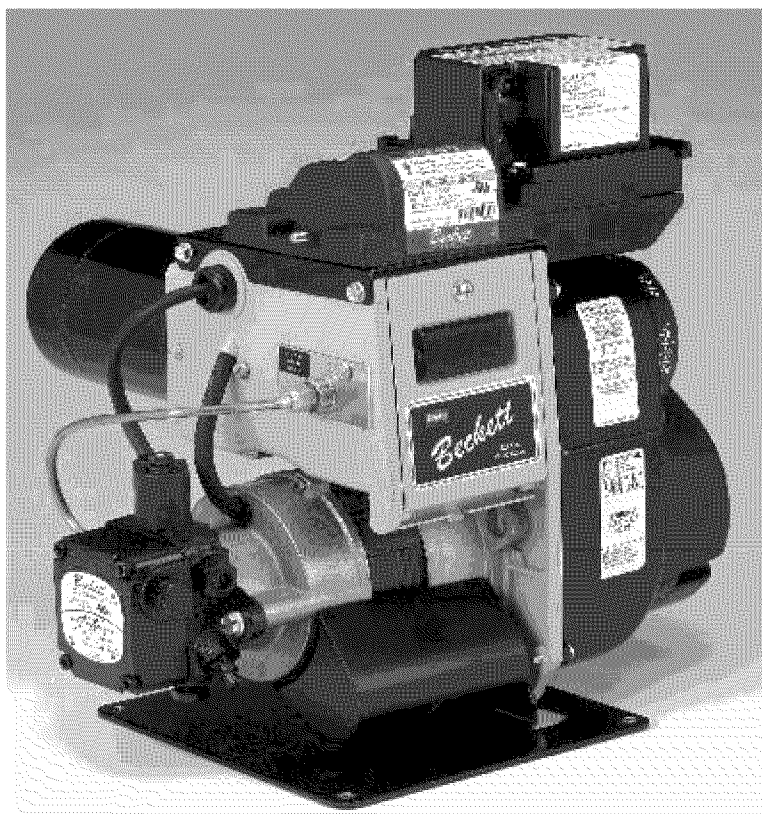


# Model AFII Oil Burner

*Beckett*

AFII 85, AFII 100, AFII 150  
Types 'HLX' & 'FBX' Air Tube Combinations  
Voltage: 120 volts AC/60 Hz



AFII Burner with  
Type 'HLX' Air Tube

**! WARNING** Potential for Fire, Smoke and Asphyxiation Hazards



*Incorrect installation, adjustment, or misuse of this burner could result in death, severe personal injury, or substantial property damage.*

**To the Homeowner or Equipment Owner:**

- Please read and carefully follow all instructions provided in this manual regarding your responsibilities in caring for your heating equipment.
- Contact a professional, qualified service agency for installation, start-up or service work.

**To the Professional, Qualified Installer or Service Agency:**

- Please read and carefully follow all instructions provided in this manual before installing, starting, or servicing this burner or heating system.
- The Installation must be made in accordance with all state and local codes having jurisdiction.



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## General Information

### General Information

#### To the Owner:

**Thank you for purchasing a Beckett burner** for use with your heating appliance. Please pay attention to the Safety Warnings contained within this instruction manual. Keep this manual for your records and provide it to your qualified service agency for use in professionally setting up and maintaining your burner

Your burner will provide years of efficient operation if it is professionally installed and maintained by a qualified service technician. If at any time the burner does not appear to be operating properly, **immediately contact your qualified service agency** for consultation.

**We recommend annual inspection/service of your oil heating system by a qualified service agency.**

#### • Hazard Definitions

**! DANGER** Indicates an imminently hazardous situation, which, if not avoided, will result in death, serious injury, or property damage.

**! WARNING** Indicates a potentially hazardous situation, which, if not avoided, could result in death, severe personal injury, and/or substantial property damage.

**! CAUTION** Indicates a potentially hazardous situation, which, if not avoided, may result in personal injury or property damage.

***Within the boundaries of the hazard warning, there will be information presented describing consequences if the warning is not heeded and instructions on how to avoid the hazard.***

#### NOTICE

Intended to bring special attention to information, but not related to personal injury or property damage.

#### **! WARNING** Owner's Responsibility



***Incorrect installation, adjustment, and use of this burner could result in severe personal injury, death, or substantial property damage from fire, carbon monoxide poisoning, soot or explosion.***

Contact a professional, qualified service agency for the installation, adjustment and service of your oil heating system. This work requires technical training, trade experience, licensing or certification in some states and the proper use of special combustion test instruments.

Please carefully read and comply with the following instructions:

- Never store or use gasoline or other flammable liquids or vapors near this burner or appliance.
- Never attempt to burn garbage or refuse in this appliance.
- Never attempt to light the burner/appliance by throwing burning material into the appliance.
- Never attempt to burn any fuel not specified and approved for use in this burner.
- Never restrict the air inlet openings to the burner or the combustion air ventilation openings in the room.

#### **! WARNING** Professional Service Required



***Incorrect installation, adjustment, and use of this burner could result in severe personal injury, death, or substantial property damage from fire, carbon monoxide poisoning, soot or explosion.***

Please read and understand the manual supplied with this equipment. This equipment must be installed, adjusted and put into operation only by a qualified individual or service agency that is:

- Licensed or certified to install and provide technical service to oil heating systems.
- Experienced with all applicable codes, standards and ordinances.
- Responsible for the correct installation and commissioning of this equipment.
- Skilled in the adjustment of oil burners using combustion test instruments.

The installation must strictly comply with all applicable codes, authorities having jurisdiction and the latest revision of the National Fire Protection Association Standard for the installation of Oil-burning Equipment, NFPA 31 (or CSA B139 and B140 in Canada).

Regulation by these authorities take precedence over the general instructions provided in this installation manual.

## General Information

### • General Specification

**Table 1 – Burner Specifications**

Capacity	'HLX' Heads Firing rate: - 0.40 – 1.50 GPH Input: Min./Max - 56,000 /210,000 Btu/h
	'FBX' Heads Firing rate: - 0.40 – 1.35 GPH Input: Min./Max. - 56,000/189,000 Btu/h
Certification/ Approvals	UL certified to comply with ANSI/UL296 & tested to CSA B140.0
Fuels	U. S No. 1 or No. 2 heating oil only (ASTM D396) Canada No. 1 stove oil or No. 2 furnace oil only
Electrical	Power supply - 120 volts AC, 60 Hz, single phase Operating load - 5.8 Amps max Motor - 1/7 hp, 3450 rpm, NEMA 48M frame PSC rotation CCW when facing shaft end Ignition - Continuous duty solid-state igniter
Fuel pump	Outlet pressure - Note 1
Air tube	ATC code - See Table 2
Dimensions (with cover)	Height (maximum) - 13 inches Width (maximum) - 14 inches Depth - 6-11/16 inches Air tube diameter - 3-1/2 inches

*\*Note 1. See appliance manufacturer's burner specifications for recommended outlet pressure.*

### • Notice Special Requirements

For recommended installation practice in Canada, refer to the latest version of CSA Standard B139 & B140.

