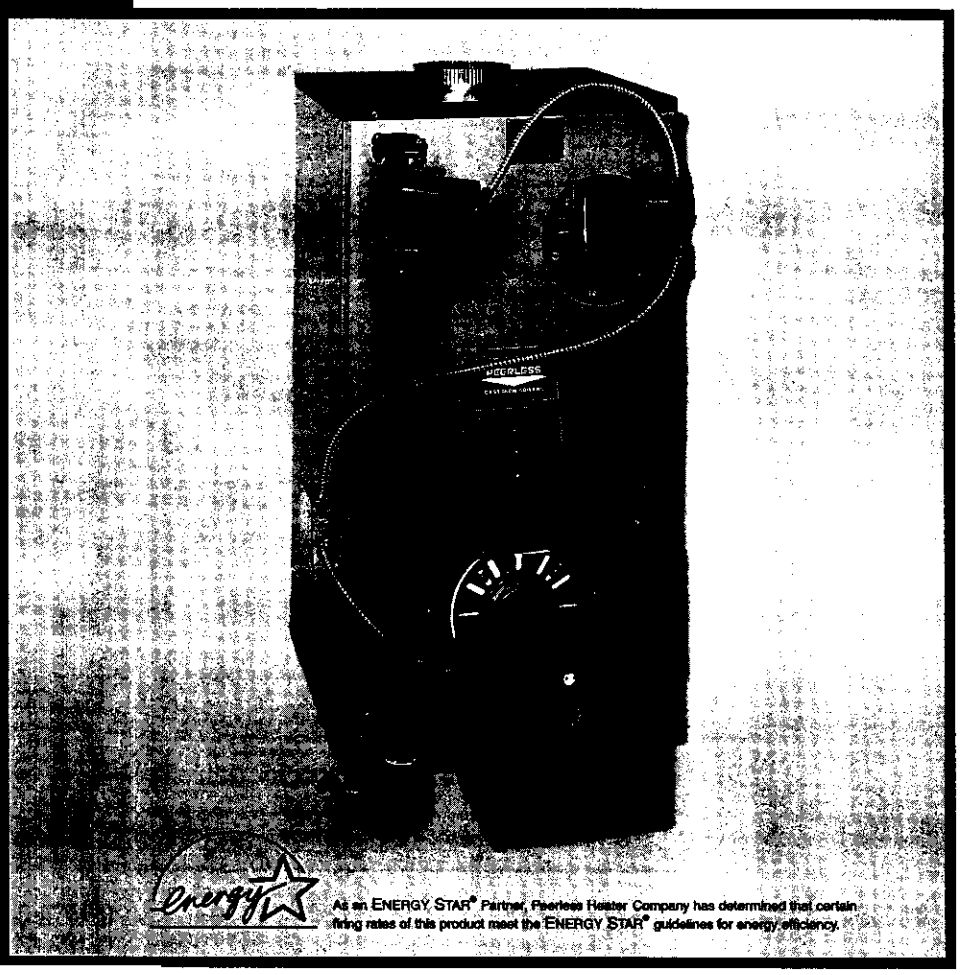
Series EC/ECT

Oil Boilers



As an ENERGY STAR® Partner, Peerless Heater Company has determined that certain firing rates of this product meet the ENERGY STAR® guidelines for energy efficiency.

Installation, Operation & Maintenance Manual

PEERLESS®

CAST IRON BOILERS

Peerless Boilers
SERIES EC/ECT

Residential Oil Fired, Packaged or Knockdown, Hot Water or Steam Boilers

11 Sizes 3-6 Sections .75 to 3.0 GPH Input 82.9% to 86.6% AFUE

Features:

Natural Draft (chimney) Venting

Factory Assembled Sections on Knockdown Boilers
- *Reduces Installation Time*

High Efficiency Flame Retention Burners
- *Choice of Beckett, Carlin or Riello*

Full Plate Swing-Out Door
- *Standard on All Boilers*
- *Provides Easy Access to Combustion Chamber Area for Cleaning and Servicing*

Large Water Content, Wet Base Section Design
- *Ideal for Steam and Large Volume Hot Water Applications*

Steel Push Nipples
- *Provide a Permanent Water Tight Seal Between Sections*
- *Unaffected by Petroleum and Other Contaminants*

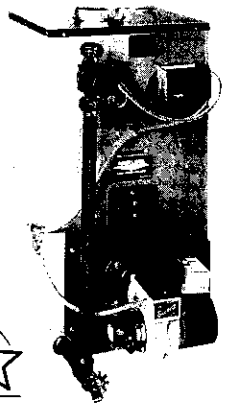
Easy to Clean
- *Flueways can be Cleaned from Either the Left Side or Top*

Deluxe Insulated Enameled Steel Jacket
- *Reduces Boiler Heat Loss*

Safety Controls
- *Probe or Float Type Low Water Cut-Off Approved on Steam Boilers*

Tankless Coils
- *For Domestic Hot Water Production on Hot Water Boilers*

ENERGY STAR® efficient!



As an ENERGY STAR® Partner, Peerless Boilers has determined that the 0.75, 1.00, 1.25, 1.50, 1.75 and 2.00 GPH firing rates of this product meet the ENERGY STAR® guidelines for energy efficiency.

Standard Equipment:
- *Honeywell Operating Controls*
- *Barometric Draft Damper*
- *Taco 007 Circulator on Packaged Water Boilers*
- *Float Type LWCO on Packaged Steam Boilers*

Optional Equipment:
- *Tankless Coils*
- *Grundfos Circulator on Packaged Water Boilers*
- *Probe Type LWCO on Packaged Steam Boilers*

A Complete Warranty Program Like No Other!

Peerless Boilers is pleased to offer one of the most comprehensive warranty programs in the industry. All Peerless residential cast iron boilers include a full one-year warranty. A limited, lifetime warranty is provided for the cast iron sections of Peerless residential hot water boilers. Peerless also provides a limited, ten-year warranty on the cast iron sections of its residential steam boilers. Five and ten-year extended warranties on parts and labor are now available. Please consult Peerless Boilers for complete warranty information.

Peerless Boilers • 610-367-2153 • www.peerless-heater.com

FAB-EC R1 (3/03-1M)
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Background Information - Draft Requirements

Modern boilers operate with higher efficiencies than older boilers. Smaller flueways, as well as bars, pins and fins are designed into modern boilers to transfer as much heat as possible from the hot gases to the water or steam and prevent heat loss up the chimney. However, these design features result in higher pressure, or draft loss, in the boiler.

This draft loss must be taken into account when installing an oil boiler into a new or old chimney. New chimneys are less likely to have poor draft. However, they must have sufficient draft to support combustion. A -.06″ draft is desirable and preferred. Older, unlined chimneys may require a replacement liner to have them perform well enough to support combustion.

An example follows:

	Old installation	**New installation**	**Comments**
Chimney Draft	-.04″	-.04″	No change, but older chimneys (especially unlined ones) have leaks which reduce draft.
Boiler Design Pressure Drop	+.01″	+.04″	Required for mandated efficiency increases.
Draft Over Fire	-.03″	0.00″	The old installation would have had a higher temperature in the chimney [as high as 800 degrees vs. 400 degrees F], which would increase the draft.

The above readings are 'cold' readings [before the boiler and chimney are heated up].
A-.01″ to -.02″ minimum draft over fire is required for a good installation where no oil fumes would be present. ***The draft would vent them up the chimney.***

The above discussion which concerns draft in the chimney and draft loss in the boiler, is incomplete without discussing the effect of draft on the burner. Very simply, increasing the fuel usage [higher gallonage] on a unit which has multiple firing rates, requires more air for combustion and a higher draft loss in the boiler. As an example, increasing the firing rate 1/4 gallon will increase the draft loss in the unit by approximately +.01″. *The actual burner used on a particular boiler also effects the draft and smoke condition.* ***The use of a burner supplied by Peerless Heater Company would assure you of a quality, trouble free installation.***

INSTALLATION INSTRUCTIONS – SERIES EC and ECT

Read carefully before beginning work. It will save time. Study the included drawings.

This boiler must be installed by a qualified contractor.

The boiler warranty can be voided if the boiler is not installed, maintained, and serviced correctly.

The equipment shall be installed in accordance with those installation regulations in force in the local area where the installation is to be made, including the current edition of NFPA-31. These shall be carefully followed in all cases. Authorities having jurisdiction shall be consulted before installations are made.

A – ACCESSIBILITY CLEARANCES

1 – To provide for reasonable conditions of accessibility for servicing, the following minimum clearances are recommended between the boiler and adjacent walls or other appliances—at least 24″ in the front, rear and on both sides.

B – AIR FOR COMBUSTION AND VENTILATION

1 – Be certain adequate facilities are available to provide air for satisfactory combustion and ventilation.

2 – Appliances Located in Unconfined Spaces.

a. For installations in unconfined spaces with conventional construction and large areas such as basements, the supply of air for combustion and ventilation can usually be considered adequate.

