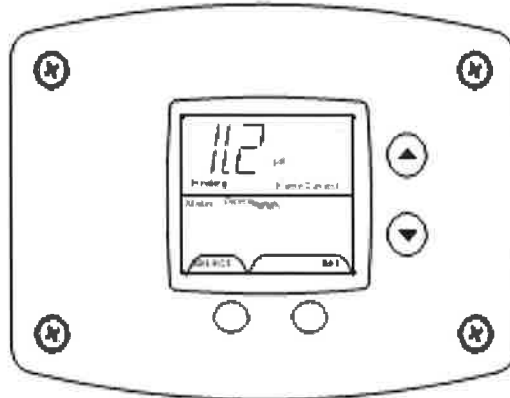
1. Max Setpoint (Display/Change)



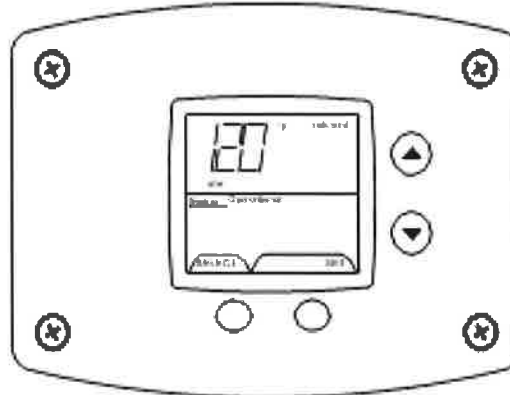
2. Tank Sensor Temperature, Displayed Water Temperature Average



3. Flame Current of Burner Flame Sensor (Displays only in the Heating Cycle)

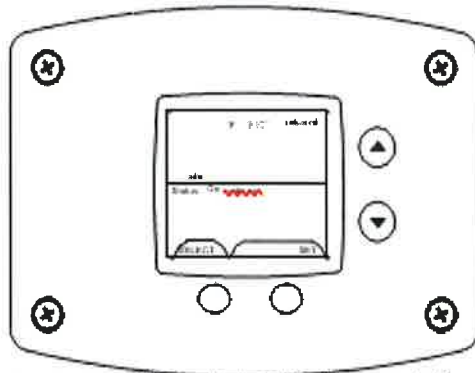


4. Setpoint (Display/Change)

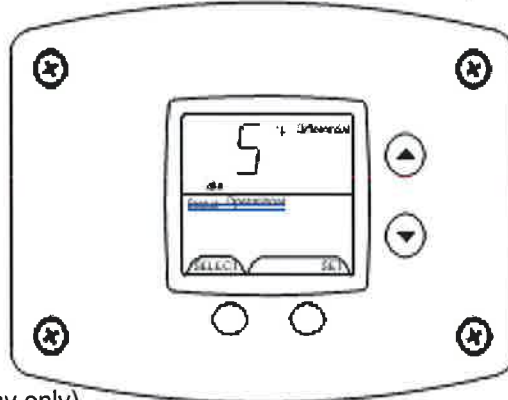


Sequence of Modes continued-

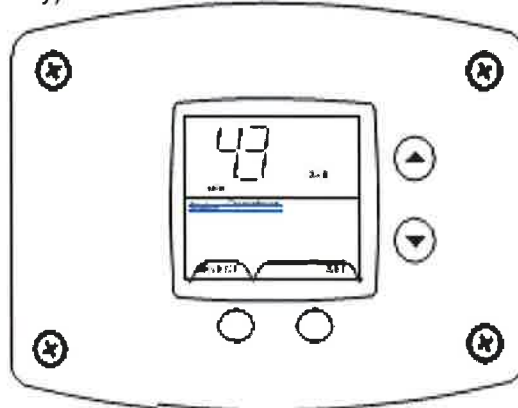
5. °F/°C (Display/Change)



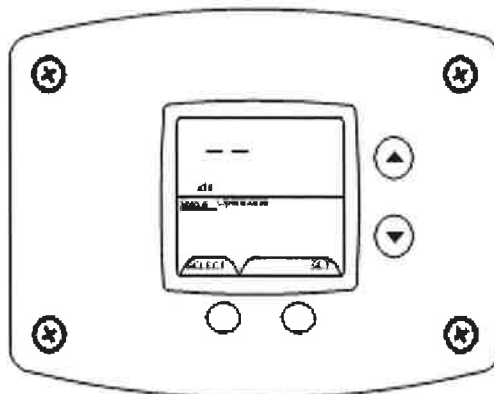
6. Differential (Display only – shows the differential of the thermostat)



7. Software Version (Display only)



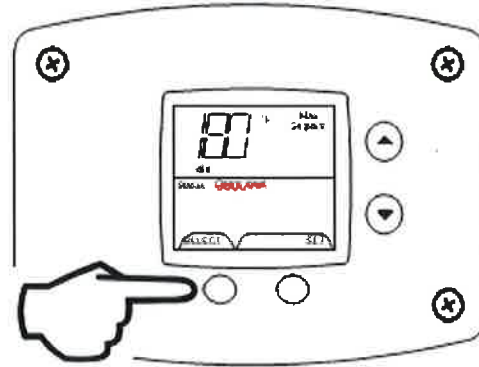
8. Error Code History (Displays if there are present error codes or up to 10 previous error codes). Water heater display will show a "--" if there are no error codes.



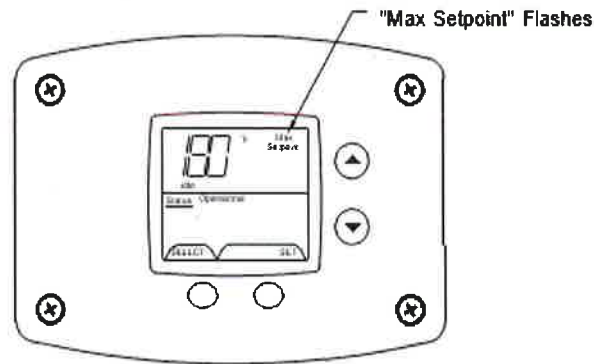
To change the Maximum Setpoint Limit (Max Setpoint) for the temperature setpoint:

Step 1: In Service Mode press the Select button until Max Setpoint is displayed.

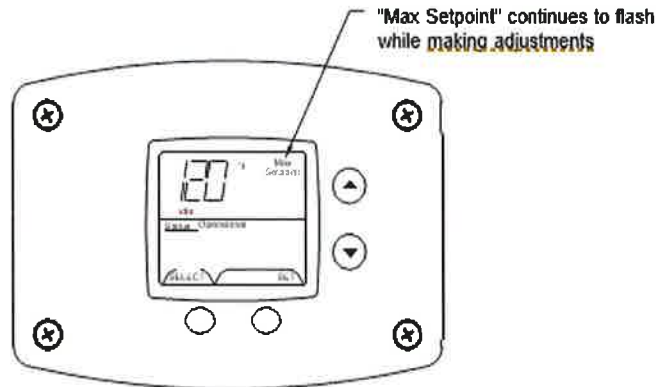
WARNING!
Setting the water temperature to the maximum setpoint can result in scalding hot water delivered to the faucets. It is highly recommended that the maximum setpoint be adjusted to the lowest temperature possible for the needs of the installation. Make sure the water heater control display is not in a public area that can result in the temperature settings being improperly adjusted.



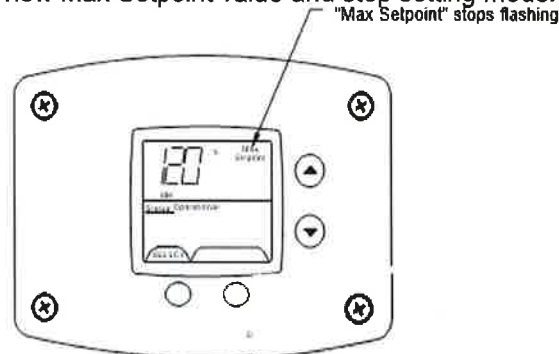
Step 2: Press Set button to enter setting mode. Max Setpoint will flash to indicate setting mode.



Step 3: Press the UP or DOWN buttons to change the maximum setpoint value. This will limit the maximum setpoint the user can select. Note: The maximum setpoint is approximately 180°F.

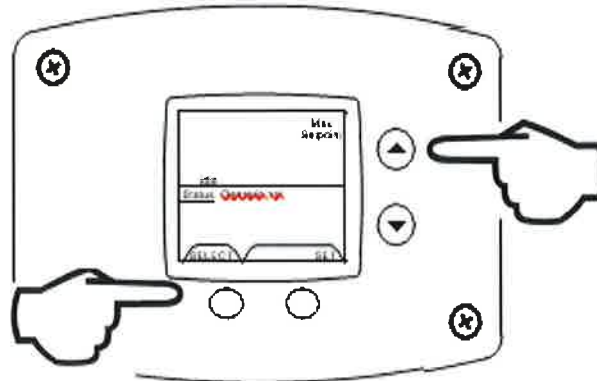


Step 4: Press Set button to confirm new Max Setpoint value and stop setting mode.



Max Setpoint Limit continued-

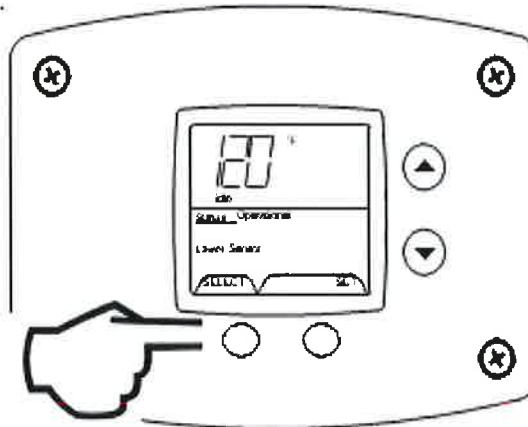
Step 5: 30 seconds after the last button press, the water heater display will go back to User Mode. It will read "Max Setpoint" without showing a temperature value if the temperature setpoint is at the maximum setting. The water heater display can be set back to the User Mode immediately by pressing both the Temperature Up and Select buttons together for 3 seconds.



Exiting Service Mode

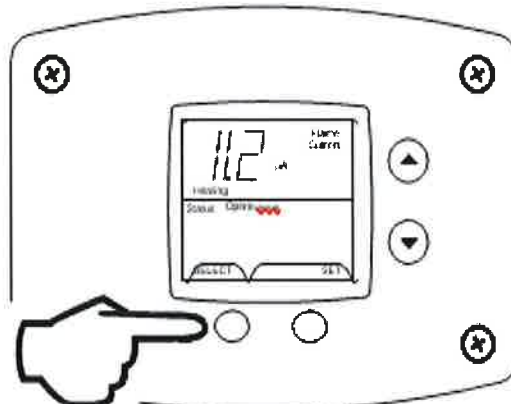
Display of Water Temperature:

In Service Mode, press the Select button until "Water Temp" is displayed in the upper right section of the water heater display. This is the reading for the sensor.



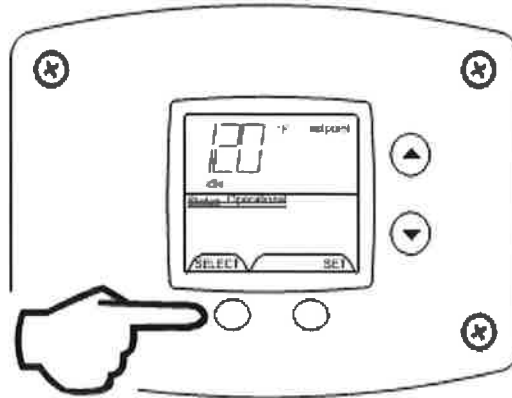
To Display Flame Sense Current of the Pilot Flame Sensor:

The pilot flame sense current is available only when the burner is in operation. **Step 1:** Make sure the status displays "Heating" or draws enough hot water to start the burners. **Step 2:** Enter the Service Mode described previously. **Step 3:** Press the Select button until a number value is displayed with "Flame Current" to the right of the number. The value is in microamps (μ A).

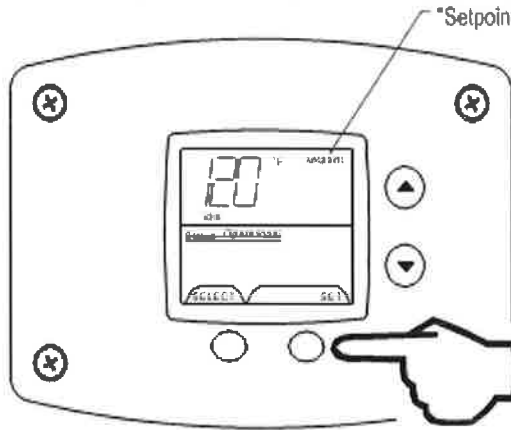


To Display and Change Temperature Setpoint:

Step 1: In Service Mode, press the Select button until "Setpoint" is shown in the water heater display.



Step 2: Press the Set button to enter the setting mode. "Setpoint" will flash in the water heater display.



Step 3: To raise the temperature setpoint, press the Temperature Up button until the desired temperature is shown in the water heater display.

NOTICE

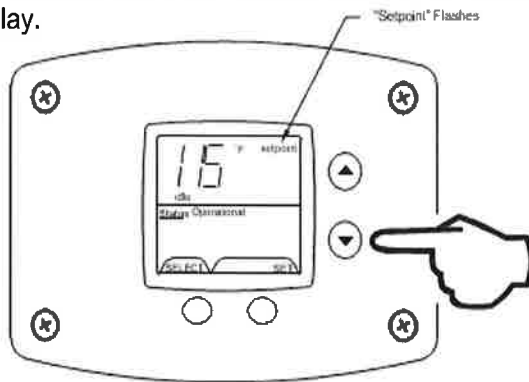
The maximum temperature that can be set in the water heater display is limited to the Max Setpoint previously described. To change the Max Setpoint, refer to the procedure To Change the Maximum Setpoint Limit described previously under Accessing the Service Mode on the Water Heater Display

WARNING

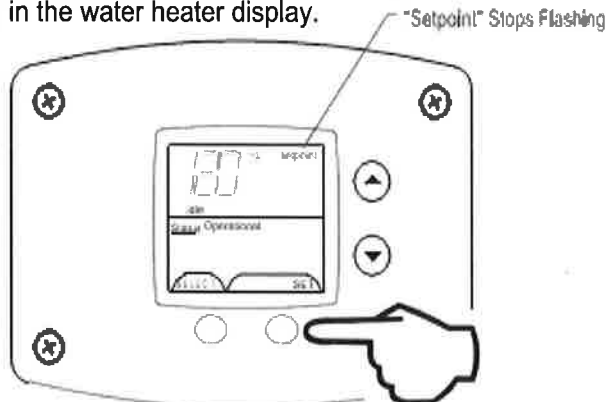
Setting the water temperature to the maximum setpoint can result in scalding hot water delivered to the faucets. It is highly recommended that the maximum setpoint be adjusted to the lowest temperature possible for the needs of the installation. Make sure the water heater control display is not in a public area that can result in the temperature settings being improperly adjusted.

Change Temperature Setpoint continued-

Step 4: To lower the temperature setpoint, press the "Temperature Down" button until the desired temperature is shown on the water heater display.

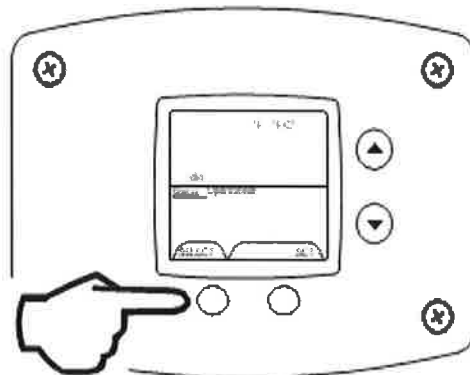


Step 5: When the desired setpoint is reached on the water heater display, press the Set button to confirm the new setpoint. "Setpoint" stops flashing in the water heater display.

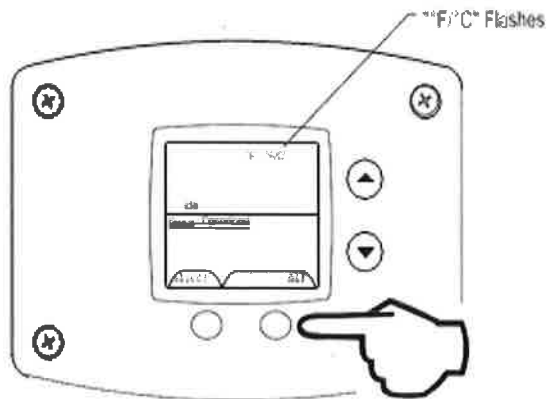


To Change Temperature Format in Display from °F to °C or °C to °F:

Step 1: While in Service Mode, press the Select button until "°F/°C" is shown in the upper right corner of the water heater display.

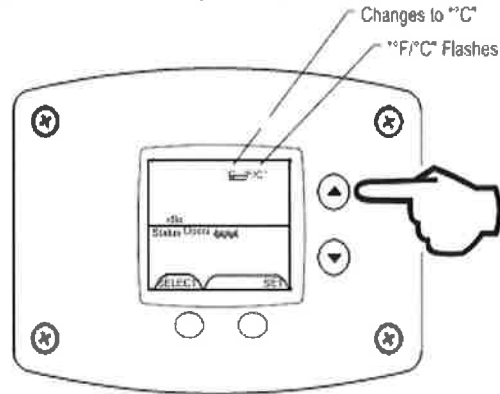


Step 2: Press the Set button to change the temperature format. The "°F/°C" symbol will flash in the water heater display.

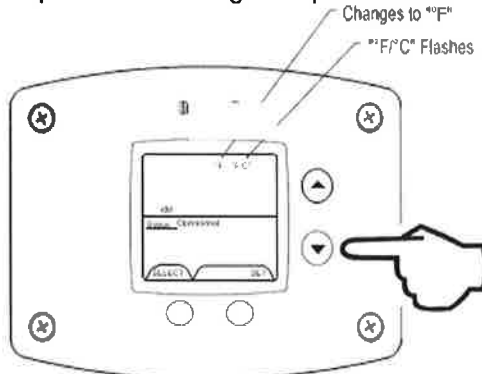


Change Temperature Format in Display continued-

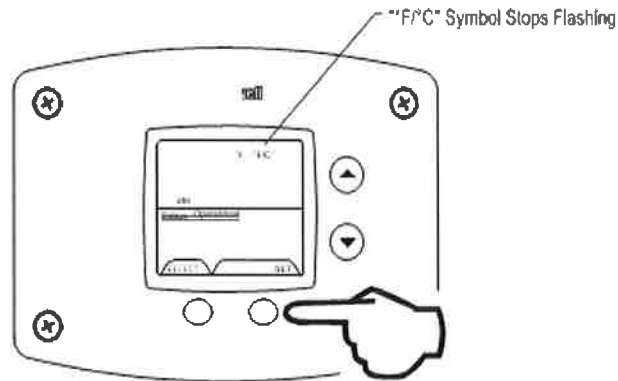
Step 3a: Press the Temperature Up button to change temperature format to °C.



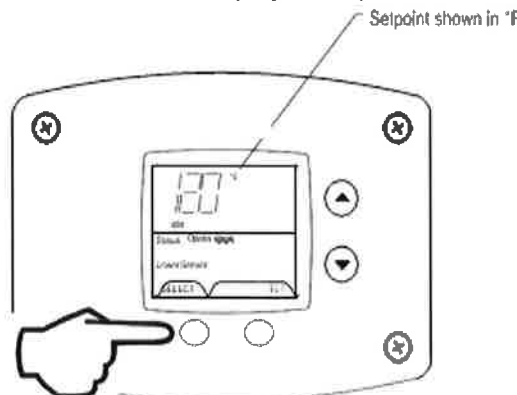
Step 3b: Press the Temperature Up button to change temperature format to °F.



Step 4: Press the Set button to confirm °F or °C format. "°F/°C" will stop flashing in the water heater display.

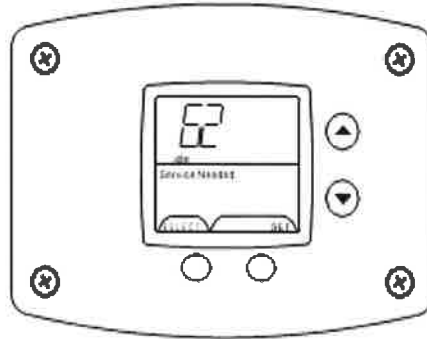


Step 5: Pressing the Select button will return the display to setpoint in format selected (°F or °C) immediately.



Error Codes and Error History Display:

If there is an operating problem with the water heater, an error code number will appear on the water heater display with "Service Needed" to the right of the "Status" indicator. The error code label is located under the Water Heater Display and the following section in this Service Manual explains the error codes with corrective actions to repair the water heater.



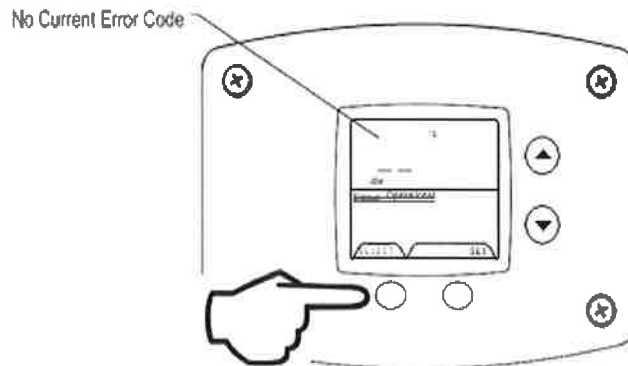
Example of Error Code in the Display

Error Code History:

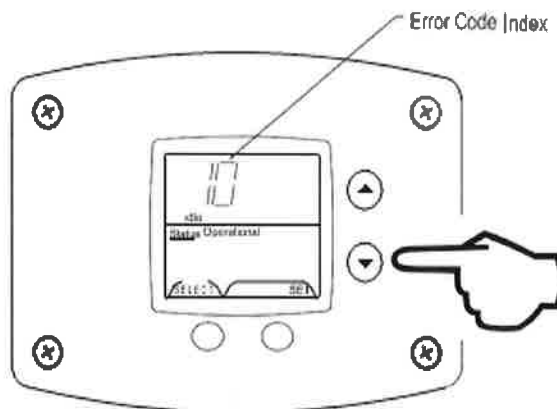
In Service Mode pressing the Select button after the Software Version (item 8 in the previously described sequence of service modes) will show an error code history, if there have been any previous operating problems with the water heater. If the display shows "--", there is not a current error code. The water heater display will provide up to 10 previous error codes. The oldest error code will be stored in code index #1 and the most recent in code index #10.

To View Previous Error Codes:

Step 1: In "Service Mode" press the Select button until the next display after the Software Version. If there are no current error codes, the display will show "--".

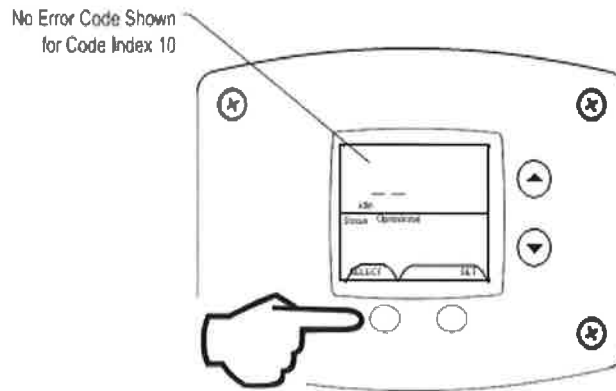


Step 2: Press the Temperature Down button to select the error code index, starting with the most recent error code 10.

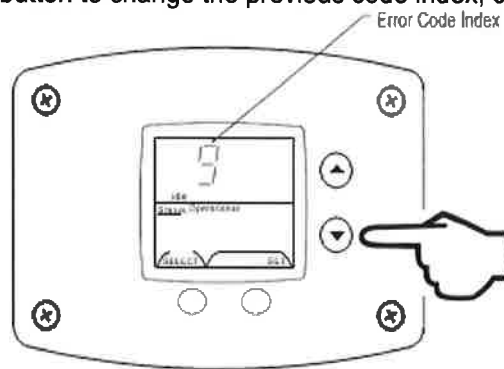


View Previous Error Code continued-

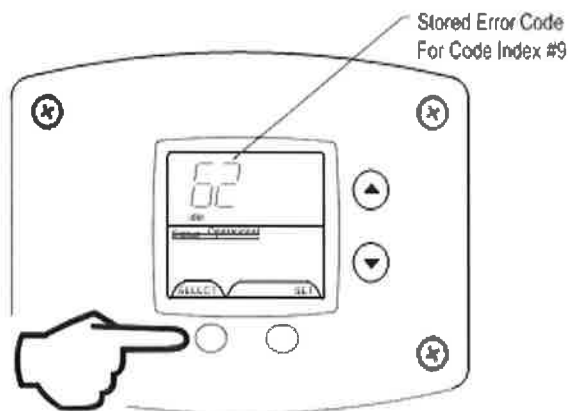
Step 3: Press the Select button to view the error code for code 10. If there is a number displayed, note what the number is. The label next to the water heater display will identify the code number. If no number is displayed with only a "--" in the water heater display, then there has not been an error code for error code index 10.



Step 4: Press the Temperature Down button to change the previous code index, code 9.



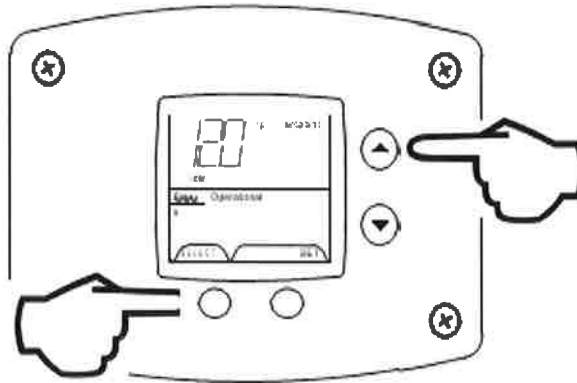
Step 5: Press the Select button for code index 9 to view if there are any code numbers.



Step 6: Continue pressing the Temperature Down button to change to the next error code index and press Select to view the error code number, if any, for that index number. Continue on to index 1, the oldest error code index. The water heater display will store up to 10 error codes with the oldest code starting in code index 1 with the most recent code in code index 10.

View Previous Error Code continued-

Step 7: 10 seconds after the last button press, the Water Heater Display will revert back to the current error code display. To exit Service Mode, either wait 30 seconds or press Temperature Up button and Select button for 3 seconds.



Exiting Service Mode

Error Code Definitions

If the water heater has an operating problem, there will be a number in the water heater display with “Service Needed” shown below the error code number. Note the error code and the definition in the chart below. This label appears on the control box under the water heater display. The following sections will provide instructions for servicing each error code.

INTEGRATED CONTROL ERROR CODE DISPLAY	
ERROR CODE	DEFINITION
4	LOW FLAME SENSE CURRENT
6	FLAME SENSED OUT OF NORMAL SEQUENCE (BEFORE OPENING GAS VALVE OR AFTER CLOSING GAS VALVE)
23	FLAME DETECTED BEFORE IGNITION
24	FLAME DETECTED AFTER A HEATING CYCLE COMPLETES
29	PRESSURE SWITCH FAILED TO CLOSE OR OPEN (STUCK OPEN)
32	LOWER SENSOR READINGS FAULTY
57	FLAME ROD SHORTED TO GROUND
58	AC LINE FREQUENCY ERROR - SIGNAL TOO NOISY OR FREQUENCY INCORRECT
59	LINE VOLTAGE TOO LOW OR HIGH
61	DC OUTPUT VOLTAGE UNSTABLE
62	MAXIMUM NUMBER OF RETRIES DETECTED
63	MAXIMUM NUMBER OF IGNITION RECYCLES DETECTED
64	ELECTRONICS FAILURE
65	HIGH WATER TEMPERATURE (OVER 200°F)
IF ANY OF THE ABOVE CODES APPEAR ON THE CONTROL DISPLAY, CONTACT YOUR PLUMBER OR QUALIFIED SERVICE AGENT FOR SERVICE OF THE WATER HEATER.	

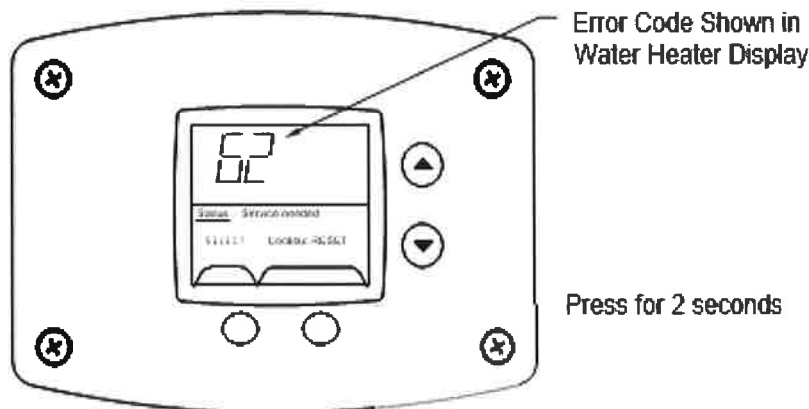
Troubleshooting

Resetting Error Codes

WARNING

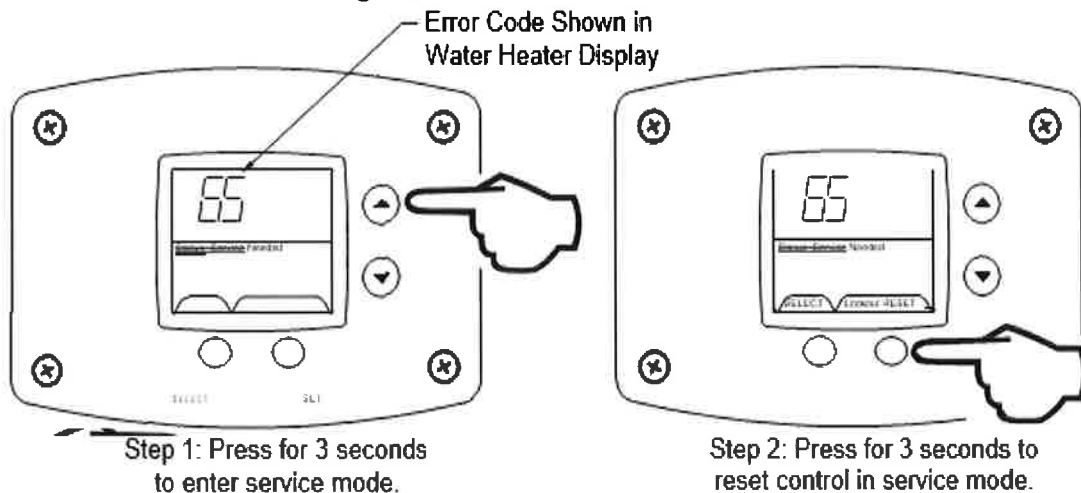
The following procedure is for **service and installation personnel ONLY**. Resetting lockout conditions without correcting the malfunction can result in a hazardous condition.

If an error code is displayed (except for 4, low flame sense current), the water heater will be in a Lockout Condition with the water heater display showing the error code number and "Service Needed" in the status section of the display window. Error codes 62 (maximum number of retries detected) and 63 (maximum number if ignition recycles detected) are Soft Lockouts in which the control can be reset in the User Mode by pressing the lower right button under Lockout Reset, shown in the lower right portion of the display. The control will also go through 3 attempts to relight the burners every hour in the soft lockout condition.



All other error codes will put the water heater into a Hard Lockout condition, in which the water heater will not operate and cannot be reset in the User Mode. To reset a Hard Lockout, first enter the Service Mode described earlier by pressing both the Temperature Up and Select buttons at the same time for 3 seconds. Then press the lower right button under Lockout Reset in the water heater display and hold for 3 seconds.

Resetting Error Codes in Hard Lockout Condition



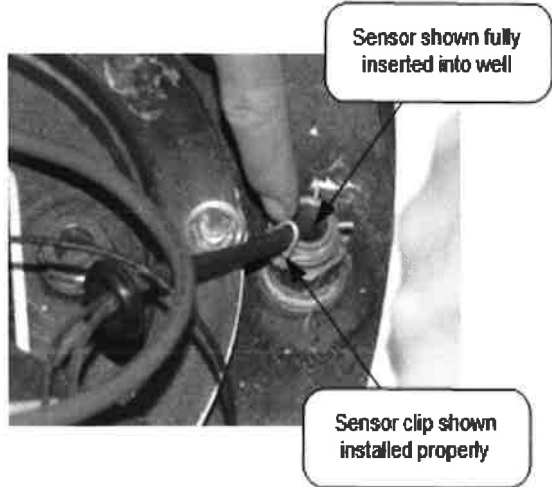
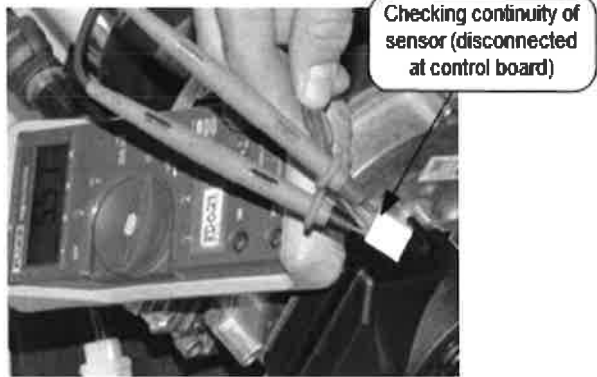
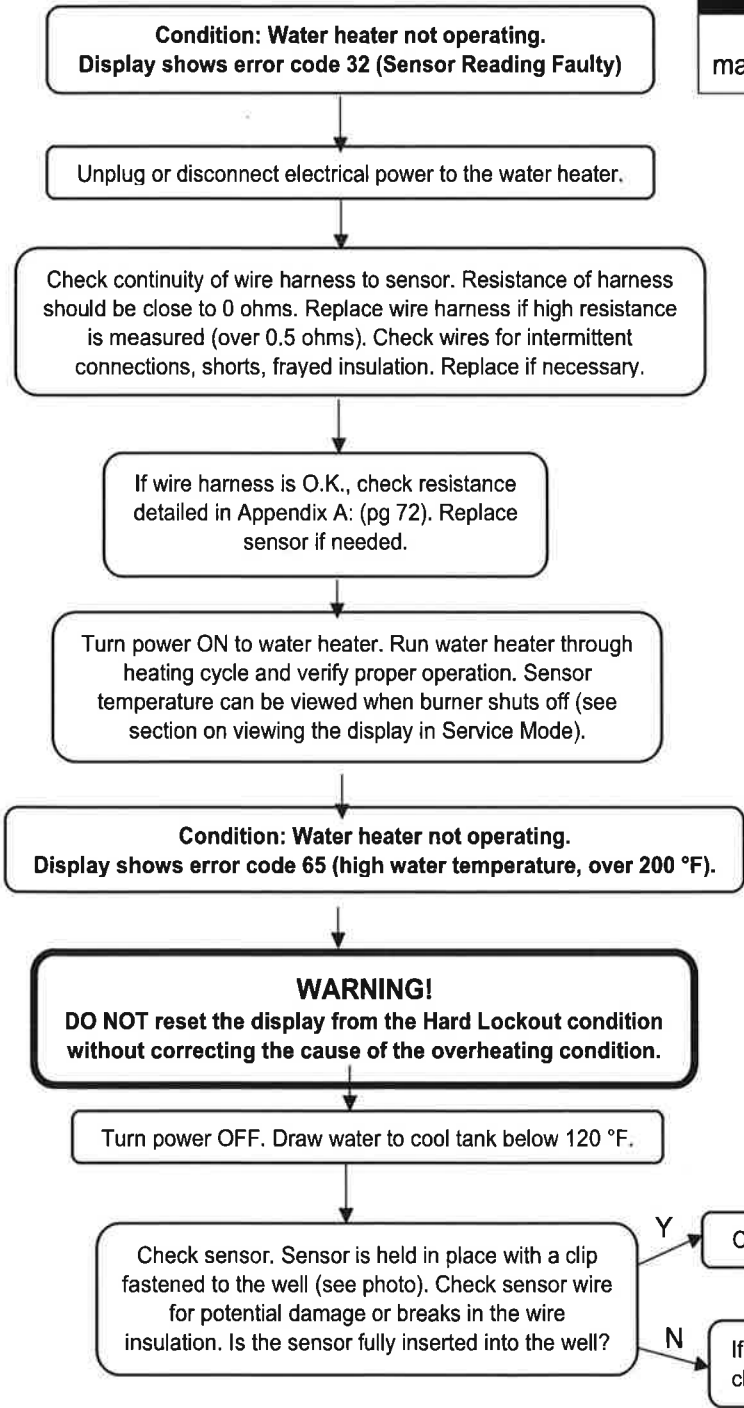
Service Procedure I

Thermostat Circuit Testing and Replacement

NOTE: This procedure assumes a cool tank.

⚠ WARNING
120 volt potential exposure. Use caution making voltage checks to avoid personal injury.

⚠ CAUTION
Use caution to not damage connectors when making voltage measurements or jumping terminals.



Service Procedure I

Thermostat Circuit Testing and Replacement (Continued)

⚠ WARNING

DO NOT operate the water heater without verifying that the overheating condition has been corrected.

Continued from previous page.

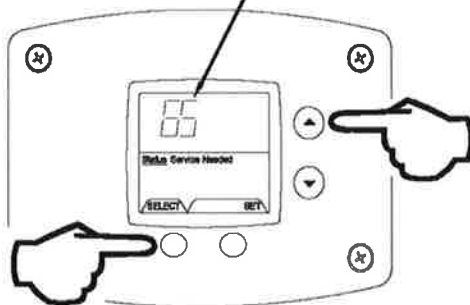
Condition: Water heater not operating.
Display shows error code 65 (high water temperature, over 200 °F).

Once cause of overheating condition has been diagnosed and corrected, the control may be reset.

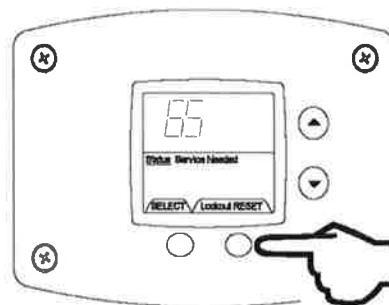
- Reconnect and switch ON power to the water heater.
- Enter service mode on the water heater display (see image below).
- Press button under "Lockout Reset" and hold for 3 seconds.
- Set thermostat to the desired setting.
- Water heater will start.
- Monitor temperatures for one complete heating cycle making sure the maximum tank temperature remains well below 200 °F.

This water heater is equipped with a manual reset type gas shutoff device designed to shut off the gas to the burners if excessive water temperature occurs. To reset the control, first press the "temperature up" and "select" buttons on the water heater display for 3 seconds to enter service mode. Then press the lower right button under "RESET" in the display for 3 seconds.

Error code 65 indicates high limit lockout condition



Step 1: Press for 3 seconds to enter service mode.



Step 2: Press for 3 seconds to reset control.

Service Procedure I

Thermostat Circuit Testing and Replacement (Continued)

Appendix – A Sensor Resistance at Various Temperatures

Be careful when making voltage measurements or jumping terminals NOT to damage or deform connectors or connector pins.

Draw water from the Temperature and Pressure Relief Valve. Compare the Temperature with Temperature Ohms Chart below.

Example: If temperature of the sensor is 84 °F, then the resistance through the sensor would be 8449 (see shaded area).

NOTE: Sensor resistance increases as the temperature falls.

In Degrees F										
°F	0	1	2	3	4	5	6	7	8	9
40	26109	25400	24712	24045	23399	22771	22163	21573	21000	20445
50	19906	19383	18876	18383	17905	17440	16990	16553	16128	15715
60	15314	14925	14548	14180	13823	13477	13140	12812	12494	12185
70	11884	11592	11308	11032	10763	10502	10248	10000	9760	9526
80	9299	9078	8862	8653	8449	8250	8057	7869	7685	7507
90	7333	7165	7000	6839	6683	6531	6383	6238	6098	5961
100	5827	5697	5570	5446	5326	5208	5094	4982	4873	4767
110	4663	4562	4464	4368	4274	4183	4094	4006	3922	3839
120	3758	3679	3602	3527	3453	3382	3312	3244	3177	3112
130	3048	2986	2925	2866	2808	2752	2697	2643	2590	2538
140	2488	2439	2391	2344	2298	2253	2209	2166	2124	2083
150	2043	2004	1966	1928	1891	1856	1820	1786	1753	1720
160	1688	1656	1625	1595	1566	1537	1509	1481	1454	1427
170	1402	1376	1351	1327	1303	1280	1257	1235	1213	1191
180	1170	1150	1129	1110	1090	1071	1053	1035	1017	999
190	982	965	949	933	917	901	886	871	857	842
200	828	814	801	788	775	762	749	737	725	713

Appendix – B Temperature Dial Resistance

Proper readings should be 5400-6600 Ohms at minimum setting and 0-50 Ohms at maximum setting.

Be careful when making voltage measurements or jumping terminals NOT to damage or deform connectors or connector pins.

Service Procedure I

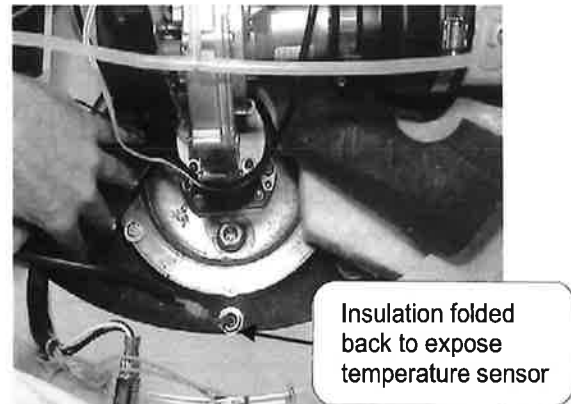
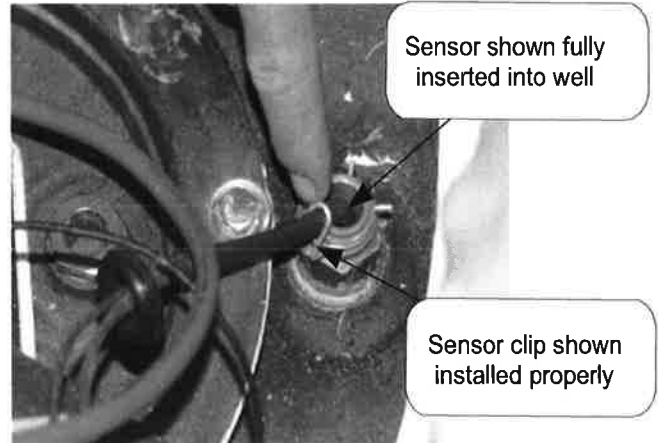
Thermostat Circuit Testing and Replacement (Continued)

Thermostat Sensor (Thermister) Replacement Procedure

1. Position main power switch to OFF.
2. Disconnect (unplug) the water heater from 120 volt power source.
3. Unlatch and remove the top of the surround cover from the top of the water heater.
4. Fold back the insulation just in front of the burner to expose the temperature sensor (see image at right).
5. Disconnect temperature sensor from harness (see images at right).
6. Unclip the sensor from the well and pull the sensor to remove, do NOT remove the well.
NOTE: Using a deep well socket will allow room inside socket for sensor connector and wires.
7. Install the new sensor completely into the well and reinstall the sensor clip.
8. Fold the insulation back into place. Be sure there are no wires in contact with the burner.
9. Restore 120 volt power supply and water supply to the water heater, check and repair any leaks found. Confirm proper operation following the lighting instruction label or the lighting instruction located in the Installation and Operating Instruction Manual.
10. Replace the surround cover on the top of the water heater.

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.



Service Procedure II

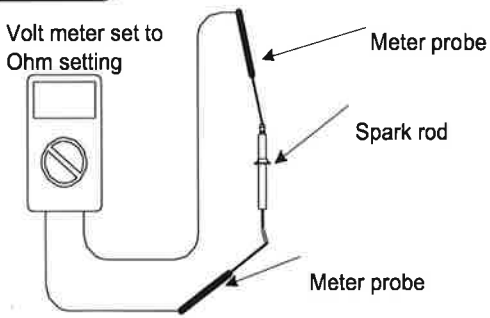
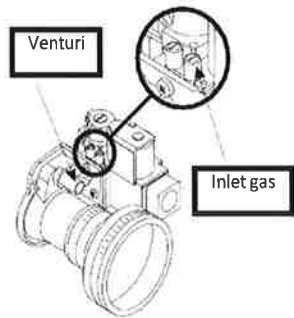
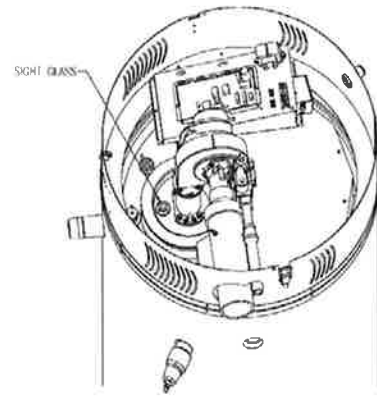
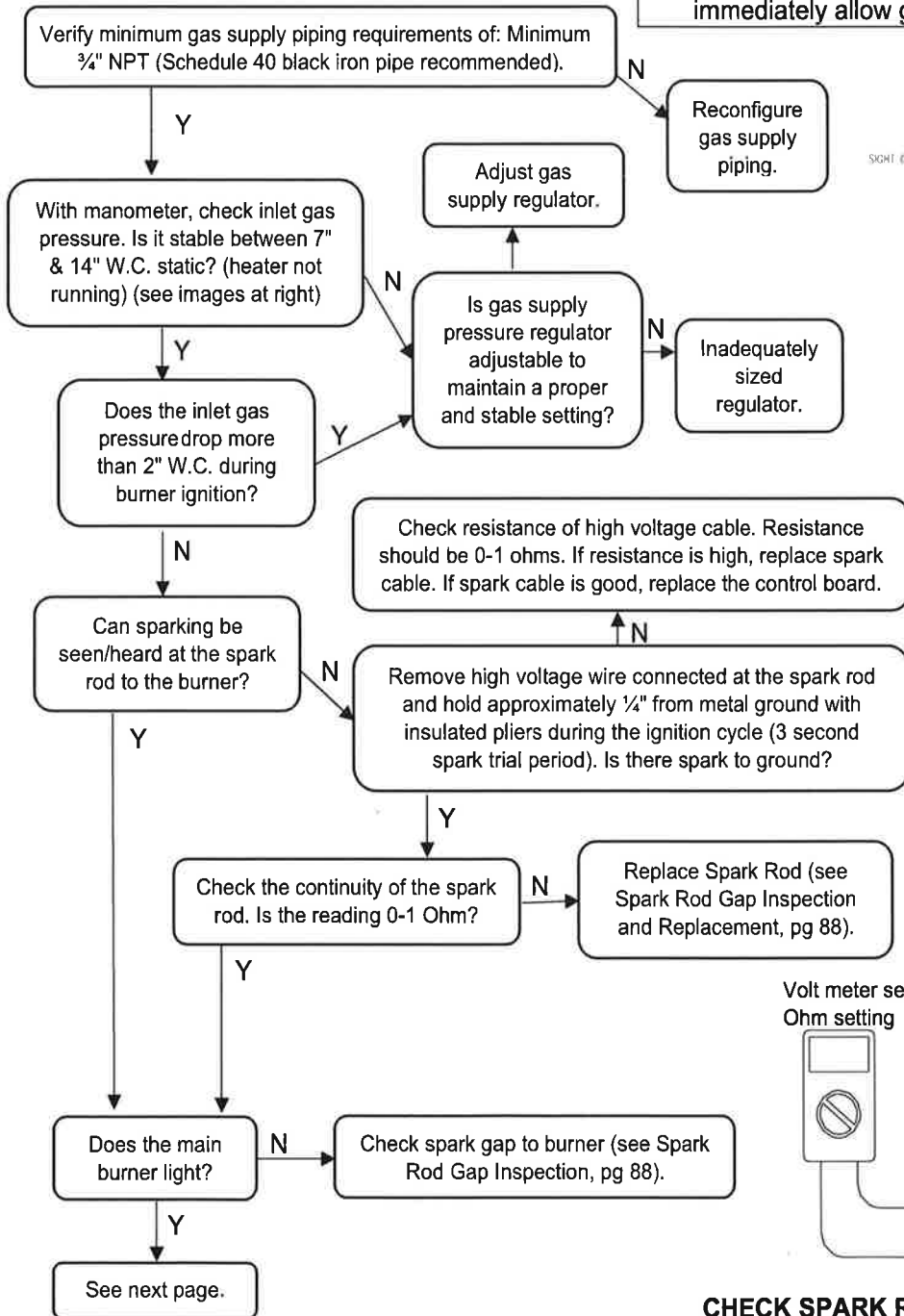
Combustion System Testing and Replacement

Observe burner operation through the sight glass located on the combustion insert mounting flange. Normal burner operation should ignite smoothly, without evidence of coughing or huffing upon ignition. The burner flame should be a blue flame near the burner surface in a uniform flame pattern. Occasional yellow or white streaks are normal.

Note: On higher input models using metal fiber mesh burner a red glow from the burner surface is normal.

⚠ WARNING
120 volt potential exposure. Use caution making voltage checks to avoid personal injury.

⚠ WARNING
Removing screw from inlet gas pressure tap will immediately allow gas to flow from pressure tap.



CHECK SPARK ROD RESISTANCE

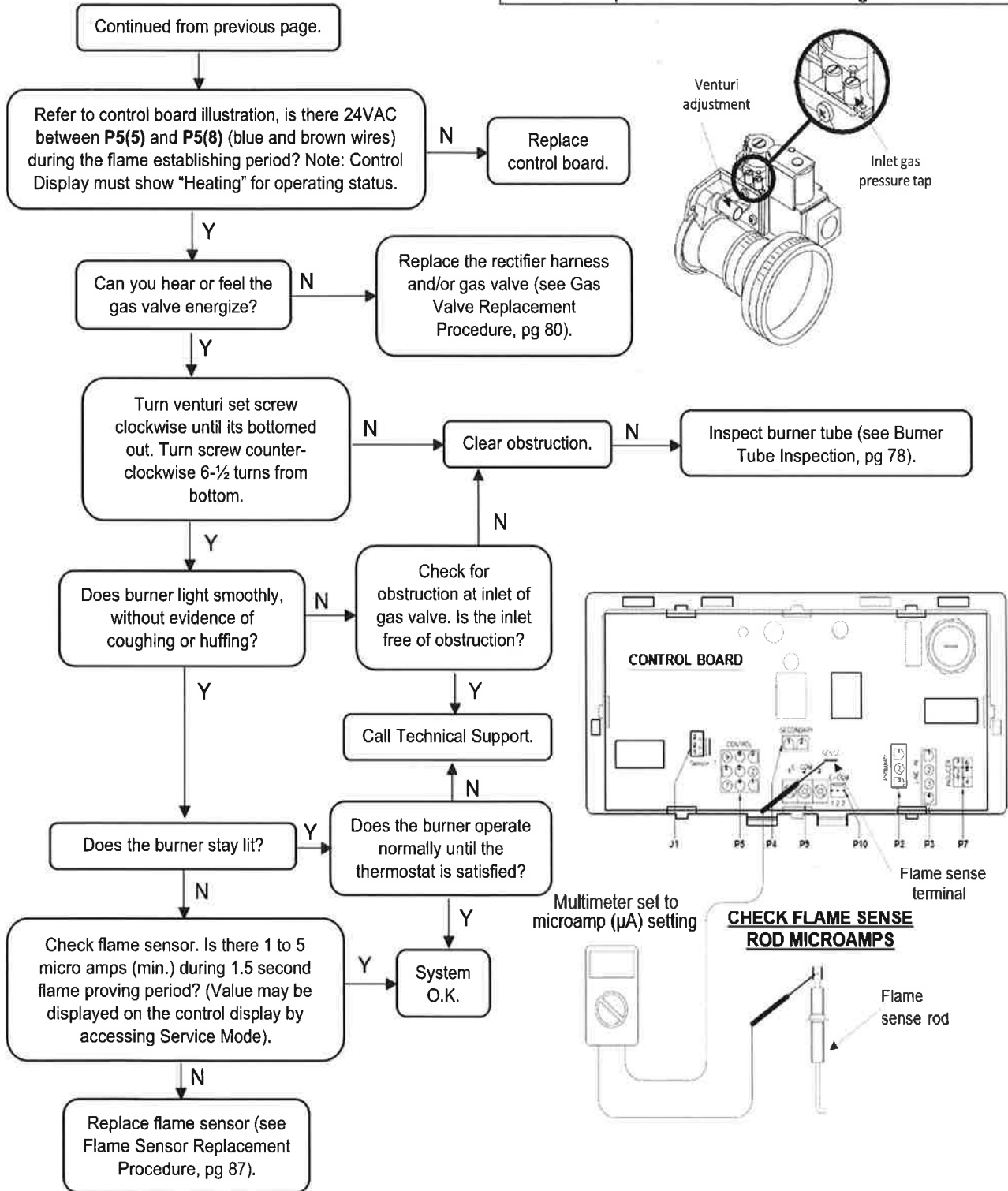
Service Procedure II

Combustion System Testing and Replacement (Continued)

Observe burner operation through the sight glass located on the combustion insert mounting flange. Normal burner operation should ignite smoothly, without evidence of coughing or huffing upon ignition. The burner flame should be a blue flame near the burner surface in a uniform flame pattern. Occasional yellow or white streaks are normal.

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.



Service Procedure II

Combustion System Testing and Replacement (Continued)

Combustion System Removal Procedure

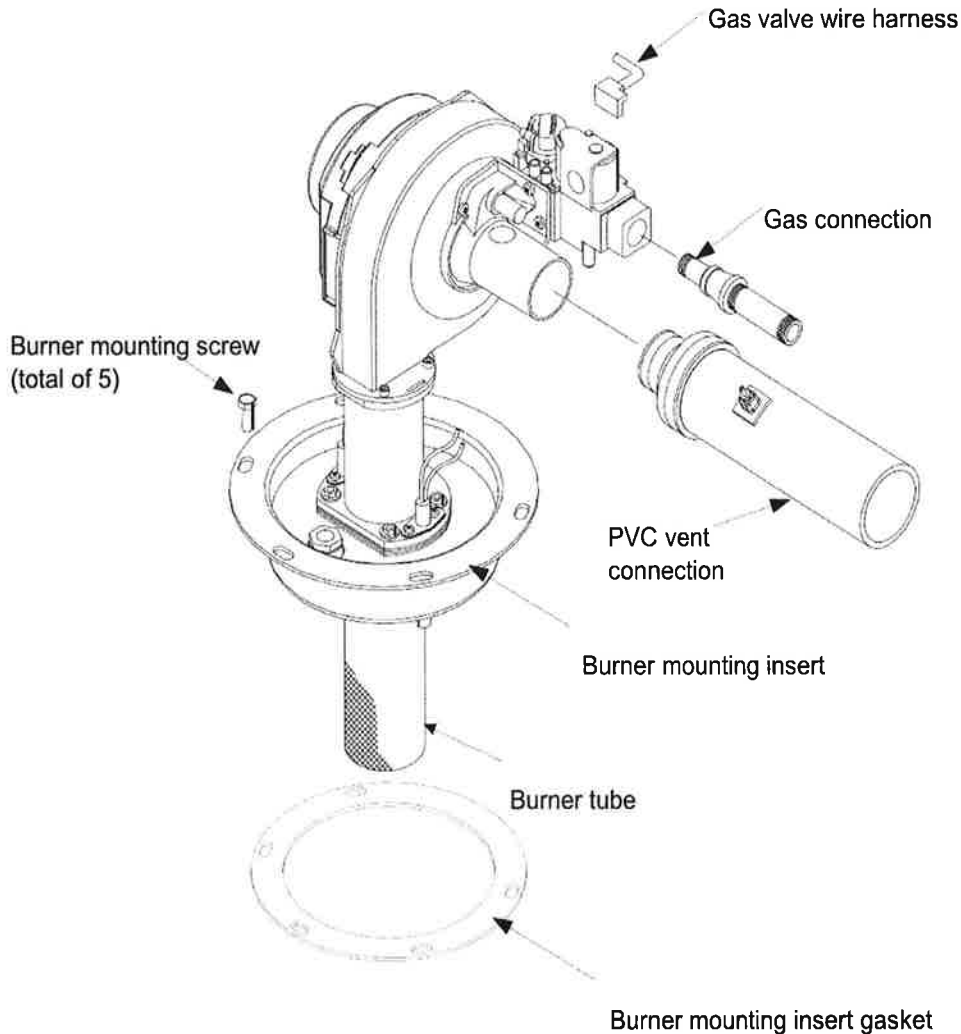
1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120 volt power source.
3. Turn OFF gas supply to the water heater.
4. Unlatch and remove the surround cover from the top of the water heater.
5. From the gas valve, disconnect the gas connection, PVC venting, silicone tubing, and wire harness.
6. Disconnect the wire harnesses, flame sensor, and blower. Disconnect high voltage cable from the spark rod connection.
7. Remove the 5 bolts (1/2" socket) holding the burner mounting insert in place.
8. Carefully remove combustion assembly with gasket from the water heater.
9. See next page for combustion system installation procedure.

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.

⚠ WARNING

Heater components may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.



Service Procedure II

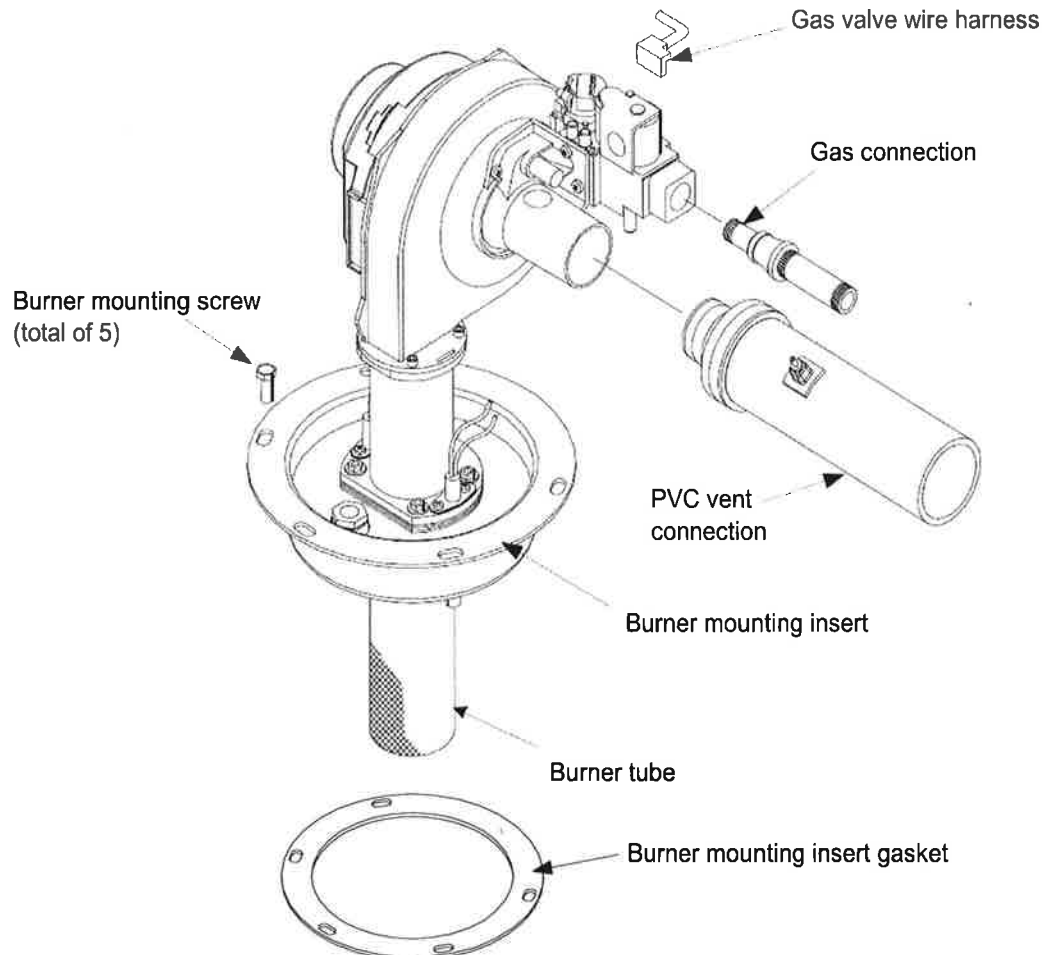
Combustion System Testing and Replacement (Continued)

Combustion System Replacement Procedure

1. Fully inspect burner mounting insert gasket for the following:
 - a) Tears
 - b) Missing material
 - c) Cracks
 - d) Dirt or debris
 - e) Other imperfections that would inhibit proper seal

If gasket is NOT affected by any of the above, gasket replacement is not required.

2. Install combustion assembly using new gasket or fully inspected gasket from step 1. Secure combustion assembly at the burner mounting insert using screws from step 6 on previous page. Tighten screws evenly.
3. Reconnect wire harnesses to igniter or high voltage cable to spark rod, flame sensor, blower, and gas valve.
4. Reconnect PVC venting, gas supply and silicone tubing to gas valve. Turn on gas supply to heater and check for gas leaks, repair any gas leaks found.
5. Restore 120 volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instruction located in the Installation and Operating Instruction Manual.
6. Replace the surround cover on the top of the water heater.



Service Procedure III

Burner Tube Inspection and Replacement

Burner Tube Removal Procedure

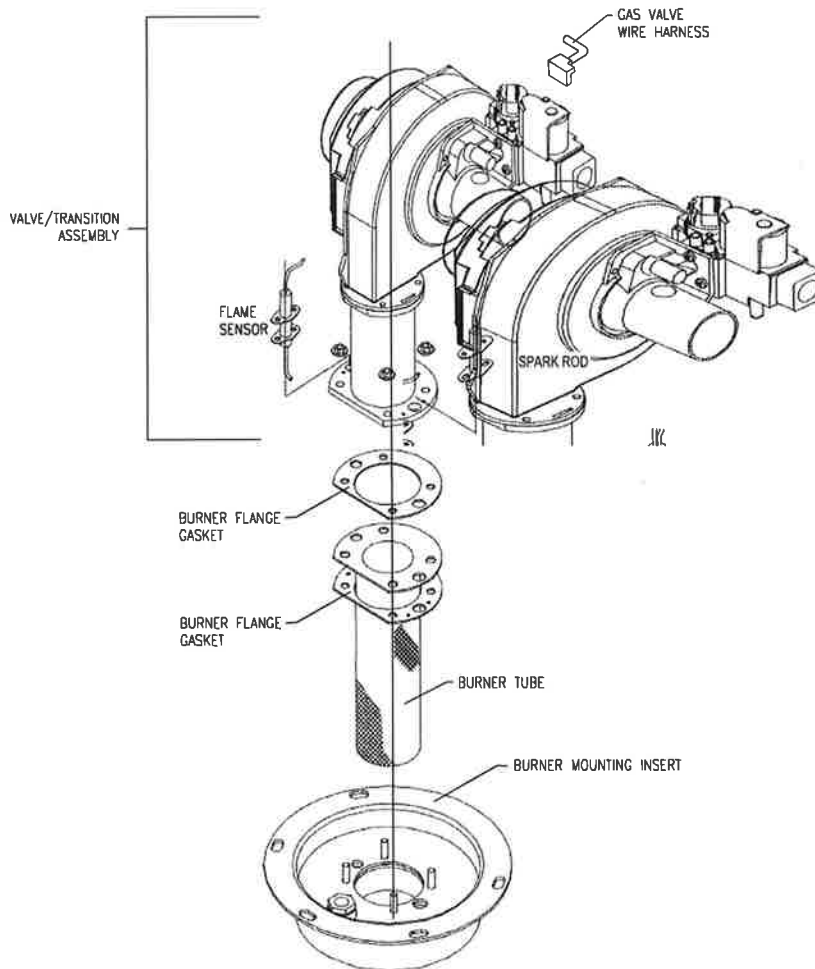
1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120 volt power source.
3. Turn OFF gas supply to the water heater.
4. Unlatch and remove the surround cover from the top of the water heater.
5. From the gas valve, disconnect the gas connection, PVC venting, silicone tubing, and wire harness.
6. Disconnect the wire harness from the blower assembly.
7. Carefully remove the flame sensor from combustion assembly. Remove the two screws on the spark rod bracket and remove the spark rod.
8. Remove the 4 nuts (7/16" wrench) holding the burner transition in place. Lift the blower/gas valve transition assembly from burner mounting insert, remove gasket and set aside.
9. Remove burner tube from burner mounting insert. See next page for burner tube inspection procedure.

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.

⚠ WARNING

Heater components may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.



Service Procedure III

Burner Tube Inspection and Replacement (Continued)

⚠ WARNING

Heater components may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.

1. **Inspect burner tube as follows:**
 - a) Outer fiber mesh should be uniform with no tears or deterioration.
2. If burner tube is affected by any of the above, replacement is required. Refer to burner tube replacement procedure below.

Burner Tube Replacement Procedure

Note: Provide the model and serial number for the correct replacement burner.

1. Fully inspect burner flange gaskets, igniter and flame sensor gaskets for the following:
 - a) Tears
 - b) Missing material
 - c) Cracks
 - d) Dirt or debris
 - e) Other imperfections that would inhibit proper sealIf gaskets are NOT affected by any of the above, gasket replacement is not required.
2. Install burner tube with gaskets into burner mounting insert. Be sure gasket surfaces are free of debris.
3. Reconnect the blower/gas valve/transition assembly to burner mounting insert. Secure using nuts from step 8 on previous page.
4. Carefully reinstall flame sensor with gasket and igniter with gasket and secure with screws from step 7 on previous page. Reconnect wire harnesses to sensor and igniter.
5. Reconnect wire harnesses to blower motor and to the gas valve.
6. Reconnect PVC venting, gas supply and silicone tubing to gas valve. Turn on gas to heater and check for gas leaks, repair any gas leaks found.
7. Restore 120 volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instruction located in the Installation and Operating Instruction Manual.
8. Replace the surround cover on the top of the water heater.

Service Procedure IV

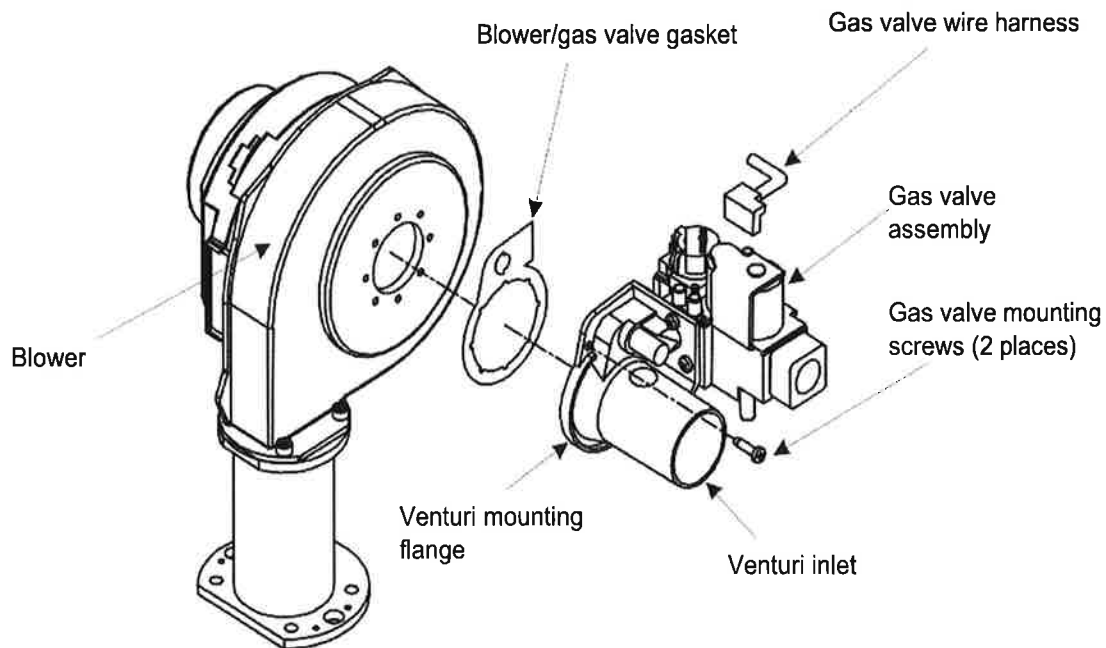
Gas Valve Replacement

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.

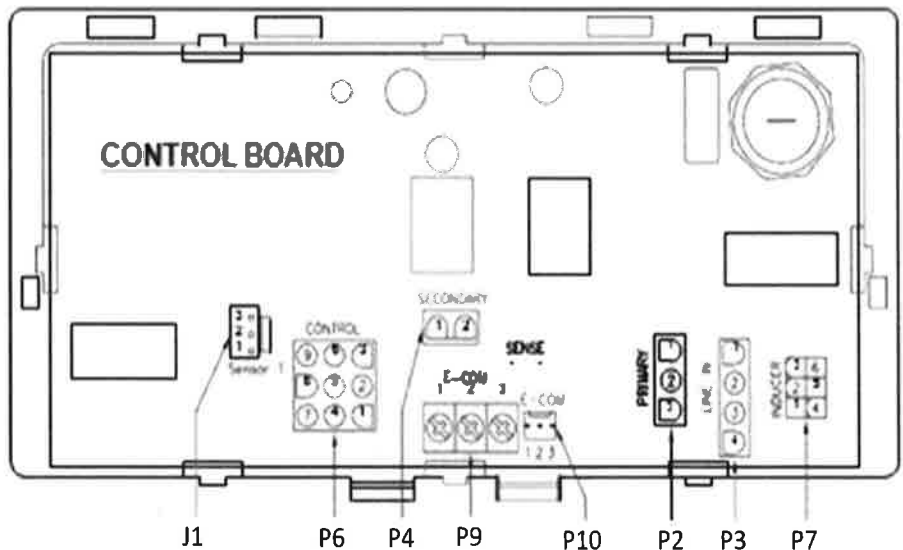
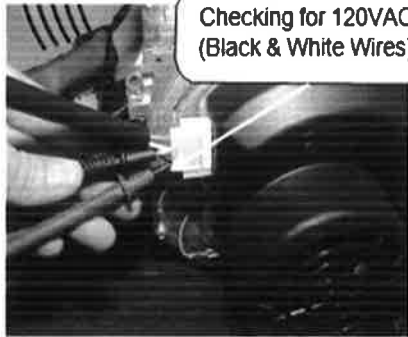
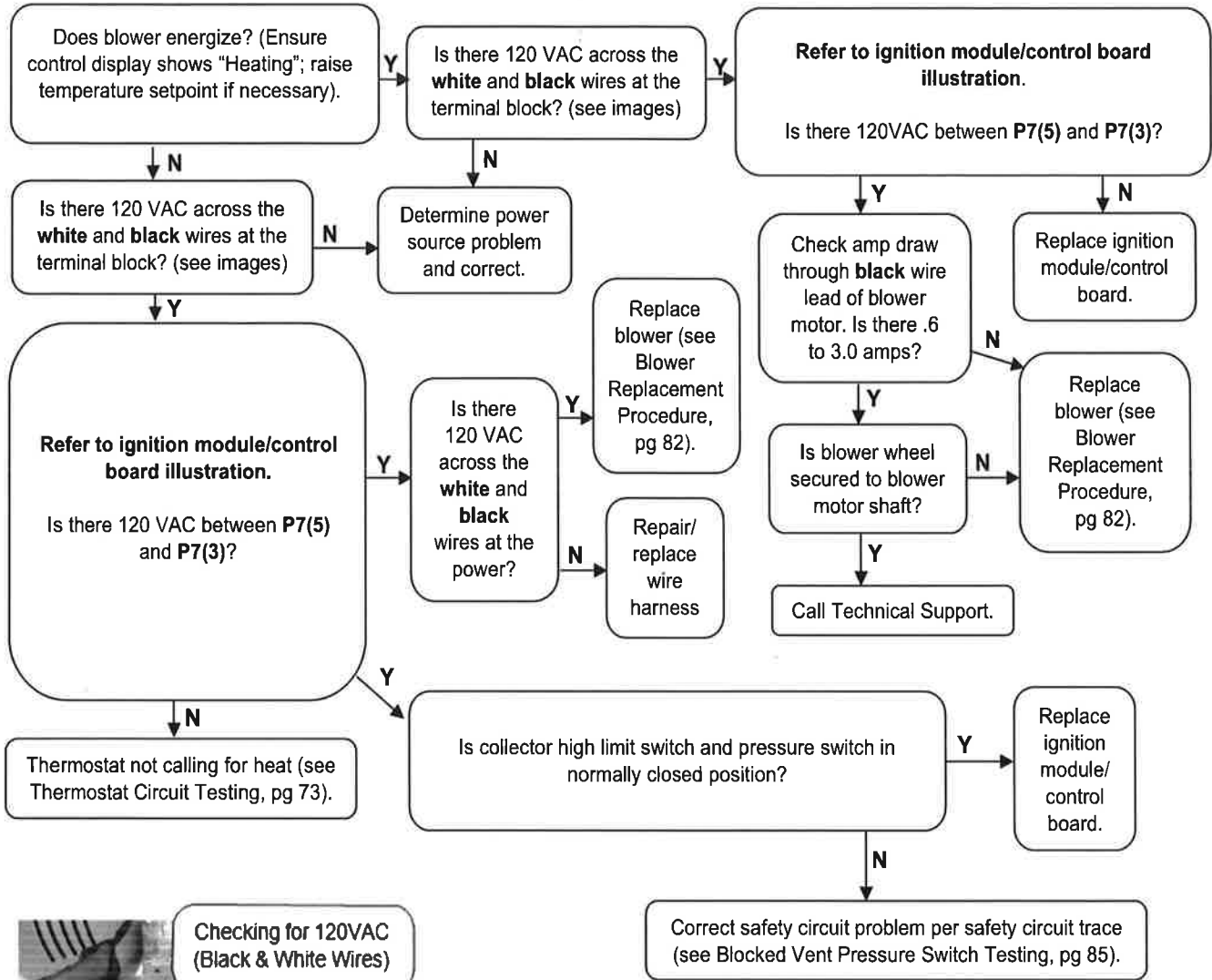
Gas Valve Replacement Procedure

1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120 volt power source.
3. Turn OFF gas supply to water heater.
4. Unlatch and remove the surround cover from the top of the water heater.
5. From the gas valve, disconnect the gas connection, PVC venting, wire harness, and silicone tubing.
6. Remove the two gas valve mounting screws (Torx bit) located on the venturi mounting flange and remove gas valve from water heater.
7. Remove any residual gasket material from blower and venturi mounting flange.
8. Install new gas valve with new gasket provided. Secure gas valve in place using screws from step 6.
9. Reconnect PVC venting, gas supply, silicone tubing, and wire harness to the gas valve. Turn ON gas supply to heater and check for gas leaks, repair any gas leaks found.
10. Restore 120 volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instruction located in the Installation and Operating Instruction Manual.
11. Replace the surround cover on the top of the water heater.



Service Procedure V

Blower Testing and Replacement



Service Procedure V

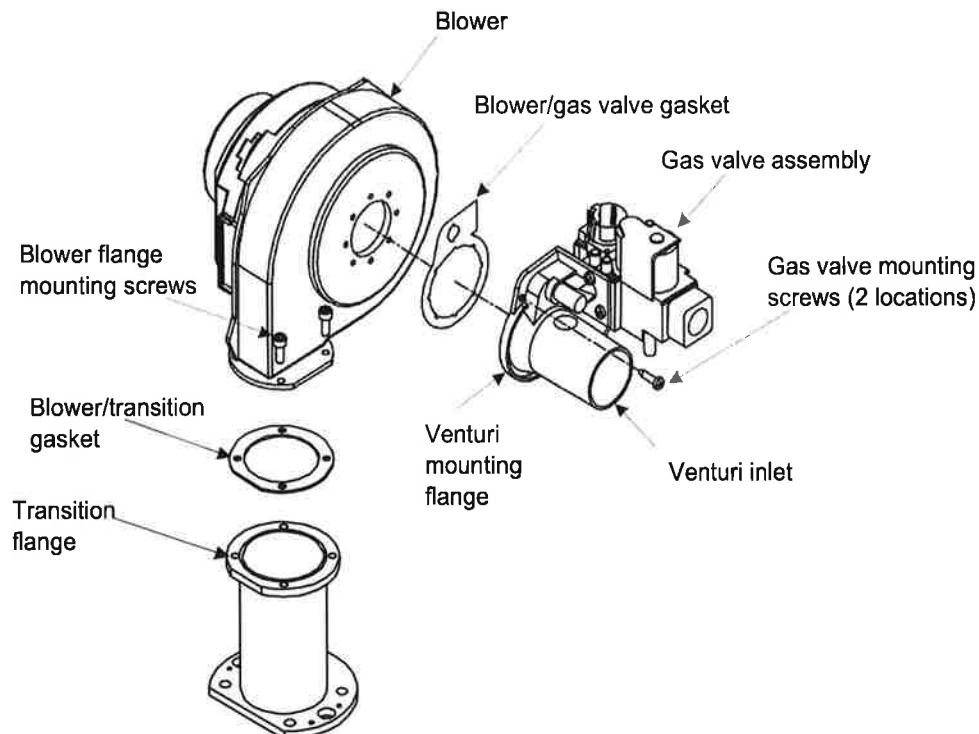
Blower Testing and Replacement (Continued)

Blower Replacement Procedure

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multi-meter.

1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120 volt power source.
3. Turn OFF gas supply to water heater.
4. Unlatch and remove surround cover from top of heater.
5. Disconnect wire harness from blower.
6. Disconnect intake vent and gas supply from gas valve assembly.
7. Remove the two gas valve mounting screws (Torx bit) located on the venturi mounting flange.
8. Remove the four blower flange mounting screws (5/32 Allen wrench) and remove blower from transition flange.
9. Remove any residual gasket material from venturi mounting flange and transition flange.
10. Install new blower with new gasket provided. Secure blower in place using screws from step 8.
11. Reconnect gas valve assembly to blower with new gasket provided. Secure gas valve in place using screws from step 7.
11. Reconnect intake vent and gas line to gas valve assembly and check for gas leaks; repair any leaks found.
13. Reconnect wire harness to blower assembly. Restore 120 volt power supply and gas supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instructions located in the Installation and Operating Instruction Manual.
14. Replace the surround cover on the top of the water heater.



Service Procedure VI

Blocked Vent Pressure Switch Testing and Replacement

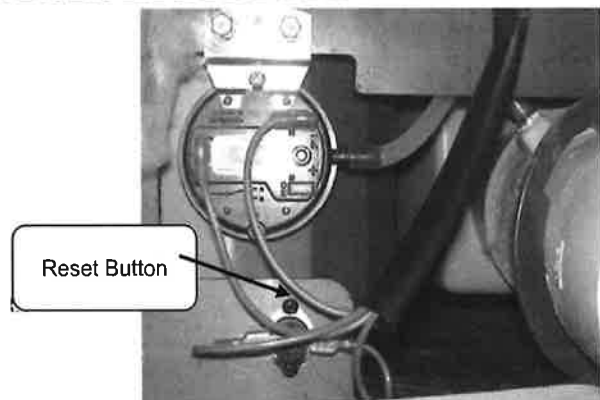
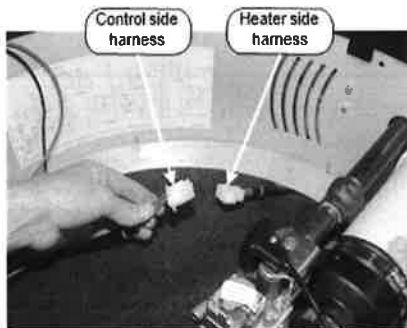
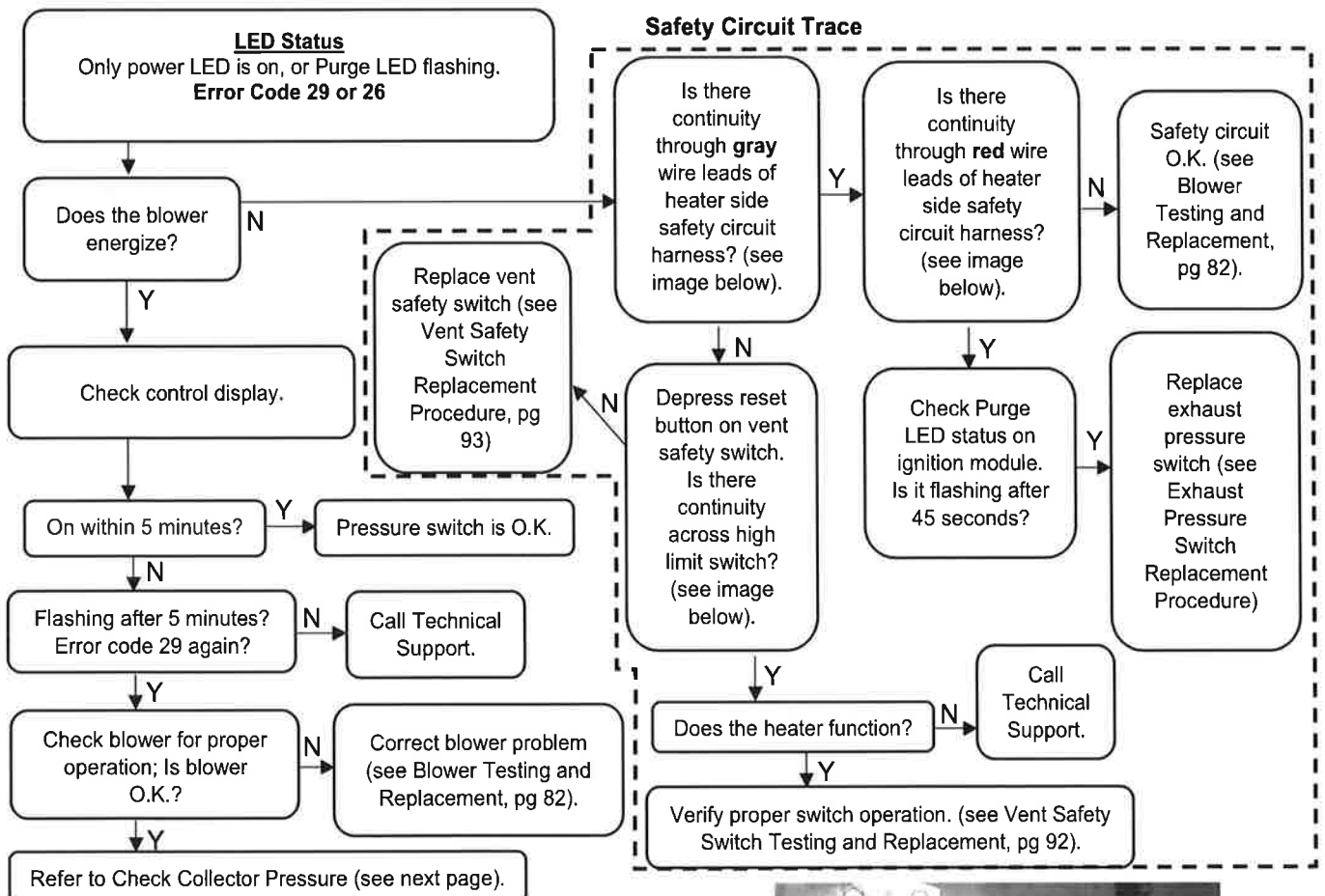
⚠ WARNING

120 volt potential exposure. Use caution making voltage checks to avoid personal injury.

⚠ WARNING

Make sure exhaust collector compartment is not overheating (350°F) before resetting vent safety switch. If there is evidence the collector compartment is overheating, call Technical Support.

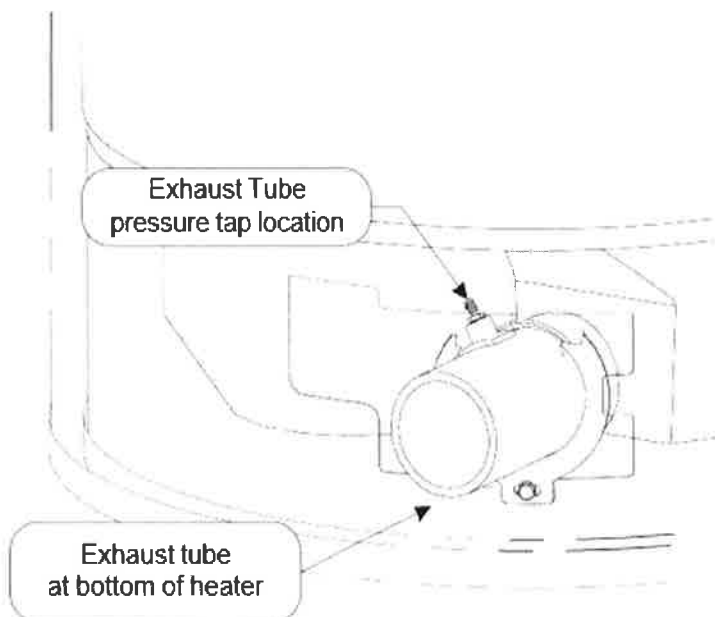
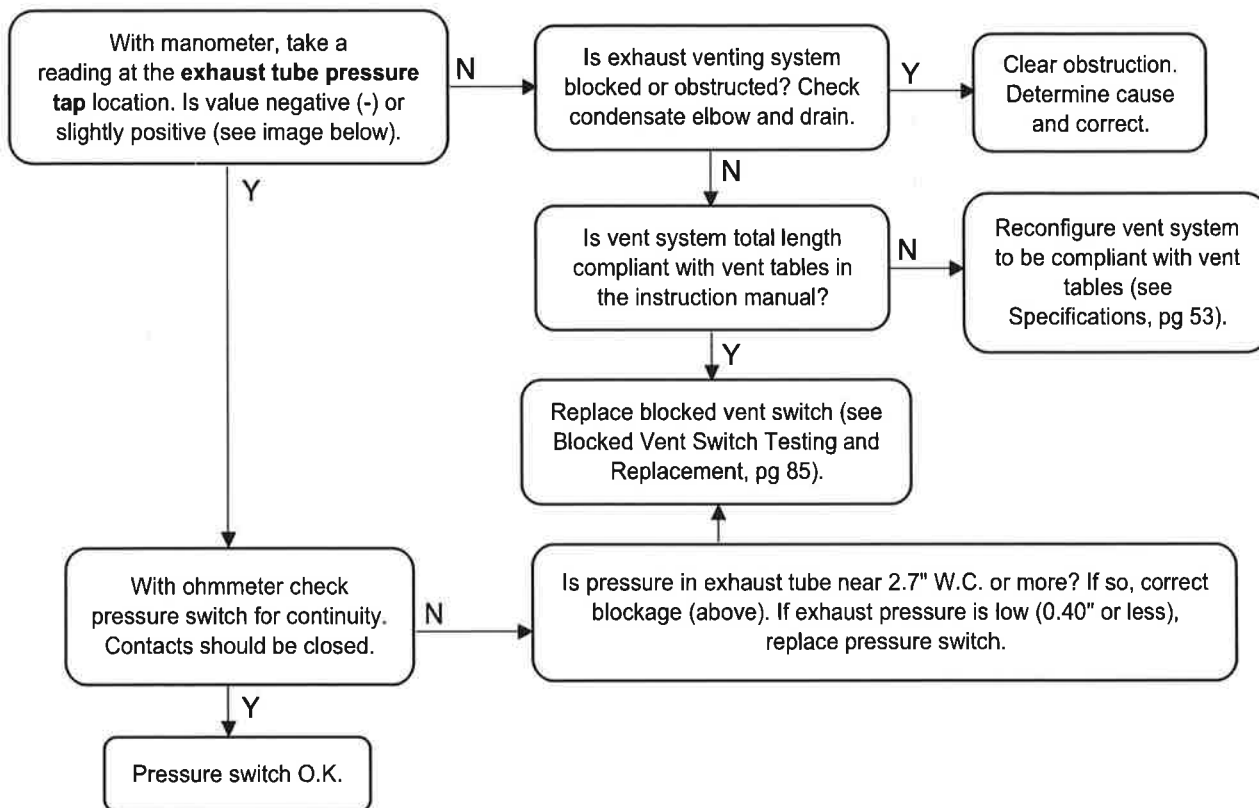
Sequence of Operation: The blocked vent pressure switch monitors the pressure in the exhaust tube. The switch contacts are normally closed and will not open unless there is a blockage in the exhaust venting or terminal (snow, ice, debris). If the blocked vent pressure switch contacts open after the thermostat initiates the blower, the blower will remain on for up to 5 minutes waiting for the contacts to close. If the contacts remain open, the blower will stop, and error code 29 will display.



Service Procedure VI

Blocked Vent Pressure Switch Testing and Replacement (Continued)

Check Exhaust Tube Pressure

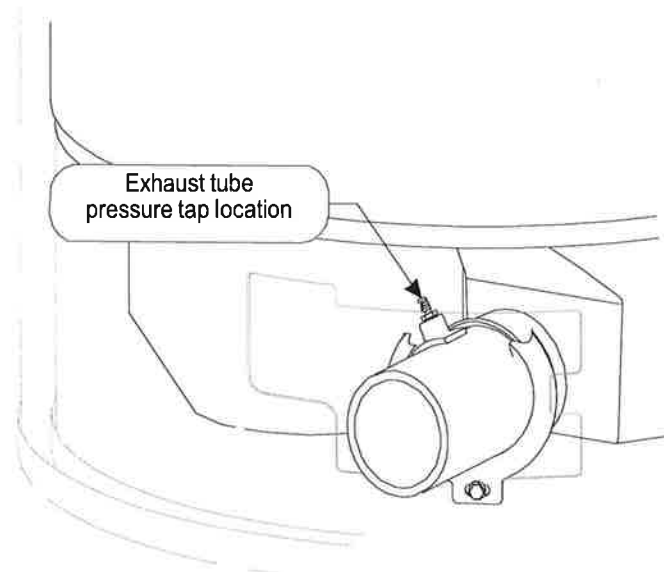
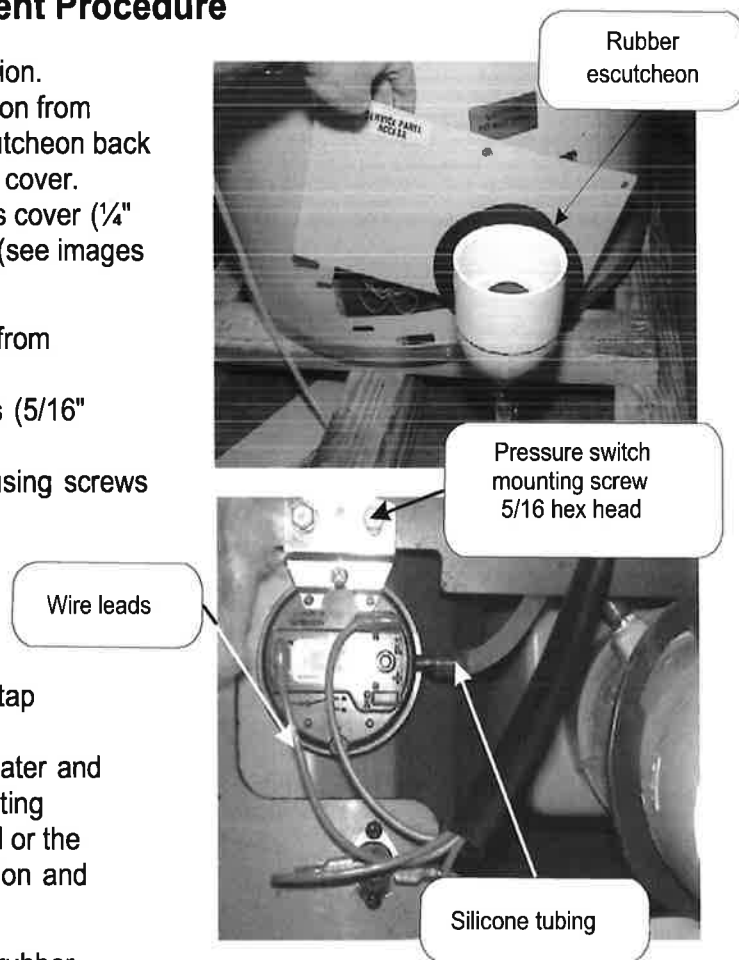


Service Procedure VI

Blocked Vent Pressure Switch Testing and Replacement (Continued)

Exhaust Pressure Switch Replacement Procedure

1. Position main power switch to "OFF" position.
2. Loosen adhesive backed rubber escutcheon from service panel access cover and slide escutcheon back along exhaust pipe to allow for removal of cover.
3. Remove screws from service panel access cover ($\frac{1}{4}$ " nut driver) and remove cover from heater (see images at right).
4. Disconnect silicone tubing and wire leads from pressure switch (see images at right).
5. Remove pressure switch mounting screws ($\frac{5}{16}$ " wrench) and remove pressure switch.
6. Assemble new pressure switch to heater using screws from Step 5.
7. Reconnect wire leads. **Note:** Wire leads are interchangeable with either terminal.
8. Reconnect silicone tubing to pressure switch as follows:
 - a. Exhaust pipe tubing connects to single tap located on switch.
9. Restore 120 volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instructions located in the Installation and Operating Instruction Manual.
10. Reinstall service panel access cover and rubber escutcheon.



