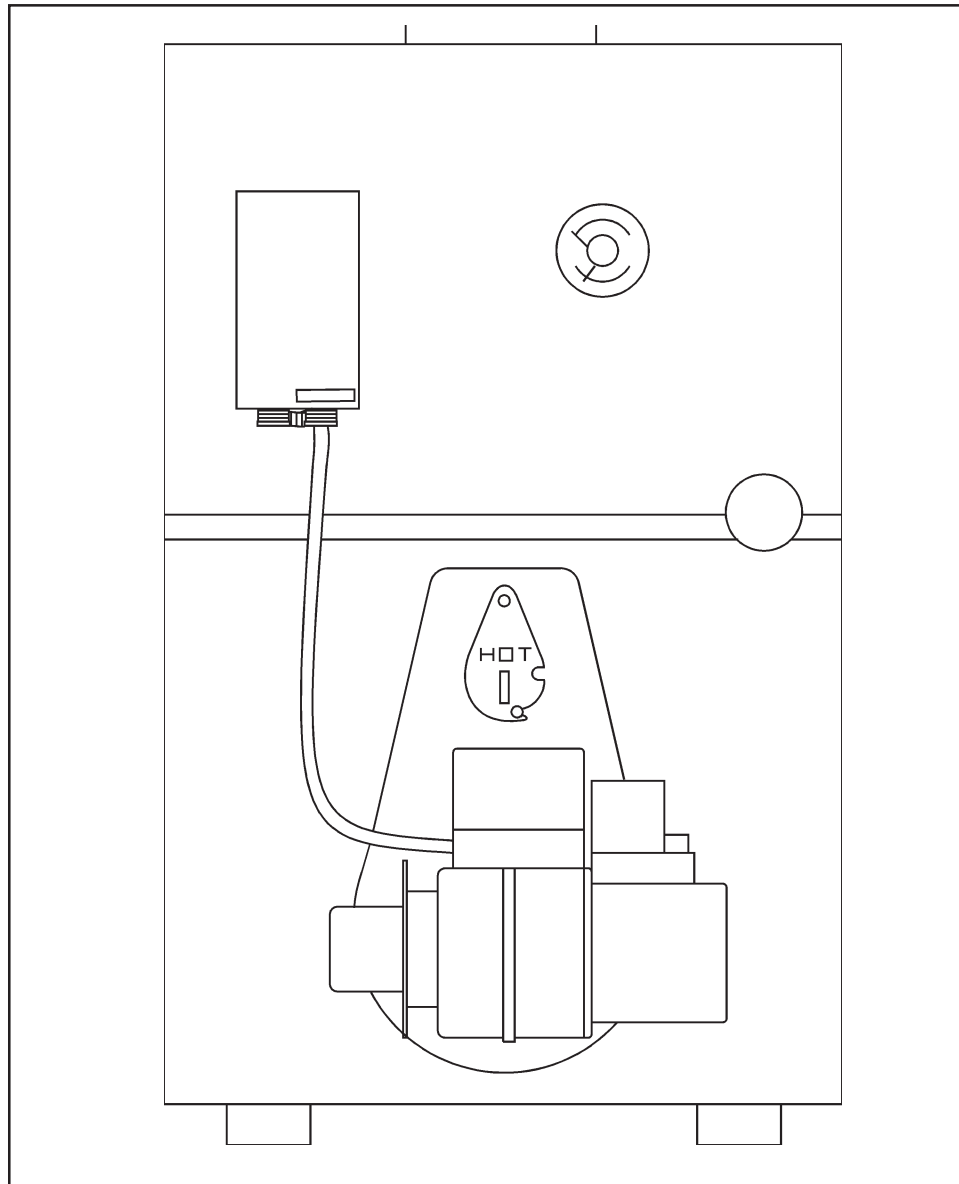


BC Series

OIL FIRED CAST IRON BOILER



Utica Boilers • P.O. Box 4729 • Utica, NY 13504

INSTALLATION MANUAL AND OPERATING INSTRUCTIONS

TABLE OF CONTENTS

SAFETY SYMBOLS & WARNINGS	PAGE 1
INSTALLATION PROCEDURE	PAGE 2
VENTILATION AND COMBUSTION AIR	PAGES 3-5
CONNECTING SUPPLY AND RETURN PIPING	PAGES 6-8
VENTING SYSTEM INSPECTION & INSTALLATION	PAGE 9
OIL TANK PIPING	PAGE 10
ELECTRICAL WIRING	PAGES 11-12
THERMOSTAT INSTALLATION	PAGE 12
NORMAL SEQUENCE OF OPERATION	PAGE 12
OPERATING INSTRUCTIONS	PAGES 13-15
SERVICE CHECK LIST	PAGE 16
JACKET DESCRIPTIONS & PART NUMBERS	PAGES 17
HEAT EXCHANGER DESCRIPTIONS & PART NUMBERS	PAGE 18
BASE DESCRIPTIONS & PART NUMBERS	PAGE 19
BURNER PARTS, CONTROLS AND MISC. PARTS	PAGE 20
RATINGS, DATA AND DIMENSIONS	BACK COVER

KEEP THIS MANUAL NEAR BOILER. RETAIN FOR FUTURE REFERENCE

SERIES BC
CAST IRON
OIL FIRED BOILER



INSTALLATION MANUAL AND OPERATING INSTRUCTIONS

PUBLISHED MARCH 1997
PRINTED IN USA
MADE IN USA



TESTED FOR 30 LBS.
ASME WORKING
PRESSURE

SAFETY SYMBOLS

The following defined symbols are used throughout this manual to notify the reader of potential hazards of varying risk levels.

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 potential hazardous situation which, if not avoided, **MAY** result in minor or moderate injury. It may also be used to alert against unsafe practices.

IMPORTANT **READ ALL INSTRUCTIONS BEFORE INSTALLING.**

WARNING

1. Keep boiler area clear and free from combustible materials, gasoline and other flammable vapors and liquids.
2. **DO NOT** obstruct air openings to the boiler room.
3. Modification, substitution or elimination of factory equipped, supplied or specified components may result in property damage, personal injury or the loss of life.
4. To the owner: Installation and service of this boiler must be performed by a qualified installer.
5. To the installer: Leave all instructions with the boiler for future reference.
6. When this product is installed in the Commonwealth of Massachusetts the installation must be performed by a Licensed Plumber or Licensed Gas Fitter.

 **WARNING:** ALL INSTALLATIONS OF BOILERS AND VENTING SHOULD BE DONE ONLY BY A QUALIFIED EXPERT AND IN ACCORDANCE WITH THE APPROPRIATE UTICA BOILERS MANUAL. INSTALLING OR VENTING A BOILER OR ANY OTHER GAS APPLIANCE WITH IMPROPER METHODS OR MATERIALS MAY RESULT IN SERIOUS INJURY OR DEATH DUE TO FIRE OR TO ASPHYXIATION FROM POISONOUS GASES SUCH AS CARBON MONOXIDE WHICH IS ODORLESS AND INVISIBLE.

INSTALLATION PROCEDURE



WARNING:

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life.

All installations must conform to the 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 BOILER in front of final position before removing crate. Provide a level solid base as near chimney as possible and centrally located with respect to the heat distribution system as practical.



WARNING:

BOILER MAY NOT BE INSTALLED ON COMBUSTIBLE FLOORING.

Allow 24 inches in the front and top for servicing and cleaning. Allow 24 inches on the right hand side for removal of tankless coil if so equipped.

When installed in a utility room, the door should be wide enough to allow the largest boiler part to enter, or to permit replacement of another appliance such as a water heater.

FOR INSTALLATION ON NON-COMBUSTIBLE FLOORS ONLY. The boiler must not be installed on carpeting, wood or vinyl flooring. Minimum clearances to combustible construction are:

TOP	24 IN.
FRONT	24 IN.
FLUE CONNECTOR	9 IN.
REAR	6 IN.
LEFT HAND SIDE	6 IN.
RIGHT HAND SIDE	24 IN.

NOTE: CLEARANCE FOR ACCESS SHOULD EXCEED FIRE PROTECTION CLEARANCE.

REMOVE CRATE and plastic protective wrapper and inspect for damage. All equipment is carefully manufactured, inspected and packaged by experienced workers. Our responsibility ceases upon delivery of the crated boiler to the carrier in good condition. Any claims for damage or shortage in shipment must be filed immediately against the carrier by the cosignee. Move boiler to permanent position by sliding or walking.

VENTILATION & COMBUSTION AIR



WARNING:

AIR OPENINGS TO COMBUSTION AREA MUST NOT BE OBSTRUCTED. BY FOLLOWING THE CHART BELOW, ADEQUATE COMBUSTION AIR CAN BE MAINTAINED.

COMBUSTION AIR REQUIREMENTS (Minimum Opening Requirements)				
	*UNCONFINED AREA		**CONFINED AREA	
	Outside	Inside	Outside Combustion Air	
BTU/HR INPUT	Combustion Air 1 IN. ² /5000 BTU/HR (Paragraph 4)	Combustion Air 1 IN. ² /1000 BTU/HR (See Fig 1) (MIN. 100 IN ²)	VERT. DUCTS 1 IN. ² /4000 BTU/HR (See Fig 2 & 3)	HORZ. DUCTS 1 IN. ² /2000 BTU/HR (See Fig 4)
107,800	22	108	27	54
140,000	28	140	35	70
196,000	40	196	49	98

*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).