3 – Appliances Located in Confined Spaces.

a. If all air for combustion and ventilation is to come from within the building; two openings, one near the ceiling and one near the floor of the boiler room shall be provided with the minimum free area of each opening equal to 140 sq. in. per gallon of oil burned.

b. If all air for combustion and ventilation is to come from outside the building; two openings, one near the ceiling and one near the floor of the boiler room shall be provided with the minimum free area of each opening equal to 35 sq. in. per gallon of oil burned. If ducts are used to convey the air, areas of 35 sq. in. per gallon of oil burned for vertical ducts or 70 sq. in. per gallon of oil burned for horizontal ducts are to be provided. Ducts shall have the same area as the free area of the openings to which they are connected.

C – SETTING BOILER BLOCK

1 – The Series EC/ECT boiler sections are factory assembled with the target wall shipped in place. Provide a level foundation, located as close as possible to the center of the heating system and to the chimney. The heating surface of the Series EC/ECT boilers is designed to be cleaned from either the top or left side of the unit. Allow adequate clearance on the left of unit if servicing is to be done from the side.

2 – Open flue collector carton. Remove flue collector (Item 9, Fig. 4) and high temperature rope. Lay rope (Item 8, Fig.4) on top of boiler against bead provided. Place flue collector on top of rope and attach to boiler with 1/4″-20 x 1 3/4″ studs with nuts through flue collector brackets into the tapped lugs provided in the top of the boiler end sections. Draw nuts down snugly.

3 – Remove clean-out cover plates and insulation (25). Each clean-out cover plate is attached to the boiler by using two carriage bolts, nuts and washers (24). Install the carriage bolts into the notch at the top and bottom of each clean-out opening, then secure them with a flat washer and steel nut as shown in Figure 1 locking them into place. Press the clean-out plate with insulation over the protruding carriage bolts until the bolts punch through the insulation so flat washer and brass nut can be installed. Tighten down nuts snugly compressing the insulation to form a good seal around the clean-out opening.

4 – This boiler is suitable for use on combustible flooring, provided the boiler is **not** set on carpet and a metal drip pan is placed under the appliance.

INSTALLATION OF SIDE CLEAN-OUT COVER PLATES

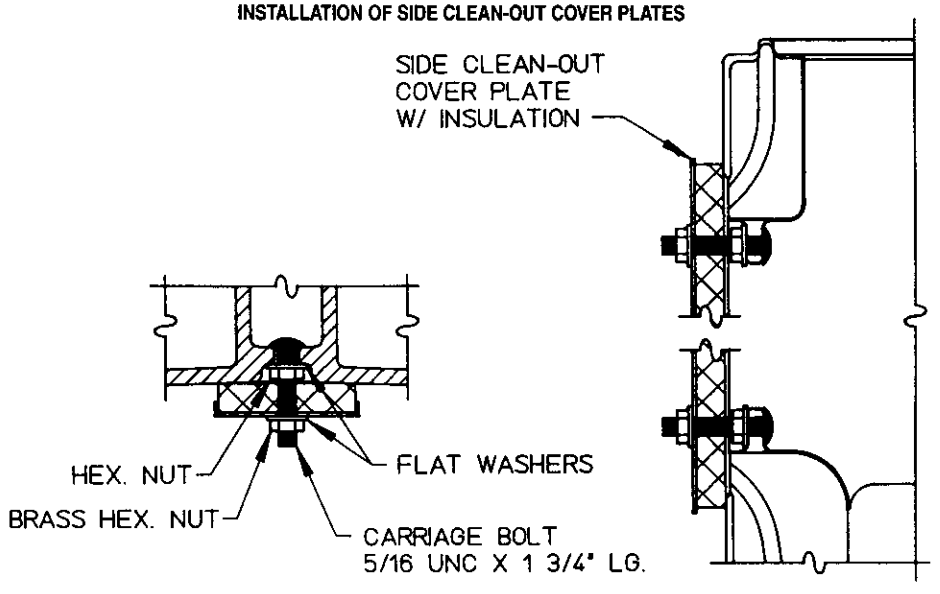


Figure 1

D – SWING DOOR AND OBSERVATION COVER ASSEMBLY

1 – Remove burner mounting plate including right side mounting studs for burner mounting plate (do not remove left side studs).

2 – Collect the Swing Door Carton (90924) containing the hinge assembly and hardware.

3 – Install Internal Hinge P/N EC1021 (Item 6, Fig. 4) to front section of boiler with (2) 5/16-18 UNC x 3/4" hex head cap screws and 5/16" flat washers (do not use the 1 1/4" long screws).

4 – Install External Hinge P/N EC10122 (Item 7, Fig. 4) to the outside of the burner mounting plate with (2) 5/16-18 UNC x 1 1/4" hex head cap screws, flat washers, and nuts. The cap screws should be inserted through the back of the burner mounting plate, then through the hinge. Do NOT tighten External Hinge screws at this time. This will allow for alignment of the plate once it is placed in position.

5 – Hang burner mounting plate in position, then close to align the remaining three (3) studs on left side of section. Once alignment is accomplished, tighten nuts on External Hinge. Do NOT reinstall nuts/washers on left side studs until after jacket installation.

6 – Remove observation door (Item 4, Fig. 4) from inside burner mounting plate. Attach the observation door to the outside of the mounting plate.

7 – The remaining swing door carton parts will be used in Section H, Wiring.

E – JACKET ASSEMBLY

1 – Refer to Page 4, Fig. 4 for exploded view. Attach the back panel (19) to bosses on middle of back section with two 1/4" x 3/8" truss head machine screws (20) provided. The back panel has two 5/16" diameter holes close to the center of the panel.

2 – Lift off the burner mounting plate. Place cerafelt liner (28) on floor of boiler in front of target wall.

3 – Remove the (2) knock-outs in the front jacket panel (23) which allow clearance for the hinge. Place the front jacket panel on the block and replace the burner mounting plate.

4 – Attach right side jacket panel (22) to the front and back panels with sheet metal screws.

NOTE: ON SERIES ECT BOILERS, THE OPTIONAL WATER HEATER (17) MUST BE INSTALLED IN LARGE OPENING IN BACK SECTION BEFORE THE LEFT SIDE JACKET PANELS ARE ATTACHED.

5 – If water heater is used, remove knock out pieces in upper left side jacket panel (21) and back jacket panel (19) before installing. Attach left side jacket panels in the same manner as the right side panel.

6 – Attach the top panel. The top is made in two pieces (26 & 27). Join the two pieces together with sheet metal screws. Secure top panel to front and back panel with sheet metal screws.

7 – Install water heater (13) when required, in large opening in front of boiler. See Figure 3A or 3B for suggested piping. When water heater is not employed, cover the heater opening with cover plate (12) or (16).

BE SURE RUBBER GASKET IS IN PLACE BETWEEN COVER PLATE OR WATER HEATER PLATE AND BOILER SECTION.