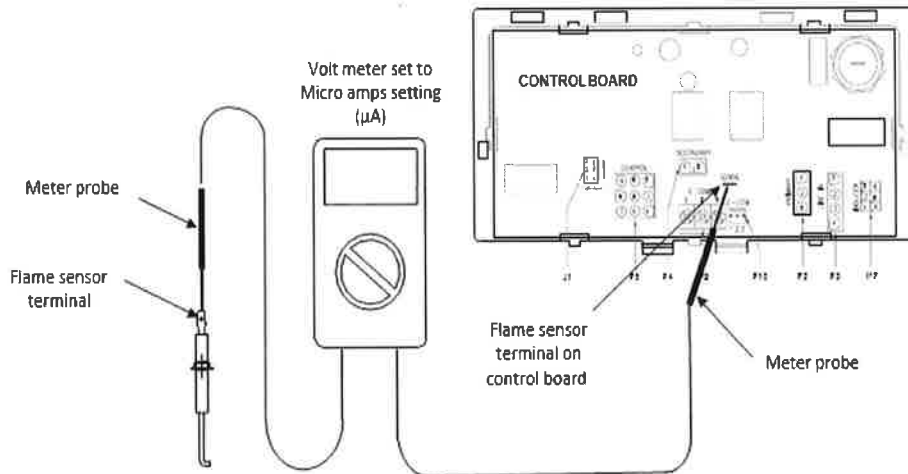
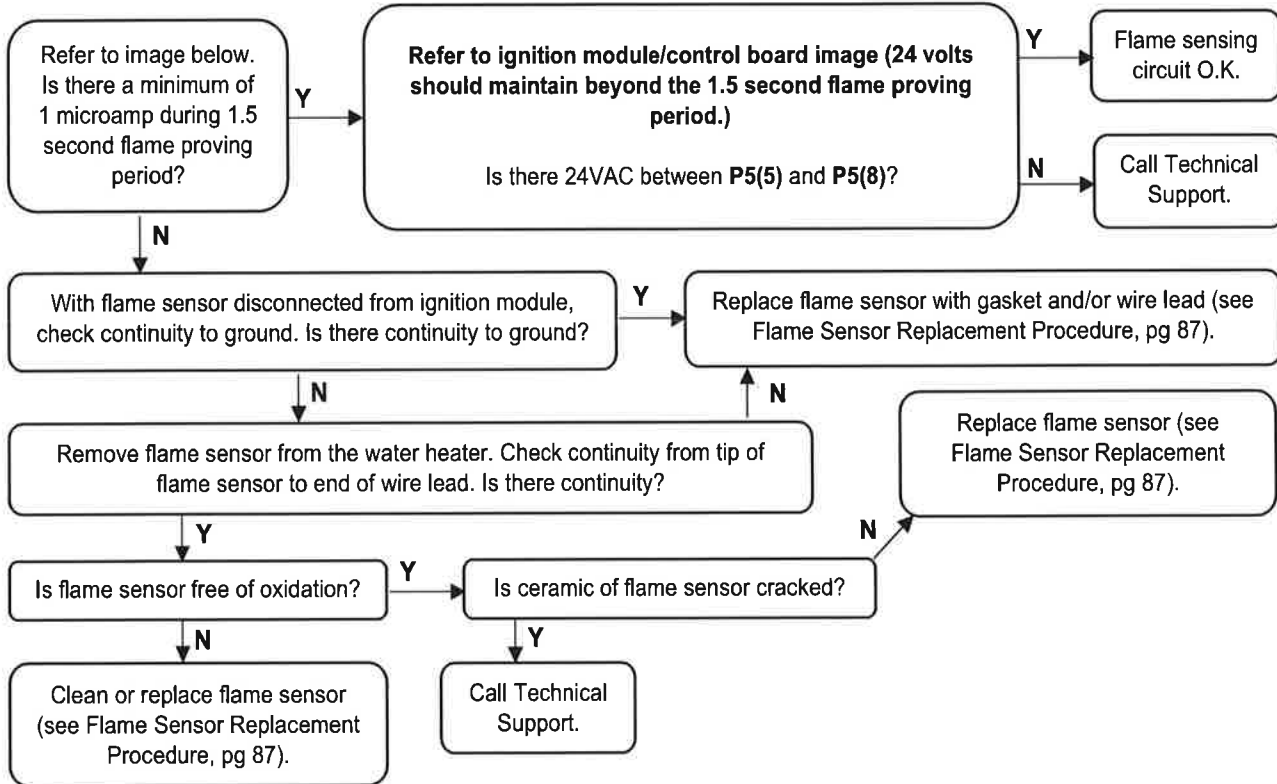
Service Procedure VII

Flame Sensor Testing and Replacement

⚠ WARNING

120 volt potential exposure. Use caution making voltage checks to avoid personal injury. Flame sensor may be too hot to handle, take necessary precautions.

Flame Sensor Testing Procedure



Service Procedure VII

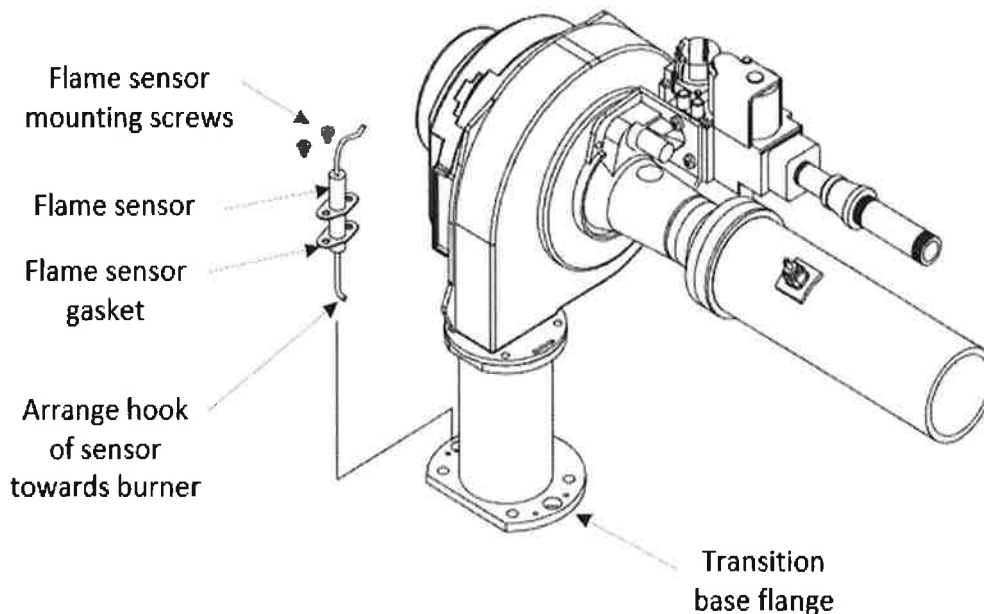
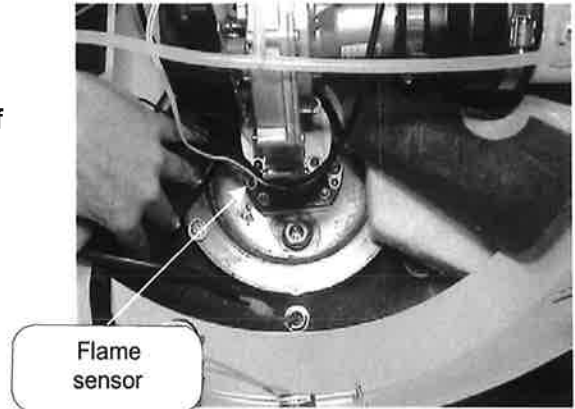
Flame Sensor Testing and Replacement (Continued)

Flame Sensor Replacement Procedure

1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120 volt power source.
3. Unlatch and remove the surround cover from the top of the water heater.
4. Fold back insulation in front of combustion assembly to expose flame sensor (see image at right).
5. Disconnect the wire lead from the flame sensor.
6. Remove the two sensor mounting screws (magnetic tip, long reach Phillips screwdriver) and remove flame sensor and gasket from the transition base flange.
7. Remove any residual gasket material from the transition base flange.
8. Install new flame sensor with new gasket provided using screws from step 6. Arrange the flame sensor with hook towards the burner.
9. Reconnect the flame sensor wire.
10. Fold insulation back into place. Be sure no wires are in contact with the burner flange.
11. Restore 120 volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instructions located in the Installation and Operating Instruction Manual.
12. Replace the surround cover on the top of the water heater.

⚠ WARNING

120 volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multimeter.



Service Procedure VIII

Spark Rod Gap Adjustment and Replacement (Continued)

Spark Rod Gap Inspection and Adjustment

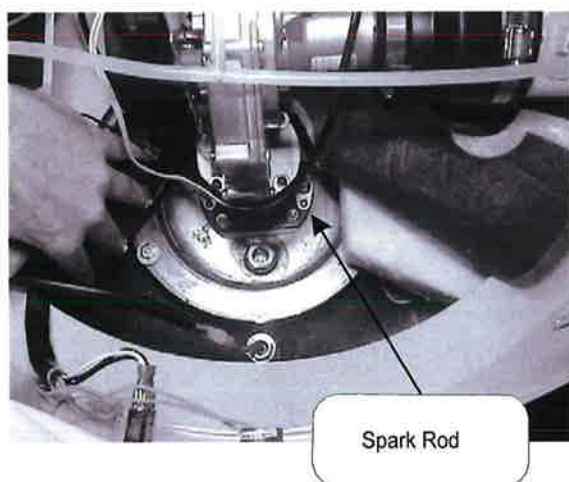
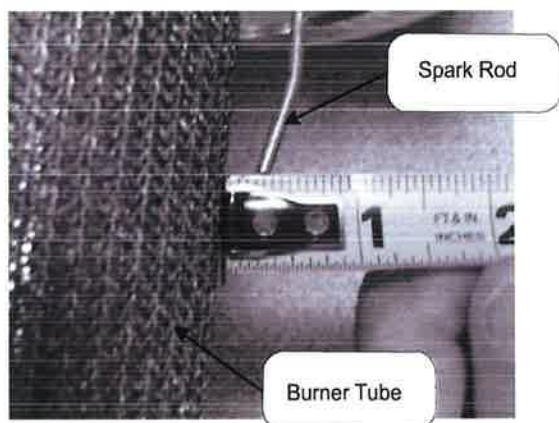
1. Remove combustion system as described in Combustion System Removal Procedure (pg 76).
2. Measure spark gap between the spark rod and burner tube. Acceptable spark gap is between 3/16" - 1/4" (see images below).
3. If spark gap is not between 3/16" - 1/4", the spark rod may be carefully bent by supporting the end near the ceramic insulator with pliers and bending the end near the burner tube with needle nose pliers (see image below).
4. Ensure and verify spark gap is between 3/16" - 1/4" after bending.
5. Reinstall the combustion system per Combustion System Replacement Procedure (pg 77) and check several ignitions to ensure the burner lights smoothly.

⚠ WARNING

Spark gap must be set to 3/16" to 1/4". Failure to set and verify proper spark gap may result in a delayed ignition resulting in damage to the water heater.

⚠ CAUTION

Use caution while performing these steps to prevent stressing or cracking the ceramic insulator.



Service Procedure VIII

Spark Rod Gap Adjustment and Replacement (Continued)

Spark Rod Replacement Procedure

1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120-volt power source.
3. Unlatch and remove the surround cover from the top of the water heater.
4. Fold back insulation in front of combustion assembly to expose spark rod (see image at right).
5. Disconnect the wire lead from the spark rod.
6. Remove the 2 mounting screws (magnetic tip, long reach Phillips screwdriver) and remove spark rod and gasket from the transition base flange.
7. Remove any residual gasket material from transition base flange.
8. Install new spark rod with new gasket provided using screws from step 6. Arrange spark rod with hook towards burner (off-center mounting hole towards the front of the water heater).
9. Remove combustion system following Combustion System Removal Procedure (pg 76) and verify spark gap following Spark Rod Gap Adjustment and Replacement (pg 88).
10. Reassemble combustion system following Combustion System Replacement Procedure (pg. 77).
11. Fold insulation back into place. Be sure no wires are in contact with burner flange.
12. Restore 120-volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instructions located in the Installation and Operating Instruction Manual.
13. Replace the surround cover on the top of the water heater.

⚠ WARNING

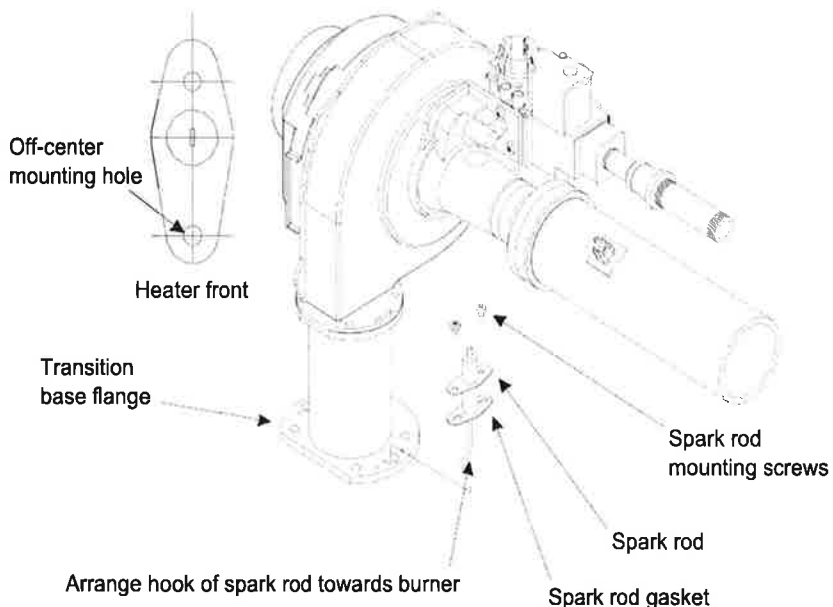
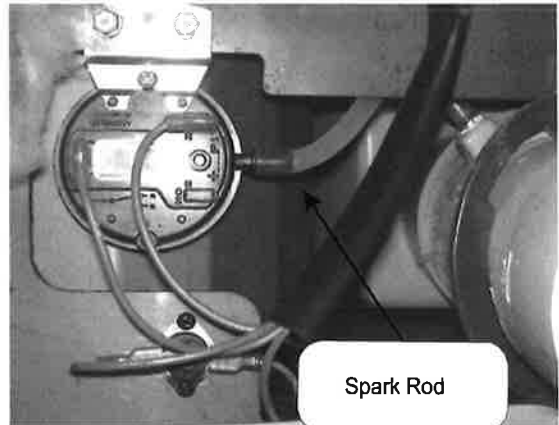
120-volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multimeter.

⚠ CAUTION

If spark rod is replaced for any reason, the combustion system **MUST** be removed and the spark gap to the burner measured and adjusted properly.

⚠ WARNING

Spark gap must be set to 3/16" to 1/4". Failure to set and verify proper spark gap may result in a delayed ignition resulting in damage to the water heater.



Service Procedure IX

Ignition Module/Control Board Replacement

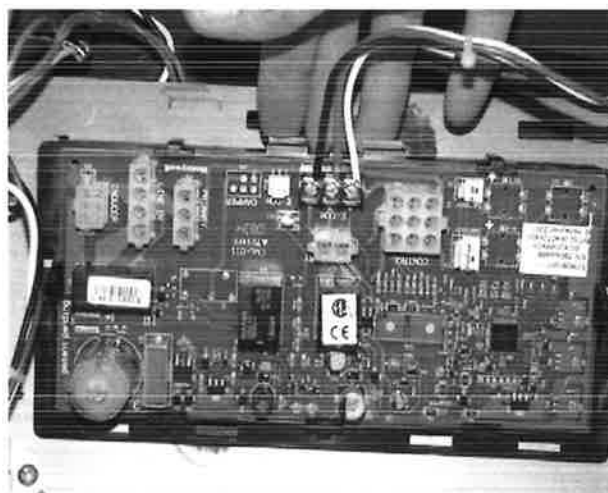
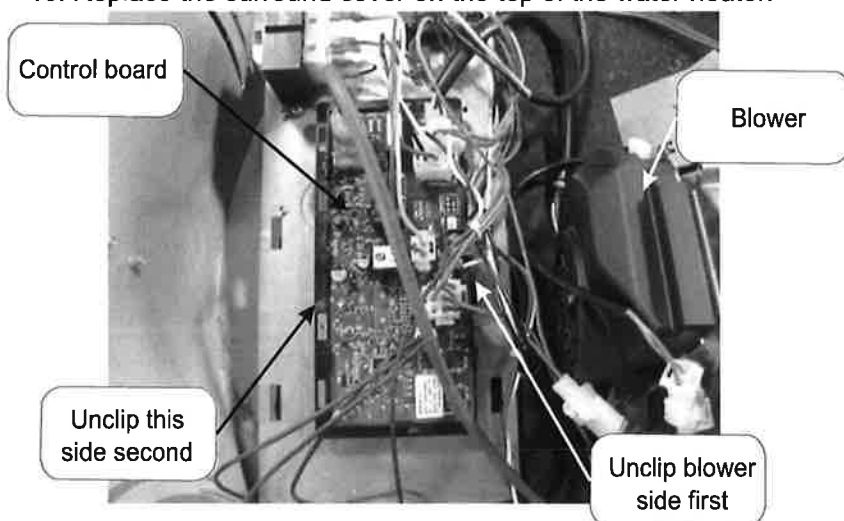
Control Board Replacement

(Integrated Control w/ Direct Spark Ignition)

⚠ WARNING

120-volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multimeter.

1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120-volt power source.
3. Unlatch and remove surround cover from the top of the water heater.
4. Locate the control board.
5. Carefully disconnect all wire connections from the control board.
Note: It may be necessary to identify wires for proper reconnection.
6. Depress the plastic tabs on the blower side of the control board first.
7. Tilt the control panel and slide control hook tabs from slots in the control panel (see image below).
8. Replace the control board and all wire connections.
9. Restore 120-volt power supply to the water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instructions located in the Installation and Operating Manual.
10. Replace the surround cover on the top of the water heater.



Service Procedure X

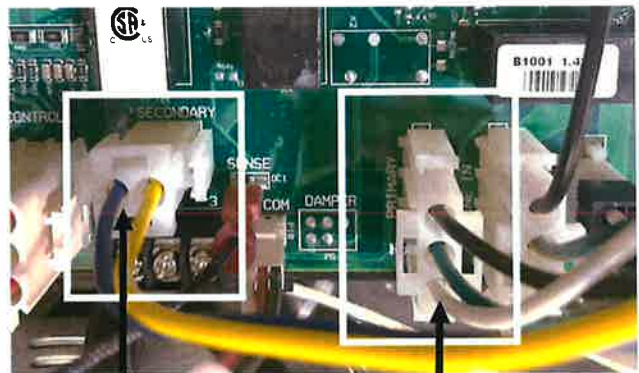
Transformer Replacement

⚠ WARNING

120-volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multimeter.

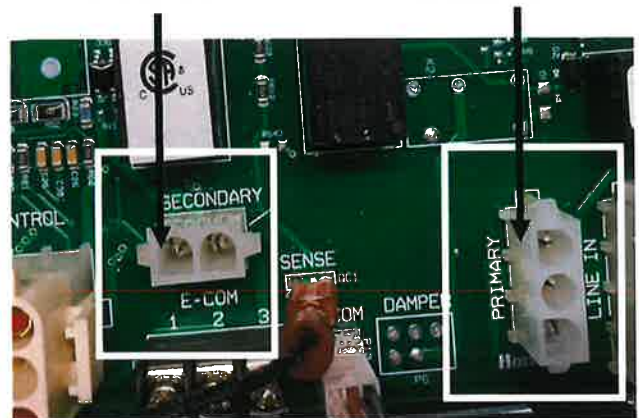
Transformer Replacement Procedure

1. Position main power switch to OFF.
2. Disconnect (unplug) water heater from 120-volt power source.
3. Unlatch and remove the surround cover from the top of the water heater.
4. Disconnect primary leads (**black & white**) and secondary leads (**blue & yellow**) from the control board (connectors are different sizes to prevent interchanging).
5. Remove the 2 screws (short Phillips screwdriver) holding the transformer in place and remove transformer from control panel (see image at right).
6. Install new transformer and secure in place with screws from Step 5.
7. Reconnect primary and secondary wires to the board (controls are different sizes to prevent interchanging).
8. Restore 120-volt power supply to the water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instructions located in the Installation and Operating Manual.
9. Replace the surround cover on the top of the water heater.

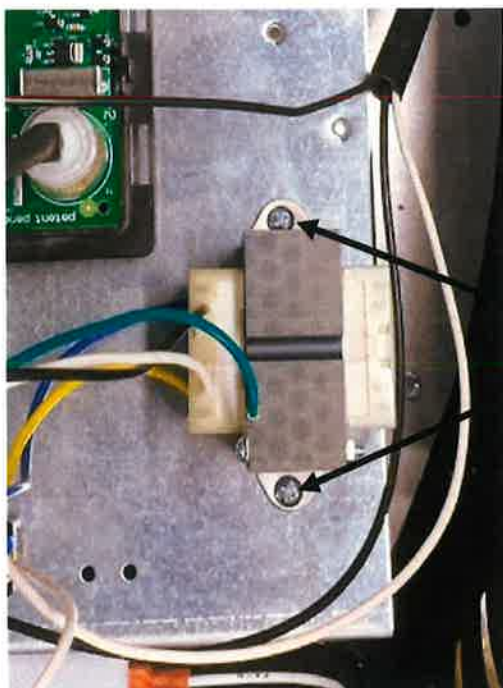


Secondary Lead Wires and connector

Primary Lead Wires and connector



Remove Screws



Service Procedure XI

Vent Safety Switch Testing and Replacement

⚠ WARNING

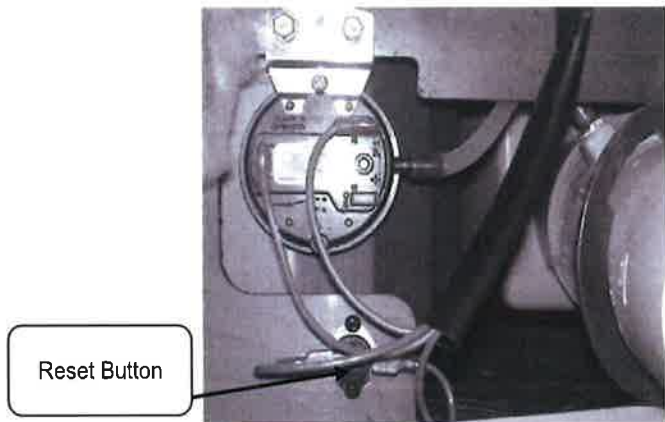
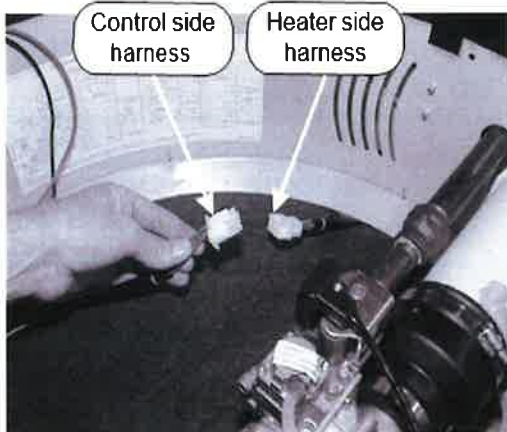
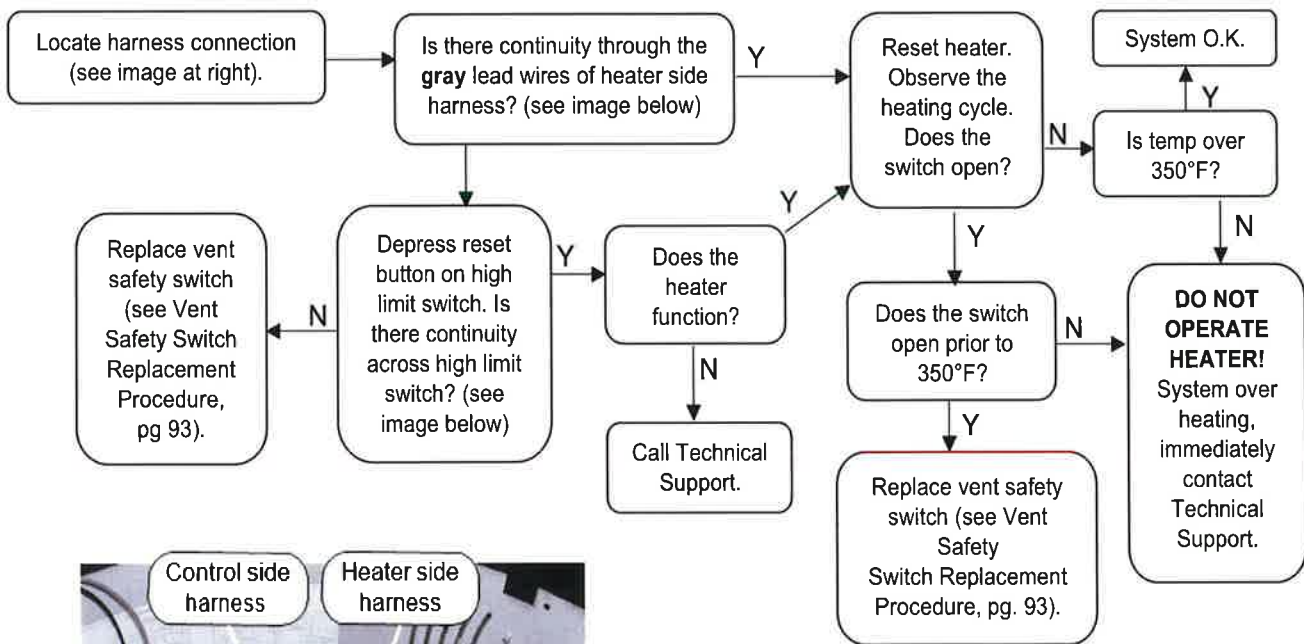
120-volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multimeter.

⚠ WARNING

Make sure the exhaust collector compartment is not overheating (350°F) before resetting vent safety switch. If there is evidence the collector compartment is overheating, call Technical Support.

Sequence of Operation

Error code 26 will display indicating an open circuit for the vent safety switch. Determine if temperature has reached 350°F before resetting switch and restoring operation. If evidence of extreme temperature is present, call Technical Support.



Service Procedure XI

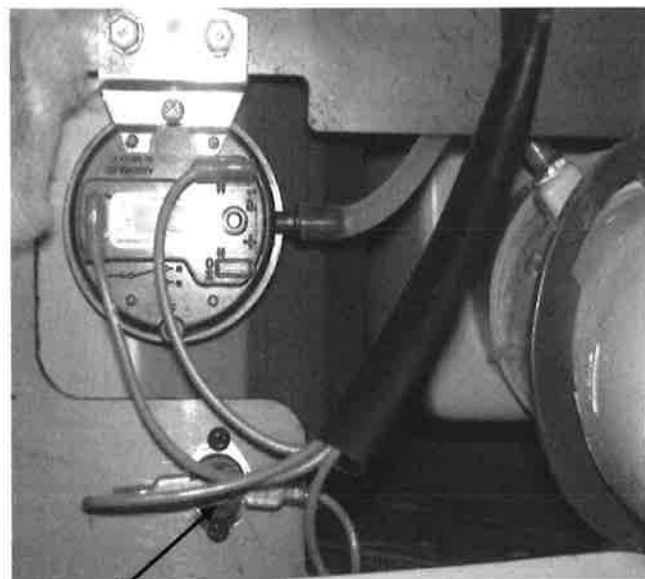
Vent Safety Switch Testing and Replacement (Continued)

Vent Safety Switch Replacement Procedure

⚠ WARNING

120-volt potential exposure. Isolate the appliance and reconfirm power is disconnected using a multimeter.

1. Position main power switch to OFF.
2. Loosen the adhesive backed rubber escutcheon from the service panel access cover and slide the escutcheon back along the exhaust pipe to allow for removal of cover (see photos below).
3. Remove the screws from service panel access cover (1/4" nut driver) and remove the cover from the water heater (see images below)
4. Disconnect the wire leads from the vent safety switch (see image below).
5. Remove the 2 switch mounting screws (Phillips screwdriver) and nuts (5/16 wrench) and remove the switch from the water heater.
6. Install new switch using the screws from step 5.
7. Reconnect the wire leads.
Note: Wire leads are interchangeable with either switch terminal.
8. Restore 120-volt power supply to water heater and confirm proper operation following the lighting instructions on the lighting instruction label or the lighting instruction located in the Installation and Operating Instruction Manual.
9. Reinstall the service panel access cover and the rubber escutcheon.



Service Procedure XII

Flue Baffle Inspection and Replacement

⚠ WARNING

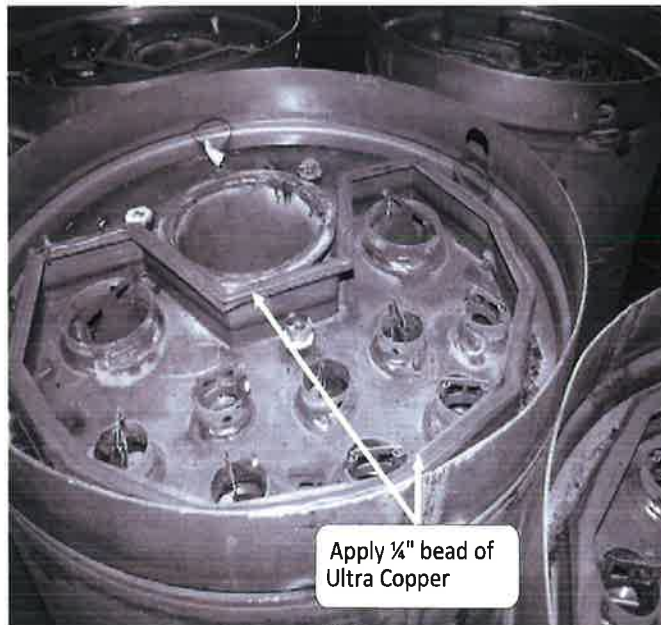
Heater components may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.

Flue Baffle Inspection and Replacement

1. Disassemble heater per Disassembly Procedure for Access to Anodes and Flue Baffles.
2. Remove flue baffles from heater using pliers (8 two inch (2") baffles & 2 four inch (4") baffles).
3. Visually inspect flue baffles. Flue baffles should show signs of oxidation, this is normal. If the oxidation has deteriorated any portion of the flue baffle, replacement is recommended. If any restrictors are missing, replacement is recommended.
4. Upon completion of inspection or subsequent replacement, reinstall flue baffles into heater.
5. Reinstall collector cover per Collector Cover Installation Procedure.
6. Reinstall collector insulation and control panel, reconnect control panel wire harnesses.
7. Restore 120 volts to water heater and verify proper heater operation following the instructions on the lighting instruction label or the lighting instruction located in the Installation and Operating Instruction Manual.
8. Replace the surround cover on the top of the water heater.

Collector Cover Installation Procedure

1. Remove old silicone from top surface of collector flange and collector cover.
2. Apply ¼" bead of Ultra Copper Silicone around entire collector flange surface. Allow caulk to "cure" for 10 minutes.
3. Carefully reinstall collector cover, tighten screws evenly.
4. Allow a minimum of 6 hours before putting heater back in service.



Service Procedure XIII

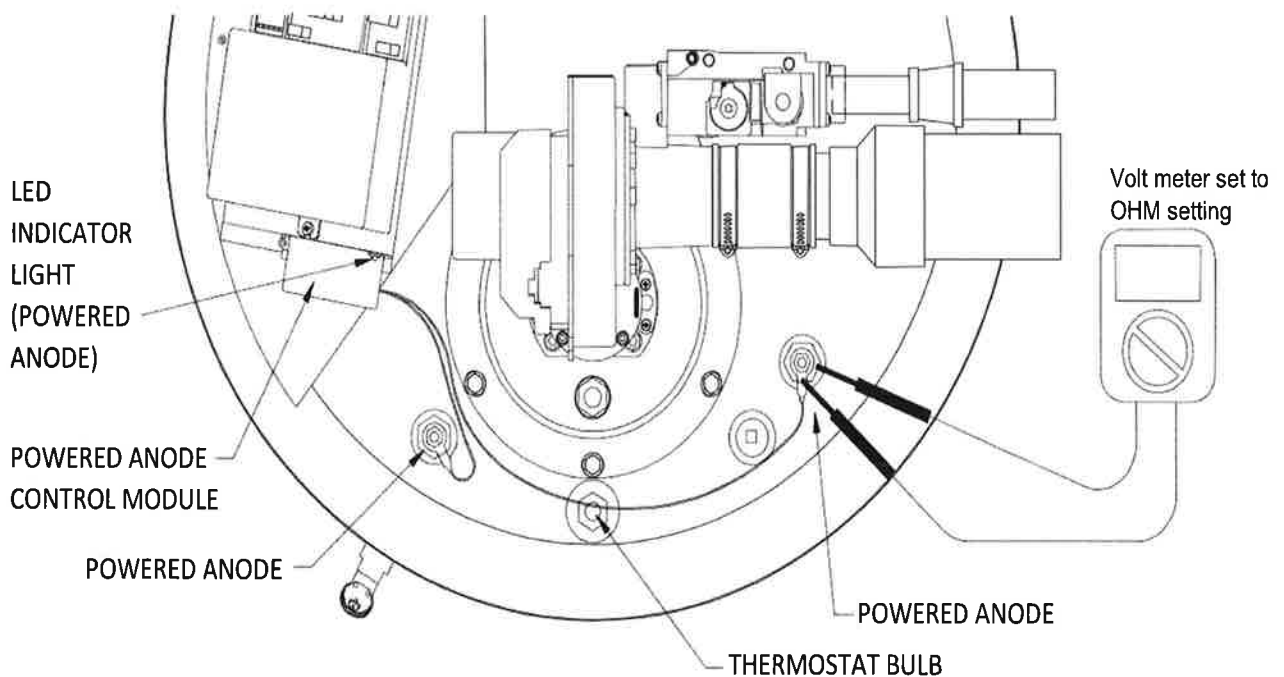
Powered Anode Replacement

⚠ WARNING!

Water heater components may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.

The powered anode control module is located on the vertical side of the control panel inside the surround panel. The control has a LED indicator light to show the status of operation. When the tank is filled with water and the power supply is on the water heater, the light should have a steady green glow to indicate that protection current is flowing and operating normally. If the indicator light is not glowing, the power supply to the water heater or powered anode system is disconnected.

1. Check the power supply or wire connections to the powered anode control.
2. Indicator light diagnostic codes:
 - a. If the control is flashing red, then there is a malfunction with the powered anode system. Make sure there are no bare spots in the wire insulation to the powered anode rods.
3. Check all electrical connections. The powered anode rods are insulated from the water heater tank in the bushing.
 - a. With an ohmmeter, check continuity between the powered anode terminal and the bushing. There should not be continuity. If there is continuity, replace the powered anode assembly.





United States

Sales 800-523-2931

Technical Support 800-334-3393

Email techserv@bradfordwhite.com

Warranty 800-531-2111

Email warranty@bradfordwhite.com

Service Parts 800-538-2020

Email parts@bradfordwhite.com

Canada

Sales & Technical Support 866-690-0961 905-203-0600

Fax 905-636-0666

Warranty bwccwarranty@bradfordwhite.com

Technical Support bwccotech@bradfordwhite.com

Service Parts orders@bradfordwhitecanada.com

Orders ca.orders@bradfordwhite.com

For U.S. and Canada field service,
contact your professional installer or
local Bradford White sales representative.

International

General Contact international@bradfordwhite.com



COMMERCIAL GAS REPLACEMENT PARTS LIST

High Efficiency Commercial Gas Models



Models Covered:

Models Covered:

PAGE #3 SECTION 1: SERIAL NUMBERS

“XC-” (MAR. 2021) AND LATER:

EF60T125(E)*(N,X)(A)(2)

EF60T150(E)*(N,X)(A)(2)

EF60T199(E)*(N,X)(A)(2)

EF100T150(E)*(N,X)(A)(2)

EF100T199(E)*(N,X)(A)(2)

EF100T250(E)*(N,X)(A)(2)

EF100T300(E)*(N,X)(A)(2)

(*) Denotes Warranty Years

PAGE #13 SECTION 2: SERIAL NUMBERS

“XL-” (NOV. 2021) AND LATER

W/ -895 DESIGNATOR:

EF60T125(E)*(N,X)(A)(2)

EF60T150(E)*(N,X)(A)(2)

EF60T199(E)*(N,X)(A)(2)

EF100T150(E)*(N,X)(A)(2)

EF100T199(E)*(N,X)(A)(2)

(*) Denotes Warranty Years

Effective: November, 2022

ECO 8562

NOTE: BOTH MODEL AND SERIAL NUMBERS ARE REQUIRED FOR ORDERING REPLACEMENT PARTS

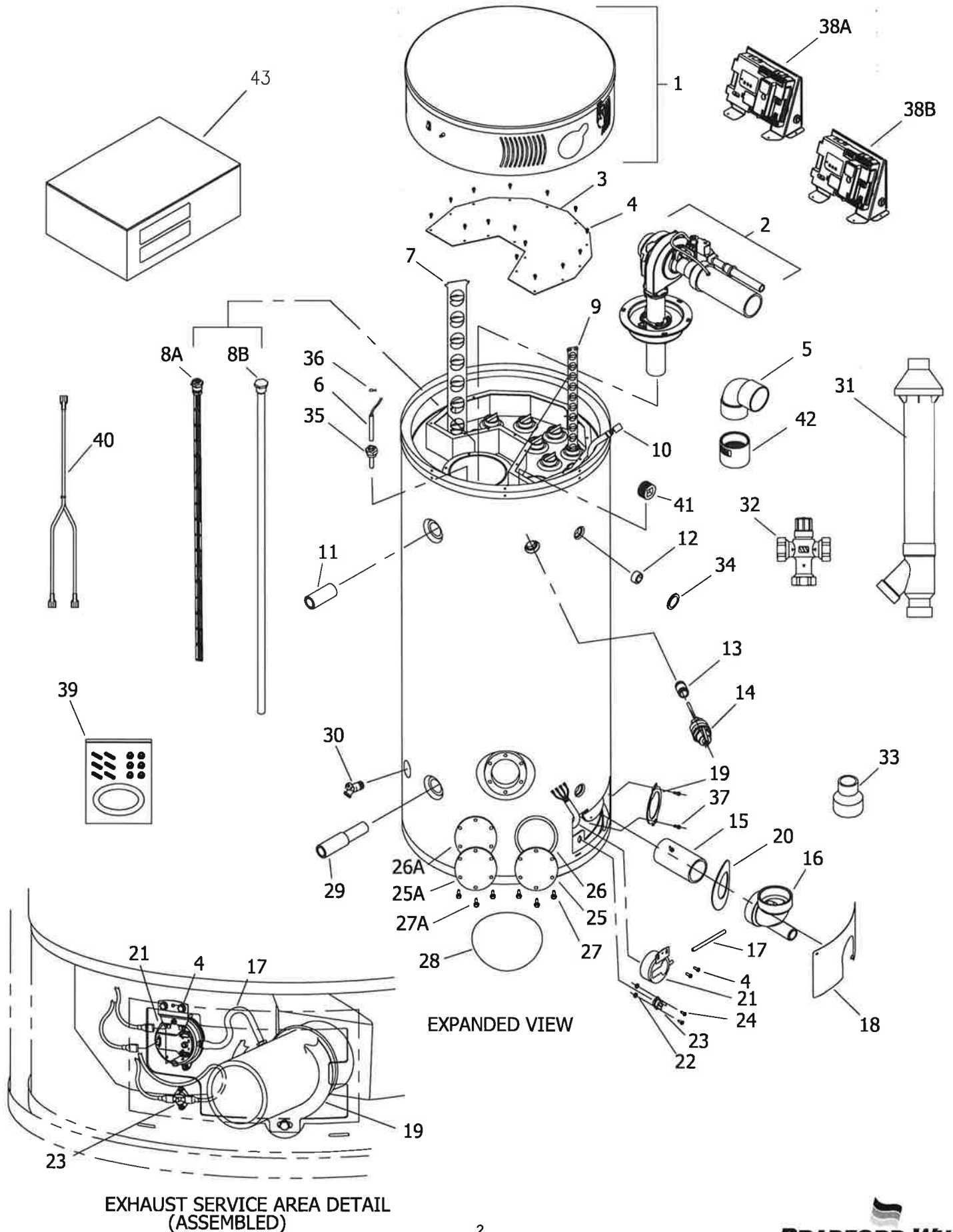
Dimensions and specifications subject to change without notice.



As required by the state of California Proposition 65.

SECTION 1: Serial Numbers "XC-" (March 2021) and Later

APPLIES TO PAGES: 2 THROUGH 13



SECTION 1: Serial Numbers "XC-" (March 2021) and Later
APPLIES TO PAGES: 2 THROUGH 13

Item Description	Model	Model	Model
1 Combustion Surround Assembly	EF60T125(E)(N,X)(A)2	EF60T150(E)(N,X)(A)2	EF60T199(E)(N,X)(A)2
2 Combustion System Assembly	243-54046-01	243-54046-01	243-54046-01
3 Collector Cover Second Pass	See Page 6	See Page 6	See Page 6
4 Screw 10-16 x 3/4	239-52975-00	239-52975-00	239-52975-00
5 Elbow-Vent Terminal (2 Req'd)	239-44444-00	239-44444-00	239-44444-00
6 Temperature Sensor	415-40579-00	415-40579-00	415-40579-00
7 Baffle 4" Flue (2 Req'd)	415-46553-02	415-46553-02	415-46553-02
8a Anode Rod (Powered) (2 Req'd) (If Applicable)	243-43304-00	243-43304-00	243-43304-00
8b Magnesium Anode Rod	224-53839-00	224-53839-00	224-53839-00
9 Baffle 2" Flue (8 Req'd)	415-47782-12	415-47782-12	415-47782-12
10 Wire Harness-Service Panel	239-45659-00	239-45659-00	239-45659-00
11 Nipple Hot Water Outlet Plastisert. (Front Connect)	239-43358-02	239-43358-02	239-43358-02
12 Pipe Plug 1" NPT	229-40913-07	229-40913-07	229-40913-07
13 Nipple Plastisert T&P	239-02048-00	239-02048-00	239-02048-00
14 T&P Relief Valve	229-32762-02	229-32762-02	229-32762-02
15 Exhaust Vent Pipe	415-30246-00	415-30246-00	415-30246-00
16 Condensate Elbow	239-45971-00	239-45971-00	239-45971-00
17 Silicone Tubing 3/16" I.D.	415-43211-00	415-43211-00	415-43211-00
18 Outer Door Service Panel	239-41718-00	239-41718-00	239-41718-00
19 Bracket Exhaust Support	243-44668-00	243-44668-00	243-44668-00
20 Escutcheon-Exhaust Pipe (EF Series)	239-44667-00	239-44667-00	239-44667-00
21 Exhaust Pressure Switch	239-43997-00	239-43997-00	239-43997-00
22 Keps Nut (2 Req'd)	415-46037-01	415-46037-01	415-46037-01
23 Hi-Limit Switch	239-81844-00	239-81844-00	239-81844-00
24 Screw 6-32 x 3/8 (2 Req'd)	415-43238-02	415-43238-02	415-43238-02
25 Cleanout Cover	239-81843-00	239-81843-00	239-81843-00
25A Cleanout Cover (ASME)	205-18428-00	205-18428-00	205-18428-00
26 Cleanout Gasket	205-32941-00	205-32941-00	205-32941-00
26A Cleanout Gasket (ASME)	205-18427-00	205-18427-00	205-18427-00
27 Screw 5/16 - 18 x 1/2	205-32942-00	205-32942-00	205-32942-00
27A Screw 5/16 - 18 x 1/2 (ASME) (6 Req'd)	239-82166-00	239-82166-00	239-82166-00
28 Clean Out Access Cover	239-32970-00	239-32970-00	239-32970-00
29 Dip Tube w/ Nipple Hydrojet (Front Connect)	243-20299-00	243-20299-00	243-20299-00
30 Drain Valve Brass (No Handle)	415-44375-00	415-44375-00	415-44375-00
31 Coaxial Vent Pipe with Terminal (Optional)	415-42351-02	415-42351-02	415-42351-02
32 Approved Mixing Valve (Optional)	415-44069-01	415-44069-01	415-44069-01
33 Reducer 3" x 2"	239-51778-00	239-51778-00	239-51778-00
34 Hole Closure	---	---	---
35 Sensor Well	239-31547-02	239-31547-02	239-31547-02
36 Clip Thermostat	233-46558-01	233-46558-01	233-46558-01
37 Screw 1/4-20 x 5/8 Hex Washer (2 Req'd)	233-45242-00	233-45242-00	233-45242-00
38A ICON Control Box and Wiring (Powered Anodes)	239-42637-00	239-42637-00	239-42637-00
38B ICON Control Box and Wiring (Magnesium Anodes)	243-54158-00	243-54158-00	243-54158-00
39 Kit-Cleanout (Not For Use With ASME Tanks)	243-55242-00	243-55242-00	243-55242-00
40 Power Anode Harness	415-54256-00	415-54256-00	415-54256-00
41 Plug-3/4" NPT X Square Socket	239-46070-00	239-46070-00	239-46070-00
42 Coupling-Vent Terminal	239-11638-00	239-11638-00	239-11638-00
43 BMS Gateway Kit (Optional)	239-46740-00	239-46740-00	239-46740-00
	415-53943-00	415-53943-00	415-53943-00

* Applies to all warranties

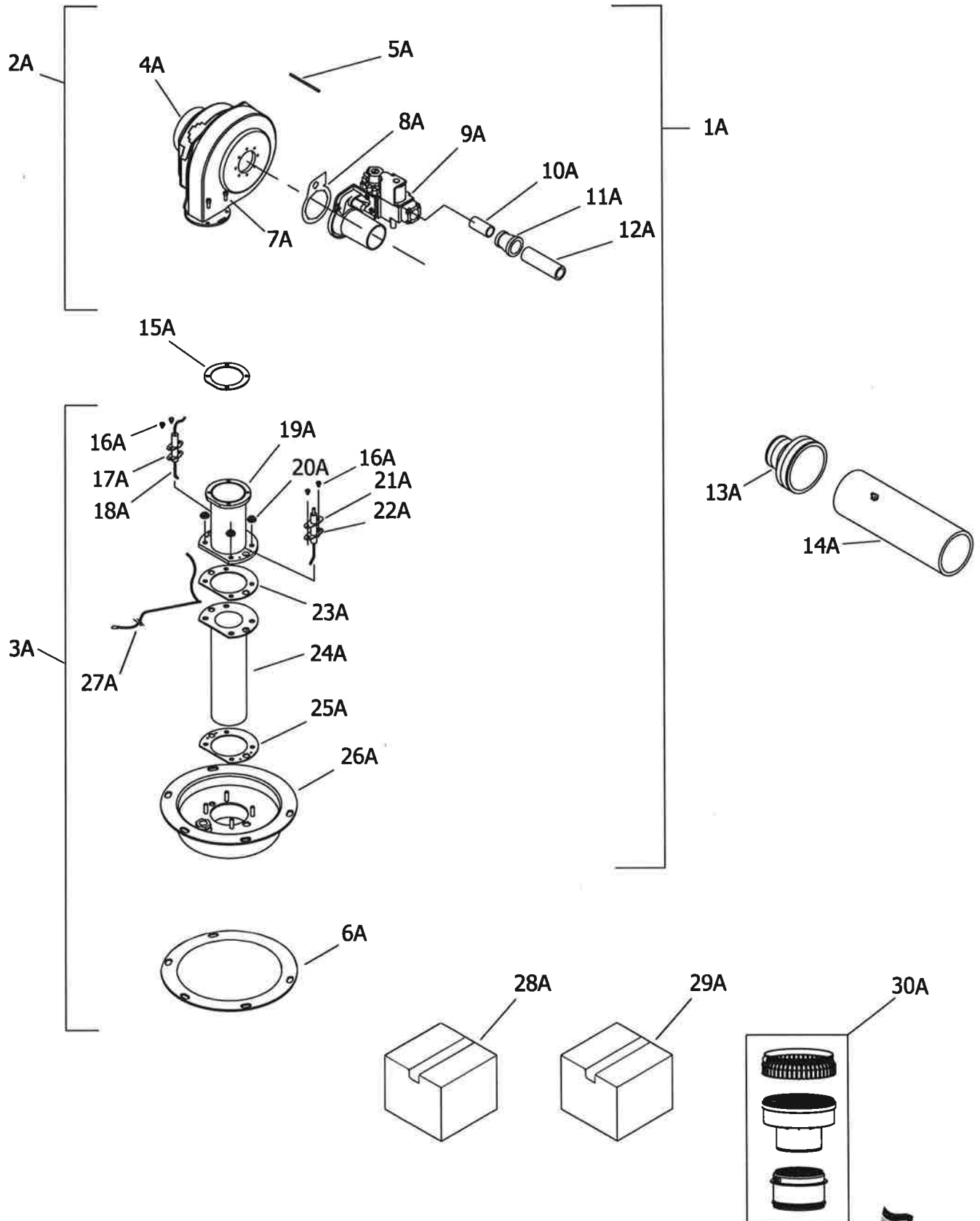
SECTION 1: Serial Numbers "XC-" (March 2021) and Later
 APPLIES TO PAGES: 2 THROUGH 13

Item Description	Model EF100T150(E)*N,X(A)2	Model EF100T199(E)*N,X(A)2	Model EF100T250(E)*N,X(A)2	Model EF100T300(E)*N,X(A)2
1 Combustion Surround Assembly	243-54046-01	243-54046-01	243-54046-01	243-54046-01
2 Combustion System Assembly	See Page 7	See Page 7	See Page 7	See Page 7
3 Collector Cover Second Pass	239-52975-00	239-52975-00	239-52975-00	239-52975-00
4 Screw 10-16 x 3/4	239-44444-00	239-44444-00	239-44444-00	239-44444-00
5 Elbow-Vent Terminal (2 Req'd)	---	---	---	---
6 Temperature Sensor	415-46553-02	415-46553-02	415-46553-02	415-46553-02
7 Baffle 4" Flue (2 Req'd)	---	243-43304-00	243-43304-00	243-43304-00
8a Anode Rod (Powered) (2 Req'd) (If Applicable)	224-53839-00	224-53839-00	224-53839-00	224-53839-00
8b Magnesium Anode Rod	415-47782-12	415-47782-12	415-47782-12	415-47782-12
9 Baffle 2" Flue (8 Req'd)	239-45658-00	239-45658-00	239-45658-00	239-45658-00
10 Wire Harness-Service Panel	239-43358-01	239-43358-01	239-43358-01	239-43358-01
11 Nipple Hot Water Outlet Plastisert (Front Connect)	229-40913-07	229-40913-07	229-40913-07	229-40913-07
12 Pipe Plug 1" NPT	239-02048-00	239-02048-00	239-02048-00	239-02048-00
13 Nipple Plastisert, T&P	229-32762-02	229-32762-02	229-80982-00	229-80982-00
14 T&P Relief Valve	415-30246-00	415-30246-00	415-33630-04	415-33630-04
15 Exhaust Vent Pipe	239-45971-00	239-45971-00	239-45971-00	239-45971-00
16 Condensate Elbow	415-43211-00	415-43211-00	415-43211-00	415-43211-00
17 Silicone Tubing 3/16" I.D.	239-41718-00	239-41718-00	239-41718-00	239-41718-00
18 Outer Door Service Panel	243-44668-00	243-44668-00	243-44668-00	243-44668-00
19 Bracket Exhaust Support	239-44667-00	239-44667-00	239-44667-00	239-44667-00
20 Escutcheon-Exhaust Pipe (EF Series)	239-43997-00	239-43997-00	239-43997-00	239-43997-00
21 Exhaust Pressure Switch	415-46037-01	415-46037-01	415-46037-01	415-46037-01
22 Keps Nut (2 Req'd)	239-81844-00	239-81844-00	239-81844-00	239-81844-00
23 Hi-Limit Switch	415-43238-02	415-43238-02	415-43238-02	415-43238-02
24 Screw 5-32 x 3/8 (2 Req'd)	239-81843-00	239-81843-00	239-81843-00	239-81843-00
25 Cleanout Cover	205-18428-00	205-18428-00	205-18428-00	205-18428-00
25A Cleanout Cover (ASME)	205-32941-00	205-32941-00	205-32941-00	205-32941-00
26 Cleanout Gasket	205-18427-00	205-18427-00	205-18427-00	205-18427-00
26A Cleanout Gasket (ASME)	205-32942-00	205-32942-00	205-32942-00	205-32942-00
27 Screw 5/16 - 18 x 1/2	239-82166-00	239-82166-00	239-82166-00	239-82166-00
27A Screw 5/16 - 18 x 1/2 (ASME) (6 Req'd)	239-32970-00	239-32970-00	239-32970-00	239-32970-00
28 Clean Out Access Cover	243-20299-00	243-20299-00	243-20299-00	243-20299-00
29 Dip Tube w/ Nipple Hydrojet (Front Connect)	415-44375-00	415-44375-00	415-44375-00	415-44375-00
30 Drain Valve Brass (No Handle)	415-42351-02	415-42351-02	415-42351-02	415-42351-02
31 Coaxial Vent Pipe with Terminal (Optional)	415-44069-01	415-44069-01	415-44069-01	415-44069-01
32 Approved Mixing Valve (Optional)	239-51778-00	239-51778-00	239-51778-00	239-51778-00
33 Reducer 3" x 2"	---	---	---	---
34 Hole Closure	239-31547-02	239-31547-02	239-31547-02	239-31547-02
35 Sensor Well	233-46558-01	233-46558-01	233-46558-01	233-46558-01
36 Clip Thermostat	233-45242-00	233-45242-00	233-45242-00	233-45242-00
37 Screw 1/4-20 x 5/8 Hex Washer (2 Req'd)	239-42637-00	239-42637-00	239-42637-00	239-42637-00
38A ICON Control Box and Wiring (Powered Anodes)	243-54158-00	243-54158-00	243-54158-00	243-54158-00
38B ICON Control Box and Wiring (Magnesium Anodes)	243-55242-00	243-55242-00	243-55242-00	243-55242-00
39 Kit-Cleanout (Not For Use With ASME Tanks)	415-54256-00	415-54256-00	415-54256-00	415-54256-00
40 Power Anode Harness	239-46070-00	239-46070-00	239-46070-00	239-46070-00
41 Plug-3/4" NPT X Square Socket	239-11638-00	239-11638-00	239-11638-00	239-11638-00
42 Coupling-Vent Terminal	239-46740-00	239-46740-00	239-46740-00	239-46740-00
43 BMS Gateway Kit (Optional)	415-53943-00	415-53943-00	415-53943-00	415-53943-00

* Applies to all warranties

SECTION 1: Serial Numbers "XC-" (March 2021) and Later

APPLIES TO PAGES: 2 THROUGH 13



SECTION 1: Serial Numbers "XC-" (March 2021) and Later

APPLIES TO PAGES: 2 THROUGH 13

Item Description	Model EF60T125(E)*(N,X)(A)2	Model EF60T150(E)*(N,X)(A)2	Model EF60T199(E)*(N,X)(A)2
1A Combustion System Assembly (Nat)	265-54043-01	265-54043-02	265-54043-03
Combustion System Assembly (L.P.)	265-54043-08	265-54043-09	265-54043-10
2A Blower and Gas Valve Assembly (Nat)	265-54044-01	265-54044-02	265-54044-03
Blower and Gas Valve Assembly (L.P.)	265-54044-08	265-54044-09	265-54044-10
3A Burner Assembly EF	265-46024-00	265-46024-00	265-46024-00
4A Blower	415-51225-00	415-51225-00	415-48922-00
5A Hose Tubing 3/16" I.D.	239-41718-00	239-41718-00	239-41718-00
6A Burner Mounting Insert Gasket**	239-43197-00	239-43197-00	239-43197-00
7A Screw 10-32 x 3/4 SHCS (4 Req'd)	239-43273-00	239-43273-00	239-43273-00
8A Gasket Venturi to Blower	239-44654-00	239-44654-00	239-44654-00
9A Gas Valve Assembly (Nat)	265-54040-01	265-54040-02	265-54040-03
Gas Valve Assembly (L.P.)	265-54041-01	265-54041-02	265-54041-03
10A Nipple 1/2 NPT X 3"	239-37047-00	239-37047-00	239-37047-00
11A Reducer 3/4 x 1/2 NPT	239-04474-00	239-04474-00	239-04474-00
12A Nipple 3/4 NPT x 7"	239-43373-00	239-43373-00	239-43373-00
13A 2" x 3" Dia. Flex Reducer	239-40902-00	239-40902-00	239-40902-00
14A Inlet Tube (PVC)	239-43364-01	239-43364-01	239-43364-01
15A Gasket Blower Transition	239-43241-00	239-43241-00	239-43241-00
16A Screw 8-32 x 1/4 RHCR (4 Req'd)	239-43272-00	239-43272-00	239-43272-00
17A Flame Sensor Gasket	239-43371-00	239-43371-00	239-43371-00
18A Flame Sensor W/ Gasket	415-43232-00	415-43232-00	415-43232-00
19A Blower Transition Weldment	239-43201-00	239-43201-00	239-43201-00
20A Nut Hex Washer (4 Req'd)	239-43297-00	239-43297-00	239-43297-00
21A Spark Rod (w/ Gasket)	415-46481-00	415-46481-00	415-46481-00
22A Spark Rod Gasket	239-43370-00	239-43370-00	239-43370-00
23A Burner Mounting Gasket	239-43246-00	239-43246-00	239-43246-00
24A Burner Tube Kit (w/ Gasket)	415-53033-00	415-53033-00	415-53033-00
25A Burner Mounting Gasket	239-43246-00	239-43246-00	239-43246-00
26A Burner Mounting Insert	239-43167-00	239-43167-00	239-43167-00
27A Ground Wire Assembly 24" Green	239-51994-00	239-51994-00	239-51994-00
28A Gas Regulator Kit (optional)	243-45517-00	243-45517-00	243-45517-00
29A LP to Natural Gas Conversion Kit	265-54048-03	265-54048-02	265-54048-01
30A Common Venting Kit - PVC	415-54696-00	415-54696-00	415-54696-00
Common Venting Kit - Polypro	415-54697-00	415-54697-00	415-54697-00

* Applies to all warranties

** Included with Item 3A

SECTION 1: Serial Numbers "XC-" (March 2021) and Later
 APPLIES TO PAGES: 2 THROUGH 13

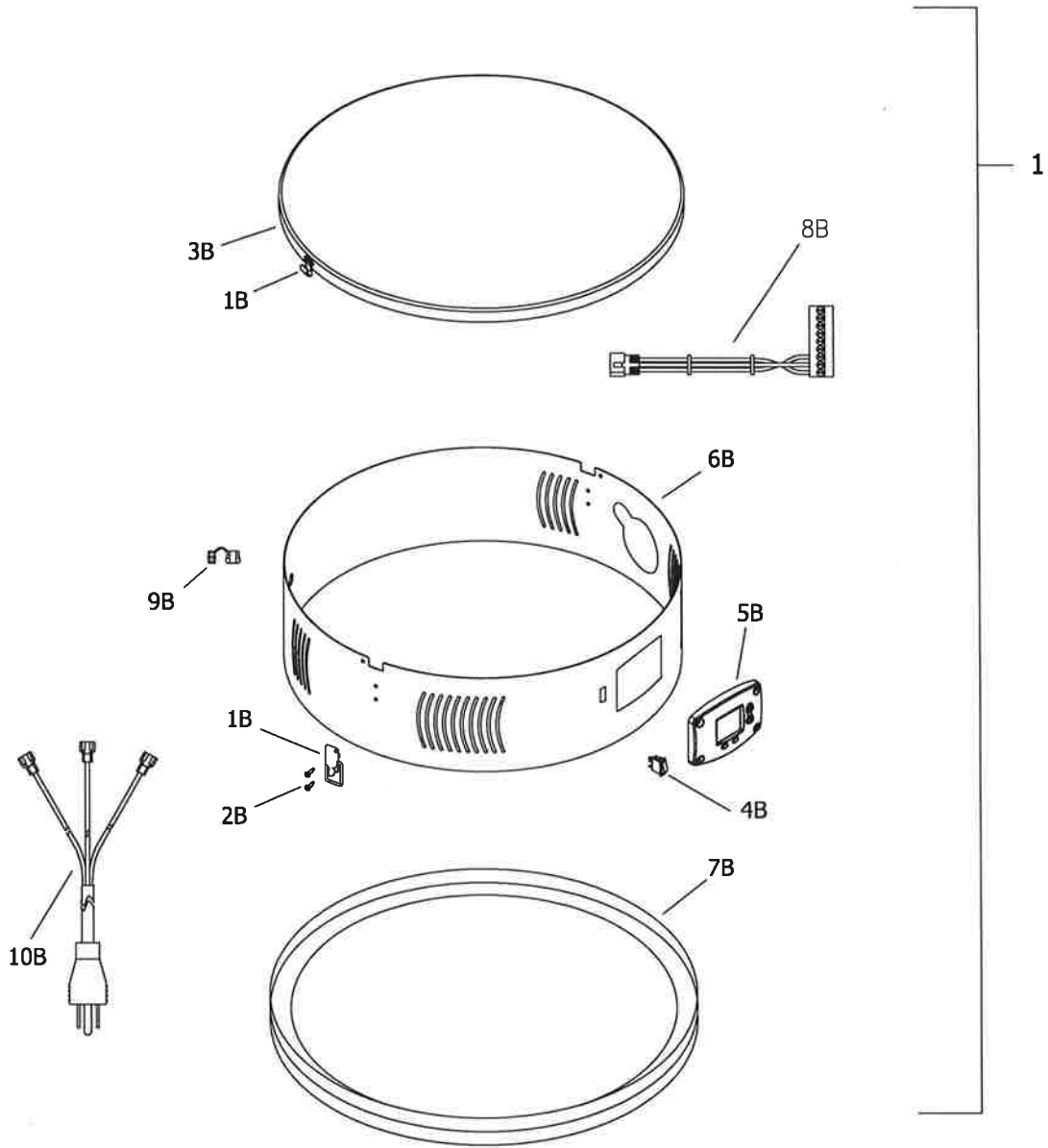
Item Description	Model EF100T150(E)*N,X(A)2	Model EF100T199(E)*N,X(A)2	Model EF100T250(E)*N,X(A)2	Model EF100T300(E)*N,X(A)2
1A Combustion System Assembly (Nat)	265-54043-04	265-54043-05	265-54043-06	265-54043-07
Combustion System Assembly (L.P.)	265-54043-11	265-54043-12	265-54043-13	265-54043-14
2A Blower and Gas Valve Assembly (Nat)	265-54044-04	265-54044-05	265-54044-06	265-54044-07
Blower and Gas Valve Assembly (L.P.)	265-54044-11	265-54044-12	265-54044-13	265-54044-14
3A Burner Assembly EF	265-46024-00	265-46024-00	265-46024-00	265-46024-00
4A Blower	415-51225-00	415-51428-00	415-51428-00	415-51428-00
5A Hose Tubing 3/16" I.D.	239-41718-00	239-41718-00	239-41718-00	239-41718-00
6A Burner Mounting Insert Gasket**	239-43197-00	239-43197-00	239-43197-00	239-43197-00
7A Screw 10-32 x 3/4 SHCS (4 Req'd)	239-43273-00	239-43273-00	239-43273-00	239-43273-00
8A Gasket Venturi to Blower	239-44654-00	239-44654-00	239-44654-00	239-44654-00
9A Gas Valve Assembly (Nat)	265-54040-04	265-54040-05	265-54040-06	265-54040-07
Gas Valve Assembly (L.P.)	265-54041-04	265-54041-05	265-54041-06	265-54041-07
10A Nipple 1/2 NPT X 3"	239-37047-00	239-37047-00	239-37047-00	239-37047-00
11A Reducer 3/4 x 1/2 NPT	239-04474-00	239-04474-00	239-04474-00	239-04474-00
12A Nipple 3/4 NPT x 7"	239-43373-00	239-43373-00	239-43373-00	239-43373-00
13A 2" x 3" Dia. Flex Reducer	239-40902-00	239-40902-00	239-40902-00	239-40902-00
14A Inlet Tube (PVC)	239-43364-01	239-43364-01	239-43364-01	239-43364-01
15A Gasket Blower Transition	239-43241-00	239-43241-00	239-43241-00	239-43241-00
16A Screw 8-32 x 1/4 RHCR (4 Req'd)	239-43272-00	239-43272-00	239-43272-00	239-43272-00
17A Flame Sensor Gasket	239-43371-00	239-43371-00	239-43371-00	239-43371-00
18A Flame Sensor W/ Gasket	415-43232-00	415-43232-00	415-43232-00	415-43232-00
19A Blower Transition Weldment	239-43201-00	239-43201-00	239-43201-00	239-43201-00
20A Nut Hex Washer (4 Req'd)	239-43297-00	239-43297-00	239-43297-00	239-43297-00
21A Spark Rod (w/ Gasket)	415-46481-00	415-46481-00	415-46481-00	415-46481-00
22A Spark Rod Gasket	239-43370-00	239-43370-00	239-43370-00	239-43370-00
23A Burner Mounting Gasket	239-43246-00	239-43246-00	239-43246-00	239-43246-00
24A Burner Tube Kit (w/ Gasket)	415-53033-00	415-53033-00	415-53033-00	415-53033-00
25A Burner Mounting Gasket	239-43246-00	239-43246-00	239-43246-00	239-43246-00
26A Burner Mounting Insert	239-43167-00	239-43167-00	239-43167-00	239-43167-00
27A Ground Wire Assembly 24" Green	239-51994-00	239-51994-00	239-51994-00	239-51994-00
28A Gas Regulator Kit (optional)	243-45517-00	243-45517-00	243-45517-00	243-45517-00
29A LP to Natural Gas Conversion Kit	265-54048-07	265-54048-06	265-54048-05	265-54048-04
30A Common Venting Kit - PVC	415-54696-00	415-54696-00	415-54696-00	415-54696-00
Common Venting Kit - Polypro	415-54697-00	415-54697-00	415-54697-00	415-54697-00

* Applies to all warranties

** Included with Item 3A

SECTION 1: Serial Numbers "XC-" (March 2021) and Later

APPLIES TO PAGES: 2 THROUGH 13



SECTION 1: Serial Numbers "XC-" (March 2021) and Later
 APPLIES TO PAGES: 2 THROUGH 13

	Model	Model	Model
	EF60T125(E)(N,X)(A)2	EF60T150(E)(N,X)(A)2	EF60T199(E)(N,X)(A)2
1B Keeper Latch & Catch	239-43239-00	239-43239-00	239-43239-00
2B Screw 8-32 x 1/2 RHCR (2 Req'd)	239-41715-00	239-41715-00	239-41715-00
3B Surround Head-EF Comm.	243-45823-02	243-45823-02	243-45823-02
4B Main Power Switch	239-43234-00	239-43234-00	239-43234-00
5B Control Display-ICON System	415-54047-00	415-54047-00	415-54047-00
6B Ring Combustion Surround	239-47305-02	239-47305-02	239-47305-02
7B Combustion Surround Base	239-51296-02	239-51296-02	239-51296-02
8B Display to Control Harness	239-48168-00	239-48168-00	239-48168-00
9B Strain Relief Bushing (Power Cord)	239-80372-00	239-80372-00	239-80372-00
10B Power Cord-96"	239-44466-00	239-44466-00	239-44466-00

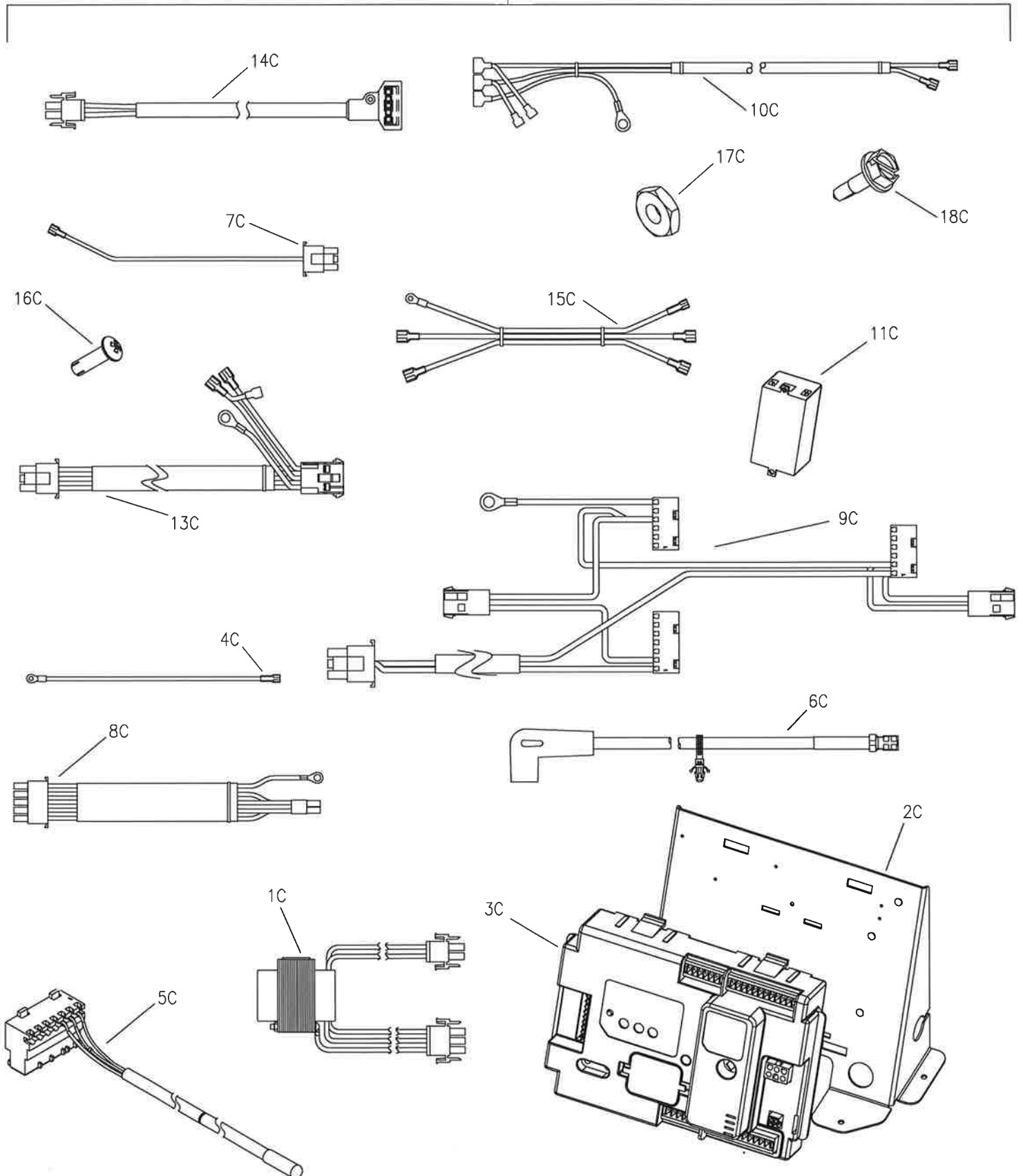
	Model	Model	Model
	EF100T150(E)(N,X)(A)2	EF100T199(E)(N,X)(A)2	EF100T250(E)(N,X)(A)2
1B Keeper Latch & Catch	239-43239-00	239-43239-00	239-43239-00
2B Screw 8-32 x 1/2 RHCR (2 Req'd)	239-41715-00	239-41715-00	239-41715-00
3B Surround Head-EF Comm.	243-45823-02	243-45823-02	243-45823-02
4B Main Power Switch	239-43234-00	239-43234-00	239-43234-00
5B Control Display-ICON System	415-54047-00	415-54047-00	415-54047-00
6B Ring Combustion Surround	239-47305-02	239-47305-02	239-47305-02
7B Combustion Surround Base	239-51296-02	239-51296-02	239-51296-02
8B Display to Control Harness	239-48168-00	239-48168-00	239-48168-00
9B Strain Relief Bushing (Power Cord)	239-80372-00	239-80372-00	239-80372-00
10B Power Cord-96"	239-44466-00	239-44466-00	239-44466-00

SECTION 1: Serial Numbers "XC-" (March 2021) and Later

APPLIES TO PAGES: 2 THROUGH 13

(POWERED ANODES)

38A



SECTION 1: Serial Numbers "XC-" (March 2021) and Later
 APPLIES TO PAGES: 2 THROUGH 13
 (POWERED ANODES)

	Model	Model	Model
	EF60T125(E)(N,X)(A)2	EF60T150(E)(N,X)(A)2	EF60T199(E)(N,X)(A)2
1C Transformer 120V to 24V	233-50559-00	233-50559-00	233-50559-00
2C Control Panel	239-50514-00	239-50514-00	239-50514-00
3C Module-ICON System	415-54156-01	415-54156-01	415-54156-01
4C Ground Wire	239-38951-88	239-38951-88	239-38951-88
5C T-Stat Sensor Harness	239-48587-00	239-48587-00	239-48587-00
6C High Voltage Spark Cable	265-50887-00	265-50887-00	265-50887-00
7C Flame Sensor Wire	239-48237-00	239-48237-00	239-48237-00
8C Blower Modulation Harness	239-48170-00	239-48170-00	239-48170-00
9C Wire Harness Low Fire Start	239-53961-00	239-53961-00	239-53961-00
10C Power Cord/Switch Harness	239-48171-00	239-48171-00	239-48171-00
11C Power Anode Module	239-46229-00	239-46229-00	239-46229-00
13C Blower Power Harness	239-48617-00	239-48617-00	239-48617-00
14C Rectifier Harness	239-43571-00	239-43571-00	239-43571-00
15C Powered Anode Control Harness	239-46247-00	239-46247-00	239-46247-00
16C Screw-#4-40 X 3/8 Pan	239-50731-00	239-50731-00	239-50731-00
17C Nut 8-32 Keeps	239-80029-00	239-80029-00	239-80029-00
18C Screw-#8-18 X 1/2	239-32761-00	239-32761-00	239-32761-00

* Applies to all warranties

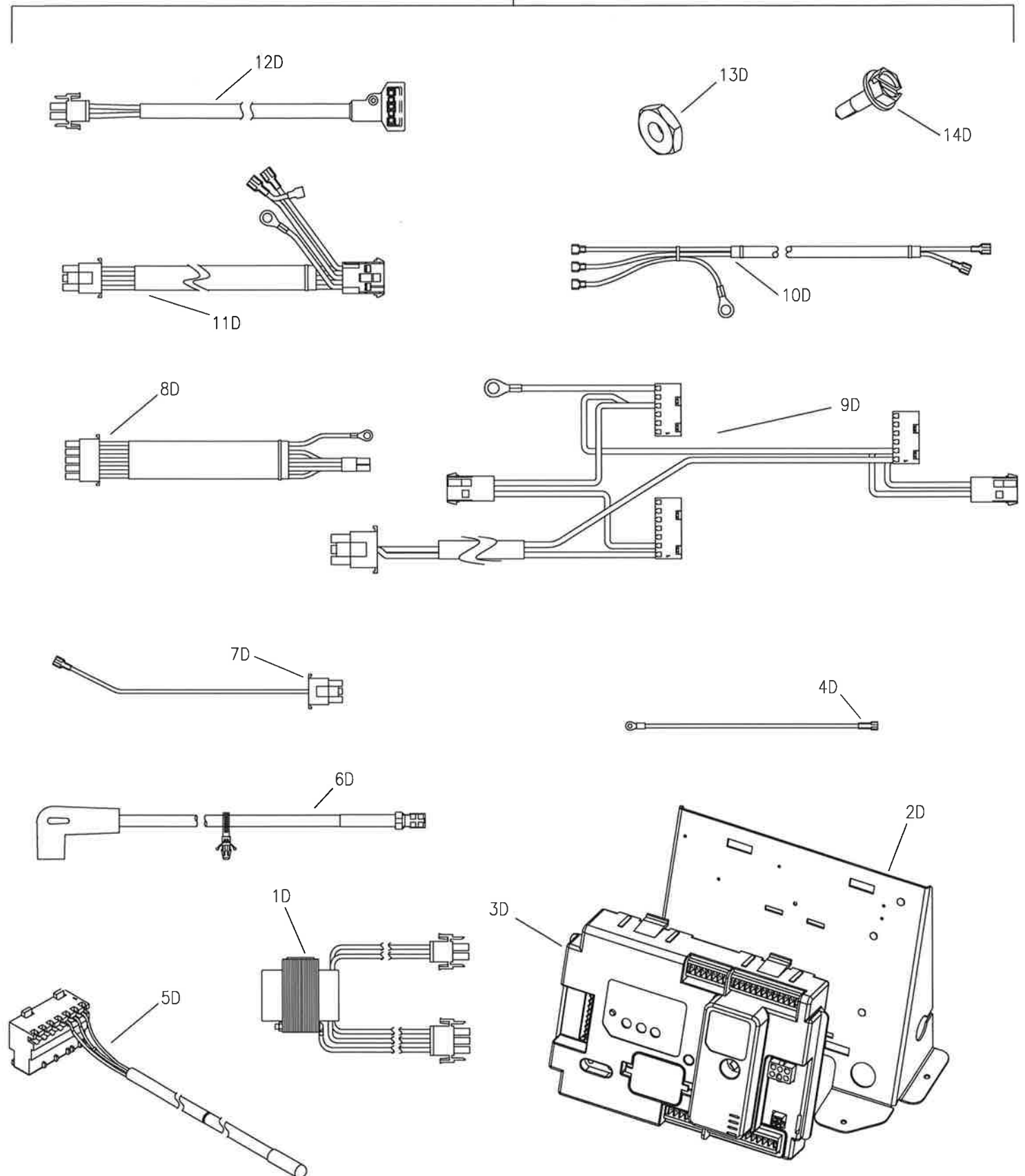
	Model	Model	Model
	EF100T150(E)(N,X)(A)2	EF100T199(E)(N,X)(A)2	EF100T300(E)(N,X)(A)2
1C Transformer 120V to 24V	233-50559-00	233-50559-00	233-50559-00
2C Control Panel	239-50514-00	239-50514-00	239-50514-00
3C Module-ICON System	415-54156-01	415-54156-01	415-54156-01
4C Ground Wire	239-38951-88	239-38951-88	239-38951-88
5C T-Stat Sensor Harness	239-48587-00	239-48587-00	239-48587-00
6C High Voltage Spark Cable	265-50887-00	265-50887-00	265-50887-00
7C Flame Sensor Wire	239-48237-00	239-48237-00	239-48237-00
8C Blower Modulation Harness	239-48170-00	239-48170-00	239-48170-00
9C Wire Harness Low Fire Start	239-53961-00	239-53961-00	239-53961-00
10C Power Cord/Switch Harness	239-48171-00	239-48171-00	239-48171-00
11C Power Anode Module	239-46229-00	239-46229-00	239-46229-00
13C Blower Power Harness	239-48617-00	239-48617-00	239-48617-00
14C Rectifier Harness	239-43571-00	239-43571-00	239-43571-00
15C Powered Anode Control Harness	239-46247-00	239-46247-00	239-46247-00
16C Screw-#4-40 X 3/8 Pan	239-50731-00	239-50731-00	239-50731-00
17C Nut 8-32 Keeps	239-80029-00	239-80029-00	239-80029-00
18C Screw-#8-18 X 1/2	239-32761-00	239-32761-00	239-32761-00

* Applies to all warranties

SECTION 1: Serial Numbers "XC-" (March 2021) and Later

APPLIES TO PAGES: 2 THROUGH 13
(MAGNESIUM ANODES)

38B



SECTION 1: Serial Numbers "XC-" (March 2021) and Later
APPLIES TO PAGES: 2 THROUGH 13
(MAGNESIUM ANODES)

	Model	Model	Model
	EF60T125(E)(N,X)(A)2	EF60T150(E)(N,X)(A)2	EF60T199(E)(N,X)(A)2
1D Transformer 120V to 24V	233-50559-00	233-50559-00	233-50559-00
2D Control Panel	239-50514-00	239-50514-00	239-50514-00
3D Module-ICON System	415-54156-01	415-54156-01	415-54156-01
4D Ground Wire	239-38951-88	239-38951-88	239-38951-88
5D T-Stat Sensor Harness	239-48587-00	239-48587-00	239-48587-00
6D High Voltage Spark Cable	265-50887-00	265-50887-00	265-50887-00
7D Flame Sensor Wire	239-48237-00	239-48237-00	239-48237-00
8D Blower Modulation Harness	239-48170-00	239-48170-00	239-48170-00
9D Wire Harness Low Fire Start	239-53961-00	239-53961-00	239-53961-00
10D Power Cord/Switch Harness	239-54969-00	239-54969-00	239-54969-00
11D Blower Power Harness	239-48617-00	239-48617-00	239-48617-00
12D Rectifier Harness	239-43571-00	239-43571-00	239-43571-00
13D Nut 8-32 Keeps	239-80029-00	239-80029-00	239-80029-00
14D Screw-#8-18 X 1/2	239-32761-00	239-32761-00	239-32761-00

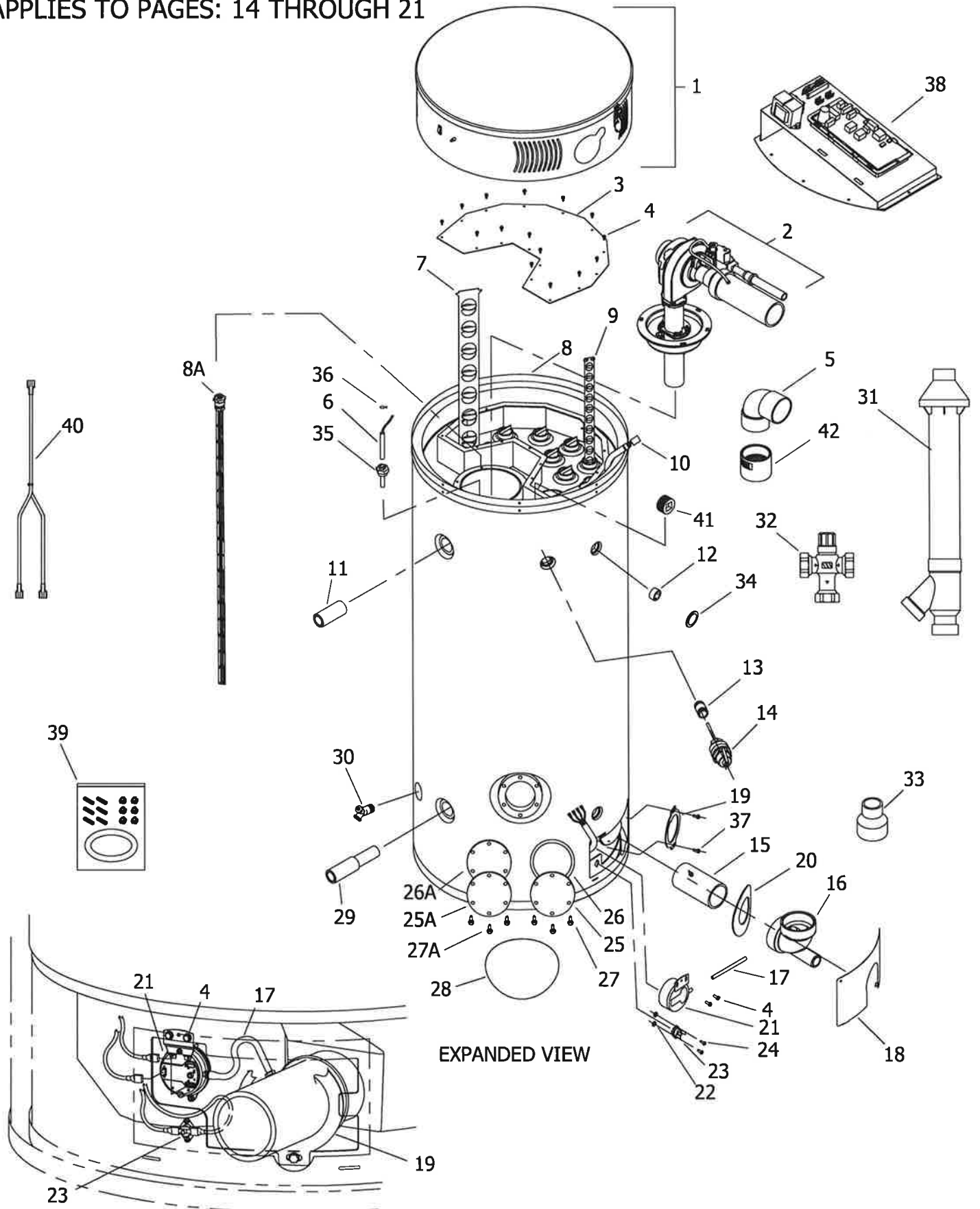
* Applies to all warranties

	Model	Model	Model
	EF100T150(E)(N,X)(A)2	EF100T199(E)(N,X)(A)2	EF100T300(E)(N,X)(A)2
1D Transformer 120V to 24V	233-50559-00	233-50559-00	233-50559-00
2D Control Panel	239-50514-00	239-50514-00	239-50514-00
3D Module-ICON System	415-54156-01	415-54156-01	415-54156-01
4D Ground Wire	239-38951-88	239-38951-88	239-38951-88
5D T-Stat Sensor Harness	239-48587-00	239-48587-00	239-48587-00
6D High Voltage Spark Cable	265-50887-00	265-50887-00	265-50887-00
7D Flame Sensor Wire	239-48237-00	239-48237-00	239-48237-00
8D Blower Modulation Harness	239-48170-00	239-48170-00	239-48170-00
9D Wire Harness Low Fire Start	239-53961-00	239-53961-00	239-53961-00
10D Power Cord/Switch Harness	239-54969-00	239-54969-00	239-54969-00
11D Blower Power Harness	239-48617-00	239-48617-00	239-48617-00
12D Rectifier Harness	239-43571-00	239-43571-00	239-43571-00
13D Nut 8-32 Keeps	239-80029-00	239-80029-00	239-80029-00
14D Screw-#8-18 X 1/2	239-32761-00	239-32761-00	239-32761-00

* Applies to all warranties

SECTION 2: Serial Numbers "XL-" (November 2021) and Later with -895 Designator

APPLIES TO PAGES: 14 THROUGH 21



EXHAUST SERVICE AREA DETAIL (ASSEMBLED)

SECTION 2: Serial Numbers "XL-" (November 2021) and Later with -895 Designator
 APPLIES TO PAGES: 14 THROUGH 21

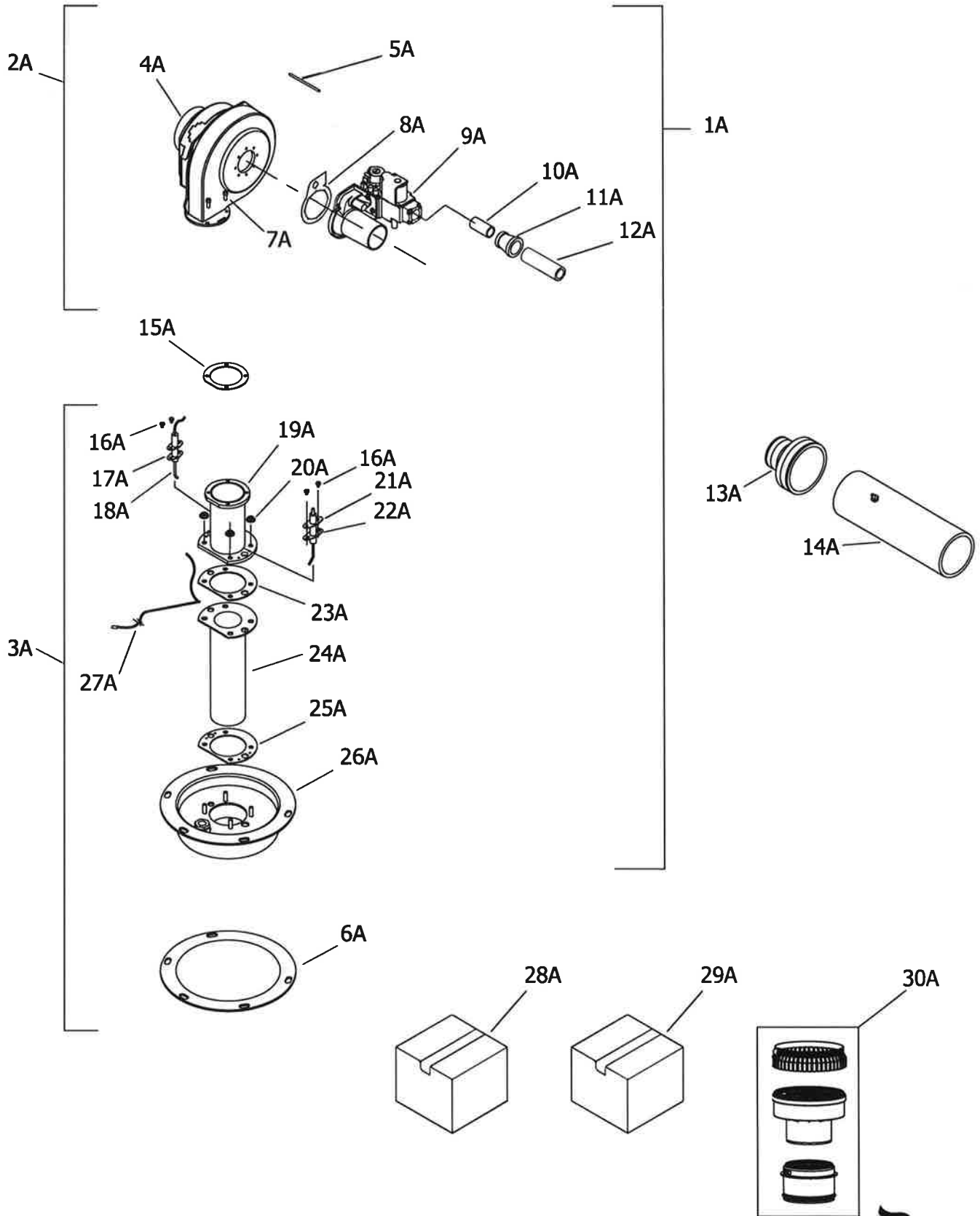
Item Description	Model	Model	Model	Model	Model	Model
	EF60T129(E)*(N,X)(A)2	EF60T150(E)*(N,X)(A)2	EF60T199(E)*(N,X)(A)2	EF100T150(E)*(N,X)(A)2	EF100T199(E)*(N,X)(A)2	
1 Combustion Surround Assembly	243-47304-02	243-47304-02	243-47304-02	243-47304-02	243-47304-02	243-47304-02
2 Combustion System Assembly	See Page 17	See Page 17	See Page 17	See Page 17	See Page 17	See Page 17
3 Collector Cover Second Pass	239-52975-00	239-52975-00	239-52975-00	239-52975-00	239-52975-00	239-52975-00
4 Screw 10-16 x 3/4	239-44444-00	239-44444-00	239-44444-00	239-44444-00	239-44444-00	239-44444-00
5 Elbow-Vent Terminal (2 Req'd)	415-40579-00	415-40579-00	415-40579-00	415-40579-00	415-40579-00	415-40579-00
6 Temperature Sensor	415-46553-02	415-46553-02	415-46553-02	415-46553-02	415-46553-02	415-46553-02
7 Baffle 4" Flue (2 Req'd)	243-43304-00	243-43304-00	243-43304-00	243-43304-00	243-43304-00	243-43304-00
8 Anode Rod (Powered) (2 Req'd)#	224-53839-00	224-53839-00	224-53839-00	224-53839-00	224-53839-00	224-53839-00
9 Baffle 2" Flue (8 Req'd)	239-45659-00	239-45659-00	239-45659-00	239-45659-00	239-45659-00	239-45659-00
10 Wire Harness-Service Panel	239-43358-02	239-43358-02	239-43358-02	239-43358-01	239-43358-01	239-43358-01
11 Nipple Hot Water Outlet Plastisert (Front Connect)	229-40913-07	229-40913-07	229-40913-07	229-40913-07	229-40913-07	229-40913-07
12 Pipe Plug 1" NPT	239-02048-00	239-02048-00	239-02048-00	239-02048-00	239-02048-00	239-02048-00
13 Nipple Plastisert T&P	229-32762-02	229-32762-02	229-32762-02	229-32762-02	229-32762-02	229-32762-02
14 T&P Relief Valve	415-30246-00	415-30246-00	415-30246-00	415-30246-00	415-30246-00	415-30246-00
15 Exhaust Vent Pipe	239-45971-00	239-45971-00	239-45971-00	239-45971-00	239-45971-00	239-45971-00
16 Condensate Elbow	415-43211-00	415-43211-00	415-43211-00	415-43211-00	415-43211-00	415-43211-00
17 Silicone Tubing 3/16" I.D.	239-41718-00	239-41718-00	239-41718-00	239-41718-00	239-41718-00	239-41718-00
18 Outer Door Service Panel	243-44668-00	243-44668-00	243-44668-00	243-44668-00	243-44668-00	243-44668-00
19 Bracket Exhaust Support	239-44667-00	239-44667-00	239-44667-00	239-44667-00	239-44667-00	239-44667-00
20 Escutcheon-Exhaust Pipe (EF Series)	239-43997-00	239-43997-00	239-43997-00	239-43997-00	239-43997-00	239-43997-00
21 Exhaust Pressure Switch	415-46037-01	415-46037-01	415-46037-01	415-46037-01	415-46037-01	415-46037-01
22 Keps Nut (2 Req'd)	239-81844-00	239-81844-00	239-81844-00	239-81844-00	239-81844-00	239-81844-00
23 Hi-Limit Switch	415-43238-02	415-43238-02	415-43238-02	415-43238-02	415-43238-02	415-43238-02
24 Screw 6-32 x 3/8 (2 Req'd)	239-81843-00	239-81843-00	239-81843-00	239-81843-00	239-81843-00	239-81843-00
25 Cleanout Cover	205-18428-00	205-18428-00	205-18428-00	205-18428-00	205-18428-00	205-18428-00
25A Cleanout Cover (ASME)	205-32941-00	205-32941-00	205-32941-00	205-32941-00	205-32941-00	205-32941-00
26 Cleanout Gasket	205-18427-00	205-18427-00	205-18427-00	205-18427-00	205-18427-00	205-18427-00
26A Cleanout Gasket (ASME)	205-32942-00	205-32942-00	205-32942-00	205-32942-00	205-32942-00	205-32942-00
27A Screw 5/16 - 18 x 1/2 (ASME)(6 Req'd)	239-82166-00	239-82166-00	239-82166-00	239-82166-00	239-82166-00	239-82166-00
28 Clean Out Access Cover	243-20299-00	243-20299-00	243-20299-00	243-20299-00	243-20299-00	243-20299-00
29 Dip Tube w/ Nipple Hydrojet (Front Connect)	415-44375-00	415-44375-00	415-44375-00	415-44375-00	415-44375-00	415-44375-00
30 Drain Valve Brass (No Handle)	415-42351-02	415-42351-02	415-42351-02	415-42351-02	415-42351-02	415-42351-02
31 Coaxial Vent Pipe with Terminal (Optional)	415-44069-01	415-44069-01	415-44069-01	415-44069-01	415-44069-01	415-44069-01
32 Approved Mixing Valve (Optional)	239-51778-00	239-51778-00	239-51778-00	239-51778-00	239-51778-00	239-51778-00
33 Reducer 3" x 2"	---	---	---	---	---	---
34 Hole Closure	239-31547-02	239-31547-02	239-31547-02	239-31547-02	239-31547-02	239-31547-02
35 Sensor Well	233-46558-01	233-46558-01	233-46558-01	233-46558-01	233-46558-01	233-46558-01
36 Clip Thermostat	233-45242-00	233-45242-00	233-45242-00	233-45242-00	233-45242-00	233-45242-00
37 Screw 1/4-20 x 5/8 Hex Washer (2 Req'd)	239-42637-00	239-42637-00	239-42637-00	239-42637-00	239-42637-00	239-42637-00
38 Integrated Control Box and Wiring	243-54443-00	243-54443-00	243-54443-00	243-54443-00	243-54443-00	243-54443-00
39 Kit-Cleanout (Not For Use With ASME Tanks)	415-54256-00	415-54256-00	415-54256-00	415-54256-00	415-54256-00	415-54256-00
40 Power Anode Harness	239-46070-00	239-46070-00	239-46070-00	239-46070-00	239-46070-00	239-46070-00
41 Plug-3/4" NPT X Square Socket	239-11638-00	239-11638-00	239-11638-00	239-11638-00	239-11638-00	239-11638-00
42 Coupling-Vent Terminal	239-46740-00	239-46740-00	239-46740-00	239-46740-00	239-46740-00	239-46740-00

