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MANUFACTURERS OF
AIR CONDITIONING
HEATING EQUIPMENT

INSTALLATION AND MAINTENANCE INSTRUCTIONS for

HORIZONTAL OIL FIRED FURNACES

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

Horizontal Oil Fired Furnaces

INSTALLATION SHALL BE MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE BOARD OF FIRE UNDERWRITERS AND ANY OTHER LOCAL AUTHORITIES HAVE JURISDICTION,

GENERAL

The furnace is an oil fired horizontal forced air furnace listed by Underwriters' Laboratories for use with oil not heavier than commercial standard No. 2 and with either group 1 or group 2 primary safety controls.

UNPACKING

The 1.25 gal./hr. Model is shipped in two cartons. One carton contains the furnace proper, the second carton contains the atomizing high pressure oil burner, primary control, fan & limit switch, draft control and thermostat.

The 1.50 and 1.75 gal./hrs. models are shipped in three cartons. One carton contains the heating section and the second carton contains the blower section and the mounting and assembly brackets. The third carton contains the oil burner, primary control, fan & limit switch, draft control and thermostat.

If any damage is found, proper notation should be made on the carrier's freight bill. Damage claims should be filed with the carrier at once. Claims of shortage should be filed with the manufacturer within five (5) days. Check rating plate for burning rate and correct nozzle size.

ADAPTABILITY

The horizontal furnace is designed for suspended or crawl space installation and can be adapted in the field for either a left hand or right hand unit by locating the burner, controls, flue outlets and service access panels on either side. The unit, except the 1.50 and 1.75 gal./hr. models, can also be adapted to have the burner on the same side as the flue outlet or on the opposite side of the flue outlet.

Complete instructions for adapting unit for various arrangements is detailed under the heading of "INSTALLATION." These instructions should be thoroughly read before assembly of the burner, fan & limit and wiring harness.

HEAT LOSS

The maximum hourly heat loss for each shall be calculated in accordance with the procedure described in the manuals of the National Environmental Systems Contractors Association or by any other method which is suitable for local conditions, provided the results obtained are the substantial agreement with and not less than those obtained using the procedure described in the manual.

LOCATION

The furnace should be located near the chimney or flue, well centralized with respect to the heat distribution system.

The furnace should have an accessibility clearance of 24" at sides where access is required for servicing or cleaning.

The furnace may be installed with the following clearances to combustible material: Front: 24"; Back & Top: 6"; Flue pipe: 18"; Bottom: 6".

ACCESSIBILITY CLEARANCE MUST TAKE PRECEDENCE OVER FIRE PROTECTION CLEARANCES.

WITH COOLING

If the furnace is used in connection with a cooling unit, the furnace shall be installed in parallel with or on the upstream side of the cooling unit to avoid condensation in the heating element. In a parallel installation, the dampers of air controlling means shall be such as to prevent chilled air from entering the furnace. If the dampers are manually operated, they must be provided with means to prevent operation of either unit unless the dampers are in the full heat or cool positions.

COMBUSTION AIR & VENTING

In buildings of unusually tight construction, such as those where weather stripping and storm sashed windows are used, and where basement windows are also weather stripped, one opening communicating with a well ventilated attic or with the outdoors shall be provided, using a duct if necessary. This opening shall have a free area of one square inch per 5000 BTU/hr. of total input rating of all appliances to be installed in the basement, or as specified by NFBU No. 31.

When a furnace is installed in a full basement, infiltration is normally adequate to provide air for combustion. Air openings in casing front, return air grilles and warm air registers must not be obstructed.

A return air duct system is recommended. Where there is no complete return duct system, and the furnace is installed in a confined space, a return connection should be run full size to a location outside the confined space. This air duct must be tight to prevent any entrance of air from the confined space into the circulating air.

Flue pipe should be as short as possible, horizontal pipes sloping upward toward the chimney at least one quarter inch (1/4") to the foot. The flue pipe should not be smaller than the outlet diameter of the flue collar. Extend the flue pipe into the chimney so it is flush with the inside of the flue lining. Seal the joint between the pipe and the lining.

