



COLUMBIA
 P.O. Box 24202,
 Baltimore, Maryland 21227

Models

- CSFH-3085
- CSFH-3100
- CSFH-4100
- CSFH-4125
- CSFH-4145
- CSFH-5160
- CSFH-5185
- CSFH-6175
- CSFH-6210

CSFH IV SERIES 4 WATER OIL FIRED CAST IRON BOILER

INSTALLATION, OPERATION & MAINTENANCE MANUAL



Tested For 75 psi
 ASME
 Working Pressure

Manufactured by:
ECR International, Inc.
 2201 Dwyer Avenue, Utica NY 13501
 web site: www.ecrinternational.com

TABLE OF CONTENTS

Dimensions.....	3
Boiler Ratings & Capacities	4
Introduction.....	5
Ventilation & Combustion Air.....	6
Connecting Supply And Return Piping	9
System Piping	13
Venting System Inspection & Installation	16
Oil Tank And Piping.....	17
Electrical Wiring	18
Operating Instructions.....	22

**Keep this manual near boiler and
Retain for future reference**

Boiler installation shall be completed by qualified agency.

Become familiar with symbols identifying potential hazards.



This is the safety alert symbol. Symbol alerts you to potential personal injury hazards. Obey all safety messages following this symbol to avoid possible injury or death.

DANGER

Indicates a hazardous situation which, if not avoided, **WILL** result in death or serious injury

WARNING

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

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Used to address practices not related to personal injury.

WARNING

All boiler and venting installations shall be done only by qualified expert and in accordance with appropriate Manufacturer's Installation, Operation and Maintenance Manual. Installing or venting boiler or any other appliance with improper methods or materials could result in serious injury or death due to fire or to asphyxiation from poisonous gases such as carbon monoxide which is odorless and invisible.

WARNING

Modification, substitution or elimination of factory equipped, supplied or specified components could result in death or serious injury.

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

DO NOT obstruct air openings to the boiler room.

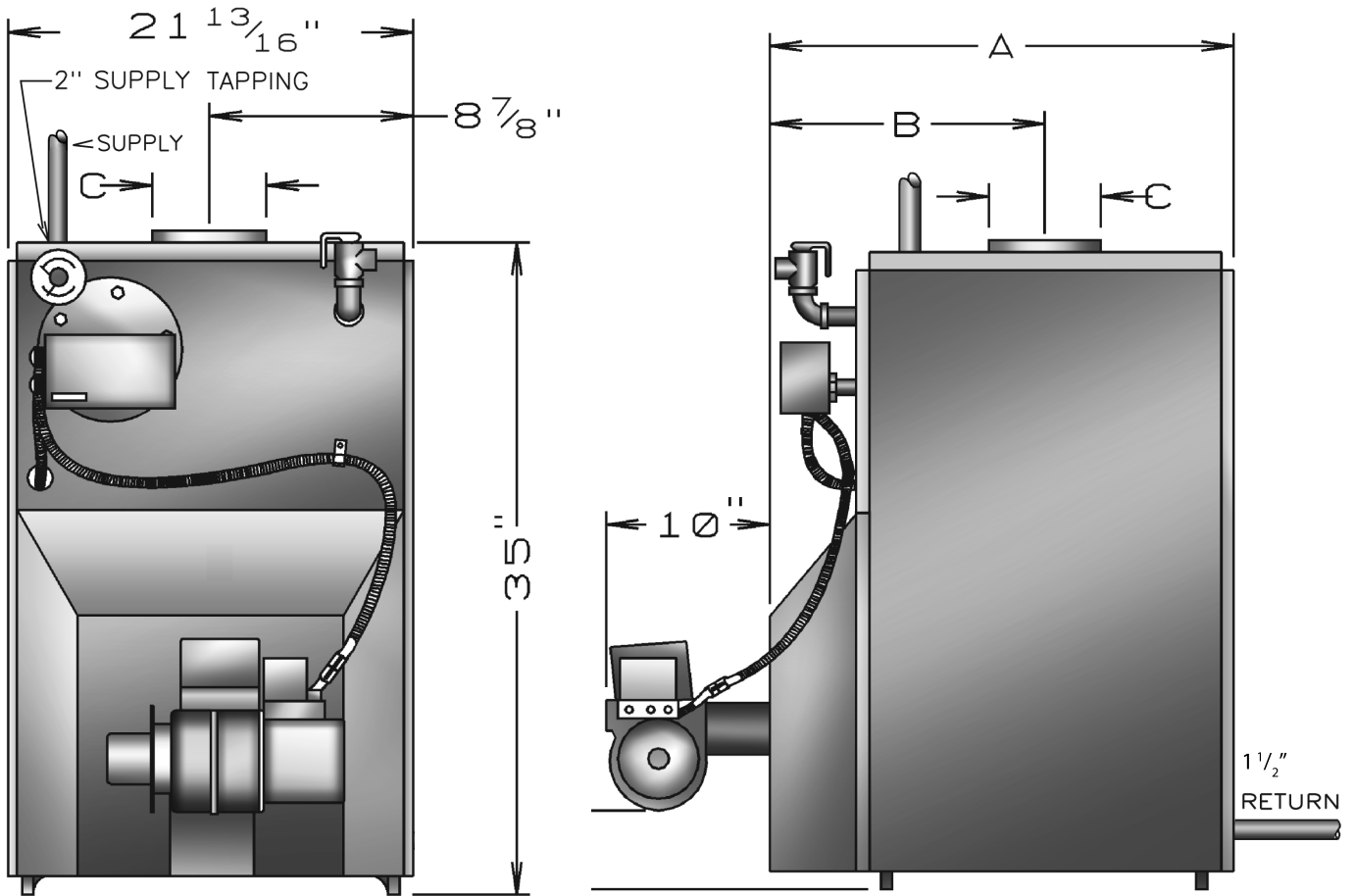
To the owner: Installation and service of this boiler must be performed by a qualified installer.

To the installer: Leave all instructions with the boiler for future reference.

When this product is installed in the Commonwealth of Massachusetts installation must be performed by a Licensed Plumber or Licensed Gas Fitter.

DIMENSIONS

DIMENSIONAL DATA



BOILER SECTION	A DEPTH OF FLUSH JACKET	B FRONT OF CASING TO CENTER LINE OF FLUE OUTLET	C DIA. OF FLUE OUTLET
3	17 7/8"	11 1/4"	6"
4	21 1/2"	12 5/8"	6"
5	25 1/8"	14 1/4"	7"
6	29 1/4"	15 15/16"	8"



BOILER RATINGS

BOILER MODEL NUMBER		(1) OIL BURNER INPUT		(3) HEATING CAPACITY	(2) NET RATINGS WATER	(3) A.F.U.E.	CHIMNEY
		gph	*Mbh	*Mbh	*Mbh		
CSFH-3085W	CSFH-3085WT	0.85	119	103	90	85.0%	8X8X15
CSFH-3100W	CSFH-3100WT	1.00	140	119	103	84.0%	8X8X15
CSFH-4100W	CSFH-4100WT	1.00	140	122	106	86.0%	8X8X15
CSFH-4125W	CSFH-4125WT	1.25	175	151	131	85.0%	8X8X15
CSFH-4145W	CSFH-4145WT	1.45	203	173	150	84.0%	8X8X15
CSFH-5160W	CSFH-5160WT	1.60	224	193	168	85.0%	8X8X15
CSFH-5185W	CSFH-5185WT	1.85	259	221	192	84.0%	8X8X15
CSFH-6175W	CSFH-6175WT	1.75	245	212	184	85.0%	8X8X15
CSFH-6210W	CSFH-6210WT	2.10	294	252	219	84.0%	8X8X15

*Mbh = 1,000 Btu per hour [Btu = British Thermal Unit]

¹ Oil burner input based on 140,000 Btu per gallon.

² Net AHRI water ratings shown are based on a piping and pickup allowance of 1.15. Consult manufacturer before selecting a boiler for installation having unusual piping and pickup requirements, such as intermittent system operation, extensive piping systems, etc.

³ Heating Capacity and AFUE based on 13.0% CO₂ with -0.02" W.C. draft over fire and #1 smoke or less. Tested in accordance with U.S. Department of Energy test procedure.

T= Tankless

STANDARD EQUIPMENT: Crated Boiler, Flush Jacket, Oil Burner, Target Wall/Liner, Circulator- 1¼", Safety Relief Valve, Temperature Pressure Gauge, Drain Valve, Wiring Harness, Burner Electrical Disconnect, Plastic Cover, Supply Tapping-2", Return Tapping-1 1/2", High Limit and Circulator Control, Primary Control. For Tankless Heater Units add Tankless Hot Water Coil and Triple Combination High Limit/Low Limit/Circulator Control.

TANKLESS WATER HEATER CAPACITIES

BOILER MODEL NUMBER	INPUT RATE G.P.H.	TANKLESS HEATER NUMBER	TANKLESS HEATER CAPACITY INTERMITTENT DRAW G.P.M.	BOILER WATER CONTENT GALS.
CSFH-3085WT	0.85	T3	3	10.5
CSFH-3100WT	1.00	T3	3¼	10.5
CSFH-4100WT	1.00	T4	3¼	13.5
CSFH-4125WT	1.25	T4	3¾	13.5
CSFH-4145WT	1.45	T4	4	13.5
CSFH-5160WT	1.60	T4	4	16.5
CSFH-5185WT	1.85	T4	4¼	16.5
CSFH-6175WT	1.75	T4	4¼	19.5
CSFH-6210WT	2.10	T4	4½	19.5

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance could result in death or serious injury.

- Installation must conform to requirements of the authority having jurisdiction. Such applicable requirements take precedence over the general instructions of this manual.
- Where required by the authority having jurisdiction, the installation must conform to the American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME No. CSD-1.
- LOCATE BOILERS in front of final position before removing crate. Provide a level solid base as near the chimney as possible, and centrally located with respect to the heat distribution system as practical.
- When installed in utility room, door should be wide enough to allow largest boiler part to enter, or to permit

replacement of another appliance such as water heater.

⚠ WARNING

Fire hazard. Do not install boiler on combustible flooring or carpeting. Failure to follow these instructions could result in death or serious injury.

Boiler must not be installed on carpeting or vinyl flooring. Minimum clearances to combustible construction are:

- TOP 24 IN.
- FRONT 24 IN.
- FLUE CONNECTOR 9 IN.
- REAR 6 IN.
- SIDES 6 IN.

NOTICE

Clearance for access should exceed fire protection clearance.

REMOVE CRATE and plastic protective wrapper, inspect for damage.
Move boiler to permanent position by sliding or walking.

⚠ WARNING

Asphyxiation, fire hazard. Do not obstruct air openings to combustion area. Follow instructions below, to maintain adequate combustion air.

COMBUSTION AIR REQUIREMENTS (MINIMUM OPENING IN SQUARE INCHES)				
INPUT (Mbh)	*UNCONFINED AREA		**CONFINED AREA	
	OUTSIDE COMBUSTION AIR	INSIDE COMBUSTION AIR	OUTSIDE COMBUSTION AIR	
	1 IN ² /5000Btu/HR (PARAGRAPH 4)	1 IN ² /1000 Btu/HR (MIN 100IN ²) (Figure 1)	1 IN ² /4000 Btu/HR (Figures 2&3)	1 IN ² /2000 Btu/HR (Figure 4)
119	24	119	30	60
140	28	140	35	70
175	35	175	44	88
203	41	203	51	102
224	45	224	56	112
245	49	245	62	123
259	52	259	65	130
294	59	297	74	147

* Unconfined area: A space whose volume is not less than 50 cubic feet per 1000 Btu per hour of all appliances installed in that space (cubic feet of space = height x width x length).

** Confined area: A space whose volume is less than 50 cubic feet per 1000 Btu per hour of all appliances installed in that space (cubic feet of space = height x width x length).