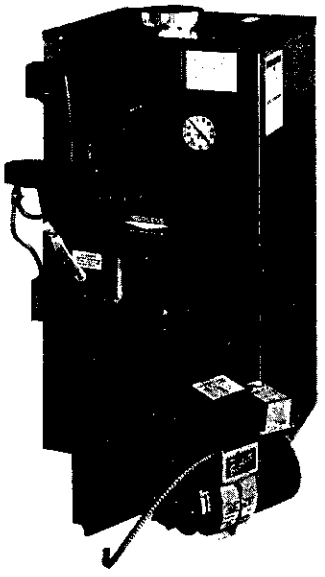


Figure 2

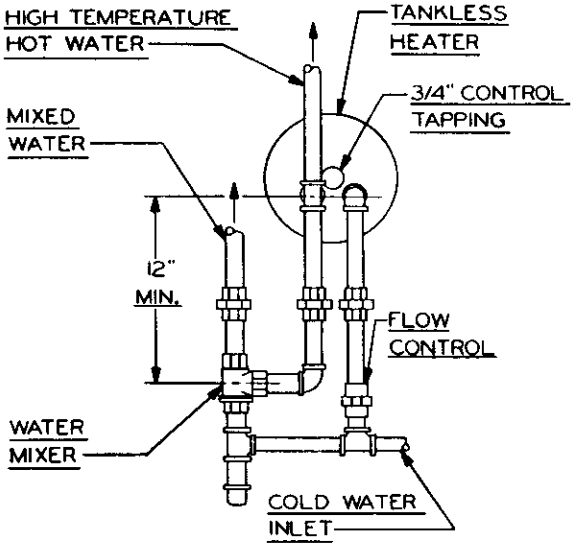


Figure 3A

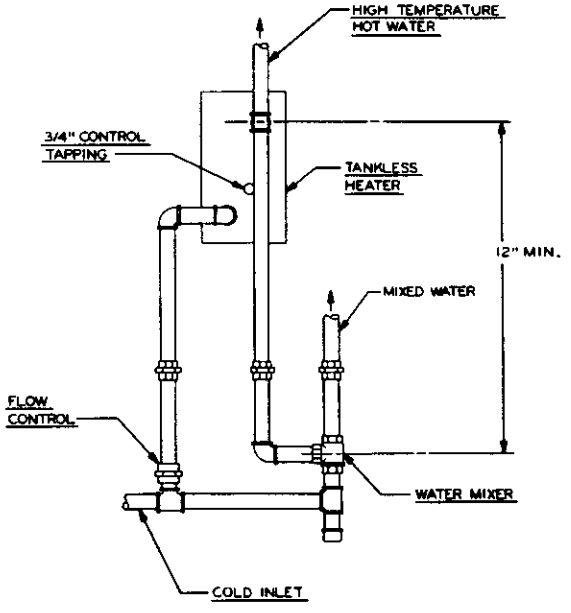


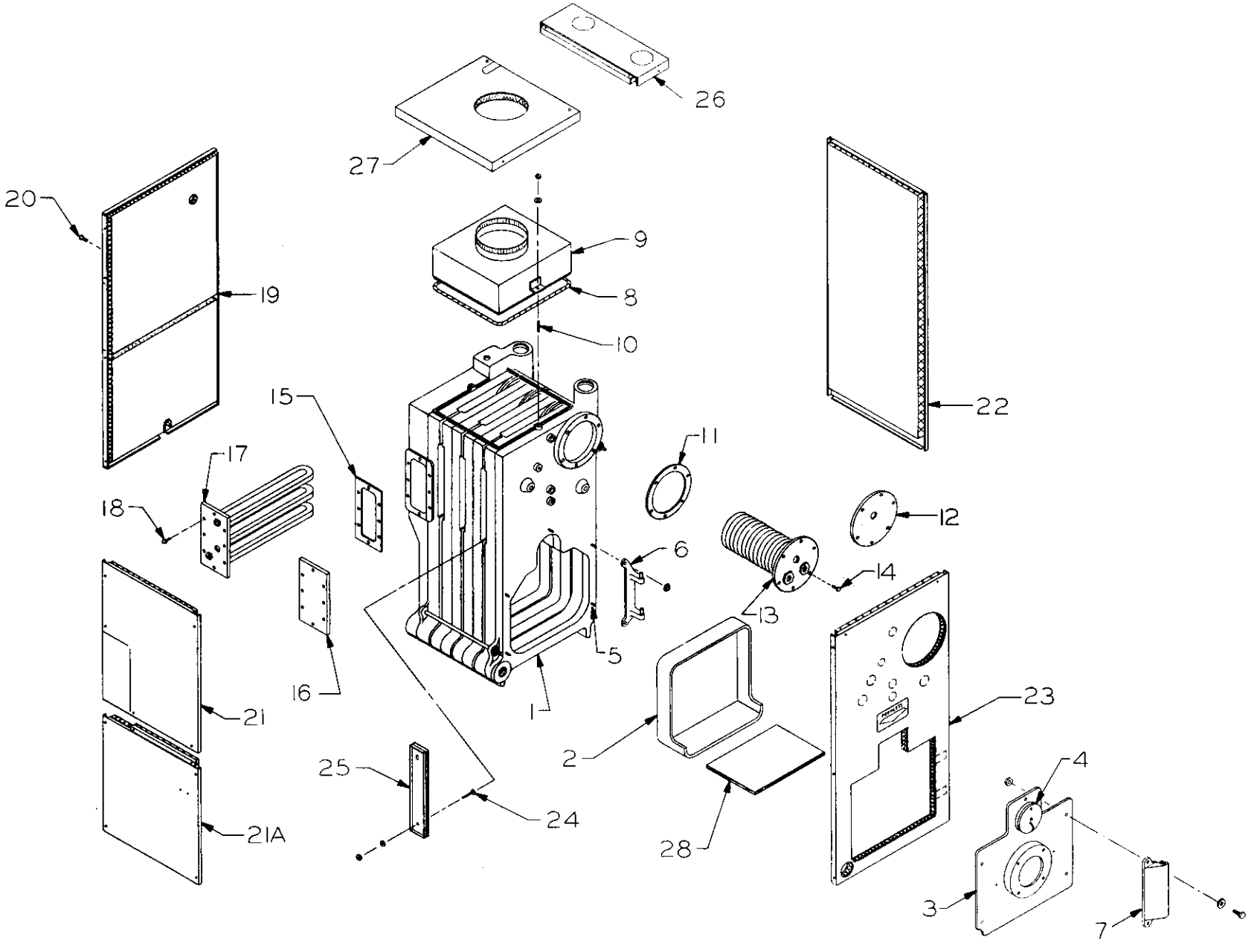
Figure 3B

Maximum Tankless Water Heater Ratings

Heater No.	*Capacity G.P.M.	
X-1020	5	For Use in Series EC
X-1082	4	For Use in Series ECT

* Water heater ratings are based on intermittent demand – 40° F. to 140° F. with 200° F. Boiler Water Temperature.

DANGER: Install anti-scald device in hot water supply piping. Water temperature over 125°F can cause severe burns instantly or death from scalds.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21A
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Figure 4

Item No.	Description	Part No.	Model No.			
			EC/ECT-03	EC/ECT-04	EC/ECT-05	EC/ECT-06
1	Block Assembly - EC-03	EC-1001	X			
	Block Assembly - EC-04	EC-1001-1		X		
	Block Assembly - EC-05	X-1096			X	
	Block Assembly - EC-06	X-1096-1				X
	Block Assembly - ECT-03	EC-1002	X			
	Block Assembly - ECT-04	EC-1002-1		X		
	Block Assembly - ECT-05	X-1097			X	
	Block Assembly - ECT-06	X-1097-1				X
2	Target Wall	X-3019	X	X	X	X
3	Burner Mounting Plate	X-1060	X	X	X	X
4	Observation Door	X-1031	X	X	X	X
5	5/16″-18 x 2-1/4″ Studs w/Nuts - 5 Req'd	X-1061	X	X	X	X
6	Swing Out Burner Mounting Plate Hinge - Internal	EC-1021	X	X	X	X
7	Swing Out Burner Mounting Plate Hinge - External	EC-1022	X	X	X	X
8	High Temp. Rope 3/8″ Diameter. 48″ Long		X			
	High Temp. Rope 3/8″ Diameter. 56″ Long			X		
	High Temp. Rope 3/8″ Diameter. 64″ Long				X	
	High Temp. Rope 3/8″ Diameter. 72″ Long					X
9	Flue Collector	EC-5000	X			
	Flue Collector	EC-5000-1		X		
	Flue Collector	EC-5000-2			X	
	Flue Collector	EC-5000-3				X
10	1/4″-20 x 1-3/4″ Studs w/Nuts - 2 Req'd	X-5000	X	X	X	X
11	Rubber Gasket	X-1023	X	X	X	X
12	Cover Plate	X-1034	X	X	X	X
13	Tankless Coil (Optional Water Only)	X-1020	X	X	X	X
14	3/8″-16 x 3/4″ Hex Hd. Cap Screws - 6 Req'd		X	X	X	X
15	Rubber Gasket (ECT Models)	X-1083	X	X	X	X
16	Cover Plate (Optional ECT Models)	X-1084	X	X	X	X
17	Tankless Heater (Optional ECT Models)	X-1082	X	X	X	X
18	3/8″-16 x 3/4″ Hex Hd. Cap Screws - 8 Req'd		X	X	X	X
19	Back Jacket Panel	EC-6003	X	X	X	X
20	1/4″-20 x 3/8″ Truss Hd. Mach. Screws - Cad. Plate - 2 Req'd		X	X	X	X
21	Upper Left Side Jacket Panel	EC-6007	X			
	Upper Left Side Jacket Panel	EC-6007-1		X		
	Upper Left Side Jacket Panel	EC-6007-2			X	
	Upper Left Side Jacket Panel	EC-6007-3				X

Item No.	Description	Part No.	Model No.			
			EC/ECT-03	EC/ECT-04	EC/ECT-05	EC/ECT-06
21A	Lower Left Side Jacket Panel	EC-6008	X			
	Lower Left Side Jacket Panel	EC-6008-1		X		
	Lower Left Side Jacket Panel	EC-6008-2			X	
	Lower Left Side Jacket Panel	EC-6008-3				X
22	Right Side Jacket Panel	EC-6002	X			
	Right Side Jacket Panel	EC-6002-1		X		
	Right Side Jacket Panel	EC-6002-2			X	
	Right Side Jacket Panel	EC-6002-3				X
23	Front Jacket Panel	EC-6000	X	X	X	X
24	5/16″-18 x 1-3/4″ Carriage Bolt w/Nuts		X	X	X	X
25	Side Clean-Out Cover Plate	X-1085	X	X	X	X
26	Right Top Jacket Panel	EC-6005	X			
	Right Top Jacket Panel	EC-6005-1		X		
	Right Top Jacket Panel	EC-6005-2			X	
	Right Top Jacket Panel	EC-6005-3				X
27	Left Top Jacket Panel	EC-6004	X			
	Left Top Jacket Panel	EC-6004-1		X		
	Left Top Jacket Panel	EC-6004-2			X	
	Left Top Jacket Panel	EC-6004-3				X
28	Base Liner	EC-3000	X			
	Base Liner	EC-3000-1		X		
	Base Liner	EC-3000-2			X	
	Base Liner	EC-3000-3				X

E – PIPING

DO NOT PIPE BOILER UNTIL AFTER JACKET IS INSTALLED.

