X: MAINTENANCE AND SERVICE INSTRUCTIONS

A. WATER BOILERS:

1. Filling of boiler and system.

   GENERAL — In a hot water heating system, the boiler and entire system (other than the expansion tank) must be full of water for satisfactory operation. Water should be added to the system until the boiler pressure gauge registers 12 psi. To insure that the system is full, water should come out of all air vents when opened.

2. BOILING OUT OF BOILER AND SYSTEM. The oil and grease which accumulate in a new hot water boiler can be washed out in the following manner:

   a. Remove relief valve using extreme care to avoid damaging it.

   b. Add an appropriate amount of recommended boil out compound.

   c. Replace relief valve.

   d. Fill the entire system with water.

   e. Start firing the boiler.

   f. Circulate the water through the entire system.

   g. Vent the system, including the radiation.

   h. Allow boiler water to reach operating temperature, if possible.

   i. Continue to circulate the water for a few hours.

   j. Stop firing the boiler.

   k. Drain the system in a manner and to a location that hot water can be discharged with safety.

   l. Remove plugs from all available returns and wash the water side of the boiler as thoroughly as possible, using a high-pressure water stream.

   m. Refill the system with fresh water.

3. Add appropriate boiler water treatment compounds as recommended by your qualified water treatment company.

4. Make pH or Alkalinity Test.

   After boiler and system have been cleaned and refilled as previously described, test the pH of the water in the system. This can easily be done by drawing a small sample of boiler water and testing with hydrion paper which is used in the same manner as litmus paper, except it gives specific readings. A color chart on the side of the small hydrion dispenser gives the reading pH. Hydrion paper is inexpensive and obtainable from any chemical supply house or through your local druggist. The pH should be higher than 7 but lower than 11. Add some of the washout chemical (caustic soda), if necessary, to bring the PH within the specified range.

5. Boiler is now ready to be put into service.

B. EXCESSIVE MAKE-UP WATER

A leaky system will increase the volume of make-up water supplied to the boiler, which can significantly shorten the life of the boiler. Entrained in make-up water are dissolved minerals, salts and oxygen. When the fresh, cool make-up water is heated in the boiler, the minerals fall out as sediment, the salts coat the inside of the boiler, and the oxygen escapes as a gas. The accumulation of sediment eventually isolates the water from contacting the cast iron. When this happens the cast iron in that area gets extremely hot and eventually cracks. The presence of free oxygen or chloride salts in the boiler corrodes the cast iron from the inside. More make-up water and higher concentrations of contaminants damage the boiler sooner. **Our warranty does not cover corrosion and sediment-related damage.** Clearly it is in everyone's best interest to prevent this type of failure. You can do your part by ensuring that your system is leak-free, keeping leakage to less than 2 percent of the boiler water volume each month. Refer to Chart below.

IMPORTANT

IF, DURING NORMAL OPERATION, IT IS NECESSARY TO ADD MORE WATER THAN INDICATED BELOW, CONSULT A QUALIFIED SERVICE TECHNICIAN TO CHECK YOUR SYSTEM FOR LEAKS.

Boiler Series	Gallons Per Month	Gallons Per Year
FR-HGS/FR-HGSII	0.2	2.4
FR-98/122	0.4	4.8
FR-147/173	0.8	9.6
FR-205/232	0.9	10.8
FR-265/305	1.0	12.0
FR-350/400	1.4	16.8
FR-462	1.6	19.2

C. ATTENTION TO BOILER WHILE NOT IN OPERATION

1. IMPORTANT

   IF BOILER IS NOT USED DURING WINTER TIME, IT MUST BE FULLY DRAINED TO PREVENT FREEZE DAMAGE.

2. Spray inside surfaces with light lubricating or crankcase oil using gun with extended stem so as to reach all corners.

3. With steam boilers, at end of season add sufficient water to fill boiler to top of water column and leave it that way until fall when water should be drained again to proper level. If, at this time, boiler water is dirty, drain water, flush out boiler, and refill with clean water to prescribed water level.

X: MAINTENANCE AND Service INSTRUCTIONS (continued)

4. Always keep the manual fuel supply valve shut off if the burner is shut down for an extended period of time.
5. To recondition the heating system in the fall season after a prolonged shut down, follow the instructions outlined in Section IV, Paragraphs A through K.

WARNING

This boiler contains controls which may cause the boiler to shut down and not restart without service. If damage due to frozen pipes is a possibility, the heating system should not be left unattended in cold weather; or appropriate safeguards and alarms should be installed on the heating system to prevent damage if the boiler is inoperative.

XI: BOILER CLEANING

NOTICE

BURNER SHUTDOWN: Open Service Switch to turn off burner.

Manual Oil Supply Valve should be closed and Electric Service to boiler turned off if boiler will not be operated for an extended period of time.

A. GENERAL

Inspection service and cleaning should be conducted annually. Turn off electric power and close oil supply valve while conducting service or maintenance.

B. FIRETUBES AND COMBUSTION CHAMBER (See Figure 22)

1. CLEAN THE FIRETUBES

a. Disconnect electric service to burner.

b. To gain access to the firetubes, remove the front flue box door. For boilers equipped with flue box swingdoor, remove two (2) nuts at top of flue box door and swing door down. For boilers not equipped with swingdoor, remove fasteners around the perimeter of flue box frame and remove door.

c. Remove turbulators.

d. Using a firetube brush clean firetubes. Using a wire or fibre bristle brush, clean front tube sheet. Use care not to damage the insulation on the inside of the flue box. Remove debris and vacuum as necessary.

e. Replace turbulators and flue box door.

f. Disconnect vent pipe from rear smokebox collar. Through collar opening, brush surfaces and vacuum as necessary to remove debris from cleaning firetubes in Step d above. Inspect base of chimney for accumulation of debris. Remove debris, clean and vacuum as necessary. Reconnect vent pipe to smokebox collar and secure. Seal joint at chimney collar, if necessary.

Units should be cleaned at least once a year, preferably at the end of each heating season.

It is not necessary to remove burner to clean boiler.