1. Ventilation of boiler room must be adequate enough to provide sufficient air to properly support combustion.
2. When boiler is located in an unconfined space in a building of conventional construction frame, masonry or metal, infiltration normally is adequate to provide air for combustion and ventilation. However, in any building which has been altered to conserve energy or to minimize infiltration, the boiler area should be considered as a CONFINED SPACE. Provide combustion air and ventilation air in accordance with the section "Air for Combustion and Ventilation," of NFPA 31: Standard for the Installation of Oil-Burning Equipment.
3. When a boiler is installed in an unconfined space, in a building of unusually tight construction, air for combustion and room ventilation must be obtained from outdoors or from spaces freely communicating with the outdoors. A permanent opening or openings having a total free area of not less than 1 square inch per 5,000 Btu per hour of total input rating of all appliances shall be provided. Ducts may be used to convey make-up air from the outdoors and shall have the same cross-sectional area of the openings to which they are connected.

VENTILATION & COMBUSTION AIR

4. When air for combustion and room ventilation is from inside buildings, confined space shall be provided with two permanent openings, one starting 12 inches from the top and one 12 inches from the bottom of the enclosed space. Each opening shall have a minimum free area of 1 square inch per one thousand (1,000) Btu per hour of the total input rating of all appliances in the enclosed space, but must not be less than one hundred (100) square inches. These openings must freely communicate with the interior areas having adequate infiltration from the outside. See **Figure #1**.
5. When the boiler is installed in a confined space and all air is provided from the outdoors, the confined space shall be provided with two permanent openings, one commencing within 12 inches from the top and one commencing 12 inches from the bottom of the enclosure. The openings shall communicate directly, or by ducts, with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors. One of the following methods must be used to provide adequate air for ventilation and combustion.
 - A. When directly communicating with the outdoors, each opening shall have a minimum free area of 1 square inch per 4,000 Btu per hour of total input rating of all equipment in the enclosure. See **Figure #2**.
 - B. When communicating with the outdoors by means of vertical ducts, each opening shall have a minimum free area 1 square inch per 4,000 Btu per hour of total input rating of all appliances in the enclosed space. See **Figure #3**.
 - C. If horizontal ducts are used, each opening shall have a minimum free area 1 square inch per 2,000 Btu per hour total input rating of all appliances in the enclosed space. See **Figure #4**.
 - D. When ducts are used, they shall be of the same cross sectional area as the free area of the area of the openings to which they connect. The minimum dimension of rectangular air ducts shall not be less than 3 inches.
6. In calculating free area using louvers, grills or screens for the above, consideration shall be given to their blocking effect. Screens used shall not be smaller than $\frac{1}{4}$ inch mesh. If the free area through a design of louver or grill is known, it should be used in calculating the size opening required to provide the free area specified. If the design and free area is not known, it may be assumed that wood louvers will have 20-25% free area and metal louvers and grills will have 60-75% free area. Louvers and grills shall be fixed in the open position or interlocked with the boiler so that they are opened automatically during boiler operation. Refer to the *Combustion Air Requirements* chart on previous page for combustion air minimum opening requirements.

Figure #1

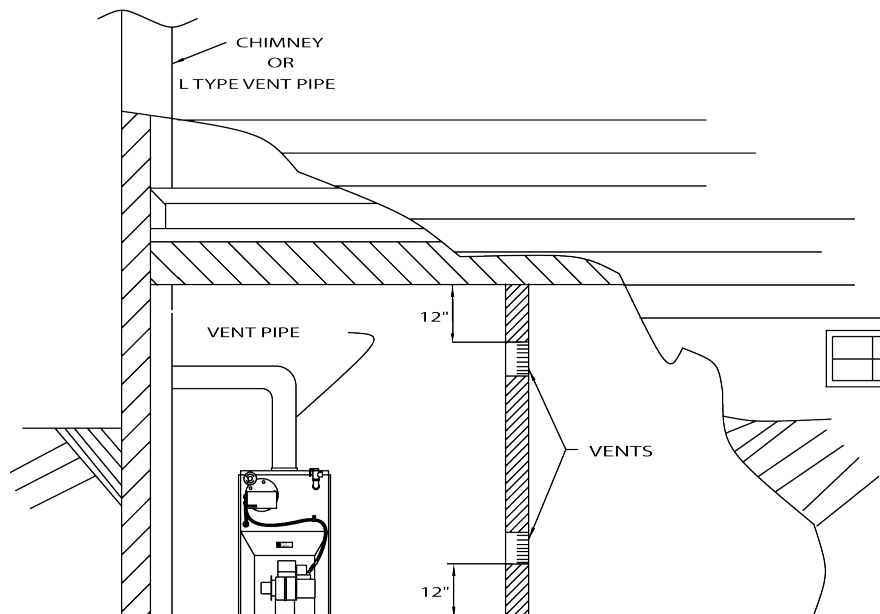


Figure #2

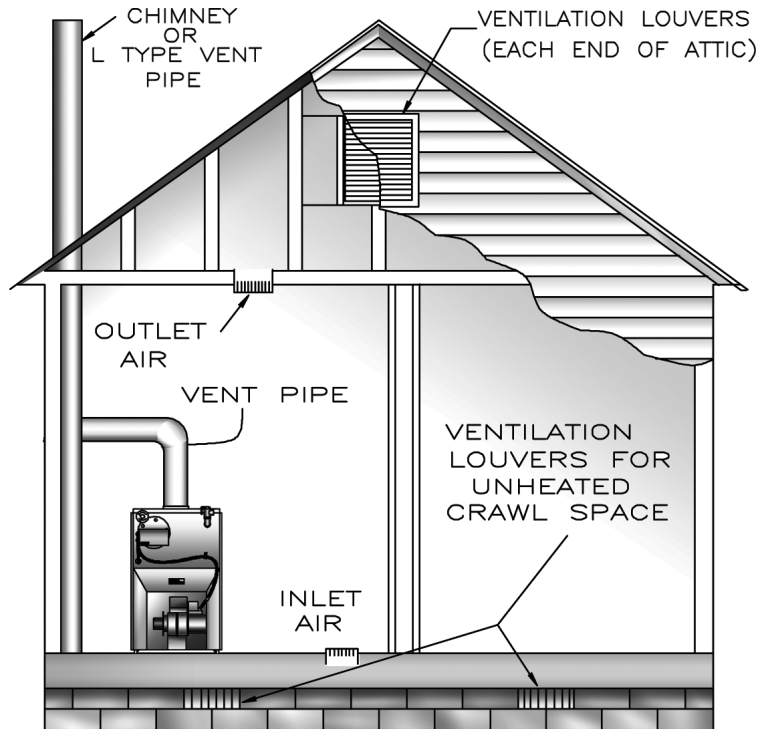


Figure #3

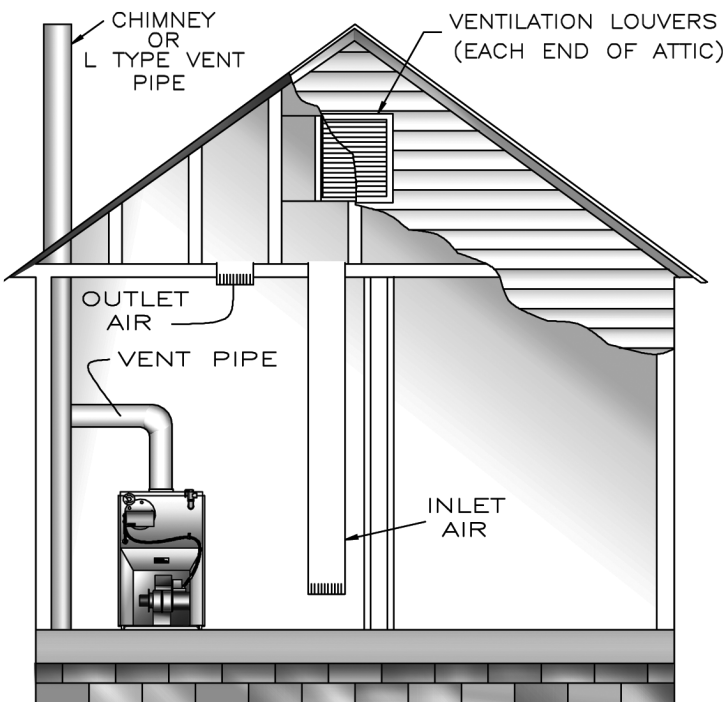
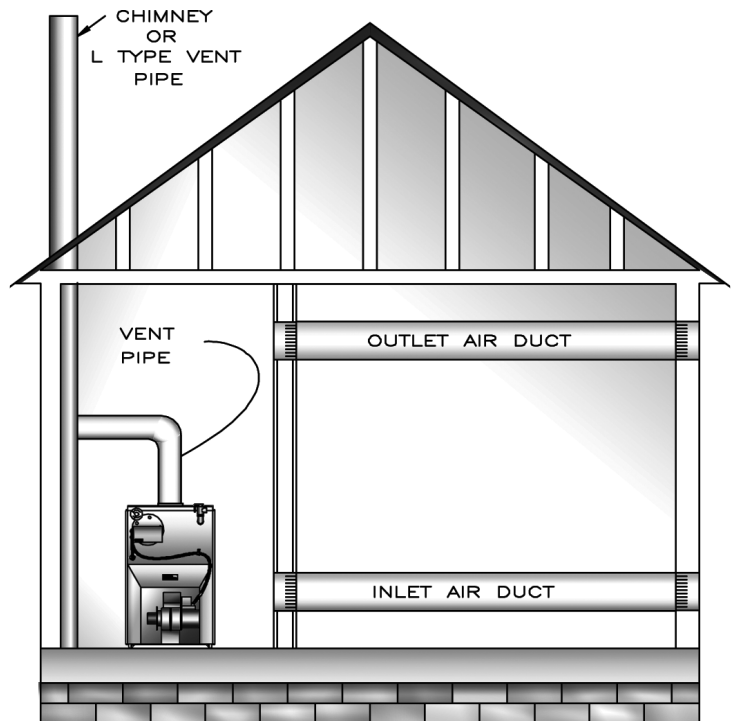