1 – See Figures 5 and 6 for suggested piping to the boiler. Also, see Hydronics Institute Residential Hydronic Heating Guide 2000.

2 – Make up cold water supply connection to the boiler.

3 – Install pressure gauge or temperature-pressure gauge in tapping provided. See Figure 9.

4 – Plug all open tappings in the boiler and fill with water. Apply approximately thirty (30) pounds pressure. Check to make certain that all joints and fittings are water tight.

5 – After all joints and connections have been proven water tight, remove cold water supply and plugs from all tappings that are to be used. See Figure 9 for tapping locations.

6 – The return piping to the 1-1/4″ NPT lower tapping on the front section must be installed in such a manner to assure proper clearance of the oil burner and mounting plate when opening and closing the burner mounting plate. Peerless suggests using a 1-1/4″ 90 degree street elbow at this lower tapping in order to position the return piping away from the mounting plate assembly.

NOTE: IF THIS BOILER AND DISTRIBUTING SYSTEM IS USED IN CONJUNCTION WITH A REFRIGERATION SYSTEM, THE CHILLED MEDIUM SHALL BE PIPED IN PARALLEL WITH THE BOILER AND THE PROPER VALVES APPLIED TO PREVENT THE CHILLED MEDIUM FROM ENTERING THE BOILER. WHEN THE BOILER IS CONNECTED TO HEATING COILS LOCATED IN AIR HANDLING UNITS WHERE THEY MAY BE EXPOSED TO REFRIGERATED AIR CIRCULATION, THE BOILER PIPING SYSTEM MUST BE EQUIPPED WITH FLOW CONTROL VALVES OR OTHER AUTOMATIC MEANS TO PREVENT GRAVITY CIRCULATION OF THE BOILER WATER DURING THE COOLING CYCLE.

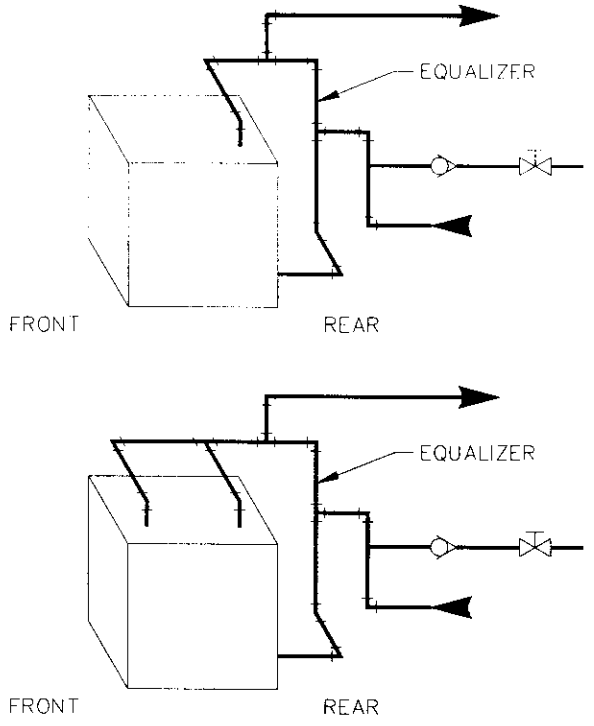

Figure 5

Boiler Model No.	Risers	Header	Equalizer
EC/ECT-03-075	1-2″		1¼″
EC/ECT-03-100	1-2″		1¼″
EC/ECT-03-120	1-2″		1¼″
EC/ECT-04-125	2-2″	2½″	1½″
EC/ECT-04-150	2-2″	2½″	1½″
EC/ECT-04-175	2-2″	2½″	1½″
EC/ECT-05-175	2-2″	3″	1½″
EC/ECT-05-200	2-2″	3″	1½″
EC/ECT-05-250	2-2″	3″	1½″
EC/ECT-06-275	2-2″	3″	1½″
EC/ECT-06-300	2-2″	3″	1½″

The return from system should always enter equalizer through Hartford Loop, 2″ to 4″ below normal water line (see dimensional drawing for normal water line).

STEAM

Size the supply and return connections to suit the system.

Pipe the supply and return in one of two ways:

1) Pipe the supply from the top of the rear section and return to the bottom of the front section. Use the 3/4″ tapping in the top of the back section for air elimination.
2) As an acceptable alternative, pipe the supply from the top of the front section and return to the bottom of the rear section. Provide an air elimination means within the supply piping.

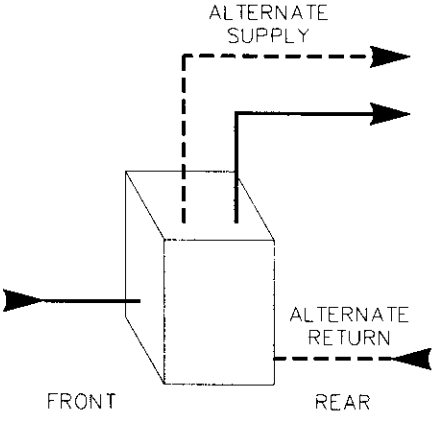

Figure 6

HOT WATER

F – OIL BURNER INSTALLATION

1 – The oil burner is supplied with a mounting flange fixed in position.

2 – Mount the burner to the burner mounting plate (3) Figure 4 with four 5/16″ studs and nuts provided.
BE SURE HIGH TEMP GASKET IS BETWEEN THE BURNER MOUNTING FLANGE AND THE BURNER MOUNTING PLATE.

3 – Route the oil lines to avoid interference when opening the plate for boiler servicing. Use flexible oil lines or copper. When using flexible oil lines, provide tubing long enough to allow the plate to swing freely over its entire range. When using copper, install flared copper disconnects with valves.

4 – See Figure 7 for Oil Burner Specifications. If exceeding 100 PSI pump pressure on burners shown at 100 PSI, see chart on page 13 to determine the required reduction in nozzle size.

WAYNE BURNER WITH 100 PSI PUMP PRESSURE						
Boiler Model No.	Burner Model No.	Air Cone I.D.	Nozzle Size	Flame Lock	Start-Up Settings Off-Cycle Damp.	Air Shutter
EC/ECT-03-075	HS	2 1/2" No Holes	.75 80° A DEL	1	1.0	.50
EC/ECT-03-100	HS	2 1/2" No Holes	1.00 80° B DEL	1	1.2	1.50
EC/ECT-03-120	HS	2 1/2" No Holes	1.20 80° B DEL	1 1/2	1.5	1.75
EC/ECT-04-125	HS	2 1/2" 6 Holes	1.25 80° B DEL	1	2.0	2.00
EC/ECT-04-150	HS	2 1/2" 6 Holes	1.50 80° B DEL	3	2.0	2.25
EC/ECT-04-175	HS	2 1/2" 6 Holes	1.75 80° B DEL	5	2.0	2.50
EC/ECT-05-175	HS	2 1/2" 6 Holes	1.75 80° B DEL	5	2.0	2.50
EC/ECT-05-200	HS	2 1/2" 6 Holes	2.00 80° B DEL	5	2.0	3.50
EC/ECT-05-250	HS	2 1/2" 6 Holes	2.50 80° B DEL	8	2.0	5.00
EC/ECT-06-275	HS	3-5/16" Str. Bore	2.75 80° B DEL	2	2.0	4.00
EC/ECT-06-300	HS	3-5/16" Str. Bore	3.00 80° B DEL	2	2.0	4.50

CARLIN BURNER						
Boiler Model No.	Burner Model No.	Air Shutter	Nozzle Size	Pump Pressure	Start-Up Settings Head Dim. A	Air Band
EC/ECT-04-125	*99FRD	Blank	1.00 x 70° B DEL	150 PSI	2	40% open
EC/ECT-04-150	*99FRD	Blank	1.25 x 60° B DEL	150 PSI	3	60% open
EC/ECT-04-175	*99FRD	Blank	1.50 x 60° B DEL	150 PSI	4	100% open
EC/ECT-05-175	*99FRD	Open	1.50 x 60° B HAGO	150 PSI	5	10% open
EC/ECT-05-200	*99FRD	Open	1.65 x 60° B HAGO	150 PSI	5	45% open
EC/ECT-05-250	*99FRD	Open	2.00 x 60° B HAGO	150 PSI	8	100% open
EC/ECT-06-275	102CRD	Open	2.75 x 60° B DEL	100 PSI	7	100% open
EC/ECT-06-300	102CRD	Open	3.00 x 60° B DEL	100 PSI	9	100% open