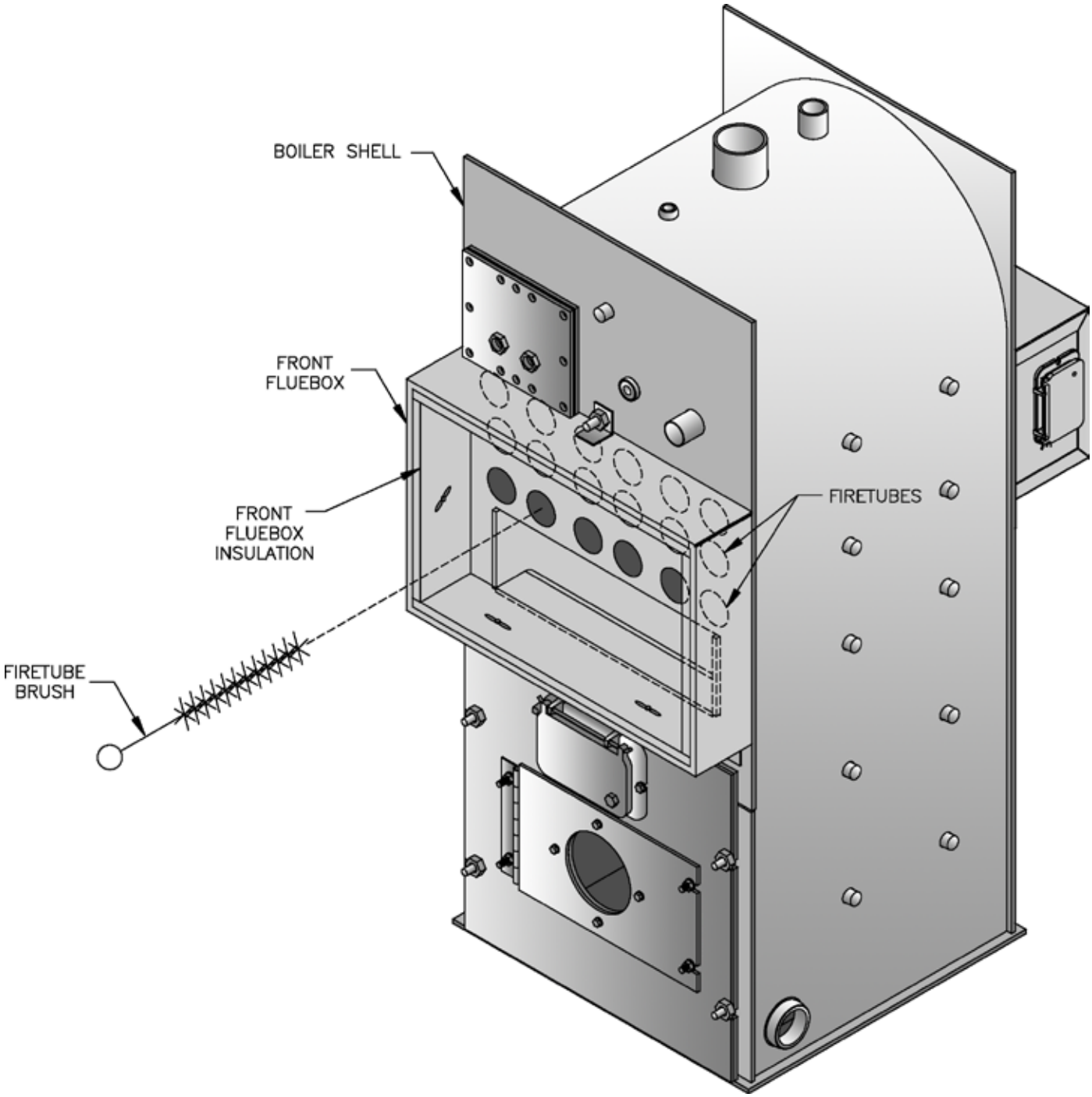


Figure 22: Cleaning of FR Boiler

Important Product Safety Information
Refractory Ceramic Fiber Product

Warning:

The Repair Parts list designates parts that contain refractory ceramic fibers (RCF). RCF has been classified as a possible human carcinogen. When exposed to temperatures above 1805°F, such as during direct flame contact, RCF changes into crystalline silica, a known carcinogen. When disturbed as a result of servicing or repair, these substances become airborne and, if inhaled, may be hazardous to your health.

AVOID Breathing Fiber Particulates and Dust

Precautionary Measures:

Do not remove or replace RCF parts or attempt any service or repair work involving RCF without wearing the following protective gear:

1. A National Institute for Occupational Safety and Health (NIOSH) approved respirator
2. Long sleeved, loose fitting clothing
3. Gloves
4. Eye Protection

- Take steps to assure adequate ventilation.
- Wash all exposed body areas gently with soap and water after contact.
- Wash work clothes separately from other laundry and rinse washing machine after use to avoid contaminating other clothes.
- Discard used RCF components by sealing in an airtight plastic bag. RCF and crystalline silica are not classified as hazardous wastes in the United States and Canada.

First Aid Procedures:

- If contact with eyes: Flush with water for at least 15 minutes. Seek immediate medical attention if irritation persists.
- If contact with skin: Wash affected area gently with soap and water. Seek immediate medical attention if irritation persists.
- If breathing difficulty develops: Leave the area and move to a location with clean fresh air. Seek immediate medical attention if breathing difficulties persist.
- Ingestion: Do not induce vomiting. Drink plenty of water. Seek immediate medical attention.

XII: TROUBLESHOOTING

A. COMBUSTION

1. NOZZLES — Although the nozzle is a relatively inexpensive device, its function is critical to the successful operation of the oil burner. The selection of the nozzle supplied with the FR boiler is the result of extensive testing to obtain the best flame shape and efficient combustion. Other brands of the same spray angle and spray pattern may be used but may not perform at the expected level of CO_2 and smoke. Nozzles are delicate and should be protected from dirt and abuse. Nozzles are mass-produced and can vary from sample to sample. For all of those reasons a spare nozzle is a desirable item for a serviceman to have.
2. FUEL LEAKS — Any fuel leak between the pump and the nozzle will be detrimental to good combustion results. Look for wet surfaces in the air tube, under the ignitor, and around the air inlet. Any such leaks should be repaired as they may cause erratic burning of the fuel and in the extreme case may become a fire hazard.
3. SUCTION LINE LEAKS — Any such leaks should be repaired, as they may cause erratic burning of the fuel and in extreme cases may become a fire hazard. Whatever it takes, **The Oil Must Be Free of Air**. This can be a tough problem, but it must be resolved. Try bleeding the pump through a clear tube. There must be no froth visible. There are various test kits available to enable you to look at the oil through clear tubing adapted to the supply line at the pump fitting. Air eliminators are on the market that have potential. Also, electronic sight glasses are being used with good success. At times, new tubing must be run to the tank or new fittings put on. Just make sure you get the air out before you leave.