Concealed damage — If you discover damage to the burner or controls during unpacking, notify the carrier at once and file the appropriate claim.

When contacting Beckett for service information — Please record the burner serial number (and have available when calling or writing). You will find the serial number on the silver label located on the left rear of the burner. Refer to Figure 1.

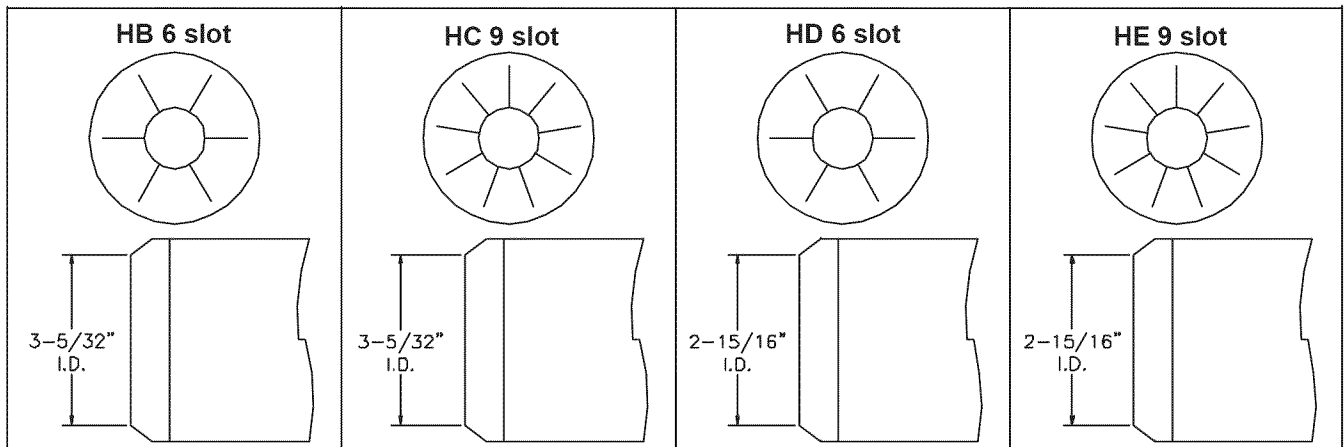
## Inspect/Prepare Installation Site

### • Clearances to Burner and Appliance

Provide space around burner and appliance for ease of service and maintenance. Check the minimum clearances against those shown by the appliance manufacturer and by applicable building codes.

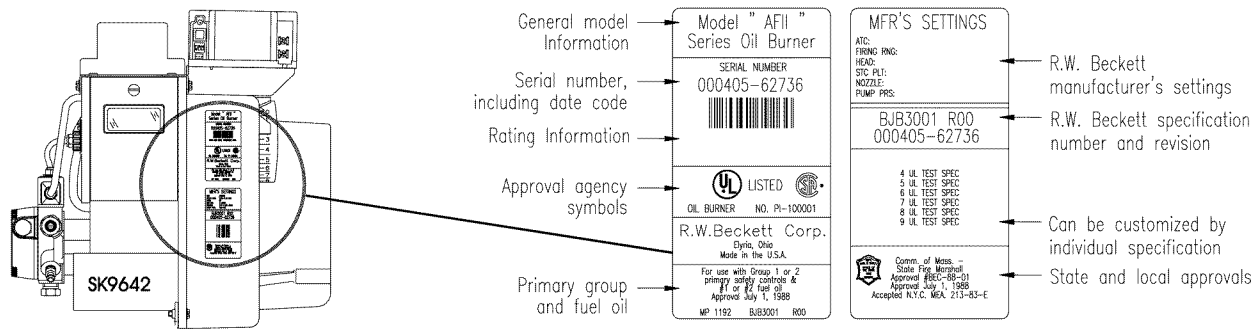
**Table 2 – Air Tube Combinations (ATC) & Dimensions**

	ATC codes for usable air tube lengths dim. "A" (Figure 3)						Firing rate range (gph)Min-Max		
	3"	5"	7"	9"	ATC Code	Head	AFII 85	AFII 100	AFII 150
Adjustable w/stop screw Head Design	HLX30	HLX50	HLX70	HLX90	HB	AF2-6	0.4-0.85 gph	0.65-1.00 gph	0.75-1.35 gph
	HLX30	HLX50	HLX70	HLX90	HC	AF2-9	N/A	0.65-1.00 gph	0.75-1.50 gph
	HLX30	HLX50	HLX70	HLX90	HD	AF2-6	0.40-0.85 gph	0.65-1.00 gph	0.75-1.10 gph
	HLX30	HLX50	HLX70	HLX90	HE	AF2-9	N/A	0.65-1.00 gph	0.75-1.35 gph
Head Design - Fixed	FBX30	FBX50	FBX70	FBX90	HFXS	FB0	0.40-0.65 gph	0.55-0.75 gph	0.75-1.00 gph
	FBX30	FBX50	FBX70	FBX90	HGXS	FB3	0.55-0.85 gph	0.55-1.10 gph	0.85-1.20 gph
	FBX30	FBX50	FBX70	FBX90	HHSX	FB4	N/A	0.75-1.10 gph	1.10-1.25 gph
	FBX30	FBX50	FBX70	FBX90	HIXS	FB6	N/A	0.85-1.15 gph	1.15-1.35 gph



## Inspect/Prepare Installation Site

Figure 1. Burner label location



### • Inspect Chimney or Direct Vent System

Inspect the chimney or vent. Make sure it is properly sized and in good working condition. Follow the instructions supplied by the appliance manufacturer.