*Model 99FRD Burner Equipped with Model 98022 PSC Motor

CARLIN EZ-1HP OIL BURNER WITH MODEL 98022 PSC MOTOR							
Boiler Model No.	Firing Rate	Burner Model No.	Air Shutter	Nozzle Size	Pump Pressure	Start-Up Settings Air Band	Head Bar
EC/ECT-03-075	.75	EZ-1HP	Blank	0.60 x 70° B DEL	150 PSI	0.55	0.60 - 0.65
EC/ECT-03-100	1.00	EZ-1HP	Blank	0.85 x 70° A DEL	150 PSI	0.65	0.85 - 1.00
EC/ECT-03-120	1.20	EZ-1HP	Blank	1.00 x 70° A DEL	150 PSI	0.80	0.85 - 1.00

BECKETT BURNER WITH 140 PSI PUMP PRESSURE							
Boiler Model No.	Burner Model No.	Burner Head	Static Plate	Nozzle Size	Start-Up Settings Air Shutter	Air Band	Head Setting
EC/ECT-03-075	AFG-L1*	L1*	3 3/8"	.65 60° B HAGO	9.0	2	N/A
EC/ECT-03-100	AFG-L1	L1	3 3/8"	.85 60° B HAGO	10.0	1	N/A
EC/ECT-03-120	AFG-L1	L1	**	1.00 60° B HAGO	9.0	2	N/A
EC/ECT-04-125	AFG-F6	F6	2 3/4"	1.10 80° A DEL	5.0	1	N/A
EC/ECT-04-150	AFG-F6	F6	2 3/4"	1.25 80° B HAGO	8.0	1	N/A
EC/ECT-04-175	AFG-F6	F6	2 3/4"	1.50 80° B HAGO	10.0	3	N/A
EC/ECT-05-175	AFG-MV1	M-V1-3	—	1.50 60° B HAGO	10.0	3	3
EC/ECT-05-200	AFG-MV1	M-V1-3	—	1.75 60° B HAGO	10.0	9	3
EC/ECT-05-250	AFG-MV1	M-V1-5	—	2.00 45° B HAGO	10.0	5	5
EC/ECT-06-275	CF-375	L1-S	—	2.25 45° P HAGO	10.0	6	2
EC/ECT-06-300	CF-375	L1-S	—	2.50 45° P HAGO	10.0	6	3

* Requires Low Firing Rate Baffle ** Remove static plate for 1.20 GPH rate.

NOTE: Above air settings are start-up settings only — final adjustments are to be made with combustion test instruments. Adjust burner for highest CO_2 (Maximum 13%) while maintaining a 0 smoke and -.01 to -.02 overfire draft.

Figure 7 *(continued on next page)*

RIELLO SERIES 40 OIL BURNER						
Boiler Model No.	Firing Rate	Burner Model No.	Nozzle Size	Pump Pressure	Turbulator Setting	Air Damper Setting
EC/ECT-03-075	.75	F5	.60 60° B DEL	155	.5	2.1
EC/ECT-03-100	1.00	F5	.85 60° W DEL	145	2.0	2.6
EC/ECT-03-120	1.20	F5	1.00 60° W DEL	145	3.0	2.9
EC/ECT-04-125	1.25	F5	1.00 60° W DEL	155	2.5	3.4
EC/ECT-04-150	1.50	F10	1.25 60° B DEL	145	1.5	3.1
EC/ECT-04-175	1.75	F10	1.35 60° B DEL	165	2.0	2.5
EC/ECT-05-175	1.75	F10	1.35 60° B DEL	165	2.0	2.5
EC/ECT-05-200	2.00	F10	1.50 60° B DEL	170	2.5	2.8
EC/ECT-05-250	2.50	F10	2.00 60° B DEL	155	3.5	4.2
EC/ECT-06-275	2.75	F10	2.25 60° B DEL	150	4.0	4.2
EC/ECT-06-300	3.00	F10	2.50 60° B DEL	145	4.5	4.2

NOTE: Above Turbulator and Air Damper Settings are **start-up settings only** — final adjustments must be made with combustion test instruments.

Figure 7 *(continued)*

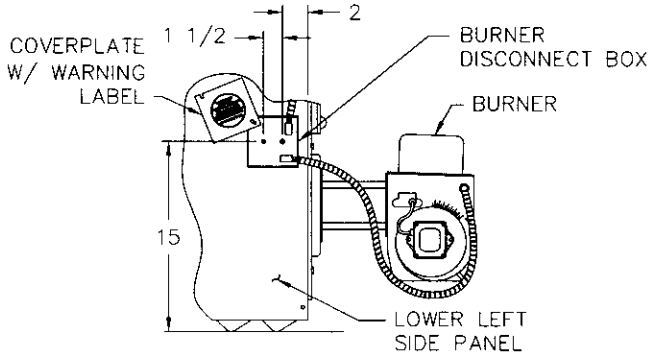

Figure 8

G – CONTROLS

1 – Apply controls as follows:

a. Water Boilers:
Install the limit or operating control, temperature-pressure gauge and safety relief valve. See Figure 9 for proper location.

b. Steam Boilers, Float Low Water Cut-Off:
Install pressure limit control, pressure gauge, gauge glass trim and safety valve. See Figure 9. For application of float low water cut-off see Figure 9 and control manufacturers instruction sheet shipped with the control.

c. Steam Boilers, Primary Probe Low Water Cut-off:

Caution: Do not install a probe low water cut-off in the boiler primary probe tapping unless the low water cut-off is equipped with a timed on and off feature. The cycled off time will allow the probe low water cut-off to sense the true water level in the boiler and eliminate a false reading caused from sensing a foaming or surging water condition. Failure to use a timed low water cut-off could result in a failed heat exchanger.

NOTE: Longer gauge glass and rods are required for use with the optional CG-450 Primary Probe Low Water Cut-Off. The gauge glass carton, 22-162-10, is provided with a packaged boiler. For a KD boiler the longer gauge glass carton is located in a special Probe Low Water Cut-Off Carton, 90759.

Packaged Boilers: The CG 450 LWCO, and PA404A limit are installed and wired at the factory. The boiler miscellaneous parts carton, located within the boiler crate, contains the longer gauge glass carton 22-162-10, Gauge Valves Carton 20-105-03, fittings and components.

KD Boilers: A separate Primary Probe Low Water Cut-Off Carton, 90759 is required. This carton contains the CG450 LWCO, 22-162-10 longer glass/rods carton, 3/4″ x 3″ nipple, 3/4″ x 3/4″ x 1/4″ tee, (2) 1/2″ x 2″ nipples and (2) 1/2″ couplings. Use these components along with those from the Steam Trim Carton and install fittings and controls per Figure 11.

NOTE: The PA404A limit and siphon are not included as part of a standard KD boiler offering for ECT model boilers.

Caution: Pipe the discharge of the safety valve or safety relief valve to prevent injury in the event of pressure relief. Pipe the discharge to a drain. Pipe full size of outlet.