   Any air leaks in the fuel line will cause an unstable flame and may cause delayed ignition noises. Use only flare fittings in the fuel lines.
4. GASKET LEAKS — If 11.5 to 12.5% CO_2 with a #1 smoke cannot be obtained in the breeching, look for air leaks around the burner mounting gasket, observation door, and canopy gasket. Such air leaks will cause a lower CO_2 reading in the breeching. The smaller the firing rate the greater effect an air leak can have on CO_2 readings.
5. DIRT — A fuel filter is a good investment. Accidental accumulation of dirt in the fuel system can clog the nozzle or nozzle strainer and produce a poor spray pattern from the nozzle. The smaller the firing rate, the smaller the slots become in the nozzle and the more prone to plugging it becomes with the same amount of dirt.
6. WATER — Water in the fuel in large amounts will stall the fuel pump. Water in the fuel in smaller amounts will cause excessive wear on the pump, but more importantly water doesn't burn. It chills the flame and causes smoke and unburned fuel to pass out of the combustion chamber and clog the flueways of the boiler.
7. COLD OIL — If the oil temperature approaching the fuel pump is 40°F or lower, poor combustion or delayed ignition may result. Cold oil is harder to atomize at the nozzle. Thus, the spray droplets get larger and the flame shape gets longer. An outside fuel tank that is above grade or has fuel lines in a shallow bury is a good candidate for cold oil. The best solution is to locate the tank near the boiler in the basement utility room or bury the tank and lines deep enough to keep the oil above 40°F. Check environmental issues with local authorities having jurisdiction.
8. FLAME SHAPE — Looking into the combustion chamber through the observation port, the flame should appear straight with no sparklers rolling up toward the crown of the chamber. If the flame drags to the right or left, sends sparklers upward or makes wet spots on the target wall, the nozzle should be replaced. If the condition persists look for fuel leaks, air leaks, water or dirt in the fuel as described above.
9. HIGH ALTITUDE INSTALLATIONS — Air openings must be increased at higher altitudes. Use instruments and set for 11.5 to 12.5% CO_2.
10. START-UP NOISE — Late ignition is the cause of start-up noises. If it occurs recheck for electrode settings, flame shape, air or water in the fuel lines.
11. SHUT DOWN NOISE — If the flame runs out of air before it runs out of fuel, an after burn with noise may occur. That may be the result of a faulty cut-off valve in the fuel pump, or it may be air trapped in the nozzle line. It may take several firing cycles for that air to be fully vented through the nozzle. Water in the fuel or poor flame shape can also cause shut down noises.

NOTICE

CHECK TEST PROCEDURE. A very good test for isolating fuel side problems is to disconnect the fuel system and with a 24" length of tubing, fire out of an auxiliary five gallon pail of clean, fresh, warm #2 oil from another source. If the burner runs successfully when drawing out of the auxiliary pail then the problem is isolated to the fuel or fuel lines being used on the job site.

XII: TROUBLESHOOTING (continued)

B. OIL PRIMARY CONTROL **(Oil Primary)**

1. Burner (Oil Primary) will not come on.
   a. No power to Oil Primary.
   b. Oil Primary is in lockout or restricted mode. Press reset button for one (1) second to exit lockout. If control has recycled three times within the same call for heat, it will enter into restricted mode. To reset from restricted mode, refer to Section VIII, Paragraph I, Step 2 for details.
   c. CAD cell seeing light.
   d. CAD assembly defective.
   e. Control motor relay is stuck closed (see note below).
2. Burner (control) will light, then shut down after a short time, then restart after one (1) minute.
   a. CAD cell is defective.
   b. Air leaking into oil line causing flame out.
   c. Defective nozzle causing flame to be erratic.
   d. Excessive airflow or draft causing flame to leave burner head.
   e. Excessive back pressure causing flame to be erratic.
3. Control locks out after Trial For Ignition (TFI).
   a. No oil to burner.
   b. Shorted electrodes.
   c. Nozzle clogged.
   d. Airflow too high.
   e. Ignitor module defective.
   f. CAD cell defective.
   g. Oil valve stuck open or closed.

   Note: The Safety Monitoring Circuit (SMC) is designed to provide lockout in the event of a stuck or welded motor relay.

NOTICE

If flame is not established within 15 seconds of oil valve actuation (known as Trial For Ignition [TFI]) lockout will occur. Lockout is indicated by a red LED solid-on located on the oil primary control.

Hard Lockout will occur if the Oil Primary Control locks-out three (3) times during a call for heat. This is indicated by red light reset button solid-on.

C. INTELLIGENT OIL BOILER CONTROL

- **Cold Start Boiler Control** is used on Boilers without Tankless Heaters.
- **Warm Start Boiler Control** is used on Boilers with Tankless Heaters

1. When a problem occurs with the boiler operation, the Boiler Control easily provides specific, valuable information to help resolve the issue quickly. The display on the Boiler Control should be the first place to check.
   a. If an Error Code "Err" **IS NOT** displayed on the Boiler Control: In this circumstance, Table 11 can be used to determine the problem and possible causes.

TABLE 11: TROUBLESHOOTING GUIDE

System Condition	Diagnostic Condition	Check	Action
Boiler is cold, house is cold.	Display is OFF.	120 Vac System power.	Turn system power on.
	Display is ON.	24 Vac T-T	No 24 V; replace control.
		24 V present; disconnect thermostat, short T-T.	Boiler starts, check wiring and thermostat.
		120 Vac at B1-B2	• If no, replace control. • If yes, check burner and wiring.
		Refer to **Err** on display.	-----
Boiler is hot, house is cold.	Display is ON.	120 Vac at C1-C2	• 120 Vac at C1-C2, check wiring to pump. • Wiring OK, is pump running? • If not, replace the pump. • If pump is running, check for trapped air or closed zone valves
		Boiler below the Low Limit temperature, wait for boiler to go above Low Limit temperature.	-----
		Boiler above LL? If yes, check for 120 Vac between ZC and L2.	• If no 120 Vac , replace control. • If yes, check zone relays, circulators and wiring.

XII: TROUBLESHOOTING (continued)

b. If the Boiler Control detects an error it will flash "Err" (boiler control error) followed by a number. Use this text and number to identify the boiler problem and corrective action in Table 12 below.

TABLE 12: BOILER CONTROL ERROR NUMBERS

Display	Status	Recommended Corrective Actions
Err 1	Temperature Sensor Fault	Temperature sensor failure, wire harness loose or shorted connection or control hardware failure: - Check sensor is securely attached to boiler control - Check that sensor wire is not damaged - If secure and in good condition, replace sensor - If problem persists, replace control
Err 2	Communication Fault	Enviracom terminal is shorted to ground or line voltage. - Check wiring to EnviraCOM terminals 1,2 and 3. Wiring to external EnviraCom device is incorrect.
Err 3	Internal Hardware Fault	Error detected with AC power supply frequency or boiler control failure. Cycle power to the control. Replace control if problem persists.
Err 4	Burner Output (B1) Fault	B1 output sensed powered during safety output relay check sequence or un-powered during running, or powered in idle in combination with water temperature above 264°F limit. Cycle power to the control. Replace control if problem persists.
Err 5	Line Voltage Fault (< 80 Vac)	AC voltage out of specification high or low; check L1, L2, 110 VAC.
Err 6	Fuse missing	Internal fuse is blown or missing. The fuse protects the Aquastat from miss wiring the L1 and L2 on Oil Primary. When the Oil Primary is correctly wired the fuse is useless and not detected. If Primary is wired incorrectly the fuse is blown out and Aquastat report error 6. EnviraCOM message is sent when the wiring is fixed and the error disappears to indicate the end of the error state. Check wiring and replace fuse.
Err 7	User settings lost, (reset to factory defaults)	Warning: Generated if user adjustments are lost and the device uses factory default values. Error is cleared by entering and exiting the Adjustment mode. Replace control if problem persists.
Err 8	Manual Reset Lockout (resettable)	Set if Err 4 was invoked four times in a row. Check wiring and clear Lockout by pressing all three user keys for 30 seconds.

XIII: REPAIR PARTS

All FR™ Series Repair Parts may be obtained through your local New Yorker Wholesale distributor. Should you require assistance in locating a New Yorker distributor in your area, or have questions regarding the availability of New Yorker products or repair parts, please contact: New Yorker Boiler Co., Inc., P.O. Box 10, Hatfield, PA 19440-0010, ATTN: Customer Service Department.

