BRIDGEPORT RESCUE MISSION

(JOEL SMILOW)

O&M DOCUMENTS
Job 4929

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Danbury, CT 06810
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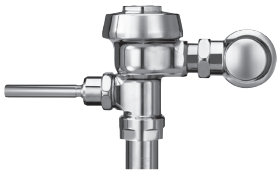
SLOAN

Repair Parts and Maintenance Guide **P1**

Control Stop

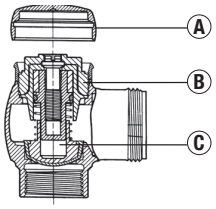


H-700 Series Bak-Chek® control stops and replacement parts (available for 3/4" and 1" water supply inlet pipes)

Replaces H-600 and H-540 Series control stops

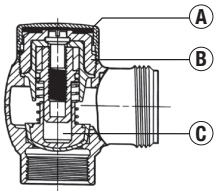
CONTROL STOP AND REPLACEMENT PARTS

H-700 Stop, chrome plated: Screwdriver Angle Stop with H-1010-A Vandal Resistant Cap



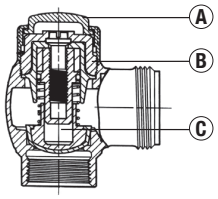
Code No.	Part No.	Description
Complete Stops		
3308384	H-700-A	3/4" NPTF inlet for adjustable tail
3308386	H-700-A	1" NPTF inlet for adjustable tail
3308385	H-700-AG	3/4" NPTF inlet for ground joint tail
3308387	H-700-AG	1" NPTF inlet for ground joint tail
3308388	H-700-AW	1" Whitworth inlet for adjustable tail
Repair Parts		
3308772	H-1010-A	Ⓐ Vandal Resistant Cap*, chrome plated
0308612	H-622	Ⓑ Bonnet, chrome plated
3308853	H-541-ASD	Ⓒ Control Stop Repair Kit*

H-710 Stop, chrome plated: Screwdriver Angle Stop with H-573-A Locking Vandal Resistant Cap



Complete Stops		
0388025	H-710-A	3/4" NPTF inlet for adjustable tail
0388022	H-710-A	1" NPTF inlet for adjustable tail
0388026	H-710-AG	3/4" NPTF inlet for ground joint tail
0388024	H-710-AG	1" NPTF inlet for ground joint tail
0388037	H-710-AW	1" Whitworth inlet for adjustable tail
0388062	H-710-AAR	1" BSP British Standard Pipe inlet for adjustable tail
0388043	NH-710-A	1" NPTF inlet for adjustable tail (Naval brass)
0388048	NH-710-AG	3/4" NPTF inlet for ground joint tail (Naval brass)
0388058	NH-710-AG	1" NPTF inlet for ground joint tail (Naval brass)
0388042	NH-710-AW	1" Whitworth inlet for adjustable tail (Naval brass)
0388045	NH-710-AGW	1" Whitworth inlet for ground joint tail (Naval brass)
0388044	NH-710-AGS	1" NPSM inlet for ground joint tail (Naval brass)
Repair Parts		
3308840	H-573-A	Ⓐ Locking Vandal Resistant Cap*, chrome plated
0308612	H-622	Ⓑ Bonnet, chrome plated
3308853	H-541-ASD	Ⓒ Control Stop Repair Kit*

H-720 Stop, chrome plated: Screwdriver Angle Stop with H-574 Short bumper Cap (-YO Variation)



Complete Stops		
0388034	H-720-A	1" NPTF inlet for adjustable tail
0388033	H-720-AG	1" NPTF inlet for ground joint tail
0388038	H-720-AW	1" Whitworth inlet for adjustable tail
Repair Parts		
3308866	H-574	Ⓐ Stop Cap with Seat Bumper*, chrome plated
0308612	H-622	Ⓑ Bonnet, chrome plated
3308853	H-541-ASD	Ⓒ Control Stop Repair Kit*

*Refer to page 98 for diagrams of our Stop Caps and page 99 for the components supplied in our Control Stop Repair Kits.

CONTROL STOP AND REPLACEMENT PARTS

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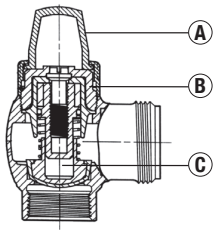
Control Stop

CONTROL STOP AND REPLACEMENT PARTS

H-725 Stop, chrome plated: Screwdriver Angle Stop with H-576 Extended Bumper Cap (-YG Variation)



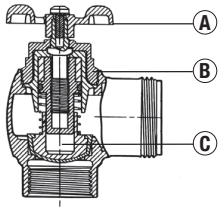
Complete Stops

0388035	H-725-A	1" NPTF inlet for adjustable tail
0388057	H-725-AG	1" NPTF inlet for ground joint tail
0388039	H-725-AW	1" Whitworth inlet for adjustable tail
0388047	NH-725-AGW	1" Whitworth inlet for ground joint tail (Naval brass)

Repair Parts

3308867	H-576	(A) Stop Cap with Extended Seat Bumper chrome plated
0308612	H-622	(B) Bonnet, chrome plated
3308853	H-541-ASD	(C) Control Stop Repair Kit*

H-730 Stop, rough brass: Concealed Wheel Handle Angle Stop



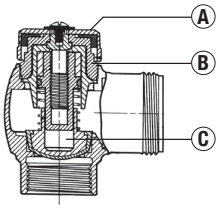
Complete Stops

0388011	H-730-A	3/4" NPTF inlet for adjustable tail
0388010	H-730-A	1" NPTF inlet for adjustable tail
0388014	H-730-AG	3/4" NPTF inlet for ground joint tail
0388013	H-730-AG	1" NPTF inlet for ground joint tail
0388012	H-730-AW	1" Whitworth inlet for adjustable tail
0388056	NH-730-AG	3/4" NPTF inlet for ground joint tail (Naval brass)
0388017	NH-730-AG	1" NPTF inlet for ground joint tail (Naval brass)
0388041	NH-730-AW	1" Whitworth inlet for adjustable tail (Naval brass)
0388046	NH-730-AGW	1" Whitworth inlet for ground joint tail (Naval brass)

Repair Parts

3308872	H-1011-A	(A) Concealed Wheel Handle Repair Kit*
0208083	H-623	(B) Bonnet, rough brass
3308860	H-1006-A	(C) Control Stop Repair Kit*

H-735 Stop, chrome plated: Exposed Wheel Handle Angle Stop



Complete Stops

0388007	H-735-A	3/4" NPTF inlet for adjustable tail
0388006	H-735-A	1" NPTF inlet for adjustable tail
0388009	H-735-AG	3/4" NPTF inlet for ground joint tail
0388008	H-735-AG	1" NPTF inlet for ground joint tail

Repair Parts

3308060	H-1002-A	(A) Exposed Wheel Handle Repair Kit*
0308615	H-623	(B) Bonnet, chrome plated
3308855	H-541-AWH	(C) Control Stop Repair Kit*

*Refer to page 106 for diagrams of Stop Caps and page 99 for the components supplied in our Control Stop Repair Kits.

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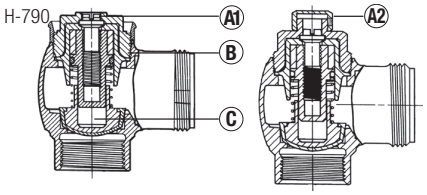
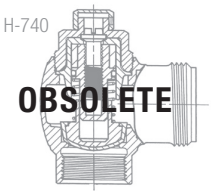
Control Stop

CONTROL STOP AND REPLACEMENT PARTS

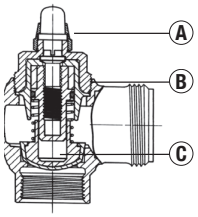
H-740 Stop, chrome plated: Screwdriver Angle Stop with H-37 Cap (Regal® Valve Stop) – OBSOLETE
H-790 Stop, chrome plated: Screwdriver Angle Stop with Vandal Resistant Cap (for Regal or Regal XL Valve Stop)





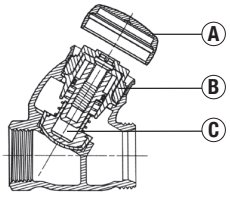
Code No.	Part No.	Description
Complete Stops For Regal® flushometers		
0388031	H-740-A	3/4" NPTF inlet for adjustable tail – **OBSOLETE**
0388029	H-740-A	1" NPTF inlet for adjustable tail – **OBSOLETE**
0388040	H-740-AG	3/4" NPTF inlet for ground joint tail – **OBSOLETE**
0388028	H-740-AG	1" NPTF inlet for ground joint tail – **OBSOLETE**
Complete Stops For Regal® "XL" flushometers		
0388064	H-790-A	3/4" NPTF inlet for adjustable tail
0388065	H-790-A	1" NPTF inlet for adjustable tail
0388068	H-790-AG	3/4" NPTF inlet for ground joint tail
0388067	H-790-AG	1" NPTF inlet for ground joint tail
Repair Parts		
5388002	H-528	(A1) Hole Plug
5388001	H-1012-A	(A2) Vandal Resistant Socket Cap*, chrome plated with set screw, for Regal "XL" flushometer – 6 per package
0308612	H-622	(B) Bonnet, chrome plated
3308853	H-541-ASD	(C) Control Stop Repair Kit*

H-745 Stop, chrome plated: Screwdriver Angle Stop with J-2/J-7 Bumper (for Regal® Valve Stop) (-YO/-YG Variations) – OBSOLETE



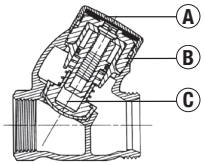
Complete Stops		
0388035	H-725-A	1" NPTF inlet for adjustable tail
Repair Parts		
5310034	J-2/J-7	(A) Cap*, chrome plated – 6 per package – **OBSOLETE**
0308991	H-639	(B) Bonnet, chrome plated – **OBSOLETE**
3308853	H-541-ASD	(C) Control Stop Repair Kit* – **OBSOLETE**

H-750 Stop, chrome plated: Screwdriver Straight Stop with H-1010-A Vandal Resistant Cap



Complete Stops		
3308389	H-750-AG	1" NPTF inlet for ground joint tail
Repair Parts		
3308772	H-1010-A	(A) Vandal Resistant Cap*, chrome plated
0308612	H-622	(B) Bonnet, chrome plated
3308853	H-541-ASD	(C) Control Stop Repair Kit*

H-760 Stop, chrome plated: Screwdriver Straight Stop with H-573-A Locking Vandal Resistant Cap



Complete Stops		
0388023	H-760-AG	1" NPTF inlet for ground joint tail
Repair Parts		
0308738	H-573-A	(A) Locking Vandal Resistant Cap*, chrome plated
0308612	H-622	(B) Bonnet, chrome plated
3308853	H-541-ASD	(C) Control Stop Repair Kit*

*Refer to page 98 for diagrams of our Stop Caps and page 99 for the components supplied in our Control Stop Repair Kits.

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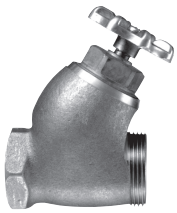
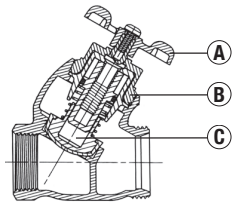
Control Stop

ONTROL STOP AND REPLACEMENT PARTS

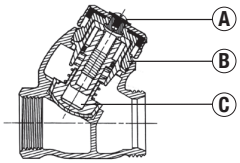
H-770 Stop, rough brass: Concealed Wheel Handle Straight Stop





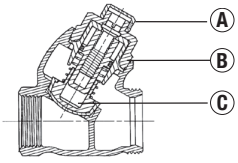
Complete Stops		
0388030	H-770-AG	1" NPTF inlet for ground joint tail
Repair Parts		
3308872	H-1011-A	Ⓐ Concealed Wheel Handle Repair Kit*
0208083	H-623	Ⓑ Bonnet, rough brass
3308860	H-1006-A	Ⓒ Control Stop Repair Kit*

H-775 Stop, chrome plated: Exposed Wheel Handle Straight Stop



Complete Stops		
0388036	H-775-AG	1" NPTF inlet for ground joint tail
Repair Parts		
3308060	H-1002-A	Ⓐ Exposed Wheel Handle Repair Kit*
0308615	H-623	Ⓑ Bonnet, chrome plated
3308855	H-541-AWH	Ⓒ Control Stop Repair Kit*

H-780 Stop, chrome plated: Screwdriver Straight Stop with H-37 Cap (Regal® Valve Stop) and H-795 Stop, chrome plated: Screwdriver Straight Stop with Vandal Resistant Cap (for Regal or Regal XL Valve Stop)

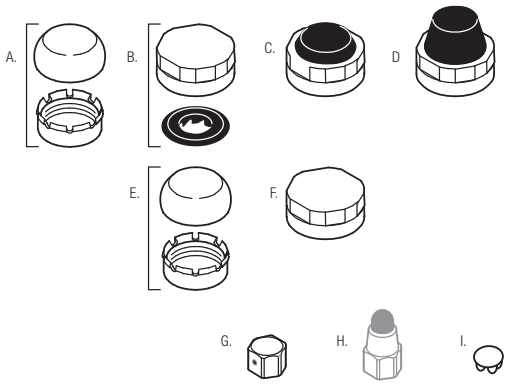


For H-790 Stop, refer to information shown for H-740 and H-790 Stops
For H-795 Stop, refer to information shown for H-780 and H-795 Stops

Complete Stops For Regal® flushometers		
0388027	H-780-AG	1" NPTF inlet for ground joint tail – **OBSOLETE**
Complete Stops For Regal® "XL" flushometers		
0388079	H-795-AG	1" NPTF inlet for ground joint tail
Repair Parts		
5388001	H-1012-A	Ⓐ Vandal Resistant Socket Cap*, chrome plated with set screw, for Regal "XL" flushometer – 6 per package
0308991	H-639	Ⓑ Bonnet, chrome plated
3308853	H-541-ASD	Ⓒ Control Stop Repair Kit*

CONTROL STOP AND REPLACEMENT PARTS FOR H-540, H-600 AND H-700 SERIES CONTROL STOPS

Replacement Stop Caps for Screwdriver Control Stops for H-540, H-600, and H-700 Series Control Stops



For 1" H-600 and H-700 Series Stops and 3/4" H-700 Series Stops

Item No.	Code No.	Part No.	Description
A.	**3308772**	H-1010-A	Vandal Resistant Stop Cap, chrome plated, with Sleeve
	5308954	H-628	Plastic Sleeve only – 6 per package
B.	**3308840**	H-573-A	Locking Vandal Resistant Stop Cap, chrome plated
C.	**3308866**	H-574	Stop Cap, chrome plated with Seat Bumper (-YO)
D.	**3308867**	H-576	Stop Cap, chrome plated with Extended Seat Bumper (-YG)
For 3/4" H-600 Series Stops			
E.	**3308790**	H-1009-A	Vandal Resistant Stop Cap, chrome plated, with Sleeve and 3/4" Bonnet
	5308952	H-614	Plastic Sleeve only – 6 per package
F.	**0308848**	H-582	Stop Cap, chrome plated
For all H-40, H-440, H-540 and H-740 Series Stops			
G.	**5388001**	H-1012-A	Vandal Resistant Stop Cap with set screw, chrome plated – 6 per package
H.	**5310034**	J-2/J-7	Stop Cap, chrome plated with Seat Bumper – 6 per package – **OBSOLETE**
I.	**5388002**	H-528	Hole Plug

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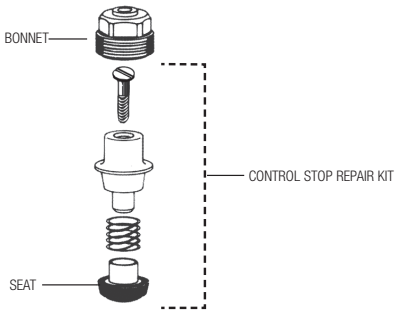
Control Stop

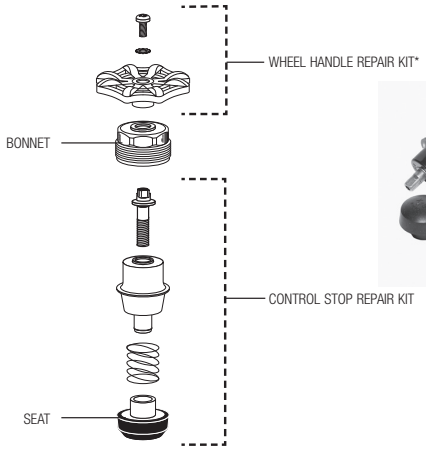
CCONTROL STOP AND REPLACEMENT PARTS FOR H-540, H-600 AND H-700 SERIES CONTROL STOPS

Screwdriver Control Stop Repair Kits



Code No.	Part No.	Description
Complete Repair Kits		
3308853	H-541-ASD	For 1" H-540, H-600 and H-700 Series Stops and 3/4" H-700 Series Stops
3308856	H-543-ASD	For 3/4" H-540 and H-600 Series Stops
Bonnets		
0308612	H-622	For 1" H-600 and H-700 Series Stops and 3/4" H-700 Series Stops
0308991	H-639	For 1" H-540 and H-740 Series Stops and 3/4" H-740 Series Stops
0308843	H-577	For 3/4" H-600 Series Stops – **OBSOLETE**
0308601	H-538	For 3/4" H-540 Series Stops – **OBSOLETE**
Seat only – 6 per package		
5308850	H-584	For 1" H-540, H-600 and H-700 Series Stops and 3/4" H-700 Series Stops
5308836	H-569	For 3/4" H-540 and H-600 Series Stops

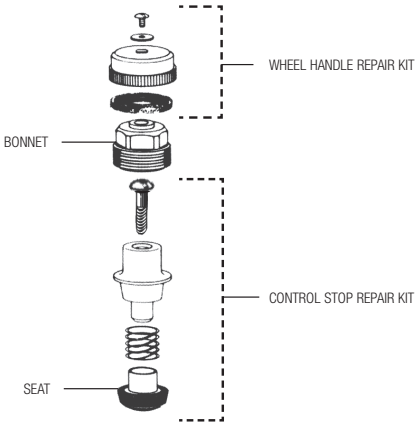
Concealed Wheel Handle Control Stop Repair Kits – Note: Repair Kit includes H-1011-A Wheel Handle Repair Kit



Complete Repair Kits		
3308860	H-1006-A	For 1" H-540, H-600 and H-700 WH Series Stops and 3/4" H-700 WH Series Stops
3308859	H-1007-A	For 3/4" H-540 and H-600 Series Stops
Wheel Handle Repair Kit — Note: Repair Kit includes handle, screw and lockwasher		
3308872	H-1011-A	For all Concealed Wheel Handle Stops
Bonnets		
0208083	H-623	For 1" H-540, H-600 and H-700 WH Series Stops and 3/4" H-700 Series Stops
0308705	H-561	For 3/4" H-540, H-600 Series Stops – **OBSOLETE**
Seat only – 6 per package		
5308850	H-584	For 1" H-540, H-600 and H-700 WH Series Stops and 3/4" H-700 WH Series Stops
5308836	H-569	For 3/4" H-540 and H-600 Series Stops

NOTE: H-540 and H-600 Series concealed wheel handle stops made prior to 1993 featured a design identical to the exposed wheel handle design. These stops can be repaired using an exposed wheel handle repair kit or converted to the current design by using a concealed wheel handle repair kit.

Exposed Wheel Handle Control Stop Repair Kits



Complete Repair Kits		
3308855	H-541-AWH	For 1" H-540, H-600 and H-700 WH Series Stops and 3/4" H-700 Series Stops
3308858	H-543-AWH	For 3/4" H-540 and H-600 Series Stops
Wheel Handle Repair Kit — Note: Repair Kit includes handle, washer, screw and lockwasher		
3308060	H-1002-A	For all Exposed Wheel Handle Stops
5308059	H-1003-A	Screw and Lockwasher only – 12 per package
Bonnets		
0308615	H-623	For 1" H-540, H-600 and H-700 WH Series Stops and 3/4" H-700 Series Stops
0308705	H-561	For 3/4" H-540 and H-600 Series Stops – **OBSOLETE**
Seat only – 6 per package		
5308850	H-584	For 1" H-540, H-600 and H-700 WH Series Stops and 3/4" H-700 WH Series Stops
5308836	H-569	For 3/4" H-540 and H-600 Series Stops

NOTE: 1" and 3/4" H-700 Series stops use "common stop" repair kits. 1" and 3/4" H-540 and H-600 Series stops use stop repair kits unique to each size. See the "common stop" on page 102 for more details.

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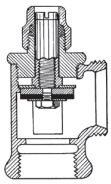
Control Stop

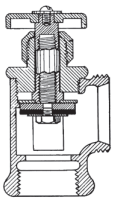
CONTROL STOP AND REPLACEMENT PARTS FOR OLDER CONTROL STOPS

H-10-A 1" Screwdriver Angle Stop, (also fits H-15-A 1" Screwdriver Straight Stop) — used from 1920's through 1940's

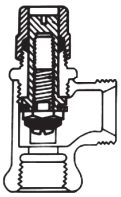
Code No.	Part No.	Description
5308077	H-12	Packing only – 12 per package
—	—	Bonnet no longer available

H-10-A 1" Wheel Handle Angle Stop (also fits H-15-A 1" Wheel Handle Straight Stop) — Used from 1920's through 1940's

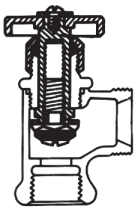
Code No.	Part No.	Description
5308077	H-12	Packing only – 12 per package
—	—	Bonnet no longer available

H-20-A 1/2" and 3/4" Screwdriver Angle Stop (also fits H-30-A Screwdriver Straight Stop) — Used from 1920's through 1950's

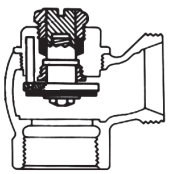
Code No.	Part No.	Description
5308077	H-12	Packing only – 12 per package
—	—	Bonnet no longer available

H-20-A 1/2" and 3/4" Wheel Handle Angle Stop (also fits H-30-A Wheel Handle Straight Stop) — Used from 1920's through 1950's

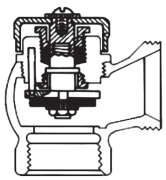
Code No.	Part No.	Description
5308077	H-12	Packing only – 12 per package
—	—	Bonnet no longer available

H-40-A 3/4" and 1" Screwdriver Angle Stop (also fits H-45-A Screwdriver Straight Stop) — Used from 1930's through 1960's

Code No.	Part No.	Description
3308277	H-47-A-SD	Repair kit includes packing ring, key socket, lock shield, retaining ring, screw assembly, and packing
0308176	H-39-A-SD	Bonnet assembly repair kit includes a bonnet assembled with packing ring, key socket, retaining ring, screw assembly, and packing plus our H-37 Vandal Resistant Stop Cap that replaces the lock shield
5308077	H-12	Packing only – 12 per package
0308167	H-39	Bonnet Only

H-40-A 3/4" and 1" Wheel Handle Angle Stop (also fits H-45-A Wheel Handle Straight Stop) — Used from 1930's through 1960's

Code No.	Part No.	Description
3308278	H-47-A-WH	Repair kit includes packing ring, screw, wheel handle, key stem, gland for wheel handle, retaining gland, screw assembly, washer and packing
0308175	H-39-A-WH	Bonnet assembly repair kit includes a bonnet assembled with packing ring, screw, wheel handle, key stem, gland for wheel handle, retaining gland, screw assembly, washer and packing
5308077	H-12	Packing only – 12 per package
0308170	H-39	Bonnet Only

NOTE: STOPS PRIOR TO 1964 WERE GROUND JOINT

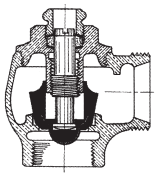
SLOAN

Repair Parts and Maintenance Guide **P1**

Control Stop

CONTROL STOP AND REPLACEMENT PARTS

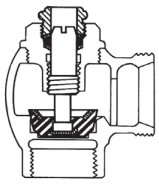
H-340-A 3/4" and 1" Screwdriver and Wheel Handle Angle Stops — Used from 1940's through 1950's

The only replacement part available for this stop is the rubber plug.

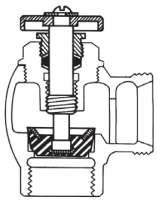
Code No.	Part No.	Description
0308433	H-382-A	Rubber Plug

H-440-A 3/4" Screwdriver Angle Stop — Used from 1950's through 1960's

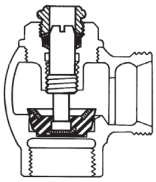
3308442	H-484-A-SD	Repair kit includes lock shield, packing, key stem, rubber plug, and packing ring
0308432	H-439-AU	Bonnet assembly repair kit includes a bonnet assembled with packing, key stem, rubber plug, and packing ring plus our H-37 Vandal Resistant Stop Cap that replaces the lock shield
0308434	H-439	Bonnet
0308490	H-484-A	Rubber Plug
5308077	H-12	Packing only – 12 per package

H-440-A 3/4" Wheel Handle Angle Stop — Used from 1950's through 1960's

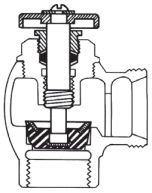
0308435	H-439	Bonnet
0308490	H-484-A	Rubber Plug
5308077	H-12	Packing only – 12 per package

H-440-A 1" Screwdriver Angle Stop (also fits H-445-A Screwdriver Straight Stop) — Used from 1950's through 1960's

3308453	H-482-A-SD	Repair kit includes lock shield, packing, key stem, rubber plug, and packing ring
0308428	H-439-A	Bonnet assembly repair kit includes a bonnet assembled with packing ring, key socket, retaining ring, screw assembly, and packing plus our H-37 Vandal Resistant Stop Cap that replaces the lock shield
0308434	H-439	Bonnet
0308489	H-482-A	Rubber Plug
5308077	H-12	Packing only – 12 per package

H-440-A 1" Wheel Handle Angle Stop (also fits H-445-A Wheel Handle Straight Stop) — Used from 1950's through 1960's

0308435	H-439	Bonnet
0308489	H-482-A	Rubber Plug
5308077	H-12	Packing only – 12 per package

NOTE: H-440 Series control stops were used with Sloan's "Quiet Flush" flushometer models.
NOTE: All obsolete control stops are for ground joint tailpiece connections.
NOTE: Sloan has made other stops up to 1964. If you have an older stop that is not listed on these two pages, the repair parts are obsolete. Prior to 1964, all stops were ground joint connections; the H-700-AG series stops, 3/4" and 1" angle stops, and 1" straight stops, are the current replacement.

SLOAN

Control Stop

THE "COMMON STOP"

In 1996, Sloan began using the H-700 series of control stops with all flushometers. This "common stop" offers 3/4" and 1" supply inlet size options, yet uses a single repair kit for both urinal and water closet stops. This change primarily affects the H-700 series 3/4" stops, which now use the same repair kit as 1" stops. Repair kits for the smaller H-540 and H-600 3/4" stops remain available and are included in this section.

The "common stop" body offers precise control over flow rates delivered through the valve. This feature is important, especially for 1-gallon urinal designs. This finite flow adjustment makes the difference between a proper flush and an ineffective flush that splashes and spills.

The "common stop" internal components are interchangeable with their counterparts in older H-600 and H-540 stops. The distinctively contoured seat plug in the "common stop" allows a finer flow rate adjustment similar to that of a needle valve. Unlike natural rubber components that can be destroyed by water treatment products, our synthetic Permex™ rubber seat plugs resist the effects of chloramines. Our stop spring, formerly brass, is now constructed of stainless steel. This helps prevent corrosion from the increasingly aggressive water supplies we see today.

All complete "common stops" now have bonnets stamped with an H-700 series number. Both exposed and concealed wheel handle stops are stamped H-700-WH series. The H-740 and H-780 stops that replace the H-540 series stops used with Regal valves are stamped H-740 series.

CONTROL STOP DESIGNS

Supply Inlets

Sloan supplies control stops in two basic inlet sizes:

1. 3/4" NPTF — For most urinal flushometers
2. 1" NPTF — For all water closet flushometers and blow-out urinal flushometers

Control stops are also available in some models with the following inlets for specialized and export applications:

1. 1" Whitworth thread
2. 1" BSP British Standard Pipe inlet
3. 1" NSPM Straight thread — for use with shipboard Sil-Braz fittings

Tailpiece Connections

The majority of flushometers supplied by Sloan since 1964 feature an adjustable tailpiece. Connection of the valve tailpiece to the control stop is made with a sliding O-ring seal.

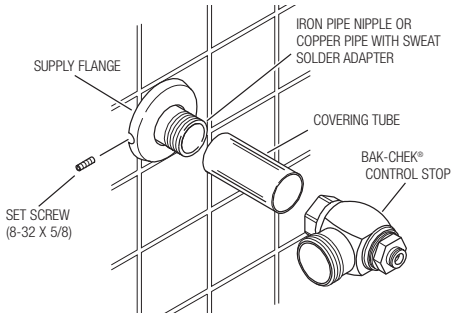
Older valves (produced before 1964), and valves furnished for salt-water installations, and all straight stops utilized a metal-to-metal ground joint (GJ) connection.

When replacing an older stop, it is important to note which type of stop connection is required.

Stops for use with salt water must be made from Naval brass.

GENERAL INSTALLATION INSTRUCTIONS

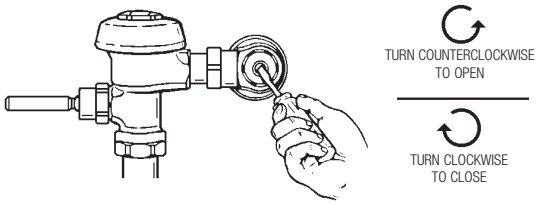
Install the Sloan Bak-Chek® control stop to water supply line with outlet positioned as required. Tighten the control stop coupling with a wrench.



CONTROL STOP ADJUSTMENT

After installation or service, readjust the control stop to meet the flow rate required for the proper cleansing of the fixture. Open the control stop COUNTERCLOCKWISE one full turn from the closed position. Activate flushometer.

Adjust control stop after each flush until the rate of flow delivered properly cleanses the fixture. Turn the control stop adjustment screw (or wheel handle) COUNTERCLOCKWISE to increase the flow rate or CLOCKWISE to decrease the flow rate.



Important: A Sloan flushometer is engineered for quiet operation. Excessive water flow creates noise, while too little water flow may not satisfy the needs of the fixture. Proper adjustment is made when the plumbing fixture is cleansed after each flush without splashing water out from the lip AND a quiet flushing cycle is achieved.

The control stop should never be opened to the point where the flow from the valve exceeds the flow capability of the fixture. In the event of a valve failure, the fixture must be able to accommodate a continuous flow from the valve.

MAINTENANCE AND CLEANING

Control stops have moving parts that may wear over time. Deterioration of rubber parts may result in an incomplete seal. If you can not shut off the stop completely, or if leakage is visible at the adjustment screw, order one of our control stop repair kits and rebuild the control stop.

DO NOT USE abrasive or chemical cleaners to clean flushometers. These cleaners may dull the luster and attack the chrome or special decorative finishes. Use **ONLY** mild soap and water, and then wipe dry with a clean cloth or towel. While cleaning the bathroom tile, protect the flushometer from any splattering of cleaner. Acids and cleaning fluids can discolor or remove chrome plating.

SLOAN

Flush Connections and Flanges

Complete Flush Connection Assemblies Chrome Plate Finish for Exposed Installations

Code No.	Part No.	Description
For Models 110/111		
0393007	V-600-AA	CP Vacuum Breaker 1-1/2" x 9"
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
For Model 113		
0393008	V-600-AA	CP Vacuum Breaker 1-1/2" x 13-1/2"
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
For Model 114		
0393011	V-600-AA	CP Vacuum Breaker 1-1/2" x 32-1/2"
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
For Model 115		
0393009	V-600-AA	CP Vacuum Breaker 1-1/2" x 21-1/2"
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
For Model 116		
0393010	V-600-AA	CP Vacuum Breaker 1-1/2" x 24-1/2"
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
For Model 117		
0393009	V-600-AA	CP Vacuum Breaker 1-1/2" x 21-1/2"
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
For Model 180		
0393006	V-600-AA	CP Vacuum Breaker 1-1/4" x 9"
0306140	F-5-AU	CP Spud Coupling 1-1/4" x 3"
For Model 186		
0393004	V-600-AA	CP Vacuum Breaker 3/4" x 9"
0306125	F-5-AW	CP Spud Coupling 3/4" x 2-1/2"
For Model 300/310		
0306060	F-2-AU	CP Coupling 1-1/4"
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
0306196	F-7	CP Flange w//Prongs 1" x 2-3/4"
0306209	F-7	CP Flange Flat 1-1/4" x 3-1/8"
0306555	F-21-AA	Elbow 1-1/2" x 1-1/4" x 4"
0393007	V-600-AA	CP Vacuum Breaker 1-1/2" x 9"
0396009	F-43-A	CP Outlet & Street El 1"
0396093	F-101	CP Outlet
For Model 320		
0301149	A-35	Reducer Bushing 1" NPT x 3/4 NPT
0306052	F-2-AW	CP Coupling Assembly 3/4"
0306125	F-5-AW	CP Spud Coupling 3/4" x 2-1/2"
0306188	F-7	CP Flange Flat 3/4" x 2-23/32"
0306343	F-15-A	CP Elbow Tail Assembly 3/4" x 4"
0393004	V-600-AA	Vacuum Breaker 3/4" x 9"
0396009	F-43-A	CP Outlet & Street El 1"
0396093	F-101	CP Outlet 1-1/2" x 4-1/2"

Complete Flush Connection Assemblies Chrome Plate Finish for Exposed Installations (continued)

Code No.	Part No.	Description
For Model 120		
0306093	F-2-AT	CP Coupling 1-1/2"
0393003	V-600-A	CP Vacuum Breaker
0396293	F-109	CP Tube 1-1/2" x 8" x 5" Bend
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
For Model 121		
0306093	F-2-AT	CP Coupling 1-1/2"
0393003	V-600-A	CP Vacuum Breaker
0396316	F-109	CP Tube 1-1/2" x 13" x 5" Bend
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
For Model 122		
0306093	F-2-AT	CP Coupling 1-1/2"
0393003	V-600-A	CP Vacuum Breaker
0396322	F-109	CP Tube 1-1/2" x 21" x 5" Bend
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
For Model 136		
0393038	V-600-AA	CP Vacuum Breaker 1-1/2" x 36"
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
For Model 137		
0306093	F-2-AT	CP Coupling 1-1/2"
0393003	V-600-A	CP Vacuum Breaker
0396339	F-109	CP Tube 1-1/2" x 36" x 5""
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"

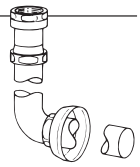
Drip Pocket Flush Connection Assemblies and Parts

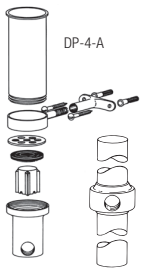
DP-4-A Includes:		
0330015	DP-4-A	Drip Pocket
0330026	DP-1002-A	Float & Seat Repair Kit For DP-4-A
0330002	DP-2-A	Drip Pocket Wall Support (Available upon request)
DP-6-A Includes:		
0330021	DP-6-A	1-1/2" x 18-1/2" CP Outlet
DP-7-A Includes:		
0330002	DP-2-A	D.P. Wall Support
0330015	DP-4-A	Drip Pocket Assembly
0330021	DP-6-A	Drip Pocket Flush Connection
0330004	F-33	Extension Nipple

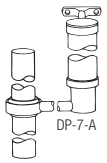
Use on the following flush valve: 118

Special F-33 Includes:

0330004	F-33	Extension for DP-4-A





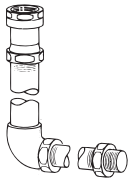


SLOAN

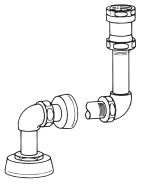
Flush Connections and Flanges

Complete Flush Connection Assemblies
Rough Brass Finish for Concealed Installations

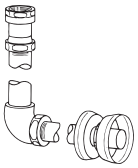
Code No.	Part No.	Description
For Model 150		
0323011	V-500-A	RB Vacuum Breaker
0306087	F-2-A	RB 1-1/2" Coupling w/S30
0306569	F-22	RB Outlet 1" NPT Female
For Model 152		
0323177	V-500-AA	RB Vacuum Breaker 1-1/2" x 22" w/ 3" Score
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306091	F-2-A	RB 1-1/2" Coupling w/S21
0306619	F-2-AA	RB Two Sets F-2-A 1-1/2" Coupling
—	F-100	RB Outlet - Specify Size



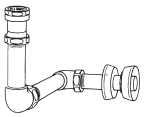
For Model 153/155		
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
0306237	F-7	CP Flange w/Prongs 1-1/2" x 2-3/4"
0306400	F-15-A	CP Elbow 1-1/2" x 4"
0306619	F-2-AA	RB Two Sets F-2-A 1-1/2" SJ Coupling
0323176	V-500-AA	1-1/2" x 17-1/2" w/ 3" Score
—	F-102	CP Outlet - Specify Size



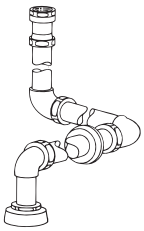
For Model 154		
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306091	F-2-A	RB 1-1/2" Coupling w/S21
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
0306237	F-7	CP Flange 1-1/2" x 2-3/4" w/Prongs
0306619	F-2-AA	RB Two Sets F-2-A 1-1/2" SJ Coupling
0323177	V-500-AA	RB Vacuum Breaker 1-1/2" x 22 w/ 3" Score
—	F-102	CP Outlet - Specify Size



For Model 140		
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
0306237	F-7	CP Flange w/Prongs 1-1/2" x 2-3/4"
0306619	F-2-AA	RB Two Sets F-2-A 1-1/2" SJ Coupling
0306688	F-25-A	RB Elbow/Tail 1-1/2" x 10" C/E w/ 3" Score
0323188	V-500-AA	RB Vacuum Breaker 1-1/2" x 11-1/2" w/ 3" Score
—	F-102	CP Outlet - Specify Size

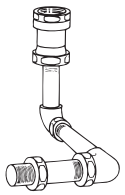


For Model 142		
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
0306237	F-7	CP Flange w/Prongs 1-1/2" x 2-3/4"
0306400	F-15-A	CP Elbow 1-1/2" x 4"
0306619	F-2-AA	RB Two Sets F-2-A 1-1/2" SJ Coupling
0306688	F-25-A	RB Elbow/Tail 1-1/2" x 10 C/E w/ 3" Score
0323207	V-500-AA	RB Vacuum Breaker 1-1/2" x 6" w/ 3" Score
—	F-102	CP Outlet - Specify Size



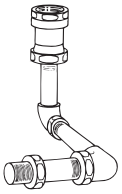
Complete Flush Connection Assemblies
Rough Brass Finish for Concealed Installations (continued)

Code No.	Part No.	Description
For Model 143		
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306091	F-2-A	RB 1-1/2" Coupling w/S21
0306619	F-2-AA	RB Two Sets F-2-A 1-1/2" SJ Coupling
0306688	F-25-A	RB Elbow/Tail 1-1/2" x 10" C/E w/ 3" Score
0323188	V-500-AA	RB Vacuum Breaker 1-1/2" x 11-1/2 w/ 3" Score
—	F-100	RB Outlet - Specify Size

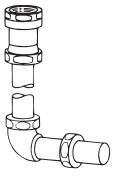


For Model 144		
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306091	F-2-A	RB 1-1/2" Coupling w/S21
0306619	F-2-AA	RB Two Sets F-2-A 1-1/2" SJ Coupling
0306688	F-25-A	RB Elbow/Tail 1-1/2" x 10" C/E w/ 3" Score
0323208	V-500-AA	RB Vacuum Breaker 1-1/2" x 7-1/2" w/ 3" Score
—	F-100	RB Outlet - Specify Size

For Model 192		
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306140	F-5-AU	CP Spud Coupling
0306237	F-7	CP Flange w/Prongs 1-1/2" x 2-3/4"
0306472	F-15-A	CP Elbow/Tail 1-1/2" x 1-1/4" x 4"
0306619	F-2-AA	RB Two Sets F-2-A 1-1/2" SJ Coupling
0323188	V-500-AA	RB Vacuum Breaker 1-1/2" x 11-1/2" w/ 3" Score
—	F-102	CP Outlet -Specify Size



For Model 195		
0306054	F-2-AW	RB Coupling 3/4"
—	F-15-A	Specify Size
0323003	V-500-AA	RB Vacuum Breaker 3/4" x 10-1/2"
For Model 197		
0306125	F-5-AW	CP Spud Coupling 3/4" x 2-1/2"
0306186	F-7	CP Flange 3/4" x 2-3/4"
0306375	F-15-A	CP Elbow/Tail 3/4" x 5"
0306376	F-15-A	CP Elbow/Tail 3/4" x 14"
0323003	V-500-AA	RB Vacuum Breaker 3/4" x 10-1/2"
For Model 190		
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306059	F-2-AU	RB Coupling 1-1/4"
0306088	F-2-AT	RB Coupling 1-1/2"
0306091	F-2-A	RB 1-1/2" Coupling w/S21
0323188	V-500-AA	RB Vacuum Breaker 1-1/2" x 11-1/2" w/3" Score
—	F-110	Specify Size



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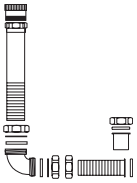
Flush Connections and Flanges

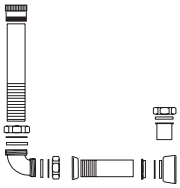
Complete Flush Connection Assemblies
Rough Brass Finish for Concealed Installations (continued)

Code No.	Part No.	Description
For Model 312		
0306060	F-2-AU	CP Coupling 1-1/4"
0306087	F-2-A	RB 1-1/2" Coupling w/S30
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
0306209	F-7	CP Flange Flat 1-1/4" x 3-1/8"
0306555	F-21-AA	CP Elbow 1-1/2" x 1-1/4" x 4"
0306569	F-22	RB Outlet 1" NPT Female x 1-1/2"
0393007	V-600-AA	CP Vacuum Breaker 1-1/2" x 9"

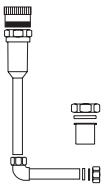
For Model 313		
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306087	F-2-A	RB 1-1/2" Coupling w/S30
0306091	F-2-A	RB 1-1/2" Coupling w/S21
0306569	F-22	RB Outlet 1" NPT Female x 1-1/2"
0306619	F-2-AA	RB Two Sets F-2-A 1-1/2" SJ Coupling
0322026	V-79	RB 1" Adapter
0323188	V-500-AA	RB Vacuum Breaker 1-1/2" x 11-1/2" w/3" Score
—	F-100	RB Outlet



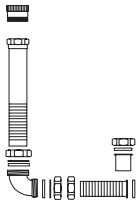
For Model 318		
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306087	F-2-A	RB 1-1/2" Coupling w/S30
0306146	F-5-AT	CP Spud Coupling 1-1/2" x 3"
0306237	F-7	CP Flange w/Prongs 1-1/2" x 2-3/4"
0306569	F-22	RB Outlet 1" NPT Female x 1-1/2"
0306619	F-2-AA	RB Two Sets F-2-A 1-1/2" SJ Coupling
0322026	V-79	RB 1" Adapter
	F-102	CP Outlet - Specify Size
0323188	V-500-AA	RB Vacuum Breaker 1-1/2" x 11-1/2" w/3" Score



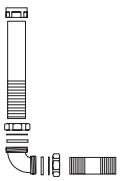
For Model 323		
0206160	F-22	RB 3/4" Outlet Female
0306054	F-2-AW	RB 3/4"
0306087	F-2-A	RB 1-1/2" Coupling w/S30
0306366	F-15-A	RB Elbow Tail Assembly 3/4" x 11"
0322021	V-79	RB 3/4" Adapter Inlet
0323003	V-500-AA	RB Vacuum Breaker 3/4" x 10-1/2"



For Model 343		
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306059	F-2-AU	RB Coupling 1-1/4"
0306087	F-2-A	RB 1-1/2" Coupling w/S30
0306091	F-2-A	RB 1-1/2" Coupling w/S21
0306569	F-22	RB Outlet 1" NPT Female x 1-1/2"
0322026	V-79	RB 1" Adapter
0323188	V-500-AA	RB Vacuum Breaker 1-1/2" x 11-1/2" w/ 3" Score
—	F-110	RB 1-1/2" Flange x 1-1/4" Tube w/Score



For Model 139		
0206146	F-21	RB 1-1/2" EI Double Male Slip
0306619	F-2-AA	RB Two Sets F-2-A 1-1/2" Coupling
0323312	V-500-AA	RB Vacuum Breaker 1-1/2" x 33-1/2" w/3" Score
0396210	F-102	RB Tube 1-1/2" x 10" w/Score



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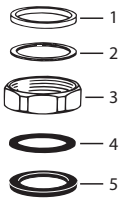
Flush Connections and Flanges

Couplings and Gaskets

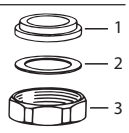
Item No.	Code No.	Part No.	Description
F-2-A			
1-3	**0306052**	F-2-A	3/4" CP Coupling Assembly
	0306054	F-2-A	3/4" RB Coupling Assembly
	0306077	F-2-A	1" CP Coupling Assembly
	0306060	F-2-A	1-1/4" CP Coupling Assembly
	0306059	F-2-A	1-1/4" RB Coupling Assembly
	0306093	F-2-A	1-1/2" CP Coupling Assembly
	0306088	F-2-A	1-1/2" RB Coupling Assembly
3-4	**0306092**	F-2-A	1-1/2" CP Coupling Assembly
	0306087	F-2-A	1-1/2" RB Coupling Assembly
1	**5306113**	F-5	3/4" SJ Gasket
	5306115	F-5	1" SJ Gasket
	5322176	VBF-5	1-1/4" SJ Gasket
	5322001	VBF-5	1-1/2" SJ Gasket
2	**5306055**	F-3	3/4" Friction Ring
	5306056	F-3	1" Friction Ring
	5306057	F-3	1-1/4" Friction Ring
	5306058	F-3	1-1/2" Friction Ring
3	*	F-2	3/4" CP Coupling
	*	F-2	3/4" RB Coupling
	*	F-2	1" CP Coupling
	*	F-2	1-1/4" CP Coupling
	*	F-2	1-1/4" RB Coupling
	0306045PK	F-2	1-1/2" CP Coupling
	*	F-2	1-1/2" RB Coupling
4	**5319086**	S-30	1-1/2" Gasket
5	**0319079**	S-21	1-1/2" Rigid Seat
3-5	**0306091**	F-2-A	1-1/2" with S-21 Seat

*N/A order appropriate F-2-A



NF-2-A

1	**0396264**	F-105	1-1/2" x 1-1/4" SJ Gasket
1-3	**0314011**	NF-2-A	1-1/2" x 1-1/4" SJ Reducing Coupling Assembly

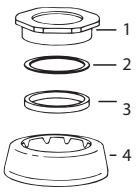


Spud Coupling Assemblies

F-5-A

1-4	**0306125**	F-5-A	3/4" CP Spud Coupling Assembly
	0306132	F-5-A	1" CP Spud Coupling Assembly
	0306140	F-5-A	1-1/4" CP Spud Coupling Assembly
	0306146	F-5-A	1-1/2" CP Spud Coupling Assembly
1-3	**0306516**	F-20-AW	3/4" Spud Coupling
	0306524	F-20-AU	1-1/4" Spud Coupling
	0306526	F-20-AT	1-1/2" Spud Coupling
2	**5306055**	F-3	3/4" Friction Ring
	5306056	F-3	1" Friction Ring
	5306057	F-3	1-1/4" Friction Ring
	5306058	F-3	1-1/2" Friction Ring
3	**5306113**	F-5	3/4" SJ Gasket
	5306115	F-5	1" SJ Gasket
	5322176	VBF-5	1-1/4" Gasket
	5322001	VBF-5	1-1/2" Gasket
4	**0306189**	F-7	3/4" Spud Flange
	0306197	F-7	1" Spud Flange
	0306214	F-7	1-1/4" Spud Flange
	0306238	F-7	1-1/2" Spud Flange

Note: 3-1/2" spud flange available in old style only.



Wall Flange For Tubing

Code No.	Part No.	Description
F-7 (2-3/4" O.D. X 5/8" Deep)		
0306204	F-7	1-1/4" Tube Flange
0306237	F-7	1-1/2" Tube Flange

Supply Flange For Iron Pipe

Code No.	Part No.	Description
F-7 (2-3/4" O.D.)		
0306191	F-7	3/4" IPS CP Supply Flange
0306196	F-7	1" IPS CP Supply Flange
0306205	F-7	1-1/4" IPS CP Supply Flange

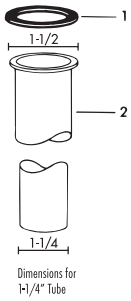
F-7 (2-3/4" O.D. Flat)		
0306167	F-7	1/2" IPS CP Supply Flange
0306188	F-7	3/4" IPS CP Supply Flange
0306201	F-7	1" IPS CP Supply Flange
0306209	F-7	1-1/4" IPS CP Supply Flange

F-45-A		
0396019	F-45-A	3/4" Heavy Supply Flange with Set Screw for IPS
0396020	F-45-A	1" Heavy Supply Flange with Set Screw for IPS

For additional flanges, see 4.9.1

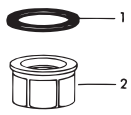
Outlets

Item No.	Code No.	Part No.	Description
F-1 (Flanged)			
1	**5319086**	S-30	Gasket
2	**0306007**	F-1	1-1/2" x 1-1/4" x 6" CP Flanged Outlet
	0306009	F-1	1-1/2" x 1-1/4" x 8" CP Flanged Outlet
	0306012	F-1	1-1/2" x 1-1/4" x 10" CP Flanged Outlet
	0306013	F-1	1-1/2" x 1-1/4" x 12" CP Flanged Outlet
	0306031	F-1	1-1/2" x 6" CP Flanged Outlet
	0306034	F-1	1-1/2" x 8" CP Flanged Outlet
	0306039	F-1	1-1/2" x 10" CP Flanged Outlet
	0306044	F-1	1-1/2" x 12" CP Flanged Outlet



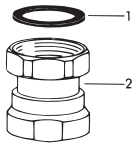
F-22

1	**5319086**	S-30	Gasket
2	**0206159**	F-22	1/2" IPS RB Female Outlet
	0206160	F-22	3/4" IPS RB Female Outlet
	0306569	F-22	1" IPS RB Female Outlet



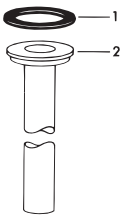
F-22-A

1-2	**0306574**	F-22-A	1-1/4" IPS RB Union Outlet Assembly
	0306575	F-22-A	1-1/4" IPS CP Union Outlet Assembly
1	**5319086**	S-30	Gasket



F-29-A

1	**5319086**	S-30	Gasket
2	**0306767**	F-29-A	3/4" x 6" CP Outlet
	0306769	F-29-A	3/4" x 7-1/2" RB Outlet
	0306773	F-29-A	3/4" x 8-1/2" CP Outlet
	0306791	F-29-A	3/4" x 10-1/2" RB Outlet



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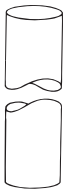
Repair Parts and Maintenance Guide **P1**

Flush Connections and Flanges

Outlets (continued)

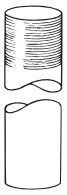
Code No.	Part No.	Description
F-101		
0396060	F-101	3/4" x 4-1/2" CP Outlet
0396100	F-101	1-1/2" x 6" CP Outlet
0396113	F-101	1-1/2" x 9" CP Outlet
0396119	F-101	1-1/2" x 10-1/2" CP Outlet
0396127	F-101	1-1/2" x 13-1/2" CP Outlet
0396134	F-101	1-1/2" x 18-1/2" CP Outlet
0396142	F-101	1-1/2" x 21-1/2" CP Outlet
0396147	F-101	1-1/2" x 24-1/2" CP Outlet



F-102 (Scored - Both Ends)		
0396175	F-102	1-1/4" x 5" RB Outlet, 3-3/4" "L" Dimension
0396176	F-102	1-1/4" x 6" RB Outlet, 4-3/4" "L" Dimension
0396177	F-102	1-1/4" x 7" RB Outlet, 5-3/4" "L" Dimension
0396178	F-102	1-1/4" x 8" RB Outlet, 6-3/4" "L" Dimension
0396179	F-102	1-1/4" x 9" RB Outlet, 7-3/4" "L" Dimension
0396180	F-102	1-1/4" x 10" RB Outlet, 8-3/4" "L" Dimension
0396181	F-102	1-1/4" x 11" RB Outlet, 9-3/4" "L" Dimension
0396182	F-102	1-1/4" x 12" RB Outlet, 10-3/4" "L" Dimension
0396183	F-102	1-1/4" x 13" RB Outlet, 11-3/4" "L" Dimension
0396184	F-102	1-1/4" x 14" RB Outlet, 12-3/4" "L" Dimension
0396185	F-102	1-1/4" x 15" RB Outlet, 13-3/4" "L" Dimension
0396186	F-102	1-1/4" x 16" RB Outlet, 14-3/4" "L" Dimension
0396678	F-102	1-1/2" x 5" RB Outlet, 3-3/4" "L" Dimension
0396674	F-102	1-1/2" x 6" RB Outlet, 4-3/4" "L" Dimension
0396194	F-102	1-1/2" x 7" RB Outlet, 5-3/4" "L" Dimension
0396201	F-102	1-1/2" x 8" RB Outlet, 6-3/4" "L" Dimension
0396206	F-102	1-1/2" x 9" RB Outlet, 7-3/4" "L" Dimension
0396210	F-102	1-1/2" x 10" RB Outlet, 8-3/4" "L" Dimension
0396214	F-102	1-1/2" x 11" RB Outlet, 9-3/4" "L" Dimension
0396217	F-102	1-1/2" x 12" RB Outlet, 10-3/4" "L" Dimension
0396220	F-102	1-1/2" x 13" RB Outlet, 11-3/4" "L" Dimension
0396221	F-102	1-1/2" x 14" RB Outlet, 12-3/4" "L" Dimension
0396224	F-102	1-1/2" x 15" RB Outlet, 13-3/4" "L" Dimension
0396715	F-102	1-1/2" x 16" RB Outlet, 14-3/4" "L" Dimension

Outlets (continued)

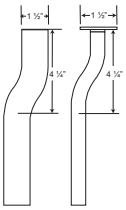
Code No.	Part No.	Description
Special F-102 (Scored - One End)		
0396163	F-102	1-1/4" x 8" CP Outlet, 3-3/4" "L" Dimension
0396164	F-102	1-1/4" x 9" CP Outlet, 4-3/4" "L" Dimension
0396171	F-102	1-1/4" x 15" CP Outlet, 10-3/4" "L" Dimension
0396669	F-102	1-1/2" x 8" CP Outlet, 3-3/4" "L" Dimension
0396670	F-102	1-1/2" x 9" CP Outlet, 4-3/4" "L" Dimension
0396671	F-102	1-1/2" x 10" CP Outlet, 5-3/4" "L" Dimension
0396679	F-102	1-1/2" x 11" CP Outlet, 6-3/4" "L" Dimension
0396672	F-102	1-1/2" x 12" CP Outlet, 7-3/4" "L" Dimension
0396673	F-102	1-1/2" x 13" CP Outlet, 8-3/4" "L" Dimension
0396713	F-102	1-1/2" x 14" CP Outlet, 9-3/4" "L" Dimension
0396714	F-102	1-1/2" x 15" CP Outlet, 10-3/4" "L" Dimension
0396716	F-102	1-1/2" x 16" CP Outlet, 11-3/4" "L" Dimension



F-201		
0396455	F-201	1-1/2" x 1-1/4" x 9" CP Outlet
0396456PK	F-201	1-1/2" x 1-1/4" x 11" CP Outlet
0396461	F-201	1-1/2" x 1-1/4" x 11" CP Outlet
0396464	F-201	1-1/2" x 1-1/4" x 21-1/2" CP Outlet
0396468PK	F-201	1-1/2" x 1-1/4" x 10" CP Outlet

Offset Outlet Tubes

0396202	F-66-A	3/4" x 1" Offset x 13-1/4"
0396203	F-67-A	3/4" x 1-1/2" Offset x 13-1/4"
0396204	F-68-A	3/4" x 2" Offset x 13-1/4"
0396530	F-188	1-1/2" x 1" Offset x 13-1/4"
0396532	F-189	1-1/2" x 1-1/2" Offset x 13-1/4"
0396534	F-190	1-1/2" x 2" Offset x 13-1/4"



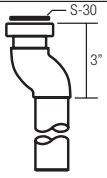
Designed for use with V-600-A or V-500-A "short" Vacuum Breaker. Each tube is 13-1/4" in length.

For 3/4" tubes, and "short" Vacuum Breaker, use F-2-A Coupling S-30 Gasket (Code No. **0306092**).