Figure #4



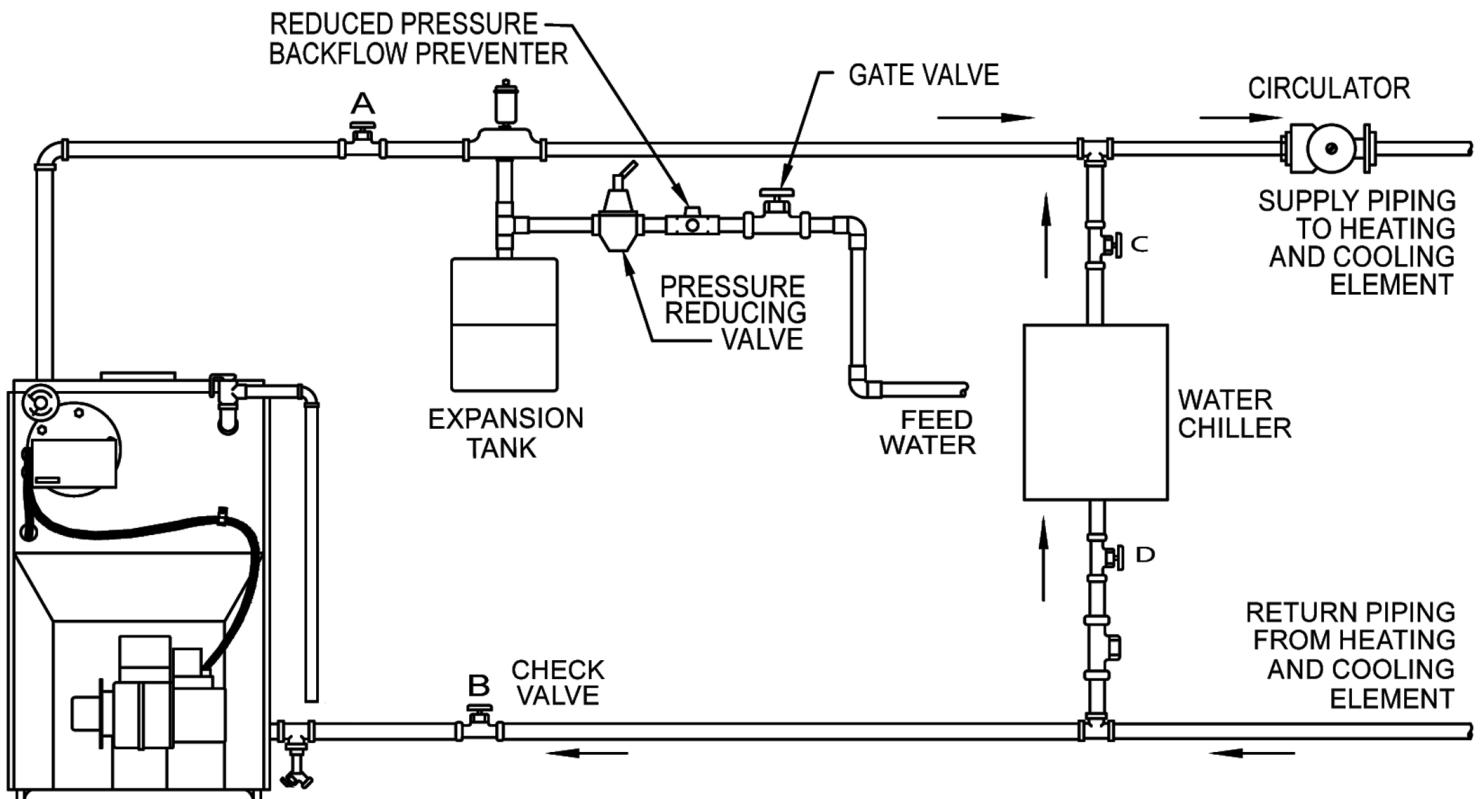
CONNECTING SUPPLY AND RETURN PIPING

1. Connect supply and return piping as suggested in **Figure #5**, below. When boiler is used in connection with refrigerated systems:
 - A. Chilled medium **MUST BE IN PARALLEL** with boiler.
 - B. Use appropriate valves to prevent chilled medium from entering heating boiler.
2. During heating cycle open valves A and B, close valves C and D.
3. During heating cooling cycle open valves C and D, close valves A and B.
 - A. Maintain minimum clearance of one inch to hot water pipes.
4. Hot water boilers installed above radiation level must be provided with low water device either as part of boiler or at time of boiler installation.
5. When boiler is connected to heating system utilizing multiple zoned circulators, each circulator must be supplied with flow control valve to prevent gravity circulation.

** Reduced pressure back flow preventer must be used under provisions required by the Environmental Protection Agency, (EPA).*
6. Bypass piping is an option which gives ability to adjust supply boiler water temperature to fit system or condition of installation. Although, this method of piping is not typically required for baseboard heating systems.

In air handling units where they may be exposed to refrigerated air circulation, boiler piping system **MUST** be supplied with flow control valves or other automatic means to prevent gravity circulation of boiler water during cooling cycle.

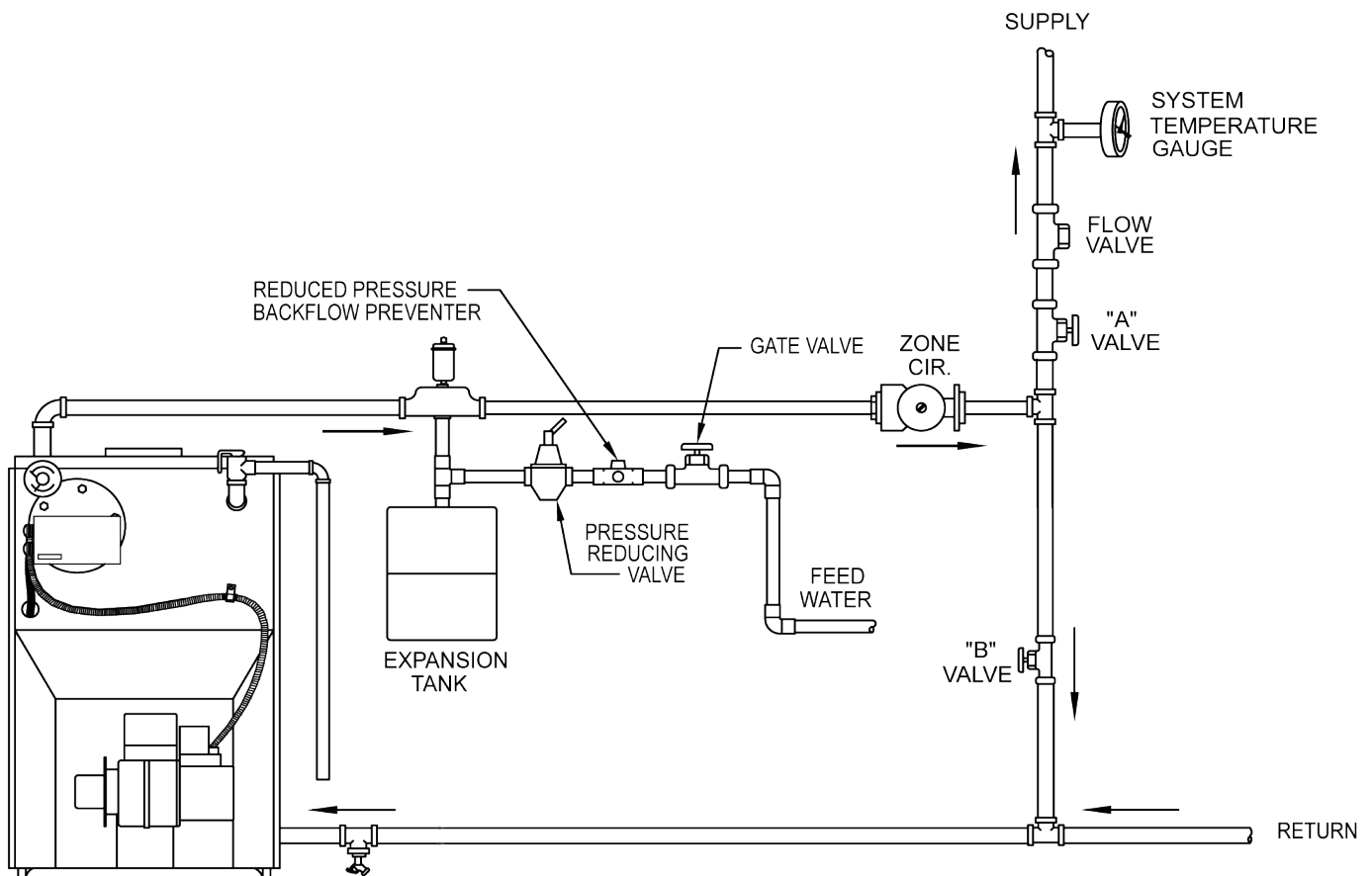
Figure #5 Typical Piping Configuration



CONNECTING SUPPLY AND RETURN PIPING

- A. This method is used to protect boilers from condensate forming due to low temperature return water. Generally noticed in large converted gravity systems or other large water volume systems. See **Figure #6**.
- B. These methods are used to protect systems using radiant panels and material they are encased in from high temperature supply water from boiler and protect boiler from condensation. See **Figures #7 and #8** following page.
- C. This method is used to protect boilers from condensate forming as well as protecting heating system from high water temperature. See **Figure #8** following page.
- Note:** When using bypass piping, adjust valves A and B until desired system temperature is obtained.
7. Bypass loop piping must be same size piping for supply and return.

Figure #6 Bypass Piping



CONNECTING SUPPLY AND RETURN PIPING

Figure #7 - Mixing Valve Piping

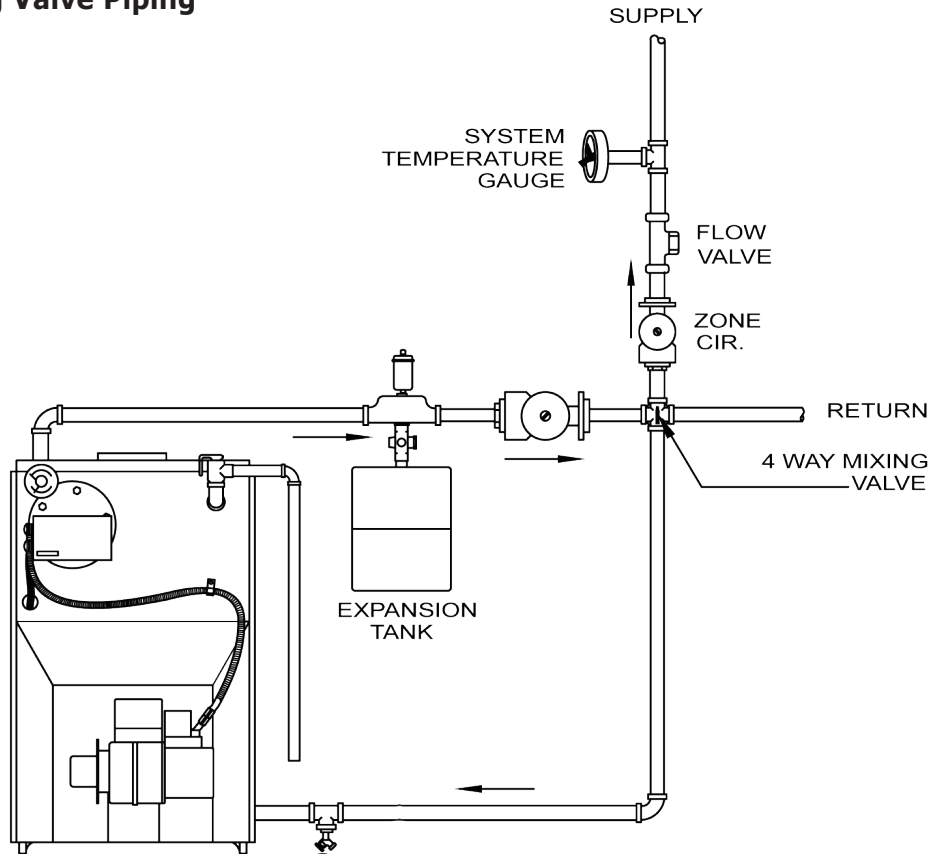
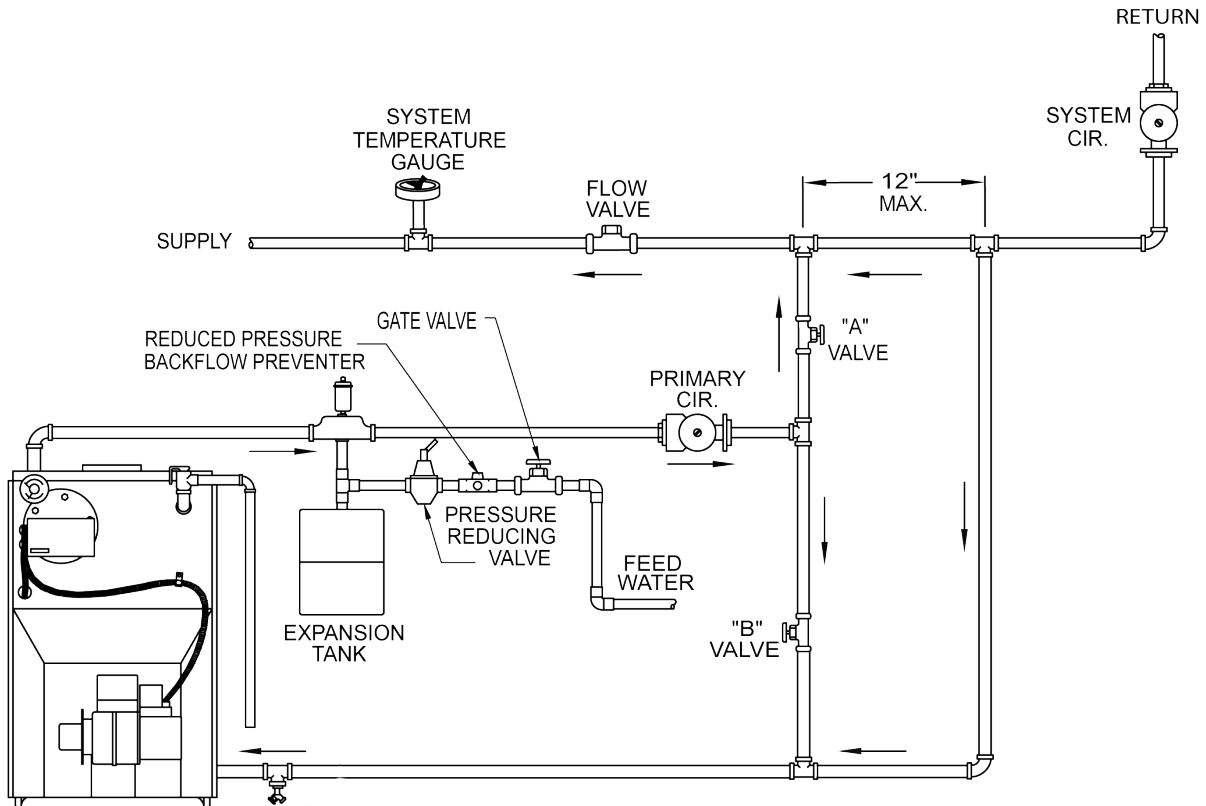


Figure #8 - Primary Secondary Piping With Bypass



CONNECTING SUPPLY AND RETURN PIPING

- Typical indirect water heater installation using circulators is shown in **Figure #9**.
- Typical indirect water heater installation using zone valves is shown in **Figure #10**.

