



BARD MANUFACTURING COMPANY
P. O. Box 607
BRYAN, OHIO 43506

MANUFACTURERS OF
AIR CONDITIONING
HEATING EQUIPMENT

INSTALLATION AND MAINTENANCE INSTRUCTIONS for

**HORIZONTAL OIL FIRED FURNACES
MODELS**

84,000 B.T.U.

95,000 B.T.U.

112,000 B.T.U.

125,000 B.T.U.

FOR YOUR SAFETY

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

Warning: Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to the Installation Instructions provided with the furnace and this manual. For assistance or additional information consult a qualified installer.



INSTALLATION INSTRUCTIONS

IMPORTANT NOTICE

The installation of furnace, wiring, warm air piping, etc., should conform to the requirements of the National Fire Protection Association, National Electric Code or Canadian Standards Association, Canadian Electrical Code, recommendations of The National Environmental Systems Contractors Association, and any State Laws or Local Ordinances. The Local authorities having jurisdiction should be consulted before installation is made.

SUCH APPLICABLE REGULATIONS OR REQUIREMENTS TAKE PRECEDENCE OVER THE GENERAL INSTRUCTIONS IN THIS MANUAL.

CHIMNEY

Prior to the installation of the unit a thorough inspection of the chimney should be made to determine whether repairs are necessary and that the chimney is of the proper size and constructed in accordance with the requirements of the National Board of Fire Underwriters or Canadian Standards Association. The smallest dimension of the chimney should be at least equal to the diameter of the flue pipe of the furnace. Where two or more appliances vent into a common flue, the area of the common flue should be at least equal to the area of the largest flue or vent connector plus 50 percent of the areas of the additional flue or vent connectors. Be sure the chimney will produce a steady draft sufficient to remove all the products of the combustion from the furnace.

UNPACKING

The complete furnace is shipped from the factory in one package fully assembled and wired. Check carefully when unpacking your furnace to see that you do not misplace any small parts.

INSTALLATION OF FURNACE

BE SURE to read all the special instructions before starting work so your installation will conform to Underwriters' Laboratories or Canadian Standards Association requirements. **BE SURE** the furnace is level when placed on its foundation or in its suspended position. Using a carpenter's level, check furnace in at least two directions. **BE SURE** the weight is distributed evenly on the bottom support or hanger rods before duct work is attached. If the weight is not distributed evenly, it will throw a strain on side of cabinet and may cause popping and cracking noises.

LOCATION

The compact, horizontal design of this unit makes it ideal for installation in a crawl space under a house, utility room or in a wide range of suspended applications. Locate the furnace as centrally as possible so that all warm air pipes to the various

rooms are nearly the same length. This will allow each room to receive an equal and proper amount of heat. This may vary with each particular installation. Place the furnace so that the flue pipe connection to the chimney will be of a minimum distance and have a minimum of fittings.

MINIMUM CLEARANCES

This furnace must be installed no closer to combustible material than shown in the following table:

84,000 & 95,000 BTU/Hr

6"	Top, Bottom and Rear
24"	Front
2"	End of supply Plenum
6"	Discharge End of Furnace
2"	Above Horizontal Warm Air Duct within 3 ft. of Furnace
6"	Inlet End of Furnace
18"	Smoke Pipe Horizontal
18"	Smoke Pipe Vertical

112,000 & 125,000 BTU/Hr

6"	Top, Bottom and Rear
24"	Front
2"	End of Supply Plenum
6"	Discharge End of Furnace
2"	Above Horizontal Warm Air Duct within 3 ft. of Furnace
18"	Smoke Pipe Horizontal
18"	Smoke Pipe Vertical
6"	Inlet End of Furnace

A minimum of 48" must be provided in front of furnace for servicing the burner and filter. A passage suitable for a large man shall be provided to the furnace and chimney; the latter for inspection or replacement of the flue connector when necessary.

AIR REQUIREMENTS

Where the furnace is confined in a tightly closed room (such as a utility room) without ventilating openings to outdoors or other rooms, provisions must be made for supplying air for combustion through special openings. Provide two openings, each with one square inch of free area per 1,000 BTU input per hour. (minimum, 100 square inches per opening). One is to be below the burner level and the other is to be above the draft regulator. The upper opening should not be more than 6" down from the ceiling on the furnace side.

An opening to outdoors for combustion air is strongly recommended especially in new homes. Provide a minimum free area of one-half square inch per 1,000 BTU/Hr input. This combustion air should be brought into utility room below burner and the lower opening in door omitted.

AIR CONDITIONING

When summer air conditioning is used in connection with the furnace the furnace shall be installed in parallel with or on the upstream side of the evaporator coil. With the parallel flow arrangement, the dampers or other means used to control flow of air shall be adequate to prevent chilled air from entering the furnace, and if manually operated, must be equipped with means to prevent operation of either unit unless the damper is in the full heat or cool position.

REVERSING THE AIR FLOW

When shipped from the factory the furnace is assembled so that when facing the front, the warm air is being discharged out the left side. If installation requires that the flow be reversed, this can be done in the following manner:

1. Rotate the furnace 180° so that when facing the front, the warm air is being discharged out the right.
2. Remove the nuts in the bracket that holds the burner to the furnace front. Rotate burner 180° and replace nuts on studs.

NON-SUSPENDED INSTALLATION

To support furnace from below, set furnace on non-combustible material (such as concrete blocks, bricks or angle iron). Use level to check level of furnace in at least two directions. To make adjustment, use shims or non-combustible material. There must be at least 6" minimum clearance between bottom of furnace and combustible material.