For 1-1/2" tubes, and "short" Vacuum Breaker, use F-2-A Coupling with Slip Gasket (Code No. **0306093**)

F-31-AA (For High Clearance Offset and Rigid Application)

0306919	F-31-AA	1-1/2" x 8-1/4" CP Flanged and Coupling Outlet ASM W/1" Offset
0306921	F-31-AA	1-1/2" x 8-1/4" CP Flanged and Coupling Outlet ASM W/2" Offset
0306922	F-31-AA	1-1/2" x 9-3/4" CP Flanged and Coupling Outlet ASM W/2" Offset



F-182 Flanged Outlet Tube w/Offset

0396525	F-182	1-1/2" x 8" x 1-1/2" Offset

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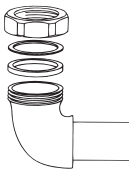
Repair Parts and Maintenance Guide **P1**

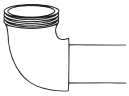
Flush Connections and Flanges

Elbows

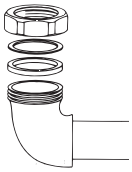
Code No.	Part No.	Description
F-15-A		
0306341	F-15-A	3/4" CP SJ WII with Tail 4-5/8" C to E
0306472	F-15-A	1-1/4" CP SJ WII with Tail 4-5/8" C to E
0306340	F-15-A	3/4" RB SJ Ell & Tail F/ 3-3/4" L Dimension
0306344	F-15-A	3/4" RB SJ Ell & Tail F/ 5-3/4" L Dimension
0306350	F-15-A	3/4" RB SJ Ell & Tail F/ 6-3/4" L Dimension
0306355	F-15-A	3/4" RB SJ Ell & Tail F/ 7-3/4" L Dimension
0306358	F-15-A	3/4" RB SJ Ell & Tail F/ 8-3/4" L Dimension
0306362	F-15-A	3/4" RB SJ Ell & Tail F/ 9-3/4" L Dimension
0306366	F-15-A	3/4" RB SJ Ell & Tail F/ 10-3/4" L Dimension



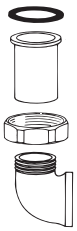
F-21-AA		
0306555	F-21-AA	1-1/2" x 1-1/4" CP Ell with Tail 5 C to E
0306558	F-21-AA	1-1/2" x 1-1/4" CP Ell with Tail 8 C to E



F-25-A		
0306671	F-25-A	1-1/2" RB SJ Ell with Tail 4" C to E
0306678	F-25-A	1-1/2" RB SJ Ell with Tail 5-1/2" C to E
0306682	F-25-A	1-1/2" RB SJ Ell with Tail 7-1/2" C to E
0306683	F-25-A	1-1/2" RB SJ Ell with Tail 8-1/2" C to E
0306687	F-25-A	1-1/2" RB SJ Ell with Tail 9" C to E
0306688	F-25-A	1-1/2" RB SJ Ell with Tail 9-1/2" C to E
0306712	F-25-A	1-1/2" RB SJ Ell with Tail 14" C to E
0306737	F-25-A	1-1/2" RB SJ Ell with Tail 18-1/2" C to E
0306719	F-25-A	1-1/2" RB SJ Ell with Tail 20" C to E

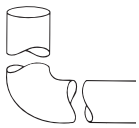


F-43-A		
0396009	F-43-A	1" CP Outlet A7 Street Ell (Royal®)
0396010	F-43-A	1" CP Outlet A7 Street Ell (Crown®)



Tube Ends

Code No.	Part No.	Description
F-109		
0396265	F-109	1-1/4" x 5" x 8-1/2" CP Tube Bend
0396283	F-109	1-1/4" x 5" x 11-1/2" CP Tube Bend
0396288	F-109	1-1/4" x 5" x 13-1/2" CP Tube Bend
0396289	F-109	1-1/4" x 5" x 16" CP Tube Bend
0396290	F-109	1-1/4" x 5" x 21" CP Tube Bend
0396291	F-109	1-1/4" x 5" x 24" CP Tube Bend
0396293	F-109	1-1/2" x 5" x 8-1/2" CP Tube Bend
0396310	F-109	1-1/2" x 5" x 11-1/2" CP Tube Bend
0396316	F-109	1-1/2" x 5" x 13-1/2" CP Tube Bend
0396320	F-109	1-1/2" x 5" x 16" CP Tube Bend
0396322	F-109	1-1/2" x 5" x 21" CP Tube Bend
0396326	F-109	1-1/2" x 5" x 24" CP Tube Bend



Miscellaneous

V-75		
0322013	V-75	Inlet Adaptor for old style Royal®
0322015	V-75	Inlet Adaptor for old style Crown®

Special V-79		
0322021	Spl V-79	3/4" RB Inlet Adaptor
0322026	Spl V-79	1" RB Inlet Adaptor

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Flushometer Parts Quick Reference Guide

V-500-AA VACUUM BREAKER FLUSH CONNECTION

Code No.	Part No.	Description
5323006	V-500-AA	CP Vacuum Breaker 1-1/4" x 9"
5323005	V-500-AA	CP Vacuum Breaker 3/4" x 9"
5323007	V-500-AA	CP Vacuum Breaker 1-1/2 x 9"
0323229	V-500-AA	CP Vacuum Breaker 1-1/2" x 22-1/2" w/2" Offset
0323225	V-500-AA	CP Vacuum Breaker 1-1/2" x 22-13/16" w/1" Offset
0323227	V-500-AA	CP Vacuum Breaker 1-1/2" x 22-5/8" w/1-1/2" Offset
0323230	V-500-AA	CP Vacuum Breaker 1-1/2" x 25-1/2" w/2" Offset
0323226	V-500-AA	CP Vacuum Breaker 1-1/2" x 25-13/16" w/1" Offset
0323228	V-500-AA	CP Vacuum Breaker 1-1/2" x 25-5/8" w/1-1/2" Offset
0323013	V-500-AA	CP Vacuum Breaker 1-1/2" x 10-1/2"
0323014	V-500-AA	CP Vacuum Breaker 1-1/2" x 13-1/2"
0323017	V-500-AA	CP Vacuum Breaker 1-1/2" x 15"
0323015	V-500-AA	CP Vacuum Breaker 1-1/2" x 21-1/2"
0323016	V-500-AA	CP Vacuum Breaker 1-1/2" x 24-1/2"
0323021	V-500-AA	CP Vacuum Breaker 1-1/2" x 26"
0323057	V-500-AA	CP Vacuum Breaker 1-1/2" x 32"
0323002	V-500-AA	CP Vacuum Breaker 1-1/4" x 10-1/2"
0323018	V-500-AA	CP Vacuum Breaker 1-1/4" x 13-1/2"
0323026	V-500-AA	CP Vacuum Breaker 1-1/4" x 15"
0323020	V-500-AA	CP Vacuum Breaker 1-1/4" x 21-1/2"
0323012	V-500-AA	CP Vacuum Breaker 1" x 9"
0323004	V-500-AA	CP Vacuum Breaker 3/4" x 10-1/2"
0323210	V-500-AA	CP Vacuum Breaker 3/4" x 15"
0323188	V-500-AA	RB Vacuum Breaker 1-1/2" x 11-1/2" w/3" Score
0323142	V-500-AA	RB Vacuum Breaker 1-1/2" x 13-1/2" w/3" Score
0323176	V-500-AA	RB Vacuum Breaker 1-1/2" x 17-1/2" w/3" Score
0323177	V-500-AA	RB Vacuum Breaker 1-1/2" x 22" w/3" Score
0323209	V-500-AA	RB Vacuum Breaker 1-1/2" x 30-1/2" w/3" Score
0323207	V-500-AA	RB Vacuum Breaker 1-1/2" x 6" w/3" Score
0323208	V-500-AA	RB Vacuum Breaker 1-1/2" x 7-1/2" w/3" Score

V-600-AA VACUUM BREAKER FLUSH CONNECTION

Code No.	Part No.	Description
0393029	V-600-AA	CP Vacuum Breaker 1-1/2" x 22-1/2" w/2" Offset
0393025	V-600-AA	CP Vacuum Breaker 1-1/2" x 22-13/16" w/1" Offset
0393027	V-600-AA	CP Vacuum Breaker 1-1/2" x 22-5/8" w/1-1/2" Offset
0393030	V-600-AA	CP Vacuum Breaker 1-1/2" x 25-1/2" w/2" Offset
0393026	V-600-AA	CP Vacuum Breaker 1-1/2" x 25-13/16" w/1" Offset
0393028	V-600-AA	CP Vacuum Breaker 1-1/2" x 25-5/8" w/1-1/2" Offset
0393008	V-600-AA	CP Vacuum Breaker 1-1/2" x 13-1/2"
0393031	V-600-AA	CP Vacuum Breaker 1-1/2" x 15"
0393009	V-600-AA	CP Vacuum Breaker 1-1/2" x 21-1/2"
0393010	V-600-AA	CP Vacuum Breaker 1-1/2" x 24-1/2"
0393038	V-600-AA	CP Vacuum Breaker 1-1/2" x 36"
3393007	V-600-AA	CP Vacuum Breaker 1-1/2" x 9" package
0393039	V-600-AA	CP Vacuum Breaker 1-1/4" x 13-1/2"
0393045	V-600-AA	CP Vacuum Breaker 1-1/4" x 21-1/2"
3393006	V-600-AA	CP Vacuum Breaker 1-1/4" x 9" package
0393046	V-600-AA	CP Vacuum Breaker 3/4" x 10-1/2"
0393047	V-600-AA	CP Vacuum Breaker 3/4" x 15"
3393004	V-600-AA	CP Vacuum Breaker 3/4" x 9" package

F-7 SUPPLY FLANGE

0306167	F-7	CP Flange Flat 1/2" IPS x 2-23/32"
0306188	F-7	CP Flange Flat 3/4" x 2-23/32"
0306238	F-7	CP Flange Spud 1-1/2" x 3" w/Prongs
0306214	F-7	CP Flange Spud 1-1/4" x 3" w/Prongs
0306197	F-7	CP Flange Spud 1" x 2-1/2" w/Prongs
0306189	F-7	CP Flange Spud 3/4" x 2-1/2" w/Prongs
0306205	F-7	CP Flange Supply 1-1/4" x 3"
0306196	F-7	CP Flange Supply 1" x 2-3/4" w/Prongs
0306191	F-7	CP Flange Supply 3/4" x 2-3/4" w/Prongs
0306209	F-7	CP Flange Supply Flat 1-1/4" x 3-1/8"
0306201	F-7	CP Flange Supply Flat 1" x 3-1/8"
0306204	F-7	CP Flange Tube 1-1/4" x 2-3/4" w/Prongs
0306237	F-7	CP Flange Tube 1-1/2" x 2-3/4" w/Prongs

F-15-A ELBOW FLUSH CONNECTION

0306341	F-15-A	CP Elbow Tail Assembly SJ 3/4" x 4"
0306362	F-15-A	RB Elbow Tail Assembly SJ 3/4" x 10"
0306366	F-15-A	RB Elbow Tail Assembly SJ 3/4" x 11"
0306340	F-15-A	RB Elbow Tail Assembly SJ 3/4" x 4"
0306344	F-15-A	RB Elbow Tail Assembly SJ 3/4" x 6"
0306350	F-15-A	RB Elbow Tail Assembly SJ 3/4" x 7"
0306355	F-15-A	RB Elbow Tail Assembly SJ 3/4" x 8"
0306358	F-15-A	RB Elbow Tail Assembly SJ 3/4" x 9"

F-100 FLARED END FLUSH CONNECTION

Code No.	Part No.	Description
0396160	F-100	RB Outlet 1-1/2" x 11-1/2" w/3" Score
0396167	F-100	RB Outlet 1-1/2" x 13-1/2" w/3" Score
0396168	F-100	RB Outlet 1-1/2" x 19-1/2" w/3" Score
0396169	F-100	RB Outlet 1-1/2" x 23-1/2" w/3" Score
0396156	F-100	RB Outlet 1-1/2" x 3-1/4" w/3" Score
0396157	F-100	RB Outlet 1-1/2" x 5-1/2" w/3" Score
0396158	F-100	RB Outlet 1-1/2" x 7-1/2" w/3" Score
0396159	F-100	RB Outlet 1-1/2" x 9-1/2" w/3" Score
0396161	F-100	RB Outlet 1-1/2" x 9-1/2" w/9" Score

F-109 TUBE BEND

Code No.	Part No.	Description
0396310	F-109	CP Tube Outlet 1-1/2" x 11-1/2" x 5" Bends
0396283	F-109	CP Tube Outlet 1-1/4" x 11-1/2" x 5" Bends
0396288	F-109	CP Tube Outlet 1-1/4" x 13-1/2" x 5" Bends
0396293	F-109	CP Tube Outlet 1-1/2" x 8-1/2" x 5" Bends
0396265	F-109	CP Tube Outlet 1-1/4" x 8-1/2" x 5" Bends
0396316	F-109	CP Tube Outlet 1-1/2" x 13" x 5" Bends
0396320	F-109	CP Tube Outlet 1-1/2" x 16" x 5" Bends
0396322	F-109	CP Tube Outlet 1-1/2" x 21" x 5" Bends
0396326	F-109	CP Tube Outlet 1-1/2" x 24" x 5" Bends
0396289	F-109	CP Tube Outlet 1-1/4" x 16" x 5" Bends
0396290	F-109	CP Tube Outlet 1-1/4" x 21" x 5" Bends
0396291	F-109	CP Tube Outlet 1-1/4" x 24" x 5" Bends

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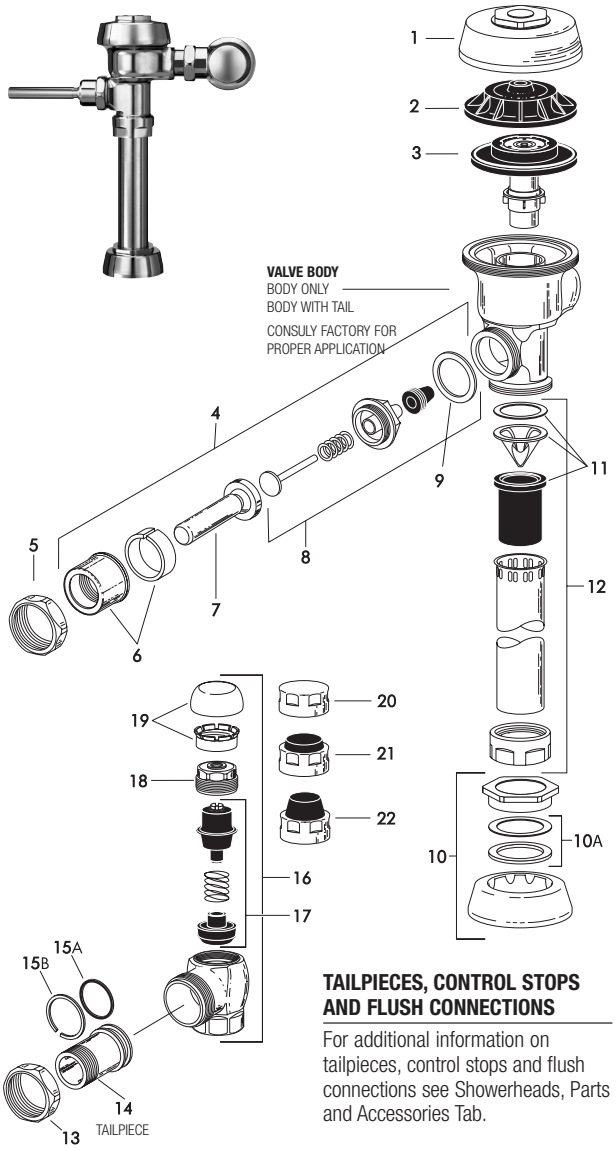
Repair Parts and Maintenance Guide **P1**

Royal® Flushometer



TAILPIECES, CONTROL STOPS AND FLUSH CONNECTIONS

For additional information on tailpieces, control stops and flush connections see Showerheads, Parts and Accessories Tab.

ITEM 10A. SLIP JOINT GASKETS AND RINGS

Size	Code No.	Part No.	Description
1-1/2"	**5306058**	F-3	Red Friction Ring
	5322001	VBF-5	Black Slip Joint Gasket
	0319086/5319086	S-30	Flexible Seat
	0319079	S-21	Rigid Seat (rubber over brass)
1-1/2" x 1-1/4"	**0396062**	F-105	Slip Joint Gasket – Rigid
1-1/4"	**5306057**	F-3	Red Friction Ring
	5322176	VBF-5	Black Slip Joint Gasket
	0307052/5307052	G-21	Rigid Seat (rubber over brass)
1"	**5306056**	F-3	Red Friction Ring
	5306115	F-5	Black Slip Joint Gasket
3/4"	**5306055**	F-3	Red Friction Ring
	5306113	F-5	Black Slip Joint Gasket

* See pages 102-103 for additional lengths
† For use with 1" and 3/4" H-700-A and 1" H-600-A Bak-Chek® screwdriver control stop
‡ For use with 3/4" H-600-A Bak-Chek® screwdriver control stop
RW for use with Reclaimed Water Flushometers

PARTS LIST

Item No.	Code No.	Part No.	Description
1.	**0301172PK**	A-72	CP Cover
	0301435PK	A-72-HE	CP High Efficiency Cover
2.	**0301168**	A-71	Inside Cover
	0301336	A-71-1	Inside Cover (Purple)
3.	**—**		Dual-Filtered Bypass Diaphragm Assembly (refer to table and diagram on following page)
4.	**0302390**	B-73-A	CP ADA-Compliant Triple Seal Handle Assembly
	0302267	B-73-A-PH	CP ADA-Compliant Triple Seal Handle Assembly
5.	**0301082**	A-6	CP Handle Coupling
6.	**0302109**	B-7-A	CP Socket Assembly
7.	**0302389**	B-74-A	CP ADA-Compliant Handle
	0302264	B-74-A-PH	CP ADA-Compliant Handle (Purple Handle)
8.	**3302306**	B-51-A	Triple Seal Handle Repair Kit
9.	**5301139**	A-31	Handle Gasket – 48 per package
10.	**0306125**	F-5-AW	3/4" (19 mm) CP Spud Coupling Assembly
	0306140	F-5-AU	1-1/4" (32 mm) CP Spud Coupling Assembly
	0306146	F-5-AT	1-1/2" (38 mm) CP Spud Coupling Assembly
10A.	**SEE SLIP JOINT GASKETS AND RINGS TABLE BELOW LEFT**		
11.	**3323182**	V-651-A	High Back Pressure Vacuum Breaker Repair Kit
12.	**3393004**	V-600-AA	3/4" (19 mm) x 9" (228 mm) CP Vacuum Breaker
	3393006	V-600-AA	1-1/4" (32 mm) x 9" (228 mm) CP Vacuum Breaker
	3393007	V-600-AA	1-1/2" (38 mm) x 9" (228 mm) CP Vacuum Breaker
13.	**0308676**	H-550	CP Stop Coupling
14.	**0308801**	H-551-A	CP Adjustable Tailpiece 2-1/16" (52 mm long) Standard Length*
15A.	**5308696**	H-553	O-ring – 24 per package
15B.	**5308381**	H-552	Locking Ring – 12 per package
16.	**3308386**	H-700-A	1" (25 mm) CP Bak-Chek® Screwdriver Stop
	0388141	H-700-A-RW	1" (25 mm) CP Bak-Chek® Screwdriver Stop
	3308384	H-700-A	3/4" (19 mm) CP Bak-Chek® Screwdriver Stop
	0388142	H-700-A-RW	3/4" (19 mm) CP Bak-Chek® Screwdriver Stop
17.	**3308853**	H-541-ASD	Control Stop Repair Kit †
	3308856	H-543-ASD	Control Stop Repair Kit ‡
18.	**0308612**	H-622	CP Bonnet †
	0308892	H-608-RW	CP Bonnet †
	0308843	H-577	CP Bonnet ‡ – **DISCONTINUED**
19.	**3308772**	H-1010-A	Vandal Resistant Control Stop Cap Assembly †
	3308790	H-1009-A	Vandal Resistant Control Stop Cap Assembly ‡ H-600 3/4" Stop only
20.	**0308738**	H-573	Control Stop Cap CP †
	0308848	H-582	Control Stop Cap CP ‡
21.	**3308866**	H-574	Control Stop Cap with Bumper † (–YO Variation)
22.	**3308867**	H-576	Control Stop Cap with Extended Bumper † (–YG Variation)
23.	**3388015**	H-1015	Flow Control Kit (not Shown) (HEU Only)
24.	**3308735**	H-634-AA-RW	1" (25 mm) Sweat Solder Kit w/ Cast Set Screw Purple Flange (not shown)
	3308736	H-636-AA-RW	3/4" (19 mm) Sweat Solder Kit w/ Cast Set Screw Flange (not shown)
	3308785	H-636-AA	1" (25 mm) Sweat Solder Kit w/ Cast Set Screw Purple Flange (not shown)
	3308788	H-636-AA	3/4" (19 mm) Sweat Solder Kit w/ Cast Set Screw Flange (not shown)

Sloan products are also available in satin, brushed nickel, chrome, gold and polished brass finishes – contact factory for part numbers.

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Repair Parts and Maintenance Guide **P1**

Royal® Flushometer

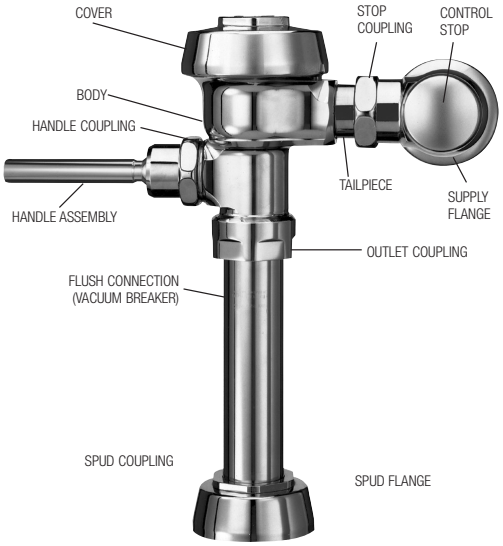
DUAL-FILTERED DIAPHRAGM ASSEMBLY

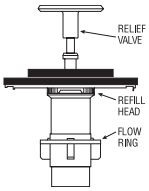
Available in diaphragm only and Royal® Performance™ Kits.

Royal® Performance™ Kit includes dual-filtered diaphragm assembly (item 3), handle repair kit with triple seal packing (item 8), high back pressure vacuum breaker repair kit (item 11), and one tailpiece O-ring (item 15A). DIAPHRAGM ONLY KIT contains "drop-in" dual-filtered diaphragm assembly (item 3) ONLY.

The dual-filtered diaphragm can be used in Royal,® Regal,® and similar diaphragm-style valve bodies. For use in Sloan valve bodies with a bell-shaped cover (manufactured before 1964), replace the bottom filter ring in these kits with a blue A-108 filter ring (not shown Sloan Code No. **5301283**).

NOTE: In January 1998, the Royal® diaphragm design was upgraded to a preassembled unit with two (2) plastic filtering rings attached to the rubber diaphragm (one on top and one on bottom). If the flushometer you are servicing has our older, segmented diaphragm with brass by-pass hole, refer to our Regal section for additional troubleshooting information.





THE COLORS OF THE RELIEF VALVE AND THE REFILL HEAD PLUS THE SHAPE OF FLOW RING IDENTIFY THE FLUSH VOLUME OF A DUAL-FILTERED DIAPHRAGM ASSEMBLY.

ROYAL® PERFORMANCE KIT

Code No.	Part No.	Description	Relief Valve†	Refill Head*	Flow Ring
3301070	A-1101-A	Low Consumption Water Closets-1.6 gpf (6.0 Lpf)**	Green	Gray	Smooth
3301071	A-1102-A	Water Saver Water Closets-3.5 gpf (13.2 Lpf)**	White	Gray	Smooth
3301072	A-1103-A	9 Liter European Water Closets-2.4 gpf (9.0 Lpf)	Blue	Gray	Smooth
3301073	A-1106-A	Wash Down Urinals-0.5 gpf (1.9 Lpf)	Green	Black	Smooth
3301074	A-1107-A	Low Consumption Urinals-1.0 gpf (3.8 Lpf)**	Green	Black	Slotted
3301075	A-1108-A	Water Saver Urinals-1.5 gpf (5.7 Lpf)**	Black	Black	Smooth

*CLOSET REFILL HEADS (GRAY) HAVE LARGER SLOTS THAN URINAL REFILL HEADS (BLACK).

DIAPHRAGM ONLY KIT

Code No.	Part No.	Description	Relief Valve†	Refill Head*	Flow Ring
3301502	A-1041-A	Low Consumption Water Closets-1.6 gpf (6.0 Lpf)**	Green	Gray	Smooth
3301501	A-1038-A	Water Saver Water Closets-3.5 gpf (13.2 Lpf)**	White	Gray	Smooth
3301505	A-1044-A	9 Liter European Water Closets-2.4 gpf (9.0 Lpf)	Blue	Gray	Smooth
3301504	A-1043-A	Wash Down Urinals-0.5 gpf (1.9 Lpf)	Green	Black	Smooth
3301503	A-1042-A	Low Consumption Urinals-1.0 gpf (3.8 Lpf)**	Green	Black	Slotted
3301500	A-1037-A	Water Saver Urinals-1.5 gpf (5.7 Lpf)**	Black	Black	Smooth
3301506	A-1045-A	High-Efficiency Water Closets-1.28 gpf (4.8 Lpf)	Blue	Gray	Smooth
3301142	A-1047-A	High-Efficiency Urinals-0.25 gpf (1.0 Lpf) with White Inserts	White	HEU Black	Smooth
3301143	A-1050-A	High-Efficiency Urinals-0.125 gpf (0.5 Lpf) with White Inserts	Blue	HEU Black	Smooth
3301594	A-1075-A-BX	High-Efficiency Water Closets-1.28 gpf (4.8 Lpf) RW	Blue	Black	Smooth
3301592	A-1073-A-BX	High-Efficiency Urinals-0.5 gpf (1.9 Lpf) RW	Green	Black	Smooth + Slotted
3301591	A-1077-A-BX	High-Efficiency Urinals-0.25 gpf (1.0 Lpf) RW	White	HEU Black	Smooth
3301590	A-1070-A-BX	High-Efficiency Urinals-0.125 gpf (0.5 Lpf) RW	Blue	HEU Black	Smooth

† Consult factory for availability of replacement plastic relief valves (green, black, blue, and white) and brass relief valves.
NOTE: For older water closets that require 4.5 gpf (17.0 Lpf), choose kits A-1102-A or A-1038-A, but remove the flow ring before use. For blowout-style urinals that require 3.5 gpf (13.2 Lpf), choose kits A-1102-A or A-1038-A. For service sinks that require 6.5 gpf (24.6 Lpf), order A-36-A diaphragm repair kit (not shown Sloan Code No. **3301036**) and remove the flow ring before use. Regulations for low consumption fixtures prohibit the use of higher flush volumes.

*CLOSET REFILL HEADS (GRAY) HAVE LARGER SLOTS THAN URINAL REFILL HEADS (BLACK).

** WATER SAVER (3.5 GPF CLOSET AND 1.5 GPF URINAL) AND LOW CONSUMPTION (1.6 GPF CLOSET AND 1.0 GPF URINAL) FIXTURES MUST USE MATCHING GPF (LPF) DIAPHRAGM KITS; USING A SMALLER GPF (LPF) KIT IN FIXTURES NOT INTENDED FOR LESS VOLUME WILL RESULT IN INADEQUATE DILUTION IN URINALS AND IMPROPER EVACUATION IN CLOSETS.

RW for use with Reclaimed Water Flushometers.

SLOAN

Royal® Flushometer

TROUBLESHOOTING GUIDE

ATTENTION INSTALLERS: With the exception of the control stop inlet, **DO NOT USE** pipe sealant or plumbing grease on any valve component or coupling! To protect the chrome or special finish of Sloan flushometers, **DO NOT USE** toothed tools to install or service these valves. Use our A-50 Super-Wrench or other smooth-jawed wrench to secure couplings. Regulations for low consumption fixtures (1.6 gpf/6.0 Lpf closets and 1.0 gpf/3.8 Lpf urinals) prohibit use of higher flush volumes.

1. **Flushometer does not function (no flush).**
   - A. Control stop or main supply valve is closed. Open control stop or main supply valve.
   - B. Handle assembly is damaged. Replace B-73-A handle or repair with B-51-A handle repair kit.
   - C. Relief valve is damaged. Replace relief valve.
2. **Handle leaks.**
   - A. Handle seal or handle assembly is damaged. Replace B-73-A handle or repair with B-51-A handle repair kit.
3. **Water splashes from fixture.**
   - A. Control stop is open wider than necessary. Adjust control stop for desired delivery of water volume.
   - B. Water saver/conventional diaphragm assembly is installed on low consumption fixture or closet diaphragm assembly is installed on urinal fixture. Determine the required flush volume (see label on valve or markings on fixture). Replace diaphragm assembly or relief valve for appropriate flush volume of fixture.
4. **Volume of water is insufficient to adequately siphon fixture.**
   - A. Control stop is not open wide enough. Adjust control stop for desired delivery of water volume.
   - B. Diaphragm assembly is damaged. Replace diaphragm assembly.
   - C. Low consumption diaphragm assembly is installed on water saver/ conventional fixture or urinal diaphragm assembly is installed on closet fixture. Determine the required flush volume (see label on valve or markings on fixture). Replace diaphragm assembly or relief valve for appropriate flush volume of fixture.
   - D. Inadequate water volume or pressure is available from supply. Increase flow rate or pressure to the valve. If gauges are not available to measure supply pressure/volume, remove relief valve from diaphragm assembly and open the control stop.

     If the fixture siphons: Additional water volume is required. Install higher flushing volume relief valve or diaphragm assembly or cut flow ring from guide. **IMPORTANT: LAWS AND REGULATIONS PROHIBIT THE USE OF HIGHER FLUSHING VOLUMES THAN LISTED ON FIXTURE OR FLUSHOMETER.**

     If the fixture **DOES NOT** siphon (or a low consumption flush is required): Additional steps must be taken to increase the water pressure and/or volume at the water supply. Contact fixture manufacturer for minimum supply requirements of fixture.
5. **Flushometer valve closes immediately (short flush).**
   - A. Worn or damaged diaphragm assembly. Replace diaphragm assembly.
   - B. Handle assembly is damaged. Replace B-73-A handle or repair with B-51-A handle repair kit.
   - C. Low consumption diaphragm assembly is installed on water saver/ conventional fixture or urinal diaphragm assembly is installed on closet fixture. Determine the required flush volume (see label on valve or markings on fixture). Replace relief valve or diaphragm assembly for appropriate flush volume of fixture.
6. **Length of flush is too long (long flush) or fails to shut off.**
   - A. Bypass hole (upper filter ring) of diaphragm assembly is dirty. Remove the diaphragm assembly. Disassemble the filter rings from the diaphragm, wash under running water, and reassemble. Replace as necessary.
   - B. Relief valve or diaphragm assembly is damaged. Replace relief valve or diaphragm assembly.
   - C. Water saver/conventional diaphragm assembly is installed on low consumption fixture or closet diaphragm assembly is installed on urinal fixture. Determine the required flush volume (see label on valve or markings on fixture). Replace diaphragm assembly or relief valve for appropriate flush volume of fixture.
   - D. Inside cover is damaged. Install new A-71 part.
   - E. Line water pressure dropped and is insufficient to close valve. Close the control stop until pressure is restored.
   - F. Relief valve is not seated properly. Disassemble diaphragm components (relief valve, filter rings, and diaphragm unit), wash under running water, and reassemble. Replace as necessary.
7. **Chattering noise is heard during flush.**
   - A. Inside cover is damaged. Install new A-71 part.
   - B. Relief valve or diaphragm assembly is damaged. Replace relief valve or diaphragm assembly.

CARE AND CLEANING INSTRUCTIONS

DO NOT USE abrasive or chemical cleaners to clean flushometers that may dull the luster and attack the chrome or decorative finish. Use **ONLY** mild soap and water, then wipe dry with a clean towel or cloth. When cleaning the bathroom tile, protect the flushometer from any splattering of cleaner. Acids and cleaning fluids can discolor or remove chrome plating.

When assistance is required, please contact Sloan Technical Support at: 1-888-SLOAN-14 (1-888-756-2614).

SLOAN

Tailpiece

TAILPIECES

The tailpiece is the connection between the valve body and the control stop.

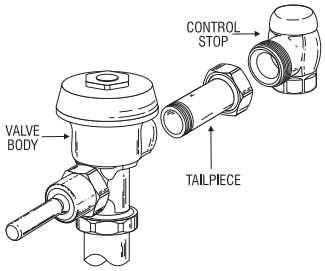
Sloan adjustable and ground joint tailpieces are threaded into the valve body at the factory. Sloan tailpieces are available in a variety of lengths to accommodate installation rough-in errors and unique installation requirements.

Sloan flushometer brands feature three types of tailpiece connections:

H-551 ADJUSTABLE TAILPIECE

H-5 GROUND JOINT TAILPIECE

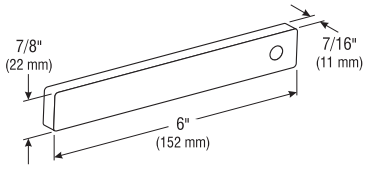
H-130-A ADJUSTABLE GROUND JOINT TAILPIECE



H-551-A

TAILPIECE REPLACEMENT

H-530 TAILPIECE REMOVAL BAR
0334014

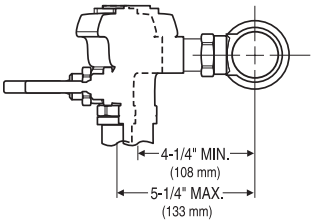


Sloan adjustable and ground joint tailpieces are assembled into the valve body using a pipe thread. Significant force is used to drive the tailpiece into the valve body. As such, removal of the old tailpiece may be difficult.

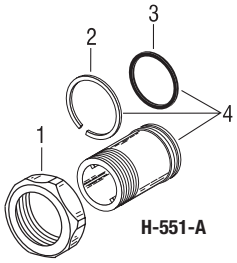
For replacement, we recommend using the **H-530 tailpiece removal bar** (Code No. **0334014**). Remove the flushometer cover and interior parts. Secure the tailpiece removal bar vertically in a vice. Place the flushometer tailpiece over the bar. The cast lugs inside the tailpiece will catch on the bar. Insert a length of 3/4" pipe into the barrel of the valve body. Unscrew tailpiece from valve body.

Assemble the new tailpiece into the valve body in the reverse manner. Use teflon tape (or pipe sealant) on tailpiece pipe threads. Ensure that both the coupling and the locking ring (adjustable tailpiece only) are on the tailpiece before tightening the assembly. Do NOT use sealant on the first few threads of the tailpiece.

H-551-A ADJUSTABLE TAILPIECE CONNECTION



The majority of flushometers supplied by Sloan since 1964 feature the H-551-A adjustable tailpiece. The valve tailpiece connects to the control stop with a sliding O-ring seal. The H-551-A adjustable tailpiece standard length is 2-1/16" (54 mm). This is designed for a standard flushometer installation in which the distance between the centerline of the valve and the centerline of the water supply inlet is 4-3/4" (121 mm). The adjustable tailpiece allows for a variance of ±1/2" (13 mm) from this nominal dimension.



H-551-A

Item No.	Code No.	Part No.	Description
1.	**0308676**	H-550	Coupling CP
	0308690	H-550	Coupling RB
2.	**5308381**	H-552	Locking Ring – 12 per package
3.	**5308696**	H-553	O-Ring – 24 per package
4.	**0308801**	H-551-A	2-1/16" (53 mm) Tailpiece Assembly† CP
	0308802	H-551-A	2-1/16" (53 mm) Tailpiece Assembly† RB
	0308803	H-551-A	3-1/16" (78 mm) Tailpiece Assembly† CP
	0308805	H-551-A	4-1/16" (103 mm) Tailpiece Assembly† CP
	0308807	H-551-A	5-1/16" (129 mm) Tailpiece Assembly† CP
	0308809	H-551-A	6-1/16" (154 mm) Tailpiece Assembly† CP

† Each tailpiece assembly includes an H-553 O-Ring and an H-552 locking ring.

Abbreviations: CP: chrome plated; RB: rough brass

Sloan Valve Company can also provide products not shown in our current catalog. For our special finishes, consult factory for part numbers.

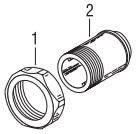
SLOAN

Repair Parts and Maintenance Guide **P1**

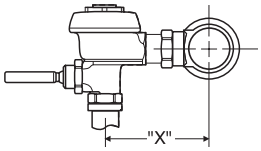
Tailpiece

NH-5 GROUND JOINT TAILPIECE CONNECTION

Older valves (prior to 1964), valves furnished for salt-water installations, and all Sloan flushometers furnished with straight stops use a metal-to-metal ground joint (GJ) tailpiece connection. The standard length of the H-5 tailpiece is 1-3/4" (44 mm) for a standard 4-3/4" (121 mm) rough-in dimension; other lengths are available in 1/4" (6 mm) increments.



The ground joint tailpiece connection cannot be adjusted in the field, so rough-in must be exact. Replacement NH-5 tailpieces can compensate for rough-in errors.



CHROME PLATED COMPONENTS

Item No.	Code No.	Description	
1.	**0308063**	H-6 Coupling	
2.	**See below**	NH-5 Ground Joint Tailpiece	
		"X"	**Tailpiece Length**
	0308019	4-1/4" (108 mm)	1-1/4" (32 mm)
	0308023	4-1/2" (114 mm)	1-1/2" (38 mm)
	0308026	4-3/4" (121 mm)	1-3/4" (44 mm)
	0308030	5" (127 mm)	2" (51 mm)
	0308031	5-1/4" (133 mm)	2-1/4" (57 mm)
	0308033	5-1/2" (140 mm)	2-1/2" (64 mm)
	0308034	5-3/4" (146 mm)	2-3/4" (70 mm)
	0308035	6" (152 mm)	3" (76 mm)
	0308037	6-1/4" (159 mm)	3-1/4" (83 mm)
	0308038	6-1/2" (165 mm)	3-1/2" (89 mm)
	0308040	6-3/4" (171 mm)	3-3/4" (95 mm)
	0308041	7" (178 mm)	4" (102 mm)
	0308042	7-1/4" (184 mm)	4-1/4" (108 mm)
	0308043	7-1/2" (191 mm)	4-1/2" (114 mm)
	0308044	7-3/4" (197 mm)	4-3/4" (121 mm)
	0308045	8" (203 mm)	5" (127 mm)
	0308047	8-1/2" (216 mm)	5-1/2" (140 mm)
	0308050	9" (229 mm)	6" (152 mm)

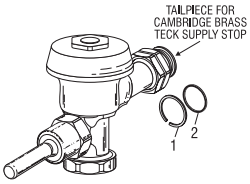
ROUGH BRASS COMPONENTS

1.	**0308063**	H-6 Coupling	
2.	**See below**	NH-5 Ground Joint Tailpiece	
		"X"	**Tailpiece Length**
	0308028	4-3/4" (121 mm)	1-3/4" (44 mm)

NOTE: "X" indicates the distance between the centerline of valve and the centerline of the water supply. Ground joint couplings are notched for identification.

"XDT" FLUSHOMETER FOR CANADIAN TECK VALVES

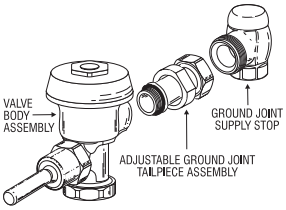
Sloan can provide a flushometer with a tailpiece that can connect to a Cambridge Brass Teck (Wal-teck) supply stop. This special valve assembly is specified as our "–XDT" variation. This tailpiece cannot be replaced in the field.



Item No.	Code No.	Part No.	Description
1.	**5308934**	H-501	Locking Ring – 6 per package
2.	**5308958**	H-589	O-Ring – 6 per package

H-130-A ADJUSTABLE GROUND JOINT TAILPIECE CONNECTION

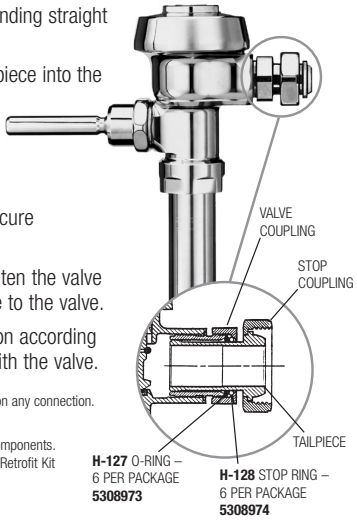
To accommodate adjustability in a ground joint connection, Sloan developed the H-130-A adjustable ground joint tailpiece connection. This is commonly supplied on valves used in retrofit applications where an existing ground joint supply stop (made by either Sloan or another manufacturer) is utilized. The H-130-A tailpiece is supplied as our "–XD" variation and requires a special valve body. It **cannot** be used to replace an H-551-A or an H-5 tailpiece.



TO INSTALL THE ADJUSTABLE GROUND JOINT TAILPIECE:

NOTE: flushometer should be standing straight and not leaning to either side.

- Screw threaded end of the tailpiece into the flushometer body.
- Continue turning until tailpiece matches up to the end of the existing supply stop.
- Tighten the stop coupling to secure the valve to the supply stop.
- Using a flat-jawed wrench, tighten the valve coupling to secure the tailpiece to the valve.
- Continue flushometer installation according to the instructions packaged with the valve.

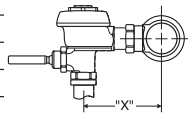


NOTE: DO NOT use pipe dope or thread sealant on any connection. Lubricate O-ring ONLY with water!

O-ring and stop ring are available as individual components. All other items are sold only in H-130-A tailpiece Retrofit Kit (see table below).

TAILPIECE RETROFIT KIT (WHEN USED WITH GROUND JOINT SUPPLY STOP)

Code No.	"X" †	Part No.
0308976	4-3/4" (121 mm)	H-130-A-1 ‡
0308983	5-3/4" (146 mm)	H-130-A-2
0308984	6-3/4" (171 mm)	H-130-A-3
0308979	7-3/4" (197 mm)	H-130-A-4



† When used with a Sloan ground joint supply stop, the tailpiece can be adjusted to a shorter or longer length (± 1/2" or 12 mm from the "X" dimension shown). When used with Delany ground joint supply stop, the tailpiece can be adjusted up to 1" (25 mm) longer from the "X" dimension shown.

‡ Unless otherwise specified, the H-130-A-1 tailpiece is furnished as standard with all "–XD" variation flushometer valves.

P1

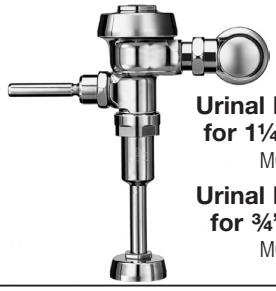
Code No. 0816195
Rev. 6 (02/15)

SLOAN®

INSTALLATION INSTRUCTIONS FOR EXPOSED ROYAL® FLUSHOMETERS

Closet Flushometer for 1½" Top Spud
MODELS 110/111, 113, 115 & 116

Service Sink Flushometer for 1½" Top Spud
MODEL 117



Urinal Flushometer for 1¼" Top Spud
MODEL 180

Urinal Flushometer for ¾" Top Spud
MODEL 186

Closet Flushometer for 1½" Back Spud
MODELS 120, 121 & 122

PRIOR TO INSTALLATION

Before you install the flushometer, be sure the items listed below are installed. Also, refer to the rough-in diagram below.

- Closet fixture •Drain line •Water supply line

IMPORTANT:

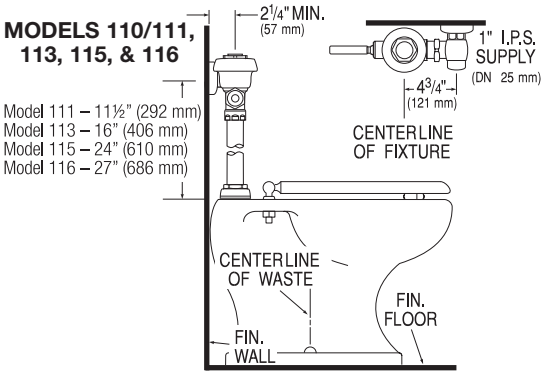
- **ALL PLUMBING SHOULD BE INSTALLED IN ACCORDANCE WITH APPLICABLE CODES AND REGULATIONS.**
- **WATER SUPPLY LINES MUST BE SIZED TO PROVIDE AN ADEQUATE VOLUME OF WATER FOR EACH FIXTURE.**
- **FLUSH ALL WATER LINES PRIOR TO MAKING CONNECTIONS.**

Sloan's flushometers are designed to operate with 15 to 80 psi (103 to 552kPa) of water pressure. **THE MINIMUM PRESSURE REQUIRED TO THE VALVE IS DETERMINED BY THE TYPE OF FIXTURE SELECTED.**

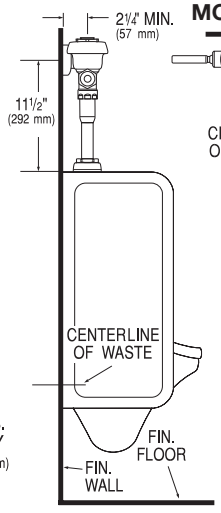
Consult fixture manufacturer for minimum pressure requirements. Most High Efficiency water closets require a minimum flowing pressure of 25 psi (172 kPa). Many building codes and the ASME A112.19.2 fixture standard list Maximum static water pressure as 80 PSI (552 kPa).

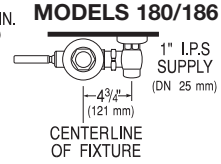
ROUGH-INS

MODELS 110/111, 113, 115, & 116

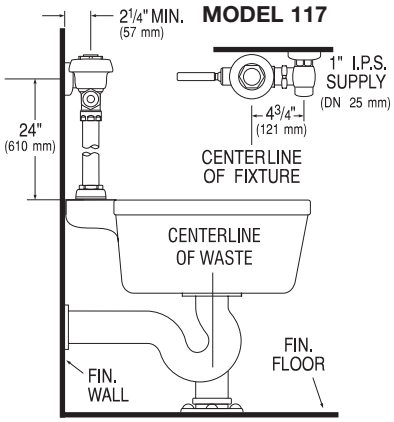


MODELS 180/186

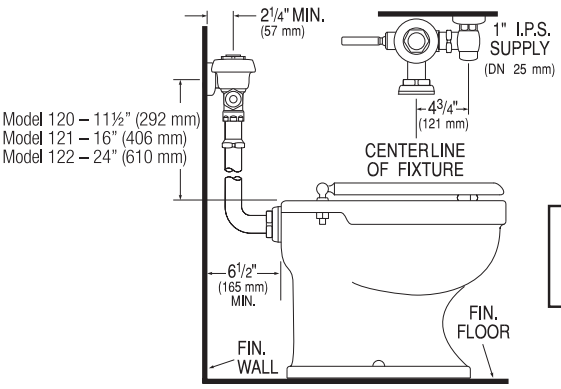




MODEL 117



MODELS 120, 121, & 122



!!! IMPORTANT !!!

WHEN MOUNTED ON AN ADA ACCESSIBLE BOWL, THE ROUGH-IN TO THE SUPPLY INLET SHOULD BE NO HIGHER THAN 37½" OR THE HANDLE WILL EXCEED MAXIMUM HEIGHT ALLOWANCES UNDER ADA GUIDELINES.

TOOLS REQUIRED FOR INSTALLATION

- Straight blade screwdriver
- Sloan A-50 Super-Wrench™, Sloan A-109 Plier Wrench or smooth jawed spud wrench

!!! IMPORTANT !!!

PROTECT THE CHROME OR SPECIAL FINISH OF SLOAN FLUSHOMETERS — DO NOT USE TOOTHED TOOLS TO INSTALL OR SERVICE THESE VALVES. USE A SLOAN A-50 SUPER-WRENCH™, SLOAN A-109 PLIER WRENCH OR SMOOTH JAWED SPUD WRENCH TO SECURE ALL COUPLINGS. SEE "CARE AND CLEANING" SECTION.

!!! IMPORTANT !!!

NEVER OPEN CONTROL STOP TO WHERE THE FLOW FROM THE VALVE EXCEEDS THE FLOW CAPABILITY OF THE FIXTURE. IN THE EVENT OF A VALVE FAILURE, THE FIXTURE MUST BE ABLE TO ACCOMMODATE A CONTINUOUS FLOW FROM THE VALVE.

!!! IMPORTANT !!!

WITH THE EXCEPTION OF CONTROL STOP INLET, DO NOT USE PIPE SEALANT OR PLUMBING GREASE ON ANY VALVE COMPONENT OR COUPLING!

!!! IMPORTANT !!!

THIS PRODUCT CONTAINS MECHANICAL AND/OR ELECTRICAL COMPONENTS THAT ARE SUBJECT TO NORMAL WEAR. THESE COMPONENTS SHOULD BE CHECKED ON A REGULAR BASIS AND REPLACED AS NEEDED TO MAINTAIN THE VALVE'S PERFORMANCE.

Please take the time to read this manual to ensure proper product installation and longevity.

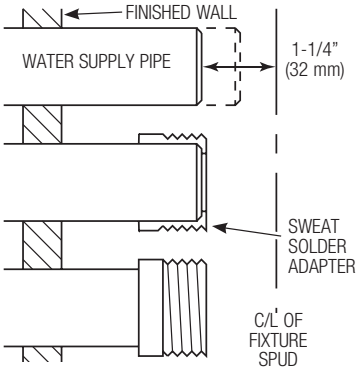
When further assistance is required, please contact your local Sloan Representative or Sloan Technical Support at: 1-888-SLOAN-14 (1-888-756-2614)

1 - INSTALL OPTIONAL SWEAT SOLDER ADAPTER (ONLY IF YOUR SUPPLY PIPE DOES NOT HAVE A MALE THREAD)

A Measure from finished wall to C/L of fixture spud. Cut pipe 1¼" (32 mm) shorter than this measurement. Chamfer O.D. and I.D. of water supply pipe.

B Slide threaded adapter fully onto pipe.

C Sweat solder the Adapter to pipe.

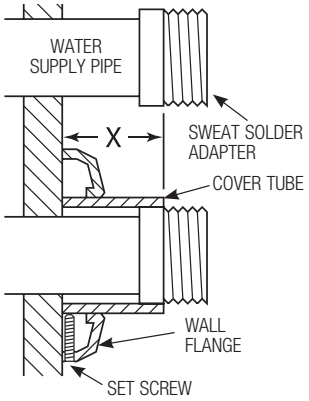


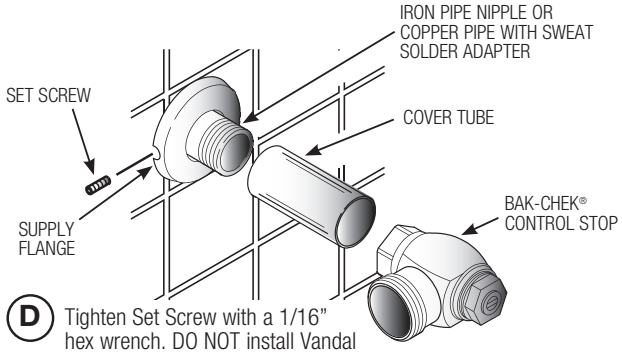
2 - INSTALL COVER TUBE, WALL FLANGE AND CONTROL STOP TO SUPPLY PIPE

A Measure from finished wall to first thread of Adapter or threaded supply pipe (dimension "X"). Cut Cover Tube to this length.

B Slide Cover Tube over pipe. Slide Wall Flange over Cover Tube until against wall.

C Thread Control Stop onto pipe. Tighten with a wrench.





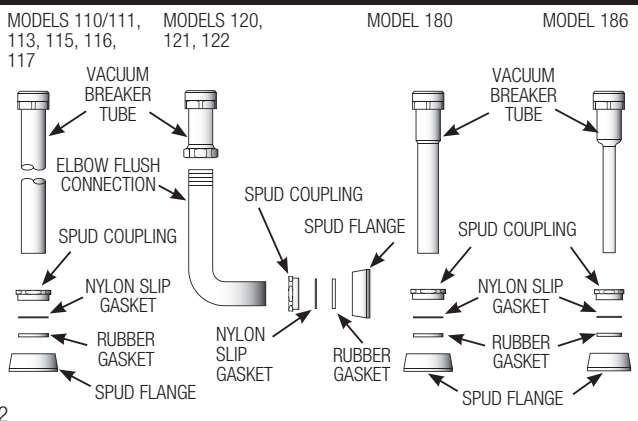
D Tighten Set Screw with a 1/16" hex wrench. DO NOT install Vandal Resistant Stop Cap at this time.

3 - INSTALL VACUUM BREAKER FLUSH CONNECTION

A Slide Spud Coupling, Nylon Slip Gasket, Rubber Gasket and Spud Flange over Vacuum Breaker Tube.

B Insert Tube into Fixture Spud.

C Hand tighten Spud Coupling onto Fixture Spud.



4 - INSTALL FLUSHOMETER AND TRIPLE SEAL HANDLE ASSEMBLY

NOTE

For high efficiency urinal flushometers (0.5, 0.25 and 0.125 gpf), it is necessary to first insert the flow control component into the tailpiece assembly. See the H1015A flow control kit and separate instructions for details on how to install.

A Lubricate tailpiece O-ring with water. Insert Adjustable Tailpiece into Control Stop. Tighten Tailpiece Coupling by hand.

B Align Flushometer directly above the Vacuum Breaker Flush Connection by sliding the Flushometer Body IN or OUT as needed. Tighten Vacuum Breaker Coupling by hand.

NOTE

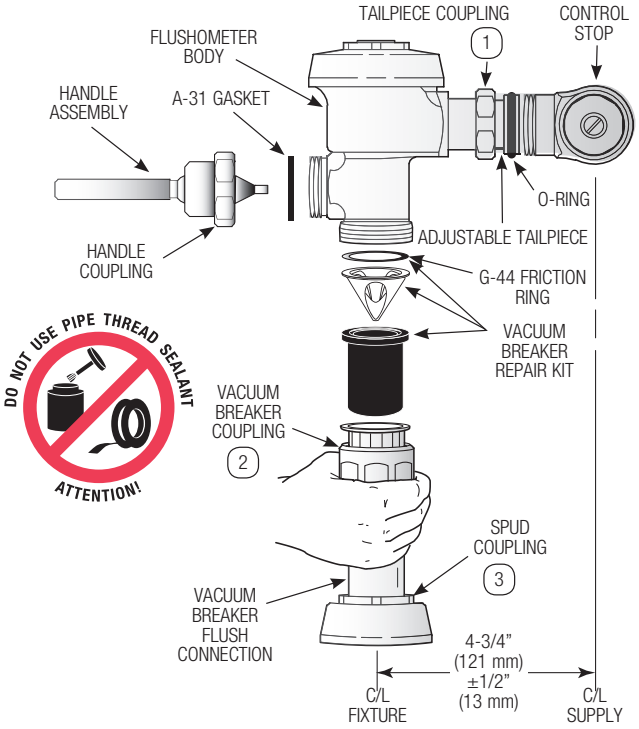
Maximum adjustment of the Sloan Adjustable Tailpiece is 1/2" (13 mm) IN or OUT from the standard 4-3/4" (121 mm) (centerline of Flushometer to centerline of Control Stop).

If roughing-in measurement exceeds 5-1/4" (133 mm), consult factory for longer tailpiece.

C Align Flushometer Body and securely tighten first the Tailpiece Coupling (1), then the Vacuum Breaker Coupling (2), and finally the Spud Coupling (3). Use a wrench to tighten these couplings in the order shown.

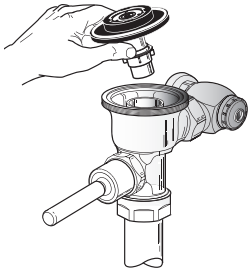
D Install the red A-31 Handle Gasket on the Handle Assembly. Insert the Handle Assembly into the Handle opening in the Flushometer Body. Securely tighten the Handle coupling with a wrench.

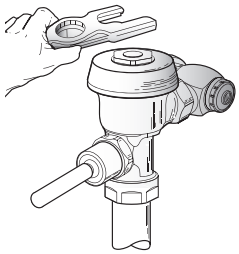
Sloan's triple-sealed Flushometer Handle is ADA-complaint.



5 - FLUSH OUT SUPPLY LINE

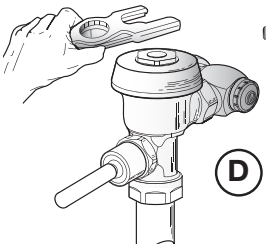
A Make sure Control Stop is CLOSED and remove Flushometer Outer Cover.

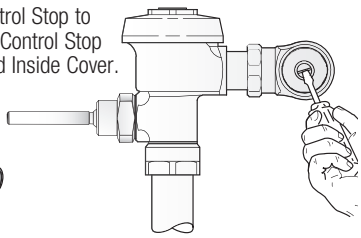




B Remove Inside Cover and lift out Inside Parts Assembly.

C Reinstall Outside and Inside Cover wrench tight. Open Control Stop to flush supply line. Close Control Stop and remove Outside and Inside Cover.





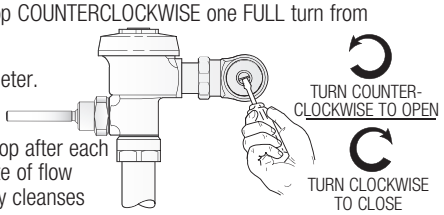
D Reinstall Inside Parts Assembly, Inside Cover and Outside Cover wrench tight.

6 - ADJUST CONTROL STOP AND INSTALL VANDAL RESISTANT STOP CAP

A Open Control Stop COUNTERCLOCKWISE one FULL turn from closed position.

B Activate Flushometer.

C Adjust Control Stop after each flush until the rate of flow delivered properly cleanses the fixture.



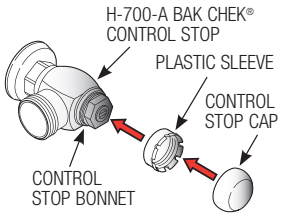
!!! IMPORTANT !!!

Sloan's flushometers are engineered for quiet operation. Excessive water flow creates noise, while too little water flow may not satisfy the needs of the fixture. Proper adjustment is made when plumbing fixture is cleansed after each flush without splashing water out from the lip AND a quiet flushing cycle is achieved.

Never open Control Stop to where the flow from the valve exceeds the flow capability of the fixture. In the event of a valve failure, the fixture must be able to accommodate a continuous flow from the valve.

D Install Vandal Resistant Control Stop Cap onto Control Stop.

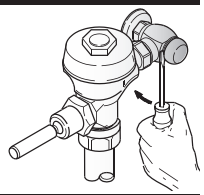
- Thread the Plastic Sleeve onto the Stop Bonnet until it is snug (tighten only by hand; do not use pliers or a wrench).
- Place the metal Control Stop Cap over the plastic Sleeve and use the palm of the hand to push or "pop" the Cap over the fingers of the Plastic Sleeve. The Cap should spin freely.



Important: DO NOT install Cap onto Sleeve unless the Sleeve has been threaded onto Control Stop Bonnet. If the Sleeve and Cap are assembled off of the Control Stop, the Sleeve WILL NOT come apart from the Cap.

VANDAL RESISTANT CONTROL STOP CAP REMOVAL

Use a large flat screwdriver as a lever to remove the Cap from the Control Stop. Insert the screwdriver blade between the bottom edge of the Cap and the flat surface of the Control Stop body as shown. Push the screwdriver handle straight back toward the wall to gently lift the Cap. If necessary, work the screwdriver around the diameter of the Cap until you can grasp the Cap and lift it completely off the Sleeve. The Sleeve should remain attached to the bonnet of the Control Stop.



TROUBLESHOOTING GUIDE

1. Flushometer does not function (no flush).

A. Control stop or main valve is closed. Open control stop or main valve.
B. Handle assembly is damaged. Replace handle or install handle repair kit.
C. Relief Valve is damaged. Replace relief valve.

2. Volume of water is not sufficient to siphon fixture.

A. Control stop is not open wide enough. Adjust control stop for desired delivery of water volume.
B. Diaphragm assembly is damaged. Replace diaphragm assembly.
C. Incorrect diaphragm assembly is installed in flushometer; for instance, urinal assembly inside a closet flushometer, or low consumption assembly inside a higher consumption fixture. Determine the flush volume required by the fixture and replace diaphragm. Use valve label and markings on fixture for reference.
D. Water supply volume or pressure is inadequate. If no gauges are available to properly measure supply pressure or volume of water at the flushometer, then remove the relief valve from the diaphragm assembly, reassemble the flushometer and completely open the control stop.
- If the fixture siphons, more water volume is required. Install a higher flushing volume diaphragm. **IMPORTANT – LAWS AND REGULATIONS PROHIBIT THE USE OF HIGHER FLUSHING VOLUMES THAN LISTED ON FIXTURE OR FLUSHOMETER.**
- If the fixture DOES NOT siphon or if a low consumption flush is required, steps must be taken to increase the water supply pressure and/or volume. Contact the fixture manufacturer for minimum water supply requirements of the fixture.

3. Length of flush is too short (short flush).

A. Diaphragm assembly is worn or damaged. Replace diaphragm assembly.
B. Handle assembly is damaged. Replace handle or install handle repair kit.
C. Incorrect diaphragm assembly is installed in flushometer; for instance, urinal assembly inside a closet flushometer, or low consumption assembly inside a higher consumption fixture. Determine the flush volume required by the fixture and replace diaphragm. Use valve label and markings on fixture for reference.

4. Length of flush is too long (long flush) or continuous.

A. Metering bypass hole (upper filter ring) in diaphragm is clogged. Remove the diaphragm assembly. Remove the primary and secondary filter rings from the diaphragm, wash under running water, and reassemble. Replace as necessary.
B. Diaphragm or relief valve is damaged. Replace diaphragm or relief valve.
C. Incorrect diaphragm assembly is installed in flushometer; for instance, closet assembly inside a urinal flushometer, or water saver assembly inside a low consumption flushometer. Determine the flush volume required by the fixture and replace the diaphragm. Use valve label and markings on fixture for reference.
D. Inside cover is damaged. Replace Inside cover.
E. Supply line water pressure has dropped and is not sufficient to close the valve. close control stop until pressure is restored.
F. Relief valve is not seated properly. Disassemble diaphragm components (relief valve, filter rings, and diaphragm unit), wash under running water, and reassemble. Replace as necessary.

5. Chattering noise is heard during flush.

A. Inside cover is damaged. Replace inside cover.
B. Relief valve or diaphragm is damaged. Replace relief valve or diaphragm assembly.

6. Handle Leaks.

A. Handle seal or assembly is damaged. Replace handle or install handle repair kit.

7. Water splashes from fixture.

A. Control stop is open wider than necessary. Adjust control stop for desired delivery of water volume.
B. Water saver/conventional diaphragm assembly is installed on low consumption fixture or closit diaphragm assembly is installed on urinal fixture. Determine the required flush volume (see label on valve or markings on fixture). Replace diaphragm assembly or relief valve for appropriate flush volume of fixture.

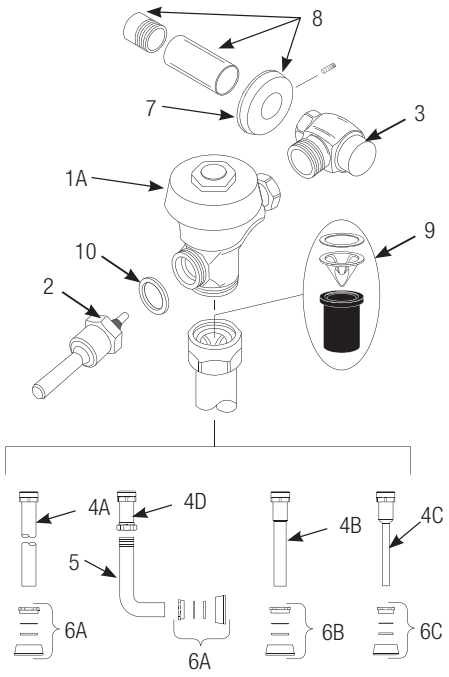
When assistance is required, please contact your local Sloan Representative or Sloan Technical Support at: 1-888-SLOAN-14 (1-888-756-2614)

CARE AND CLEANING

DO NOT use abrasive or chemical cleaners (including chlorine bleach) to clean Flushometers that may dull the luster and attack the chrome or special decorative finishes. Use ONLY mild soap and water, then wipe dry with clean cloth or towel.

While cleaning the bathroom tile, protect the Flushometer from any splattering of cleaner. Acids and cleaning fluids will discolor or remove chrome plating.

PARTS LIST



Item No.	Part No.	Description
1	†	Valve Assembly
2	B-73-A	ADA Compliant Handle Assembly
3	H-700-A	Bak-Chek® Control Stop
4A	V-600-AA	1½" (38 mm) Vacuum Breaker Assembly ‡
4B	V-600-AA	1¼" (32 mm) Vacuum Breaker Assembly
4C	V-600-AA	¾" (19 mm) Vacuum Breaker Assembly
4D	V-600-A	Vacuum Breaker Assembly
5	F-109	1½" (38 mm) Elbow Flush Connection
6A	F-56-A	1½" (38 mm) Spud Coupling Assembly
6B	F-57-A	1¼" (32 mm) Spud Coupling Assembly
6C	F-58-A	¾" (19 mm) Spud Coupling Assembly
7	F-7	Supply Flange (Supplied when Valve is not Ordered with Sweat Solder Kit)
8	H-633-AA	1" (25 mm) Sweat Solder Kit with Cast Set Screw Flange
	H-636-AA	¾" (19 mm) Sweat Solder Kit with Cast Set Screw Flange
9	V-651-A	High Back Pressure Vacuum Breaker Repair Kit
10	A-31	Handle Gasket

† Part number varies with valve model variation; consult factory.
‡ Length varies with valve model variation; consult factory.

NOTE: The information contained in this document is subject to change without notice.

SLOAN • 10500 SEYMOUR AVENUE • FRANKLIN PARK, IL 60131
Phone: 1-800-9-VALVE-9 or 1-847-671-4300 • Fax: 1-800-447-8329 or 1-847-671-4380 • sloan.com

Code No. 0816195 Rev. 6 (02/15)

Sloan Flushometers Maintenance Schedule

Manual diaphragm flushometer

			Life Expectancy Industry Standard / Sloan Standard	3/4+ years	3/5+ years	15/20+ years
	**Handle assembly** Internal parts	**Maintenance Indicator** 1. Leaking around the handle 2. Drooping handle 3. Short erratic flush		✓		
	**Vacuum breaker** Internal (baffle and sack)	**Maintenance Indicator** 1. Leaking around the vacuum breaker vent holes during flush cycle		✓		
	**Inside cover**	**Maintenance Indicator** 1. Slow leaks into the fixture 2. Flush cycle too long or too short 3. Grooves cut into inner cover from diaphragm segments		✓		
	**Diaphragm kit** Regal	**Maintenance Indicator** 1. Slow leaks into the fixture 2. Flush cycle too long or too short		✓		
	**Diaphragm kit** Royal/Sloan	**Maintenance Indicator** 1. Slow leaks into the fixture. 2. Flush cycle too long or too short			✓	
	**Stop assembly** Internal parts	**Maintenance Indicator** 1. Leaking around the stop 2. Failure to completely shut off water 3. Excessive wrench marks on bonnet			✓	
	**Brass parts** Body, outside cover, stop and vacuum breaker tube	**Maintenance Indicator** 1. Compromised chrome finish 2. Missing or distorted threads				✓
	**Flanges & connections**	**Maintenance Indicator** 1. Compromised chrome finish 2. Missing or distorted threads 3. Excessive wrench marks on coupling 4. Leaking around connections				✓

Sloan Flushometers Maintenance Schedule

Battery-powered diaphragm flushometers

(Same as manual diaphragm flushometer with exception of following parts)

		Life Expectancy Industry Standard / Sloan Standard	3/4+ years	3/6+* years	5/7+ years	20/25+ years
	**Batteries-alkaline**	**Maintenance Indicator** 1. Blinking LED 2. Unit will not flush		✓		
	**Sensor ring cover assembly** (includes solenoid)	**Maintenance Indicator** 1. Unit will not flush 2. Unit will continuously leak into fixture			✓	

Hardwired diaphragm flushometers

(Same as battery-powered diaphragm flushometer with exception of following parts)

	**Actuator cartridge assembly**	**Maintenance Indicator** 1. Leaking around button upon activation	✓			
	**Solenoid**	**Maintenance Indicator** 1. Unit will not flush 2. Unit will continuously leak into fixture			✓	
	**Transformer**	**Maintenance Indicator** 1. Unit will flush intermittently or not at all				✓

*Sloan battery operated flushometers provide a blinking low battery signal when the batteries need to be replaced. Failure to replace batteries when needed can cause leakage and may result in damage to the flushometer electronics.