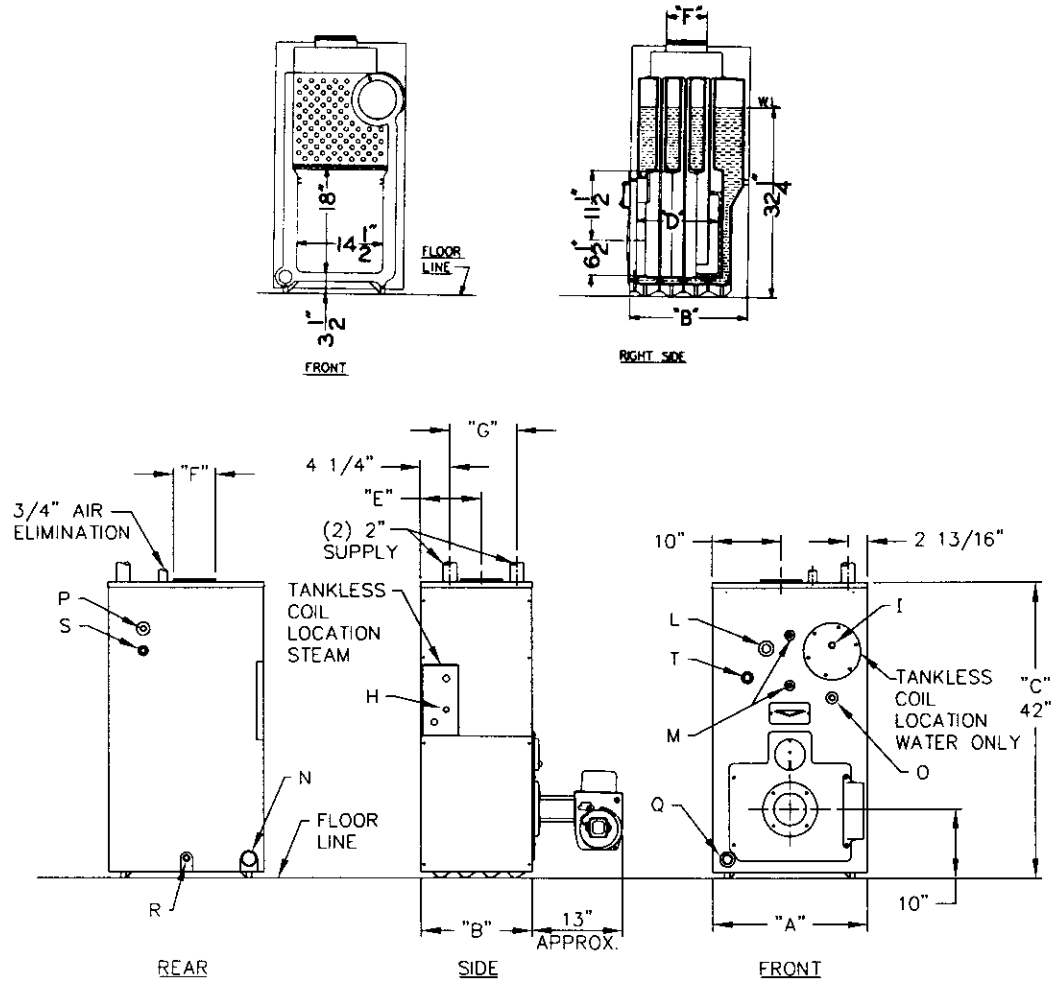

Figure 9

DIMENSIONS							
Boiler Model	Jacket			Length Fire Box "D"	Rear of Jacket to ℄ Flue "E"	Flue Outlet Diameter. "F"	Distance Between ℄ Tappings* "G"
	Width "A"	Depth "B"	Height "C"				
EC/ECT-03	22 1/2"	15 3/4"	42"	10"	8 3/4"	6"	9 1/16"
EC/ECT-04	22 1/2"	19 15/16"	42"	14 3/16"	10 7/8"	7"	13 1/4"
EC/ECT-05	22 1/2"	24 1/8"	42"	18 3/8"	13"	8"	17 7/16"
EC/ECT-06	22 1/2"	28 5/16"	42"	22 9/16"	15 1/16"	9"	21 5/8"

*Dimensions are approximate.

TAPPING LOCATIONS			
LOCATION	SIZE NPT	WATER	STEAM
H	3/4"	N/A	Low Limit Control
I	3/4"	Limit Control	Pressure Gauge
L	1/4"	Temperature-Pressure Gauge	Limit Control
M	1/2"	N/A	Gauge Glass and Low Water Cut-off
N	2"	Optional Return	Return
O	3/4"	Secondary Probe Low Water Cut-off	Secondary Probe Low Water Cut-off
P	3/4"	Safety Relief Valve	Safety Valve
Q	1 1/4"	Return	N/A
R	3/4"	Drain Valve	Drain Valve
S	1 1/2"	Optional High Limit	Skim
T	3/4"	N/A	Primary Probe Low Water Cut-off

McD & M#67PE-2

LOW WATER CUT-OFF

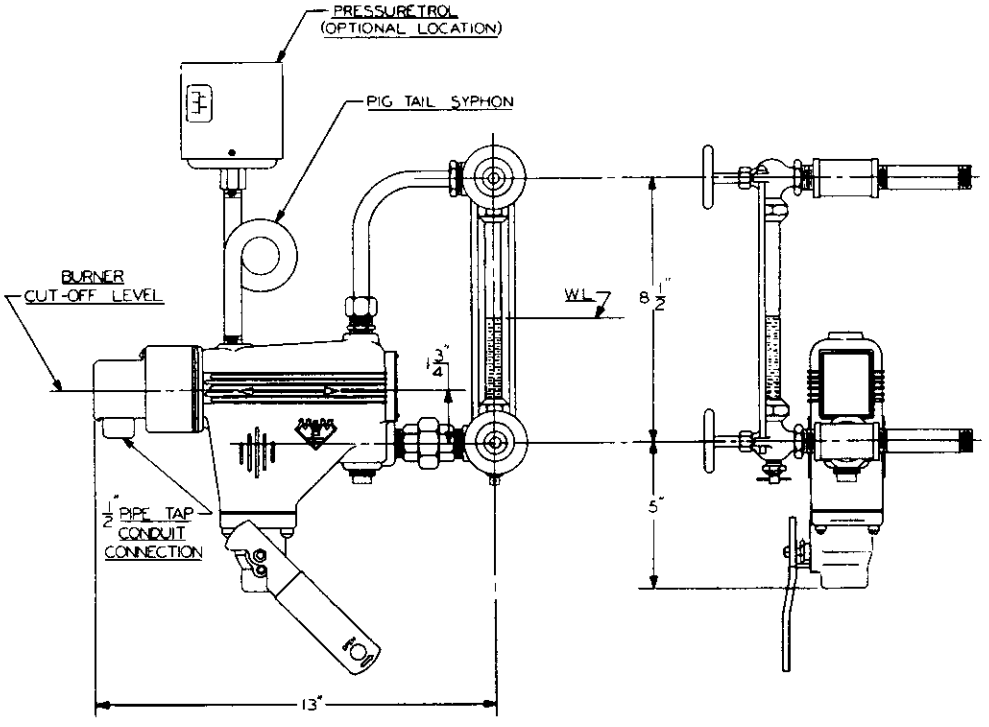

Figure 10

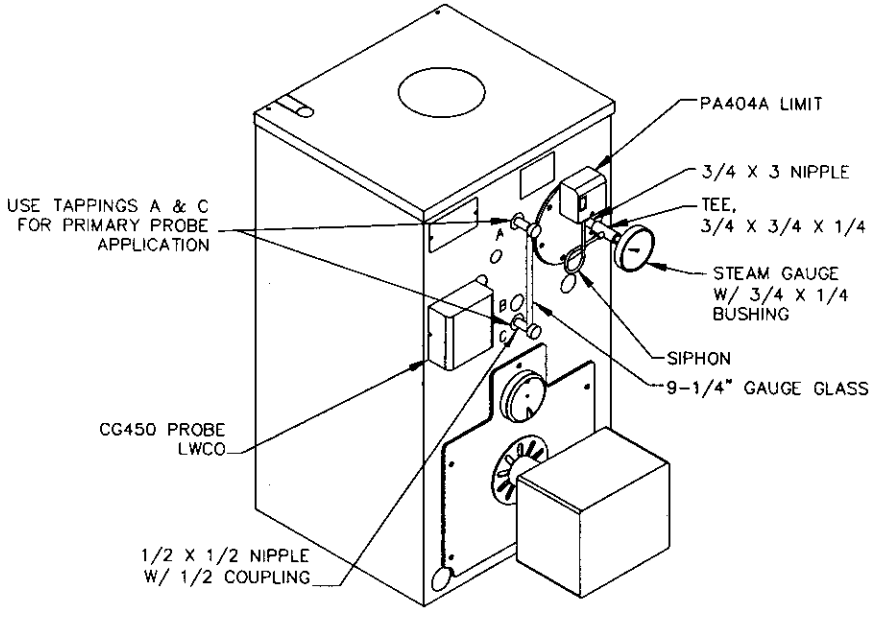

Figure 11

H – WIRING

1 – All electrical wiring shall be done in accordance with the National Electrical Code and Local Requirements.

2 – Locate junction box in the swing door carton. Mount junction box to the holes on the left side of jacket with (2) #10 x 1″ sheet metal screws.

3 – Locate the polarized harness(es) in the swing door carton. If your carton has two polarized harnesses, select the harness with male pins. Connect harness from the junction box to the limit (water boilers) or low water cutoff (steam boilers) using field-supplied conduit. See wiring diagrams (Fig. 12, 13 & 14), junction box detail (Fig. 8), and photos (Fig. 2 & cover). The additional harness is a duplicate of the harness now located in the burner carton and may be discarded if using a Peerless supplied burner (harness in burner carton includes conduit).

Warning: Improper installation of burner harness can allow burner to energize with swing door open, creating a severe burn hazard to boiler maintenance personnel.

4a– Locate the polarized burner harness in the burner carton. Attach harness between burner and junction box as shown in Figure 8.

4b– If using a non-Peerless supplied burner, obtain appropriate burner harness from a Peerless Distributor, or hardwire burner such that burner swing door can not be opened without disconnecting power.

*Harness for Beckett or Carlin burner – 50233 (polarized, 21″ long conduit)

*Harness for Riello burner – 50234 (polarized, 28″ long conduit)

5– For complete information on servicing and adjustment of controls, refer to the attached control specification sheets.

NOTE: Single Pole Switches including those of Safety Controls or Protective Devices shall not be wired in a grounded line.