Figure #9 - Indirect Water Heater Piping with Circulator

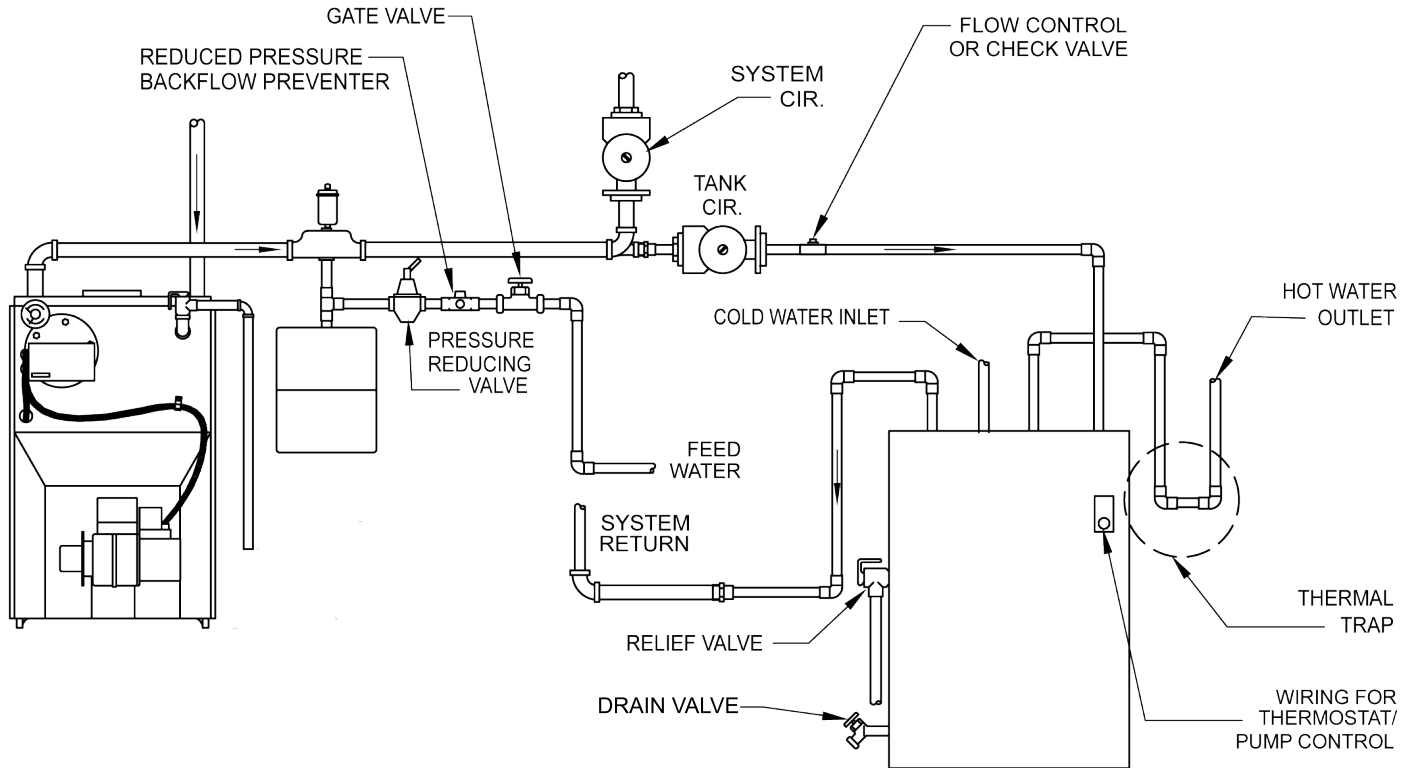
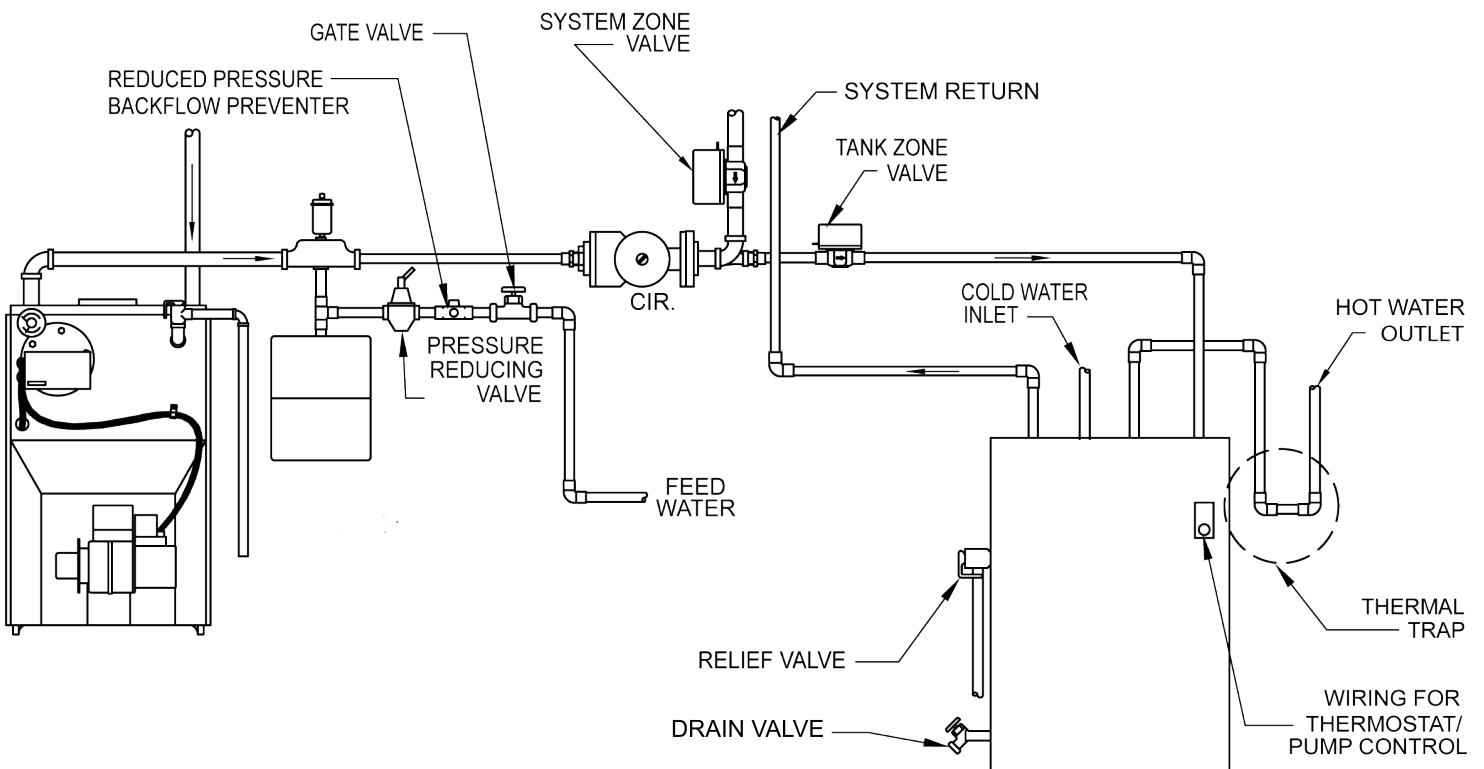


Figure #10 - Indirect Water Heater Piping with Zone Valve



⚠ WARNING

Burn or Scald Hazard. Discharge line shall be installed to relief valve outlet connection to avoid burns, scalding, or water damage due to discharge of steam and/or hot water during operation.

Discharge line shall:

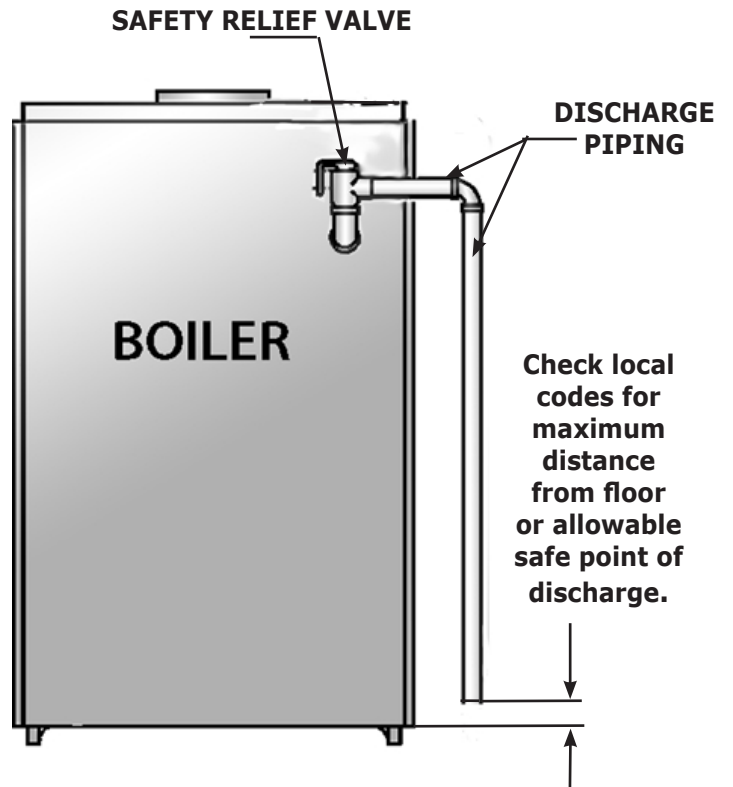
- Connect to safety valve outlet. Piped down to safe point of disposal. Check local codes for maximum distance from floor or allowable safe point of discharge.
- Pipe size be of equal to or greater than of safety valve outlet over entire length of discharge line.
- Have no intervening shutoff valve between safety valve and discharge to atmosphere. Do not plug or place any obstruction in discharge line.
- Terminate freely to atmosphere where any discharge will be clearly visible and at no risk of freezing.
- Allow complete drainage of valve and discharge line.
 - Install safety valve with spindle in vertical position.
 - Do not install shutoff valve between boiler and safety valve.
 - Support safety valve discharge piping.
- Be short and straight as possible.
- Terminate with plain end, not threaded.
- Constructed of material suitable for exposure to temperatures of 375° F (191°C); or greater.

Refer to local codes and appropriate ASME Boiler and Pressure Vessel Code for additional installation requirements.