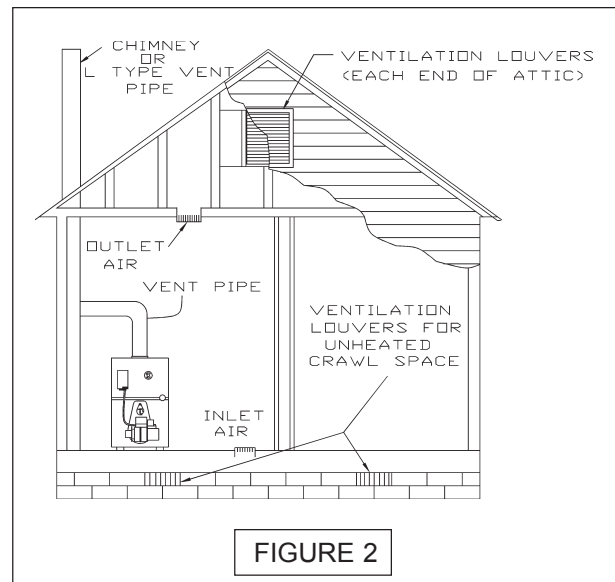
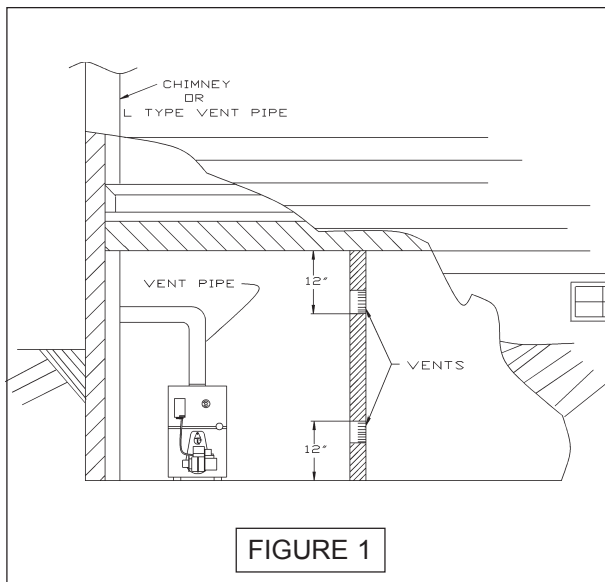
1. Ventilation of boiler room must be adequate enough to provide sufficient air to properly support combustion.

2. When a 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. If there is any doubt, install air supply provisions for combustion and ventilation in accordance with section 5.3, Air for Combustion and Ventilation, of the most recent revision of the NFPA 54 1988 code, the recommendations that follow, or applicable provisions of the local building codes.

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.

4. When air for combustion and room ventilation is from inside buildings, the 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 below.



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, above.

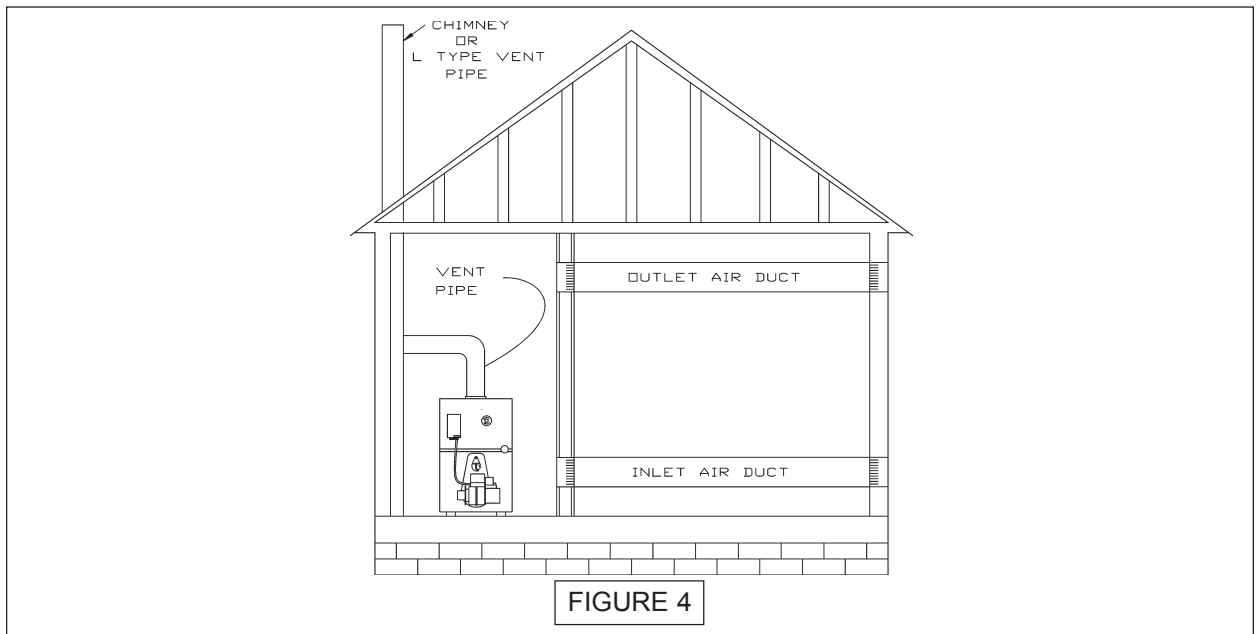
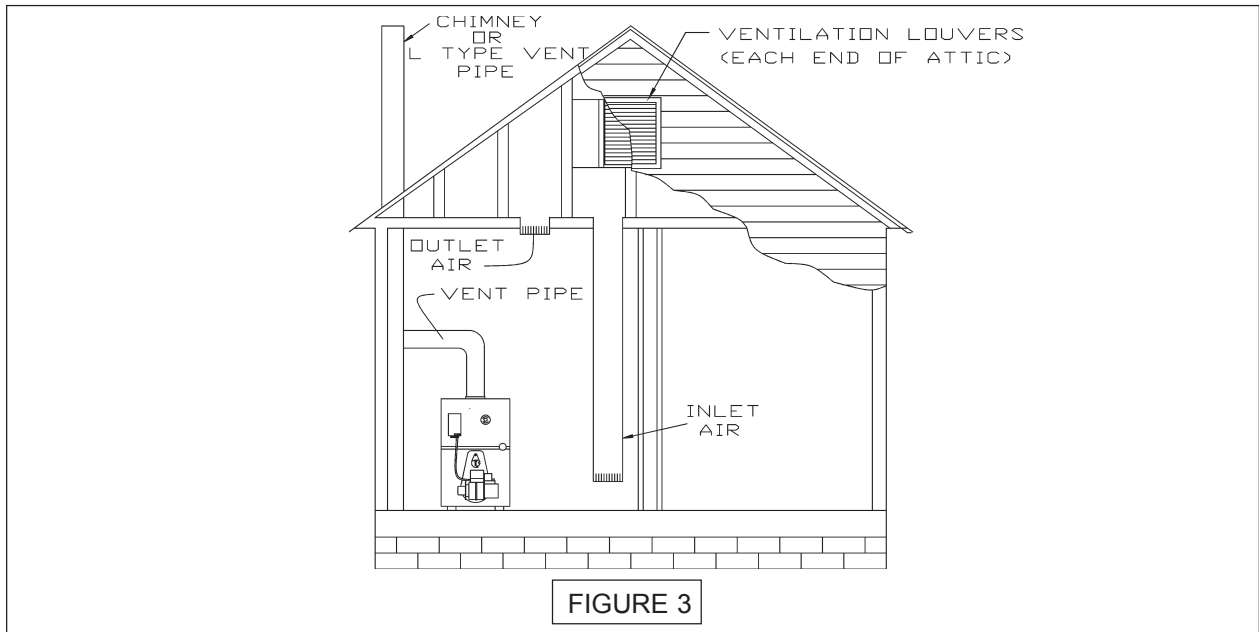
B. When communicating with the outdoors by means of vertical ducts, each opening shall have a minimum free area 1 square inch per 4,000 BTU per hour of total input rating of all appliances in the enclosed space. See figure 3 on page 5.

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 on page 5.

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 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. See chart on page 3 for combustion air minimum opening requirements.

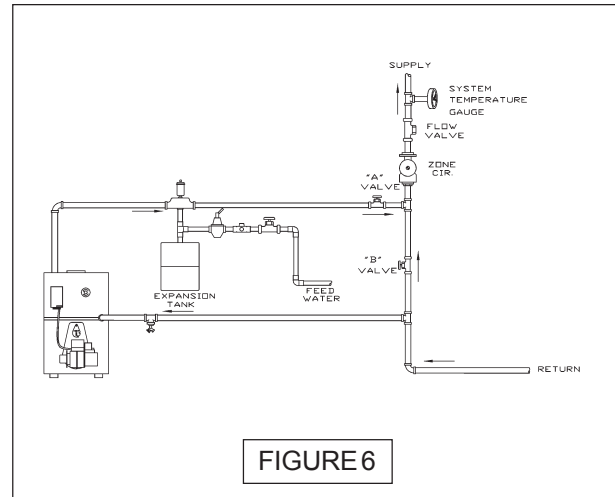
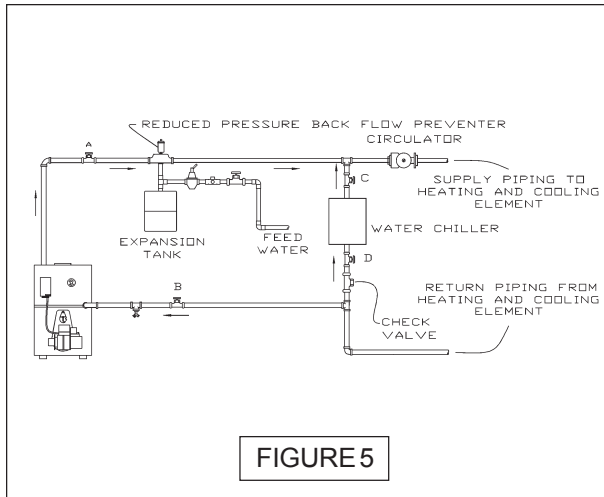


CONNECTING SUPPLY AND RETURN PIPING

IMPORTANT: Circulators in the following illustrations are mounted on the system supply side, but mounting on the system return side is also acceptable practice.