### • Combustion Air Supply Information

#### **WARNING** Adequate Combustion and Ventilation Air Supply Required

*Failure to provide adequate air supply could seriously affect the burner performance and result in damage to the equipment, asphyxiation, explosion or fire hazards.*

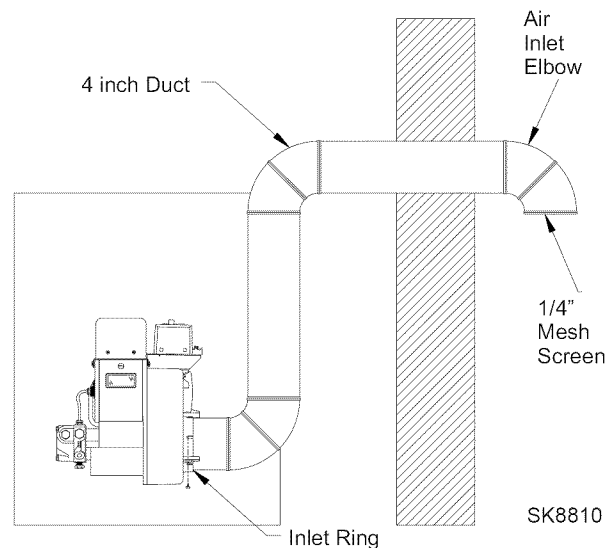
- The burner cannot properly burn the fuel if it is not supplied with a reliable combustion air source.
- Follow the guidelines in the latest editions of the NFPA 31 and CSA-B139 regarding providing adequate air for combustion and ventilation.

See NFPA Standard 31 for complete details.

**Appliances located in confined spaces:** All confined spaces should have two (2) permanent openings; one near the top of the enclosure and one near the bottom of the enclosure. Each opening must have a free area of not less than one (1) square inch per 1,000 BTU's per hour of the total input rating of all appliances within the enclosure. The openings should have free access to the building interior, which should have adequate infiltration from the outside.

**Exhaust fans and other air-using devices:** Size air openings large enough to supply all air-using devices in addition to the minimum size required for combustion air. If there is any possibility of the equipment room developing a negative pressure due to exhaust fans, clothes dryers, etc., either pipe combustion air directly to the burner or provide a sealed enclosure for the burner and supply it with its own combustion air supply.

Figure 2. Outside Air Connection



### • Direct/Sidewall Venting Application

- When sidewall venting appliances, carefully follow appliance and power venter instructions for installation and wiring.
- AFII burners are equipped with a removable air inlet to allow use of a 4" duct to supply outside air for combustion. Do not exceed 70 equivalent feet. Allow 6 feet for each elbow.
  1. Remove the inlet cover.
  2. Insert 4" duct into the inlet ring.
  3. Fasten duct into place using at least 3 sheet metal screws evenly spaced around the inlet ring. Refer to Figure 2.
  4. Remove the barometric draft control unless it is in the same atmospheric pressure zone as the inlet.

On the outside of the home use a 90° elbow pointed downward with a 1/4" mesh screen over its opening. The air inlet elbow must be located above the snow line and in such a way as to prevent leaves and/or other debris from blocking the air flow. Such debris will prevent proper operation of the burner. Refer to local codes for proper location of inlet.

## • Fuel Line Installation

### **CAUTION** Do Not Use Teflon Tape

**Damage to the pump could cause impaired burner operation, oil leakage and appliance soot-up.**

- Never use Teflon tape on fuel oil fittings.
- Tape fragments can lodge in fuel line components and fuel unit, damaging the equipment and preventing proper operation.
- Use oil-resistant pipe sealant compounds.

For fuel line installation, continuous lengths of heavy wall copper tubing are recommended. Always use flare fittings. Never use compression fittings.

Always install fittings in accessible locations. To avoid vibration noise, fuel lines should not run against the appliance or ceiling joists.

## • Fuel Line Valves and Filter

Install two high quality oil duty rated shutoff valves in accessible locations on the oil supply line. Locate one close to the tank and the other close to the burner, upstream of the filter.

### **NOTICE**

For protection in the event of fire, some states require the shutoff valves to be a fusible-handle design. R.W. Beckett Corporation recommends this design as good industry practice for all installations.

### **NOTICE**

To further protect the fuel supply system and reduce nozzle orifice plugging with firing rates below 0.75 gph, a dual filtration system can be installed. This typically consists of a 50 micron primary filter, located near the fuel tank and a secondary filter rated for at least 10 microns located near the burner.

Also install a generous capacity filter, rated for 50 microns or less, inside the building between the fuel tank shutoff valve and the burner. Locate both the filter and the valve close to the burner for ease of servicing.

## Inspect/Prepare Installation Site

### Prepare the Burner

#### • General

In most cases, the burner is ready to mount to the appliance. There can be situations where the burner needs to be reconfigured to perform properly in the appliance. Review the appliance manufacturer's specifications prior to installing to determine if any modification is required to properly configure the burner.

Instruction on how to perform the following burner preparation tasks can be found in the Professional Maintenance section.

- Remove / install burner nozzle
- Check head/air adjusting plate

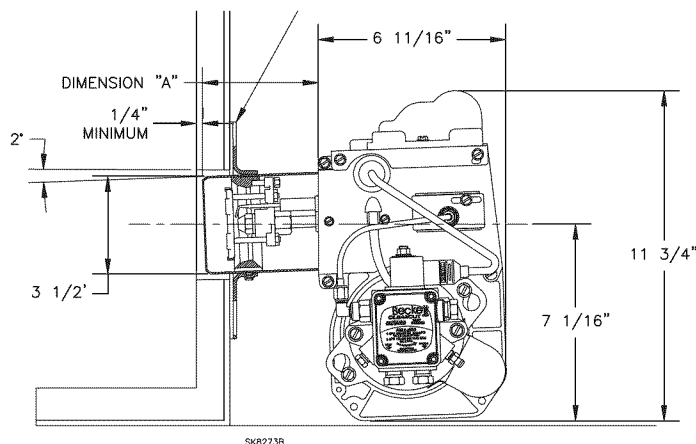
#### • Mount Burner on Appliance

Verify that the air tube installed on the burner provides the correct insertion depth. Refer to Figure 3.

The end of the air tube should normally be 1/4" back from the inside wall of the combustion chamber. Never allow the leading edge of the retention ring to extend into the chamber, unless otherwise specified by the appliance manufacturer.

Bolt the burner to the appliance using the factory-welded flange.

**Figure 3. – Mounting Burner in Appliance**



## Start the Burner and Set Combustion

### • Connect Fuel Lines

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#### **WARNING** Do Not Install By-pass Plug with 1-Pipe System

**Failure to comply could cause immediate pump seal failure, pressurized oil leakage and the potential for a fire and injury hazard.**

- The burner is shipped without the by-pass plug installed.
  - Install the by-pass plug in two-pipe oil supply systems **ONLY**.
- 

The burner is supplied with either a one-stage pump or a two-stage pump based on the oil supply system requirements. Consult the instructions provided with the pump for installation specifications.