The chimney should have its top at least two (2) feet above the highest point of a peaked roof and at least

three (3) feet above the highest point of a flat roof. The narrowest internal dimension of the chimney should not be less than eight (8) inches. All unused chimney openings should be closed.

Flue pipe must not pass through a floor or ceiling, but may pass through a wall where provision has been made for a thimble, as specified in the Standards of the National Board of Fire Underwriters.

If more than one appliance is attached to the chimney, they should run individually to the chimney. Install draft control in the flue pipe close to chimney. Installation instructions are supplied with the draft control.

OIL INSTALLATION

Complete information on installing oil lines and tanks is shown in the oil burner manual supplied with the oil burner.

ELECTRICAL CONNECTIONS

All wiring should be done in accordance with the National Electric Code, or with local codes, where they prevail. A separate electric line should be run directly from the main house panel to the leads in the furnace junction box. A fused manual switch should be installed in this line.

Connect the thermostat wires to the terminals on the primary control. Select a location which will measure true air temperature. Locate on an inside wall, away from drafts, in the room having the greatest exposure.

INSTALLATION

Figure 1 shows the various arrangements that these units may be installed. Unit is shipped with burner and flue connection in front and air flow left to right (Arrangement No. 1). Burner, fan & limit switch, primary control, draft control and wiring harness are shipped separately for field installation.

The instructions following are for the 1.25 gal./hr. model.

These instructions apply to the unit as it is received from the factory (Arrangement No. 1) and before the burner, fan & limit and wiring harness are assembled to the unit.

ARRANGEMENT NO. 2: Burner and flue in front and air flow right to left.

1. Remove blower from unit.
2. Turn unit upside down. The bottom now becomes the top.
3. Remove the blower division panel, rotate the bottom to the top and replace. The word "top" stamped on the blower division panel should appear at top of panel.

4. Install blower with feet on the new bottom.

ARRANGEMENT NO. 3: Burner in front, flue in back and air flow right to left.

(The following steps are made easier if the unit is left standing on its shipping base with the carton removed.)

1. Remove burner mounting plate and rear cover plates from unit being careful not to damage gaskets. When these plates are removed, there will be one screw remaining on each side of the unit at the burner pouch. These screws hold the heat exchanger in position and should not be removed.

The removal of these plates exposes the combustion chamber and the mounting brackets. Figure 11 shows the relative position of the combustion chamber and the mounting brackets.

Refer to Figure 11 while reversing the burner location on the unit.

Note: The retaining brackets mounted to the combustion chamber bracket must not be disassembled.

2. Back off the 1-1/4 in. screw on item 1, a sufficient amount so the screw will slide out of the slot in the retaining bracket. (Do not remove screw from Tinnerman clip in the banding.) Remove the banding from the combustion chamber.
3. Remove combustion support brackets, item 1 and item 2.
4. Back off the 1-1/4 in. screw in the retaining bracket, item 3, a sufficient amount so the screw will slide out of the slot in the bracket. (Do not remove screw from Tinnerman clip.) Remove the bracket, item 3, from heat exchanger pouch. Replace screws in holes in pouch.

Place this bracket in the opposite pouch using the two screws in the pouch. The bracket should be placed with the double flanged end toward combustion chamber. Use the two outboard holes in the bracket when securing bracket to the pouch.

5. Rotate the combustion chamber 180 degrees, so the burner opening is facing the opposite pouch. Rotate the banding at the bottom of the drum 180 degrees so the screw in the banding may be placed in the slot of the retaining bracket, item 3. Make sure that the banding is evenly placed around the combustion chamber and that the combustion chamber is in contact with the drum bottom. Tighten screw.
6. Install the combustion chamber support bracket, that has the "V" notch and large round opening on the same end, in pouch that has the burner

opening. The "V" notch and round hold must face the burner opening. This bracket will be secured in the pouch by placing screws into the (2) round holes and the (2) slotted holes of the bracket.