1. Connect supply and return piping as suggested in figure 5, below. When the boiler is used in connection with refrigerated systems:

- A. The chilled medium **MUST BE IN PARALLEL** with the boiler.
- B. Use appropriate valves to prevent the chilled medium from entering the heating boiler.



2. During the 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 a minimum clearance of one inch to hot water pipes.

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

4. Hot water boilers installed above radiation level must be provided with a low water device either as part of the boiler or at the time of boiler installation.

5. When a boiler is connected to a heating system that utilizes multiple zoned circulators, each circulator must be supplied with a flow control valve to prevent gravity circulation.

* Reduced pressure back flow preventer must be present under provisions required by the Environmental Protection Agency, (EPA).

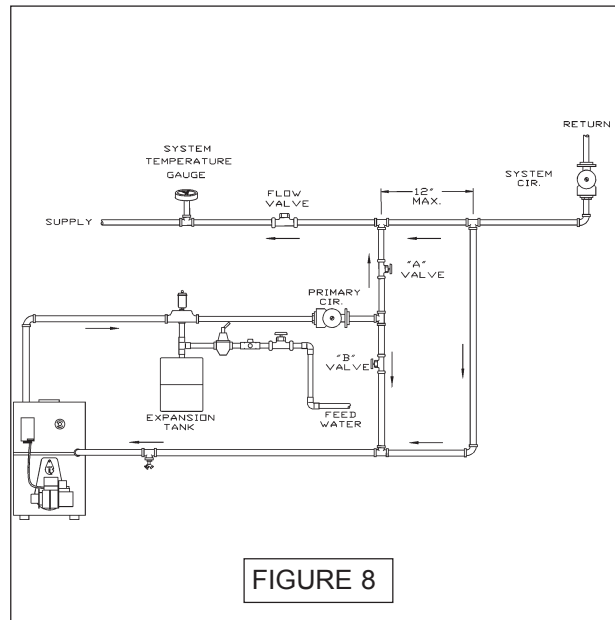
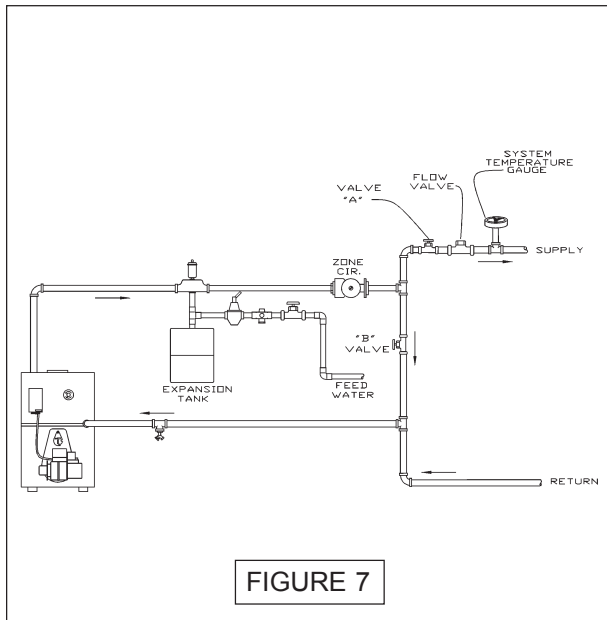
6. Bypass piping is an option which gives the ability to adjust the supply boiler water temperature to fit the system or condition of the installation. Although, this method of piping is not typically required for baseboard heating systems.

A. This method is used to protect systems using radiant panels and the material they are encased in from high temperature supply water from the boiler. See figure 6 above.

B. 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 7 on page 7.

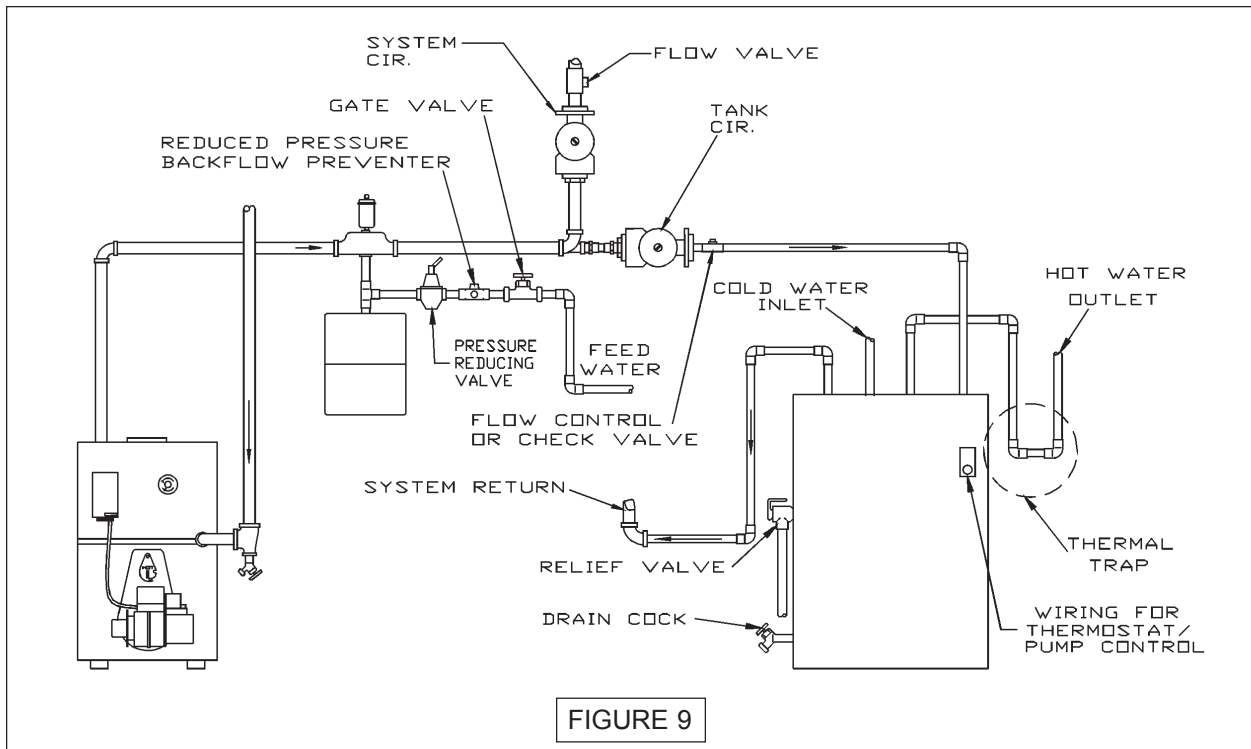
C. This method is used to protect boilers from condensate forming as well as protecting the heating system from high water temperature. See figure 8, below.