10. Install discharge piping from safety relief valve.

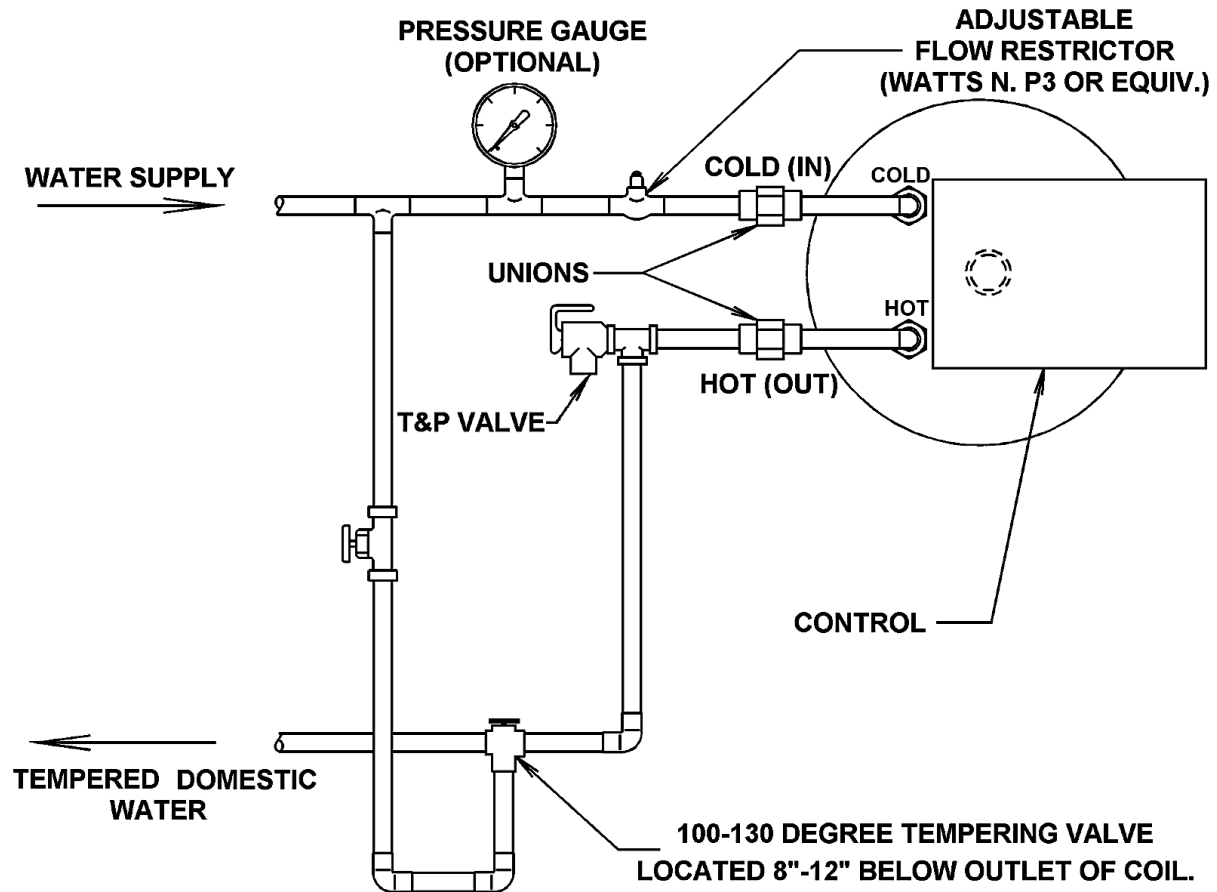
- Use $\frac{3}{4}$ " or larger pipe. See **Figure #11**.
- Individual boiler discharge piping shall be independent of other discharge piping.
- Size and arrange discharge piping to avoid reducing safety relief valve relieving capacity below minimum relief valve capacity stated on rating plate.
- Install union, if used, close to safety relief valve outlet.
- Install elbow(s), if used, close to safety relief valve outlet and downstream of union (if used).

Figure #11 - Discharge Piping From Safety Relief Valve



CONNECTING SUPPLY AND RETURN PIPING

Figure #12 - Recommended Piping For Boilers Equipped With T3 Or T4 Tankless Heater



⚠ DANGER

Water temperatures exceeding 125°F will cause severe burns instantly or death by scalding.

- Automatic mixing valve must be installed on outlet of domestic coil. Installation must comply with valve manufacturer's recommendations, and instructions.
- Do not remove bolts or limit at time of installation.
- Pipe in accordance with boiler's Installation, Operation and Maintenance Manual.
- Due to varying water conditions, adjustable flow restrictor must be installed in cold water inlet of this coil.

CONNECTING SUPPLY AND RETURN PIPING

OPTIONS UTILIZING 3/4" TAPPING

Figure #13 - Optional Location For Air Vent

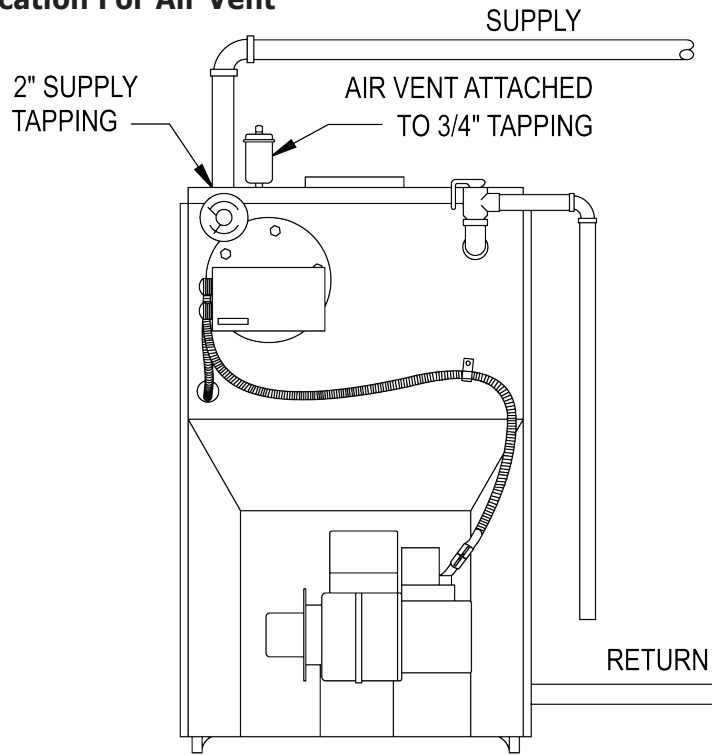
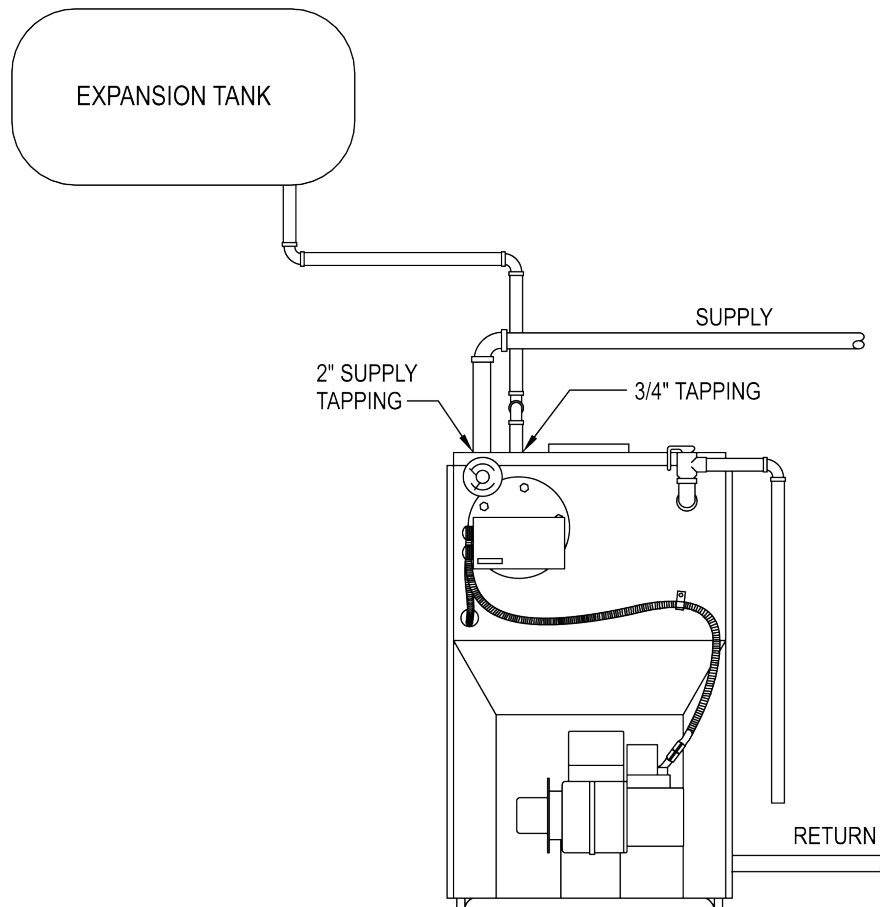


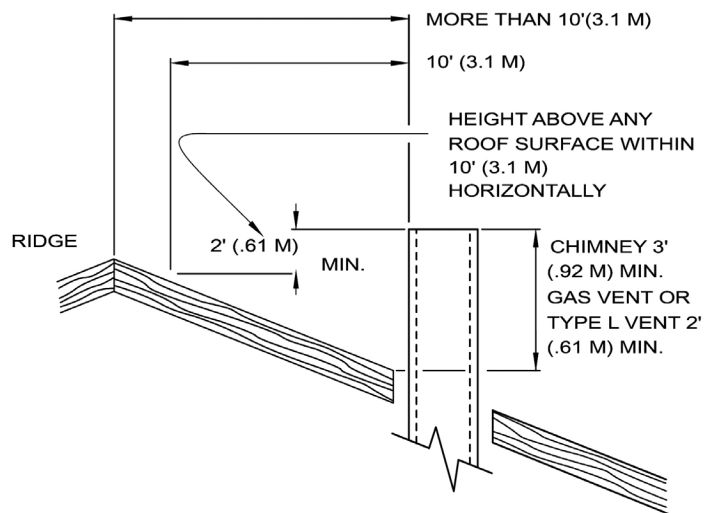
Figure #14 - Optional Location For Expansion Tank (Non-Diaphragm Type)



INSPECT CHIMNEY to make certain it is constructed according to latest revision of the NFPA 211. Local codes may differ from this code and should be checked. Where there is a conflict, local code will prevail.

- Boiler must be installed into chimney which has masonry or metallic chimney liner.
- Unlined chimney will have leaks that will cause poor chimney performance (NO DRAFT), and could result in positive pressure in combustion chamber.
- Horizontal portions of venting system should not exceed 10 feet in length. Horizontal lengths over 10 feet will have negative effect on chimney performance.
- Chimney should extend at least 2 feet above any portion of building within 10 feet. See **Figure #15**. It should produce negative draft of .06 to .08 inches of water column, (W.C.), as measured with draft gauge between boiler and barometric draft control while maintaining .02 inch W.C. negative draft in combustion chamber. See chart "Chimney or Vent Sizes" for recommended chimney or vent sizes.
- Inadequate draft will cause improper combustion, resulting in dirty flue ways and high fuel bills.

Figure #15



CONNECT FLUE PIPE same size as boiler outlet to chimney, sloping upward continuously toward chimney approximately 1/4" per foot. Bolt or screw joints together to avoid sag.

If oil fired water heater is vented into same flue as boiler, provide separate hole into chimney whenever possible. When not possible, use "Y" connection in flue pipe, using separate draft regulator for each unit.

When chimney will not provide adequate draft to handle input from water heater and boiler simultaneously, wire units so that only one will operate at a time, favoring water heater.

OIL TANK AND PIPING

- Install burner per instructions provided with burner-in-a-box kit.
- Install oil tank and piping in accordance with the National Board of Fire Underwriters and local regulations.
- Oil storage tank, vent, fill pipe and caps should be as prescribed by local codes.
- In no case should vent pipe be smaller than 1¼" I.P.S. Fill pipe should not be less than 2" I.P.S.
- Suction line from tank to burner should be one continuous piece of tubing to prevent air entering line.
- Suction line, must be ¾" O.D. copper tubing for runs of 50 feet or less, and ½" O.D. for longer runs. Oil return line, same size as suction line, must be used on any installation where bottom of tank is below fuel unit of burner.
- Oil lines should be buried or otherwise protected from mechanical injury.
- Flare fittings on all oil lines are recommended. Compression fittings on suction line often allow air to be drawn into fuel pump, making it difficult to maintain

oil pressure at nozzle.

- Do not run overhead fuel lines from tank to oil burner.
- Fuel pump connections and by-pass should be made according to instructions attached to fuel pump. If tank is more than 20' from boiler, a two stage fuel unit should be installed in place of single stage pump supplied as standard equipment with burner. Make certain rotation and speed are same and pump is suitable for burner horsepower rating.
- Oil line filter and shut-off valve should be installed in suction line. Shut-off valves should be installed in both suction and return lines at burner for convenience in servicing burner.
- Allow extra tubing at burner so burner may be removed from boiler for cleaning without disconnecting tubing. (See **Figures #16 & #17**, below).
- Optional flexible oil line is available.