Sloan Flushometers Maintenance Schedule

Hydraulic actuator flushometers

(Same as manual diaphragm flushometer with exception of hydraulic push button assembly)

			3/4+ years	3/5+ years
	Life Expectancy Industry Standard / Sloan Standard			
	**Hydraulic push button assembly**	**Maintenance Indicator** 1. Leaking around the button upon activation	✓	

Manual piston flushometer

(Same as manual diaphragm flushometer with exception of piston kits)

	**Piston kit-GEM-2**	**Maintenance Indicator** 1. Slow leaks into the fixture 2. Flush cycle too long or too short	✓	
	**Piston kit-Crown**	**Maintenance Indicator** 1. Slow leaks into the fixture 2. Flush cycle too long or too short		✓

This maintenance guide is intended to be a guide, based on Sloan's 110 years of experience.
There are many factors that impact how long flushometers and their parts last, including the following:

- Water quality
- Vandalism and abuse
- Regular maintenance
- High traffic
- Proper installation
- Plumbing system

Please note that life expectancy is different than warranty. Sloan's limited 3 year warranty applies to all Sloan parts.

SYMMONS® the smart choice™

Symmetrix®

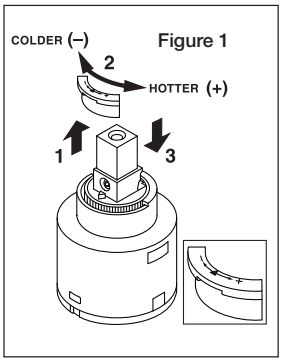
Lavatory Faucet S-20 Series
Installation and Service Instructions

For California Residents
WARNING: This product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

Installation

Caution: Be sure to turn off hot and cold water supplies before installing or servicing faucet.

1. Loosely install the anchor bar (KN-23), spacer (KN-26) and nut (L-36) on the mounting bolts and place gasket on base of faucet. Push faucet supplies and anchor bolt/spacer/nut assemblies with gasket through holes in sink. Secure faucet to sink by tightening nuts from underside. (If sink or counter surface is uneven, use putty or sealant to make proper seal under base.)
2. Connect hot supply to left tube and cold supply to right tube using appropriate connectors.
3. Pop-up drain installation:
   a) Remove pop-up plug, tail piece and flange from the drain body. Make sure that locknut is threaded all the way down onto the body with flat friction washer in middle and beveled washer on top.
   b) Apply plumbers putty or sealant to bottom of flange.
   c) Install drain body through drain opening in lavatory and screw flange onto the drain body making sure that the threads are completely engaged for proper sealing and strength of the connection. Apply joint compound to all threaded parts to insure proper seal. Apply putty or teflon tape to tail piece before attaching to drain body.
   d) Tighten locknut to compress the beveled flange evenly across the bottom of the drain opening taking care not to over tighten the locknut, causing damage to the lavatory.
   e) Remove one of two ball washers from inside the threaded cavity. Insert pop-up plug and pivot rod into body. Add one ball washer (the second ball washer should remain inside the body) to the outside of the ball. Tighten the retaining nut until the ball is seated on the internal and external ball washers.
      Note: The pop-up plug can be installed either in the removable or non-removable position, depending on the location of the hole located in the guide at the bottom of the plug.
   f) Slide the pivot rod through one side of the spring clip, then the appropriate adjustment hole and then other side of the spring clip.
   g) Insert lift rod through faucet housing and the top of the lift strap and secure it in place by tightening the screw.
      Note: To ensure proper operation of lift rod and pop-up, some adjustment of the linkage may be required. There are two possible adjustment points: 1) lift strap to lift rod and 2) lift strap to pivot rod.
4. It is very important to thoroughly flush the supply lines to prevent foreign matter, i.e. copper chips, sand, stones, etc. from damaging the sealing surfaces of cartridge.
   Remove aerator and turn valve handle on to full cold position, open cold supply. Without closing, turn handle to full hot and open hot supply. Let water run in hot only and cold only positions long enough to flush supply lines thoroughly. Shut off faucet and replace aerator. Check for leaks.
5. The handle limit stop can be set to limit handle turn to the hot position. The limit mechanism is factory set to allow full handle travel. To adjust the limit stop, turn handle to the full hot position and lift handle to open faucet approximately half way to obtain a smooth flow for correct initial temperature measurement.



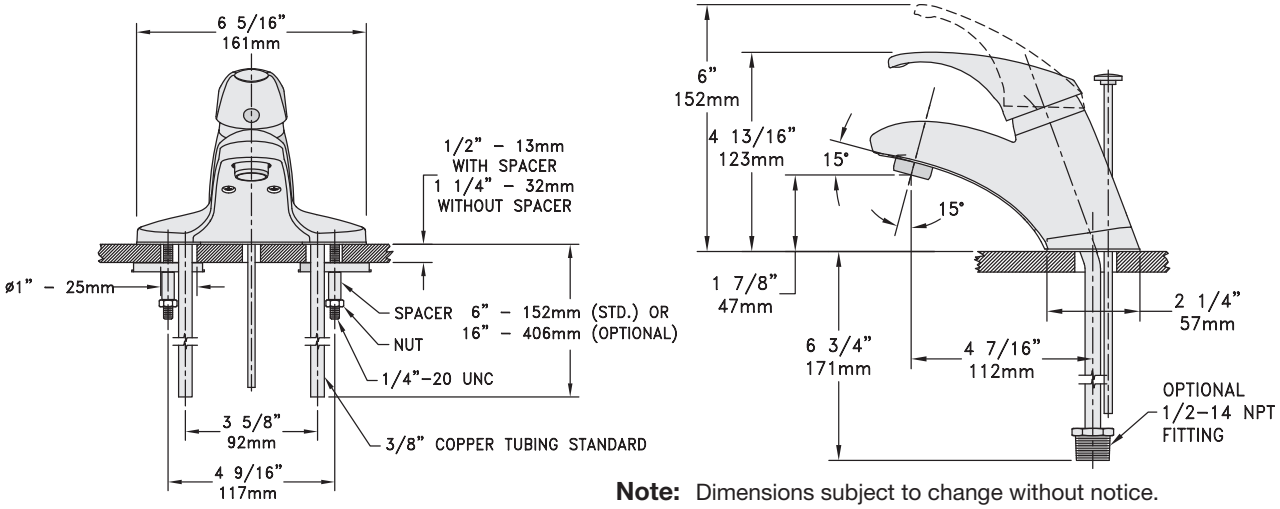
Limit stop adjust

6. If when faucet is on and in full hot position and water is too hot, shut off water, remove plug button (KN-157), loosen set screw (L-22) and remove handle (KN-3RB, KN-3BRB or LN-135). Lift limit stop ring using a small flat head screw driver and rotate clockwise to lower temperature. If water is not hot enough, rotate counter clockwise (See Figure 1 above). After correct temperature is achieved, reattach handle, reversing procedure above.

Replacing cartridge (KN-4)

1. Remove plug button (KN-157), loosen set screw (L-22) and remove handle (KN-3RB, KN-3BRB or LN-135).
2. Engage tabs in cartridge wrench (LN-34) with slots in compression ring (KN-2) and use screwdriver in wrench holes or pliers on wrench and turn counter clockwise until compression ring engages with cap (LN-8). Continue turning counter clockwise so that cap/ring assembly is removed from the body (LN-371). Remove cartridge and o-ring seal (KN-4).
3. Install new cartridge while taking care to maintain position of the o-ring seal at the base of the cartridge. Match posts in base of cartridge with alignment holes in valve body during assembly.
4. Reassemble faucet in reverse fashion. Thread cap onto body firmly by hand. Do not use a wrench which may damage the finish. Tighten compression ring (KN-2) finger tight using the wrench (LN-34) then 1/4 to 1/2 turn further.
5. Set hot water limit stop in accordance with installation step 5 above.

Dimensions Symmetrix Lavatory Faucet, *S-20-2*



Note: Dimensions subject to change without notice.

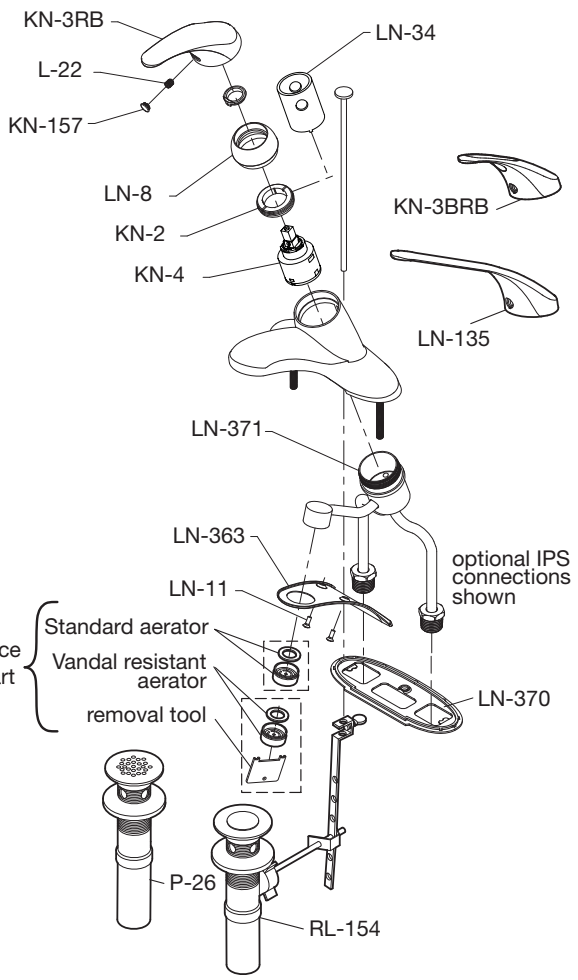
Parts Assembly Symmetrix Lavatory Faucet, *S-20 Series*

KN-2	Compression ring
KN-3RB*	Solid handle
KN-3BRB*	Loop handle
KN-4	Cartridge
KN-23	Anchor bar (2)
KN-26	Mounting spacer (2)
KN-157	Plug button
LN-8*	Valve cap
LN-11*	Screw (2)
LN-15*	Aerator without removal key
LN-34	Cartridge wrench
LN-135	6" lever handle with red/blue indicators
LN-363*	Undercover plate
LN-370	Mounting gasket
LN-371	Cartridge housing assembly
L-22	Set screw
L-36	Mounting nut (2)
RL-154*	Pop-up drain assembly (complete)
P-26	Grid drain assembly (complete)

For Decorative Finish Faucets add suffix to parts marked with an asterisk as follows:

Suffix -STN Satin finish

Aerator (flow regulator)	Part Number	
	Standard Aerators	Vandal Resistant with removal tool
2.2 gpm (8.3L/min)	LN-15*	LN-101*
1.5 gpm (5.7L/min)	FLR-110-1.5*	RL-288 (non-aerated)
1.0 gpm (3.8L/min)	FLR-110-1.0*	RL-288-VP-1.0 (non-aerated)
0.5 gpm (1.9L/min)	----	LN-100*
Removal tool part number, LL-60K		

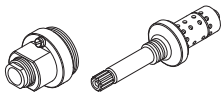


SYMMONS® Origins®
the smart choice™

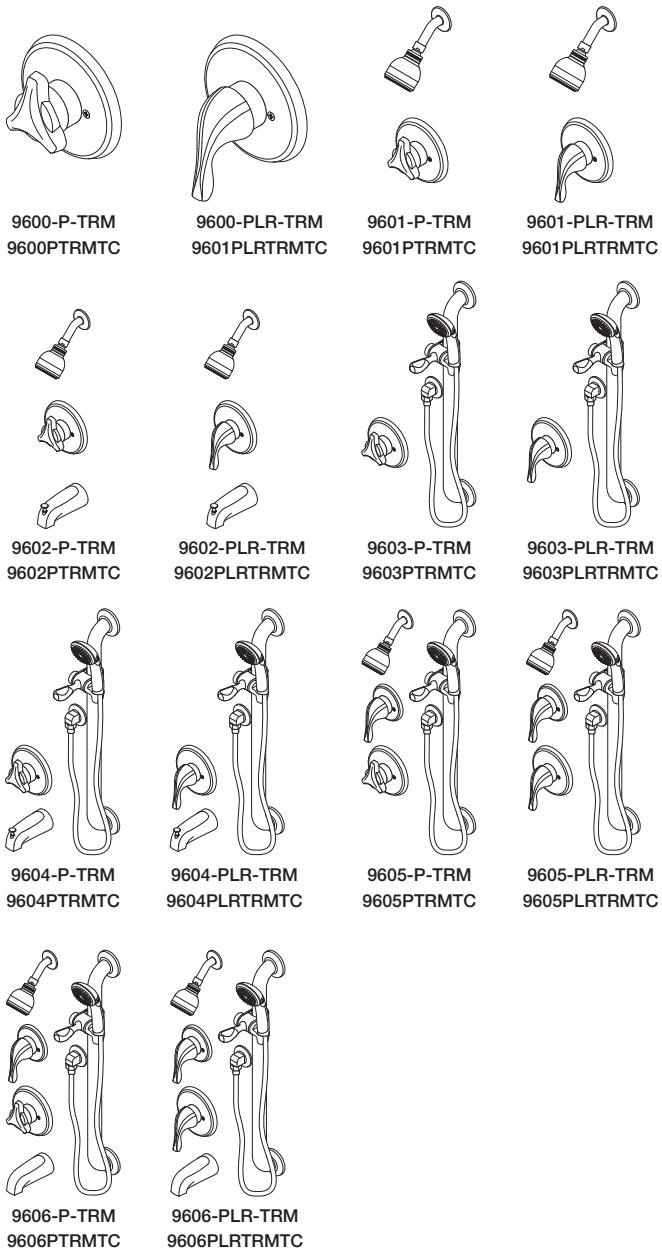
Origins Trim Series
Origins Trim Series with TA-10 Flow Control Spindle & T-12A Cap Assembly
Installation & Operation Instructions

Model Numbers

TRIM ONLY	TRIM, TA-10, T-12A
9600-P-TRM Shower Valve Trim	**9600PTRMTC** Shower Valve Trim
9600-PLR-TRM Shower Valve Trim	**9600PLRTRMTC** Shower Valve Trim
9601-P-TRM Shower Trim	**9601PTRMTC** Shower Trim
9601-PLR-TRM Shower Trim	**9601PLRTRMTC** Shower Trim
9602-P-TRM Tub/Shower Trim	**9602PTRMTC** Tub/Shower Trim
9602-PLR-TRM Tub/Shower Trim	**9602PLRTRMTC** Tub/Shower Trim
9603-P-TRM Hand Shower Trim	**9603PTRMTC** Hand Shower Trim
9603-PLR-TRM Hand Shower Trim	**9603PLRTRMTC** Hand Shower Trim
9604-P-TRM Tub/Hand Shower Trim	**9604PTRMTC** Tub/Hand Shower Trim
9604-PLR-TRM Tub/Hand Shower Trim	**9604PLRTRMTC** Tub/Hand Shower Trim
9605-P-TRM Shower/Hand Shower Trim	**9605PTRMTC** Shower/Hand Shower Trim
9605-PLR-TRM Shower/Hand Shower Trim	**9605PLRTRMTC** Shower/Hand Shower Trim
9606-P-TRM Tub/Shower/Hand Shower Trim	**9606PTRMTC** Tub/Shower/Hand Shower Trim
9606-PLR-TRM Tub/Shower/Hand Shower Trim	**9606PLRTRMTC** Tub/Shower/Hand Shower Trim



T-12A TA-10



9600-P-TRM 9600PTRMTC | 9600-PLR-TRM 9601PLRTRMTC | 9601-P-TRM 9601PTRMTC | 9601-PLR-TRM 9601PLRTRMTC

9602-P-TRM 9602PTRMTC | 9602-PLR-TRM 9602PLRTRMTC | 9603-P-TRM 9603PTRMTC | 9603-PLR-TRM 9603PLRTRMTC

9604-P-TRM 9604PTRMTC | 9604-PLR-TRM 9604PLRTRMTC | 9605-P-TRM 9605PTRMTC | 9605-PLR-TRM 9605PLRTRMTC

9606-P-TRM 9606PTRMTC | 9606-PLR-TRM 9606PLRTRMTC

Compliance

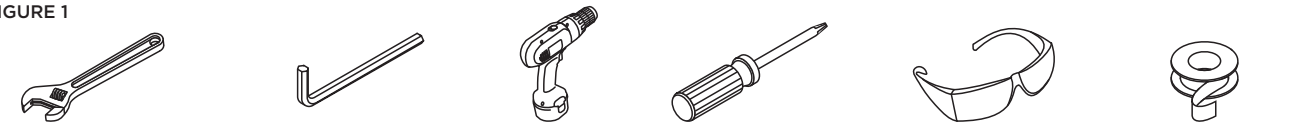
- ASME A112.18.1/CSA B125.1

Warranty

Limited Lifetime - to the original end purchaser in consumer/residential installations.
5 Years - for industrial/commercial installations.
Refer to www.symmons.com/warranty for complete warranty information.
Go to www.symmons.com/register to register your Symmons product.

1. Recommended Tools

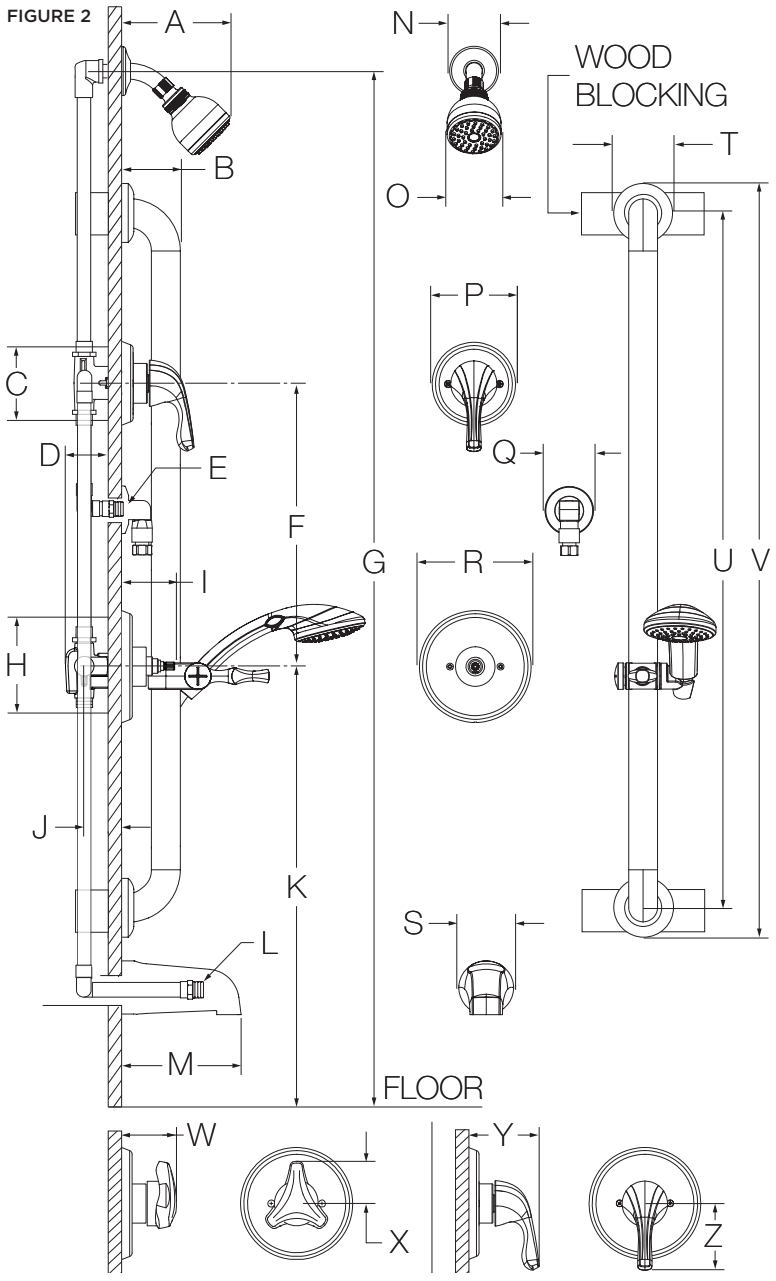
FIGURE 1



Adjustable Wrench | Allen Wrench (3mm) | Drill | Phillips Screwdriver | Safety Glasses | Thread Seal Tape

2. Dimensions

FIGURE 2



Measurements	
A	6-3/8″, 162 mm
B	3″, 76 mm
C	Diverter Valve Hole Size Min. Ø 3″, 76 mm Max. Ø 3-1/4″, 83 mm
D	3 1/2″, 89 mm
E	Male 1/2″ NPT fitting must protrude 3/8″ from finished wall
F	Ref. 10″, 254 mm
G	Ref. 77″, 1956 mm
H	Shower Valve Hole Size Min. Ø 3″, 76 mm Max. Ø 4″, 102 mm
I	2-7/8″, 73 mm
J	Rough-in 2-3/8″ ± 1/2″, 60 mm ± 13 mm
K	**9600, 9601, 9603, 9605:** Ref. 42″, 1067 mm **9602, 9604, 9606:** Ref. 32″, 813 mm
L	Male 1/2″ NPT fitting must protrude 4″ from finished wall
M	5-1/2″, 140 mm
N	Ø 2-1/2″, 64 mm
O	Ø 2-3/4″, 70 mm
P	Ø 4-1/4″, 108 mm
Q	Ø 2-1/2″, 64 mm
R	Ø 5-3/4″, 146 mm
S	Ø 2-1/2″, 64 mm
T	Ø 3-1/8″, 79 mm
U	36″, 914 mm
V	39″, 991 mm
W	2-7/8″, 73 mm
X	2-1/8″, 54 mm
Y	3-5/8″, 92 mm
Z	3-3/8″, 86 mm

Notes:

1) Valve body and piping not included and shown as reference only.
2) Plaster shield (p/n T-176) for dry wall, plaster or other type walls 1/2″ or greater.
3) All dimensions measured from nominal rough-in (see J as reference).
4) Dimensions subject to change without notice.

3. Parts Breakdown (Model Numbers Ending in TRMTC)

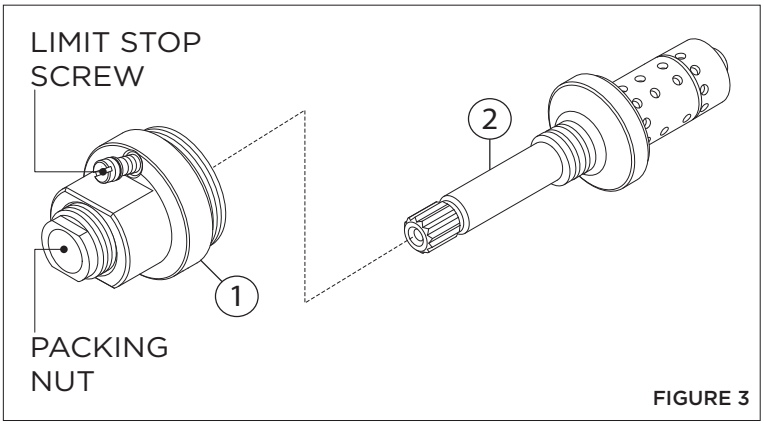


FIGURE 3

Replacement Parts		
Item	Description	Part Number
1	Cap Assy.	T-12A
2	Flow Control Spindle	TA-10

IMPORTANT: Model numbers ending in **TRMTC** coordinate with Temptrol pressure balancing valves ordered with Test Cap. The Test Cap is used to allow pressurization of system. **Do not** remove test cap from valve during wall construction, installation of valve or pressurization of system.

⚠ **WARNINGS:**

1. Test cap rated for pressure testing up to 200 psi maximum. **DO NOT** exceed 200 psi while pressure testing valve body.
2. Do not expose valve with test cap to heat for longer than 2 minutes when soldering copper tubing. Doing so may damage the internal components of the valve and will void the product warranty.
3. Ensure test cap is re-torqued to **30 lb-ft** after soldering valve body.

4. Installation - Remove Test Cap (Model Numbers Ending in TRMTC)

Flow control spindle (TA-10) and cap assembly (T-12A) will come factory assembled for all model numbers ending in **TRMTC**. When ready to remove Test Cap and install trim, follow the instructions below:

1) Check for leaks around the valve assembly and all pipe fittings.

2) Remove test cap from valve (FIGURE 4.1).

3) If system is dirty, flush valve.

4) Thread flow control spindle and cap assembly into valve body. Turn clockwise to secure to valve (FIGURE 4.2).

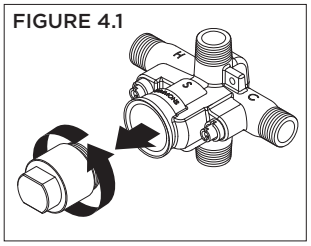


FIGURE 4.1

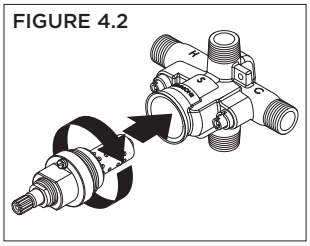


FIGURE 4.2

5. Installation - Adjust Packing Nut (Model Numbers Ending in TRMTC)

1) Turn hot and cold supplies on. Valve will not operate unless both hot and cold water supply pressures are on.

2) Place handle over flow control spindle.

3) Tighten packing nut for positive frictional resistance as handle is rotated from shut-off position across adjustment range.

6. Installation - Setting Limit Stop Screw (Model Numbers Ending in TRMTC)

The temperature limit stop screw limits valve handle from being turned to maximum position resulting in excessive hot water discharge temperatures.

⚠ **WARNING:** Failure to adjust limit stop screw properly may result in serious scalding.

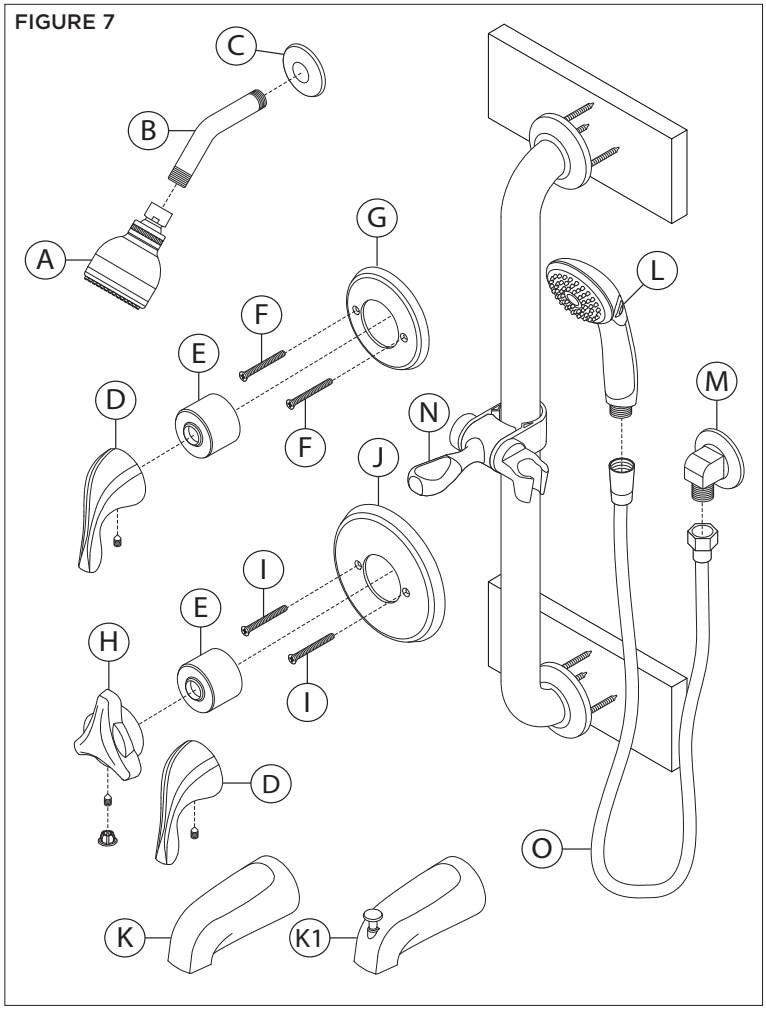
1) Turn hot and cold supplies on. Valve will not operate unless both hot and cold water supply pressures are on.

2) Place handle on flow control spindle and open valve to maximum desired temperature.

3) Turn limit stop screw clockwise until it seats.

7. Parts Breakdown

FIGURE 7




EF-109*

*Order in-line vacuum breaker (EF-109) for hand shower systems without dual checks.

Replacement Parts		
Item	Description	Part Number
A	Showerhead	4-141
B C	Shower Arm Flange	300S
D	'PLR' Handle	RTS-063
E	Dome Cover	T-19
F G	Diverter Escutcheon Screws	96-66-DIV-ESC
H	'P' Handle	RTS-061
I J	Shower Escutcheon Screws	**Standard (P):** 9600-P-ESC **Brass (P):** 9600-P-B-ESC **Standard (PLR):** 9600-PLR-ESC **Brass (PLR):** 9600-PLR-B-ESC
K K1	Tub Spout Diverter Tub Spout	060 054
L	Hand Shower	ADACHS
M	Wall Elbow	40A
N	Slide Mechanism	FP-SM6
O	60" Hose	RTS-045

Notes:

1) Append appropriate suffix for premium finish.
2) Append appropriate flow rate to showerhead or hand shower for low flow.
3) Apply a bead of silicone around the perimeter of all shower trim installed flush to the finished wall. Leave opening on bottom of escutcheons for weep hole.
4) Apply plumber tape to all threaded connections.

8. Installation - Shower Valve Trim

1) Secure large shower escutcheon to Temptrol pressure balancing valve using mounting screws (FIGURE 8.1).

2) Install dome cover by turning clockwise (FIGURE 8.2).

3) Install 'P' handle to shower valve. Secure with set screw. Install plug button (FIGURE 8.3).

4) Install 'PLR' handle to shower valve. Secure with set screw (FIGURE 8.4).

FIGURE 8.1

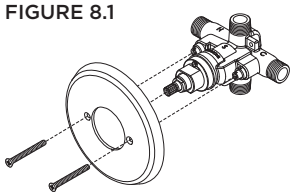
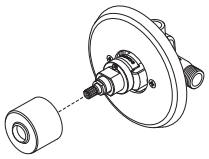


FIGURE 8.2



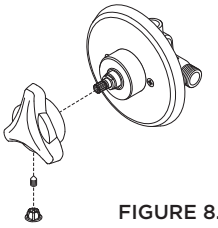


FIGURE 8.3

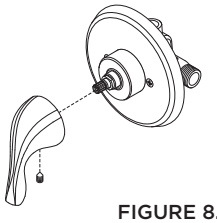


FIGURE 8.4

9. Installation - Diverter Valve Trim

1) Secure small diverter escutcheon to Symmons diverter valve using mounting screws (FIGURE 9.1).

2) Install dome cover by turning clockwise (FIGURE 9.2).

3) Install handle to diverter valve. Secure with set screw (FIGURE 9.3).

FIGURE 9.1

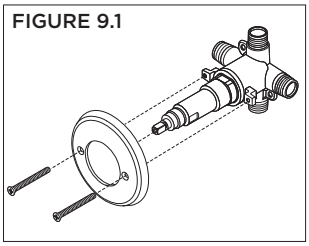


FIGURE 9.2

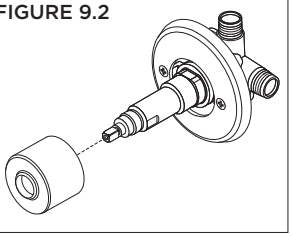
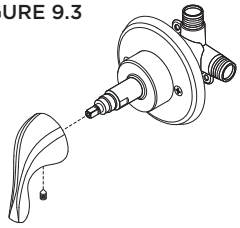


FIGURE 9.3



10. Installation - Showerhead & Tub Spout

1) Attach arm and flange to shower pipe. Turn clockwise to tighten (FIGURE 10.1).

2) Install showerhead to shower arm. Turn clockwise to tighten (FIGURE 10.2).

3) Install tub spout to stub out pipe. Turn clockwise to tighten (FIGURE 10.3).

FIGURE 10.1

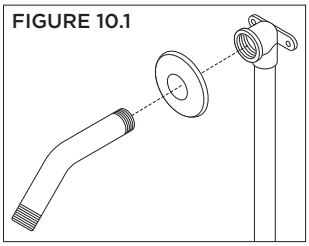


FIGURE 10.2

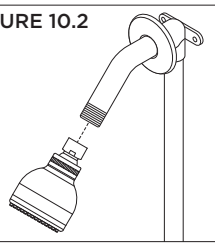
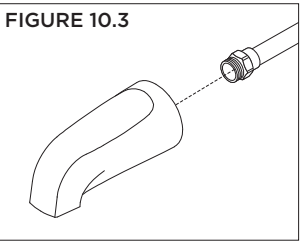


FIGURE 10.3



11. Installation - Slide Bar Assembly

1) Remove slide bar ends from slide bar flanges. Using flanges as a guide, drill 1/8" pilot holes into studs or wood blocking. With slide bar in position, secure to wall using screws. Attach slide bar ends to bar flanges (FIGURE 11.1).

2) Remove screw cap from slide mechanism (FIGURE 11.2).

3) Remove wand holder from slide mechanism (FIGURE 11.3).

4) Remove lever handle from slide mechanism (FIGURE 11.4).

5) Install slide mechanism components to slide bar following STEPS 11.2 - 11.4 in reverse. Flat edge on (N1) and (N2) must be aligned. Arrows on (N1) and (N3) identify bottom side (FIGURE 11.5).
Note: Adjust screw cap for ease of movement of slide assembly.

6) Press tabs on wall elbow flange. Install wall elbow to pipe fitting. Turn clockwise to secure (FIGURE 11.6).

7) Attach small end of hand shower hose to wall elbow. Turn clockwise to tighten (FIGURE 11.7).

8) Attach large end of hand shower hose to hand shower wand. Turn clockwise to tighten (FIGURE 11.8).

FIGURE 11.1

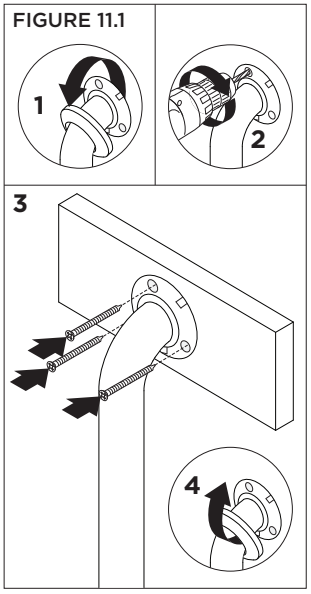


FIGURE 11.2

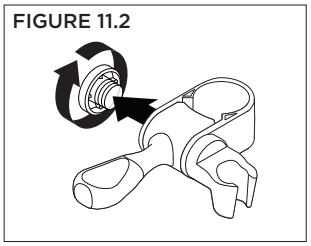


FIGURE 11.3

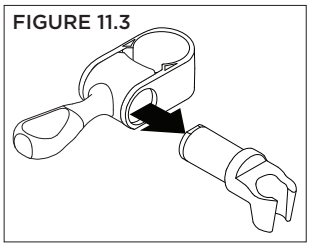


FIGURE 11.4

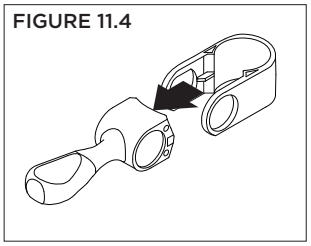


FIGURE 11.5

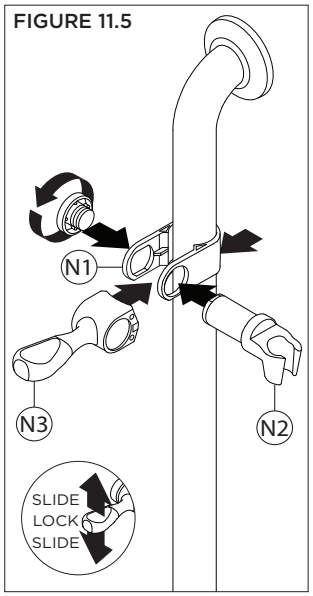


FIGURE 11.6

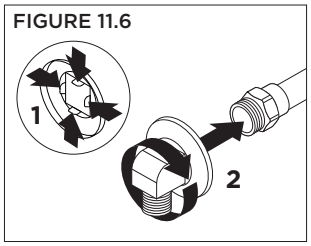


FIGURE 11.7

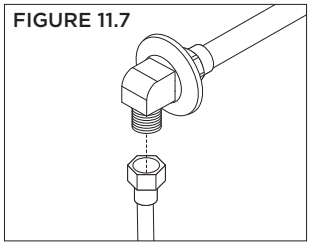
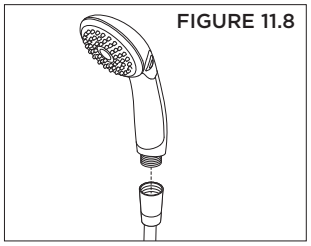


FIGURE 11.8



12. Operation (Temperature Control)

1) Turn shower handle counter-clockwise approximately 1/4 turn to put valve in cold position (FIGURE 12.1).

2) Turn shower handle counter- clockwise approximately 1/2 turn to put valve in warm position (FIGURE 12.2).

3) Turn shower handle counter- clockwise approximately 3/4 turn to put valve in hot position (FIGURE 12.3).

FIGURE 12.1

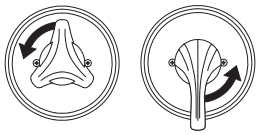


FIGURE 12.2

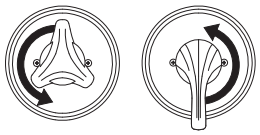
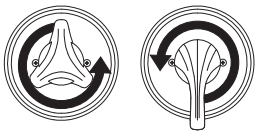


FIGURE 12.3



13. Operation (Dual Outlet Diverter Control)

Note: Additional handle positions for same output are illustrated.

1) Cartridge is factory set to divert to function 1 (FIGURE 13.1).

2) Turn handle to position 2 to divert to function 2 (FIGURE 13.2).

3) Turn handle to position 3 to share functions 1 and 2 (FIGURE 13.3).

FIGURE 13.1

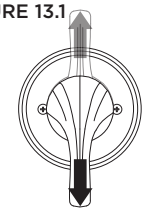


FIGURE 13.2

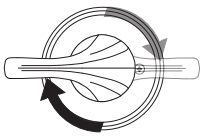
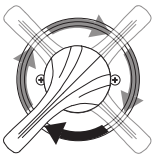


FIGURE 13.3



14. Operation (Triple Outlet Diverter Control)

1) Cartridge is factory set to divert to function 1 (FIGURE 14.1).

2) Turn handle to position 2 to divert to function 2 (FIGURE 14.2).

3) Turn handle to position 3 to divert to function 3 (FIGURE 14.3).

4) Turn handle to position 4 to share functions 2 and 3 (FIGURE 14.4).

5) Turn handle to position 5 to share functions 1 and 3 (FIGURE 14.5).

6) Turn handle to position 6 to share functions 1 and 2 (FIGURE 14.6).

FIGURE 14.1

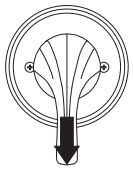


FIGURE 14.2

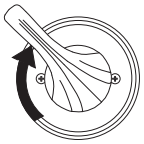


FIGURE 14.3

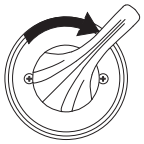


FIGURE 14.4

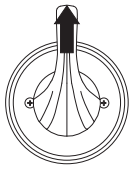
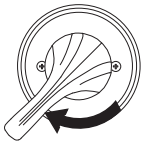


FIGURE 14.5

FIGURE 14.6



15. Troubleshooting Chart

Problem	Cause	Solution
Finish is spotting.	Elements in water supply may cause water staining on finish.	Clean finished trim area with a soft cloth using mild soap and water or a non-abrasive cleaner and then quickly rinse with water.

⚠ **WARNING:** This product can expose you to chemicals including lead, which is known to the state of California to cause cancer, birth defects, or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

P5

INSTALLATION INSTRUCTIONS FOR THE MODEL 830-AA SERVICE SINK WITH INTEGRAL VACUUM BREAKER

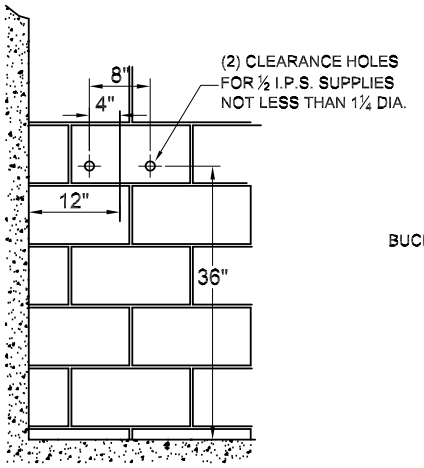


Fig. 1

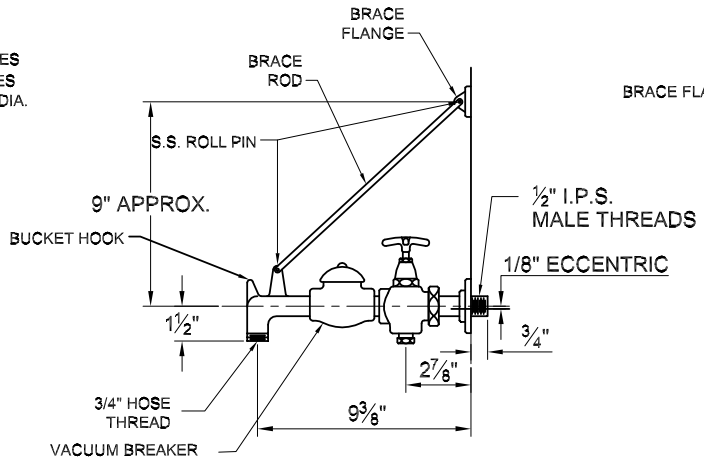


Fig. 2

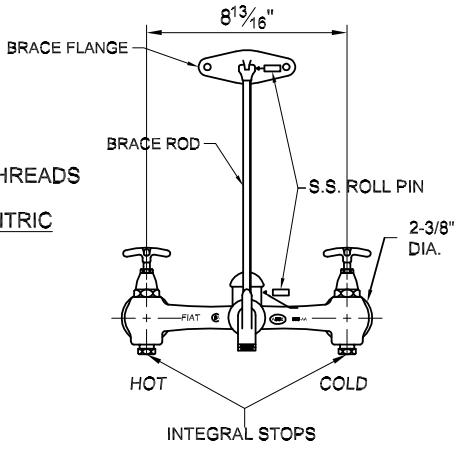


Fig. 3

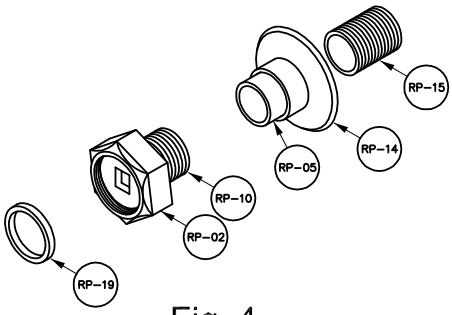


Fig. 4

INSTALLATION INSTRUCTIONS

1. Unpack the valve and check for any damage that may have occurred during shipment.
2. Drill the supply holes for the hot and cold sides of the valve as per Fig. 1
3. Remove RP-02, RP-10, and RP-19 from the hot and cold sides of the valve and assemble as shown in Fig. 4 and place onto supply pipe for hot and cold water.
4. Once Step 3 is complete attach the valve to RP-02. NOTE: If RP-19 is not placed as shown in Fig. 4 the connection will leak.
5. Attach Brace Rod to nozzle with S.S. roll pin. Once this is completed, attach the Brace Flange to Brace Rod with S.S. roll pin. Position the Brace Flange against the wall and mark two hole locations for the Brace Flange holes and secure the Brace Flange to the wall.

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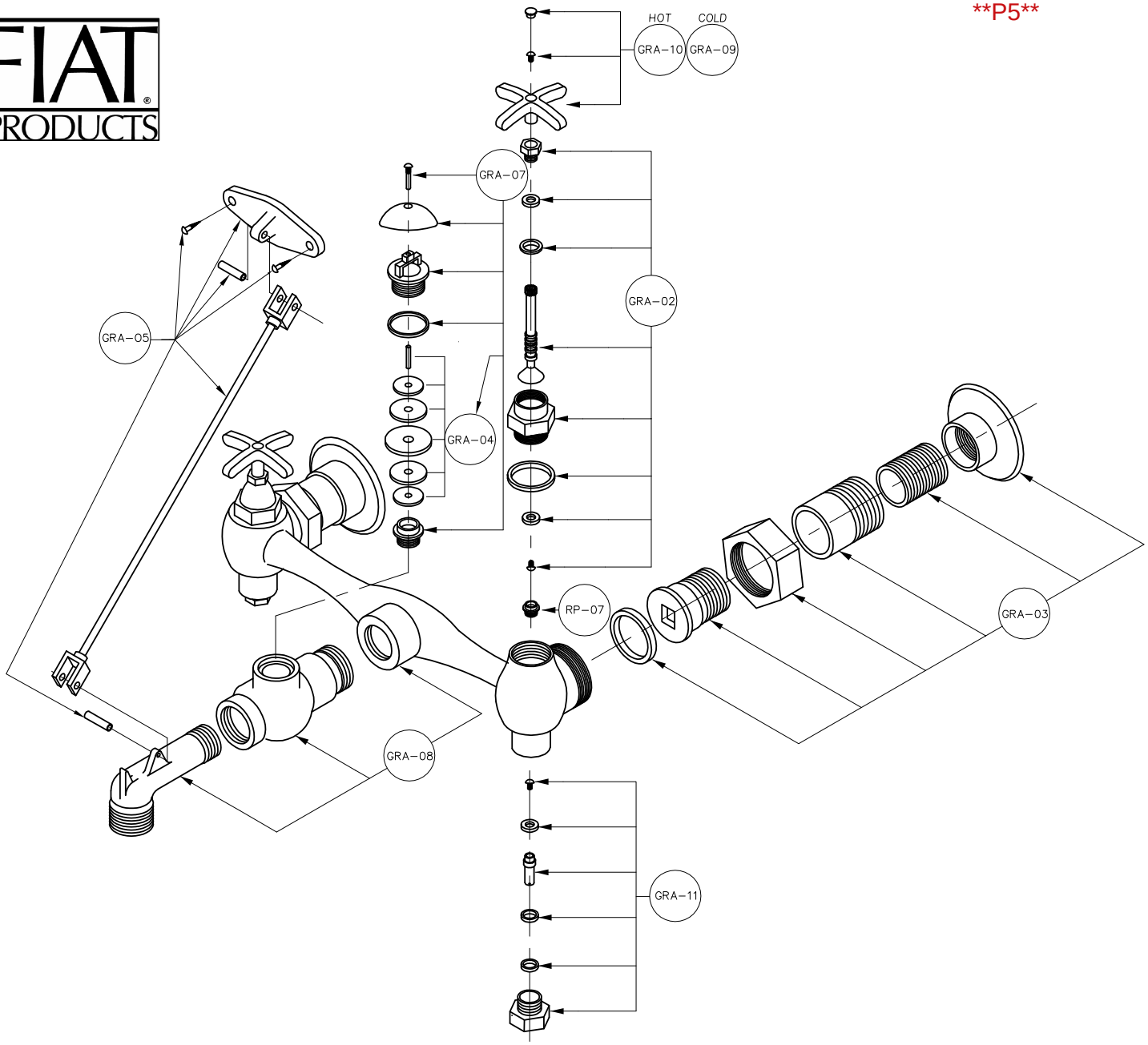


GROUP RELACEMENT ASSEMBLY PARTS LIST

GRA-02 HANDLE MOUNTING GROUP ASSEMBLY
- SPINDLE
- SEAT WASHER
- SEAT WASHER SCREW
- PACKING NUT
- BRASS WASHER
- PACKING
- HANDLE HUB
- HUB WASHER

GRA-03 COUPLING ASSEMBLY
- COUPLING NUT
- BUSHING(SOCKET)
- SWIVEL
- WALL FLANGE
- WASHER
- NIPPLE

GRA-05 BRACE ASSEMBLY
- WOOD SCREW (2)
- BRACE FLANGE
- S.S. ROLL PIN (2)
- WALL BRACE ROD

GRA-07 VACUUM BREAKER ASSEMBLY
- SEAT
- V.B. HUB
- CAP
- V.B. HUB WASHER
- V.B. CAP SCREW
- GRA-04 ASSEMBLY

GRA-08 BODY ASSEMBLY
- NOZZLE
- CENTER BODY
- V.B. BODY

GRA-09 COLD HANDLE ASSEMBLY
- HANDLE
- HANDLE SCREW
- COLD INDEX

GRA-10 HOT HANDLE ASSEMBLY
- HANDLE
- HANDLE SCREW
- HOT INDEX

GRA-11 INTEGRAL STOP ASSEMBLY
- SPINDLE
- BRASS WASHER
- WASHER
- PACKING NUT
- SEAT WASHER SCREW
- PACKING

RP-07 SEAT

Elkay Faucet Care and Cleaning

With proper care and maintenance, your Elkay faucet will give you a lifetime of service. Below are the suggestions for the care and cleaning of your Elkay Faucet.

Faucet Cleaning

- Clean faucets daily to avoid build-up of soap or mineral deposits, as these tend to have an adverse effect on the appearance of the product.
- For typical cleaning, wipe faucet well with a damp cloth and dry thoroughly with a soft towel. Drying helps avoid water spots.
- DO NOT use cleaning products containing ammonia, bleach, alcohol or other harsh chemicals and DO NOT use any form of abrasives (e.g. abrasive sponges or steel wool) which are damaging to metal surfaces.
- Faucet spray faces may become dirty over time. With Elkay's easy-clean rubber spray face, cleaning is as easy as rubbing with a finger to clean. This is recommended to do on a daily basis.

Chrome

With chrome finished faucets common household cleaners (e.g. dish soap) can be used.* However, cleaners should be rinsed off thoroughly and the faucet should be dried.

Oil Rubbed Bronze

With oil rubbed bronze faucets Windex original can be used .* However, cleaners should be rinsed off thoroughly and the faucet should be dried.

*Though household cleaners CAN be used, simply using a damp towel and drying thoroughly is still recommended.

Care and Maintenance

- These simple steps will extend the life of your faucet.
- The water in certain areas of the world can be very caustic - standing water around the product can cause damage. Be sure to remove standing water with a dry, soft cloth as soon as possible.
- For chrome and brushed finishes, as often as once a week, you can apply a paste wax or special, non-abrasive, brass coating (for polished brass)
- Before applying a protective coating (paste wax), gently brush the entire fixture using a soft tooth brush. This will remove any dirt or deposit build-up.
- DO NOT APPLY POLISH

Replacing Parts

If your Elkay faucet is leaking it may be time to replace the faucet's cartridge. To learn more about this process, please reference this article on replacing your cartridge. However, Elkay recommends that replacing a cartridge should be done by a professional.

Failure to follow care and cleaning will void your warranty. For additional information, please visit Elkay.com.

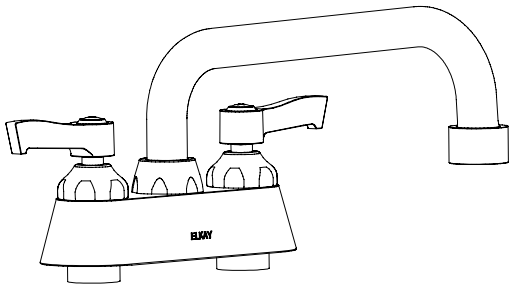
P6

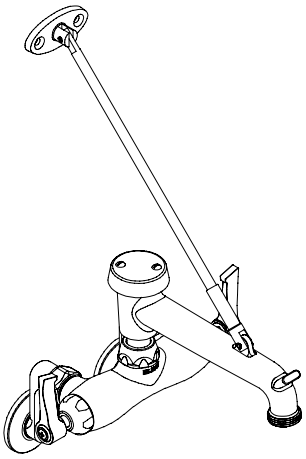
Elkay Faucet Care and Cleaning

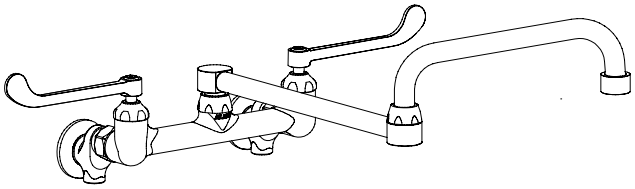
Home Remedies for Cleaning

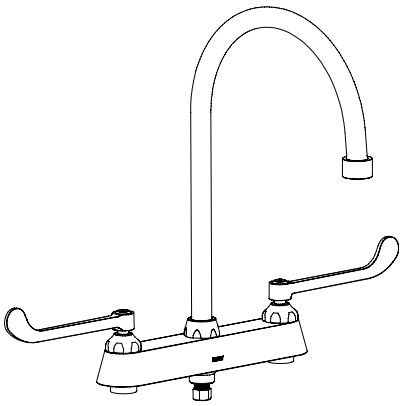
- For major stains or grime on your faucets, a mixture of a half a cup of white vinegar and a half cup of water will help. Dip a cloth into the solution and rub away the grime or stain. The solution should then be rinsed off and dried to prevent damage to the finish of your faucet.
- The above mixture is also recommended for spray faces with built up debris. Use a toothbrush with this mixture to try to dislodge any debris obstructing the water flow.
- Another solution for major grime or stains, is a small amount of baking soda and water on a toothbrush. This should remove any nasty stains. Again, the solution should then be rinsed off and dried to prevent damage to the finish of your faucet.
- DO NOT allow any part of your Elkay faucet to soak in either of the above mixtures. It is also recommended to test the above mixtures on an unseen part of your faucet to see what affect it has to the finish of your faucet.

Installation Instructions for Wall Mount and Deck Mount Faucets



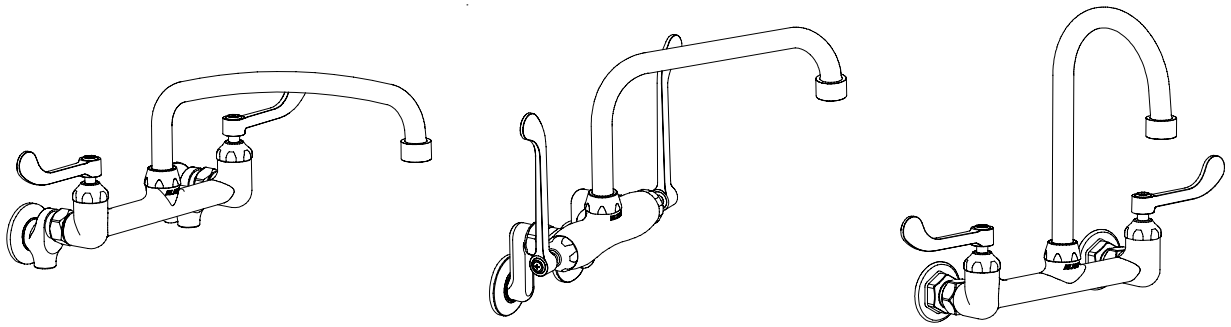






ELKAY ▪ 2222 CAMDEN COURT ▪ OAK BROOK, IL. 60523 USA

WALL MOUNT ASSEMBLY



General Instructions

- Turn off the water supply at the main source.
- Hand tighten all parts prior to tightening with wrench. Do not force parts together.
- Handle plated surfaces with care, being careful not to scratch with tools.
- Wall mount faucets have a ½" I.P.S. female flanged inlet.
- For easier assembly, you may purchase as an accessory, the LKMK462 mounting kit (see Figure 2).

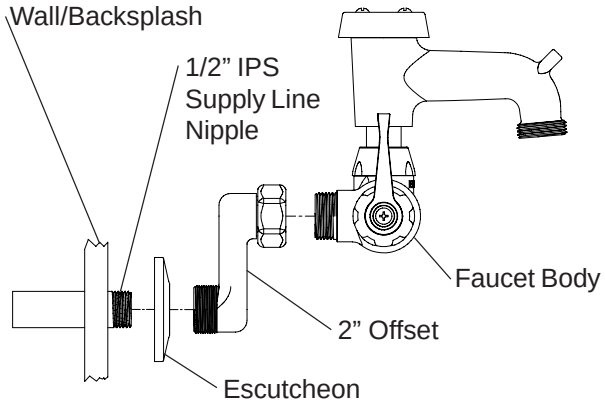


Figure 1

Assemble Faucet to Backsplash

1. Apply teflon tape or pipe joint compound to supply line nipples.
2. Place nipples through holes in backsplash.
3. Assemble each flanged inlet to one nipple, then the other.
4. Using the optional LKMK462, apply in order behind the back-splash: rubber washer, washer, lock nut and elbow (see Figure 2).
5. Thread flanged inlet loosely against wall or backsplash.
6. Carefully orient, mount and hand tighten the faucet to the two flanges. Besure to include the washers provided.
7. Use wrench to tighten flange against backsplash. (Maintain alignment of faucet or spout to sink while tightening).
8. Wrench tighten flanges to faucet body.
9. Make sure drain is attached and turn on water supply - being sure to check for leaks. Wrench tighten where needed.

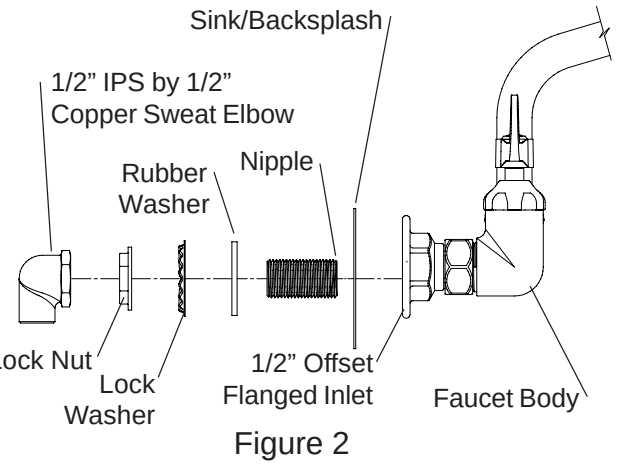
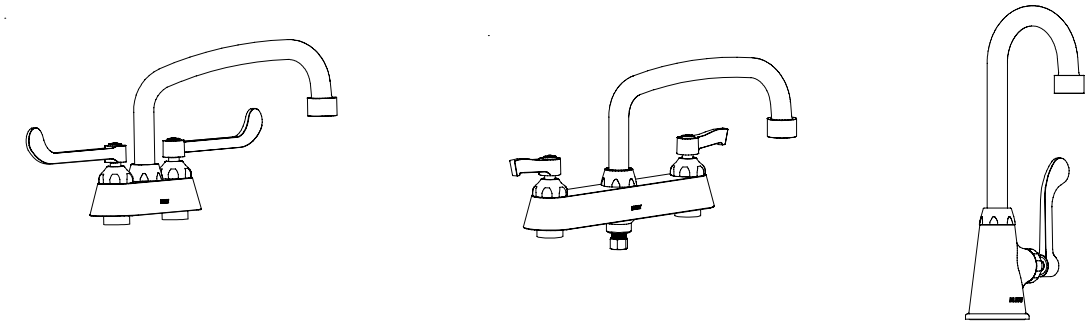


Figure 2

TO FIX SPOUT IN POSITION

1. Prior to spout installation, remove provided lock pin from sealed bag.
2. Place lock pin in the pierced hole at the base of the spout.
3. Align pin with slots in the ring found inside the throat of the spout connection on the faucet body.
4. Tighten spout nut to appropriate torque.

DECK MOUNT ASSEMBLY



General Instructions

- Turn off the water supply at the main source.
- Hand tighten all parts prior to tightening with wrench. Do not force parts together.
- Handle plated surfaces with care, being careful not to scratch with tools.
- All deck mount faucets and spouts come complete with compression nut and one piece nutwasher for ½" O.D. tube.

Assemble Base to Sink Deck

1. Apply Teflon tape or pipe joint compound to the threads on the shank(s).
2. Place shank(s) through holes in deck.
3. Apply in order: nutwasher and nut (see Figure 3).
4. Hand tighten nutwasher against deck of sink. (Maintain alignment of faucet or spout to sink while tightening.
5. Attach supply lines.
6. Make sure drain is attached and turn on water supply – being sure to check for leaks. Tighten with wrench where needed.

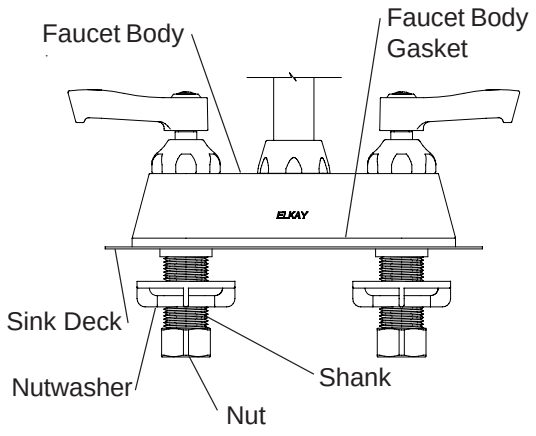


Figure 3

IMPORTANT END USER INFORMATION

Care and Cleaning Instructions

Your Elkay faucet has been constructed of the finest materials. However, certain precautions must be taken to maintain the lustrous decorative finish.

Do not use abrasive cleaners or harsh chemical cleansers on this product which could damage the finish.

A warm water wash with a wipedown using a soft cloth will generally remove dry water spots. Never use alcohol or other organic solvents.

ELKAY

COMMERCIAL SINKS AND FAUCETS LIMITED WARRANTY

Elkay warrants commercial sink and faucet products to be free of defects in workmanship and materials for a period of 5 years from the date of purchase. This warranty does not cover transportation or installation charges. Contact Elkay customer service (630-572-3192) for complete details and conditions.

TO OBTAIN SERVICE UNDER WARRANTY

1. Write to: Elkay
   Attention: Consumer Service
   2222 Camden Court
   Oak Brook, Illinois 60523

2. Include a letter containing the following information:

   a. Date of purchase and installation

   b. Description of nature of defect.

   c. Model number or description of model and/or component part if possible.

ELKAY®
SPECIFICATIONS

Elkay 4" Centerset with Exposed Deck Faucet with 5" Gooseneck Spout 2" Lever Handles Chrome

P6 **Model(s) LK406GN05L2**

PRODUCT SPECIFICATIONS

Elkay 4" Centerset with Exposed Deck Faucet with 5" Gooseneck Spout 2" Lever Handles Chrome. Faucet has a flow rate of 1.5 GPM, and is made of Chrome Plated Brass material, with a Quarter Turn Ceramic Disc valve. Faucet requires 2 faucet holes.