SUSPENDED INSTALLATION

When the furnace is to be suspended, remove knockouts in top of panel at warm air discharge and at blower panel. Use 3/8" threaded rods cut to desirable length. Use one (1) flat washer and two (2) nuts on each rod. One (1) nut on inside of unit, the other nut on outside of unit. This will be the locking nut. Unit can be leveled with the nuts on the inside. See Fig. 1.

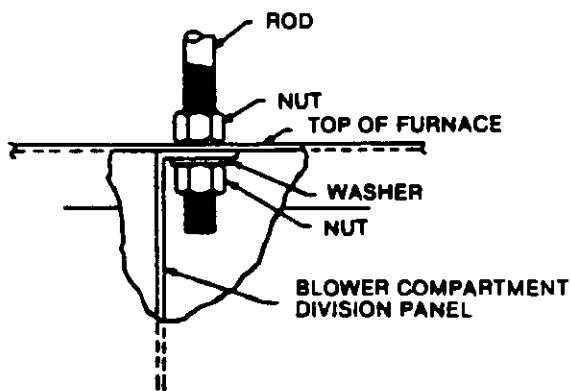


Figure 1—Hanger Rod Installation

VENT PIPE

Connect the flue outlet to the chimney with 24 gauge or heavier galvanized steel vent pipe and fittings, the same size as the outlet of the flue pipe. It is desirable to have the vent pipe as short and direct as possible. The flue pipe shall maintain a rise as great as possible or a minimum of at least 1/4-inch to the foot (horizontal length). Make sure the thimble of the flue connector does not protrude into the chimney beyond the inside wall of the chimney.

RETURN AIR TO THE FURNACE

In confined spaces such as utility rooms where there is no complete return duct system, a return air connection should be run full size to a location outside the room.

BURNER

For information on burners, refer to the oil burner manual.

COMBUSTION CHAMBER

The combustion chamber is installed in the furnace at the factory. **BE SURE** to read the instruction plate on the front of the unit concerning the proper care of the chamber.

This combustion chamber is made of a flexible ceramic material, superior in many ways to the old rigid chamber. Use extreme care when installing the oil burner that the chamber is not damaged around the burner tube.

FILTER

This unit does not contain a filter. It is recommended that a return air filter grille be used for crawl space or suspended application. There is also an external filter rack available (optional equipment).

The following sized filter grilles should be used (minimum size):

84 & 95 units—20" x 24" or equivalent

112 & 125 units—20" x 25" or equivalent

PLENUMS OF FURNACE

Both warm air and return plenums shall be square sided at least 18" long and the full size of the furnace opening.

FAN & LIMIT CONTROL

Fan and limit control is installed and wired at the factory. **REPLACEMENT OF THE "FAN AND LIMIT CONTROL" MUST BE MADE WITH AN IDENTICAL CONTROL AS ORIGINALLY SUPPLIED ON THE EQUIPMENT FROM THE FACTORY INCLUDING "FAN" AND "LIMIT" STOPS.** The use of other controls will void the warranty of the furnace. Operation of this furnace with greater than 130° F "Fan On" air temperature will void the warranty of the furnace. The fan control and blower speed

should be set per CAC, page 7.

DRAFT REGULATOR

Install Barometric Draft Regulator that is provided with furnace in accordance with the instructions packed with it.

ELECTRICAL WIRING

The furnace is shipped from the factory wired in accordance with the National Electric Code and Canadian Standards Association and should conform to all local codes. Connect the 115 volt, single phase service line to the unit as shown on the wiring diagram pasted on the blower compartment door. It is recommended that a separate circuit be taken from the main service box, with a separate fused switch, direct to the furnace. Follow the wiring diagram carefully using not less than #14 wire. Use 15 amp., 115 volt fuses.

SERVICE AND MAINTENANCE

OILING: Oil instructions are on the blower.

WIRING: The wiring diagram is located on the inside door of the blower compartment panel.

FINISH: Your unit is painted with baked enamel. Like a good piece of furniture, it has an excellent appearance and an occasional waxing and dusting will keep it attractive for years. If the finish is accidentally scratched, it is possible to obtain touch-up paint to repair it.

CLEANING HEAT EXCHANGER

1. Remove vent pipe and sheet metal screws around the flue collar.
2. Remove flue collar.
3. Clean heat exchanger through vent pipe opening and observation door with vacuum cleaner or wire brush.
4. **DO NOT USE** wire brush or vacuum cleaner in combustion chamber. **DO NOT ATTEMPT TO CLEAN OUT COMBUSTION CHAMBER MECHANICALLY.** The "Ceramiflex" combustion chamber is easily damaged. If the combustion chamber is covered with carbon, adjust the burner for a "hard" fire which will give more air and will burn off carbon coating and restore "Ceramiflex" to original white color.

CONTINUOUS AIR CIRCULATION

If adjustments are so made that the furnace blower will run continuously when there is any appreciable need for heat in the house, an excellent job of heating will result even if pipe sizes and register locations are only reasonably correct.

The necessary settings are not complicated.

1. Open all dampers in duct system. Be sure filters are clean and there is no restriction to air circulation.
2. Insert a thermometer in warm air register nearest furnace. Insert another thermometer in the face of the air filter on the return air side of furnace or return air register.
3. Set room thermostat at high temperature to keep burner in constant operation. When unit has operated long enough to establish equilibrium, the temperature difference between two thermometers will be between 70° and 90°.
4. Reduce thermostat setting enough to stop burner and set the "off" position of blower control as low as possible. When temperature shown by thermometer at the warm air register near the furnace reaches 80°, adjust fan switch to stop blower. Set blower starting temperature 15° above this point.
5. Balance system with dampers in each pipe so all rooms are the same temperature.

For complete data on Continuous Air Circulation, see Manual 6 published by The National Environmental Systems Contractors Association.

CONVERTING TO REDUCED OUTPUT

These furnaces come equipped from the factory with oil burner nozzle for the maximum BTU/HR output.