---

#### **CAUTION** Oil Supply Pressure Control Required

**Damage to the filter or pump seals could cause oil leakage and a fire hazard.**

- The oil supply inlet pressure to the burner **cannot exceed 3 psig**.
  - Insure that a pressure limiting device is installed in accordance with the latest edition of NFPA 31.
  - Gravity Feed Systems: Always install an anti-siphon valve in the oil supply line or a solenoid valve (RWB Part # 2182602U) in the pump/nozzle discharge tubing to provide backup oil flow cut-off protection.
- 

When installing a **one-pipe system**, connect the inlet line to the pump inlet. The fuel pump may be installed with gravity feed or lift. The maximum allowable lift for a single pipe installation is 8 ft.

When installing a **two-pipe system**, remove the 1/16" pipe by-pass plug from plastic bag attached to fuel unit. Remove 1/4" plug from return port. Insert and tighten the by-pass plug. Attach return and inlet lines. The return line should terminate approximately 3 to 4 inches above supply line inlet. Failure to do this may introduce air into the system and could result in loss of prime.

### • Wiring Connections Diagram

Refer to the appliance manufacturer's wiring diagram prior to connecting the burner wiring. All wiring must be in accordance with the latest revision of National Electric Code NFPA 70 and all local codes and regulations.

The R7184 primary control with valve-on delay and burner motor-off delay, shown in Figure 4, requires a constant 120 volt AC power source supplied to the black wire on the control. (Refer to the appliance manufacturer's instructions. The red wire goes to the appliance limit circuit. Please note that other control manufacturers may use different wire colors for power and limit connections.

## Start the Burner and Set Combustion

### • Startup burner

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#### **WARNING** Explosion and Fire Hazard



**Failure to follow these instructions could lead to equipment malfunction and result in heavy smoke emission, soot-up, hot gas puff-back, fire and asphyxiation hazards.**

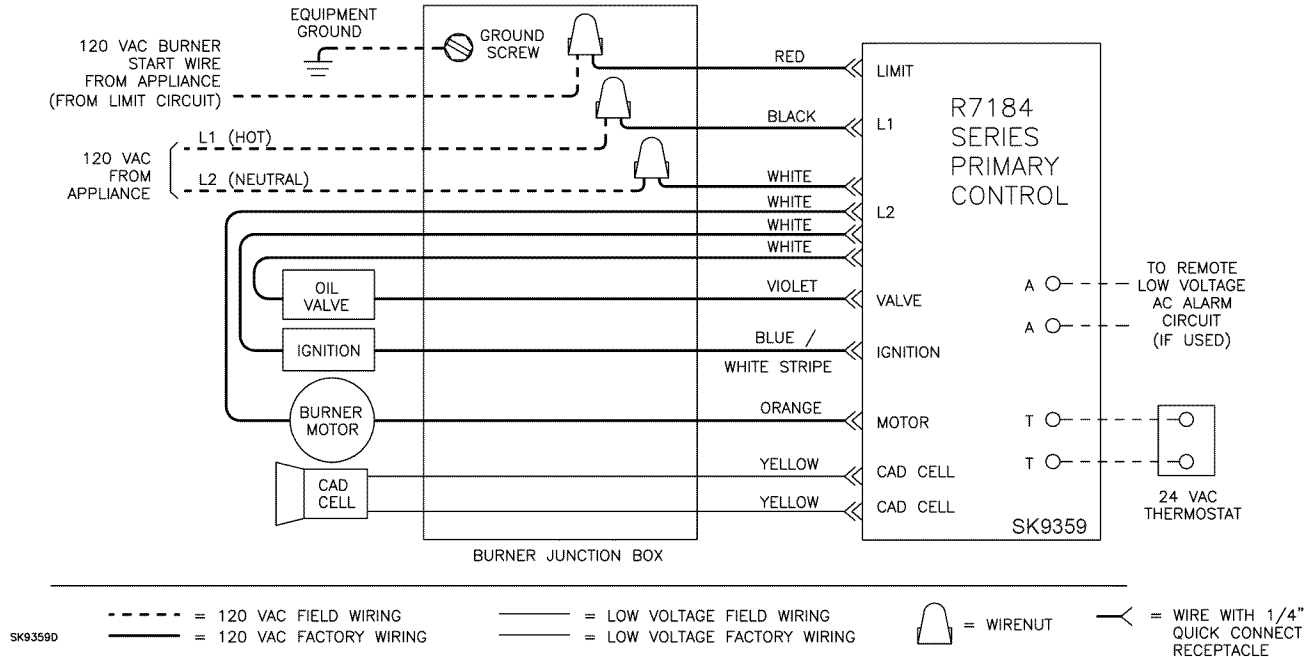
- Do not attempt to start the burner when excess oil has accumulated in the appliance, the appliance is full of vapor, or when the combustion chamber is very hot.
  - Do not attempt to re-establish flame with the burner running if the flame becomes extinguished during start-up, venting, or adjustment.
  - Vapor-Filled Appliance: Allow the unit to cool off and all vapors to dissipate before attempting another start.
  - Oil-Flooded Appliance: Shut off the electrical power and the oil supply to the burner and then clear all accumulated oil before continuing.
  - If the condition still appears unsafe, contact the Fire Department. Carefully follow their directions.
  - Keep a fire extinguisher nearby and ready for use.
- 

1. Open the shutoff valves in the oil supply line to the burner.
2. Open the air dial. This is an initial air setting for the pump bleeding procedure only. Additional adjustments must be made with instruments.
3. Set the thermostat substantially above room temperature.
4. Close the line voltage switch to start the burner. If the burner does not start immediately you may have to reset the safety switch of the burner primary control.
5. Bleed air from the fuel unit as soon as burner motor starts rotating. To bleed the fuel unit, attach a clear plastic hose over the vent fitting. Loosen the fitting and catch the oil in an empty container. Tighten the fitting when all air has been purged from the oil supply system.