Mounting Type:	Deck Mount
Special Features:	Low Flow Solid Brass Construction Spout swing restriction pin
Finish:	Chrome (CR)
Handle Type:	2" Lever Handle
Deck Clearance:	8-1/8"
Spout Reach:	5"
Spout Height:	10-3/4"
Hole Drillings:	2
Material:	Chrome Plated Brass
Valve Type:	Quarter Turn Ceramic Disc
Valve Connection:	1/2" NPSM Male
Flow Rate:	1.5 GPM
Faucet Hole Spread:	4
Spout Type:	Gooseneck

Special Note: 1.5 GPM flow regulator installed (2.2 GPM flow regulator also included with faucet)

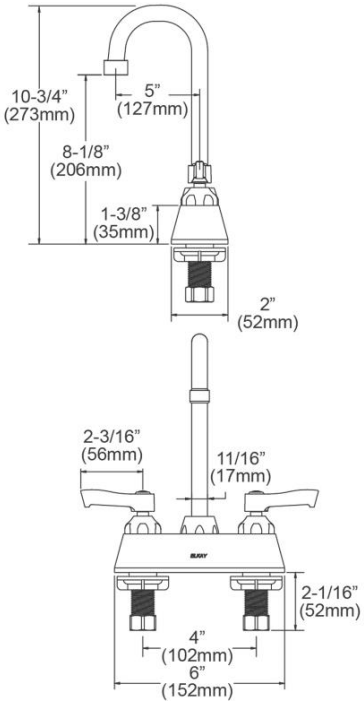
Chrome (CR)

AMERICAN PRIDE. A LIFETIME TRADITION.
Like your family, the Elkay family has values and traditions that endure. For almost a century, Elkay has been a family-owned and operated company, providing thousands of jobs that support our families and communities.

Product Compliance: ADA & ICC A117.1
ASME A112.18.1/CSA B125.1
NSF 61
NSF 372 (lead free)

Complies with ADA & ICC A117.1 accessibility requirements when installed according to the requirements outlined in these standards.

Clean and Care Manual (PDF)
Installation Instructions (PDF)
Limited Warranty (PDF)



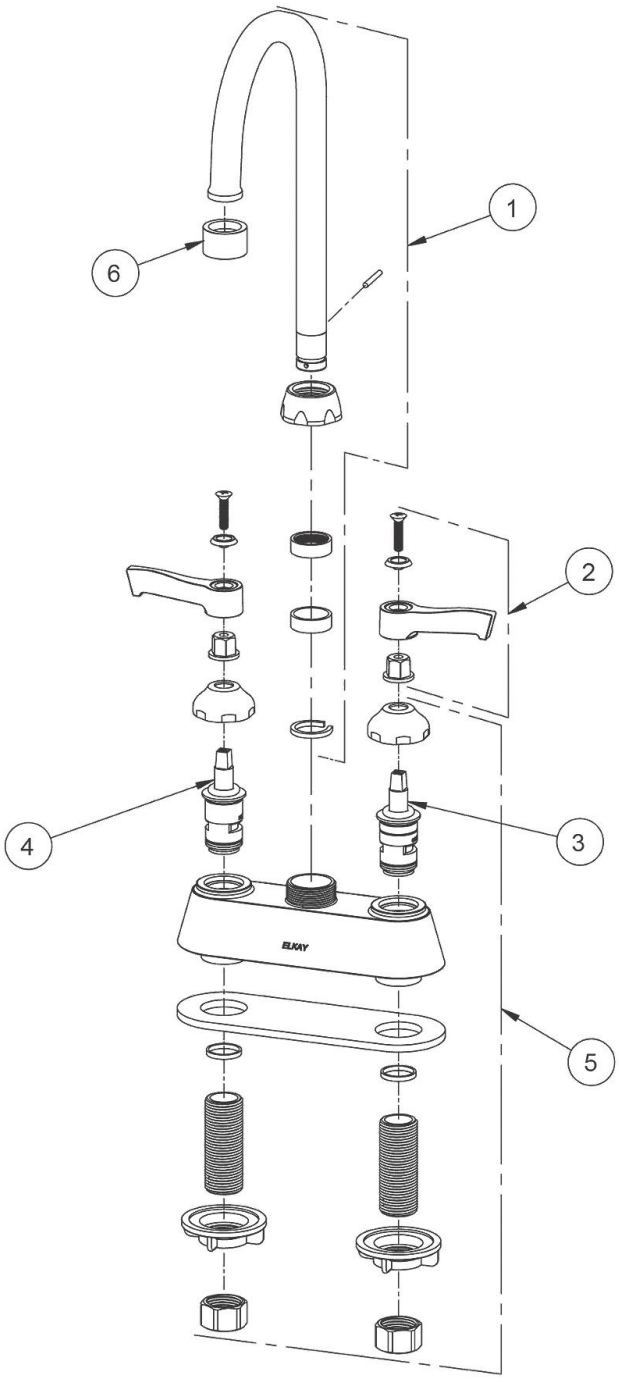
PART:_____QTY: _____
PROJECT:_____
CONTACT:_____
DATE:_____
NOTES:_____
APPROVAL:

In keeping with our policy of continuing product improvement, Elkay reserves the right to change product specifications without notice. Please visit elkay.com for the most current version of Elkay product specification sheets. This specification describes an Elkay product with design, quality, and functional benefits to the user. When making a comparison of other producers' offerings, be certain these features are not overlooked.

ELKAY®
SPECIFICATIONS

Elkay 4" Centerset with Exposed Deck Faucet with 5" Gooseneck Spout 2" Lever Handles Chrome

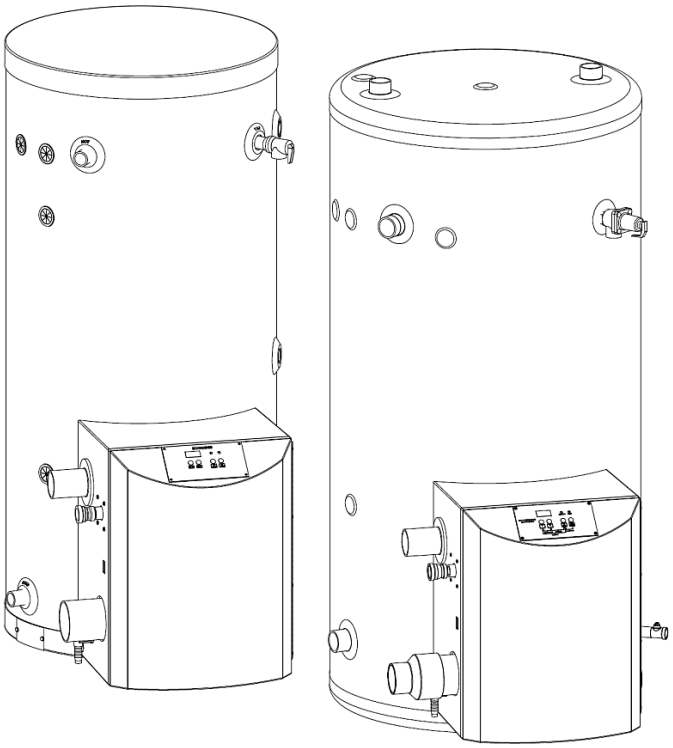
P6 **Model(s) LK406GN05L2**



ITEM	IND. PART	DESCRIPTION
1	A55401	Spout
2	45918C	Handle, 2"
3	45923C	Right Cold Cartridge
4	45924C	Left Hot Cartridge
5	45917C	Body
6	LK734	2.2 GPM VR Aerator

In keeping with our policy of continuing product improvement, Elkay reserves the right to change product specifications without notice. Please visit elkay.com for the most current version of Elkay product specification sheets. This specification describes an Elkay product with design, quality, and functional benefits to the user. When making a comparison of other producers' offerings, be certain these features are not overlooked.

Phoenix Series



INSTALLATION

START-UP

MAINTENANCE

PARTS

WARRANTY

Phoenix Water Heater Models*
PH100-55 / 130-55 / 160-55 / 199-55
PH100-80 / 130-80 / 160-80 / 199-80
PH100-119 / 130-119 / 160-119 / 199-119

Phoenix Sanitizer Booster Models*
PH130-55SA / PH199-55SA

Phoenix Multi Fit Models
PHM130-80 / 130-100
PHM199-80 / 199-100

***A suffix of "LP" denotes propane gas**
***A suffix of "S" denotes solar model**

⚠ DANGER

This manual must only be used by a qualified heating installer/service technician. Read and understand all instructions in this manual before installing. Perform steps in the order given. Failure to comply will result in substantial property damage, severe personal injury, or death.

NOTICE: *HTP reserves the right to make product changes or updates without notice and will not be held liable for typographical errors in literature.*

The surfaces of these products contacted by consumable water contain less than 0.25% lead by weight, as required by the Safe Drinking Water Act, Section 1417.

NOTE TO CONSUMER: PLEASE KEEP ALL INSTRUCTIONS FOR FUTURE REFERENCE.

120 Braley Rd. P.O. Box 429 East Freetown, MA 02717-0429 www.htproducts.com
LP-179 REV. 12.16.14

⚠ WARNING

IF THE INFORMATION IN THIS MANUAL IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT, CAUSING PROPERTY DAMAGE, PERSONAL INJURY, OR LOSS OF LIFE. DO NOT STORE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch.
- Do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department. Installation and service must be provided by a qualified installer, service agency, or the gas supplier.

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result, causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- **Do not try to light any appliance**
- **Do not touch any electric switch; do not use any phone in your building**
- **Immediately call your gas supplier from a neighbor's phone. Follow the gas suppliers' instructions.**
- **If you cannot reach your gas supplier, call the fire department.**

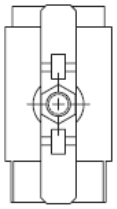
C. Use only your hand to turn the gas control knob. Never use tools. If the handle will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

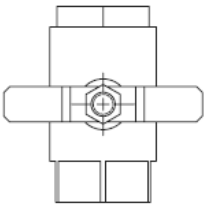
OPERATING INSTRUCTIONS

1. **STOP! Read the safety information above.**
2. **Set the thermostat to lowest setting.**
3. **Turn off all electric power to the appliance.**
4. **This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.**

GAS VALVE ON



GAS VALVE OFF



5. **Remove front cover.**
6. **Turn gas shutoff valve to "off". Handle will be across the piping, do not force.**
7. **Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.**
8. **Turn gas shutoff valve to "on". Handle will be in line with piping.**
9. **Install Front Cover.**
10. **Turn on all electric power to appliance.**
11. **Set thermostat to desired setting.**
12. **If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.**

TO TURN OFF GAS TO APPLIANCE

1. **Set the thermostat to lowest setting.**
2. **Turn off all electric power to the appliance if service is to be performed.**
3. **Remove Front Cover.**
4. **Turn gas shutoff valve to "off". Handle will be across the piping. Do not force.**
5. **Install Front Cover.**

LP-175 Rev. 4 3-11-08

SPECIAL ATTENTION BOXES
The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels, or to important product information.
⚠ DANGER
DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING
WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION
CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
CAUTION
CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

FOREWORD

This manual is intended to be used in conjunction with other literature provided with the Phoenix Gas-Fired Water Heater. This includes all related control information. It is important that this manual, all other documents included with this system, and additional publications including the National Fuel Gas Code, ANSI Z223.1-2002, be reviewed in their entirety before beginning any work.

Installation should be made in accordance with the regulations of the Authority Having Jurisdiction, local code authorities, and utility companies which pertain to this type of water heating equipment.

Authority Having Jurisdiction (AHJ) – The Authority Having Jurisdiction may be a federal, state, local government, or individual such as a fire chief, fire marshal, chief of a fire prevention bureau, labor department or health department, building official or electrical inspector, or *others having statutory authority*. In some circumstances, the property owner or his/her agent assumes the role, and at government installations, the commanding officer or departmental official may be the AHJ.

NOTE: HTP, Inc. reserves the right to modify product technical specifications and components without prior notice.

FOR THE INSTALLER

⚠ DANGER
This manual must only be used by a qualified heating installer/service technician. Read and understand all instructions in this manual before installing. Perform steps in the order given. Failure to comply will result in substantial property damage, severe personal injury, or death.

This water heater must be installed by qualified and licensed personnel. The installer should be guided by the instructions furnished with the heater, and with local codes and utility company requirements. In the absence of local codes, preference should be given to the National Fuel Gas Code, ANSI Z223.1-2002.

INSTALLATIONS MUST COMPLY WITH:
Local, state, provincial, and national codes, laws, regulations and ordinances.

The latest version of the National Fuel Gas Code, ANSI Z223.1, from American Gas Association Laboratories, 8501 East Pleasant Valley Road, Cleveland, OH 44131.

In Canada – CGA No. B149 (latest version), from Canadian Gas Association Laboratories, 55 Scarsdale Road, Don Mills, Ontario, Canada M3B 2R3. Also, Canadian Electrical Code C 22.1, from Canadian Standards Association, 5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6.

Code for the installation of Heat Producing Appliances (latest version), from American Insurance Association, 85 John Street, New York, NY 11038.

The latest version of the National Electrical Code, NFPA No. 70.

NOTE: The gas manifold and controls met safe lighting and other performance criteria when undergoing tests specified in ANSI Z21.10.3 – latest edition.

TABLE OF CONTENTS

PART 1 – GENERAL SAFETY INFORMATION

A. PRECAUTIONS

This water heater is for indoor installations only. Clearance to combustible materials: 0” top, bottom, sides and back. Unit must have room for service: 24” front and 12” sides are minimum recommended service clearances. (A combustible door or removable panel is acceptable front clearance.) This water heater has been approved for closet installation, and installation on combustible flooring. Do not install this water heater directly on carpeting. Use only Category IV vent systems.

⚠ WARNING

INSTALLER – Read all instructions in this manual before installing. Perform steps in the order given.

USER – This manual is for use only by a qualified heating installer/service technician. Have this heater serviced/inspected by a qualified service technician annually.

FAILURE TO ADHERE TO THE GUIDELINES ON THIS PAGE AND HAVE THIS HEATER SERVICED/INSPECTED ANNUALLY CAN RESULT IN SUBSTANTIAL PROPERTY DAMAGE, SEVERE PERSONAL INJURY, OR DEATH.

⚠ WARNING

If the heater is exposed to the following, do not operate until all corrective steps have been made by a qualified serviceman:

1. FIRE
2. DAMAGE
3. WATER

Any claims for damage or shortage in shipment must be filed immediately against the transportation company by the consignee.

⚠ WARNING

DO NOT USE THIS WATER HEATER IF ANY PART HAS BEEN SUBMERGED IN WATER. Immediately call a qualified service technician. The water heater MUST BE replaced if it has been submerged. Attempting to operate an appliance that has been submerged could create numerous harmful conditions, such as a potential gas leakage causing a fire and/or explosion, or the release of mold, bacteria, or other harmful particulates into the air. Operating a previously submerged water heater could result in property damage, severe personal injury, or death.

NOTE: Water heater damage due to flood or submersion is considered an Act of God, and IS NOT covered under product warranty.

B. IMPROPER COMBUSTION

⚠ WARNING

Do not obstruct the flow of combustion and ventilating air. Adequate air is necessary for safe operation. Failure to keep the vent and combustion air intake clear of ice, snow, or other debris could result in property damage, serious personal injury, or death.

C. GAS

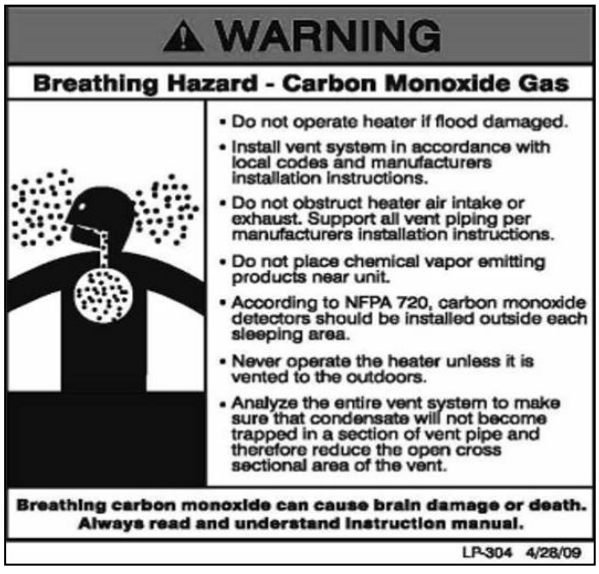
Should overheating or gas supply fail to shut off, turn off the manual gas control valve to the water heater.

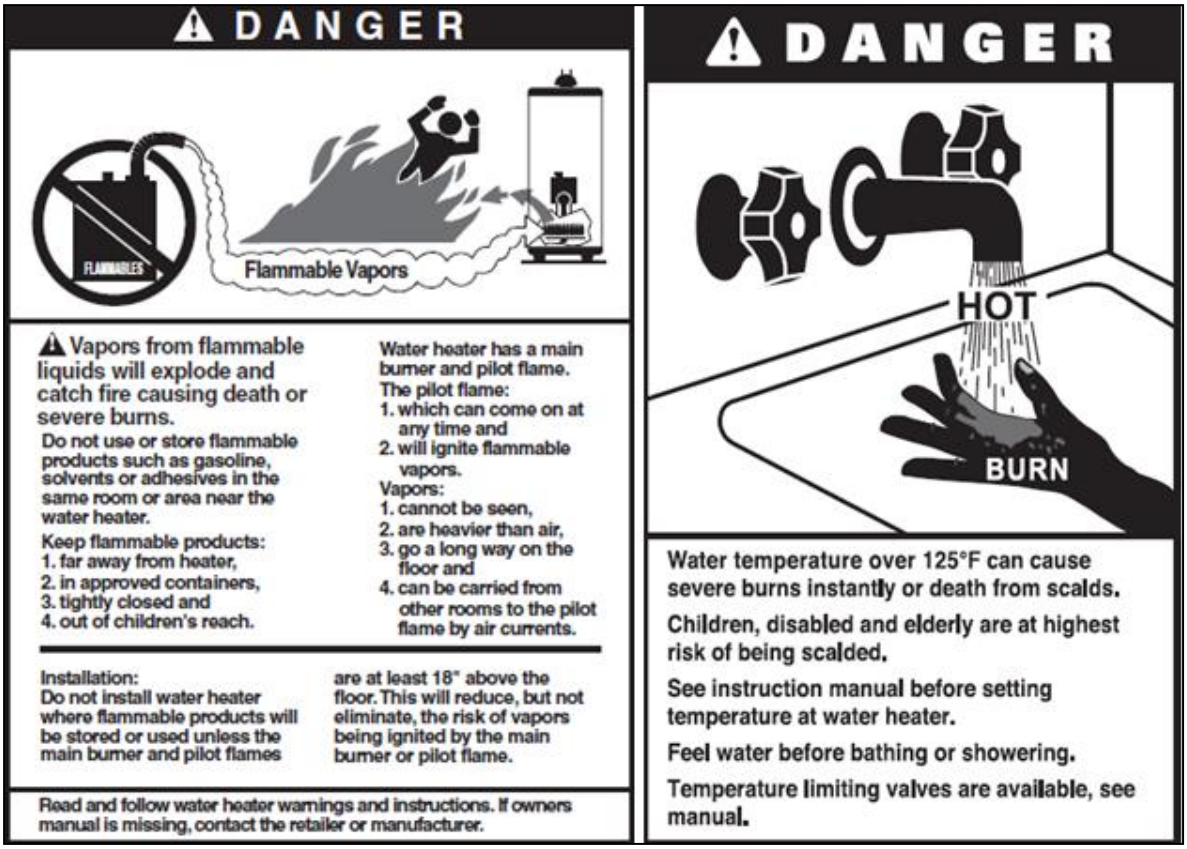
D. WHEN SERVICING THE HEATER

- To avoid electric shock, disconnect electrical supply before performing maintenance.
- To avoid severe burns, allow heater to cool.

E. HEATER WATER

- Do not use petroleum-based cleaning or sealing compounds in a heater system. Gaskets and seals in the system may be damaged. This can result in substantial property damage.
- Do not use “homemade cures” or “heater patent medicines”. Substantial property damage, damage to heater, and/or serious personal injury may result.





PART 2 – BEFORE YOU START

A. WHAT'S IN THE BOX

Also included with the heater:

- Intake PVC Tee with Screens
- Exhaust PVC Coupling with Screens
- Temperature and Pressure Relief Valve
- Two Threaded Brass Caps (PHM Models Only)
- Installation Manual
- Warranty
- Solar Addendum (Solar Models Only)
- LP Conversion Kit (Natural Gas Models Only)

B. HOW THE HEATER OPERATES

Modulation Condensing Technology is an intelligent system that delivers highly efficient water heating, while maximizing efficiency by measuring the data parameters of your water heating system. Some of its features are:

Stainless Steel Water Storage Tank
The stainless steel water storage tank has a combustion chamber submerged into the tank water. When the water heater is fired, combustion gases heat the combustion chamber walls, transferring heat directly into the surrounding water. These hot gases are blown into secondary heat exchanger coils, where more heat is transferred into the water, removing even more heat from the gases.

Modulating Combustion System
Modulation during water heating operation is based on tank temperature. The control monitors the system to regulate burner output during operation to match system demand. This increase in efficiency allows for substantial fuel savings.

Gas Valve
The gas valve senses suction from the blower, allowing gas to flow only if the gas valve is energized and combustion air is flowing.

Upper Supply Tank Sensor
This sensor monitors the upper portion water temperature (system supply) of the water heater. The control module adjusts the burner firing rate so the outlet water temperature meets the set point.

Lower Return Tank Sensor
This sensor monitors the lower portion of the water heater inlet water temperature (system return). The control module reduces or increases input, depending on how close the water temperature is to the outlet water temperature set point.

Control
The integrated control system monitors upper and lower water temperature and regulates fan speed to regulate the unit's energy output. This allows the unit to deliver the required amount of heated energy and nothing more.

Burner
Constructed of high grade stainless steel, the burner uses pre-mixed air and gas and provides a wide range of firing rates.

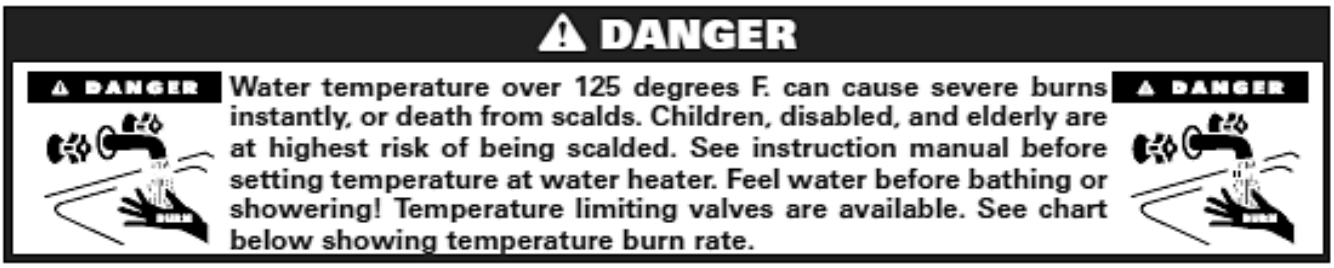
Condensate Drain Connection
This is a condensing high efficiency water heater, and therefore has a condensate removal system. Condensate is nothing more than water vapor, derived from combustion products and similar to an automobile when it is initially started. It is very important that the condensate line slopes away from the water heater and down to a suitable inside drain.

If the condensate outlet on the heater is lower than the drain, you must use a condensate removal pump (kit p/n 554200 available from HTP.) In addition, local authorities may require a condensate neutralizer to neutralize the condensate. Condensate neutralizers are made up of lime crystals, marble or phosphate chips. Neutralizers can be installed in the field by the installer and purchased from HTP (p/n 7450P-212).

It is also very important not to expose the condensate line to freezing temperatures or any type of blockage. Plastic tubing must be the only material used for the condensate line. Steel, brass, copper or other materials will be subject to corrosion or deterioration. A second vent may be necessary to prevent condensate line vacuum lock on a long horizontal run. Also, an increase in pipe size may be necessary to allow condensate to drain properly. Support of the condensation line may be necessary to avoid blockage of the condensate flow.

Spark Ignition
The burner flame is ignited by applying high voltage to the system spark electrode. This causes a spark from electrode to ground.

Outdoor Sensor – Monitors outdoor temperature and adjusts unit set point to provide greater efficiency.



C. OPTIONAL EQUIPMENT

Below is a list of optional equipment available from HTP:

- 3" Stainless Steel Outside Termination Vent Kit (V1000)
- 4" Stainless Steel Outside Termination Vent Kit (V2000)
- 2" PVC Concentric Vent Kit (Part # KGAVT0501CVT)
- 3" PVC Concentric Vent Kit (Part # KGAVT0601CVT)
- 3" Polypro Vent Kit (Part # 8400P-001)
- 3" Polypro Pipe (33' length Part # 8400P-002, 49.5' length Part # 8400P-003)
- PC Connection Kit (Part # 7250P-320)
- Condensate Neutralizer (Part # 7450P-212)
- Outdoor Sensor (Part # 7250P-319)
- Sanitizer Booster Kit (Part # VSBK-1200)

PART 3 – PREPARE WATER HEATER LOCATION

CAUTION

Carefully consider installation when determining heater location. Please read the entire manual before attempting installation. Failure to properly take factors such as heater venting, piping, condensate removal, and wiring into account before installation could result in wasted time, money, and possible property damage and personal injury.

A. BEFORE LOCATING THE HEATER

⚠ WARNING

Incorrect ambient conditions can lead to damage to the heating system and put safe operation at risk. Ensure that the heater installation location adheres to the information included in this manual. Failure to do so could result in property damage, serious personal injury, or death.

CAUTION

Failure of heater or components due to incorrect operating conditions IS NOT covered by product warranty.

1. Installation Area (Mechanical Room) Operating Conditions
   - Ensure ambient temperatures are higher than 32°F/0°C and lower than 104°F/40°C.
   - Prevent the air from becoming contaminated by the products, places, and conditions listed in this manual, Part 3, Section F.
   - Avoid continuously high levels of humidity
   - Never close existing ventilation openings
   - Ensure a minimum 1” clearance around hot water and exhaust vent pipes

CAUTION

The service life of the heater’s exposed metallic surfaces, such as the casing, as well as internal surfaces, such as the heat exchanger, are directly influenced by proximity to damp and salty marine environments. In such areas, higher concentration levels of chlorides from sea spray coupled with relative humidity can lead to degradation of the heat exchanger and other heater components. In these environments, heaters must not be installed using direct vent systems which draw outdoor air for combustion. Such heaters must be installed using room air for combustion. Indoor air will have a much lower relative humidity and, hence, potential corrosion will be minimized.

⚠ WARNING

This heater is certified for indoor installations only. Do not install the heater outdoors. Failure to install this heater indoors could result in substantial property damage, severe personal injury, or death.

2. Check for nearby connections to:
   - System water piping
   - Venting connections
   - Gas supply piping
   - Electrical power
   - Condensate drain

3. Check area around heater. Remove any combustible materials, gasoline, and other flammable liquids.

⚠ WARNING

Failure to keep heater area clear and free of combustible materials, liquids, and vapors can result in substantial property damage, severe personal injury, or death.

4. Gas control system components must be protected from dripping water during operation and service.

5. If the heater is to replace an existing heater, check for and correct any existing system problems, such as:
   - System leaks
   - Location that could cause the system and heater to freeze and leak.
   - Incorrectly-sized expansion tank

6. Clean and flush system when reinstalling a heater.

NOTE: When installing in a zero clearance location, it may not be possible to read or view some product labeling. It is recommended to make note of the heater model and serial number.

B. LEVELING

⚠ CAUTION

In order for the condensate to properly flow out of the collection system, the area where you locate the heater must be level. Location must also fully support the weight of the filled water heater.

C. CLEARANCES FOR SERVICE ACCESS

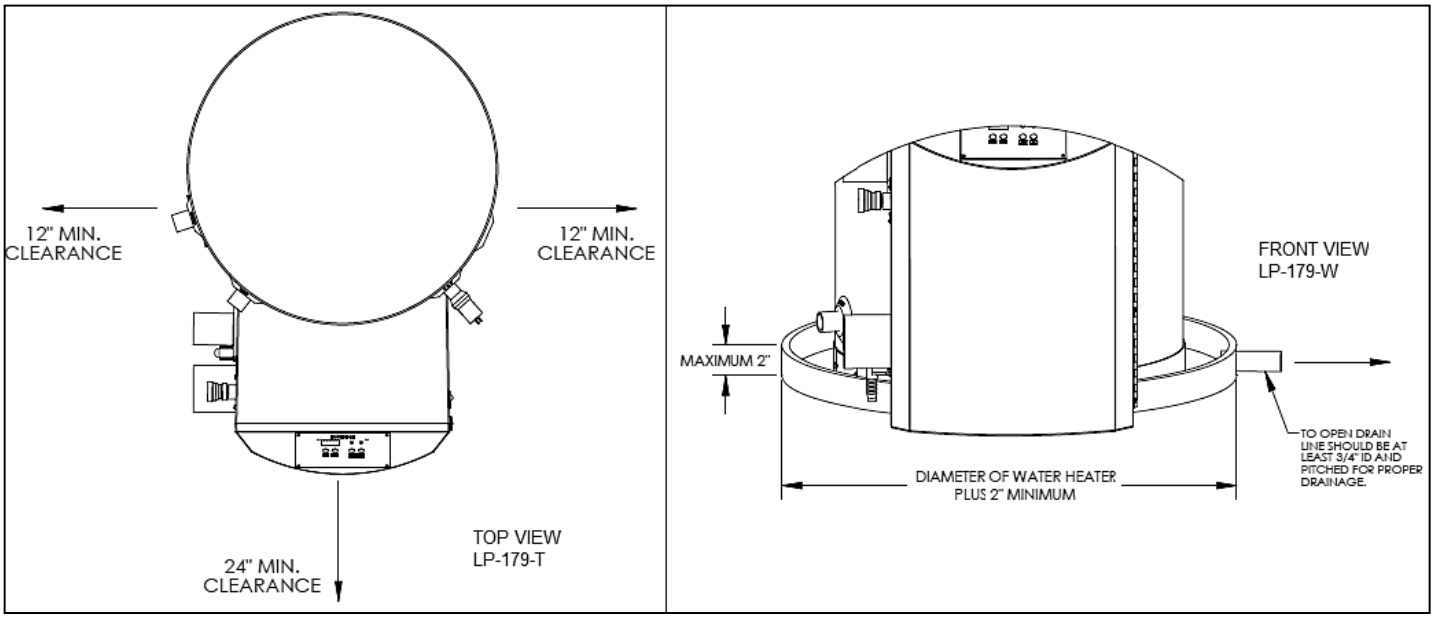


Figure 1 – Minimum Service Clearances

NOTE: If you do not provide the minimum clearances shown in Figure 1, it might not be possible to service the heater without removing it from the space.

⚠ WARNING

The space must be provided with combustion/ventilation air openings correctly sized for all other appliances located in the same space as the heater. The heater cover must be securely fastened to prevent the heater from drawing air form the heater room. This is particularly important if the heater is in a room with other appliances. Failure to comply with the above warnings could result in substantial property damage, severe personal injury, or death.

D. RESIDENTIAL GARAGE INSTALLATION

PRECAUTIONS

If the heater is located in a residential garage, per ANSI Z223.1:

- Mount the bottom of the heater a minimum of 18" above the floor of the garage, to ensure the burner and ignition devices are well off the floor.
- When raising the heater, fully support the entire bottom of the water heater.
- Locate or protect the heater so it cannot be damaged by a moving vehicle.

E. EXHAUST VENT AND INTAKE PIPE

The heater is rated ANSI Z21.10.3 Category IV (pressurized vent, likely to form condensate in the vent) and requires a special vent system designed for pressurized venting.

NOTE: The venting options described here (and further detailed in Venting, Part 5 in this manual) are the lone venting options approved for this water heater. Failure to vent the water heater in accordance with the provided venting instructions will void the warranty.

⚠ DANGER

Failure to vent the water heater properly will result in serious personal injury or death.

⚠ WARNING

Vents must be properly supported. Heater exhaust and intake connections are not designed to carry heavy weight. Vent support brackets must be within 1' of the heater and the balance at 4' intervals. Heater must be readily accessible for visual inspection for the first 3' from the heater.

1. DIRECT VENT INSTALLATION OF EXHAUST VENT AND INTAKE PIPE

If installing a direct vent option, combustion air must be drawn from the outdoors directly into the water heater intake, and exhaust must terminate outside. There are three basic direct vent options detailed in this manual: 1. Side Wall Venting, 2. Roof Venting, and 3. Unbalanced Venting.

Be sure to locate the heater such that the exhaust vent and intake piping can be routed through the building and properly terminated. Different vent terminals can be used to simplify and eliminate multiple penetrations in the building structure (see Optional Equipment in Venting Section). The exhaust vent and intake piping lengths, routing and termination methods must all comply with the methods and limits given in the Venting section, Part 5 of this manual.

When installing a combustion air intake from outdoors, care must be taken to utilize uncontaminated combustion air. **To prevent combustion air contamination, see Table 1** – Contaminant Table**.**

2. INDOOR COMBUSTION AIR INSTALLATION IN CONFINED OR UNCONFINED SPACE

This heater requires fresh, uncontaminated air for safe operation and must be installed in a mechanical room where there is adequate combustion and ventilating air. **NOTE: To prevent combustion air contamination, see Table 1** – Contaminant Table**.**

Combustion air from the indoor space can be used if the space has adequate area or when air is provided through a duct or louver to supply sufficient combustion air based on the water heater input. **Never obstruct the supply of combustion air to the water heater.** If the water heater is installed in areas where indoor air is contaminated (see Table 1) it is imperative that the water heater be installed as direct vent so that all combustion air is taken directly from the outdoors into the water heater intake connection.

Unconfined space is space with volume greater than 50 cubic feet per 1,000 Btu/hour (4.8 cubic meters per kW) of the total input rating of all fuel-burning appliances installed in that space. Rooms connected directly to this space, through openings not furnished with doors, are considered part of the space. See **Figure 21** for details.

Confined space is space with volume less than 50 cubic feet per 1,000 Btu/hour (4.8 cubic meters per kW) of the total input rating of all fuel-burning appliances installed in that space. Rooms connected directly to this space, through openings not furnished with doors, are considered part of the space.

When drawing combustion air from inside a conventionally constructed building to a confined space, such space should be provided with two permanent openings: one located 6" (15 cm) below the space ceiling, the other 6" (15cm) above the space floor. Each opening should have a free area of one square inch per 1,000 Btu/hr (22cm^2/kW) of the total input of all appliances in the space, but not less than 100 square inches (645cm^2).

If the confined space is within a building of tight construction, air for combustion must be obtained from the outdoors as outlined in the Venting section, Part 5 of this manual.

CAUTION

When drawing combustion air from the outside into the mechanical room, care must be taken to provide adequate freeze protection.

⚠ WARNING

Do not attempt to vent this water heater by any means other than those described in this manual. Doing so will void the warranty, and may result in severe personal injury or death.

⚠ WARNING

Failure to provide an adequate supply of fresh combustion air can cause poisonous flue gases to enter living space, resulting in severe personal injury or death. To prevent combustion air contamination, see Table 1**.**

F. PREVENT COMBUSTION AIR CONTAMINATION

Install intake piping for the heater as described in the Venting Section. Do not terminate exhaust in locations that can allow contamination of intake air.

⚠ WARNING

Ensure that the intake air will not contain any of the contaminants below. Contaminated air will damage the heater, resulting in possible substantial property damage, severe personal injury, or death. For example, do not pipe intake near a swimming pool. Also, avoid areas subject to exhaust fumes from laundry facilities. These areas always contain contaminants.

PRODUCTS TO AVOID	AREAS LIKELY TO HAVE CONTAMINANTS
Spray cans containing fluorocarbons	Dry cleaning/laundry areas and establishments
Permanent wave solutions	Swimming pools
Chlorinated waxes/cleaners	Metal fabrication plants
Chlorine-based swimming pool chemicals	Beauty shops
Calcium chloride used for thawing	Refrigeration repair shops
Sodium chloride used for water softening	Photo processing plants
Refrigerant leaks	Auto body shops
Paint or varnish removers	Plastic manufacturing plants
Hydrochloric or Muriatic acid	Furniture refinishing areas and establishments
Cements and glues	New building construction
Antistatic fabric softeners used in clothes dryers	Remodeling areas
Chlorine-type bleaches, laundry detergents, and cleaning solvents	Garages and workshops
Adhesives used to fasten building products	

Table 1 – Contaminant Table

NOTE: DAMAGE TO THE HEATER CAUSED BY EXPOSURE TO CORROSIVE VAPORS IS NOT COVERED BY WARRANTY. (Refer to the limited warranty for complete terms and conditions).

G. REMOVING A HEATER FROM A COMMON VENT SYSTEM

⚠ DANGER

Do not install the heater into a common vent with any other appliance. This will cause flue gas spillage or appliance malfunction, resulting in possible substantial property damage, severe personal injury, or death.

⚠ WARNING

Failure to follow all instructions can result in flue gas spillage and carbon monoxide emissions, causing severe personal injury or death.

When removing an existing heater, follow the steps below.

1. Seal any unused openings in the common venting system.

2. Visually inspect the venting system for proper size and horizontal pitch to determine if there is blockage, leakage, corrosion or other deficiencies that could cause an unsafe condition.

3. If practical, close all building doors, windows and doors between the space in which the water heater remains connected to the common venting system and other spaces in the building. Turn on clothes dryers and any appliances not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, at maximum speed. Do not operate a summer exhaust fan. Close all fireplace dampers.

4. Place in operation the appliance being inspected. Follow the lighting instructions. Adjust the thermostat so the appliance will operate continuously.

5. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle or smoke from a cigarette.

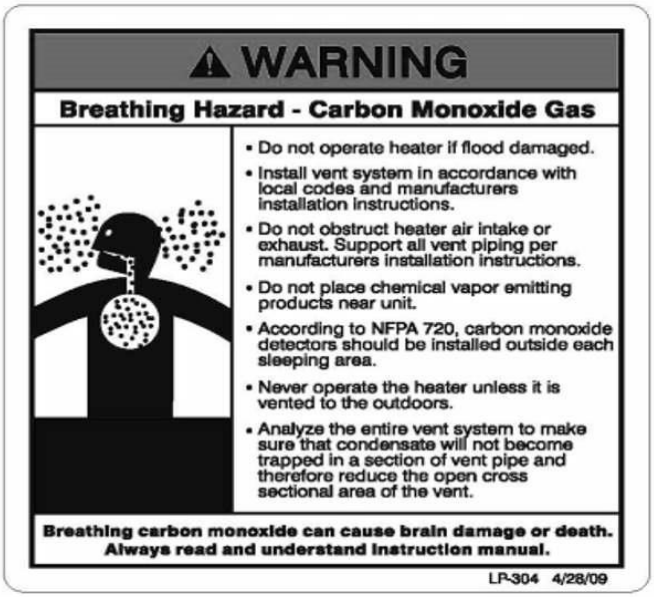


Figure 2 - CO Warning Label

6. After it has been determined that each appliance remaining connected to common venting system properly vents when tested as outlined, return doors, windows, exhaust fans, fireplace dampers and any other gas burning appliance to their previous condition of use.

7. Any improper operation of the common venting system should be corrected to conform to the National Fuel Gas Code, ANSI Z223.1. When resizing any portion of the common venting system, the system should approach the minimum size as determined using the appropriate tables in Appendix G in the National Fuel Gas Code, ANSI Z 223.1.

H. WATER CHEMISTRY

CAUTION

Chemical imbalance of the water supply may affect efficiency and cause severe damage to the water heater and associated equipment. HTP recommends having water quality professionally analyzed to determine whether it is necessary to install a water softener. It is important that the water chemistry on both the domestic hot water and central heating sides are checked before installing the water heater, as water quality will affect the reliability of the system. Failure of a heat exchanger due to lime scale build-up on the heating surface, low pH, or other chemical imbalance IS NOT covered by the warranty.

CAUTION

Operating temperatures above 135°F will further accelerate the build-up of lime scale on the heating surface and may shorten the service life of the water heater. Failure of a heat exchanger due to lime scale build-up on the heating surface, low pH, or other chemical imbalance IS NOT covered by the warranty.

Outlined below are water quality parameters which need to be met in order for the system to operate efficiently for many years.

Water Hardness
Water hardness is mainly due to the presence of calcium and magnesium salts dissolved in water. The concentration of these salts is expressed in mg/L, ppm, or grains per gallon as a measure of relative water hardness. Grains per gallon is the common reference measurement used in the U.S. water heater industry. Hardness expressed as mg/L or ppm may be divided by 17.1 to convert to grains per gallon. Water may be classified as very soft, slightly hard, moderately hard, or hard based on its hardness number. The minerals in the water precipitate out as the water is heated and cause accelerated lime scale accumulation on a heat transfer surface. This lime scale build-up may result in premature failure of the heat exchanger. Operating temperatures above 135°F will further accelerate the build-up of lime scale on the heating surface and may shorten the service life of the water heater.

Water that is classified as hard and very hard must be softened to avoid heat exchanger failure. See below for further information about water hardness.

CLASSIFICATION	MG/L OR PPM	GRAINS/GAL
Soft	0 – 17.1	0 - 1
Slightly Hard	17.1 – 60	1 – 3.5
Moderately Hard	60 – 120	3.5 – 7.0
Hard	120 – 180	7.0 – 10.5
Very Hard	180 and over	10.5 and over

If the hardness of the water exceeds the maximum level of 7 grains per gallon, water should be softened to a hardness level no lower than 5 grains per gallon. Water softened as low as 0 to 1 grain per gallon may be under-saturated with respect to calcium carbonate, resulting in water that is aggressive and corrosive.

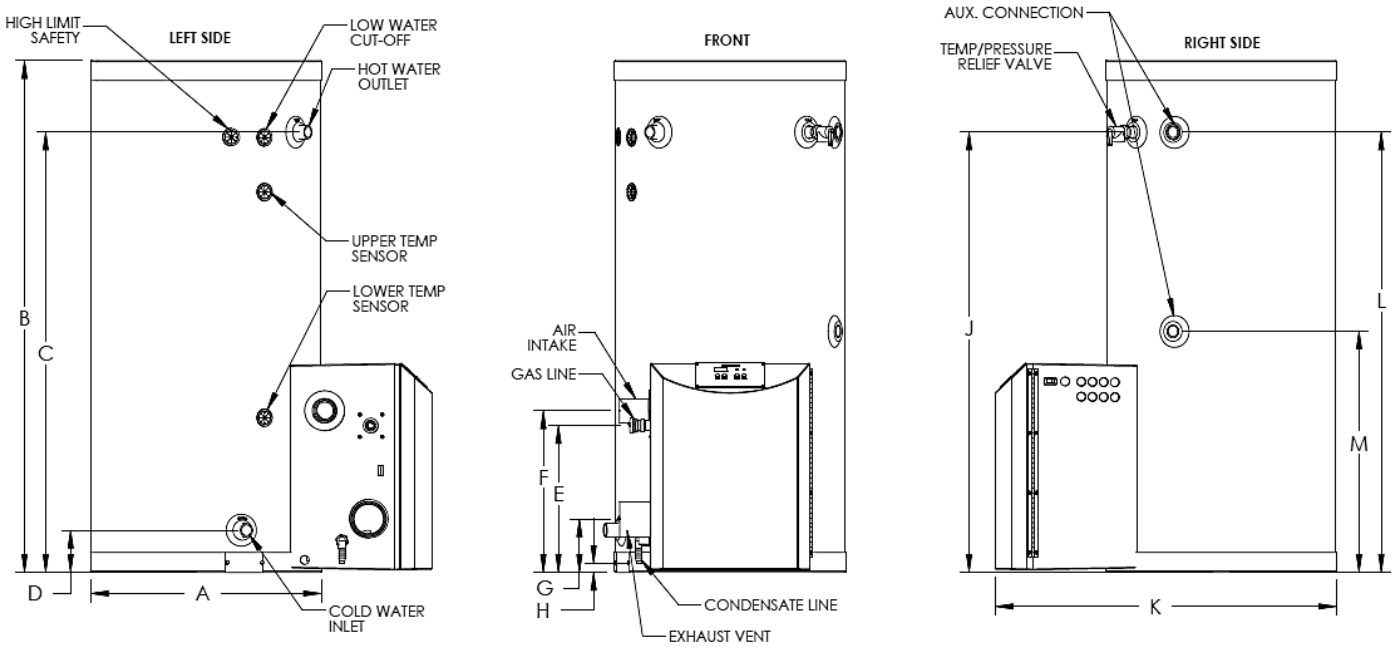
pH of Water
pH is a measure of relative acidity, neutrality or alkalinity. Dissolved minerals and gases affect water pH. The pH scale ranges from 0 to 14. Water with a pH of 7.0 is considered neutral. Water with a pH lower than 7 is considered acidic. Water pH higher than 7 is considered alkaline. A neutral pH (around 7) is desirable for most potable water applications. **Corrosion damage and heater failures resulting from water pH levels of lower than 6 or higher than 8 ARE NOT covered by the warranty.** The ideal pH range for water used in a storage tank or a water heater system is 7.2 to 7.8.

Total Dissolved Solids
Total Dissolved Solids (TDS) is a measurement of all minerals and solids dissolved in a water sample. The concentration of total dissolved solids is usually expressed in parts per million (ppm).

Water with a high TDS concentration will greatly accelerate lime and scale formation in the hot water system. Most high TDS concentrations precipitate out of the water when heated. This can generate a scale accumulation on the heat transfer surface that will greatly reduce the service life of a water heater. This scale accumulation can also impede the ability of the heat exchanger to transfer heat into the water. A heat exchanger damaged or blocked by lime/scale accumulation must be replaced.

The manufacturer of the water heater has no control of water quality, especially TDS levels in your system. Total dissolved solids in excess of 2,000 ppm will accelerate lime and scale formation in the heat exchanger. Heat exchanger failure due to total dissolved solids in excess of 2,000 ppm is a non-warrantable condition. **Failure of a water heater due to lime scale build up on the heating surface IS NOT covered by the warranty.**

Hardness: 7 grains
Chloride levels: 100 ppm
pH levels: 6-8
TDS: 2000 ppm
Sodium: 20 mGL



PHOENIX WATER HEATER AND SANITIZER BOOSTER DIMENSIONS

MODEL*	GAL.	A	B	C	D	E	F	G	H	J	K	L	M
PH100-55/130-55/160-55/199-55	55	23"	52"	45"	5"	14-3/4"	16-1/4"	5-1/4"	1"	45"	34-1/4"	45"	27-1/2"
PH100-80/130-80/160-80/199-80	80	23"	72"	64"	5-3/4"	17"	18-1/2"	7-3/4"	3-1/4"	64"	34-1/4"	64"	29-3/4"
PH100-119/130-119/160-119/199-119	119	27"	74"	66-1/4"	7-1/2"	18-3/4"	21-1/2"	10-1/2"	5"	66-1/2"	38-1/2"	66-1/2"	31"
PH130-55SA / PH199-55SA	55	23"	52"	45"	5"	14-3/4"	16-1/4"	5-1/4"	1"	45"	34-1/4"	45"	27-1/2"

PHOENIX WATER HEATER SPECIFICATIONS

MODEL*	INPUT MODULATION	AIR INTAKE/ EXHAUST VENT SIZE	INLET/ OUTLET SIZE	AUXILIARY CONN.	GAS LINE CONN.	SYSTEM RELIEF PIPE SIZE	SHIPPING WEIGHT	MAX. TEMPERATURE LIMIT
PH100-55	35,000 - 100,000	2"	1" NPT	1" FNPT	3/4"	3/4"	175 LBS.	160°
PH130-55	35,000 - 130,000	2"	1" NPT	1" FNPT	3/4"	3/4"	175 LBS	160°
PH160-55	40,000 - 160,000	3"	1" NPT	1" FNPT	3/4"	3/4"	175 LBS.	160°
PH199-55	40,000 - 199,000	3"	1" NPT	1" FNPT	3/4"	3/4"	175 LBS	160°
PH100-80	35,000 - 100,000	2"	1-1/2" NPT	1" FNPT	3/4"	3/4"	235 LBS.	160°
PH130-80	35,000 - 130,000	2"	1-1/2" NPT	1" FNPT	3/4"	3/4"	235 LBS	160°
PH160-80	40,000 - 160,000	3"	1-1/2" NPT	1" FNPT	3/4"	3/4"	235 LBS.	160°
PH199-80	40,000 - 199,000	3"	1-1/2" NPT	1" FNPT	3/4"	3/4"	235 LBS.	160°
PH100-119	35,000 - 100,000	2"	1-1/2" NPT	1" FNPT	3/4"	3/4"	405 LBS.	160°
PH130-119	35,000 - 130,000	2"	1-1/2" NPT	1" FNPT	3/4"	3/4"	405 LBS.	160°
PH160-119	40,000 - 160,000	3"	1-1/2" NPT	1" FNPT	3/4"	3/4"	405 LBS.	160°
PH199-119	40,000 - 199,000	3"	1-1/2" NPT	1" FNPT	3/4"	3/4"	405 LBS.	160°
PHOENIX SANITIZER BOOSTER SPECIFICATIONS								
PH130-55SA	35,000 - 130,000	2"	1" NPT	1" FNPT	3/4"	3/4	175 LBS	184°
PH-199-55SA	40,000 - 199,000	3"	1"	1" FNPT	3/4"	3/4	175 LBS	184°

*ALL DIMENSIONS ARE APPROXIMATE, A SUFFIX OF "LP" DENOTES PROPANE GAS

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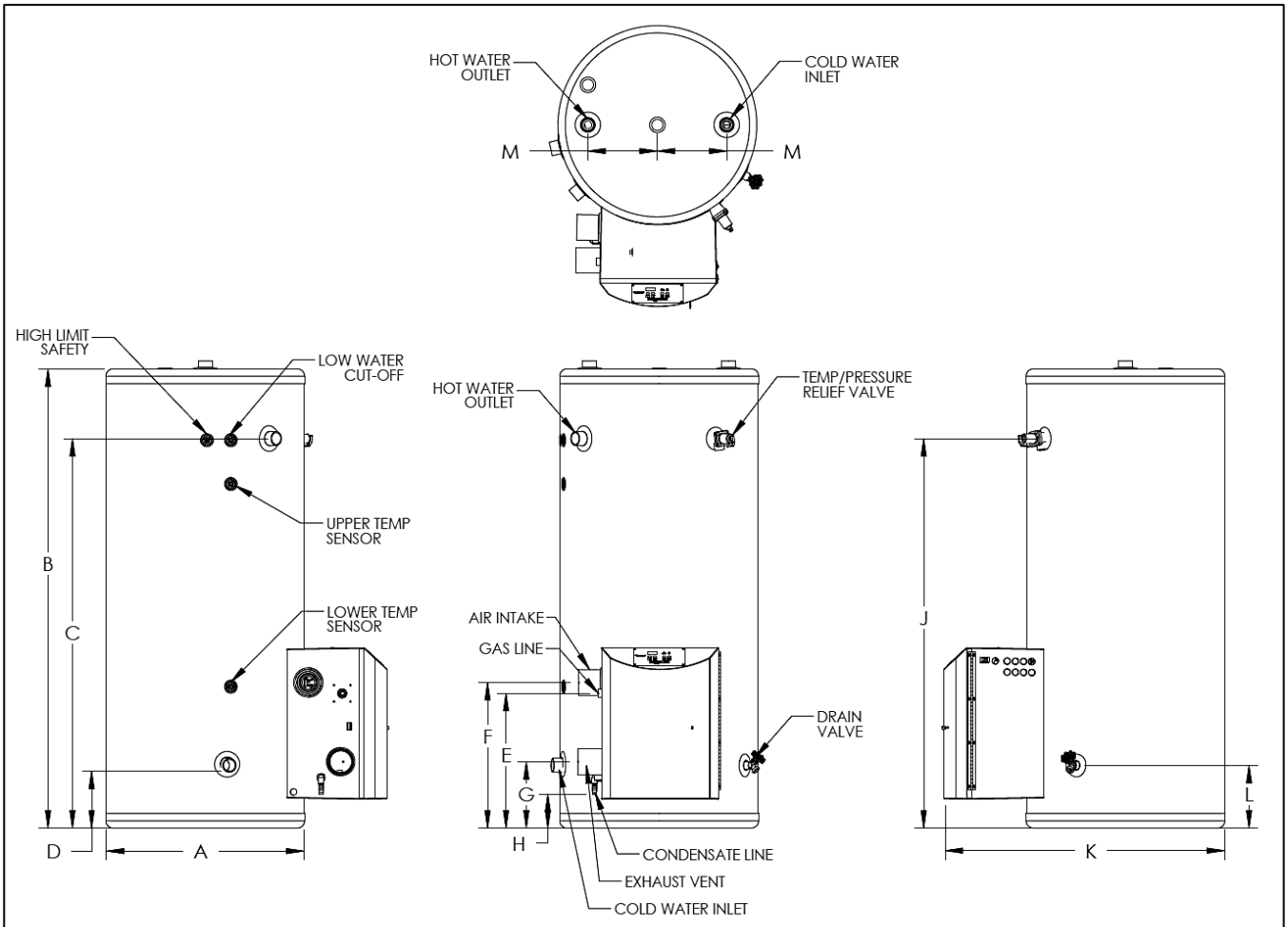
08/25/14

Figure 3 – Specifications and Dimensions



PHOENIX MULTI FIT WATER HEATER

MODEL*	GAL.	A	B	C	D	E	F	G	H	J	K	L	M
PHM130-80/199-80	80	27"	55"	46"	7-1/4"	17"	18-1/4"	8"	3"	46"	38-1/4"	7-1/4"	9-1/2"
PHM130-100/199-100	100	27"	63"	54"	7-1/4"	17"	18-1/4"	8"	3"	54"	38-1/4"	7-1/4"	9-1/2"

PHOENIX MULTI FIT WATER HEATER SPECIFICATION

MODEL*	INPUT MODULATION	AIR INTAKE/ EXHAUST VENT SIZE	INLET/ OUTLET SIZE	GAS LINE CONN.	SYSTEM RELIEF PIPE SIZE	SHIPPING WEIGHT	MAX. TEMPERATURE LIMIT
PHM130-80	35,000 - 130,000	2"	1-1/2" NPT	3/4"	3/4"	235 LBS	160°
PHM199-80	40,000 - 199,000	3"	1-1/2" NPT	3/4"	3/4"	235 LBS.	160°
PHM130-100	35,000 - 130,000	2"	1-1/2" NPT	3/4"	3/4"	405 LBS.	160°
PHM199-100	40,000 - 199,000	3"	1-1/2" NPT	3/4"	3/4"	405 LBS.	160°

*ALL DIMENSIONS ARE APPROXIMATE, A SUFFIX OF "LP" DENOTES PROPANE GAS

LP-179-B
09/08/14

Figure 4 – Phoenix Multi Fit Specifications and Dimensions

⚠ WARNING

UNCRATING HEATER – Any claims for damage or shortage in shipment must be filed immediately against the transportation company by the consignee.

⚠ CAUTION

COLD WEATHER HANDLING – If the heater has been stored in a very cold location (BELOW 0°F) before installation, handle with care until the plastic components come to room temperature.

Remove all sides of the shipping crate to allow the heater to be lifted into its installation location.

PERFORMANCE SPECIFICATIONS FOR PHOENIX MODELS													
BTUH	Efficiency	Temperature Rise											
		(°F)	40	50	60	70	80	90	100	110	120	130	140
		(°C)	22	28	33	39	44	50	56	61	67	72	78
100,000	96%	GPH	298	240	202	173	152	136	123	110	101	94	88
		GPM	5	4	3.4	2.9	2.5	2.25	2	1.8	1.7	1.6	1.5
		LPH	1128	908	765	655	575	515	466	416	382	356	333
		LPM	18.8	15.1	12.75	10.9	9.6	8.6	7.8	6.9	6.4	5.9	5.6
130,000	96%	GPH	384	309	260	222	195	175	158	141	130	120	112
		GPM	6.4	5.2	4.3	3.7	3.25	2.9	2.6	2.4	2.2	2	1.9
		LPH	1454	1170	984	840	738	662	598	534	492	454	424
		LPM	24.25	19.5	16.4	14	12.3	11	10	8.9	8.2	7.6	7
160,000	96%	GPH	470	378	317	271	238	213	192	173	159	147	137
		GPM	7.8	6.3	5.3	4.5	4	3.6	3.2	2.9	2.7	2.5	2.3
		LPH	1779	1431	1200	1026	901	806	727	655	602	556	519
		LPM	29.7	23.9	20	17.1	15	13.4	12.1	10.9	10	9.3	8.7
199,000	96%	GPH	582	468	392	335	294	263	237	213	196	181	169
		GPM	9.7	7.8	6.5	5.6	4.9	4.4	4	3.6	3.3	3	2.8
		LPH	2203	1772	1484	1268	1113	996	897	806	742	685	640
		LPM	36.7	29.5	24.7	21.1	18.6	16.6	15	13.4	12.4	11.4	10.7

Table 2 – Recovery on rating plate is based at 94% thermal efficiency at 70° Fahrenheit rise, as required by ANSI

PERFORMANCE EQUATIONS

$$GPM = \frac{\text{Rated Input x .9}}{\text{Temp Rise (°F) x 500}} \qquad GPH = GPM \times 60$$

PART 4 – HEATER PIPING

⚠ WARNING

Failure to follow the instructions in this section WILL VOID the warranty and may result in property damage, serious injury, or death.

⚠ CAUTION

Never use dielectric unions or galvanized steel fittings when connecting to a stainless steel storage tank or heater. Use only copper or brass fittings. Teflon thread sealant must be used on all connections.

CAUTION

DO NOT pipe this water heater with black iron, galvanized steel, steel, or lead pipe. Doing so will result in premature product failure and property damage, and WILL VOID the product warranty.

A. GENERAL PIPING INFORMATION

CAUTION

Use two wrenches when tightening water piping at heater. Use one wrench to prevent the heater return or supply line from turning. Failure to prevent piping connections from turning could cause damage to heater components.

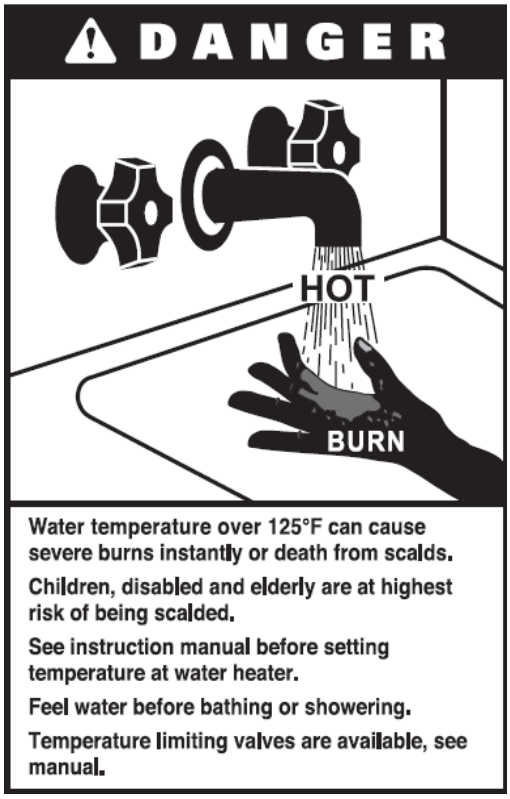
CAUTION

The heater control module uses temperature sensors to provide both high limit protection and modulating temperature control. The control module also provides low water protection by sensing the water level in the tank. Some codes/jurisdictions may require additional external controls.

B. SCALDING

APPROXIMATE TIME / TEMPERATURE RELATIONSHIPS IN SCALDS	
120°F	More than 5 minutes
125°F	1 ½ to 2 minutes
130°F	About 30 seconds
135°F	About 10 seconds
140°F	Less than 5 seconds
145°F	Less than 3 seconds
150°F	About 1 ½ seconds
155°F	About 1 second

Table 3



This heater can deliver scalding water. Be careful whenever using hot water to avoid scalding injury. Certain appliances, such as dishwashers and automatic clothes washers may require increased water temperature. By setting the thermostat on this heater to obtain the increased water temperature required by these appliances, you may create the potential for scald injury.

To protect against injury, you should install a mixing valve in the water system. This valve will reduce point of discharge temperature by mixing cold and hot water in branch supply lines. Such valves are available from your local plumbing supplier.

Table 3 details the relationship of water temperature and time with regard to scald injury and may be used as a guide in determining the safest water temperature for your applications.

C. TEMPERATURE AND PRESSURE RELIEF VALVE

⚠ WARNING

To avoid water damage or scalding due to relief valve operation:

- Discharge line must be connected to relief valve outlet and run to a safe place of disposal. Terminate the discharge line in a manner that will prevent possibility of severe burns or property damage should the relief valve discharge.
- Discharge line must be as short as possible and the same size as the valve discharge connection throughout its entire length.
- Discharge line must pitch downward from the valve and terminate at least 6" above the floor drain, making discharge clearly visible.
- The discharge line shall terminate plain, not threaded, with a material serviceable for temperatures of 375°F or greater.
- Do not pipe discharge to any location where freezing could occur.
- No shutoff valve may be installed between the relief valve and heater or in the discharge line. Do not plug or place any obstruction in the discharge line.
- Test the operation of the relief valve after filling and pressurizing the system by lifting the lever. Make sure the valve discharges freely. If the valve fails to operate correctly, immediately replace with a new properly rated relief valve.
- Test T&P valve at least once annually to ensure the waterway is clear. If valve does not operate, turn the heater "off" **and call a plumber immediately.**
- Take care whenever operating relief valve to avoid scalding injury or property damage.

FAILURE TO COMPLY WITH THE ABOVE GUIDELINES COULD RESULT IN FAILURE OF RELIEF VALVE OPERATION, RESULTING IN POSSIBILITY OF SUBSTANTIAL PROPERTY DAMAGE, SEVERE PERSONAL INJURY, OR DEATH.

⚠ WARNING

Do not thread a cap or plug into the relief valve under any circumstances! Explosion and property damage, serious injury, or death may result.

D. BACKFLOW PREVENTER

Use a backflow preventer specifically designed for water heater installations. This valve should be installed on the cold water fill supply line per local codes.

E. POTABLE EXPANSION TANK

A potable hot water expansion tank is required to offset heated water expansion. In most city plumbing systems, the water meter has a no return or back flow device built into the system to prevent back flowing of water into city mains. Some local codes require back flow preventers on all incoming water supplies. The hot water expansion tank must be listed for potable water use. The expansion tank should be located on the cold inlet piping close to the water heater.

EXPANSION TANK AND MAKE-UP WATER

1. Ensure that the expansion tank is sized to correctly handle heater and system water volume and temperature.

CAUTION
Undersized expansion tanks cause system water to be lost from the relief valve, causing make-up water to be added. Eventual heater failure can result due to excessive make-up water addition. **SUCH FAILURE IS NOT COVERED BY WARRANTY.**

2. The expansion tank must be located as shown in the Heater Piping Details, or following recognized design methods. See expansion tank manufacturer's instructions for details.