7. Note: When using bypass piping, adjust valves **A** and **B** until desired system temperature is obtained.

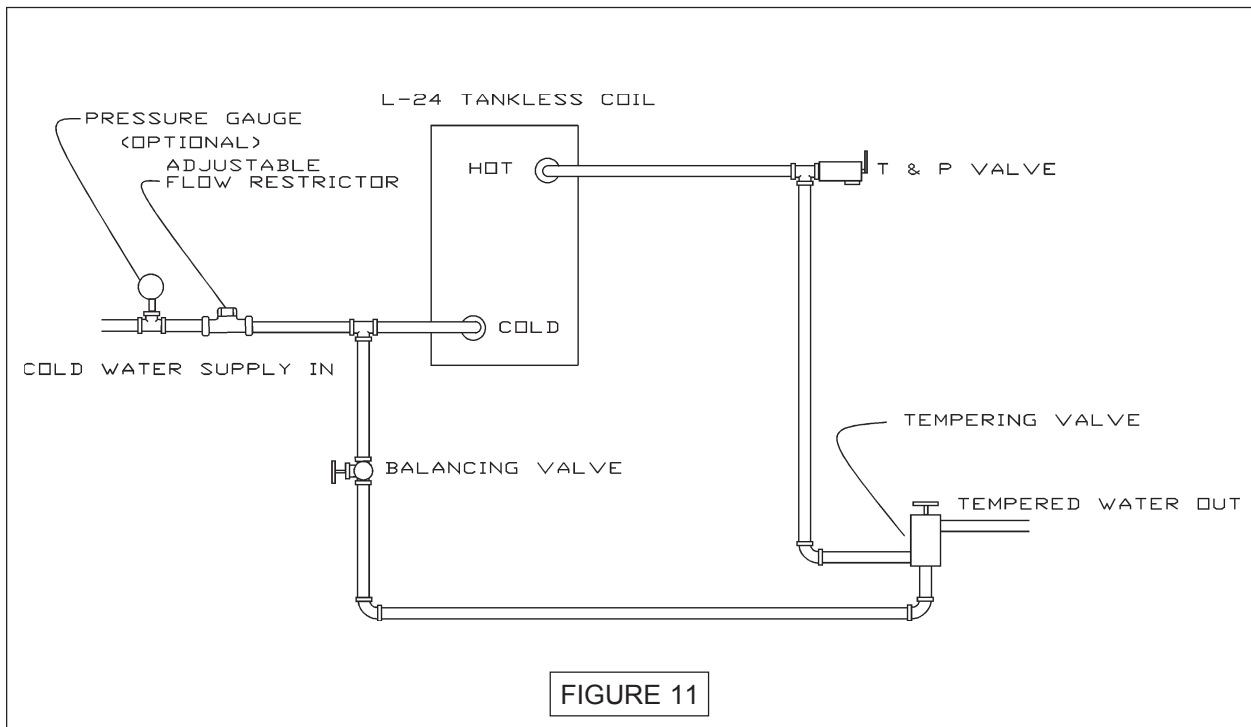
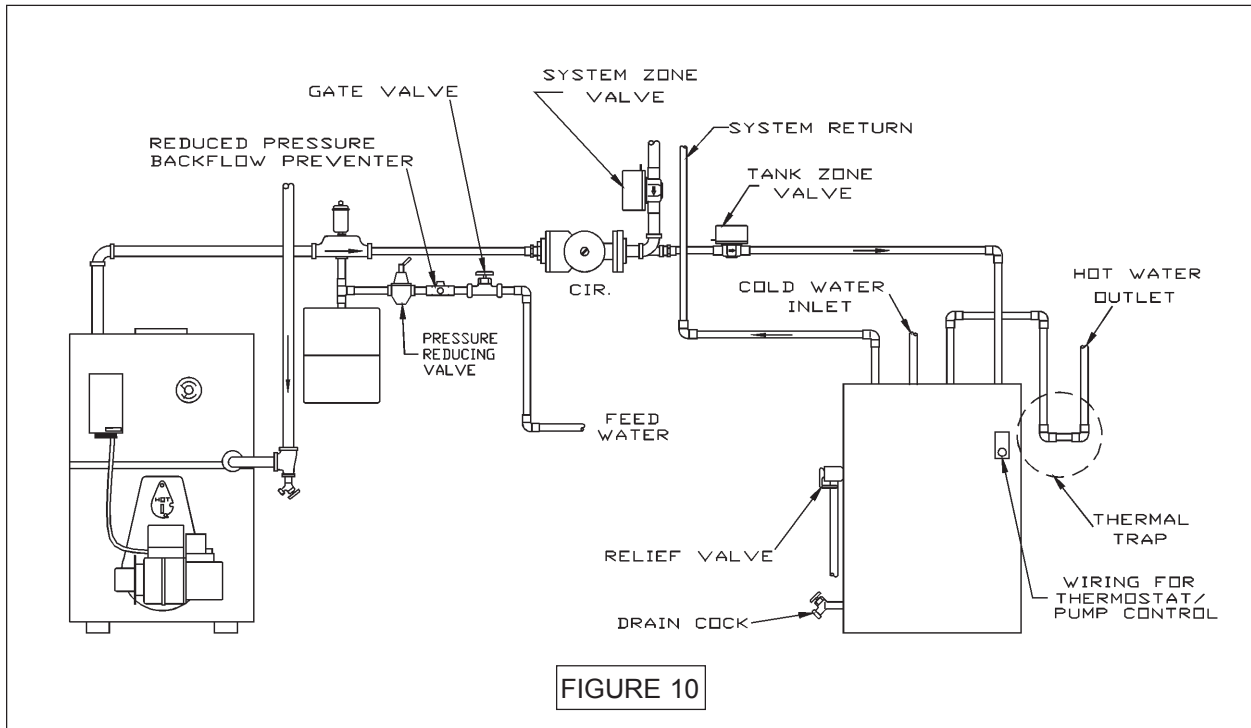


8. Bypass loop piping must be the same size piping for the supply and return.

9. Typical installation using circulators is shown in figure 9, below.



10. Typical installation using zone valves is shown in figure 10 below.
11. See figure 11 below for typical piping for domestic hot water heater.
12. For further piping information refer to the I=B=R installation and piping guide.



VENTING SYSTEM INSPECTION & INSTALLATION

! WARNING: BOILER IS TO BE VENTED BY NATURAL DRAFT AND SHALL NOT BE CONNECTED INTO A MECHANICAL DRAFT SYSTEM OPERATING UNDER A POSITIVE PRESSURE.

INSPECT CHIMNEY to make certain it is constructed according to NFPA211-1988. Local codes may differ from this code and should be checked. Where there is a conflict, the local code will prevail.

This boiler must be installed into a chimney which has a tile lined masonry or metallic chimney liner.

An unlined chimney will have leaks that will cause poor chimney performance (**NO DRAFT**), and could result in poor positive pressure in the combustion chamber.

Horizontal portions of the venting system should not exceed 10 feet in length. Horizontal lengths over 10 feet will have a negative effect on the chimney performance.

The chimney should extend at least 2 feet above any portion of the building within 10 feet. See figure 12 below. It should produce a negative draft of .06 to .08 inches of water column, (W.C.), as measured with a draft gauge between the boiler and barometric draft control while maintaining an .02 inch W.C. negative draft in the combustion chamber. See chart below for recommended chimney or vent sizes.

Inadequate draft will cause improper combustion, resulting in dirty flue ways and high fuel bills.

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

If an oil fired water heater is vented into the same flue as the boiler, provide a separate hole into the chimney whenever possible. When this isn't possible, use a "Y" connection in the flue pipe, using a separate draft regulator for each unit. When a chimney will not provide adequate draft to handle the input from the water heater and boiler simultaneously, wire the units so that only one will operate at a time, favoring the water heater.

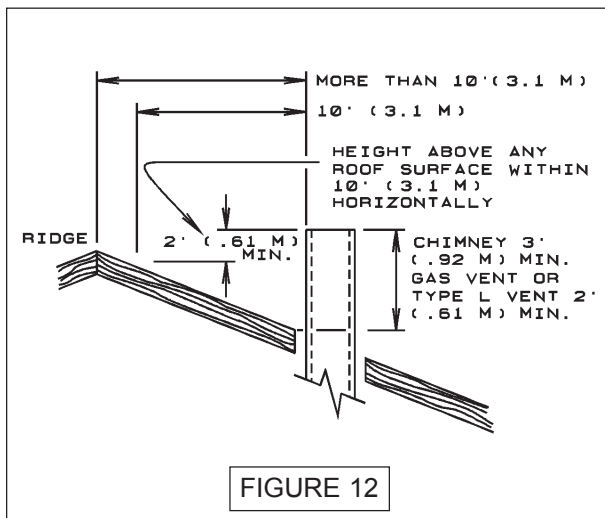


FIGURE 12

CHIMNEY OR VENT SIZES						
MODEL NO.	ROUND INCHES		SQUARE INCHES		HEIGHT FEET	
	MIN	MAX	MIN	MAX	MIN	MAX
BC3	6	8	8x8	8x10	15	40
BC4	6	8	8x8	8x10	15	40

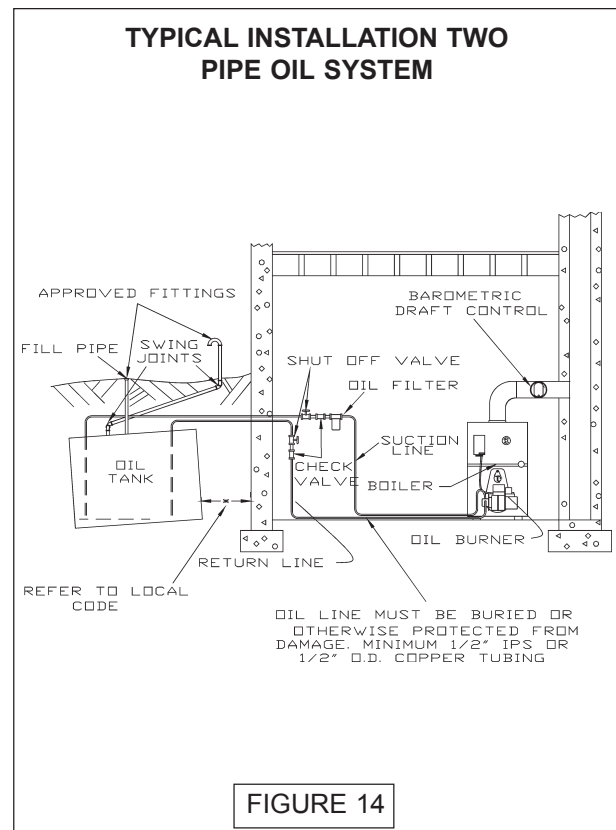
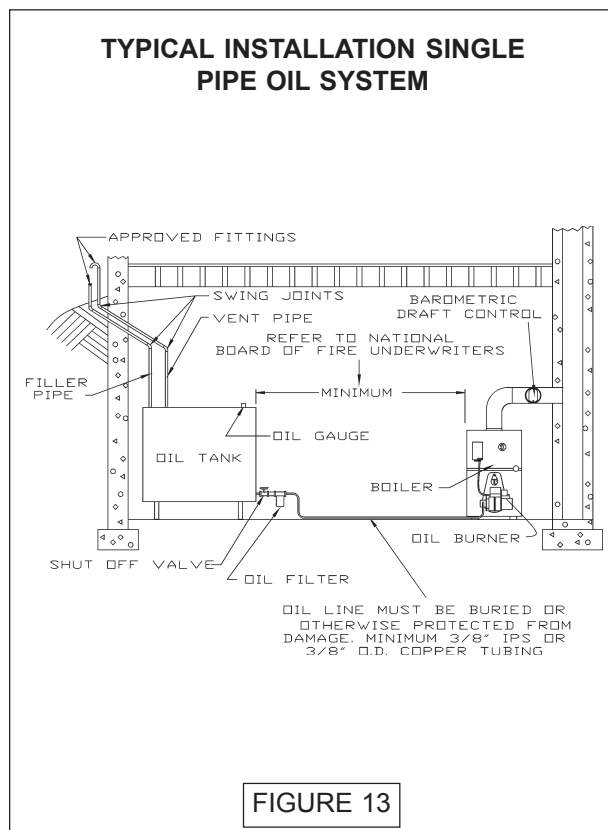
OIL TANK AND PIPING

OIL TANK AND PIPING should be installed 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 the vent pipe be smaller than 1-1/4" I.P.S. The fill pipe should not be less than 2" I.P.S.