To reduce the BTU/HR output, remove the oil burner, remove nozzle from oil burner, install in the oil burner a .75 G.P.H. nozzle for a 84,000 BTU/HR output in the 95 furnace and a 1.00 G.P.H. nozzle for a 112,000 BTU/HR output in the 125 furnace. These nozzles must have an 80° spray angle and solid pattern.

SERVICE HINTS

If you experience trouble after installation, consult this list and the list found in the Oil Burner Manual for the possible trouble.

CAUSES

1. UNIT VIBRATES
 - a. Belt on blower too tight.
 - b. Blower running too fast.
- c. Primary air on burner open too much.

2. UNIT SHORT CYCLING ON FAN CONTROL

- a. On-off setting of fan control too close.
- b. Fan control set too high.
- c. Input too low.
- d. Blower running too fast.

3. LIMIT CONTROL SHUTS OFF UNIT

- a. Limit control setting set below mfgr. recommended setting.
- b. Unit over fired.
- c. Not enough warm or cold air piping on furnace or too many runs are shut off.
- d. Return air restricted.
- e. Blower running too slow.

4. NOISY BLOWER OR MOTOR

- a. Poor alignment of pulleys.
- b. Needs oil.
- c. Excessive speed or belt too tight.
- d. Pulleys loose on blower or motor.
- e. Resilient mounting bolts too tight.

5. UNIT NOT HEATING

- a. Oil burner nozzle plugged.
- b. Undersized unit.
- c. Restricted registers.
- d. Fan control setting wrong.
- e. No electricity.
- f. Out of oil.
- g. Limit control setting wrong.
- h. Thermostat.
- i. Insufficient cold air.

CORRECTION

- a. Loosen motor adjusting screw and readjust.
- b. Readjust motor speed to 70° to 90° rise across furnace.
- c. Adjust primary air.

- a. Reset.
- b. Maximum fan setting 120°.
- c. Check pump pressure and nozzle size.
- d. Readjust blower speed to 70° to 90° rise across furnace.

- a. Move to stop.
- b. Check pump pressure and nozzle size.
- c. Open runs which are shut off. Add warm air or cold air runs as required. Remove blower door for a check.
- d. Check for dirty filters and rugs over return grilles.
- e. Readjust motor speed to 70° to 90° rise across furnace.

- a. Re-align.
- b. Use SAE #20 oil once a year (check instr. on blower).
- d. Readjust speed or belt.
- d. Tighten.
- e. Loosen.

- a. Replace with new, proper size nozzle.
- b. Check heat loss of building to be sure furnace is correct size.
- c. Check dampers and registers.
- d. Set fan control for continuous air circulation.
- e. Check electrical connections—particularly for loose or blown fuses and main switch "ON" position.
- g. Check limit control setting to be sure it is not cutting off too soon.
- h. Check thermostat for loose connections.
- i. Check for blocked cold air returns or dirty filters.

If you are unable to correct your troubles or are in doubt about what to do, call your furnace dealer. He will be happy to serve you.

HOMEOWNER'S INSTRUCTIONS

Your Oil Furnace is a quality piece of equipment, don't neglect it. Periodic checking of your furnace will save you costly repairs and inconvenience. Here are the points to check and service.

AIR FILTERS should be kept clean. Check filter weekly until cleaning cycle has been established. DON'T allow dirt to plug the face of the filters. Replace filters when dirt appears on back of filters and before each heating season.

BLOWER MOTOR - BELT DRIVE— Oil only once a year. When blower is operated with summer air conditioning, oil motor a second time. Six to eight drops of oil (a good grade SAE #20) in each cup will be sufficient. Don't over oil the motor.

BLOWER MOTOR - DIRECT DRIVE— Direct drive motors are factory lubricated and need only be oiled every two years if operated continuously the year around with air conditioning and heating. Normal heating operation should only require oiling every three years. Remove the blower motor and unscrew the oil caps on each end of the motor. See Figure 4. Six to eight drops of oil (a good grade SAE #20) in each cup will be sufficient. Don't over oil the motor.

BLOWER BEARINGS - BELT DRIVE— Are lifetime oil-less bearings and need no oil. If blower squeaks, place one drop of oil on shaft at each end of bearings. This will start lubrication again.

OIL BURNER should be cleaned and adjusted once a year. Contact your experienced furnace dealer to have this done during the summer.

LIGHTING INSTRUCTIONS— Consult your dealer for necessary instructions.

KEEP CLEAN the outside of your furnace. Use a damp cloth if necessary; automobile wax will help.

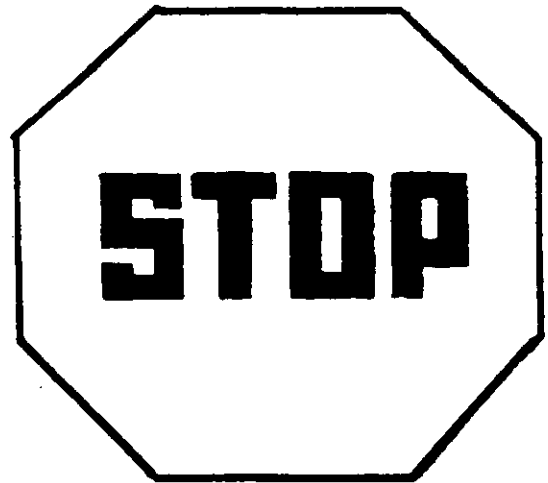
FOR ASSISTANCE CALL YOUR DEALER.