⚠ **CAUTION**
The expansion tank must be suitable for hot potable water.

F. WATER PIPING

⚠ **CAUTION**
Never use dielectric unions or galvanized steel fittings on any domestic water or auxiliary connections. Use only copper or brass fittings. Thread sealant must be used on all connections.

The domestic water connections must be installed in accordance to all local and national plumbing codes, or any applicable standard which prevails. The inlet and outlet ports are 1" on 55 gallon models, and 1 ½" on 80 and 119 gallon models.

On the cold inlet, install a 1" brass tee on 55 gallon models, or a 1 ½" tee on 80 and 119 gallon models. On the run of the 1" brass tee, install a 1" brass drain cock or equivalent with pipe sealant compound. In the branch of the 1" or a 1 ½" brass tee, install a copper male adapter to match your copper plumbing system. For convenience, you may install a sweat shut off valve and a union in the cold inlet piping to ease future servicing. If there is a back flow preventer or any type of a no return valve in the system, you must install an additional tee here, suitable for a potable hot water expansion tank.

In the hot outlet, install a suitable adapter to match the copper tubing of the plumbing system. A thermal trap or heat trap loop may be installed here to provide additional energy savings and prevent the thermal siphoning of domestic hot water.

G. AUXILIARY CONNECTIONS

The auxiliary connections are additional connections for air handlers, plate exchangers, or other devices that supply hot water. These connections must be installed in accordance with all local and national codes or any applicable standard that prevails. Auxiliary connections are 1" on all models. Never use dielectric unions or galvanized steel fittings. Use only copper or brass fittings. Sealant must be used on all connections. The top port is the supply outlet and the bottom port is the return inlet.

⚠ **WARNING**
Never connect auxiliary connections to any system that uses glycol or other solutions formulated for hydronic systems. These auxiliary connections are to be used only in a potable water system. Failure to follow this warning could result in serious injury or death.

H. PIPING DIAGRAMS

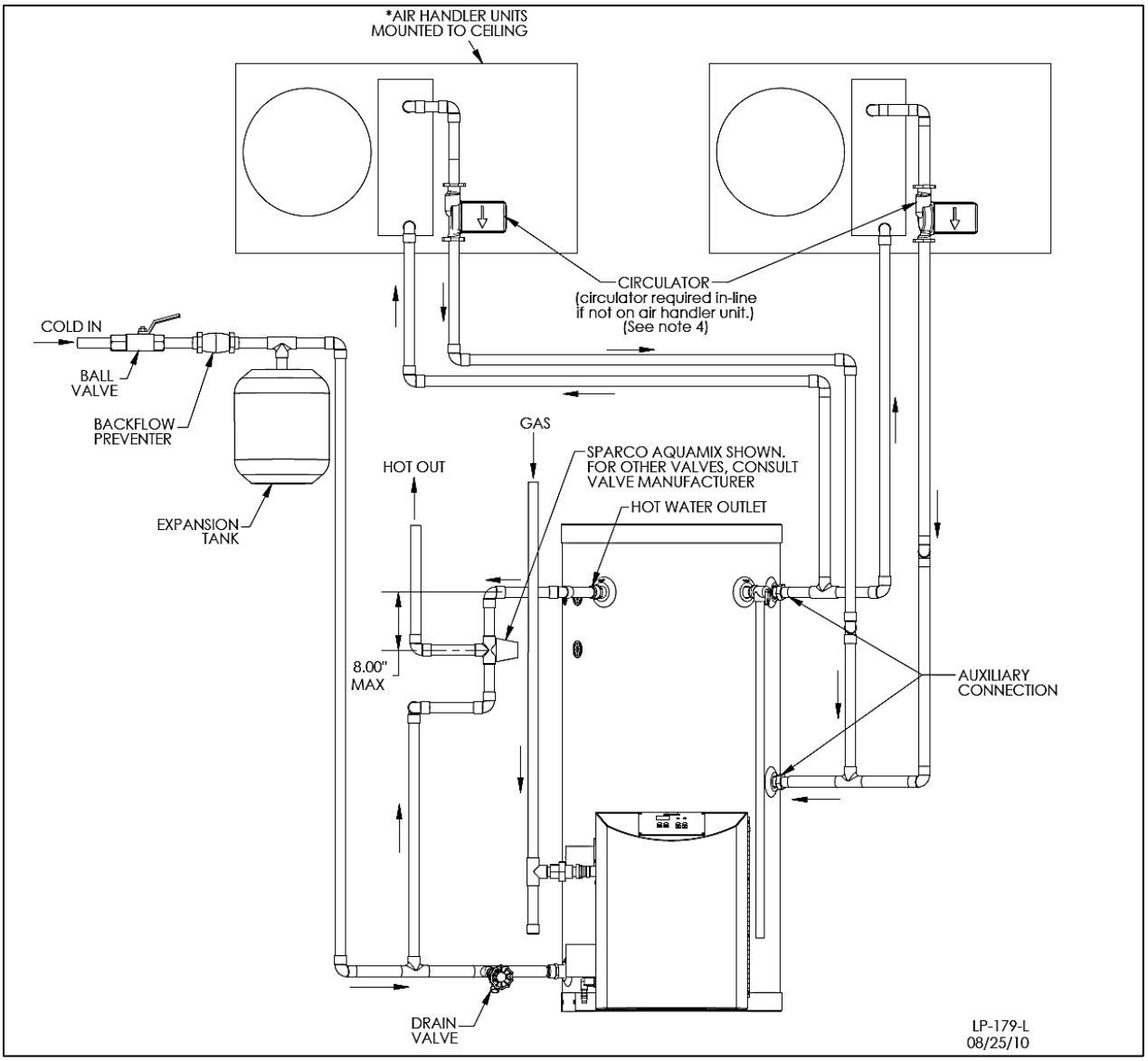


Figure 5 – Phoenix Model With Air Handler - NOTES:

1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Check with air handler manufacturer for proper sizing.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes.

NOTES FOR AIR HANDLER APPLICATION:

1. MASSACHUSETTS STATE PLUMBING CODE REQUIRES A DISTANCE NO GREATER THAN 50 FEET FROM THE WATER HEATER TO THE FAN COIL IN THE AIR HANDLER.
2. MASSACHUSETTS STATE PLUMBING CODE REQUIRES AN ELECTRONICALLY TIMED CIRCULATOR PUMP TO ACTIVATE EVERY SIX HOURS FOR 60 SECONDS. THIS CIRCULATOR IS REQUIRED TO BE BRONZE OR STAINLESS.
3. ALL WATER PIPING MUST BE INSULATED.
4. YOU MUST INSTALL A VACUUM RELIEF VALVE PER 248 CMR.

NOTE: THIS DRAWING IS MEANT TO DEMONSTRATE SYSTEM PIPING ONLY. THE INSTALLER IS RESPONSIBLE FOR ALL EQUIPMENT AND DETAILING REQUIRED BY LOCAL CODES.

⚠ DANGER

An ASSE 1017 thermostatic mixing valve MUST be installed when using outdoor reset. Failure to do so could result in substantial property damage, serious injury, or death.

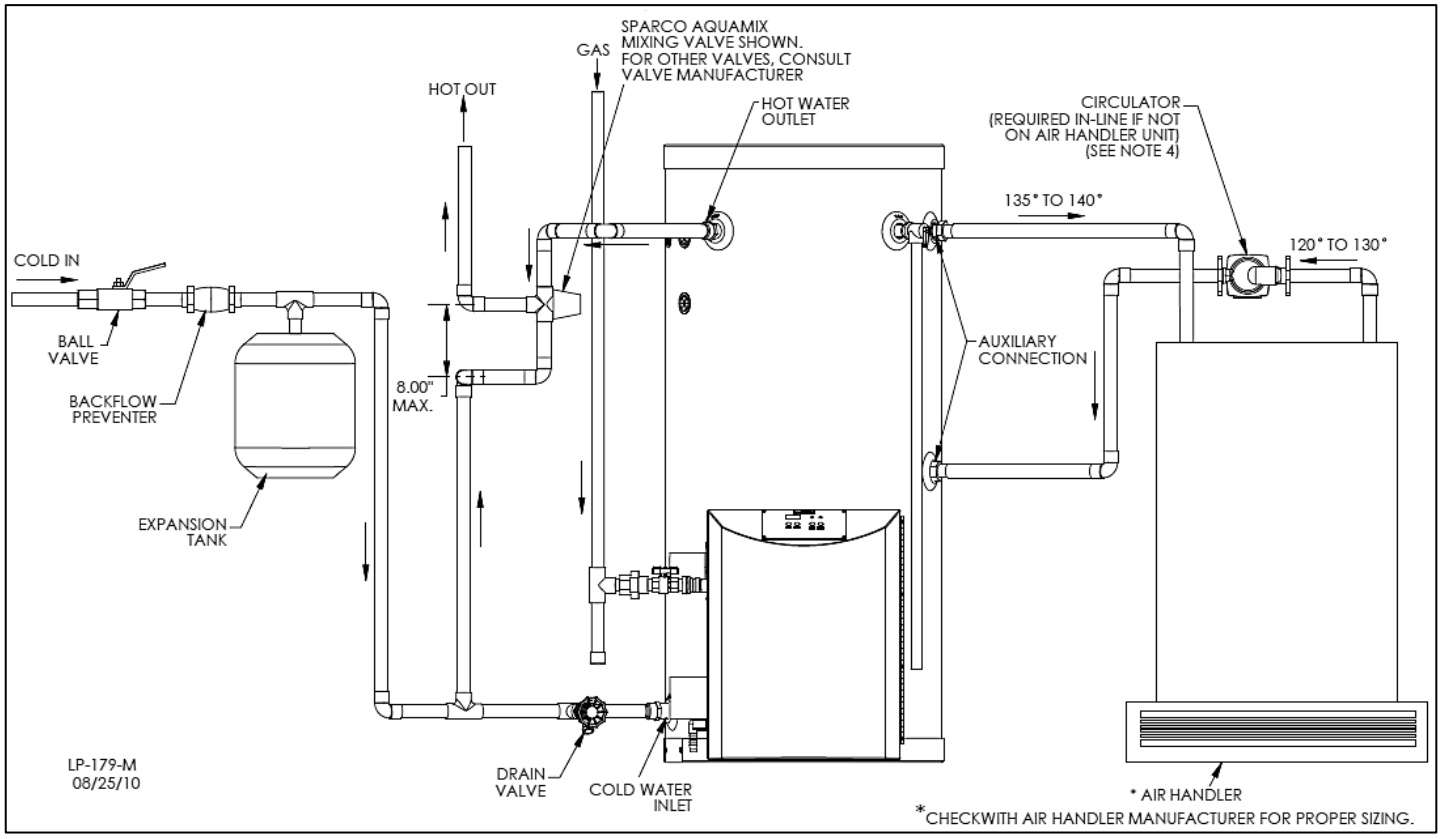


Figure 6 – Phoenix Model with Air Handler on Side

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Check with air handler manufacturer for proper sizing.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR. With air handlers, outdoor reset is available with an outdoor sensor. See Part 8, Section D.

NOTES FOR AIR HANDLER APPLICATION:
1. MASSACHUSETTS STATE PLUMBING CODE REQUIRES A DISTANCE NO GREATER THAN 50 FEET FROM THE WATER HEATER TO THE FAN COIL IN THE AIR HANDLER.
2. MASSACHUSETTS STATE PLUMBING CODE REQUIRES AN ELECTRONICALLY TIMED CIRCULATOR PUMP TO ACTIVATE EVERY SIX HOURS FOR 60 SECONDS. THIS CIRCULATOR IS REQUIRED TO BE BRONZE OR STAINLESS.
3. ALL WATER PIPING MUST BE INSULATED.
4. YOU MUST INSTALL A VACUUM RELIEF VALVE PER 248 CMR.

NOTE: THIS DRAWING IS MEANT TO DEMONSTRATE SYSTEM PIPING ONLY. THE INSTALLER IS RESPONSIBLE FOR ALL EQUIPMENT AND DETAILING REQUIRED BY LOCAL CODES.

⚠ DANGER

An ASSE 1017 thermostatic mixing valve MUST be installed when using outdoor reset. Failure to do so could result in substantial property damage, serious injury, or death.

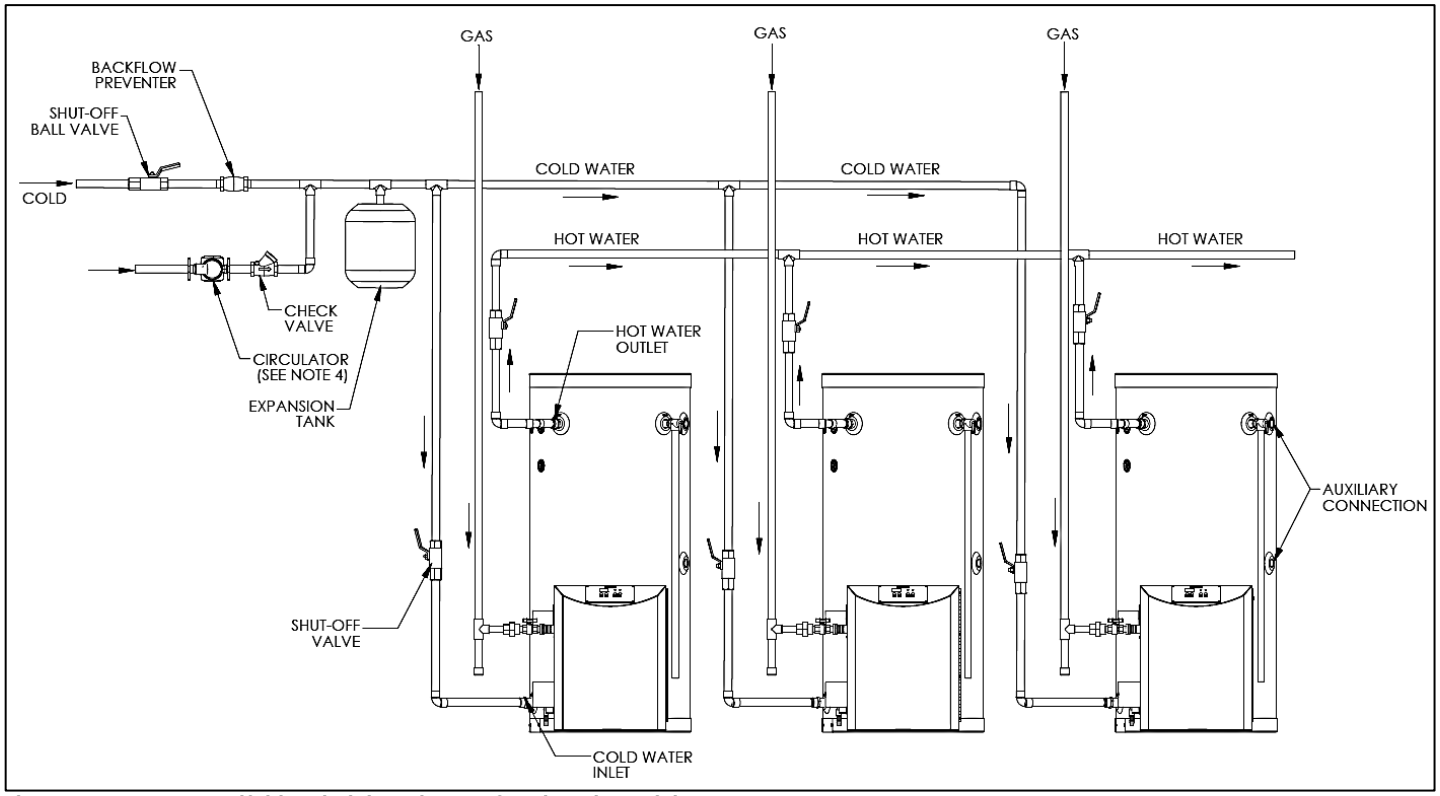


Figure 7 – Reverse Manifold and Piping Diagram for Phoenix Models - LP-179-N

NOTES:

1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Check with air handler manufacturer for proper sizing.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR. With air handlers, outdoor reset is available with an outdoor sensor. See Part 8, Section D.

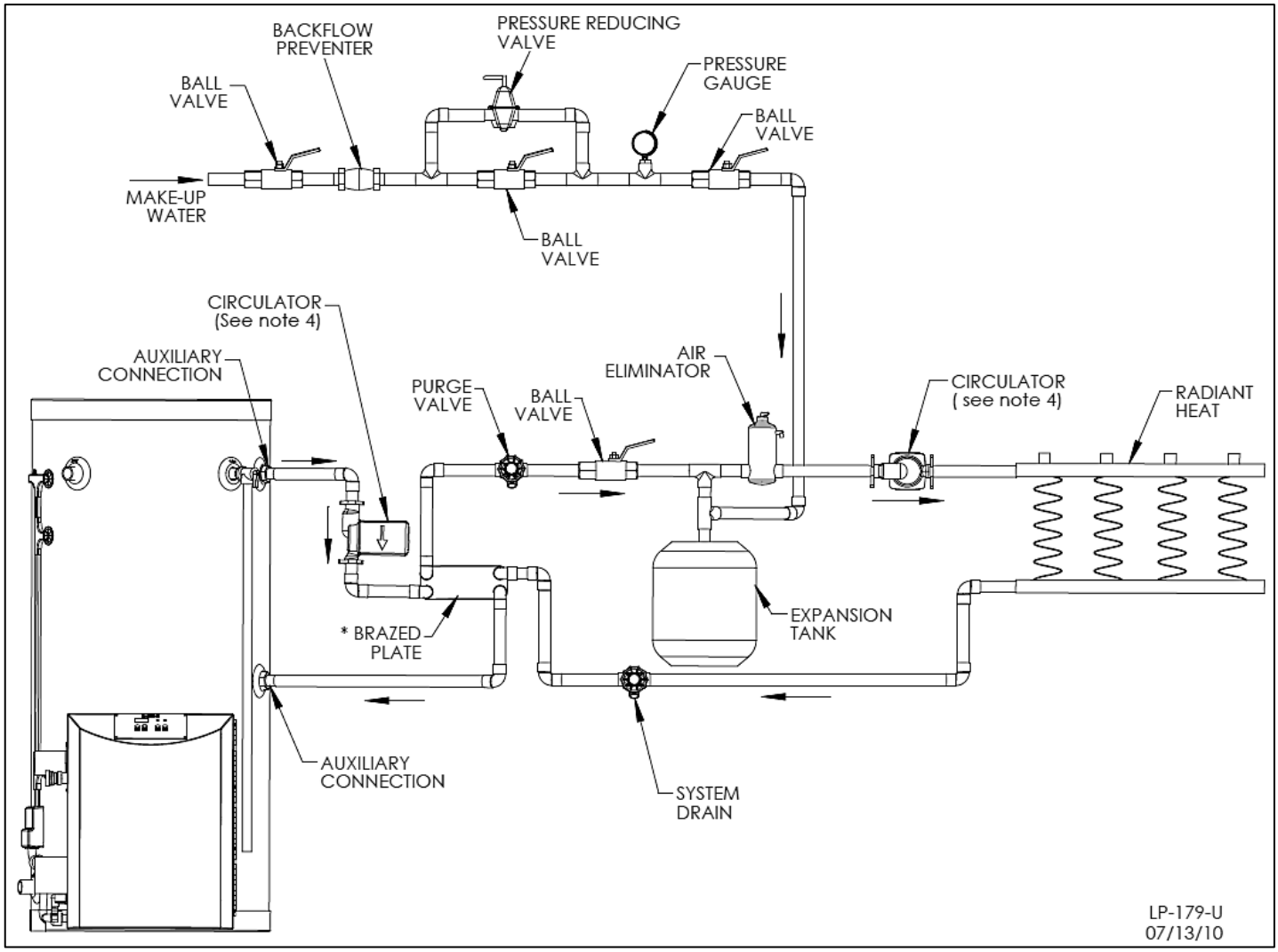


Figure 8 – Phoenix Model with Closed Loop for Radiant Heating - LP-179-U

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Check with brazed plate manufacturer for correct plate connections and orientation.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR. With air handlers, outdoor reset is available with an outdoor sensor. See Part 8, Section D.

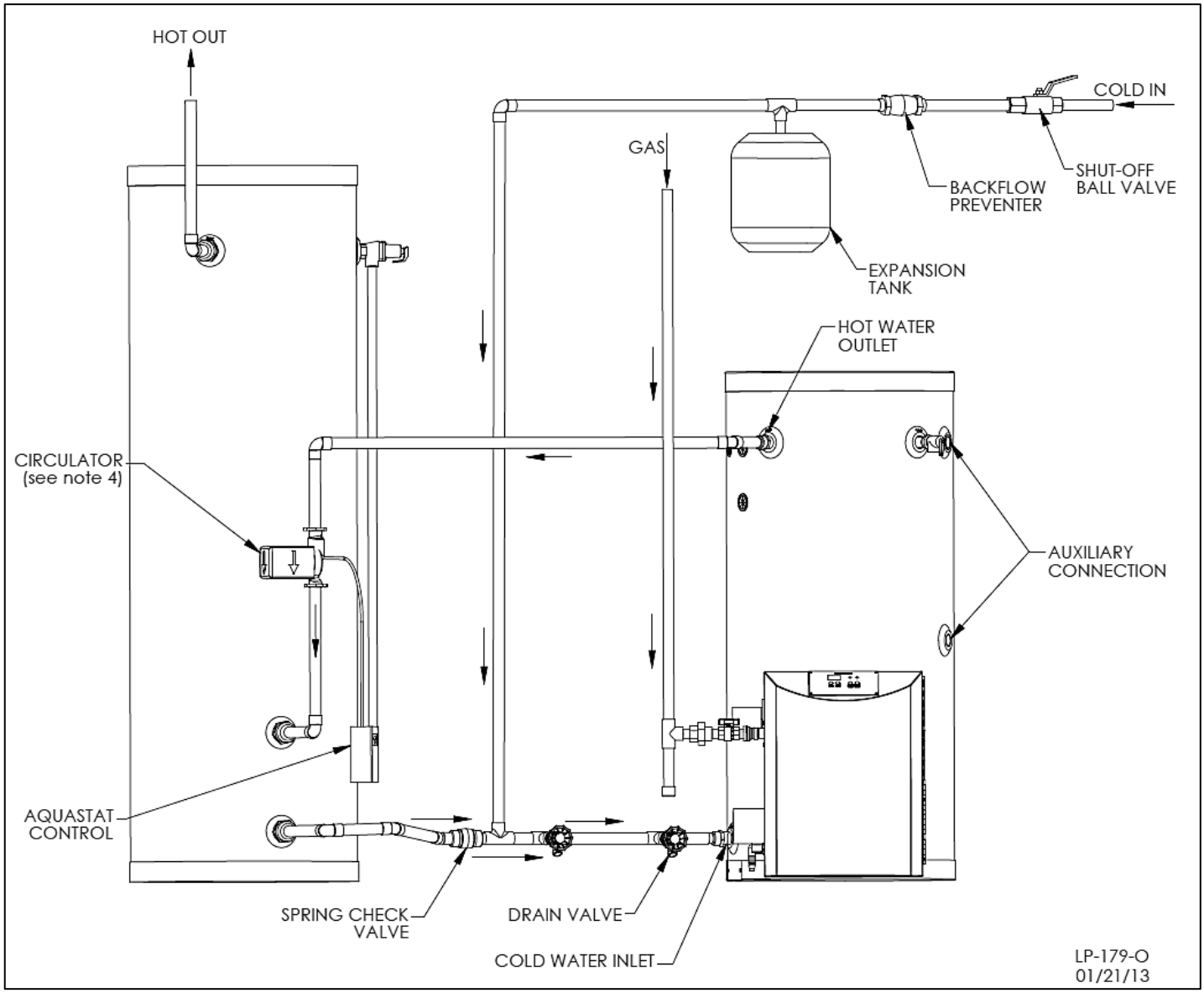


Figure 9 – Phoenix Model With Storage Tank

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Drains and check valve between unit and storage tank will assist in purging air from system.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR.

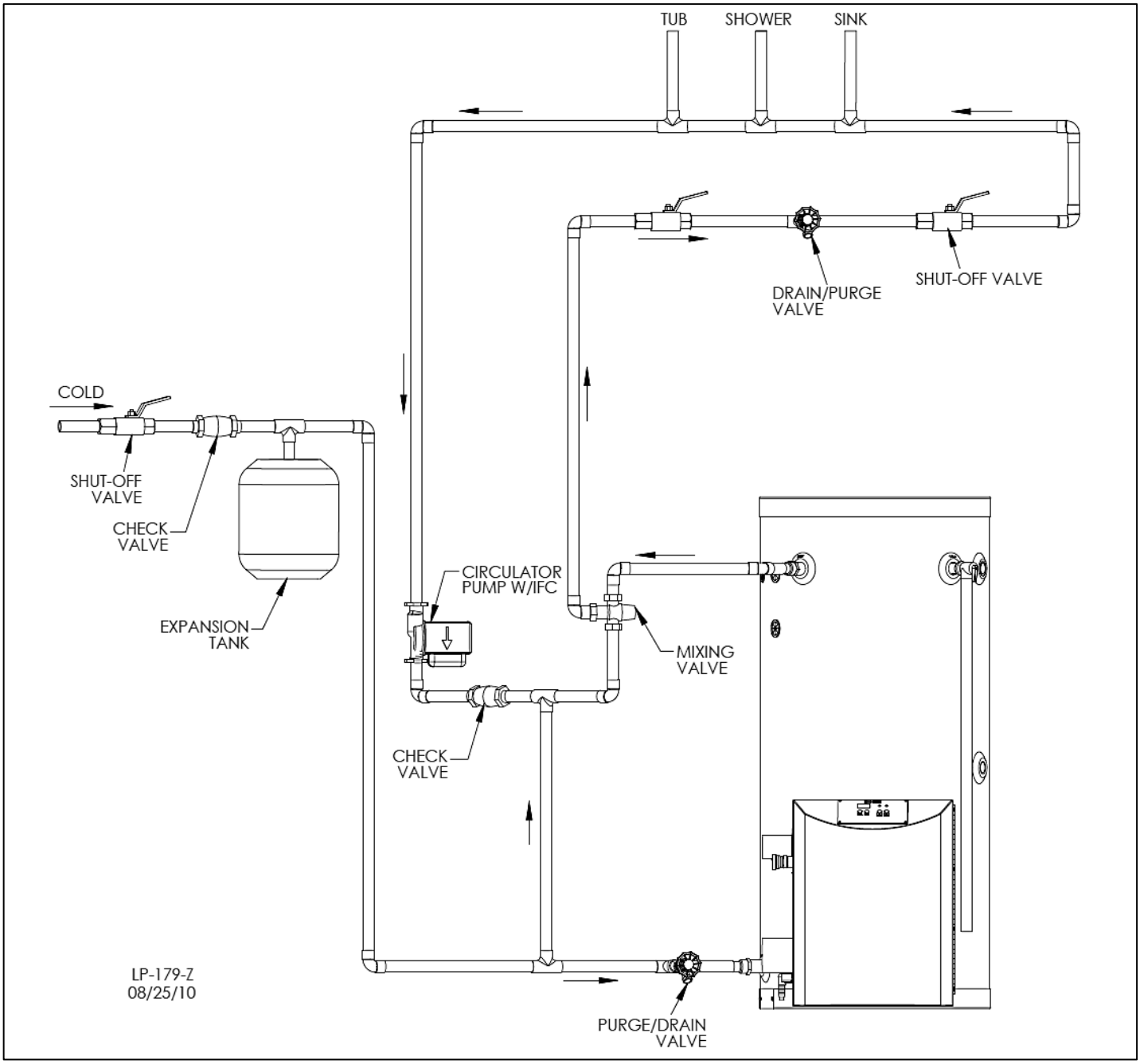


Figure 10 – Phoenix Model with Recirculation Line and Thermostatic Mixing Valve Piping

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Drains and check valve between unit and storage tank will assist in purging air from system.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR.

⚠ DANGER

An ASSE 1017 thermostatic mixing valve MUST be installed when using outdoor reset. Failure to do so could result in substantial property damage, serious injury, or death.

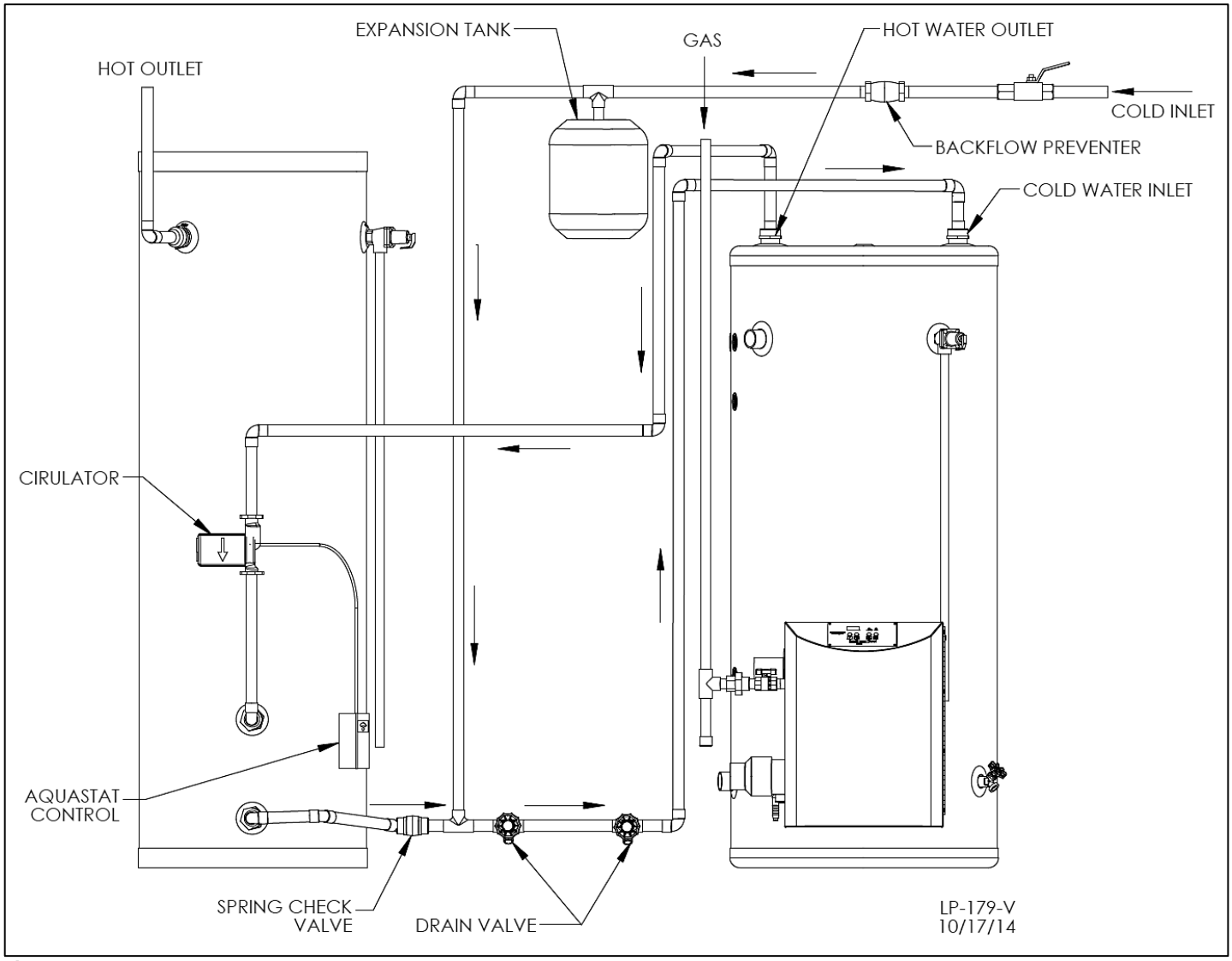


Figure 11 – Phoenix Multi Fit Model with Storage Tank and Thermostatic Mixing Valve

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Drains and check valve between unit and storage tank will assist in purging air from system.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR.

⚠ DANGER

An ASSE 1017 thermostatic mixing valve MUST be installed when using outdoor reset. Failure to do so could result in substantial property damage, serious injury, or death.

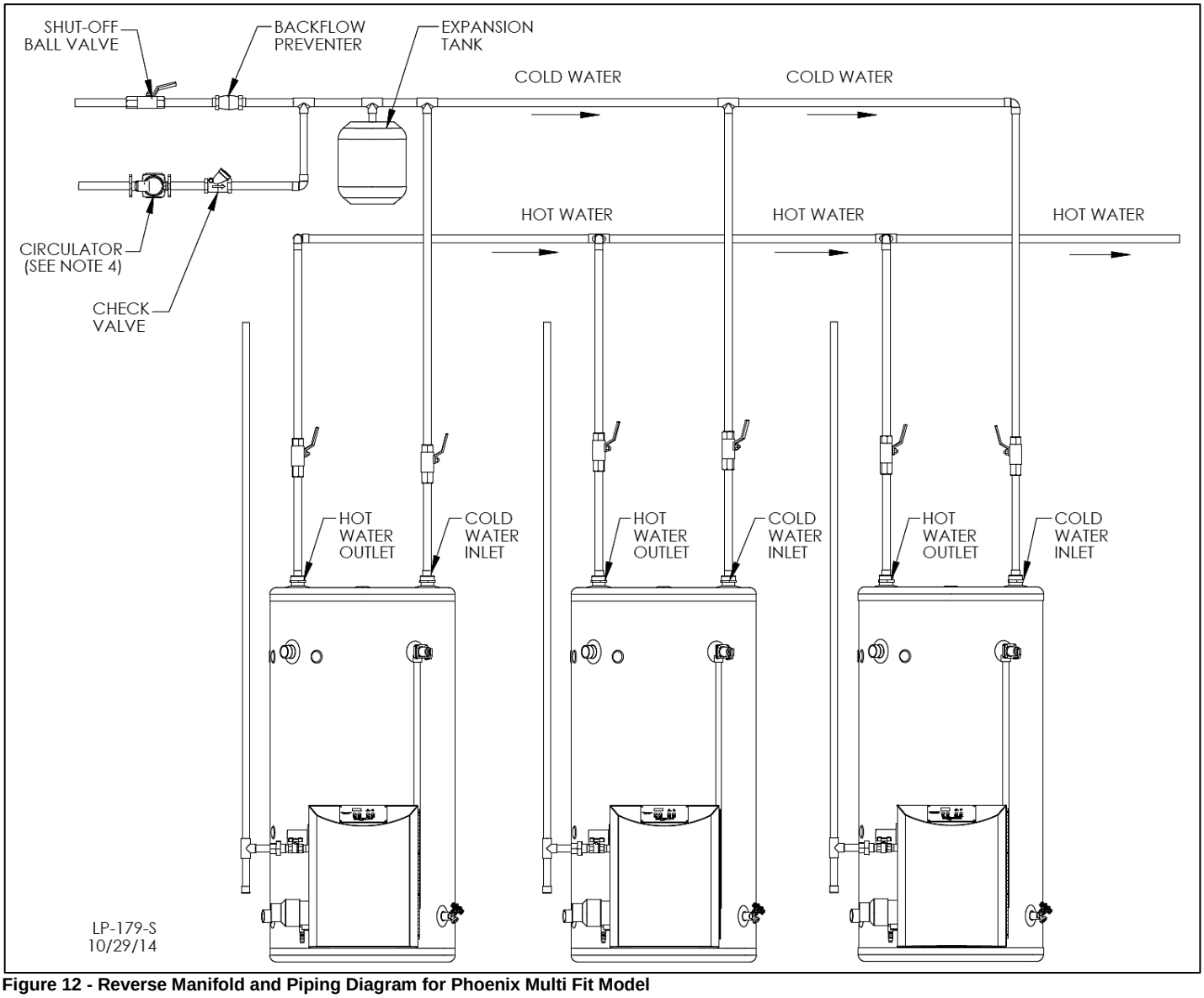
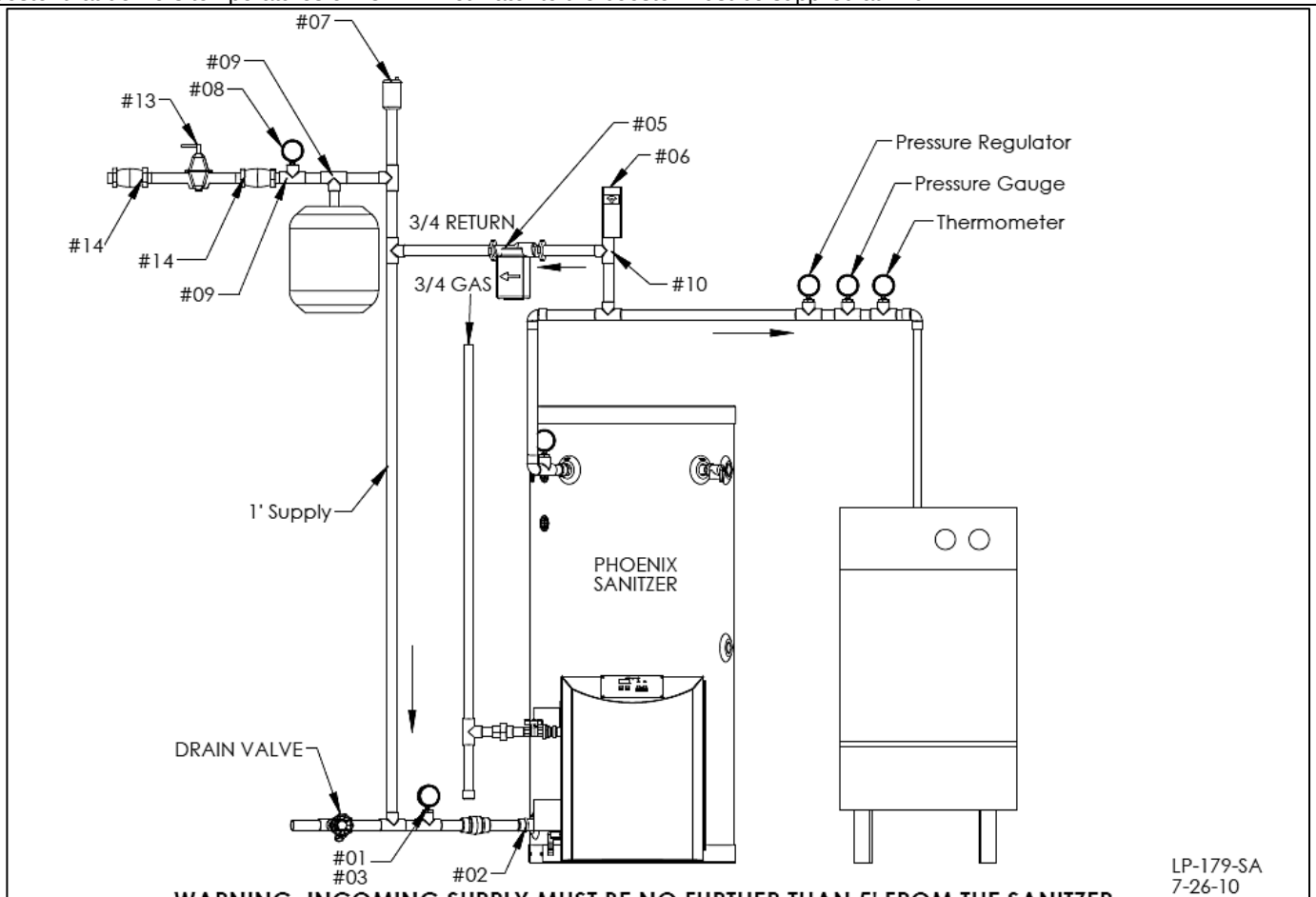


Figure 12 - Reverse Manifold and Piping Diagram for Phoenix Multi Fit Model

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Check with air handler manufacturer for proper sizing.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR. With air handlers, outdoor reset is available with an outdoor sensor. See Part 8, Section D.

CAUTION

The standard unit does not meet the required temperature settings for sanitizer booster applications. Use only the Phoenix Sanitizer Booster that delivers temperatures of 184°F. Inlet water to the booster must be supplied at 140°F.



WARNING; INCOMING SUPPLY MUST BE NO FURTHER THAN 5' FROM THE SANITZER
VERY IMPORTANT: INSULATE ALL PIPES ON RECIRCULATION LINE TO AND FROM SANITIZER

THE ITEMS LISTED BELOW ARE THE ITEMS AND PART NUMBERS IN THE VSBK-1200 SANITIZER BOOSTER KIT

ITEM	PART	DESCRIPTION	PART NUMBER	ITEM	PART	DESCRIPTION	PART NUMBER
#01	NIBCO TEE	1"X1"X 1/2"	7000-708	#08	PRESSURE GAUGE		7000-716
#02	FEMALE ADAPTER	1"	7000-709	#09	NIBCO TEE	1" X 1" X 3/4" 712R	7000-728
#03	DIAL THERMOMETER		7000-710	#10	NIBCO TEE	1" X 1/2" X 1" COPPER	7000-739
#04	EXPANSION TANK 4.5 GAL		7000-711	#11	NIBCO TEE	1" X 1/2" X 1"R	7000-730
#05	GRUNDFOS 3 SPEED PUMP	W/ CHECK VALVE	7000-712	#12	REDUCING COUPLING		7000-732
#06	NIBCO TEE	1/2" X 1/2" FITTING AIR CHAMBER	7000-737	#13	PRESSURE REDUCING VALVE		7000-733
#07	VACUUM RELIEF VALVE		7000-714	#14	NIBCO MALE ADAPTERS		7000-736

Figure 13 - Phoenix Sanitizer Booster Installation – PH130-55SA / PH199-55SA - LP-179-SA

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Drains and check valve between unit and storage tank will assist in purging air from system.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR.
7. For further energy savings, install the Phoenix Sanitizer Booster on the same electrical circuit as the dishwasher.

PART 5 – VENTING, COMBUSTION AIR AND CONDENSATE REMOVAL

⚠ DANGER

The heater must be vented as detailed in this Venting Section. Ensure exhaust vent and intake piping complies with these instructions regarding vent system. Inspect finished exhaust vent and intake piping thoroughly to ensure all joints are well secured, airtight, and comply with all applicable code requirements, as well as with the instructions provided in this manual. Failure to properly install the vent system will result in severe personal injury or death.

A. GENERAL

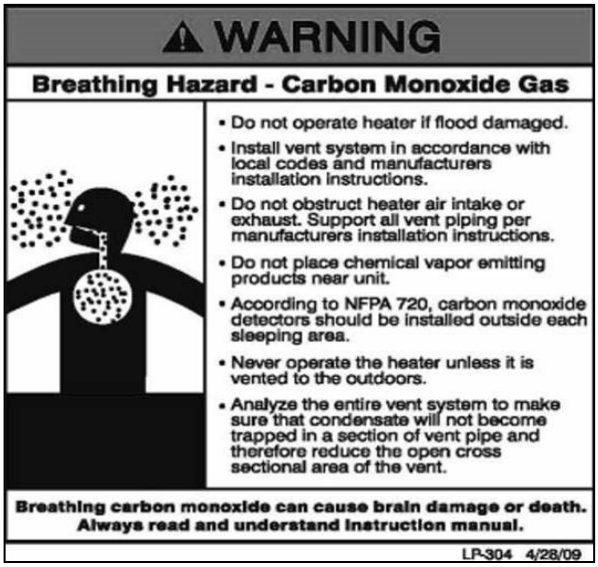
⚠ DANGER

This heater is certified as a "Category IV" appliance, and requires a special venting system. The vent system will operate with a positive pressure in the pipe. Exhaust gases must be piped directly outdoors using the vent materials and rules outlined in these instructions. Do not connect vent connectors serving appliances vented by natural draft into any portion of mechanical draft systems operating under positive pressure. Follow the venting instructions below carefully. Failure to do so will result in substantial property damage, severe personal injury, or death.

1. Installation should be made in accordance with the regulations of the Authority Having Jurisdiction, local code authorities, and utility companies which pertain to this type of water heating equipment.

2. Install the venting system in accordance with these instructions and with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, CAN/CGA B149, and/or applicable provisions of local building codes.

3. This water heater must be vented with materials, components, and systems listed and approved for Category IV appliances.



⚠ DANGER

Exhaust vent and intake pipes are to be piped separately. This heater cannot share a common exhaust or intake with multiple appliances. Failure to follow this instruction will result in substantial property damage, severe personal injury, or death.

NOTE: To avoid contamination often contained in indoor air, it is best to pipe all intake combustion air directly to the outdoors.

NOTE: If exhaust vent pipe system passes through an unheated space, such as an alcove or attic, the space must be heated or the pipe must be insulated. The insulation must have an R value sufficient to prevent freezing of the condensate.

⚠ WARNING

Improper seating of vent pipe gaskets can cause eventual gasket failure and exhaust gas leakage. Ensure the exhaust vent pipe is properly beveled and seated before insertion into the flue adapter. Failure to do so could result in property damage, severe personal injury, or death.

⚠ DANGER

Due to the extreme flammability of most glues, cements, solvents, and primers used to join plastic exhaust vent and intake pipes, explosive solvent vapors must be cleared from all vent piping before start-up. Avoid using excess cement or primer, as this may pool in the vent pipes. Vent assemblies should be allowed to cure for a period of at least 8 hours before powering a connected appliance. Failure to follow these instructions will result in substantial property damage, severe personal injury, or death. It is the installers' responsibility to understand the hazards associated with explosive solvents and take the necessary precautions to avoid these risks.

B. APPROVED MATERIALS FOR EXHAUST VENT AND INTAKE PIPE

APPROVED EXHAUST VENT AND INTAKE PIPE MATERIAL			
Item	**Material**	**Standards for Installation in:**	
		United States	**Canada**
Exhaust vent or Intake pipe and fittings	PVC schedule 40/80	ANSI/ASTM D1785	PP, CPVC, and PVC venting must be ULC-S636 Certified. IPEX is an approved manufacturer in Canada, supplying vent material listed to ULC-S636.
	PVC-DWV*	ANSI/ASTM D2665	
	CPVC schedule 40/80	ANSI/ASTM F441	
	Polypropylene	ULCS636	
	Stainless Steel AL29-4C	Certified for Category IV and direct vent appliance venting	Certified for Category IV and direct vent appliance venting
Pipe cement/primer	PVC	ANSI/ASTM D2564	IPEX System 636 Cements & Primers
	CPVC	ANSI/ASTM F493	

⚠ DANGER

- The exhaust and intake components installed with this heater must be used for near heater piping BEFORE transitioning to the approved materials listed above. DO NOT REMOVE these installed components. Doing so WILL VOID heater warranty.
- PVC/CPVC pipe and fittings of the same diameter are considered interchangeable.
- DO NOT use Foam Core Pipe in any portion of the exhaust piping from this water heater.
- DO NOT connect PVC/CPVC to PP without an approved vent connector.
- When installing AL29-4C vent piping, install a PVC-to-stainless adapter at the heater vent connection, and at the termination when using an HTP PVC termination kit. DO NOT mix AL-29-4C piping from different manufacturers unless using adapters specifically designed for the purpose by the manufacturer.
- *PVC-DWV for air intake applications ONLY.

Failure to follow these directions will result in substantial property damage, severe personal injury, or death.

Table 4 – Approved Materials for Exhaust Vent and Intake Pipe

⚠ WARNING

DO NOT mix components from different venting systems. The vent system could fail, causing leakage of flue products into the living space. Use only the approved pipe and fitting materials, and primer and cement specifically designed for the material used, as listed in Table 4. Failure to do so could result in property damage, severe personal injury, or death.

⚠ WARNING

Exhaust vent adaptors are not designed as load-bearing devices, and must not be used to support exhaust vent piping. All vent pipes must be properly connected, supported, and the exhaust must be pitched a minimum of ¼" per foot back to the heater to allow drainage of condensate. Failure to properly support vent piping and follow the information in this statement could result in product damage, severe personal injury, or death.

NOTE: The use of double-wall vent or insulated material for the combustion air inlet pipe is recommended in cold climates to prevent the condensation of airborne moisture in the incoming combustion air.

CAUTION

High heat sources (sources generating heat 100°F / 37°C or greater, such as stove pipes, space heaters, etc.) may damage plastic components of the water heater as well as plastic vent pipe materials. Such damages ARE NOT covered by warranty. It is recommended to keep a minimum clearance of 8" from high heat sources. Observe heat source manufacturer instructions, as well as local, state, provincial, and national codes, laws, regulations and ordinances when installing this water heater and related components near high heat sources.

C. REQUIREMENTS FOR INSTALLATION IN CANADA

1. Installations must be made with a vent pipe system certified to ULC-S636. IPEX is an approved vent manufacturer in Canada supplying vent material listed to ULC-S636. Additionally you may use AL29-4C stainless steel venting to comply with Canadian requirements.

2. The first three (3) feet of vent pipe from the water heater flue outlet must be readily accessible for visual inspection.

3. The components of the certified vent system must not be interchanged with other vent systems or unlisted pipe / fittings.

Cellular foam core piping may be used on air inlet piping **only**.

⚠ DANGER

You must not use "B" vent in an exhaust application. "B" vent is for intake applications **ONLY**. Using "B" vent in an exhaust application will result in serious injury or death.

D. EXHAUST VENT AND INTAKE PIPE LOCATION

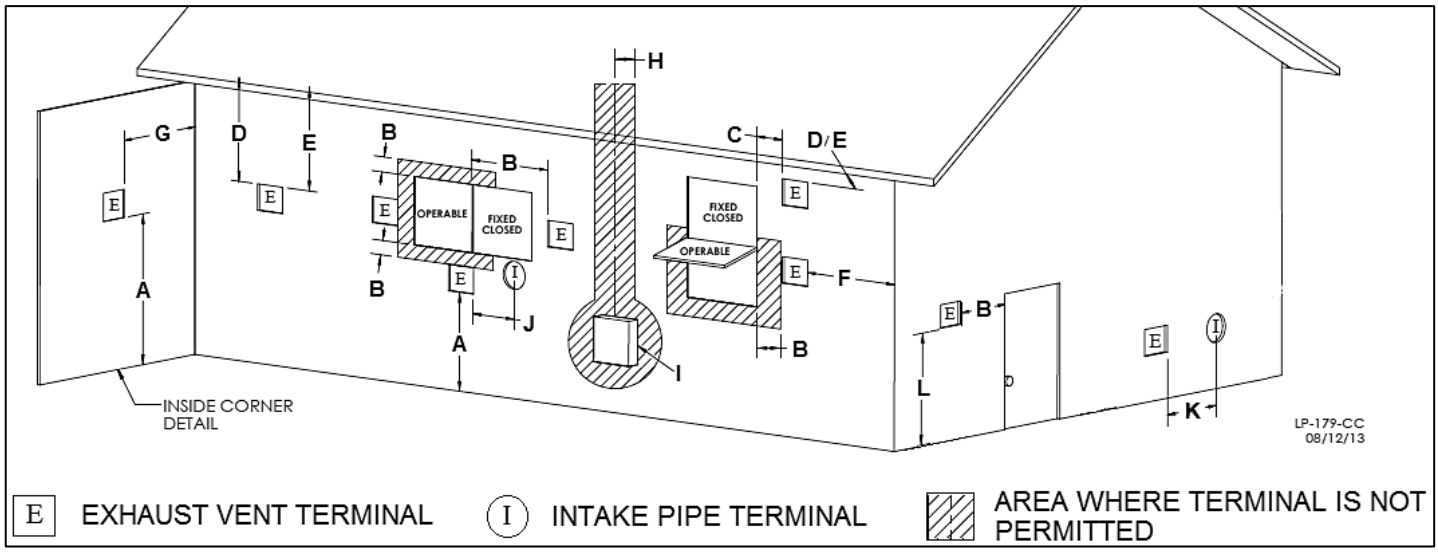


Figure 14 – ANSI Z223.1 / NFPA 54 for US and CAN/CSA B149.1 for Canada – Exit Terminals for Direct-Vent Venting Systems

DETERMINE EXHAUST VENT AND INTAKE PIPE LOCATION – FIGURE 14 NOTES:

A. Provide a minimum of 1 foot clearance from the bottom of the exhaust vent and intake pipe above the expected snow accumulation level. Snow removal may be necessary to maintain clearance.
B. Provide a minimum of 1 foot distance from exhaust vent termination to any door, operable window, or gravity intake into any building.
C. Provide a minimum of 1 foot distance from exhaust vent termination to any permanently closed door or window.
D. Provide a minimum of 4 feet vertical clearance from the exhaust vent to all roof overhangs.
E. Locating exhaust vent termination near roof overhangs will result in the formation of icicles in freezing weather, and could result in blockage of the exhaust vent. To prevent icicles from forming, maintain 4 feet vertical clearance from the exhaust vent to all roof overhangs.
F. Provide 4 feet clearance from the outside corner of vertical walls, chimneys, etc., as well as horizontal corners created by roof overhangs.
G. Provide 6 feet clearance from the inside corner of vertical walls, chimneys, etc., as well as horizontal corners created by roof overhangs.
H. Provide 4 feet clearance from center line within a height of 15 feet above electrical meters, gas meters, gas regulators, relief equipment, exhaust fans and inlets.
I. Provide 4 feet horizontal clearance from electrical meters, gas meters, gas regulators, relief equipment, exhaust fans and inlets. In no case shall the exit terminal be above or below the aforementioned equipment unless the 4 foot horizontal distance is maintained.
J. This water heater vent system shall terminate at least 3 feet (0.9 m) above any forced air intake located within 10 ft (3 m).
NOTE: This does not apply to the combustion air intake of a direct-vent appliance.
K. When venting with a two pipe system, maximum distance between exhaust vent and intake pipe is 6 feet (1.8 m). Minimum distance between exhaust vent and intake pipe on single direct vented appliance is 10” (0.255 m) center-to-center. Minimum distance between exhaust vents and intake pipes on multiple water heaters is 10” (0.255 m) center-to-center.
L. When adjacent to a public walkway, locate exit terminal at least 7 feet above grade.

In addition:

- Total length of vent piping shall not exceed the limits specified in this manual.
- The vent piping for this direct vented appliance is approved for zero clearance to combustible construction.
- The flue products coming from the exhaust vent will create a large plume when the water heater is in operation. Avoid venting in areas that will affect neighboring buildings or be considered objectionable.
- DO NOT locate exhaust vent or intake pipe in a parking area where machinery may damage the pipe.
- DO NOT locate the exhaust vent or intake pipe terminals under a porch, balcony, or veranda.
- Avoid terminating exhaust vents near shrubs, air conditioners, or other objects that will obstruct the exhaust stream.
- DO NOT vent over a public walkway. Condensate could drip or freeze and create a nuisance or hazard.
- **NOTE:** Due to potential moisture build-up, sidewall venting may not be the preferred venting option. Carefully consider venting installation and location to save time and cost.

⚠ WARNING

The building owner is responsible for keeping the exhaust and intake terminations free of snow, ice, or other potential blockages, as well as scheduling routine maintenance. Failure to keep the vent piping terminations clear and properly maintain the heater could result in property damage, severe personal injury, or death.

⚠ WARNING

For each floor containing bedroom(s), a carbon monoxide detector and alarm shall be placed in the living area outside the bedrooms, as well as in the room that houses the heater. Detectors and alarms shall comply with NFPA 720 (latest edition). Failure to comply with requirements for detectors and alarms could result in property damage, severe personal injury, or death.

E. EXHAUST VENT AND INTAKE PIPE SIZING

1. The exhaust vent and intake pipe size is 2" for the PH100 and PH130 and 3" for the PH160 and PH199.

2. The maximum total equivalent length of 2" exhaust vent and intake pipe **must not exceed 85 feet**. The total maximum equivalent length of 3" exhaust vent and intake pipe **must not exceed 200 feet**.

a. The equivalent length of elbows, tees, and other fittings are listed in the Friction Loss Table, Table 5:

FRICTION LOSS EQUIVALENT IN PIPING AND FITTINGS			
FITTINGS OR PIPING	EQUIVALENT FEET		
	2"	3"	4"
90 DEGREE ELBOW*	5'	5'	3'
45 DEGREE ELBOW	3'	3'	1'
COUPLING	0'	0'	0'
AIR INLET TEE	0'	0'	0'
STRAIGHT PIPE	1'	1'	1'
CONCENTRIC VENT KIT	3'	3'	N/A
V500 2" VENT KIT	1'	N/A	N/A
V1000 3" VENT KIT	N/A	1'	1'
V2000 4" VENT KIT	N/A	1'	1'

Table 5 - *Friction loss for long radius elbow is 1 foot less. NOTE: Consult Polypropylene venting instructions for friction loss and pressure drop equivalents.

b. For example: If the exhaust vent has two 90° elbows and 10 feet of PVC pipe we will calculate:
Exhaust Vent Equivalent Length = (2x5) + 10 = 20 feet.
Further, if the intake pipe has two 90° elbows, one 45° elbow and 10 feet of PVC pipe, the following calculation applies:
Intake Pipe Equivalent Length = (2x5) + 3 + 10 = 23 feet.
Finally, if a concentric vent kit is used we find:
Total Equivalent Length = 20 + 23 + 3 = 46 feet.
The total equivalent length is 46 feet which is well below the maximum of 85 feet.

3. The minimum total equivalent length is 16 equivalent feet.

CAUTION

Failure to provide a minimum total vent length of 16 equivalent feet could result in property damage and improper product operation.

F. LONGER VENT RUNS

The maximum total equivalent length can be extended by increasing the diameter of both exhaust vent and intake pipe equally. However, the transitions should begin a minimum of 15 total equivalent feet from the water heater.

a. **The maximum total equivalent length for increased diameter vent pipes is 125 feet for 2" transitioning to 3" pipe (this number includes the minimum 15 total equivalent feet necessary for transition), and 200 maximum total equivalent feet for 3" transitioning to 4" pipe (including the minimum 15 total equivalent feet necessary for transition).**

b. Transitions should always be made in vertical sections of pipe to prevent the condensate from pooling in the vent pipe.

MODEL	MAXIMUM TOTAL EQUIVALENT LENGTH AT STANDARD VENT CONNECTION	REDUCING COUPLING	MAXIMUM TOTAL EQUIVALENT LENGTH AT MAXIMUM INCREASED VENT SIZE
PH100 PH130	85' @ 2"	3" X 2"	125' at 3"
PH160 PH199	200' @ 3"	4" X 3"	200' at 4"

Table 6 – Vent Sizing – Diameter and Length

c. If the transition occurs at a distance greater than 15 equivalent feet from the water heater, the maximum equivalent length will be reduced.

⚠ DANGER

Total maximum equivalent length of increased diameter exhaust vent and intake pipe must not exceed the lengths defined in this manual. 125 maximum total equivalent feet for 2" increased to 3" diameter vent pipe; 200 maximum total equivalent feet for 3" increased to 4" diameter vent pipe. Failure to keep the total equivalent length below the maximum lengths determined in this manual will result in faulty water heater operation, substantial property damage, serious personal injury, or death.

TRANSITION POINT (FT. FROM WATER HEATER)	TEL OF OVERSIZED VENT PIPE (FT.)*	MAXIMUM TEL OF ALL VENT PIPE (FT.)
15	95	125
20	77-1/2	117-1/2
25	60-1/2	110-1/2
30	43	103
35	26	96
40	8-1/2	88-1/2
NONE	0	85

Table 7 – TEL = Total Equivalent Length *Oversized vent pipe diameter is 1" or greater than factory supplied connection.

G. EXHAUST VENT AND INTAKE PIPE INSTALLATION

⚠ WARNING

All joints of positive pressure vent systems must be sealed completely to prevent leakage of flue products into living space.

1. Use only solid PVC or CPVC pipe, or a Polypropylene vent system approved for use with Category IV appliances.

FOAM CORE PIPING IS NOT APPROVED FOR EXHAUST VENT APPLICATIONS. Foam core piping may be used on air inlet piping **only**.

2. Remove all burrs and debris from joints and fittings.

3. When using PVC or CPVC pipe, all joints must be properly cleaned, primed, and cemented. Use only cement and primer approved for use with the pipe material. Cement must conform to ASTM D2564 for PVC and ASTM F493 for CPVC pipe. **NOTE: DO NOT CEMENT POLYPROPYLENE PIPE.**

4. Ensure the vent is located where it will not be exposed to prevailing winds.

5. In all roof venting applications, exhaust discharge must point away from the pitch of the roof.

6. To prevent water leakage, install adequate roof flashing where the pipe enters the roof.

7. Do not locate vent over public walkways, driveways, or parking lots. Condensate could drip and freeze, resulting in a slip hazard or damage to vehicles and machinery.

8. Due to potential moisture build-up, sidewall venting may not be the preferred venting option. To save time and cost, carefully consider venting installation and location.

9. Horizontal lengths of exhaust vent must slope back towards the water heater not less than ¼" per foot to allow condensate to drain from the vent pipe.

10. The exhaust vent must terminate where vapors cannot make accidental contact with people or pets, or damage shrubs or plants.

11. In vacant chimney applications, install and seal a rain cap over existing chimney openings.

12. All piping must be fully supported. Use pipe hangers at a minimum of 4 foot intervals to prevent sagging of the pipe where condensate may form.

13. Do not use the heater to support any piping.

14. A screened straight coupling is provided with the heater for use as an outside exhaust termination.

15. A screened inlet air tee is provided with the heater to be used as an outside intake termination.

Table 8 lists optional intake air/exhaust vent terminations available from HTP:

DESCRIPTION	STOCK CODE
2” PVC CONCENTRIC VENT TERMINATION KIT	KGAVT0501CVT
3” PVC CONCENTRIC VENT TERMINATION KIT	KGAVT0601CVT
2” STAINLESS STEEL VENT TERMINATION KIT	V500
3” STAINLESS STEEL VENT TERMINATION KIT	V1000
4” STAINLESS STEEL VENT TERMINATION KIT	V2000
3” POLYPRO VENT KIT	8400P-001

Table 8

H. VENTING DRAWINGS

1. DIRECT VENT INSTALLATION OF EXHAUST VENT AND INTAKE PIPE

If installing a direct vent option, combustion air must be drawn from the outdoors directly into the water heater intake, and exhaust must terminate outside. There are three basic direct vent options detailed in this manual: 1. Side Wall Venting, 2. Roof Venting, and 3. Unbalanced Venting.

Be sure to locate the heater such that the exhaust vent and intake piping can be routed through the building and properly terminated. Different vent terminals can be used to simplify and eliminate multiple penetrations in the building structure (see Optional Equipment in Venting Section). The exhaust vent and intake piping lengths, routing and termination methods must all comply with the methods and limits given in the Venting section, Part 5 of this manual.

When installing a combustion air intake from outdoors, care must be taken to utilize uncontaminated combustion air. **NOTE: To prevent combustion air contamination, see Table 1** – Contaminant Table**.**

⚠ WARNING

Take extra precaution to adequately support the weight of vent pipes terminating through the roof. Failure to properly support roof terminated vent piping could result in property damage, serious personal injury, or death due to flue gas leakage.