The suction line from the tank to the burner should be one continuous piece of tubing to prevent air entering the line. The suction line, must be 3/8" O.D. copper tubing for runs of 50 feet or less, and 1/2" O.D. for longer runs. An oil return line, same size as the suction line, must be used on any installation where the bottom of the tank is below the fuel unit of the burner. Oil lines should be buried or otherwise protected from mechanical injury. Flare fittings on all oil lines are required. Compression fittings on the suction line often allow air to be drawn into the fuel pump, making it difficult to maintain oil pressure at the 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 the fuel pump. If tank is more than 20' from the boiler, a two stage fuel unit should be installed in place of the single stage pump supplied as standard equipment with the burner. Make certain the rotation and speed are the same and the pump is suitable for the burner horsepower rating.

An oil line filter and shut-off valve should be installed in the suction line. Shut-off valves should be installed in both the suction and return lines at the 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 13 & 14, below). An optional flexible oil line is available.



ELECTRICAL WIRING

ELECTRICAL WIRING should conform with the latest edition of National Electrical Code ANSI/NFPA No. 70 and/or local authority having jurisdiction. A separate electrical circuit should be run from the entry box with a fused disconnect switch in this circuit. See wiring diagram's in figures 15 below, & 16, page 12, for suggested circuitry and field wiring. Wiring for zone valve installations are furnished with zone valve packages.

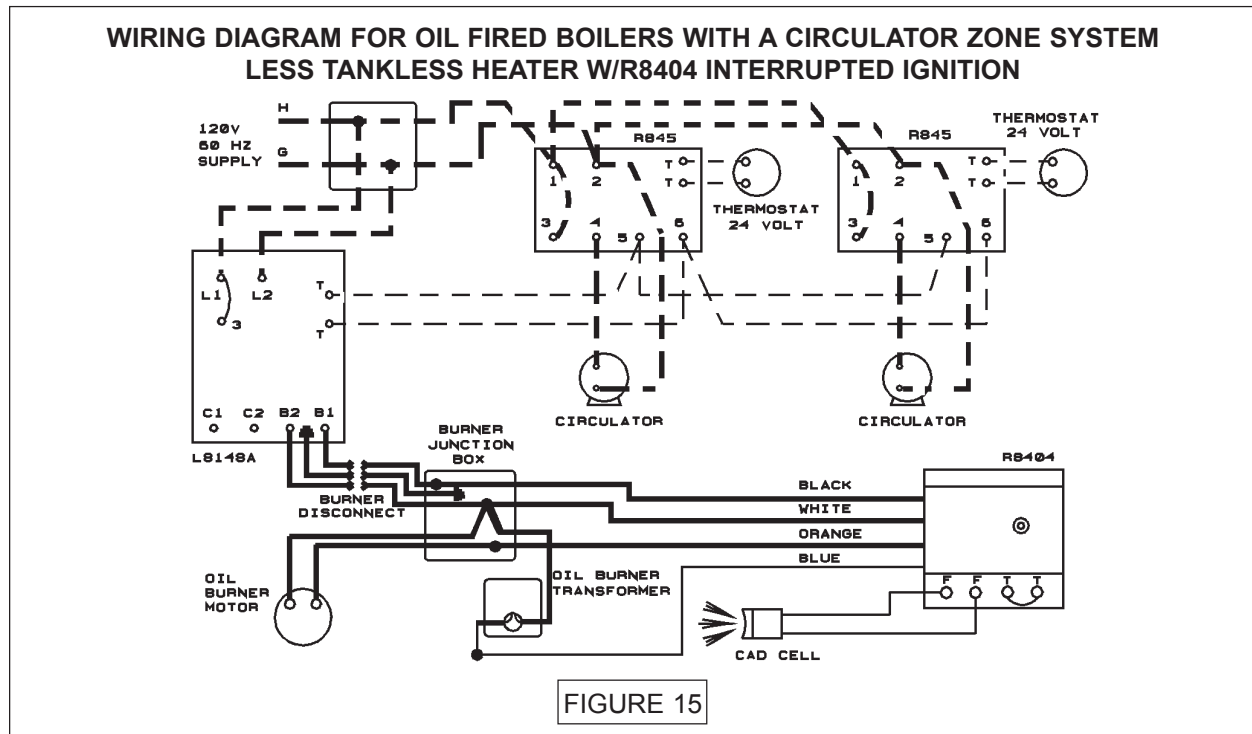
1. COMPONENT CODING

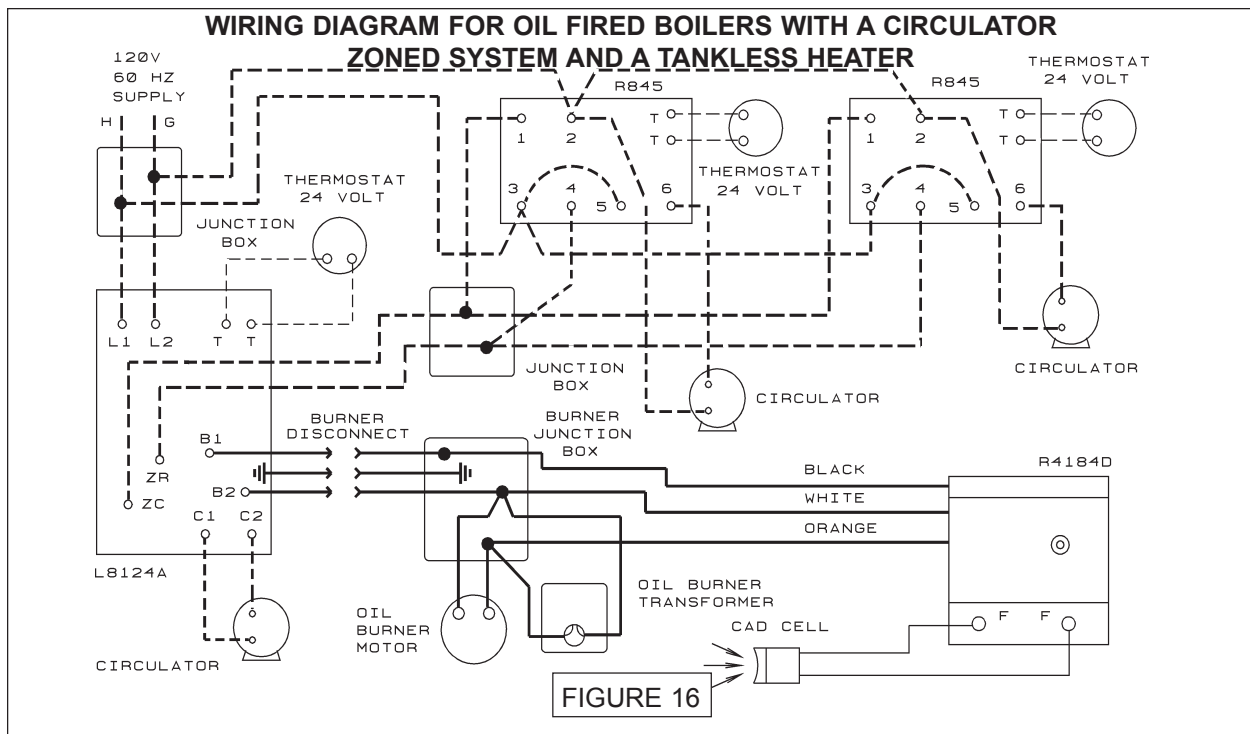
TH-1	Thermostat (millivolt)	1K1	Relay Contacts
TH-2	Thermostat (24 Volt)	1K2	Relay Contacts
TH-3	Thermostat (Line Voltage)	LS	Limit Switch
TR-1	Transformer (120V/24V 40VA)	MS	Manual Switch
TR-2	Transformer (120V/24V 50VA)	CIR	Circulator
LGV	24 Volt Gas Valve	ECO	Energy Cut-Off
PS	Pressure Switch	PSC	Pilot Safety Coil
MR-PS	Manual Reset Pressure Sw.	●	Wire Connection
○	Control Terminal	LWCO	Low Water Cut Off
1K	Relay Coil	EWF	Electric Water Feeder
		PG	Power Generator

2. WIRING CODE

—————	LINE VOLTAGE BY FACTORY
—————	LOW VOLTAGE BY FACTORY
- - - - -	LINE VOLTAGE BY INSTALLER
- - - - -	LOW VOLTAGE BY INSTALLER

*** NOT ALL COMPONENTS LISTED ARE USED IN ALL CONTROL SYSTEMS.**





THERMOSTAT INSTALLATION

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

NORMAL SEQUENCE OF OPERATION

On a call for heat, the thermostat will actuate, completing the circuit to the aquastat. In turn, the circulator and ignition systems are activated and ignition will begin. In the event the boiler water temperature exceeds the high limit setting on the boiler mounted aquastat, power will be interrupted between the aquastat and the ignition system. The power will remain off until the boiler water temperature drops below the high limit setting. The circulator will continue to operate under this condition until the thermostat is satisfied.

OPERATING INSTRUCTIONS

The venting system should be inspected at the start of each heating season. Check the vent pipe from the boiler to the chimney for signs of deterioration by rust or sagging joints. Repair if necessary.

Remove the vent pipe at the base of the chimney or flue and, using a mirror, check for obstruction.

The lever of the pressure relief valve, shown in Figure 17, on page 16, on the boiler should be operated periodically to make sure that it is functioning properly. The pressure relief valve should open before the water pressure exceeds the 30 lb. reading on the gauge. If this pressure is exceeded and the pressure relief valve leaks water when the boiler is operating at normal pressures, it should be immediately replaced. Corrosion can build up rapidly at the valve seat and prevent its functioning as a safety device.