Figure #16 - Typical Installation Single Pipe Oil System

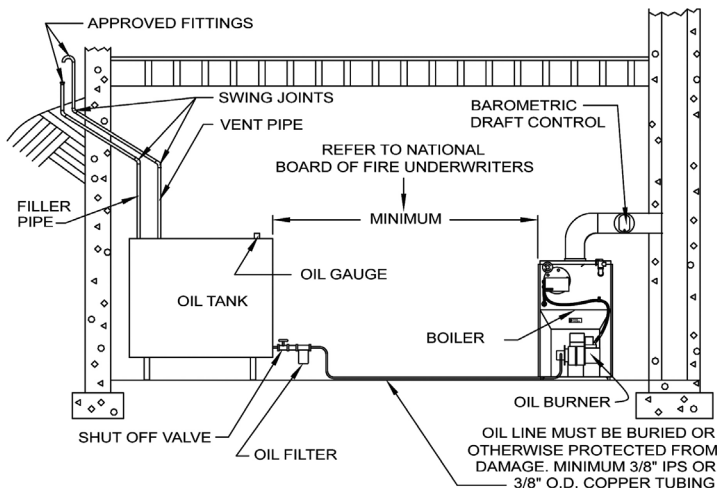
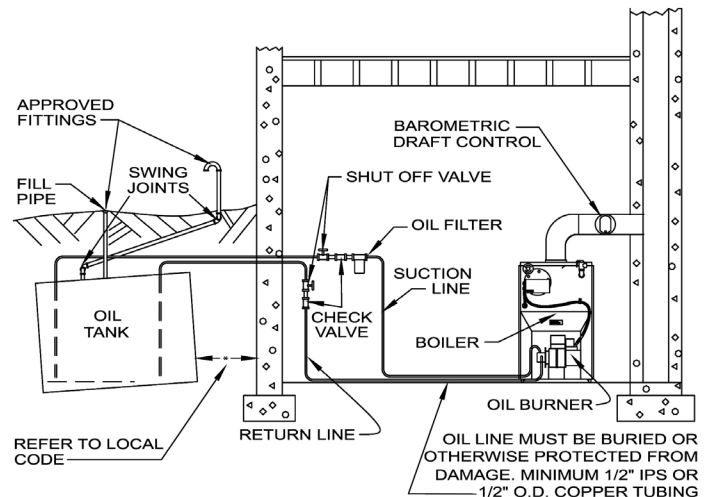


Figure #17 - Typical Installation Two Pipe Oil System



⚠ WARNING

Electrical shock hazard. Turn OFF electrical power supply at service panel before making electrical connections. Failure to do so could result in death or serious injury.

Electrically bond boiler to ground in accordance with requirements of authority having jurisdiction. Refer to:

- USA- National Electrical Code, ANSI/NFPA 70.

Install fused disconnect switch between boiler and meter at convenient location.

Sequence Of Operations

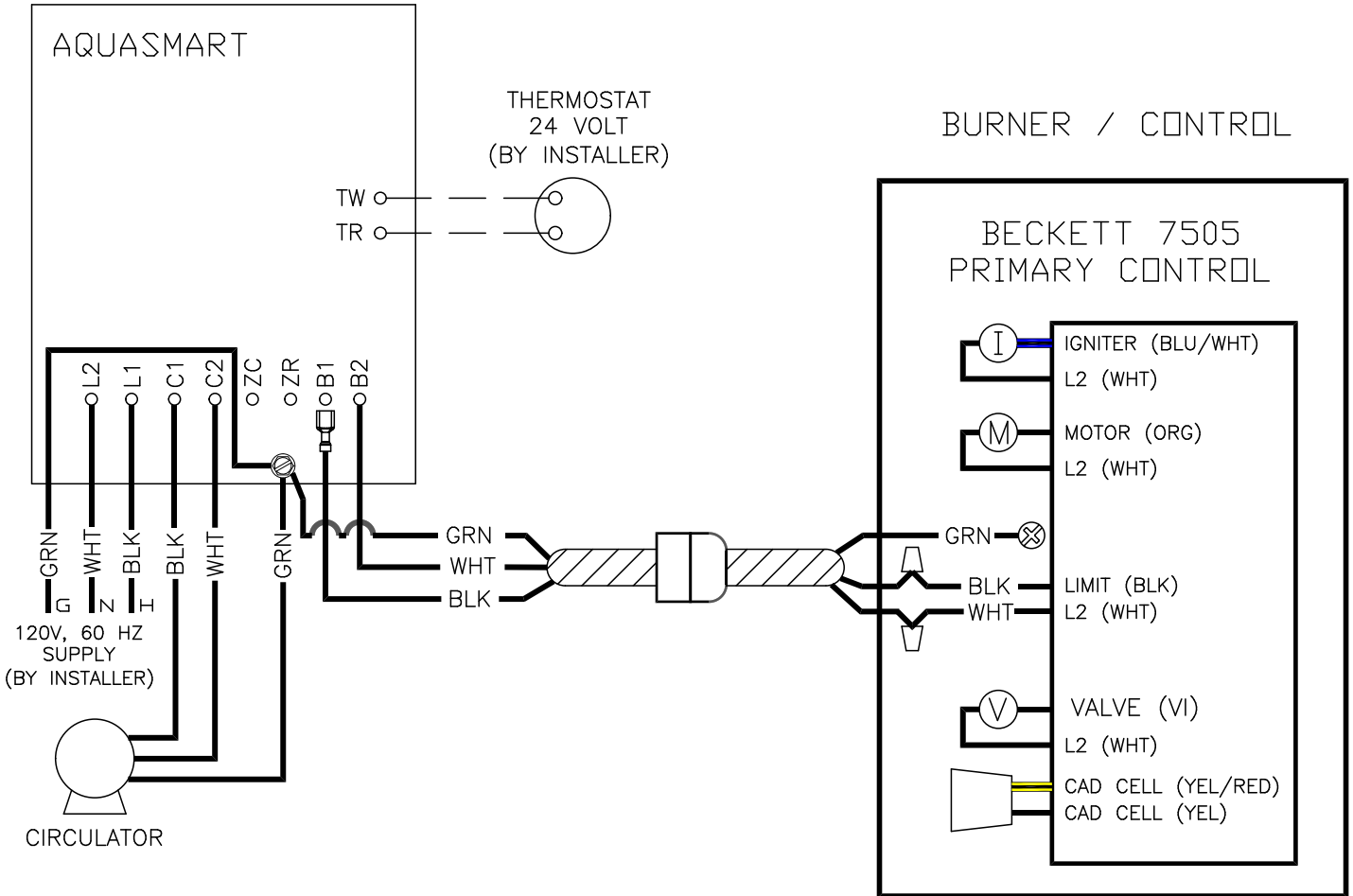
On call for heat, thermostat will actuate, completing circuit to limit. In turn, circulator and ignition systems are activated and ignition will begin.

In event boiler water temperature exceeds high limit setting on boiler mounted limit, power will be interrupted between limit and ignition system. Power will remain off until boiler water temperature drops below high limit setting. Circulator will continue to operate under this condition until thermostat is satisfied.

Thermostat Installation

1. Thermostat should be installed on inside wall about four feet above the floor.
2. **NEVER** install thermostat on outside wall.
3. Do not install thermostat where it will be affected by:
 - Drafts
 - Hot or cold pipes
 - Sun light
 - Lighting fixtures
 - Television sets
 - Fireplace or chimney
4. Check thermostat operation by raising and lowering thermostat as required to start and stop burner.
5. Instructions for final adjustment of thermostat are packaged with thermostat (adjusting heating anticipator, calibration, ect.).

Figure #18 - Wiring Diagram Beckett AFG with or without Tankless Heater



Note: Limit control program based on use with or without tankless heater. Refer to Beckett AquaSmart™ Product Manual provided with boiler for additional information.