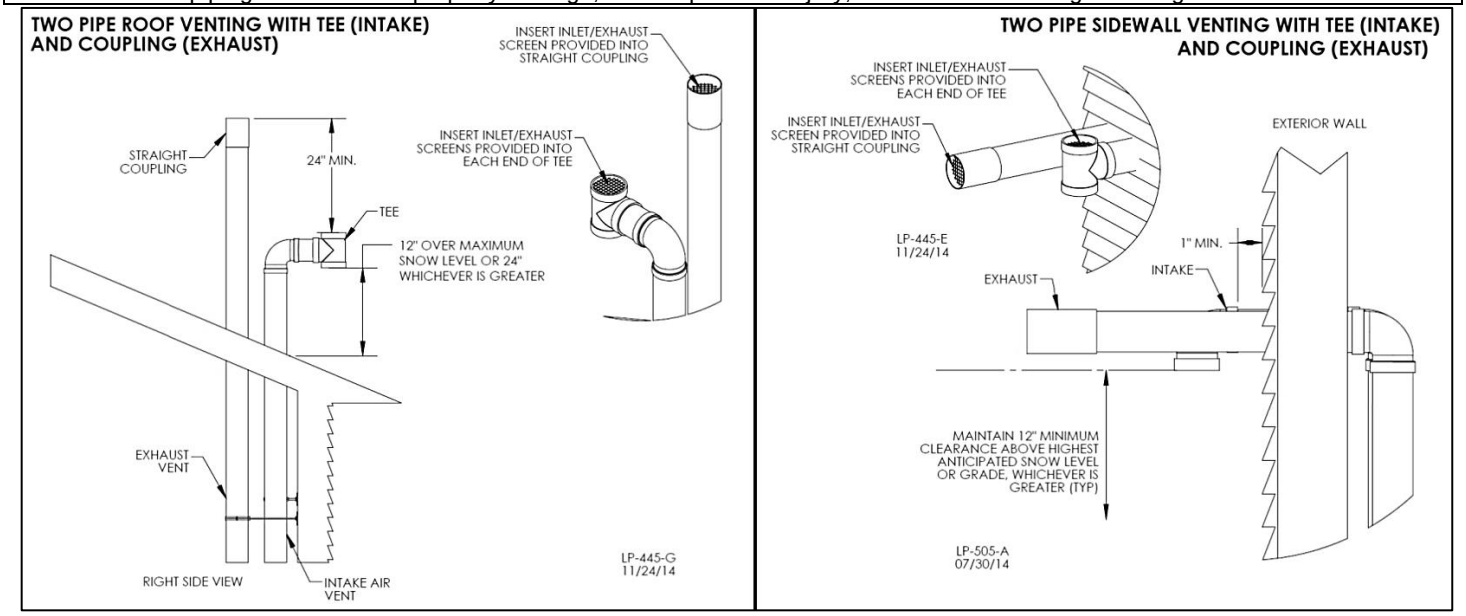


Figure 15 – Two Pipe Roof and Sidewall Venting with Included Equipment (Tee and Coupling) - NOTE: These drawings are meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.

⚠ WARNING

All vent pipes must be glued, properly supported, and the exhaust must be pitched a minimum of ¼” per foot back to the heater to allow drainage of condensate. When placing support brackets on vent piping, the first bracket must be within 1 foot of the water heater and the balance at 4 foot intervals on the vent pipe. Heater venting must be readily accessible for visual inspection for the first three feet from the heater.

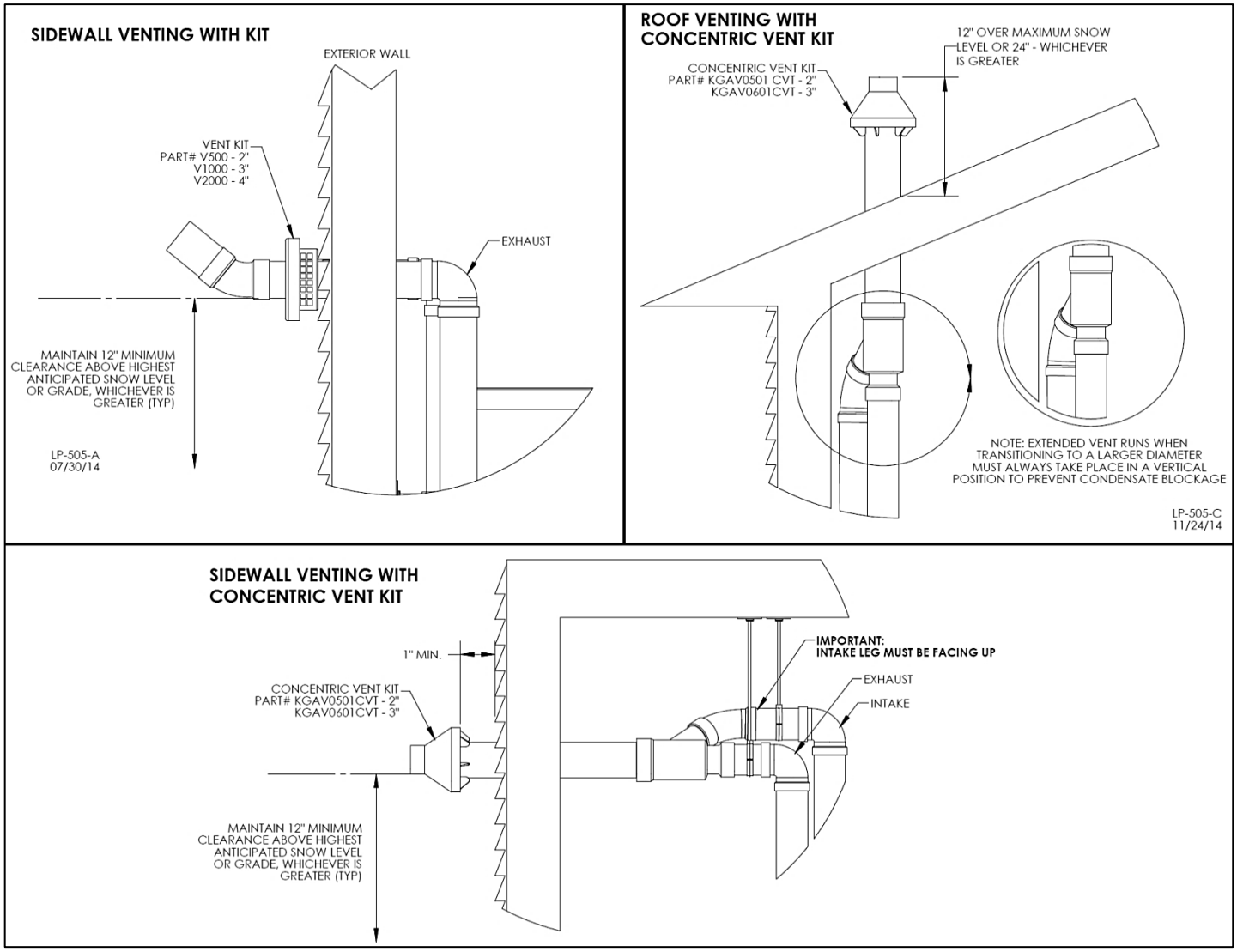


Figure 16 – Venting with Optional Kits (NOT INCLUDED WITH THE WATER HEATER) NOTE: These drawings are meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.

⚠ WARNING

All vent pipes must be glued, properly supported, and the exhaust must be pitched a minimum of ¼" per foot back to the heater to allow drainage of condensate. When placing support brackets on vent piping, the first bracket must be within 1 foot of the water heater and the balance at 4 foot intervals on the vent pipe. Heater venting must be readily accessible for visual inspection for the first three feet from the heater.

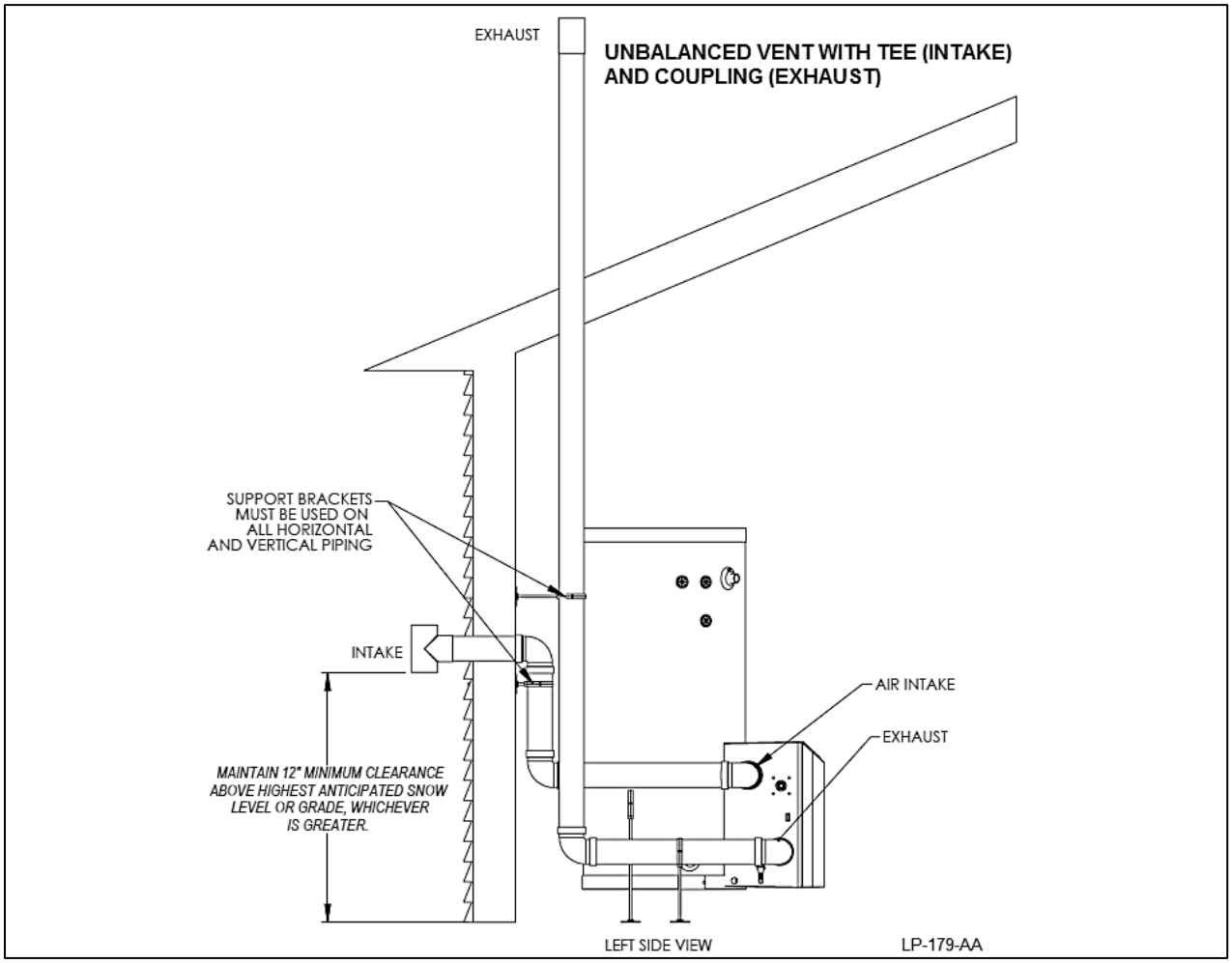


Figure 17 – LP-179-F - NOTE: This drawing is meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.

⚠ WARNING
All vent pipes must be glued, properly supported, and the exhaust must be pitched a minimum of ¼" per foot back to the heater to allow drainage of condensate. When placing support brackets on vent piping, the first bracket must be within 1 foot of the water heater and the balance at 4 foot intervals on the vent pipe. Heater venting must be readily accessible for visual inspection for the first three feet from the heater.

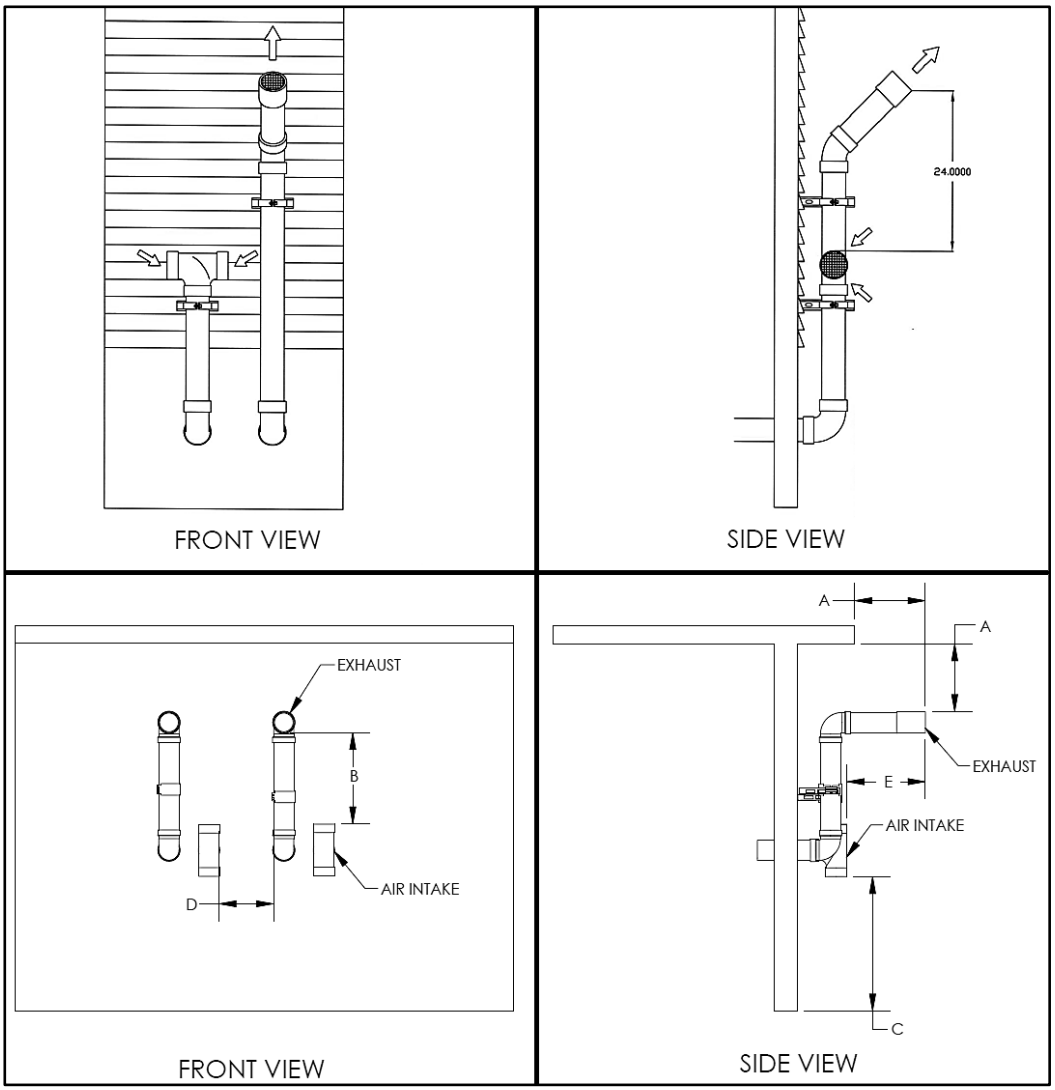


Figure 18 – Horizontal Venting - NOTE: Drawing is meant to demonstrate system venting ONLY.

NOTES:
A. For every 1" of overhang, the exhaust vent must be located 1" vertical below overhang (overhang means top of building structure and not two adjacent walls [corner of building]).
B. Typical installations require 12" minimum separation between bottom of exhaust outlet and top of air intake.
C. Maintain 12" minimum clearance above highest anticipated snow level or grade (whichever is greater).
D. Minimum 12" between vents when installing multiple vents.
E. 12" minimum beyond air intake.

⚠ WARNING

All vent pipes must be glued, properly supported, and the exhaust must be pitched a minimum of ¼" per foot back to the heater to allow drainage of condensate. When placing support brackets on vent piping, the first bracket must be within 1 foot of the water heater and the balance at 4 foot intervals on the vent pipe. Heater venting must be readily accessible for visual inspection for the first three feet from the heater.

2. VENTING THROUGH AN EXISTING SYSTEM

This heater may be vented through an existing unused vent system. The inner diameter of the existing vent system is utilized for the combustion air source. Two methods have been approved for such venting: Concentric Venting Through an Existing System and Venting as a Chase.

VENT / AIR INLET SIZE	MINIMUM EXISTING VENT / CHASE SIZE
2"	4"
3"	5"
4"	7"

Table 9 – Minimum Existing Vent / Chase Sizing

⚠ DANGER

Do not install the heater into a common existing vent with any other appliance. This will cause flue gas spillage or heater malfunction, resulting in substantial property damage, severe personal injury, or death.

CAUTION

Contractors must check state and local codes before installing through an existing vent opening. State and local codes always take precedence over manufacturer's instructions. Failure to check state and local codes before installing through an existing opening could result in property damage and add significantly to installation costs.

CAUTION

If an existing venting system is converted for use with this heater, the installer must ensure that the existing venting system is clean and free from particulate contamination that could damage the heater. Failure to do so could result in property damage and heater failure. Such failure IS NOT covered under warranty.

CONCENTRIC VENTING THROUGH AN EXISTING SYSTEM

NOTE: The following instructions refer only to venting through an existing vent system, and not to venting with HTP's optional concentric vent kits. Refer to Concentric Vent Kit installation manual (LP-166) for further information on venting with the optional concentric vent kits.

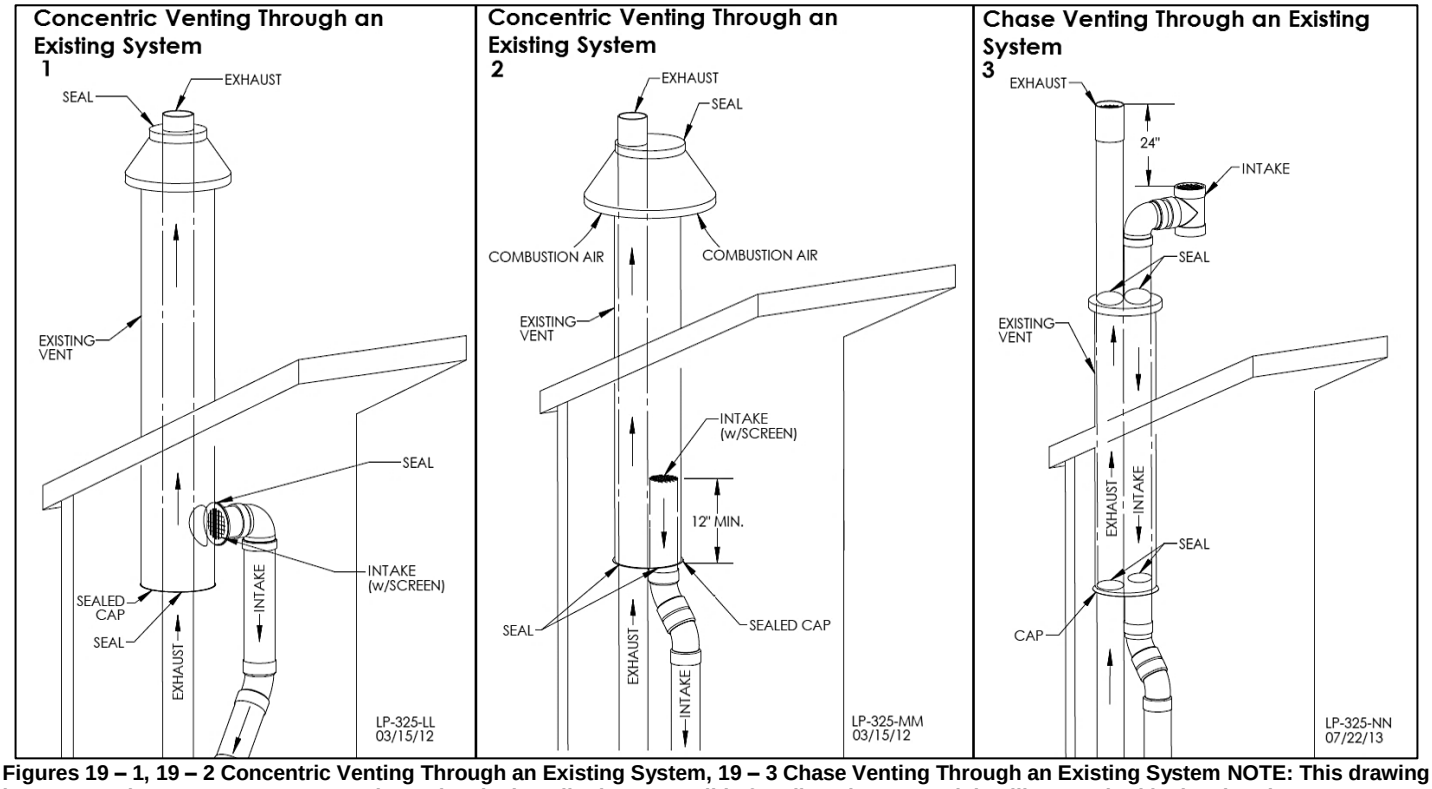
Concentric venting through an existing system must run vertically through the roof. See Table 9 for proper minimum vent sizing. Use only the approved venting materials specified in Table 4 for piping the system. All instructions listed in Part 5 - Venting apply. See Figures 19-1 and 19-2 for venting demonstrations.

⚠ DANGER

The upper and lower vent terminations as well as all joints in the venting system must be properly sealed to ensure that all combustion air is drawn properly and exhaust does not leak from the system. Failure to properly seal the venting system will result in property damage, severe personal injury, or death.

CHASE VENTING THROUGH AN EXISTING SYSTEM

When venting as a chase, follow all instructions included in Part 5 – Venting of this manual, as well as the previous Concentric Venting section. See Figure 19-3 for chase venting demonstration.



Figures 19 – 1, 19 – 2 Concentric Venting Through an Existing System, 19 – 3 Chase Venting Through an Existing System NOTE: This drawing is meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.

3. INDOOR COMBUSTION AIR INSTALLATION IN CONFINED OR UNCONFINED SPACE

This heater requires fresh, uncontaminated air for safe operation and must be installed in a mechanical room where there is adequate combustion and ventilating air. **NOTE: To prevent combustion air contamination, see Table 1** – Contaminant Table**.**

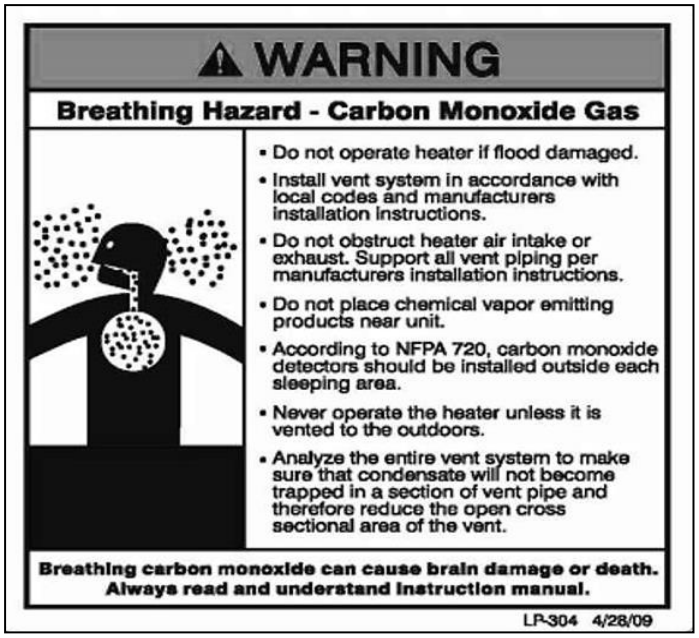
Combustion air from the indoor space can be used if the space has adequate area or when air is provided through a duct or louver to supply sufficient combustion air based on the water heater input. **Never obstruct the supply of combustion air to the water heater.** If the water heater is installed in areas where indoor air is contaminated (see Figure 20) it is imperative that the water heater be installed as direct vent so that all combustion air is taken directly from the outdoors into the water heater intake connection.

Unconfined space is space with volume greater than 50 cubic feet per 1,000 Btu/hour (4.8 cubic meters per kW) of the total input rating of all fuel-burning appliances installed in that space. Rooms connected directly to this space, through openings not furnished with doors, are considered part of the space.

Confined space is space with volume less than 50 cubic feet per 1,000 Btu/hour (4.8 cubic meters per kW) of the total input rating of all fuel-burning appliances installed in that space. Rooms connected directly to this space, through openings not furnished with doors, are considered part of the space.

When drawing combustion air from inside a conventionally constructed building to a confined space, such space should be provided with two permanent openings: one located 6" (15 cm) below the space ceiling, the other 6" (15cm) above the space floor. Each opening should have a free area of one square inch per 1,000 Btu/hr (22cm^2/kW) of the total input of all appliances in the space, but not less than 100 square inches (645cm^2).

If the confined space is within a building of tight construction, air for combustion must be obtained from the outdoors as outlined in the Venting section of this manual. See **Figure 21**.



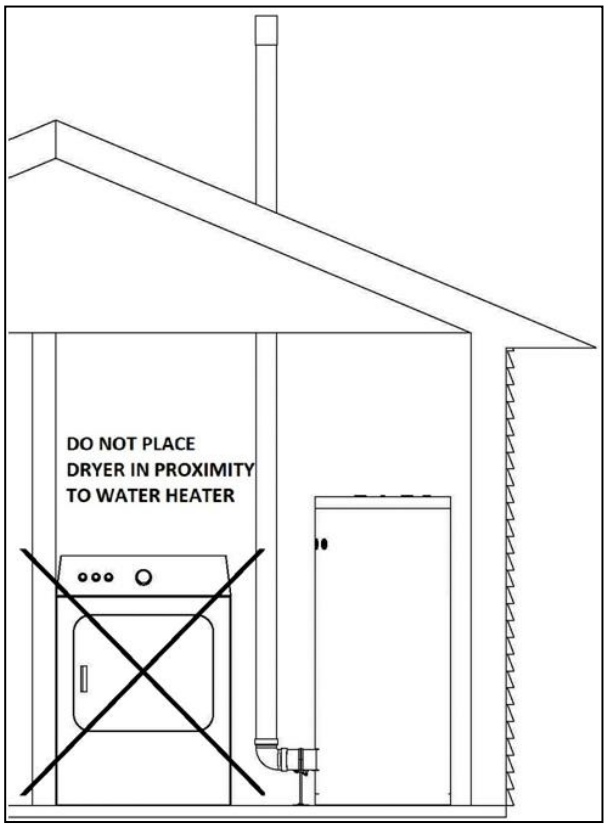
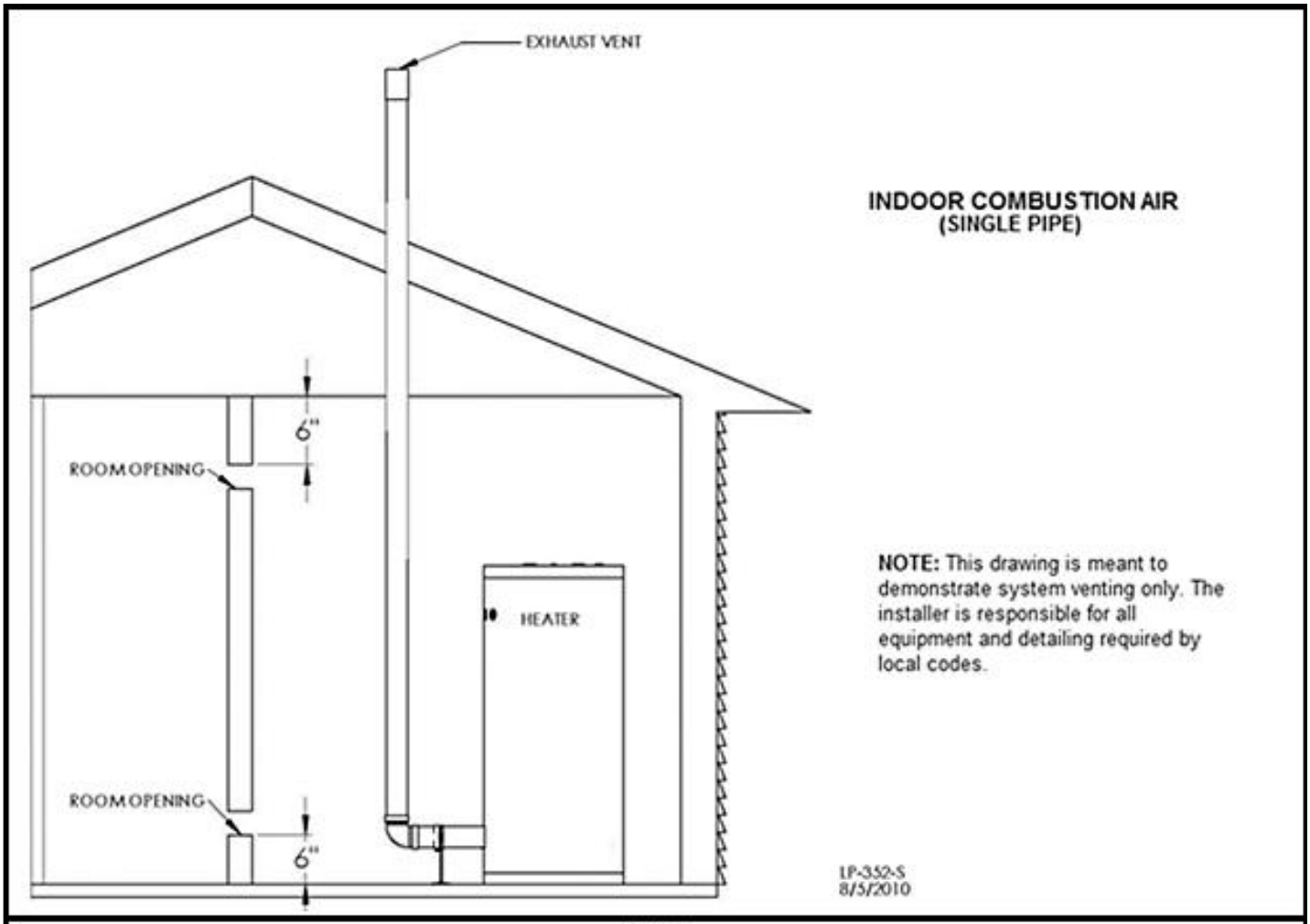


Figure 20 – LP-325-X


EXHAUST VENT
INDOOR COMBUSTION AIR
(SINGLE PIPE)
6"
ROOM OPENING
HEATER
NOTE: This drawing is meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.
ROOM OPENING
6"
LP-352-S
8/5/2010

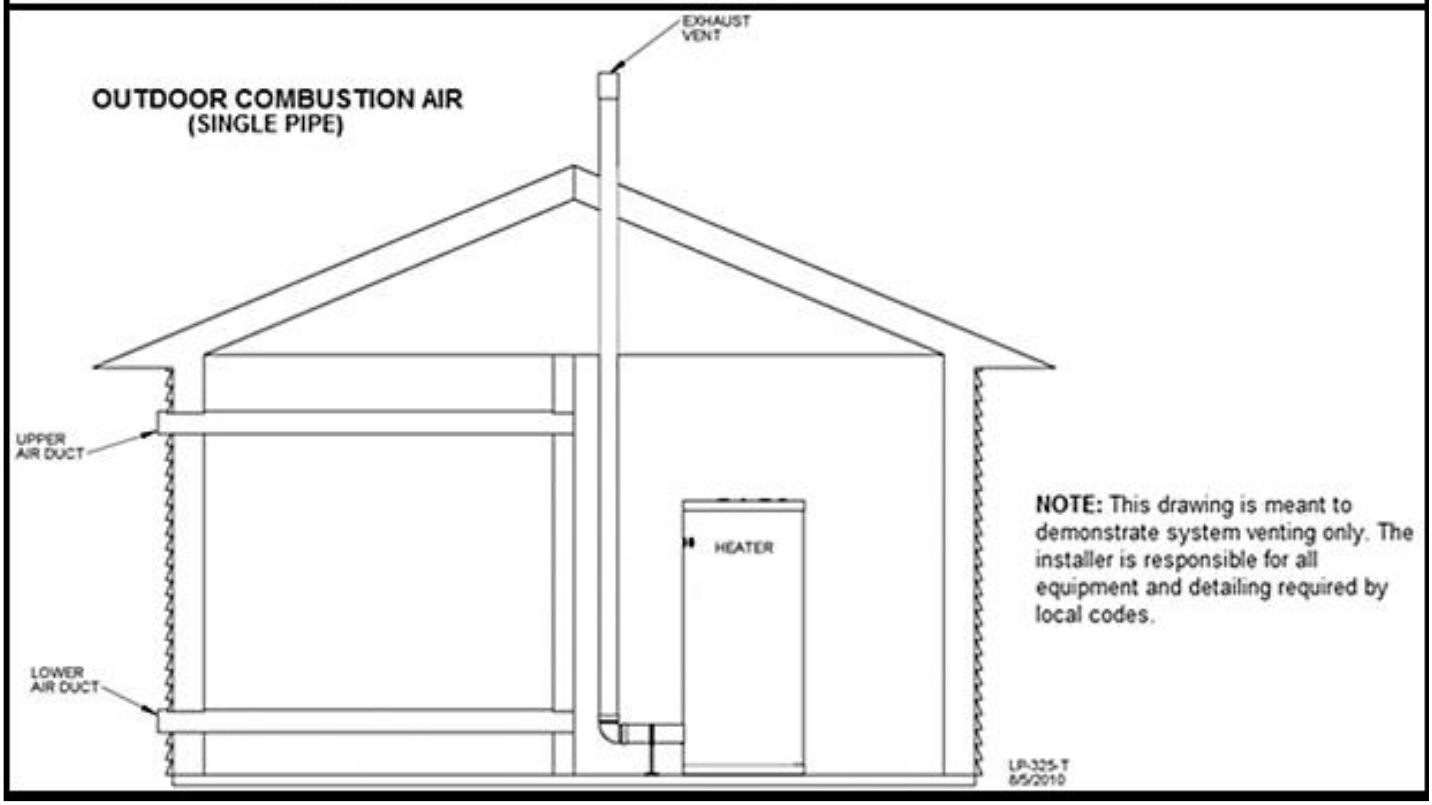

EXHAUST VENT
OUTDOOR COMBUSTION AIR
(SINGLE PIPE)
UPPER AIR DUCT
HEATER
NOTE: This drawing is meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.
LOWER AIR DUCT
LP-325-T
8/5/2010

Figure 21

I. CONDENSATE REMOVAL SYSTEM

NOTE: Check with your local gas company to determine if combustion condensate disposal is permitted in your area. In the state of Massachusetts, condensate must be neutralized before entering a drain.

This condensing high efficiency water heater has a condensate removal system. Condensate is water vapor derived from combustion products, similar to an automobile when it is initially started. It is very important that the condensate line is sloped down away from the heater and to a suitable drain.

If the heater condensate outlet is lower than the drain, you must use a condensate removal pump (kit p/n 554200 available from HTP). If required by local authorities, a condensate filter of lime crystals, marble, or phosphate chips will neutralize slightly acidic condensate. This can be installed in the field and purchased from HTP (p/n 7450P-212).

CAUTION

The condensate line must remain unobstructed. If allowed to freeze in the line or obstructed in any other manner, condensate can exit from the water heater tee, resulting in potential water damage to property. When installing a condensate pump, select one approved for use with condensing heaters and furnaces. The condensate pump should have an overflow switch to prevent property damage from spillage. Condensate from the heater will be slightly acidic (pH from 3.2 to 4.5). Install a neutralizing filter if required by local codes.

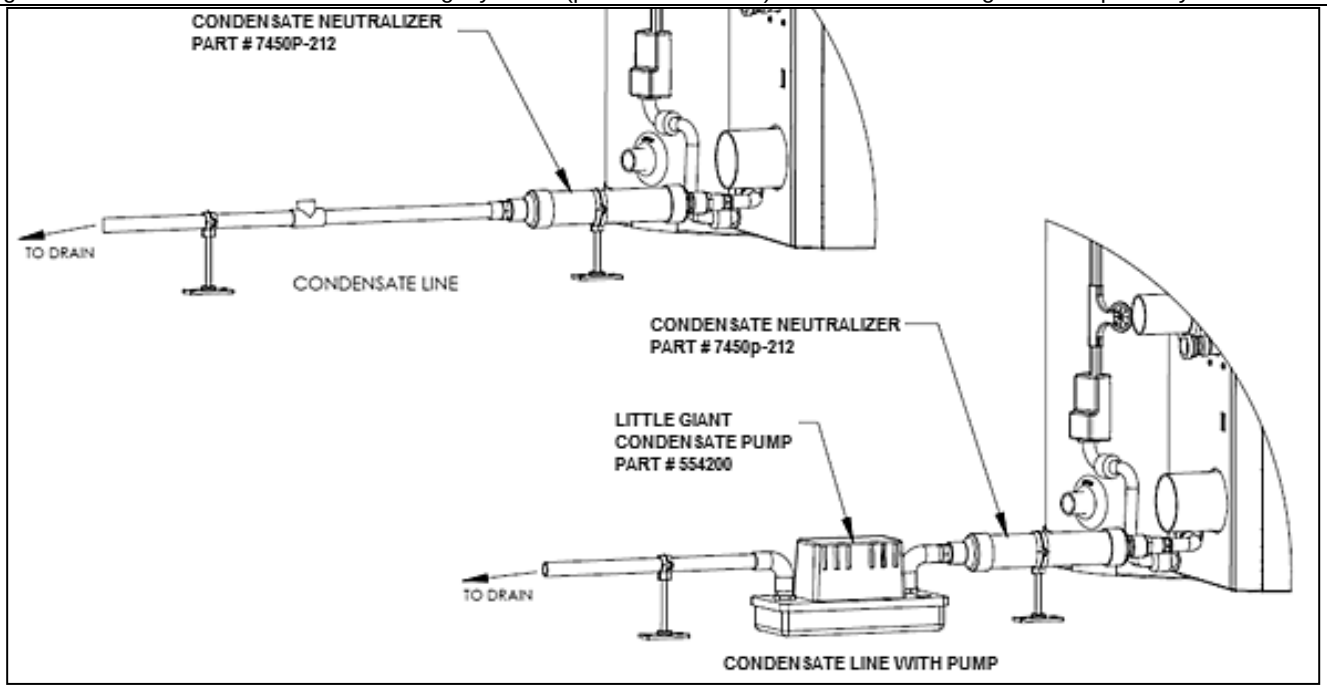


Figure 22 – LP-179-K

NOTES:
1. Condensate line must be pitched at least ¼" per foot to properly drain. If this cannot be done, or a very long length of condensate hose is used, increase the condensate line to a minimum of 1" ID and place a tee in the line after the condensate neutralizer to properly reduce vacuum lock in the drain line.
2. Plastic pipe should be the only material used for condensate line. Steel, brass, copper, and other metals will be subject to corrosion or deterioration.
3. NEVER install condensate lines outside. It is very important that the condensate line is not exposed to freezing temperatures or any type of blockage. Damages due to frozen or blocked condensate lines ARE NOT covered by warranty.
4. Support of the condensate line may be necessary to avoid blockage of the condensate flow.

PART 6 – WIRING

⚠ WARNING

To avoid electrical shock, turn off all power to the heater prior to opening an electrical box within the unit. Ensure the power remains off while any wiring connections are being made. Failure to follow these instructions could result in component or product failure, serious injury, or death. Such product failure IS NOT covered by warranty.

A. LINE VOLTAGE INPUT

The heater must be wired to a 120 volt circuit by a qualified electrician. It is recommended that the heater be wired on its own circuit to minimize the possibility of circuit failure due to outside causes. The heater requires a maximum of 8 amps at 120 volts in use.

B. LINE VOLTAGE CONDENSATE OUTPUT

The heater has the capability of supplying power to a condensate pump. The connection is 120 VAC +/- 10% at a max of 2 amps. Power is supplied to the pump only when the heater is connected to power, and the power switch is in the on position.

C. LOW VOLTAGE OUTDOOR SENSOR INPUT

The heater has the capability of an outdoor reset. Connecting an outdoor sensor allows the heater to operate at optimum efficiency. HTP offers an outdoor sensor, p/n 7250P-319.

The outdoor sensor must be a 12K NTC sensor. Use a minimum 22 AWG wire for runs of 100 feet or less and minimum 18 AWG wire for runs up to 150 feet. Instructions are included with the outdoor sensor to correctly mount the sensor on the exterior surface of the building. It is preferable to mount the sensor on the north side in an area that will not be affected by direct sunlight but will be exposed to varying weather conditions. Connect the outdoor sensor to terminals marked “Outdoor”.

⚠ WARNING

It is of extreme importance that this unit be properly grounded. It is very important that the building system ground is inspected by a qualified electrician prior to making this connection. Electrical power must only be turned on when the heater is completely filled with cold water.

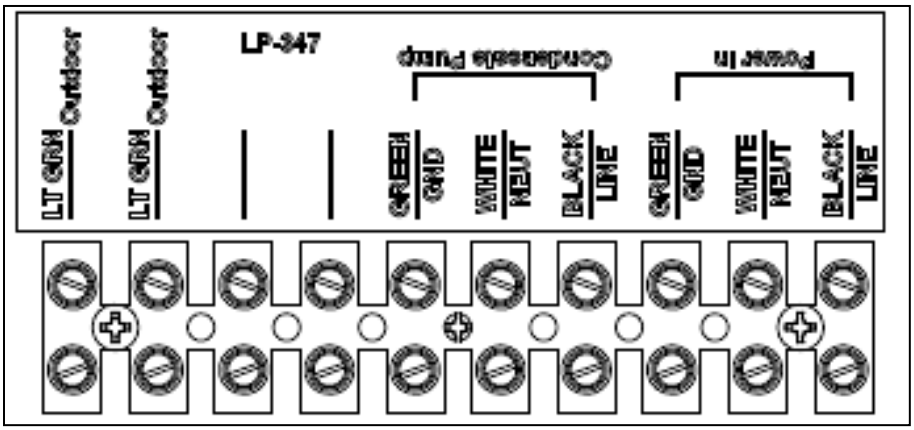


Figure 23 – Low Voltage Wiring

⚠ CAUTION

Label all wires prior to disconnecting them when servicing the heater. Wiring errors can cause improper and dangerous operation. Failure to follow these instructions may result in property damage or personal injury.

D. INTERNAL WIRING DIAGRAM

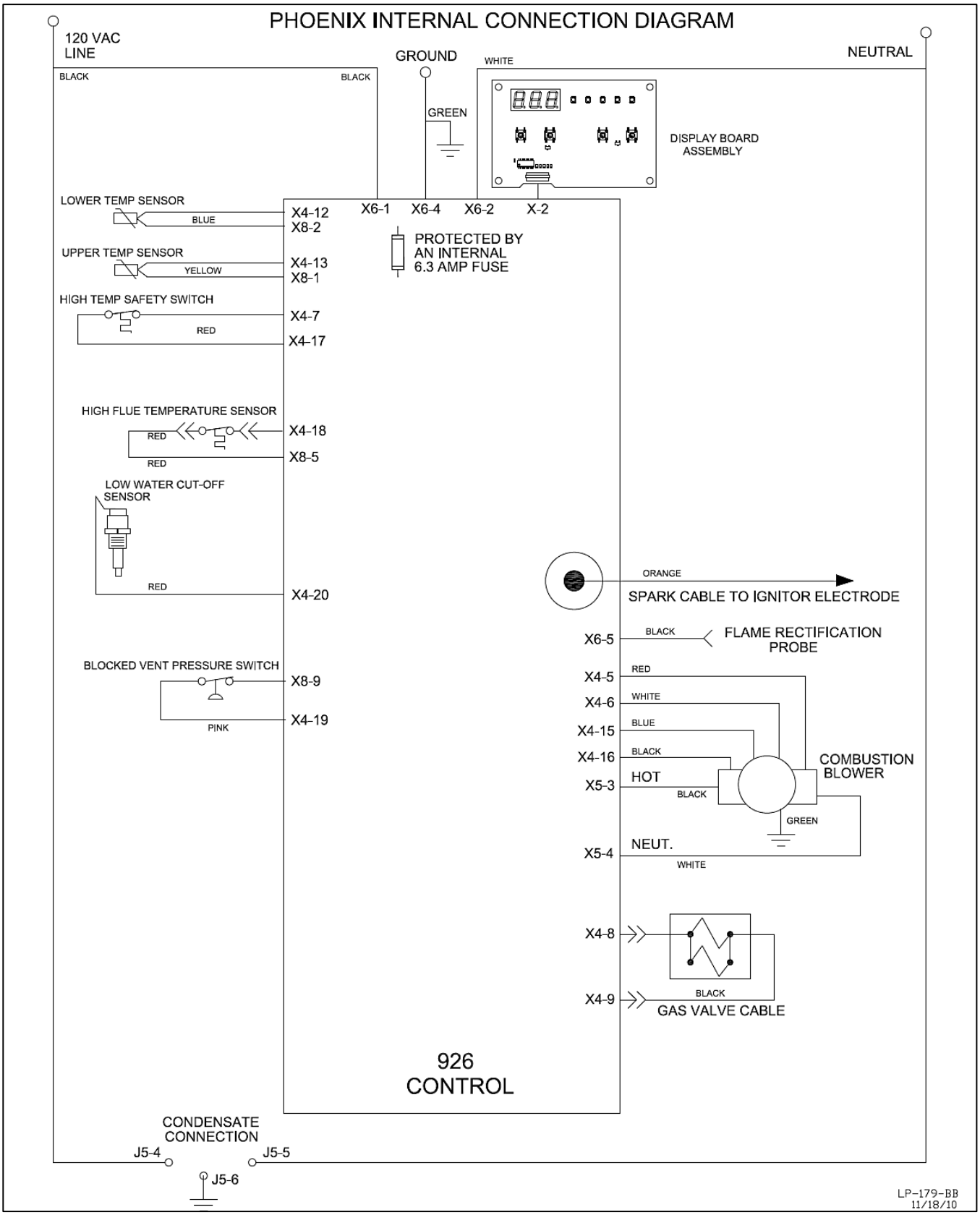


Figure 24 – Wiring Diagram

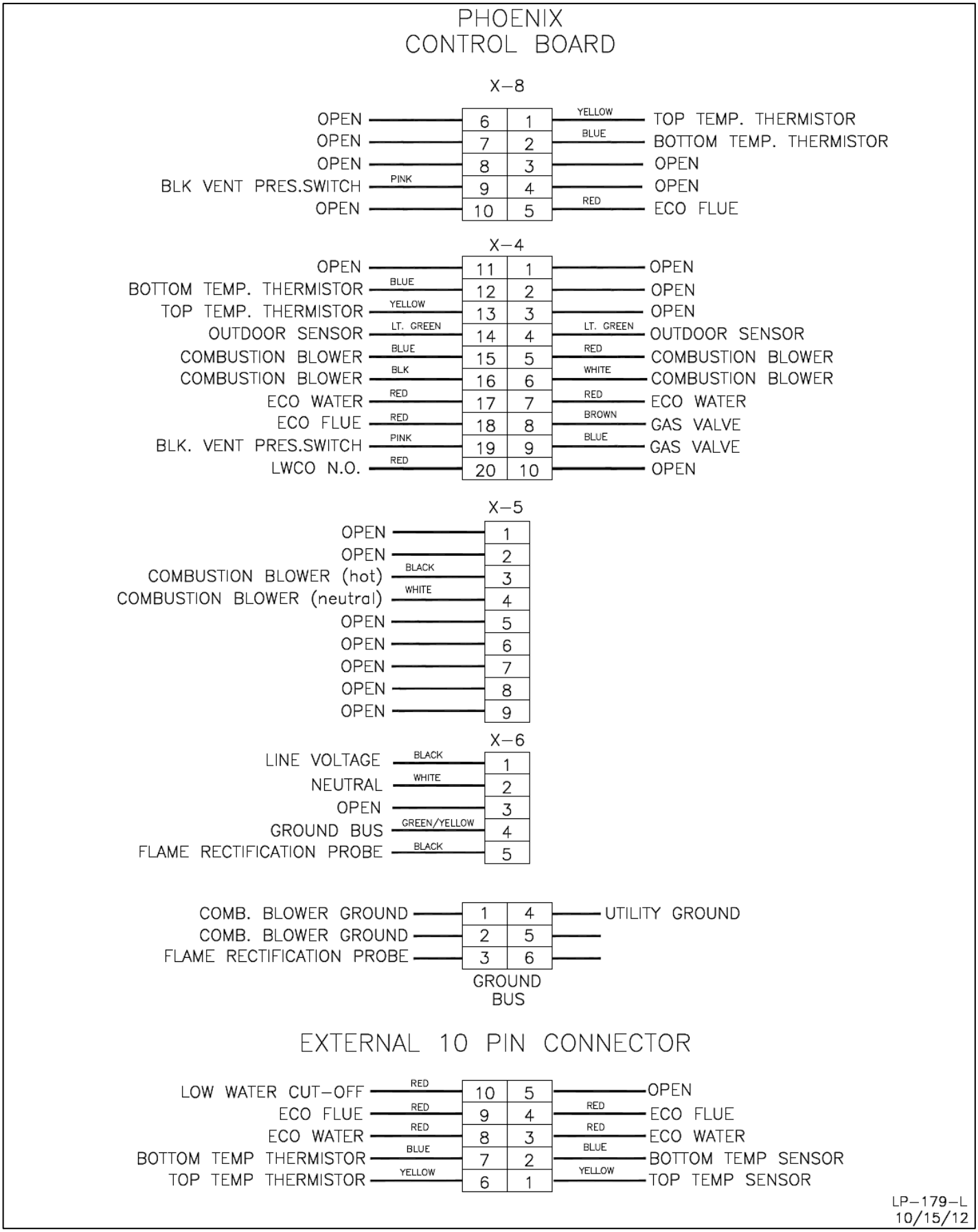


Figure 25 – LP-179-L

PART 7 – GAS CONNECTIONS

⚠ WARNING

Failure to follow all precautions could result in fire, explosion, severe injury or death!

The gas supply shall have a maximum inlet pressure of less than 14" water column (350 mm), ½ pound pressure (3.5 kPa), and a minimum of 3.5" water column. The entire piping system, gas meter and regulator must be sized properly to prevent pressure drop greater than 0.5" WC as stated in the National Fuel Gas Code. This information is listed on the rating plate.

It is very important that you are connected to the type of gas as noted on the rating plate: "LP" for liquefied petroleum, propane gas, or "Nat" for natural or city gas. All gas connections must be approved by the local gas supplier or utility, in addition to the governing authority, prior to turning the gas supply on.

Do not remove the adaptor in Figure 26! It is mandatory that this fitting is used for connection to a field fabricated drip leg per the National Fuel Gas Code. You must ensure that the entire gas line to the connection at the water heater is no smaller than ¾".

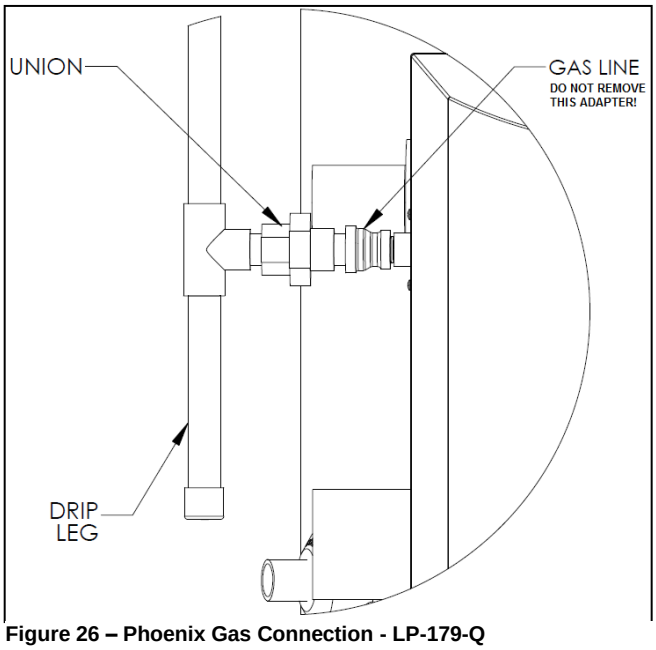
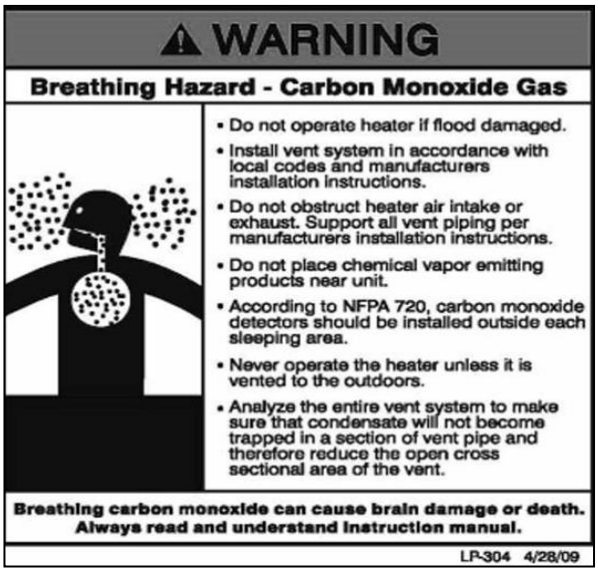


Figure 26 – Phoenix Gas Connection - LP-179-Q

Once all inspections have been performed, the piping must be leak tested. If the leak test requirement is a higher test pressure than the maximum gas inlet pressure, you must isolate the heater from the gas line to continue leak testing. To do this, you must turn off the factory and field-installed gas cocks. This will minimize the possibility of damaging the gas valve. Failure to do so may damage the gas valve. In the event the gas valve is exposed to a pressure greater than ½ PSI, 14" water column, the gas valve must be replaced. Never use an open flame (match, lighter, etc.) to check gas connections.



A. GAS PIPING

Run the gas supply line in accordance with all applicable codes. Locate and install manual shutoff valves in accordance with local and state requirements.

B. GAS TABLE

Refer to the table below to size the supply piping to minimize pressure drop between meter or regulator and unit.

Maximum capacity of pipe in cubic feet of gas per hour for gas pressures of .5 psi or less and a pressure drop of .3 inch water column.

Nominal Iron Pipe Size (In.)	Internal Dia. (In.)	Length of Pipe (Feet)														BTU's Per Hour x 1,000
		10	20	30	40	50	60	70	80	90	100	125	150	175	200	
¾	.824	278	190	152	130	115	105	96	90	84	79	72	64	59	55	
1	1.049	520	350	285	245	215	195	180	170	160	150	130	120	110	100	
1 ¼	1.380	1,050	730	590	500	440	400	370	350	320	305	275	250	225	210	
1 ½	1.610	1,600	1,100	890	760	670	610	560	530	490	460	410	380	350	320	

Table 10 – Source – ANSI Z223.1

It is recommended that a soapy solution be used to detect leaks. Bubbles will appear on the pipe to indicate a leak is present. The gas piping must be sized for proper flow and length of pipe to avoid excessive pressure drop. Both the gas meter and the gas regulator must be properly sized for the total gas load. If you experience a pressure drop greater than 1" WC, the meter, regulator or gas line is undersized or in need of service. You can attach a manometer to the incoming gas drip leg by removing the cap. The gas pressure must remain between 3.5" WC and 14" WC during stand-by (static) mode and while in operating (dynamic) mode at full output.

If an in-line regulator is used, it must be a minimum of 10 feet from the heater. It is very important that the gas line is properly purged by the gas supplier or utility. Failure to properly purge the lines or improper line sizing will result in ignition failure. This problem is especially noticeable in NEW LP installations and also in empty tank situations. This can also occur when a utility company shuts off service to an area to provide maintenance to their lines. The gas valve must not be replaced with a conventional gas valve under any circumstances. As an additional safety feature, the gas valve in this water heater has a flanged connection to the swirl plate and blower.

C. GAS VALVE

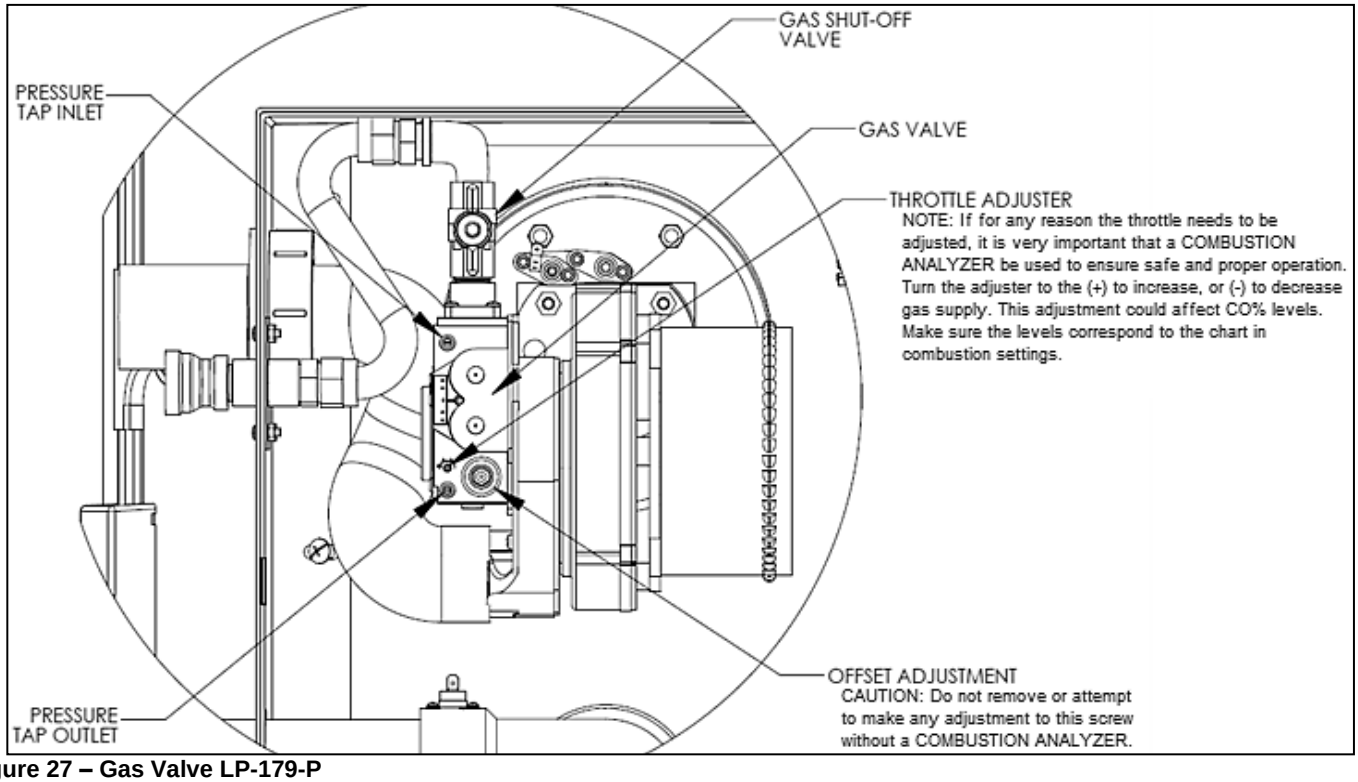


Figure 27 – Gas Valve LP-179-P

⚠ DANGER

Do not do a gas conversion on this water heater without an officially approved conversion kit and instructions supplied by HTP. Failure to use a conversion kit when converting the heater to fire on Natural or LP gas will result in extremely dangerous burner operation, leading to fire, explosion, severe injury or death.

⚠ WARNING

Strain on the gas valve and fittings may result in vibration, premature component failure and gas leakage, and result in fire, explosion, property damage, severe personal injury, or death.

⚠ WARNING

Adjustments to the throttle screw or offset may only be made by a qualified gas technician using a calibrated combustion analyzer capable of measuring CO_2 and CO. Failure to follow this instruction could result in fire, explosion, property damage, severe personal injury, or death.

PART 8 – START-UP PROCEDURE

⚠ WARNING

FOR YOUR OWN SAFETY READ BEFORE OPERATING

1. This water heater does not have pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

2. BEFORE OPERATING: smell all around the water heater area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any water heater.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas suppliers' instructions.
- If you cannot reach your gas supplier, call the fire department.
- Turn off gas shutoff valve (located outside of the water heater) so that the handle is crosswise to the gas pipe. If the handle will not turn by hand, don't try to force or repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

4. Do not use this water heater if any part has been under water. Immediately call a qualified service technician to inspect the water heater and to replace any part of the control system and any gas control that has been damaged.

5. The water heater shall be installed so the gas ignition system components are protected from water (dripping, spraying, rain, etc.) during water heater operation and service (circulator replacement, condensate trap, control replacement, etc.)

Failure to follow these instructions could result in property damage, serious personal injury, or death.

A. OPERATING INSTRUCTIONS

If you smell gas, **STOP**. Follow listed safety instructions above. If you do not smell gas, follow the next steps.

1. Turn on all electric power to water heater. Make sure tank is full with cold water and purge all piping. To assure adequate purging, open all hot water faucets.

⚠ WARNING

Ensure the water heater is full of water before firing the burner. Failure to do so will damage the heater. Such damage IS NOT covered by warranty, and could result in property damage, serious personal injury, or death.

2. Adjust the temperature set point of the heater to the desired level. The factory default setting is 119°F. If changes are necessary, follow “Overall Water Heater and Control Operation” in this section.

3. If the water heater fails to start, refer to the Troubleshooting section in the back of this manual.

B. OVERALL WATER HEATER AND CONTROL OPERATION

To adjust the temperature of stored water, press and hold {S3} for 2 seconds. The first item is: DU: Water Temperature Set Point – factory set at 119°F. Adjust down by pressing {S1} to a temperature as low as 95°F. Adjust up as high as 160°F by pressing the {S2}. Press {S3} again to display DH, the differential which is factory set at 7°F and adjustable down to 1°F by pressing {S1} and up to 18°F by pressing {S2}. Note: Due to the highly advanced control on this water heater, which compensates for varying inlet water temperature, the actual differential temperature may vary slightly from your setting. Press {S3} again to display the factory default temperature measurement in Fahrenheit. Change the default to Celsius by pressing {S1}. When finished, press {S3} one final time to place unit back into operation. The control automatically re-starts if no key is pressed for 2 minutes.

C. STATUS MENU

Installers are also able to check the current status of the heater parameters by pressing {S4} for 3 seconds. Once activated, the display will show |d1| alternating value of the actual upper supply tank temperature. Actual values are displayed for each function. To view the next value, simply press {S/4} to go to the next displayed value. Listed below are the values which can be displayed. These values cannot be changed. To exit this menu, press {S3} to resume normal operation.