WARNING: WATER WILL BE BOILING HOT.

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. Burner mounting bolts should be tight.

B. Check electrode setting, as they may have been jarred out of position during transportation.

C. Lubricate burner motor and circulator motor if required. Some circulators are water lubricated and do not require oiling.

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 for 140 lbs. Adjust if necessary.

CAUTION: DO NOT SET FIRE VISUALLY.

Instruments are the only reliable method to determine proper air adjustments. An improperly adjusted burner causes soot and high fuel bills because of incomplete combustion of the 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 the proper adjustments with a smoke tester, CO₂ indicator and draft gauge. Bacharach or Dwyer test kits include these instruments.

INSTRUCTIONS TO OBTAIN PROPER OPERATION OF THE BOILER-BURNER UNIT

A 1/4" diameter slot is provided in the inspection cover plate to take draft readings in the combustion chamber. See figure 17, on page 16. A 1/4" diameter hole will be required in the flue pipe between the boiler and barometric damper (if used) to take draft, CO₂, smoke and temperature readings. Adjust air shutter on oil burner to obtain a "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 the venting or the chimney.

The following table is provided as a guideline for initial start-up. Final adjustments **MUST** be made using combustion instruments as previously mentioned.

MODEL NO.	END CONE	STATIC DISC	AIR BAND SETTING	AIR SHUTTER SETTING	NOZZLE FURNISHED
BC3D	F-0	2-3/4	0	8	.65X80B
BC3	F-3	2-3/4	1	8	.85X80B
BC4D	F-3	2-3/4	1	8	.85X80B
BC4	F-6	2-3/4	3	10	1.25X80B

Information in above table uses Beckett model AF burner for both model numbers BC-3 and BC-4.

BC3D and BC4D are derated boilers which require derate kits; part numbers 5612501 for BC3D and 5612202 for BC4D.

CHECK SAFETY CONTROL CIRCUIT after burner adjustments have been made for satisfactory performance.

A. High limit control: remove cover and note temperature setting. See figure 17 on page 16. With the burner operating, decrease this setting to the minimum point. When boiler water temperature exceeds this set point, the high limit switch will open, shutting off the power to the oil burner. Return setting to desired high limit point. Burner should re-start.

B. Primary control and flame sensor:

To Check:

A. Flame failure - simulate by shutting off oil supply with hand valve while burner is on. Sixty seconds after flameout, the safety switch locks out, ignition stops, motor stops and oil valve - when used - closes. To restart, open oil supply valve and reset safety switch.

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.

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 an oil fired boiler reduces operating costs. The boiler, vent and vent pipe should be inspected for accumulation of soot or scale deposits periodically but at least once every year before the start of each heating season. When soot is present on the section walls and flueways, improper combustion will result, causing additional sooting and scaling until flueways are completely closed. To remove soot and scale from the flueways, remove top jacket panel, top clean-out plate and burner. See instructions on page 15 for instructions on removal of the oil burner. Using a wire brush, brush the soot and scale into the combustion chamber where it can be removed through

the burner opening. Carefully vacuum debris from the combustion chamber. Inspect combustion chamber for signs of damage, i.e. cracks. In the event the combustion chamber is damaged, replace it immediately. Failure to do so will cause premature failure of the unit, and may result in personal injury. See figure 17 on page 16.

PERIODIC INSPECTION and tightening of the tankless heater/cover plate bolts will reduce the risk of leaks. Refer to BC series exploded heat exchanger drawing on page 18, part numbers x and x. **CAUTION: Do not overtighten bolts.**

INSTRUCTIONS FOR REMOVING OIL BURNER

1. Turn off power to boiler.
2. Allow boiler to cool down.
3. Remove three (3) 1/2" nuts from burner flange.
4. Close oil valve. See figures 13 and 14 on page 10.
5. Disconnect oil line from burner.

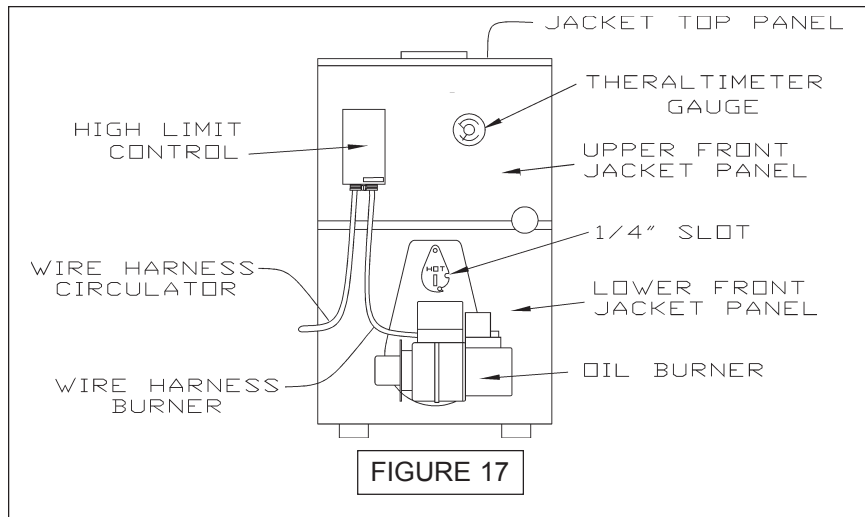


CAUTION: USE CAUTION WHEN VACUUMING IN THE CHAMBER AREA. DAMAGE TO CHAMBER COULD RESULT.

It is recommended to replace the nozzle at the start of each heating season. Lubricate the burner motor and circulator motor - if required - with a few drops of a good grade of light motor oil. Do not over oil. Have a competent service person service the burner and check the controls and check the electrodes for carbon or cracks in the insulators. Burners should be adjusted to produce the conditions shown in Start-up and Adjustment of Oil Burner procedure.

INSTRUCTIONS FOR REPLACING OIL BURNER

1. Reconnect oil line.
2. Open oil valve. See figures 13 and 14 on page 10.
3. Install and tighten three (3) 1/2" nuts on the burner flange.
4. Turn on power to boiler.
5. Bleed the oil line.

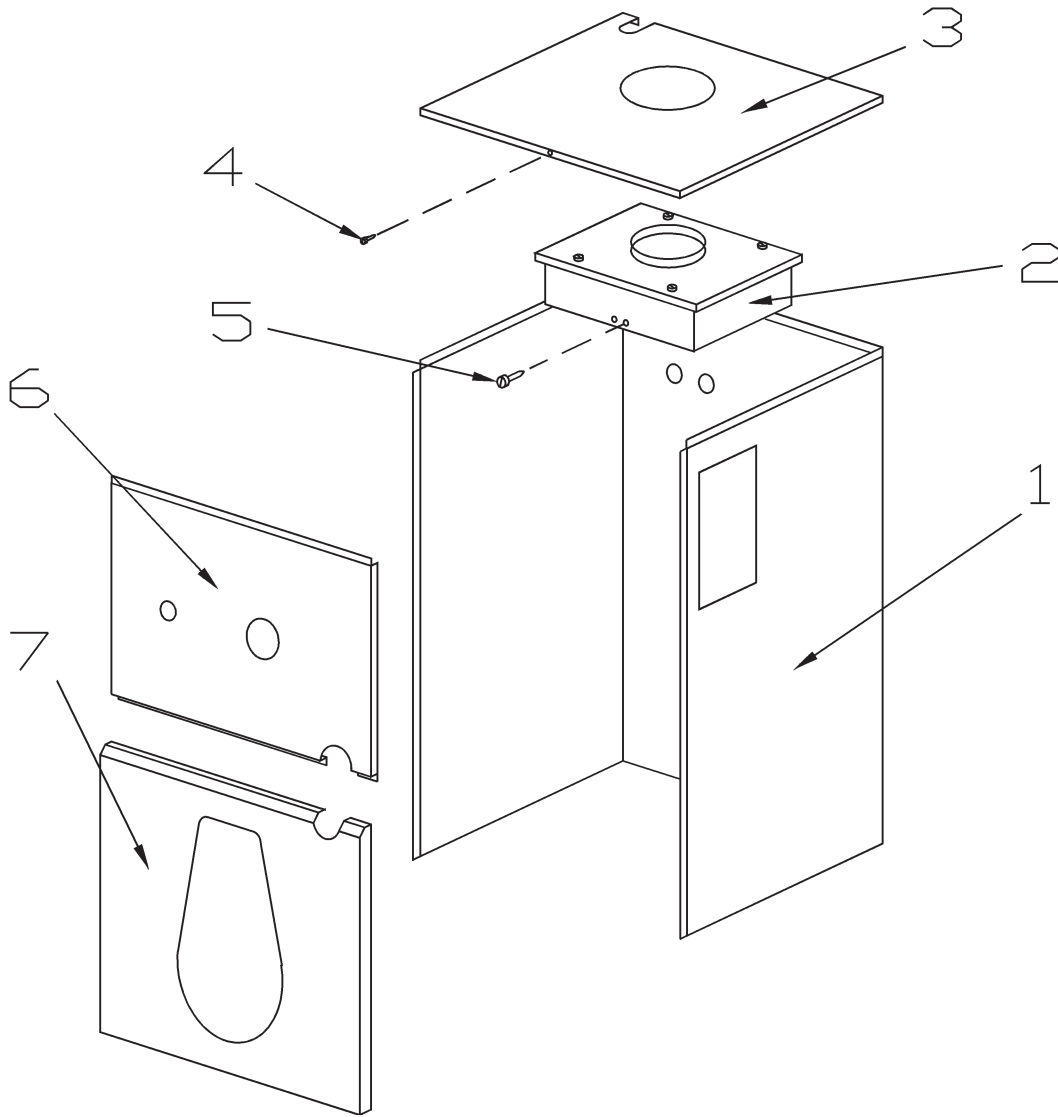


SERVICE CHECK LIST

- | | |
|---|--|
| <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Inspect Chimney and Flue pipe <input checked="" type="checkbox"/> Inspect and Clean Appliance <input checked="" type="checkbox"/> Inspect Oil Line - Size/Leaks <input checked="" type="checkbox"/> Inspect Electrical Connections <input checked="" type="checkbox"/> Install New Filter <input checked="" type="checkbox"/> Room Make-up Air <input checked="" type="checkbox"/> Electrode setting <input type="checkbox"/> Nozzle-Size, Angle, Type | <ul style="list-style-type: none"> <input type="checkbox"/> Pump Pressure/Vacuum <input type="checkbox"/> Line Voltage/Motor Amps <input type="checkbox"/> Smoke Test <input type="checkbox"/> Draft-Overfire/In Flue <input type="checkbox"/> CO² or O² <input type="checkbox"/> Flue Gas Temperature <input checked="" type="checkbox"/> Proper Light-Off (Hot & Cold) <input checked="" type="checkbox"/> Controls and Safety Devices |
|---|--|
- * Measure with Instruments and Record results on chart provided below