* Applies to all warranties



SECTION 2: Serial Numbers XL- (NOVEMBER 2021) and Later with -895 Designator

APPLIES TO PAGES: 14 THROUGH 21



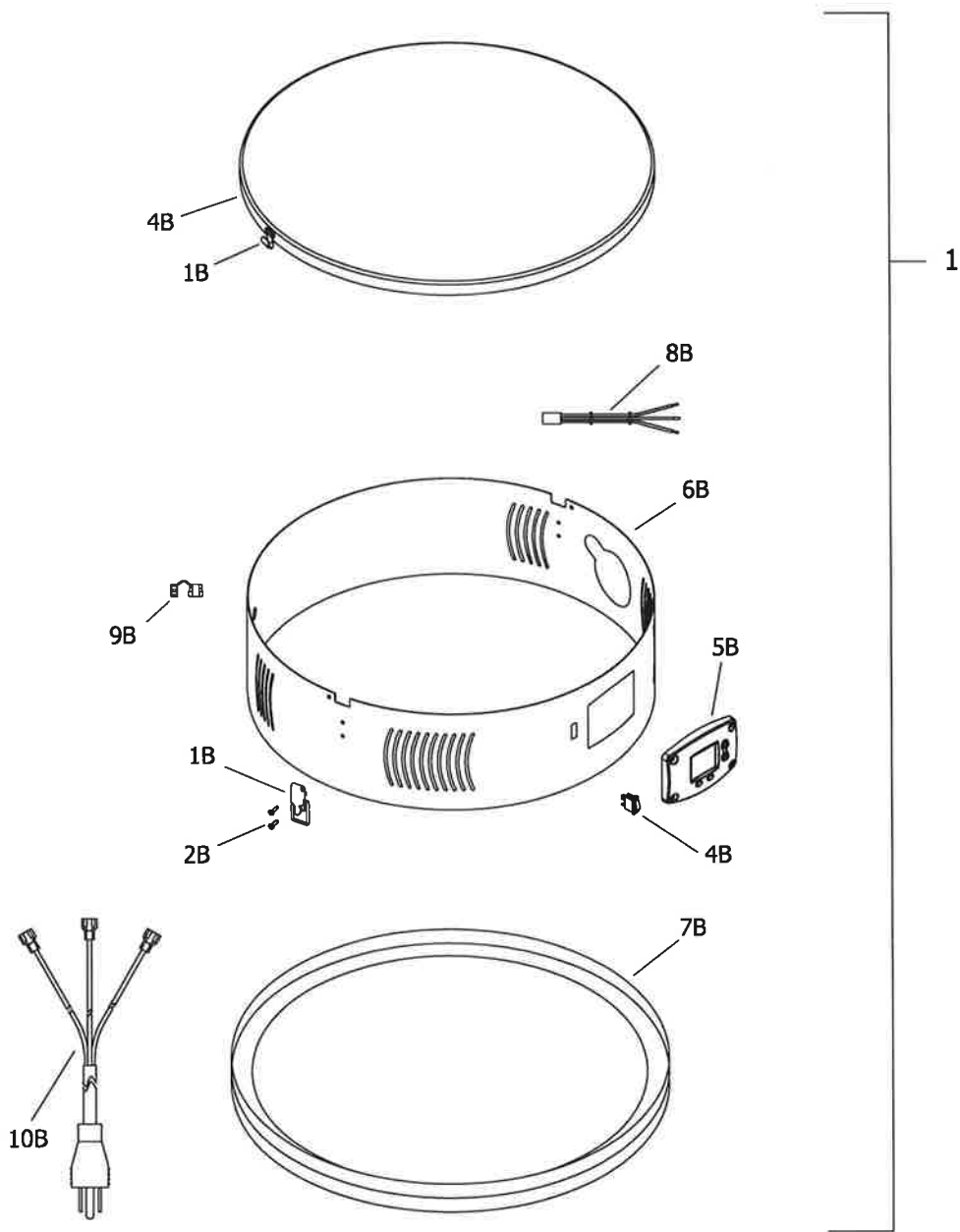
SECTION 2: Serial Numbers "XL" (November 2021) and Later with -895 Designator
 APPLIES TO PAGES: 14 THROUGH 21

Item Description	Model	Model	Model	Model	Model	Model
	EF60T125(E)(N,X)(A)2	EF60T150(E)(N,X)(A)2	EF60T199(E)(N,X)(A)2	EF100T150(E)(N,X)(A)2	EF100T199(E)(N,X)(A)2	EF100T199(E)(N,X)(A)2
1A Combustion System Assembly (Nat)	265-54043-01	265-54043-02	265-54043-03	265-54043-04	265-54043-05	265-54043-06
Combustion System Assembly (L.P.)	265-54043-08	265-54043-09	265-54043-10	265-54043-11	265-54043-12	265-54043-13
2A Blower and Gas Valve Assembly (Nat)	265-54044-01	265-54044-02	265-54044-03	265-54044-04	265-54044-05	265-54044-06
Blower and Gas Valve Assembly (L.P.)	265-54044-08	265-54044-09	265-54044-10	265-54044-11	265-54044-12	265-54044-13
3A Burner Assembly EF	265-46024-00	265-46024-00	265-46024-00	265-46024-00	265-46024-00	265-46024-00
4A Blower	415-51225-00	415-51225-00	415-48922-00	415-51225-00	415-51225-00	415-51225-00
5A Hose Tubing 3/16" I.D.	239-41718-00	239-41718-00	239-41718-00	239-41718-00	239-41718-00	239-41718-00
6A Burner Mounting Insert Gasket**	239-43197-00	239-43197-00	239-43197-00	239-43197-00	239-43197-00	239-43197-00
7A Screw 10-32 x 3/4 SHCS (4 Req'd)	239-43273-00	239-43273-00	239-43273-00	239-43273-00	239-43273-00	239-43273-00
8A Gasket Venturi to Blower	239-44654-00	239-44654-00	239-44654-00	239-44654-00	239-44654-00	239-44654-00
9A Gas Valve Assembly (Nat)	265-54040-01	265-54040-02	265-54040-03	265-54040-04	265-54040-05	265-54040-06
Gas Valve Assembly (L.P.)	265-54041-01	265-54041-02	265-54041-03	265-54041-04	265-54041-05	265-54041-06
10A Nipple 1/2 NPT X 3"	239-37047-00	239-37047-00	239-37047-00	239-37047-00	239-37047-00	239-37047-00
11A Reducer 3/4 x 1/2 NPT	239-04474-00	239-04474-00	239-04474-00	239-04474-00	239-04474-00	239-04474-00
12A Nipple 3/4 NPT x 7"	239-43373-00	239-43373-00	239-43373-00	239-43373-00	239-43373-00	239-43373-00
13A 2" x 3" Dia. Flex Reducer	239-40902-00	239-40902-00	239-40902-00	239-40902-00	239-40902-00	239-40902-00
14A Inlet Tube (PVC)	239-43364-01	239-43364-01	239-43364-01	239-43364-01	239-43364-01	239-43364-01
15A Gasket Blower Transition	239-43241-00	239-43241-00	239-43241-00	239-43241-00	239-43241-00	239-43241-00
16A Screw 8-32 x 1/4 RHCR (4 Req'd)	239-43272-00	239-43272-00	239-43272-00	239-43272-00	239-43272-00	239-43272-00
17A Flame Sensor Gasket	239-43371-00	239-43371-00	239-43371-00	239-43371-00	239-43371-00	239-43371-00
18A Flame Sensor W/ Gasket	415-43232-00	415-43232-00	415-43232-00	415-43232-00	415-43232-00	415-43232-00
19A Blower Transition Weldment	239-43201-00	239-43201-00	239-43201-00	239-43201-00	239-43201-00	239-43201-00
20A Nut Hex Washer (4 Req'd)	239-43297-00	239-43297-00	239-43297-00	239-43297-00	239-43297-00	239-43297-00
21A Spark Rod (w/ Gasket)	415-46481-00	415-46481-00	415-46481-00	415-46481-00	415-46481-00	415-46481-00
22A Spark Rod Gasket	239-43370-00	239-43370-00	239-43370-00	239-43370-00	239-43370-00	239-43370-00
23A Burner Mounting Gasket	239-43246-00	239-43246-00	239-43246-00	239-43246-00	239-43246-00	239-43246-00
24A Burner Tube Kit (w/ Gasket)	415-53033-00	415-53033-00	415-53033-00	415-53033-00	415-53033-00	415-53033-00
25A Burner Mounting Gasket	239-43246-00	239-43246-00	239-43246-00	239-43246-00	239-43246-00	239-43246-00
26A Burner Mounting Insert	239-43167-00	239-43167-00	239-43167-00	239-43167-00	239-43167-00	239-43167-00
27A Ground Wire Assembly 24" Green	239-51994-00	239-51994-00	239-51994-00	239-51994-00	239-51994-00	239-51994-00
28A Gas Regulator Kit (optional)	243-45517-00	243-45517-00	243-45517-00	243-45517-00	243-45517-00	243-45517-00
29A LP to Natural Gas Conversion Kit	265-54048-03	265-54048-02	265-54048-01	265-54048-07	265-54048-06	265-54048-05
30A Common Venting Kit - PVC	415-54696-00	415-54696-00	415-54696-00	415-54696-00	415-54696-00	415-54696-00
Common Venting Kit - Polypro	415-54697-00	415-54697-00	415-54697-00	415-54697-00	415-54697-00	415-54697-00

* Applies to all warranties
 ** Included with Item 3A

SECTION 2: Serial Numbers "XL-" (November 2021) and Later with -895 Designator

APPLIES TO PAGES: 14 THROUGH 21



SECTION 2: Serial Numbers "XL-" (November 2021) and Later with -895 Designator

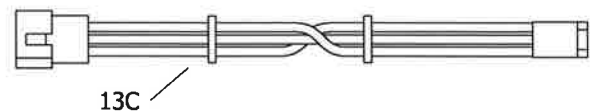
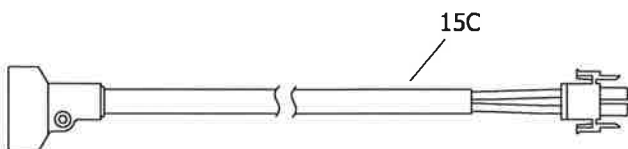
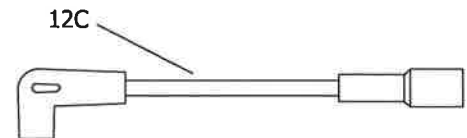
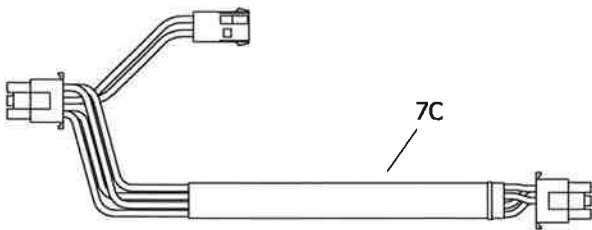
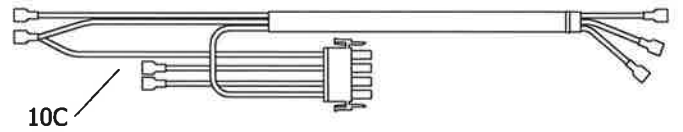
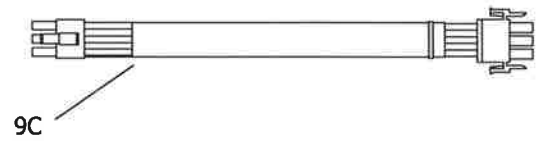
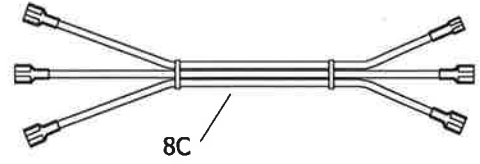
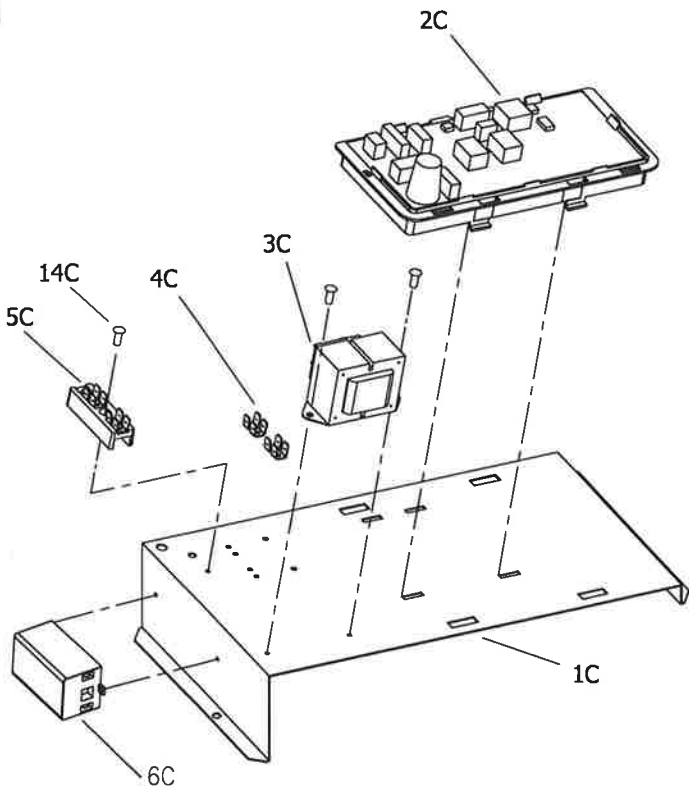
APPLIES TO PAGES: 14 THROUGH 21

Item Description	Model	Model	Model	Model	Model	Model
	EF60T125(E)(N,X)(A)2	EF60T150(E)(N,X)(A)2	EF60T199(E)(N,X)(A)2	EF100T150(E)(N,X)(A)2	EF100T199(E)(N,X)(A)2	EF100T199(E)(N,X)(A)2
1B Keeper Latch & Catch	239-43239-00	239-43239-00	239-43239-00	239-43239-00	239-43239-00	239-43239-00
2B Screw 8-32 x 1/2 RHCR (2 Req'd)	239-41715-00	239-41715-00	239-41715-00	239-41715-00	239-41715-00	239-41715-00
3B Surround Head-EF Comm.	243-45823-02	243-45823-02	243-45823-02	243-45823-02	243-45823-02	243-45823-02
4B Main Power Switch	239-43234-00	239-43234-00	239-43234-00	239-43234-00	239-43234-00	239-43234-00
5B Display Integrated, Control System	233-46557-00	233-46557-00	233-46557-00	233-46557-00	233-46557-00	233-46557-00
6B Ring Combustion Surround	239-47305-02	239-47305-02	239-47305-02	239-47305-02	239-47305-02	239-47305-02
7B Combustion Surround Base	239-51296-02	239-51296-02	239-51296-02	239-51296-02	239-51296-02	239-51296-02
8B Display to Integrated Control Harness	239-46617-00	239-46617-00	239-46617-00	239-46617-00	239-46617-00	239-46617-00
9B Strain Relief Bushing (Power Cord)	239-80372-00	239-80372-00	239-80372-00	239-80372-00	239-80372-00	239-80372-00
10B Power Cord	239-44466-00	239-44466-00	239-44466-00	239-44466-00	239-44466-00	239-44466-00

SECTION 2: Serial Numbers "XL-" (November 2021) and Later with -895 Designator

APPLIES TO PAGES: 14 THROUGH 21

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SECTION 2: Serial Numbers "XL-" (November 2021) and Later with -895 Designator

APPLIES TO PAGES: 14 THROUGH 21

Item Description	Model	Model	Model	Model	Model	Model
	EF60T125(E)*(N,X)(A)Z	EF60T150(E)*(N,X)(A)Z	EF60T199(E)*(N,X)(A)Z	EF100T150(E)*(N,X)(A)Z	EF100T199(E)*(N,X)(A)Z	
1C Control Panel	239-48060-00	239-48060-00	239-48060-00	239-48060-00	239-48060-00	239-48060-00
2C Integrated Control Board	415-46954-00	415-46954-00	415-46954-00	415-46954-00	415-46954-00	415-46954-00
3C Transformer	233-50559-00	233-50559-00	233-50559-00	233-50559-00	233-50559-00	233-50559-00
4C Ground Lug (Terminal)	239-80112-00	239-80112-00	239-80112-00	239-80112-00	239-80112-00	239-80112-00
5C Terminal Strip	239-80373-00	239-80373-00	239-80373-00	239-80373-00	239-80373-00	239-80373-00
6C Powered Anode Module (115V)	239-46229-00	239-46229-00	239-46229-00	239-46229-00	239-46229-00	239-46229-00
7C Control Harness	239-46863-00	239-46863-00	239-46863-00	239-46863-00	239-46863-00	239-46863-00
8C Powered Anode Harness	239-54422-00	239-54422-00	239-54422-00	239-54422-00	239-54422-00	239-54422-00
9C Blower Harness	239-46865-00	239-46865-00	239-46865-00	239-46865-00	239-46865-00	239-46865-00
10C Power Switch Harness	239-46864-00	239-46864-00	239-46864-00	239-46864-00	239-46864-00	239-46864-00
11C Sensor Wire 19" Black	239-38951-84	239-38951-84	239-38951-84	239-38951-84	239-38951-84	239-38951-84
12C High Voltage Spark Cable	239-46861-00	239-46861-00	239-46861-00	239-46861-00	239-46861-00	239-46861-00
13C Integrated Control Board Display Harness	239-46944-00	239-46944-00	239-46944-00	239-46944-00	239-46944-00	239-46944-00
14C Screw-#8-18 x 1/2 PHCR (5 Req'd)	239-43736-00	239-43736-00	239-43736-00	239-43736-00	239-43736-00	239-43736-00
15C Rectifier Harness EF	239-43571-00	239-43571-00	239-43571-00	239-43571-00	239-43571-00	239-43571-00

* Applies to all warranties



United States

Sales 800-523-2931

Technical Support 800-334-3393

Email techserv@bradfordwhite.com

Warranty 800-531-2111

Email warranty@bradfordwhite.com

Service Parts 800-538-2020

Email parts@bradfordwhite.com

Canada

Sales & Technical Support 866-690-0961 905-203-0600

Fax 905-636-0666

Warranty bwccwarranty@bradfordwhite.com

Technical Support bwccotech@bradfordwhite.com

Service Parts orders@bradfordwhitecanada.com

Orders ca.orders@bradfordwhite.com

For U.S. and Canada field service,
contact your professional installer or
local Bradford White sales representative.

International

General Contact international@bradfordwhite.com

BRADFORD WHITE CORPORATION

LIMITED COMMERCIAL WATER HEATER WARRANTY

WHAT DOES THIS LIMITED WARRANTY COVER?

This limited warranty covers both the glass-lined tank and component parts for leakage or other malfunction caused by defects in materials and/or workmanship. It extends to the first buyer and to any subsequent owner(s) as long as the water heater remains installed at its original place of installation.

WHAT DOES THIS LIMITED WARRANTY NOT COVER?*

1. This limited warranty does not cover leakage or other malfunctions caused by:
 - a) Defective installation, and specifically, any installation which is made:
 - i) in violation of applicable state or local plumbing, housing or building codes, or
 - ii) without a certified American Gas Association, ASME, or comparable combination temperature and pressure relief valve, or
 - iii) contrary to the written instructions furnished with the unit.
 - b) Adverse local conditions, and specifically, sediment or lime precipitate in the tank or corrosive elements in the atmosphere.
 - c) Misuse, and specifically, operations, and maintenance contrary to the written instructions furnished with the unit, removal of anode(s), disconnection, alteration or addition of non-approved components or apparatus, operation with fuels or at settings other than those set forth on the rating plate, or accidental or other exterior damage.
2. This warranty also does not cover:
 - a) Production of noise, taste, odors, discoloration or rusty water.
 - b) Incidental property damage, loss of use, inconvenience or other incidental or consequential costs.
 - c) Costs associated with the replacement and/or repair of the unit, including:
 - i) any freight, shipping or delivery charges
 - ii) any removal, installation or re-installation charges
 - iii) any material, and/or permits required for installation, re-installation or repair
 - iv) charges to return the defective water heater and/or component part to the manufacturer.

WHAT IS THE PERIOD OF COVERAGE?

This limited warranty runs from date of installation (or without proof of installation, from three (3) months after the date of manufacture) for the period specified on the following chart. To determine length of coverage, check model number listed on the rating plate of appliance against this chart.

MODEL NUMBER PREFIX	LIMITED TANK** WARRANTY	LIMITED PARTS** WARRANTY
D, H, V, LD, DB, PDV, F-I, L-I-6, M,M-I, M-II, EF, LH-I, LV-I, TW, DH, SW, CDW, PDX, P, E, U, (U)LG, LE, LC, CEHD, CEA, SLE	1, 3, 5 or 6 YRS	1 YEAR
M3ST, BST, NH, NV	5 YRS	1 YEAR
No Letter Prefix	1,3 or 5 YRS	1 YEAR

NOTE: The duration of the tank warranty will be found in the model number.

i.e.; D80T1991N has a 1 Year tank warranty;

D80T1993N has a 3 Year tank warranty;

LG250H3N has a 3 Year tank warranty;

LG250H5N has a 5 Year tank warranty.

**All replacement water heaters and parts carry the balance of the original warranty, i.e. if an original three (3) year tank warranted water heater develops a leak due to defects in materials/workmanship after only two (2) years, the replacement unit is warranted for only the balance remaining from the original three (3) year warranty, or one (1) year in this example.

WHAT IS THE DURATION OF THE IMPLIED WARRANTY?

ANY IMPLIED WARRANTIES, INCLUDING THE WARRANTY OF MERCHANTABILITY IMPOSED ON THE SALE OF THE WATER HEATER UNDER THE LAWS OF THE STATE OF SALE ARE LIMITED IN DURATION TO ONE YEAR FROM DATE OF ORIGINAL INSTALLATION.

HOW DOES STATE LAW RELATE TO THE WARRANTY?

Some states do not allow:

1. Limitations on how long an implied warranty lasts.
2. Limitations on incidental or consequential damages.

Therefore, the above limitations or exclusions may not apply to you.

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

*Restrictions are not applicable to implied warranties in California. See "Special State Provisions" on reverse side.

LIMITED COMMERCIAL WATER HEATER WARRANTY (CONTINUED)

WHAT WILL WE DO TO CORRECT PROBLEMS?

If a defect occurs within the warranty period, we will:

1. Provide a replacement water heater of our manufacture, (or at our option) repair any unit which develops a leak in the steel tank within the tank warranty period. To obtain a replacement, you must forward the rating plate from the defective unit to us. If government regulations require the replacement water heater to have features not found in the defective water heater, you will be required to pay the difference in price represented by those government required features.
2. Provide a replacement part (or at our option repair) any part which fails to function within the parts warranty period. To obtain a replacement, you must forward the defective part to us. If government regulations require the replacement part to have features not found in the defective part, you will be required to pay the difference in price represented by those government required features.

We do reserve the right to verify any claims of defect by inspection.

WHAT WILL WE NOT DO?

We will not:

1. Repair or replace any water heater, or part, subject to conditions outlined in "What Does This Limited Warranty Not Cover?"
2. Reimburse any costs associated with repair and/or replacement.
3. Replace and/or repair any water heater without complete model/serial number.
4. Replace any water heater without prior receipt of actual rating plate from appliance.

HOW DO YOU GET WARRANTY ASSISTANCE?

Upon discovering a defect or problem, you should:

1. Contact either the installer or dealer, or
2. Contact us--

BRADFORD WHITE CORPORATION
WARRANTY SUPPORT GROUP
200 LAFAYETTE STREET
MIDDLEVILLE, MI 49333
(800) 531-2111

WHAT SHOULD YOU DO TO KEEP THE WARRANTY IN EFFECT?

To facilitate warranty assistance, you should:

1. Follow all instructions enclosed with the product.
2. Retain all bills of sale or receipts for proof of installation, etc.
3. Contact your installer, dealer or our Warranty Department as soon as any problem or defect is noticed.
4. When necessary, allow us, or our chosen representative, to inspect the unit.
5. For your reference, fill in the Model and Serial Number found on the units Rating Plate:

Model Number _____

Serial Number _____

Date of Installation _____

SPECIAL STATE PROVISIONS

For water heaters installed in California or Oregon, Paragraphs 2(c) (i) (iv) of the paragraph "WHAT DOES THIS WARRANTY NOT COVER?" does not apply.
All other terms and conditions of this warranty apply as stated.

PLEASE RETAIN THIS WARRANTY IN A SAFE LOCATION FOR FUTURE REFERENCE.

Models: PLT-5, PLT-12, PLT-20

Potable Hot Water Expansion Tank

Installation Instructions

⚠ WARNING!

Improper installation, adjustment, alteration, service or maintenance can cause property damage, serious bodily injury or death. Read instructions completely before proceeding with installation. Only qualified personnel may install or service this equipment in accordance with local codes and ordinances.

Do not exceed 80psi (5.5 bar) air charge. Air charge pressure exceeding 80psi (5.5 bar) could become hazardous and will void any and all warranties, either written or implied. Failure to follow these instructions will result in the possibility of property damage, serious bodily injury or death.

This Expansion Tank is designed and intended for water storage at a maximum pressure of 150psi (10.3 bar) and a maximum temperature of 200°F (93°C). Any use other than for potable water or a sustained or instantaneous pressure in excess of 150psi (10.3 bar) or 200°F (93°C) is **UNSAFE** and can cause property damage, serious bodily injury or result in death.



Certified to ANSI/NSF 61
(73°F/23°C)



Listed by IAPMO

Disclaimer: The manufacturer of this tank does not accept any liability or other responsibility for personal injury or property damage resulting from improper use, installation or operation of this tank or the system of which it is a part.

Notice: The expansion tank, piping and your connections may in time leak. Select a location to install the expansion tank where a water leak will not damage the surrounding area. The manufacturer is not responsible for any water damage in connection with this expansion tank.

Acceptance Volume

Air Side Pre-pressure (psi) (bar)	Water Side Volume at 150psi (10.3 bar) (gallons)		
	PLT-5	PLT-12	PLT-20
20 (1.4)	1.48	3.42	7.102
40 (2.8)	1.26	2.88	5.882
60 (4.1)	1.0	2.49	4.705
80 (5.5)	.80	1.85	4.009

	PLT-5	PLT-12	PLT-20
Order No.	0067370	0067371	0067372
Description			
Max. Pressure - psi	150	150	150
Max. Temp. - °F	200	200	200
Tank Volume - gal.	2.1	4.5	8.5
Tank Acceptance - gal.	1.26	2.8	3.4
Air Pre-charge - psi	20	20	20
Connections Size - in.	¾ male	¾ male	¾ male
Diameter - in.	8	10.5	12½
Length - in.	11	13.5	19¾
Weight - lbs.	5.5	10	15

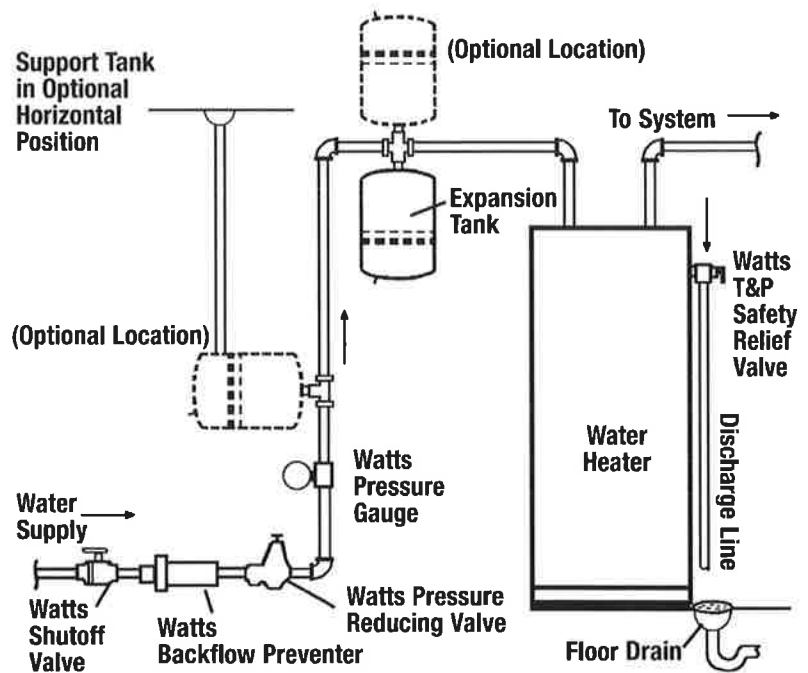


Figure 1

Installation

- Before beginning installation determine the system pressure.
 - Open a faucet to allow the system pressure to equalize.
 - Close faucet.
 - Read the system pressure at the pressure gauge (Figure 1).
- The expansion tank pre-charge must be set to the system pressure as determined in Step 1. Pre-charge prior to installation in the system.

Caution: Pre-charge prior to installation in the system. Do not adjust the air pre-charge of the expansion tank with the system under pressure. The air pre-charge should only be adjusted under zero system pressure.

Note: The normal pre-charge is 20psi (138 kPa). **Do not exceed 80psi.** If system pressure exceeds 80psi (5.5 bar) it will be necessary to either: **A.** Add a pressure reducing valve to the system or, **B.** Locate the expansion tank in a riser where the static pressure is below 80psi (5.5 bar).



- Unscrew the protective cap from the air inlet valve.
 - Using a tire pressure gauge, check the tank pre-charge pressure.
 - If necessary, pressurize the tank to the proper setting using a manual bicycle tire pump. **Caution do not exceed 80psi.**
 - Replace the protective air cap.
- Shut off the water supply valve.
 - Shut off power source to the water heater, (electricity, gas, oil burner switch) and drain system following water heater manufacturer recommendations.
 - Install the expansion tank in the system (refer to Figure 1).
 - The weight of the expansion tank filled with water is supported by the system piping. Therefore, it is important that, where appropriate, the piping has suitable bracing (strapping, hanger, brackets).
 - The expansion tank may be installed vertically (preferred method) or horizontally. **Caution: The tank must be properly supported in horizontal applications.**
 - This expansion tank, as all expansion tanks, may eventually leak. **Do not install without adequate drainage provisions.**
 - Turn on the water supply valve.
 - Open a hot water fixture and allow water flow until all air is removed from the system.
 - Reapply power to the water heater.
 - Open a hot water fixture to allow a slight flow until the hot water has reached operating temperature.
 - Recheck system pressure following Step 1.a through c.

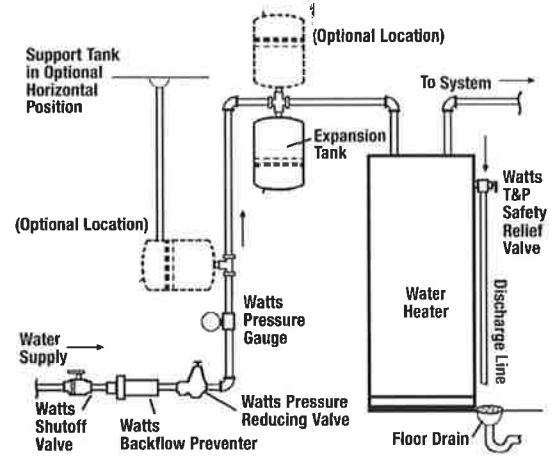


Figure 1

Caution: Pre-charge prior to installation in the system. Do not adjust the air pre-charge of the expansion tank with the system under pressure. The air pre-charge should only be adjusted under zero system pressure.

If necessary, adjust the pressure reducing valve to the expansion tank pre-charge as determined in Step 2.

Important!

- A pressure relief valve sized and installed in accordance with local codes must be incorporated in the systems requiring a combined temperature and pressure safety relief valve. The temperature and pressure safety relief valve should be sized and installed in accordance with local codes.
- Never plug a safety Relief Valve.

CALIFORNIA PROPOSITION 65 WARNING

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. (California law requires this warning to be given to customers in the State of California.)

For more information: www.watts.com/prop65

Limited Warranty: Watts Regulator Co. (the "Company") warrants each product to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment. In the event of such defects within the warranty period, the Company will, at its option, replace or recondition the product without charge.

THE WARRANTY SET FORTH HEREIN IS GIVEN EXPRESSLY AND IS THE ONLY WARRANTY GIVEN BY THE COMPANY WITH RESPECT TO THE PRODUCT. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The remedy described in the first paragraph of this warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product.

Some States do not allow limitations on how long an implied warranty lasts, and some States do not allow the exclusion or limitation of incidental or consequential damages. Therefore the above limitations may not apply to you. This Limited Warranty gives you specific legal rights, and you may have other rights that vary from State to State. You should consult applicable state laws to determine your rights. **SO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL SHIPMENT.**

WATTS®

A Watts Water Technologies Company

ISO 9001-2000
CERTIFIED

USA: 815 Chestnut St., No. Andover, MA 01845-6098; www.watts.com

Canada: 5435 North Service Rd., Burlington, ONT. L7L 5H7; www.wattscanada.ca

P-6



Instruction Sheet

102-054

“00” Cartridge Circulators

SUPERSEDES: May 1, 2010

EFFECTIVE: July 1, 2015

Plant I.D. 001-934

APPLICATION:

1. Maximum operating pressure is 125 psi (862 kPa).
2. Maximum water temperature not to exceed nameplate rating.
3. Cast iron circulators are to be used for closed loop systems. Bronze or stainless steel circulators are to be used for open loop, fresh water, or potable water systems.
4. Taco Cartridge circulator pumps are for indoor use only – employer uniquement a l'interieur.

INSTALLATION:

1. Mounting position – Circulator must be mounted with the motor in a horizontal position. It may be mounted vertically with the motor up, provided that the system pressure is at least 20 psi (138 kPa).

CAUTION: DO NOT USE FLAT RUBBER GASKETS. ONLY USE O-RING GASKETS PROVIDED OR LEAKS MAY RESULT. WARRANTY WILL BE VOID.

2. Rotating body – Body has an arrow on the front that indicates direction of flow. To rotate body, remove the four body bolts, rotate body and replace bolts. Make sure that the junction box is NOT located underneath the circulator. (The junction box must NOT be located in the 6 o'clock position, as viewed from the motor end.)
3. Electrical connections – Observe all applicable codes when connecting to power supply. The motor is impedance protected, and does not require overload protection. Either colored wire from the capacitor box can be attached to either colored wire from the power supply. There is no “hot” or “common” wire leading from the capacitor box. Typical installation would be to attach the white wire to the white (common) power supply wire and either the yellow or blue wire to the black (hot) power supply wire. The pump cannot run backwards.

WARNING: Do not use in swimming pool or spa areas; pump has not been investigated for this application.

WARNING: In the event the retaining screws have been pulled out of the housing, DO NOT replace them. Use of any other screw may short out the stator windings, creating a risk of electrical shock.

CAUTION: When installing electrical connections, do not apply mechanical loads to the capacitor box; otherwise, retaining screws may be pulled out of the housing, making circulator unusable.

CAUTION: Installations at higher elevations over 5000 feet must have higher fill pressure of 20 psi minimum to prevent pump cavitation and flashing. Premature failure may result. Adjust expansion tank pressure to equal fill pressure. A larger size expansion tank may be required.

4. Fill system with tap water – The system must be filled before operating the circulator. The bearings are water lubricated and should not be allowed to operate dry. Filling the system will result in immediate lubrication of the bearings. It is always good practice to flush a new system of foreign matter before starting the circulator.

CAUTION: Never run the circulator dry or permanent damage will result.

5. Circulator operation – Operate the circulator for 5 minutes immediately after filling system to purge remaining air from the bearing chamber. This is especially important when installing the circulator during the off-season.

**CAUTION: 1. The addition of petroleum based fluids or certain chemical additives to systems utilizing TACO equipment voids the warranty.
2. Use supply wires suitable for 90°C – ATTENTION: Employer des fils d'alimentation adequats pour 90°C.**

WARNING: To avoid electrical shock, disconnect the power supply to the circulator and the main electrical unit.

REPLACING MOTOR ASSEMBLY:

1. Disconnect the electrical supply.
2. Reduce system pressure to 0 psi and allow system to return to room temperature. Isolate the circulator by closing the service valves or draining the system.
3. Remove the body bolts and swing motor assembly away from the body.
4. Install new motor, and reassemble circulator using the new gasket and bolts supplied.
5. Follow the "installation" procedure to start up the circulator.

REPLACING CARTRIDGE ASSEMBLY:

1. Disconnect the electrical supply.
2. Reduce system pressure to 0 psi and allow system to return to room temperature. Isolate the circulator by closing the service valves or draining the system.
3. Remove the body bolts and swing motor assembly away from the body.
4. Pull cartridge out of the motor housing.
5. Install replacement cartridge, making sure that the cover plate is between the cartridge flange and motor.
6. Make sure the replacement cartridge corresponds to the full circulator product number. A complete parts list is available from your local plumbing supply wholesaler.
7. Reassemble the circulator using the new gasket and bolts supplied.
8. Follow the "Installation" procedure to start up the circulator.

REPLACING CAPACITOR:

1. Replacement capacitor must have same rating as originally furnished.

LIMITED WARRANTY STATEMENT

Taco, Inc. will repair or replace without charge (at the company's option) any Taco 00 Series circulator or circulator part which is proven defective under normal use within three (3) years from the date of manufacture.

In order to obtain service under this warranty, it is the responsibility of the purchaser to promptly notify the local Taco stocking distributor or Taco in writing and promptly deliver the subject product or part, delivery prepaid, to the stocking distributor. For assistance on warranty returns, the purchaser may either contact the local Taco stocking distributor or Taco. If the subject product or part contains no defect as covered in this warranty, the purchaser will be billed for parts and labor charges in effect at time of factory examination and repair.

Any Taco product or part not installed or operated in conformity with Taco instructions or which has been subject to misuse, misapplication, the addition of petroleum-based fluids or certain chemical additives to the systems, or other abuse, will

not be covered by this warranty.

If in doubt as to whether a particular substance is suitable for use with a Taco product or part, or for any application restrictions, consult the applicable Taco instruction sheets or contact Taco at (401-942-8000).

Taco reserves the right to provide replacement products and parts which are substantially similar in design and functionally equivalent to the defective product or part. Taco reserves the right to make changes in details of design, construction, or arrangement of materials of its products without notification.

TACO OFFERS THIS WARRANTY IN LIEU OF ALL OTHER EXPRESS WARRANTIES. ANY WARRANTY IMPLIED BY LAW INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS IS IN EFFECT ONLY FOR THE DURATION OF THE EXPRESS WARRANTY SET FORTH IN THE FIRST PARAGRAPH ABOVE.

THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR STATUTORY, OR ANY OTHER WARRANTY OBLIGATION ON THE PART OF TACO.

TACO WILL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF ITS PRODUCTS OR ANY INCIDENTAL COSTS OF REMOVING OR REPLACING DEFECTIVE PRODUCTS.

This warranty gives the purchaser specific rights, and the purchaser may have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts or on the exclusion of incidental or consequential damages, so these limitations or exclusions may not apply to you.

 **TACO Comfort Solutions™** A Taco Group Company

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P-7



BRADFORD WHITE[®]
W A T E R H E A T E R S

**Residential & Light Duty
Commercial Electric Water Heaters**



SERVICE **MANUAL**

Troubleshooting Guide
and Instructions for Service

(To be performed ONLY by
qualified service providers)

Models Covered by This Manual:

Residential:

RE1 & RE3 Upright Models.
RE1 & RE2 Lowboy Models.
RE1 Utility Models.
RE1 Wall Hung Models.

Light Duty:

LE Upright Models.
LE Utility Models.
LE Lowboy.
LE Wall Hung.

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Introduction

This service manual is designed to aid service and maintenance professionals on the function, proper diagnosis and repair of Bradford White residential electric and light duty commercial electric water heaters.

The text and illustrations in this manual provide step by step instructions to facilitate proper operation and troubleshooting procedures. Contact the Bradford White Technical Support Group immediately if diagnosis can not be made using the methods described in this service manual.

Tools

- | | |
|------------------------|------------------------------|
| - Multi Meter | - Phillips Head Screw Driver |
| - 1-½ Deep Well Socket | - Thermometer |
| - ¼" Nut Driver | - Drain Hose |

- Various Hand Tools: Pipe Wrench, Channel Locks, Pliers (common & needle nose), Wire cutters, Wire Strippers, Flash Light.

Commonly Used Formulas

Amps = $\frac{\text{Watts}}{\text{Volts}}$ (for single phase units) Example: $4500\text{W}/240\text{V} = 18.75\text{A}$

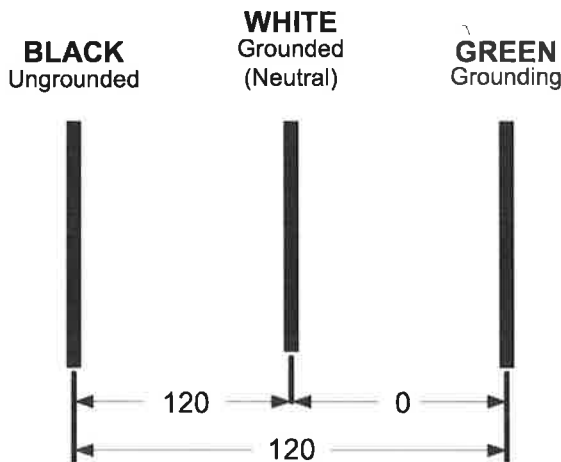
Amps = $\frac{\text{Watts}}{\text{Volts} \times 1.732}$ (for balanced 3 phase units) Example: $4500\text{W}/240\text{V} \times 1.732 = 10.82\text{A}$

Watts = Amps x Volts Example: $18.75\text{A} \times 240\text{V} = 4500\text{W}$

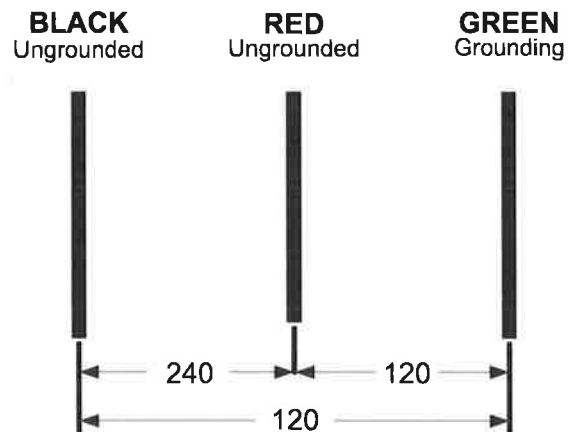
Ohms = $\frac{\text{Volts}^2}{\text{Watts}}$ Example: $(240\text{V})^2 / 4500\text{W} = 12.8 \text{ Ohms}$

Common Service Wire Configurations

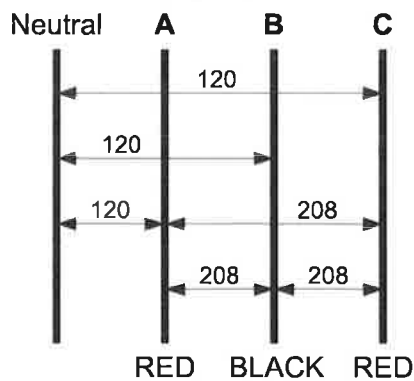
120 VOLT



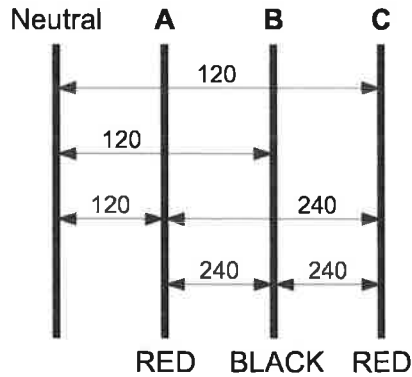
240 VOLT



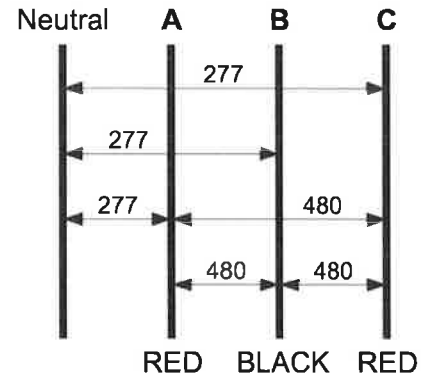
208 3Ph



240 3Ph



480 3Ph/277 1 Ph



Wattage Limitations at Various Voltages

Residential Electric Upright RE2 & RE3 Series (Non-Simultaneous Operation)
 Residential High Efficiency Upright RE2 Series (Non-Simultaneous Operation)
 Residential Electric Lowboy RE2 Series (Non-Simultaneous Operation)

Maximum Wattage	Element Upper/Lower	Voltage
3,000	3,000/3,000	120
6,000	6,000/6,000	208, 240
6,000	6,000/6,000	277, 480

Residential Electric Upright RE2 & RE3 Series (Simultaneous Operation)
 Residential High Efficiency Upright RE2 Series (Simultaneous Operation)
 Residential Electric Lowboy RE2 Series (Simultaneous Operation)
 Light Duty Commercial Electric LE Series (Non-Simultaneous Operation)
 Light Duty Commercial Electric LE Series (Simultaneous Operation)

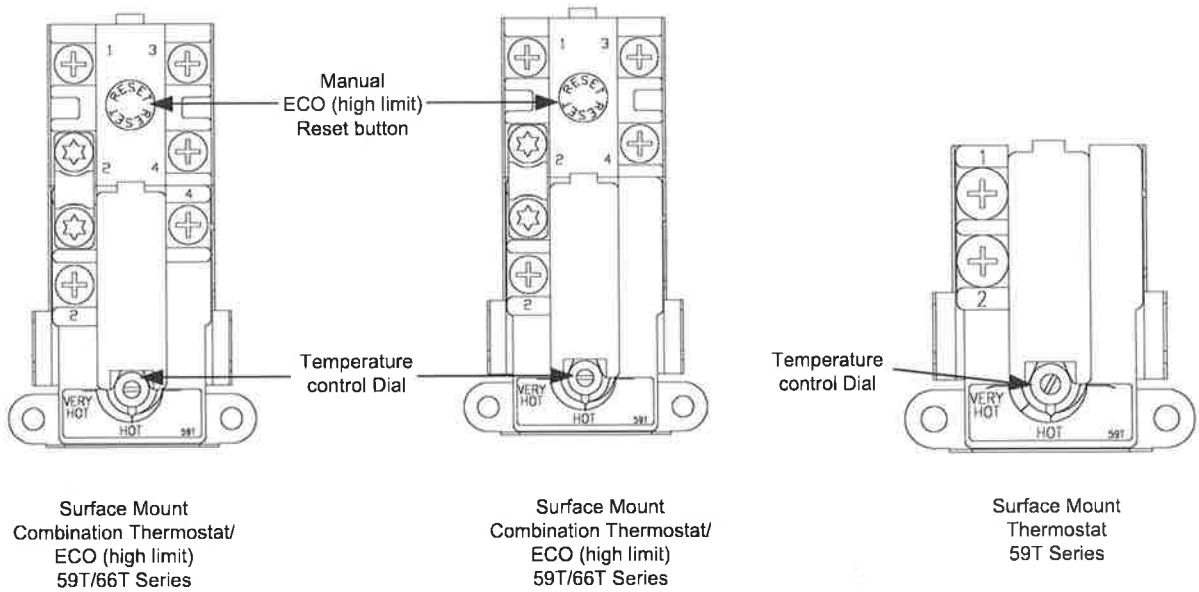
Maximum Wattage	Element Upper/Lower	Voltage
3,000	1,500/1,500	120
10,000	5,000/5,000	208
11,000	5,500/5,500	240
12,000	6,000/6,000	277, 480

Residential Electric Utility Series (Single Element Operation)
 Light Duty Utility Series (Single Element Operation)

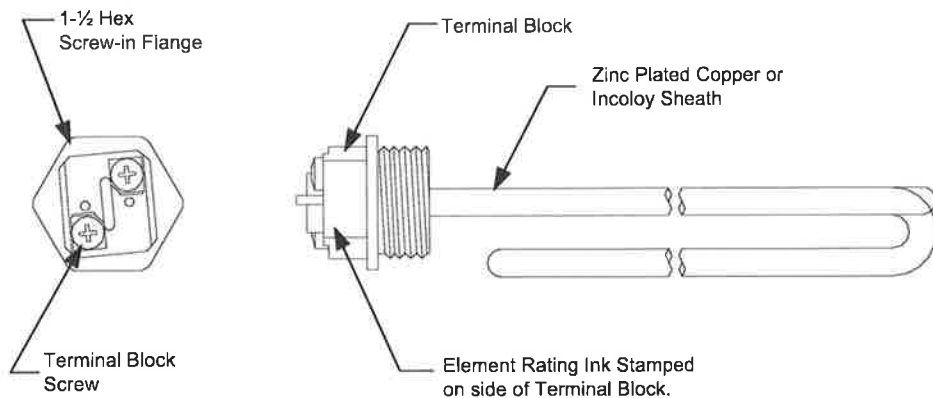
Maximum Wattage	Single Element	Voltage
3,000	3,000	120
6,000	6,000	208, 240
6,000	6,000	277
6,000	6,000	480

Surface Mounted Thermostats

Surface mounted thermostats are mounted into a bracket which holds the thermostat against the side of the tank. Surface mounted thermostats respond to tank surface temperatures to sense a call for heat, set point temperature settings and high limit (ECO) activation. It is important that the entire back surface of the thermostat is in full contact or flush with the tank. Improperly mounted thermostat will lead to improper water heater operation.



Direct Immersion “Screw-in” Type Heating Element



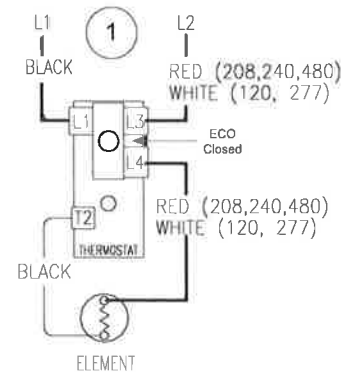
SEQUENCE OF OPERATION

Residential and light duty commercial electric water heaters are designed to operate using several different operating modes. The common modes and sequence of operation are as follows:

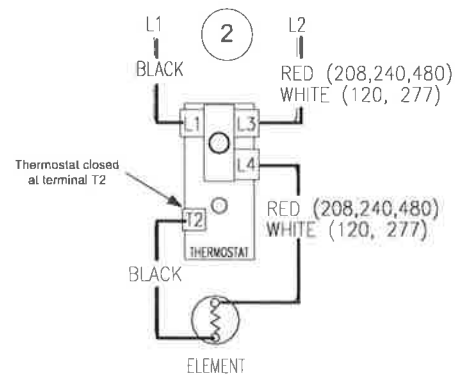
1. Single Element Operation.
2. Double Element Non-Simultaneous Operation (single phase).
3. Double Element Non-Simultaneous Operation (3 phase).
4. Double Element Simultaneous Operation (single phase).
5. Double Element Simultaneous Operation (3 phase).

Sequence of Operation- Single Element Operation.

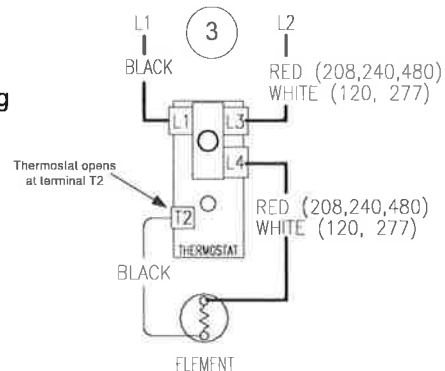
- 1 Line voltage is applied across terminals L1 & L3 of the thermostat. ECO is closed, so there is voltage at terminal L4 and to one side of the element.



- 2 Tank is cold therefore thermostat is closed at terminal T2 (calling for heat). This completes the circuit and allows current to flow through the element.



- 3 When the thermostat is satisfied, it opens at terminal T2 interrupting current flow through the element. System is now in stand-by mode, waiting for the next call for heat.



Non-Simultaneous and Simultaneous Operation

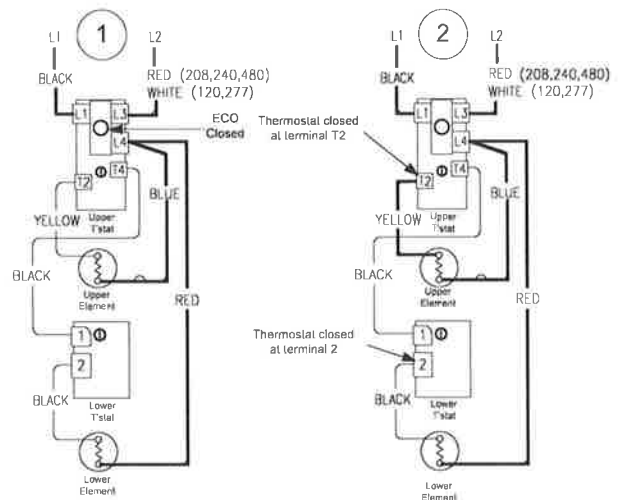
Double element electric water heaters are designed to operate in either Non-Simultaneous or Simultaneous mode.

Non-Simultaneous Mode: Allows only one heating element to operate at a time. For example, when the tank is cold, the upper element is energized first, heating the top of the tank. Only when the upper thermostat is satisfied, the upper element is de-energized and power is directed to the lower thermostat, energizing the lower element and heating the bottom portion of the tank until the lower thermostat is satisfied. As hot water is drawn off the tank, it is replaced with cold water delivered through the dip tube to the bottom of the tank. When the tank cools at the lower thermostat level, the lower thermostat will call for heat, energizing the lower element. If enough hot water is drawn from the tank, the top portion of the tank cools and the upper thermostat will call for heat, de-energizing the lower element and allowing only the top element to energize until the upper thermostat is satisfied.

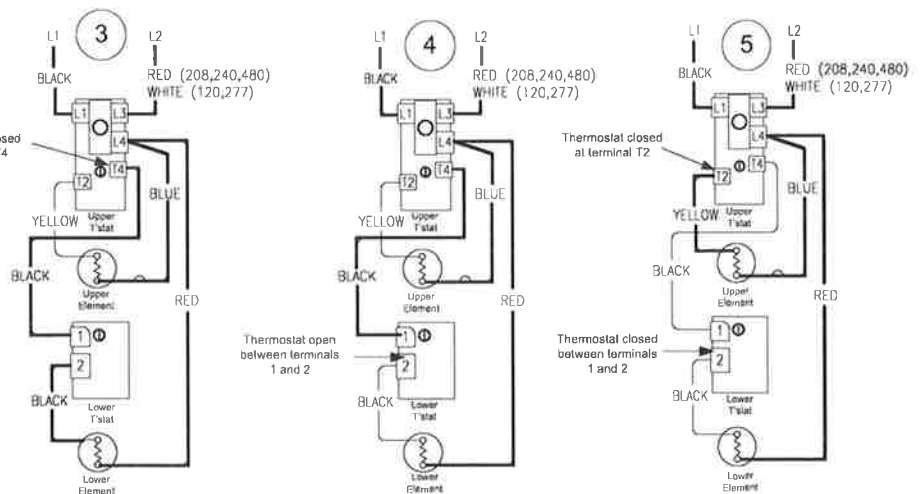
Simultaneous mode: allows both heating elements to operate at the same time. That is, if either thermostat (upper or lower) is calling for heat, the corresponding heating element is energized independent of the other.

Sequence of Operation- Double Element, Non-Simultaneous Operation, Single Phase.

- 1 Line voltage is applied across terminals L1 & L3 of the upper thermostat. ECO is closed, so there is voltage at terminal L4 and to one side of the upper and lower elements.
- 2 Tank is cold. Therefore, the thermostats are closed at terminals T2 & 2 (calling for heat). The circuit is complete through the upper thermostat only, allowing current to flow through upper element.
- 3 When the upper thermostat is satisfied, it opens at terminal T2, interrupting current flow through the upper element. Terminal T4 closes, allowing voltage to pass to terminal 1 of the lower thermostat. This completes the circuit through the lower thermostat and allows current flow through the lower element.
- 4 When the lower thermostat is satisfied, it opens at terminal 2, interrupting current flow through lower element. The system is now in stand-by mode waiting for the next call for heat.



- 5 The lower thermostat/element combination will generally cycle on and off more often than the upper. In some cases, such as a cold tank or in high demand periods, the upper thermostat will call for heat (opening at terminal T4 and closing at terminal T2) prior to the lower thermostat being satisfied. This will interrupt current flow through the lower thermostat and element and allow current to flow through the upper element only. When the upper thermostat is satisfied, it resumes operation as described in sequence #3 above.



SEQUENCE OF OPERATION

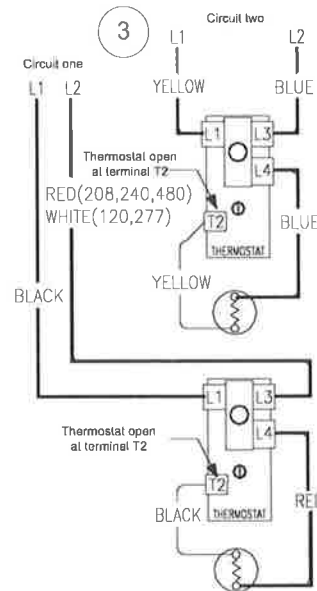
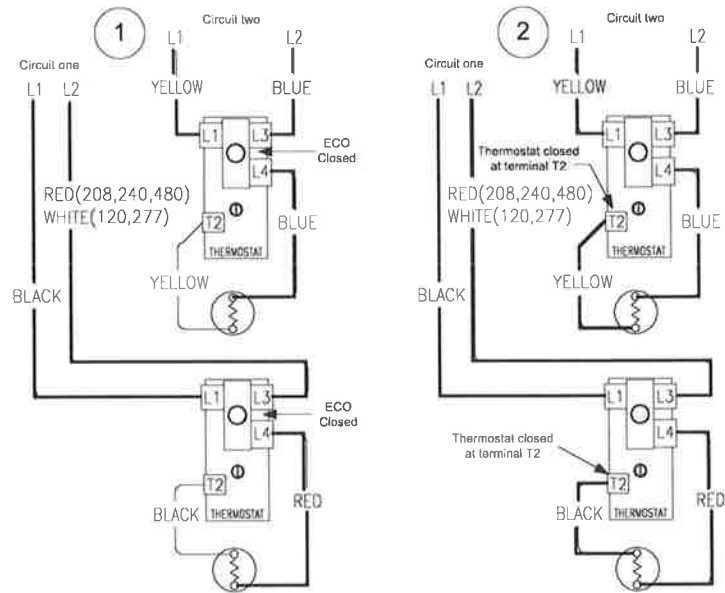
A 4 wire, double element heater wired for simultaneous operation is essentially two single element systems operating independently. The heaters are wired internally with two independent circuits, one circuit for each thermostat/element combination. When installed using a two wire service, the blue and red (or white) wires will be connected together, likewise black and yellow wires will be connected together.

Sequence of Operation- Double Element, Simultaneous Operation, Single Phase, 4 wire service installation.

1 Line voltage from circuit one is applied across terminals L1 & L3 of the lower thermostat. Likewise, line voltage from circuit two is applied across terminals L1 & L3 of the upper thermostat. ECO in both upper and lower thermostat is closed, so there is voltage at terminal L4 of each thermostat and to one side of the upper and lower elements.

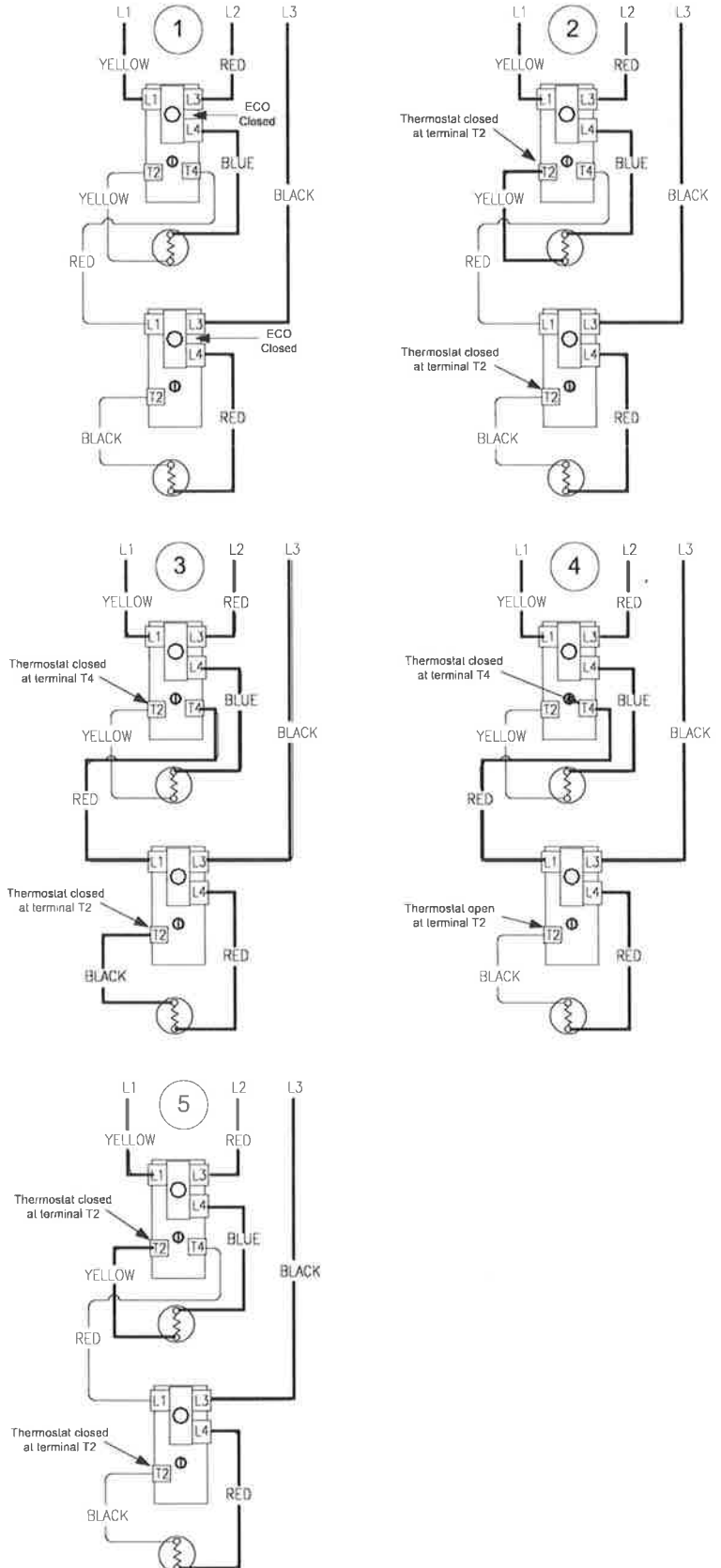
2 Tank is cold therefore both thermostats are closed at terminal T2 (calling for heat). This completes the circuit through the thermostats and allows current to flow through the elements.

3 When either thermostat is satisfied, it will open at terminal T2, interrupting current flow through the corresponding element. As both thermostats satisfy, the system will be in stand-by mode waiting for the next call for heat. Thermostats will operate independent of each other.



Sequence of Operation- Double Element, Non-Simultaneous Operation, 3 Phase.

- 1 Line voltage is applied across terminals L1 & L3 of upper thermostat. Likewise, Line voltage is applied to terminal L3 of lower thermostat. ECO in both upper & lower thermostat is closed, so there is voltage at terminal L4 of both thermostats and to one side of both upper & lower elements.
- 2 Tank is cold therefore both thermostats are closed at terminal T2 (calling for heat). The circuit is complete through the upper thermostat only allowing current to flow through the upper element.
- 3 When the upper thermostat is satisfied, it opens at terminal T2 interrupting current flow through upper element, and closes at terminal T4 allowing voltage to pass to terminal L1 of lower thermostat. This completes the circuit through the lower thermostat allowing current flow through lower element.
- 4 When the lower thermostat is satisfied, it opens at terminal T2 interrupting the current flow through the lower element. The system is now in stand-by mode waiting for the next call for heat.
- 5 The lower thermostat/element combination will generally cycle on and off more often than the upper. In some cases, such as a cold tank or in high demand periods, the upper thermostat will call for heat (opening at terminal T4 and closing at terminal T2) prior to the lower thermostat being satisfied. This will interrupt current flow through the lower thermostat and element and allow current to flow through the upper element only. When the upper thermostat is satisfied, it resumes operation as described in sequence #3 above.



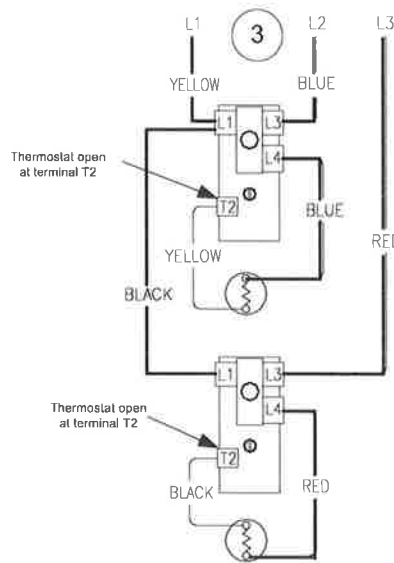
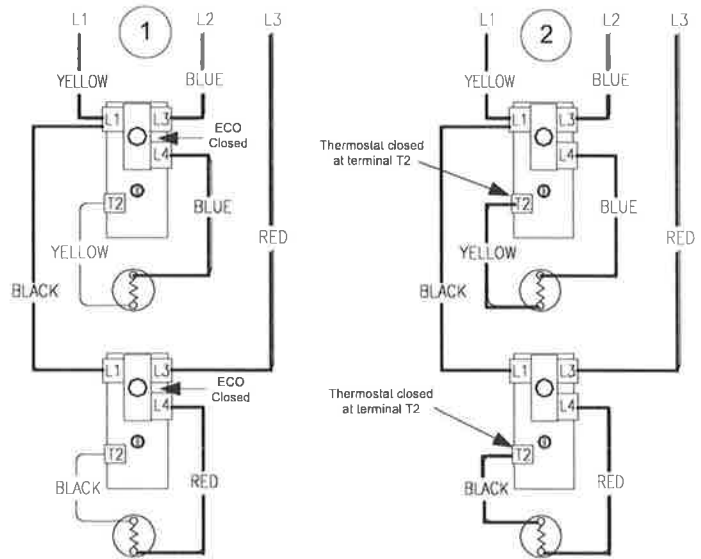
SEQUENCE OF OPERATION

Sequence of Operation- Double Element, Simultaneous Operation, 3 Phase.

1 Line voltage is applied across terminals L1 & L3 of upper thermostat. Line voltage also extends to terminal L1 of lower thermostat. Also, line voltage is applied to terminal L3 of lower thermostat. ECO in both upper & lower thermostat is closed, so there is voltage at terminal L4 of both thermostats and to one side of both upper & lower elements.

2 Tank is cold therefore both thermostats are closed at terminal T2 (calling for heat). This completes the circuit through the thermostats and allows current to flow through the elements.

3 When either thermostat is satisfied, it will open at terminal T2, interrupting current flow through the corresponding element. As both thermostats satisfy, the system will be in stand-by mode waiting for the next call for heat. Thermostats will operate independent of the other.



Some electric utility companies will offer discounts for using electricity during "Off Peak" Times of the day. The system allows the use of an "Off Peak" meter, which interrupts power to the lower element during high power demand periods.

Sequence of Operation- Double Element, Non-Simultaneous Operation, Single Phase, Off Peak.

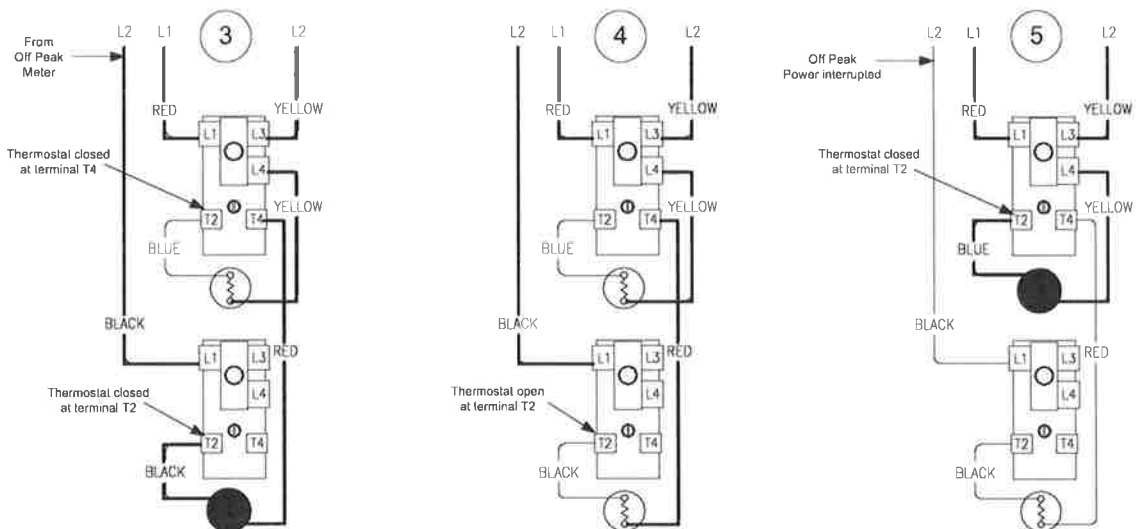
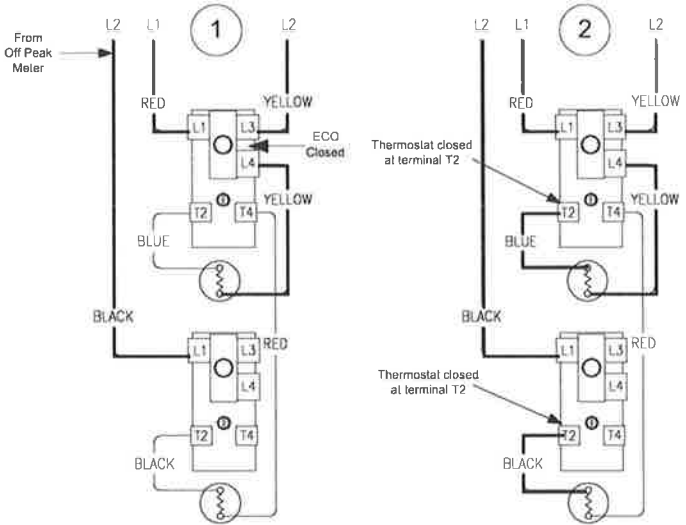
1 Line voltage is applied across terminals L1 & L3 of the upper thermostat. Line voltage from off peak meter is supplied to terminal L1 of lower thermostat. ECO in the upper thermostat is closed, so there is voltage at terminal L4 of upper thermostat and to one side of the upper element.

2 Tank is cold therefore both thermostats are closed at terminal T2 (calling for heat). The circuit is complete through the upper thermostat only, allowing current to flow through upper element.

3 When upper thermostat is satisfied, it opens at terminal T2 interrupting current flow through upper element, and closes at terminal T4 allowing voltage to pass to one side of the lower element. This completes the circuit through the lower thermostat and off peak meter allowing current flow through lower element.

4 When the lower thermostat is satisfied, it opens at terminal T2 interrupting current flow through lower element. The system is now in stand-by mode waiting for the next call for heat

5 During peak power demand periods as determined by the local utility, the off peak meter will interrupt power to terminal L1 of lower thermostat. Only the top thermostat/element combination is allowed to operate during this period.



Most common cause for improper electric water heater operation can be linked to heating element failure.

When troubleshooting an electric water heater with the incidence of “No Hot Water” or “Insufficient Amount of Hot Water,” It’s always a good idea to check the heating elements first by following the procedure on page 15.

Common Heating Element Failures:

1. **Dry Firing.** Element may be partially submerged in water or most likely, completely exposed with no water in tank. In some cases, sediment or lime build up around an element can eventually cause an air pocket, and within seconds, result in a dry fired element. At this point the element becomes inoperative. When element replacement is required, be sure the tank is full of water prior to energizing the water heater.
2. **Grounded Element.** An element with a short circuit to ground will in most cases cause the circuit breaker in the service panel to open or shut off. In some cases, there may not be enough current draw for the circuit breaker to open. This will allow the heating element to be in continuous operation resulting in over heated water, limited only by the ECO or Energy Cut Out. Repeated actuation of the ECO is usually the result of a grounded element.
3. **Sediment build up.** Slow hot water recovery can usually be traced back to sediment or lime build up around heating element. Sediment build up can also over time cause a dry fired element.

Figure 1, below shows a common “Screw-In” type heating element identifying certain features commonly referred to throughout this manual.

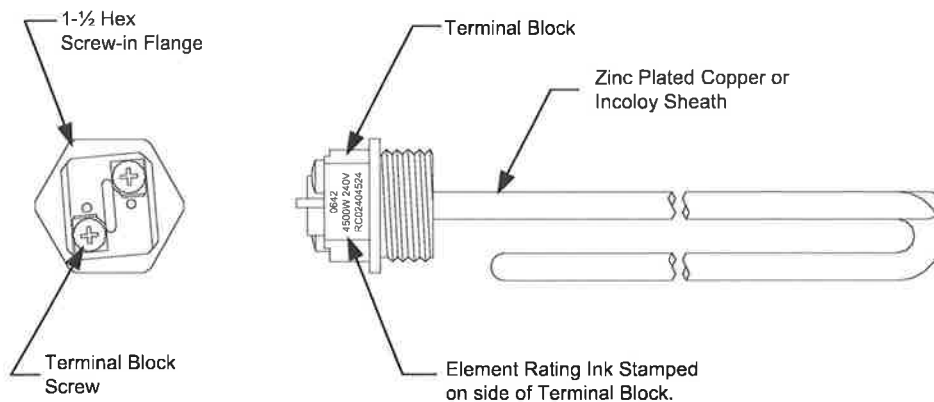


Figure 1
**Typical Direct Immersion “Screw-In”
Type Heating Element**

Quick Step Plan to Hot Water

1. TURN OFF power to water heater and check all wire connections to ensure they are tight and corrosion free.
2. Turn power "ON" and determine that service voltage is present, and the high limit (ECO) has not actuated (see procedure on page 14).
3. Check for inoperative heating element (see procedure on page 15).
4. Check for proper thermostat operation (see procedures beginning on page 16). NOTE: Thermostat testing procedures assume items 2 and 3 above are in working order.

⚠ WARNING
High voltage exposure. Use caution when making voltage checks to avoid personal injury.

<u>SYMPTOM</u>	<u>PROBABLE CAUSE</u>	<u>CORRECTIVE ACTION</u>	<u>SERVICE PROCEDURE</u>
No Hot Water	<ol style="list-style-type: none"> 1. No Power to heater. 2. Loose wire connections. 3. Inoperative upper heating element. 4. Inoperative upper thermostat. 5. Open ECO. 	<ol style="list-style-type: none"> 1. Check fuses or circuit breakers in service panel. 2. Check all wire connections. 3. Check heating element(s). Replace as needed. 4. Check thermostat(s) operation. Replace as needed. 5. Check ECO. Reset or replace thermostat(s) as needed. 	<ol style="list-style-type: none"> 3. See Service Procedure RE-II, Page 15. 4. See Service Procedure RE-III, Page 16. 5. See Service Procedure RE-I, Page 14.
Not Enough Hot Water	<ol style="list-style-type: none"> 1. Inoperative lower heating element. 2. Thermostat(s) set to low. 3. Inoperative thermostat(s). 4. Loose wire connection. 5. Sediment or lime build up on element(s). 6. High demand period. 7. Undersized heater. 8. Very cold inlet water to heater. 9. Plumbing connections reversed. 10. Damaged dip tube. 	<ol style="list-style-type: none"> 1. Check heating element(s), replace as needed. 2. Increase thermostat setting. 3. Check thermostat(s), replace as needed. 4. Check all wire connection. 5. Remove heating element(s) and check for lime build up. 6. Reduce demand. 7. Replace with larger heater. 8. Temper water to heater. 9. Correct plumbing connections. 10. Check dip tube, replace as needed. 	<ol style="list-style-type: none"> 1. See Service Procedure RE-II, Page 15. 3. See Service Procedure RE-III, Page 16. 5. See Service Procedure RE-VI, Page 34. 10. See Service Procedure RE-VII, Page 35.
Slow Hot Water Recovery	<ol style="list-style-type: none"> 1. Sediment or lime build up on element(s). 2. Loose wire connections. 3. Inoperative thermostat(s). 4. Derated heating element installed. 	<ol style="list-style-type: none"> 1. Remove heating element(s) and check for lime build up. 2. Check all wire connections. 3. Check thermostat(s), replace as needed. 4. Check terminal block of element for proper voltage and wattage rating. 	<ol style="list-style-type: none"> 1. See Service Procedure RE-VI, Page 34. 3. See Service Procedure RE-III, Page 16.
Over Heated Water or Continued Operation	<ol style="list-style-type: none"> 1. Thermostat not in contact with tank. 2. Grounded heating element(s). 3. Thermostat set too high. 4. Inoperative thermostat(s). 5. Inoperative ECO. 6. Undersized water heater. 	<ol style="list-style-type: none"> 1. Position thermostat flush with tank surface. 2. Check heating element(s). Replace as needed. 3. Adjust thermostat(s) to desired setting. 4. Check thermostat(s), replace as needed. 5. Check ECO, replace thermostat as needed. 6. Replace with larger heater. 	<ol style="list-style-type: none"> 1. See Service Procedure RE-V, Page 33. 2. See Service Procedure RE-II, Page 15. 4. See Service Procedure RE-III, Page 16. 5. See Service Procedure RE-I, Page 14.
Noisy (singing or hissing) Elements	<ol style="list-style-type: none"> 1. Lime formation on elements. 	<ol style="list-style-type: none"> 1. Remove and clean heating elements. Replace as needed. 	<ol style="list-style-type: none"> 1. See Service Procedure RE-VI, Page 34.

SERVICE PROCEDURE RE-I
Line Voltage & High Limit (ECO)
Testing

Line Voltage Testing

1. Turn "OFF" power to water heater.
2. Remove access cover(s) from front of water heater. Remove insulation and plastic cover from thermostat.
3. Set multi-meter to "Volts AC."
4. Turn power "ON" to water heater.
5. Check voltage across terminals L1 & L3 of upper thermostat (see Figure 2).

- A) Rated voltage IS present, power to the water heater is okay.
- B) Rated voltage NOT present, Check circuit breaker at service panel.

⚠ WARNING
High voltage exposure. Use caution when making voltage checks to avoid personal injury.

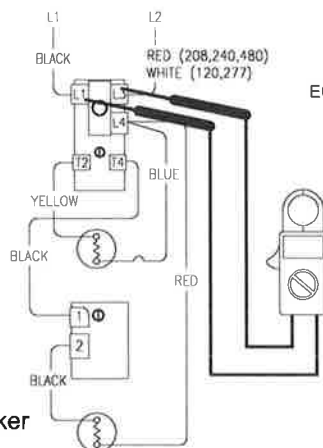


Figure 2

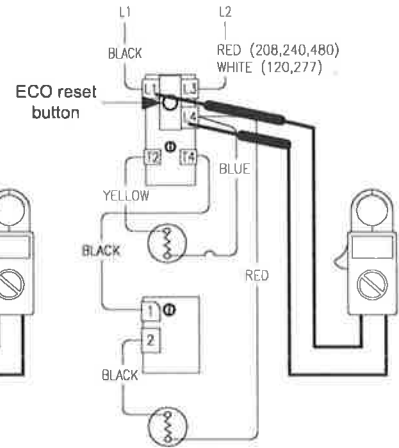


Figure 3

High Limit (ECO) Testing

1. Check voltage across terminals L1 & L4 upper thermostat (see Figure 3).
 - A) Rated Voltage IS present, ECO is okay.
 - B) Rated voltage NOT present, proceed to step 2.
2. Turn power "OFF" to water heater and firmly press ECO reset button on thermostat(s). Turn power "ON" and recheck voltage across terminals L1 & L4 of upper thermostat (see Figure 3).
 - A) Rated voltage IS present, the ECO has previously opened indicating the water in the tank, at some point did overheat, check the following:
 1. Thermostat must be in full contact with tank.
 2. Be sure heating element(s) is not shorted to ground (see page 15).
 3. Proper thermostat operation (see procedures beginning on page 16).
 - B) Rated voltage NOT present, water in tank may be over heated.
 1. If water is hot, turn "OFF" power to water heater and flow water through tank to cool below set point of upper thermostat. Recheck voltage per step 1.
 2. If water is cool, Replace upper thermostat.

Testing For Open Or Burned Out Element

Step 1. **TURN OFF POWER TO WATER HEATER**

Step 2. Remove access cover(s) from front of water heater. Remove insulation and plastic cover from thermostat.

Step 3. Disconnect wires from heating element(s).

Step 4. Set multi-meter to "ohms" setting.

Step 5. Touch probes of multi-meter to screw terminals of heating element(s) (see Figure 4).

Step 6. Reading should be 12.8 ohms (±6%) for a 240 volt, 4500 watt element:

$$\text{Ohms} = \frac{\text{Volts}^2}{\text{Watts}}$$

A reading outside the range using the formula beyond (±6%), indicates a bad element and the element must be replaced.

⚠ WARNING
High voltage exposure. Be sure power is turned OFF to water heater prior to performing this procedure.

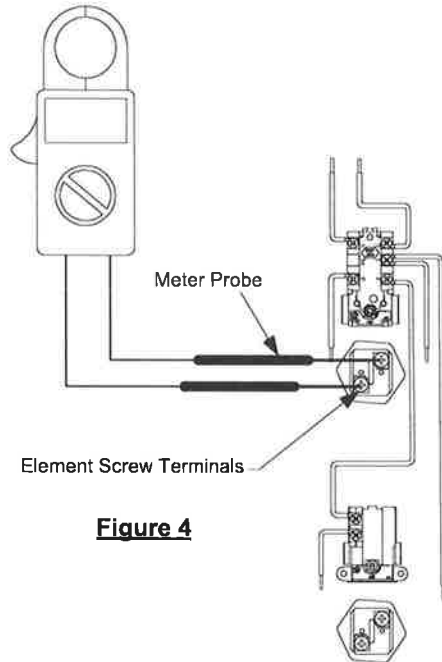


Figure 4

Testing For Heating Element Short Circuit To Ground

Step 1. **TURN OFF POWER TO WATER HEATER**

Step 2. Remove access cover(s) from front of water heater. Remove insulation and plastic cover from thermostat.

Step 3. Disconnect wires from heating element(s).

Step 4. Set multi-meter to "ohms" setting.

Step 5. Touch one probe of multi-meter to either screw terminal of heating element and the other on the element flange (see figure 5). There should be no reading on the ohm meter. Any reading indicates a grounded element and the element must be replaced. Repeat this step for the other screw terminal.

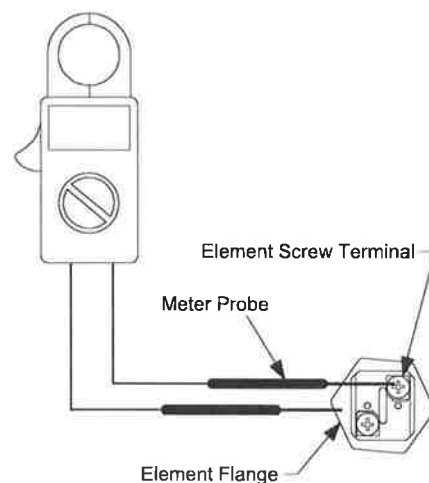


Figure 5

SERVICE PROCEDURE RE-III
Residential Thermostat Testing

**Single Element Operation or Double Element,
 4 Wire, Simultaneous, Single Phase Operation**

⚠ WARNING
**High voltage exposure. Use caution to avoid
 personal injury during this procedure.**

Water In Tank Is Cold With Power ON

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Turn power "ON" to water heater.
3. Set multi-meter to "Volts AC."
4. Check across terminals L4 and T2 of thermostat (see Figure 6).
 - A) Rated voltage NOT present, Recheck ECO. If ECO is okay, replace thermostat.
 - B) Rated voltage IS present, proceed to next step.
5. Check across element terminals (see Figure 7).
 - A) Rated voltage NOT present, check wire connections from thermostat to element.
 - B) Rated voltage IS present, Repeat element testing see page 15.

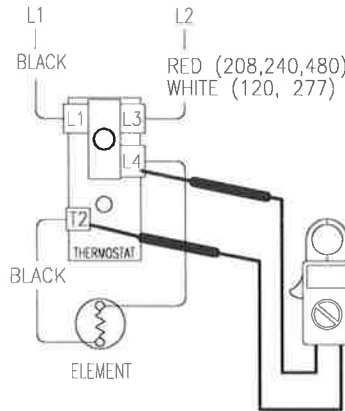


Figure 6

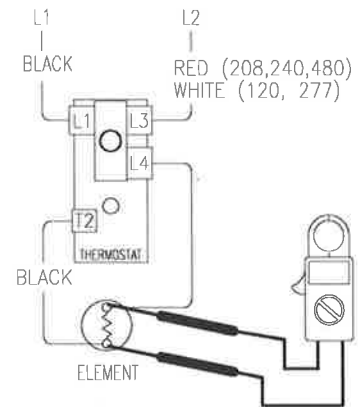
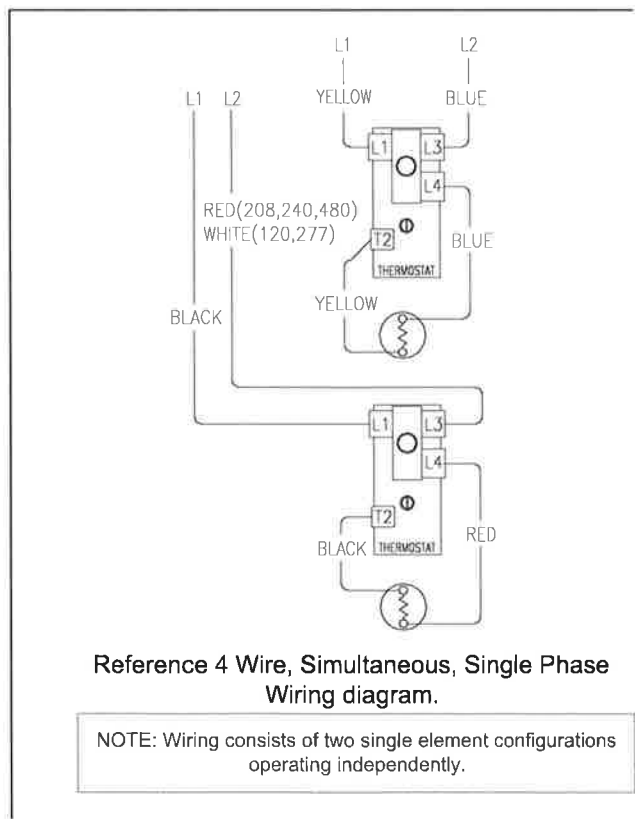


Figure 7

Water Temperature In Tank Is Above Thermostat Setting

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Turn power "ON" to water heater.
3. Set multi-meter to "Volts AC."
4. See Figure 6 above, check across terminals L4 and T2 of thermostat.
 - A) Rated voltage IS present, replace thermostat.
 - B) Rated voltage NOT present, thermostat is okay.
 - C) Lower than rated voltage IS present, recheck for grounded element (see page 15).



Double Element, Non-Simultaneous, Single Phase Operation.

⚠ WARNING
High voltage exposure. Use caution to avoid personal injury during this procedure.

Water In Tank Is Cold With Power ON.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Turn power "ON" to water heater.
3. Set multi-meter to "Volts AC."
4. Check across terminals L4 and T2 of upper thermostat (see Figure 8).
 - A) Rated voltage NOT present, Recheck ECO. If ECO is okay, replace thermostat.
 - B) Rated voltage IS present, proceed to next step.
5. Check across element terminals (see Figure 9).
 - A) Rated voltage NOT present, check wire connections from thermostat to element.
 - B) Rated voltage IS present, Repeat element testing see page 15.