The other combustion chamber support bracket which has the "V" notch on one end and the large round hole on the other end, will be placed in the pouch opposite the burner opening. The "V" notch should be facing away from the combustion chamber. This channel will be secured by 4 screws placed in the four slots of the channel and then into the pouch side. Slide this bracket firmly against the combustion chamber making sure that all channels fit over the embossments of the combustion chamber. Tighten all screws.

7. The banding removed in Step 2 should be placed over the combustion chamber and flanges of the bracket. Place the screw in the slot of the flange on the burner opening side and tighten screw.
8. Re-install the burner pouch plate on the new front of the unit and install the blank pouch plate and cover plate on the rear of the unit.
9. Remove the junction box and install on new front of unit.

ARRANGEMENT NO. 4: Burner in front, flue in back and air flow left to right.

1. Follow steps 1, 2, 3, and 4 under Arrangement No. 2.
2. Follow steps 1, 2, 3, 4 and 5 under Arrangement No. 3.

THE FOLLOWING INSTRUCTIONS ARE FOR THE 1.50 and 1.75 gal./hr. MODELS ONLY.

This model can be installed in Arrangement 1 and 2 ONLY. The blower section and heat exchanger section are two separate assemblies. The blower section can only be installed as it is received from the factory. The blower feet must be on the bottom of the unit.

ARRANGEMENT NO. 1: Burner in front, flue in front and air flow left to right.

Assemble the blower compartment to the heat exchanger as they are received. There are four (4) brackets shipped with the unit in the blower compartment. Three (3) brackets have extended flanges on each end with a 7/16" diameter hole in each flange. The other bracket has a return bend on each end. Figure III shows the relative position of the brackets with the unit.

1. Place the blower section and heat exchanger section together. Make sure that the outlet of the blower enters the division panel on the heat

exchanger section.

Remove all screws on the side of the bottom panel both front and rear of the unit. Remove the two screws on the side of the top panel at the middle of the unit both front and rear of unit. These screws and holes will be used to install the support brackets. Do not remove any screws in the front or back panels of the unit.

2. Place one of the support brackets with the extended flange under the heat exchanger section and blower section. Align the two holes found on each side of the bracket with the single hole in the side of the heating section and the single hole in the side of the blower section and install the screws removed into these holes. This is done on the front and rear of the unit. Refer to Figure III.
3. Place the assembly bracket with the return bend on the top of the unit. This is done by placing the short return flange in to the groove of the top panel on one side and then snapping this return bend into the groove of the top panel on the other side. Align the two holes on each end of this bracket with single hole in heating section and the single hole in the blower section and install screws removed into these holes. This is done on the front and rear of the unit. Refer to Figure III.
4. Install the other two support brackets with the extended flanges at the discharge and inlet end of the unit on the bottom. Align brackets with holes and install screws that were removed. Refer to Figure III.

ARRANGEMENT NO. 2: Burner in front, flue pipe in front and air low right to left.

As previously mentioned the blower section is not changed but is installed as it is received with the blower feet on bottom of unit.

1. Turn the heat exchanger section upside down. The bottom now becomes the top.
2. Remove the blower division panel on the heat exchanger section and rotate it bottom to top. This will allow the word "Top" to appear at the top of the panel.
3. Remove junction box and install on new front of blower compartment.
4. Using the brackets described under Arrangement No. 1, follow steps 1, 2, 3, and 4 under Arrangement No. 1. After unit is set up in the arrangement desired, the controls may be placed on the unit.

These instructions apply to all models of this unit.

OIL BURNER

The oil burner must be installed on the furnace

mounting plate using the two studs and screws that are assembled to the mounting plate on the furnace.

To install burner, remove the nuts and flat washers from the two studs and the screw and flat washer that are on the furnace mounting plate. Place the burner on the studs and replace the flat washers and nuts removed. Install the screw and flat washer removed at the top of the burner mounting plate. Tighten all nuts and screws.

LIMIT CONTROL: Limit control must be located at the top of unit.

Remove the know-out at the top of the unit for the limit control. Insert limit control and fasten in holes provided in side panel. Drill one or two no 3/8 holes in edge of top panel as needed to align with top hole(s) of limit control and secure with sheet metal screws supplied.