Function Value
|d1| — Actual temperature from upper tank sensor

|d2| — Actual temperature from lower sensor

|d3| — |0| (Not used)

|d4| — |308| (Not used)

|d5| — Outdoor sensor

|d6| — Actual fan speed multiplied by 10 (Example: If fan speed displayed is |410| RPM x 10 = 4100 actual fan speed)

|d7| — Actual ionization current read from flame rectification probe

|d8| — |0| (Not used)

|d9| — |1| (Not used)

|d10| — Actual status of bus communication |co| = connected, |nc| = not connected

|d11| — |32| (Not used)

|d12| — Power on hours in thousands (display will not read until 100 hrs.)

|d13| — Total water heating hours in thousands (display will not read until 100 hrs.)

|d14| — |0| (Not used)

|d15| — Passed ignition attempts in thousands

D. OUTDOOR RESET

This unit is supplied with outdoor reset wire connection terminals. **When an outdoor sensor (p/n 7250P-319) is connected, operation of the unit immediately changes.** Refer to the following steps to properly set up the unit with an outdoor sensor.

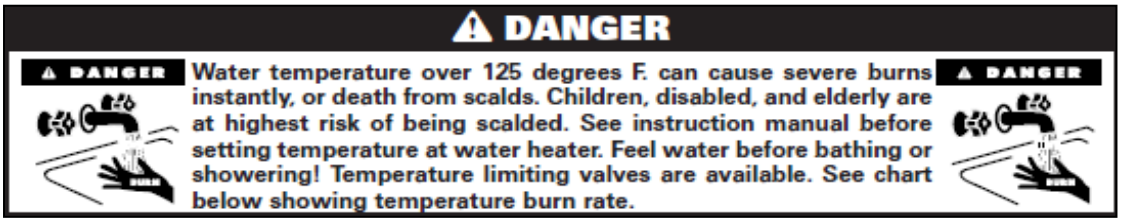
⚠ DANGER

An ASSE 1017 thermostatic mixing valve MUST be installed when using outdoor reset. Failure to do so could result in substantial property damage, serious injury, or death.

1. Connect the outdoor sensor to the terminals marked “outdoor”.

2. Press and hold {S3}. You will see a flashing du and a temperature value. Set du to the maximum desired tank temperature (default 119°F). After you set the temperature; press {S3} until you exit the menu.

3. Setting the outdoor reset curve (change only the functions in the descriptions below):
   a. Press and hold {S3} and {S4} together for 5 seconds
   b. Use {S1} and {S2} to adjust flashing |000| to code |975|. Press {S3} until you enter the menu.
   c. Use {S3} to scroll to Function 8 to adjust minimum outdoor temperature. Use {S1} and {S2} to adjust temperature to desired setting (Range: -49°F – 32°F / Default 5°F).
   d. Use {S3} to scroll to Function 9 to adjust maximum supply temperature. Use {S1} and {S2} to adjust temperature to desired setting (Range: 77°F – 160°F / Default 119°F). It is recommended that the du setting matches Function 9.
   e. Use {S3} to scroll to Function 10 to adjust maximum outdoor temperature. Use {S1} and {S2} to adjust temperature to desired setting (Range: 32°F – 95°F / Default 68°F).
   f. Use {S3} to scroll to Function 11 to adjust maximum supply temperature. From the water heater, use {S1} and {S2} to adjust temperature to desired setting. It is recommended that this temperature is set to the maximum desired DHW temperature (Range: 32°F – 160°F / Default 159°F).
   g. Use {S3} to scroll to Function 12 to adjust desired DHW temperature (minimum tank temperature). Use {S1} and {S2} to adjust temperature to desired setting (Range: 32°F – 160°F / Default 95°F).
   h. Press and hold {S4} to exit the menu



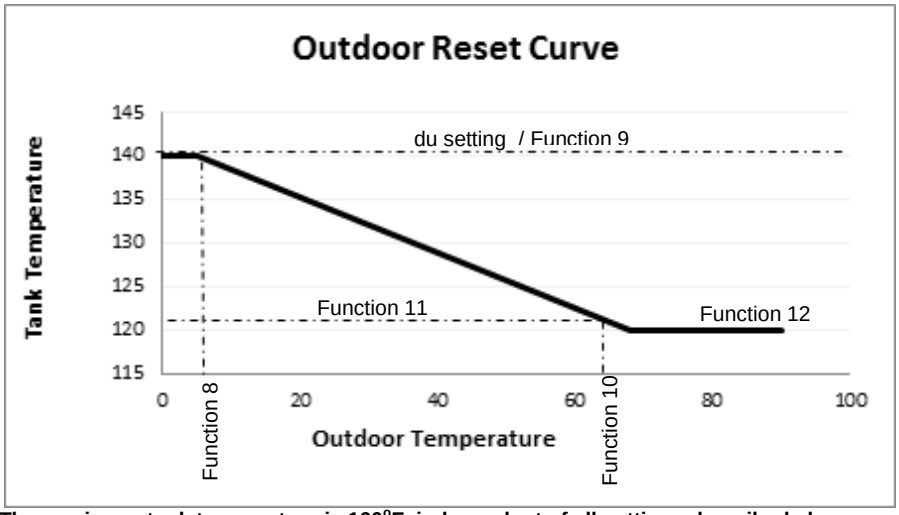


Figure 28 - NOTE: The maximum tank temperature is 160°F, independent of all settings described above.

E. TEST MODE

This function is intended to simplify the gas valve adjustment if needed. Listed below are the recommended limits on each heater and the combustion settings. Automatic modulation does not take place when the controller is in Test mode, only temperature limitation based on the heater set point. The user will be allowed to increase or decrease the fan speed by pressing in either the {S1} or {S2} keys.

To activate the Test Mode simply press the {S2} and {S3} key together for 1 second. Once activated, you will see in the display {Ser} and the actual fan speed. The measurement of the combustion levels should always be taken at the highest and lowest fan speed. When in Test Mode, the heater's limit will shut down the burner if temperature limit is exceeded. It is recommended to draw water out of the tank to lower temperature so tests can be performed.

After 10 minutes, Test Mode stops automatically. To exit Test Mode manually, press {S1} and {S2} key together for 1 second.

COMBUSTION SETTINGS ON ALL MODELS						
	Natural Gas			Propane LP		
Fan Speed	Low	Ignition	High	Low	Ignition	High
Carbon Monoxide PPM	1 – 10	2 - 15	2 – 20	1 – 10	2 - 15	2 – 20
Carbon Dioxide (CO_2)	8 - 10%	8 – 10%	8 - 10%	8 ½ - 10 ½%	8 ½ - 10 ½%	9 - 11%

Table 11

FAN SPEEDS			
BTU	**IGNITION**	**MIN**	**MAX**
100,000	3000	2000	5700
130,000	3000	2000	7300
160,000	3000	2000	7450
199,000	3000	2000	9100

Table 12

F. MAINTENANCE

The control system requires no periodic maintenance under normal conditions. However, in unusually dirty or dusty conditions, periodic vacuuming of the cover to maintain visibility of the display and indicators is recommended. In dirty environments, such as construction sites, care must be taken to keep the water heater burner cover in place and drywall or saw dust away from water heater.

⚠ CAUTION

In unusually dirty or dusty conditions, care must be taken to keep water heater burner door in place. **Failure to do so VOIDS WARRANTY!**

⚠ WARNING

Allowing the heater to operate with a dirty combustion chamber will hurt operation. Failure to clean the heat exchanger as needed by the installation location could result in heater failure, property damage, personal injury, or death. Such product failures ARE NOT covered under warranty.

PART 9 – SHUTDOWN

A. SHUTDOWN PROCEDURE

If the burner is not operating, disconnect the electrical supply.

If the burner is operating, lower the set point value to 70°F and wait for the burner to shut off. Continue to wait for the combustion blower to stop, so all latent combustion gases are purged from the system. This should take a maximum of 40 to 90 seconds.

B. VACATION PROCEDURE

If there is danger of freezing, change the set point to 70°F. DO NOT turn off electrical power. If there is no danger of freezing, follow "Shutdown Procedure".

C. FAILURE TO OPERATE

Should the burner fail to light, the control will perform two more ignition trials prior to entering a lockout state. Note that each subsequent ignition trial will not occur immediately. After a failed ignition trial, the blower must run for approximately 10 seconds to purge the system. Therefore, a time period of approximately 40 to 90 seconds will expire between each ignition trial.

If the burner lights during any one of these three ignition trails, normal operation will resume. If the burner lights, but goes off in about 4 seconds, check the polarity of the wiring. See electrical connection section.

If the burner does not light after the third ignition trial, the control will enter a lockout state. This lockout state indicates that a problem exists with the water heater, the controls, or the gas supply. Under such circumstances, a qualified service technician should be contacted immediately to properly service the water heater and correct the problem. If a technician is not available, depressing the {S4} button once will remove the lockout state so additional trials for ignition can be performed. The unit will try to re-light once every 6 minutes.

RESISTANCE TABLE FOR SUPPLY TEMPERATURE SENSOR	
HIGH/LOW TEMP. SENSOR TEMP. (°F)	RESISTANCE (ohms)
32	32550
41	25340
50	19870
59	15700
68	12490
77	10000
86	8059
95	6535
104	5330
113	4372
122	3605
131	2989
140	2490
149	2084
158	1753
167	1481
176	1256
185	1070
194	915
202	786
212	667

Table 13

PART 10 – TROUBLESHOOTING

A. ERROR CODE

An error code may occur during installation of the heater. This condition may lead to a lock out condition of the controller, which will need to be manually reset by pressing the {S4} button. These following will help the installer correct the problem before going into a lock out condition, which will require a manual reset.

B. HEATER ERROR

1. When an error condition occurs the controller will display an error code on the display module.

2. These error codes and several suggested corrective actions are included in Table 14.

3. In the case of |E00|, |E13|, and |E14| this error, if uncorrected, will go into a fault condition as described in Paragraph C.

C. LOCKOUT

1. When a fault condition occurs the controller will illuminate the red "fault" indication light and display a fault code in the format (Example: |F00|) on the display module.

2. Note the fault code and refer to Table 15 for an explanation of the fault code along with several suggestions for corrective actions.

3. Press the reset key to clear the fault and resume operation. Be sure to observe the operation of the unit to prevent a recurrence of the fault.

⚠ WARNING

When servicing or replacing any components of this water heater be certain that:

- The gas is off.
- All electrical power is disconnected.

⚠ DANGER

When servicing or replacing components that are in direct contact with heater water, be certain that:

- There is no pressure in the heater. Pull the release on the relief valve to relieve pressure in the heater.
- Heater water is not hot.
- The electrical power is off.

⚠ WARNING

DO NOT USE THIS WATER HEATER IF ANY PART HAS BEEN SUBMERGED IN WATER. Immediately call a qualified service technician. The water heater MUST BE replaced if it has been submerged. Attempting to operate an water heater that has been submerged could create numerous harmful conditions, such as a potential gas leakage causing a fire and/or explosion, or the release of mold, bacteria, or other harmful particulates into the air. Operating a previously submerged water heater could result in property damage, severe personal injury, or death.

NOTE: Water heater damage due to flood or submersion is considered an Act of God, and IS NOT covered under product warranty.

⚠ CAUTION

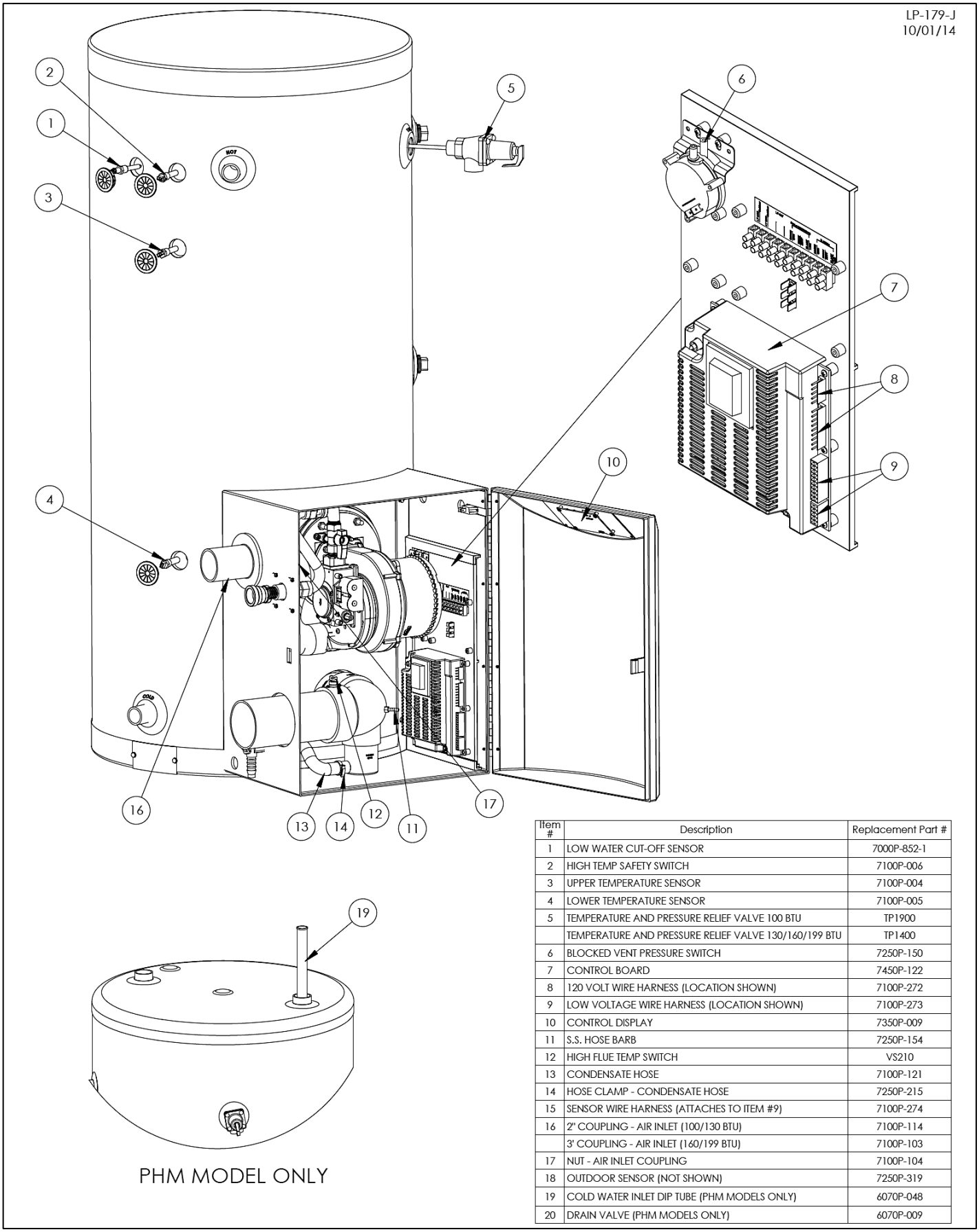
The water heater has wire function labels on all internal wiring. Observe the position of each wire before removing it. Wiring errors may cause improper and dangerous operation. Verify proper operation after servicing.

926 CONTROL BOARD ERROR CODES			
CODE	**DESCRIPTION**	**DURATION**	**CORRECTIVE ACTION**
E13	Heater combustion air fan speed less than 70% of expected.	60 Sec.	1. Check the combustion air fan wiring. 2. Replace the combustion air fan. 3. Replace the control board.
E14	Heater combustion air fan speed is more than 130% of expected.	60 Sec.	1. Check the combustion air fan wiring. 2. Replace the combustion air fan. 3. Replace the control board.
LEO	Water Level in Tank is Low	Until Corrected	1. Be sure all air is bled from system. 2. Inspect low level switch and wiring for damage and repair if necessary.
FLU	Blocked Vent, Pressure Switch open, Condensate cup Full, Condensate Cup not present	Until Corrected	1. Check the flue vent to be sure it is not blocked or damaged. 2. Check the blocked vent pressure switch operation by applying a jumper. (If the switch is not functioning properly, replace it.
LOU	24 Volt Low	Until Corrected	1. Check line voltage. Must be between 100 – 128 volts. 2. If available, connect a PC and, using HTP service software, check the 24v supply display in the lower left corner of the screen. The number displayed must be greater than 128 and should be greater than 250. Use this as a troubleshooting guide as you follow the steps below. 3. Remove 10 pin Molex connector from customer connection board. If LOU clears, the problem is with external sensor wiring. Examine external sensor wiring for shorts to ground, repairing as necessary. If LOU code is still present and the heater is so equipped, disconnect high gas pressure switch, then low gas pressure switch, then UL 353 low water cutoff in this order, one at a time, to see if LOU code clears. Replace faulty part. Check low voltage wire harness in heater for shorts to ground. 4. If LOU only occurs when burner tries to light, check gas valve for excessive current draw. 5. If LOU is present with the low voltage harness disconnected from the 926 control board, replace the 926 control board.

Table 14 – Control Board Error Codes

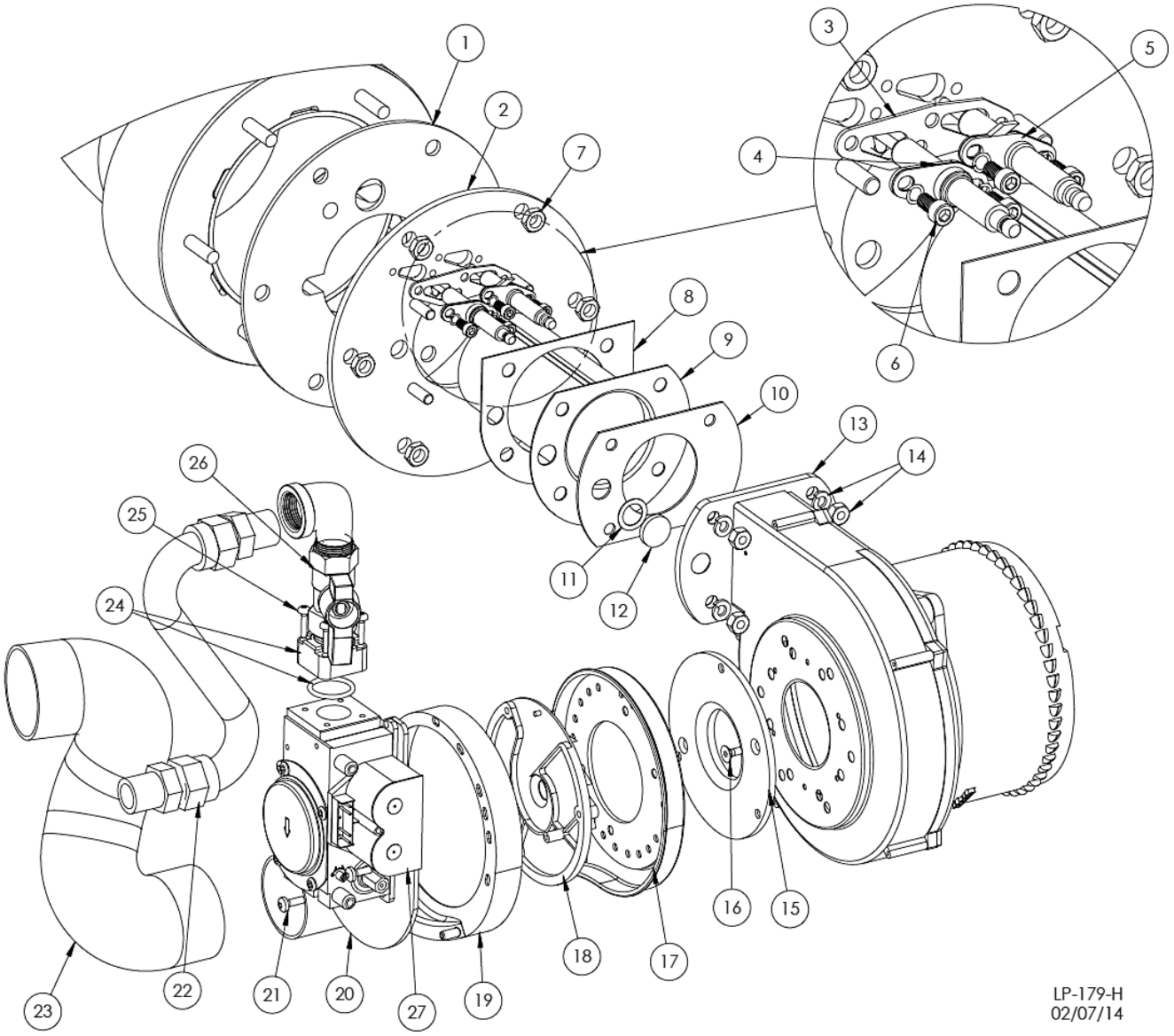
926 CONTROL BOARD FAULT		
CODE	**DESCRIPTION**	**REMEDY**
F00	High temperature switch limit exceeded 194°F.	1. Try reset. If F00 repeats, create a demand for hot water. **(DANGER: Use caution to prevent burn injury.)** If water is above 194°F, test upper and lower temperature sensor with an ohmmeter. (Refer to resistance chart, this section.) Replace bad sensor. If water is below 194°F, test high temperature switch and wiring with ohmmeter. Switch should be closed at this point. If not, replace switch. 2. If unit did reset successfully, let the heater run and go into the status menu to check the upper and lower temperature sensor. If either reading displayed does not make sense, check appropriate sensor with ohmmeter. (Refer to resistance chart, this section.) Replace bad sensor. Do an OHMs reading on both sensors to check continuity.
F01	Vent temperature limit exceeded.	1. Inspect all flue piping. If the flue is damaged or shows signs of overheating, repair or replace the flue parts as necessary before proceeding. 2. If the flue piping system is intact, not damaged and there is no sign of the flue overheating (such as discoloration or melting), push the red reset button on the flue switch 3. Be sure the heater is connected to a water supply and full of water. 4. Push the RESET button on the heater control panel. The water heater should light. If the water heater lights, proceed to step 5. If the water heater does not light and the display again begins to flash F01, inspect the wiring to the flue switch, repairing or replacing as necessary. If the wiring is intact, replace the flue switch, using care to mount the new flue switch in the same position and mounting holes as the old one. If the display flashes a code other than F01, follow the troubleshooting guide for that code. 5. Observe operation for 5 minutes. Place the probe of an exhaust analyzer into the flue system within 6 feet of the heater. The exhaust temperature should not rise above 190°F after several minutes of operation. 6. If the flue temperature is below 190°F and the heater again goes into lockout displaying F01, replace the flue switch, using care to mount the new flue switch in the same position and mounting holes as the old one. If the display flashes a code other than F01, follow the troubleshooting guide for that code. 7. If the flue temperature increases to over 190°F, consult HTP for further assistance.
F02	Interrupted or shorted upper temperature sensor.	1. Check the electrical connection to the appropriate temperature sensor. 2. If connection is okay, replace bad sensor.
F03	Interrupted or shorted lower temperature sensor.	
F05	Upper temperature sensor exceeds 194°F.	1. If water in tank is not greater than 194°F, check wiring. Repair if faulty. 2. If wiring is okay, check appropriate sensor with ohmmeter and compare to reading in resistance chart above. If reading does not agree with water temperature, replace bad sensor.
F06	Lower temperature sensor exceeds 194°F.	
F09	No flame detected – Heater will make three attempts at ignition before the control goes into this lockout condition. Will reset in 1 hour.	1. Watch the igniter through the observation window provided. 2. If there is no spark, check the spark electrode for the proper ¼" gap. 3. Remove any corrosion from the spark electrode and flame rectifier probe. 4. If there is a spark but no flame, check the gas supply to the heater. 5. If there is a flame, check the flame sensor. 6. Check any flue blockage or condensate blocks.
F10	Loss of flame signal – The heater will relight 4 times before the control goes into this lockout condition. Will reset in 1 hour.	1. Monitor the gas pressure to the unit while in operation. 2. Assure that the flame is stable when lit. 3. Check to see if the green light on the display module is out while the heater is running. 4. If the green light doesn't come on or goes off during operation check the flame signal on the status menu. 5. If the signal reads less than 1 microampere, clean the flame rectifier probe. 6. If the flame rectifier probe continues to read low, replace it.
F11	False flame signal – The heater will lock out if it senses a flame signal when there should be none present.	1. Turn the gas off to the unit at the service valve. 2. If the flame signal is still present replace the igniter. 3. If the flame signal is not present after turning off the gas supply, check the gas valve electrical connection. 4. If there is no power to the gas valve, remove the valve and check for obstruction in the valve seat or replace the gas valve. 5. Turn the gas on at the service valve after corrective action is taken.
F13	Combustion fan speed incorrect – The heater will lock out if it senses that the fan speed is less than 70% of expected rate for more than 60 seconds.	1. Check the combustion air fan wiring. 2. Replace the combustion air fan. 3. Replace the control board.

Table 15 - NOTE: If you replace a part to remedy a fault, it is recommended that you cycle the unit at least three or four times to assure the fault has been resolved.



Item #	Description	Replacement Part #
1	LOW WATER CUT-OFF SENSOR	7000P-852-1
2	HIGH TEMP SAFETY SWITCH	7100P-006
3	UPPER TEMPERATURE SENSOR	7100P-004
4	LOWER TEMPERATURE SENSOR	7100P-005
5	TEMPERATURE AND PRESSURE RELIEF VALVE 100 BTU	TP1900
	TEMPERATURE AND PRESSURE RELIEF VALVE 130/160/199 BTU	TP1400
6	BLOCKED VENT PRESSURE SWITCH	7250P-150
7	CONTROL BOARD	7450P-122
8	120 VOLT WIRE HARNESS (LOCATION SHOWN)	7100P-272
9	LOW VOLTAGE WIRE HARNESS (LOCATION SHOWN)	7100P-273
10	CONTROL DISPLAY	7350P-009
11	S.S. HOSE BARB	7250P-154
12	HIGH FLUE TEMP SWITCH	VS210
13	CONDENSATE HOSE	7100P-121
14	HOSE CLAMP - CONDENSATE HOSE	7250P-215
15	SENSOR WIRE HARNESS (ATTACHES TO ITEM #9)	7100P-274
16	2" COUPLING - AIR INLET (100/130 BTU)	7100P-114
	3' COUPLING - AIR INLET (160/199 BTU)	7100P-103
17	NUT - AIR INLET COUPLING	7100P-104
18	OUTDOOR SENSOR (NOT SHOWN)	7250P-319
19	COLD WATER INLET DIP TUBE (PHM MODELS ONLY)	6070P-048
20	DRAIN VALVE (PHM MODELS ONLY)	6070P-009

Figure 29 – Replacement Parts



Item #	Description	Replacement Part #
1	GASKET - MOUNTING PLATE	7100P-139
2	MOUNTING PLATE	7100P-007
3	GASKET - PROBES	7100P-155
4	FLAME RECTIFICATION PROBE (w/GASKET)	7100P-082
5	IGNITOR ELECTRODE (w/GASKET)	7100P-124
6	10-32 X 3/8 SCREWS/#10 LOCK WASHERS	N/A
7	NUTS - 5/16-18	N/A
8	GASKET - BURNER MOUNTING FLANGE	7100P-152
9	BURNER - 100-130K BTU	7100P-316
	BURNER - 160-199K BTU	7100P-317
10	GASKET - BURNER OUTLET	7000P-361
11	GASKET - SIGHT GLASS	7100P-105
12	SIGHT GLASS	G2000
13	COMBUSTION BLOWER (w/GASKET, SIGHT GLASS)	7100P-015
	COMBUSTION BLOWER (w/GASKET, SIGHT GLASS)199K BTU ONLY	7100P-350
14	1/4-20 BRASS NUTS/1/4 LOCK WASHERS	7100P-268

Item #	Description	Replacement Part #
15	ADAPTER PLATE	7250P-644
16	FLAT HEAD SCREW - ADAPTER PLATE	7100P-045
17	AIR INTAKE ADAPTER - BLOWER SIDE	7500P-185
18	SWIRL PLATE - BLACK (100/130 BTU)	7100P-042
	SWIRL PLATE - WHITE (160/199 BTU)	7500P-092
19	AIR INTAKE ADAPTER - VALVE SIDE	7500P-184
20	GAS VALVE (100/130 BTU)	7000P-862
	GAS VALVE (160/199 BTU)	7000P-863
21	SCREWS - GAS VALVE	7100P-046
22	1/2" FLARE X 1/2" NPT FLEX HOSE	7100P-140
23	TUBE - AIR INLET	7500P-189
24	GAS VALVE ADAPTER (w/O-RING)	7250P-454
25	SCREWS - M4 X 20MM GAS VALVE ADAPTER	7250P-717
26	GAS SHUT-OFF VALVE	7250P-140
27	24VAC GAS VALVE COIL ONLY - GREY	7350P-624

Figure 30 – LP-179-H

PART 11 - MAINTENANCE

CAUTION

In unusually dirty or dusty conditions, care must be taken to keep water heater cabinet door in place at all times. Failure to do so VOIDS WARRANTY!

⚠ WARNING

Allowing the water heater to operate with a dirty combustion chamber will hurt operation. Failure to clean the heat exchanger as needed by the installation location could result in water heater failure, property damage, personal injury, or death. Such product failures ARE NOT covered under warranty.

The water heater requires minimal periodic maintenance under normal conditions. However, in unusually dirty or dusty conditions, periodic vacuuming of the cover to maintain visibility of the display and indicators is recommended.

Periodic maintenance should be performed once a year by a qualified service technician to assure that all the equipment is operating safely and efficiently. The owner should make necessary arrangements with a qualified heating contractor for periodic maintenance of the heater. Installer must also inform the owner that the lack of proper care and maintenance of the heater may result in a hazardous condition.

INSPECTION ACTIVITIES		DATE LAST COMPLETED			
PIPING		1st YEAR	2nd YEAR	3rd YEAR	4th YEAR*
Near heater piping	Check heater and system piping for any sign of leakage; make sure they are properly supported.				
Vent	Check condition of all vent pipes and joints. Ensure the vent piping terminations are free of obstructions and blockages.				
Gas	Check Gas piping, test for leaks and signs of aging. Make sure all pipes are properly supported.				
SYSTEM					
Visual	Do a full visual inspection of all system components.				
Functional	Test all functions of the system (Heat, Safeties)				
Temperatures	Verify safe settings on heater or Anti-Scald Valve				
Temperatures	Verify programmed temperature settings				
ELECTRICAL					
Connections	Check wire connections. Make sure they are tight.				
Smoke and CO detector	Verify devices are installed and working properly. Change batteries if necessary.				
Circuit Breakers	Check to see that the circuit breaker is clearly labeled. Exercise circuit breaker.				
CHAMBER/BURNER					
Combustion Chamber	Check burner tube and combustion chamber coils. Clean according to maintenance section of manual. Vacuum combustion chamber. Replace any gaskets that show signs of damage.				
Spark Electrode	Clean. Set gap at ¼".				
Flame Probe	Clean. Check ionization in uA (d7 on status menu in Start-up Procedures). Record high fire and low fire.				
CONDENSATE					
Neutralizer	Check condensate neutralizer. Replace if necessary.				
Condensate hose	Disconnect condensate hose. Clean out dirt. Fill with water to level of outlet and re-install. (NOTE: Verify the flow of condensate, making sure that the hose is properly connected during final inspection.)				
GAS					
Pressure	Measure incoming gas pressure (3.5" to 10" W.C. for Natural Gas, 8" – 14" W.C for LP)				
Pressure Drop	Measure drop in pressure on light off (no more than 1" W.C.)				
Check gas pipe for leaks	Check piping for leaks. Verify that all are properly supported.				
COMBUSTION					
CO/CO2 Levels	Check CO and CO2 levels in Exhaust (See Start-up Procedures for ranges). Record at high and low fire.				
SAFETIES					
ECO (Energy Cut Out)	Check continuity on Flue and Water ECO. Replace if corroded.				
Upper/Lower Sensors	Check wiring. Verify through ohms reading.				
FINAL INSPECTION					
Check list	Verify that you have completed entire check list. WARNING: FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.				
Homeowner	Review what you have done with the homeowner.				

Table 16 - *Continue annual maintenance beyond the 4th year as required.

ADDITIONAL INSTALLATION REQUIREMENTS FOR THE COMMONWEALTH OF MASSACHUSETTS

In the Commonwealth of Massachusetts, the installer or service agent shall be a plumber or gas fitter licensed by the Commonwealth.

When installed in the Commonwealth of Massachusetts or where applicable state codes may apply; the unit shall be installed with a CO detector per the requirements listed below.

5.08: Modifications to NFPA-54, Chapter 10

(1) Revise NFPA-54 section 10.5.4.2 by adding a second exception as follows:

Existing chimneys shall be permitted to have their use continued when a gas conversion burner is installed, and shall be equipped with a manually reset device that will automatically shut off the gas to the burner in the event of a sustained back-draft.

(2) Revise 10.8.3 by adding the following additional requirements:

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

1. INSTALLATION OF CARBON MONOXIDE DETECTORS. At the time of installation of the side wall horizontal vented gas fueled equipment, the installing plumber or gasfitter shall observe that a hard wired carbon monoxide detector with an alarm and battery back-up is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the service of qualified licensed professionals for the installation of hard wired carbon monoxide detectors

a. In the event that the side wall horizontally vented gas fueled equipment is installed in a crawl space or an attic, the hard wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.

b. In the event that the requirements of this subdivision cannot be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

2. APPROVED CARBON MONOXIDE DETECTORS. Each carbon monoxide detector as required in accordance with the above provisions shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.

3. SIGNAGE. A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment. The sign shall read, in print size no less than one-half (1/2) inch in size, "GAS VENT DIRECTLY BELOW, KEEP CLEAR OF ALL OBSTRUCTIONS".

4. INSPECTION. The state or local gas inspector of the side wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08 (2)(a) 1 through 4.

(b) EXEMPTIONS: the following equipment is exempt from 248 CMR 5.08 (2)(a) 1 through 4:

1. The equipment listed in Chapter 10 entitled "Equipment Not Required to be Vented" in the most current edition of NFPA 54 as adopted by the Board; and

2. Product Approved side wall horizontally vented gas fueled equipment installed in a room or structure separate from the dwelling, building or structure used in whole or in part for residential purposes.

(c) MANUFACTURER REQUIREMENTS – GAS EQUIPMENT VENTING SYSTEM PROVIDED. When the manufacturer of Product Approved side wall horizontally vented gas equipment provides a venting system design or venting system components with the equipment, the instructions provided by the manufacturer for installation of the equipment and the venting system shall include:

1. Detailed instructions for the installation of the venting system design or the venting system components; and

2. A complete parts list for the venting system design or venting system.

(d) MANUFACTURER REQUIREMENTS – GAS EQUIPMENT VENTING SYSTEM NOT PROVIDED. When the manufacturer of a Product Approved side wall horizontally vented gas fueled equipment does not provide the parts for venting the flue gases, but identifies "special venting systems", the following requirements shall be satisfied by the manufacturer:

1. The referenced "special venting system" instructions shall be included with the appliance or equipment installation instructions; and

2. The "special venting systems" shall be Product Approved by the Board, and the instructions for that system shall include a parts list and detailed installation instructions.

(e) A copy of all installation instructions for all Product Approval side wall horizontally vented gas fueled equipment, all venting instructions, all parts lists for venting instructions, and/or all venting design instructions shall remain with the appliance or equipment at the completion of the installation.

MAINTENANCE NOTES

HTP CUSTOMER INSTALLATION RECORD FORM

The following form should be completed by the installer for you to keep as a record of the installation in case of a warranty claim. After reading the important notes at the bottom of the page, please also sign this document.

Customer's Name:	
Installation Address:	
Date of Installation:	
Installer's Code/Name:	
Product Serial Number(s):	
Comments:	
Installer's Phone Number:	
Signed by Installer:	
Signed by Customer:	

IMPORTANT:

Customer: Please only sign after the installer has reviewed the installation, safety, proper operation and maintenance of the system. In the case that the system has any problems, please call the installer. If you are unable to make contact, please contact your HTP Sales Representative.

Distributor/Dealer: Please insert contact details.

Advanced Heating and Hot Water Systems

P.O. Box 429 · 120 Braley Road · East Freetown, MA 02717 · 508-763-8071· Fax: 508-763-3769

Phoenix® Gas Water Heater and Solar Gas Water Heater

Limited Warranty for Residential and Commercial Use

HTP warrants each Phoenix® water heater and its parts to be free from defects in materials and workmanship according to the following terms, conditions, and time periods. The replacement water heater will be warranted for the unexpired portion of the applicable warranty period of the original water heater. Replacement parts will be warranted for 90 days. **UNLESS OTHERWISE NOTED THESE WARRANTIES COMMENCE ON THE DATE OF INSTALLATION.** This limited warranty is only available to the **original owner** of this water heater, and is non-transferable.

Residential Use Warranty (One (1) year – Parts, Seven (7) years – Tank)

"Residential" setting shall mean water heater usage in a single family dwelling, or usage in a multiple family dwelling, provided that the water heater services only one (1) dwelling in which the original consumer purchaser resides on a **permanent basis and operating temperatures do not exceed 140°F.**

Commercial Use Warranty (One (1) year – Parts, Three (3) years – Tank)

Water heaters used in a commercial setting shall mean any usage not falling within the definition of a "residential" setting.

COVERAGE

A. Should a defect or malfunction result in a leakage of water within the above-stated warranty periods due to defective material or workmanship, malfunction, or failure to comply with the above warranty, HTP will replace the defective or malfunctioning water heater with a replacement of the nearest comparable model available at the time of replacement.
B. If HTP is unable to repair or replace the water heater so as to conform to this warranty after a reasonable number of attempts, HTP will then provide, at its option, a replacement unit. These remedies are the purchaser's exclusive remedies for breach of warranty.
C. If government regulations, industry certification, or similar standards require the replacement water heater or part(s) to have features not found in the defective water heater or part(s), you will be charged the difference in price represented by those required features. If you pay the price difference for those required features and/or to upgrade the size and/or other features available on a new replacement water heater or part(s), you will also receive a complete new limited warranty for that replacement water heater or part(s).
D. If at the time of a request for service the purchaser cannot provide a copy of the original sales receipt or the warranty card registration, the warranty period for the water heater shall then be deemed to have commenced thirty (30) days after the date of manufacture of the water heater and **NOT** the date of installation of the water heater.
E. This warranty extends only to Phoenix® Gas Water Heaters or Solar Gas Water Heaters utilized in heating applications that have been properly installed by qualified professionals based upon the manufacturer's installation instructions.

OWNER RESPONSIBILITIES

To avoid the exclusion list in this warranty, the owner or installer must:
1. Maintain the water heater in accordance with the maintenance procedure listed in the manufacturer's provided instructions. Preventive maintenance can help avoid any unnecessary breakdown of your water heater and keep it running at optimum efficiency.
2. Maintain all related heating components in good operating condition.
3. Check all condensate lines to confirm that all condensate drains properly from the water heater.
4. Use the water heater in an open system, or in a closed system with a properly sized and installed thermal expansion tank.
5. Use the water heater at water pressures not exceeding the working pressure shown on the rating plate.

WARRANTY EXCLUSIONS

This limited warranty will not cover:
1. Any water heater purchased from an unauthorized dealer or online retailer.
2. Any water heater not installed by a qualified heating installer/service technician.
3. Service trips to teach you how to install, use, maintain, or to bring the water heater installation into compliance with local building codes and regulations.
4. Failure to locate the water heater in an area where leakage of the tank or water line connections and the combination temperature and relief valve will not result in damage to the area adjacent to the water heater or lower floors of the structure.
5. Any failed components of the heat system not manufactured by HTP as part of the water heater.
6. Water heaters repaired or altered without the prior written approval of HTP.
7. Damages, malfunctions, or failures resulting from failure to install the water heater in accordance with applicable building codes/ordinances or good plumbing and electrical trade practices.
8. Damages, malfunctions, or failures resulting from improper installation, failure to operate the water heater at pressures not exceeding the working pressure shown on the rating plate, or failure to operate and maintain the water heater in accordance with the manufacturer's provided instructions.
9. Failure to operate the water heater in an open system, or in a closed system with a properly sized and installed thermal expansion tank.

10. Failure or performance problems caused by improper sizing of the water heater, expansion device, piping, or the gas supply line, the venting connection, combustion air openings, electric service voltage, wiring or fusing.
11. Damages, malfunctions, or failures caused by improper conversion from natural gas to LP gas or LP gas to natural gas.
12. Damages, malfunctions, or failures caused by operating the water heater with modified, altered, or unapproved parts.
13. Damages, malfunctions, or failures caused by abuse, accident, fire, flood, freeze, lightning, acts of God and the like.
14. Tank failures (leaks) caused by operating the water heater in a corrosive or contaminated atmosphere.
15. Damages, malfunctions, or failures caused by operating the water heater with an empty or partially empty tank ("dry firing"), or failures caused by operating the water heater when it is not supplied with potable water, free to circulate at all times.
16. Failure of the heater due to the accumulation of solid materials and lime deposits.
17. Any damage or failure resulting from improper water chemistry. WATER CHEMISTRY REQUIREMENTS – Sodium less than 20mGL. Water pH between 6.0 and 8.0. Hardness less than 7 grains. Chlorine concentration less than 100 ppm.
18. Any damages, malfunctions, or failures resulting from the use of dielectric unions.
19. Components of the water heater that are not defective, but must be replaced during the warranty period as a result of reasonable wear and tear.
20. Damages, malfunctions, or failures caused by subjecting the tank to pressures or firing rates greater than those shown on the rating label.
21. Damages, malfunctions, or failures resulting from the use of any attachment(s) not supplied by HTP.
22. Water heaters installed outside the fifty states (and the District of Columbia) of the United States of America and Canada.
23. Water heaters moved from the original installation location.
24. Water heaters that have had their rating labels removed.

PROCEDURES FOR WARRANTY SERVICE REQUESTS

Any claim for warranty assistance must be made promptly. Determine if the water heater is "in-warranty" (that is, within the applicable warranty period) by reviewing a copy of the original sales receipt. You must present a copy of the original sales receipt for a warranty service request.
If your water heater is "in-warranty", contact the retailer from whom the water heater was purchased (or the installer) for assistance. Be prepared to provide the retailer or installer with a copy of your original receipt, complete model and serial numbers, and the date of installation of your water heater, in addition to explanation of your water heater problem.
Warranty coverage is subject to validation of "in-warranty" coverage by HTP claims department personnel. All alleged defective or malfunctioning parts must be returned to HTP via the **local distribution channels** where original purchase was made. **NOTE: Any parts or heaters returned to HTP for warranty analysis will become the property of HTP and will not be returned, even if credit is denied.** If all warranty conditions are satisfied, HTP will provide replacement parts to the retailer.
If you have questions about the coverage of this warranty, please contact HTP at the address or phone number stated below:

HTP P.O. Box 429 120 Braley Road East Freetown, MA. 02717 Attention: Warranty Service Department
1(800) 323-9651

SERVICE, LABOR AND SHIPPING COSTS

This limited warranty does not extend to any shipping charges, delivery expenses, or administrative fees incurred by the purchaser in repairing or replacing the water heater or part(s). This warranty does not extend to labor costs beyond the coverage specified in this warranty document. All such expenses are your responsibility.

LIMITATIONS OF YOUR HTP WARRANTY AND REMEDIES

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND ARE GIVEN AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ANY OBLIGATION, LIABILITY, RIGHT, CLAIM OR REMEDY IN CONTRACT OR TORT, WHETHER OR NOT ARISING FROM HTP'S NEGLIGENCE, ACTUAL OR IMPUTED. THE REMEDIES OF THE PURCHASER SHALL BE LIMITED TO THOSE PROVIDED HEREIN TO THE EXCLUSION OF ANY OTHER REMEDIES INCLUDING WITHOUT LIMITATION, INCIDENTAL OR CONSEQUENTIAL DAMAGES, SAID INCIDENTAL AND CONSEQUENTIAL DAMAGES INCLUDING, BUT NOT LIMITED TO, PROPERTY DAMAGE, LOST PROFIT OR DAMAGES ALLEGED TO HAVE BEEN CAUSED BY ANY FAILURE OF HTP TO MEET ANY OBLIGATION UNDER THIS AGREEMENT INCLUDING THE OBLIGATION TO REPAIR AND REPLACE SET FORTH ABOVE. NO AGREEMENT VARYING OR EXTENDING THE FOREGOING WARRANTIES, REMEDIES OR THIS LIMITATION WILL BE BINDING UPON HTP. UNLESS IN WRITING AND SIGNED BY A DULY AUTHORIZED OFFICER OF HTP. THE WARRANTIES STATED HEREIN ARE NOT TRANSFERABLE AND SHALL BE FOR THE BENEFIT OF THE ORIGINAL PURCHASER ONLY.

NO OTHER WARRANTIES

Your HTP Warranty gives you specific legal rights, and you may also have other rights that vary from state to state. Some states do not allow the exclusion or limitation of incidental or consequential damages so this limitation or exclusion may not apply to you.
These are the only written warranties applicable to the Phoenix® Gas Water Heater and Solar Gas Water Heater manufactured and sold by HTP. HTP neither assumes nor authorizes anyone to assume for it any other obligation or liability in connection with said Phoenix® Gas Water Heater and Solar Gas Water Heaters.
HTP reserves the right to change specifications or discontinue models without notice.

H. PIPING DIAGRAMS

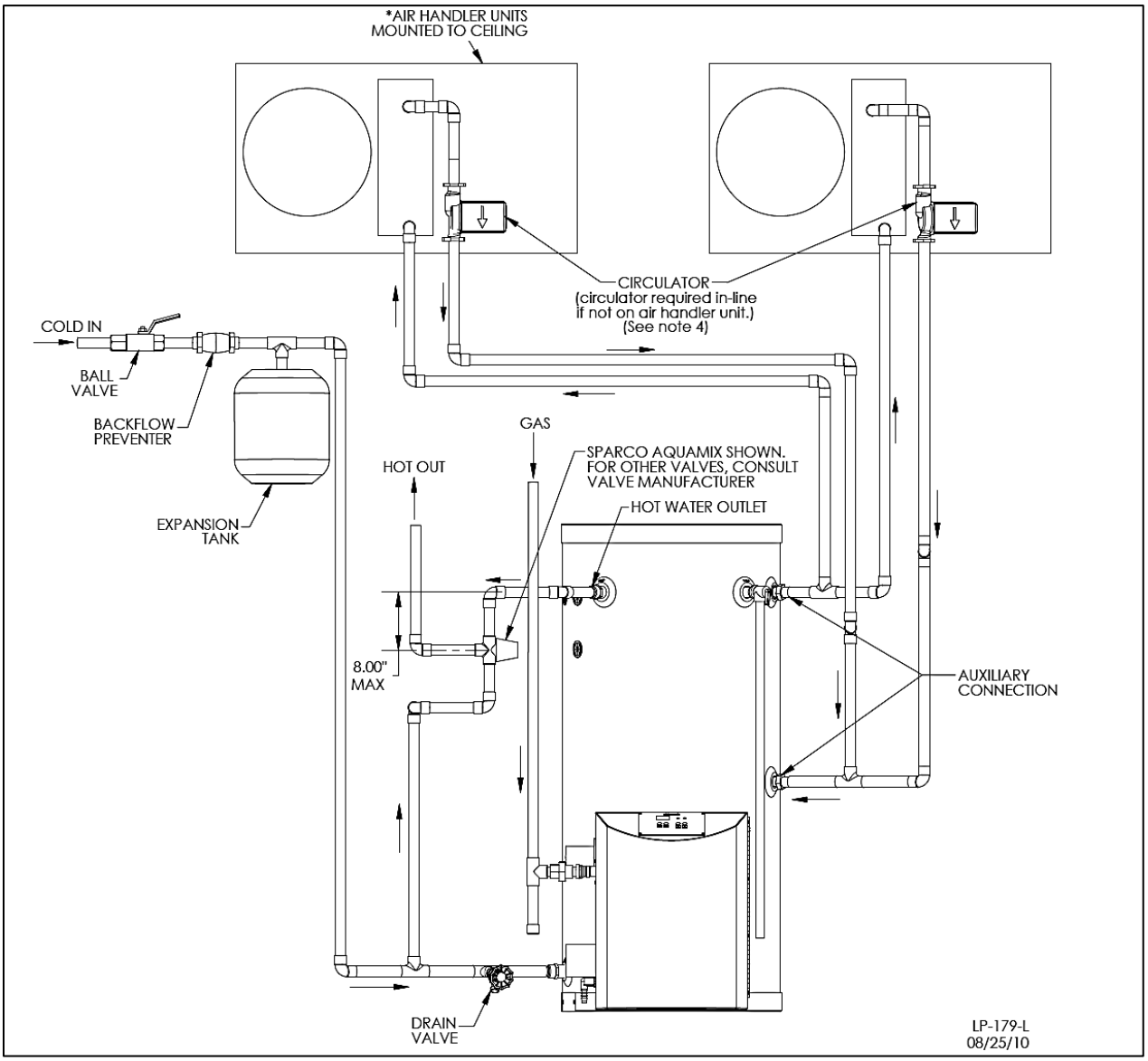


Figure 5 – Phoenix Model With Air Handler - NOTES:

1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Check with air handler manufacturer for proper sizing.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes.

NOTES FOR AIR HANDLER APPLICATION:

1. MASSACHUSETTS STATE PLUMBING CODE REQUIRES A DISTANCE NO GREATER THAN 50 FEET FROM THE WATER HEATER TO THE FAN COIL IN THE AIR HANDLER.
2. MASSACHUSETTS STATE PLUMBING CODE REQUIRES AN ELECTRONICALLY TIMED CIRCULATOR PUMP TO ACTIVATE EVERY SIX HOURS FOR 60 SECONDS. THIS CIRCULATOR IS REQUIRED TO BE BRONZE OR STAINLESS.
3. ALL WATER PIPING MUST BE INSULATED.
4. YOU MUST INSTALL A VACUUM RELIEF VALVE PER 248 CMR.

NOTE: THIS DRAWING IS MEANT TO DEMONSTRATE SYSTEM PIPING ONLY. THE INSTALLER IS RESPONSIBLE FOR ALL EQUIPMENT AND DETAILING REQUIRED BY LOCAL CODES.

⚠ DANGER

An ASSE 1017 thermostatic mixing valve MUST be installed when using outdoor reset. Failure to do so could result in substantial property damage, serious injury, or death.

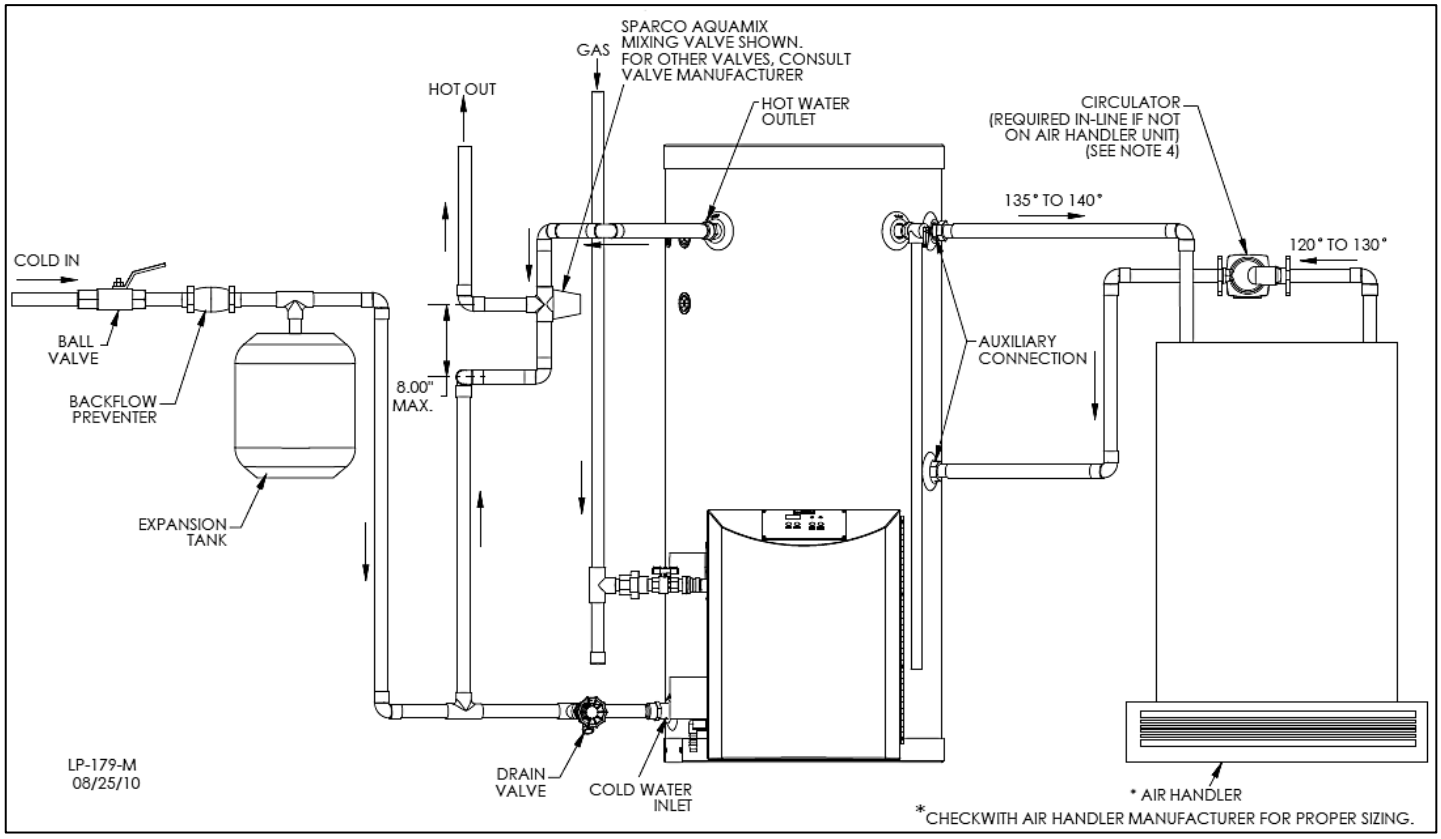


Figure 6 – Phoenix Model with Air Handler on Side

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Check with air handler manufacturer for proper sizing.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR. With air handlers, outdoor reset is available with an outdoor sensor. See Part 8, Section D.

NOTES FOR AIR HANDLER APPLICATION:
1. MASSACHUSETTS STATE PLUMBING CODE REQUIRES A DISTANCE NO GREATER THAN 50 FEET FROM THE WATER HEATER TO THE FAN COIL IN THE AIR HANDLER.
2. MASSACHUSETTS STATE PLUMBING CODE REQUIRES AN ELECTRONICALLY TIMED CIRCULATOR PUMP TO ACTIVATE EVERY SIX HOURS FOR 60 SECONDS. THIS CIRCULATOR IS REQUIRED TO BE BRONZE OR STAINLESS.
3. ALL WATER PIPING MUST BE INSULATED.
4. YOU MUST INSTALL A VACUUM RELIEF VALVE PER 248 CMR.

NOTE: THIS DRAWING IS MEANT TO DEMONSTRATE SYSTEM PIPING ONLY. THE INSTALLER IS RESPONSIBLE FOR ALL EQUIPMENT AND DETAILING REQUIRED BY LOCAL CODES.

⚠ DANGER

An ASSE 1017 thermostatic mixing valve MUST be installed when using outdoor reset. Failure to do so could result in substantial property damage, serious injury, or death.

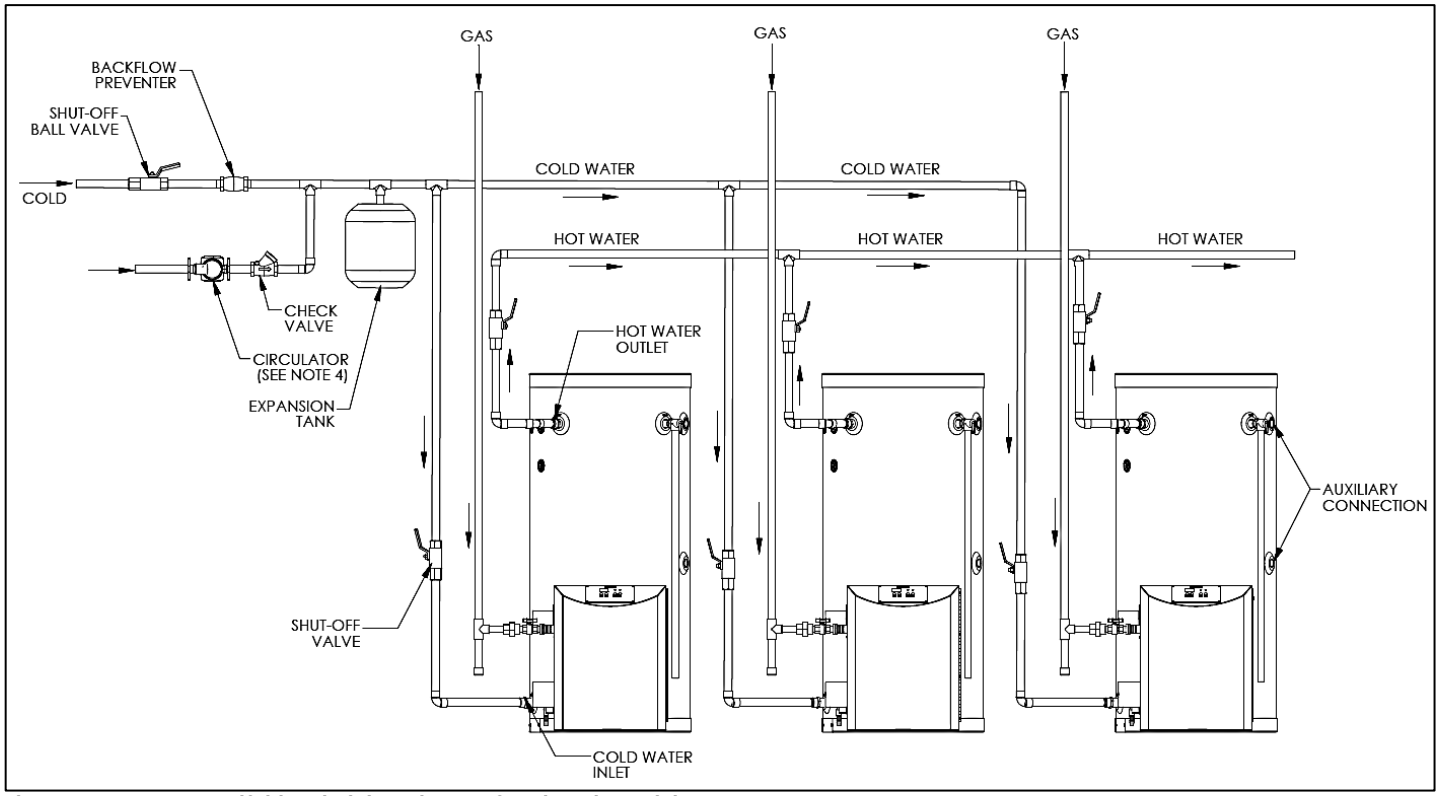


Figure 7 – Reverse Manifold and Piping Diagram for Phoenix Models - LP-179-N

NOTES:

1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Check with air handler manufacturer for proper sizing.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR. With air handlers, outdoor reset is available with an outdoor sensor. See Part 8, Section D.

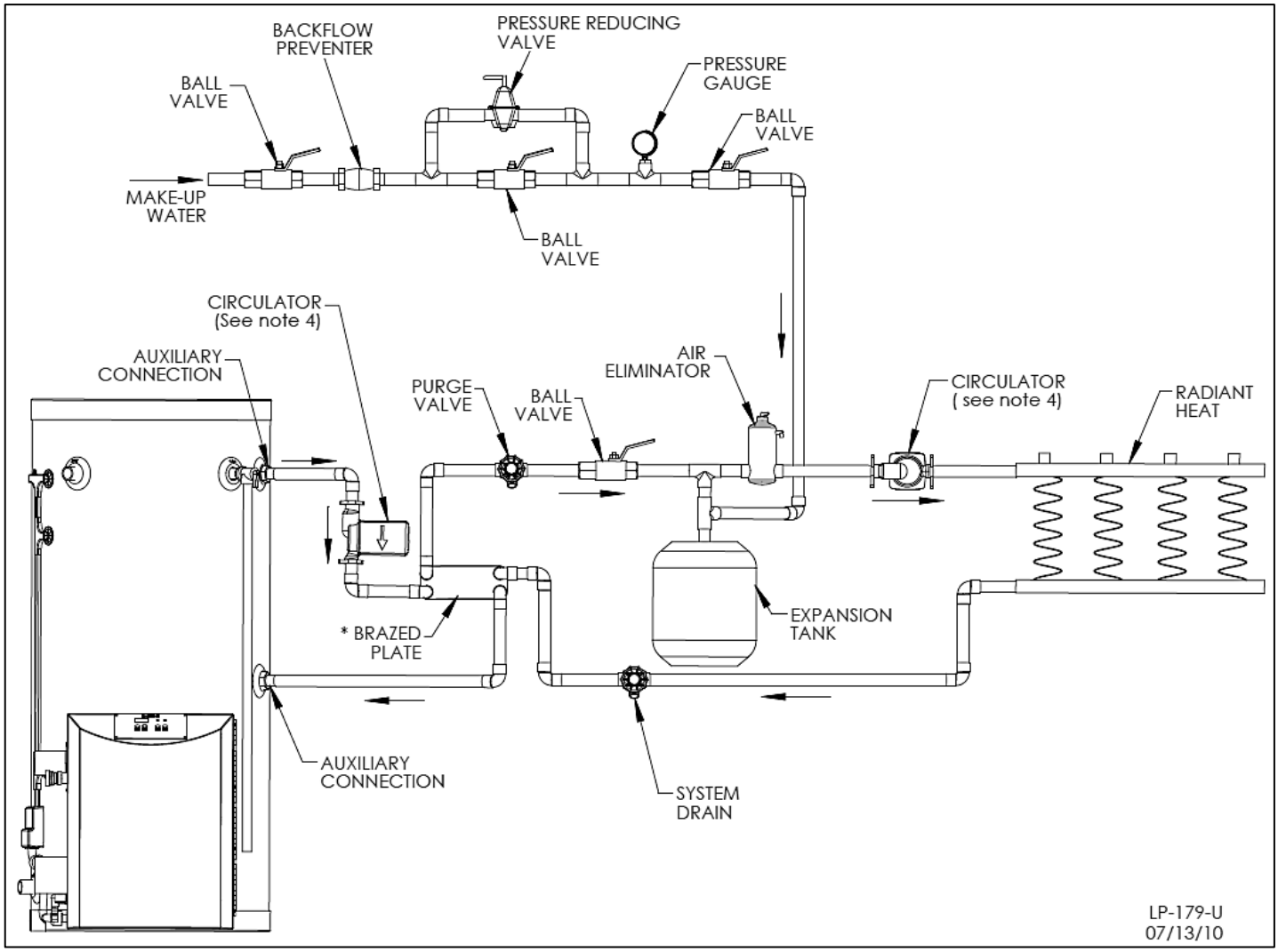


Figure 8 – Phoenix Model with Closed Loop for Radiant Heating - LP-179-U

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Check with brazed plate manufacturer for correct plate connections and orientation.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR. With air handlers, outdoor reset is available with an outdoor sensor. See Part 8, Section D.