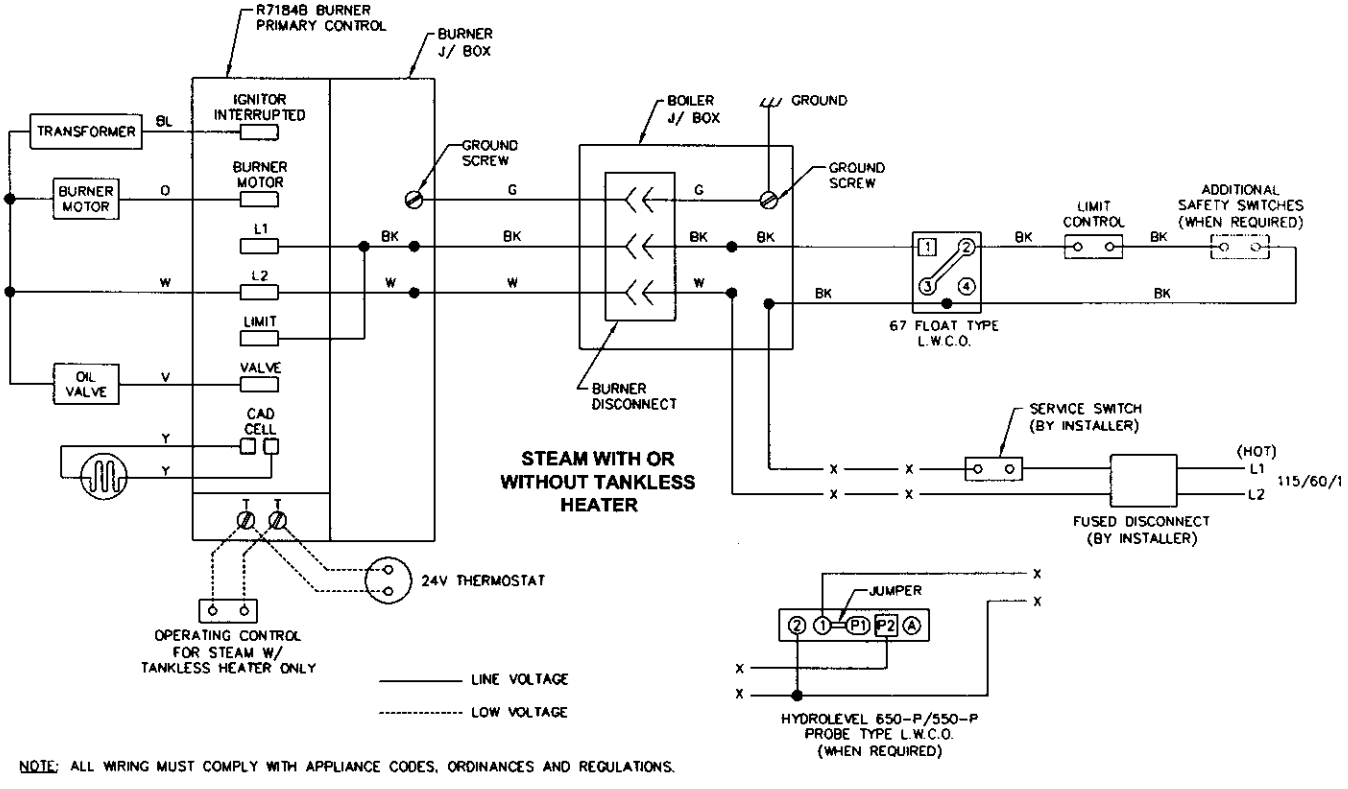

Figure 12

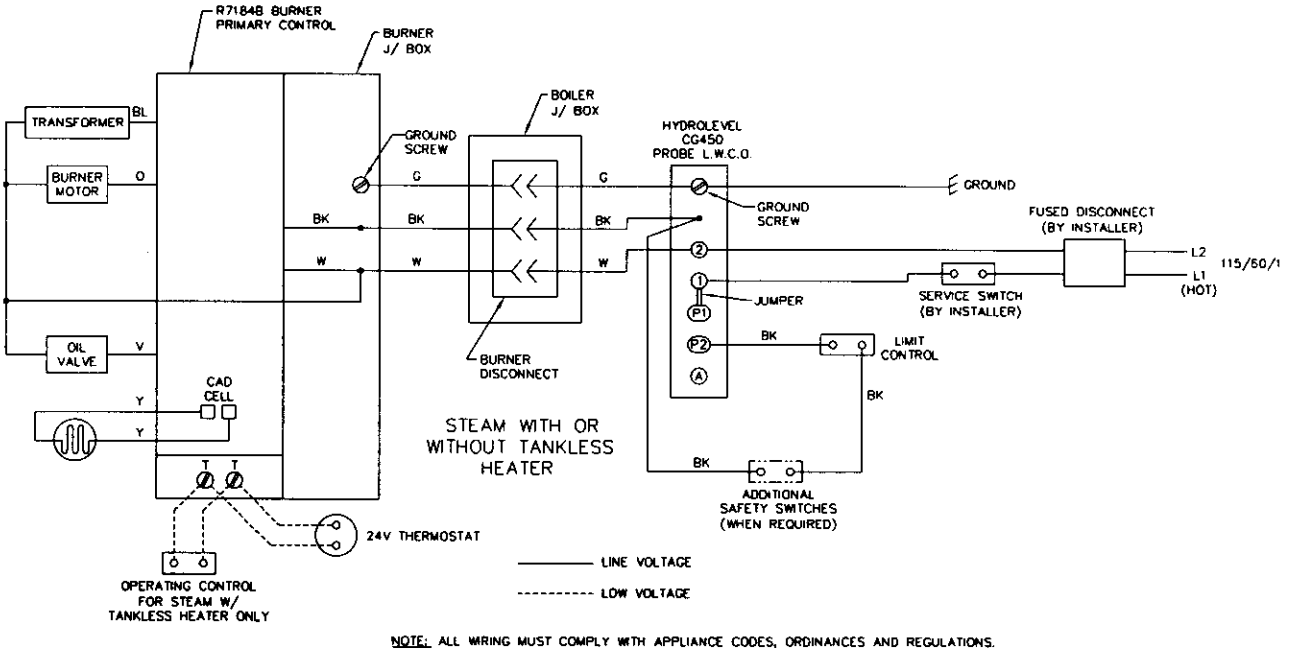

Figure 13

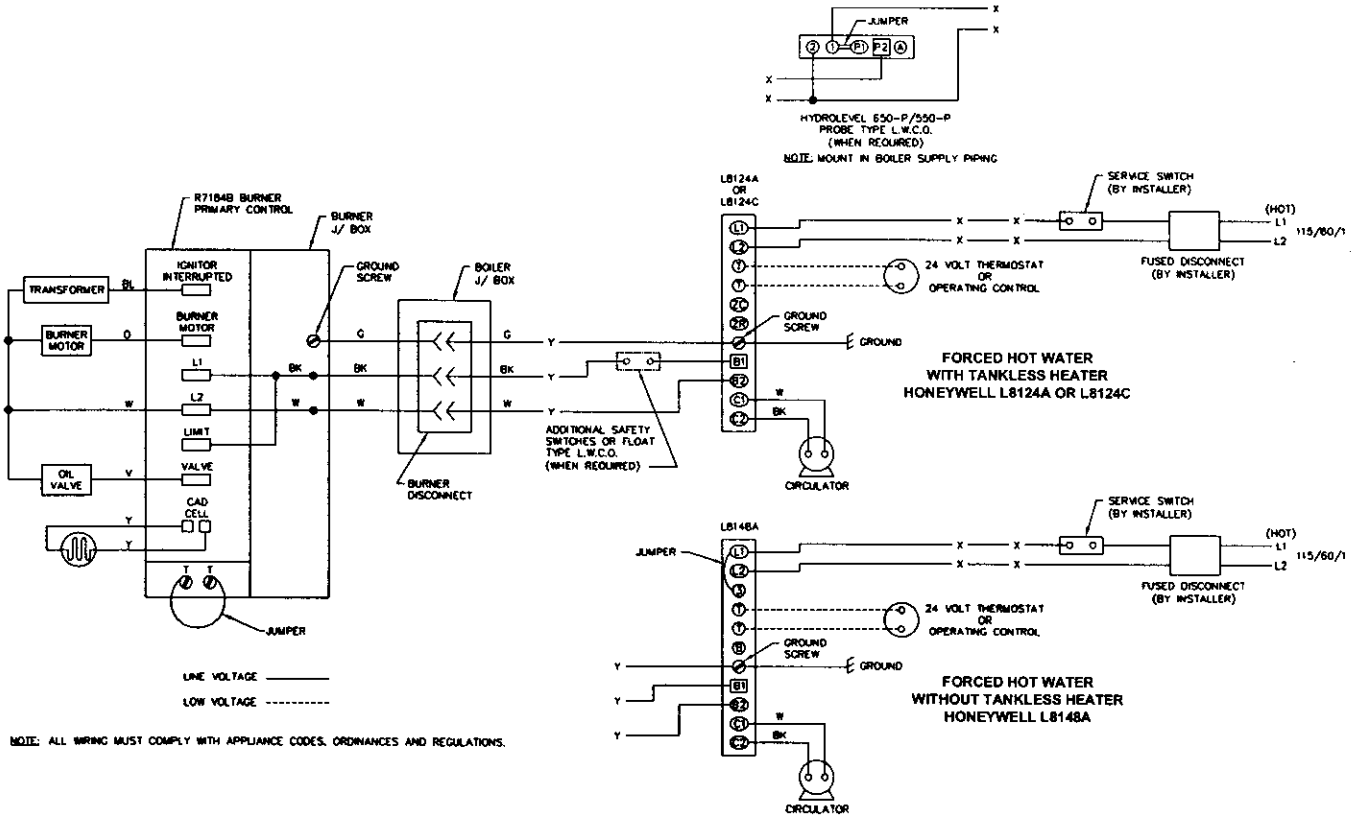

Figure 14

I – CLEANING HEATING SURFACES

NOTE: CLEAN BOILER AT LEAST ONCE PER YEAR. CLEAN BOILER FROM THE LEFT SIDE OR FROM THE TOP.