PRIMARY CONTROL

The unit is furnished with a cad cell flame detector primary control. Mount the relay on the unit junction box. The cad cell is factory mounted in the burner. Using wiring harness furnished, wire unit according to diagram located inside the blower access panel. The wiring harness from the junction box to the fan & limit control and to the oil burner must be secured by clamps (provided) as shown in Figure IV.

SUSPENDING UNIT

1.25 gal./hr. Models

Holes are provided in the top and bottom panels of the unit. Threaded rods or eye bolts should be slipped through the holes in the top panel and then extended through the holes in the bottom panel. Use lock nuts and flat washers to secure rods at bottom of unit.

1.50 and 1.75 gal./hr. Models

3/8 in. diameter rods can be attached to the support brackets which were attached when the blower and heating compartments were assembled (See Figure III) Use lock nuts and flat washers to secure rods to brackets.

BLOWER

Blower adjustment must be such to obtain an air temperature rise between 70-100 degrees at static pressure as noted on the rating plate. Air delivery and air temperature may be varied by adjusting the pulley on the motor. Loosen set screw in pulley outer flange, close pulley to increase speed and decrease air temperature rise; open pulley to decrease speed and increase air temperature rise. Align motor and blower pulley to minimize belt wear. Check belt tension

by flexing belt midway between pulleys. Correct belt tension permits approximately 1 in. flexing. Too much tension will cause motor overload and bearing wear. Too little tension will permit belt slippage.

Direct drive blower models will provide an air temperature rise of 85 degrees at static pressure as noted on the rating plate. If a duct system with less resistance is used, a lower air temperature will result. To increase the air temperature, add restriction to the return air system or to the blower inlet.

The belt drive motor should require oiling only once a year using a good grade of SAE 10 oil. Do not over oil motor. A few drops in each oil cup are sufficient. Blower bearings are permanently lubricated and do not require oiling. Direct drive blowers contain motors which do not require oiling.

To remove blower for servicing or replacement, remove blower door. Blower is fastened to base of unit by four screws. Remove screws and lift out blower assembly. The electrical leads on the belt drive blowers can be disconnected at the blower motor. When removing the direct drive blower assembly, the electrical leads must be disconnected at the junction box and leads are withdrawn with the blower assembly.

FAN & LIMIT CONTROLS

To obtain maximum comfort, low settings on the fan control are recommended to obtain nearly continuous air circulation as recommended by the National Environmental Systems Contractors Association. A 100 degree fan off position will usually be satisfactory. A 150 degree fan on position is recommended to minimize recycling of the blower.

MAINTENANCE & SERVICE

CAUTION: When cleaning or servicing, avoid contact with combustion chamber lining. Lining will not stand abuse or abrasion.

Heat exchanger should be inspected periodically and cleaned if necessary. If cleaning is necessary, remove burner. Use a stiff brush with wire handle to remove scale and soot inside the drum and flue pipe. To clean radiator, remove round covers on control compartment panel. Loosen nuts on radiator cleanouts found directly behind panel, but do not remove nuts. Remove covers carefully so as not to break gaskets. Wire brush can now be used to clean inside surfaces of radiator. Brush out all accumulations and use a vacuum cleaner to remove all soot and scale. When replacing covers, use new gaskets if old are broken.

FILTER

The unit contains disposable filters. Filters should be cleaned or replaced at least once every heating season, or more frequently if unusual dusty conditions are encountered. Replace filters with the same size as provided.

OPERATING INSTRUCTIONS

Before Lighting

1. Open all supply and return registers.
2. Open all valves in oil pipes.
3. Turn on electric power supply.

To Light Unit

1. Set thermostat to call for heat. The burner should start.

NOTE: It may be necessary to press reset button at primary control. Also, read instructions for primary control to place control in step, if needed.