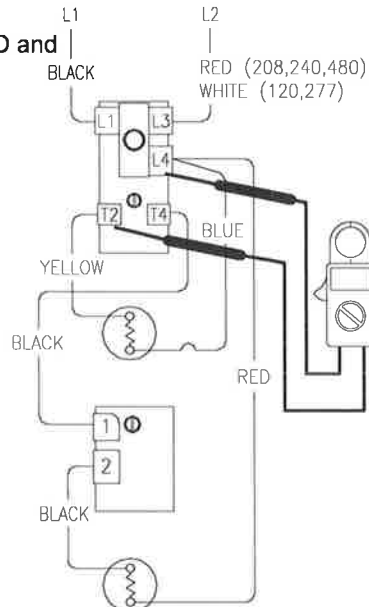


Figure 8

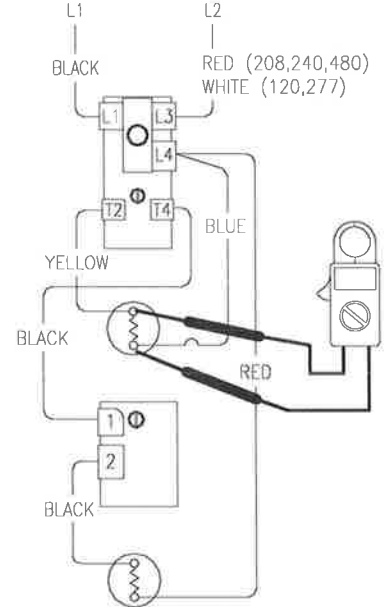


Figure 9

Tank Does Not Deliver Enough Hot Water.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Turn power "ON" to water heater and set multi-meter to "Volts AC."
3. Adjust temperature setting of upper thermostat to the highest setting. Water temperature in tank must be below thermostat setting for this test.
4. See Figure 8 above, check voltage across terminals L4 and T2 of upper thermostat.
 - A) Rated voltage IS present, okay, upper thermostat is calling for heat. Go to step 5 below.
 - B) Rated voltage NOT present, replace upper thermostat.
5. Adjust temperature setting of upper thermostat to the minimum setting. Water temperature in tank must be above thermostat setting for this test.
6. Check voltage across terminals L4 and T4 of upper thermostat (see Figure 10).
 - A) Rated voltage NOT present, replace upper thermostat.
 - B) Rated voltage IS present, thermostat is okay. Go to step 7 on next page.

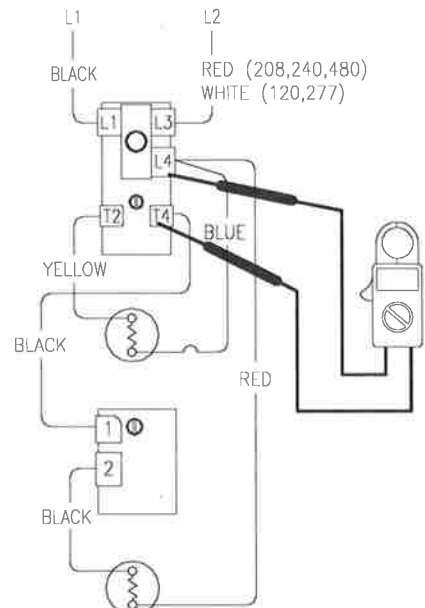


Figure 10

SERVICE PROCEDURE RE-III
Residential Thermostat Testing

Double Element, Non-Simultaneous, Single Phase Operation (continued).

Not Enough Hot Water (continued).

7. Check voltage across terminal L4 of upper thermostat and terminal 1 of lower thermostat (see Figure 11).
 - A) Rated voltage NOT present, - check wire connection between thermostats.
 - B) Rated voltage IS present, okay, go to step 8.
8. Adjust lower thermostat to highest setting. Water temperature in tank must be below the lower thermostat setting for this test.
9. Check voltage across terminal L4 of upper thermostat and terminal 2 of lower thermostat (see Figure 12).
 - A) Rated voltage NOT present, replace lower thermostat.
 - B) Rated voltage IS present, thermostat is ok.

⚠ WARNING
High voltage exposure. Use caution to avoid personal injury during this procedure.

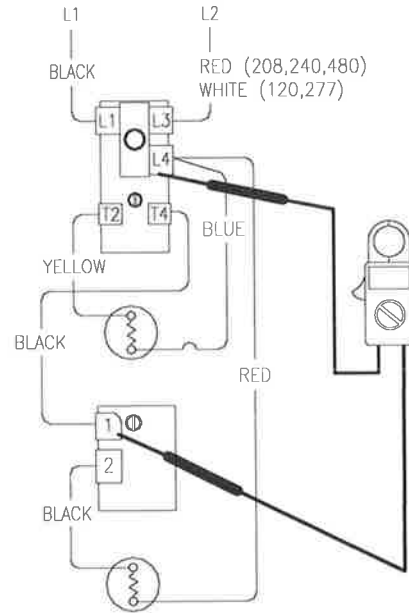


Figure 11

⚠ WARNING
Be sure thermostats are reset to their original temperature settings as found prior to thermostat testing

Water Temperature In Tank Is Above Thermostat Setting.

1. This procedure assumes Line voltage, ECO and elements are in working order.
2. Adjust upper and lower thermostats to the lowest setting.
3. Turn power "ON" to water heater and set multi-meter to "Volts AC."
4. Check across terminals L4 and T2 of upper thermostat (see Figure 8 on page 17).
 - A) Rated voltage IS present, replace upper thermostat.
 - B) Rated voltage NOT present, upper thermostat is okay. Go to step 5 below.
 - C) Lower than rated voltage IS present, recheck for grounded upper element (see page 15).
5. Check across terminals L4 and 2 of lower thermostat (see Figure 12).
 - A) Rated voltage IS present, replace lower thermostat.
 - B) Rated voltage NOT present, lower thermostat is okay.
 - C) Lower than rated voltage IS present, recheck for grounded lower element (see page 15).

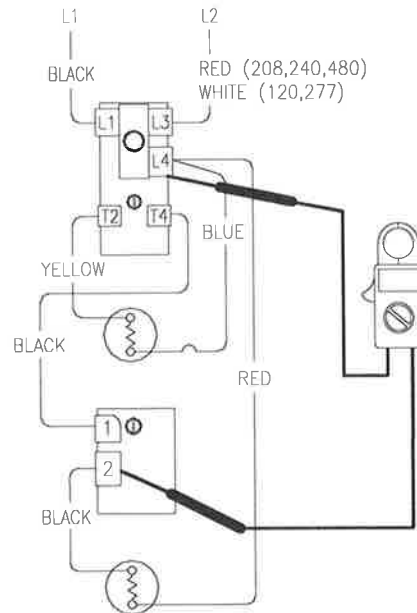


Figure 12

Double Element, Non-Simultaneous, Three Phase Operation.

Water In Tank Is Cold With Power ON.

⚠ WARNING
High voltage exposure. Use caution to avoid personal injury during this procedure.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Turn power "ON" to water heater.
3. Set multi-meter to "Volts AC."
4. Check across terminals L4 and T2 of upper thermostat (see Figure 13).

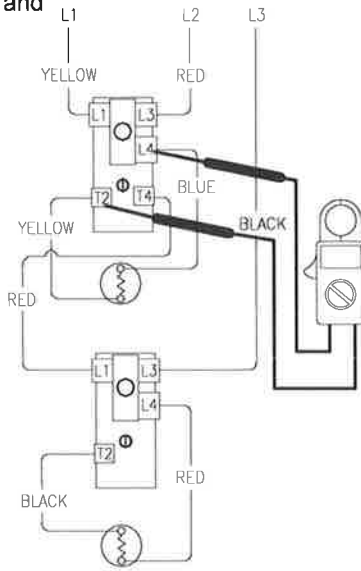


Figure 13

- A) Rated voltage NOT present, recheck ECO. If ECO is okay, replace thermostat.
- B) Rated voltage IS present, proceed to next step.

5. Check across element terminals (see Figure 14).

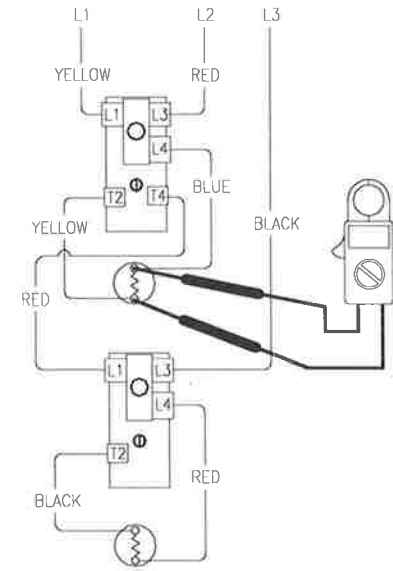


Figure 14

- A) Rated voltage NOT present, check wire connections from thermostat to element.
- B) Rated voltage IS present, repeat element testing, see page 15.

Tank Does Not Deliver Enough Hot Water.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Turn power "ON" to water heater and set multi-meter to "Volts AC."
3. Adjust temperature setting of upper thermostat to the highest setting. Water temperature in tank must be below thermostat setting for this test.
4. See Figure 13 above, check voltage across terminals L4 & T2 of upper thermostat.

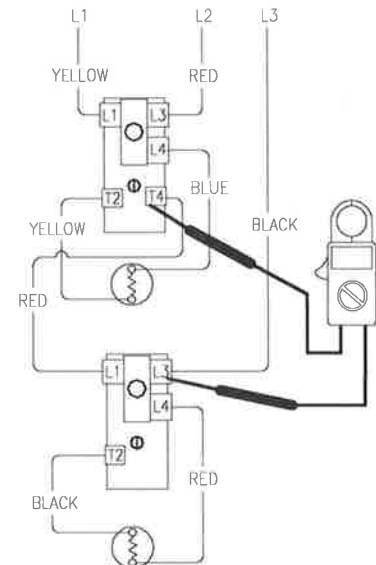


Figure 15

- A) Rated voltage IS present, okay, upper thermostat is calling for heat. Go to step 5 below.
 - B) Rated voltage NOT present, replace upper thermostat.
5. Adjust temperature setting of upper thermostat to the minimum setting. Water temperature in tank must be above thermostat setting for this test.
 6. Check voltage across terminals T4 of upper thermostat & L3 of lower thermostat (see Figure 15).
 - A) Rated voltage NOT present, replace upper thermostat.
 - B) Rated voltage IS present, upper thermostat is okay. Go to step 7 on next page.

SERVICE PROCEDURE RE-III
Residential Thermostat Testing

Double Element, Non-Simultaneous, Three Phase Operation (continued).

⚠ WARNING
High voltage exposure. Use caution to avoid personal injury during this procedure.

Tank Does Not Deliver Enough Hot Water (continued)

7. Check voltage across terminal L1 & L3 of lower thermostat (see Figure 16).
 - A) Rated voltage NOT present, check wire connection between thermostats.
 - B) Rated voltage is present, okay, go to step 8.
8. Adjust lower thermostat to highest setting. Water temperature in tank must be below the lower thermostat setting for this test.
9. Check voltage across terminal L4 & T2 of lower thermostat (see Figure 17).
 - A) Rated voltage NOT present, recheck ECO (see page 14). If ECO okay, replace lower thermostat.
 - B) Rated voltage IS present, thermostat is ok. Check wire connection to lower element. If connection okay, recheck lower element (see page 15).

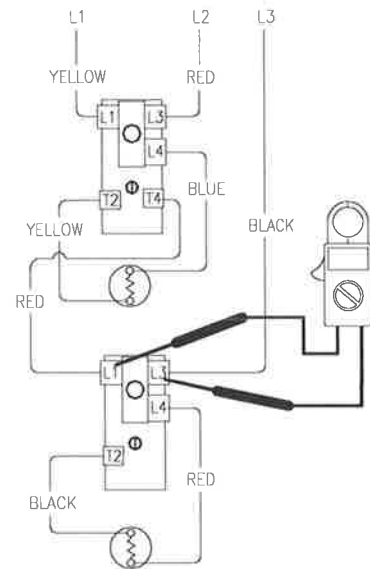


Figure 16

⚠ WARNING
Be sure thermostats are reset to their original temperature settings as found prior to thermostat testing

Water Temperature In Tank Is Above Thermostat Setting.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Adjust upper and lower thermostats to the lowest setting.
3. Turn power "ON" to water heater and set multi-meter to "Volts AC."
4. Check across terminals L4 and T2 of upper thermostat (see Figure 13 on page 19).
 - A) Rated voltage IS present, replace upper thermostat.
 - B) Rated voltage NOT present, upper thermostat is okay. Go to step 5 below.
 - C) Lower than rated voltage IS present, recheck for grounded upper element (see page 15).
5. Check across terminals L4 and T2 of lower thermostat (see Figure 17).
 - A) Rated voltage IS present, replace lower thermostat.
 - B) Rated voltage NOT present, lower thermostat is okay.
 - C) Lower than rated voltage IS present, recheck for grounded lower element (see page 15).

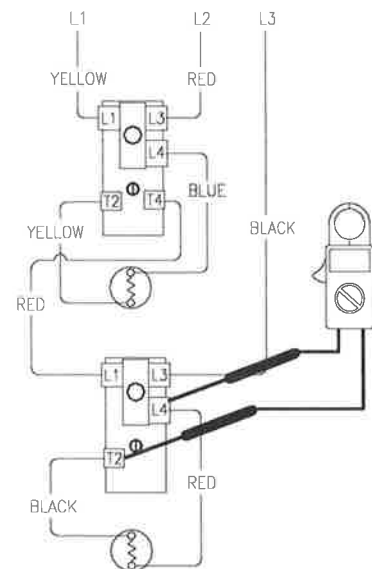


Figure 17

Double Element, Simultaneous, Three Phase Operation.

⚠ WARNING
High voltage exposure. Use caution to avoid personal injury during this procedure.

Water In Tank Is Cold Or Not Enough Hot Water With Power ON.

1. This procedure assumes line voltage, ECO and elements are in working order.

2. Adjust temperature setting for both thermostats to the highest setting.

2. Turn power "ON" to water heater.

3. Set multi-meter to "Volts AC."

4. Check across terminals L4 and T2 of upper thermostat (see Figure 18).

A) Rated voltage NOT present, recheck ECO (see page 14). If ECO is okay, replace thermostat.

B) Rated voltage IS present, proceed to next step.

5. Check across upper element terminals (see Figure 19).

A) Rated voltage NOT present, check wire connections from thermostat to element.

B) Rated voltage IS present, repeat element testing see page 15.

6. Check across terminals L1 & L3 of lower thermostat (see Figure 20).

A) Rated voltage NOT present, check wire connections from upper to lower thermostats.

B) Rated voltage IS present, okay, go to step 7.

7. Check across terminals L4 and T2 of lower thermostat (see Figure 21).

A) Rated voltage NOT present, recheck ECO (see page 14). If ECO is okay, replace thermostat.

B) Rated voltage IS present, proceed to next step.

8. Check across lower element terminals.

A) Rated voltage NOT present, check wire connections from thermostat to element.

B) Rated voltage IS present, repeat element testing see page 15.

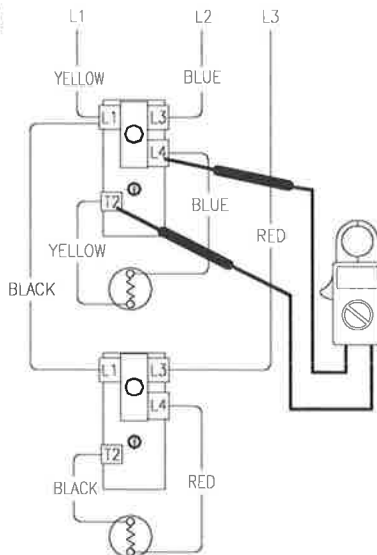


Figure 18

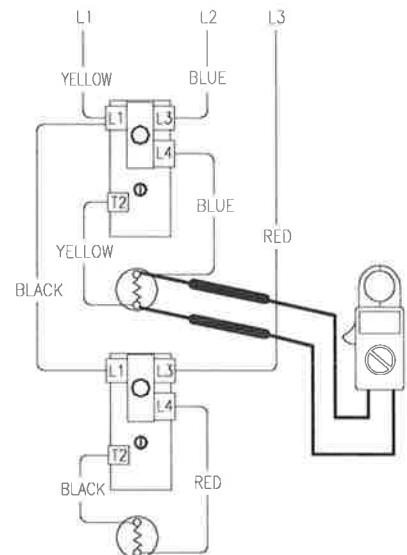


Figure 19

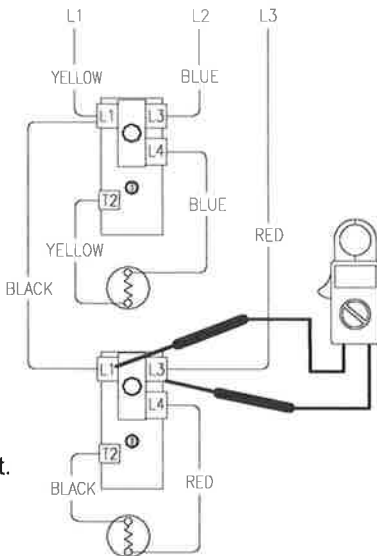


Figure 20

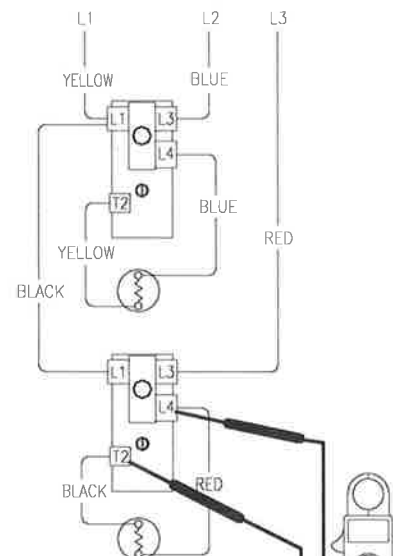


Figure 21

⚠ WARNING
Be sure thermostats are reset to their original temperature settings as found prior to thermostat testing

Double Element, Simultaneous, Three Phase Operation (continued).

Water Temperature In Tank Is Above Thermostat Setting.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Adjust upper and lower thermostat to the lowest setting.
3. Turn power "ON" to water heater.
4. Set multi-meter to "Volts AC."
5. Check across terminals L4 and T2 of upper thermostat (see Figure 22).
 - A) Rated voltage IS present, replace upper thermostat.
 - B) Rated voltage NOT present, upper thermostat is okay. Go to step 6 below.
 - C) Lower than rated voltage IS present, recheck for grounded upper element (see page 15).

6. Check across terminals L4 and T2 of lower thermostat (see Figure 23).
 - A) Rated voltage IS present, replace lower thermostat.
 - B) Rated voltage NOT present, lower thermostat is okay.
 - C) Lower than rated voltage IS present, recheck for grounded lower element (see page 15).

⚠ WARNING
High voltage exposure. Use caution to avoid personal injury during this procedure.

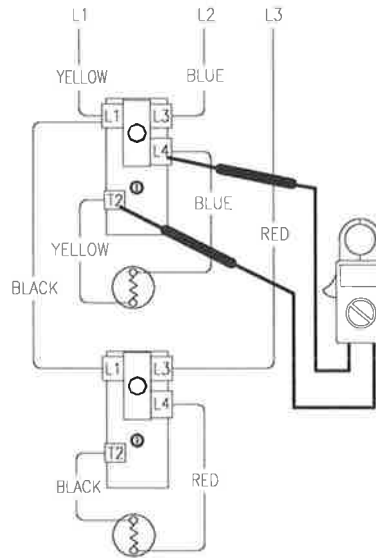


Figure 22

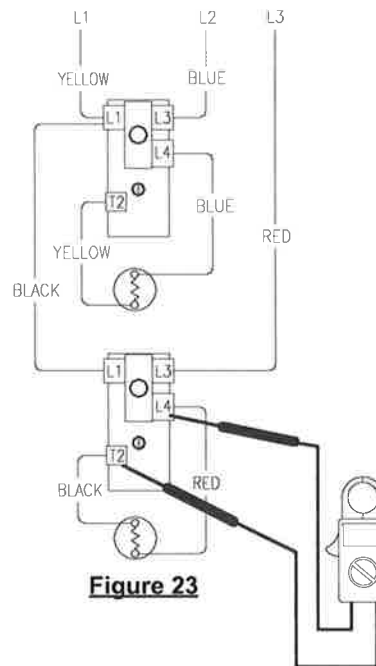


Figure 23

**Double Element, Non-Simultaneous, Single Phase,
Off Peak Operation.**

⚠ WARNING
**High voltage exposure. Use caution to avoid
personal injury during this procedure.**

Water In Tank Is Cold With Power ON.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Turn power "ON" to water heater.
3. Set multi-meter to "Volts AC."
4. Check across terminals L4 and T2 of upper thermostat (see Figure 24).
 - A) Rated voltage NOT present, recheck ECO (see page 14). If ECO is okay, replace thermostat.
 - B) Rated voltage IS present, proceed to next step.
5. Check across element terminals (see Figure 25).
 - A) Rated voltage NOT present, check wire connections from thermostat to element.
 - B) Rated voltage IS present, Repeat element testing see page 15.

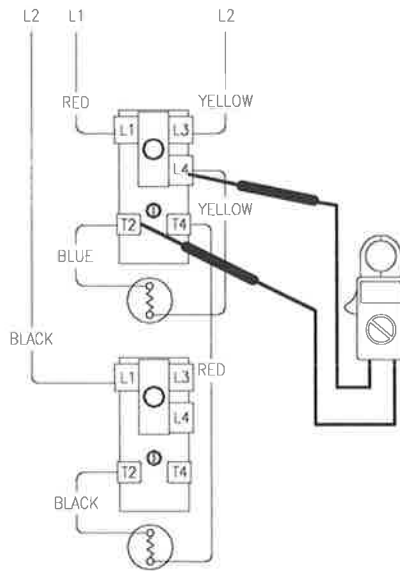


Figure 24

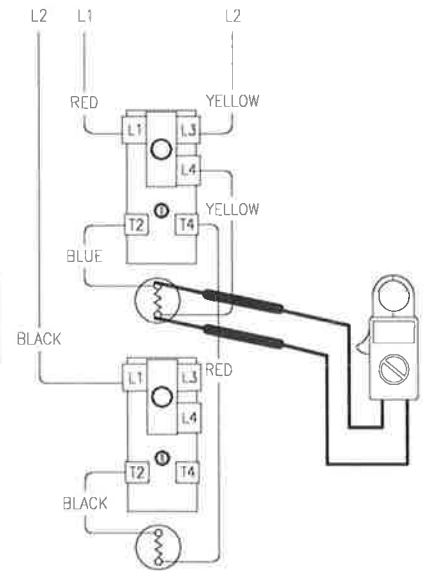


Figure 25

Tank Does Not Deliver Enough Hot Water.

1. This procedure assumes line voltage, ECO and elements are in working order. Be sure OFF PEAK meter has not interrupted line voltage.
2. Turn power "ON" to water heater and set multi-meter to "Volts AC."
3. Adjust temperature setting of upper & lower thermostat to the highest setting. Water temperature in tank must be below thermostat setting for this test.
4. See Figure 24 above. Check voltage across terminals L4 & T2 of upper thermostat.
 - A) Rated voltage IS present, okay, upper thermostat is calling for heat. Go to step 5 below.
 - B) Rated voltage NOT present, replace upper thermostat.
5. Adjust temperature setting of upper thermostat to the minimum setting. Water temperature in tank must be above thermostat setting for this test.
6. Check voltage across terminals T4 of upper thermostat & L1 of lower thermostat (see Figure 26).
 - A) Rated voltage NOT present, replace upper thermostat.
 - B) Rated voltage IS present, upper thermostat is okay. Go to step 7 on next page.

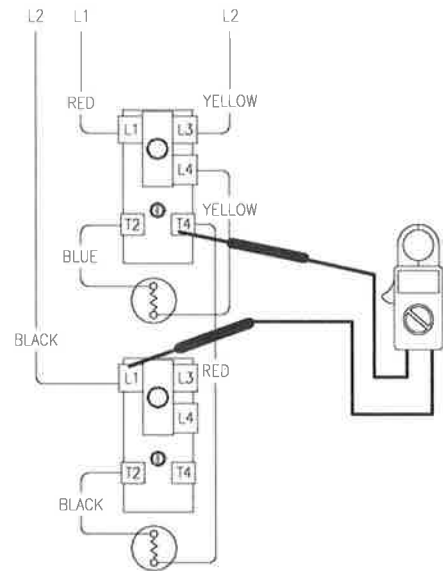


Figure 26

SERVICE PROCEDURE RE-III
Residential Thermostat Testing

**Double Element, Non-Simultaneous,
Single Phase, Off Peak Operation.**
(continued)

⚠ WARNING
High voltage exposure. Use caution to avoid
personal injury during this procedure.

Not Enough Hot Water (continued).

7. Check voltage across terminal T4 of upper thermostat & T2 of lower thermostat. (see Figure 27).

- A) Rated voltage NOT present, replace lower thermostat.
- B) Rated voltage is present, okay, go to step 8.

8. Check voltage across lower element (see Figure 28).

- A) Rated voltage NOT present, check wire connections between thermostats & element.
- B) Rated voltage IS present, repeat element testing see page 15.

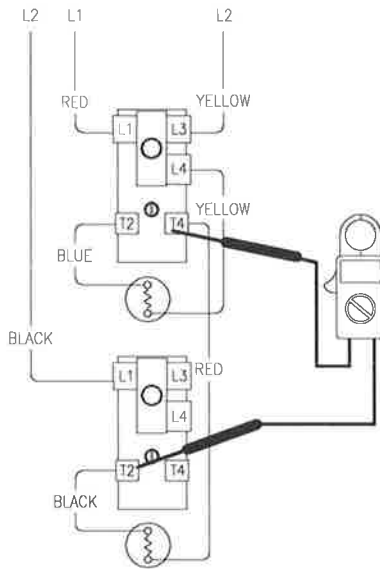


Figure 27

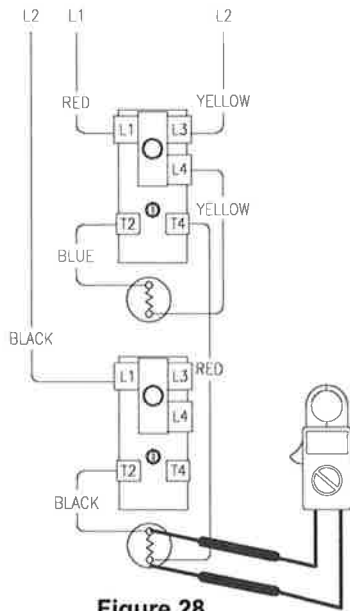


Figure 28

⚠ WARNING
Be sure thermostats are reset to their original
temperature settings as found prior to
thermostat testing

Water Temperature In Tank Is Above Thermostat Setting.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Adjust upper and lower thermostats to the lowest setting.
3. Turn power "ON" to water heater and set multi-meter to "Volts AC."
4. Check across terminals L4 and T2 of upper thermostat (see Figure 24 on page 23).
 - A) Rated voltage IS present, replace upper thermostat.
 - B) Rated voltage NOT present, upper thermostat is okay. Go to step 5 below.
 - C) Lower than rated voltage IS present, recheck for grounded upper element (see page 15).
5. Check across terminals T4 of upper thermostat and T2 of lower thermostat (see Figure 27 above).
 - A) Rated voltage IS present, replace lower thermostat.
 - B) Rated voltage NOT present, lower thermostat is okay.
 - C) Lower than rated voltage IS present, recheck for grounded lower element (see page 15).

Double Element, Non-Simultaneous, Single Phase Operation.

⚠ WARNING
High voltage exposure. Use caution to avoid personal injury during this procedure.

Water In Tank Is Cold With Power ON.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Turn power "ON" to water heater.
3. Set multi-meter to "Volts AC."
4. Check across terminals L4 and T2 of upper thermostat (see Figure 29).
 - A) Rated voltage NOT present, recheck ECO (see page 14). If ECO is okay, replace thermostat.
 - B) Rated voltage IS present, proceed to next step.
5. Check across element terminals (see Figure 30).
 - A) Rated voltage NOT present, check wire connections from thermostat to element.
 - B) Rated voltage IS present, repeat element testing see page 15.

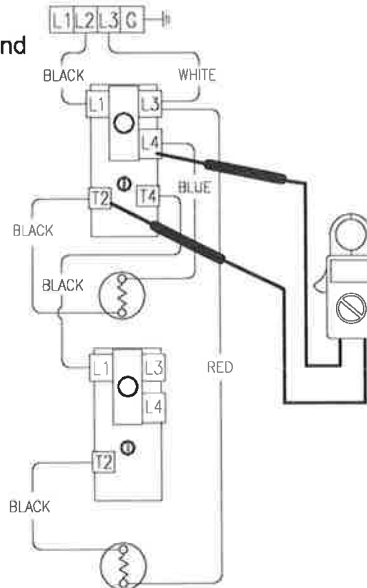


Figure 29

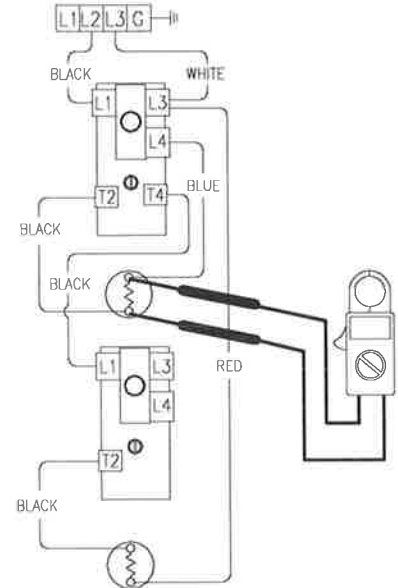


Figure 30

Tank Does Not Deliver Enough Hot Water.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Turn power "ON" to water heater and set multi-meter to "Volts AC."
3. Adjust temperature setting of upper & lower thermostat to the highest setting. Water temperature in tank must be below thermostat setting for this test.
4. See Figure 29 above. Check voltage across terminals L4 & T2 of upper thermostat.
 - A) Rated voltage IS present, okay, upper thermostat is calling for heat. Go to step 5 below.
 - B) Rated voltage NOT present, replace upper thermostat.
5. Adjust temperature setting of upper thermostat to the minimum setting. Water temperature in tank must be above thermostat setting for this test.
6. Check voltage across terminals L3 & T4 of upper thermostat (see Figure 31).
 - A) Rated voltage NOT present, replace upper thermostat.
 - B) Rated voltage IS present, upper thermostat is okay. Go to step 7 on next page.

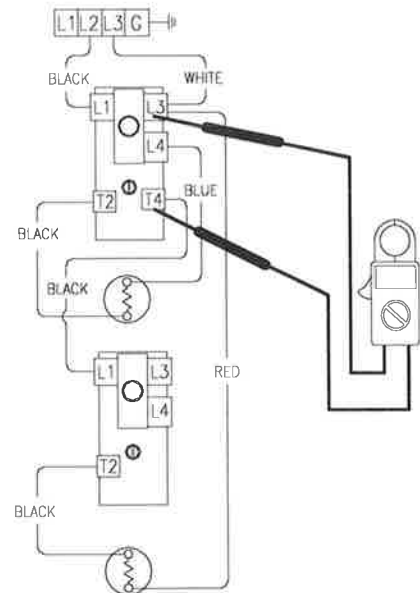


Figure 31

SERVICE PROCEDURE RE-IV
Light Duty Commercial
Thermostat Testing

Double Element, Non-Simultaneous,
Single Phase Operation (continued)

⚠ WARNING
High voltage exposure. Use caution to avoid
personal injury during this procedure.

Tank Does Not Deliver Enough Hot
Water (continued).

7. Check voltage across terminal L3 of upper thermostat & T2 of lower thermostat. (see Figure 32).
 - A) Rated voltage NOT present, replace lower thermostat.
 - B) Rated voltage is present, okay, go to step 8.
8. Check voltage across lower element (see Figure 33).
 - A) Rated voltage NOT present, Check wire connections between thermostats & element.
 - B) Rated voltage IS present, repeat element testing see page 15.

⚠ WARNING
Be sure thermostats are reset to
their original temperature settings
as found prior to thermostat
testing

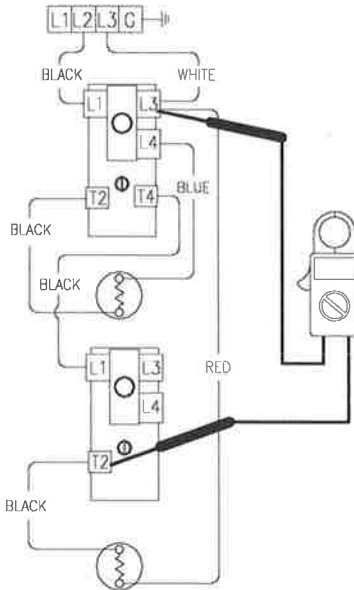


Figure 32

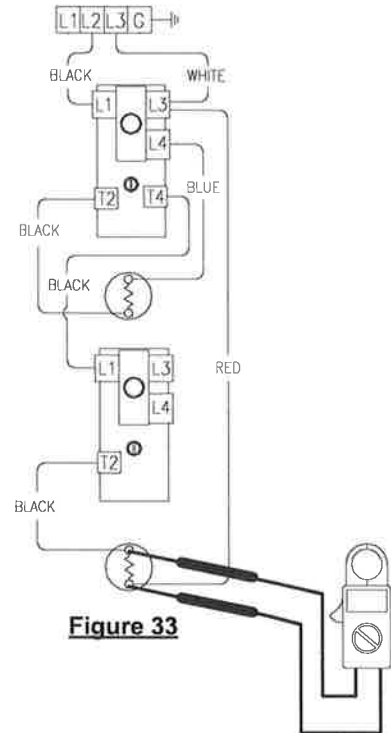


Figure 33

Water Temperature In Tank Is Above Thermostat Setting.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Adjust upper and lower thermostat to the lowest setting.
3. Turn power "ON" to water heater and Set multi-meter to "Volts AC."
4. See Figure 32 above. Check across terminal L3 of upper thermostat & T2 of lower thermostat.
 - A) Rated voltage IS present, replace lower thermostat.
 - B) Rated voltage NOT present, okay, go to step 5 below.
 - C) Lower than rated voltage IS present, recheck for grounded lower element see page 15.
5. Check across terminal L4 & T2 of upper thermostat (see Figure 34).
 - A) Rated voltage IS present, replace upper thermostat.
 - B) Rated voltage NOT present, upper thermostat is okay.
 - C) Lower than rated voltage IS present, recheck for grounded upper element see page 15.

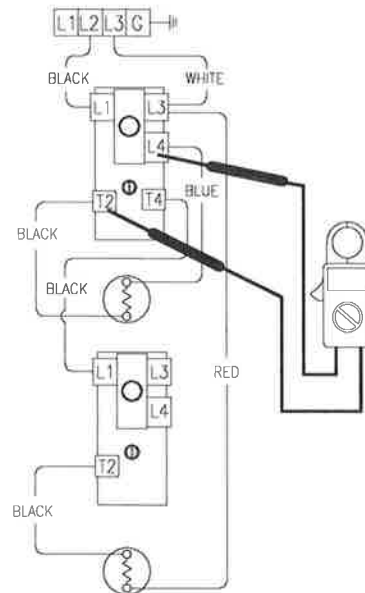


Figure 34

Double Element, Simultaneous, Single Phase Operation.

⚠ WARNING
High voltage exposure. Use caution to avoid personal injury during this procedure.

Water In Tank Is Cold Or Not Enough Hot Water With Power ON.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Adjust temperature setting for both thermostats to the highest setting.
3. Turn power "ON" to water heater.
4. Set multi-meter to "Volts AC."
5. Check across terminals L4 and T2 of upper thermostat (see Figure 35).

- A) Rated voltage NOT present, recheck upper ECO (see page 14). If ECO is okay, replace upper thermostat.
- B) Rated voltage IS present, proceed to next step.

6. Check across upper element terminals (see Figure 36).

- A) Rated voltage NOT present, check wire connections from thermostat to upper element.
- B) Rated voltage IS present, repeat element testing see page 15.

7. Check across terminal L3 of upper thermostat and T2 of lower thermostat (see Figure 37).

- A) Rated voltage NOT present, check ECO (see page 14) & wire connections at upper & lower thermostats. If okay, replace lower thermostat.
- B) Rated voltage IS present, proceed to next step.

8. Check across lower element terminals (see Figure 38).

- A) Rated voltage NOT present, check lower element wire connections to the thermostats.
- B) Rated voltage IS present, repeat lower element testing see page 15

⚠ WARNING
Be sure thermostats are reset to their original temperature settings as found prior to thermostat testing

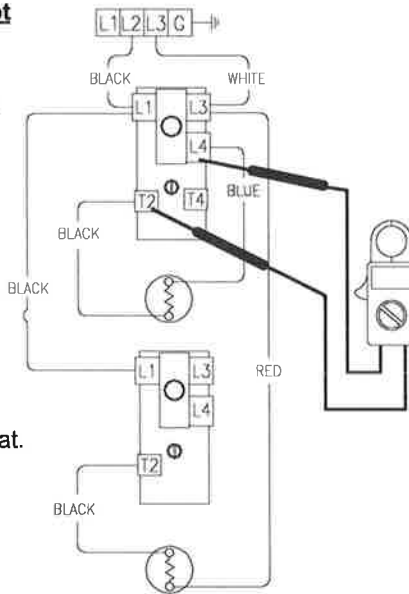


Figure 35

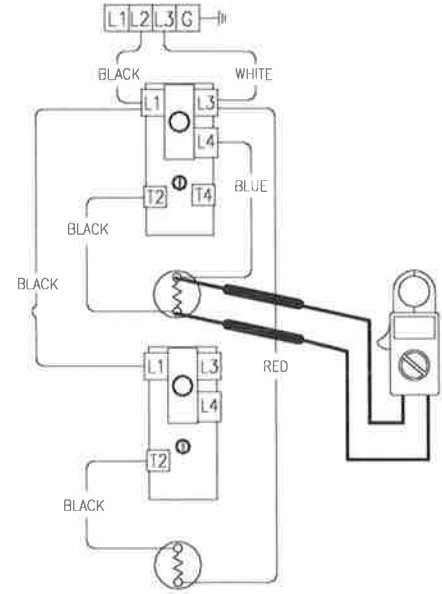


Figure 36

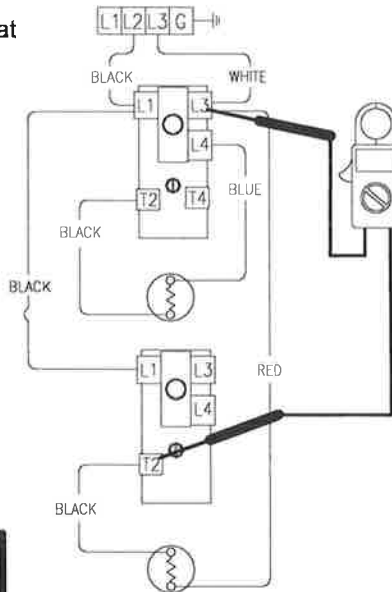


Figure 37

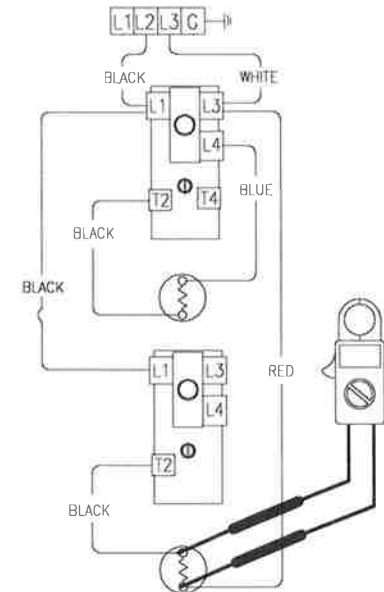


Figure 38

SERVICE PROCEDURE RE-IV
Light Duty Commercial
Thermostat Testing

Double Element, Simultaneous, Single Phase
Operation (continued)

⚠ WARNING
High voltage exposure. Use caution to avoid
personal injury during this procedure.

Water Temperature In Tank Is Above Thermostat
Setting.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Adjust upper and lower thermostat to the lowest setting.
3. Turn power "ON" to water heater.
4. Set multi-meter to "Volts AC."
5. Check across terminals L4 and T2 of upper thermostat (see Figure 39).
 - A) Rated voltage IS present, replace upper thermostat.
 - B) Rated voltage NOT present, upper thermostat is okay. Go to step 6 below.
 - C) Lower than rated voltage IS present, recheck for grounded upper element see page 15.
6. Check across terminal L3 of upper thermostat and T2 of lower thermostat (see Figure 40).
 - A) Rated voltage IS present, replace lower thermostat.
 - B) Rated voltage NOT present, lower thermostat is okay.
 - C) Lower than rated voltage IS present, recheck for grounded lower element see page 15.

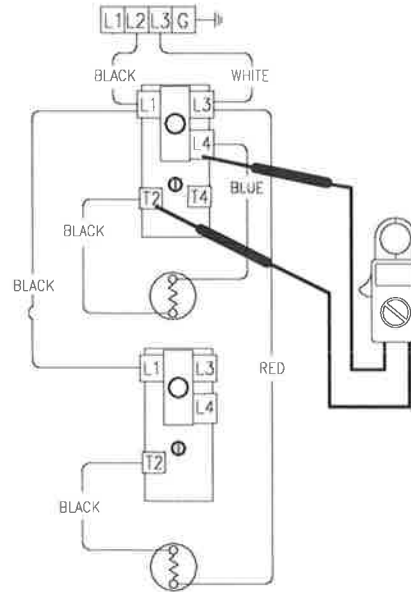


Figure 39

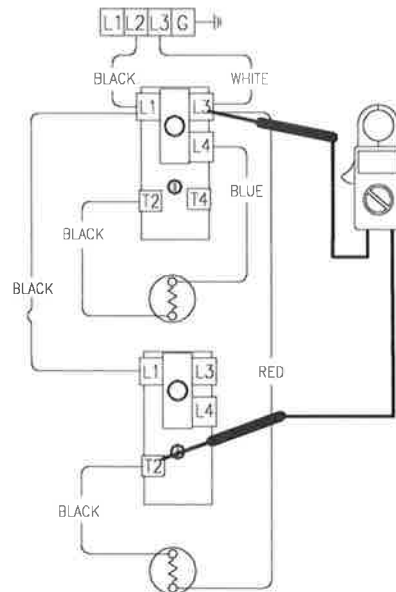


Figure 40

Double Element, Non-Simultaneous, Three Phase Operation.

⚠ WARNING
High voltage exposure. Use caution to avoid personal injury during this procedure.

Water In Tank Is Cold With Power ON.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Turn power "ON" to water heater.
3. Set multi-meter to "Volts AC."
4. Check across terminals L4 and T2 of upper thermostat (see Figure 41).
 - A) Rated voltage NOT present, recheck upper ECO. If ECO is okay, replace thermostat.
 - B) Rated voltage IS present, proceed to next step.
5. Check across element terminals (see Figure 42).
 - A) Rated voltage NOT present, check wire connections from thermostat to element.
 - B) Rated voltage IS present, repeat element testing see page 15.

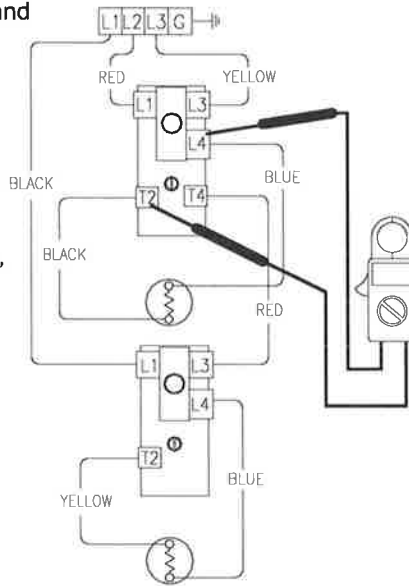


Figure 41

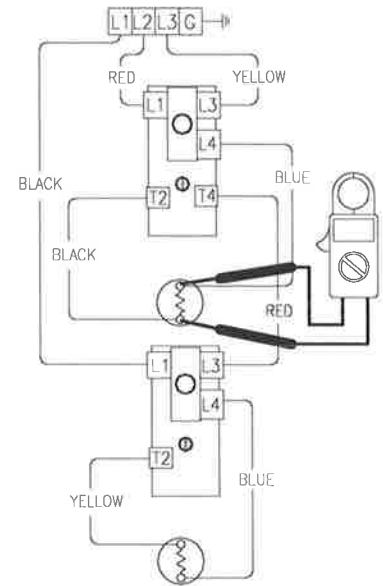


Figure 42

Tank Does Not Deliver Enough Hot Water.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Turn power "ON" to water heater and set multi-meter to "Volts AC."
3. Adjust temperature setting of upper & lower thermostat to the highest setting. Water temperature in tank must be below thermostat setting for this test.
4. See Figure 41 above. Check voltage across terminals L4 & T2 of upper thermostat.
 - A) Rated voltage IS present, okay, upper thermostat is calling for heat. Go to step 5 below.
 - B) Rated voltage NOT present, replace upper thermostat.
5. Adjust temperature setting of upper thermostat to the minimum setting. Water temperature in tank must be above thermostat setting for this test.
6. Check voltage across terminals L3 & T4 of upper thermostat (see Figure 43).
 - A) Rated voltage NOT present, replace upper thermostat.
 - B) Rated voltage IS present, upper thermostat is okay. Go to step 7 on next page.

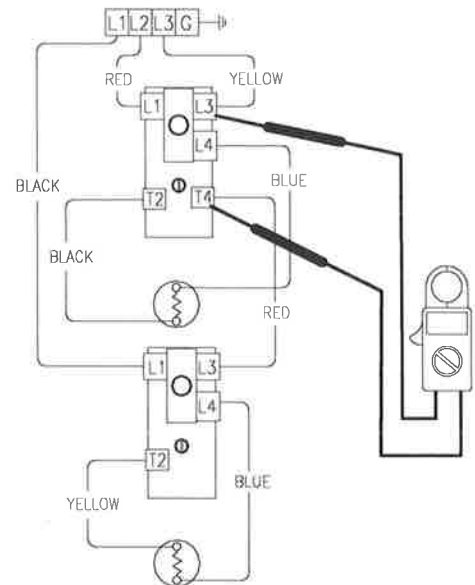


Figure 43

SERVICE PROCEDURE RE-IV
Light Duty Commercial
Thermostat Testing

Double Element, Non-Simultaneous,
Three Phase Operation (continued).

⚠ WARNING
High voltage exposure. Use caution to avoid
personal injury during this procedure.

Tank Does Not Deliver Enough Hot Water
(continued).

7. Check voltage across terminal L1 of upper thermostat & T2 of lower thermostat. (see Figure 44).

- A) Rated voltage NOT present, Replace lower thermostat.
- B) Rated voltage is present, okay, go to step 8.

8. Check voltage across lower element (see Figure 45).

- A) Rated voltage NOT present, check wire connections between thermostats & element.
- B) Rated voltage IS present, repeat element testing see page 15.

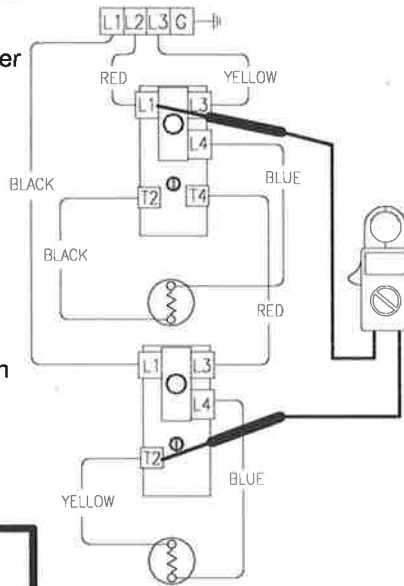


Figure 44

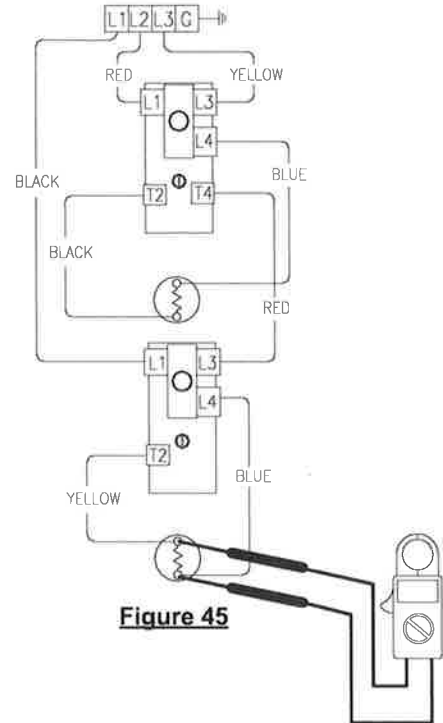


Figure 45

⚠ WARNING
Be sure thermostats are reset to
their original temperature settings
as found prior to thermostat
testing

Water Temperature In Tank Is Above Thermostat Setting.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Adjust upper and lower thermostat to the lowest setting.
3. Turn power "ON" to water heater and Set multi-meter to "Volts AC."
4. See Figure 44 above. Check across terminal L1 of upper thermostat & T2 of lower thermostat.

- A) Rated voltage IS present, replace lower thermostat.
- B) Rated voltage NOT present, okay, go to step 5 below.
- C) Lower than rated voltage IS present, recheck for grounded lower element.

5. Check across terminal L4 & T2 of upper thermostat (see Figure 46).

- A) Rated voltage IS present, replace upper thermostat.
- B) Rated voltage NOT present, upper thermostat is okay.
- C) Lower than rated voltage IS present, recheck for grounded upper element, see page 15.

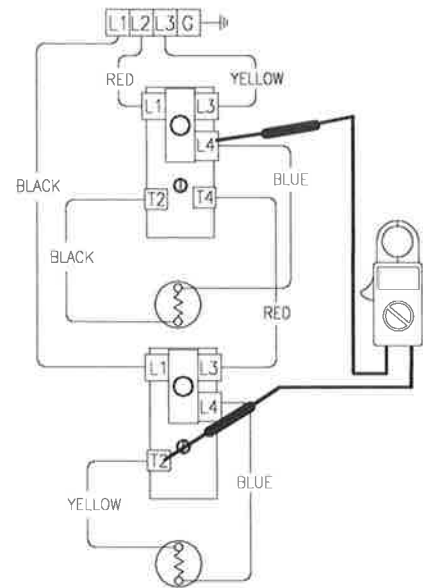


Figure 46

Double Element, Simultaneous, Three Phase Operation.

Water In Tank Is Cold Or Not Enough Hot Water With Power ON.

⚠ WARNING
High voltage exposure. Use caution to avoid personal injury during this procedure.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Adjust temperature setting for both thermostats to the highest setting.
3. Turn power "ON" to water heater.
4. Set multi-meter to "Volts AC."
5. Check across terminals L4 and T2 of upper thermostat (see Figure 47).
 - A) Rated voltage NOT present, recheck upper ECO (see page 14). If ECO is okay, replace upper thermostat.
 - B) Rated voltage IS present, proceed to next step.
6. Check across upper element terminals (see Figure 48).
 - A) Rated voltage NOT present, check wire connections from thermostat to upper element.
 - B) Rated voltage IS present, repeat element testing see page 15

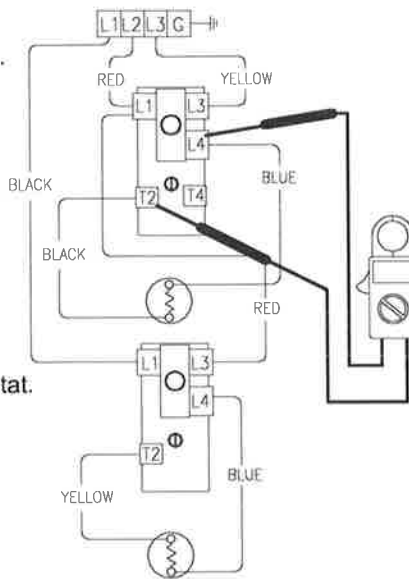


Figure 47

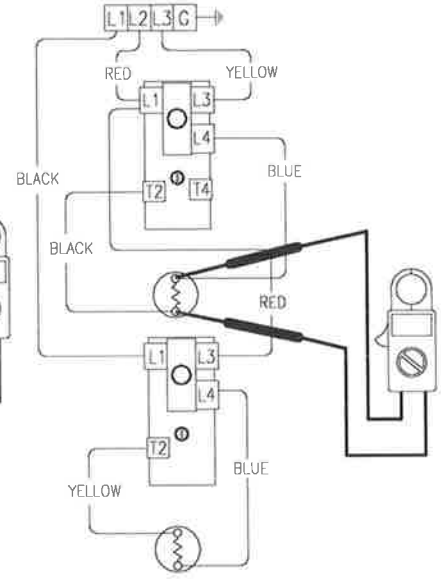


Figure 48

7. Check across terminal L4 of lower thermostat and T2 of lower thermostat (see Figure 49).
 - A) Rated voltage NOT present, check ECO (see page 14) & wire connections at upper & lower thermostats. If okay, replace lower thermostat.
 - B) Rated voltage IS present, proceed to next step.
8. Check across lower element terminals (see Figure 50).
 - A) Rated voltage NOT present, check lower element wire connections to thermostat.
 - B) Rated voltage IS present, repeat lower element testing see page 15.

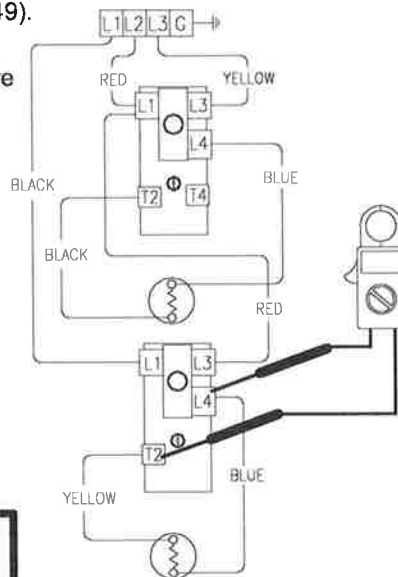


Figure 49

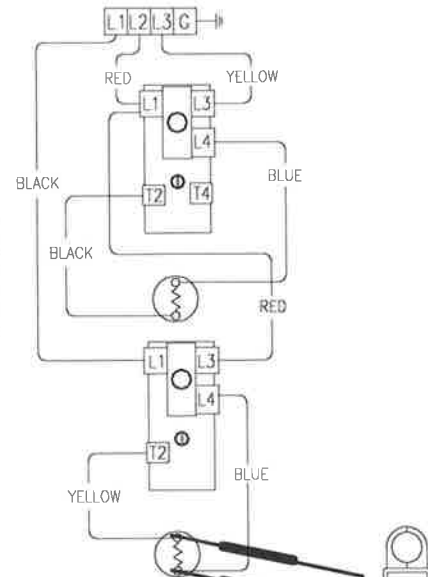


Figure 50

⚠ WARNING
Be sure thermostats are reset to their original temperature settings as found prior to thermostat testing

SERVICE PROCEDURE RE-IV
Light Duty Commercial
Thermostat Testing

Double Element, Simultaneous, Three Phase
Operation (continued).

Water Temperature In Tank Is Above Thermostat
Setting.

1. This procedure assumes line voltage, ECO and elements are in working order.
2. Adjust upper and lower thermostat to the lowest setting.
3. Turn power "ON" to water heater.
4. Set multi-meter to "Volts AC."
5. Check across terminals L4 and T2 of upper thermostat (see Figure 51).
 - A) Rated voltage IS present, replace upper thermostat.
 - B) Rated voltage NOT present, upper thermostat is okay. Go to step 6 below.
 - C) Lower than rated voltage IS present, recheck for grounded upper element see page 15.
6. Check across terminals L4 & T2 of lower thermostat (see Figure 52).
 - A) Rated voltage IS present, replace lower thermostat.
 - B) Rated voltage NOT present, lower thermostat is okay.
 - C) Lower than rated voltage IS present, recheck for grounded lower element.

⚠ WARNING
High voltage exposure. Use caution to avoid personal injury during this procedure.

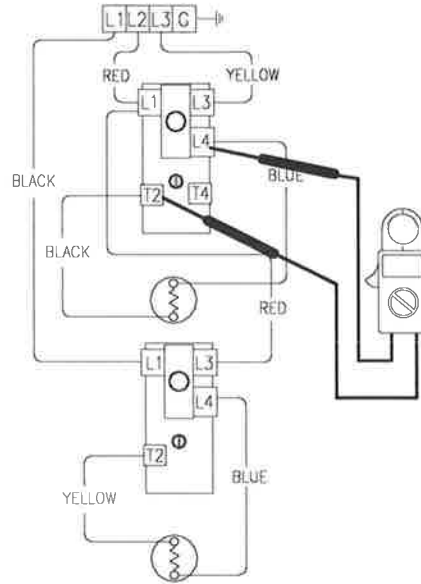


Figure 51

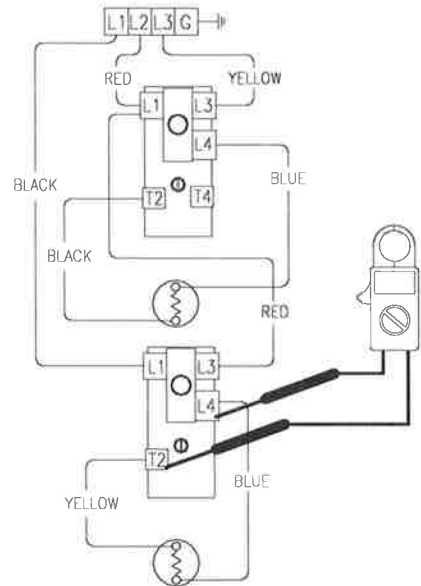


Figure 52

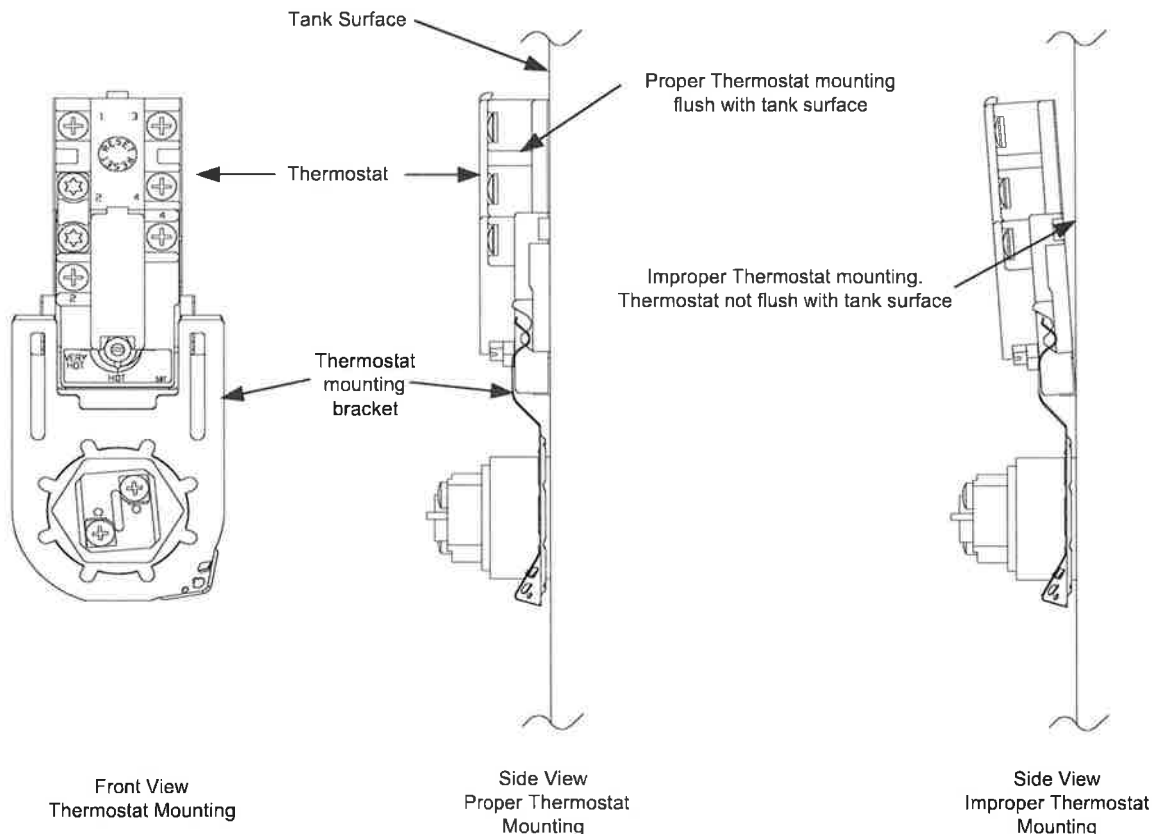
Thermostat Removal

1. Turn power "OFF" to water heater.
2. Remove access cover and insulation.
3. Remove plastic thermostat protector from thermostat.
4. Disconnect wires from thermostat terminals. It may be necessary to label wires for proper re-connection to new thermostat.
5. Note thermostat temperature setting for proper setting of new thermostat.
6. Slide thermostat upwards and out of mounting bracket.

⚠ WARNING
High voltage exposure. Be sure power is "OFF" when performing this procedure.

Thermostat Replacement

1. Use a stiff brush to remove any debris or loose scale from tank surface where new thermostat will be installed.
2. Slide new thermostat down into thermostat bracket until it snaps into place. **IMPORTANT!** Thermostat must sit completely flat or flush to tank surface. An improperly installed thermostat will cause improper water heater operation.
3. Refer to the wire diagram located on the inside of the access cover and reconnect wires to the thermostat. Be sure wire connections are snug and corrosion free. Do not over tighten, doing so may damage thermostat.
4. Set thermostat to the original thermostat setting found on the old thermostat.
5. Re-install plastic thermostat protector.
6. Re-install insulation and access cover.
7. Restore power to water heater and verify proper heater operation.



SERVICE PROCEDURE RE-VI

Heating Element Removal and Replacement

Heating Element Removal

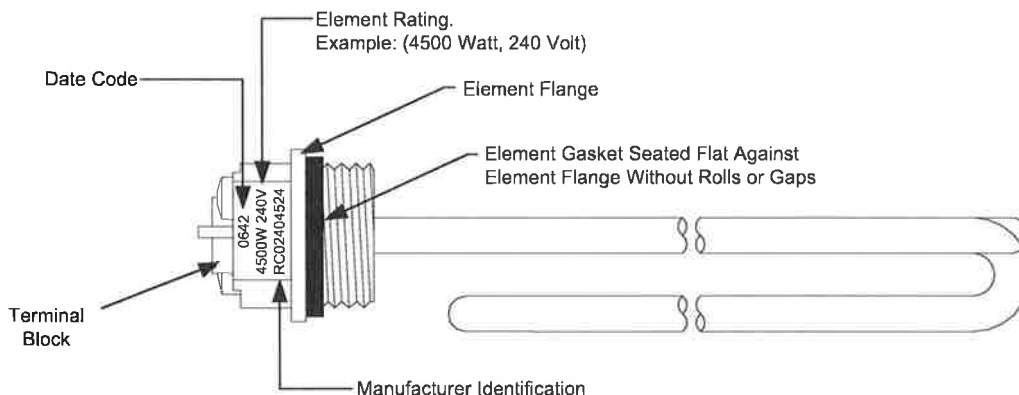
1. Turn power "OFF" To water heater.
2. Turn off cold water supply to heater. Connect hose to drain spigot of water heater and route to an open drain. Open a nearby hot water faucet to vent heater for draining. Open drain spigot of water heater and allow heater to drain to a point below the element(s).
3. Close drain spigot and remove hose.
4. Remove access cover and insulation.
5. Remove plastic thermostat protector from thermostat.
6. Disconnect wires from element terminals.
7. Remove element from tank using 1-½ deep well socket or appropriate wrench. Unscrew element counter-clockwise to remove from tank.
8. Be sure to remove old element gasket from the tank. It is not recommended to be re-used.

⚠ WARNING
High voltage exposure. Be sure power is **"OFF"** when performing this procedure.

⚠ WARNING
Heater components and stored water may be **HOT** when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.

Heating Element Replacement

1. Check element terminal block for proper electrical rating. NOTE: Some elements have dual ratings, be sure to check all surfaces of the element terminal block (see illustration below).
2. Apply new element gasket to the new element. Be sure gasket is seated flat against element flange without rolls or gaps (see illustration below).
3. Clean any debris from element fitting on tank. Lubricate element threads as needed with thread lubricant.
4. Thread new element clockwise into tank. Tighten element using 1-½ deep well socket or appropriate wrench. Do not over tighten, over tightening may damage element gasket.
5. Reconnect wires to element, be sure wires are snug and corrosion free. Do not over tighten, doing so may damage terminal block.
6. Resume water supply to heater, be sure tank is full of water and check for leaks.
7. Re-install plastic thermostat protector.
8. Re-install insulation and access cover.
9. To resume operation, **BE SURE TANK IS FULL OF WATER** and restore power to water heater. Verify proper heater operation.



Diptube Inspection and Replacement

WARNING

Heater components and stored water may be **HOT** when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.

- Step 1. Turn power "OFF" to water heater.
- Step 2. Turn off cold water supply to heater. Connect hose to drain spigot of water heater and route to an open drain. Open a nearby hot water faucet to vent heater for draining. Open drain spigot of water heater and allow heater to drain to a point below the inlet connection nipple.
- Step 3. Close drain spigot and remove hose.
- Step 4. Disconnect inlet nipple from plumbing system.
- Step 5. With an appropriate wrench, remove inlet nipple/dip tube from the water heater. Use caution not to damage nipple threads.
- Step 6. Visually inspect inlet nipple/dip tube. Inlet nipple/dip tube should be free of cracks and any blockage. Hydro-jets located near the bottom of the dip tube should be open and free of any blockage. Anti-siphon hole located approximately 6" from the bottom of nipple, should be free of any blockage.

Any damage such as cracks, restriction due to deformation or unintentional holes are not field repairable and the inlet nipple/dip tube must be replaced.
- Step 7. Upon completion of inspection or subsequent replacement, reinstall inlet nipple/dip tube into heater. Ensure pipe dope is used on the nipple's threads. Connect nipple to plumbing system, close spigot and remove drain hose, resume water supply and refill heater with water.
- Step 8. To resume operation, **BE SURE TANK IS FULL OF WATER** and turn power "ON" to water heater.

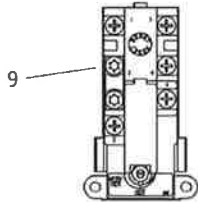
Anode Inspection and Replacement

- Step 1. Turn power "OFF" to water heater.
- Step 2. Turn off cold water supply to heater. Connect hose to drain spigot of water heater and route to an open drain. Open a nearby hot water faucet to vent heater for draining. Open drain spigot of water heater and allow heater to drain to a point below the outlet connection nipple.
- Step 3. Close drain spigot and remove hose.
- Step 4. Disconnect outlet nipple from plumbing system.
- Step 5. With an appropriate wrench, remove outlet nipple/anode from the water heater. Use caution not to damage nipple threads.
- Step 6. Visually inspect outlet nipple/anode. Outlet nipple/anode should show signs of depletion, this is normal. If depletion is $\frac{1}{2}$ of the original anode diameter (original diameter approximately $\frac{3}{4}$ "), replacement is recommended. If any of the steel core of the anode is exposed, replacement is recommended.
- Step 7. Upon completion of inspection or subsequent replacement, reinstall outlet nipple/anode into heater. Ensure pipe dope is used on the nipple's threads. Connect nipple to plumbing system, close spigot and remove drain hose, resume water supply and refill heater with water.
- Step 8. To resume operation, **BE SURE HEATER IS FULL OF WATER** and turn power "ON" to water heater.

Generic Parts List

TOP LOCATION

- Double element water heater, non-simultaneous single phase and three phase operation.

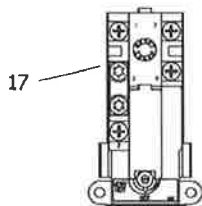


TOP LOCATION

- Double element water heater, simultaneous operation.

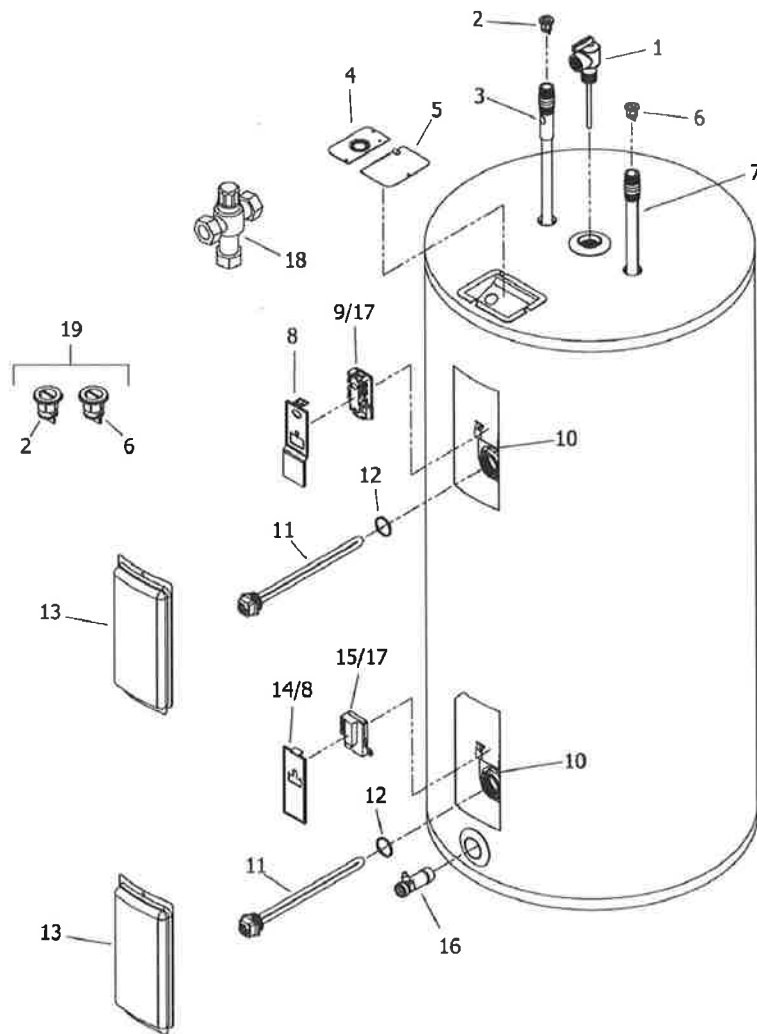
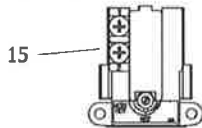
BOTTOM LOCATION

- Single element water heater.
- Double element water heater, non-simultaneous three phase operation.
- Double element water heater, simultaneous operation.



BOTTOM LOCATION

- Double element water heater, non-simultaneous single phase operation.



1. T&P Relief Valve
2. Heat Trap Insert (Outlet)
3. Hot Water Outlet/Anode
4. Cover Conduit/Ground
5. Junction Box Cover
6. Heat Trap Insert (Inlet)
7. Cold Water Inlet Diptube
8. Upper Thermostat Protector
9. Upper Thermostat
10. Thermostat Mounting Bracket

11. Heating Element
12. Element Gasket
13. Access Cover
14. Lower Thermostat Protector
15. Lower Thermostat (59T)
16. Brass Drain Valve
17. Thermostat w/High Limit (59T/66T)
18. ASSE Approved Mixing Device
19. Kit Heat Trap



United States

Sales 800-523-2931

Technical Support 800-334-3393

Email techserv@bradfordwhite.com

Warranty 800-531-2111

Email warranty@bradfordwhite.com

Service Parts 800-538-2020

Email parts@bradfordwhite.com

Canada

Sales & Technical Support 866-690-0961 905-203-0600

Fax 905-636-0666

Warranty bwccwarranty@bradfordwhite.com

Technical Support bwccotech@bradfordwhite.com

Service Parts orders@bradfordwhitecanada.com

Orders ca.orders@bradfordwhite.com

For U.S. and Canada field service,
contact your professional installer or
local Bradford White sales representative.

International

General Contact international@bradfordwhite.com



BRADFORD WHITE[®]
WATER HEATERS

ELECTRIC REPLACEMENT PARTS LIST

Residential (RE(1,2)U) Utility and Commercial (LE(1,2)U) Utility Models



RE110U* model shown,
models may vary in appearance

Models Covered:
RE(12, 16, 112, 120)U*
LE(16, 120)U*
RE112T
LE112T
RE220U
LE220U
RE(110, 115)U*
LE(110, 115)U*
*Denotes warranty year

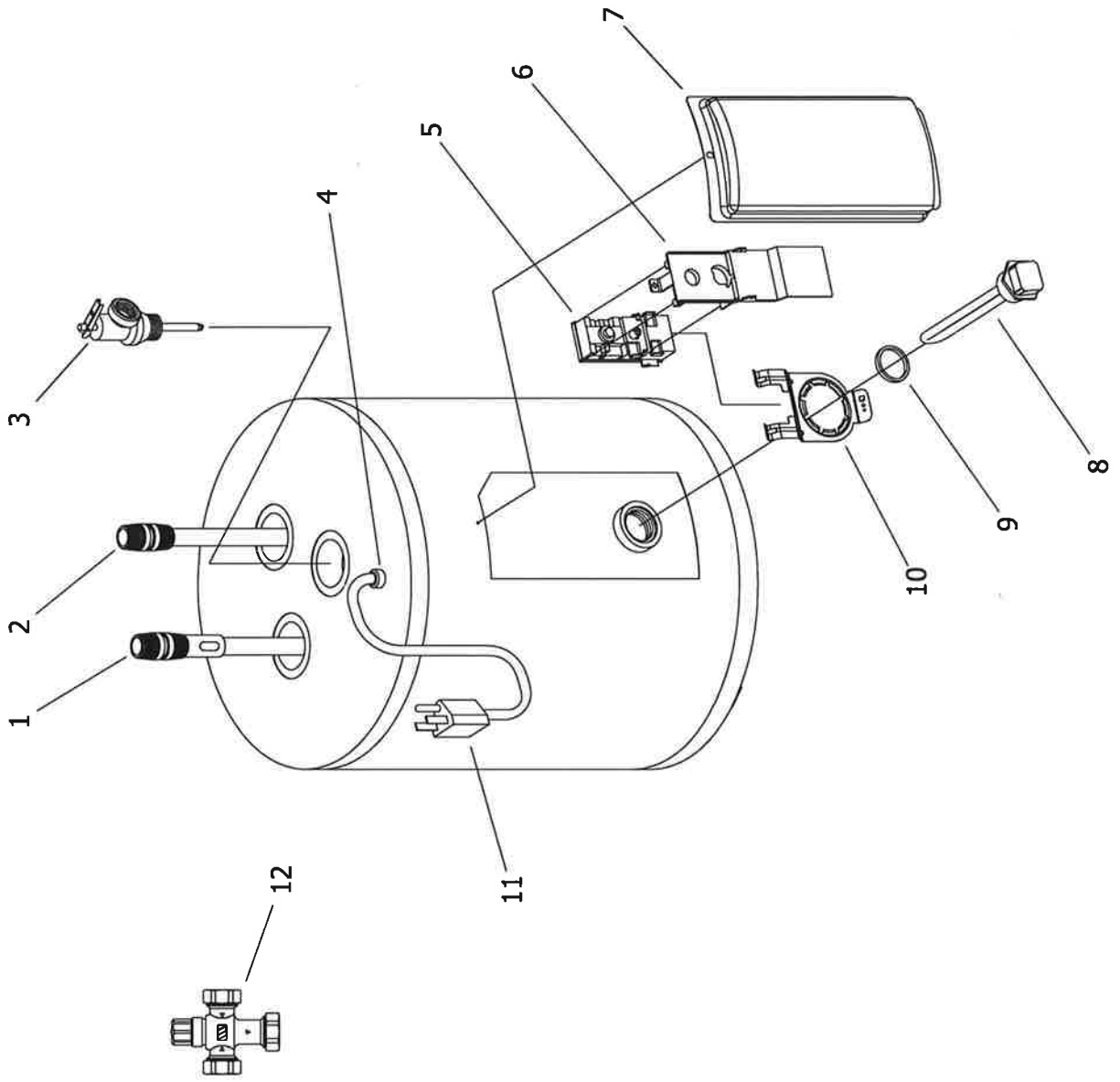
Effective: November, 2023
ECO 8414

**NOTE: BOTH MODEL AND SERIAL
NUMBERS ARE REQUIRED FOR
ORDERING REPLACEMENT PARTS**

Dimensions and specifications
subject to change without notice.

WARNING
CANCER AND REPRODUCTIVE HARM
WWW.P65WARNINGS.CA.GOV

As required by the state of California Proposition 65.



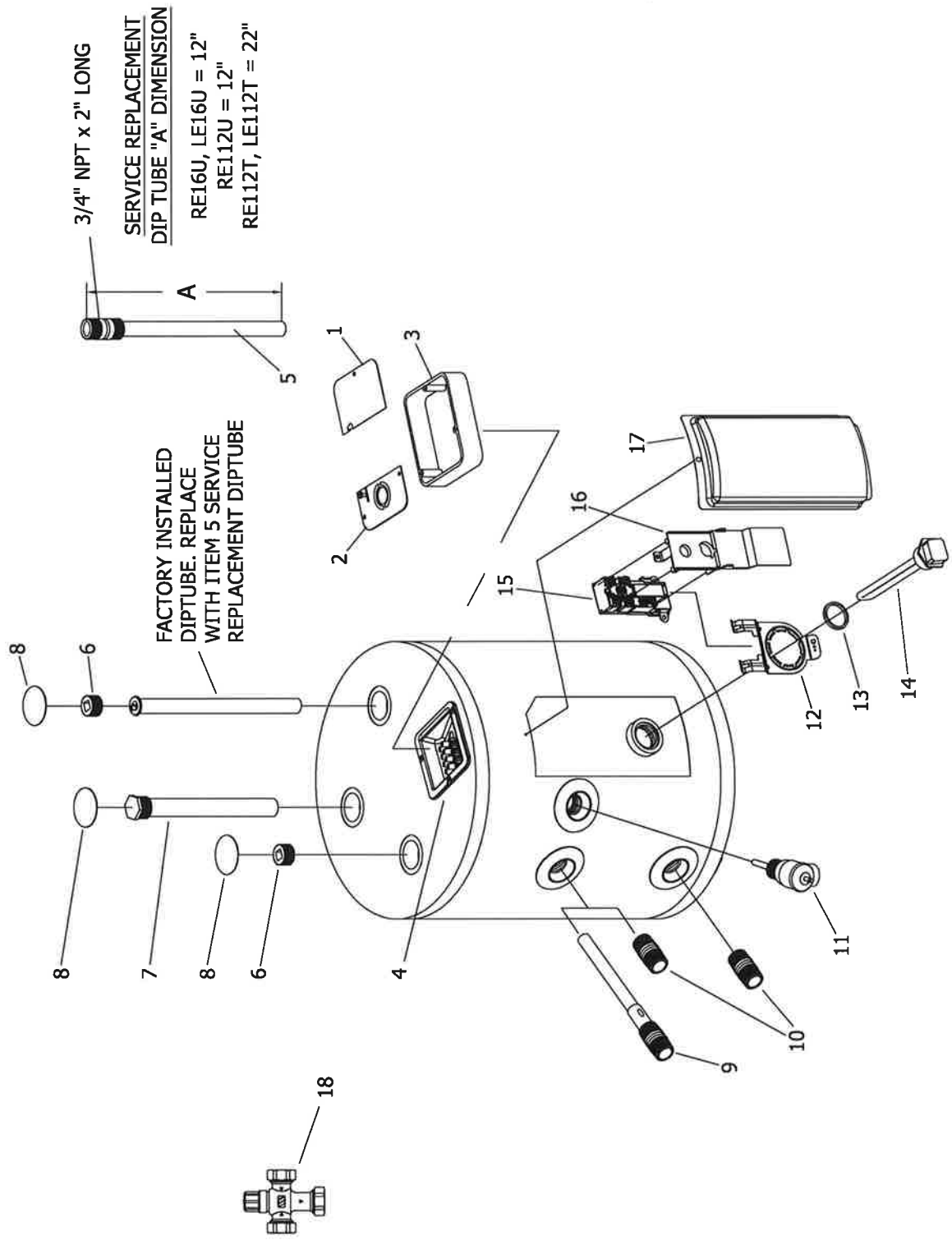
Item	Description	Model
1	Hot Water Outlet Anode (Magnesium)	RE12U*
	Hot Water Outlet Anode (Aluminum)	415-47776-20
	Hot Water Outlet Anode (A420 Aluminum)	415-32999-32
	Hot Water Outlet Anode (A420 Aluminum)	415-49560-09
2	Cold Water Inlet Dip Tube (PEX)	229-51534-15
3	T&P Relief Valve	415-32920-01
4	Strain Relief Bushing	239-80372-00
5	Thermostat ■	415-50691-00
6	Thermostat Protector	223-50125-00
7	Access Cover	239-44929-00
8	Heating Element (120V/1500W Copper)** ♦	415-42540-02
	Heating Element (120V/1500W Incoloy)** ♦	N/A
9	Element Gasket	223-34019-00
10	Thermostat Mounting Bracket	415-50689-00
11	Power Cord	239-38846-00
12	ASSE Approved Mixing Valve (Optional)	239-51778-00

■ Protector (Item #6) and mounting bracket (Item #10) included in kit with thermostat.

♦ Gasket (Item #9) included with this kit

* Applies to all warranties

** For other wattages/voltages, consult residential Heating Element Replacement Parts List.



Item	Description	Model RE16U*	Model LE16U*	Model RE120U*	Model LE120U*
1	Junction Box Cover	243-39452-00	243-39452-00	243-39452-00	243-39452-00
2	Bracket-Grounding/Conduit w/ Ground Screw	239-55386-00	---	239-55386-00	---
	Bracket-Grounding/Conduit	---	239-39451-00	---	239-39451-00
3	Junction Box Extender	---	239-40587-00	---	239-40587-00
4	J-Box w/ Terminal Block	---	265-47380-00	---	265-47380-00
5	Service Replacement Dip Tube (PEX)	415-51534-13	415-51534-13	---	---
6	Pipe Plug 3/4 NPT	239-11638-00	239-11638-00	---	---
7	Anode Rod Plug Type (Magnesium)#	415-47782-08	415-47782-08	---	---
	Anode Rod Plug Type (Aluminum)#	415-38508-10	415-38508-10	---	---
	Anode Rod Plug Type (A420 Aluminum)#	415-49559-04	415-49559-04	---	---
8	Hole Closure	239-31547-02	239-31547-02	---	---
9	Hot Water Outlet Anode (Magnesium)#	---	---	415-47776-19	415-47776-19
	Hot Water Outlet Anode (Aluminum)#	---	---	415-32999-28	415-32999-28
	Hot Water Outlet Anode (A420 Aluminum)#	---	---	415-49560-10	415-49560-10
10	Inlet/Outlet Nipple	229-32762-03	229-32762-03	229-32762-03	229-32762-03
11	T&P Relief Valve	415-40594-02	415-40594-02	415-40594-02	415-40594-02
12	Thermostat Mounting Bracket	415-50689-00	415-50689-00	415-50689-00	415-50689-00
13	Element Gasket	223-34019-00	223-34019-00	223-34019-00	223-34019-00
14	Heating Element 1500W, 120V Copper** ◆	415-42540-02	415-42540-02	415-42540-02	415-42540-02
	Heating Element 1500W, 120V Incoloy** ◆	415-42541-02	415-42541-02	415-42541-02	415-42541-02
15	Thermostat-Residential ■■	415-50691-00	---	415-50691-00	---
	Thermostat-Light Duty Commercial ■■ ∩	---	415-50691-00	---	415-50691-00
	Thermostat-Light Duty Commercial ■ Φ ∩ ∩	---	415-53388-00	---	415-53388-00
16	Thermostat Protector	223-50125-00	223-50125-00	223-50125-00	223-50125-00
17	Access Cover	243-36618-02	243-36618-02	243-36618-02	243-36618-02
18	ASSE Approved Mixing Valve (Optional)	239-51778-00	239-51778-00	239-51778-00	239-51778-00

■ Protector (Item #16) included in kit with thermostat.

■ ■ Protector (Item #16) and mounting bracket (Item #12) included in kit with thermostat.

Φ Mounting bracket (Item #12) not included in kit with thermostat.

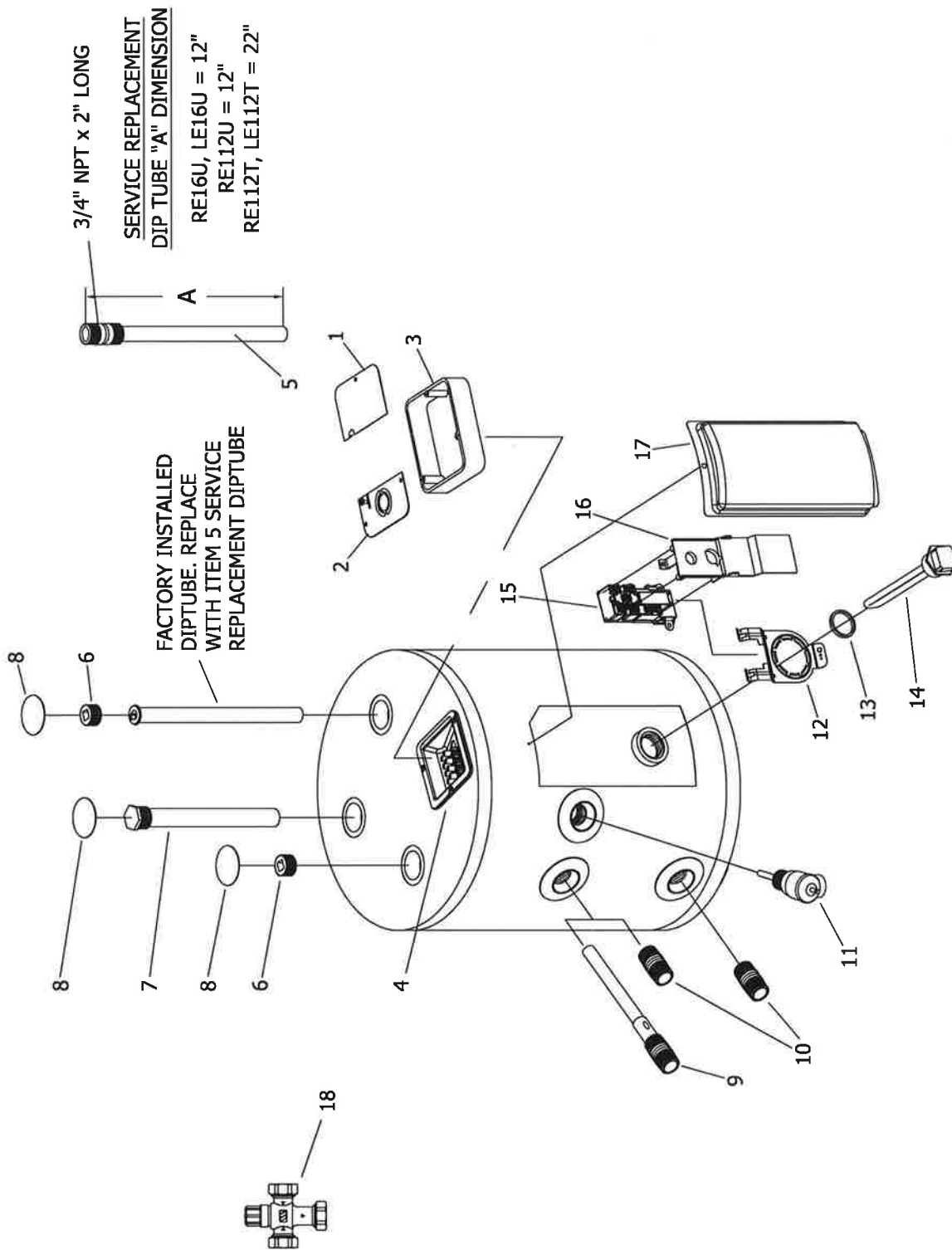
◆ Gasket (Item #13) included with this kit

** For other wattages/voltages, consult residential Heating Element Replacement Parts List.

Anode may need to be cut to length

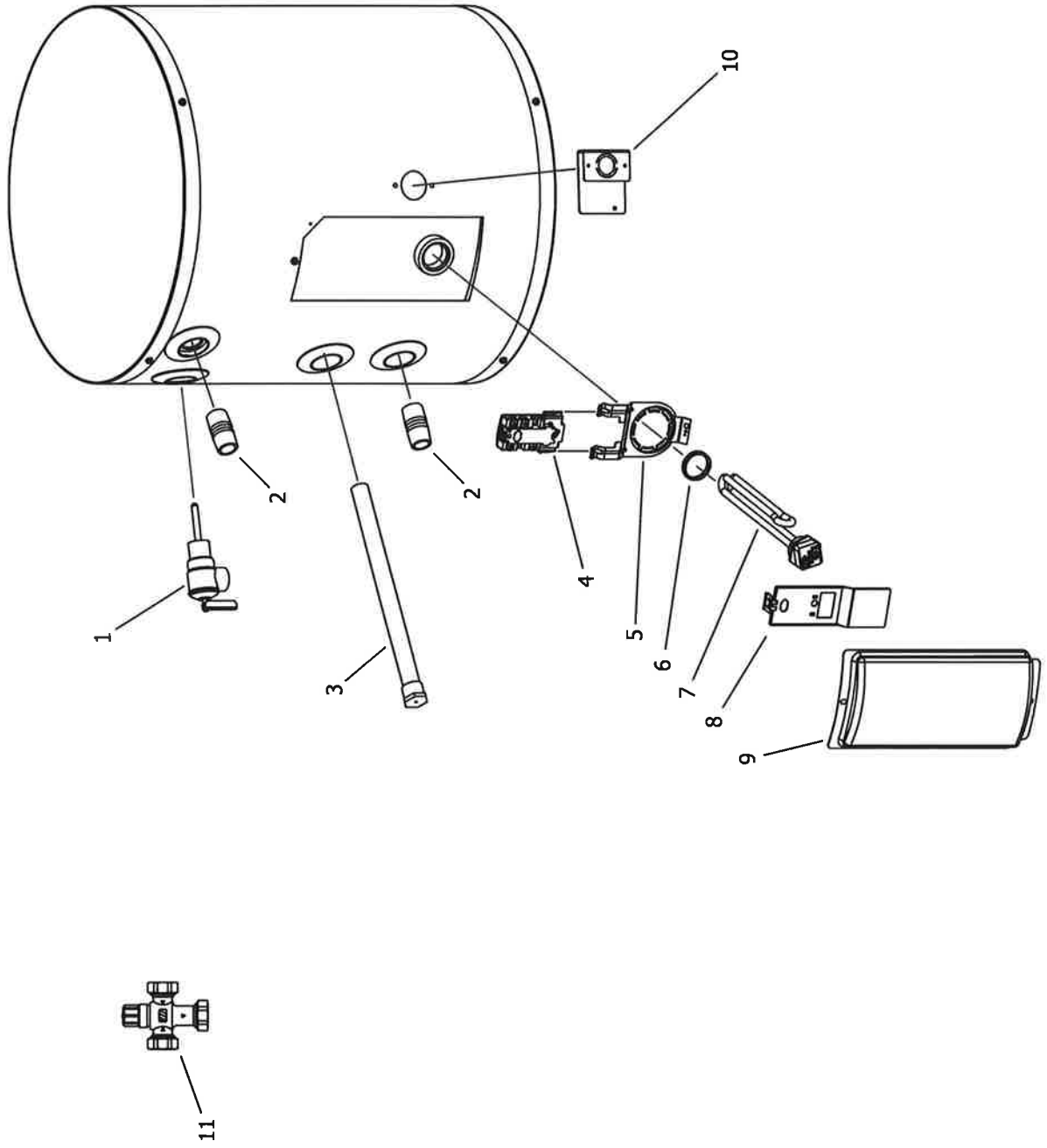
∩ Design certified for products with serial numbers PRIOR to TD43243484.

∩ ∩ Design certified for products with serial numbers AFTER and including TD43243484.