DEALER _____

ADDRESS _____

PHONE _____

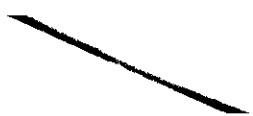
HANG THIS CARD NEAR FURNACE



Have you completely serviced this unit? Check the following list:

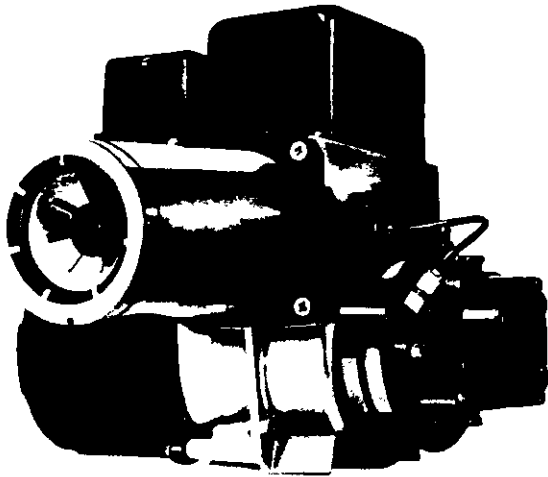
ORIGINAL SERVICE—BE SURE to service the unit when ready to start it. The following steps should be included in servicing the unit.

1. Oil blower, Burner and motor.
2. Put furnace in operation and check safety on relay.
3. Check for oil leaks. Tighten packing nut on valve.
4. Adjust blower speed for 80° rise across furnace. On Direct Drive blowers, this should be very close when wired as they come from factory. (See C.A.C. Page 7.)
5. Check Fan Control for C.A.C. (See Page 7.)
6. Balance system to secure same temperature in all rooms.
7. Check thermostat for adjustable heater. If adjustable, set heat at "Ampere Rating" shown on name plate of relay.
8. Remove back sheet of this manual (Home Owner's Guide) and tack up near furnace. If Home Owner is present, go over operation of furnace with him.



R. W. BECKETT CORP.

P.O. Box 1289
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MODELS AF, AR OIL BURNERS

INSTALLATION AND SERVICE INSTRUCTIONS FOREWORD TO THE OWNER

Over thirty years of engineering and product development have gone into your new oil burner. Its quality and design are unsurpassed. Properly installed and maintained, it will provide many years of efficient, trouble-free operation. Please observe these instructions carefully to get best operation from your oil burner.

CONCEALED DAMAGE

If any damage to the burner or controls is found during unpacking notify the carrier at once and file the appropriate claim.

SPECIFICATIONS

CAPACITIES - MODEL AF

..... .50 to 3.0 gallons per hour
..... 70,000 to 420,000 BTU/HR Input

CAPACITIES - MODEL AR

..... .50 to 1.35 gallons per hour
..... 70,000 to 189,000 BTU/HR Input

FUELS

No. 1 or No. 2 Heating Oil (ASTM D396)

DIMENSIONS (Standard)

Height 11-1/2"
Width 12-7/8"
Depth (Chassis Only) 6-9/16"

ELECTRICAL CHARACTERISTICS: (See Note)

Power 115 V/60HZ 1 PH
Load (Max.) 5.8 Amps.
Motor 3450 RPM, N. E. M. A. "M" Flange, manual
reset overload, protection
Transformer 10,000 V/23 ma Secondary Continuous
duty, shielded & balanced

FUEL UNIT:

..... Sundstrand, or Webster

NOTE:

50 Hertz electrical components are available on special order.

TWO VERY IMPORTANT NOTES

A PROPERLY DESIGNED CHIMNEY OF ADEQUATE SIZE AND HEIGHT AND ADEQUATE COMBUSTION AIR SUPPLY ARE ESSENTIALS FOR THE BEST OPERATION OF ANY HEATING PLANT.

In installing the heater and/OR BURNER BE SURE TO PROVIDE ADEQUATE SPACE FOR EASY SERVICE & MAINTENANCE. CAUTION: "DO NOT TAMPER WITH THE UNIT OR CONTROLS - CALL YOUR SERVICEMAN."

HOMEOWNER NOTICE: BECKETT WARRANTS ITS EQUIPMENT SPECIFICALLY TO THOSE WHO HAVE PURCHASED IT FOR RESALE, INCLUDING YOUR DEALER. IN THE EVENT OF ANY PROBLEMS WITH YOUR EQUIPMENT OF ITS INSTALLATION, YOU SHOULD CONTACT YOUR DEALER FOR ASSISTANCE.

The burner is certified to comply with the requirements of Commercial Standard CS75. It is listed by Underwriters' Laboratories for use with either Group I or II primary safety controls and with No. 1 or No. 2 fuel oil as specified in ASTM D396. State and local approvals are as shown on burner rating label and CSA certified in Canada.

All oil burners should be installed in accordance with regulations of the National Fire Protection Association Pamphlet No. 31 and in complete accordance with all local codes and authorities having jurisdiction. Regulations of these authorities take precedence over the general instructions provided in this installation manual. For recommended installation practice in Canada, reference should be made to CSA Standard B 139.

GENERAL INFORMATION

FUEL UNITS & TUBING INSTALLATION

Burners are most commonly installed with a single stage fuel unit. This fuel unit, when connected with a supply line only, is satisfactory where the fuel supply is on a level with, or above the burner permitting gravity flow of oil. When it is necessary to lift oil to the burner, a return line should be connected between the fuel unit and tank. This requires insertion of the "by-pass" plug into the fuel unit. If lift exceeds approximately 10 ft., a two-stage pump should be installed with a return line.

When a return line is used, with either single or two-stage pumps, air is automatically returned to the tank making the unit self-purging.

Use of continuous runs of heavy wall copper tubing is recommended. Always use flare fittings. Avoid use of fittings in inaccessible locations. Avoid running tubing against heating unit and across ceiling or floor joists. If possible install under floor.