To Shut Down Unit

1. Set thermostat to lowest setting.
2. Turn off electric supply.
3. Close oil valves tightly.

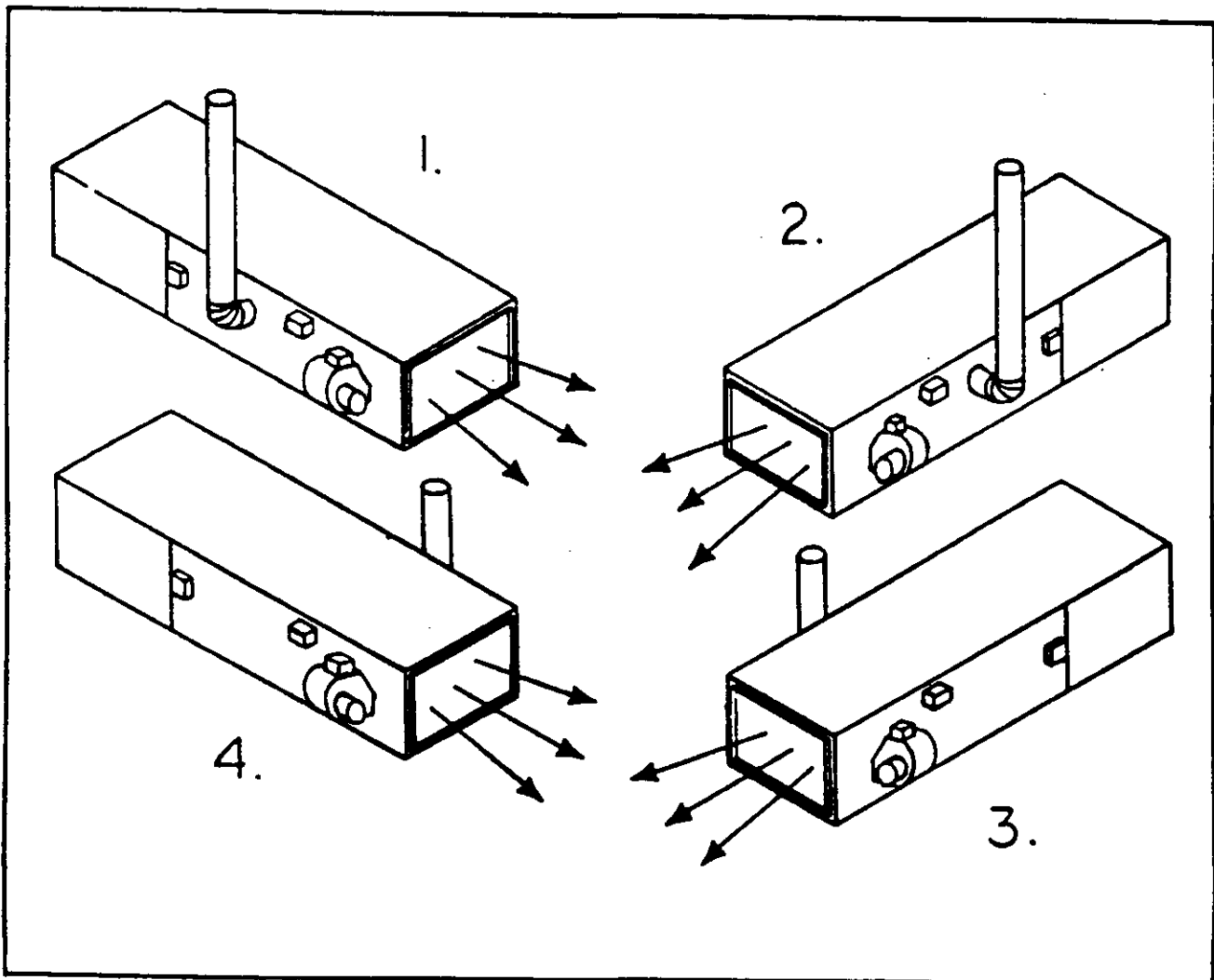
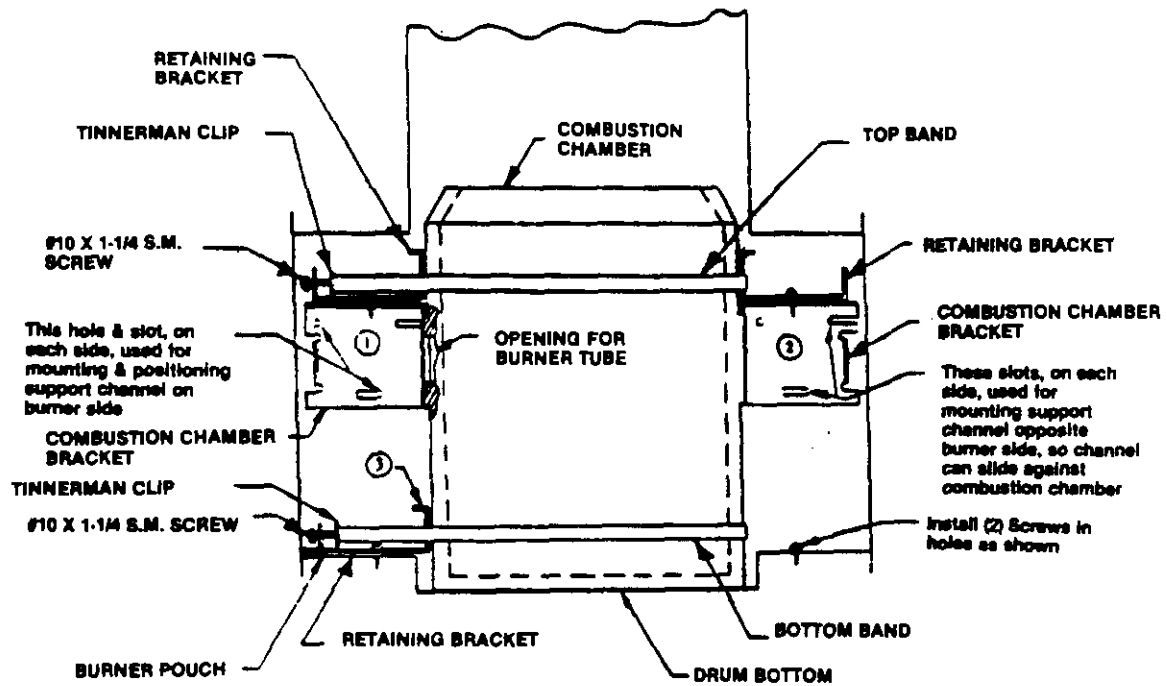
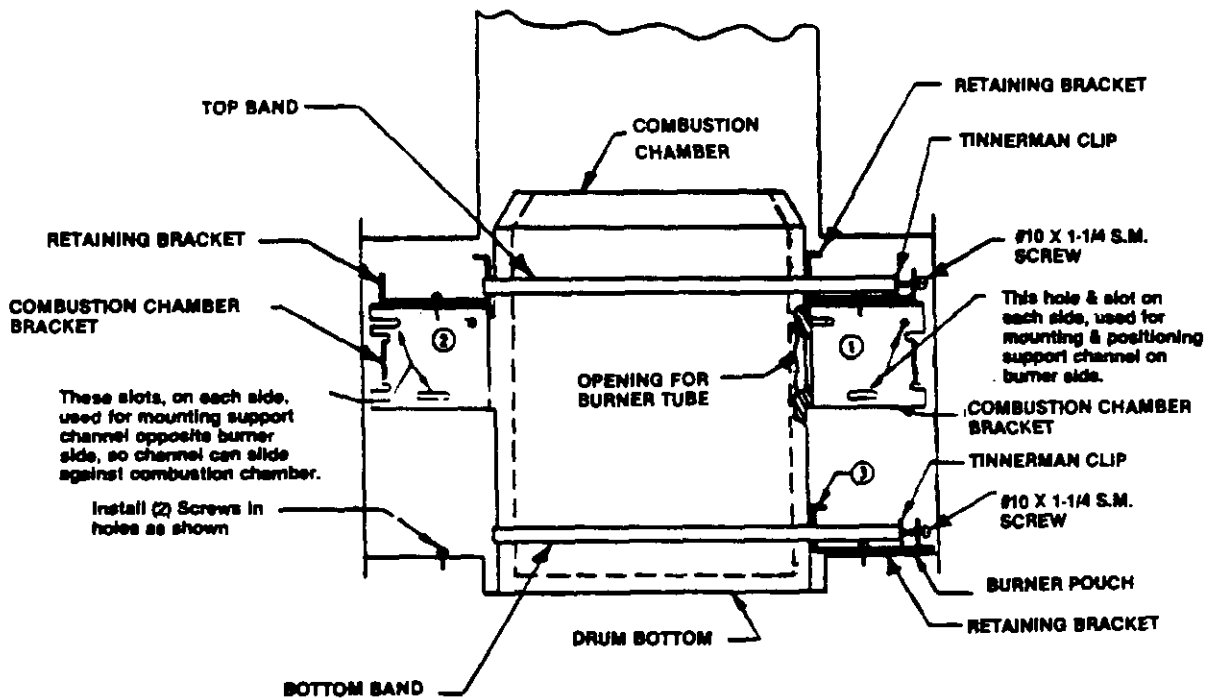