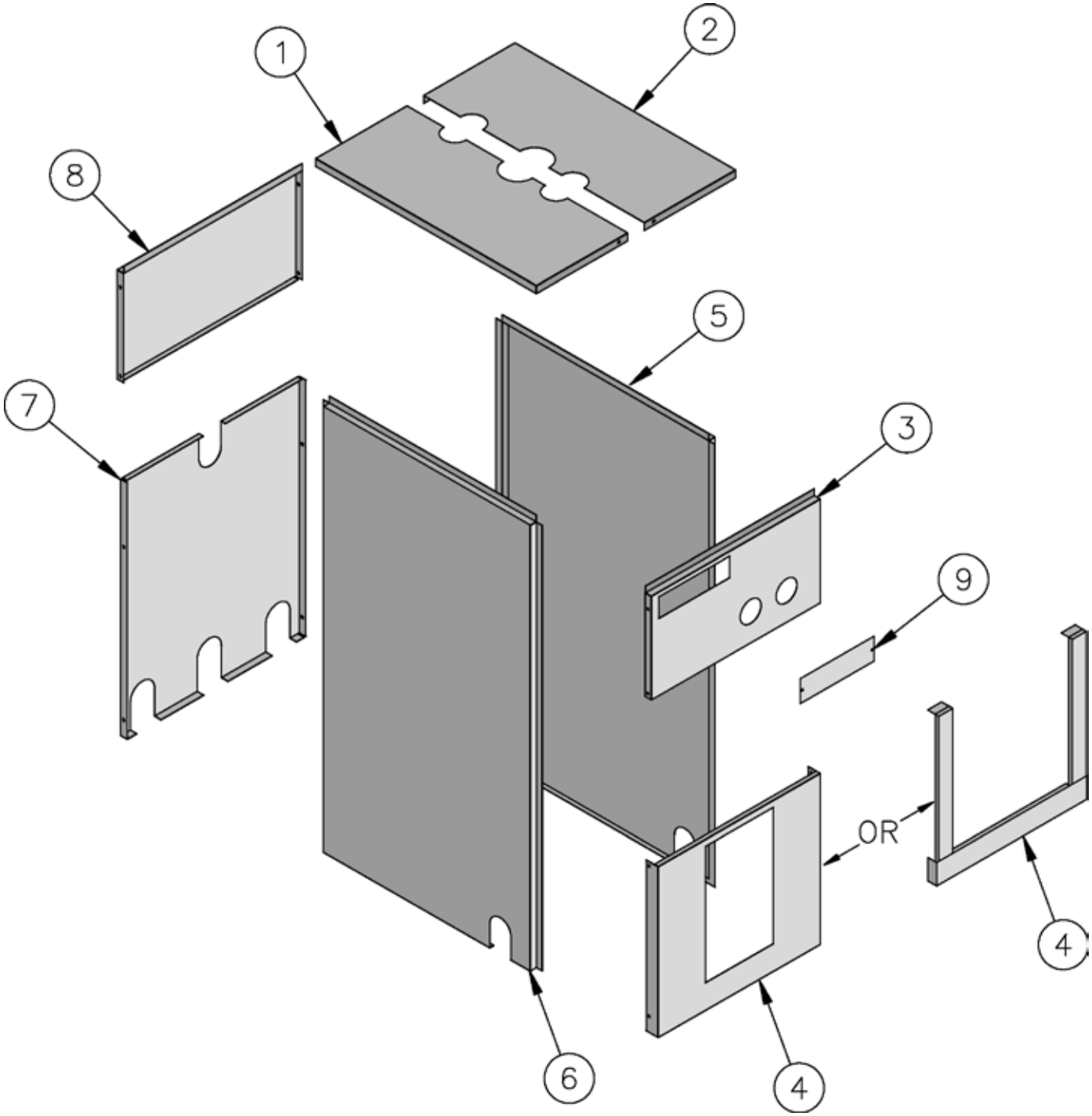


Figure 23: Jacket Repair Parts

XIII: Repair Parts (continued)

JACKET ASSEMBLY

ITEM	DESCRIPTION		PART NUMBER	
1	Jacket Top Left Panel	FR-HGS	60472010	
		FR-HGSII	60472011	
		FR-98/122	60472012	
		FR-147/173	60472013	
		FR-205/232/265/305	60472014	
		FR-350/400	60472015	
		FR-462	60472016	
2	Jacket Top Right Panel	FR-HGS	604370372	
		FR-HGSII	60472020	
		FR-98/122	60437037	
		FR-147/173	60437046	
		FR-205/232/265/305	60437054	
		FR-350/400	60437067	
		FR-462	60437071	
3	Jacket Upper Front Panel	FR-98/122	60437034	
		FR-147 thru 305	60437043	
		FR-350/400/462	60437060	
4	(2) Jacket Lower Left/Right Front Panels & (1) Lower Front Tie Bar		*L/R Panels*	*Tie Bar*
		FR-HGS/HGSII	60437039	60472030
		FR-98/122		
		FR-147/173	60437047	60472031
		FR-205/232		
	Jacket Lower Front Panel	FR-265/305	60472040	
		FR-350/400/462	60472041	
5	Jacket Right Side Panel	FR-HGS/HGSII	604370312	
		FR-98/122	60437031	
		FR-147/173	60437040	
		FR-205/232	60437055	
		FR-265/305	60437057	
		FR-350/400	60437064	
		FR-462	60437068	
6	Jacket Left Side Panel	FR-HGS/HGSII	604370322	
		FR-98/122	60437032	
		FR-147/173	60437041	
		FR-205/232	60437056	
		FR-265/305	60437058	
		FR-350/400	60437065	
		FR-462	60437069	
7	Jacket Lower Rear Panel	FR-HGS/HGSII	60437033	
		FR-98/122		
		FR-147 thru 305	60437042	
		FR-350/400/462	60437063	
8	Jacket Upper Rear Panel	FR-98/122	60437035	
		FR-147 thru FR-232	60437044	
		FR-265/305	60437059	
		FR-350/400/462	60437062	
9	ASME Data Cover Plate	FR-147 thru FR-462	60472050	

Notes:

1. Jacket Lower Front Panels on FR boilers equipped with burner swingdoor are constructed of three individual pieces.
2. Jacket sets for special builds may have unique panels not listed here. For special build parts contract New Yorker Boiler Co., Inc. Customer Service.