Specific information on piping, fuel unit connections, lift capabilities, and tank installations is provided in the instructions of the fuel unit manufacturer.

COMBUSTION AIR

Burner must be installed in area with adequate fresh air available to support combustion.

Appliances located in confined spaces: The confined space shall be provided with two permanent openings, one near the top of the enclosure and one near the bottom. Each opening shall have a free area of not less than one square inch per 1,000 Btu per hour of the total input rating of all appliances in the enclosure, freely communicating with interior areas having in turn adequate infiltration from the outside.

WIRING

The wiring must be in accordance with the National Electric Code and local codes and regulations.

Wiring diagrams are included in the heating unit installation instructions.

UPGRADING OR CONVERSION

ATTACHING AIR TUBE COMBINATION (CHASSIS PLAN ONLY)

If the air tube combination and oil burner chassis are packaged separately, the assembly is completed as follows:

1. Attach air tube to burner housing using four sheet metal screws. (If using an adjustable burner mounting flange, first attach flange to air tube.)
2. Insert nozzle line electrode assembly into tube and position nozzle from head, using 'Z' dimension shown elsewhere in these instructions. Check to be certain nozzle and head are concentric.
3. Secure escutcheon plate by tightening screw at side of housing.
4. Secure nozzle line using bulkhead lock nut. When a knurled lock nut is supplied, the recessed side is to face away from burner housing.
5. Attach connector tube (from pump to nozzle line). With long air tube combinations, insertion of the nozzle line electrode assembly into the air tube is facilitated by rotating the assembly 180° from its installed position, inserting it partially into the air tube, and then rotating it back to its proper position.

SETTING THE BURNER

Use a mounting flange or pedestal as required.

The end of the burner air tube should be ¼" back from the inside surface of the front wall of the combustion chamber.

Insulate around air tube to prevent overheating of tube, nozzle and components. Make sure that insulation and cement do not obstruct face of burner head.

IMPORTANT CAUTIONS READ BEFORE STARTING

CAUTION: STAINLESS STEEL COMBUSTION CHAMBERS

The higher temperature levels produced by high-performance flame retention burners may exceed the temperature rating of stainless steel combustion chambers and can result in chamber burn-outs.

Where a burner upgrading is being made in a unit with a stainless steel chamber, please observe at least one of these precautions:

1. Line the Chamber with a "wet-pac" ceramic liner.
2. Adjust inlet air to the burner so that the CO₂ level is below 11%.

OIL

Before starting the burner be sure fuel tank is adequately filled with clean No. 1 or No. 2 furnace oil. *Crankcase oil, waste oil or GASOLINE should never be used.* Water, rust, or other contamination in the fuel supply system will cause malfunction and premature failure of the internal parts of the fuel unit.

POWER CIRCUIT

Be sure that burner and controls are wired correctly and that the line switch is properly fused (20 amp). In Canada wiring to be done in accordance with the Canadian Electrical Code, Part 1.

NOZZLE

Be sure that specified nozzle is installed and that any covering over nozzle is removed prior to starting the burner.

NOZZLE AND ELECTRODE SETTING

Be sure nozzle and electrodes are positioned as shown elsewhere in these instructions. Improper adjustment can result in oil impingement or ignition difficulties.

AIR TUBE INSERTION

The burner head should be ¼" back from the inside wall of combustion chamber. Under no circumstances should the burner head extend into the combustion chamber.

FUEL UNIT

Be sure that fuel unit is arranged for the type of oil supply system installed . . . "One Pipe" or "Two Pipe". Be sure that all connections are tight.

Fuel units generally require manual venting of air when initially started. Failure to vent the air from the fuel unit through the vent plug provided may result in an air lock within the pump that will prevent oil from being delivered to the nozzle. See also Fuel Unit Manufacturer's instructions.

LINE OIL FILTER

Use an oil filter of generous capacity for all installations. Install inside the building between the tank shutoff valve and the burner. For ease of servicing, locate the filter and a shut-off valve close to the oil burner.

OIL SHUTOFF VALVE

Install approved high quality shutoff valves in oil supply line in accessible locations, one close to the tank and another close to oil burner, but ahead of the filter. Note that some types of filters are made with a built-in shutoff valve.

STARTING AND ADJUSTMENT PROCEDURE

Caution: Do not attempt to start the burner when excess oil has accumulated, when the furnace or boiler is full of vapour when the combustion chamber is very hot.

1. Set thermostat substantially above room temperature.
2. Open shut-off valves in the oil supply line to the burner.

3. Check initial air adjustment. Normally the bulk air band (3) should be closed and the shutter (2) partially open.
4. Close line switch to start burner. If burner does not start immediately re-set manual overload switches on motor and control.
5. Vent fuel unit as soon as burner motor starts rotating. To vent, loosen vent plug while holding an empty container under the vent opening to catch oil which will be expelled. Drain at least 1/2 pint of oil from the pump then close the vent plug. The ignition should be instantaneous with closing the vent plug.

If the burner starts and runs but stops again during the venting operation, wait three to five minutes for the safety switch to cool then re-set the manual switch and repeat the procedure until ignition is obtained. Sometimes after venting is accomplished and oil is ignited, the fire will again go out. This probably means that additional venting is necessary. Repeat the above venting procedure.

AIR ADJUSTMENT

Adjust air supply by loosening lock screws and moving air shutter (2) and if necessary the bulk air band (3). Allow just sufficient air to obtain clean combustion determined by visual inspection. Reduce air supply until flame tips appear slightly smoky, then increase air just enough to make the flame tips appear absolutely clean.

DRAFT CONTROL ADJUSTMENT

When the burner air supply and draft are properly adjusted the combustion chamber draft will normally be .01" - .02" WC. Larger installations may require slightly greater draft.