Figure #19 - Wiring Diagram Riello 40F5 with or without Tankless Heater

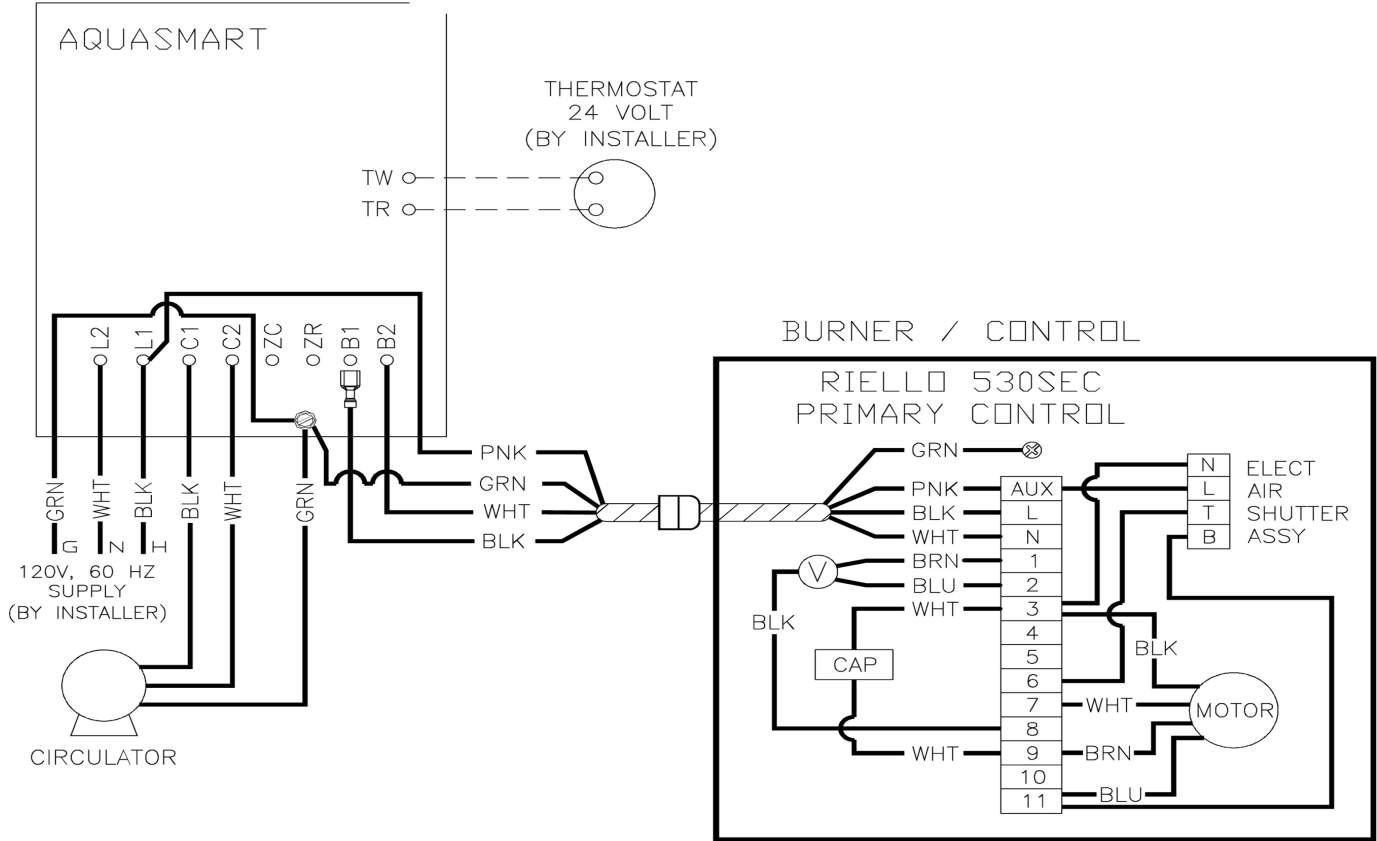


Figure #20 - Wiring Diagram Riello 40 F10 with or without Tankless Heater

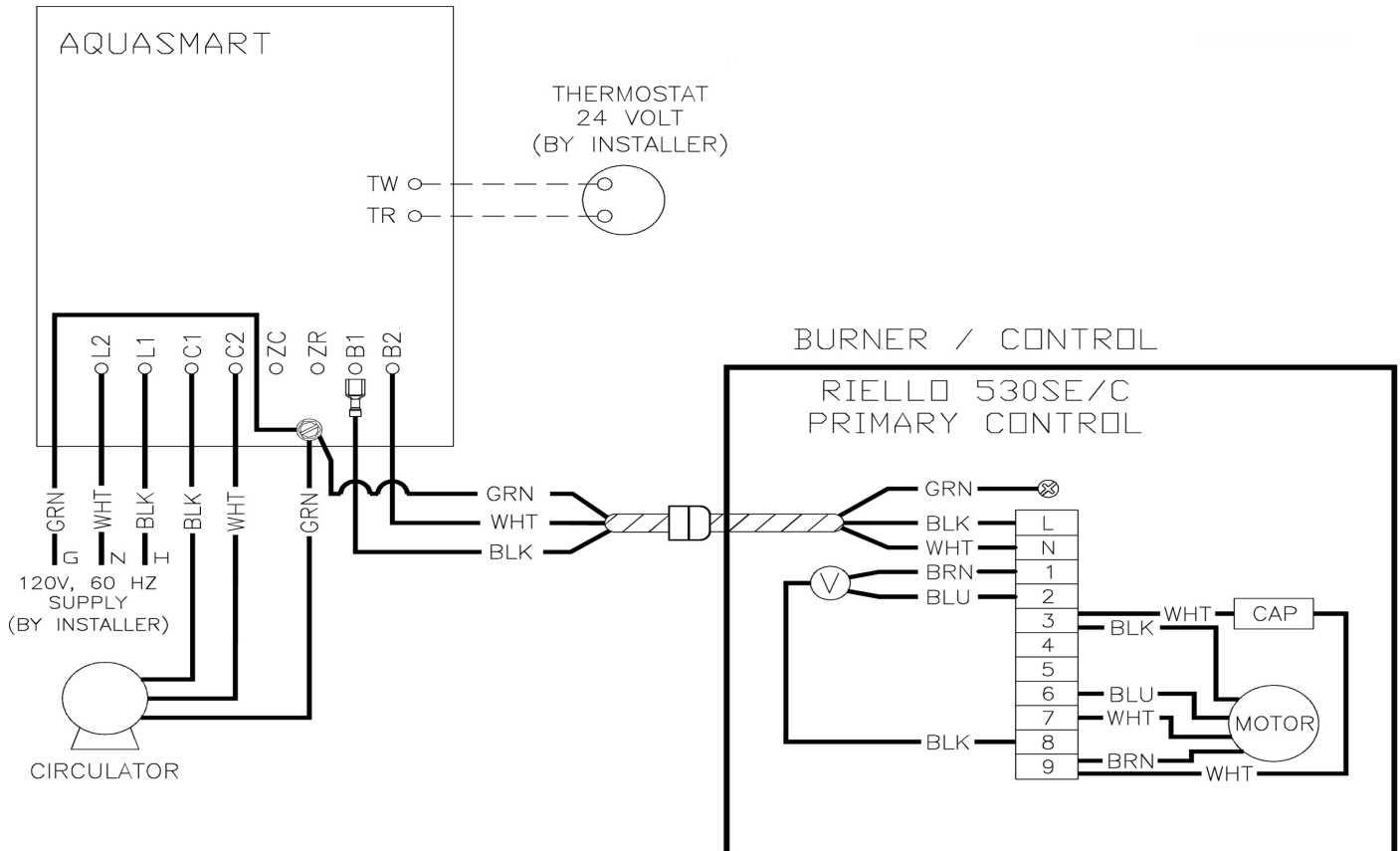
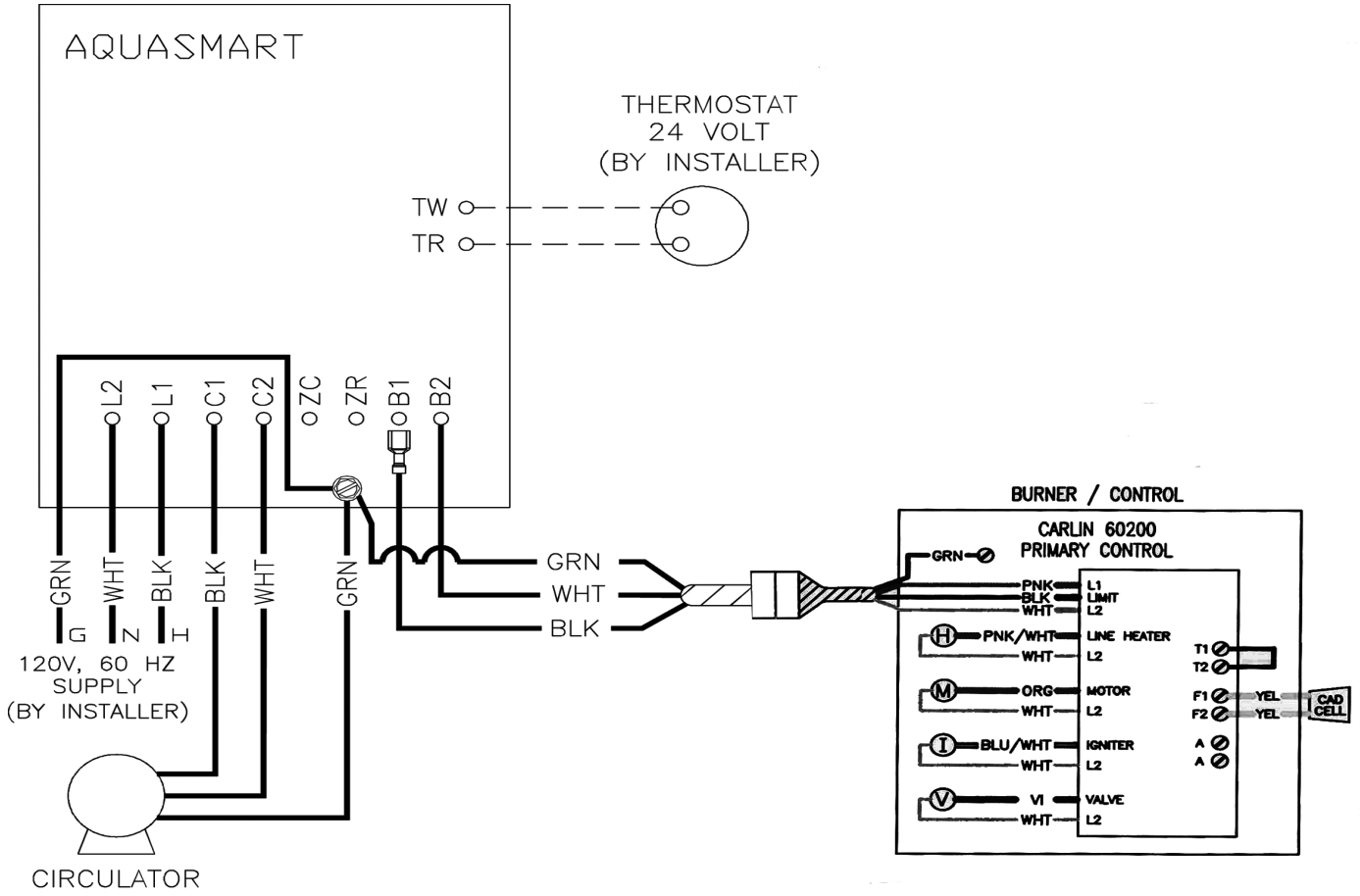


Figure #21 - Wiring Diagram Carlin EZ-1/2 with or without Tankless Heater



Operating Instructions

1. Inspect venting system at start of each heating season.
2. Check vent pipe from boiler to chimney for signs of deterioration by rust or sagging joints. Repair if necessary.
3. Remove vent pipe at base of chimney or flue and, using mirror, check for obstruction.

Safety Relief Valve

⚠ WARNING

Burn and scald hazard. Safety relief valve could discharge steam or hot water during operation.

- Operate lever of safety relief valve, on boiler periodically to make sure it is functioning properly.
- Safety relief valve should open before water pressure exceeds 30 psi reading on gauge.
- If this pressure is exceeded and safety relief valve starts leaking water when boiler is operating at normal pressures, it should be immediately replaced.
- Corrosion can build up rapidly at valve seat and prevent its functioning as safety device. See **Figure #11**, page 13.

Start-Up And Adjustment Of Oil Burner

(See oil burner instructions for nozzle and electrode setting)

- A. Check oil burner nozzle to make certain it is tight in adapter.
- B. Check electrode setting, they may have been jarred out of position during transportation.
- C. Burner mounting bolts should be tight.
- D. Set room thermostat to call for heat, or jump thermostat contacts on the boiler control.
- E. Open all oil line valves.
- F. Turn service switch on. Burner should start.
- G. On one pipe fuel systems only, vent pump as soon as burner starts. Allow oil to run until all traces of air in the suction line disappear.
- H. Turn "OFF" burner and install pressure gauge port on pump.
- I. Start burner again and check oil pressure see setup charts on page 23. Adjust if necessary.

Do not set fire visually. Instruments are only reliable method to determine proper air adjustments.

Improperly adjusted burner causes soot and high fuel bills because of incomplete combustion of fuel oil. This in turn may require excessive boiler maintenance, service costs, and in some instances, house cleaning or redecorating. A competent service mechanic should be consulted to make proper adjustments with smoke tester, CO₂ indicator and draft gauge.

Instructions For Proper Operation Of Boiler Burner Unit

A 1/4" diameter slot is provided in inspection cover plate to take draft readings in combustion chamber. See **Figure #22**. A 1/4" diameter hole will be required in flue pipe between boiler and barometric damper (if used) to take draft, CO₂, smoke and temperature readings. Adjust air shutter on oil burner to obtain "trace" of smoke. Measure CO₂ at this point. Increase air adjustment to lower CO₂ approximately one (1) percent. Check to insure minimum negative .02" w.c., (water column), "overfire" draft and zero (0) smoke. If - .02" w.c. "overfire" draft can not be maintained, changes and/or modifications may be required in venting or chimney.

Following table (page 22) is provided as guideline for initial start-up. Final adjustments MUST be made using combustion instruments as previously mentioned.

Check Safety Control Circuit - for satisfactory performance after burner adjustments have been made.

1. High limit control: remove cover and note temperature setting. See **Figure #22**. With burner operating, decrease setting to minimum point. When boiler water temperature exceeds this set point, high limit switch will open, shutting off power to oil burner. Return setting to desired high limit point. Burner should restart. Refer to instructions included with limit.
2. Primary control and flame sensor check following:
 - A. **Flame failure** - simulate by shutting off oil supply with hand valve while burner is on. After flame extinguishes, control goes through recycle period and attempts another ignition then locks out. To restart, open oil supply valve and reset safety switch. Refer to instructions included with burner.
 - B. **Ignition failure** - with burner off, close oil supply valve and run through start-up procedure, The safety switch should lock out as in flame failure.

OPERATING INSTRUCTIONS

C. Power failure - Turn off main power supply switch while burner is operating. When burner stops, restore power and burner should start.

If operation is not as described as above, check wiring and controls.

Preventive Maintenance - of oil fired boiler reduces operating costs. Boiler and vent pipe should be inspected for accumulation of soot or scale deposits periodically but at least once every year before start of each heating season. When soot is present on section walls and flueways, improper combustion will result, causing additional sooting and scaling until flueways are completely closed. To remove soot and scale from flueways, remove top jacket panel, top clean-out plate, open burner swing door. See **Figure #22**.

Periodic Inspection - and tightening of tankless heater/ cover plate bolts will reduce risk of leaks. See *Replacement Parts "Heat Exchanger"* section.

Instructions For Opening Burner Swing Door

1. Turn off power to boiler.
2. Allow boiler to cool down.
3. Disconnect power cable at factory supplied burner electrical disconnect. See **Figure #22**.

WARNING

Burn, scald hazard. Do not attempt to start the burner when excess oil has accumulated, when the unit is full of vapor, or when the combustion chamber is very hot.

NOTICE

Use only number 2 fuel oil.
Do not use gasoline, crankcase drainings or any oil containing gasoline.