NOTE: When ordering parts always give the serial number and model number shown on the boiler. Also provide the name of the part(s) shown below:

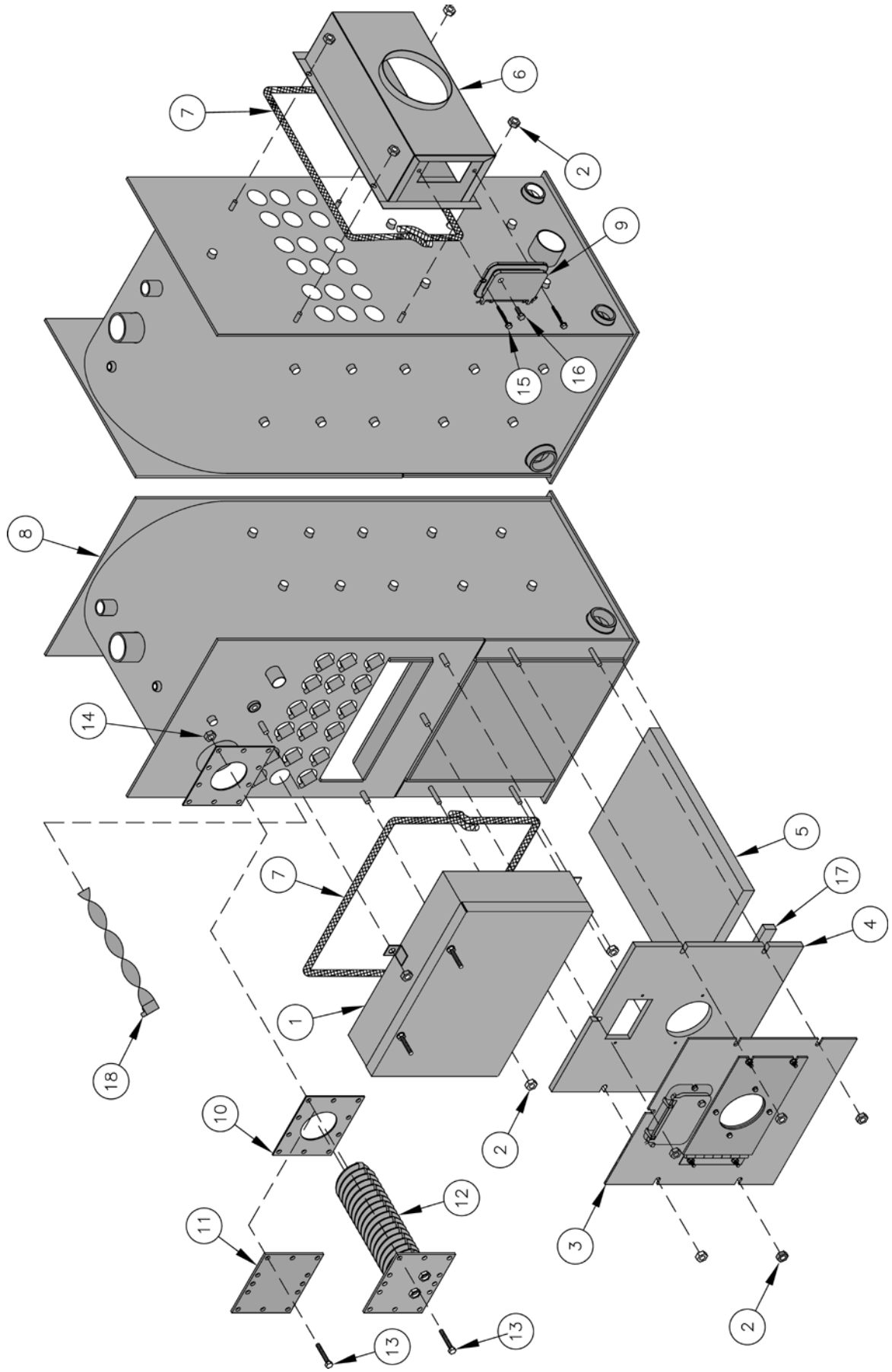


Figure 24: FR Bare Boiler Repair Parts

XIII: Repair Parts (continued)

BARE BOILER ASSEMBLY

ITEM	DESCRIPTION		PART NUMBER
1	Front Flue Box Assembly (INCLUDES INSULATION)	FR-98/122	61172001
		FR-HGSII	61172002
		FR-147/173/205/232	61172003
		FR-265/305	61172004
		FR-350/400/462	61172005
N/A	Front Flue Box Door Insulation (SEE NEXT PAGE FOR INSULATION KITS)	FR-HGS/98/122	82072008
		FR-HGSII	82072009
		FR-147/173/205/232	82072010
		FR-265/305	82072011
		FR-350/400/462	82072012
2	Flanged Hex Nut, 3/8-16	All Models	80860498
3	Burner Door Assembly	FR-HGS/HGSII	6257201
		FR-98/122	
		FR-147/173/205/232	6257202
		FR-265/305	6257206
		FR-350/400/462	6257207
4	Burner Door Insulation (SEE NEXT PAGE FOR INSULATION KITS)	FR-HGS/HGSII	82072013
		FR-98/122	
		FR-147 thru FR-305	82072014
		FR-350/400/462	82072015
5	Floor Insulation (SEE NEXT PAGE FOR INSULATION KITS)	FR-HGS/HGSII	82072016
		FR-98/122	
		FR-147/173	82072017
		FR-205/232/265/305	82072018
		FR-350/400	82072019
		FR-462	82072020
6	Rear Smokebox	FR-HGS/98/122	61137004
		FR-HGSII	61137003
		FR-147/173	61137005
		FR-205/232	61137006
		FR-265/305	61137007
		FR-350/400/462	61137008
7	Braided Fiberglass Rope Gasket, 3/8”	All Models	82072024
8	Boiler Shell Assembly	Contact Sales Office	
9	Observation Door	All Models	8023701
10	Heater Coil/Cover Plate Gasket	All Models	8206036
11	Blank Heater Cover	FR-147 thru FR-462	
12	Tankless Heater Coil	S-4	6037201
		S-5	6037202
		S-6	C08700
13	Hex Head Cap Screw, 3/8-16 x 1-1/4 LG	FR-147/173	80861360
14	Heavy Hex Nut, 3/8-16	FR-147 thru FR-462	80860400
15	Sheet Metal Screw, #12 x 3/4 LG	FR-147 thru FR-462	80860041
16	Hex Head Cap Screw, 3/8-16 x 3/4 LG	FR-147 thru FR-462	808601375
17	Cerafelt Insulation, 1/2” x 1”	All Sizes	9206005 (Specify Length)
18	Turbulators	FR-98 and FR-122	7116037
		All Models **Except** FR-98 and FR-122	7116038

Notes:

1. Bare boiler parts for special builds may be different than those listed here. Contact New Yorker Boiler Co., Inc. Customer Service for special build boiler parts.

INSULATION REPLACEMENT KITS

Combustion Chamber Insulation Replacement Kits

Combustion Chamber Insulation Replacement Kits provide the floor insulation and the burner door insulation.