FINAL ADJUSTMENTS

At this point a final adjustment should be made using suitable instruments for smoke spot and CO₂ (or O₂) measurements. Unless otherwise specified in appliance manufacturer's instructions, the unit should be set as follows: After allowing 10 minutes for warm up, air should be set so that the smoke number is zero or a trace; less than no. 1 smoke is highly desirable and should never exceed this limit. (Note: Occasionally a new heating appliance will require longer warm up time in order to burn clean because of the evaporation of oil deposits on the heat exchanger and other surfaces. CO₂ measured in the stack (ahead of the draft control) should be a minimum of 10% for knocked down appliances or retrofit applications and a minimum of 12% for units with burners tested and supplied by manufacturers as a package.

Tighten all locking screws after final adjustments are made.

The unit should be started and stopped several times to make sure there are no significant rumbles or pulsations.

CHECKING THE CONTROLS

Check and adjust all controls in accordance with the Control Manufacturer's instruction sheets. Be sure the primary control safety switch operates properly so that safety shutdown will occur in the event of equipment malfunction.

FINAL CHECKS

Be sure air shutter and draft control are locked . . . that there is an ample supply of fresh air to the room in which the unit is located, and there are no oil leaks.

INSTRUCTING THE HOMEOWNER

The operation and care of the heating system should be explained to the home owner, including how to adjust the thermostat, necessity of air supply to the burner, care of the burner, and the simple checks to make before calling for service if the burner fails to operate automatically.

HOMEOWNER INFORMATION

OIL SUPPLY

Do not allow the fuel tank to run out of oil. During the summer be sure that your fuel tank is kept full; this will prevent condensation of moisture on the inside surfaces of the tank.

IF YOUR TANK RUNS DRY, IT MAY BE NECESSARY TO MANUALLY VENT THE AIR FROM THE PUMP AND LINES WHEN RE-STARTING THE BURNER.

COMBUSTION AIR SUPPLY

Your burner requires a generous amount of clean combustion air in order to burn the fuel completely. Lack of adequate combustion air may result in erratic operation of the burner or noisy combustion or fuel odors in the air. Remember your need for outside air will be greatly increased if you have a vented dryer in the basement or other venting fans in the home.

OILING MOTOR

Motor life will be increased by proper oiling. Use a few drops of non-detergent oil at both motor oil holes twice each year.

FILTER

The line filter cartridge should be replaced every year to avoid contamination of the fuel unit and atomizing nozzle.

AREA AROUND HEATING UNIT

Should be kept clean and free of any combustible materials especially papers and oily rags.

NEVER

Burn garbage or refuse in your heating unit. Never try to ignite or by tossing burning papers or other material into your heater.

SERVICE INFORMATION

"Preventive maintenance" is the best way to avoid unnecessary expense and inconvenience. Have your heating system and burner inspected at regular intervals by a qualified service man. If difficulty occurs, follow these simple checks before calling the service man.

1. Be sure there is oil in the tank and valve is open.
2. Be sure the thermostat is set above Room Temperature.
3. Be sure main Line Switch is "ON" and fuses are not blown.
4. Reset Safety Switch of Burner Primary Control.
5. Press Thermal Protector Button of Burner Motor.
6. If installation is equipped with Manual Reset Limit Control . . . Press Reset Button.
7. If burner runs but there is no flame, fuel unit may be air-bound. Follow instructions for venting fuel unit.

THE FOLLOWING INFORMATION IS IMPORTANT IN SERVICING THE BURNER

1. Burner Components: If replacement of burner parts is necessary, always use parts recommended by the manufacturer. Specify part number & description when ordering.
2. Nozzles: Use of the correct atomizing nozzle is very important. If replacement is necessary, use the same type supplied by the manufacturer. Nozzle capacity and type are stamped on the hex-portion of the nozzle body. Use extreme care in handling nozzles to avoid scratches or dirt that could cause leaks or affect the oil spray pattern.
3. Electrode Setting is important for reliable ignition of the oil. Check to be sure setting is in accordance with instructions provided elsewhere in this manual.
4. Fan and blower housing should be kept clean of dirt and lint. If heating unit is located near unvented dryer, special care must be taken that lint does not restrict air passages in burner.

OIL BURNER CERTIFICATE

AS REQUIRED BY COMMERCIAL STANDARD CS75-56

The Oil Burner Model No., Serial No., installed at
(Make)

..... bears a label evidencing compliance with commercial Standard CS75-56, and
(Address of Installation)
has been installed in accordance with the instructions in the manufacturer's installation manual and in conformity with local regulations, codes, and ordinances.

The boiler, (), furnace (), is a No., and
the heating load consists of: (Make)

1. Btu, or square feet steam (), hot water () radiation; and
2. Btu, or square feet of equivalent steam (), hot water () radiation in domestic hot water load; or
3. Btu, or square inches of cross-sectional area of warm air supply pipes measured at the furnace take off; or
4. Btu, or square feet of equivalent steam (), hot water () radiation in the following special load:

.....
All necessary permits have been secured, and the installation has been tested in accordance with the test procedure of Commercial Standard CS75-56 and the following reading taken:

CO₂ { Over Fire.....
 { At Breeching..... Stack Temperature at Breeching.....°F

Draft { Over Fire..... } inches H₂O. Firing Rate..... gals./hr.
 { At Breeching..... }

All controls and limiting devices have been checked for proper operation

Fuel used, Grade No..... per ASTM D396 Standard Specification

Field service equipment smoke scale reading

The above test results are certified to be true:

For service call: (Name of Company making installation)

..... (Name) Per (Signature)

..... (Address) (Address)