FIGURE I

NOTE: "V" notch is always toward chamber on burner side and away from chamber on side opposite burner.



COMBUSTION CHAMBER POSITIONED FOR BURNER MOUNTING (ARRANGEMENT 1 & 2)



COMBUSTION CHAMBER POSITIONED FOR BURNER MOUNTING (ARRANGEMENT 3 & 4)

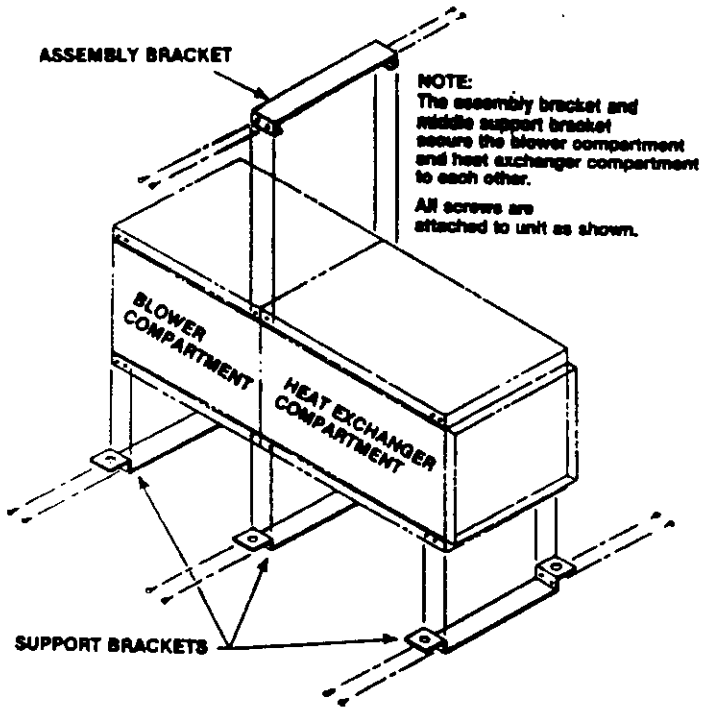
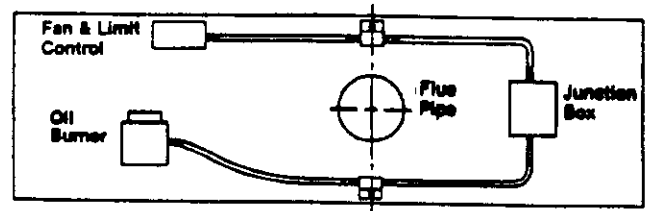


FIGURE III



Wiring harnesses from Junction Box to Fan & Limit Control and Oil Burner must be secured by clamps (provided) in holes as shown in the above figures.

FIGURE IV

CONVERTING TO REDUCED OUTPUT — 1.75 GAL./HR. MODELS ONLY

The 1.75 G.P.H. furnace comes 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 1.50 G.P.H. nozzle for a 166,000 BTU/HR output in the 1.75 G.P.H. furnace. This nozzle must have an 70° spray angle and solid pattern.