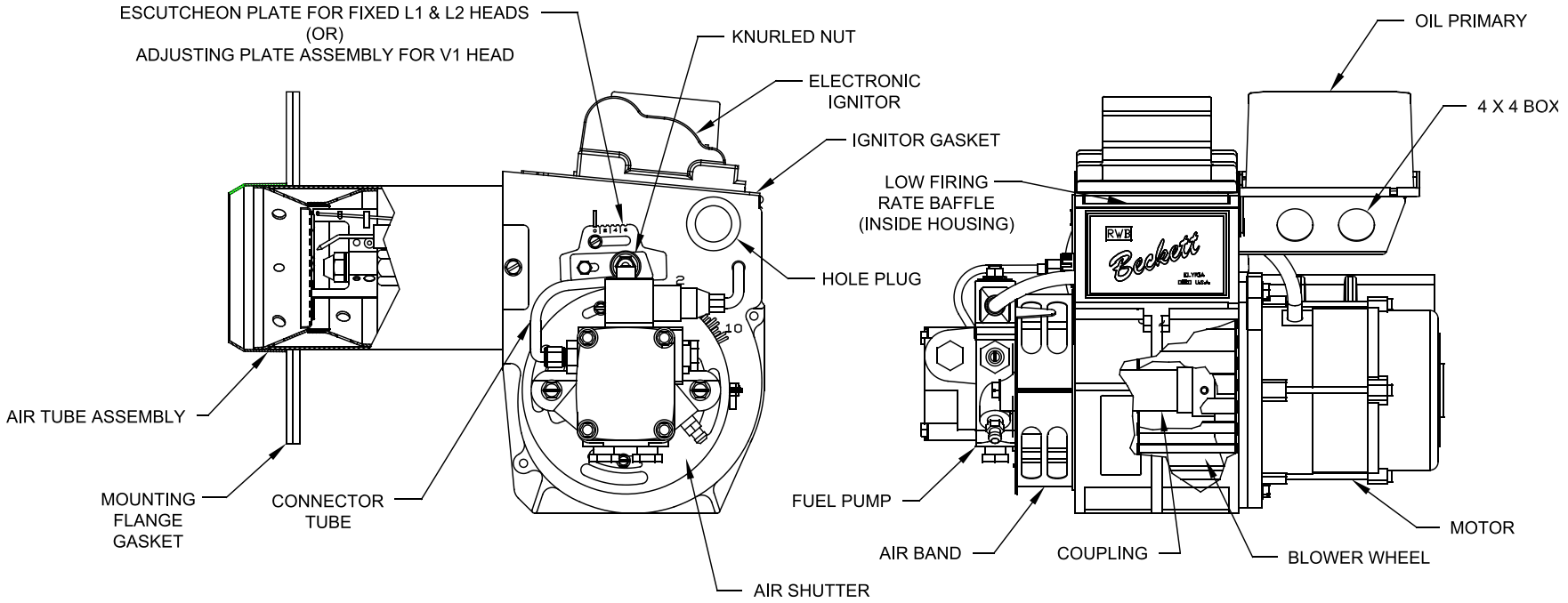
Boiler Series	Kit Part Number
FR-HGS/HGSII/98/122	62072001
FR-147/173	62072002
FR-205/232/265/305	62072003
FR-350/400	62072004
FR-462	62072005

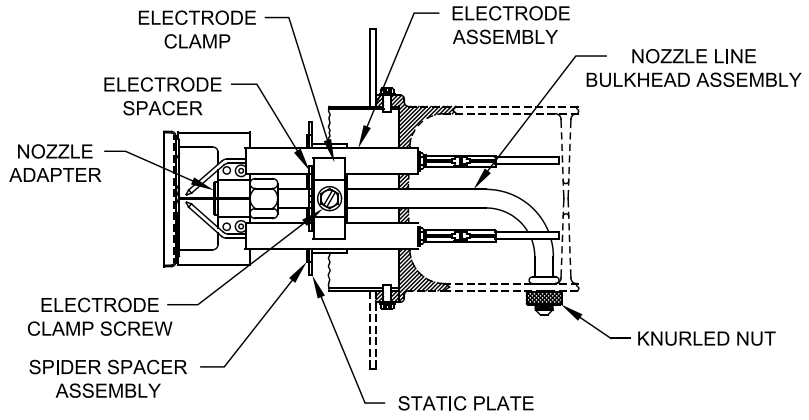
Flue Box Insulation Replacement Kits

Flue Box Insulation Replacement Kits provide the flue box door insulation, flue box frame top/bottom insulation pieces and flue box frame side insulation pieces. Works with swing door style flue box.

Boiler Series	Kit Part Number
FR-HGS/98/122	62072006
FR-HGSII	62072007
FR-147/173/205/232	62072008
FR-265/305	62072009
FR-350/400/462	62072010

XIII: Repair Parts (continued)



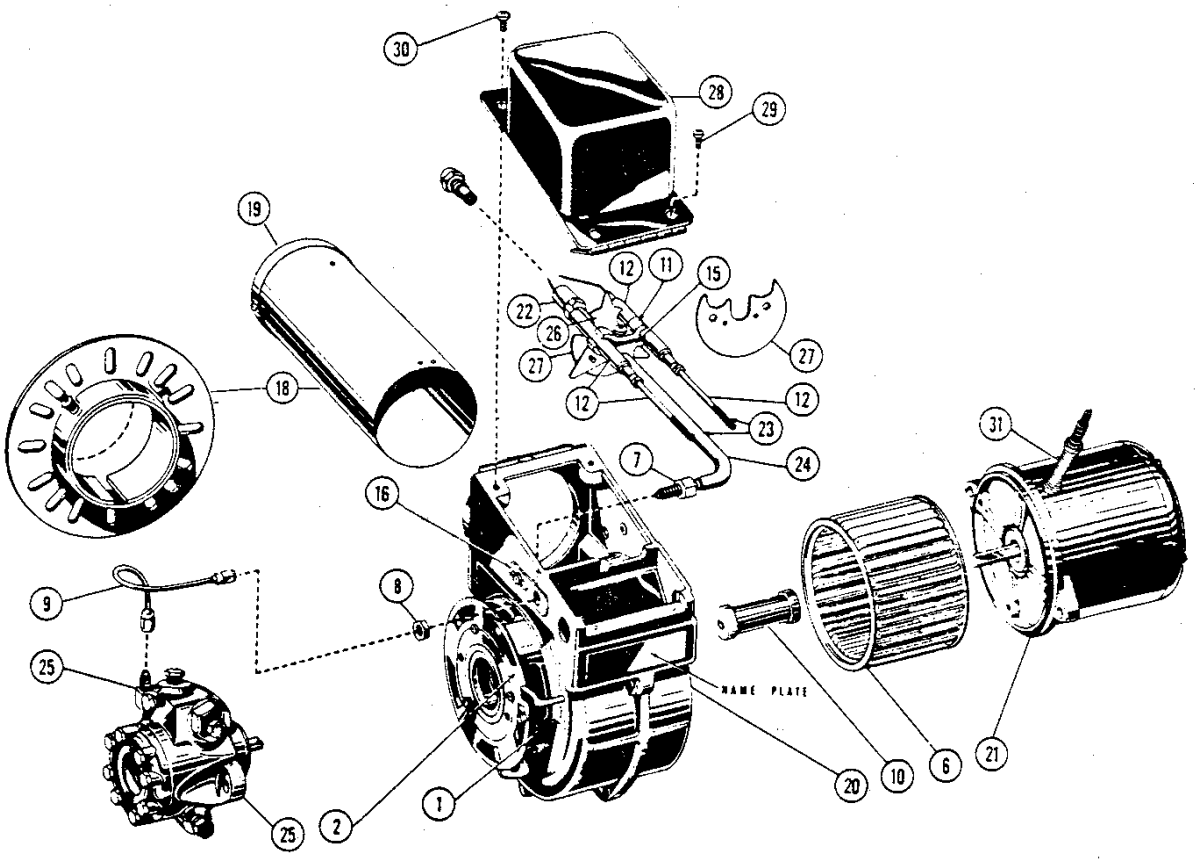


NOZZLE DETAIL

BECKETT BURNER PARTS LIST FOR FR SERIES STEEL BOILERS

FOR REPLACEMENT OIL BURNER PARTS, CONTACT YOUR WHOLESALER OR THE BURNER MANUFACTURER:

R. W. BECKETT CORP.
P. O. BOX 1289
ELYRIA, OHIO 44036
1-800-645-2876



BECKETT AF and SF MODEL BURNERS

1 Air Band
2 Air Shutter
6 Blower
7 Bulkhead Fitting
8 Bulkhead Fitting Locknut
9 Connector Tube Assembly
10 Coupling
11 Electrode Clamp
12 Electrode Insulator Assembly
15 Spider Spacer Assembly
16 Escutcheon Plate
18 Flange and Air Tube Assembly
19 Head
20 Housing Assembly w/Inlet Bell
21 Motor
22 Nozzle Adapter
23 Nozzle Line Electrode Assembly
25 Pump
27 Static Plate
28 Ignitor
29 Ignitor Hinge Screw
30 Ignitor Holding Screw
31 Ignitor Gasket Kit
32 Wire Guard

XIV: BURNER SPECIFICATIONS

TABLE 13: BECKETT AFG & SF BURNER SPECIFICATIONS

Boiler Series	Boiler Model	Firing Rate (GPH)	Burner Model	Head	Insertion Depth (Inches)	Nozzle		Settings			
						GPH x Angle, Type	Shipped	Air Shutter	Air Band	Head Bearing	Pump Pressure (PSI)
FR-HGS	* FRHGSL	0.80	AFG	L-1	1.69	0.65 x 60W Delavan	Loose [1]	10	0		140
	FRHGS	1.00				0.85 x 60B Hago	Installed	9	1		140
FR-HGSII	FRHGSII	1.30	AFG	V-1	1.69	1.10 x 60W Delavan	Installed	9	2	0	140
FR-98	FR98	0.85		L-2		0.75 x 60B Hago		8	0	0	150
FR-122	FR122	1.10		V-1		0.85 x 60A Delavan		9	0	0	170
FR-147	FR147	1.25				1.00 x 60B Hago		10	0	0	140
FR-173	FR173	1.50				1.25 x 60B Hago		5	3	2	140
FR-205	FR205	1.75				1.50 x 60B Hago		10	3	3	140
FR-232	FR232	2.00				1.65 x 60B Hago		4	4	4	140
FR-265	FR265W	2.35	SF	F-16	3.75	2.00 x 80B Delavan		9	0		140
FR-305	FR305W	2.60				2.25 x 80B Delavan		10	2		140
FR-350	FR350W	3.00		F-220	3.63	3.00 x 80B Delavan		5	3		100
FR-400	FR400W	3.50				3.50 x 80B Delavan		5	3		100
FR-462	FR462W	4.00		F-300	3.63	4.00 x 80B Delavan		5	2		100

***** Equipped with low firing baffle

[1] Nozzle is shipped loose in a bag attached to the burner for the FRHGS.

APPENDIX A: AFTERMARKET LOW WATER CUT OFF (LWCO)

WARNING

DO NOT ATTEMPT to cut factory wires to install an aftermarket Low Water Cut Off (LWCO). Only use connections specifically identified for Low Water Cut Off.

In all cases, follow the Low Water Cut Off (LWCO) manufacturer's instructions.

When

A low water cutoff is required to protect a hot water boiler when any connected heat distributor (radiation) is installed below the top of the hot water boiler (i.e. baseboard on the same floor level as the boiler). In addition, some jurisdictions require the use of a LWCO with a hot water boiler.

Where

The universal location for a LWCO on both gas and oil hot water boilers is above the boiler, in either the supply or return piping. The minimum safe water level of a water boiler is at the uppermost top of the boiler; that is, it must be full of water to operate safely.

It is recommended that the LWCO control is installed above the boiler to provide the highest level of protection. However, where the LWCO control is approved by the LWCO control manufacturer for installation in a high boiler tapping of a water boiler, the use of the listed LWCO control is permitted when it is installed according to the LWCO manufacturer's instructions.

What Kind

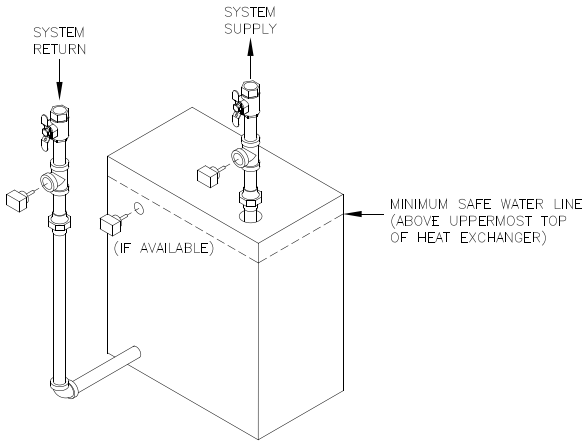
Typically, in residential applications, a probe type LWCO is used instead of a float type, due to their relative costs and the simplicity of piping for a probe LWCO.

How to Pipe

A "tee" is commonly used to connect the probe LWCO to the supply or return piping, as shown below.

Select the appropriate size tee using the LWCO manufacturer's instructions. Often, the branch connection must have a **minimum** diameter to prevent bridging between the probe and the tee. Also, the run of the tee must have a minimum diameter to prevent the end of the probe from touching or being located too close to the inside wall of the run of the tee.

Ideally, manual shutoff valves should be located above the LWCO and the boiler to allow for servicing. This will allow probe removal for inspection without draining the heating system. Many probe LWCO manufacturers recommend an annual inspection of the probe.



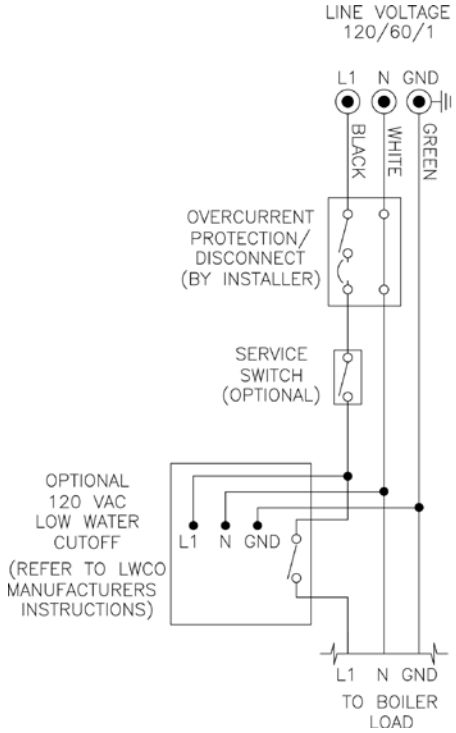
LWCO Location

How to Wire

LWCO's are available in either 120 VAC or 24 VAC configurations. The 120 VAC configuration can be universally applied to both gas and oil boilers by wiring it in the line voltage service to the boiler (after the service switch, if so equipped).