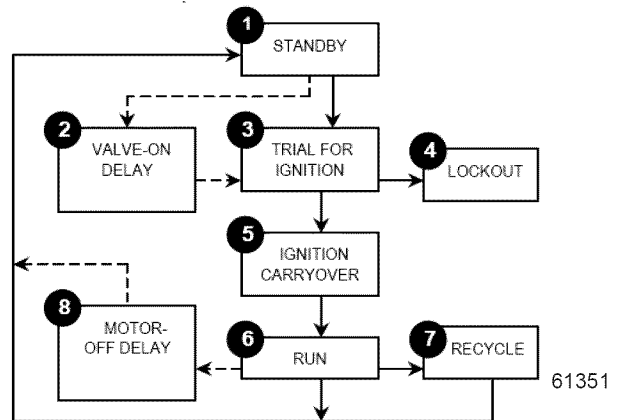
# Start the Burner and Set Combustion

**Figure 4. – Typical Wiring, R7184 Primary Control**



- 1. STANDBY.** The burner is idle, waiting for a call for heat. When a call for heat is initiated, there is a 3-10 second delay while the control performs a safe start check.
- 2. VALVE-ON DELAY.** The ignition and motor are turned on for a 15 second valve-on delay.
- 3. TRIAL FOR IGNITION (TFI).** The fuel valve is opened. A flame should be established within the 15 second lockout time.
- 4. LOCKOUT.** If flame is not sensed by the end of the TFI, the control shuts down on safety lockout and must be manually reset. If the control locks out three times in a row, the control enters restricted lockout.
- 5. IGNITION CARRYOVER.** Once flame is established, the ignition remains on for 10 seconds to ensure flame stability before turning off. If the control is wired for intermittent duty ignition, the ignition unit stays on the entire time the motor is running.
- 6. RUN.** The burner runs until the call for heat is satisfied. The burner is then sent to burner motor off delay, if applicable, or it is shut down and sent to standby.

- 7. RECYCLE.** If the flame is lost while the burner is firing, the control shuts down the burner, enters a 60 second recycle delay, and then repeats the above ignition sequence. If flame is lost three times in a row, the control locks out to prevent cycling with repetitious flame loss due to poor combustion.
- 8. BURNER MOTOR-OFF DELAY.** The fuel valve is closed and the burner motor is kept on for the selected motor-off delay time before the control returns the burner to standby.



## Control System Features

Feature	Interrupted ignition	Limited reset, Limited recycle	Diagnostic LED, cad cell indicator	Valve-on delay	Burner motor off delay	Alarm Contacts
R7184A	YES	YES	YES	—	—	—
R7184B	YES	YES	YES	YES	—	—
R7184P	YES	YES	YES	YES	YES	Optional

## Trained Service Technician's Regular Maintenance

- If the burner locks out on safety during bleeding, reset the safety switch and complete the bleeding procedure. Note — Electronic safety switches can be reset immediately; others may require a three- to five-minute wait.
  - If burner stops after flame is established, additional bleeding is probably required. Repeat the bleeding procedure until the pump is primed and a flame is established when the vent fitting is closed.
  - For R7184 primary controls, see Technician's Quick Reference Guide, part number 61351 or 61465, for special pump priming sequence.
  - Prepare for combustion tests by drilling a 1/4" sampling hole in the flue pipe between the appliance and the barometric draft regulator.
6. Initial air adjustment — Using a smoke tester, adjust the air dial (and change firing pin on HLX ATC's, if necessary) to obtain a clean flame. Now the additional combustion tests with instruments can be made.

### • Set combustion with instruments

1. Allow the burner to run for approximately 5 to 10 minutes.
2. Set the stack or over-fire draft to the level specified by the appliance manufacturer.
  - **Natural Draft Applications;** typically over-fire draft is  $-0.01"$  or  $-0.02"$  w.c.
  - **Direct Venting;** typically may not require draft adjustment.
  - **High Efficiency/Positive Pressure Appliances;** also vary from traditional appliances (see manufacturer's recommendations).
3. Follow these four steps to properly adjust the burner:

**Step 1:** Adjust the air dial until a trace of smoke is achieved.

**Step 2:** At the trace of smoke level, measure the CO<sub>2</sub> (or O<sub>2</sub>). This is the vital reference point for further adjustments. Example: 13.5% CO<sub>2</sub> (2.6% O<sub>2</sub>)

**Step 3:** Increase the air to reduce the CO<sub>2</sub> by 1.5 to 2 percentage points. (O<sub>2</sub> will be increased by approximately 2.0 to 2.7 percentage points.) Example: Reduce CO<sub>2</sub> from 13.5% to 11.5% (2.6% to 5.3% O<sub>2</sub>).

**Step 4:** Recheck smoke level. It should be Zero.

- This procedure provides a margin of reserve air to accommodate variable conditions.
- If the draft level has changed, recheck the smoke and CO<sub>2</sub> levels and readjust the burner if necessary

4. Once combustion is set, tighten all fasteners on air dial, rear access door, and escutcheon plate.
5. Start and stop the burner several times to ensure satisfactory operation. Test the primary control and all other appliance safety controls to verify that they function according to the manufacturer's specifications.

## Trained Service Technician's Regular Maintenance



### WARNING

### Annual Professional Service Required



***Tampering with or making incorrect adjustments could lead to equipment malfunction and result in asphyxiation, explosion or fire.***

- Do not tamper with the burner or controls or make any adjustments unless you are a trained and qualified service technician.
- To ensure continued reliable operation, a qualified service technician must service this burner annually.
- More frequent service intervals may be required in dusty or adverse environments.
- Operation and adjustment of the burner requires technical training and skillful use of combustion test instruments and other test equipment.

The following guidelines are provided for routine maintenance.

- ☐ Replace the oil supply line filter. The line filter cartridge must be replaced to avoid contamination of the fuel unit and nozzle.
- ☐ Inspect the oil supply system. All fittings should be leak-tight. The supply lines should be free of water, sludge and other restrictions.
- ☐ Remove and clean the pump strainer if applicable.
- ☐ Replace the nozzle with an exact replacement as specified by the appliance manufacturer.
- ☐ Clean and inspect the electrodes for damage, replacing any that are cracked or chipped.
- ☐ Check electrode tip settings. Replace electrodes if tips are rounded.
- ☐ Inspect the igniter cables and connections.
- ☐ Clean the cad cell grid surface, if necessary.
- ☐ Inspect all gaskets. Replace any that are damaged or would fail to seal adequately.
- ☐ Inspect the combustion head and air tube. Remove any carbon or foreign matter. Replace all damaged units with exact parts.
- ☐ Clean the blower wheel, air inlet, air guide, burner housing and nozzle line assembly of any lint or foreign material.

## Trained Service Technician's Regular Maintenance

- ☐ If motor is not permanently lubricated, oil motor with a few drops of SAE 20 nondetergent oil at each oil hole. DO NOT over oil motor. Excessive oiling can cause motor failure.
- ☐ Check motor current. The amp draw should not exceed the nameplate rating by more than 10%.
- ☐ Check all wiring for secure connections or insulation breaks.
- ☐ Check the pump pressure and cutoff function.
- ☐ Check primary control safety lockout timing.
- ☐ Check ignition system for proper operation.
- ☐ Inspect the vent system and chimney for soot accumulation or other restriction.
- ☐ Clean the appliance thoroughly according to the manufacturer's recommendations.
- ☐ Check the burner performance. Refer to the section "Set combustion with test instruments".
- ☐ It is good practice to make a record of the service performed and the combustion test results.