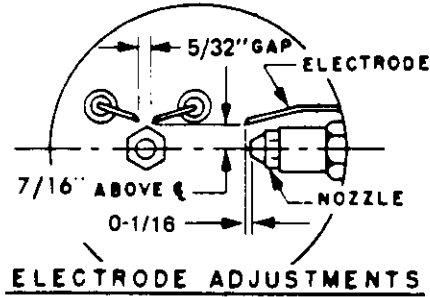
..... (Telephone) (Telephone)

Date

AIR TUBE COMBINATION DETAILS

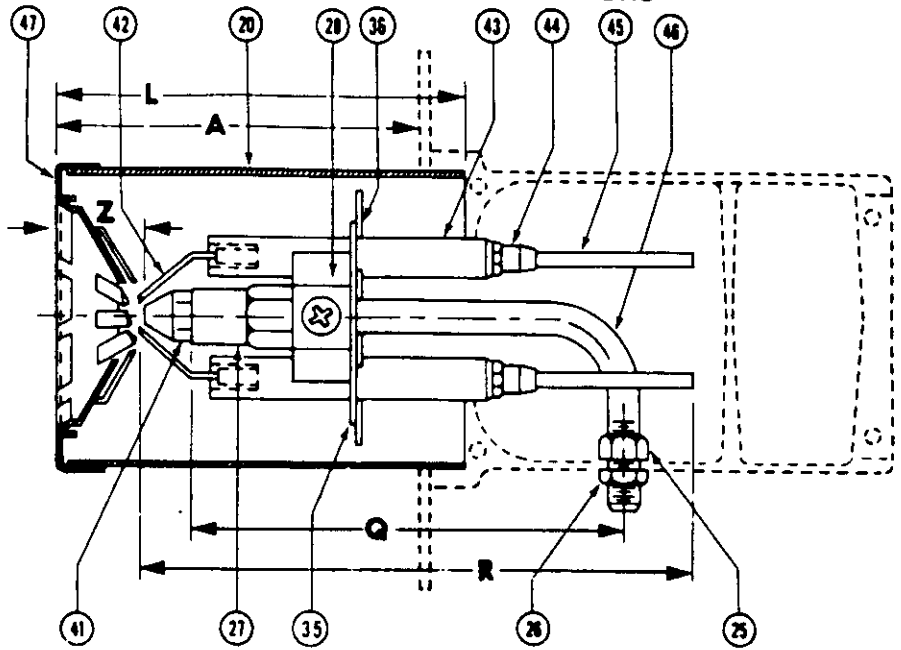
DIMENSIONAL RELATIONSHIPS

"A" = Usable Air Tube Length
 "L" = "A" + 5/8"
 "R" = "A" + 2-3/8"
 "Q" = "A" + 1-1/16"
 "Z" = 1-1/8"



AIR TUBES
4" O.D.

AR FLAME RETENTION COMBINATIONS



AIR TUBE COMBINATION PARTS

REF.	DESCRIPTION	PART NO.
20	Air Tube	Note
Nozzle Line Electrode Assembly, Consisting Of		
25	Bulkhead Fitting	3-488
26	Locknut Bulkhead Fitting	3-666
27	Nozzle Adapter - Single	2-13
28	Electrode Clamp	1-49
	Static Plate and Nozzle Line Support Assembly	Note
35	Centering Spider	5-503

AIR TUBE COMBINATION PARTS

REF.	DESCRIPTION	PART NO.
36	Static Plate	Note
	Static Plate Holding Screws	4-218
41	Nozzle	
42	Electrode Rod and Tip	Note
43	Porcelain	Note
44	Electrode Rod Ext. Adapter, as Req'd.	Note
45	Electrode Rod Extension, as Req'd.	Note
48	Nozzle Line and Vent Plug	Note
47	Burner Head, Specify Type F or R	

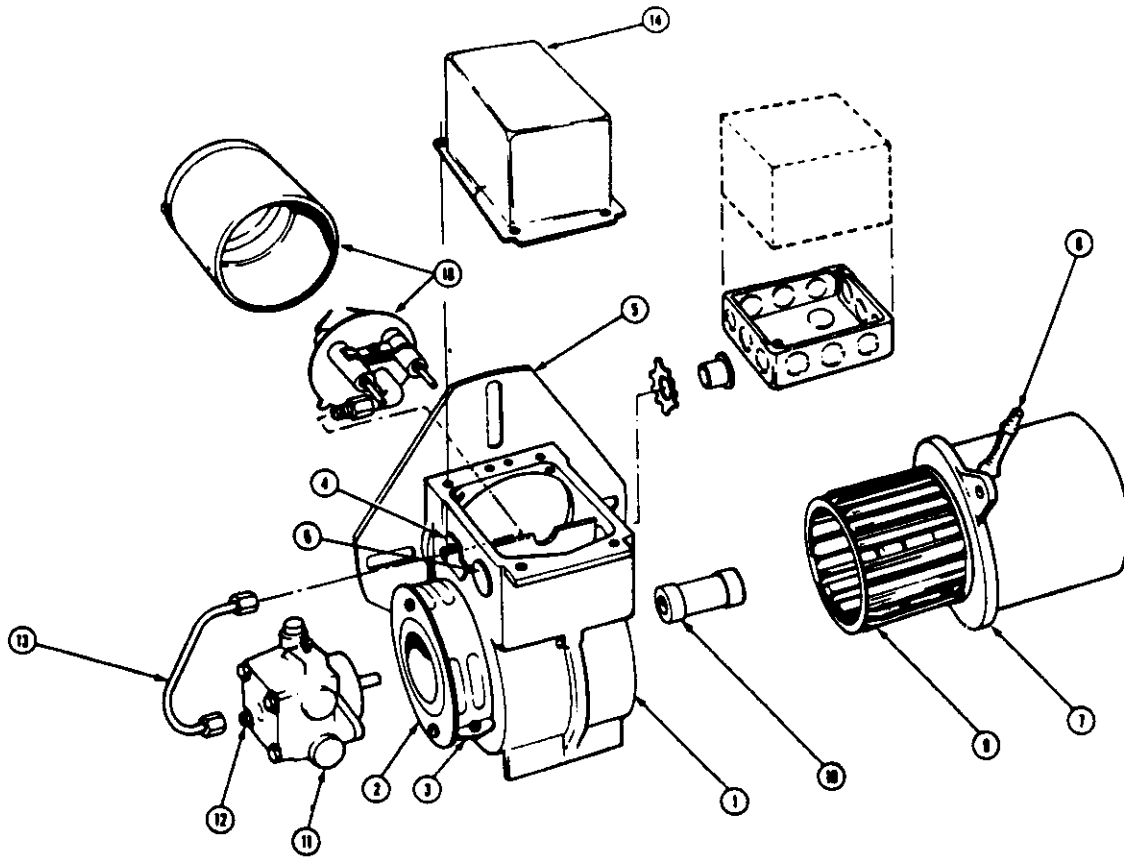
Specify burner tube specification number, part description, air tube combination with usable air tube length.