Item	Description	Model RE112U*	Model RE112T	Model LE112T	Model RE220U	Model LE220U
1	Junction Box Cover	243-39452-00	243-39452-00	243-39452-00	243-39452-00	243-39452-00
2	Bracket-Grounding/Conduit w/ Ground Screw	239-55386-00	239-55386-00	---	239-55386-00	---
3	Bracket-Grounding/Conduit	---	---	239-39451-00	---	239-39451-00
4	Junction Box Extender	---	---	239-40587-00	---	239-40587-00
5	J-Box w/ Terminal Block	---	---	265-47380-00	---	265-47380-00
6	Service Replacement Dip Tube (PEX)	415-51534-02	415-51534-02	415-51534-02	---	---
7	Pipe Plug 3/4 NPT	239-11638-00	239-11638-00	239-11638-00	---	---
8	Anode Rod Plug Type (Magnesium)#	415-47782-08	415-47782-08	415-47782-08	---	---
9	Anode Rod Plug Type (Aluminum)#	415-38508-10	415-38508-10	415-38508-10	---	---
10	Anode Rod Plug Type (A420 Aluminum)#	415-49559-04	415-49559-04	415-49559-04	---	---
11	Hole Closure	239-31547-02	239-31547-02	239-31547-02	---	---
12	Hot Water Outlet Anode (Magnesium)#	---	---	---	415-47776-19	415-47776-19
13	Hot Water Outlet Anode (Aluminum)#	---	---	---	415-32999-28	415-32999-28
14	Hot Water Outlet Anode (A420 Aluminum)#	---	---	---	415-49560-10	415-49560-10
15	Inlet/Outlet Nipple	229-32762-03	229-32762-03	229-32762-03	229-32762-03	229-32762-03
16	T&P Relief Valve	415-40594-02	415-40594-02	415-40594-02	415-40594-02	415-40594-02
17	Thermostat Mounting Bracket	415-50689-00	415-50689-00	415-50689-00	415-50689-00	415-50689-00
18	Element Gasket	223-34019-00	223-34019-00	223-34019-00	223-34019-00	223-34019-00
19	Heating Element 1500W, 120V Copper** ♦	415-42540-02	415-42540-02	415-42540-02	415-42540-02	415-42540-02
20	Heating Element 1500W, 120V Incoloy** ♦	415-42541-02	415-42541-02	415-42541-02	415-42541-02	415-42541-02
21	Thermostat-Residential ■■	415-50691-00	415-50691-00	---	415-50691-00	---
22	Thermostat-Light Duty Commercial ■■ ∩	---	---	415-50691-00	---	415-50691-00
23	Thermostat-Light Duty Commercial ■ Φ ∩∩	---	---	415-53388-00	---	415-53388-00
24	Thermostat Protector	223-50125-00	223-50125-00	223-50125-00	223-50125-00	223-50125-00
25	Access Cover	243-36618-02	243-36618-02	243-36618-02	243-36618-02	243-36618-02
26	ASSE Approved Mixing Valve (Optional)	239-51778-00	239-51778-00	239-51778-00	239-51778-00	239-51778-00

- Protector (Item #16) included in kit with thermostat.
- Protector (Item #16) and mounting bracket (Item #12) included in kit with thermostat.
- Φ Mounting bracket (Item #12) not included in kit with thermostat.
- ♦ Gasket (Item #13) included with this kit
- ** For other wattages/voltages, consult residential Heating Element Replacement Parts List.
- # Anode may need to be cut to length
- ∩ Design certified for products with serial numbers PRIOR to TD43243484.
- ∩∩ Design certified for products with serial numbers AFTER and including TD43243484.



Item	Description	Model RE110U*	Model LE110U*	Model RE115U*	Model LE115U*
1	T&P Relief Valve	415-40594-02	415-40594-02	415-40594-02	415-40594-02
2	Inlet/Outlet Nipple	229-32762-03	229-32762-03	229-32762-03	229-32762-03
3	Anode Rod Plug Type (Magnesium)#	415-47782-08	415-47782-08	415-47782-08	415-47782-08
	Anode Rod Plug Type (Aluminum)#	415-38508-10	415-38508-10	415-38508-10	415-38508-10
	Anode Rod Plug Type (A420 Aluminum)#	415-49559-04	415-49559-04	N/A	N/A
4	Thermostat-Residential ■■	415-50691-00	---	415-50691-00	---
	Thermostat-Light Duty Commercial ■■ ∩	---	415-50691-00	---	415-50691-00
	Thermostat-Light Duty Commercial ■ Φ ∩∩	---	415-53388-00	---	415-53388-00
5	Thermostat Mounting Bracket	415-50689-00	415-50689-00	415-50689-00	415-50689-00
6	Element Gasket	223-34019-00	223-34019-00	223-34019-00	223-34019-00
7	Heating Element 1500W, 120V Copper** ◆	415-42540-02	415-42540-02	415-42540-02	415-42540-02
	Heating Element 1500W, 120V Incoloy** ◆	415-42541-02	415-42541-02	415-42541-02	415-42541-02
8	Thermostat Protector	223-50125-00	223-50125-00	223-50125-00	223-50125-00
9	Access Cover	243-36618-02	243-36618-02	243-36618-02	243-36618-02
10	Bracket-Grounding/Conduit	239-46167-00	239-46167-00	239-46167-00	239-46167-00
11	ASSE Approved Mixing Valve (Optional)	239-51778-00	239-51778-00	239-51778-00	239-51778-00

- Protector (Item #16) included in kit with thermostat.
- Protector (Item #16) and mounting bracket (Item #12) included in kit with thermostat.
- Φ Mounting bracket (Item #12) not included in kit with thermostat.
- ◆ Gasket (Item #6) included with this kit.
- # Anode may need to be cut to length.
- ∩ Design certified for products with serial numbers PRIOR to TD43243484.
- ∩∩ Design certified for products with serial numbers AFTER and including TD43243484.

Reference Chart of Anode Length by Model

Model	AOD Anode Cut Length (End to end)		Hex Head Anode Cut Length (End to end)	
	Inches	Millimeters	Inches	Millimeters
RE12U*	9.63	245	---	---
RE16U*	---	---	9.5	241
RE120U*	13.63	346	---	---
LE120U*	13.63	346	---	---
RE112U*	---	---	9.5	241
RE112T	---	---	17.5	445
LE112T	---	---	17.5	445
RE220U	13.63	346	---	---
LE220U	13.63	346	---	---
RE110U*	---	---	9.5	241
LE110U*	---	---	9.5	241
RE115U*	---	---	9.5	241
LE115U*	---	---	9.5	241



United States

Sales 1-800-523-2931
Technical Support 1-800-334-3393
Email techsupport@bradfordwhite.com
Warranty 1-800-531-2111
Email warranty@bradfordwhite.com
Service Parts 1-800-538-2020
Email parts@bradfordwhite.com

Canada

Sales 1-866-690-0961 1-905-203-0600
Fax 905-636-0666
Warranty 1-800-531-2111
Email warranty@bradfordwhite.com
Technical Support 1-800-334-3393
Email techsupport@bradfordwhite.com
Orders ca.orders@bradfordwhite.com
Service Parts bwccwarranty@bradfordwhite.com

For U.S. and Canada field service, contact your professional installer or local Bradford White sales representative.

International

General Contact international@bradfordwhite.com

BRADFORD WHITE CORPORATION

LIMITED COMMERCIAL WATER HEATER WARRANTY

WHAT DOES THIS LIMITED WARRANTY COVER?

This limited warranty covers both the glass-lined tank and component parts for leakage or other malfunction caused by defects in materials and/or workmanship. It extends to the first buyer and to any subsequent owner(s) as long as the water heater remains installed at its original place of installation.

WHAT DOES THIS LIMITED WARRANTY NOT COVER?*

1. This limited warranty does not cover leakage or other malfunctions caused by:
 - a) Defective installation, and specifically, any installation which is made:
 - i) in violation of applicable state or local plumbing, housing or building codes, or
 - ii) without a certified American Gas Association, ASME, or comparable combination temperature and pressure relief valve, or
 - iii) contrary to the written instructions furnished with the unit.
 - b) Adverse local conditions, and specifically, sediment or lime precipitate in the tank or corrosive elements in the atmosphere.
 - c) Misuse, and specifically, operations, and maintenance contrary to the written instructions furnished with the unit, removal of anode(s), disconnection, alteration or addition of non-approved components or apparatus, operation with fuels or at settings other than those set forth on the rating plate, or accidental or other exterior damage.
2. This warranty also does not cover:
 - a) Production of noise, taste, odors, discoloration or rusty water.
 - b) Incidental property damage, loss of use, inconvenience or other incidental or consequential costs.
 - c) Costs associated with the replacement and/or repair of the unit, including:
 - i) any freight, shipping or delivery charges
 - ii) any removal, installation or re-installation charges
 - iii) any material, and/or permits required for installation, re-installation or repair
 - iv) charges to return the defective water heater and/or component part to the manufacturer.

WHAT IS THE PERIOD OF COVERAGE?

This limited warranty runs from date of installation (or without proof of installation, from three (3) months after the date of manufacture) for the period specified on the following chart. To determine length of coverage, check model number listed on the rating plate of appliance against this chart.

MODEL NUMBER PREFIX	LIMITED TANK** WARRANTY	LIMITED PARTS** WARRANTY
D, H, V, LD, DB, PDV, F-I, L-I-6, M, M-I, M-II, EF, LH-I, LV-I, TW, DH, SW, CDW, PDX, P, E, U, (U)LG, LE, LC, CEHD, CEA, SLE	1, 3, 5 or 6 YRS	1 YEAR
M3ST, BST, NH, NV	5 YRS	1 YEAR
No Letter Prefix	1,3 or 5 YRS	1 YEAR

NOTE: The duration of the tank warranty will be found in the model number.

i.e.; D80T1991N has a 1 Year tank warranty;

D80T1993N has a 3 Year tank warranty;

LG250H3N has a 3 Year tank warranty;

LG250H5N has a 5 Year tank warranty.

**All replacement water heaters and parts carry the balance of the original warranty, i.e. if an original three (3) year tank warranted water heater develops a leak due to defects in materials/workmanship after only two (2) years, the replacement unit is warranted for only the balance remaining from the original three (3) year warranty, or one (1) year in this example.

WHAT IS THE DURATION OF THE IMPLIED WARRANTY?

ANY IMPLIED WARRANTIES, INCLUDING THE WARRANTY OF MERCHANTABILITY IMPOSED ON THE SALE OF THE WATER HEATER UNDER THE LAWS OF THE STATE OF SALE ARE LIMITED IN DURATION TO ONE YEAR FROM DATE OF ORIGINAL INSTALLATION.

HOW DOES STATE LAW RELATE TO THE WARRANTY?

Some states do not allow:

1. Limitations on how long an implied warranty lasts.
2. Limitations on incidental or consequential damages.

Therefore, the above limitations or exclusions may not apply to you.

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

*Restrictions are not applicable to implied warranties in California. See "Special State Provisions" on reverse side.

LIMITED COMMERCIAL WATER HEATER WARRANTY (CONTINUED)

WHAT WILL WE DO TO CORRECT PROBLEMS?

If a defect occurs within the warranty period, we will:

1. Provide a replacement water heater of our manufacture, (or at our option) repair any unit which develops a leak in the steel tank within the tank warranty period. To obtain a replacement, you must forward the rating plate from the defective unit to us. If government regulations require the replacement water heater to have features not found in the defective water heater, you will be required to pay the difference in price represented by those government required features.
2. Provide a replacement part (or at our option repair) any part which fails to function within the parts warranty period. To obtain a replacement, you must forward the defective part to us. If government regulations require the replacement part to have features not found in the defective part, you will be required to pay the difference in price represented by those government required features.

We do reserve the right to verify any claims of defect by inspection.

WHAT WILL WE NOT DO?

We will not:

1. Repair or replace any water heater, or part, subject to conditions outlined in "What Does This Limited Warranty Not Cover?"
2. Reimburse any costs associated with repair and/or replacement.
3. Replace and/or repair any water heater without complete model/serial number.
4. Replace any water heater without prior receipt of actual rating plate from appliance.

HOW DO YOU GET WARRANTY ASSISTANCE?

Upon discovering a defect or problem, you should:

1. Contact either the installer or dealer, or
2. Contact us--
BRADFORD WHITE CORPORATION
WARRANTY SUPPORT GROUP
200 LAFAYETTE STREET
MIDDLEVILLE, MI 49333
(800) 531-2111

WHAT SHOULD YOU DO TO KEEP THE WARRANTY IN EFFECT?

To facilitate warranty assistance, you should:

1. Follow all instructions enclosed with the product.
2. Retain all bills of sale or receipts for proof of installation, etc.
3. Contact your installer, dealer or our Warranty Department as soon as any problem or defect is noticed.
4. When necessary, allow us, or our chosen representative, to inspect the unit.
5. For your reference, fill in the Model and Serial Number found on the units Rating Plate:

Model Number _____

Serial Number _____

Date of Installation _____

SPECIAL STATE PROVISIONS

For water heaters installed in California or Oregon, Paragraphs 2(c) (i) (iv) of the paragraph "WHAT DOES THIS WARRANTY NOT COVER?" does not apply. All other terms and conditions of this warranty apply as stated.

PLEASE RETAIN THIS WARRANTY IN A SAFE LOCATION FOR FUTURE REFERENCE.

Models: PLT-5, PLT-12, PLT-20

Potable Hot Water Expansion Tank

Installation Instructions

⚠ WARNING!

Improper installation, adjustment, alteration, service or maintenance can cause property damage, serious bodily injury or death. Read instructions completely before proceeding with installation. Only qualified personnel may install or service this equipment in accordance with local codes and ordinances.

Do not exceed 80psi (5.5 bar) air charge. Air charge pressure exceeding 80psi (5.5 bar) could become hazardous and will void any and all warranties, either written or implied. Failure to follow these instructions will result in the possibility of property damage, serious bodily injury or death.

This Expansion Tank is designed and intended for water storage at a maximum pressure of 150psi (10.3 bar) and a maximum temperature of 200°F (93°C). Any use other than for potable water or a sustained or instantaneous pressure in excess of 150psi (10.3 bar) or 200°F (93°C) is **UNSAFE** and can cause property damage, serious bodily injury or result in death.



Certified to ANSI/NSF 61
(73°F/23°C)



Listed by IAPMO

Disclaimer: The manufacturer of this tank does not accept any liability or other responsibility for personal injury or property damage resulting from improper use, installation or operation of this tank or the system of which it is a part.

Notice: The expansion tank, piping and your connections may in time leak. Select a location to install the expansion tank where a water leak will not damage the surrounding area. The manufacturer is not responsible for any water damage in connection with this expansion tank.

Acceptance Volume

Air Side Pre-pressure (psi) (bar)	Water Side Volume at 150psi (10.3 bar) (gallons)		
	PLT-5	PLT-12	PLT-20
20 (1.4)	1.48	3.42	7.102
40 (2.8)	1.26	2.88	5.882
60 (4.1)	1.0	2.49	4.705
80 (5.5)	.80	1.85	4.009

	PLT-5	PLT-12	PLT-20
Description	Order No.	Order No.	Order No.
Max. Pressure - psi	0067370	0067371	0067372
Max. Temp. - °F	150	150	150
Tank Volume - gal.	200	200	200
Tank Acceptance - gal.	2.1	4.5	8.5
Air Pre-charge - psi	1.26	2.8	3.4
Connections Size - in.	20	20	20
Diameter - in.	¾ male	¾ male	¾ male
Length - in.	8	10.5	12½
Weight - lbs.	11	13.5	19¾
	5.5	10	15

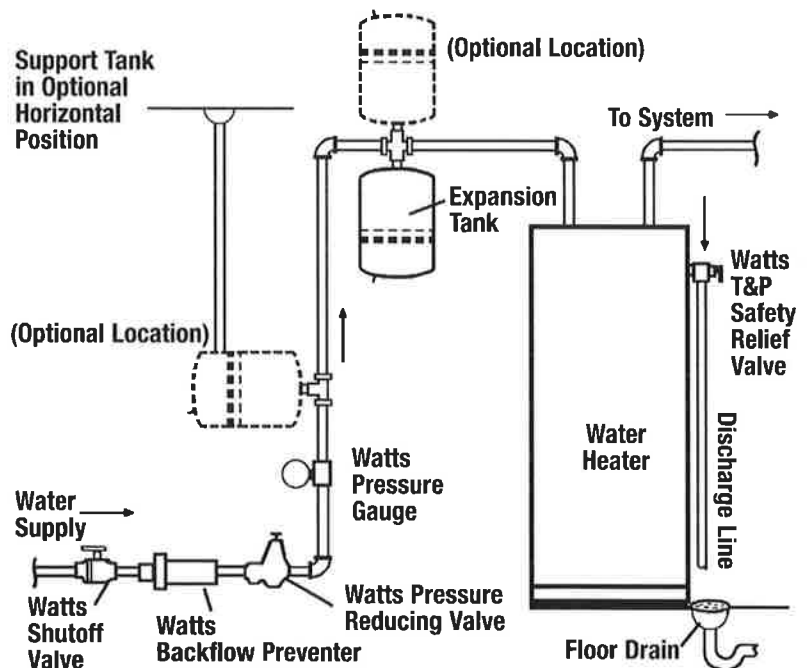


Figure 1

Installation

1. Before beginning installation determine the system pressure.
 - a. Open a faucet to allow the system pressure to equalize.
 - b. Close faucet.
 - c. Read the system pressure at the pressure gauge (Figure 1).
2. The expansion tank pre-charge must be set to the system pressure as determined in Step 1. Pre-charge prior to installation in the system.

Caution: Pre-charge prior to installation in the system. Do not adjust the air pre-charge of the expansion tank with the system under pressure. The air pre-charge should only be adjusted under zero system pressure.

Note: The normal pre-charge is 20psi (138 kPa).

Do not exceed 80psi. If system pressure exceeds 80psi (5.5 bar) it will be necessary to either: **A.** Add a pressure reducing valve to the system or, **B.** Locate the expansion tank in a riser where the static pressure is below 80psi (5.5 bar).

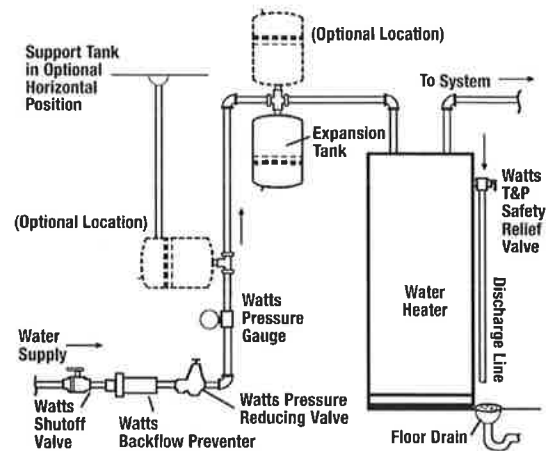


Figure 1

- a. Unscrew the protective cap from the air inlet valve.
 - b. Using a tire pressure gauge, check the tank pre-charge pressure.
 - c. If necessary, pressurize the tank to the proper setting using a manual bicycle tire pump. **Caution do not exceed 80psi.**
 - d. Replace the protective air cap.
3. Shut off the water supply valve.
 4. Shut off power source to the water heater, (electricity, gas, oil burner switch) and drain system following water heater manufacturer recommendations.
 5. Install the expansion tank in the system (refer to Figure 1).
 - a. The weight of the expansion tank filled with water is supported by the system piping. Therefore, it is important that, where appropriate, the piping has suitable bracing (strapping, hanger, brackets).
 - b. The expansion tank may be installed vertically (preferred method) or horizontally. **Caution: The tank must be properly supported in horizontal applications.**
 - c. This expansion tank, as all expansion tanks, may eventually leak. **Do not install without adequate drainage provisions.**
 6. Turn on the water supply valve.
 7. Open a hot water fixture and allow water flow until all air is removed from the system.
 8. Reapply power to the water heater.
 9. Open a hot water fixture to allow a slight flow until the hot water has reached operating temperature.
 10. Recheck system pressure following Step 1.a through c.

Caution: Pre-charge prior to installation in the system. Do not adjust the air pre-charge of the expansion tank with the system under pressure. The air pre-charge should only be adjusted under zero system pressure.

If necessary, adjust the pressure reducing valve to the expansion tank pre-charge as determined in Step 2.

Important!

- A pressure relief valve sized and installed in accordance with local codes must be incorporated in the systems requiring a combined temperature and pressure safety relief valve. The temperature and pressure safety relief valve should be sized and installed in accordance with local codes.
- Never plug a safety Relief Valve.

CALIFORNIA PROPOSITION 65 WARNING

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. (California law requires this warning to be given to customers in the State of California.)

For more information: www.watts.com/prop65

Limited Warranty: Watts Regulator Co. (the "Company") warrants each product to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment. In the event of such defects within the warranty period, the Company will, at its option, replace or recondition the product without charge.

THE WARRANTY SET FORTH HEREIN IS GIVEN EXPRESSLY AND IS THE ONLY WARRANTY GIVEN BY THE COMPANY WITH RESPECT TO THE PRODUCT. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The remedy described in the first paragraph of this warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product.

Some States do not allow limitations on how long an implied warranty lasts, and some States do not allow the exclusion or limitation of incidental or consequential damages. Therefore the above limitations may not apply to you. This Limited Warranty gives you specific legal rights, and you may have other rights that vary from State to State. You should consult applicable state laws to determine your rights. **SO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL SHIPMENT.**

WATTS®

A Watts Water Technologies Company

ISO 9001-2000
CERTIFIED

USA: 815 Chestnut St., No. Andover, MA 01845-6098; www.watts.com

Canada: 5435 North Service Rd., Burlington, ONT. L7L 5H7; www.wattscanada.ca

P-8

Installation, Maintenance, and Repair Manual

Series 009, LF009, LFU009, SS009, U009

Reduced Pressure Zone Assemblies

1/4" – 3"

⚠ WARNING



Read this Manual **BEFORE** using this equipment. Failure to read and follow all safety and use information can result in death, serious personal injury, property damage, or damage to the equipment. Keep this Manual for future reference.



⚠ WARNING

Local building or plumbing codes may require modifications to the information provided. You are required to consult the local building and plumbing codes prior to installation. If this information is not consistent with local building or plumbing codes, the local codes should be followed.

⚠ WARNING

Need for Periodic Inspection/Maintenance: This product must be tested periodically in compliance with local codes, but at least once per year or more as service conditions warrant.

If installed on a fire suppression system, all mechanical checks, such as alarms and backflow preventers, should be flow tested and inspected in accordance with NFPA 13 and/or NFPA 25.

Corrosive water conditions and/or unauthorized adjustments or repair could render the product ineffective for the service intended. Regular checking and cleaning of the product's internal components helps assure maximum life and proper product function.

NOTICE

For Australia and New Zealand, line strainers should be installed between the upstream shutoff valve and the inlet of the backflow preventer.

Fittings such as end connectors intended to join alternative pipe systems made from other materials (such as plastics) shall also conform to the relevant dimensional and performance requirements of the appropriate Australian, New Zealand, or joint Australian–New Zealand Standard for the alternative pipe system.

Testing

For field testing procedure, refer to IS-TK-DL, IS-TK-9A, IS-TK-99E, and IS-TK-99D at watts.com.

For Australia, refer to Australian standard AS/NZS 2845.3.

For other repair kits and service parts, refer to the Backflow Prevention Products Repair Kits & Service Parts price list PL-RP-BPD at watts.com.

For technical assistance, contact your local Watts representative.



LF009 with Flood Sensor

Series 009 assemblies, sizes 1/2" to 3", include a sensor on the relief valve to detect excessive discharge and trigger notification of a potential flood event.

NOTICE

An add-on connection kit is required to activate the flood sensor. Without the connection kit, the flood sensor is a passive component that has no communication with any other device. (A retrofit sensor connection kit is also available for existing installations. See "Add-on and Retrofit Sensor Connection Kits," for ordering details.)

NOTICE

Use of the flood sensor does not replace the need to comply with all required instructions, codes, and regulations related to installation, operation, and maintenance of this product, including the need to provide proper drainage in the event of a discharge.

Watts no es responsable de la falla de las alertas debido a problemas de conectividad, cortes de energía o instalación incorrecta.

Installation Guidelines

Indoors

For indoor installations, the assembly needs to be easily accessible to facilitate testing and servicing. If it is located in a line close to a wall, be sure the test cocks are easily accessible. A drain line and air gap should be piped from the relief valve connection as shown in Figure 1. This is where evidence of discharge is clearly visible, signaling the need to protect against water damage. Therefore, never install the assembly in concealed locations. (For more information, download the ES-AG/EL/TC specification at watts.com.)

Outside

In an area where freezing conditions do not occur, the assembly can be installed outside. The most satisfactory installation is above ground; thus, the assembly should be installed in this manner.

Backflow preventers should not be installed in pits unless approved by local codes. In such cases, a modified pit installation is preferred.

NOTICE

In an area where freezing conditions can occur, the assembly should be installed above ground in an insulated enclosure, as shown in Figure 2. (For more information, download the ES-WB specification at watts.com.)

The assembly must be installed in an accessible location to facilitate testing and servicing. A discharge line should be piped from the air gap at the relief valve connection to ensure there is adequate drainage. Never pipe the discharge line directly into a drainage ditch, sewer, or sump. Never install the assembly where any part of the unit could become submerged in standing water.

Parallel

Two or more smaller-sized assemblies can be piped in parallel (when approved) to serve a large supply pipe main, as shown in Figure 3. This type of installation is employed where increased capacity is needed beyond that provided by a single valve and permits testing or servicing of an individual valve without shutting down the complete line.

The number of assemblies used in parallel should be determined by the engineer's judgment based on the operating conditions of a specific installation.

For parallel valve installations, the total capacity of the assemblies should equal or exceed that required by the system.

Figure 1

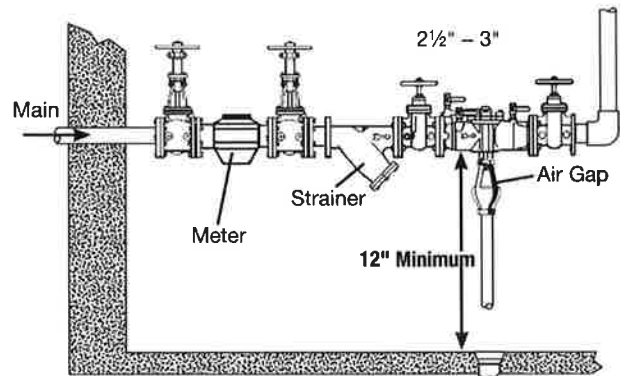


Figure 2

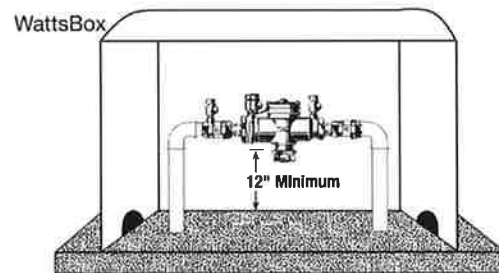
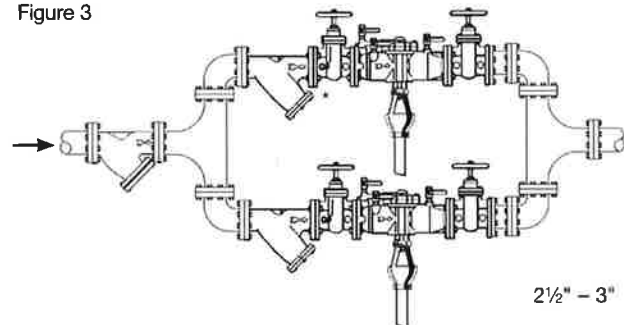


Figure 3



Annual Inspection

Annual inspection of all water system safety and control valves is required and necessary. Regular inspection, testing, and cleaning assures maximum life and proper product function.

NOTICE

Shutoff Valves: When shutoff valves are removed and reassembly is necessary, the shutoff valve with the test cock is to be mounted on the inlet side of the backflow preventer.

- A. The assembly should always be installed in an accessible location to facilitate testing and servicing. **Check the state and local codes to ensure that the backflow preventer is installed in compliance, such as the proper height above the ground.**
- B. Watts recommends that a strainer be installed ahead of the assembly to protect the internal components from unnecessary fouling.

CAUTION

Do not add a strainer when the backflow preventer is installed on seldom-used water lines, such as fire sprinkler lines or other lines called upon only during emergencies.

Start Up: The downstream shutoff should be closed. Open the upstream shutoff slowly and fill the valve. When the valve is filled, open the downstream shutoff slowly and fill the water supply system. This is necessary to avoid water hammer or shock damage.

- C. Water discharge from the relief valve should be vented in accordance with code requirements. The relief valve should never be solidly piped into a drainage ditch, sewer, or sump. The discharge should be terminated approximately 12" above the ground or through an air gap piped to a floor drain.

NOTICE

Relief Valve Discharge Rates

The installation of an air gap with the drain line terminating above a floor drain handles any normal discharge or nuisance spitting through the relief valve. However, floor drain size may need to be designed to prevent water damage caused by a catastrophic failure condition. See Figure 4 for maximum relief valve discharge rates, size, and capacity of typical floor drains.

Do not reduce the size of the drain line from the air gap fitting. Pipe full line size.

- D. After initial installation, a discharge from the relief valve opening may occur due to inadequate initial flushing of pipe lines to eliminate dirt and pipe compounds. If flushing does not clear, remove the first check valve and clean thoroughly.

NOTICE

Periodic relief valve discharge may occur on dead end service applications, such as boiler feed lines or cooling tower makeup lines due to fluctuating supply pressure during a static or no flow condition. To avoid this discharge, install a spring-loaded rubber seated check valve ahead of the backflow assembly to "lock-in" the downstream pressure.

- E. Backflow preventers should never be placed in pits unless absolutely necessary and then only when and as approved by local codes. In such cases, provision should be made to always vent above flood level or for a pit drain to ensure an adequate air gap below the relief port.

- F. The backflow preventers must be inspected periodically for any discharge from the relief valve which provides a visual indication of need for cleaning or repair of check valves. Also testing for proper operation of the device should be made periodically in compliance with local codes, but at least once a year or more often, depending upon system conditions.

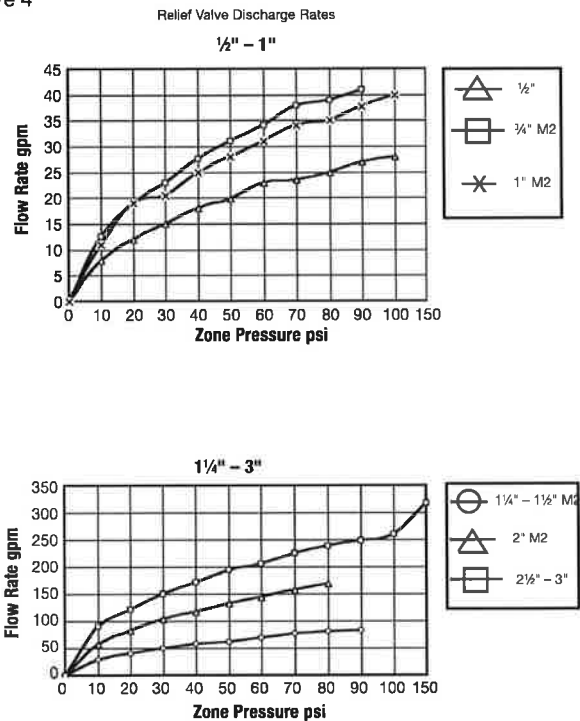
The relief vent discharges water when, during no-flow periods, the first check valve is fouled or the inlet pressure to the device drops sufficiently due to upstream pressure fluctuations to affect the required operating differential between the inlet pressure and reduced pressure zone. Otherwise, such relief (spitting) can occur when the second check is fouled during emergency backflow or resulting from a water hammer condition. (For more information, download Troubleshooting Guide S-TSG at watts.com.)

NOTICE

Special considerations are necessary when testing assemblies installed on Fire Prevention Systems.

Fire Protection System Installations: The National Fire Protection Agency (NFPA) Guidelines require a confirming flow test be conducted whenever a "main line" valve such as a backflow assembly or the shutoff valves have been operated. Certified testers of backflow assemblies must conduct this confirming test.

Figure 4



TYPICAL FLOW RATES AS SIZED BY FLOOR DRAIN MANUFACTURERS

2" 55 gpm	5" 350 gpm
3" 112 gpm	6" 450 gpm
4" 170 gpm	8" 760 gpm

Servicing the Relief Valve

NOTICE

No special tools are required to service assembly sizes 2½" to 3".

1. Detach the activation module, if installed, from the flood sensor then remove the sensor from the relief valve.
2. Remove the four or six relief valve cover bolts while holding the cover down.
3. Lift the cover straight off. The stem and diaphragm assembly normally remain with the cover as it is removed. The relief valve spring is free inside the body at this point.
4. The relief valve seat is located at the bottom of the body bore, and can be removed, if necessary, for cleaning. The disc can be cleaned without disassembly of the relief valve module. If it is determined that the relief valve diaphragm and/or disc should be replaced, the relief valve module can be readily disassembled without the use of special tools.

NOTICE

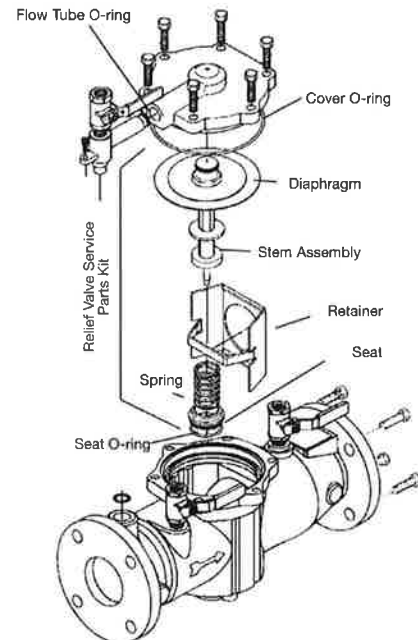
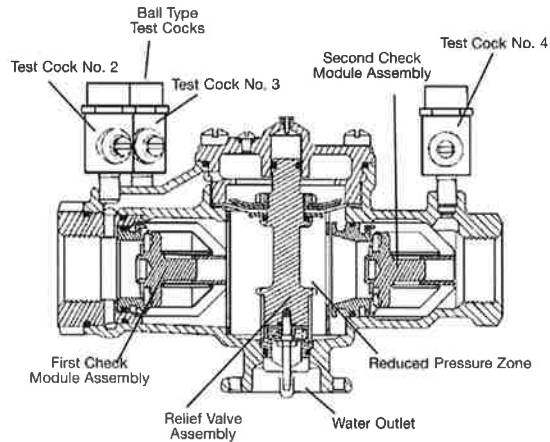
The disc rubber is molded into the disc holder and is supplied as a disc holder assembly.

5. To reassemble the relief valve, press the seat firmly into place in the body, center the spring on the seat, and insert the cover and relief valve module as a unit straight into the bore. Press down on the cover to assure proper alignment. Insert and tighten bolts.
6. Reattach the flood sensor to the relief valve and mount the activation module to the sensor.

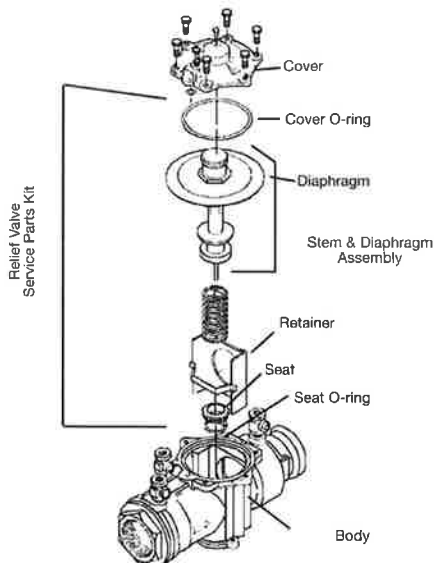
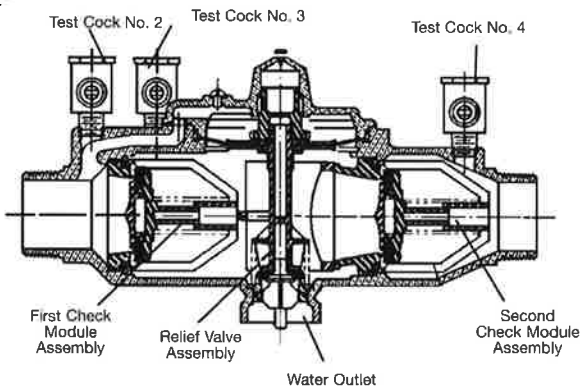
NOTICE

If the cover does not press flat against the body, the stem assembly is crooked and damage can result. Realign the stem and cover before bolts are inserted.

2½" - 3"



1" - 2"



Servicing First and Second Check Valves

1. Remove the relief valve assembly by following the preceding procedure.
2. Remove the retainer from the body bore. The check valve modules can now be removed from the valve by hand or with a screwdriver.

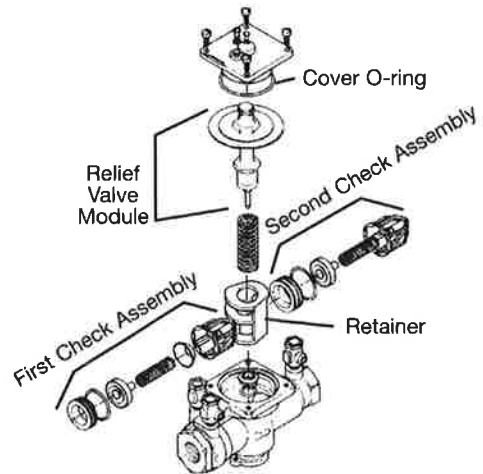
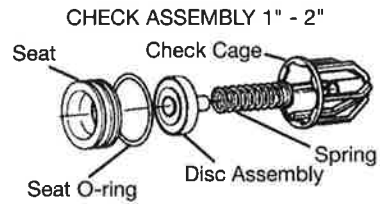
NOTICE

The seats and springs of the first and second check modules are not interchangeable. The heavier spring and smaller diameter seat belong with the first check module.

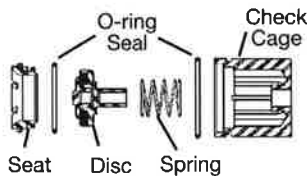
3. The check seats are attached to the cage with a bayonet type locking arrangement. Holding the cage in one hand, push the seat inward and rotate counterclockwise for 2½" to 3"; clockwise for ¼" to 2" against the cage. The seat, spring cage, spring, and disc assembly are now individual components.
4. The disc assembly may now be cleaned and reassembled or, depending on its condition, discarded and replaced with a new assembly from the repair kit. O-rings should be cleaned or replaced as necessary and lightly greased with the FDA-approved silicon grease.
5. Reassemble the check valve modules. Check modules are installed in the valve body with the seat facing the valve inlet. The modules must be securely in place before the retainer can be replaced. Reinstall relief valve assembly as well as flood sensor and activation module.

NOTICE

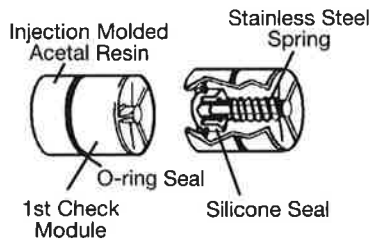
No special tools are required to service assembly sizes 2½" to 3".



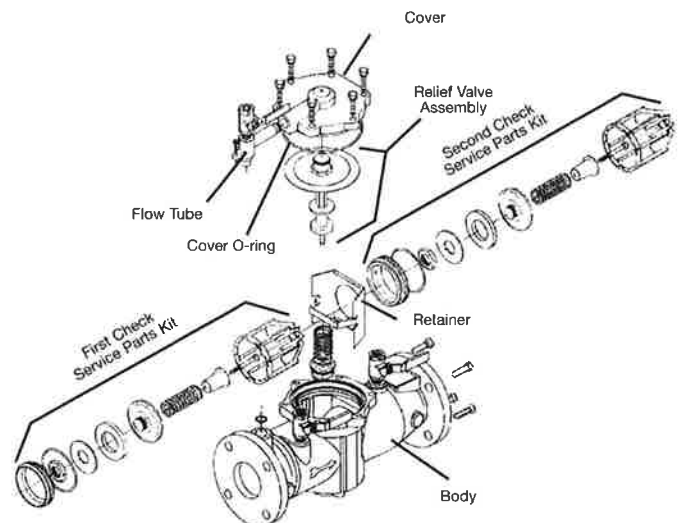
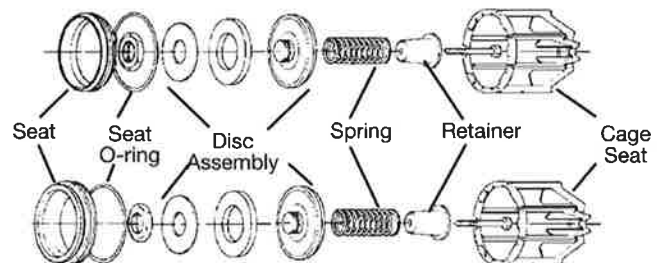
CHECK ASSEMBLY ¼" M3



CHECK ASSEMBLY ¼" - ¾"







CHECK ASSEMBLY 2½" - 3"







Troubleshooting

SYMPTOM	CAUSE	SOLUTION
Check valve fails to hold 1.0 PSID minimum	Debris on check disc sealing surface	Disassemble and clean
	Leaking isolation valve	Disassemble and clean or repair
	Damaged seat disc or seat O-ring	Disassemble and replace
	Damaged guide holding check open	Disassemble and clean or replace
	Weak or broken spring	Disassemble and replace spring
Chatter during flow conditions	Worn, damaged or defective guide	Disassemble and repair or replace guide
Low flows passing through mainline valve	Mainline check fouled	Disassemble and clean
	Meter strainer plugged	
	Damaged mainline seat disc or seat	Disassemble and replace
	Broken mainline spring	

Add-on and Retrofit Sensor Connection Kits for Building Management Systems

ORDERING CODE	ADD-ON/RETROFIT KIT	DESCRIPTION
88003056	 <p>FP-BF-BMS BMS Sensor Connection Kit Series 009, LF009, LFU009, SS009, U009 Sizes ½" to 3"</p>	Includes sensor activation module with cable, deflector (4), ground wire, and power adapter. Use this kit to activate the flood sensor and enable flood detection capabilities on the relief valve of a new installation working with a BMS controller (not included).
88003057	 <p>FP-RFK-BF-BMS-CFS BMS Sensor Retrofit Connection Kit Series 009, LF009, LFU009, SS009, U009 Sizes ½" to ¾"</p>	Includes flood sensor, deflector, sensor activation module with cable, ground wire, and power adapter. Use this kit to install the flood sensor and enable flood detection capabilities on the relief valve of an existing installation working with a BMS controller (not included).
88003058	 <p>FP-RFK-BF-BMS-CFS BMS Sensor Retrofit Connection Kit Series 009, LF009, LFU009, SS009, U009 Sizes 1" to 1½"</p>	Includes flood sensor, deflector (2), sensor activation module with cable, mounting bolts, ground wire, and power adapter. Use this kit to install the flood sensor and enable flood detection capabilities on the relief valve of an existing installation working with a BMS controller (not included).
88003059	 <p>FP-RFK-BF-BMS-CFS BMS Sensor Retrofit Connection Kit Series 009, LF009, LFU009, U009 Sizes 2" to 3"</p>	Includes flood sensor, deflector, sensor activation module with cable, mounting bolts, ground wire, and power adapter. Use this kit to install the flood sensor and enable flood detection capabilities on the relief valve of an existing installation working with a BMS controller (not included).

Add-on and Retrofit Sensor Connection Kits for Cellular Communication

ORDERING CODE	ADD-ON/RETROFIT KIT	DESCRIPTION
88003060	 <p>FP-BF-CFS Cellular Sensor Connection Kit Series 009, LF009, LFU009, SS009, U009 Sizes ½" to 3"</p>	Includes sensor activation module with cable, deflector (4), Cellular Gateway with mounting kit, ground wire, and power adapter. Use this kit to activate the flood sensor and enable flood detection capabilities on the relief valve of a new installation working with cellular communication to send alerts by email message, SMS text message, or voice call.
88003061	 <p>FP-RFK-BF-CFS Cellular Sensor Retrofit Connection Kit Series 009, LF009, LFU009, SS009, U009 Sizes ½" to ¾"</p>	Includes flood sensor, deflector, sensor activation module with cable, Cellular Gateway with mounting kit, ground wire, and power adapter. Use this kit to install the flood sensor and enable flood detection capabilities on the relief valve of an existing installation working with cellular communication to send alerts by email message, SMS text message, or voice call.
88003062	 <p>FP-RFK-BF-CFS Cellular Sensor Retrofit Connection Kit Series 009, LF009, LFU009, SS009, U009 Sizes 1" to 1½"</p>	Includes flood sensor, deflector (2), sensor activation module with cable, mounting bolts, Cellular Gateway with mounting kit, ground wire, and power adapter. Use this kit to install the flood sensor and enable flood detection capabilities on the relief valve of an existing installation working with cellular communication to send alerts by email message, SMS text message, or voice call.
88003063	 <p>FP-RFK-BF-CFS Cellular Sensor Retrofit Connection Kit Series 009, LF009, LFU009, U009 Sizes 2" to 3"</p>	Includes flood sensor, deflector, sensor activation module with cable, mounting bolts, Cellular Gateway with mounting kit, ground wire, and power adapter. Use this kit to install the flood sensor and enable flood detection capabilities on the relief valve of an existing installation working with cellular communication to send alerts by email message, SMS text message, or voice call.

Limited Warranty: Watts (the "Company") warrants each product to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment. In the event of such defects within the warranty period, the Company will, at its option, replace or recondition the product without charge.

THE WARRANTY SET FORTH HEREIN IS GIVEN EXPRESSLY AND IS THE ONLY WARRANTY GIVEN BY THE COMPANY WITH RESPECT TO THE PRODUCT. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The remedy described in the first paragraph of this warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product.

Some States do not allow limitations on how long an implied warranty lasts, and some States do not allow the exclusion or limitation of incidental or consequential damages. Therefore the above limitations may not apply to you. This Limited Warranty gives you specific legal rights, and you may have other rights that vary from State to State. You should consult applicable state laws to determine your rights. **SO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL SHIPMENT.**



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P-9



WARNING
Read this Manual BEFORE using this equipment. Failure to read and follow all safety and use information can result in death, serious personal injury, property damage, or damage to the equipment. Keep this Manual for future reference.



WARNING
You are required to consult the local building and plumbing codes prior to installation. If the information in this manual is not consistent with local building or plumbing codes, the local codes should be followed. Inquire with governing authorities for additional local requirements.

Installation Instructions

- The valve should be installed by a licensed contractor in accordance with local codes and ordinances.
- This valve should be installed where it is accessible with sufficient clearance for cleaning, service, or adjustment.
- Before installing the valve, be sure that the pipe ends are reamed and threads are cut to size. For valves with Quick-Connect tailpieces refer to Quick-Connect Installation instructions below.
- Flush the lines to remove all loose scale, dirt and other foreign matter that can damage or clog the valve.

NOTICE

To tighten valve, first hand tighten followed by 1/2-1 turn, using wrench.
Product is for interior or exterior applications. Product should not be buried directly in the ground. For exterior applications where the valve will be situated in a vault or pit or in contact with the ground, the valve should be

WARNING
Failure to read and follow all safety and use information can result in death, serious personal injury, property damage, or damage to the equipment. Keep this Manual for future reference.

Adjustment

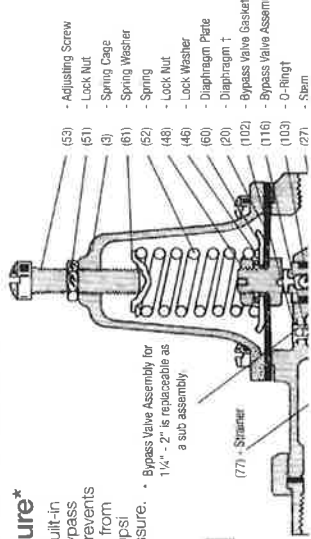
Regulator is factory preset to 50psi (344 kPa) in a static condition. To adjust pressure setting, loosen the lock nut and turn the adjusting bolt clockwise to increase pressure, counterclockwise to decrease pressure.

CAUTION

Any time a reducing valve is adjusted, use a pressure gauge to verify correct pressure setting. Do not bottom out adjusting screw on spring cage.

Bypass Feature*

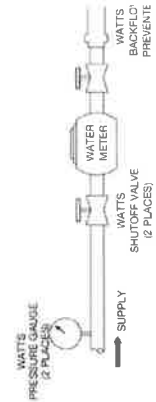
This regulator has a built-in thermal expansion bypass feature. This feature prevents downstream pressure from rising to more than 10psi above the supply pressure.



NOTICE

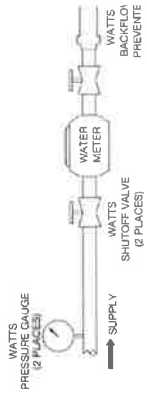
The bypass feature will not prevent the pressure relief valve from operation on the

Typical Installation



Series Installation

Series installations are recommended where very high pressure must be reduced to a very low downstream pressure. Reducing the pressure in stages eliminates whistling.



Limited Warranty: Watts Regulator Co. (the "Company") warrants each product to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment. In the event of such defects within the warranty period, the Company will, at its option, replace or recondition the product without charge.

THE WARRANTY SET FORTH HEREIN IS GIVEN EXPRESSLY AND IS THE ONLY WARRANTY GIVEN BY THE COMPANY WITH RESPECT TO THE PRODUCT. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The remedy described in the first paragraph of this warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product.

Some States do not allow limitations on how long an implied warranty lasts, and some States do not allow the exclusion or limitation of incidental or consequential damages. Therefore the above limitations may not apply to you. This Limited Warranty gives you specific legal rights, and you may have other rights that vary from State to State. You should consult applicable state laws to determine your rights. **SO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL SHIPMENT.**



La Compañía^(*) garantiza, por un periodo de un año a partir de esta fecha, los productos de materiales y mano de obra que encuentren tales defectos dentro del periodo de garantía, la condición del producto sin costo alguno.

LA EN FORMA EXPRESA Y ES LA ÚNICA GARANTÍA DADA POR EL PRODUCTO. LA COMPAÑÍA NO OTORGA NINGUNA OTRA GARANTÍA. LA COMPAÑÍA NO DA LA PRESENTE RENUNCIA A OTRAS GARANTÍAS, EXPRESAS O IMPLÍCITAS, INCLUYENDO SIN LIMITACIÓN PARA LA COMERCIALIZACIÓN E IDONEIDAD PARA EL PRODUCTO.

La garantía descrita en el primer párrafo de esta garantía constituirá la única y exclusiva solución por la que se hará responsable por daños accidentales, especiales o de garantía o el costo de reparación o reemplazo de otro material de este producto, otros costos resultantes por modificaciones ocasionadas por materiales extraños, daños debidos a cualquier otra circunstancia sobre la cual la Compañía no tenga control, caso de abuso, uso indebido, aplicación incorrecta, o alteración del producto.

Algunos Estados no permiten limitaciones sobre el tiempo que una garantía implícita y algunos Estados no permiten la exclusión o limitación de daños incidentales, especiales o de garantía. Por lo tanto, es posible que las limitaciones anteriores no se apliquen a usted. Esta garantía le da derechos legales específicos. Usted podría tener también otros derechos que varían de un Estado a otro. Debe consultar las leyes estatales aplicables para determinar sus derechos. **EN LA MEDIDA EN QUE SE ALINEA CON LAS LEYES ESTATALES APLICABLES, CUALQUIER GARANTÍA IMPLÍCITA QUE PUEDA NO SER DESALIANZADA, INCLUYENDO LAS GARANTÍAS IMPLÍCITAS DE ADECUACIÓN PARA UN PROPÓSITO EN PARTICULAR, SE LIMITA EN LA MEDIDA DEL EMBARQUE ORIGINAL.**

Installation Instructions • Instrucciones de instalación • Instructions d'installation

IS-25AUB

Series

WF25AUB-Z3

Water Pressure Reducing Valve

Válvula reductora de la presión del agua

Régulateur de pression d'eau

Size: 1/2" - 2"

Medidas: 1/2 a 2 pulg.

Tailles : 0.5 à 2" po



WF25AUB-Z3

WF25AUB-DU-QC-Z3



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ADVERTENCIA
 Lea este manual ANTES de usar el equipo. El hecho de no leer y seguir toda la información de seguridad y de uso, puede provocar la muerte, lesiones serias, daños materiales o daños en el equipo. Conserve este manual como referencia en el futuro.

ADVERTENCIA

Instrucciones de instalación

1. Un contratista licenciatado debe instalar la válvula conforme a los códigos y ordenanzas locales.
2. Esta válvula debe instalarse en un lugar accesible con suficiente espacio para la limpieza, la reparación o el ajuste.
3. Antes de instalar la válvula, asegúrese de que los extremos de la tubería estén escarados y las roscas estén contradas al tamaño adecuado. Para las válvulas con acachos de aspiración de conexión rápida, consulte las instrucciones a continuación para ver la "instalación de conexión rápida".
4. Enjuague las líneas para eliminar todo el sarro, la suciedad y otros materiales extraños sueltos que pueden dañar u obstruir la válvula.
5. Instale el regulador con la flecha del cuerpo apuntando hacia la dirección del flujo.

ADVERTENCIA
Se requiere inspección y mantenimiento periódicos. Este producto se debe probar periódicamente de conformidad con las normativas locales, pero por lo menos una vez al año o con más frecuencia según lo requieran las condiciones de servicio. Condiciones de agua corrosiva, o ajustes o reparaciones no autorizadas pueden provocar que el producto no sea efectivo para el uso previsto. La verificación y limpieza periódicas de los componentes internos del producto ayudan a garantizar la máxima vida útil y el funcionamiento adecuado del producto.

Es posible que se requiera mantenimiento cuando el agua en dirección descendente del producto muestre una o más de las siguientes condiciones: presión excesiva del agua, presión o flujo del agua inconsistentes o presión de agua inconsistente.

Instrucciones de mantenimiento

ADVERTENCIA
 Despresurice la válvula antes de realizar el mantenimiento o la reparación.

- Para limpiar el filtro: cierre la presión de entrada del agua, quite el tapón del filtro (2), retire y limpie el filtro.
- Para reemplazar el disco de asiento: cierre el suministro, abra la tuerca (51) y retire el tornillo de ajuste (53), quite el tornillo de resorte (61), el resorte (62) y la arandela (60). Quite el tapón de la parte inferior (12) y la junta (101). Introduzca y mantenga el destornillador en la ranura de la parte superior del resorte mientras aplica el soporte de disco de asiento (47) de la parte inferior del vástagó (27).
- Para reemplazar el diafragma: afloje la contratuercia (48) y quite la arandela de traba (46), la placa del diafragma (60) y el diafragma (20).
- Cuando vuelva a ensamblar, aplique una gota de sellador de rosca de baja potencia al soporte del disco.
- Abra el suministro de entrada del agua lentamente.

ADVERTISSEMENT
 Lire ce manuel AVANT d'utiliser cet équipement. Le non-respect de toutes les instructions de sécurité et d'utilisation peut entraîner des dommages matériels, des blessures graves ou la mort. Conserver ce manuel pour référence ultérieure.

ADVERTISSEMENT
 Vous êtes tenu de consulter les codes du bâtiment et de plomberie locaux avant l'installation. Si l'information n'est pas compatible avec les codes du bâtiment ou de plomberie locaux, les codes locaux doivent être suivis. Renseignez-vous auprès des autorités de réglementation pour les exigences locales supplémentaires.

Instrucciones d'installation

1. Ce régulateur doit être installé par un entrepreneur agréé, en conformité avec les codes et règlements locaux.
2. Il doit être installé dans un endroit facilement accessible, avec un dégagement suffisant pour le nettoyage, l'entretien et les réglages.
3. Avant l'installation, les extrémités des tuyaux doivent être alésées et les filetages coupés à dimension. Pour les régulateurs dotés d'abouts à raccord rapide, se reporter à la rubrique « Pose de raccord rapide ».
4. Purger les conduites pour éliminer les saletés, le sable et autres corps étrangers qui risqueraient d'endommager ou d'obstruer le régulateur.

6. Le régulateur peut être installé à la verticale ou à l'horizontale (droit ou inversé).

7. Procédure - ouvrir l'arrivée d'eau froide, puis d'eau chaude. Vérifier qu'il n'y a pas de fuites.

AVIS
 Pour serrer le robinet, commencez par serrer à la main suivi d'un 1/4-1 tour à l'aide d'une clé. Un contrôle annuel du régulateur garantit une durée de service et une performance optimales. Ce produit a été conçu pour des applications intérieures ou extérieures. Ce produit ne doit pas être entou directement dans le sol. Pour des applications extérieures ou la valve serait située dans un endroit où elle pourrait être endommagée par des débris, des animaux ou d'autres facteurs, elle doit être protégée par une cage en acier.

ADVERTENCIA
 El regulador es configurado a 344 kPa (50 psi) en la fábrica. Para ajustar la configuración de presión, atíjelo la contratuercia y gire el perno de ajuste hacia la derecha para aumentar la presión o en el sentido contrario para disminuirla.

PRECAUCIÓN
 Siempre que se ajuste una válvula reductora, utilice un manómetro para verificar que la presión sea la correcta. No atornille el tornillo de ajuste hasta el fondo en el terminal de resorte.

Función de derivación*
 Este regulador tiene una función de derivación de expansión térmica incorporada. Esta función evita que aumente la presión de la tubería descendente a más de 0,89 bares (10 psi) de la presión del suministro.

AVISO
 La función de derivación no evitará que la válvula de liberación de presión se abra en el sistema de suministro de agua caliente con una presión por encima de los 1,034 kPa (150 psi).

† Se puede reemplazar 1 pulg.) solamente no se pueden reemplazar.

** No se puede reemplazar 1 pulg.) solamente no se pueden reemplazar.

Juegos para reparación
 † El juego para la serie LF25AUB-Z3 incluye todo lo que se muestra arriba.

CÓDIGO DE PEDIDO	N.º DE JUEGO	TAMAÑO
0864941	1/2"	LF25AUB-RK
0864942	3/4"	LF25AUB-RK
0864943	1"	LF25AUB-RK
0864944	1 1/4"	LF25AUB-RK
0864945	1 1/2"	LF25AUB-RK
0864946	2"	LF25AUB-RK

Réglage
 Le régulateur est réglé en usine à 344 kPa (50 lb/ps²). Pour régler la pression, desserrer le contre-écrou et tourner le vis de réglage dans le sens horaire pour augmenter la pression, ou dans le sens antihoraire pour la diminuer.

MISE EN GARDE
 Chaque fois qu'un robinet réducteur de pression est ajusté, utilisez un manomètre pour vérifier le bon réglage de la pression. N'allez pas jusqu'au fond en ajustant la vis sur le bloc à ressort.

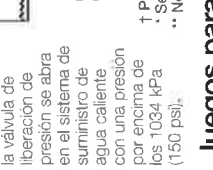
Dispositif de dérivation*
 Ce régulateur comprend un dispositif intégré de dérivation de la dilatation thermique. Ce dispositif empêche la pression en aval de s'élever de plus de 68,9 kPa (10 lb/ps²) au-delà de la pression d'alimentation.

AVIS
 * Dans un circuit d'alimentation en eau chaude, le dispositif

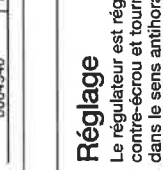
Instalación típica



Instalación en serie
 Se recomiendan las instalaciones en serie cut de suministro muy alta. Deba reducirse a una l de tubería descendente. La reducción de la p elimina silbidos y ruidos.



Instalación paralela
 Se recomiendan las instalaciones paralelas c o bajo es intermitente/ocasional. También se l servicio no puede ser interrumpido.



Installation type



Ajuste
 El regulador es configurado a 344 kPa (50 psi) en la fábrica. Para ajustar la configuración de presión, atíjelo la contratuercia y gire el perno de ajuste hacia la derecha para aumentar la presión o en el sentido contrario para disminuirla.

PRECAUCIÓN
 Siempre que se ajuste una válvula reductora, utilice un manómetro para verificar que la presión sea la correcta. No atornille el tornillo de ajuste hasta el fondo en el terminal de resorte.

Función de derivación*
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AVISO
 La función de derivación no evitará que la válvula de liberación de presión se abra en el sistema de suministro de agua caliente con una presión por encima de los 1,034 kPa (150 psi).

† Se puede reemplazar 1 pulg.) solamente no se pueden reemplazar.

** No se puede reemplazar 1 pulg.) solamente no se pueden reemplazar.

Juegos para reparación
 † El juego para la serie LF25AUB-Z3 incluye todo lo que se muestra arriba.

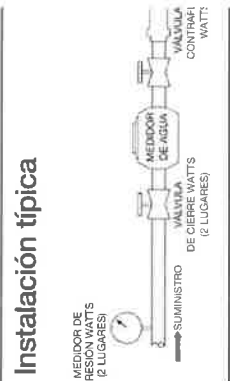
CÓDIGO DE PEDIDO	N.º DE JUEGO	TAMAÑO
0864941	1/2"	LF25AUB-RK
0864942	3/4"	LF25AUB-RK
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0864944	1 1/4"	LF25AUB-RK
0864945	1 1/2"	LF25AUB-RK
0864946	2"	LF25AUB-RK

Réglage
 Le régulateur est réglé en usine à 344 kPa (50 lb/ps²). Pour régler la pression, desserrer le contre-écrou et tourner le vis de réglage dans le sens horaire pour augmenter la pression, ou dans le sens antihoraire pour la diminuer.

MISE EN GARDE
 Chaque fois qu'un robinet réducteur de pression est ajusté, utilisez un manomètre pour vérifier le bon réglage de la pression. N'allez pas jusqu'au fond en ajustant la vis sur le bloc à ressort.

Dispositif de dérivation*
 Ce régulateur comprend un dispositif intégré de dérivation de la dilatation thermique. Ce dispositif empêche la pression en aval de s'élever de plus de 68,9 kPa (10 lb/ps²) au-delà de la pression d'alimentation.

AVIS
 * Dans un circuit d'alimentation en eau chaude, le dispositif



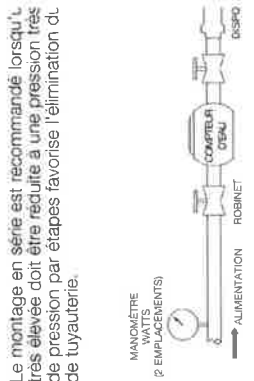
Instalación en serie
 Se recomiendan las instalaciones en serie cut de suministro muy alta. Deba reducirse a una l de tubería descendente. La reducción de la p elimina silbidos y ruidos.



Instalación paralela
 Se recomiendan las instalaciones paralelas c o bajo es intermitente/ocasional. También se l servicio no puede ser interrumpido.



Installation type



SUBMITTAL REVIEW

Date: 05/15/23

To:	Taggart Architects 4500 Burrow Drive North Little Rock, AR 72116		
Attention:	James Meyer, AIA		
From:	Austin Lynch		
Re:	220000 Plumbing Fixtures		
Project No.	TAG-043	Project Name:	Pine Bluff Sixth Avenue District

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CODE 1 Approved	CODE 2 Approved as Noted	CODE 3 Approved As Noted / Confirm	CODE 4 Revise and Resubmit	CODE 5 Not Approved	CODE 6 Comments Attached	CODE 7 Receipt Acknowledged

1. COTG – **Approved**
2. FCO1 – **Approved**
3. FCO2 – **Approved**
4. FD1 – **Approved**
5. FD2 – **Approved**
6. FS1 – **Approved**
7. HB1 – **Approved**
8. HB2 – **Approved as Noted**
 - a. Provide with Stainless Steel box to match basis of design.
9. HB3 – **Approved**
10. MS – **Approved**
 - a. Faucet – **Approved**
11. P1A – **Approved**
 - a. Flush Valve – **Approved**
12. P1B – **Approved**
 - a. Flush Valve – **Approved**
13. P2 – **Approved**
14. P3 – **Approved**
 - a. Faucet – **Approved**
15. P4 – **Approved**
 - a. Faucet – **Approved**
16. P5 (trim) – **Approved**
17. WH1 – **Approved as Noted**
 - a. Note: Provide Condensate neutralizer kit sized for 250,000btuh.
 - b. Expansion Tank – **Approved**
18. RP1 – **Approved**
19. WH2 – **Approved as Noted**
 - a. Note: Coordinate with electrical contractor to furnish and install new 20A/1P circuit breaker in panelboard L1R for water heater. Contractor shall match manufacturer, type, and AIC ratings of other circuit breakers in panelboard L1R. Provide (2)#12W and (1)#12G from panelboard L1R to water heater and make all final terminations.

20. RPZs – **Approved**

21. WHA – **Approved**

SHOP DRAWING REVIEW

Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Engineer's review and approval will be only to determine if the items covered by the submittals will conform to the information given in the Contract Documents and be compatible with the design concept. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

TRANSMITTAL LETTER



To: Ms. Scott Guerin
Brown Engineers
17200 Chenal Parkway, #300
Little Rock, Arkansas 72223

Project: City of Pine Bluff – 6th Avenue
Plaza – Submittals

FROM: James Meyer, A.I.A.
Project Architect

Date: April 13, 2023

WE TRANSMIT to you herewith under separate cover via

- | | | |
|---|--|--|
| <input type="checkbox"/> Drawings | <input type="checkbox"/> Approved | <input type="checkbox"/> As Requested |
| <input type="checkbox"/> Specifications | <input type="checkbox"/> Approved as Noted | <input checked="" type="checkbox"/> For Your Use |
| <input type="checkbox"/> Correspondence | <input type="checkbox"/> Revise and Resubmit | <input type="checkbox"/> For Comment or Approval |
| <input checked="" type="checkbox"/> Shop Drawings | <input type="checkbox"/> Not Approved | <input type="checkbox"/> |

Copies	Document #	Date	Description
1	220000	4/13/2023	Plumbing Fixtures – Product Data

Remarks: Please find enclosed the above referenced submittals for your review and comment. Please maintain a copy of the submittal for your records and return the remainder with your comments and the Taggart as well as the Nabholz Transmittals.

Copies To:

Signed By:

Billy J. Mathis, CSI, CDT
Administrative Assistant for Architecture



Nabholz Construction - HQ
 1718 Aldersgate Road
 Little Rock, Arkansas 72205
 P: +15012175500

Project: 04-22-3162 SIXTH AVENUE PLAZA
 601 SOUTH MAIN STREET
 PINE BLUFF, Arkansas 71601

Submittal #22-0000-1.0 - 22 00 00 - Plumbing Fixtures 22-0000 - Plumbing Basics

Revision	0	Submittal Manager	Ralph Moreno (Nabholz Construction Corporation)
Status	Open	Date Created	Apr 13, 2023
Issue Date		Spec Section	22-0000 - Plumbing Basics
Responsible Contractor	COMFORT SYSTEMS USA (ARK) INC	Received From	
Received Date		Submit By	
Final Due Date	Apr 28, 2023	Lead Time	
		Type	
Approvers	Brie Gregory , James Meyer		
Ball in Court	Ralph Moreno (Nabholz Construction Corporation)		
Distribution			
Description			
Lead Time		Priority	

Submittal Workflow

Name	Sent Date	Due Date	Returned Date	Response	Attachments
General Information Attachments					
Ralph Moreno		Apr 14, 2023		Pending	
Brie Gregory		Apr 28, 2023		Pending	
James Meyer		Apr 28, 2023		Pending	

NABHOLZ CONSTRUCTION CORP.

Reviewed for general compliance with the Design Documents.
 Subcontractor or vendor is fully responsible for all materials, accessories, coordination with contract documents and other trades, detailing and field measurements, and related construction criteria necessary to produce a complete, properly functioning and coordinated product, prepared for installation in full compliance with the contract documents, Nabholz Construction Subcontract or Purchase Order.

Ralph Moreno

Signature

04/13/2023

Date

6th Ave District

Pine Bluff, AR

Comfort Systems USA

North Little Rock, AR

Plumbing Submittals

Sanders Supply



Hot Springs, AR

April 3, 2023

Pine Bluff 6th Ave District

Plumbing Fixture Schedule Index

<u>TAB</u>	<u>Description</u>
COTG	Cleanout to Grade
FCO1	Floor Cleanout-Round
FCO2	Floor Cleanout-Square
FD1	Floor Drain
FD2	Floor Drain
FS1	Floor Sink
FS2	Floor Sink Trap Guard
HB1	Frost Proof Hose Bibb
HB2	Enclosed Wall Hydrant
HB3	Frost Proof Roof Hydrant
MS	Mop Sink Faucet/Accessories
P1A	Water Closet ADA
P1B	Water Closet
P2	Water Closet Flush Tank
P3	Wall Mount Lavatory
P4	Mop Sink
P5	Handwash Sink Supplies
WH1	Gas Water Heater
RP1	Recirc Pump

WH2

Water Heater-Electric

RPZ

Reduced Pressure Zone Backflow

WHA

Water Hammer Arrestor

COTG

Engineering Specification

Job Name **6th Ave District**
 Job Location **Pine Bluff**
 Engineer **Brown**
 Approval _____
 Tag **COTG**

Contractor **Comfort Systems USA**
 Approval _____
 Contractor's P.O. No. _____
 Representative **Sanders Supply**

CO-200-RX-4 Floor Cleanout with Ductile Iron Top Specification

Watts Drainage CO-200-RX-4 epoxy coated cast iron floor cleanout with 5"(127) round adjustable gasketed heavy duty ductile iron top, removable gas tight gasketed brass cleanout plug, and no hub (standard) outlet.



Pipe Sizing	
Suffix	Description
2	2"(51) Pipe Size <input type="checkbox"/>
3	3"(76) Pipe Size <input type="checkbox"/>
4	4"(102) Pipe Size <input type="checkbox"/>

Outlet Type	
Suffix	Description
NH	No Hub (MJ) <input type="checkbox"/>
P	Push On <input checked="" type="checkbox"/>
X	Inside Caulk <input type="checkbox"/>

Options	
Suffix	Description
-C	Membrane Clamp <input type="checkbox"/>
-6	Vandal Proof <input type="checkbox"/>
-13	Galvanized Body <input type="checkbox"/>

Optional Body Material	
Suffix	Description
-60	PVC Body w/Poly Plug <input type="checkbox"/>
-61	ABS Body w/Poly Plug <input type="checkbox"/>

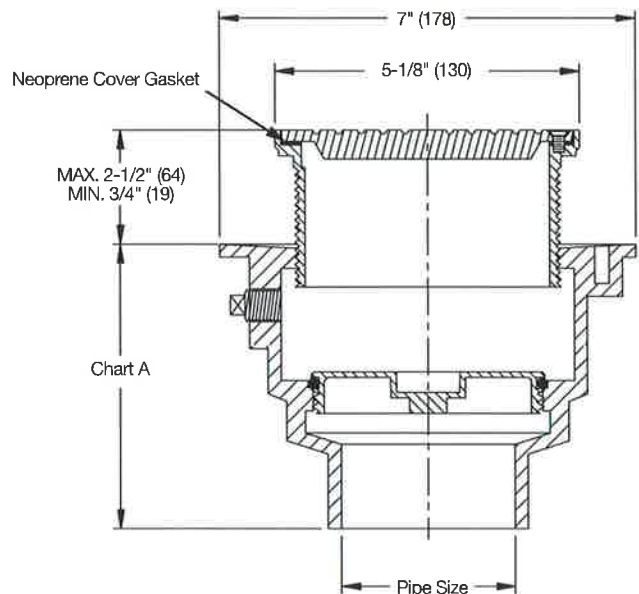


Chart A

	NH(MJ)	P	60/61
Pipe Size	No Hub	Push On	PVC/ABS
2"	4-1/2" (114)	5-1/2" (140)	4" (102)
3"	4-1/2" (114)	5-1/2" (140)	4" (102)
4"	4-3/4" (121)	5-1/2" (140)	4" (102)

Load Rating
*XHD

*The load classifications are in accordance with the American National Standards ASME A112.21.1M ASME Ratings are as follows:
 XHD - Safe Live Load 7500-10000 lbs.(3375-4500kg)
 The above categories are given as a guide only. Please consult factory.

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.



FCO1

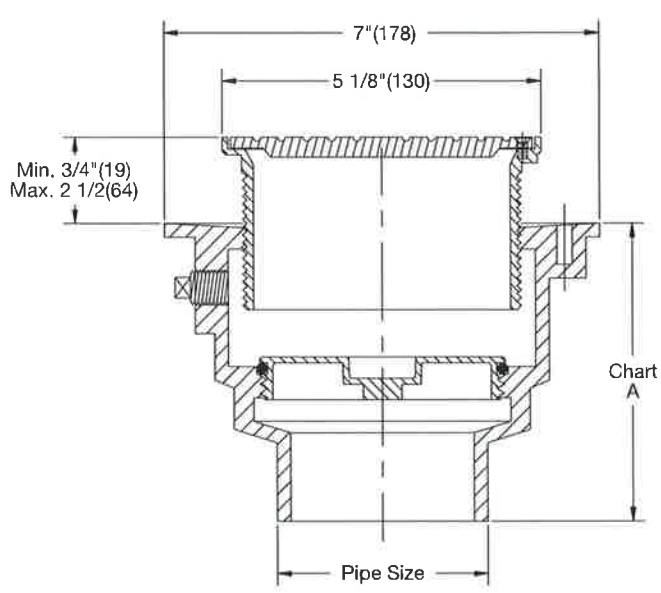
Engineering Specification

Job Name **6th Ave District**
 Job Location **Pine Bluff**
 Engineer **Brown**
 Approval _____
 Tag **FCO1**

Contractor **Comfort Systems USA**
 Approval _____
 Contractor's P.O. No. _____
 Representative **Sanders Supply**

CO-200-R Floor Cleanout with Round Top Specification

Watts CO-200-R epoxy coated cast iron floor cleanout with 5"(127) round adjustable gasketed nickel bronze top, removable gas tight gasketed brass cleanout plug, and no hub (standard) outlet.



Pipe Sizing (Select One)		
Suffix	Description	
2	2" (51) Pipe Size	<input type="checkbox"/>
3	3" (76) Pipe Size	<input type="checkbox"/>
4	4" (102) Pipe Size	<input type="checkbox"/>

Outlet Type (Select One)		
Suffix	Description	
NH	No Hub (MJ)	<input type="checkbox"/>
P	Push On	<input checked="" type="checkbox"/>
X	Inside Caulk	<input type="checkbox"/>

Options (Select One)		
Suffix	Description	
-C	Membrane Clamp	<input type="checkbox"/>
-6	Vandal Proof	<input type="checkbox"/>
-13	Galvanized Body	<input type="checkbox"/>
-CF	Carpet Clamping Flange	<input type="checkbox"/>
-SO	Side Outlet	<input type="checkbox"/>

Optional Body Material (NH Only)		Load Rating
Suffix	Description	
-60	PVC Body w/Poly Plug	MD
-61	ABS Body w/Poly Plug	

Chart A

Pipe Size	NH	Push-On	PVC/ABS
2" (51)	4 3/4" (121)	5 1/2" (140)	4" (102)
3" (76)	4 3/4" (121)	5 1/2" (140)	4" (102)
4" (102)	4 3/4" (121)	5 1/2" (140)	4" (102)

NOTICE

The load classifications are in accordance with the American National Standards ASME A112.36.2M-91(R2012) ASME Ratings are as follows:
 MD - Safe Live Load 2000-4999 lbs. (900-2250 kg)
 The above categories are given as a guide only.
 Please consult factory.

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USA: T: (800) 338-2581 • F: (828) 248-3929 • Watts.com
Canada: T: (888) 208-8927 • F: (905) 481-2316 • Watts.ca
Latin America: T: (52) 55-4122-0138 • Watts.com

FCO2

Engineering Specification

Job Name **6th Ave District**
 Job Location **Pine Bluff**
 Engineer **Brown**
 Approval _____
 Tag **FCO2**

Contractor **Comfort Systems USA**
 Approval _____
 Contractor's P.O. No. _____
 Representative **Sanders Supply**

CO-200-S Floor Cleanout with Square Top Specification

Watts CO-200-S epoxy coated cast iron floor cleanout with 5"x5"(127x127) square adjustable gasketed nickel bronze top, removable gas tight gasketed brass cleanout plug, and no hub (standard) outlet.



Pipe Sizing		
Suffix	Description	
2	2"(51) Pipe Size	<input type="checkbox"/>
3	3"(76) Pipe Size	<input type="checkbox"/>
4	4"(102) Pipe Size	<input type="checkbox"/>

Outlet Type		
Suffix	Description	
NH	No Hub (MJ)	<input type="checkbox"/>
P	Push On	<input checked="" type="checkbox"/>
X	Inside Caulk	<input type="checkbox"/>

Options		
Suffix	Description	
-C	Membrane Clamp	<input type="checkbox"/>
-6	Vandal Proof	<input type="checkbox"/>
-13	Galvanized Body	<input type="checkbox"/>

Optional Body Material		
Suffix	Description	
-60	PVC Body w/Poly Plug	<input type="checkbox"/>
-61	ABS Body w/Poly Plug	<input type="checkbox"/>

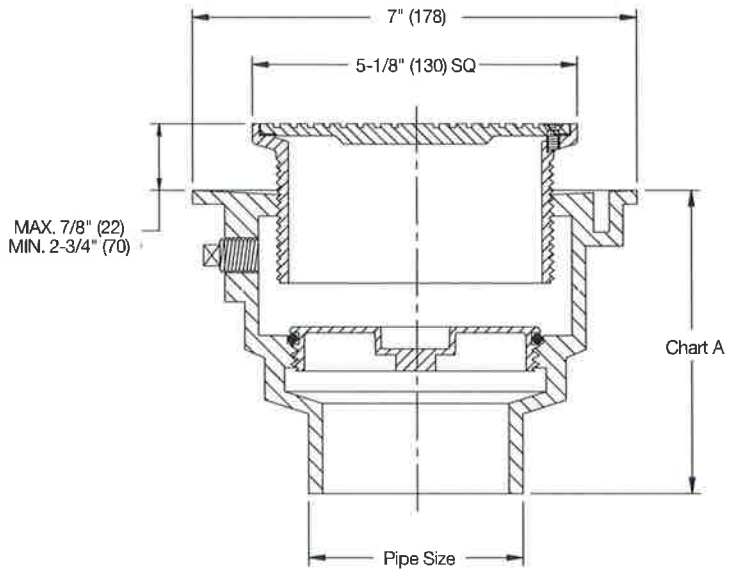


Chart A

	NH(MJ)	P	60/61
Pipe Size	No Hub	Push On	PVC/ABS
2"	4-1/2" (114)	5-1/2" (140)	4" (102)
3"	4-1/2" (114)	5-1/2" (140)	4" (102)
4"	4-3/4" (121)	5-1/2" (140)	4" (102)

Load Rating
*MD

* The load classifications are in accordance with the American National Standards ASME A112.21.1M ASME Ratings are as follows:
 MD - Safe Live Load 2000-4999 lbs.(900-2250kg)
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FD1

Engineering Specification

Job Name 6th Ave District
 Job Location Pine Bluff
 Engineer Brown
 Approval _____
 Tag FD1

Contractor Comfort Systems USA
 Approval _____
 Contractor's P.O. No. _____
 Representative Sanders Supply

FD-100-A

Floor Drain with Round Strainer

Specification

Watts FD-100-A epoxy coated cast iron floor drain with anchor flange, reversible clamping collar with primary and secondary weepholes, adjustable round heel proof nickel bronze strainer, and no hub (standard) outlet.



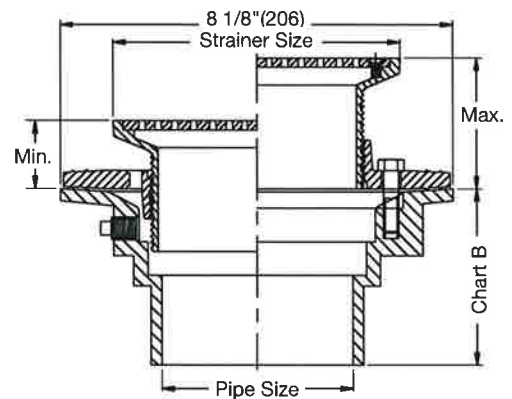
Pipe Sizing	
Suffix	Description
2	2"(51) Pipe Size <input type="checkbox"/>
3	3"(76) Pipe Size <input type="checkbox"/>
4	4"(102) Pipe Size <input type="checkbox"/>
6	6"(152) Pipe Size (NH Only) <input type="checkbox"/>

Outlet Type	
Suffix	Description
NH	No Hub (M.) <input type="checkbox"/>
P	Push On <input checked="" type="checkbox"/>
T	Threaded Outlet <input type="checkbox"/>
X	Inside Caulk <input type="checkbox"/>

Strainer	
Suffix	Description
A5	5"(127) Dia., Nickel Bronze <input type="checkbox"/>
A6	6"(127) Dia., Nickel Bronze <input checked="" type="checkbox"/>
A7	7"(178) Dia., Nickel Bronze <input type="checkbox"/>
A8	8"(203) Dia., Nickel Bronze <input type="checkbox"/>
A10	10"(254) Dia., Nickel Bronze <input type="checkbox"/>

Options	
Suffix	Description
-5	Sediment Bucket <input type="checkbox"/>
-6	Vandal Proof <input type="checkbox"/>
-7	Trap Primer Tapping <input checked="" type="checkbox"/>
-8	Backwater Valve (2, 3, 4" Only) <input type="checkbox"/>
-13	Galvanized Body <input type="checkbox"/>
-15	Strainer Extension (DD-50) <input type="checkbox"/>
-F4-50	4" Round Cast Iron Funnel <input type="checkbox"/>
-F4-1	4" Round Nickel Bronze Funnel <input type="checkbox"/>
-F6-1	6" Round Nickel Bronze Funnel <input type="checkbox"/>
-G-50	4x9" Oval Cast Iron Funnel <input type="checkbox"/>
-G-1	4x9" Oval Nickel Bronze Funnel <input type="checkbox"/>
-S0	Side Outlet <input type="checkbox"/>

Optional Body Material	
Suffix	Description
-60	PVC Body w/Socket Outlet (2, 3, 4" Only) <input type="checkbox"/>
-61	ABS Body w/Socket Outlet (2, 3, 4" Only) <input type="checkbox"/>



Strainer Size				
Str. Dia.	Min.	Max.	Load Rating	Free Area Sq. In.
5"(127)	13/16"(21)	3 1/4"(83)	*MD	8
6"(152)	7/8"(22)	3 3/8"(86)	*MD	9
7"(178)	11/16"(17)	3 1/4"(83)	*MD	12
8"(203)	7/8"(22)	3 1/4"(83)	*MD	18
10"(254)	1 1/4"(32)	3 1/4"(83)	*MD	28

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

Chart B					
Pipe Size	Std. No Hub	P Push On	T Female Thread	X Inside Caulk	60/61 PVC/ABS
2"(52)	3 5/8"(92)	4 1/4"(108)	4 1/4"(108)	4 1/2"(114)	4"(102)
3"(76)	3 5/8"(92)	4 1/4"(108)	4 1/4"(108)	4 1/2"(114)	4"(102)
4"(102)	3 5/8"(92)	4 1/4"(108)	4 1/4"(108)	4 1/2"(114)	4"(102)
6"(152)	3 1/2"(89)				

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.



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 Latin America: T: (52) 55-4122-0138 • Watts.com

Location: FD1

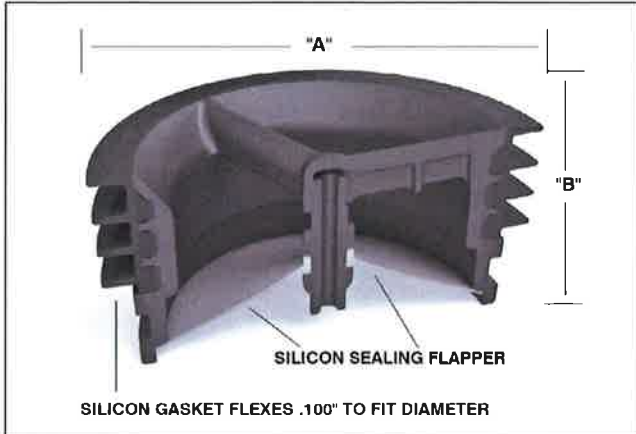


MI-GARD®

FLOOR DRAIN TRAP SEAL

Specification: MIFAB® MI-GARD® Series inline floor drain trap seal with UV resistant ABS plastic frame, silicon rubber sealing flapper and four flexible sealing ribs. Tested and certified to the ASSE 1072 Standard and listed with IAPMO and I.P.C. Specify connection size (1 1/2", 2", 3", 3 1/2", 4" or 6"). 10 year warranty is included.

Function: Used in the outlet connections of floor drain bodies, or the inside of floor drain strainers to seal the opening to prevent odors, sewer gases, and insects from entering up through the floor drain grate. The MI-GARD®'s four flexible silicone sealing ribs ensure easy installation into openings that have variations in size. The MI-GARD® will open to allow drainage and close when there is no water flow.



MODEL NO.	"A" (PIPE SIZE)	"B" (HEIGHT)
○ MI-GARD-1.5	1-1/2" (38)	2" (51)
○ MI-GARD-2	2" (51)	2" (51)
○ MI-GARD-3	3" (76)	2" (51)
○ MI-GARD-3.5	3 1/2" (89)	2" (51)
○ MI-GARD-4	4" (102)	2" (51)
○ MI-GARD-6	6" (152)	2" (51)

MI-GARD® prevents the following from entering through the top of floor drains:

- Odors and sewer gases
- Insects

Not intended to be used in lieu of a trap seal primer. 6" MI-GARD not IAPMO certified. Note:

The MI-GARD-6 is designed in accordance with industry standards but is not listed. MI-GARD

Floor Drain Trap Seals are in compliance with International Plumbing Code (I.P.C.)



MI-GARD-1.5

CALIFORNIA PROPOSITION 65 WARNING. This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Job Name: 6th Ave District Page No: _____

Section No: _____ Contractor: ComfortSystemsUSA

Schedule No: _____ Purchase Order No: _____

MIFAB® reserves the right to make changes in material and design without formal notice and obligation.

USA: 1-800-465-2736 www.mifab.com CAN: 1-800-387-3880

2022-07-07

FD2

Engineering Specification

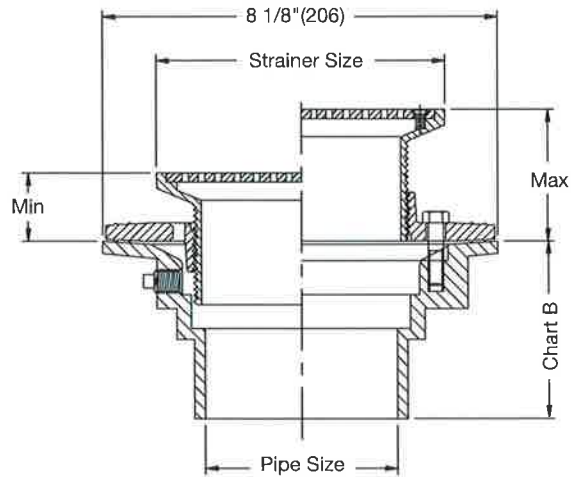
Job Name **6th Ave District**
 Job Location **Pine Bluff**
 Engineer **Brown**
 Approval _____
 Tag **FD2**

Contractor **Comfort Systems USA**
 Approval _____
 Contractor's P.O. No. _____
 Representative **Sanders Supply**

FD-100-M Floor Drain with Square Strainer

Specification

Watts FD-100-M epoxy coated cast iron floor drain with anchor flange, reversible clamping collar with primary & secondary weepholes, adjustable square heel proof nickel bronze strainer, and no hub (standard) outlet.



Pipe Sizing		
Suffix	Description	
2	2"(51) Pipe Size	<input type="checkbox"/>
3	3"(76) Pipe Size	<input type="checkbox"/>
4	4"(102) Pipe Size	<input type="checkbox"/>
6	6"(152) Pipe Size	<input type="checkbox"/>

Outlet Type		
Suffix	Description	
NH	No Hub (M.I.)	<input type="checkbox"/>
P	Push On	<input checked="" type="checkbox"/>
T	Threaded Outlet	<input type="checkbox"/>
X	Inside Caulk	<input type="checkbox"/>

Strainer		
Suffix	Description	
M5	5" x 5" (127) Nickel Bronze	<input type="checkbox"/>
M6	6" x 6" (152) Nickel Bronze	<input checked="" type="checkbox"/>
M8	8" x 8" (203) Nickel Bronze	<input type="checkbox"/>

Optional Body Material		
Suffix	Description	
-60	PVC Body w/Socket Outlet	<input type="checkbox"/>
-61	ABS Body w/Socket Outlet	<input type="checkbox"/>

Options		
Suffix	Description	
-5	Sediment Bucket	<input type="checkbox"/>
-6	Vandal Proof	<input type="checkbox"/>
-7	Trap Primer Tapping	<input checked="" type="checkbox"/>
-8	Backwater Valve (2, 3, 4" Only)	<input type="checkbox"/>
-9	Hinged Grate (For 6", 8" Strainer Only)	<input type="checkbox"/>
-13	Galvanized Body	<input type="checkbox"/>
-15	Strainer Extension (DD-50)	<input type="checkbox"/>
-F4-50	4" Round Cast Iron Funnel	<input type="checkbox"/>
-F4-1	4" Round Nickel Bronze Funnel	<input type="checkbox"/>
-F6-1	6" Round Nickel Bronze Funnel	<input type="checkbox"/>
-G-50	4x9" Oval Cast Iron Funnel	<input type="checkbox"/>
-G-1	4x9" Oval Nickel Bronze Funnel	<input type="checkbox"/>
-SO	Side Outlet	<input type="checkbox"/>

Strainer Size

Str. Dia.	Strainer Size		Load Rating	Free Area Sq. In.
	Min.	Max.		
5" x 5" (127x127)	1"(25)	3"(76)	*MD	9
6" x 6" (152x152)	1 1/8"(29)	3 1/8"(79)	*MD	12
8" x 8" (203x203)	1 1/4"(32)	3 1/4"(83)	*MD	26

Chart B

Pipe Size	Std.	P	T	X	60/61
	No Hub	Push On	Female Thread	Inside Caulk	PVC/ABS
2"(51)	3-5/8"(92)	4-1/4"(108)	4-1/4"(108)	4-1/2"(114)	4"(102)
3"(76)	3-5/8"(92)	4-1/4"(108)	4-1/4"(108)	4-1/2"(114)	4"(102)
4"(102)	3-5/8"(92)	4-1/4"(108)	4-1/4"(108)	4-1/2"(114)	4"(102)
6"(152)	3-1/2"(89)				

NOTICE

The load classifications are in accordance with the American National Standards A112.6.3. ASME Ratings are as follows:
 *MD - Safe Live Load 2000-4999 lbs. (900-2250 kg)
 These categories are given as a guide only. Please consult factory.

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Canada: T: (888) 208-8927 • F: (888) 479-2887 • Watts.ca
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Location: FD2



MI-GARD®

FLOOR DRAIN TRAP SEAL

Specification: MIFAB® MI-GARD® Series inline floor drain trap seal with UV resistant ABS plastic frame, silicon rubber sealing flapper and four flexible sealing ribs. Tested and certified to the ASSE 1072 Standard and listed with IAPMO and I.P.C. Specify connection size (1 1/2", 2", 3", 3 1/2", 4" or 6"). 10 year warranty is included.

Function: Used in the outlet connections of floor drain bodies, or the inside of floor drain strainers to seal the opening to prevent odors, sewer gases, and insects from entering up through the floor drain grate. The MI-GARD®'s four flexible silicone sealing ribs ensure easy installation into openings that have variations in size. The MI-GARD® will open to allow drainage and close when there is no water flow.



MODEL NO.	"A" (PIPE SIZE)	"B" (HEIGHT)
○ MI-GARD-1.5	1-1/2" (38)	2" (51)
○ MI-GARD-2	2" (51)	2" (51)
○ MI-GARD-3	3" (76)	2" (51)
○ MI-GARD-3.5	3 1/2" (89)	2" (51)
○ MI-GARD-4	4" (102)	2" (51)
○ MI-GARD-6	6" (152)	2" (51)

MI-GARD® prevents the following from entering through the top of floor drains:

- Odors and sewer gases
- Insects

Not intended to be used in lieu of a trap seal primer. 6" MI-GARD not IAPMO certified. Note:

The MI-GARD-6 is designed in accordance with industry standards but is not listed. MI-GARD

Floor Drain Trap Seals are in compliance with International Plumbing Code (I.P.C.)



MI-GARD-1.5

CALIFORNIA PROPOSITION 65 WARNING. This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Job Name: 6th Ave District Page No: _____

Section No: _____ Contractor: ComfortSystemsUSA

Schedule No: _____ Purchase Order No: _____

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USA: 1-800-465-2736 www.mifab.com CAN: 1-800-387-3880

2022-07-07

FS1

Engineering Specification

Job Name **6th Ave District**
 Job Location **Pine Bluff**
 Engineer **Brown**
 Approval _____
 Tag **FS1**

Contractor **Comfort Systems USA**
 Approval _____
 Contractor's P.O. No. _____
 Representative **Sanders Supply**

FS-730

12" Square x 6" Deep Sanitary Floor Sink

Specification

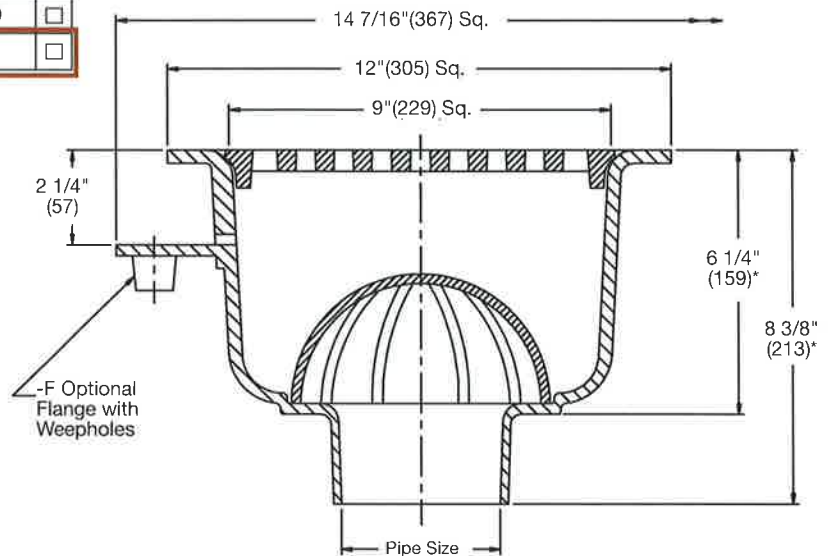
Watts FS-730 12"(305) square x 6"(152) deep sanitary floor sink with white acid resistant porcelain enamel coated interior, loose set porcelain enamel coated cast iron grate, polypropylene dome bottom strainer, and no hub (standard) outlet.