### • Removing Nozzle Line for Service

#### **WARNING** Correct Nozzle and Flow Rate Required



***Incorrect nozzles and flow rates could result in impaired combustion, under-firing, over-firing, soot-ing, puff-back of hot gases, smoke and potential fire or asphyxiation hazards.***

Use only nozzles having the brand, flow rate (gph), spray angle and pattern specified by the appliance manufacturer or Beckett Residential Burner OEM Spec Guide, Part #6711.

Follow the appliance manufacturer's specifications for the required pump outlet pressure for the nozzle, since this affects the flow rate.

- Nozzle manufacturers calibrate nozzle flow rates at 100 psig.
- This burner utilizes pressures higher than 100 psig, so the actual nozzle flow rate will be greater than the gph stamped on the nozzle body. (Example: A 1.00 gph nozzle @ 140 psig = 1.18 gph)

For typical nozzle flow rates at various pressures see accompanying chart.

1. Turn off power to burner before proceeding.
2. Disconnect copper oil connector tube from nozzle line.
3. Loosen the screw that fastens the rear access door.
4. Remove splined nut.

5. Remove the nozzle line assembly from the burner, being careful not to damage the electrodes or insulators while handling. Stop halfway to remove igniter/transformer wires.
6. To replace the nozzle assembly, reverse the above steps. "HLX" head air tubes – Be sure stop screw is fastened securely. Seat stop screw on back of choke ring to set the position of the head. "FBX" head air tubes – Use T gauge to set the "Z" dimension to 1-1/8" +/- 1/32"

### • Nozzle Installation

Perform the following steps when replacing a nozzle.

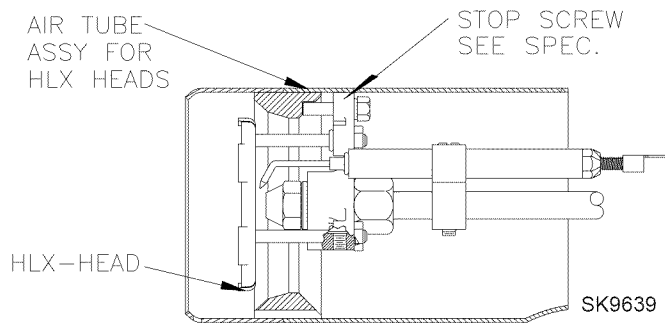
1. Remove the nozzle line assembly to gain access to the nozzle.
2. Use a 3/4" open-end wrench to hold the nozzle adapter. DO NOT attempt to remove or replace the nozzle without securing the adapter, as nozzle alignment could be seriously affected.
3. Do not squeeze the electrodes when handling the nozzle line assembly. Excessive force could change the electrode tip settings or damage the ceramic electrode insulators.
4. Use a 5/8" open-end wrench to carefully remove the existing nozzle.

### Nozzle Flow Rate by Size

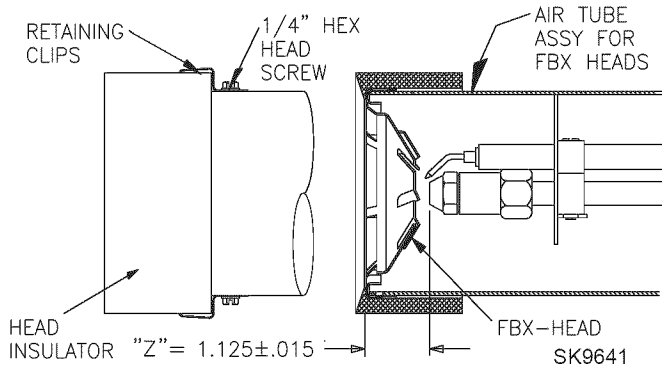
Nozzle flow rate U. S. gallons per hour of No. 2 fuel oil when pump pressure (psig) is:					
Nozzle size (rated at 100 psig)	125 psi	140 psi (factory std.)	150 psi	175 psi	200 psi
0.40	0.45	0.47	0.49	0.53	0.56
0.50	0.56	0.59	0.61	0.66	0.71
0.60	0.67	0.71	0.74	0.79	0.85
0.65	0.73	0.77	0.80	0.86	0.92
0.75	0.84	0.89	0.92	0.99	1.06
0.85	0.95	1.01	1.04	1.13	1.20
0.90	1.01	1.07	1.10	1.19	1.27
1.00	1.12	1.18	1.23	1.32	1.41
1.10	1.23	1.30	1.35	1.46	1.56
1.20	1.34	1.42	1.47	1.59	1.70
1.25	1.39	1.48	1.53	-	-
1.35	1.51	-	-	-	-

# Trained Service Technician's Regular Maintenance

**Figure 5a. HLX Air Tube**



**Figure 5b. FBX Air Tube**

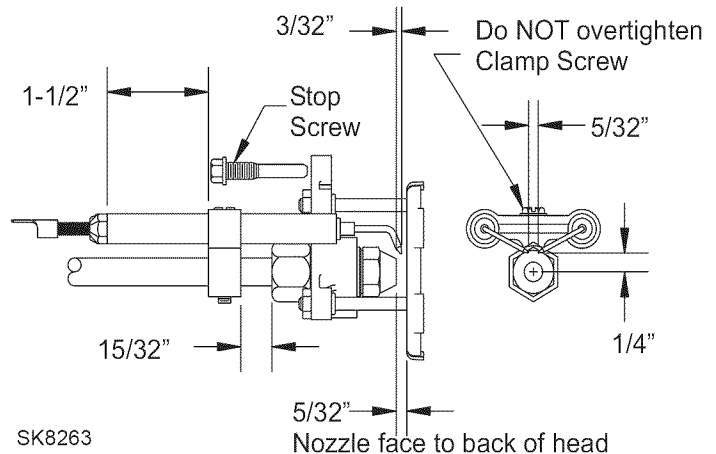


5. Inspect the nozzle adapter before installing the new nozzle. If it is grooved or scratched on the sealing surface, replace the nozzle line assembly. If the surface is damaged, oil could leak at the nozzle to adapter joint, causing serious combustion problems.
6. Protect the nozzle orifice and strainer when installing. If the orifice gets dirt in it or is scratched, the nozzle will not function properly.
7. To install a new nozzle, place a 3/4" open-end wrench on the nozzle adapter. Insert the nozzle into the adapter and secure finger tight. Finish tightening with a 3/8" open-end wrench. Use care to avoid bending the burner head support legs or electrodes.
8. Do not over-torque the nozzle when installing. This will cause deep grooves in the nozzle adapter, preventing a seal when a new nozzle is installed.
9. Carefully check and realign the electrode tips after replacing a nozzle, ensuring the electrode settings comply with Figure 6a or 6b.
10. If the head was removed when replacing the nozzle, carefully reconnect the head to the nozzle adapter. Push the head support until it stops against the nozzle shoulder. Verify the dimension between the nozzle face and the back of the head is 5/32".