FURNACE - BURNER SPECIFICATIONS

FURNACE TYPE	OUTPUT BTUH	NOZZLE	BURNER* NUMBER	PUMP STAGES	SPEC. NUMBER	BURNER TUBE SPECIFICATIONS			
						NUMBER	USABLE LENGTH	HEAD	AIR MIXER
UPFLOW - BASEMENT DOWNFLOW - HORIZONTAL	84,000	.75-80° S	36337C001 36337C002	One Two	AC-4-03 AC-4-04	AR53XZ	5-3/8	R4	Static Plate 2-3/4 O.D.
UPFLOW - BASEMENT DOWNFLOW - HORIZONTAL	95,000	.85-80° S	36337C001 36337C002	One Two	AC-4-03 AC-4-04	AR53XZ	5-3/8	R4	Static Plate 2-3/4 O.D.
UPFLOW - BASEMENT DOWNFLOW - HORIZONTAL	112,000	1.00-80° S	36337C001 36337C002	One Two	AC-4-03 AC-4-04	AR53XZ	5-3/8	R4	Static Plate 2-3/4 O.D.
UPFLOW - BASEMENT DOWNFLOW - HORIZONTAL	125,000	1.10-80° S	36337C001 36337C002	One Two	AC-4-03 AC-4-04	AR53XZ	5-3/8	R4	Static Plate 2-3/4 O.D.
BASEMENT	140,000	1.25-70° S	36338C001 36338C007	One Two	MC1-01 MC1-02	AF65XO	6-5/8	F12	Static Plate 2-3/4 O.D.
HORIZONTAL	140,000	1.25-70° S	36338C004 36338C010	One Two	MC2-01 MC2-02	AF65XO	8-5/8	F12	Static Plate 2-3/4 O.D.
BASEMENT	168,000	1.50-70° S	36338C002 36338C008	One Two	MC1-03 MC1-04	AF65XO	6-5/8	F12	Static Plate 2-3/4 O.D.
HORIZONTAL	168,000	1.50-70° S	36338C005 36338C011	One Two	MC2-03 MC2-04	AF85XO	8-5/8	F12	Static Plate 2-3/4 O.D.
BASEMENT	196,000	1.75-70° S	36338C003 36338C009	One Two	MC1-05 MC1-06	AF65XO	6-5/8	F12	Static Plate 2-3/4 O.D.
HORIZONTAL	196,000	1.75-70° S	36338C006 36338C012	One Two	MC2-05 MC2-06	AF85XO	8-5/8	F12	Static Plate 2-3/4 O.D.

*Specify Detector and Primary Control.

PARTS



WHEN ORDERING PARTS - STATE BURNER MODEL, PART DESCRIPTION AND PART NUMBER

REF	DESCRIPTION	PART #
1	Burner Housing Assembly	
	Burner Housing with Inlet Belt	5-624
2	End Air Shutter	3-494
3	Bulk Air Band.	3-625
4	Nozzle Line Escutcheon Plate	3-493
5	Unit Flange or	3-230
	Square Plate	3-399
	Holding Screws	4-99
6	Hole Plug-Wiring Box	2-139
7	Drive Motor	2-456
	Motor Holding Screws	4-189
8	Wire Guard, Motor Lead	3-345R
9	Blower Wheel 3-13/16" OD. x 2-7/8"	2-458
	4-1/4" OD. x 3-7/16"	2-459
10	Flexible Coupling.	2-454
11	Fuel Unit	
	Sundstrand (Single Stage)	2-460
	Webster (Single Stage)	2-463
	Webster (Two Stage).	2-554
	Sundstrand (Two Stage)	2-583
12	Pump Outlet Fitting.	2-256
	Pump Holding Screws	4-189
13	Connector tube assembly (Sundstrand or Webster)	5-636

REF	DESCRIPTION	PART #
14	Ignition Transformer (10,000 V/23 ma.)	2-442
	Hinge Screws	4-85
	Holding Screws	4-85
	Contact Spring Terminals	3-245
18	Air Tube Combination (see overleaf)	
	Air Tube Gasket	3-416

*Specify Air Tube Combination

NOZZLES

UNIT APPLICATIONS: When burner is supplied as an integral component of a heater the best nozzle choice will have been determined by extensive testing. The heater manufacturer's recommendation should be closely followed.

CAUTION

AFTER PIPING IS INSTALLED AND BEFORE BURNER IS OPERATED, REMOVE RETURN OIL LINE PLUG FROM TOP OF PUMP AND FILL WITH FUEL OIL