The presence of water in a properly installed LWCO will cause the normally open contact of the LWCO to close, thus providing continuity of the 120 VAC service to the boiler.

It is recommended to supply power to the probe LWCO with the same line voltage boiler service as shown below.



Wiring of Typical LWCO

Appendix A: Aftermarket Low Water Cut Off (LWCO) - continued

A 24 VAC LWCO is used primarily for gas fired boilers where a 24 volt control circuit exists within the boiler. However, a 24 VAC LWCO can only be used if the boiler manufacturer has provided piping and wiring connections and instructions to allow for this application.

How to Test

Shut off fuel supply. Lower water level until water level is BELOW the LWCO. Generate a boiler demand by turning up thermostat. Boiler should not attempt to operate. Increase the water level by filling the system. The boiler should attempt to operate once the water level is above the LWCO.

NEW YORKER BOILER COMPANY, INC.

Limited Warranties

For Residential Cast Iron and Steel Boilers

By this Warranty Statement New Yorker Boiler Company, Inc. ("New Yorker"), issues limited warranties subject to the terms and conditions stated below. These limited warranties apply to residential cast iron and steel water boilers labeled with the New Yorker® brand which are sold on or after March 1, 2004.

ONE YEAR LIMITED WARRANTY

One Year Limited Warranty for Residential Water Boilers New Yorker warrants to the original consumer purchaser at the original installation address that its residential cast iron and steel water boilers will be free from defects in material and workmanship under normal usage for a period of one year from the date of original installation. In the event that any defect in material or workmanship is found during the one year period following the date of installation, New Yorker will, at its option, repair the defective part or provide a replacement free of charge, F.O.B. its factory.

LIFETIME LIMITED WARRANTY

For all gas/oil-fired residential boilers, New Yorker warrants to the original consumer purchaser at the original installation address that the heat exchanger of the boiler will be free of defects in material and workmanship under normal usage for the lifetime of the original consumer purchaser. In the event that any defect in material or workmanship is found during the ten year period following the date of installation, New Yorker will, at its option, repair the defective pressure vessel or provide a replacement free of charge, F.O.B. its factory. In the event that any defect in material or workmanship is found after the tenth year following the date of installation, New Yorker will provide a replacement pressure vessel upon payment by the original consumer purchaser of an amount equal to a percentage of the then current retail price of the model boiler involved (or, in the event that such model is not then in production, the most comparable model then in production), as follows:

	Service Charge as a % of Retail Price																							
Years in Service	1-5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+			
Stainless Steel	No Charge			30	40	50	60	70	100															
Water Boilers	No Charge						5	10	15	20	25	30	35	40	45	50	55	60	65	70	75			
Steam Boilers	No Charge						100																	

EXCEPTIONS AND EXCLUSIONS

1. **Components Manufactured by Others** - following the expiration of the foregoing one year limited warranty, all component parts of a boiler which are manufactured by others (such as burners, burner controls, circulator, tankless water heater, and New Yorker Link) shall be subject only to the manufacturer's warranty, if any.
2. **Removal and Replacement Costs** -these warranties do not cover expenses of removal or reinstallation. The consumer purchaser will be responsible for the cost of removing and replacing any defective part and all labor and related materials connected therewith. Replacement parts will be invoiced to the distributor in the usual manner and will be subject to adjustment upon proof of defect.
3. **Proper Installation** - these warranties are conditioned upon the installation of the boiler in strict compliance with New Yorker's Installation, Operating and Service Instructions. New Yorker specifically disclaims any liability of any kind which arises from or relates to improper installation.
4. **Improper Use or Maintenance** - these warranties will not be applicable if the boiler is used or operated over its rated capacity, is installed for uses other than home heating, or is not maintained in accordance with New Yorker's Installation, Operating and Service Instructions and hydronics industry standards.
5. **Improper Operation** - these warranties 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 additives which cause unusual deposits or corrosion or on the pressure vessel or associated controls.
6. **Geographic Limitations** - these warranties apply only to boilers installed within the 48 contiguous United States.
7. **Installation Requirements** - in order for these warranties to be effective:
   - **a.** The boiler must be installed in a single or two-family residential dwelling. This warranty does not apply to boilers installed in apartments for commercial or industrial applications.
   - **b.** The boiler must be installed in strict compliance with New Yorker's Installation, Operating and Service Instructions by an installer regularly engaged in boiler installations.
   - **c.** Boiler sections must not have been damaged during shipment or installation.
   - **d.** The boiler must be vented in accordance with chimney recommendations set forth in New Yorker's Installation, Operating and Service Instructions.
8. **Exclusive Remedy** - New Yorker's obligation in the event of any breach of these warranties is expressly limited to the repair or replacement of any part found to be defective under conditions of normal use.
9. **Limitation of Damages Under no circumstances will New Yorker be liable for incidental, indirect, special or consequential damages of any kind under these warranties, including, without limitation, injury or damage to persons or property and damages for loss of use, inconvenience or loss of time**. New Yorker's liability under these warranties shall under no circumstances exceed the purchase price paid for the boiler involved. 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.
10. **Limitation of Warranty** - these limited warranties are given in lieu of all other express warranties and set forth the entire obligation of New Yorker with respect to any defect in a residential water boiler. New Yorker shall have no express obligations, responsibilities or liabilities of any kind, other than those set forth herein.

ALL APPLICABLE IMPLIED WARRANTIES, IF ANY, INCLUDING ANY WARRANTY OF MERCHANT ABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY LIMITED DURATION TO A PERIOD OF ONE YEAR, EXCEPT THAT IMPLIED WARRANTIES, IF ANY, APPLICABLE TO THE PRESSURE VESSEL OF A RESIDENTIAL WATER BOILER SHALL BE LIMITED IN DURATION TO THE LESSER OF THE DURATION OF SUCH IMPLIED WARRANTY OR A PERIOD EQUAL TO THE TERM OF THE APPLICABLE EXPRESS WARRANTY.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

PROCEDURE FOR OBTAINING WARRANTY SERVICE

Upon discovery of a condition believed to be related to a defect in material or workmanship covered by these warranties, the original consumer purchaser should notify the installer, who will in turn notify the distributor. If this action is not possible or does not produce a prompt response, the original consumer purchaser should write to New Yorker Boiler Company, Inc. at P.O. Box 10, Hatfield, PA 19440-0010, giving full particulars in support of the claim.
The original consumer purchaser is required to make available for inspection by New Yorker or its representatives the parts claimed to be defective and, if requested by New Yorker, to ship those parts prepaid to New Yorker at the above address for inspection or repair. In addition, the original consumer purchaser agrees to make all reasonable efforts to settle any disagreement arising in connection with any warranty claim before resorting to legal remedies in the courts.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

New Yorker®
RESIDENTIAL HEATING BOILERS