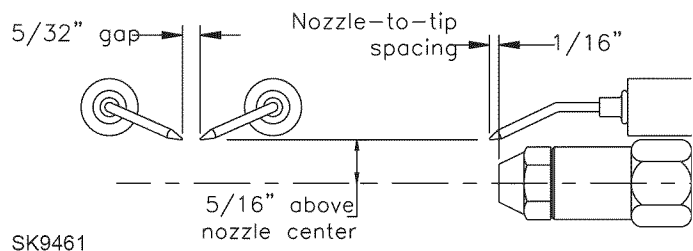
## • Check/Adjust Electrodes

Check the electrode tip settings, as shown in Figure 6a or 6b. If necessary, adjust by loosening the electrode clamp screw and slide/rotate the electrodes as necessary. When the adjustment is complete, securely tighten the clamp screw.

**Figure 6a. Electrode Settings-HLX Air Tube Combinations**



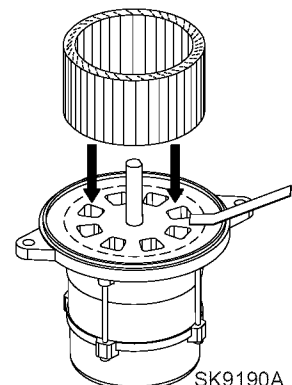
**Figure 6b. Electrode Settings-FBX Air Tube Combinations**



## • Blower Wheel Replacement

**Figure 7. – Blower Wheel Replacement**

For installation or replacement of a blower wheel, insure that there is a space between the blower wheel and the motor face of 0.062" (1/16" ± 1/64"). Refer to Figure 7.



# Trained Service Technician's Regular Maintenance

## HLX Firing Rate

Stop Screw	AFII 85	AFII 100	AFII 150
0	0.40-0.65	0.5-0.65	0.75-1.00
1	-	0.6-0.75	0.85-1.10
2	-	0.65-0.80	0.95-1.15
3	0.60-0.75	0.65-0.90	0.95-1.20
4	-	0.75-0.95	1.10-1.25
5	0.70-0.85	0.85-1.00	1.15-1.35
6	-	0.95-1.10	1.15-1.40
7	-	-	1.25-1.50
8	-	-	1.30-1.50

## HLX Air Dial Setting

Firing Rate @ 140 psig	AFII 85	AFII 100	AFII 150
0.40-0.65	3	-	-
0.60-0.75	4	3	-
0.70-0.85	5	4	-
0.75-1.00	-	5	2
0.95-1.20	-	-	3
1.15-1.35	-	-	4
1.25-1.50	-	-	5

## FBX Firing Rate

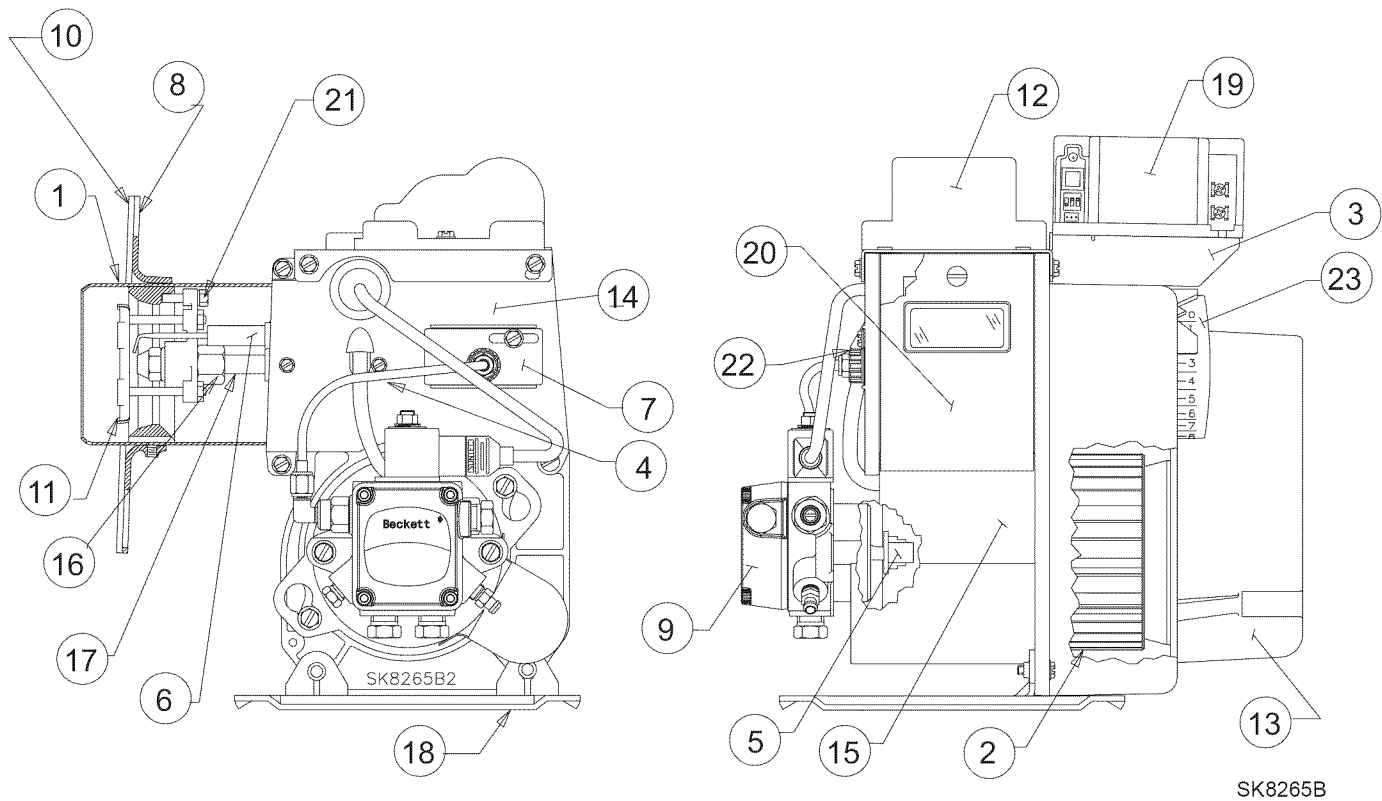
Head	AFII 85	AFII 100	AFII 150
FB0	0.40-0.65	0.55-0.75	0.75-1.00
FB3	0.55-0.85	0.55-1.10	0.85-1.20
FB4	-	0.75-1.10	1.10-1.25
FB6	-	0.85-1.15	1.15-1.35