Pipe Sizing	
Suffix	Description
2	2"(51) Pipe Size <input type="checkbox"/>
3	3"(76) Pipe Size <input type="checkbox"/>
4	4"(102) Pipe Size <input type="checkbox"/>

Outlet Type	
Suffix	Description
NH	No Hub (MJ) <input type="checkbox"/>
P	Push-On <input type="checkbox"/>

Options	
Suffix	Description
-F	Flange with Weepholes <input type="checkbox"/>
-FC	Flange w/Weepholes & Flashing Clamp <input type="checkbox"/>
-1	Nickel Bronze Top <input checked="" type="checkbox"/>
-3	Stainless Steel Rim & Grate <input type="checkbox"/>
-5	Sediment Bucket <input type="checkbox"/>
-6	Vandal Proof (-1, -3 Only) <input type="checkbox"/>
-7	Trap Primer Tapping <input type="checkbox"/>
-9	Hinged Grate (-1 Only) <input type="checkbox"/>
-21	Secondary Strainer <input type="checkbox"/>
-33	Less Grate <input type="checkbox"/>
-128	Grate w/2 1/2"(64) Center Opening <input type="checkbox"/>
-150	1/2 Grate <input type="checkbox"/>
-175	3/4 Grate <input type="checkbox"/>
-F4-1	4" Round Nickel Bronze Funnel <input type="checkbox"/>
-F6-1	6" Round Nickel Bronze Funnel <input type="checkbox"/>
-G-1	4x9" Oval Nickel Bronze Funnel <input type="checkbox"/>



* Add 5/8"(16) for -1 Nickel Bronze Top or -3 Stainless Steel Rim & Grate

Free Area Sq. In.	
Standard Grate	With -1/-3 Rim & Grate
31	47

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 Canada: T: (888) 208-8927 • F: (905) 481-2316 • Watts.ca
 Latin America: T: (52) 55-4122-0138 • Watts.com

Location: FS1



MI-GARD®

FLOOR DRAIN TRAP SEAL

Specification: MIFAB® MI-GARD® Series inline floor drain trap seal with UV resistant ABS plastic frame, silicon rubber sealing flapper and four flexible sealing ribs. Tested and certified to the ASSE 1072 Standard and listed with IAPMO and I.P.C. Specify connection size (1 1/2", 2", 3", 3 1/2", 4" or 6"). 10 year warranty is included.

Function: Used in the outlet connections of floor drain bodies, or the inside of floor drain strainers to seal the opening to prevent odors, sewer gases, and insects from entering up through the floor drain grate. The MI-GARD®'s four flexible silicone sealing ribs ensure easy installation into openings that have variations in size. The MI-GARD® will open to allow drainage and close when there is no water flow.



MODEL NO.	"A" (PIPE SIZE)	"B" (HEIGHT)
○ MI-GARD-1.5	1-1/2" (38)	2" (51)
○ MI-GARD-2	2" (51)	2" (51)
○ MI-GARD-3	3" (76)	2" (51)
○ MI-GARD-3.5	3 1/2" (89)	2" (51)
○ MI-GARD-4	4" (102)	2" (51)
○ MI-GARD-6	6" (152)	2" (51)

MI-GARD® prevents the following from entering through the top of floor drains:

- Odors and sewer gases
- Insects

Not intended to be used in lieu of a trap seal primer. 6" MI-GARD not IAPMO certified. Note:

The MI-GARD-6 is designed in accordance with industry standards but is not listed. MI-GARD Floor Drain Trap Seals are in compliance with International Plumbing Code (I.P.C.)



MI-GARD-1.5

CALIFORNIA PROPOSITION 65 WARNING. This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Job Name: 6th Ave District Page No: _____
 Section No: _____ Contractor: ComfortSystemsUSA
 Schedule No: _____ Purchase Order No: _____

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USA: 1-800-465-2736 www.mifab.com CAN: 1-800-387-3880

2022-07-07

FS2

Location: FS2



MI-GARD®

FLOOR DRAIN TRAP SEAL

Specification: MIFAB® MI-GARD® Series inline floor drain trap seal with UV resistant ABS plastic frame, silicon rubber sealing flapper and four flexible sealing ribs. Tested and certified to the ASSE 1072 Standard and listed with IAPMO and I.P.C. Specify connection size (1 1/2", 2", 3", 3 1/2", 4" or 6"). 10 year warranty is included.

Function: Used in the outlet connections of floor drain bodies, or the inside of floor drain strainers to seal the opening to prevent odors, sewer gases, and insects from entering up through the floor drain grate. The MI-GARD®'s four flexible silicone sealing ribs ensure easy installation into openings that have variations in size. The MI-GARD® will open to allow drainage and close when there is no water flow.



MODEL NO.	"A" (PIPE SIZE)	"B" (HEIGHT)
○ MI-GARD-1.5	1-1/2" (38)	2" (51)
○ MI-GARD-2	2" (51)	2" (51)
○ MI-GARD-3	3" (76)	2" (51)
○ MI-GARD-3.5	3 1/2" (89)	2" (51)
○ MI-GARD-4	4" (102)	2" (51)
○ MI-GARD-6	6" (152)	2" (51)

MI-GARD® prevents the following from entering through the top of floor drains:

- Odors and sewer gases
- Insects

Not intended to be used in lieu of a trap seal primer. 6" MI-GARD not IAPMO certified. Note:

The MI-GARD-6 is designed in accordance with industry standards but is not listed. MI-GARD Floor Drain Trap Seals are in compliance with International Plumbing Code (I.P.C.)



MI-GARD-1.5

CALIFORNIA PROPOSITION 65 WARNING. This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Job Name: 6th Ave District Page No: _____

Section No: _____ Contractor: ComfortSystemsUSA

Schedule No: _____ Purchase Order No: _____

HB1

Engineering Specification

Job Name **6th Ave District**
 Job Location **Pine Bluff**
 Engineer **Brown**
 Approval _____
 Tag **HB1**

Contractor **Comfort Systems USA**
 Approval _____
 Contractor's P.O. No. _____
 Representative **Sanders Supply**

HY-420
Non-Freeze Wall Hydrant with
Chrome Face & Integral Vacuum
Breaker

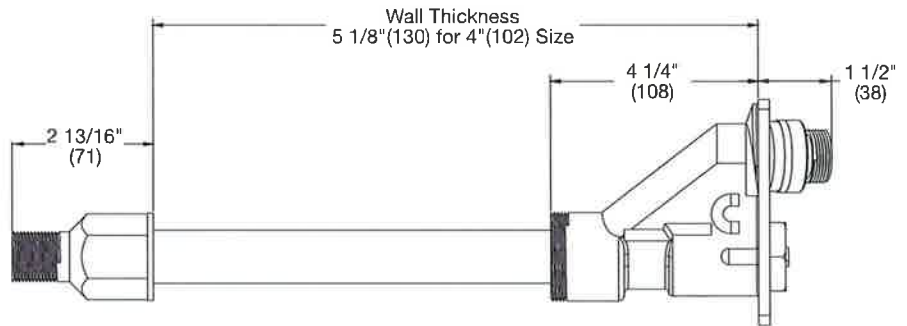


Specification:

Watts HY-420 non-freeze key operated wall hydrant with chrome plated face, integral vacuum breaker, 3/4"(19) hose connection, 3/4"(19) female x 1"(25) male pipe connection, all bronze head, seat casting and internal working parts, bronze wall casing, and loose key. Complies with ASME B1.20.7, and ASSE 1019-2004, UPC/IAPMO listed. Maximum operating pressure 125 psi.

Suffix	Wall Thickness Description	
4	4"(102) Thick	<input type="checkbox"/>
6	6"(152) Thick	<input type="checkbox"/>
8	8"(203) Thick	<input type="checkbox"/>
10	10"(254) Thick	<input type="checkbox"/>
12	12"(305) Thick	<input type="checkbox"/>
14	14"(356) Thick	<input type="checkbox"/>
16	16"(406) Thick	<input type="checkbox"/>
18	18"(457) Thick	<input type="checkbox"/>
20	20"(508) Thick	<input type="checkbox"/>
22	22"(559) Thick	<input type="checkbox"/>
24	24"(610) Thick	<input type="checkbox"/>
Other	Specify	<input type="checkbox"/>

Suffix	Options Description	
-88	Wall Clamp	<input type="checkbox"/>
-CIA	Complete Internal Assembly (Repair Kit)	<input type="checkbox"/>



Recommended Wall Opening:
 2"(51) x 4"(102)

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Latin America: T: (52) 55-4122-0138 • Watts.com

HB2

Engineering Specification

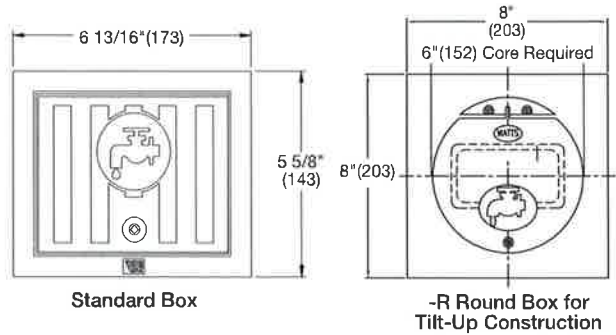
Job Name **6th Ave District**
 Job Location **Pine Bluff**
 Engineer **Brown**
 Approval _____
 Tag **HB2**

Contractor **Comfort Systems USA**
 Approval _____
 Contractor's P.O. No. _____
 Representative **Sanders Supply**

HY-725 Non-Freeze Wall Hydrant with NB Box & Integral Vacuum Breaker

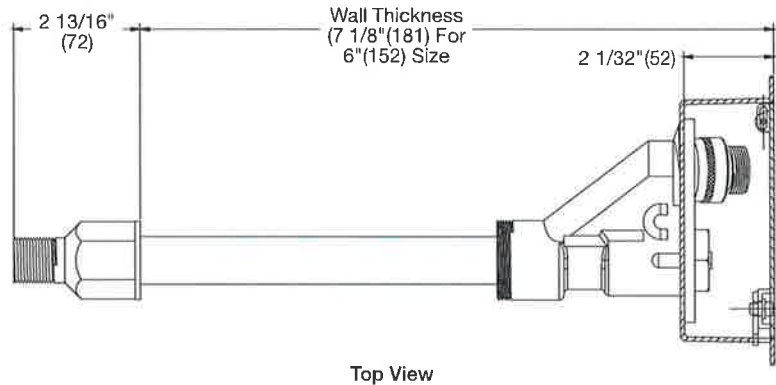
Specification

Watts HY-725 concealed non-freeze key operated wall hydrant with nickel bronze box and door, chrome plated hydrant face, integral vacuum breaker, 3/4"(19) hose connection, 3/4"(19) female x 1"(25) male pipe connection, all bronze head, seat casting and internal working parts, bronze wall casing, and loose key. Complies with ASME B1.20.7 and ASSE 1019-2004. UPC/IAMPO listed. Max. operating pressure 125 psi.



Suffix	Wall Thickness Description	
6	7 1/8"(181) Thick	<input type="checkbox"/>
8	8"(203) Thick	<input type="checkbox"/>
10	10"(254) Thick	<input type="checkbox"/>
12	12"(305) Thick	<input type="checkbox"/>
14	14"(356) Thick	<input type="checkbox"/>
16	16"(406) Thick	<input type="checkbox"/>
18	18"(457) Thick	<input type="checkbox"/>
20	20"(508) Thick	<input type="checkbox"/>
22	22"(559) Thick	<input type="checkbox"/>
24	24"(610) Thick	<input type="checkbox"/>
Other	Specify _____	<input type="checkbox"/>

Suffix	Options Description	
-K	Cylinder Lock	<input type="checkbox"/>
-88	Wall Clamp	<input type="checkbox"/>
-3	Stainless Steel Box	<input type="checkbox"/>
-CIA	Complete Internal Assembly (Repair Kit)	<input type="checkbox"/>
-R	Round Stainless Steel Box	<input type="checkbox"/>



Recommended Wall Opening:
5 1/4" x 6 1/4" (133 x 158)

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HB3

Engineering Specification

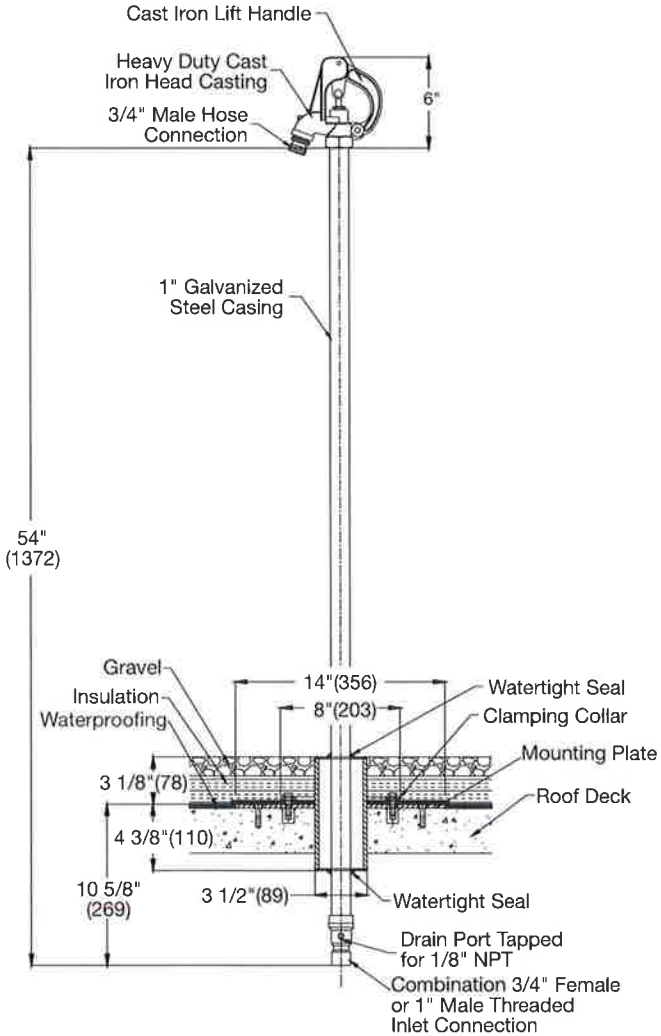
Job Name **6th Ave District**
 Job Location **Pine Bluff**
 Engineer **Brown**
 Approval _____
 Tag **HB3**

Contractor **Comfort Systems USA**
 Approval _____
 Contractor's P.O. No. _____
 Representative **Sanders Supply**

HY-900 Non-Freeze Roof Hydrant

Specification:

Watts HY-900 non-freeze roof hydrant with epoxy coated cast iron head with lift handle and lock option, galvanized casing, bronze internal working parts and valve housing, integral epoxy coated cast iron roof mounting plate with clamping collar, and 1/8" NPT drain port.



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Canada: T: (888) 208-8927 • F: (905) 481-2316 • Watts.ca
Latin America: T: (52) 65-4122-0138 • Watts.com

MS



T&S BRASS AND BRONZE WORKS, INC.

2 Saddleback Cove / P.O. Box 1088
Travelers Rest, SC 29690

Model No.

B-0665-BSTR

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com



ADA Compliant

This Space for Architect/Engineer Approval

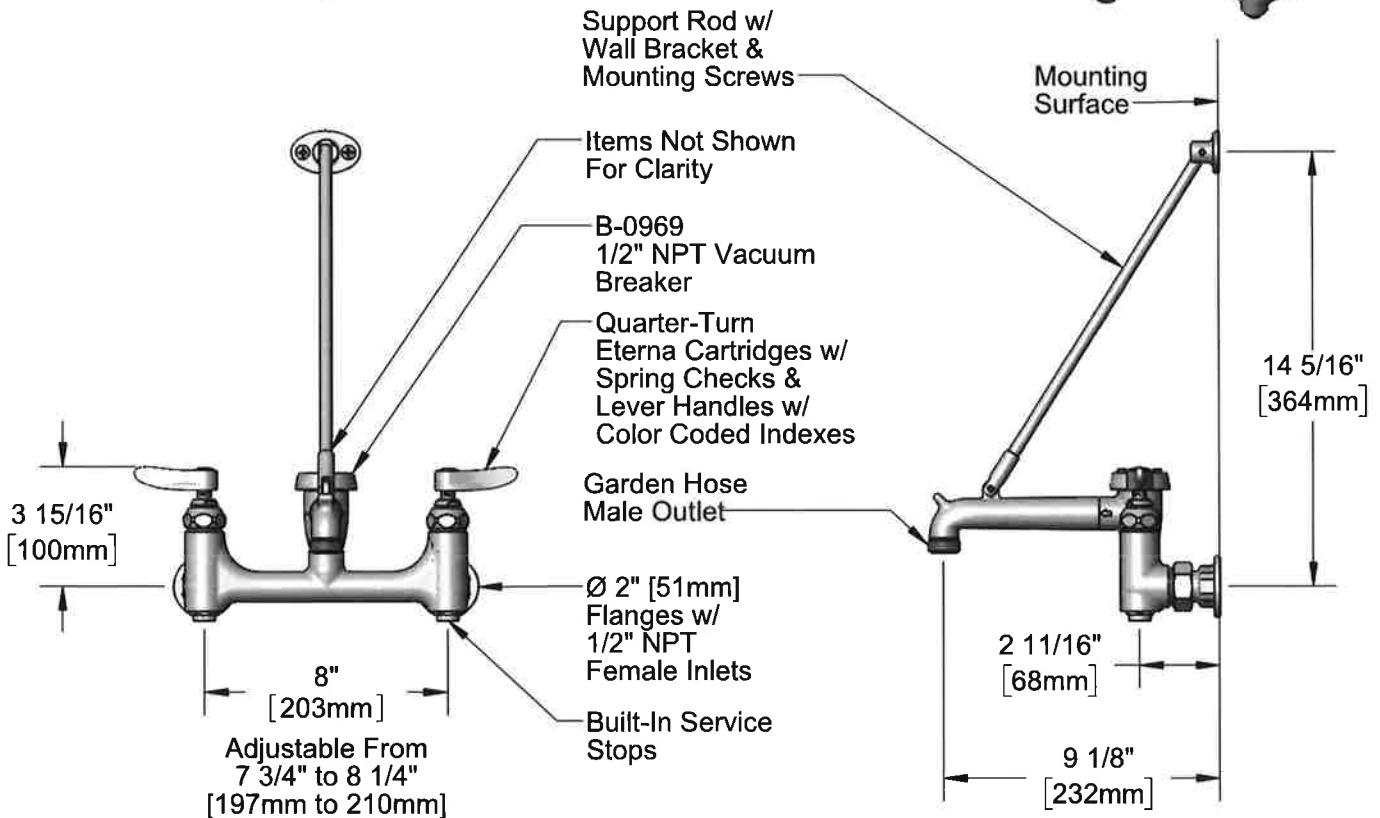
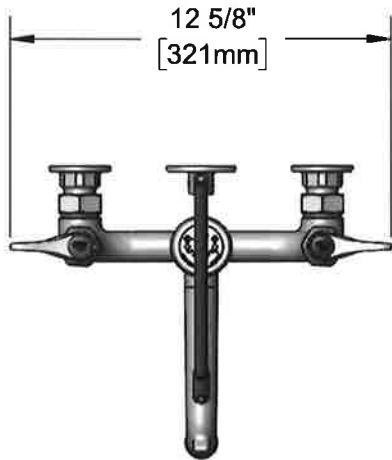
Job Name _____ Date _____

Model Specified _____ Quantity _____

Customer/Wholesaler _____

Contractor _____

Architect/Engineer _____



Product Specifications:

8" Wall Mount Service Sink, Quarter-Turn Eterna Cartridges w/ Spring Checks, Lever Handles, Upper Support Rod, Garden Hose Male Outlet, Built-In Service Stops, Rough Chrome Finish, 1/2" NPT Vacuum Breaker & 1/2" NPT Female Inlets

Product Compliance:

ASME A112.18.1 / CSA B125.1
NSF 61 - Section 9
NSF 372 (Low Lead Content)
ANSI A117.1 (ADA)
ASSE 1001 (VB)



T&S BRASS AND BRONZE WORKS, INC.

2 Saddleback Cove / P.O. Box 1088
Travelers Rest, SC 29690

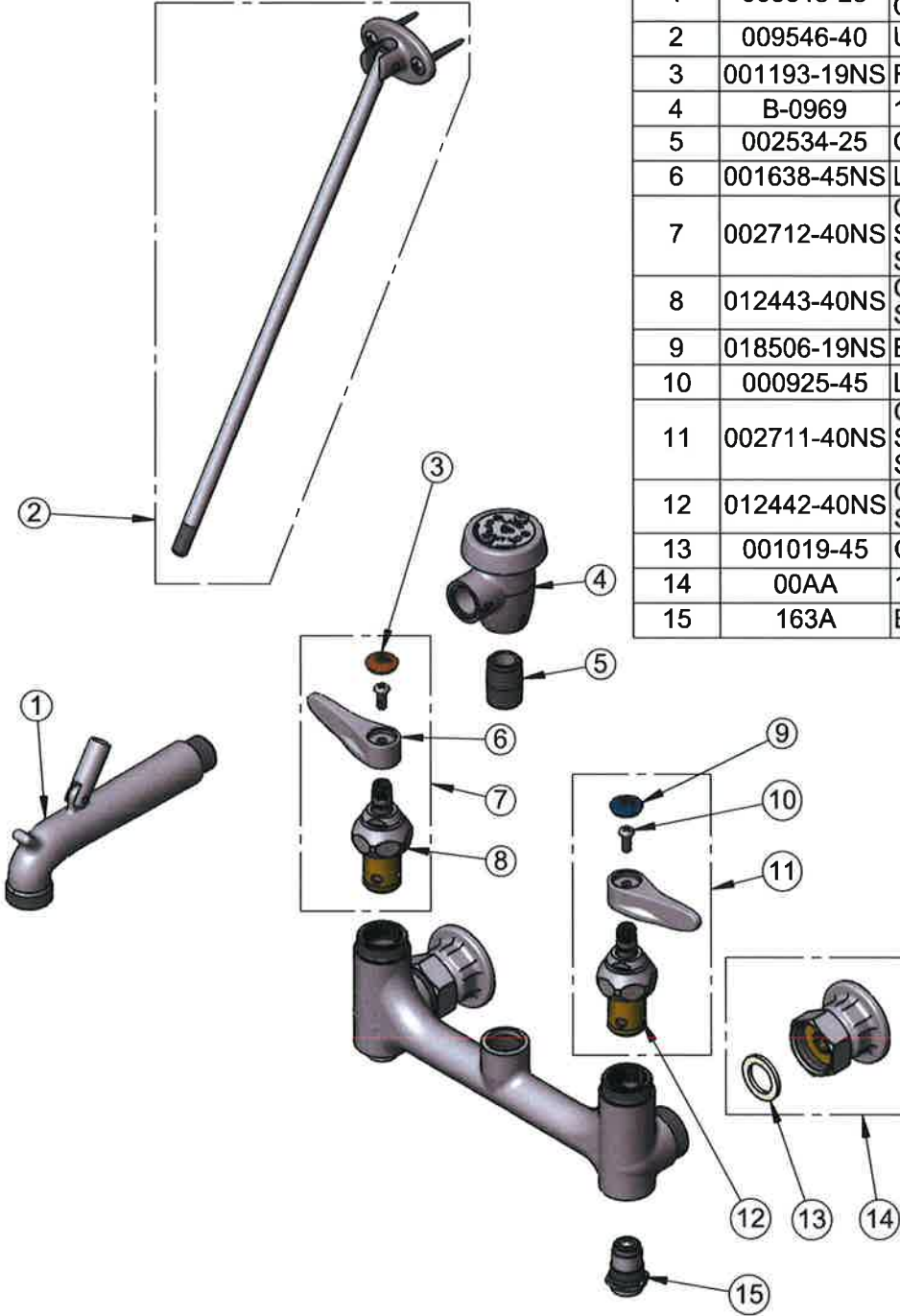
Model No.

B-0665-BSTR

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com

ITEM NO.	SALES NO.	DESCRIPTION
1	009545-25	Spout w/ Male GH Outlet & Upper Clevis - Rough Chrome
2	009546-40	Upper Support Rod
3	001193-19NS	Red Button Index, Press-in
4	B-0969	1/2" NPT Vacuum Breaker
5	002534-25	Close Nipple, 1/2" NPT
6	001638-45NS	Lever Handle (New Style)
7	002712-40NS	Quarter-Turn Eterna Cartridge w/ Spring Check, Handle, Red Index & Screw, RTC
8	012443-40NS	Quarter-Turn Eterna Cartridge w/ Spring Check, RTC
9	018506-19NS	Blue Button Index, Press-in
10	000925-45	Lab Handle Screw
11	002711-40NS	Quarter-Turn Eterna Cartridge w/ Spring Check, Handle, Blue Index & Screw, LTC
12	012442-40NS	Quarter-Turn Eterna Cartridge w/ Spring Check, LTC
13	001019-45	Coupling Nut Washer
14	00AA	1/2" NPT Female Eccentric Flange
15	163A	Built-in Service Stop



Product Specifications:

8" Wall Mount Service Sink, Quarter-Turn Eterna Cartridges w/ Spring Checks, Lever Handles, Upper Support Rod, Garden Hose Male Outlet, Built-In Service Stops, Rough Chrome Finish, 1/2" NPT Vacuum Breaker & 1/2" NPT Female Inlets

Product Compliance:

ASME A112.18.1 / CSA B125.1
NSF 61 - Section 9
NSF 372 (Low Lead Content)
ANSI A117.1 (ADA)
ASSE 1001 (VB)

Molded Stone[®] Mop Service Basins

FIAT



These rugged molded stone mop service basins are manufactured from the SMC process under the highest quality standards. The quality control molding is achieved in matched metal dies under intense heat and pressure with the result being a one-piece, dependable homogeneous product. Color is White.

SPECIFICATIONS

- 10" (254) high walls with 1" (25) wide shoulders. Model MSB-3624 includes an integrally molded shelf 10 9/16" (268) wide
- Stainless steel factory installed drain body complete with a QDC-3 joint connector for a 3" (76) drain pipe
- A combination dome strainer and stainless steel lint basket is included

Ces robustes cuves d'entretien de vadrouilles molded stone sont fabriquées grâce au procédé SMC selon les normes de qualité les plus rigoureuses afin d'en assurer la durabilité et d'éliminer les problèmes après l'installation. Le moulage se fait dans des matrices métalliques jumelées, à haute température et sous une forte pression, ce qui assure un produit homogène et fiable d'une seule pièce. La couleur est le blanc.

CARACTÉRISTIQUES

- Côtés de 10 po (254) avec épaulement de 1 po (25). Le modèle MSB-3624 comprend une tablette moulée intégrée de 10 9/16 po (268)
- Renvoi en acier inoxydable avec raccord QDC-3 pour tuyau de renvoi de 3 po (76)
- Crépine en coupole et filtre à charpie en acier inoxydable combinés compris

DIMENSIONS

MSB-3624

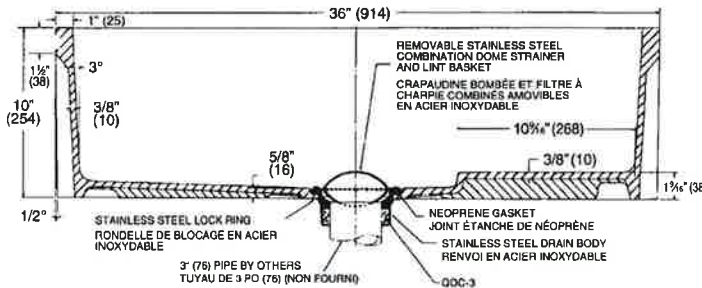
- ▲ 36" x 24" x 10" (914 x 610 x 254)
- ▲ Shipping weight / Poids à l'expédition: 70 lbs (32 kg)

MSB-2424

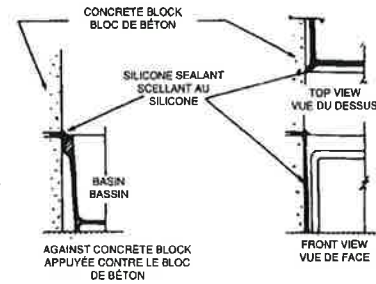
- ▲ 24" x 24" x 10" (610 x 610 x 254)
- ▲ Shipping weight / Poids à l'expédition: 50 lbs (23 kg)

OPTIONAL EQUIPMENT / ÉQUIPEMENT FACULTATIF

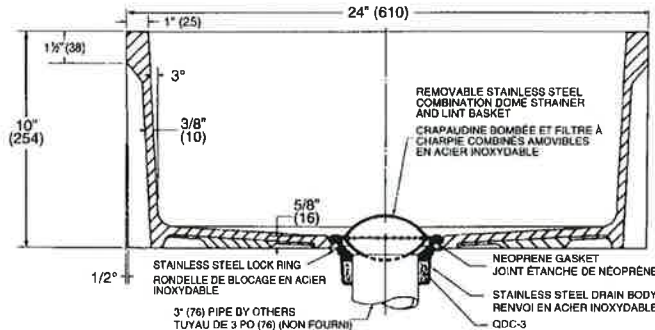
<p>830 AA – Wall mounted service faucet, chrome plated with vacuum breaker, integral stops, adjustable wall brace, pail hook and 3/4" (19) hose thread on spout. Body inlets 8" (203) center to center, four arm handles. Centre of spout outlet from back of wall flange 9 3/8" (238). CSA approved</p>		<p>830 AA – Robinet de service mural chromé avec coupe-vide, dispositif d'arrêt intégré, attache murale réglable et filets pour boyau 3/4 po (19) sur le bec. Conduites d'alimentation à 8 po (203) de centre à centre et clés à quatre ailettes. 9 3/8 po (238) entre le centre du bec et l'arrière de la bride murale. Homologué par L'ANCOR</p>																																								
<p>889 CC – Mop Bracket, 24" (610) long x 3" (76) wide, stainless steel with three (3) rubber grips</p>		<p>889 CC – crochet pour vadrouille, 24 po (610) de long par 3 po (76) de large, en acier inoxydable et muni de trois pinces à outils en caoutchouc</p>																																								
<p>E-77-AA – Vinyl bumper guards in 24" or 36" length</p>		<p>E-77-AA – butoirs en vinyle en 24 po ou 36 po de long</p>																																								
<p>1453 BB – Flat stainless steel strainer</p>		<p>1453 BB – Crépine plate en acier inoxydable pour utilisation résidentielle</p>																																								
<p>Quick Drain Connectors (QDC's)</p> <table border="1"> <thead> <tr> <th>For Use With</th> <th>QDC 3.2</th> <th>QDC 3SN</th> <th>QDC 3XH</th> <th>QDC 4</th> </tr> </thead> <tbody> <tr> <td>1/2" NPT</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> </tr> <tr> <td>3/4" NPT</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> </tr> <tr> <td>1" NPT</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> </tr> </tbody> </table>	For Use With	QDC 3.2	QDC 3SN	QDC 3XH	QDC 4	1/2" NPT	•	•	•	•	3/4" NPT	•	•	•	•	1" NPT	•	•	•	•		<p>Raccord rapide pour tuyau d'écoulement (QDC's)</p> <table border="1"> <thead> <tr> <th>For Use With</th> <th>QDC 3.2</th> <th>QDC 3SN</th> <th>QDC 3XH</th> <th>QDC 4</th> </tr> </thead> <tbody> <tr> <td>1/2" NPT</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> </tr> <tr> <td>3/4" NPT</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> </tr> <tr> <td>1" NPT</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> </tr> </tbody> </table>	For Use With	QDC 3.2	QDC 3SN	QDC 3XH	QDC 4	1/2" NPT	•	•	•	•	3/4" NPT	•	•	•	•	1" NPT	•	•	•	•
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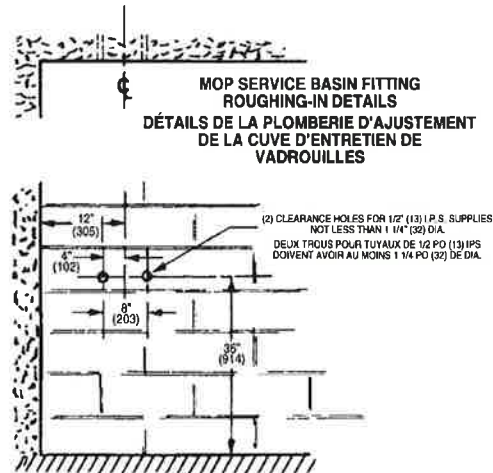
**SECTION THRU DRAIN CONNECTION
MSB-3624 (WITH SHELF)**
VUE TRANSVERSALE DU RACCORD DE RENVOI
MSB-3624 (AVEC TABLETTE)



**SUGGESTED INSTALLATION
INSTALLATION PROPOSÉE**





**SECTION THRU DRAIN CONNECTION
MSB-2424 (LESS SHELF)**
VUE TRANSVERSALE DU RACCORD DE RENVOI
MSB-2424 (SANS TABLETTE)



**SUGGESTED ROUGH-IN FOR SERVICE FAUCET - PLATES #830-AA
PLOMBERIE PROPOSÉE POUR LE ROBINET DE SERVICE - PLAQUES N° 830-AA**

OPTIONAL EQUIPMENT / ÉQUIPEMENT FACULTATIF

<p>➤ Stainless Steel Wall Guards Made of heavy gauge stainless steel. Designed and is used to protect walls adjacent to the receptor. Two panels are supplied for a corner installation, a third panel is required for a recessed installation. The wall guard models are identified as follows: MSG 2424, MSG 3232, MSG 3624, and MSG 3636</p>		<p>Protecteurs muraux en acier inoxydable Fabriqués en acier inoxydable durable et de haut calibre. Conçus pour protéger les murs adjacents au récepteur. Deux panneaux sont fournis pour une utilisation en coin, un troisième panneau est requis pour une utilisation en alcôve. Les modèles de protecteurs muraux sont identifiés comme suit: MSG 2424, MGS 3232, MSG 3624 et MSG 3636</p>
<p>➤ 832 AA - Hose and Bracket; 30" (762) long flexible heavy duty 5/8" (16) rubber hose, cloth reinforced with 3/4" (19) chrome coupling at one end. Bracket is 5" (127) long x 3" (76) wide stainless steel with rubber grip</p>		<p>832 AA - Boyau et support : Boyau en caoutchouc flexible de 5/8" (16) résistant, 30" (762) de long, renforcé à une extrémité avec un assemblage de chrome de 3/4" (19). Support de 5" (127) de long X 3" (76) de large en acier inoxydable avec prise en caoutchouc.</p>

**SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

P1A



Madera™ FloWise® 16-1/2" Height Elongated Flushometer Toilet

VITREOUS CHINA LESS EVERCLEAN®

BARRIER FREE

Madera™ FloWise® 16-1/2" Height Elongated LESS EverClean®

- Floor mount flushometer valve toilet
- Vitreous china
- High Efficiency, Low Consumption. Operates in the range of 1.1 gpf to 1.6 gpf (4.2 Lpf to 6.0 Lpf)
- Meets definition of HET (High Efficiency Toilet) when used with a high efficiency flush valve (1.1, 1.28 gpf or 1.6 / 1.1 gpf dual flush)
- Fully glazed 2-1/8" trapway
- Elongated bowl
- 10" or 12" roughing-in
- 16-1/2" rim height for accessible application
- Condensation channel
- Powerful direct-fed siphon jet action
- 10" x 12" water surface area
- 1-1/2" inlet spud
- 2 bolt caps included
- Tested to support static weight load of 2,500 lbs. (1,134 kg)



SEE REVERSE FOR ROUGHING-IN DIMENSIONS

System MaP* Score:

- 1,000 grams of miso @ 1.1 gpf, 1.28 gpf or 1.6 gpf when used with an American Standard flush valve

* Maximum Performance (MaP) testing performed by IAPMO R&T Lab. MaP Report conducted by Veritec Consulting, Inc. and Koeller and Company.

OPERATING PRESSURE:

25 psi (flowing) - 80 psi (static)

FLOW REQUIREMENT:

25 gpm (94.6 L/min.)

Component Parts:

- 047007-0070A** Inlet Spud (furnished with bowl)
- 034783-0200A** Bolt caps with retainers (furnished with bowl)

Nominal Dimensions:

718 x 356 x 419mm
(28-1/4" x 14" x 16-1/2")

Fixture only, less seat and flush valve

Compliance Certifications -

Meets or Exceeds the Following Specifications:

- ASME A112.19.2 / CSA B45.1 for Vitreous China Fixtures

- 3043.001** Elongated bowl only, top spud
- ~~3248.001 Elongated bowl only, top spud with slotted rim for bedpan holding~~
- 3249.001** Elongated bowl only, back spud

To Be Specified:

- Color: White
- Seat:
 - American Standard #5901.100 Heavy duty open front less cover
 - American Standard #5901.100SS Extra heavy duty open front less cover with EverClean®
- Flushometer Valve:



MEETS THE AMERICANS WITH DISABILITIES ACT GUIDELINES AND ANSI A117.1 REQUIREMENTS FOR ACCESSIBLE AND USABLE BUILDING FACILITIES - CHECK LOCAL CODES.



ENVIRONMENTAL
PRODUCT
DECLARATION

CEC



When used with
1.1 or 1.28 gpf
toilet flush valves

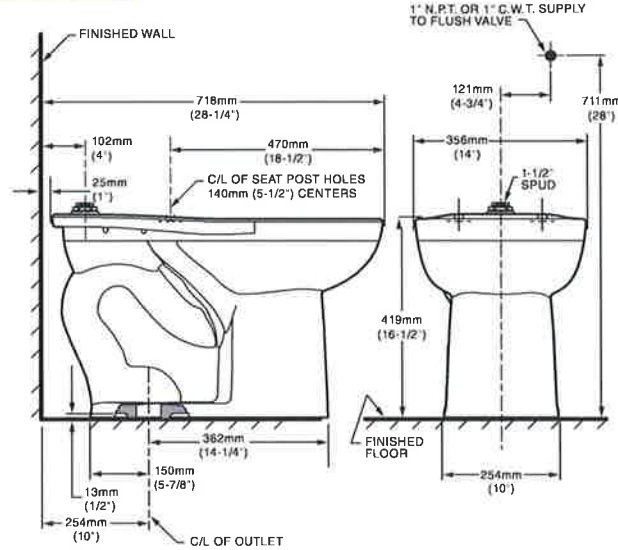


EVERCLEAN

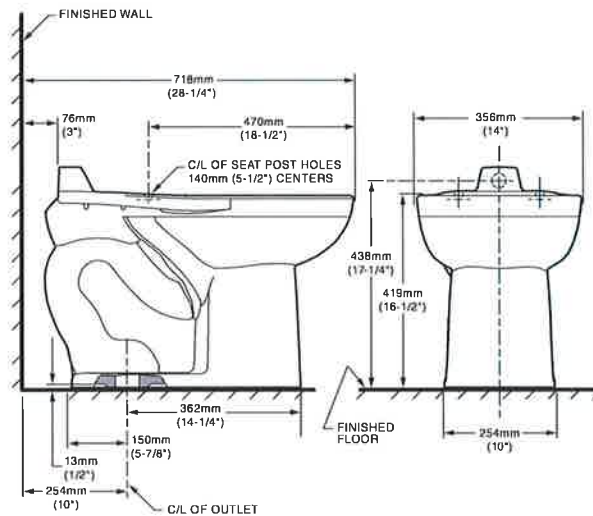


WATER
EFFICIENT

3043.001/3248.001



3249.001



NOTES:
 PRODUCT 3043 SHOWN, 3248 SAME EXCEPT WITH SLOTTED RIM FOR BED PAN HOLDING.
 TO COMPLY WITH AREA CODE GOVERNING THE HEIGHT OF VACUUM BREAKER ON THE FLUSHOMETER VALVE, THE PLUMBER MUST VERIFY DIMENSIONS SHOWN FOR SUPPLY ROUGHING.
 THIS TOILET DESIGNED TO ROUGH-IN AT A MINIMUM DIMENSION OF 254MM (10") AND A MAXIMUM DIMENSION OF 305MM (12") FROM FINISHED WALL TO C/L OF OUTLET.
 FLUSHOMETER VALVE NOT INCLUDED WITH FIXTURE AND MUST BE ORDERED SEPARATELY, FLUSHOMETER VALVE REQUIREMENTS FOR 12" (305MM) ROUGH-IN: SWEAT EXTENSION NIPPLE IS REQUIRED. REFER TO VALVE MANUFACTURER AND LOCAL CODES.

IMPORTANT: Dimensions of fixtures are nominal and may vary within the range of tolerances established by ANSI Standard A112.19.2. These measurements are subject to change or cancellation. No responsibility is assumed for use of superseded or voided pages.



ZEMS6000AV-IS

Exposed Hardwired Automatic Sensor Flush Valve
for Water Closets

TAG P1A

Architectural/Engineering Specification:

Exposed, quiet diaphragm-type, chrome plated flushometer valve with a polished exterior. Complete with Zurn's AquaVantage® TPE, chloramine resistant, dual seal diaphragm with a clog resistant, triple filtered bypass. The valve incorporates a 6 VDC motor actuator, an integral infrared convergence-type proximity sensor and a manual push button override, high impact resistant polycarbonate housing and chrome plated plastic cover with manual override push button and 10 degree angled sensor.

Product Features:

- Proprietary dezincification resistant low lead brass alloy
- Control stop has internal siphon-guard protection and vandal resistant stop cap, sweat solder kit, wall flange with set screw
- High back pressure vacuum breaker with one piece hex coupling nut
- Chloramine resistant Internal seals
- Adjustable tailpiece
- Spud coupling and flange for top spud connection



Flow Options:

	Flush Volume	WaterSense Compliant
<input type="checkbox"/> -ONE*	1.1 gpf	✓
<input type="checkbox"/> -HET*	1.28 gpf	✓
<input checked="" type="checkbox"/> -WS1	1.6 gpf	
<input type="checkbox"/> -Standard	3.5 gpi	

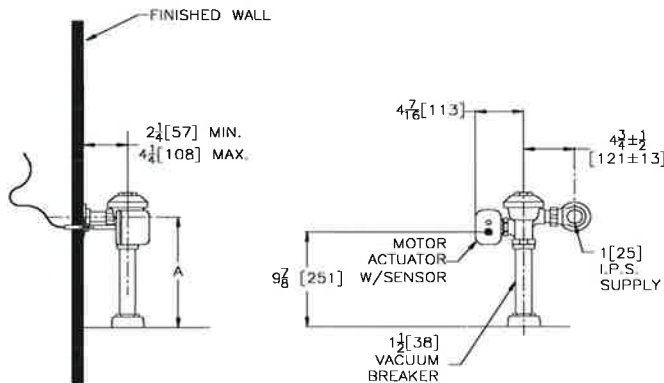
*Clog-resistant linear filter

Suffix Options:

- FM12 Floor Mount 12" Rough In
- MOB Manual Over-ride Button (Front of Body)
- YJ Split Ring Pipe Support
- YK Solid Ring Pipe Support
- YO Bumper on Angle Stop

Valve Height Options:

	Product No.	A
<input checked="" type="checkbox"/>	ZEMS6000AV-IS	11 1/2" [292]
<input type="checkbox"/>	ZEMS6000AV-1-IS	16" [406]
<input type="checkbox"/>	ZEMS6000AV-2	24" [610]



Rough-in/Overview dimensions

Accessories (Order separate as specified)

P6900-ACA-BA 7.6VDC Plug-In ACA Power Supply
Powers up to 4 valves

P6000-HW6 7.6VDC Hardwired Power Converter
Powers up to 8 valves

P6000-MJ Mini Junction Box

NOTE: Must use either Zurn P6000-HW6 hardware power converter or P6900-ACA-BA regulated plug in to ensure proper operation. Using a power converter other than Zurn may result in operation malfunction or unit failure.

Compliance and Certification:

- ADA Compliant
- Complies with ASSE 1037/ASME A112.1037/CSA



Architectural/Engineering Approval

The information contained in this document is subject to change without notice. Please contact Zurn for most up to date information.

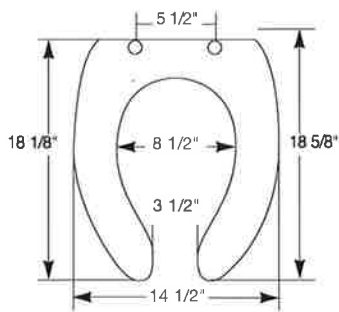
This product should be used with a WaterSense labeled counterpart with a compatible flow volume to ensure that the entire system meets the requirements for water efficiency and performance.



COMMERCIAL PLASTIC SEATS

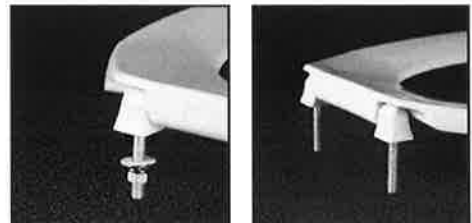
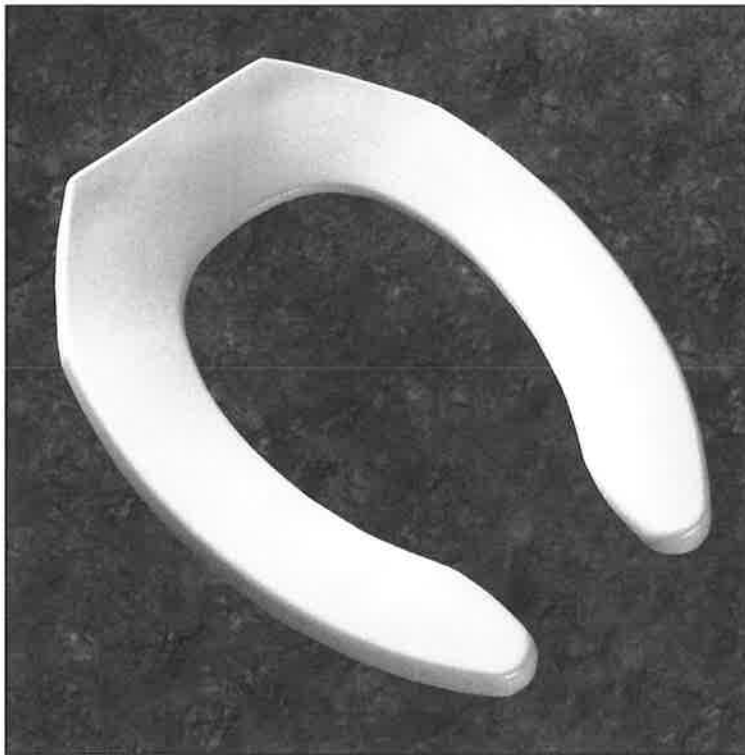
MODEL 255SSC

- ELONGATED SEAT, OPEN FRONT LESS COVER
- SOLID PLASTIC
- CONCEALED 300 SERIES STAINLESS STEEL SELF-SUSTAINING CHECK HINGE



Ring thickness is 13/16"
Ring thickness including the bumper is 1"
Height of the seat with cover is 1-1/2"

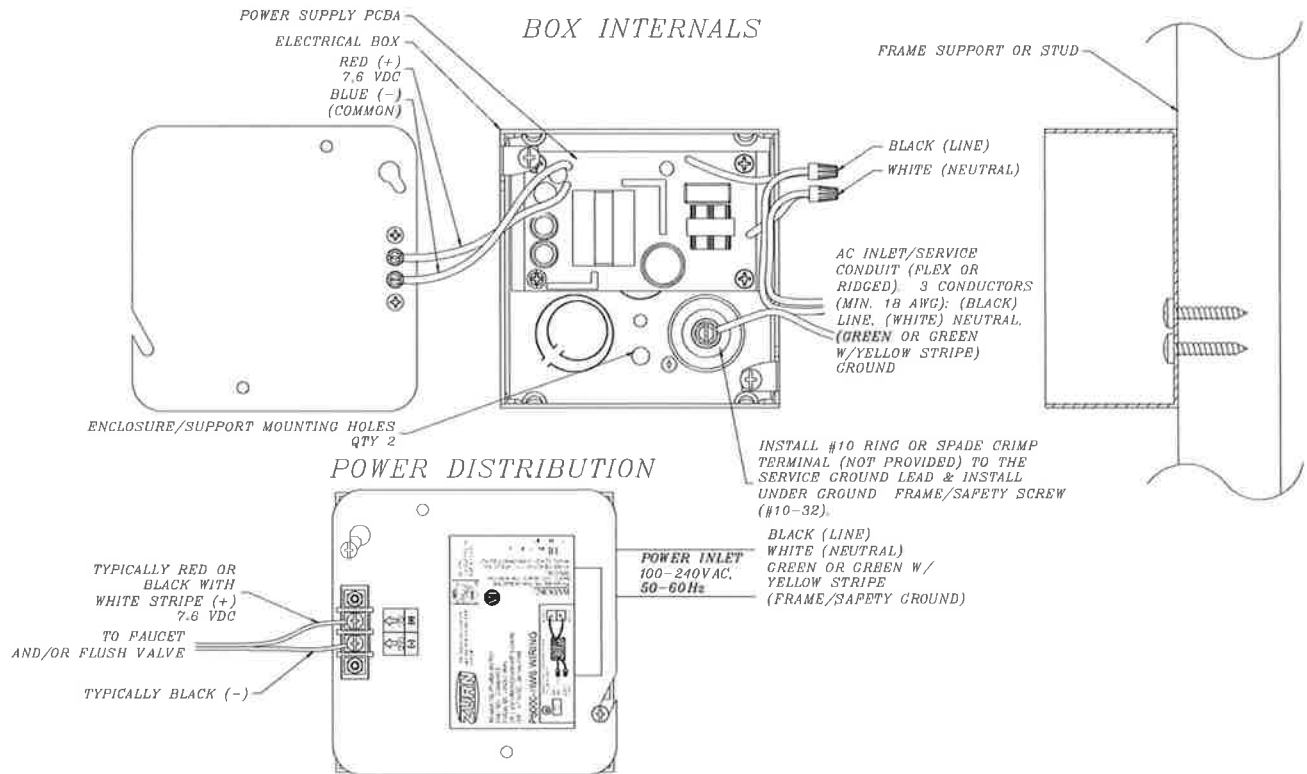
Seats shall be No. 255SSC as manufactured by Church Seats. Seats shall be commercial weight and injection molded of solid plastic. Seats shall be open front less cover for elongated bowl and feature large molded-in bumpers. 300 Series stainless steel, self-sustaining concealed check hinge holds seat in any raised position up to 11 degrees beyond vertical. Uses 300 Series stainless steel hardware. Color to be white.





P6000-HW6

7.6 VDC Hardwired Power Converter for Flush Valves and Faucets



ENGINEERING SPECIFICATION: ZURN P6000-HW6 Power Converter - The Hardwired Power Converter is a 7.6 VDC regulated, 2.0A power supply that will operate up to: (8) ZEMS or ZEMS-IS Sensors/Actuators, (8) ZESS Sensors/Solenoids, (8) sensor faucets, or (8) Pint Urinal valves. The unit shown above is integrated into a 4"L x 4"W x 2-1/8"D electrical box. The AC input connections are terminated within the electrical box. The 7.6 VDC output terminals are externally mounted to the cover plate.

Notes:

- 1. Mounting hardware (AC inlet conduit/cable clamp and enclosure-frame mounting screws) are NOT provided.

Typical Rough-In: The 3 input conductors (line, neutral and frame ground) are routed within conduit to the P6000-HW6 and the AC inlet and the frame/safety ground leads are terminated within the assembly. The low voltage, 7.6 DC, output connections are terminated externally and depending upon the installation area, appropriate cable/conductor insulation must be selected to meet local codes (conduit not required for the low voltage output conductor paths).

Architectural/Engineering Approval

The information contained in this document is subject to change without notice.
Please contact Zurn for most up to date information.

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 ♦ 7900 Goreway Drive Unit 10 ♦ Brampton, Ontario L6T5W6 ♦ Phone: 905-405-8272 Fax: 905-405-1292

P1B



Madera™ FloWise® 15" Height Elongated Flushometer Toilet

VITREOUS CHINA LESS EVERCLEAN®

Madera™ FloWise® 15" Height Elongated LESS EverClean®

- Floor mount flushometer valve toilet
- Vitreous china
- High Efficiency, Low Consumption. Operates in the range of 1.1 gpf to 1.6 gpf (4.2 Lpf to 6.0 Lpf)
- Meets definition of HET (High Efficiency Toilet) when used with a high efficiency flush valve (1.28 gpf or 1.6 / 1.1 gpf dual flush)
- Fully glazed 2-1/8" trapway
- Elongated bowl
- 10" or 12" roughing-in
- 15" rim height
- Condensation channel
- Powerful direct-fed siphon jet action
- 10" x 12" water surface area
- 1-1/2" inlet spud
- 2 bolt caps

- 2234.001** Elongated bowl only, top spud
- ~~2623.001~~ Elongated bowl only, top spud with slotted rim for bedpan holding
- 2624.001** Elongated bowl only, back spud

System MaP* Score:

- 1,000 grams of miso @ 1.1 gpf, 1.28 gpf or 1.6 gpf when used with an American Standard flush valve

* Maximum Performance (MaP) testing performed by IAPMO R&T Lab. MaP Report conducted by Veritec Consulting, Inc. and Koeller and Company.

Component Parts:

- 047007-0070A** Inlet Spud (furnished with bowl)
- 481310-100** Bolt caps with retainers (furnished with bowl)

Nominal Dimensions:

718 x 356 x 381mm
(28-1/4" x 14" x 15")

Fixture only, less seat and flush valve

Recommended working pressure—between 25 psi at valve when flushing and 80 psi static

Compliance Certifications -

Meets or Exceeds the Following Specifications:

- ASME A112.19.2 / CSA B45.1 for Vitreous China Fixtures



SEE REVERSE FOR ROUGHING-IN DIMENSIONS

To Be Specified:

- Color: White
- Seat:
 - American Standard #5901.100 Heavy duty open front less cover
 - American Standard #5905.100 Extra heavy duty open front less cover
- Flushometer Valve:
 - 1.6 gpf:
 - Sensor-Operated: American Standard Selectronic® DC Power #6065.161.002 (Top Spud)
 - Sensor-Operated: American Standard Selectronic® AC Power #6067.261.002 (Back Spud)
 - Manual: American Standard #6047.161.002 (Top Spud)
 - 1.28 gpf:
 - Sensor-Operated: American Standard Selectronic® DC Power #6065.121.002 (Top Spud)
 - Sensor-Operated: American Standard Selectronic® AC Power #6067.221.002 (Back Spud)
 - Manual: American Standard #6047.121.002 (Top Spud)
 - 1.6 / 1.1 gpf Dual Flush:
 - Sensor-Operated: American Standard Selectronic® DC Power #6065.761.002 (Top Spud)



ENVIRONMENTAL
PRODUCT
DECLARATION

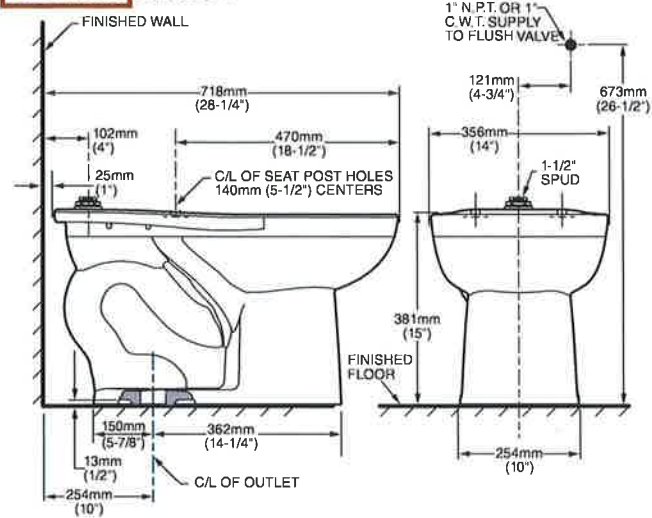


When used with
1.1 or 1.28 gpf
toilet flush valves

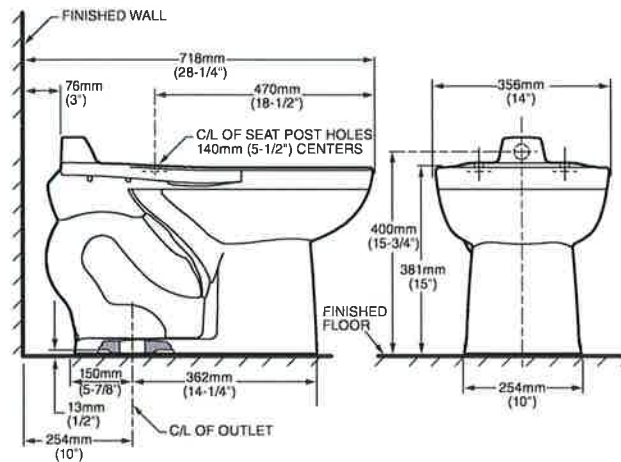


WATER
EFFICIENT

2234.001/2623.001



2624.001



NOTES:

PRODUCT 2234 SHOWN, 2623 SAME EXCEPT WITH SLOTTED RIM FOR BED PAN HOLDING.
TO COMPLY WITH AREA CODE GOVERNING THE HEIGHT OF VACUUM BREAKER ON THE FLUSHOMETER VALVE, THE PLUMBER MUST VERIFY DIMENSIONS SHOWN FOR SUPPLY ROUGHING.
THIS TOILET DESIGNED TO ROUGH-IN AT A MINIMUM DIMENSION OF 254MM (10") AND A MAXIMUM DIMENSION OF 305MM (12") FROM FINISHED WALL TO C/L OF OUTLET.

FLUSHOMETER VALVE NOT INCLUDED WITH FIXTURE AND MUST BE ORDERED SEPARATELY. FLUSHOMETER VALVE REQUIREMENTS FOR 12" (305MM) ROUGH-IN: SWEAT EXTENSION NIPPLE IS REQUIRED. REFER TO VALVE MANUFACTURER AND LOCAL CODES.

IMPORTANT: Dimensions of fixtures are nominal and may vary within the range of tolerances established by ANSI Standard A112.19.2. These measurements are subject to change or cancellation. No responsibility is assumed for use of superseded or voided pages.



ZEMS6000AV-IS

Exposed Hardwired Automatic Sensor Flush Valve
for Water Closets

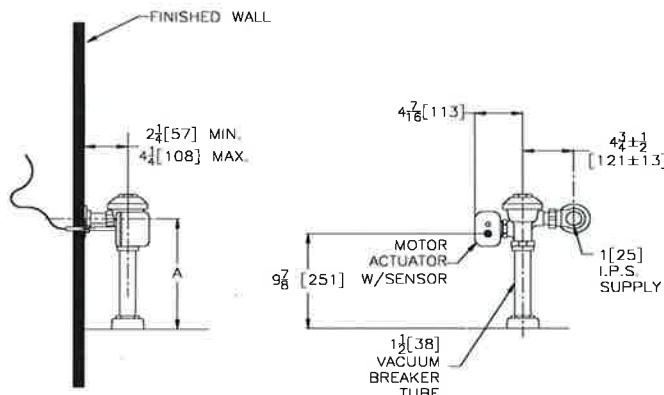
TAG P1B

Architectural/Engineering Specification:

Exposed, quiet diaphragm-type, chrome plated flushometer valve with a polished exterior. Complete with Zurn's AquaVantage® TPE, chloramine resistant, dual seal diaphragm with a clog resistant, triple filtered bypass. The valve incorporates a 6 VDC motor actuator, an integral infrared convergence-type proximity sensor and a manual push button override, high impact resistant polycarbonate housing and chrome plated plastic cover with manual override push button and 10 degree angled sensor.

Product Features:

- Proprietary dezincification resistant low lead brass alloy
- Control stop has internal siphon-guard protection and vandal resistant stop cap, sweat solder kit, wall flange with set screw
- High back pressure vacuum breaker with one piece hex coupling nut
- Chloramine resistant Internal seals
- Adjustable tailpiece
- Spud coupling and flange for top spud connection



Rough-in/Overview dimensions

Accessories (Order separate as specified)

P6900-ACA-BA 7.6VDC Plug-In ACA Power Supply

Powers up to 4 valves

P6000-HW6 7.6VDC Hardwired Power Converter

Powers up to 8 valves

P6000-MJ Mini Junction Box

NOTE: Must use either Zurn P6000-HW6 hardware power converter or P6900-ACA-BA regulated plug in to ensure proper operation. Using a power converter other than Zurn may result in operation malfunction or unit failure.

Compliance and Certification:

- ADA Compliant
- Complies with ASSE 1037/ASME A112.1037/CSA



Flow Options:

	Flush Volume	WaterSense Compliant
<input type="checkbox"/> -ONE*	1.1 gpf	✓
<input type="checkbox"/> -HET*	1.28 gpf	✓
<input checked="" type="checkbox"/> -WS1	1.6 gpf	
<input type="checkbox"/> -Standard	3.5 gpf	

*Clog-resistant linear filter

Suffix Options:

- FM12 Floor Mount 12" Rough In
- MOB Manual Over-ride Button (Front of Body)
- YJ Split Ring Pipe Support
- YK Solid Ring Pipe Support
- YO Bumper on Angle Stop

Valve Height Options:

	Product No	A
<input checked="" type="checkbox"/>	ZEMS6000AV-IS	11 1/2" [292]
<input type="checkbox"/>	ZEMS6000AV-1-IS	16" [406]
<input type="checkbox"/>	ZEMS6000AV-2	24" [610]

Architectural/Engineering Approval

The information contained in this document is subject to change without notice. Please contact Zurn for most up to date information.

This product should be used with a WaterSense labeled counterpart with a compatible flow volume to ensure that the entire system meets the requirements for water efficiency and performance.

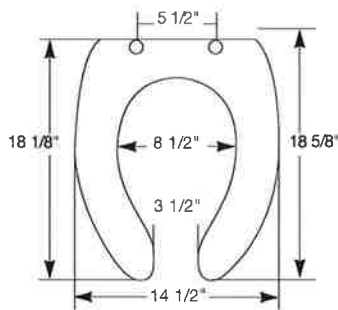




COMMERCIAL PLASTIC SEATS

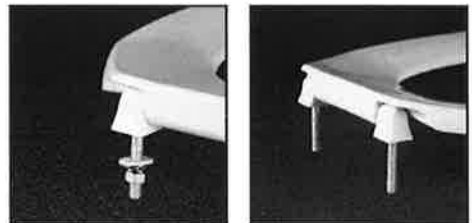
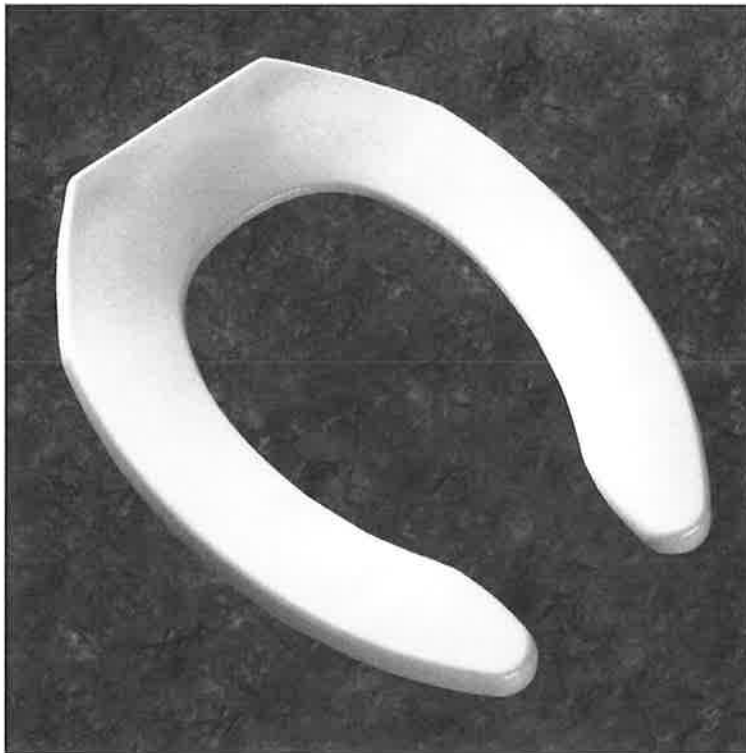
MODEL 255SSC

- ELONGATED SEAT, OPEN FRONT LESS COVER
- SOLID PLASTIC
- CONCEALED 300 SERIES STAINLESS STEEL SELF-SUSTAINING CHECK HINGE



Ring thickness is 13/16"
Ring thickness including the bumper is 1"
Height of the seat with cover is 1-1/2"

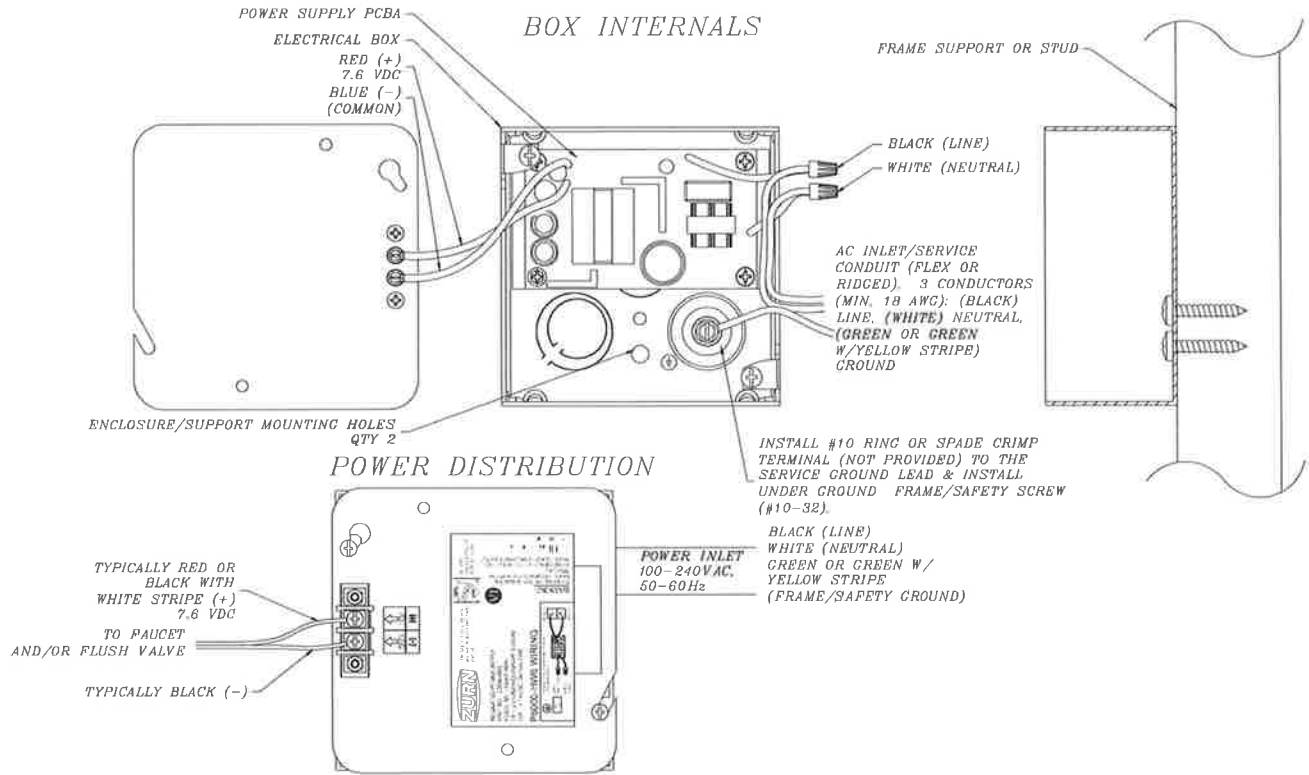
Seats shall be No. 255SSC as manufactured by Church Seats. Seats shall be commercial weight and injection molded of solid plastic. Seats shall be open front less cover for elongated bowl and feature large molded-in bumpers. 300 Series stainless steel, self-sustaining concealed check hinge holds seat in any raised position up to 11 degrees beyond vertical. Uses 300 Series stainless steel hardware. Color to be white.





P6000-HW6

7.6 VDC Hardwired Power Converter for Flush Valves and Faucets



ENGINEERING SPECIFICATION: ZURN P6000-HW6 Power Converter - The Hardwired Power Converter is a 7.6 VDC regulated, 2.0A power supply that will operate up to: (8) ZEMS or ZEMS-IS Sensors/Actuators, (8) ZESS Sensors/Solenoids, (8) sensor faucets, or (8) Pint Urinal valves. The unit shown above is integrated into a 4"L x 4"W x 2-1/8"D electrical box. The AC input connections are terminated within the electrical box. The 7.6 VDC output terminals are externally mounted to the cover plate.

Notes:

1. Mounting hardware (AC inlet conduit/cable clamp and enclosure-frame mounting screws) are NOT provided.

Typical Rough-In: The 3 input conductors (line, neutral and frame ground) are routed within conduit to the P6000-HW6 and the AC inlet and the frame/safety ground leads are terminated within the assembly. The low voltage, 7.6 DC, output connections are terminated externally and depending upon the installation area, appropriate cable/conductor insulation must be selected to meet local codes (conduit not required for the low voltage output conductor paths).

Architectural/Engineering Approval

The information contained in this document is subject to change without notice.
Please contact Zurn for most up to date information.

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 ♦ 7900 Goreway Drive Unit 10 ♦ Brampton, Ontario L6T5W6 ♦ Phone: 905-405-8272 Fax: 905-405-1292

P2



BARRIER FREE

CADET® PRO™ RIGHT HEIGHT® ELONGATED TOILET VITREOUS CHINA

CADET® PRO™ RIGHT HEIGHT® ELONGATED TOILET

215AA.004

- Features the **Cadet® Flushing System**
- Vitreous china
- Low consumption (6.0 Lpf/1.6 gpf) toilet
- Trade exclusive tank
- PowerWash® rim scrubs bowl with each flush
- Robust metal trip lever & metal shank fill valve
- Includes EZ-Install Tools w/color match bowl caps
- EverClean® surface included
- 3" flush valve
- Fully-glazed 2-1/8" trapway
- 16-1/2" rim height for accessible applications
- 12" (305mm) rough-in
- Generous 9" x 8" water surface area
- Chrome finish trip lever is supplied
- 1,000g MaP Score** at 1.6 gpf
- 5 year warranty



3517A.101 Right Height® Elongated Bowl

4188A.004 Tank

Nominal Dimensions:

767 x 441 x 771mm (30-1/8" x 17-3/8" x 30-3/8")

Fixture only, seat and supply sold separately

Alternative Tank Configuration Available:

- 4188A.054 Tank complete with Aquaguard Liner
- 4188A.064 Tank complete with tank cover locking device
- 4188A.074 Tank complete with Aquaguard Liner and tank cover locking device
- 4188A.005 Tank complete with trip lever located on right side
- 4188A.065 Tank complete with tank cover locking device and trip lever located on right side

Compliance Certifications -

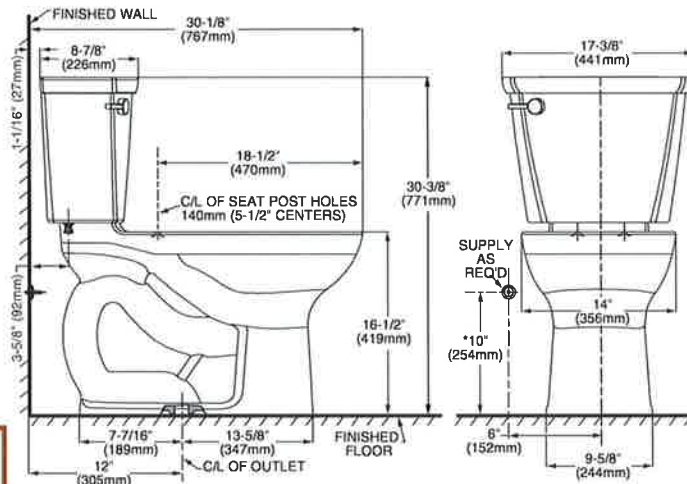
Meets or Exceeds the Following Specifications:

- ASME A112.19.2-2008/CSA B45.1-08 for Vitreous China Fixtures

** Maximum Performance (MaP) testing performed by IAPMO R&T Lab. MaP Report conducted by Veritec Consulting, Inc. and Koeller and Company.

To Be Specified:

- Color: White Bone Linen Black
- Seat: #5321.110 EverClean® Elongated Seat with Slow Close Snap-Off Hinges
- Supply with stop:



NOTES:

THIS TOILET IS DESIGNED TO ROUGH-IN AT A MINIMUM DIMENSION OF 305MM (12") FROM FINISHED WALL TO C/L OF OUTLET.
SUPPLY NOT INCLUDED WITH FIXTURE AND MUST BE ORDERED SEPARATELY.
* DIMENSION SHOWN FOR LOCATION OF SUPPLY IS SUGGESTED.

IMPORTANT: Dimensions of fixtures are nominal and may vary within the range of tolerances established by ANSI Standard A112.19.2. These measurements are subject to change or cancellation. No responsibility is assumed for use of superseded or voided pages.



MEETS THE AMERICANS WITH DISABILITIES ACT GUIDELINES AND ANSI A117.1 REQUIREMENTS FOR ACCESSIBLE AND USABLE BUILDING FACILITIES-CHECK LOCAL CODES.

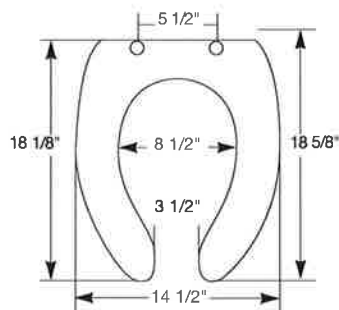




COMMERCIAL PLASTIC SEATS

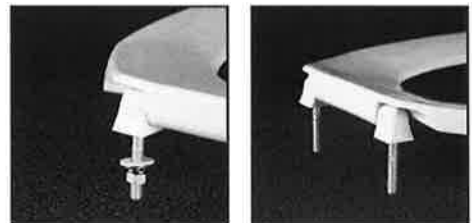
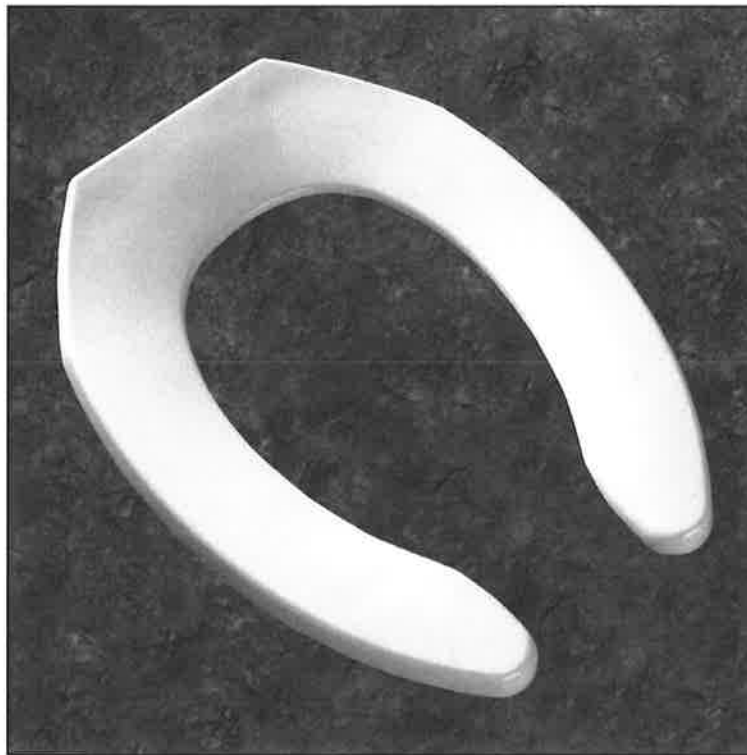
MODEL 255SSC

- ELONGATED SEAT, OPEN FRONT LESS COVER
- SOLID PLASTIC
- CONCEALED 300 SERIES STAINLESS STEEL SELF-SUSTAINING CHECK HINGE



Ring thickness is 13/16"
Ring thickness including the bumper is 1"
Height of the seat with cover is 1-1/2"

Seats shall be No. 255SSC as manufactured by Church Seats. Seats shall be commercial weight and injection molded of solid plastic. Seats shall be open front less cover for elongated bowl and feature large molded-in bumpers. 300 Series stainless steel, self-sustaining concealed check hinge holds seat in any raised position up to 11 degrees beyond vertical. Uses 300 Series stainless steel hardware. Color to be white.





McGuire Manufacturing Co., Inc.

60 Grandview Court
 P.O. Box 746 • Cheshire, CT 06410
 203-699-1801 • Fax: 203-699-1813
 www.mcguiremfg.com

PRODUCT SPECIFICATION

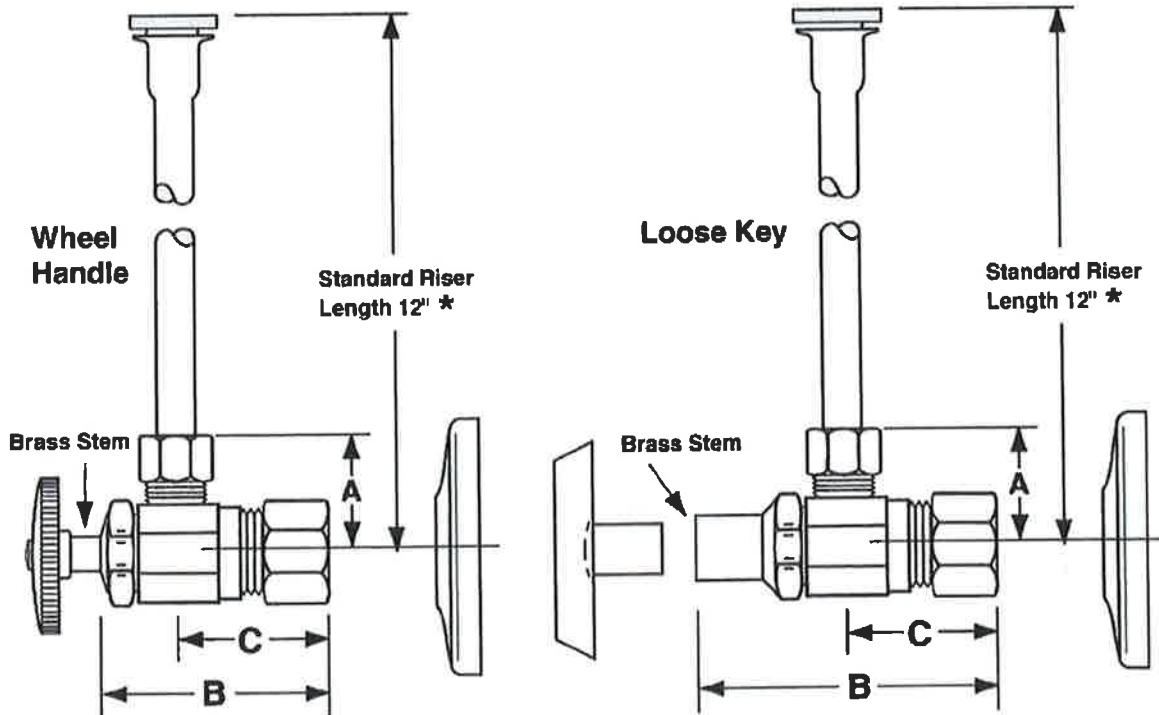
Part No.

**LF2166CC, LF2166CCLK,
 LF2169CC, LF2169CCLK**

**Compression x Compression
 Closet Supply**

Job Name: _____

Submittal Number: _____



NO.	DESCRIPTION	ROUGHING MEASUREMENTS		
		A	B	C
LF2166CC	1/2" Nominal x 3/8" O.D.	1"	1-1/2"	3/4"
LF2166CCLK	1/2" Nominal x 3/8" O.D.	1"	2-1/4"	3/4"
LF2169CC	1/2" Nominal x 1/2" O.D.	1"	1-1/2"	3/4"
LF2169CC	1/2" Nominal x 1/2" O.D.	1"	2-1/4"	3/4"



LK designates Loose Key

* See options and accessories section for details on product variations.



Specifications:

Supply kit shall include lead free chrome plated brass supply stop valves with full turn brass stem, no plastic, (12, 15, 20) inch chrome plated risers and (shallow, deep, bell) (steel, brass) or (forged brass with set screw) flange. Inlet shall be (3/8, 1/2) inch (IPS, sweat, compression). Outlet shall be (3/8, 1/2) inch (IPS, compression). Supply kit shall be McGuire _____. Supply kit shall be certified by recognized authority and bear manufacturer and testing mark.

P3

Product Specs Sheets

Cover Page

Unlimited 60

Features

- Bathroom Sink
- Made of Ceramic
- Available in 2 Finishes: Glossy White and Matte Black
- With Overflow
- Wall Mount or Countertop (Vessel) Installation
- Available with One, Three (4" or 8" Spread), or No Faucet Hole
- Available with Soap Dispenser Hole Option to the Left or Right of Faucet Hole
- Made in Italy



Related Items:

- WSBC 53991 | Push Waste Drain
- WSBC 53922 | Decorative Trap

Finishes:




SKU# | Options:

- Unlimited 60.00 WG | No Faucet Hole, Glossy White
- Unlimited 60.01 WG | Single Faucet Hole, Glossy White
- Unlimited 60.03-4 WG | Three Faucet Hole 4" Spread, Glossy White
- Unlimited 60.03-8 WG | Three Faucet Hole 8" Spread, Glossy White
- Unlimited 60.02L WG | Soap Dispenser Hole (Left), Glossy White
- Unlimited 60.02R WG | Soap Dispenser Hole (Right), Glossy White
- Unlimited 60.00 BM | No Faucet Hole, Matte Black
- Unlimited 60.01 BM | Single Faucet Hole, Matte Black
- Unlimited 60.03-4 BM | Three Faucet Hole 4" Spread, Matte Black
- Unlimited 60.03-8 BM | Three Faucet Hole 8" Spread, Matte Black
- Unlimited 60.02L BM | Soap Dispenser Hole (Left), Matte Black
- Unlimited 60.02R BM | Soap Dispenser Hole (Right), Matte Black

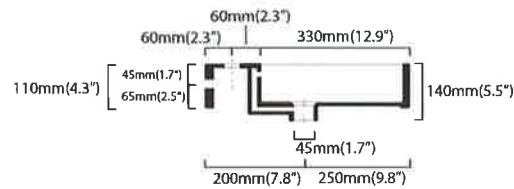
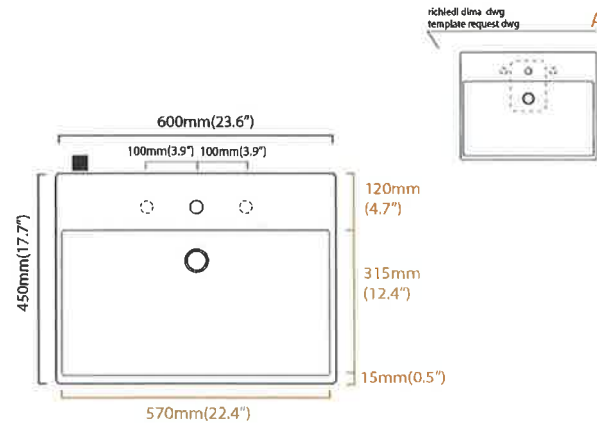
Codes & Standards:

- ADA Compliant

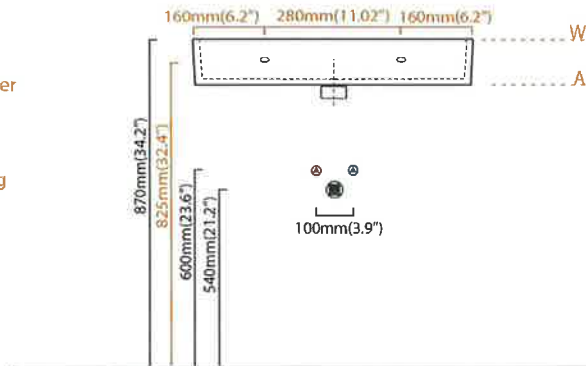
* WS Bath Collections reserves the right to revise dimensions or information on this sheet without notice

Collection Unlimited	Model Unlimited 60	Dimensions Metric <i>1 inch = 2.54 cm</i> <i>1 inch = 25.4 mm</i>	 1051 Lea Drive - Collegeville, PA 19426 Tel. 215 513 9400 - Fax 610 831 0215 www.ws bathcollections.com - info@ws bathcollections.com
----------------------------------	--------------------------------	--	--

- = smaltato perimetralmente
all glazed sides
- = non smaltato dietro
unglazed behind



- U= sottopiano
undercounter
- I= incasso
inset
- A = appoggio
freestanding
- W= sospeso
wall hung



Collection |
Unlimited

Model |
Unlimited 60

Dimensions Metric
1 inch = 2.54 cm
1 inch = 25.4 mm

WS[®]
BATH
COLLECTIONS

1051 Lea Drive - Collegeville, PA 19426
Tel. 215 513 9400 - Fax 610 831 0215
www.ws bathcollections.com - info@ws bathcollections.com

We recommend the following items that work with your sink.


Unlimited 60

TRAPS



WSBC 53922
Our best seller

 Polished Chrome
WSBC: 53922.29

 Matte Black
WSBC: 53922.22



WSBC 5392

 Polished Chrome
WSBC: 5392.29



WSBC 53925

 Polished Chrome
WSBC: 53925.29



WSBC 53921
Space saving

 Polished Chrome
WSBC: 53921.29

 Matte Black
WSBC: 53921.22

DRAINS



WSBC 53991
Push waste drain (click clack)
with overflow

 Polished Chrome
WSBC: 53991.29

 Glossy White
WSBC: 53991.09

 Glossy Black
WSBC: 53991.18

 Matte White
WSBC: 53991.26

 Matte Black
WSBC: 53991.22

MOUNTING HARDWARE

Wall-mount installation

Vessel/ countertop installation



Bolts



Silicone (optional)

Collection
Unlimited

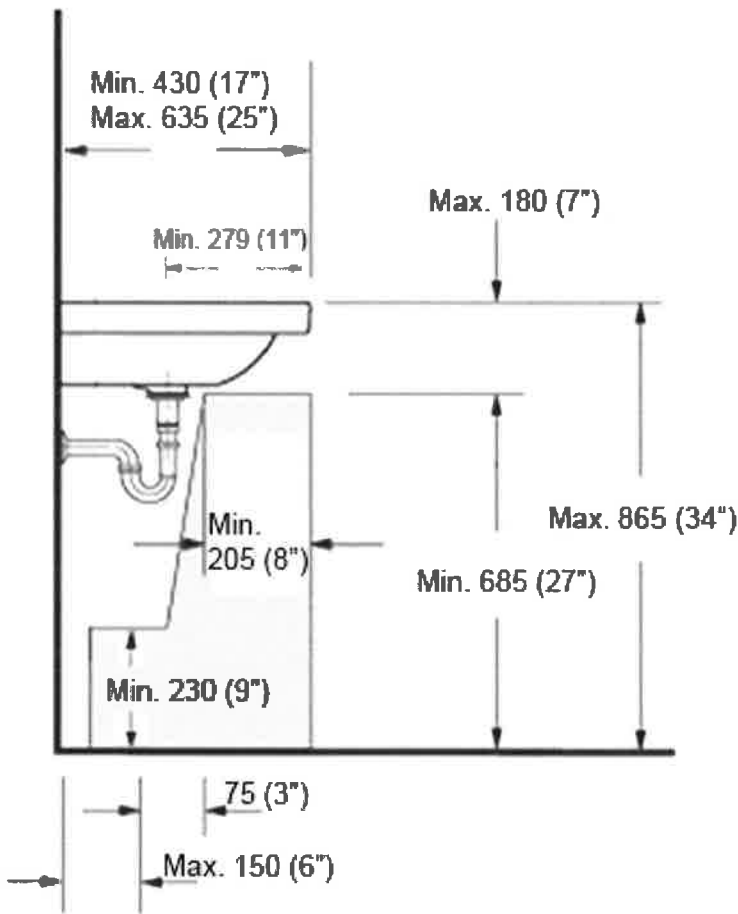
Model |
Unlimited 60

Dimensions Metric
1 inch = 2.54 cm
1 inch = 25.4 mm

WS[®]
BATH
COLLECTIONS

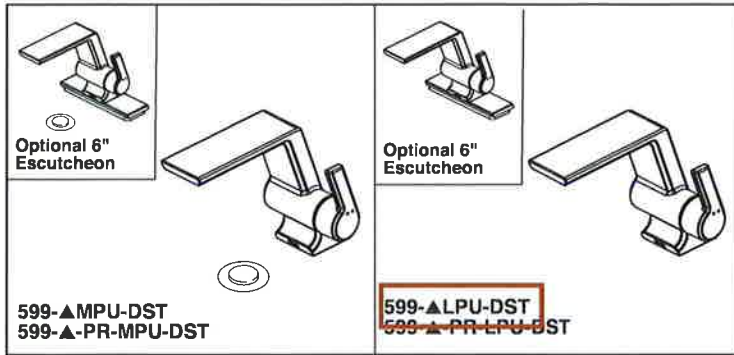
1051 Lea Drive - Collegeville, PA 19426
Tel. 215 513 9400 - Fax 610 831 0215
www.ws bathcollections.com - info@ws bathcollections.com

Recommended ADA Installation



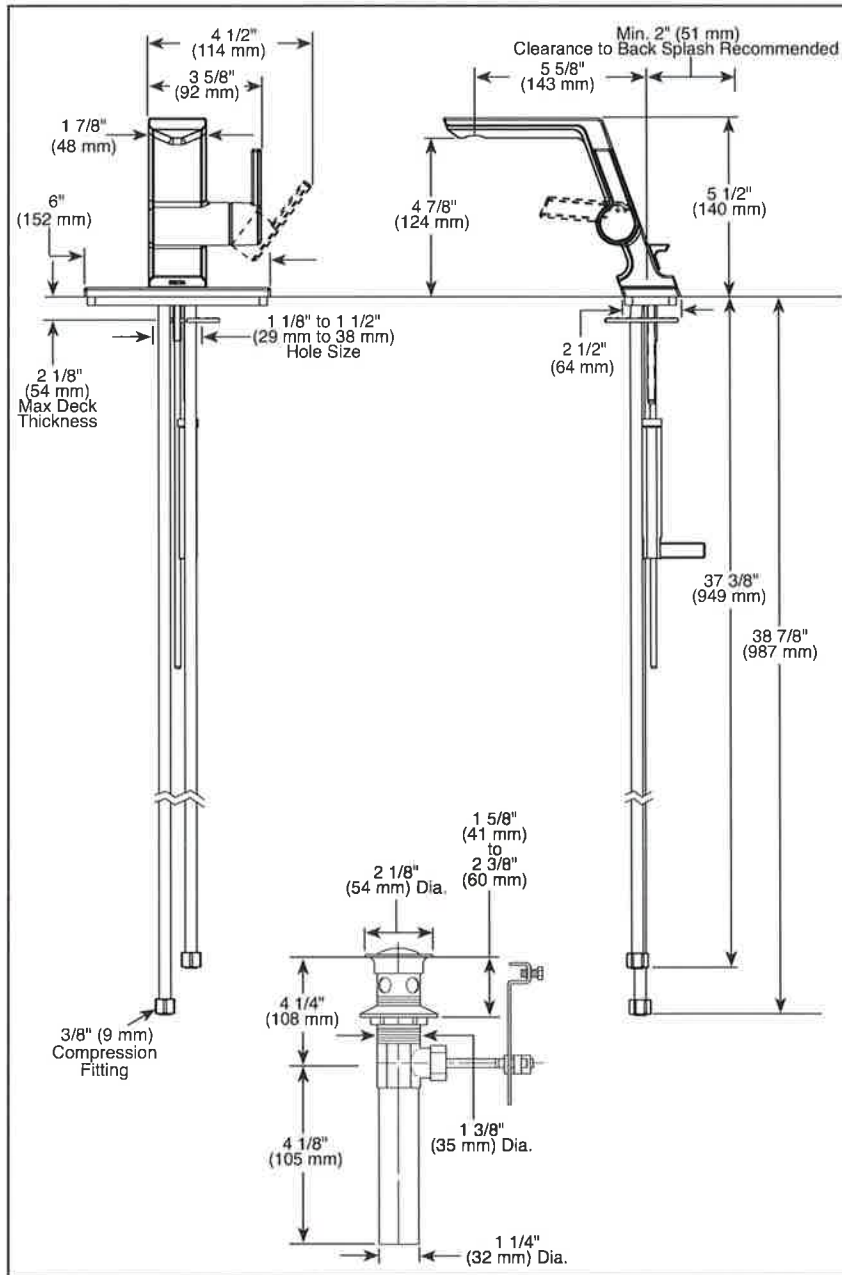
Note: ADA Compliant when installed in accordance with ADA guidelines

<p>Collection Unlimited</p>	<p>Model Unlimited 60</p>	<p>Dimensions Metric 1 inch = 2.54 cm 1 inch = 25.4 mm</p>	<p>WS[®] BATH COLLECTIONS 1051 Lea Drive - Collegeville, PA 19426 Tel. 215 513 9400 - Fax 610 831 0215 www.ws bathcollections.com - info@ws bathcollections.com</p>
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Submitted Model No.: 599-LPU-DST

Specific Features: _____



▲ Designate Proper Finish Suffix

Delta reserves the right (1) to make changes in specifications and materials, and (2) to change or discontinue models, both without notice or obligation. Dimensions are for reference only. See current full-line price book or www.deltafaucet.com for finish options and product availability.