Date	Nozzle			Pump Pressure PSI	Smoke NO.	Draft		CO ² or O ²	Flue Temperature °F
	Size	Angle	Type			O.F.	INF		

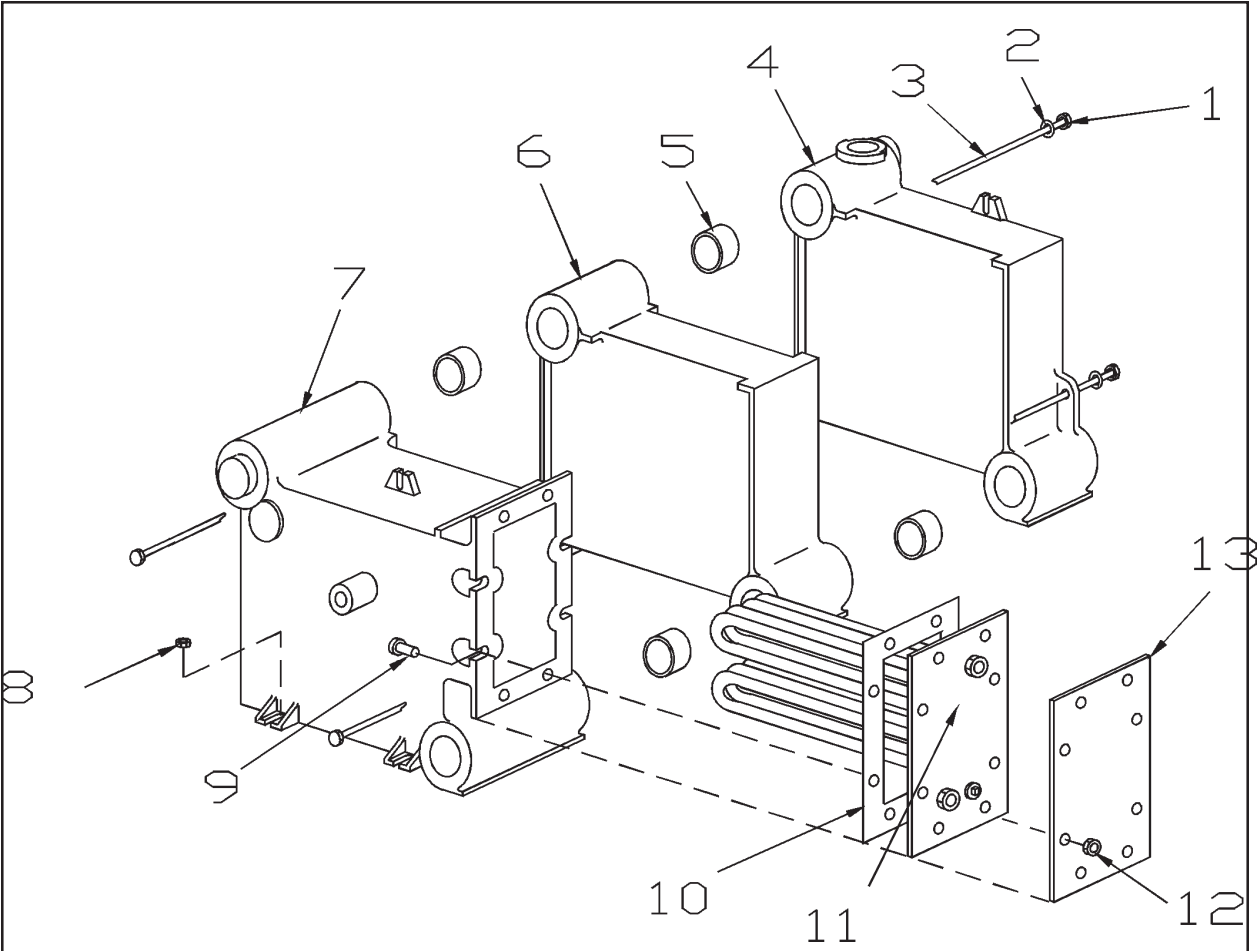
BC SERIES JACKET AND FLUE COLLECTOR ASSEMBLY



ITEM#	P/N	DESCRIPTION	QTY.
1	2162801	Pnl Jkt Wrapper Assy. BC 3	1
	2162802	Pnl Jkt Wrapper Assy. BC 4	1
2	2462101	Flue Collestor Assy. BC 3	1
	2462102	Flue Collestor Assy. BC 4	1
3	2162701	Pnl Jkt Top ASsy. BC 3	1
	2162702	Pnl Jkt Top ASsy. BC 4	1
4	HW-009.01	Scr 8-18x1/2 Stl Hx Wash Hd	16
5	HW09501	Scr 5/16-18x1x5 Type F Slh X	2
6	2162501	Pnl Jkt Top Frt Assy. BC	1
7	2162601	Pnl Jkt Low Frt Assy. BC	1

FIGURE 18

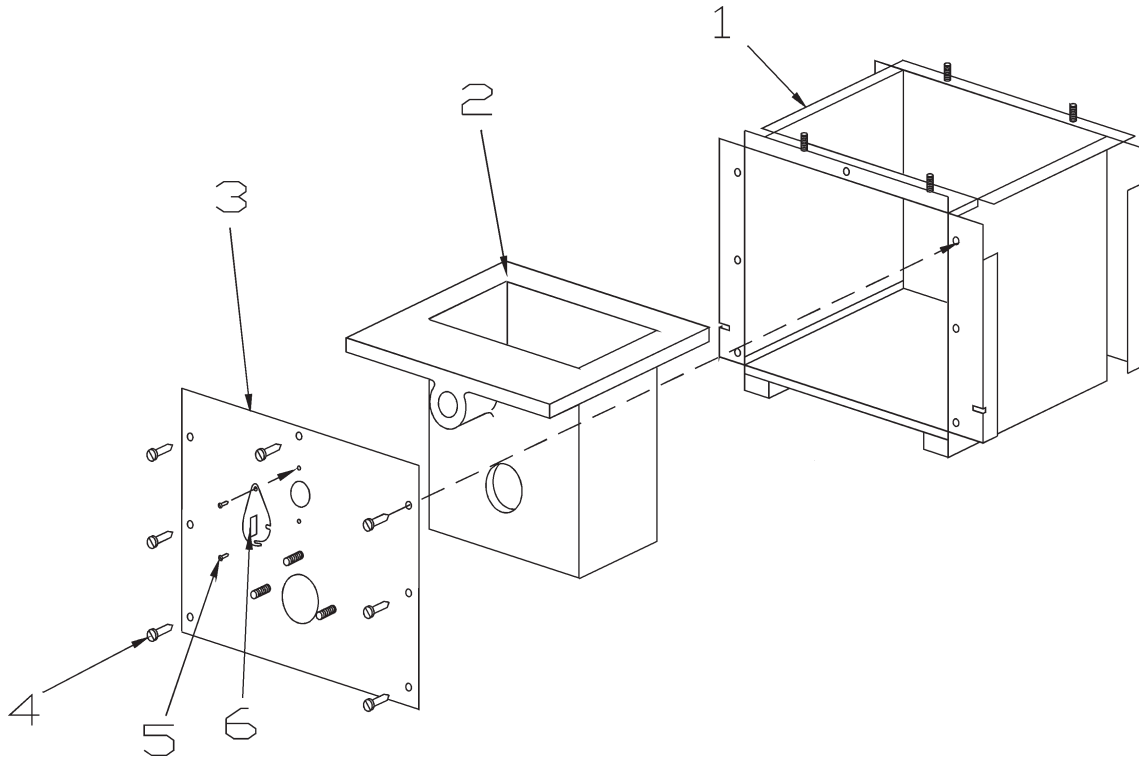
BC SERIES HEAT EXCHANGER ASSEMBLY



Item #	P/N	Description	Qty.
1	1330002	Nut 1/4-20 Hex Stl ZP	2
2	HW-008.01	Wash - 5/16 Flat Stl ZP	4
3	HW-011.02	Tie Rod 1/4-20x13x3 IH WH BC3	2
	HW-011.04	Tie Rod 1/4-20x17x3 IH WH BC4	
4	100-2-3.01	Right Section B	1
5	43300976	Nipple 2" Mach.	
	BC3(4)		BC4(6)
6	100-2-1.01	Center Section B	
	BC3(1)		BC4(2)
7	100-2-4.01	Tankless Section B	1
8	HW06901	Nut 5/16-18 Wislock	4
9	HW-012.02	Bolt 7/16-14x1-1/2 Sq Hd	8
10	252-2-2.00	Gasket B tankless	1
11	252-3-1.02	Tankless Coil L-24	1
12	HW-013.01	Nut 7/16-14 Sq Stl	8
13	202-2-1.00	Coverplate B/SF S Tankless	1