## FBX Air Dial Setting

Firing Rate @ 140 psig	AFII 85	AFII 100	AFII 150
0.40-0.65	3	-	-
0.60-0.75	4	3	-
0.70-0.85	5	4	-
0.75-1.00	-	5	2
0.95-1.20	-	-	3
1.15-1.35	-	-	4
1.25-1.50	-	-	5

## Replacement Parts Diagram

For best performance specify genuine *Beckett* replacement parts



## Replacement Parts Diagram

### Replacement Parts List

Item	Description	Kit No.
1	Air tube combination	Specify
2	Blower Wheel: AFII 85 (4-1/4") AFII 100 (4-1/2") AFII 150 (4-1/2")	21439U 21438U 21438U
3	Electrical box	30613BK
4	Connector tube, 8" Copper	5394U
5	Coupling, Motor to Pump	21437U
6	Electrodes: HLX Heads FBX Heads	51484U 51670U
7	Escutcheon Plate: AFII Blank AFII 140psi	31623 3162302
8	Flange Kit, (adjust. 3-1/2" ID w/gasket)	51480
9	Fuel Pump: Cleancut	2184404U
10	Gasket, flange	31658
11	Head: <b>FBX</b> :FB0, FB3, FB4, or FB6 <b>HLX</b> : AF2 6 Slot Head AF2 9 Slot Head Head insulator Kit (FB0, 3, 4, 6 only)	Specify 51671U 51672U 51685

Item	Description	Kit No.
12	Igniter, Electronic	51805U
13	Inlet air scoop, plastic, sound insulated	51485
14	Housing ass'y: AFII 85 & 100 AFII 150	51584U 51476U
15	Motor: 1/7 hp, 3450 rpm, 115V/60Hz	21444U
16	Nozzle adapter	213
17	Nozzle Line Electrode Head ass'y	Specify
18	Pedestal Kit, AFII Mounting	51481
19	Primary control R7184A Interrupted ignition R7184B Valve-on Delay R7184P Valve-on/Motor-off Delay R7184P With Alarm Contacts	7455U 7456U 7457U 7458U
20	Rear Access Door	51424U
21	Stop Screw, Replacement kit	51483
22	Splined Nut	3666
23	Dial, Air Adjustment (UL approved)	187

## Limited Warranty Information

### Limited WARRANTY

#### For Residential, Commercial and Specialty Burners

The R. W. BECKETT CORPORATION ("Beckett") warrants to persons who purchase its Beckett burners from Beckett for resale or for incorporation into a product for resale ("Customers") that its equipment is free from defects in material and workmanship under normal use and service for 60 months from the date of manufacture for Residential Burners and 18 months from the date of manufacture for Commercial and Specialty Burners. *Residential burner models include:* AF, AFG, AFIL, NX, SF, SR and SMG. *Commercial burner models include:* CF375, CF500, CF800, CF1400, CF2300A, CF2500, CF3500A, CG10, CG15, CG25 and CG50. *Specialty burner models include:* ADC, ADCP, ARV, SDC and SM. The provisions of this warranty are extended to individual major burner components as follows:

- a) 60 months from date of manufacture for all Beckett-branded major components, except for 12 Vdc components.
- b) 18 months from date of manufacture for all non-Beckett-branded major components and Beckett branded 12 Vdc components.

Note: Normal service items found to be defective upon receipt by the customer are covered by this warranty.

**THIS WARRANTY DOES NOT EXTEND TO EQUIPMENT SUBJECTED TO MISUSE, NEGLIGENCE, OR ACCIDENT; NOR DOES THIS WARRANTY APPLY UNLESS THE PRODUCT COVERED BY IT IS PROPERLY INSTALLED BY A QUALIFIED, COMPETENT TECHNICIAN, WHO IS LICENSED WHERE STATE AND LOCAL CODES REQUIRE, AND WHO IS EXPERIENCED IN MAKING SUCH INSTALLATIONS, IN ACCORDANCE WITH THE LATEST EDITION OF NFPA NO. 31 OF THE NATIONAL FIRE PROTECTION ASSOCIATION, THE LATEST EDITION OF THE NATIONAL FUEL GAS CODE (NFPA NO. 54) AND IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND NATIONAL CODES HAVING JURISDICTIONAL AUTHORITY.**

Equipment, which is defective in material or workmanship and within the warranty period, may be returned for credit as follows:

Beckett Burners, Beckett-branded major components and non-Beckett-branded major components that came as original equipment on a Beckett burner or were sold as a replacement part by Beckett should be returned, freight prepaid, to Beckett's home office. Credit will be issued to the customer unless the returned equipment is determined by Beckett to be out of warranty or damaged by user, in which case the equipment will be scrapped.

**Note: Beckett is not responsible for any labor cost for removal and replacement of equipment.**

THIS WARRANTY IS LIMITED TO THE PRECISE TERMS SET FORTH ABOVE, AND PROVIDES EXCLUSIVE REMEDIES EXPRESSLY IN LIEU OF ALL OTHER REMEDIES, AND IN PARTICULAR THERE SHALL BE EXCLUDED THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL BECKETT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGE OF ANY NATURE. Beckett neither assumes nor authorizes any person to assume for Beckett any other liability or obligation in connection with the sale of this equipment, Beckett's liability and Customer's exclusive remedy being limited to credit as set forth above.

**R.W. BECKETT CORPORATION**

P.O. Box 1289 Elyria, Ohio 44036

Form No. 61545 R72905

The Oilheat Manufacturers' Association supports the use of low sulfur fuels as defined by ASTM D396, Grades No. 1 Low Sulfur and No. 2 Low Sulfur, as the preferred heating fuel for the following reasons:

- Low sulfur fuels reduce deposits on heat exchanger surfaces, extending the service interval between cleanings.
- The reduced deposits increase the efficiency of the appliance.
- Low sulfur fuels reduce particulate emissions.

**R.W. BECKETT CORPORATION**

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[www.beckettcorp.com](http://www.beckettcorp.com)

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