DSP-L-599-MPU-DST Rev. H



see what Delta can do™

BATHROOM FAUCET

- Pivotal® Bath Collection
- Single Handle Deck Mount

FEATURES:

- Lumicoat™ Finish (-PR models only)
- Lumicoat™ Finishes easily wipe clean without cleaners and chemicals on the products most commonly touched areas

STANDARD SPECIFICATIONS:

- Max. flow rate 1.2 gpm @ 60 psi, 4.5 L/min @ 414 kPa
- One or three hole mount (escutcheon optional, not included)
- Solid brass fabricated body
- Diamond coated ceramic cartridge
- 3/8" O.D. straight, staggered PEX supply tubes
- Models have metal drain with pop-up type fitting with plated flange and stopper
- "LPU" models less pop-up drain; no lift rod hole
- Drain operates using vertical slide mechanism
- Red/blue indicator markings

WARRANTY

- Parts and Finish - Lifetime limited warranty; or for commercial purchasers, 10 years for multi-family residential (apartments and condominiums) and 5 years for all other commercial uses, in each case from the date of purchase.
- Electronic Parts and Batteries (if applicable) - 5 years from the date of purchase; or for commercial purchasers, 1 year from the date of purchase. No warranty is provided on batteries.



COMPLIES WITH:

- ASME A112.18.1 / CSA B125.1
- ASME A112.18.2 / CSA B125.2
- Indicates compliance to ICC/ANSI A117.1 - Valve control only
- EPA WaterSense®

Delta Faucet Company

55 E. 111th Street, Indianapolis, IN 46280
350 South Edgeware Road, St. Thomas, ON N5P 4L1
© 2021 Delta Faucet Company



McGuire Manufacturing Co., Inc.

60 Grandview Court
P.O. Box 746 ♣ Cheshire, CT 06410
203-699-1801 ♣ Fax: 203-699-1813
www.mcguiremfg.com

PRODUCT SPECIFICATION

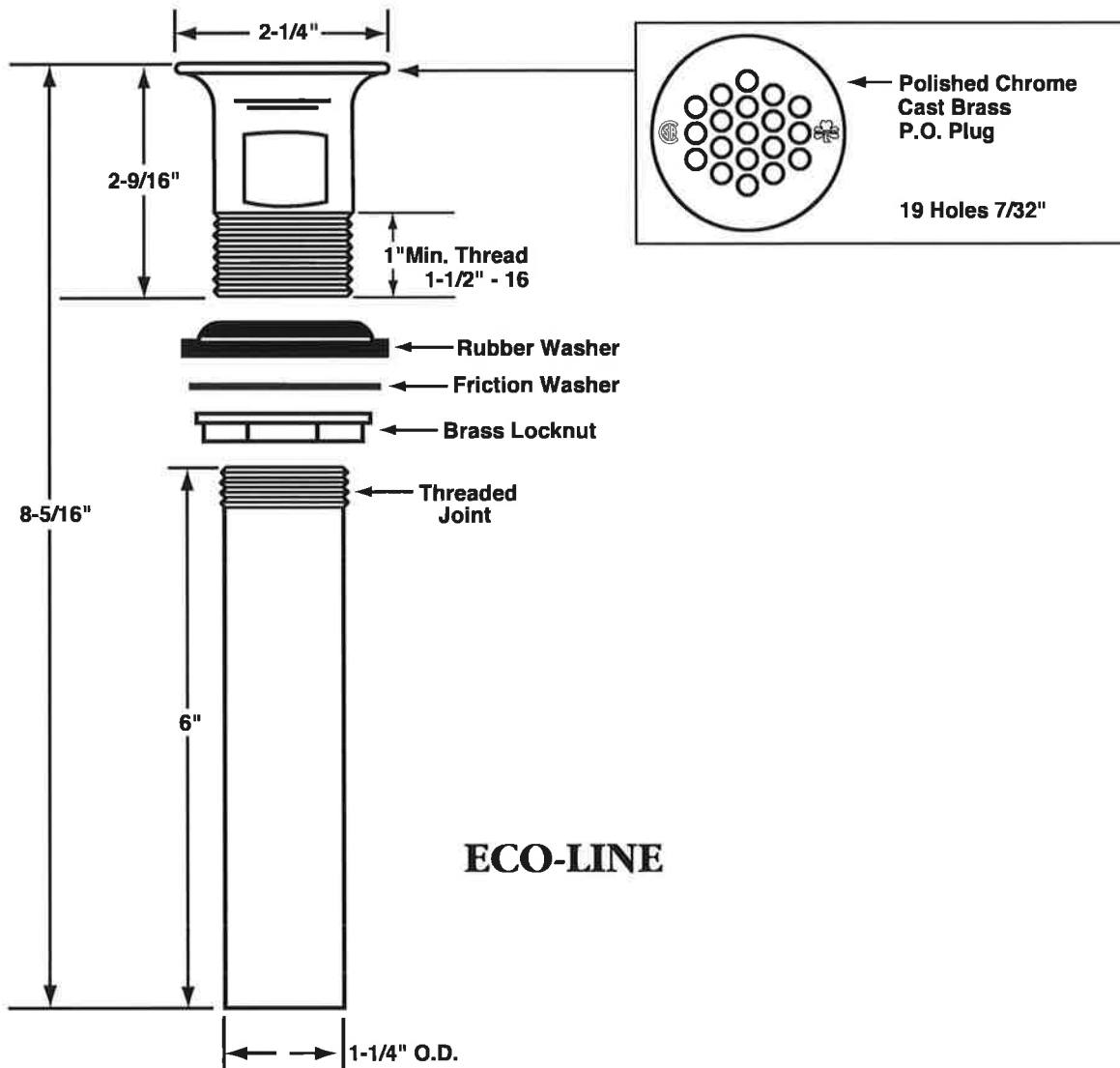
Part No.

155AECO

Open Grid P.O. Plug

Job Name:

Submittal Number:



Specifications:

Cast Brass Chrome Plated Open Grid P.O. Plug with 17 gauge 1-1/4" x 6" seamless brass tailpiece, brass locknut, heavy rubber basin washer and fiber friction washer. Drain shall be in compliance with CSA or other recognized testing authority and bear both manufacturer and testing mark.



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 P.O. Box 746 ♣ Cheshire, CT 06410
 203-699-1801 ♣ Fax: 203-699-1813
 www.mcguiremfg.com

PRODUCT SPECIFICATION

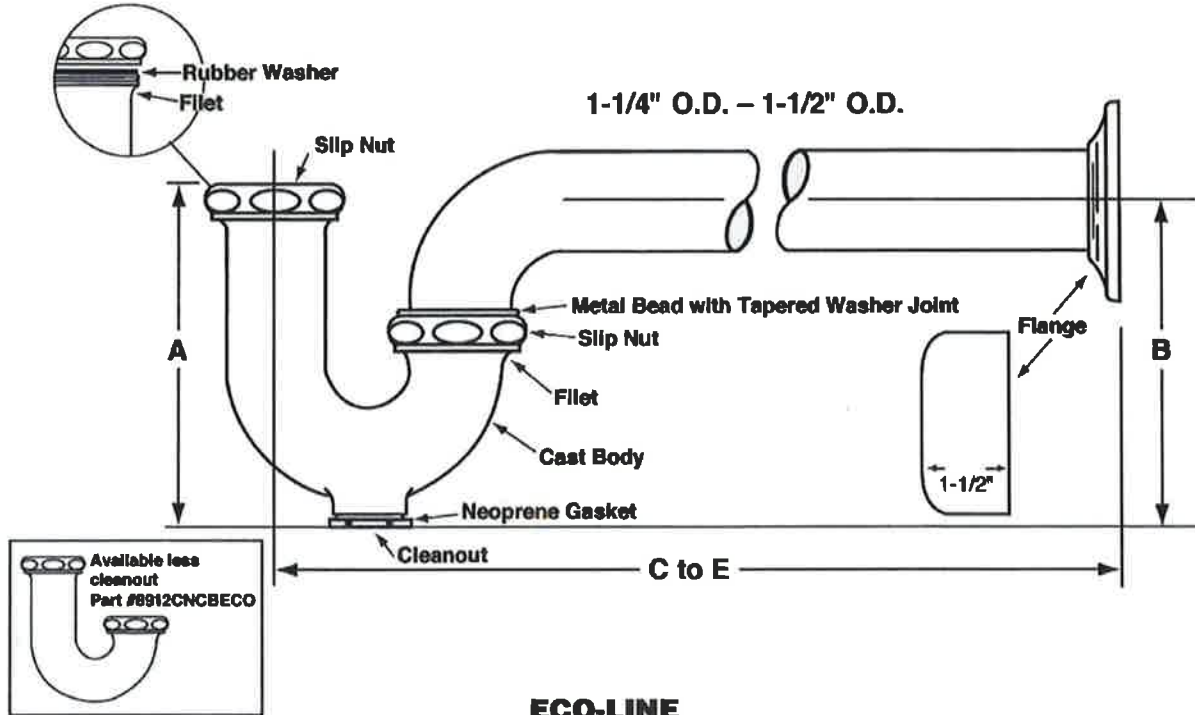
Part No.

8872CBECO, **C8872CECO**,
 8912CBECO, C8912CECO,
 8912CNCBECO, 8912C18BECO

**Cast Body P-Trap With
 or Without Cleanout**

Job Name:

Submittal Number:



ECO-LINE

ROUGHING MEASUREMENTS

MODEL NO.	TRAP DIMENSIONS		A	B	C to E	FLANGE	SLIP NUT
	INLET	OUTLET					
8872CBECO	1-1/4"	1-1/4"	5"	4-1/2"	11"	Box	Brass
C8872CECO	1-1/4"	1-1/4"	5"	4-1/2"	10"	Shallow	Zinc
8912CBECO	1-1/2", 1-1/4"	1-1/2"	5"	4-1/2"	12"	Box	Brass
C8912CECO	1-1/2"	1-1/2"	5"	4-1/2"	10-1/2"	Shallow	Zinc
8912CNCBECO	1-1/2", 1-1/4"	1-1/2"	5"	4-1/2"	12"	Box	Brass
8912C18BECO	1-1/2", 1-1/4"	1-1/2"	5"	4-1/2"	18"	Box	Brass

**FED SPEC W.W.P. 541
 CAST BRASS P-TRAP
 MINIMUM SEAL 2"**

See options and accessories section for details on product variations.



Specifications:

Chrome plated P-Trap shall be cast brass body, with or without cleanout, with 17 gauge seamless tubular wall bend and flange.



McGuire Manufacturing Co., Inc.

60 Grandview Court
 P.O. Box 746 • Cheshire, CT 06410
 203-699-1801 • Fax: 203-699-1813
 www.mcguiremfg.com

PRODUCT SPECIFICATION

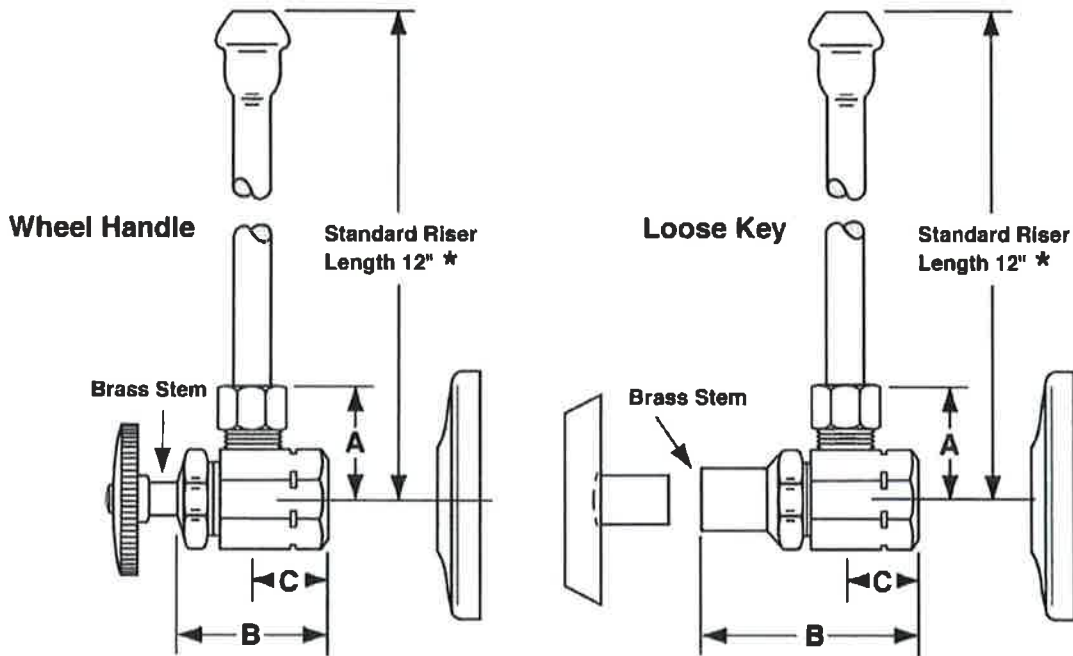
Part No.

LF2165, **LF2165LK**,
 LF2167, LF2167LK

Lavatory Supply
1/2" I.P.S. x O.D.

Job Name:

Submittal Number:



NO.	DESCRIPTION	ROUGHING MEASUREMENTS		
		A	B	C
LF2165	1/2" I.P.S. x 3/8" O.D.	1-3/16"	1-1/2"	3/4"
LF2165LK	1/2" I.P.S. x 3/8" O.D.	1-3/16"	2-1/4"	3/4"
LF2167	1/2" I.P.S. x 1/2" O.D.	1-3/16"	1-1/2"	3/4"
LF2167LK	1/2" I.P.S. x 1/2" O.D.	1-3/16"	2-1/4"	3/4"



LK designates Loose Key

* See options and accessories section for details on product variations.



Specifications:

Supply kit shall include low lead chrome plated brass supply stop valves with full turn brass stem, no plastic, (12, 15, 20) inch chrome plated risers and (shallow, deep, bell) (steel, brass) or (forged brass with set screw) flange. Inlet shall be (3/8, 1/2) inch (IPS, compression). Outlet shall be (3/8, 1/2) inch compression. Supply kit shall be McGuire _____. Supply kit shall be low lead certified by recognized authority and bear manufacturer and testing mark.

P4

**MOLDED STONE® INTEGRAL DRAIN
MOP SERVICE BASIN**

MSBID2424

- Molding done in matched metal dies under heat and pressure resulting in a one-piece homogeneous product
- Integral drain is molded into a one piece unit and designed to connect to a 3" (76mm) drain pipe with a QIC3XH gasket
- Stainless steel strainer included

Nominal Dimensions:

24" x 24" x 10"
(610 x 610 x 254mm)

Shipping Weight:

27lbs. (12.3 Kg)

Optional Components:

- QIC32** Quick Drain Connector for 2" pipe. Order separately.
- QIC3SN** Quick Drain Connector for 3" cast iron soil pipe. Order separately
- 830AA** Service Faucet:
 - Chrome plated with vacuum breaker, integral stops, adjustable wall brace, pail hook and 3/4" hose thread on spout

832AA Hose & Hose Bracket

889CC Mop Hanger

833AA Silicone Sealant

E77AA24 Vinyl Rumperguard

MSG2424 Stainless Steel Wall Guard

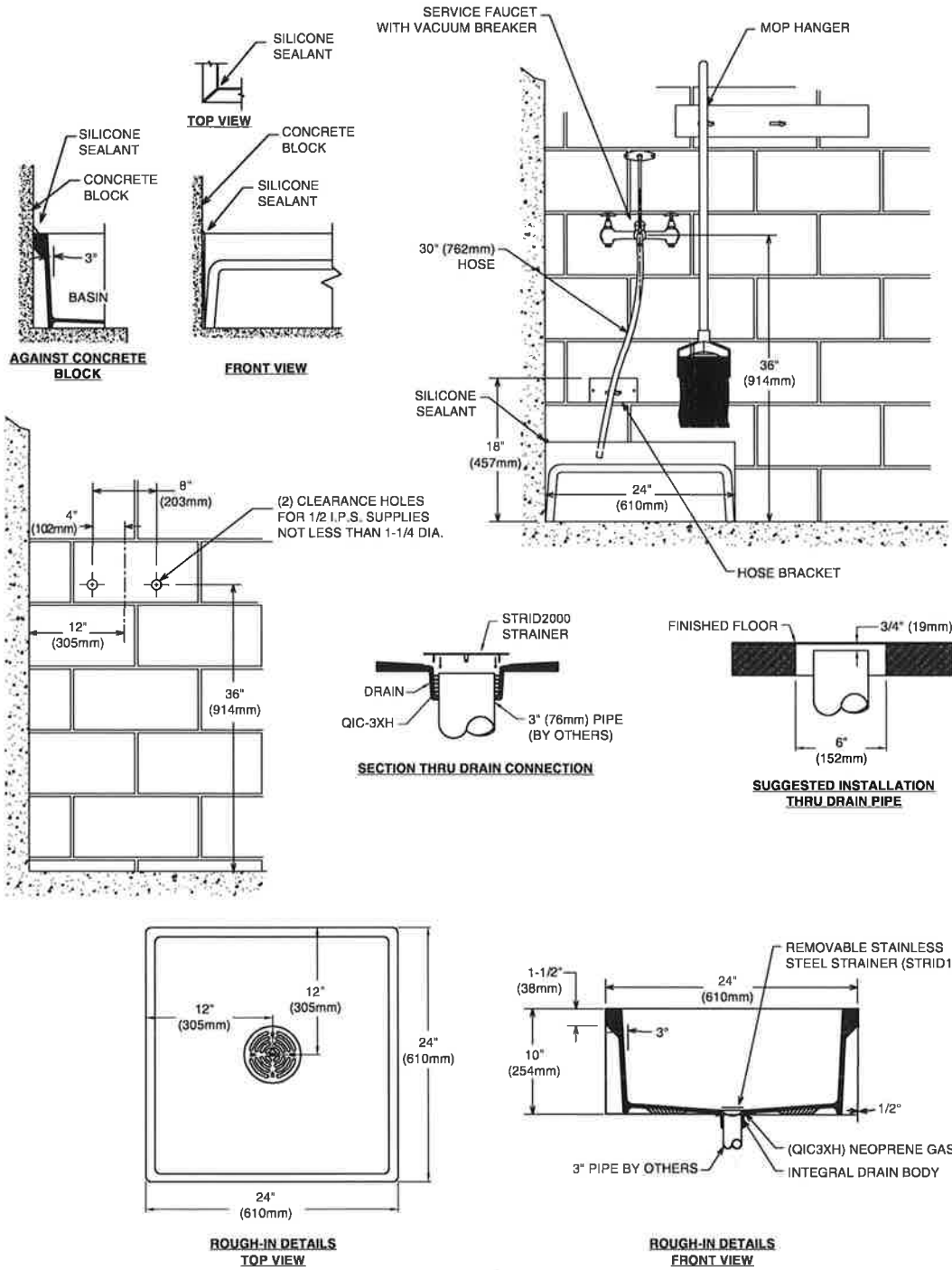


SEE REVERSE FOR ROUGHING-IN DIMENSIONS

Compliance Certifications -

Meets or Exceeds the Following Specifications:

- IAPMO / ANSI Z124.6-2007
- ASME A112.18.2 / CSA B125.2
- CSA B45.5
- Made in U.S.A.



Installation Note : QIC32 Quick Drain Connector for 2" pipe or QIC3SN Quick Drain Connector for cast iron soil pipe must be ordered separately.
IMPORTANT: Roughing-in dimensions may vary 1/2" and are subject to change or cancellation without prior notice.



T&S BRASS AND BRONZE WORKS, INC.

2 Saddleback Cove / P.O. Box 1088
Travelers Rest, SC 29690

Model No.

B-0665-BSTR

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com



ADA Compliant

This Space for Architect/Engineer Approval

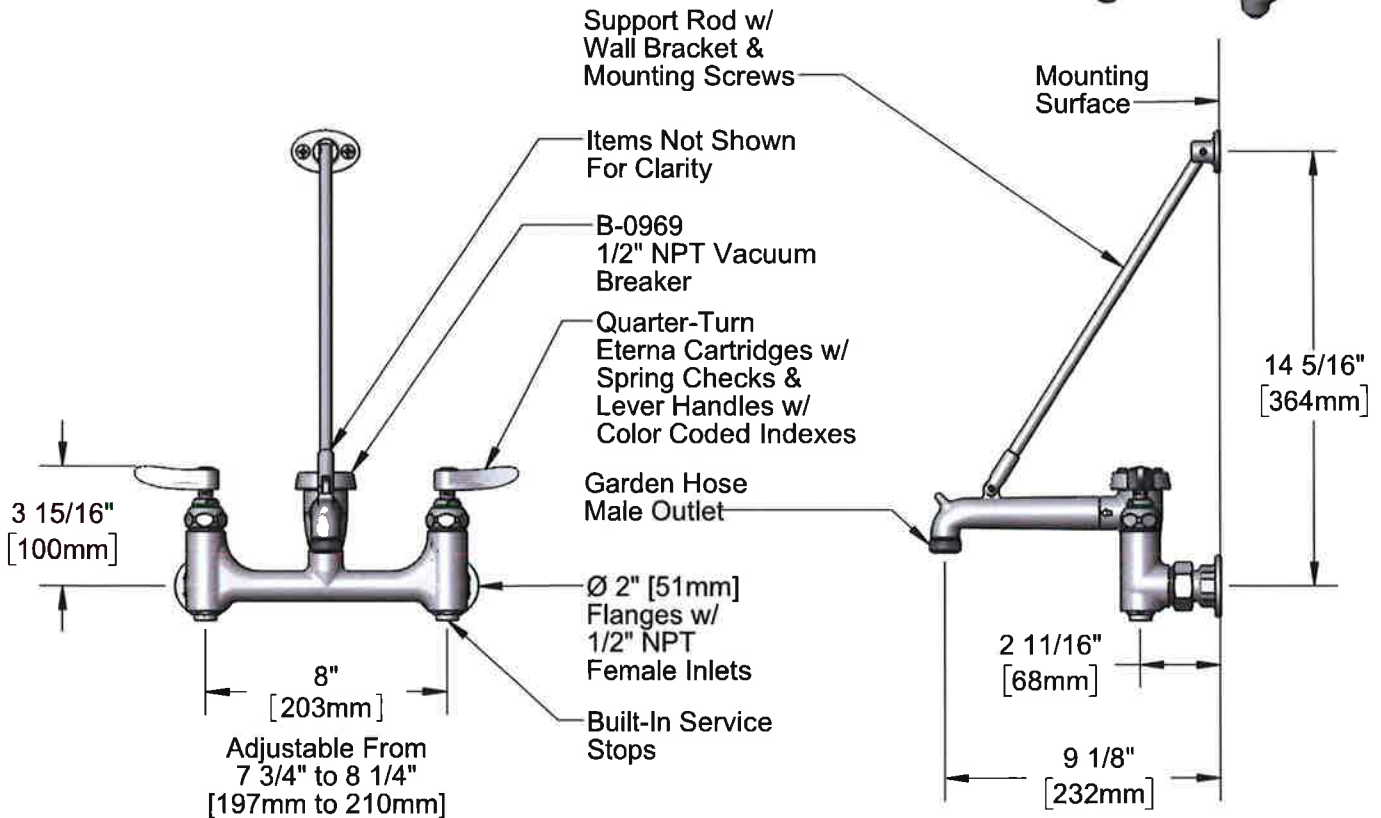
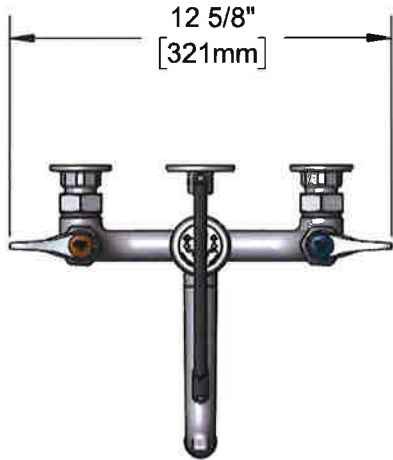
Job Name _____ Date _____

Model Specified _____ Quantity _____

Customer/Wholesaler _____

Contractor _____

Architect/Engineer _____



Product Specifications:

8" Wall Mount Service Sink, Quarter-Turn Eterna Cartridges w/ Spring Checks, Lever Handles, Upper Support Rod, Garden Hose Male Outlet, Built-In Service Stops, Rough Chrome Finish, 1/2" NPT Vacuum Breaker & 1/2" NPT Female Inlets

Product Compliance:

ASME A112.18.1 / CSA B125.1
NSF 61 - Section 9
NSF 372 (Low Lead Content)
ANSI A117.1 (ADA)
ASSE 1001 (VB)



T&S BRASS AND BRONZE WORKS, INC.

2 Saddleback Cove / P.O. Box 1088
Travelers Rest, SC 29690

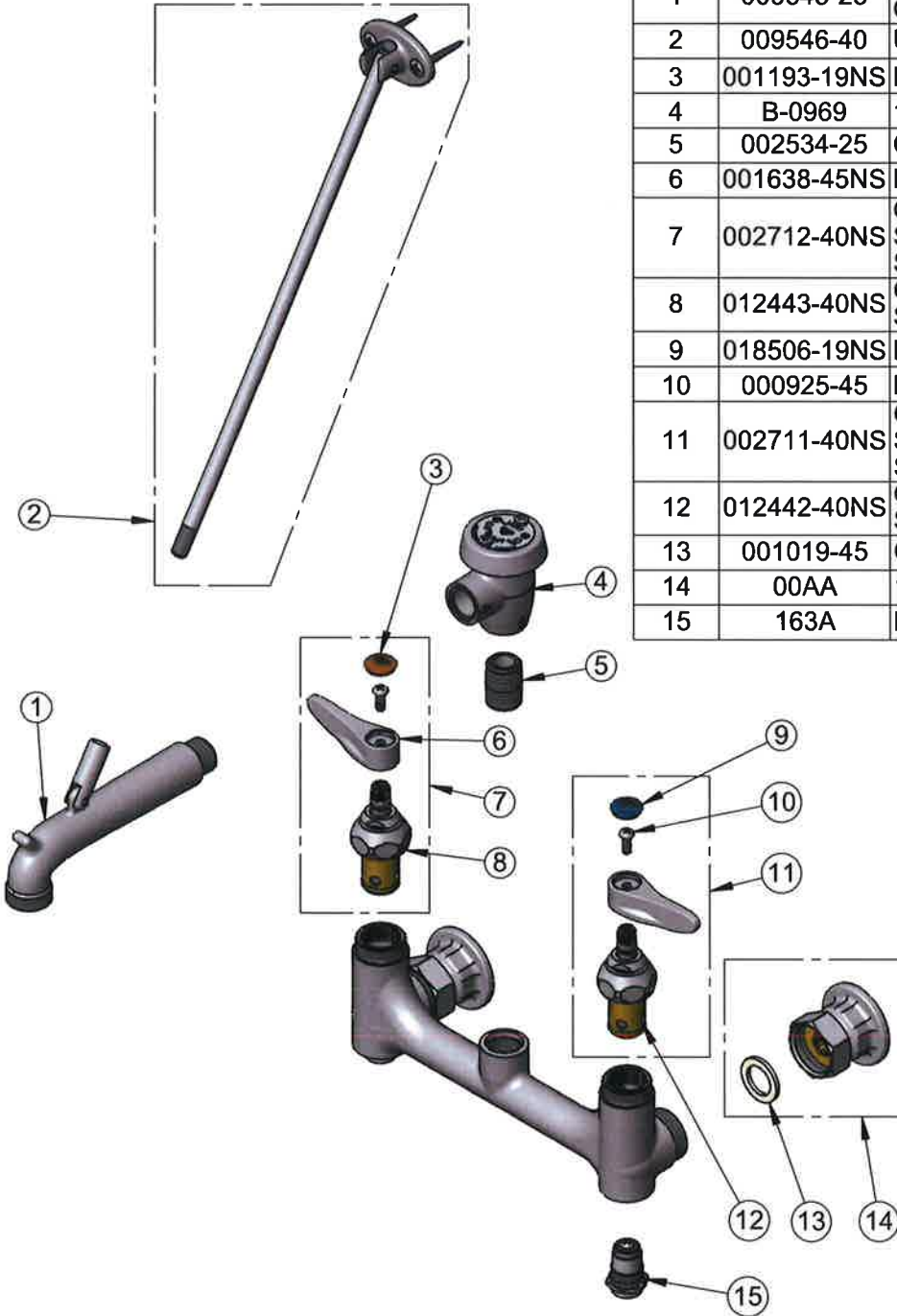
Model No.

B-0665-BSTR

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com

ITEM NO.	SALES NO.	DESCRIPTION
1	009545-25	Spout w/ Male GH Outlet & Upper Clevis - Rough Chrome
2	009546-40	Upper Support Rod
3	001193-19NS	Red Button Index, Press-in
4	B-0969	1/2" NPT Vacuum Breaker
5	002534-25	Close Nipple, 1/2" NPT
6	001638-45NS	Lever Handle (New Style)
7	002712-40NS	Quarter-Turn Eterna Cartridge w/ Spring Check, Handle, Red Index & Screw, RTC
8	012443-40NS	Quarter-Turn Eterna Cartridge w/ Spring Check, RTC
9	018506-19NS	Blue Button Index, Press-in
10	000925-45	Lab Handle Screw
11	002711-40NS	Quarter-Turn Eterna Cartridge w/ Spring Check, Handle, Blue Index & Screw, LTC
12	012442-40NS	Quarter-Turn Eterna Cartridge w/ Spring Check, LTC
13	001019-45	Coupling Nut Washer
14	00AA	1/2" NPT Female Eccentric Flange
15	163A	Built-in Service Stop



Product Specifications:

8" Wall Mount Service Sink, Quarter-Turn Eterna Cartridges w/ Spring Checks, Lever Handles, Upper Support Rod, Garden Hose Male Outlet, Built-In Service Stops, Rough Chrome Finish, 1/2" NPT Vacuum Breaker & 1/2" NPT Female Inlets

Product Compliance:

ASME A112.18.1 / CSA B125.1
NSF 61 - Section 9
NSF 372 (Low Lead Content)
ANSI A117.1 (ADA)
ASSE 1001 (VB)

P5



McGuire Manufacturing Co., Inc.

60 Grandview Court
 P.O. Box 746 ♣Cheshire, CT 06410
 203-699-1801 ♣ Fax: 203-699-1813
 www.mcguiremfg.com

PRODUCT SPECIFICATION

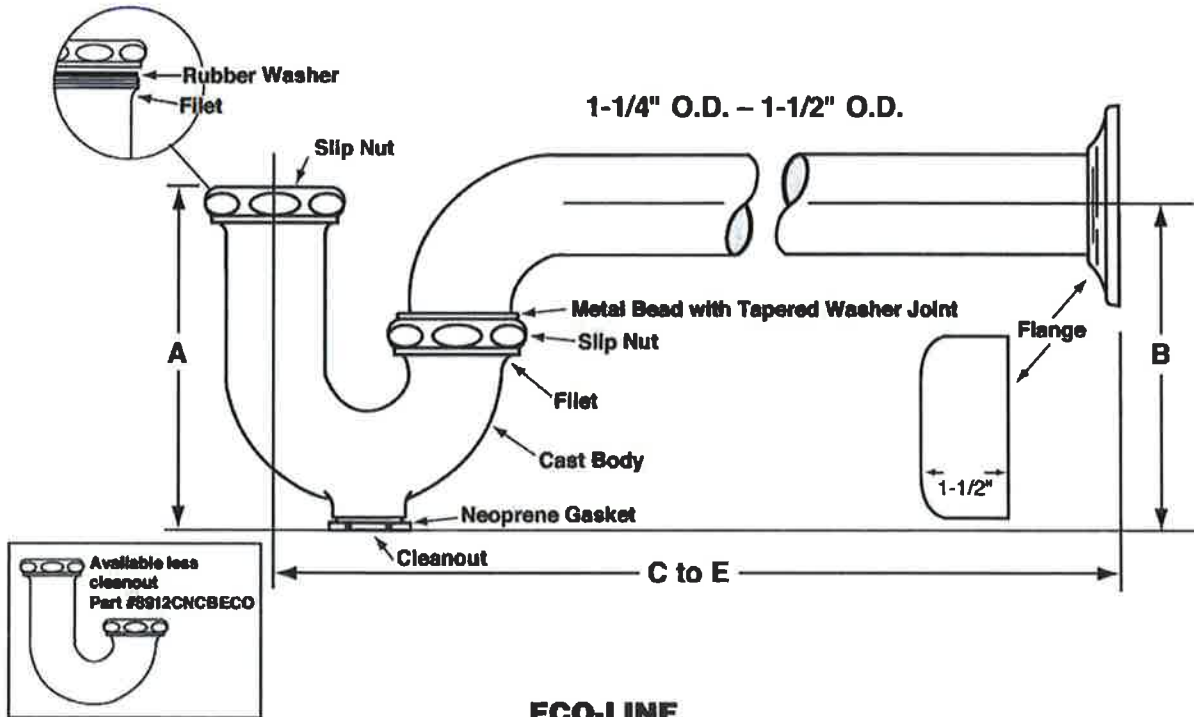
Part No.

8872CBECO, C8872CECO,
 8912CBECO, **C8912CECO**,
 8912CNCBECO, 8912C18BECO

**Cast Body P-Trap With
 or Without Cleanout**

Job Name: _____

Submittal Number: _____



ECO-LINE

ROUGHING MEASUREMENTS

MODEL NO.	TRAP DIMENSIONS		A	B	C to E	FLANGE	SLIP NUT
	INLET	OUTLET					
8872CBECO	1-1/4"	1-1/4"	5"	4-1/2"	11"	Box	Brass
C8872CECO	1-1/4"	1-1/4"	5"	4-1/2"	10"	Shallow	Zinc
8912CBECO	1-1/2", 1-1/4"	1-1/2"	5"	4-1/2"	12"	Box	Brass
C8912CECO	1-1/2"	1-1/2"	5"	4-1/2"	10-1/2"	Shallow	Zinc
8912CNCBECO	1-1/2", 1-1/4"	1-1/2"	5"	4-1/2"	12"	Box	Brass
8912C18BECO	1-1/2", 1-1/4"	1-1/2"	5"	4-1/2"	18"	Box	Brass

**FED SPEC W.W.P. 541
 CAST BRASS P-TRAP
 MINIMUM SEAL 2"**

See options and accessories section for details on product variations.



Specifications:

Chrome plated P-Trap shall be cast brass body, with or without cleanout, with 17 gauge seamless tubular wall bend and flange.



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PRODUCT SPECIFICATION

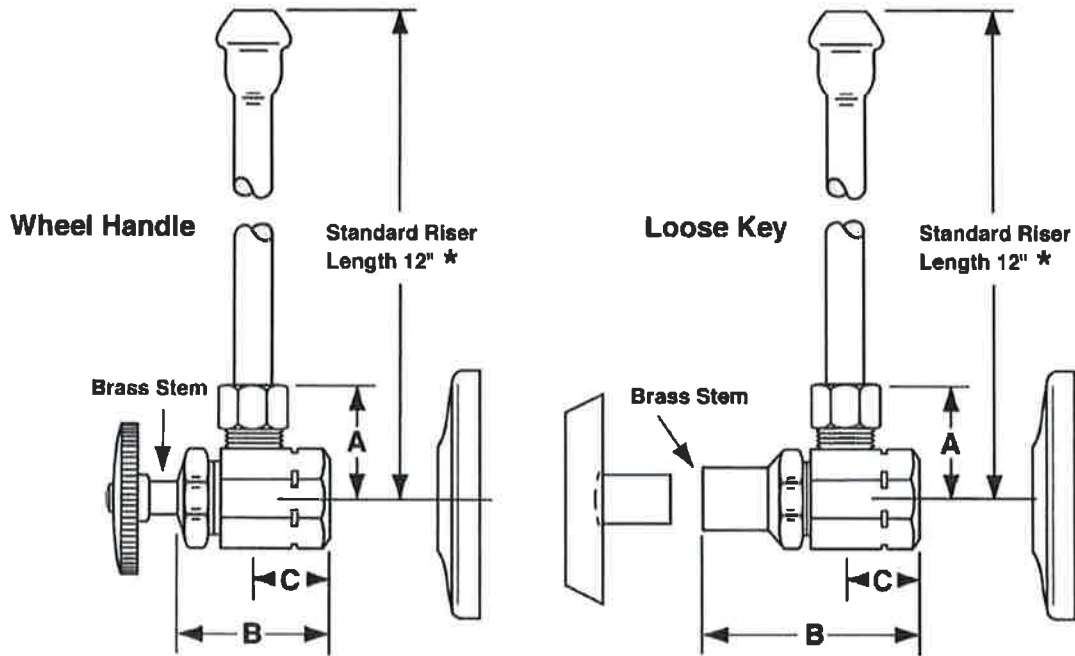
Part No.

LF2165, **LF2165LK**,
 LF2167, LF2167/LK

**Lavatory Supply
 1/2" I.P.S. x O.D.**

Job Name: _____

Submittal Number: _____



NO.	DESCRIPTION	ROUGHING MEASUREMENTS		
		A	B	C
LF2165	1/2" I.P.S. x 3/8" O.D.	1-3/16"	1-1/2"	3/4"
LF2165LK	1/2" I.P.S. x 3/8" O.D.	1-3/16"	2-1/4"	3/4"
LF2167	1/2" I.P.S. x 1/2" O.D.	1-3/16"	1-1/2"	3/4"
LF2167LK	1/2" I.P.S. x 1/2" O.D.	1-3/16"	2-1/4"	3/4"



LK designates Loose Key

* See options and accessories section for details on product variations.



Specifications:

Supply kit shall include low lead chrome plated brass supply stop valves with full turn brass stem, no plastic, (12, 15, 20) inch chrome plated risers and (shallow, deep, bell) (steel, brass) or (forged brass with set screw) flange. Inlet shall be (3/8, 1/2) inch (IPS, compression). Outlet shall be (3/8, 1/2) inch compression. Supply kit shall be McGuire _____. Supply kit shall be low lead certified by recognized authority and bear manufacturer and testing mark.

WH1

Commercial eF Series® Ultra High Efficiency Gas Water Heater



Photo is of
EF-60T-199E-3N

The eF Series® Models feature:

- **ENERGY STAR® Models Available**—EF60T125 & EF100T (150,199,250) Models.
 - **Thermal Efficiency up to 97%**—Ultra High Efficiency results in less fuel consumption and greater hot water recovery.
- **Certified Green Product™ Models available.**
- **Vitraglas® Lining with Microban®**—An exclusively engineered enamel formula that provides superior tank protection from the corrosive effects of water; and with Microban® antimicrobial product protection to help prevent the growth of bacteria, mold and mildew on the surface of the tank lining.
- **ICON HD®**—Intelligent proven design combines temperature control, diagnostic codes, and system ignition functions into a single control board with a digital LCD display.
 - **BMS Integration**—Via Modbus standard, BACnet® compatible via gateway kit.*
 - **Operation Mode**—Two different digitally displayed operation modes have the capability of adjusting the temperature setting up to 180°F (82°C), for sanitizing capability and adjusting the degree setting (°F to °C, or °C to °F).
 - **Service Mode**—Eight different digitally displayed service screens can be easily cycled through by pressing the select button. There is the capability of adjusting the temperature setting up to 180°F (82°C), adjusting the degree setting (°F to °C, or °C to °F), locking the maximum temperature setting that can be adjusted in operation mode, displaying the temperature sensor reading, displaying the flame current, and displaying diagnostic codes.
- **Protective Powered Anodes**—Two anode rods provide added protection against corrosion for long-term, trouble-free service.
- **Three Pass Fire Tube Heat Exchanger System**—The three pass Heat Exchanger system keeps the hot combustion gases moving at a high velocity. The combination of high turbulence and velocity causes an enormous rate of heat transfer into the water.
 - **Direct Spark Ignition**—For improved operational dependability and durability.
- **Premix Power Burner**—A self compensating negative regulation system automatically increases or decreases fuel flow when a change in combustion air is detected. This provides the range for optimum combustion and efficiency (automatic high altitude compatibility up to 10,000 ft./3,048m).
- **Venting Versatility**—The eF Series® can vent vertically or horizontally with either 2", 3", 4" or 6" (51mm, 76mm, 107mm or 152mm) PVC, CPVC, Polypropylene, Stainless Steel, or ABS (not approved for Canada) vent pipe, and is approved for direct vent closed combustion applications, or those applications that require inside air for combustion. The eF Series® is also approved for unbalanced venting, which means the air intake pipe doesn't have to be vented the same distance as the exhaust. Common vent kits available.
- **Hydrojet® Sediment Reduction System**—Factory Installed.
- **A Single Exhaust Pressure Switch.**
- **1" (25mm) NPT Side Connections for Space Heating.**
- **Complies with the latest ultra-low NOx requirement (14 ng/J NOx limit for natural gas and 77ppm NOx limit for liquid propane).**
- **ASME Code Available on All Models.**
- **NSF 5 Kits Available**—To meet sanitation and public health requirements when applicable.
- **T&P Relief Valve**—Installed.
- **Low Restrictive Brass Drain Valve**—Durable tamper proof design.

* Not available on certain dash number variations.

FEATURING:



3 or 5-Year Limited Tank Warranties / 1-Year Limited Warranty on Component Parts.

For more information on warranty, please visit www.bradfordwhite.com
For products installed in USA, Canada, and Puerto Rico. Some states do not allow limitations on warranties.
See complete copy of the warranty included with the heater.

Microban® antimicrobial product protection helps prevent the growth of bacteria, mold and mildew that may affect the product. The built-in antimicrobial properties do not protect users or others from disease-causing organisms. Microban® is a registered trademark of Microban Products Company.

Commercial Gas High Efficiency Water Heater



eF Series® Additional Equipment Features:

Submerged Combustion Chamber—Submerging the combustion chamber in the center of the water storage tank minimizes radiant heat loss and improves efficiency.

Zero Inch Clearance—The eF Series® jacket is cool to the touch and is approved for zero inch clearance to combustibles for unsurpassed installation flexibility.

Water Connections—Factory-installed true dielectric fittings extend water heater life and simplify water line connections.

Hand Hole Cleanout—Allows inspection of tank interior and facilitates the removal of sediment deposits.

E.C.O.—A manual re-set Energy Cut Off (E.C.O) shuts off all gas in event of an overheat condition. The ECO is manually resettable.

Non-CFC Foam Insulation—Covers the sides and top of tank, reducing the amount of heat loss. This results in less energy consumption, improved operation efficiencies and jacket rigidity.

2" (51mm) Vent Pipe	EF-60T-125		EF-60T-150 EF-100T-150			EF-60T-199 EF-100T-199			Air intake cannot exceed exhaust by more than 30 ft. (9.1m) in any venting situation. Subtract 5 ft. (1.5m) for each additional 90° elbow.
	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent	Power Vent	Power Direct Vent	Power Vent	Power Vent	
Max. Intake Length	15 ft. (4.6m)	N/A	15 ft. (4.6m)	N/A	N/A	15 ft. (4.6m)	N/A	N/A	
Max. Exhaust Length	15 ft. (4.6m)	30 ft. (9.2m)	15 ft. (4.6m)	30 ft. (9.2m)		15 ft. (4.6m)	30 ft. (9.2m)		

3" (76mm) Vent Pipe	EF-60T-125 EF-100T-150		EF-60T-150 EF-100T-199			EF-60T-199 EF-100T-250		EF-100T-300	
	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent	Power Vent	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent
Max. Intake Length	60 ft. (18.3m)	N/A	50 ft. (15.2m)	N/A	N/A	40 ft. (12.2m)	N/A	30 ft. (9.2m)	N/A
Max. Exhaust Length	60 ft. (18.3m)	120 ft. (36.6m)	50 ft. (15.2m)	100 ft. (30.5m)		40 ft. (12.2m)	80 ft. (24.4m)	30 ft. (9.2m)	60 ft. (18.3m)

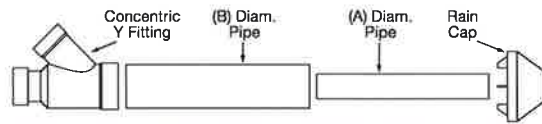
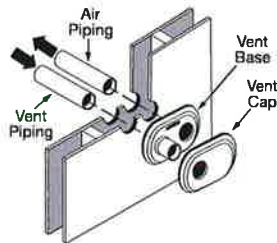
4" (102mm) Vent Pipe	EF-60T-125 EF-100T-150		EF-60T-150 EF-100T-199			EF-60T-199 EF-100T-250		EF-100T-300	
	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent	Power Vent	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent
Max. Intake Length	85 ft. (25.9m)	N/A	75 ft. (22.3m)	N/A	N/A	65 ft. (19.8m)	N/A	55 ft. (16.8m)	N/A
Max. Exhaust Length	85 ft. (25.9m)	170 ft. (51.8m)	75 ft. (22.3m)	150 ft. (45.7m)		65 ft. (19.8m)	130 ft. (39.6m)	55 ft. (16.8m)	110 ft. (33.5m)

6" (152mm) Vent Pipe	EF-60T-125 EF-100T-150		EF-60T-150 EF-100T-199			EF-60T-199 EF-100T-250		EF-100T-300	
	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent	Power Vent	Power Direct Vent	Power Vent	Power Direct Vent	Power Vent
Max. Intake Length	85 ft. (25.9m)	N/A	75 ft. (22.3m)	N/A	N/A	65 ft. (19.8m)	N/A	60 ft. (18.3m)	N/A
Max. Exhaust Length	85 ft. (25.9m)	170 ft. (51.8m)	75 ft. (22.3m)	150 ft. (45.7m)		65 ft. (19.8m)	130 ft. (39.6m)	60 ft. (18.3m)	120 ft. (36.6m)

eF Series® Optional Equipment Features:

- Common Vent Exhaust Kit PVC/CPVC p/n 415-54696-00
- Common Vent Exhaust Kit Polypropylene p/n 415-54697-00
- NSF Compliance Kit p/n 265-44542-04
- Optional Condensate Neutralizer Kit p/n A2123601 (125,000 - 250,000 BTU/Hr.)
p/n A2123602 (300,000 BTU/Hr.)
- BACnet® Gateway Kit p/n 415-53943-00

Low Inlet Gas Pressure Option—Pre-assembled to allow operation with natural gas inlet pressure down to 3.5" w.c. (Not available on EF-100T-300E-3N(A) models or any size propane models.)



2", 3" and 4" Concentric Vent Kits Part Identification

Concentric Vent Size	(A)	(B)
4 in. (102mm)	4.5 in. (114mm)	6.6 in. (168mm)
3 in. (76mm)	3 in. (76mm)	4.5 in. (114mm)
2 in. (51mm)	2.5 in. (64mm)	3.5 in. (90mm)

Low Profile Termination Kit Model Numbers

Description	Pipe O.D.	Hole Spacing (ctr to ctr)	IPEX System (1738 or 636)	IPEX Part Number
2" (51mm) Low Profile	2.36" (60mm)	5.6" (142mm)	636	196050
2" (51mm) Low Profile	2.36" (60mm)	5.6" (142mm)	1738	397984
3" (76mm) Low Profile	3.5" (89mm)	5.6" (142mm)	636	196985
3" (76mm) Low Profile	3.5" (89mm)	5.6" (142mm)	1738	397985
4" (102mm) Low Profile	4.5" (114mm)	5.6" (142mm)	636	196986
4" (102mm) Low Profile	4.5" (114mm)	5.6" (142mm)	1738	397086

Appliance Numbers Approved for Concentric Termination Kits

Description	Part Number	IPEX System (1738 or 636)	IPEX Part Number
2" (51mm) Concentric Termination	415-44069-02	636	196005 (PVC), 197040 (CPVC)
2" (51mm) Concentric Termination	—	1738	397005
3" (76mm) Concentric Termination	415-44069-01	636	196006 (PVC), 197009 (CPVC)
3" (76mm) Concentric Termination	—	1738	397006
4" (102mm) Concentric Termination	—	636	196021 (PVC), 197021 (CPVC)
4" (102mm) Concentric Termination	—	1738	397021

Commercial Gas High Efficiency Water Heater



eF Series® Models

NATURAL AND LIQUID PROPANE GAS

Meet or exceed ASHRAE 90.1 (latest edition). C.E.C. Listed

Model Number	Rated Nominal Volume		BTU/Hr. Input	Therm. Eff. %	A Floor to Exhaust Conn. in.	B Jacket Dia. in.	C Vent Size in.	D Floor to T&P Conn. in.	E Floor to Gas Conn. in.	F Floor to Top of Heater in.	H Depth in.	J Floor to Air Intake Conn. in.	K Floor to Cold Water Conn. in.	L Floor to Hot Water Conn. in.	Water Conn. NPT in.	Gas Conn. Size in.	Relief Valve Open in.	Approx. Shipping Weight lbs.
	U.S. Gal.	Imp. Gal.																
★EF-60T-125E-3N(A)	60	50	125,000	96.0	5	28 1/4	3	39 1/16	53 1/4	57	28 1/4	51 5/8	12 7/8	42 1/4	1 1/2	3/4	3/4	570
EF-60T-150E-3N(A)	60	50	150,000	93.0	5	28 1/4	3	39 1/16	53 1/4	57	28 1/4	51 5/8	12 7/8	42 1/4	1 1/2	3/4	3/4	570
EF-60T-199E-3N(A)	60	50	199,999	92.0	5	28 1/4	3	39 1/16	53 1/4	57	28 1/4	51 5/8	12 7/8	42 1/4	1 1/2	3/4	3/4	570
★EF-100T-150E-3N(A)	100	83	150,000	97.0	5	28 1/4	3	60 1/16	74 1/4	77 3/8	28 1/4	73 3/8	12 7/8	62 1/4	1 1/2	3/4	3/4	900
★EF-100T-199E-3N(A)	100	83	199,999	97.0	5	28 1/4	3	60 1/16	74 1/4	77 3/8	28 1/4	73 3/8	12 7/8	62 1/4	1 1/2	3/4	3/4	900
★EF-100T-250E-3N(A)	100	83	250,000	96.0	5	28 1/4	3	60 1/16	74 1/4	77 3/8	28 1/4	73 3/8	12 7/8	62 1/4	1 1/2	3/4	1	900
EF-100T-300E-3N(A)	100	83	300,000	92.0	5	28 1/4	3	60 1/16	74 1/4	77 3/8	28 1/4	73 3/8	12 7/8	62 1/4	1 1/2	3/4	1	900

Model Number	Rated Nominal Volume		kW/Hr. Input	Therm. Eff. %	A Floor to Exhaust Conn. mm.	B Jacket Dia. mm.	C Vent Size mm.	D Floor to T&P Conn. mm.	E Floor to Gas Conn. mm.	F Floor to Top of Heater mm.	H Depth mm.	J Floor to Air Intake Conn. mm.	K Floor to Cold Water Conn. mm.	L Floor to Hot Water Conn. mm.	Water Conn. NPT mm.	Gas Conn. Size mm.	Relief Valve Open mm.	Approx. Shipping Weight kgs.
	Liters																	
★EF-60T-125E-3N(A)	227		36.6	96.0	127	718	76	992	1353	1448	718	1303	327	1073	38	19	19	259
EF-60T-150E-3N(A)	227		43.9	93.0	127	718	76	992	1353	1448	718	1303	327	1073	38	19	19	259
EF-60T-199E-3N(A)	227		58.6	92.0	127	718	76	992	1353	1448	718	1303	327	1073	38	19	19	259
★EF-100T-150E-3N(A)	379		43.9	97.0	127	718	76	1526	1886	1972	718	1857	327	1581	38	19	19	408
★EF-100T-199E-3N(A)	379		58.6	97.0	127	718	76	1526	1886	1972	718	1857	327	1581	38	19	19	408
★EF-100T-250E-3N(A)	379		73.2	96.0	127	718	76	1526	1886	1972	718	1857	327	1581	38	19	25	408
EF-100T-300E-3N(A)	379		87.9	92.0	127	718	76	1526	1886	1972	718	1857	327	1581	38	19	25	408

For propane gas models change suffix "N" to "X" and remove "E" from the model number. **Example:** EF-100T-150-3X
 (A) ASME - All models are available with ASME construction. To order ASME construction add the (A) to the end of the model number.

Example: EF-60T-125E-3NA (Note: The weight is the same for both ASME and Non-ASME models.)

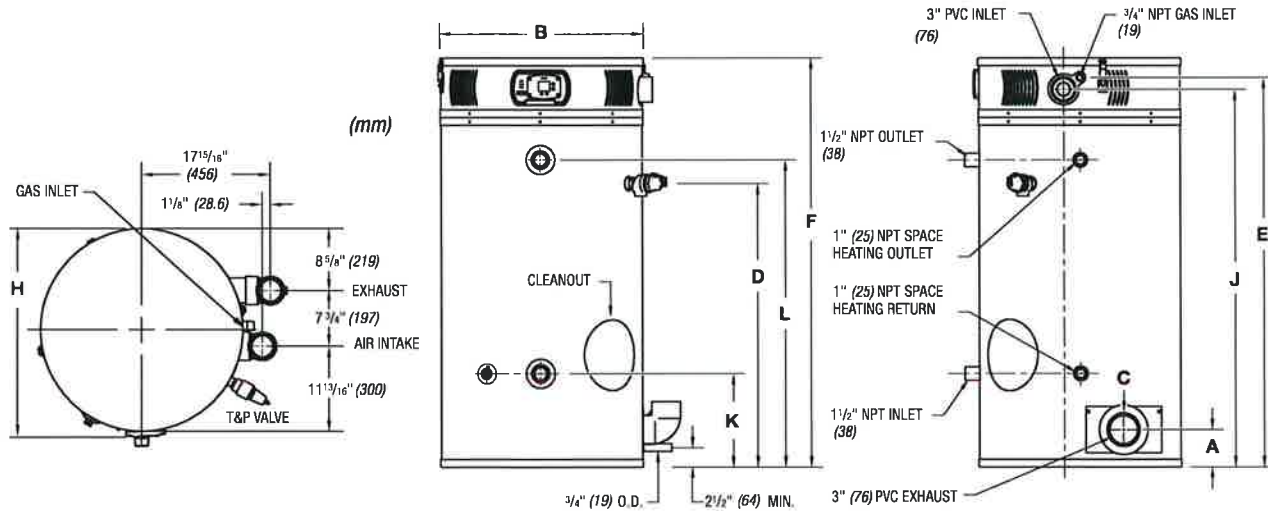
For 5 year warranty models, change suffix "3" to "5" **Example:** EF-100T-300E-5N

All models comply with the latest ultra-low NOx requirements of 14 ng/J or less for natural gas and 77ppm NOx or less for liquid propane.

14.0" w.c. maximum static, 4.5" w.c. minimum running (recommend 7.0" w.c. minimum running).

The water heater must be wired to 120VAC, 60Hz, 15A power supply.

★ = ENERGY STAR® models available. ● = Certified Green Product™ Models available.



Note: Diagrams are for both 60 (227 L) and 100 (379 L) gallon models.

Model Number	Recovery Data																							
	GPH Recovery at Degree Rise*							LPH Recovery at Degree Rise*																
	30°F	40°F	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F	17°C	22°C	28°C	33°C	39°C	44°C	50°C	56°C	61°C	67°C	72°C	78°C
EF-60T-125E-3N(A)	485	364	291	242	208	182	162	145	132	120	112	104	1836	1378	1102	916	787	689	613	549	500	458	424	394
EF-60T-150E-3N(A)	564	423	338	282	242	211	188	169	154	141	130	121	2135	1601	1279	1067	916	799	712	640	583	534	492	458
EF-60T-199E-3N(A)	740	558	444	370	317	277	247	223	202	185	171	159	2801	2112	1681	1401	1200	1049	935	844	765	700	647	602
EF-100T-150E-3N(A)	588	441	353	294	252	220	196	176	160	147	136	126	2226	1669	1336	1113	954	833	742	666	606	556	515	477
EF-100T-199E-3N(A)	784	588	470	392	336	294	261	235	214	196	181	168	2968	2226	1779	1484	1272	1113	988	890	810	742	685	636
EF-100T-250E-3N(A)	970	727	582	485	416	364	323	291	264	242	223	208	3672	2752	2203	1836	1575	1378	1223	1102	999	916	844	787
EF-100T-300E-3N(A)	1115	836	669	558	478	418	372	335	304	279	257	239	4221	3165	2532	2112	1809	1582	1408	1268	1151	1056	973	905

Commercial Gas High Efficiency Water Heater



Sample Specification

The water heater shall be a Bradford White model EF-_____ with a rated storage capacity of not less than _____ gallons/ liters, a minimum gas input of _____ BTU/hr., a minimum recovery of _____ GPH/LPH at 100°F (56°C) temperature rise, and a Thermal Efficiency Rating of ____%. It shall be design certified by CSA International (formerly AGA and CGA) for 180°F (82°C) application, either with or without a separate storage tank. The tank shall be lined with Vitraglas® vitreous enamel with Microban® antimicrobial technology and shall have a bolted hand hole cleanout. The tank shall have four extruded anode rods installed in separate head couplings. This water heater shall be equipped with stainless steel cold water inlet, Hydrojet® Sediment Reduction System. The heater shall be insulated with Non-CFC foam. This water heater shall be equipped with an electronic ignition system, an ASME rated T&P relief valve and a premix closed combustion system for direct venting using either 2", 3", 4" or 6" (51mm, 76mm, 107mm or 152mm) PVC, CPVC, Polypropylene, Stainless Steel, or ABS vent pipe. Common venting options with approved kits. The water heater shall be factory assembled and tested. The water heater shall be approved for zero inch clearance to combustibles. A digital LCD display shall be integrated into the front and be an adjustable electronic thermostat to any temperature up to 180°F. A recycling Energy Cut Off (E.C.O.) shuts off all gas in the event of an overheat condition. The entire installation shall be made in compliance with state and local codes and ordinances.

General

All gas water heaters are certified at 300 PSI test pressure (2068 kPa) and 150 PSI working pressure (1034 kPa). All models design-certified by CSA International (formerly AGA/CGA) to ANSI standard Z21.10.1, for up to 180°F (82°C) application as an Automatic Storage Heater. As an Automatic Storage Heater, all models are complete, self-contained water heating systems. It needs no separate storage tank, pump, wiring (115V AC required), or elaborate piping network. When equipped with a mixing valve, it will supply 180°F (82°C) sanitizing and lower temperature general purpose hot water simultaneously. These models can be used either as a single unit or in multiples connected in series or parallel (recommended).

Dimensions and specifications subject to change without notice in accordance with our policy of continuous product improvement.

— BRADFORD WHITE IS —



Sales: 800-523-2931 • Fax 215-641-1612

24/7 Technical Support: 800-334-3393 • Email techserv@bradfordwhite.com

Products made by Bradford White are manufactured in the United States using the finest raw materials and components from around the world.

Built to be the Best

February 2011

Product

Concentric Vent

General

The Concentric Vent allows both the intake for combustion air and the exhaust vent to pass through a standard roof or sidewall. This is an alternative to the standard two pipe Intake/vent shown in the basic furnace installation instructions.

Two Concentric Vent products are available: CVENT-2 is for use with 2" Intake/vent systems and CVENT-3 is for use with 3" intake/vent systems.

Refer to the furnace installation instructions for intake/vent pipe sizing information.

NOTE: The Concentric Vent reduces the allowable intake/vent piping length by 5 feet from that listed in the basic furnace installation instructions.

WARNING

Do not use the Concentric Vent kit for anything other than a Category IV furnace. Failure to follow this warning could result in fire, personal injury or death.

WARNING

Do not operate the furnace until the installation and assembly of the Concentric Vent and all piping are completed. Failure to follow this warning could result in product damage or improper operation, personal injury or death.

Each concentric vent kit contains the following items:

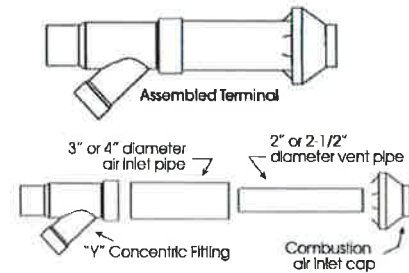
- (1) Combustion Air Inlet Cap
- (1) Air Inlet Pipe
- (1) Vent Pipe
- (1) Intake/Vent Concentric "Y"
- (1) Installation Instructions on box

Pipe and fittings are required to complete installation (user

MODEL	INTAKE/VENT NOM. PIPE SIZE	OVERALL ASSEM'D LENGTH1	INTAKE PIPE OUTSIDE DIAMETER	AIR INLET PIPE LENGTH2
CVENT-2	2"	34-3/4"	3-1/2"	27-1/4"
CVENT-3	3"	39-3/4"	4-1/2"	31-7/8"

supplied). The combustion air and vent pipe fittings must conform ANSI and ASTM standards D1785, F891, D2665, D2241, D2661, or F628. Pipe cement and primer must conform to ASTM standards D2564 or D2235.

In Canada, construct all combustion air and vent pipes for this unit of CSA or ULC certified Schedule 40 PVC, PVC-DWV, or ABS-DWV pipe and pipe cement.



Engineering Specification

Job Name _____
 Job Location _____
 Engineer _____
 Approval _____

Contractor _____
 Approval _____
 Contractor's P.O. No. _____
 Representative _____

LEAD FREE*

Series PLT Potable Water Expansion Tanks

Series PLT Potable Water Expansion Tanks are designed to absorb the increased volume of water created by thermal expansion and to maintain balanced pressure throughout the potable water supply system.

Heated water expands, and in a domestic hot water system, the system may be closed when the potable water system is isolated from the public water supply by a one-way valve such as pressure reducing valve, backflow preventer or check valve. Provisions must be made for this expansion.

Series PLT expansion tanks absorb the increased volume of water created when the hot water storage tank is heated and keeps the system pressure below the relief setting of the T&P relief valve.

It is a pre-pressurized steel tank with an expansion membrane that prevents contact of the water with the air in the tank. This prevents loss of air to the water and insures long and trouble-free life for the system. These tanks may be used with all types of Direct Fired Hot Water Heaters (gas, oil or electric) and hot water storage tanks.

Features

- Rugged flexible butyl diaphragm
- Field adjustable pre-charge
- In-line and free standing models
- Can be used with most standard hot water heaters and storage tanks

Models

PLT-5-M1	3/4" male connection, tank volume 2.1 gal.
PLT-12-M1	3/4" male connection, tank volume 4.5 gal.
PLT-20-M1	3/4" male connection, tank volume 8.5 gal.
PLT-35-M1	1" female connection, tank volume 14.00 gal.

Specifications

The potable water expansion tank shall be of drawn steel construction. It shall have a Butyl diaphragm separating the air chamber from the water containing chamber. Inlet connector shall be Stainless Steel. Materials of manufacture for the diaphragm shall be FDA approved.

The potable water expansion tank shall be a Watts Model PLT.



Standards

Models PLT-5, PLT-12 and PLT-20 are Listed by IAPMO. Certified to ANSI/NSF 61
Model PLT-35 Certified to ANSI/NSF 61



Note: The potable water expansion tank shall be installed in the cold water service pipe line on the supply side of the water heater (or water storage tank). A pressure relief valve sized and installed in accordance with local codes must be incorporated in the system.

In those systems requiring a combined temperature and pressure safety relief valve, the temperature and pressure relief valve should be sized and installed in accordance with local codes. Adequate drainage provisions should be provided where water flow will cause damage.

See chart on back

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

NOTICE

Inquire with governing authorities for local installation requirements

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.



Selection

This Quick Reference Selection Guide may be used as an alternative to using a formula to determine the correct expansion tank for the system. This table is based upon a relief valve setting of 150psi (10.3 bar), and a maximum of 50°F temperature rise.

To select the correct model PLT series tank, simply go the supply pressure equal to the system supply pressure (for pressures between those shown use next highest supply pressure shown), read across the chart to the correct tank as indicated by the water heater capacity (for capacities between those shown, use next highest capacity).

To accommodate the thermal expansion required for higher temperature and/or higher pressure systems, multiple tanks may be used. Please contact the factory for sizing information.

Materials

Diaphragm: Butyl rubber
Inlet Connection: Stainless Steel

Technical Information

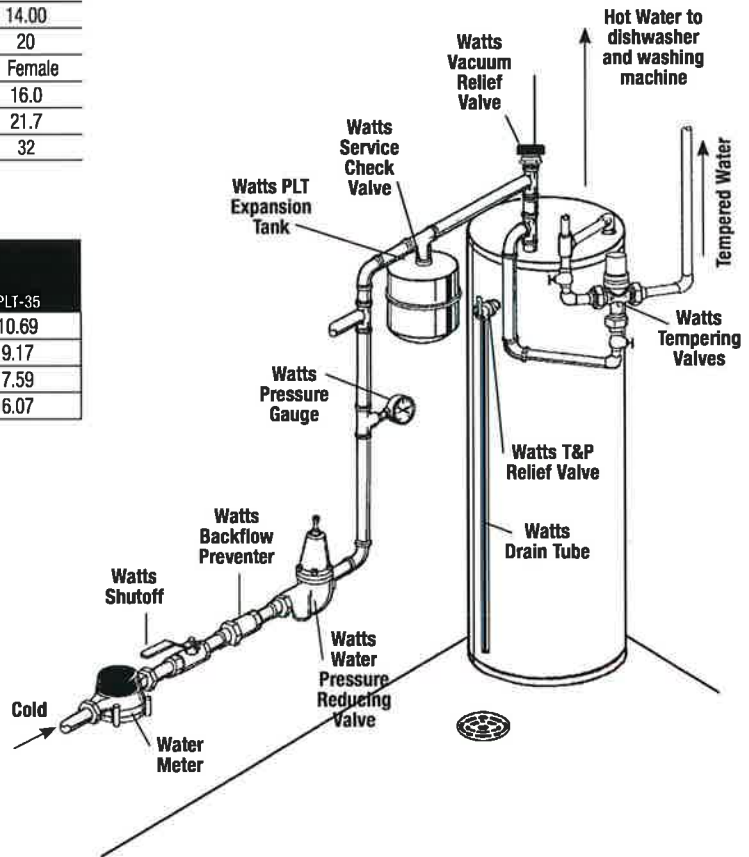
DESCRIPTION	PLT-5	PLT-12	PLT-20	PLT-35
Max. Pressure - PSI	150	150	150	150
Max. Temp. - °F	200	200	200	200
Tank Volume - Gal.	2.1	4.5	8.5	14.00
Air Pre-charge - PSI	20	20	20	20
Connections Size - Inches	¾ Male	¾ Male	¾ Male	1 Female
Diameter - Inches	8	10.5	12.5	16.0
Length - Inches	11	13.5	19.2	21.7
Weight - Lbs.	5.5	10	15	32

Acceptance Volume

AIR SIDE PRE-PRESSURE (PSI)	WATER SIDE VOLUME AT 150PSI (GALLONS)			
	PLT-5	PLT-12	PLT-20	PLT-35
20	1.48	3.42	7.102	10.69
40	1.26	2.88	5.882	9.17
60	1.0	2.49	4.705	7.59
80	.8	1.85	4.009	6.07

SUPPLY PRESSURE (PSIG)	WATER HEATER (GALLONS)						
	20	30	40	50	80	100	120
40							
50							
55							
60							
70							
80							
90							
100							
110							
120							

	PLT-5		PLT-20
	PLT-12		PLT-35
	Multiple tanks required - consult factory		



USA: T: (978) 689-6066 • F: (978) 975-8350 • Watts.com
Canada: T: (888) 208-8927 • F: (905) 332-7068 • Watts.ca
Latin America: T: (52) 55-4122-0138 • Watts.com

RP1



ETAIROS HVAC 901-345-6100 | info@EtairosHVAC.com

EQUIPMENT SUBMITTAL

JOB NAME: 6th Avenue District

LOCATION: Pine Bluff, AR.

ENGINEER: Brown Engineering

CONTRACTOR: Comfort Systems USA of Arkansas

DATE: 04/01/23

SUBMITTED BY: Jack Naquin

JOB DESCRIPTION

Recirc Pump

1- Taco 006-B4 Bronze 3/4" Sweat Circulator Pump

1- Taco 265-1 Analog Timer



Submittal Data Information

Model 006 Cartridge Circulator

101-028

Effective: March 20, 2017

Supersedes: April 4, 2013

Job: 6th Avenue District Engineer: Brown Engineering Contractor: Comfort Systems USA of AR Rep: Etairos HVAC

ITEM NO.	MODEL NO.	
Recirc Pump	006-B4	

Features

- Standard high capacity output
- Compact design
- Quiet, efficient operation
- Direct drive - Low power consumption
- Unique replaceable cartridge design
- Field serviceable
- Self lubricating
- No mechanical seal
- Unmatched reliability
- Maintenance free
- **Low-lead Bronze sweat or Stainless Steel with threaded or union connections**

Materials of Construction

Casing (Volute):..... **Low-lead Bronze or Stainless Steel**

Stator housing:..... Steel

Cartridge:..... Stainless Steel

Impeller:..... Non-metallic

Shaft:..... Ceramic

Bearings:..... Carbon

O-Ring & Gaskets: EPDM

Chlorine resistant

Model Nomenclature

B - Bronze, 3/4" sweat

BC - Bronze, 1/2" sweat, panel mount tapings

ST - Stainless Steel, 3/4" NPT

SC - Stainless Steel, union, panel mount tapings

Performance Data

Flow Range: 0 - 11 GPM

Head Range: 0 - 9.5 Feet

Min. Fluid Temperature: 40°F (4°C)

Max. Fluid Temperature: 220°F (104°C)

Max. Working Pressure: 125 psi

Connection sizes: 1/2" swt, 3/4" swt, 3/4" NPT or union

Certifications & Listings

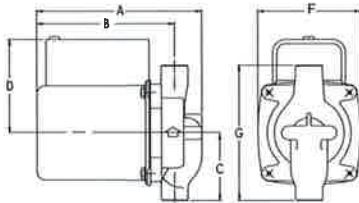


Application

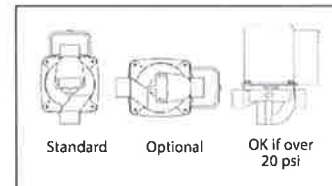
The Taco 006 is designed for circulating hot or chilled fresh water in open or closed loop applications. Typical uses include hydronic heating, domestic hot water recirculation, hydro-air heating/cooling, heat recovery units, water source heat pumps, drain down open loop Solar systems and potable water applications. The unique, replaceable cartridge contains all of the moving parts and allows for easy service instead of replacing the entire circulator. The compact, low power consumption design is ideal for high efficiency jobs.

Pump Dimensions & Weights

Models	Conn.	A		B		C		D		F		G		Ship Wt.	
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	Kg
006-BC4	1/2" Swt	5-1/8	130	4-1/8	105	2-1/8	54	3-1/16	78	3-15/16	84	4-1/4	108	6.0	2.7
006-B4	3/4" Swt	5-1/8	130	4-1/8	105	2-3/16	56	3-1/16	78	3-15/16	84	4-3/8	111	6.0	2.7
006-ST4	3/4" NPT	5-5/8	143	4-7/8	124	2	51	3-1/16	78	3-15/16	84	4	102	6.0	2.7
006-SC4-1	Union	5-5/32	131	4-11/32	110	2-31/32	76	3-1/16	78	3-15/16	84	5-15/16	151	6.0	2.7



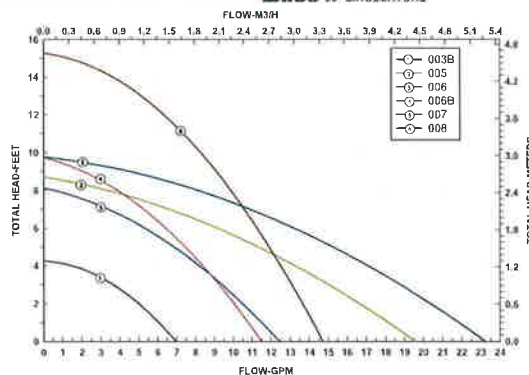
Mounting Positions



Electrical Data

Model	Volts	Hz	Ph	Amps	RPM	HP
All 006 Models	115	60	1	.52	3250	1/40
Motor Type	Permanent Split Capacitor Impedance Protected					
Motor Options	220/50/1, 220/60/1, 230/60/1, 100/110/50/60/1					

Performance Field - 60Hz





Submittal Data Information

101-036

00® Timers/Aquastat

Effective: December 10, 2015

Supersedes: June 18, 2014

Job: 6th Avenue District Engineer: Brown Engineering Contractor: Comfort Systems USA of AR Rep: Etairos HVAC

ITEM NO.	MODEL NO.	
Recirc Pump	265-1	

24 Hour Analog Clock Timer

Performance Data — #265-1

Electrical Characteristics: 115/60/1
 Timer Switch: 16A @115V
 Timer Interval: 15 Minutes
 Clock face: Hour and Minute Hands
 Manual Switch: I Permanently ON
 ⓐ Automatic Operation
 O Permanently OFF

7 Day Digital Timer

Performance Data — #265-3

Electrical Characteristics: 115/60/1
 Timer Switch: 16A @115V
 Timer Interval: 1 Minute (+) Adjustable
 Clock face: Digital with
 Circulator Programming
 Capacitor Backup: 2,500 hours

Temperature Aquastat — Snap

Action Temperature Switch — #563-2

Electrical Characteristics: 115/60/1
 Connections: 1/2" (Snap on circ, body)
 3/4" Copper pipe
 Temperature Setting: ON @ 95°F
 OFF @ 115°F
 Contacts: 7 amp SPDT Switch
 Wire Leads: 18" – Type 18-2,
 Round Premium Cable

Application

The Taco Clock Timers and Temperature Aquastat are designed to control the operation of Taco circulators on Domestic Hot Water Recirculation Systems for maximum comfort and energy efficiency. They are adaptable to any 00® Series circulator by attaching the enclosure or wiring to the electrical box.

24 Hour Analog Timer

Operates the circulator at the same pre-set times every day. Time intervals are in 15 minute increments. This user friendly clock has a raised minute hand for easy adjustments, quick-set trippers and an operation switch for Manual ON/OFF or Automatic modes.

7 Day Digital Programmable Timer

Digital Timer can be programmed to operate at different times on different days, weekdays or weekends, for maximum comfort and convenience to match family schedules. Easy circular programming clock face and LCD readout screen. Run time intervals as short as 1 minute provides maximum energy efficiency. A capacitor backup saves settings for up to 2,500 hours during power outages.

Temperature Aquastat

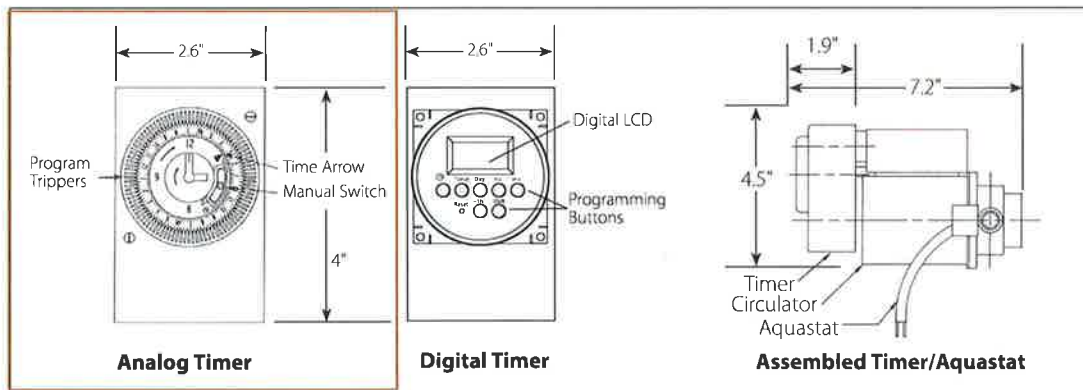
Controls pump operation to maintain system temperature between 95°F and 115°F. Easy clip-on Aquastat attaches directly to 3/4" pipe or a 1/2" sweat pump casing.

Shipping Weight

Model	Item	Lbs.	Kg
265-1	Analog Timer	.75	.35
265-3	Digital Timer	.75	.35
563-2	Aquastat	.25	.11



FOR INDOOR USE ONLY



Taco Inc., 1160 Cranston Street, Cranston, RI 02920 / (401) 942-8000 / Fax (401) 942-2360
 Taco (Canada) Ltd., 8450 Lawson Road, Unit #3, Milton, Ontario L9T 0J8 / (905) 564-9422 / Fax (905) 564-9436
www.TacoComfort.com

WH2

ElectriFLEX LD™ (Light Duty) Commercial Utility Electric Water Heater



Photo is of
LE112T3-1

Bradford White ElectriFLEX LD™ Utility Electric Models Feature:

- **Fully Automatic Thermostat Controls**—Fast acting surface-mount thermostats with a maximum setpoint of 175°F and a high limit energy cut-off (manual reset) for safety.
- **Direct Heat Transfer With a Single Immersed Element**—Transfers heat directly and efficiently to the water. Screw-in style element.
- **Vitraglas® Lining with Microban®**—An exclusively engineered enamel formula that provides superior tank protection from the corrosive effects of water; and with Microban® antimicrobial product protection to help prevent the growth of bacteria, mold and mildew on the surface of the tank lining).
- **Insulation System**—1" (25mm) Non-CFC foam insulation covers the sides and top of the tank, reducing heat loss. This results in less energy consumption, improved efficiencies, and jacket rigidity.
- **Water Connections**—3/4" (19mm) NPT factory-installed true dielectric fittings extend water heater life and simplify water line connections. Located on the side for easier installation (Fittings packaged separately inside carton).
- **Protective Anode Rod**—Provides added protection against corrosion for long trouble-free service.
- **Steel Tank**—Heavy gauge steel automatically formed, rolled, and welded.
- **Voltages Available**—120V, 208V, 240V, 277V, 380V, 415V, 480V.
- **Single Phase Operation Only.**
- **Field Conversion Kits**—Change voltage, and kW in the field (see options on following page).
- **T&P Relief Valve**—Installed.

FEATURING:



MICROBAN®



3 or 5-Year Limited Tank Warranties / 1-Year Limited Warranty on Component Parts.

For more information on warranty, please visit www.bradfordwhite.com

For products installed in USA, Canada, and Puerto Rico. Some states do not allow limitations on warranties. See complete copy of the warranty included with the heater.

Microban® antimicrobial product protection helps prevent the growth of bacteria, mold and mildew that may affect the product. The built-in antimicrobial properties do not protect users or others from disease-causing organisms. Microban® is a registered trademark of Microban Products Company.



ElectriFLEX LD™ (Light Duty) Commercial Utility Electric Water Heater

ElectriFLEX LD™ Utility Electric Models

C.E.C. Listed

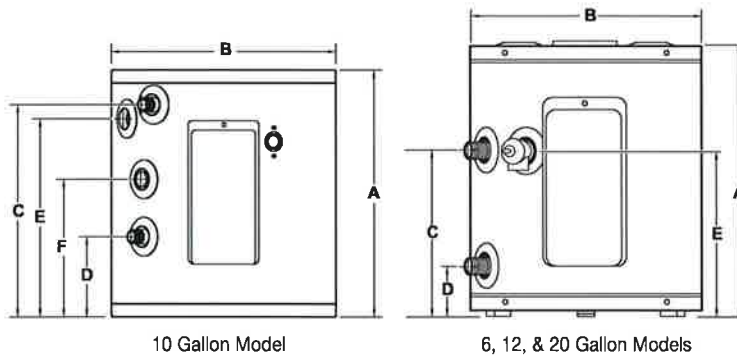
Model Number	Nominal Gal. Capacity		Recovery at 100°F Rise*		A Floor to Top of Heater in.	B Jacket Dia. in.	C Floor to C/L of Hot Water Conn. in.	D Floor to C/L of Cold Water Conn. in.	E Floor to T&P Conn. in.	F Floor to Anode Rod in.	Water Conn. NPT in.	Approx. Shipping Weight lbs.
	U.S. Gal.	Imp. Gal.	U.S. GPH	Imp. GPH								
LE16U3-1†	6	5	6	5	16 1/2	14	10 1/8	3 1/8	10 1/8	N/A	3/4	33
LE110U3-1	10	8	6	5	17 1/2	16	15	5 11/16	14	9 11/16	3/4	48
LE112T3-1†	12	10	6	5	27 3/4	14	21 1/8	3	21 1/8	N/A	3/4	48
LE120U3-1	19	16	6	5	24 3/4	18	18 1/2	3	18 1/2	N/A	3/4	59

Model Number	Nominal Liter Capacity	Recovery 56°C Rise*		A Floor to Top of Heater mm.	B Jacket Dia. mm.	C Floor to C/L of Hot Water Conn. mm.	D Floor to C/L of Cold Water mm.	E Floor to T&P Conn. mm.	F Floor to Anode Rod mm.	Water Conn. NPT mm.	Approx. Shipping Weight kg.
		Liters/Hour									
LE16U3-1†	23	23		419	356	257	79	257	N/A	19	15
LE110U3-1	38	23		445	406	381	144	355	246	19	22
LE112T3-1†	45	23		705	356	537	76	537	N/A	19	22
LE120U3-1	72	23		629	457	470	76	470	N/A	19	27

Specify wattage and voltage when ordering. Use chart below for maximum wattages at certain voltages.

† Maximum wattage at any voltage is 3000W. For 5 year models, change suffix "3" to "5".

Single element only. *Based on 1500W operation. NSF Kits available when ordering.



Wattage	Recovery S GPH Temperature Rise °F					Wattage	Recovery S LPH Temperature Rise °C				
	60	80	90	100	120		34	45	50	56	67
1500W	10	8	7	6	5	1500W	38	30	26	23	19
2000W	14	10	9	8	7	2000W	53	38	34	30	26
2500W	17	13	11	10	9	2500W	64	49	42	38	34
3000W	21	15	14	12	10	3000W	79	57	53	45	38
3500W	24	18	16	14	12	3500W	91	68	61	53	45
4000W	28	21	18	16	14	4000W	106	79	68	61	53
4500W	31	23	21	19	15	4500W	117	87	79	72	57
5000W	34	26	23	21	17	5000W	129	98	87	79	64
5500W	38	29	25	23	19	5500W	144	110	95	87	72
6000W	41	31	28	25	21	6000W	155	117	106	95	79

Voltage and Wattage Conversion Kits

Single Element Wattage	Voltage						
	120V	208V	240V	277V	380V	415V	480V
1500W	415-46409-01	415-46409-05	415-46409-13	415-46409-16	415-46409-24	415-46409-41	415-46409-32
2000W	415-46409-02*	415-46409-06	415-46409-05	415-46409-17	415-46409-43	415-46409-24	415-46409-33
2500W	415-46409-03*	415-46409-07	415-46409-06	415-46409-18	415-46409-25	415-46409-43	415-46409-34
3000W	415-46409-04*	415-46409-08	415-46409-14	415-46409-19	415-46409-26	415-46409-25	415-46409-35
3500W	N/A	415-46409-09	415-46409-07	N/A	415-46409-54	415-46409-26	N/A
4000W	N/A	415-46409-49	415-46409-08	415-46409-20	415-46409-56	415-46409-54	415-46409-36
4500W	N/A	415-46409-11	415-46409-09	415-46409-51	415-46409-57	415-46409-55	415-46409-59
5000W	N/A	415-46409-50	415-46409-15	415-46409-52	415-46409-58	415-46409-56	415-46409-38
5500W	N/A	415-46409-65*	415-46409-49	415-46409-61**	415-46409-63	415-46409-57	415-46409-62**
6000W	N/A	415-46409-66*	415-46409-48*	415-46409-53	415-46409-64	415-46409-58	415-46409-60

Wattage Limitations	Voltage						
	120V	208V	240V	277V	380V	415V	480V
1500W	yes	yes	yes	yes	yes	yes	yes
2000W	yes	yes	yes	yes	yes	yes	yes
2500W	yes	yes	yes	yes	yes	yes	yes
3000W	yes	yes	yes	yes	yes	yes	yes
3500W	no	yes	yes	no	yes	yes	no
4000W	no	yes	yes	yes	yes	yes	yes
4500W	no	yes	yes	yes	yes	yes	yes
5000W	no	yes	yes	yes	yes	yes	yes
5500W	no	yes	yes	no	yes	yes	yes
6000W	no	yes	yes	yes	yes	yes	yes

Note: Above chart can be used to determine maximum wattage at certain voltages. **INCOLOY® element only. * 415-46409-02, -03, -04, -48, -65, & -66 contain only one element. These kits cannot be wired as simultaneous. These are non-simultaneous kits only. Except where noted above, each kit will include two replacement elements, two gaskets, a rating plate overlay and one set of instructions. For water heaters with only one element, please retain the extra element and gasket as a service part.

General:

All models are exempt from NAECA requirements and ASHRAE Standard 90.1b. All models UL® listed. These heaters are wired Single Phase, 120V with one 1500W element, unless otherwise specified. All water and electrical connections are 3/4" (19mm) NPT. All models certified at 300 PSI test pressure (2068 kPa) and 150 PSI working pressure (1034 kPa). Applicable models CSA verified for energy performance in accordance with C191.1-M90.

Dimensions and specifications subject to change without notice in accordance with our policy of continuous product improvement.

— BRADFORD WHITE IS —

AMERICAN STRONG

Sales: 800-523-2931 ■ Fax 215-641-1612

24/7 Technical Support: 800-334-3393 ■ Email techserv@bradfordwhite.com

Products made by Bradford White are manufactured in the United States using the finest raw materials and components from around the world.

Built to be the Best

Engineering Specification

Job Name 6th Ave District
 Job Location Pine Bluff
 Engineer Brown
 Approval _____

Contractor Comfort Systems USA
 Approval _____
 Contractor's P.O. No. _____
 Representative Sanders Supply

LEAD FREE*

Series PLT Potable Water Expansion Tanks

Series PLT Potable Water Expansion Tanks are designed to absorb the increased volume of water created by thermal expansion and to maintain balanced pressure throughout the potable water supply system.

Heated water expands, and in a domestic hot water system, the system may be closed when the potable water system is isolated from the public water supply by a one-way valve such as pressure reducing valve, backflow preventer or check valve. Provisions must be made for this expansion.

Series PLT expansion tanks absorb the increased volume of water created when the hot water storage tank is heated and keeps the system pressure below the relief setting of the T&P relief valve.

It is a pre-pressurized steel tank with an expansion membrane that prevents contact of the water with the air in the tank. This prevents loss of air to the water and insures long and trouble-free life for the system. These tanks may be used with all types of Direct Fired Hot Water Heaters (gas, oil or electric) and hot water storage tanks.

Features

- Rugged flexible butyl diaphragm
- Field adjustable pre-charge
- In-line and free standing models
- Can be used with most standard hot water heaters and storage tanks

Models

PLT-5-M1	¾" male connection, tank volume 2.1 gal.
PLT-12-M1	¾" male connection, tank volume 4.5 gal.
PLT-20-M1	¾" male connection, tank volume 8.5 gal.
PLT-35-M1	1" female connection, tank volume 14.00 gal.

Specifications

The potable water expansion tank shall be of drawn steel construction. It shall have a Butyl diaphragm separating the air chamber from the water containing chamber. Inlet connector shall be Stainless Steel. Materials of manufacture for the diaphragm shall be FDA approved.

The potable water expansion tank shall be a Watts Model PLT.



Standards

Models PLT-5, PLT-12 and PLT-20
are Listed by IAPMO.
Certified to ANSI/NSF 61
Model PLT-35
Certified to ANSI/NSF 61



Note: The potable water expansion tank shall be installed in the cold water service pipe line on the supply side of the water heater (or water storage tank). A pressure relief valve sized and installed in accordance with local codes must be incorporated in the system.

In those systems requiring a combined temperature and pressure safety relief valve, the temperature and pressure relief valve should be sized and installed in accordance with local codes. Adequate drainage provisions should be provided where water flow will cause damage.

See chart on back

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

NOTICE

Inquire with governing authorities for local installation requirements

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

Selection

This Quick Reference Selection Guide may be used as an alternative to using a formula to determine the correct expansion tank for the system. This table is based upon a relief valve setting of 150psi (10.3 bar), and a maximum of 50°F temperature rise.

To select the correct model PLT series tank, simply go the supply pressure equal to the system supply pressure (for pressures between those shown use next highest supply pressure shown), read across the chart to the correct tank as indicated by the water heater capacity (for capacities between those shown, use next highest capacity).

To accommodate the thermal expansion required for higher temperature and/or higher pressure systems, multiple tanks may be used. Please contact the factory for sizing information.

Materials

Diaphragm: Butyl rubber
Inlet Connection: Stainless Steel

Technical Information

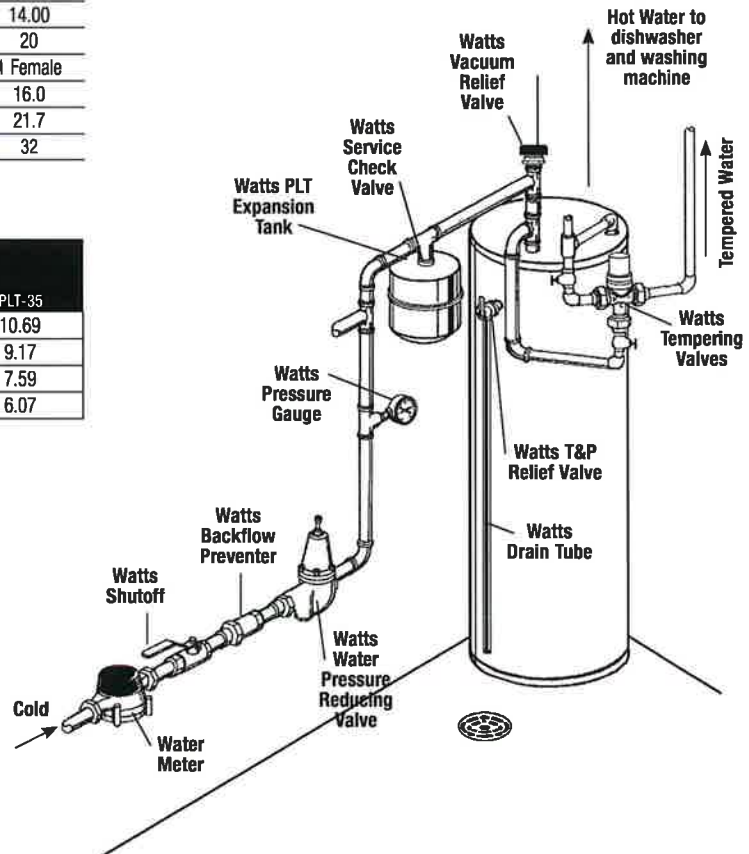
DESCRIPTION	PLT-5	PLT-12	PLT-20	PLT-35
Max. Pressure - PSI	150	150	150	150
Max. Temp. - °F	200	200	200	200
Tank Volume - Gal.	2.1	4.5	8.5	14.00
Air Pre-charge - PSI	20	20	20	20
Connections Size - Inches	¾ Male	¾ Male	¾ Male	1 Female
Diameter - Inches	8	10.5	12.5	16.0
Length - Inches	11	13.5	19.2	21.7
Weight - Lbs.	5.5	10	15	32

Acceptance Volume

AIR SIDE PRE-PRESSURE (PSI)	WATER SIDE VOLUME AT 150PSI (GALLONS)			
	PLT-5	PLT-12	PLT-20	PLT-35
20	1.48	3.42	7.102	10.69
40	1.26	2.88	5.882	9.17
60	1.0	2.49	4.705	7.59
80	.8	1.85	4.009	6.07

SUPPLY PRESSURE (PSIG)	WATER HEATER (GALLONS)						
	20	30	40	50	80	100	120
40							
50							
55							
60							
70							
80							
90							
100							
110							
120							

PLT-5
 PLT-12
 PLT-20
 PLT-35
 Multiple tanks required - consult factory



USA: T: (978) 689-6066 • F: (978) 975-8350 • Watts.com
Canada: T: (888) 208-8927 • F: (905) 332-7068 • Watts.ca
Latin America: T: (52) 55-4122-0138 • Watts.com

For Water Heater/Tank Applications

Job Name 6th Ave District
 Job Location Pine Bluff
 Engineer Brown
 Approval _____

Contractor Comfort Systems USA
 Approval _____
 Contractor's P.O. No. _____
 Representative Sanders Supply

LEAD FREE*

**Model LFN36-M1
 Vacuum Relief Valve**

Sizes: 1/2" - 3/4" Male NPT

Features

- Low profile
- All Lead Free* brass body
- Protective cap
- Suitable for low pressure steam and water service
- Tested and rated to ANSI Z21.22
- CSA certified
- The LFN36-M1 features Lead Free* construction to comply with Lead Free* installation requirements.