FIGURE 19

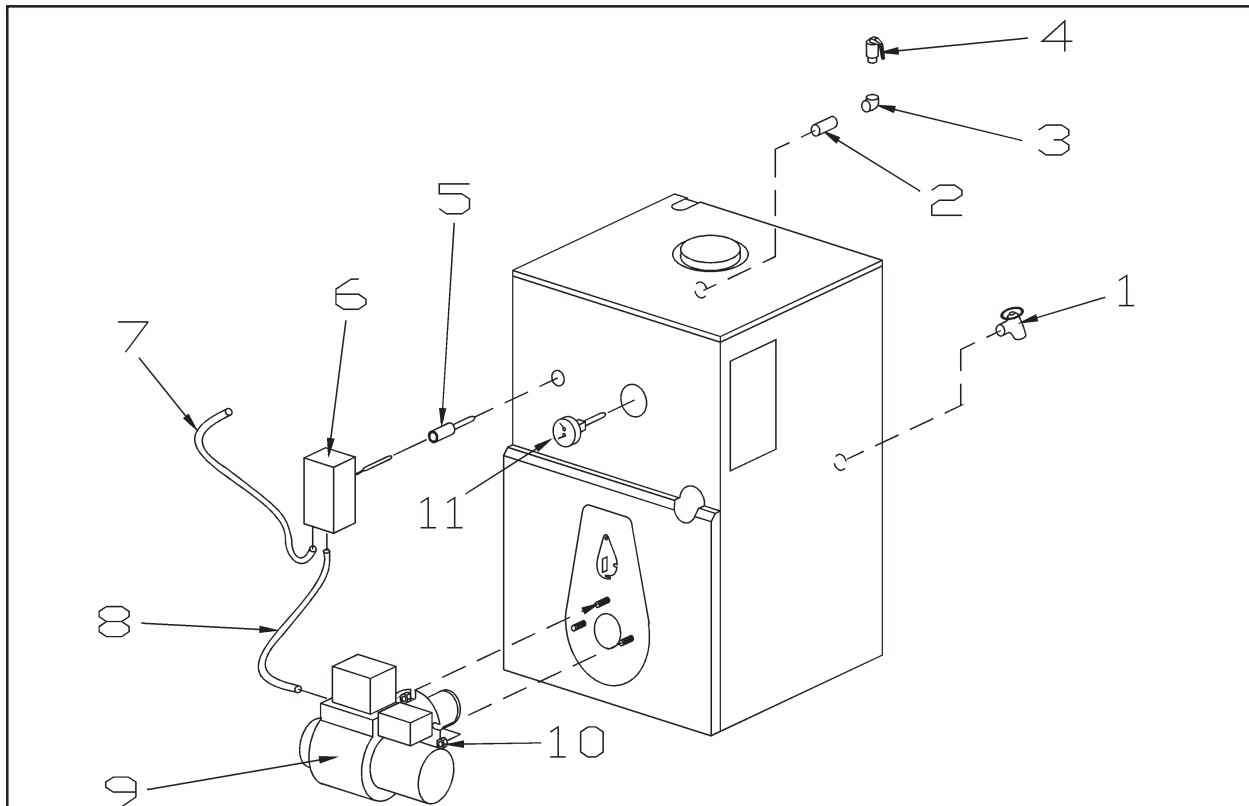
BC SERIES BASE ASSEMBLY



No.	P/N	Description	Qty.
1	2262101	Base Assy BC 3	1
	2262102	Base Assy BC 4	1
2	252-2-3.01	Combustion Chamber BC 3	1
	252-2-3.02	Combustion Chamber BC 4	1
3	2261201	Base Burner Mtg pl Assy, BC 3, 4	1
4	HW-005.01	Scr-1/4-20x1/2 Self Tap	7
5	HW09501	Scr 5/16-18x1.5 Type F SLHX	2
6	10011701	Cast Iron Obsv Door	1

FIGURE 20

BC SERIES BURNER, CONTROLS AND MISC. PARTS



No.	P/N	Description	Qty.
1	HW-016.02	Drain Long 31-608-04	1
2	PF-005.11	Pipe Fit Npl 3/4x4 NPT	1
3	PF-002.04	Pipe Fit Elb 3/4 NPT 90 Deg	1
4	VR-001.01	R/V-30 # 3/4 10-407-05	1
5	AQ-020.01	Well 123871A-3/4x3 HW	1
6	AQ-010.00	Control-L8124A-1130 HW	1
7	37519501	Harness Circulator 72"	1
8	2861401	Wire Harn Ctrl/Burn BC	1
9	BN08301	Burner Oil AF BC 3	1
	BN08302	Burner Oil AF BC 4	1
10	HW06901	Nut-5/16-18 Wislock	3
11	GA-001.00	Gauge Theraltimeter Water	1
		<u>Burner Replacement Parts:</u>	
	BN08101	Burner Static Disc 3383 - 2.3/4	1
	BN08501	Burner Blast Tube 580501 BC	1
	BN07103	Burner Drawer Assembly NL65XN	1
	BN08001	Burner-oil Flange Gasket 3616	1
	RP-015.00	Oil Burner Motor PSC #21805U	1
	RP-019.01	Oil Burner Transformer 5878U	1
	RP03701	Pump - 140 PSI 1 Stage	1
	RY-001.02	Control R4184D1027	1
	CD-001.01	C554A Cad Cell - Oil	1
	1050002	F-3 Burner Head BC3	1
	1050004	F-6 Burner Head BC4	1

FIGURE 21

RATINGS, DATA, AND DIMENSIONS

(1) BOILER MODEL NUMBER	(2)* I=B=R OIL BURNER INPUT		D.O.E. HEATING CAPACITY	(3)(5)* I=B=R NET RATINGS WATER	MINIMUM NATURAL DRAFT CHIMNEY SIZE		PUMP PRESSURE	NOZZLE FURNISHED	A. F. U. E. RATING
	G.P.H.	MBH			MBH*	MBH			
			PSI	140 PSIG*					
BC3D	.77	107	93	75	6	8x8x15	140	.65x80B	86.0
BC3	1.00	140	118	103	6	8x8x15	140	.85 80B	80.0
BC4D	1.00	140	120	104	6	8x8x15	140	.85x80B	86.0
BC4	1.40	196	165	143	6	8x8x15	140	1.25 80B	81.0

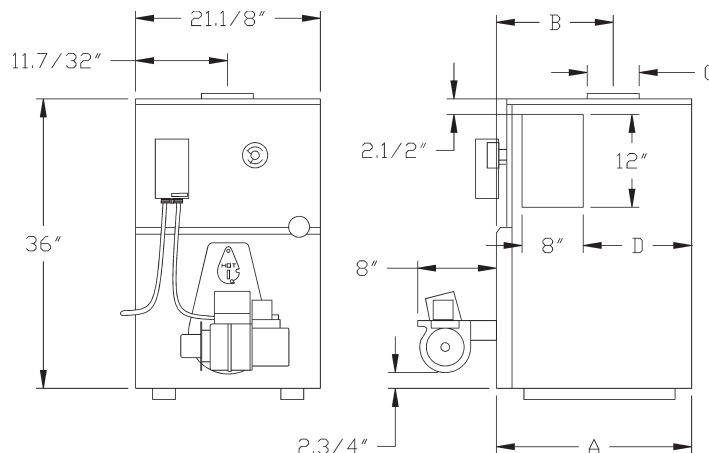
STANDARD EQUIPMENT: Crated Boiler, Flush Jacket, Oil Burner, Target Wall/Liner, Circulator-1.1/4", ASME Relief Valve, Therallitimeter Gauge, Drain Cock, Wiring Harness, Burner Electrical Disconnect, Plastic Cover, Supply Tapping-2", Return Tapping-1.1/2", High Limit and Circulator Control, Primary Control. For Tankless Heater Units-add Tankless Hot Water Coil, Flow Restrictor and Triple Aquastat Relay.

TANKLESS WATER HEATER CAPACITIES

BOILER MODEL NUMBER	FIRING RATE G.P.H.	TANKLESS HEATER NUMBER	TANKLESS H EATER CAPACITY INTERMITTENT DRAW G.P.H.	BOILER WATER CONTENT GALS.
BC3D	.65	L-24	-	6.7
BC3	1.0	L-24	3.25	6.7
BC4D	1.0	L-24	3.25	8.2
BC4	1.4	L-24	4.00	8.2

DIMENSIONS

BOILER NO.	A LENGTH OF FLUSH JACKET	B FRONT OF CASTING TO CENTER LINE OF FLUE OUTLET	C DIA. OF FLUE OUTLET	D TANKLESS COIL TO BACK OF JACKET
BC3	19"	9.3/4"	6"	8.7/8"
BC4	23"	11.3/4"	6"	12.3/4"



NOTES:

1. Add suffix "T" to denote boiler with tankless heater.
2. I=B=R burner capacity is based on an oil heating value of 140,000 Btu/gal. and with 13% CO₂.
3. Net ratings based on 170 °F temperature in radiators and include 15% allowance for normal piping and pick up load. Consult manufacturers for unusual piping and pick-up requirements.
4. Nozzle listed is for use with beckett burner. When alternate burner is used, consult burner manufacturer's recommendations.
5. For equivalent square feet of radiation, divide I=B=R output by 150.
6. MEA number for the BC series boiler is 47-76E.
7. MEA number for the R.W. Beckett AF burner is 156-77-E.
8. Electrical service to be 120 Volts, 15 Amps, & 60 Hz.