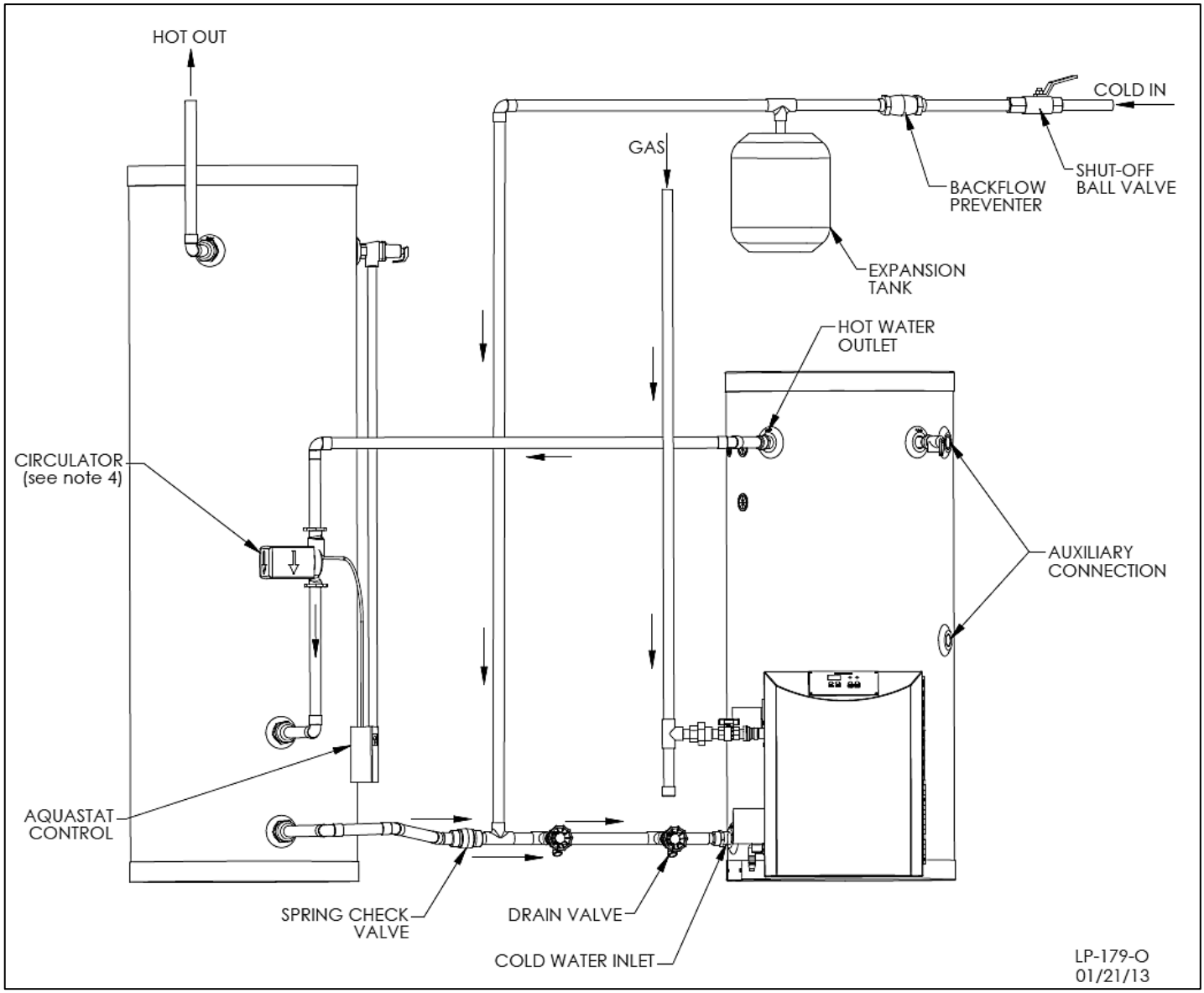


Figure 9 – Phoenix Model With Storage Tank

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Drains and check valve between unit and storage tank will assist in purging air from system.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR.

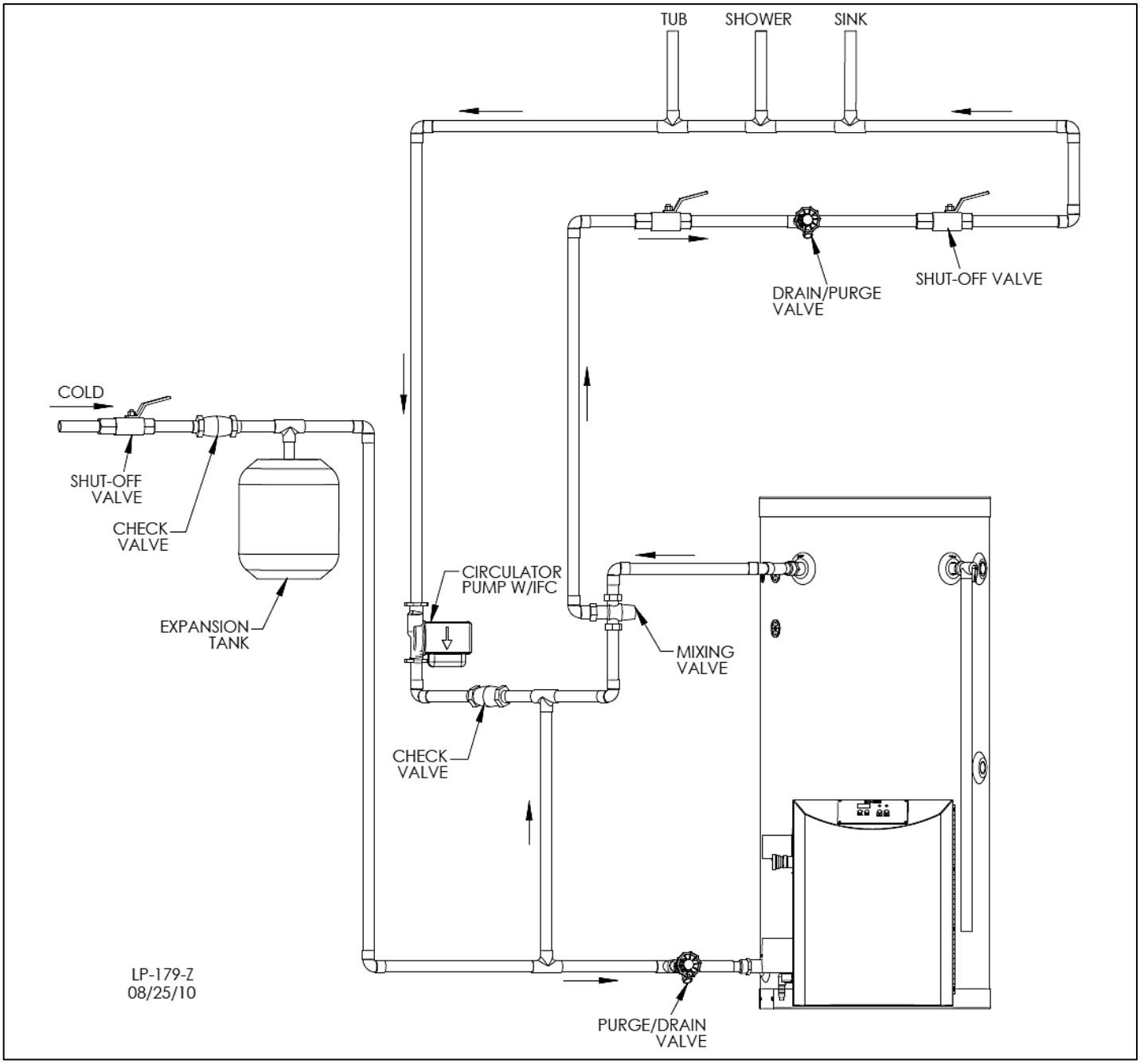


Figure 10 – Phoenix Model with Recirculation Line and Thermostatic Mixing Valve Piping

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Drains and check valve between unit and storage tank will assist in purging air from system.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR.

⚠ DANGER

An ASSE 1017 thermostatic mixing valve MUST be installed when using outdoor reset. Failure to do so could result in substantial property damage, serious injury, or death.

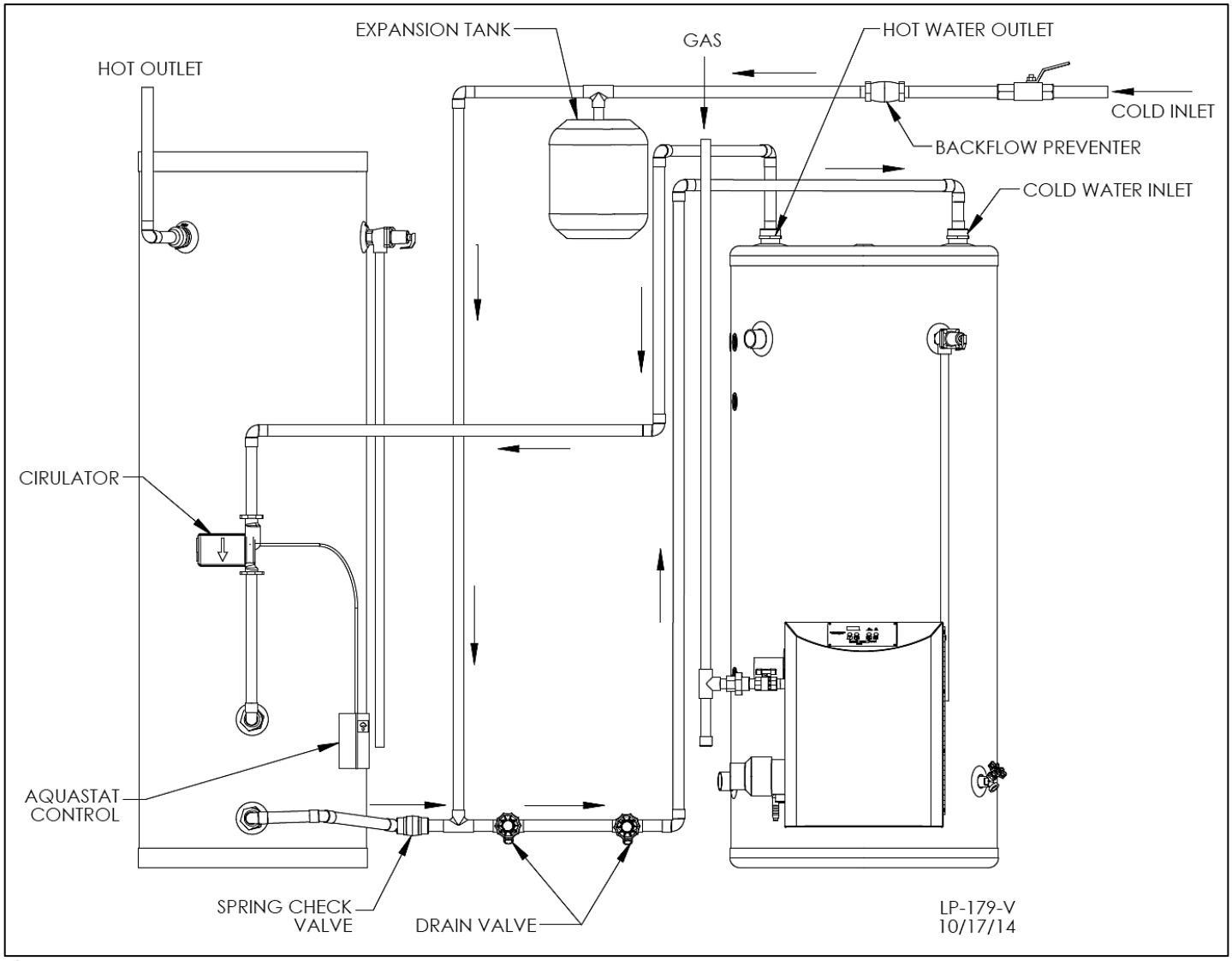


Figure 11 – Phoenix Multi Fit Model with Storage Tank and Thermostatic Mixing Valve

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Drains and check valve between unit and storage tank will assist in purging air from system.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR.

⚠ DANGER

An ASSE 1017 thermostatic mixing valve MUST be installed when using outdoor reset. Failure to do so could result in substantial property damage, serious injury, or death.

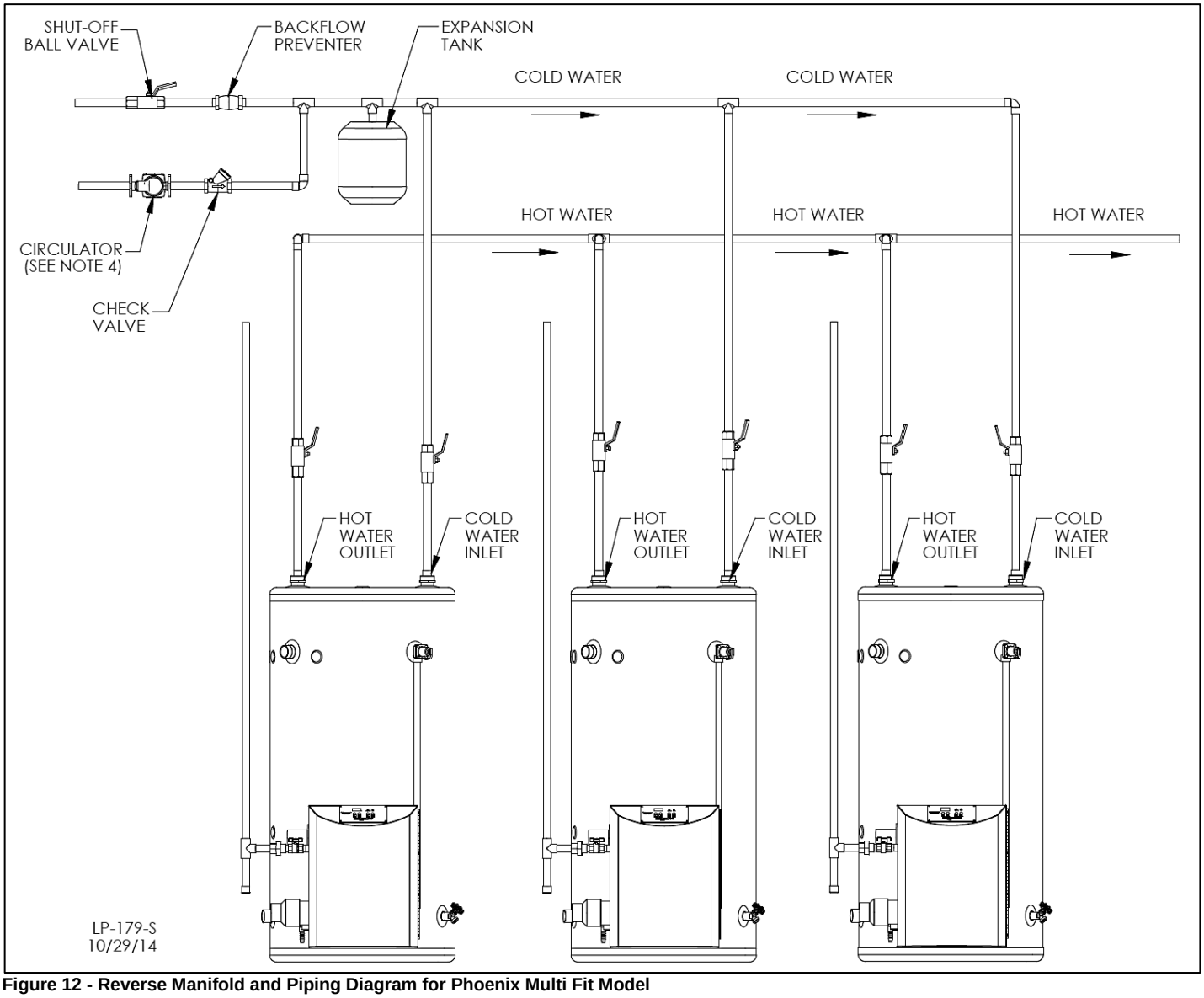
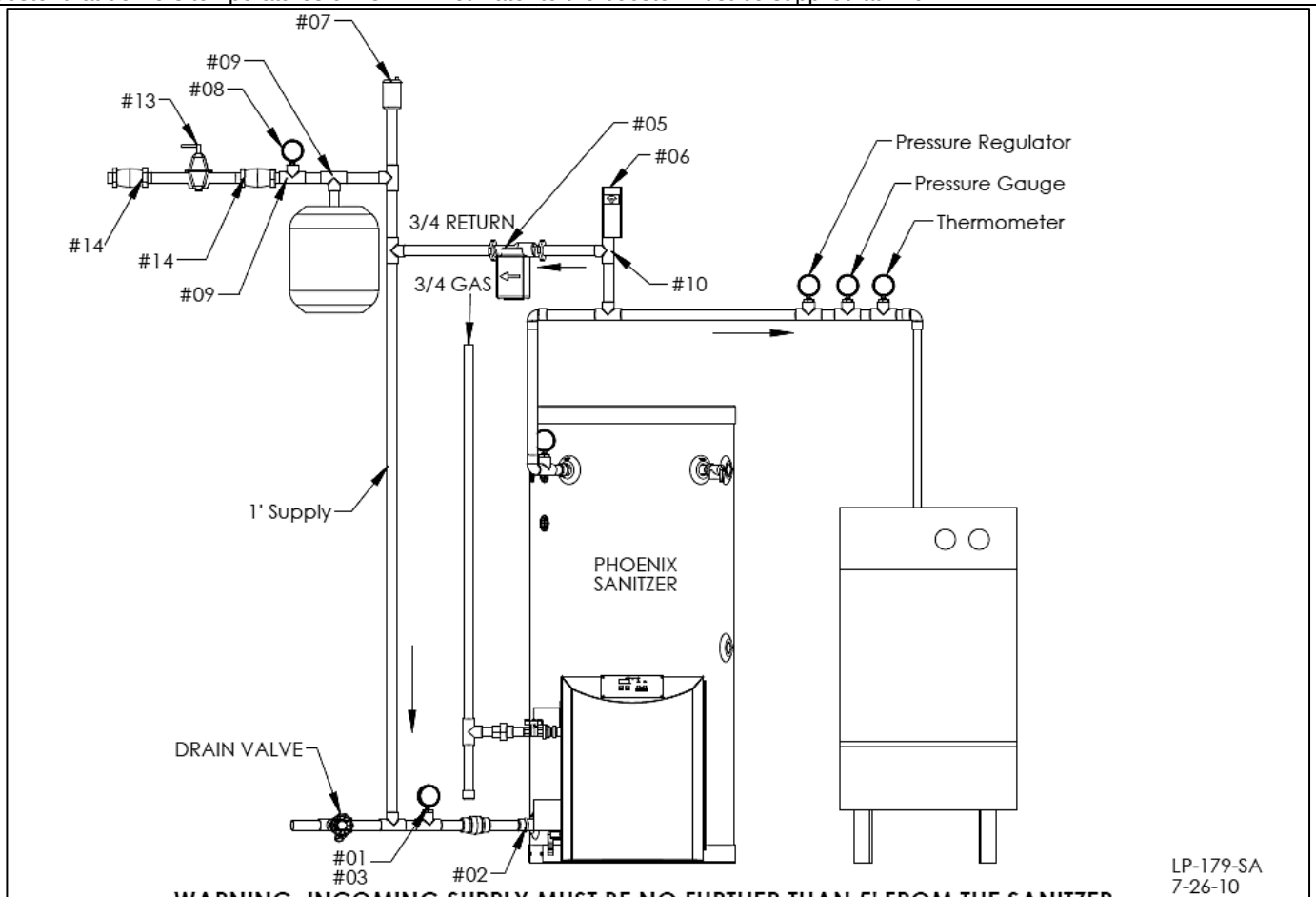


Figure 12 - Reverse Manifold and Piping Diagram for Phoenix Multi Fit Model

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Check with air handler manufacturer for proper sizing.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR. With air handlers, outdoor reset is available with an outdoor sensor. See Part 8, Section D.

CAUTION

The standard unit does not meet the required temperature settings for sanitizer booster applications. Use only the Phoenix Sanitizer Booster that delivers temperatures of 184°F. Inlet water to the booster must be supplied at 140°F.



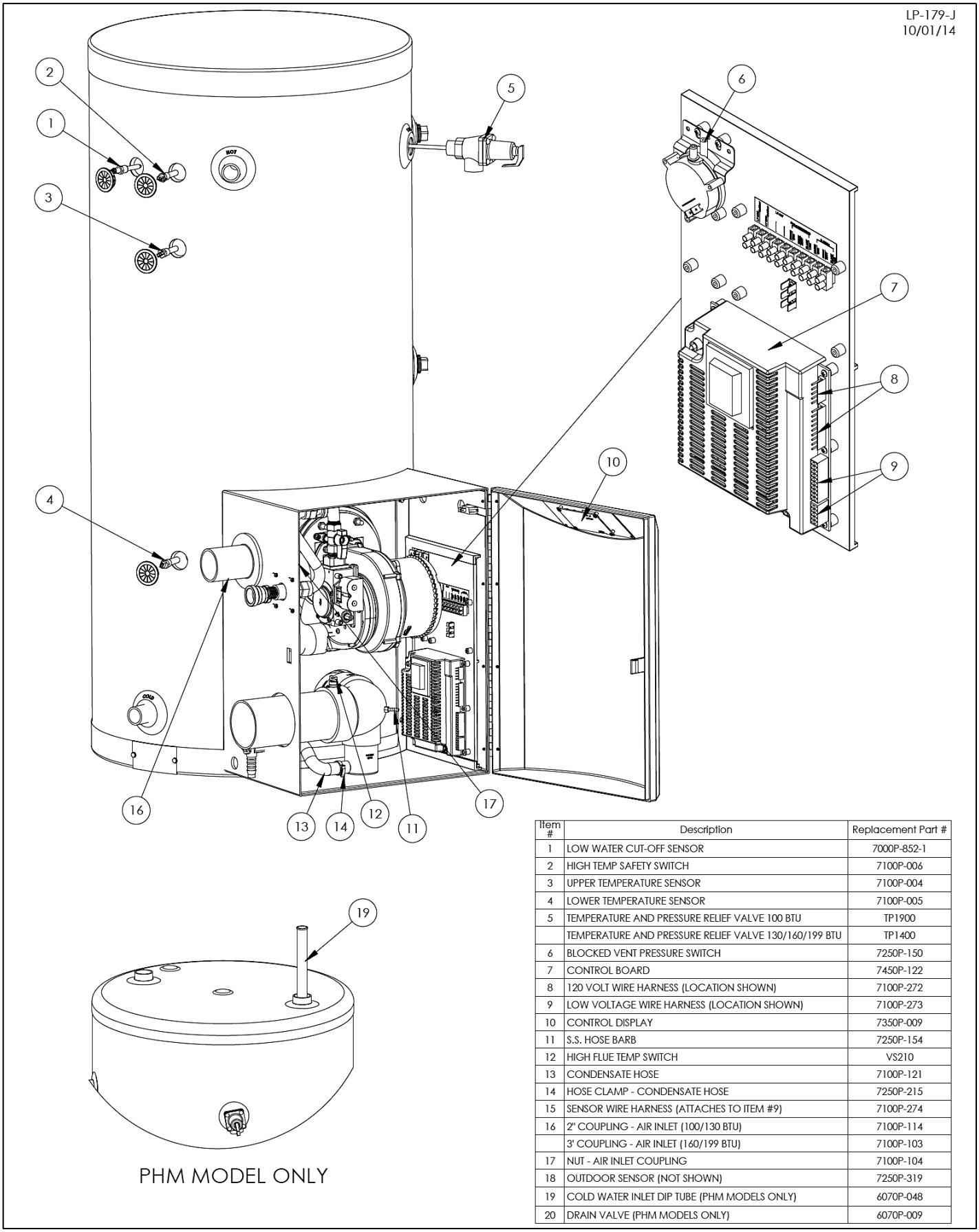
WARNING; INCOMING SUPPLY MUST BE NO FURTHER THAN 5' FROM THE SANITZER
VERY IMPORTANT: INSULATE ALL PIPES ON RECIRCULATION LINE TO AND FROM SANITIZER

THE ITEMS LISTED BELOW ARE THE ITEMS AND PART NUMBERS IN THE VSBK-1200 SANITIZER BOOSTER KIT

ITEM	PART	DESCRIPTION	PART NUMBER	ITEM	PART	DESCRIPTION	PART NUMBER
#01	NIBCO TEE	1"X1"X 1/2"	7000-708	#08	PRESSURE GAUGE		7000-716
#02	FEMALE ADAPTER	1"	7000-709	#09	NIBCO TEE	1" X 1" X 3/4" 712R	7000-728
#03	DIAL THERMOMETER		7000-710	#10	NIBCO TEE	1" X 1/2" X 1" COPPER	7000-739
#04	EXPANSION TANK 4.5 GAL		7000-711	#11	NIBCO TEE	1" X 1/2" X 1"R	7000-730
#05	GRUNDFOS 3 SPEED PUMP	W/ CHECK VALVE	7000-712	#12	REDUCING COUPLING		7000-732
#06	NIBCO TEE	1/2" X 1/2" FITTING AIR CHAMBER	7000-737	#13	PRESSURE REDUCING VALVE		7000-733
#07	VACUUM RELIEF VALVE		7000-714	#14	NIBCO MALE ADAPTERS		7000-736

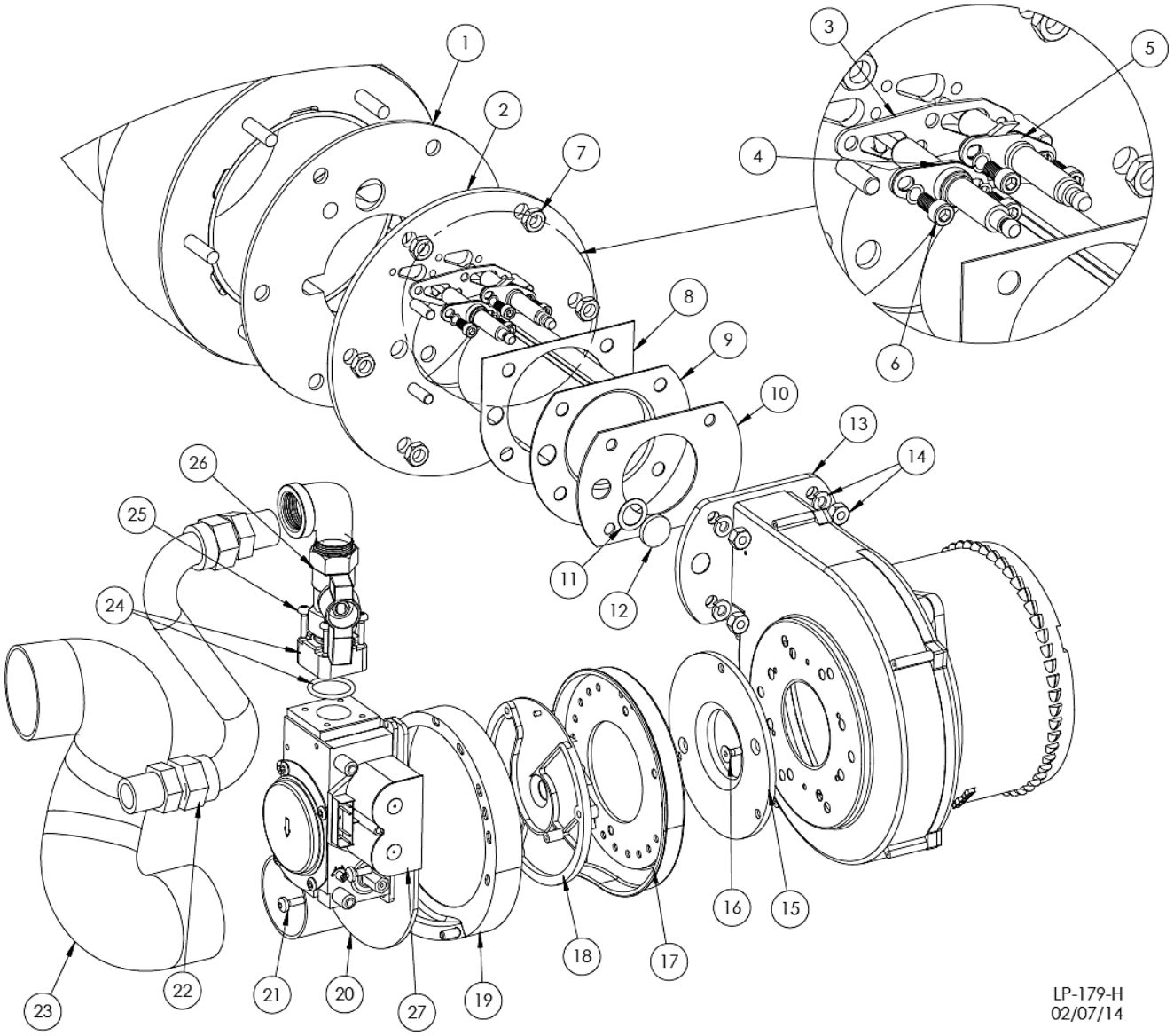
Figure 13 - Phoenix Sanitizer Booster Installation – PH130-55SA / PH199-55SA - LP-179-SA

NOTES:
1. Minimum pipe size should match unit connection size. Upsize pipe accordingly if greater flow is required.
2. A thermal expansion tank suitable for potable water must be sized and installed within this piping system between the backflow preventer and the cold water inlet.
3. Gas line must be rated to the unit maximum input capacity. Unit must have 10 feet of pipe after gas regulator.
4. All circulators should have an integral flow check.
5. Drains and check valve between unit and storage tank will assist in purging air from system.
6. This drawing is meant to demonstrate system piping only. The installer is responsible for all equipment and detailing required by local codes. In Massachusetts, you must install a vacuum relief valve per 248 CMR.
7. For further energy savings, install the Phoenix Sanitizer Booster on the same electrical circuit as the dishwasher.



Item #	Description	Replacement Part #
1	LOW WATER CUT-OFF SENSOR	7000P-852-1
2	HIGH TEMP SAFETY SWITCH	7100P-006
3	UPPER TEMPERATURE SENSOR	7100P-004
4	LOWER TEMPERATURE SENSOR	7100P-005
5	TEMPERATURE AND PRESSURE RELIEF VALVE 100 BTU	TP1900
	TEMPERATURE AND PRESSURE RELIEF VALVE 130/160/199 BTU	TP1400
6	BLOCKED VENT PRESSURE SWITCH	7250P-150
7	CONTROL BOARD	7450P-122
8	120 VOLT WIRE HARNESS (LOCATION SHOWN)	7100P-272
9	LOW VOLTAGE WIRE HARNESS (LOCATION SHOWN)	7100P-273
10	CONTROL DISPLAY	7350P-009
11	S.S. HOSE BARB	7250P-154
12	HIGH FLUE TEMP SWITCH	VS210
13	CONDENSATE HOSE	7100P-121
14	HOSE CLAMP - CONDENSATE HOSE	7250P-215
15	SENSOR WIRE HARNESS (ATTACHES TO ITEM #9)	7100P-274
16	2" COUPLING - AIR INLET (100/130 BTU)	7100P-114
	3' COUPLING - AIR INLET (160/199 BTU)	7100P-103
17	NUT - AIR INLET COUPLING	7100P-104
18	OUTDOOR SENSOR (NOT SHOWN)	7250P-319
19	COLD WATER INLET DIP TUBE (PHM MODELS ONLY)	6070P-048
20	DRAIN VALVE (PHM MODELS ONLY)	6070P-009

Figure 29 – Replacement Parts



Item #	Description	Replacement Part #
1	GASKET - MOUNTING PLATE	7100P-139
2	MOUNTING PLATE	7100P-007
3	GASKET - PROBES	7100P-155
4	FLAME RECTIFICATION PROBE (w/GASKET)	7100P-082
5	IGNITOR ELECTRODE (w/GASKET)	7100P-124
6	10-32 X 3/8 SCREWS/#10 LOCK WASHERS	N/A
7	NUTS - 5/16-18	N/A
8	GASKET - BURNER MOUNTING FLANGE	7100P-152
9	BURNER - 100-130K BTU	7100P-316
	BURNER - 160-199K BTU	7100P-317
10	GASKET - BURNER OUTLET	7000P-361
11	GASKET - SIGHT GLASS	7100P-105
12	SIGHT GLASS	G2000
13	COMBUSTION BLOWER (w/GASKET, SIGHT GLASS)	7100P-015
	COMBUSTION BLOWER (w/GASKET, SIGHT GLASS)199K BTU ONLY	7100P-350
14	1/4-20 BRASS NUTS/1/4 LOCK WASHERS	7100P-268

Item #	Description	Replacement Part #
15	ADAPTER PLATE	7250P-644
16	FLAT HEAD SCREW - ADAPTER PLATE	7100P-045
17	AIR INTAKE ADAPTER - BLOWER SIDE	7500P-185
18	SWIRL PLATE - BLACK (100/130 BTU)	7100P-042
	SWIRL PLATE - WHITE (160/199 BTU)	7500P-092
19	AIR INTAKE ADAPTER - VALVE SIDE	7500P-184
20	GAS VALVE (100/130 BTU)	7000P-862
	GAS VALVE (160/199 BTU)	7000P-863
21	SCREWS - GAS VALVE	7100P-046
22	1/2" FLARE X 1/2" NPT FLEX HOSE	7100P-140
23	TUBE - AIR INLET	7500P-189
24	GAS VALVE ADAPTER (w/O-RING)	7250P-454
25	SCREWS - M4 X 20MM GAS VALVE ADAPTER	7250P-717
26	GAS SHUT-OFF VALVE	7250P-140
27	24VAC GAS VALVE COIL ONLY - GREY	7350P-624

Figure 30 – LP-179-H

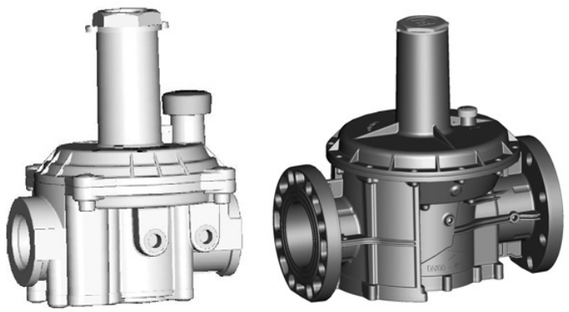
Cod. 940.00216.00.D

US OPERATING AND MAINTENANCE MANUAL SINGLE GOVERNOR

FR MANUEL DE FONCTIONNEMENT ET D'ENTRETIEN DU GOVERNOR MODELE SIMPLE

E MANUAL DE OPERACIÓN Y MANTENIMIENTO

GOVERNOR GAS REGULATOR
REGULATEUR DE GAZ GOVERNOR
REGULADOR DE GAS GOVERNOR



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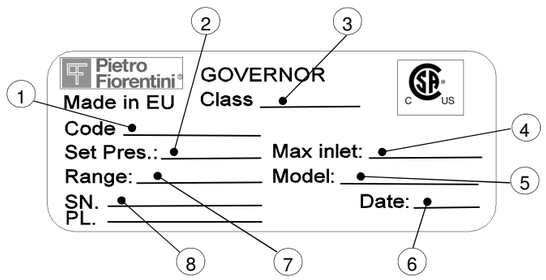

1. Code-model / Modèle-Code / Código-modelo
2. Outlet Pressure / Pression de sortie / Presión de salida
3. Class / Classe / Clase
4. Max operating pressure / Max pression de fonctionnement / Max. presión de operación
5. Model / Modèle / Modelo
6. Production date / Date de production / Fecha de producciòn
7. Spring range / Range de ressort / Range de resorte
8. Serial Number + Lot / Numero de serie + Lot / Número de serie + Lote

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Réalisé en UE par Pietro Fiorentini S.p.A. - ITALIE

Hecho en EU por Pietro Fiorentini S.p.A. - ITALIA

US GOVERNOR GAS REGULATOR

The ½" - 4" Governor gas regulators comply with and are certified to CSA 6.22a-2005 and ANSI Z21.80a-2005 for 2 PSIG inlet applications. The Governor design incorporates an integral vent limiter in the regulator. To ensure the installation complies with CSA 6.22a-2005 and ANSI Z21.80a-2005, the vent cap should be left in place and at no time should any restriction or plug be installed in the vent cap of the regulator. When using an external vent limiter, the flat top of the vent limiter must always be facing up, with the threads facing down, so it operates properly. If mounting the regulator in position (B) or (C), you must use the 90 degree external vent limiter adapter to ensure the vent limiter faces up (Fig. 2).

FR REGULATEUR DE GAZ GOVERNOR

Les régulateurs de ½" - 4" sont conformes et certifiés aux normes CSA 6.22a-2005 et ANSI Z21-80a-2005 pour des applications avec entrée de 2 PSIG. La conception du régulateur Governor inclut un limiteur intégral d'évent. Afin de s'assurer que l'installation soit conforme aux normes CSA 6.22a-2005 et ANSI Z21-80a-2005 le couvercle de l'évent doit être laissé à sa place et il ne faut jamais installer aucune restriction ou bouchon sur le couvercle de l'évent du régulateur. Lorsqu'un limiteur d'évent externe est utilisé, le dessus plat du limiteur d'évent doit toujours être vers le haut, avec le filetage vers le bas pour qu'il fonctionne correctement. Si le régulateur est installé en position (B) ou (C), vous devez utiliser l'adaptateur 90 degré du limiteur d'évent externe pour s'assurer que le limiteur d'évent soit vers le haut (Fig. 2).

E REGULADOR DE GAS GOVERNOR

El GOVERNOR de presion de gas de ½" a 4" cumple con y esta certificado bajo CSA 6.22a-2005 y ANSI Z21.80a-2005 para aplicaciones con entrada de 2 PSIG. El diseño del GOVERNOR incorpora una limitador integral de venteo en el regulador. Para asegurar que la instalación cumple con CSA 6.22a-2005 y ANSI Z21.80a-2005, la tapa del venteo debe dejarse en su lugar y por ninguna razón debe instalarse una restricción o tapón en el venteo del regulador. Cuando utilice un limitador externo de venteo, la superficie plana del limitador de venteo debe estar orientada hacia arriba, con la rosca orientada hacia abajo, para que opere correctamente. Si el regulador es instalado en posición (B) o (C), debe utilizar en el limitador externo de venteo un adaptador de 90˚ para asegurarse que el limitador este orientado hacia arriba (Fig. 2).

US The single unit Governor regulator is designed and CSA certified for 2 PSIG maximum inlet pressure. Inlet pressures above 2 PSIG require an over pressure protection device.
The Governor design incorporates an integral vent limiter in the regulator. To ensure that installation of the Governor regulator complies with CSA 6.22a-2005 and ANSI Z21.80a-2005, the vent cap, or external vent limiter (if installed), should be left in place and at no time should any restriction or plug be installed in the vent connection of the regulator. If venting is required, use a union at the vent connection and install a vent line to the atmosphere, in accordance with all local codes, standards and requirements.

15 feet is the maximum vent line distance that can be run before affecting the performance of the regulator.
Recommended diameter of the vent line for model:
- 1/4" NPT x Ø6mm pour le modèle: 1/2" - 3/4" - 1" NPT
- 1/2" NPT x Ø10mm pour le modèle: 1 1/4" - 1 1/2" - 2" NPT
- 1/2" NPT x Ø12mm pour le modèle: 2 1/2" - 3" - 4" ASME

FR Le régulateur Governor, modèle unité simple est conçu et certifié CSA pour pression maximum d'entrée de 2 PSIG. Les pressions d'entrée supérieures à 2 PSIG exigent un mécanisme de protection contre la surpression.
Le projet du régulateur inclut un limiteur d'évent intégral dans le régulateur. Afin de s'assurer que l'installation du Governor soit conforme aux normes CSA 6.22a-2005 et ANSI Z21-80a-2005, le bouchon de vent, ou le limiteur de vent externe (si installé), doit etre laissé en place et aucune restriction ni aucune prise doit etre installée dans la connection de vent du regulateur. Si un event est nécessaire, il faut utiliser un raccord sur la connexion de l'évent et installer une ligne d'évent à l'atmosphère en conformité avec toutes les normes et conditions ainsi que les codes locaux.

15 pieds est la distance maximale d'évent qu'on peut parcourir avant d'affecter la performance du régulateur.
Diamètre recommandé de la ligne d'évent pour le modèle:
- 1/4" NPT x Ø6mm pour le modèle: 1/2" - 3/4" - 1" NPT
- 1/2" NPT x Ø10mm pour le modèle: 1 1/4" - 1 1/2" - 2" NPT
- 1/2" NPT x Ø12mm pour le modèle: 2 1/2" - 3" - 4" ASME

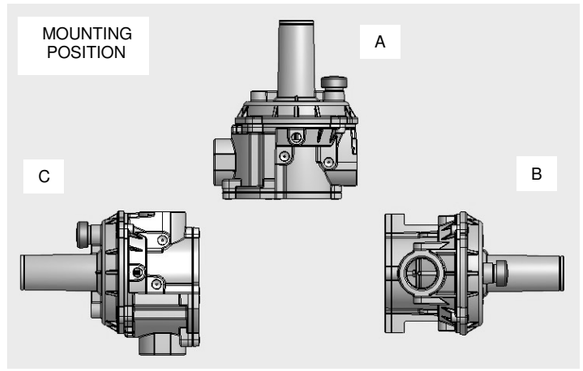
E El regulador GOVERNOR simple es disenado y certificado por CSA para 2 PSIG de presion de entrada maxima. Para presiones arriba de 2 PSIG, se require el uso de un dispositivo de proteccion por sobre presion.
El diseño del GOVERNOR incorpora una limitador integral de venteo. Para asegurarse que el GOVERNOR cumple con CSA 6.22-a-2005 y ANSI Z21.80a-2005, la tapa del venteo o el limitador de venteo (si es instalado), deben dejarse en su lugar y por ninguna razón debe instalarse una restricción o tapón en el venteo del regulador. Si el venteo es requerido, use una unión en la conexión del venteo e instale una línea de venteo a la atmosfera, de acuerdo con todos los códigos, estándares y requerimientos locales.

15 pies es la maxima longitud de la linea de venteo sin que se afecte el desempeño del regulador.
Diámetro recomendado de la linea de venteo para el modelo:
- 1/4" NPT x Ø6mm pour le modèle: 1/2" - 3/4" - 1" NPT
- 1/2" NPT x Ø10mm pour le modèle: 1 1/4" - 1 1/2" - 2" NPT
- 1/2" NPT x Ø12mm pour le modèle: 2 1/2" - 3" - 4" ASME

THE GOVERNOR GAS REGULATOR CAN BE MOUNTED IN A VERTICAL AND HORIZONTAL POSITION.

LE RÉGULATEUR DE GAZ GOVERNOR PEUT ÊTRE INSTALLÉ EN POSITION VERTICALE ET HORIZONTALE.

EL REGULADOR DE GAS GOVERNOR PUEDE SER MONTADO EN POSICION VERTICAL Y HORIZONTAL.



ADJUSTMENT SPRINGS
You will need a 7/16" Allen wrench to remove the cap 1, and 7/16" or 8mm Allen wrench on 1/2" to 1 1/2" models and 7/16" or 12 mm Allen wrench on 2" and larger models to adjust the spring.

RESSORTS DE RÉGLAGE
Vous devez utiliser un clé Allen de 7/16" afin de retirer le bouchon pos. 1 et un clè Allen de 7/16" ou 8 mm sur 1/2 "à 1 1/2" modèles et une clé Allen de 7/16"ou 12 mm sur 2" et les grands modèles pour ajuster le ressort.

RESORTES DE AJUSTE
Se require de una llave Allen de 7/16" para remover la tapa 1, y una llave de 7/16" o 8 mm para los modelos de 1/2" a 1 1/2" y una llave Allen de 7/16" o 12 mm para modelos de 2" y mayores para ajuste del resorte.

ADJUSTMENT SPRINGS
RESSORTS DE REGLAGE
RESORTES DISPONIBLES

GOVERNOR MODEL	1/2"- 3/4"- 1"	1/2"- 3/4"- 1"	1 1/4" - 1 1/2"	2"	2 1/2" - 3" - 4"
SPRING RANGE COLOR	SPRINGS CODE				
2" - 5" w.c. **Green** 0.072 - 0.18 psig	64470219	64470228	64470246	64470255	64470320
3" - 8" w.c. **Red** 0.1 - 0.29 psig	64470220	64470229	64470247	64470256	64470324
6" - 14" w.c. **Black** 0.21 - 0.5 psig	64470397	64470380	64470381	64470382	64470383
9.8" - 27.5" w.c. **Yellow** 0.354 - 0.99 psig	64470295	64470297	64470299	64470301	64470321
23.6" - 59" w.c. **Violet** 0.85 - 2.12 psig	64470296	64470298	64470300	64470302	64470322
55" - 118" w.c **Orange** 1.98 - 4.25 psig		64470235	64470253	64470262	64470323

US SPECIFICATIONS

Inlet pressure range: 4" w.c. to 7 PSIG
Maximum Emergency Inlet Exposure Pressure: 80 PSIG
CSA Certified Maximum inlet pressure: 2 PSIG
Outlet pressure range: 2" w.c. to 0.5 PSIG for CSA Class I
Minimum operating differential pressure: ∆ P: 1" w.c.
CSA Outlet pressures to 0.5 PSIG for Compliance
Temperature class: -40° F to + 150° F (-40° C to +65.5° C)
Suitable for use with Natural Gas, LPG, Propane-air and any non-corrosive gas
Designed for Indoor and Outdoor Installations.

NOTE: Installers and servicers must be trained, competent and should have the knowledge on how to install and maintain the equipment correctly.

1. INSTALLATION INSTRUCTIONS: All work should be carried out by trained, qualified and authorized personnel using the correct tools and equipment to install and adjust the regulator to all relevant standards, local codes, requirements and procedures. Ensure the installation is approved and the piping is clear of all oil and debris and has been tested for leaks. Make sure the piping is supported and no stressful force is placed upon the regulator. The regulator can be mounted in horizontal and vertical positions with the directional flow arrow facing in the direction of the flow. Preferably, the regulator should be mounted in horizontal position (A) on the pipe with the pressure adjustment screw upright. If using an external vent limiter, the flat top of the vent limiter must be facing up, with the threads facing down, so it operates properly. If mounting the regulator in position (B) or (C), you must use the 90 degree external vent limiter adapter to ensure the vent limiter faces up (Fig. 2). When venting is required, remove the cover of the vent cap using a union at the connection, then connect the vent pipe, being careful to place the outlet in a safe place, in accordance to all local codes, standards, and requirements. If the outlet pipe increases or decreases more than 1 pipe size, an external control line is recommended.

2. STARTUP: Slowly open the inlet shut-off valve. Slowly, partially open the downstream valve to allow a slow pressurizing of the downstream system. After the downstream system is pressurized, completely open the downstream shut-off valve. Verify that there is no leakage in the system. Verify that the burner ignition is connected. Verify the working pressure at different flow rates and check lock up pressure at a flow rate of 0.

3. USE OF THE INLET AND OUTLET PRESSURE TEST PORT (OPTIONAL):
Before any use of the test ports, close the inlet valve completely and depressurize the Governor. The test ports usually have a plastic pipe cap in them, and if so, remove the cap. With the regulator removed from the line, activate the port by drilling a 1/16" hole in the port. Install the regulator and connect the gauge to the port. Slowly open the inlet shut-off valve and check for leaks within the connected measuring equipment. Continue the start-up as indicated in step 2. When the measuring equipment is disconnected, plug the test port by using a threaded plug.

4. PRESSURE REGULATION ADJUSTMENT: The Governors are set by the factory to the regulation pressure indicated on the regulator. The range of the spring setting pressure is indicated on the nameplate. You will need a 7/16" Allen wrench to remove cap 1, and 7/16" or 8mm Allen wrench on 1/2" to 1 1/2" models and 7/16" or 12 mm Allen wrench on 2" and larger models to adjust the spring. To adjust pressure, unscrew cap 1, turning ring nut 4 clockwise to increase the pressure, and counter-clockwise to decrease the pressure.

5. CHANGING THE SETTING BY SPRING REPLACEMENT: Choose the required type of spring as indicated on the table. Unscrew cap 1 and ring nut 4. Remove the existing spring and insert the new spring. Note the new setting value on the label. Reassemble the above parts and make a new setting as indicated in step 4. When the adjustments is finished, secure cap 1 and seal it, if necessary.

6. REPLACING THE FILTER CARTRIDGE (OPTIONAL): Close the inlet and outlet valves and slowly depressurize the Governor regulator. Ensure that there is no pressure inside the Governor regulator, then remove the screws on the cover pos. 6. Remove the cover pos. 3. Remove the filter cartridge pos. 5 and replace it with the new one. Place the new cartridge in its seat and ensure that the new cartridge fits perfectly inside the Governor housing guide. CAREFULLY inspect the O-ring seal and replace it, if necessary. Reassemble the cover, making sure that the cartridge fits perfectly in the cover seat and tighten the screws crosswise. Pressurize the Governor regulator by SLOWLY opening the inlet valve. Check the seal around the cover and the screws using foam or soapy water. After a successful test, SLOWLY open the outlet valve.

7. RECOMMENDATIONS: Check the equipment condition periodically. Check the downstream pressure periodically. Verify that the whole system works perfectly (the smell of gas odor indicates a leak). Perform periodical maintenance on all regulated equipment.

FR SPECIFICATIONS

Gamme de pression d'entrée: 4" w.c. à 7 PSIG.
Possibilité de pression d'entrée maximum en situation d'urgence: 80 PSIG.
Pression d'entrée maximum certifié CSA : 2 PSIG.
Gamme de pression de sortie: 2" w.c. à 0.5 PSIG pour CSA Classe I
Pression différentielle minimale de fonctionnement ∆ P : 1" w.c.
Pression de sortie à 0.5 PSIG pour conformité CSA.
Classe de température: -40° F à + 150° F (-40° C à +65.5° C)
Prévu pour utilisation avec du Gaz Naturel, GPL, Air Propane et tout gaz non corrosif.
Conçu pour des installations intérieures et extérieures.

REMARQUE: Le personnel préposé à l'entretien doit être formé et compétent et il doit avoir la connaissance pour installer et entretenir correctement l'équipement.

1. DIRECTIVES D'INSTALLATION : Tout le travail doit être effectué par du personnel formé, qualifé et autorisé, qui utilise les instruments et l'équipement approprié pour installer et régler le régulateur selon toutes les normes relatives, conditions et procédures ainsi que les codes locaux. Il faut s'assurer que l'installation soit approuvée, et que la tuyauterie ne contienne pas d'huile ou des débris et qu'elle ait été vérifiée contre toutes fuites. S'assurer que la tuyauterie est soutenue et qu'aucune tension n'est mise sur le régulateur. Le régulateur peut être installé dans les positions verticale et horizontale avec la flèche dans le sens de la direction du flux. De préférence, le régulateur doit être installé en position horizontale (A) sur le tuyau avec la vis de réglage de pression vers le haut. Lorsqu'un limiteur d'évent externe est utilisé, le dessus plat du limiteur d'évent doit toujours être vers le haut, avec le filetage vers le bas pour qu'il fonctionne correctement. Si le régulateur est installé en position (B) ou (C), vous devez utiliser l'adaptateur 90 degré du limiteur d'évent externe pour s'assurer que le limiteur d'évent soit vers le haut (Fig. 2). Lorsqu'un évent est requis, enlever le couvert de l'évent, utilisant un raccord sur la connexion, ensuite connecter l'évent en s'assurant de positionner la sortie dans un endroit sécuritaire, en conformité avec toutes les normes et conditions ainsi que les codes locaux. Si les tuyaux de sortie augmente ou diminue de plus de 1 la taille du tuyau, une ligne de commande externe est recommandée.

2. DÉMARRAGE: Ouvrir lentement la vanne d'entrée. Lentement ouvrir partiellement la vanne en aval pour permettre une pressurisation lente du système en aval. Après que le système en aval est pressurisé, ouvrir complètement la vanne en aval. Vérifier qu'il n'y ait pas de fuites dans le système. Vérifier que l'allumage du brûleur soit branché. Vérifier la pression de fonctionnement à différents débits et vérifier la fermeture complète de la pression à un débit de 0.

3. EMPLOI DU PORT D'ESSAI DE LA PRESSION D'ENTRÉE ET DE SORTIE (OPTIONNEL): avant d'utiliser les ports d'essai, il faut fermer complètement la vanne d'entrée et dépressuriser le régulateur Governor. Les ports d'essai ont normalement un bouchon en plastique à l'intérieur, si c'est le cas, il faut enlever le bouchon. Lorsque le régulateur est enlevé de la ligne, il faut faire un trou de 1/16" dans le port pour l'utilisation. Installer le régulateur et brancher la jauge au port. Ouvrir lentement la vanne d'entrée et vérifier s'il y a des fuites à l'équipement de mesurage (optionnel). Continuer le démarrage comme indiqué au paragraphe 2. Lorsque l'équipement de mesurage est débranché, boucher le port d'essai avec un bouchon fileté.

4. RÉGLAGE DE LA PRESSION: les régulateurs Governor sont réglés en usine selon la pression indiquée sur le régulateur. Vous devez utiliser un clé Allen de 7/16" afin de retirer le bouchon pos. 1 et un clè Allen de 7/16" ou 8 mm sur 1/2" à 1 1/2" modèles et une clé Allen de 7/16 "ou 12 mm sur 2" et les grands modèles pour ajuster le ressort. L'échelle de pression du ressort est indiquée sur la plaque signalétique. Pour ajuster la pression, dévisser le couvercle 1, ensuite tourner en la bague 4 en sens horaire pour augmenter la pression et en sens anti-horaire pour la diminuer.

5. CHANGEMENT DU RÉGLAGE EN REMPLAÇANT LE RESSORT :
Choisir le type de ressort requis comme indiqué dans la table; dévisser le couvercle 1 et la bague 4. Enlever le ressort existant et introduire le nouveau ressort et noter la nouvelle valeur de réglage sur l'étiquette. Remonter les pièces susmentionnées et faire un nouveau réglage tel qu'indiqué à l'étape 3 ci-haut. Lorsque le réglage est terminé, fixer le couvercle 1 et sceller si nécessaire.

6. REMPLACEMENT DE LA CARTOUCHE DU FILTRE (OPTIONNEL): fermer les vannes d'entrée et de sortie et dépressuriser lentement le régulateur. Assurez-vous qu'il n'y ait pas de pression dans le régulateur, ensuite enlever les vis sur le couvercle pos. 6. Enlever le couvercle pos 3, enlever la cartouche du filtre pos 5 et la remplacer avec la nouvelle. Placer la nouvelle cartouche dans son siège et s'assurer que la nouvelle cartouche s'adapte parfaitement à l'intérieur du guide d'emplacement du régulateur. SOIGNEUSEMENT inspecter la bague O-ring et la remplacer si nécessaire. Remonter le couvercle en vous assurant que la cartouche s'adapte parfaitement au siège à l'intérieur du couvercle, et serrer les vis par un mouvement croisé. Pressurizer le régulateur en ouvrant LENTEMENT la vanne d'entrée. Vérifier le joint d'étanchéité autour du couvercle et des vis utilisant de la mousse ou de l'eau savonneuse. Après une vérification réussie, ouvrir LENTEMENT la vanne de sortie.

7. RECOMMANDATIONS: ne pas utiliser le régulateur Governor comme un levier. Vérifier périodiquement les conditions de l'équipement. Vérifier périodiquement la pression en aval. Vérifier que tout le système fonctionne parfaitement (l'odeur de gaz indique une fuite). Effectuer une maintenance périodique sur l'équipement réglé.

E ESPECIFICACIONES

Presión de entrada: 4" w.c. a 7 PSIG.
Maxima presión de entrada en caso de emergencia: 80 PSIG.
Presión de entrada maximum certificada CSA : 2 PSIG.
Rango de presión de salida: 2" w.c a 0.5 PSIG para CSA Clase I.
Mínima presión diferencial de operación ΔP: 1" w.c.
Para conformidad con CSA presiones de salida hasta 0,5 PSIG.
Clase de temperatura: -40°F to + 150°F (-40°C +65.5°C)
Adecuado para su uso con Gas Natural, LPG, Propano-aire y cualquier otro gas no corrosivo.
Diseñado para instalación interior y exterior.

NOTA: Instaladores y operadores deben ser entrenados, competentes y deben tener conocimiento sobre la instalacion y mantenimiento correcto del producto.

1. INSTRUCCIONES DE INSTALACION: todo trabajo debe ser realizado por personal entrenado, calificado y autorizado, utilizando las herramientas y equipo correctos y setear el regulador segun los estandares, codigos locales, requerimientos y procedimientos. Asegurarse que la instalacion es aprobada y la tuberia este libre de aceite, suciedad y ha sido probada para fugas. Asegurarse que la tubería este soportada y no hayan fuerzas que produzcan un estrés sobre el regulador. El regulador puede ser instalado en posicion vertical y horizontal con el sentido de flujo segun la direccion de la fecha. Preferiblemente, el regulador debe ser montado en la tubería en la posición horizontal (A) con la tuerca de ajuste de la presión hacia arriba. Cuando se utiliza un limitador de venteo externa, la parte superior plana del limitador de venteo debe estar siempre al día con el hilo hacia abajo para que funcione correctamente. Si el regulador está instalado en posición (B) o (C), debe utilizar en el limitador externo de venteo un adaptador de 90˚ para asegurarse que el limitador este orientado hacia arriba (Fig. 2). En caso de requerir venteo, remover la tapa del venteo utilizando una union en la conexion, luego conecte la tuberia de venteo, siendo cuidadoso de llevar la salida en un lugar seguro de acuerdo con código, estándar y requerimiento local. Si la tubería de salida aumenta o disminuye más de 1 tamaño de la tubería, se recomienda una línea de control externo.

2. ARRANQUE: lentamente abra la valvula de corte a la entrada. Lentamente, abra parcialmente la valvula a la salida para permitir presurización del sistema aguas abajo. Luego que el sistema aguas abajo este presurizado, abra completamente la valvula de corte de salida. Verifique que no hay fugas en el sistema. Verifique que la ignicion del horno este conectado. Verfique la presión operacional a diferentes flujos y chequee la presión de cirre a flujo cero.

3. USO DEL PUERTO DE PRUEBA DE PRESION DE ENTRADA Y SALIDA (OPTIONAL): antes de usar cualquiera de los puertos de prueba, cierre la valvula de entrada completamente y despresurice el Governor. Los puertos de prueba tienen usualmente una tapa de plástico, si es asi, remueva la tapa. Con el regulador retirado de la tubería, activar el puerto perforando un orificio de 1/6" en el puerto. Instalar el regulador y conectar una manometro en el puerto. Lentamente abra la valvula de corte a la entrada y verifique que no hay fugas en el equipo de medición de presion. Continue con el arranque como esta descrito en el paso 2. Cuando el equipo de medición sea desconectado, tape el puerto de prueba usando una tapon roscado.

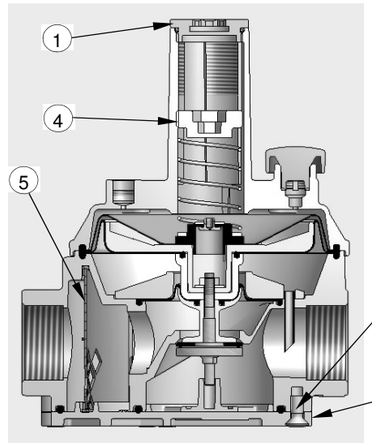
4. AJUSTE DE LA PRESION DE REGULACION: el Governor es ajustado por la fabrica a la presión de regulación indicada en el regulador. Se require de una llave Allen de 7/16" para remover la tapa 1, y una llave de 7/16" o 8 mm para los modelos de 1/2" a 1 1/2" y una llave Allen de 7/16" o 12 mm para modelos de 2" y mayores para ajuste del resorte. El rango de ajuste de presión del resorte esta indicado en la placa. Para ajustar la presión, destornille la tapa 1, de vuelta a la tuerca 4 en sentido horario para incrementar la presión y en sentido anti-horario para reducir la presión.

5. CAMBIANDO EL AJUSTE MEDIANTE LA SUBSTITUCION DEL RESORTE
Elija el tipo de resorte requerido como esta indicado en la table. Remueva la tapa 1 y la tuerca 4. Remueva el resorte existente e inserte el Nuevo resorte. Anotar el nuevo valor de ajuste en la etiqueta. Reensamble las partes anteriores y obtenga el nuevo punto de ajuste como esta indicado en el paso 4. Cuando ha completado el ajsute, asegure la tapa 1 y ponga el precinto, si es necesario.

6. SUBSTITUCION DEL CARTUCHO DE FILTRACION (OPCIONAL):
Cerrar lentamente las valvulas de entrada y salida y lentamente despresurizar el Governor. Asegurarse que no hay presión interna en el regulador Governor, luego remueva los tornillos en la tapa pos. 6. Remueva la tapa pos. 3, remueva el cartucho de filtracion pos. 5 and substituya con uno nuevo. Colocar el el nuevo cartucho en su asiento, y asegurarse que el nuevo cartucho entra perfectamente dentro de la guía de la abertura. CUIDADOSAMENTE inspeccione el sello O-Ring y reemplazarlo, si es necesario. Re-ensamblar la tapa, asegurandose que el cartucho entra perfectamente en el asiento de la tapa, y ajuste los tornillos en orden cruzado. Presurizar el regulador Governor, LENTAMENTE abriendo la valvula de entrada. Chequear el sello alrededor de la tapa y los tornillos utilizando espuma o agua jabonosa. Despues de una prueba exitosa, LENTAMENTE abrir la valvula de salida.

7. RECOMENDACIONES: Chequear la condicion del equipo perioodicamente. Chequear la presión aguas abajo periódicamente. Verificar el que sistema completo funciona perfectamente (el olor a gas indica la existencia de una fuga). Realizar mantenimiento periódico en todo equipo regulado.

Fig. 1



For Indoor installations: no external vent is needed as per CSA 6.22a -2005 and ANSI Z21.80a-2005 IN ACCORDANCE WITH ALL LOCAL CODES AND STANDARDS

Pour installations intérieures: Aucun évent nécessaire, conformément aux normes CSA 6.22a-2005 et ANSI Z21.80a-2005 LORSQUE CELA EST ACCEPTÉ PAR LES NORMES ET CODES LOCAUX.

Para instalaciones interiores: El venteo al exterior no es requerido de acuerdo con CSA 6.22-a-2005 y ANSI Z21.80a-2005, CUANDO ES ACEPTADO POR CODIGO Y ESTANDAR LOCAL

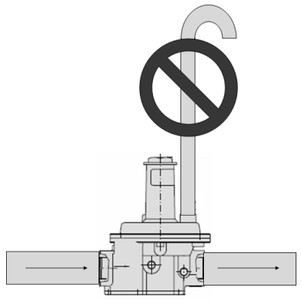


Fig. 2