Applications

- Domestic water heaters and supply tanks
- Table top heaters
- Jacketed steam kettles
- Unit heaters
- Low pressure steam systems
- Steam coil heaters

Note: Vacuum relief valves are not designed or approved as backsiphonage backflow preventers. For protection against backsiphonage install Watts Series 288A vacuum breakers.

Standards

Tested and rated to ANSI Z21.22
 CSA certified

Specifications

A Watts Model LFN36-M1 Vacuum Relief Valve shall be installed on domestic hot water supply tanks/ heaters/ unit heaters/ steam kettles as indicated on plans. The vacuum relief valve shall be ANSI Z21.22 rated and CSA certified. The vacuum relief valve shall have an all brass body and include a protective cap for automatic venting of a closed system to atmosphere when a vacuum is created. The Lead Free* Vacuum Relief Valve shall comply with state codes and standards, where applicable, requiring reduced lead content. The Watts LFN36-M1 Vacuum Relief Valve permits air to enter and prevent vacuum conditions that could siphon the water from the system, resulting in collapse of a tank or water heater or equipment burn out. The valve shall be a Watts Model LFN36-M1.



LFN36-M1

Design certified by



Tested and rated under "ANSI Z21.22
 Relief Valves for Hot Water Supply Systems".

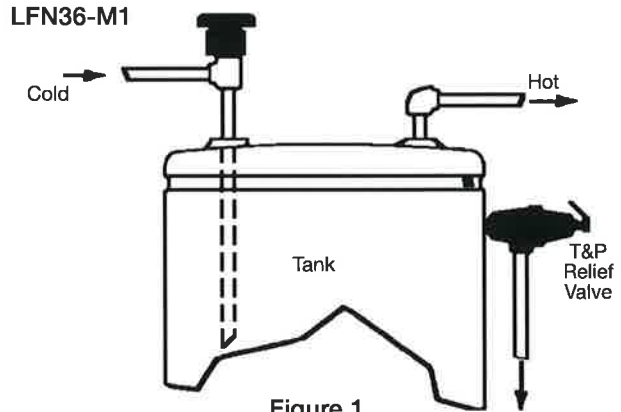


Figure 1

Domestic Hot Water Supply Tanks and Heaters with Top Supply

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

NOTICE

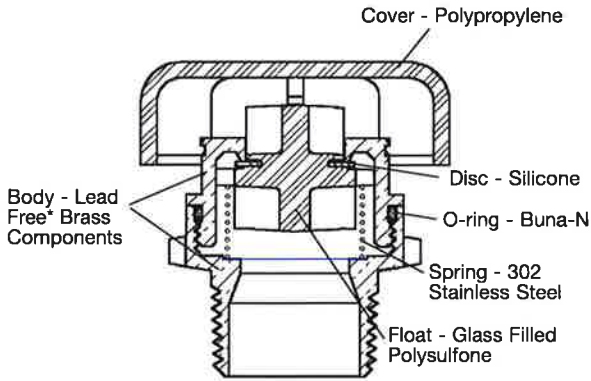
Inquire with governing authorities for local installation requirements

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.



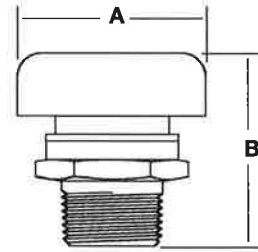
Materials



Pressure - Temperature

Maximum steam working pressure: 15 psi (1.03 bar)
 Maximum temperature: 250°F (121°C)

Dimensions-Weights



SIZE	DIMENSIONS				WEIGHT	
	in.	mm	in.	mm	oz.	gr.
1/2	2	50	2	50	4	113
3/4	2	50	2	50	4	113

Capacity

SIZE	MODEL	VENTING CAPACITY	
in.		CFM	LPM
1/2	LFN36-M1	15	425
3/4	LFN36-M1	15	425

Typical Installations

Water Service

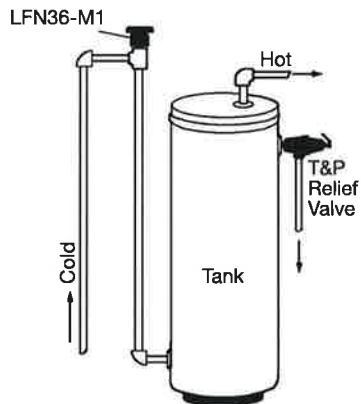


Figure 2

Domestic Hot Water Supply Tanks and Heaters with Bottom Feed

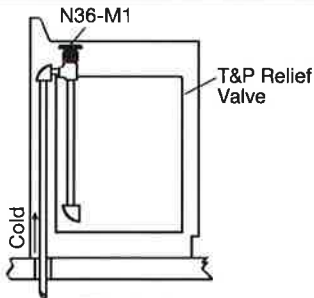


Figure 3

Table Top Heaters

Steam Service

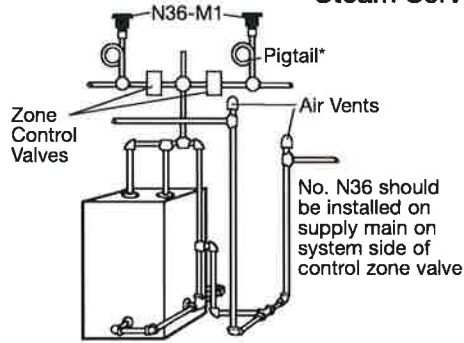


Figure 4

Low Pressure Steam Heating Systems

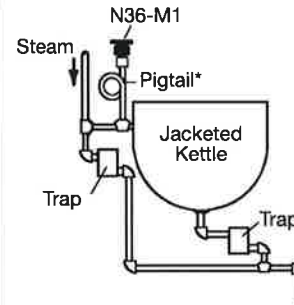


Figure 5

Jacketed Kettles

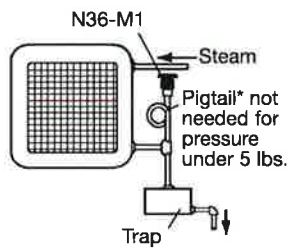


Figure 6

Unit Heaters

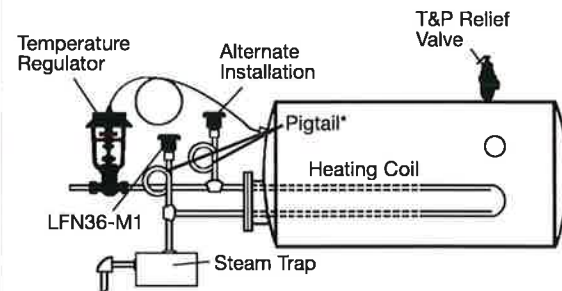


Figure 7

Steam Coil Heaters

***Note:** When used for steam service, be sure to use pigtail to prevent live steam from damaging N36 valve.

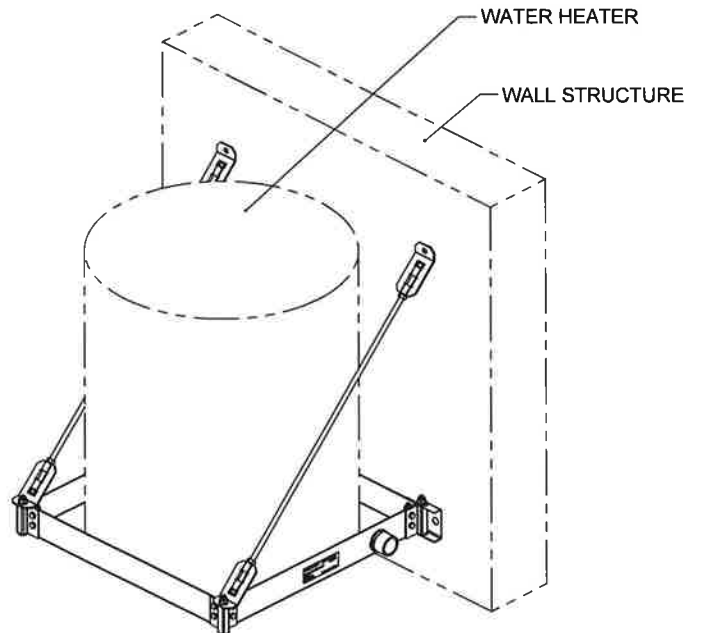
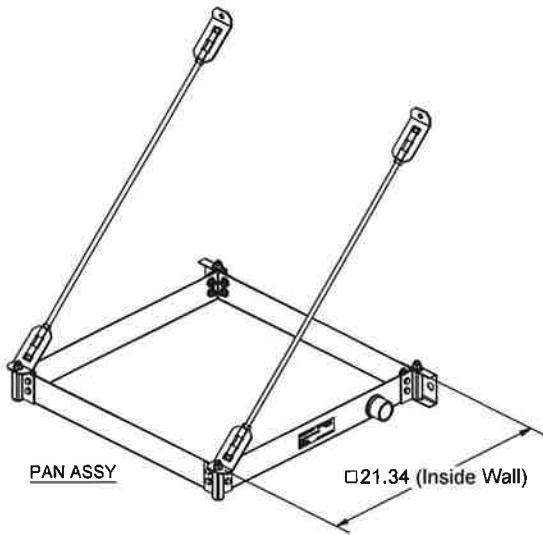


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 Canada: T: (905) 332-4090 • F: (905) 332-7068 • Watts.ca
 Latin America: T: (52) 81-1001-8600 • Watts.com

PRODUCT SPECIFICATION DRAWING

QUICK STAND™ #40-SWHP-W

Wall Mounted Equipment Platform

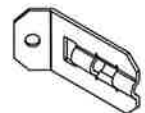
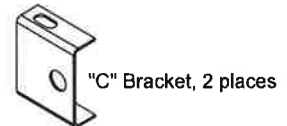


ALL DIMENSIONS IN INCHES

The Wall Mounted Equipment Platform is engineered to support water heaters up to 20 U.S. gallons (or other equipment up to 375 pounds total weight) mounted to a wall. This item also serves as a drain pan.

Product Information:

- Material:
 - Pan: 14 gage CRS, galvanized
 - Corner Brackets (4): 14 gage CRS, galvanized
 - C-Brackets (2): 16 gage CRS, galvanized
 - 45° Brackets (4): 12 gage, CRS, galvanized
 - Threaded Rod (2): Low carbon steel, zinc plated, 3/8" x 29-3/4" long
- Wide platform allows water heaters up to 21-1/4" diameter
- Watertight corners and drain fittings eliminate need for additional drain pan
- Static load rating 375 pounds with 2X safety factor (depending on structural anchorage)
- Professional Engineer stamped documentation available
- Includes PVC drain body 1" MIPT x 1" FS
- Galvanized steel construction
- Suspends with user supplied 3/8" hardware to mount to wall, 4 places
- Installation instructions for mounting to concrete or framed wall structure available
- Patent Pending



Product Submittal	
Job Name:	
Date:	
Part Number:	Qty:
Architect / Owner:	
Contractor:	
Notes:	

.....HUBBARD ENTERPRISES.....
HOLDRITE®
 "Converting Makeshift Methods into Engineered Solutions"™

RPZ

Engineering Specification

Job Name 6th Ave District
 Job Location Pine Bluff
 Engineer Brown
 Approval _____

Contractor Comfort Systems USA
 Approval _____
 Contractor's P.O. No. _____
 Representative Sanders Supply

LEAD FREE*

Series **LF009**, **LF009-FS** Reduced Pressure Zone Assemblies 1/4" – 3"

Series LF009 and LF009-FS Reduced Pressure Zone Assemblies are designed to protect potable water supplies in accordance with national plumbing codes and water authority requirements. These series are used in a variety of installations, including the prevention of health hazard cross-connections in piping systems or for containment at the service line entrance. They are also used in irrigation systems, boiler feed, water lines, and other installations requiring maximum protection. The body construction is fused with ArmorTek™ coating technology to resist corrosion due to microbial induced corrosion (MIC) or exposed metal substrate.* The series also features Lead Free* construction to comply with Lead Free* installation requirements.

Both series feature two in-line, independent check valves, captured springs, and replaceable check seats with an intermediate relief valve. Its compact modular design facilitates easy maintenance and assembly access. Sizes 1/4" to 1" shutoffs have tee handles.

Series LF009-FS assemblies of sizes 1/2" to 3" include an integrated flood sensor to detect excessive water discharges from the relief valve. The flood sensor relays a signal that triggers notification to qualified service personnel who can take corrective action, thus avoiding the possibility of ruinous flooding and costly damage.

NOTICE

An add-on connection kit is required to activate the integrated flood sensor. Without the connection kit, the flood sensor is a passive component and will not communicate with any other device. (For more information, download RP-IS-009/009-FS.)

Features

- Single access cover and modular check construction for ease of maintenance
- Top entry to all internals for immediate accessibility
- Captured springs for safe maintenance
- Internal relief valve for reduced installation clearances
- Replaceable seats for economical repair
- ArmorTek™ coating technology to resist internal corrosion†
- Lead Free* cast copper silicon alloy body construction (1/4" – 2")

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

†ArmorTek coating applied to the 2 1/2" and 3" models only.

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.



LF009M2-QT-FS

- Fused epoxy coated cast iron body (2 1/2" – 3")
- Ball valve test cocks — screwdriver slotted (1/4" – 2")
- Large body passages provides low pressure drop
- Compact, space saving design
- No special tools required for servicing
- Integrated sensor for flood detection (1/2" – 3")
- Flood alert feature activated with add-on sensor connection kit, compatible with BMS and cellular communication

NOTICE

Use of the integrated flood sensor does not replicate the need to comply with all required instructions, codes, and regulations related to installation, operation, and maintenance of this product, including the need to provide proper drainage in the event of a discharge.

Watts® is not responsible for the failure of alerts due to connectivity or power issues.

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

Inquire with governing authorities for local installation requirements.

Specification

A Reduced Pressure Zone Assembly shall be installed at each potential health hazard location to prevent backflow due to backsiphonage and/or backpressure. The assembly shall consist of an internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs and silicone seat discs. Seats and seat discs shall be replaceable in both check modules and the relief valve. There shall be no threads or screws in the waterway exposed to line fluids. Service of all internal components shall be through a single access cover secured with stainless steel bolts. Body and shutoffs shall be constructed using Lead Free* cast copper silicon alloy materials. Lead Free* reduced pressure zone assembly shall comply with state codes and standards, where applicable, requiring reduced lead content.

The assembly shall also include two resilient seated isolation valves, four resilient seated test cocks, and an air gap drain fitting. The valve body shall utilize a coating system with built-in electrochemical corrosion inhibitor and microbial inhibitor.† The assembly shall meet the requirements of USC; ASSE Std. 1013; AWWA Std. C511; CSA B64.4. Shall be a Watts Series LF009, and shall include an integrated sensor for flood detection on sizes 1/2" to 3".

Materials

1/4" – 2"

Lead Free* cast copper silicon alloy body construction, silicone rubber disc material in the first and second check plus the relief valve. Replaceable polymer check seats for first and second checks. Removable relief valve seats. Stainless steel cover bolts.

Standardly furnished with NPT body connections. Model LF009QT furnished with quarter-turn, full port, resilient seated, Lead Free* cast copper silicon alloy body ball valve shutoffs.

2 1/2" – 3"

- FDA-approved epoxy-coated cast iron unibody with plastic seats
- Relief valve with stainless steel seat and trim
- Lead Free* cast copper silicon alloy body ball valve test cocks

Model/Option

1/4" – 2"

Prefix:

U – Union connections

Suffix:

FS – Integrated sensor for flood detection (1/2" – 2")

LF – Without shutoff valves

PC – Internal polymer coating

Press** – Press inlet x press outlet (1/2" – 2")

QT – Quarter-turn ball valves

S – Strainer

2 1/2" – 3"

Suffix:

FS – Integrated sensor for flood detection

LF – Without shutoff valves

NRS – Non-rising stem resilient seated gate valves

OSY – UL/FM outside stem and yoke resilient seated gate valves

S-FDA – FDA epoxy coated strainer

NOTE: The installation of a drain line is recommended. When installing a drain line, an air gap is necessary. (For more information download ES-AG/EL/TC at watts.com.)

Pressure – Temperature

1/4" – 2"

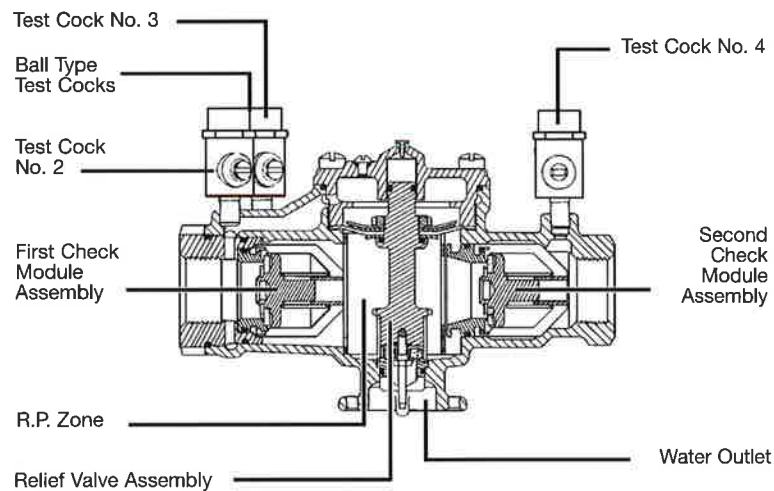
Suitable for supply pressure up to 175 psi (12.1 bar)

Water temperature: 33°F – 180°F (0.5° – 82°C)

2 1/2" – 3"

Suitable for supply pressures up to 175 psi (12.1 bar)

Water temperature: 110°F (43°C) continuous; 140°F (60°C) intermittent



** Viega ProPress® connections are optional factory-installed fitting on each end of the approved/certified assembly.

Standards

USC
 ASSE No. 1013
 AWWA C511
 CSA B64.4
 IAPMO File No. 1563

Approvals



ASSE, AWWA, CSA, IAPMO

Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California

Approval models NRS, OSY, PC, QT

UL Classified

2½" – 3" with OSY gate valves

¾" – 2" without shutoff valves (-LF), except LF009M3LF

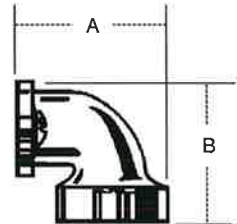
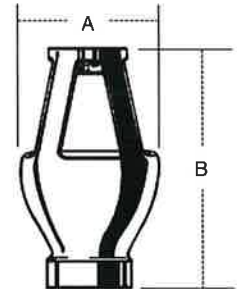
Insulated Enclosure

The WattsBox insulated enclosure is available for Series LF009/ LF009-FS. For more information download ES-WB at watts.com.

Air Gaps and Elbows

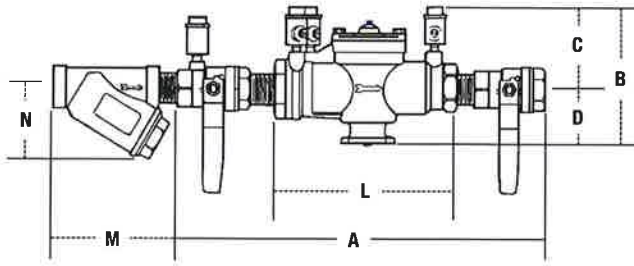
MODEL	DRAIN OUTLET	DIMENSIONS				WEIGHT			
		A		B		lb	kg		
909AGA	For 909, 009, and 993 sizes ¼"–½" 009, ¾" 009M2/M3	½"	13	2¾"	60	3⅜"	79	0.625	0.28
909AGC	¾"–1" 009/909, 1"–1½" 009M2	1"	25	3¼"	83	4⅞"	124	1.5	0.68
909AGF	1¼"–2" 009M1, 1¼"–3" 009/909, 2" 009M2, 4"–6" 993	2"	51	4¾"	111	6¾"	171	3.25	1.47
909AGK	4"–6" 909, 8"–10" 909M1	3"	76	6⅞"	162	9"	244	6.25	2.83
909AGM	8"–10" 909	4"	102	7⅞"	187	11¼"	286	15.5	7.03
909ELA	¼"–½" 009, ¾" 009M2/M3	–	–	–	–	–	–	–	–
909ELC	¾"–1" 009/909	–	–	2¾"	60	2¾"	60	0.38	0.17
909ELF*	1¼"–2" 009M1, 1¼"–2" 009/909, 2" 009M2, 4"–6" 993	–	–	3"	92	3"	92	2	0.91
909ELH* Vertical	2½"–3" 009/909	–	–	–	–	–	–	–	–

*Epoxy coated

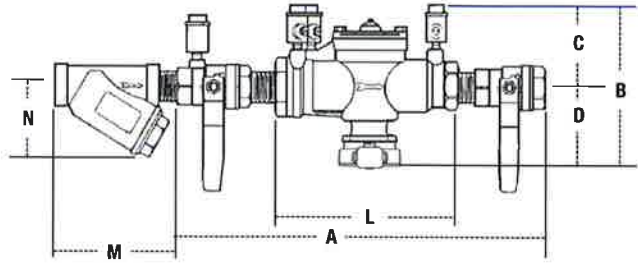


Dimensions – Weight

1/4" – 3/8"

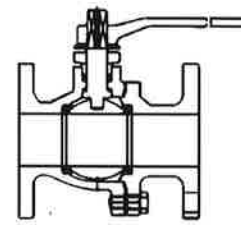
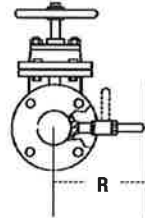
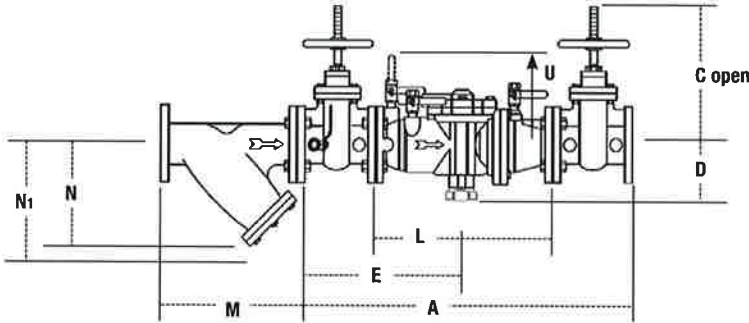


1/2" – 2"



SIZE		DIMENSIONS (APPROX.)										WEIGHT				
in.	mm	A	B	C	D	L	M	N	lb	kg						
1/4	10	250	4 5/8	117	3 3/8	86	1 1/4	32	5 1/2	140	2 3/8	60	2 1/2	64	5	2
3/8	10	250	4 5/8	117	3 3/8	86	1 1/4	32	5 1/2	140	2 3/8	60	2 1/2	64	5	2
1/2	10	250	5 5/8	149	3 3/8	86	2 1/2	64	5 1/2	140	2 3/8	70	2 1/4	57	5	2
3/4	10 3/4	273	6 1/4	159	3 1/2	89	2 3/4	70	6 3/4	171	3 3/16	81	2 3/4	70	6	3
1	14 1/2	368	6 1/4	159	3	76	3 3/4	83	9 1/2	241	3 3/8	95	3	76	12	5
1 1/4	17 3/8	441	6 3/4	169	3 1/2	89	3 3/4	83	11 1/2	289	4 7/16	113	3 1/2	89	15	6
1 1/2	17 3/8	454	6 3/4	169	3 1/2	89	3 3/4	83	11 1/2	283	4 7/8	124	4	102	16	7
2	21 1/8	543	8 3/4	222	4 1/2	114	4 1/4	108	13 1/2	343	5 5/16	151	5	127	30	13

2 1/2" – 3"



Watts G-4000 Series
QT – Ball Valves

STRAINER SIZE		DIMENSIONS (APPROX.)						WEIGHT	
in.	mm	M	N	N†	lb	kg			
2 1/2	65	10	254	6 1/2	165	9 3/4	248	28	12.7
3	80	10 1/8	257	7	178	10	254	34	15.4

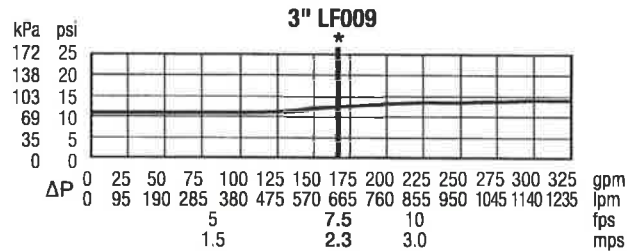
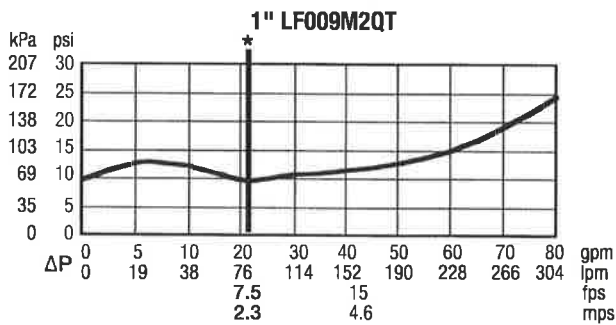
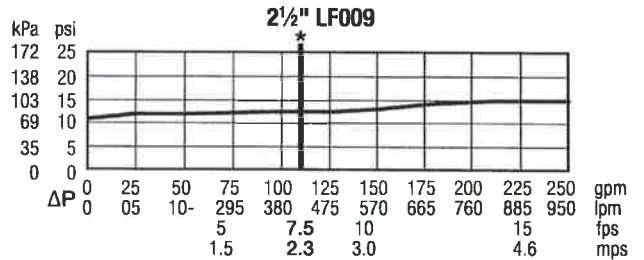
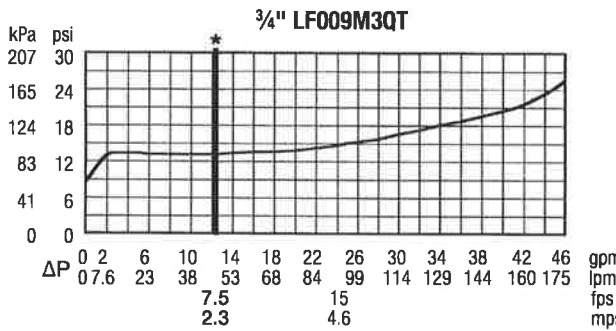
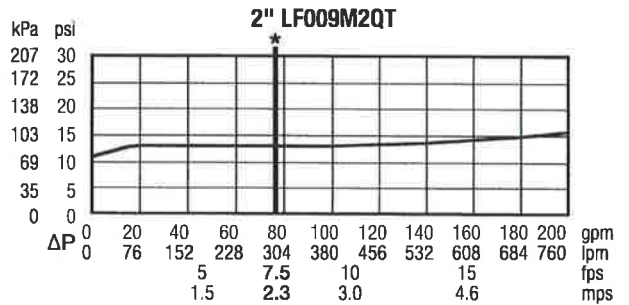
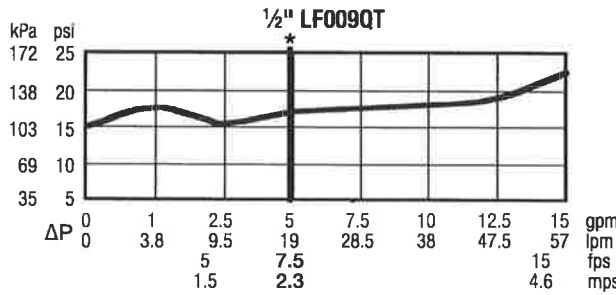
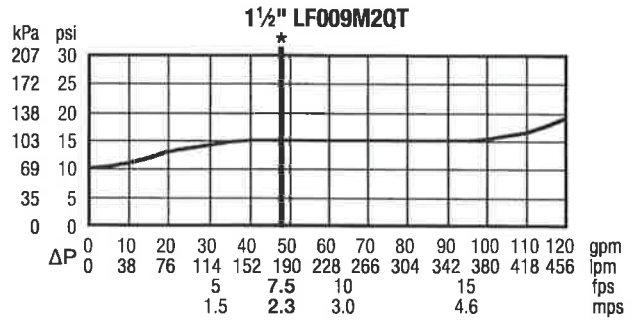
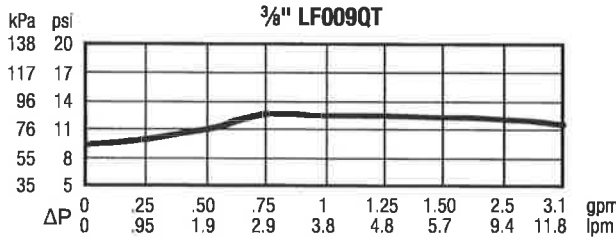
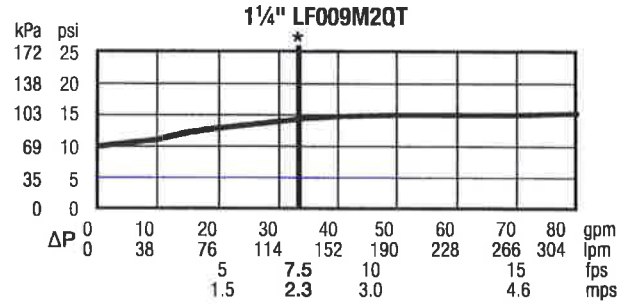
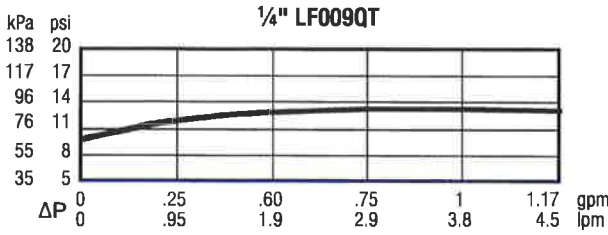
†Clearance for servicing

MODEL	SIZE	DIMENSIONS (APPROX.)										WEIGHT					
		A	C	D	E	L	R	U	lb	kg							
LF009LF	2 1/2	—	—	5 3/8	143	—	—	18 3/8	460	—	—	10 3/8	270	76	34.5		
LF0090SY	2 1/2	33 3/4	845	15 3/8	403	5 3/8	143	16 3/8	416	18 3/8	460	7 3/4	197	10 3/8	270	166	75.3
LF009NRS	2 1/2	33 3/4	845	11 3/8	289	5 3/8	143	16 3/8	416	18 3/8	460	7 3/4	197	10 3/8	270	161	73.0
LF009LF	3	—	—	5 3/8	143	—	—	18 3/8	460	—	—	10 3/8	270	76	34.5		
LF0090SY	3	34 3/4	870	18 3/8	470	5 3/8	143	16 3/8	422	18 3/8	460	8 3/4	222	10 3/8	270	198	89.8
LF009NRS	3	34 3/4	870	12 3/8	324	5 3/8	143	16 3/8	422	18 3/8	460	8 3/4	222	10 3/8	270	191	86.6

Capacity

Performance as established by an independent testing laboratory.

The asterisk (*) indicates the typical maximum system flow rate (7.5 ft/sec, 2.3 m/sec).



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 Canada: T: (888) 208-8927 • Watts.ca
 Latin America: T: (52) 55-4122-0138 • Watts.com

For Liquid and Steam Service

Job Name 6th Ave District
 Job Location Pine Bluff
 Engineer Brown
 Approval _____

Contractor Comfort Systems USA
 Approval _____
 Contractor's P.O. No. _____
 Representative Sanders Supply

LEAD FREE*

Series LF777SI, LFS777SI Wye-Pattern, Lead Free Cast Strainers

Sizes: 3/8" – 3"

Series LF777SI, LFS777SI Wye-Pattern, Lead Free* cast strainers are designed to protect plumbing system components from dirt, rust and other damaging debris. The Series LF777SI and LFS777SI feature Lead Free* construction to comply with Lead Free* installation requirements.



LF777SI

Features

- Lead Free* cast copper silicon alloy body and cap
- Wye-pattern
- Tapped retainer cap
- Closure plug
- Special flared screen opening on upstream end to provide unrestricted flow through the strainer

Models

LF777SI – 3/8" – 3" threaded connections
 LFS777SI – 1/2" – 2" solder connections

Specifications

A wye-pattern, Lead Free* cast strainer to be installed as indicated on the plans. The strainer must have a tapped retainer cap and closure plug. Strainer shall be rated to 400psi (27.6 bar) WOG; 125psi (8.6 bar) WSP for sizes 3/8"-2" and 300psi (20.7 bar) @ 210°F (99°C); 125psi (8.6 bar) WSP @ 353°F (178°C) for sizes 2 1/2"-3". The strainer shall be constructed using Lead Free* cast copper silicon alloy. Lead Free* strainers shall comply with state codes and standards, where applicable, requiring reduced lead content. Strainer shall be a Watts Series LF777SI (threaded ends) or LFS777SI (solder ends).

Materials

Body:	Lead Free* cast copper silicon alloy
Retainer Cap:	Lead Free* cast copper silicon alloy
Plug	Lead Free* brass
Gasket:	EPDM
Standard Screen:	#20 mesh, 304 stainless steel

Pressure – Temperature

Maximum Working Pressure:

3/8"–2"

400psi (27.6 bar) WOG @ 210°F (99°C)

125psi (8.6 bar) WSP @ 353°F (178°C)

2 1/2"–3"

300psi (20.7 bar) WOG @ 210°F (99°C)

125psi (8.6 bar) WSP @ 353°F (178°C)

Approvals



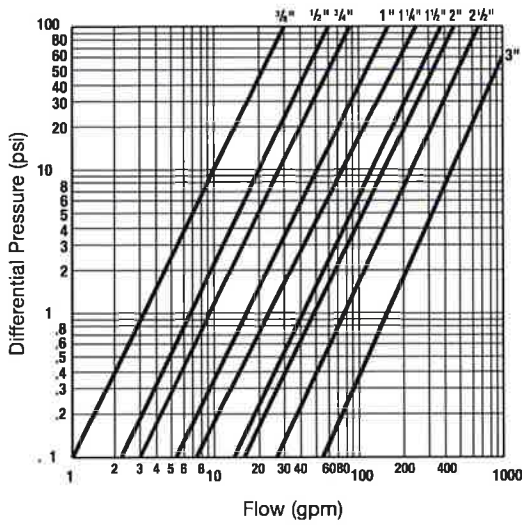
NOTICE

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*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

Performance Data

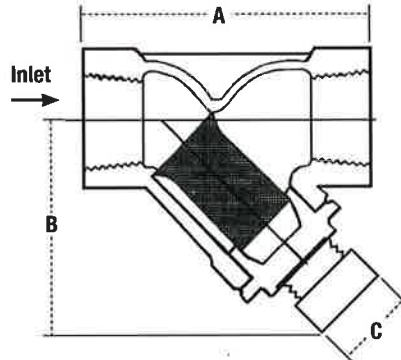


Flow curves show flows (gpm) and pressure drop (psig) through Watts Series 777SI, S777SI using standard 20 mesh screen.

Dimensions – Weights

LF777SI

SIZE	DIMENSIONS						WEIGHT	
	A		B		C		lbs.	kgs.
in.	in.	mm	in.	mm	in.	mm		
3/8	2 3/8	60	1 5/16	33	1/4	6	0.4	0.18
1/2	2 3/4	70	1 3/8	35	1/4	6	0.5	0.23
3/4	3 1/8	81	1 5/8	42	1/4	6	0.6	0.27
1	3 3/4	95	2 1/8	54	1/2	13	1.1	0.50
1 1/4	4 7/16	113	2 1/2	64	1/2	13	1.9	0.86
1 1/2	4 7/8	124	3	76	3/4	19	2.4	1.09
2	5 9/16	151	3 3/16	91	1	25	4.4	2.00
2 1/2	9 1/16	230	5 7/8	149	1/2	13	9.8	4.44
3	10 3/16	259	6 1/4	159	1/2	13	13.2	5.99



LFS777SI

SIZE	DIMENSIONS						WEIGHT	
	A		B		C		lbs.	kgs.
in.	in.	mm	in.	mm	in.	mm		
1/2	2 3/4	70	1 3/8	35	1/4	6	0.4	0.18
3/4	3 3/8	86	1 5/8	42	1/4	6	0.6	0.27
1	3 3/4	95	2 1/8	54	1/2	13	0.9	0.41
1 1/4	4 9/16	116	2 1/2	64	1/2	13	1.5	0.68
1 1/2	5 9/16	135	3	76	3/4	19	1.9	0.86
2	6 1/8	156	3 3/16	91	1	25	3.3	1.50



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 Canada: T: (905) 332-4090 • F: (905) 332-7068 • Watts.ca
 Latin America: T: (52) 55-4122-0138 • Watts.com

Engineering Specification

Job Name 6th Ave District
 Job Location Pine Bluff
 Engineer Brown
 Approval _____

Contractor Comfort Systems USA
 Approval _____
 Contractor's P.O. No. _____
 Representative Sanders Supply

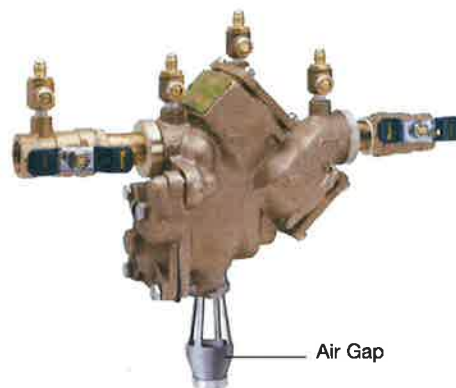
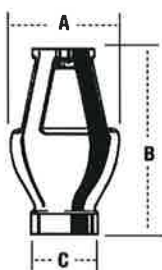
Air Gaps, Elbows, and Test Cocks

For Reduced Pressure Zone Assemblies

Air Gaps

An air gap provides the unobstructed, physical separation between the discharge end of a potable water supply line and an open receiving vessel.

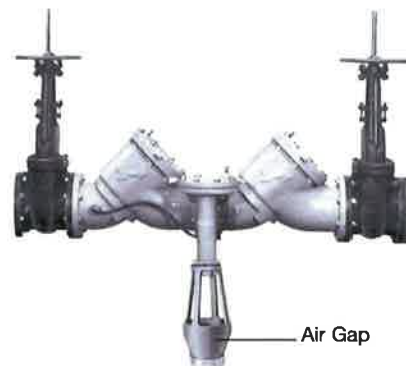
The installation of an air gap and drain line are recommended.



909 QT/LF909 QT

Approvals

ANSI/ASME A112.1.2



909 OSY/LF909 OSY



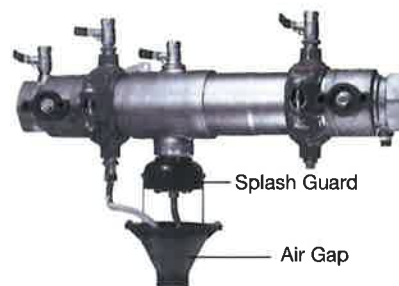
ORDERING		SIZE/SERIES	DIMENSIONS							
MODEL	CODE		A		B		C (NPT)		WEIGHT	
			in.	mm	in.	mm	in.	mm	lb	kg
909AGA	0881399	1/2" - 1/2" 009/LF009 3/4" 009/LF009M2/M3 1/2" - 1" 995	2%	60	3 1/4	79	1/2	13	0.63	0.28
909AGC	0881376	3/4" - 1" 009/LF009, 909/ LF909 1" - 1 1/2" 009/LF009M2 1 1/4" - 2" 995	3 1/4	83	4 7/8	124	1	25	1.50	0.68
909AGC-B	0881377	3/4" - 1" 909 1" - 1 1/2" 009M2 1 1/2" - 2" 995	3 1/4	88	3 3/4	95	1	25	1.90	0.86
909AGF	0881378	1 1/4" - 3" 009/LF009, 909/ LF909 1 1/4" - 2" 009/LF009M1 2" 009/LF009M2	4%	111	6%	171	2	51	3.25	1.47
909AGK	0881385	4" - 6" 909/LF909 4" - 10" 909RPDA 8" - 10" 909/LF909M1	6%	162	9%	244	3	76	6.25	2.83
909AGM	0881387	8" - 10" 909/LF909	7%	187	11 1/4	286	4	102	15.50	7.03
919AGC	0881576	3/4" - 1" 919/LF919	2%	60	3 1/4	79	1/2	13	0.63	0.28
919AGF	0881577	1 1/4" - 2" 919/LF919	4%	111	8 1/2	216	2	51	3.5	1.6
957-AG	0111764	2 1/2" - 10" 957	7 1/2	190	12	304	2	51	1.50	0.68

Splash Guard

994AGK-P	0881397	2 1/2" - 10" 994	8	203	11 1/4	286	2	51	1.50	0.68
995-AG	0439190	3" - 6" 995	5	127	8	203	2	51	-	-
957-AG SG	0111815	2 1/2" - 10" 957	4 1/4	119	2 1/2	62	-	-	0.4	0.18

NOTICE

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957 QT

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Engineering Specification

Job Name 6th Ave District
 Job Location Pine Bluff
 Engineer Brown
 Approval _____

Contractor Comfort Systems USA
 Approval _____
 Contractor's P.O. No. _____
 Representative Sanders Supply

LEAD FREE*

Series LF009, LF009-FS

Reduced Pressure Zone Assemblies

1/4" – 3"

Series LF009 and LF009-FS Reduced Pressure Zone Assemblies are designed to protect potable water supplies in accordance with national plumbing codes and water authority requirements. These series are used in a variety of installations, including the prevention of health hazard cross-connections in piping systems or for containment at the service line entrance. They are also used in irrigation systems, boiler feed, water lines, and other installations requiring maximum protection. The body construction is fused with ArmorTek™ coating technology to resist corrosion due to microbial induced corrosion (MIC) or exposed metal substrate.* The series also features Lead Free* construction to comply with Lead Free* installation requirements.

Both series feature two in-line, independent check valves, captured springs, and replaceable check seats with an intermediate relief valve. Its compact modular design facilitates easy maintenance and assembly access. Sizes 1/4" to 1" shutoffs have tee handles.

Series LF009-FS assemblies of sizes 1/2" to 3" include an integrated flood sensor to detect excessive water discharges from the relief valve. The flood sensor relays a signal that triggers notification to qualified service personnel who can take corrective action, thus avoiding the possibility of ruinous flooding and costly damage.

NOTICE

An add-on connection kit is required to activate the integrated flood sensor. Without the connection kit, the flood sensor is a passive component and will not communicate with any other device. (For more information, download RP-IS-009/009-FS.)

Features

- Single access cover and modular check construction for ease of maintenance
- Top entry to all internals for immediate accessibility
- Captured springs for safe maintenance
- Internal relief valve for reduced installation clearances
- Replaceable seats for economical repair
- ArmorTek™ coating technology to resist internal corrosion†
- Lead Free* cast copper silicon alloy body construction (1/4" – 2")

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

†ArmorTek coating applied to the 2 1/2" and 3" models only.



LF009M2-QT-FS

- Fused epoxy coated cast iron body (2 1/2" – 3")
- Ball valve test cocks — screwdriver slotted (1/4" – 2")
- Large body passages provides low pressure drop
- Compact, space saving design
- No special tools required for servicing
- Integrated sensor for flood detection (1/2" – 3")
- Flood alert feature activated with add-on sensor connection kit, compatible with BMS and cellular communication

NOTICE

Use of the integrated flood sensor does not replicate the need to comply with all required instructions, codes, and regulations related to installation, operation, and maintenance of this product, including the need to provide proper drainage in the event of a discharge.

Watts® is not responsible for the failure of alerts due to connectivity or power issues.

NOTICE

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Inquire with governing authorities for local installation requirements.

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Specification

A Reduced Pressure Zone Assembly shall be installed at each potential health hazard location to prevent backflow due to backsiphonage and/or backpressure. The assembly shall consist of an internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs and silicone seat discs. Seats and seat discs shall be replaceable in both check modules and the relief valve. There shall be no threads or screws in the waterway exposed to line fluids. Service of all internal components shall be through a single access cover secured with stainless steel bolts. Body and shutoffs shall be constructed using Lead Free* cast copper silicon alloy materials. Lead Free* reduced pressure zone assembly shall comply with state codes and standards, where applicable, requiring reduced lead content.

The assembly shall also include two resilient seated isolation valves, four resilient seated test cocks, and an air gap drain fitting. The valve body shall utilize a coating system with built-in electrochemical corrosion inhibitor and microbial inhibitor.† The assembly shall meet the requirements of USC; ASSE Std. 1013; AWWA Std. C511; CSA B64.4. Shall be a Watts Series LF009, and shall include an integrated sensor for flood detection on sizes ½" to 3".

Materials

¼" – 2"

Lead Free* cast copper silicon alloy body construction, silicone rubber disc material in the first and second check plus the relief valve. Replaceable polymer check seats for first and second checks. Removable relief valve seats. Stainless steel cover bolts. Standardly furnished with NPT body connections. Model LF009QT furnished with quarter-turn, full port, resilient seated, Lead Free* cast copper silicon alloy body ball valve shutoffs.

2½" – 3"

- FDA-approved epoxy-coated cast iron unibody with plastic seats
- Relief valve with stainless steel seat and trim
- Lead Free* cast copper silicon alloy body ball valve test cocks

Model/Option

¼" – 2"

Prefix:

U – Union connections

Suffix:

FS – Integrated sensor for flood detection (½" – 2")

LF – Without shutoff valves

PC – Internal polymer coating

Press** – Press inlet x press outlet (½" – 2")

QT – Quarter-turn ball valves

S – Strainer

2½" – 3"

Suffix:

FS – Integrated sensor for flood detection

LF – Without shutoff valves

NRS – Non-rising stem resilient seated gate valves

OSY – UL/FM outside stem and yoke resilient seated gate valves

S-FDA – FDA epoxy coated strainer

NOTE: The installation of a drain line is recommended. When installing a drain line, an air gap is necessary. (For more information download ES-AG/EL/TC at watts.com.)

Pressure – Temperature

¼" – 2"

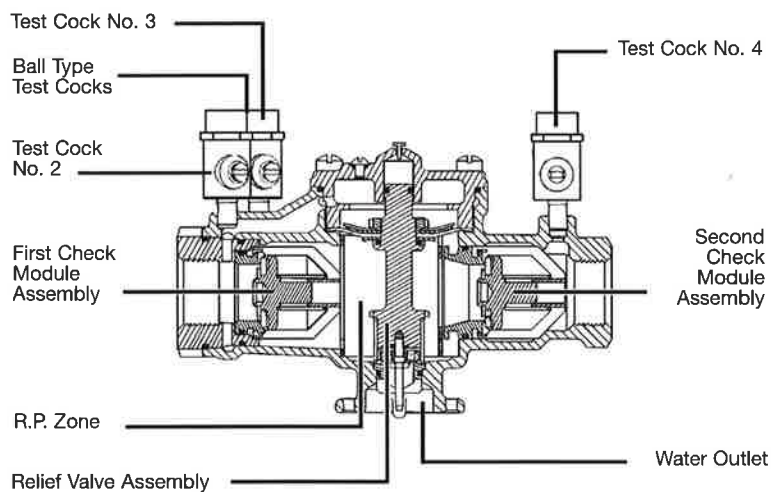
Suitable for supply pressure up to 175 psi (12.1 bar)

Water temperature: 33°F – 180°F (0.5° – 82°C)

2½" – 3"

Suitable for supply pressures up to 175 psi (12.1 bar)

Water temperature: 110°F (43°C) continuous; 140°F (60°C) intermittent



** Viega ProPress® connections are optional factory-installed fitting on each end of the approved/certified assembly.

Standards

USC
 ASSE No. 1013
 AWWA C511
 CSA B64.4
 IAPMO File No. 1563

Approvals



ASSE, AWWA, CSA, IAPMO

Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California

Approval models NRS, OSY, PC, QT

UL Classified

2½" – 3" with OSY gate valves

¾" – 2" without shutoff valves (-LF), except LF009M3LF

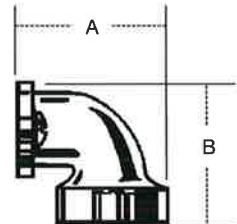
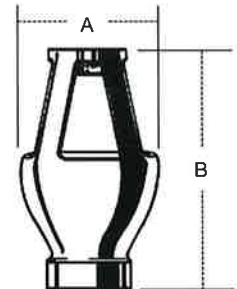
Insulated Enclosure

The WattsBox insulated enclosure is available for Series LF009/ LF009-FS. For more information download ES-WB at watts.com.

Air Gaps and Elbows

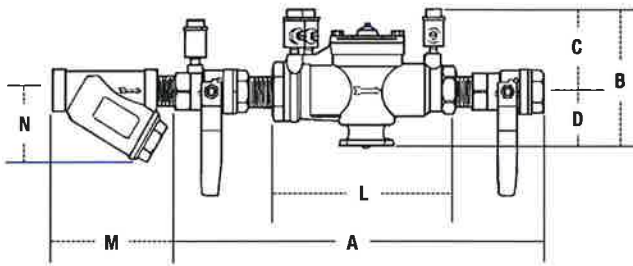
MODEL	DRAIN OUTLET	DIMENSIONS						WEIGHT	
		in.	mm	A		B		lb	kg
909AGA	For 909, 009, and 993 sizes ¼"-½" 009, ¾" 009M2/M3	½	13	2¾	60	3½	79	0.625	0.28
909AGC	¾"-1" 009/909, 1"-1½" 009M2	1	25	3¼	83	4½	124	1.5	0.68
909AGF	1¼"-2" 009M1, 1¼"-3" 009/909, 2" 009M2, 4"-6" 993	2	51	4¾	111	6¾	171	3.25	1.47
909AGK	4"-6" 909, 8"-10" 909M1	3	76	6¾	162	9¾	244	6.25	2.83
909AGM	8"-10" 909	4	102	7¾	187	11¼	286	15.5	7.03
909ELA	¼"-½" 009, ¾" 009M2/M3	-	-	-	-	-	-	-	-
909ELC	¾"-1" 009/909	-	-	2¾	60	2¾	60	0.38	0.17
909ELF*	1¼"-2" 009M1, 1¼"-2" 009/909, 2" 009M2, 4"-6" 993	-	-	3¾	92	3¾	92	2	0.91
909ELH* Vertical	2½"-3" 009/909	-	-	-	-	-	-	-	-

*Epoxy coated

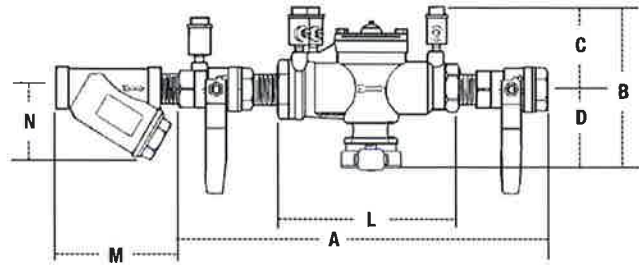


Dimensions – Weight

1/4" – 3/8"

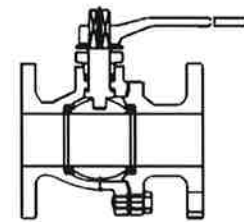
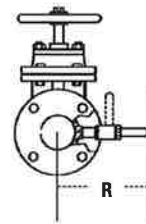
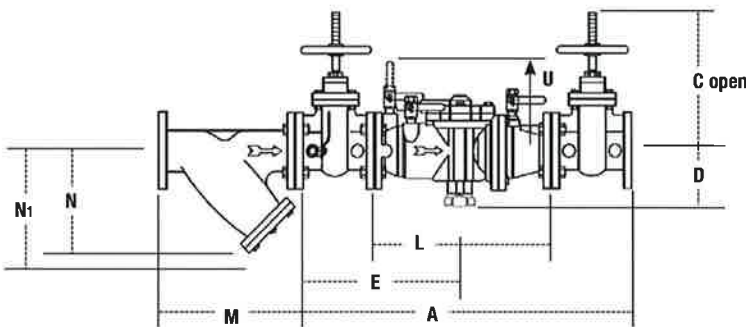


1/2" – 2"



SIZE		DIMENSIONS (APPROX.)										WEIGHT				
in.	mm	A	B	C	D	L	M	N	lb	kg						
1/4	10	250	4 3/8	117	3 3/8	86	1 1/4	32	5 1/2	140	2 3/8	60	2 1/2	64	5	2
3/8	10	250	4 3/8	117	3 3/8	86	1 1/4	32	5 1/2	140	2 3/8	60	2 1/2	64	5	2
1/2	10	250	5 1/8	149	3 3/8	86	2 1/2	64	5 1/2	140	2 3/4	70	2 1/4	57	5	2
3/4	10 3/4	273	6 1/4	159	3 1/2	89	2 3/4	70	6 3/4	171	3 1/8	81	2 3/4	70	6	3
1	14 1/2	368	6 1/4	159	3	76	3 3/4	83	9 1/2	241	3 3/8	95	3	76	12	5
1 1/4	17 3/8	441	6 3/4	169	3 1/2	89	3 3/4	83	11 3/4	289	4 1/8	113	3 1/2	89	15	6
1 1/2	17 3/8	454	6 3/4	169	3 1/2	89	3 3/4	83	11 1/4	283	4 3/8	124	4	102	16	7
2	21 3/8	543	8 3/4	222	4 1/2	114	4 1/4	108	13 1/2	343	5 1/8	151	5	127	30	13

2 1/2" – 3"



Watts G-4000 Series
QT – Ball Valves

STRAINER SIZE		DIMENSIONS (APPROX.)						WEIGHT	
in.	mm	M	N	N†	lb	kg			
2 1/2	65	10	254	6 1/2	165	9 3/4	248	28	12.7
3	80	10 1/8	257	7	178	10	254	34	15.4

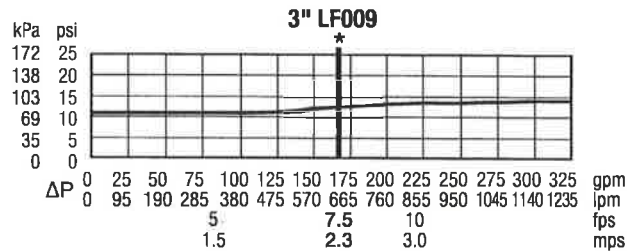
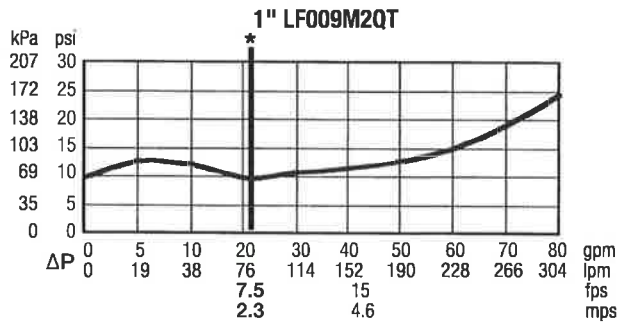
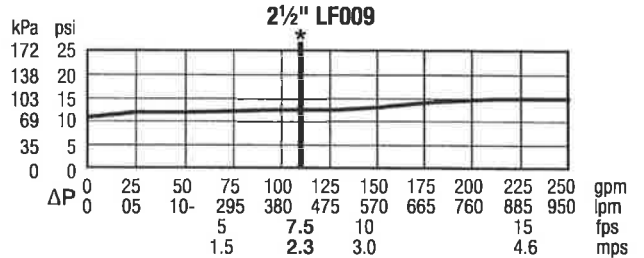
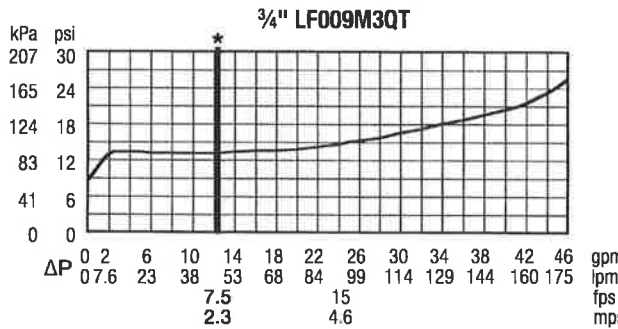
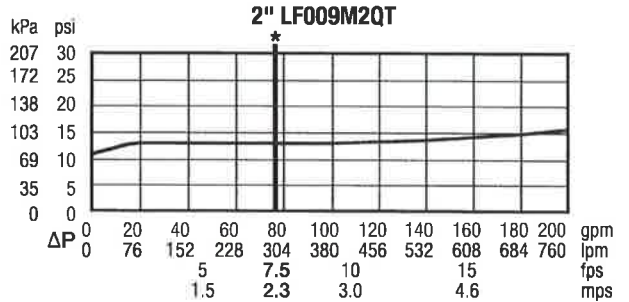
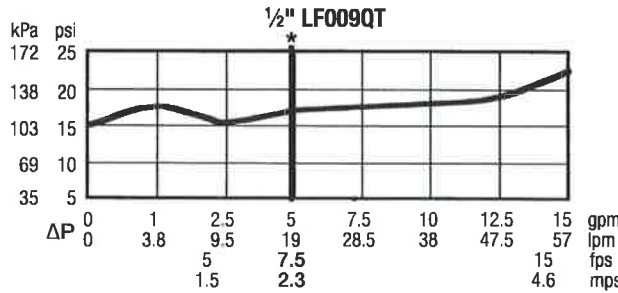
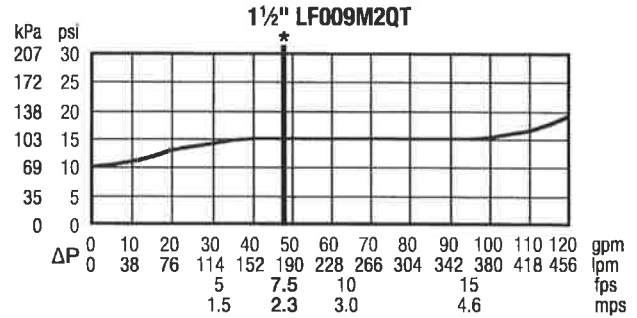
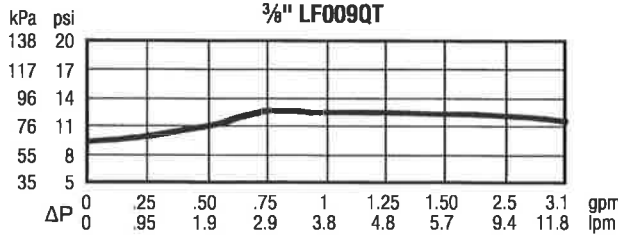
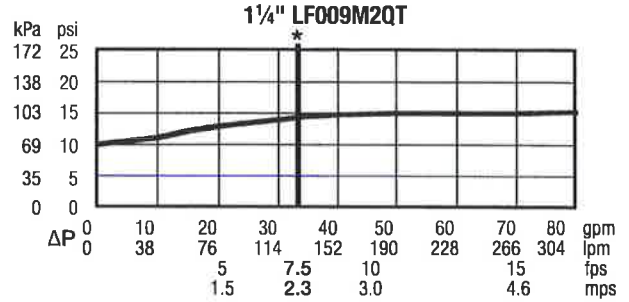
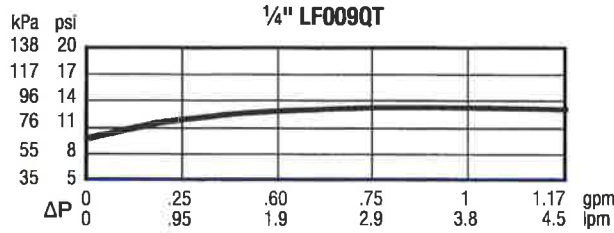
†Clearance for servicing

MODEL	SIZE	DIMENSIONS (APPROX.)										WEIGHT					
	in.	A	C	D	E	L	R	U	lb	kg							
LF009LF	2 1/2	—	—	5 1/2	143	—	—	18 1/8	460	—	—	10 3/8	270	76	34.5		
LF009OSY	2 1/2	33 1/4	845	15 3/8	403	5 1/2	143	16 3/8	416	18 1/8	460	7 3/4	197	10 3/8	270	166	75.3
LF009NRS	2 1/2	33 1/4	845	11 3/8	289	5 1/2	143	16 3/8	416	18 1/8	460	7 3/4	197	10 3/8	270	161	73.0
LF009LF	3	—	—	5 1/2	143	—	—	18 1/8	460	—	—	10 3/8	270	76	34.5		
LF009OSY	3	34 1/4	870	18 1/2	470	5 1/2	143	16 3/8	422	18 1/8	460	8 3/4	222	10 3/8	270	198	89.8
LF009NRS	3	34 1/4	870	12 3/8	324	5 1/2	143	16 3/8	422	18 1/8	460	8 3/4	222	10 3/8	270	191	86.6

Capacity

Performance as established by an independent testing laboratory.

The asterisk (*) indicates the typical maximum system flow rate (7.5 ft/sec, 2.3 m/sec).



USA: T: (978) 689-6066 • Watts.com

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Latin America: T: (52) 55-4122-0138 • Watts.com

For Liquid and Steam Service

Job Name 6th Ave District
 Job Location Pine Bluff
 Engineer Brown
 Approval _____

Contractor Comfort Systems USA
 Approval _____
 Contractor's P.O. No. _____
 Representative Sanders Supply

LEAD FREE*

Series LF777SI, LFS777SI Wye-Pattern, Lead Free Cast Strainers

Sizes: 3/8" – 3"

Series LF777SI, LFS777SI Wye-Pattern, Lead Free* cast strainers are designed to protect plumbing system components from dirt, rust and other damaging debris. The Series LF777SI and LFS777SI feature Lead Free* construction to comply with Lead Free* installation requirements.

Features

- Lead Free* cast copper silicon alloy body and cap
- Wye-pattern
- Tapped retainer cap
- Closure plug
- Special flared screen opening on upstream end to provide unrestricted flow through the strainer

Models

LF777SI – 3/8" – 3" threaded connections
 LFS777SI – 1/2" – 2" solder connections

Specifications

A wye-pattern, Lead Free* cast strainer to be installed as indicated on the plans. The strainer must have a tapped retainer cap and closure plug. Strainer shall be rated to 400psi (27.6 bar) WOG; 125psi (8.6 bar) WSP for sizes 3/8"-2" and 300psi (20.7 bar) @ 210°F (99°C); 125psi (8.6 bar) WSP @ 353°F (178°C) for sizes 2 1/2"-3". The strainer shall be constructed using Lead Free* cast copper silicon alloy. Lead Free* strainers shall comply with state codes and standards, where applicable, requiring reduced lead content. Strainer shall be a Watts Series LF777SI (threaded ends) or LFS777SI (solder ends).

Materials

Body: Lead Free* cast copper silicon alloy
 Retainer Cap: Lead Free* cast copper silicon alloy
 Plug: Lead Free* brass
 Gasket: EPDM
 Standard Screen: #20 mesh, 304 stainless steel



LF777SI

Pressure – Temperature

Maximum Working Pressure:

3/8"–2"

400psi (27.6 bar) WOG @ 210°F (99°C)

125psi (8.6 bar) WSP @ 353°F (178°C)

2 1/2"–3"

300psi (20.7 bar) WOG @ 210°F (99°C)

125psi (8.6 bar) WSP @ 353°F (178°C)

Approvals



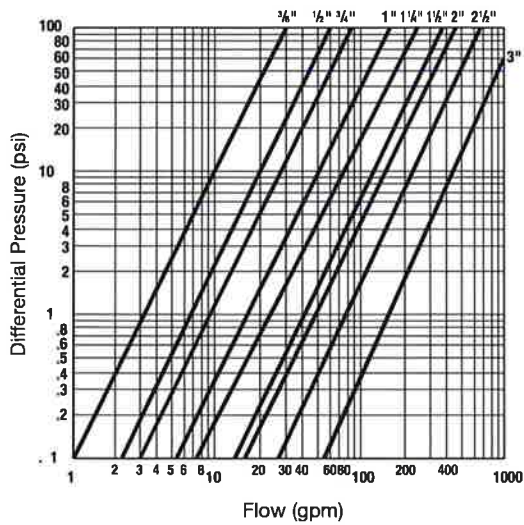
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*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

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Performance Data

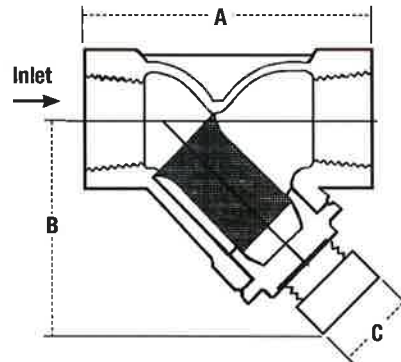


Flow curves show flows (gpm) and pressure drop (psig) through Watts Series 777SI, S777SI using standard 20 mesh screen.

Dimensions – Weights

LF777SI

SIZE	DIMENSIONS						WEIGHT	
	A		B		C		lbs.	kgs.
in.	in.	mm	in.	mm	in.	mm		
3/8"	2 5/8"	60	1 5/16"	33	1/4"	6	0.4	0.18
1/2"	2 3/4"	70	1 3/8"	35	1/4"	6	0.5	0.23
3/4"	3 1/16"	81	1 5/8"	42	1/4"	6	0.6	0.27
1"	3 3/4"	95	2 1/8"	54	1/2"	13	1.1	0.50
1 1/4"	4 7/16"	113	2 1/2"	64	1/2"	13	1.9	0.86
1 1/2"	4 7/8"	124	3"	76	3/4"	19	2.4	1.09
2"	5 1/16"	151	3 3/16"	91	1"	25	4.4	2.00
2 1/2"	9 1/16"	230	5 7/8"	149	1/2"	13	9.8	4.44
3"	10 3/16"	259	6 1/4"	159	1/2"	13	13.2	5.99



LFS777SI

SIZE	DIMENSIONS						WEIGHT	
	A		B		C		lbs.	kgs.
in.	in.	mm	in.	mm	in.	mm		
1/2"	2 3/4"	70	1 3/8"	35	1/4"	6	0.4	0.18
3/4"	3 3/8"	86	1 5/8"	42	1/4"	6	0.6	0.27
1"	3 3/4"	95	2 1/8"	54	1/2"	13	0.9	0.41
1 1/4"	4 9/16"	116	2 1/2"	64	1/2"	13	1.5	0.68
1 1/2"	5 1/16"	135	3"	76	3/4"	19	1.9	0.86
2"	6 1/8"	156	3 3/16"	91	1"	25	3.3	1.50



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 Canada: T: (905) 332-4090 • F: (905) 332-7068 • Watts.ca
 Latin America: T: (52) 55-4122-0138 • Watts.com

Engineering Specification

Job Name 6th Ave District
 Job Location Pine Bluff
 Engineer Brown
 Approval _____

Contractor Comfort Systems USA
 Approval _____
 Contractor's P.O. No. _____
 Representative Sanders Supply

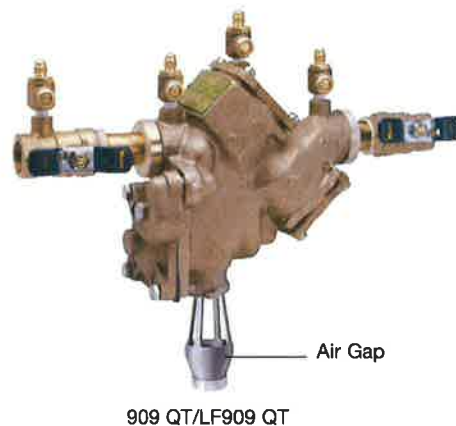
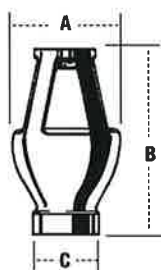
Air Gaps, Elbows, and Test Cocks

For Reduced Pressure Zone Assemblies

Air Gaps

An air gap provides the unobstructed, physical separation between the discharge end of a potable water supply line and an open receiving vessel.

The installation of an air gap and drain line are recommended.



Approvals

ANSI/ASME A112.1.2

ORDERING			DIMENSIONS					WEIGHT		
MODEL	CODE	SIZE/SERIES	A		B		C (NPT)		lb	kg
			in.	mm	in.	mm	in.	mm		
909AGA	0881399	1/2" - 1/2" 009/LF009 3/4" 009/LF009M2/M3 1/2" - 1" 995	2%	60	3%	79	1/2	13	0.63	0.28
909AGC	0881376	3/4" - 1" 009/LF009, 909/ LF909 1" - 1 1/2" 009/LF009M2 1 1/4" - 2" 995	3/4	83	4 7/8	124	1	25	1.50	0.68
909AGC-B	0881377	3/4" - 1" 909 1" - 1 1/2" 009M2 1 1/2" - 2" 995	3/4	88	3 3/4	95	1	25	1.90	0.86
➤ 909AGF	0881378	1 1/4" - 3" 009/LF009, 909/ LF909 1 1/4" - 2" 009/LF009M1 2" 009/LF009M2	4%	111	6%	171	2	51	3.25	1.47
909AGK	0881385	4" - 6" 909/LF909 4" - 10" 909RPDA 8" - 10" 909/LF909M1	6%	162	9%	244	3	76	6.25	2.83
909AGM	0881387	8" - 10" 909/LF909	7%	187	11 1/4	286	4	102	15.50	7.03
919AGC	0881576	3/4" - 1" 919/LF919	2%	60	3%	79	1/2	13	0.63	0.28
919AGF	0881577	1 1/4" - 2" 919/LF919	4%	111	8 1/2	216	2	51	3.5	1.6
957-AG	0111764	2 1/2" - 10" 957	7 1/2	190	12	304	2	51	1.50	0.68

Splash Guard

994AGK-P	0881397	2 1/2" - 10" 994	8	203	11 1/4	286	2	51	1.50	0.68
995-AG	0439190	3" - 6" 995	5	127	8	203	2	51	-	-
957-AG SG	0111815	2 1/2" - 10" 957	4%	119	2 1/2	62	-	-	0.4	0.18

NOTICE

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PRV

Engineering Specification

Job Name 6th Ave District
 Job Location Pine Bluff
 Engineer Brown
 Approval _____

Contractor Comfort Systems USA
 Approval _____
 Contractor's P.O. No. _____
 Representative Sanders Supply

LEAD FREE*

Series LF25AUB-Z3 Water Pressure Reducing Valves**

Sizes: 1/2" – 2"

Series LF25AUB-Z3 Water Pressure Reducing Valves are designed to reduce incoming water pressure to a sensible level to protect plumbing system components and reduce water consumption. This series is suitable for water supply pressures up to 300psi (20.7 bar) and may be adjusted from 25 – 75psi (172 – 517 kPa). The LF25AUB-Z3 features Lead Free* construction to comply with Lead Free* installation requirements. The standard setting is 50psi (345 kPa). All parts are quickly and easily serviceable without removing the valve from the line. The standard bypass feature permits the flow of water back through the valve into the main when pressures, due to thermal expansion on the outlet side of the valve, exceed the pressure in the main supply.

Features

- Standard construction includes Z3 sealed spring cage and stainless steel corrosion resistant adjusting & cage screws
- Union inlet connection
- Integral stainless steel strainer
- Replaceable seat module
- Lead Free* cast copper silicon alloy construction
- Serviceable in line
- Bypass feature controls thermal expansion pressure***
- High temperature resistant reinforced diaphragm for hot water

Specifications

A Water Pressure Reducing Valve with integral strainer shall be installed in the water service pipe near its entrance to the building where supply main pressure exceeds 60psi (413 kPa) to reduce it to 50psi (345 kPa) or lower. The water pressure reducing valve shall be constructed using Lead Free* materials. Lead Free* regulators shall comply with state codes and standards, where applicable, requiring reduced lead content. The valve shall feature a Lead Free* cast copper silicon alloy suitable for water supply pressures up to 300psi (20.7 bar). Provision shall be made to permit the bypass flow of water back through the valve into the main when pressures, due to thermal expansion on the outlet side of the valve, exceed the pressure in the main supply. Water Pressure Reducing Valve with built-in bypass check valves will be acceptable. Approved valve shall be listed to ASSE 1003 and IAPMO and certified to CSA B356. Valve shall be a Watts Series LF25AUB-Z3.

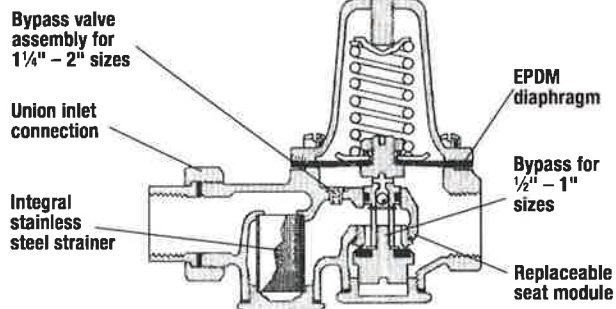
NOTICE

Product is for interior or exterior applications. Product should not be buried directly in the ground. For exterior applications where the valve will be situated in a vault or pit or be in contact with the ground, the valve should be installed in a meter box/vault, accessible for repair and adjustment, per local code.

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LF25AUB-Z3



Materials

Body:	Lead Free* copper silicon alloy
Seat:	1/2"-1" Replaceable engineered polymer (10% glass filled Noryl®) 1 1/4"-2" Replaceable stainless steel
Integral Strainer:	Stainless steel
Diaphragm:	Reinforced EPDM with PTFE wetted surface
Valve Disc:	EPDM

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

**A water saving test program concluded that reducing the supply pressure from 80-50psi (551-345 kPa) resulted in a water savings of 30%.

***The bypass feature will not prevent the pressure relief valve from opening on the hot water supply system with pressure above 150psi (10.3 bar).

Pressure – Temperature

Temperature Range: 33°F – 180°F (0.5°C – 82°C)

Maximum Working Pressure: 300psi (20.7 bar)

Adjustable Reduced Pressure Range: 25–75psi (172 – 517 kPa)

Standard Reduced Pressure Setting: 50psi (345 kPa)

Options

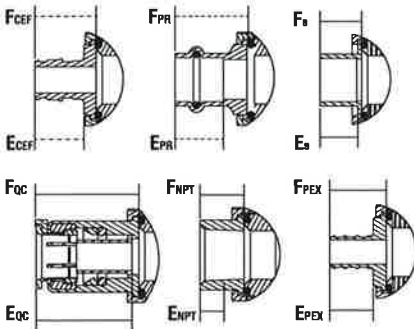
Add Suffix

- " " Threaded female union inlet x NPT female outlet
- S Solder union inlet x NPT female outlet
- QC Quick-Connect union inlet (½", ¾", 1")
- LF Double union body less fittings (¾", 1", 1¼")
- DU Double Union – NPT threaded union female inlet and outlet
- S-DU Double Union – Solder union inlet and outlet
- DU-PEX Double Union – PEX union inlet and outlet
- DU-QC Double Union – Quick-Connect inlet and outlet (½", ¾", 1")
- DU-PR Double Union – Press union inlet and outlet
- DU-CEF Double Union – PEX CEF (F1960) union inlet and outlet
- G Gauge tapping, ¼" (½", ¾"), ½" (1¼"-2")
- GG Gauge tapping and 160psi (11 bar) gauge
- HP High pressure range 75–125psi (5.2 – 8.6 bar) †
- LP Low pressure range 10–35psi (69 – 241 kPa) †
- Z6 Water meter threaded connections and 7½" (190mm) lay length for new or existing meter box installations, For ⅝", ⅞" x ¾" or ¾" meter setters or resetters

† Not available on G or GG models

Noryl® is a registered trademark of SABIC Innovative Plastics™

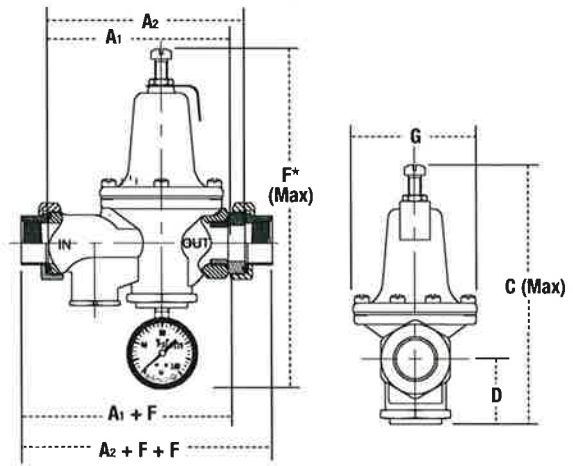
Dimensions – Weights



A₁ - SINGLE UNION LF25AUB LESS FITTING
A₂ - DOUBLE UNION LF25AUB LESS FITTINGS

VALVES MAY BE ORDERED WITH Q,1,OR 2 UNION CONNECTIONS USING ANY COMBINATION OF NPT, SOLDER, PEX, QUICK CONNECT, CEF (F1960), OR PRESS CONNECTIONS REQUIRED

"E" DIMENSIONS ARE APPROXIMATE ENGAGEMENT LENGTHS

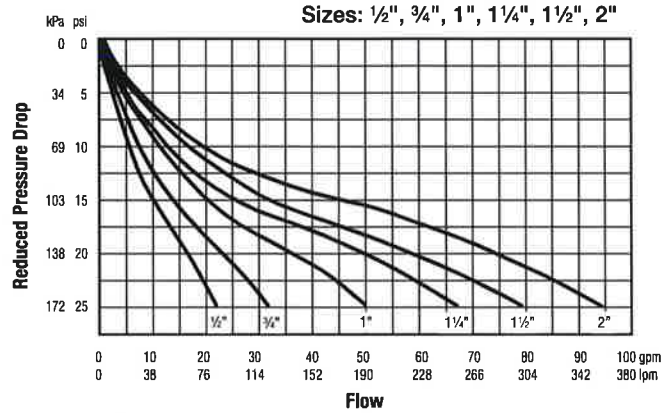


Standards



Meets requirements of ASSE Standard 1003; ANSI A112.26.2; CSA Standard B356; Southern Standard Plumbing Code and listed by IAPMO. Military Standard MIL-V-18146B Type I.

Capacity



SIZE													
A ₁			A ₂			C		D		FΔ		G	
in.	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	
½	5/16	135	5/16	129	7	178	1½	38	9/16	240	3½	79	
¾	5/16	135	5/16	132	7	178	1½	38	9/16	240	3½	79	
1	6	152	5/4	146	8	203	1¾	44	10/16	265	3¾	92	
1¼	8¼	210	7 15/16	202	9	229	2 1/8	54	11 1/16	291	3¾	92	
1½	8¼	210	8 1/16	205	9½	241	2 5/8	60	11 15/16	303	4 1/16	103	
2	8 7/8	225	8 11/16	221	11¼	286	3¼	83	13 11/16	348	4¾	121	

DIMENSIONS															WEIGHT															
SIZE	F _{NPT}	F _S	F _{PEX}	F _{OC}	F _{PR}	F _{CEF}	E _{NPT}	E _S	E _{PEX}	E _{OC}	E _{PR}	E _{CEF}	lbs.	kgs.																
in.	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm																		
½	5/8	16	½	13	5/8	16	1 1/2	38	1 1/4	32	7/8	22	½	13	½	13	-	-	1 3/8	35	1 1/8	29	¾	19	3.5	1.6				
¾	5/8	16	¾	19	5/8	16	1 11/16	43	1 1/8	29	9/16	14	¾	19	5/8	16	1 1/8	37	1 1/16	37	1 1/16	24	1 5/8	40	1 3/8	30	1 5/8	24	3.5	1.6
1	¾	19	1 1/16	24	1 1/16	21	1 ¼	44	1 1/2	38	1 1/8	29	1 1/16	17	1 5/16	24	1 3/8	41	1 5/8	41	1 5/8	40	1 3/8	30	1 3/8	30	1 3/8	38	6.5	3.0
1¼	¾	19	1	25	-	-	-	-	1 1/2	38	1 3/4	44	1 1/16	17	1	25	-	-	-	-	-	-	-	1 3/8	30	1 1/2	38	10	4.5	
1½	7/8	22	1 1/16	27	-	-	-	-	1 3/4	44	1 15/16	49	1 1/16	17	1 1/16	27	-	-	-	-	-	-	-	1 3/8	35	1 3/4	44	10	4.5	
2	1 5/16	24	1 9/16	33	-	-	-	-	2	51	-	-	¾	19	1 5/16	33	-	-	-	-	-	-	1 3/8	40	-	-	15	6.8		

Δ Dimension includes optional gauge

Nominal dimensions are shown. Allowances must be made for manufacturing tolerances.



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Canada: T: (888) 208-8927 • F: (905) 481-2316 • Watts.ca

Latin America: T: (52) 55-4122-0138 • Watts.com

Engineering Specification

Job Name 6th Ave District
 Job Location Pine Bluff
 Engineer Brown
 Approval _____

Contractor Comfort Systems USA
 Approval _____
 Contractor's P.O. No. _____
 Representative Sanders Supply

LEAD FREE*

Series LF25AUB-Z3 Water Pressure Reducing Valves**

Sizes: 1/2" – 2"

Series LF25AUB-Z3 Water Pressure Reducing Valves are designed to reduce incoming water pressure to a sensible level to protect plumbing system components and reduce water consumption. This series is suitable for water supply pressures up to 300psi (20.7 bar) and may be adjusted from 25 – 75psi (172 – 517 kPa). The LF25AUB-Z3 features Lead Free* construction to comply with Lead Free* installation requirements. The standard setting is 50psi (345 kPa). All parts are quickly and easily serviceable without removing the valve from the line. The standard bypass feature permits the flow of water back through the valve into the main when pressures, due to thermal expansion on the outlet side of the valve, exceed the pressure in the main supply.

Features

- Standard construction includes Z3 sealed spring cage and stainless steel corrosion resistant adjusting & cage screws
- Union inlet connection
- Integral stainless steel strainer
- Replaceable seat module
- Lead Free* cast copper silicon alloy construction
- Serviceable in line
- Bypass feature controls thermal expansion pressure***
- High temperature resistant reinforced diaphragm for hot water

Specifications

A Water Pressure Reducing Valve with integral strainer shall be installed in the water service pipe near its entrance to the building where supply main pressure exceeds 60psi (413 kPa) to reduce it to 50psi (345 kPa) or lower. The water pressure reducing valve shall be constructed using Lead Free* materials. Lead Free* regulators shall comply with state codes and standards, where applicable, requiring reduced lead content. The valve shall feature a Lead Free* cast copper silicon alloy suitable for water supply pressures up to 300psi (20.7 bar). Provision shall be made to permit the bypass flow of water back through the valve into the main when pressures, due to thermal expansion on the outlet side of the valve, exceed the pressure in the main supply. Water Pressure Reducing Valve with built-in bypass check valves will be acceptable. Approved valve shall be listed to ASSE 1003 and IAPMO and certified to CSA B356. Valve shall be a Watts Series LF25AUB-Z3.

NOTICE

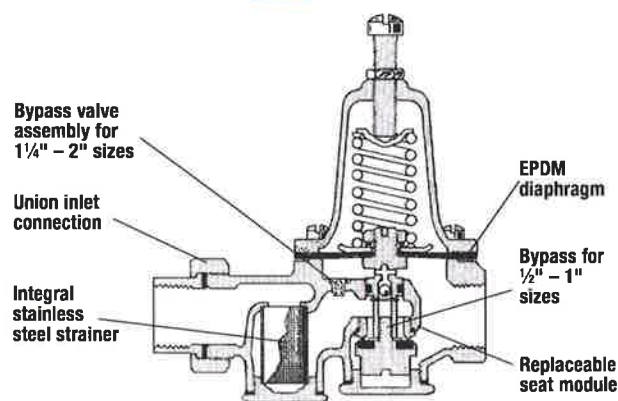
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LF25AUB-Z3



Materials

Body:	Lead Free* cast copper silicon alloy
Seat:	1/2"-1" Replaceable engineered polymer (10% glass filled Noryl®)
	1/4"-2" Replaceable stainless steel
Integral Strainer:	Stainless steel
Diaphragm:	Reinforced EPDM with PTFE wetted surface
Valve Disc:	EPDM

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

**A water saving test program concluded that reducing the supply pressure from 80-50psi (551-345 kPa) resulted in a water savings of 30%.

***The bypass feature will not prevent the pressure relief valve from opening on the hot water supply system with pressure above 150psi (10.3 bar).

Pressure – Temperature

Temperature Range: 33°F – 180°F (0.5°C – 82°C)
 Maximum Working Pressure: 300psi (20.7 bar)
 Adjustable Reduced Pressure Range: 25–75psi (172 – 517 kPa)
 Standard Reduced Pressure Setting: 50psi (345 kPa)

Options

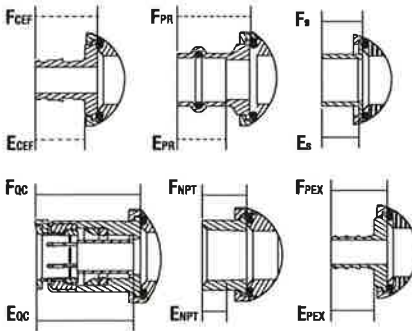
Add Suffix

- " " Threaded female union inlet x NPT female outlet
- S Solder union inlet x NPT female outlet
- QC Quick-Connect union inlet (½", ¾", 1")
- LF Double union body less fittings (¾", 1", 1¼")
- DU Double Union – NPT threaded union female inlet and outlet
- S-DU Double Union – Solder union inlet and outlet
- DU-PEX Double Union – PEX union inlet and outlet
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- DU-CEF Double Union – PEX CEF (F1960) union inlet and outlet
- G Gauge tapping, ¼" (½", ¾", 1", 1½"-2")
- GG Gauge tapping and 160psi (11 bar) gauge
- HP High pressure range 75–125psi (5.2 – 8.6 bar) †
- LP Low pressure range 10–35psi (69 – 241 kPa) †
- Z6 Water meter threaded connections and 7½" (190mm) lay length for new or existing meter box installations, For ⅝", ⅞" x ¾" or 1" meter setters or reseters

† Not available on G or GG models

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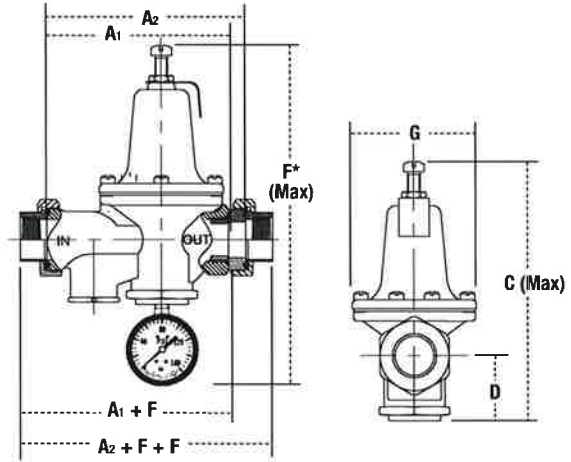
Dimensions – Weights



A₁ - SINGLE UNION LF25AUB LESS FITTING
 A₂ - DOUBLE UNION LF25AUB LESS FITTINGS

VALVES MAY BE ORDERED WITH Q,1,OR 2 UNION CONNECTIONS USING ANY COMBINATION OF NPT, SOLDER, PEX, QUICK CONNECT, CEF (F1960), OR PRESS CONNECTIONS REQUIRED

"E" DIMENSIONS ARE APPROXIMATE ENGAGEMENT LENGTHS



SIZE		A ₁		A ₂		C		D		FΔ		G	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
½	5 1/16	5 1/16	135	5 1/16	129	7	178	1 1/2	38	9 7/16	240	3 1/8	79
¾	5 1/16	5 1/16	135	5 1/16	132	7	178	1 1/2	38	9 7/16	240	3 1/8	79
1	6	5 1/4	152	5 1/4	146	8	203	1 3/4	44	10 1/16	265	3 3/8	92
1 1/4	8 1/4	7 1/16	210	7 1/16	202	9	229	2 1/8	54	11 1/16	291	3 3/8	92
1 1/2	8 1/4	8 1/16	210	8 1/16	205	9 1/2	241	2 3/8	60	11 15/16	303	4 1/16	103
2	8 1/8	8 1/16	225	8 1/16	221	11 1/4	286	3 1/4	83	13 1/16	348	4 3/8	121

SIZE		DIMENSIONS															WEIGHT	
in.	mm	F _{NPT}	F _s	F _{PEX}	F _{oc}	F _{PR}	F _{CEF}	E _{NPT}	E _s	E _{PEX}	E _{oc}	E _{PR}	E _{CEF}	lbs.	kgs.			
½	5 1/16	16	13	16	38	32	22	13	13	-	35	29	19	3.5	1.6			
¾	5 1/16	16	19	16	43	37	29	14	19	16	40	30	24	3.5	1.6			
1	6	19	24	16	44	38	37	17	24	21	41	30	30	6.5	3.0			
1 1/4	8 1/4	19	25	-	-	38	44	17	25	-	-	30	38	10	4.5			
1 1/2	8 1/4	22	27	-	-	44	49	17	27	-	-	35	44	10	4.5			
2	8 1/8	24	33	-	-	51	-	19	33	-	-	40	-	15	6.8			

Δ Dimension includes optional gauge

Nominal dimensions are shown. Allowances must be made for manufacturing tolerances.

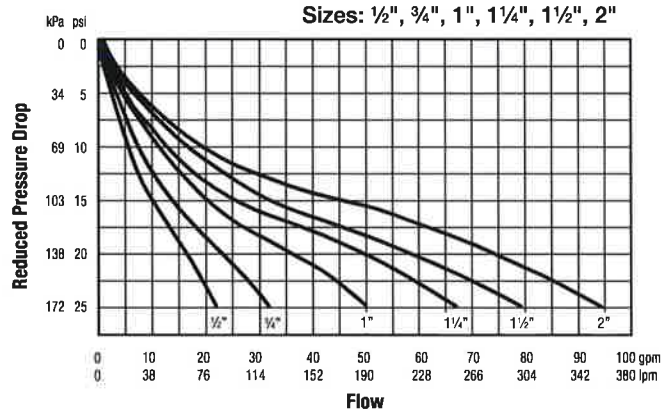


Standards



Meets requirements of ASSE Standard 1003; ANSI A112.26.2; CSA Standard B356; Southern Standard Plumbing Code and listed by IAPMO. Military Standard MIL-V-18146B Type I.

Capacity



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 Canada: T: (888) 208-8927 • F: (905) 481-2316 • Watts.ca
 Latin America: T: (52) 55-4122-0138 • Watts.com

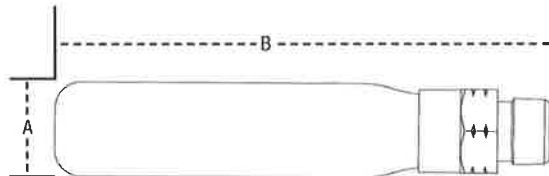
WHA



LF15M2-DR Series
 Tag: WHA

Water Hammer Arrestor

SPECIFICATION: Watts Drainage LF15M2-DR Series lead free* pre-charged copper water hammer arrestor with polypropylene piston, EPDM o-ring seal, and brass NPT threaded connection.
OPERATING PRESSURE: Designed to operate on all domestic and commercial lines up to 150psi (10.6 bar) working pressure.
TEMPERATURE RANGE: 33°F to 180°F (0.5°C to 82°C).



SIZE (DN)	CONNECTION	DIMENSIONS				PDI SIZE	FIXTURE UNITS
		A		B			
	Threaded	in.	mm	in.	mm		
LF15M2-A-DR	1/2"	1 1/8	28.5	5 15/16	150.9	A	1-11
LF15M2-B-DR	3/4"	1 3/8	34.9	8 9/16	218.0	B	12-32
LF15M2-C-DR	1"	1 5/8	41.3	8 13/16	223.5	C	33-60
LF15M2-D-DR	1"	2 1/8	54.0	9 15/16	252.5	D	61-113
LF15M2-E-DR	1"	2 1/8	54.0	12 11/16	322.5	E	114-154
LF15M2-F-DR	1"	2 5/8	66.7	11 5/32	283.5	F	155-330

Standards



Standard: Listed by IAPMO, ASSE 1010 approved, ANSI A112.26.1M approved, PDI WH201 approved and certified.

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

Job Name 6th Ave District Contractor Comfort Systems USA
 Job Location Pine Bluff Contractor's P.O. No. _____
 Engineer Brown Representative Sanders Supply

WATTS Drainage reserves the right to modify or change product design or construction without prior notice and without incurring any obligation to make similar changes and modifications to products previously or subsequently sold. See your WATTS Drainage representative for any clarification. Dimensions are subject to manufacturing tolerances.



Specification Drainage Products

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