TO CLEAN:

1 – Turn off all electrical power to the boiler. Disconnect oil burner wiring harness.

2a – If cleaning from the side, remove left jacket panel and side cleanout cover plates.

2b – If cleaning from the top, remove flue pipe, left top jacket panel and flue collector.

3 – Brush the flue passages with a wire brush to remove all scale or soot.

4 – Remove scale and soot from combustion chamber by vacuum cleaning or any other means.

NOTE: BURNER MOUNTING PLATE MUST BE REMOVED OR SWUNG OPEN TO FACILITATE THIS OPERATION. TARGET WALL IS MADE OF SOFT CERAMIC FIBER. DO NOT DAMAGE THIS MATERIAL DURING BRUSHING AND VACUUM CLEANING.

5 – Install clean-out cover plates or flue collector. Inspect clean-out cover plate insulation, flue collector gasket, or rope seal. Replace any pieces not forming a gas tight seal.

6 – Install jacket panels and flue pipe as required.

J – CLEANING THE SERIES EC STEAM BOILER WITH SKIM TAPPING

The following cleaning procedure shall be performed by a qualified service person. Refer to Figure 9 for location of skim tapping.

1 – Clean the boiler as described below no later than one week after the initial start up. Cleaning will be more effective if the boiler operates a day or two to loosen sediment and impurities in the system.

2 – The boiler must be cleaned to remove any accumulation of oil, grease, sludge, etc. that may be in the system. These substances can cause foaming and surging of the boiler water, producing an unstable water line and water carryover to the system.

WARNING: CLEANING THE BOILER REQUIRES THE USE OF VERY HOT WATER AND CORROSIVE CHEMICALS. USE CARE WHEN HANDLING TO PREVENT INJURY.

3 – Connect a 1 1/2" pipe nipple and shut off valve to skim tapping.

4 – Connect a 1 1/2" drain line off of the skim valve, run to a point of safe discharge.

5 – Close all valves to the system. Provide a means of continuous fresh water to the boiler for the cleaning process.

6 – Open the skim valve. Fill the boiler until water begins to flow out of the valve. Shut off fill valve.

7 – Use common washing soda (such as Arm and Hammer Super Washing Soda). Mix the soda with water in a 10 quart pail and pour into the boiler through the safety valve tapping. Mix a proportion of one (1) pound of washing soda for each 800 square feet EDR net boiler rating.

CAUTION: DO NOT LEAVE THE BOILER UNATTENDED WHILE FIRING. TAKE GREAT CARE NOT TO ALLOW THE WATER LEVEL TO DROP BELOW THE BOTTOM OF THE GAUGE GLASS OR TO ALLOW FRESH WATER MAKEUP TO FLOW IN TOO FAST. THIS WILL AVOID THE POSSIBILITY OF CAUSING THE BOILER SECTIONS TO FRACTURE.

8 – Turn burner on and allow the boiler water to heat up to just below steaming (180 to 200 degrees F). Cycle the burner to maintain temperature during skimming. Do not allow the boiler to steam. Steaming mixes up the contaminants in the water instead of floating them at the surface.

9 – Open the make-up water valve to continuously feed water to the boiler. Allow water to flow out of the skim tapping.

10 – Continue skimming the boiler until the water flowing from the skim tapping flows clear. This will take some time, possibly several hours for a dirty system.

11 – After skimming is complete, close the skim valve and turn off the boiler.

12 – Close the make-up water valve and open the boiler drain valve.

13 – Drain the boiler completely. Refill and drain again one or two times to make sure all of the soda has been washed out.

14 – Restore piping to normal. Pipe a nipple and cap in the skim valve.

15 – **NOTE:** If the gauge glass becomes dirty again, this indicates more contaminants have worked loose in the system. Repeat the cleaning and skimming process as needed to clean the system.

SERIES EC AND ECT RATINGS									
(1) Boiler Model No.	(2) a) Heating Capacity BTU/Hr. b) Gross Output		(3) Net I-B-R Ratings			(4) I-B-R Firing Rate G.P.H.	Chimney		Minimum Draft Required in Stack
	Water	Steam	BTU/Hr. Steam	Steam Sq. Ft.	BTU/Hr. Water		Size Inches	Height Feet	
EC/ECT-03-075	a 92,000	a 91,000	68,000	283	80,000	.75	8x8	20	.03″
EC/ECT-03-100	a 121,000	a 120,000	90,000	375	105,000	1.00	8x8	20	.04″
EC/ECT-03-120	a 144,000	a 142,000	107,000	446	125,000	1.20	8x8	20	.05″
EC/ECT-04-125	a 152,000	a 151,000	113,000	471	132,000	1.25	8x8	20	.03″
EC/ECT-04-150	a 181,000	a 180,000	135,000	563	157,000	1.50	8x8	20	.04″
EC/ECT-04-175	a 209,000	a 208,000	156,000	650	182,000	1.75	8x8	20	.05″
EC/ECT-05-175	a 214,000	a 212,000	159,000	663	186,000	1.75	8x8	20	.03″
EC/ECT-05-200	a 241,000	a 240,000	180,000	750	210,000	2.00	8x8	20	.04″
EC/ECT-05-250	b 286,000	b 286,000	215,000	896	249,000	2.50	8x12	20	.05″
EC/ECT-06-275	b 321,000	b 321,000	241,000	1004	279,000	2.75	8x12	20	.04″
EC/ECT-06-300	b 347,000	b 347,000	261,000	1083	302,000	3.00	8x12	20	.05″

(1) Boiler Model No. may have the following suffix letters:

W–Water
S–Steam
U–Boiler-Burner Unit (Unassembled)
P–Packaged
C–Circulator
T–Tankless Coil

(2a) Heating Capacity BTU/Hr. based on D.O.E. testing procedure at 13.0% CO_2, and -.02″ water column draft in firebox.

(2b) Gross Output BTU/Hr. based on 12.5% CO_2, and -.02″ water column draft in firebox.

(3) Net I=B=R Ratings based on the Testing and Rating Standard for Cast Iron and Steel Heating Boilers of The Hydronics Institute Division of GAMA.

The Net I=B=R Ratings shown include allowance for normal piping and pick-up load.

The water ratings are based on a piping and pick-up allowance factor of 1.15, steam ratings are based on allowance of 1.333.

The Peerless Heater Company should be consulted before selecting a boiler for gravity hot water installations and installations having unusual piping and pick-up requirements such as exposed piping, night shut-down, etc.

(4) Firing rate is based on a fuel oil with a heating value of 140,000 BTU per gallon. Burner input based on maximum altitude of 2,000 ft. – for other altitudes consult factory.

ADVERSE FUEL CONDITIONS

If an adverse fuel condition such as cold oil exists, it may be necessary to increase the pump pressure to the nozzle. Cold oil is much harder to atomize at 100 psi compared to room temperature oil. To the right is a chart giving flow rates of standard nozzle sizes at 120 psi and 140 psi pump pressure.

NOTE: If it was necessary to increase the pump pressure above the standard 100 psi, to eliminate any confusion for the next routine servicing a tag must be placed on the burner indicating pump pressure and nozzle size used.

Nozzle Rating At 100 PSI	Approx. Nozzle Rates GPH 120 PSI	140 PSI
.50	.55	.59
.65	.71	.77
.75	.82	.89
.85	.93	1.00
.90	.99	1.07
1.00	1.10	1.18
1.10	1.21	1.30
1.20	1.31	1.41
1.25	1.37	1.48
1.35	1.48	1.60
1.50	1.64	1.78
1.65	1.81	1.95
1.75	1.92	2.07
2.00	2.19	2.37
2.25	2.47	2.66
2.50	2.74	2.96
2.75	3.00	3.24

Series EC/ECT

Oil Boilers

Installation, Operation & Maintenance Manual

TO THE INSTALLER:
This manual is the property of the owner and must be affixed near the boiler for future reference.

TO THE OWNER:
This boiler should be inspected annually by a Qualified Service Agency.

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