4. Loosen screws on the sides of lower front jacket panel. See **Figure #22**.
 5. Pull bottom part of lower front panel forward.
 6. Lift lower front panel up and off boiler. See **Figure #22**.
 7. Close oil valve. See **Figures #16 & #17**.
 8. Disconnect oil line from burner.
 9. Do not try to swing door with oil line attached.
 10. Remove nut from swing door stud on right hand side of door.
 11. Swing open burner and door to the left.
- Brush, using flue brush, soot and scale into combustion space where it can be removed through swing door opening.
 - It is recommended to replace nozzle at start of each heating season.
 - Lubricate burner motor and circulator motor - if required - with few drops of good grade light motor oil. Do not over oil.
 - Have service agent service burner, check controls and check electrodes for carbon or cracks in insulators.
 - Burners should be adjusted to produce conditions shown in Start-up and Adjustment of Oil Burner procedure covered earlier in this section.
 - Use caution when vacuuming in the chamber area. Damage to chamber could result.

OPERATING INSTRUCTIONS

TABLE 1 - BECKETT AFG SETTINGS

BOILER NO.	HEAD TYPE	HEAD SETTING	STATIC PLATE	NOZZLE	PUMP PRESSURE [PSI]	AIR BAND	AIR SHUTTER
CSFH-3085W(T)	L1	--	3 ³ / ₈	0.75-60°B	140	0	8
CSFH-3100W(T)	L1	--	3 ³ / ₈	0.85-60°B	140	1	8
CSFH-4100W(T)	V1	0	2 ³ / ₄	0.85-60°B	140	0	6
CSFH-4125W(T)	V1	0	2 ³ / ₄	1.10-60°B	140	1	8
CSFH-4145W(T)	V1	2	2 ³ / ₄	1.25-60°B	140	2	10
CSFH-5160W(T)	F12	--	2 ³ / ₄	1.35-70°B	140	1	10
CSFH-5185W(T)	F12	--	2 ³ / ₄	1.50-70°B	150	2	10
CSFH-6175W(T)	F12	--	--	1.50-70°B	140	1	8
CSFH-6210W(T)	F16	--	--	1.75-70°B	145	2	10

TABLE 2 - RIELLO 40F5/40F10 SETTINGS

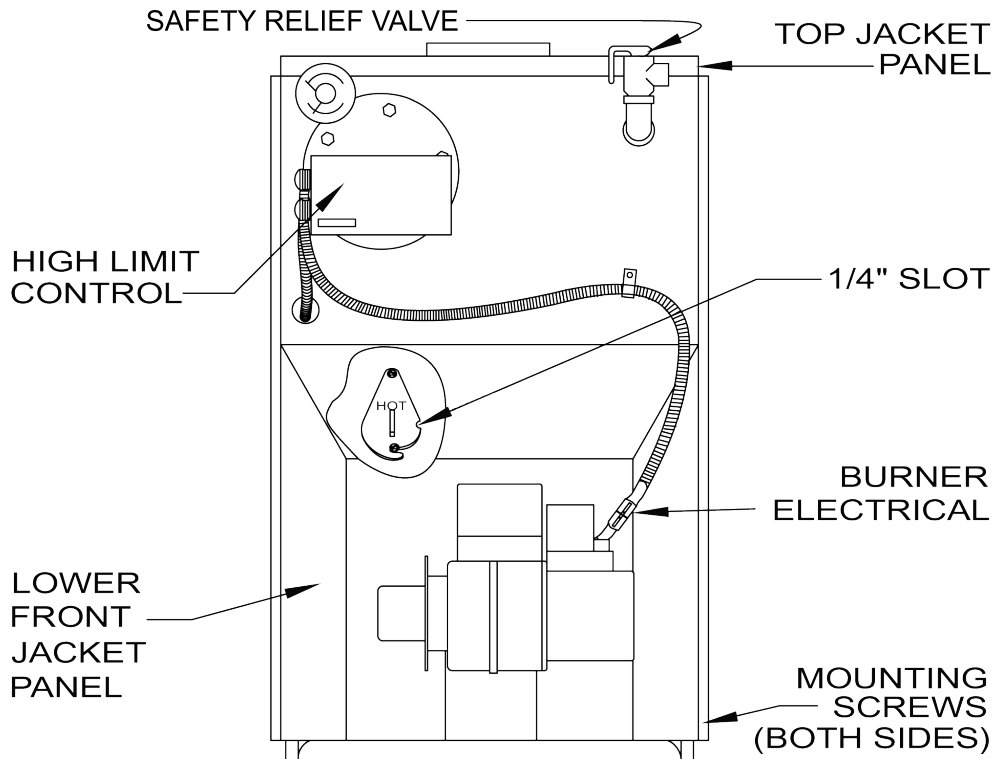
BOILER MODEL	RIELLO BURNER MODEL	BURNER INSERTION [INCHES]	NOZZLE	PUMP PRESSURE [PSI]	TURBULATOR SETTING	AIR GATE SETTING
CSFH-3085W(T)	40F5	2.25	0.70x80°W	145	0.0	2.0
CSFH-3100W(T)	40F5	2.25	0.85x80°W	145	1.0	2.5
CSFH-4100W(T)	40F5	2.25	0.85x80°W	145	1.0	2.55
CSFH-4125W(T)	40F5	2.25	1.00x80°W	155	2.0	4.0
CSFH-4145(WT)	40F5	2.25	1.20x60°W	150	3.5	4.75
CSFH-5160W(T)	40F5	2.25	1.35x60°W	145	4.0	5.75
CSFH-5160W(T)	40F10	2.25	1.35x60°W	145	1.5	2.5
CSFH-5185W(T)	40F10	2.25	1.50x60°B	150	2.0	3.0
CSFH-6175W(T)	40F10	4.75	1.50x45°B	140	0.0	3.8
CSFH-6210W(T)	40F10	4.75	1.75x45°B	145	2.0	4.75

TABLE 3 - CARLIN EZ-1/2 SETTINGS

BOILER MODEL	BURNER MODEL	FIRING RATE	NOZZLE MFR.	NOZZLE TYPE	PUMP PRESSURE [PSI]	HEAD BAR	AIR BAND SETTING	AIR SHUTTER
3085	EZ-1HP	0.85	DELAVAN	0.75 x 70 B	130	0.75	45%	BLANK
3100	EZ-1HP	1.00	DELAVAN	0.85 x 70 B	140	0.85/1.00	55%	BLANK
4100	EZ-1HP	1.00	DELAVAN	0.85 x 70 B	140	0.85/1.00	52%	BLANK
4125	EZ-1HP	1.25	DELAVAN	1.00 x 70 B	155	0.85/1.00	70%	BLANK
4145	EZ-1HP	1.45	DELAVAN	1.20 x 70 B	145	1.10/1.25	78%	BLANK
5160	EZ-2HP	1.60	DELAVAN	1.35 x 70 B	140	0.85/1.00	20%	3 SLOT
5185	EZ-2HP	1.85	DELAVAN	1.50 x 70 B	155	1.50	30%	3 SLOT
6175	EZ-2HP	1.75	DELAVAN	1.50 x 60 B	140	1.50	35%	3 SLOT
6210	EZ-2HP	2.10	DANFOSS	1.75 x 70 AS	145	1.65/1.75	65%	OPEN

Above settings are preliminary settings only. Final adjustments must be made using combustion test instruments as previously outlined in the Operating Instructions

Figure #22



Instructions For Closing Burner Swing Door

1. Swing burner and door to right until insulation is slightly compressed and stud is exposed.
2. Attach nut to stud and tighten until built in stop contacts the mounting door.
3. Replace oil line to burner.
4. Replace lower jacket panel, and tighten screws.
5. Connect power cable at factory supplied burner electrical disconnect.
6. Turn on power to boiler.
7. Bleed oil line.

Columbia

Limited Lifetime Warranty for Residential Cast Iron Water Boilers

First Year-Limited Warranty for Residential Water Boilers: (Includes Heat Exchanger and Component Parts):

Columbia warrants that its residential water boilers are free from defects in material and workmanship for one year from the date of installation. If any parts are found to be defective in manufacture, during this one year period, Columbia will supply a replacement for the defective part(s).

Second Through Twenty-Fifth Years and Beyond - Limited Lifetime Warranty for the Cast Iron Heat Exchanger of its Residential Water Boilers (Includes Heat Exchanger Only - Not Component Parts):

Columbia warrants that the cast iron heat exchanger of its residential water boilers are free from defects in material and workmanship for the second through the twenty-fifth years and beyond following the date of installation. If the heat exchanger is found to be defective in material workmanship during this period, Columbia will supply a replacement heat exchanger.

Eleventh Through Twenty-Fifth Years and Beyond - Limited Lifetime Warranty for the Cast Iron Sections of its Residential Water Boilers.

Columbia warrants that the cast iron sections of its residential water boilers are free from defects in material and workmanship for the eleventh year and beyond following the date of installation. If any sections are then found to be defective, Columbia will replace the original cast iron sections upon the payment of a proportionate charge based upon the time the defective sections have been in service. The proportionate charge will be equal to the appropriate percentage of the list price of such sections at the time the warranty claim is made, determined as follows: 11th year-5%; 12th year-10%; 13th year-15%; 14th year-20%, 15th year-25%, 16th year-30%, 17th year- 35%; 18th year-40%; 19th year-45%; 20th year-50%; 21st year-55%; 22nd year-60%; 23rd year-65%; 24th year-70%; 25th year and beyond-75%. This warranty is subject to the condition that the residential water boiler must have been installed by a heating contractor whose principal occupation is the sale and installation of plumbing, heating and/or air conditioning equipment.

EXCEPTIONS AND EXCLUSIONS

- 1.** The second through 25th year and beyond warranty covers only the cast iron heat exchanger assembly. The burner(s), jacket, controls and other equipment furnished by Columbia but purchased from other manufacturers shall be limited to their warranties, if any.
- 2.** This warranty does not cover expenses for removal or reinstallation. The homeowner will be responsible for the cost of removing and reinstalling the defective part or its replacement and all labor and material connected therewith. Replacement material will be invoiced to the distributor in the usual manner and will be subject to adjustment upon proof of defect.
- 3.** This warranty, in no way, can be considered as a guarantee of workmanship of an installer connected with the installation of the Columbia cast iron boiler or as imposing on Columbia liability of any nature for unsatisfactory performance as a result of faulty workmanship in the installation, which liability is expressly disclaimed.
- 4.** This warranty will not be applicable if the boiler is used or operated over its rated capacity; or installed for uses other than home heating; or is not maintained in accordance with Columbia recommendation or accepted good practices as determined by industry standards.

- 5.** This warranty will not be applicable if the boiler has been damaged as a result of being improperly serviced or operated, including but not limited to the following: operated with insufficient water; allowed to freeze; subjected to flood conditions; or operated with water conditions and/or fuels or additions which cause unusual deposits or corrosion in or on the iron sections.
- 6.** This warranty applies only to boilers installed within the United States.
- 7.** In order for this warranty to be effective: a) The boiler must have been properly installed in a single or two-family residential dwelling. This warranty does not apply to boilers installed in apartments or to commercial or industrial installation. b) The boiler must have been assembled in strict compliance with installation instructions furnished with the boiler by Columbia. c) Boiler sections must not have been damaged in handling during shipment or installation.
- 8.** The remedy for breach of this warranty is expressly limited to the repair or replacement of any part found to be defective under conditions of normal use; and the remedy for breach of the warranty or for negligence does not extend to liability for incidental, special or consequential damages or losses such as loss of the use of the materials, inconvenience or loss of time. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.
- 9.** The warranty is in lieu of all other, and any and all express or implied warranties (including, without limitation, any implied warranties or merchantability or fitness for a particular purpose) are expressly limited in duration to the period of the warranty as previously stated herein. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

This warranty does not extend to anyone except the first purchaser at retail and only when the boiler is in the original installation site.

IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY SHALL BE LIMITED TO THE DURATION OF THE EXPRESS WARRANTY. COLUMBIA EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY.

For prompt warranty service, notify the installer who, in turn, will notify the Columbia distributor from where the boiler was purchased. If this action does not result in warranty service, contact Columbia Customer Service Department with details in support of the warranty claim as well as a copy of your original invoice. Alleged defective part or parts must be returned through trade channels in accordance with the Columbia procedure currently in force for handling returned goods for the purpose of inspections to determine the cause of failure. Columbia will furnish the new part(s) to an authorized Columbia distributor who, in turn, will furnish the part(s) to the heating contractor who installed the boiler. If you have any questions about the coverage of the warranty, contact Columbia, at the address below.

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

Columbia

P.O. Box 24202, Baltimore, Maryland 21227

OIL FIRED BOILERS • GAS FIRED BOILERS





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