

RHEEM

HIGH EFFICIENCY 90% CONDENSING FURNACE

MODEL NUMBER: RGRA - RGSA (upflow/downflow)

BTU SIZES: 75,000 - 120,000

ACCESSIBILITY CLEARANCE

Service clearance of at least 24 inches is recommended in front of all furnaces.

CLEARANCE FROM COMBUSTIBLE MATERIAL

MODELS	UPFLOW		DOWNFLOW	
	07	12	07	12
left side	0"	0"	0"	0"
right side	0"	0"	0"	0"
back	0"	0"	0"	0"
top	1"	1"	1"	1"
front	2"	2"	2"	2"
vent	0"	0"	0"	0"

Warning: Do not install the furnace directly on carpeting, tile or other combustible material other than wood flooring.

Down flow sub-base available.

COLD AIR RETURN AIR DUCTS

CIRCULATING AIR SUPPLY: The circulating air supply may be taken either (1) from outside the building (2) from return air ducts from several rooms, or (3) any combination of the two. When outside air is utilized, the system should be designed and adjusted such that the temperature of the supply air to the furnace will not be below 50° F. during the heating season. When using a combination of outside air and return air, be sure the ducts are so designed and a diverting damper so installed that the volume of circulating air entering the furnace cannot be reduced or restricted below that which would normally enter through the circulating air intake of the furnace.

Sealed to the furnace casing and terminated outside the space containing the furnace. If there is no complete return air duct system, the return air connection must be sealed to the furnace casing and run full size to a location outside the utility room or space housing the furnace to prevent a negative pressure on the venting system.

If installed in parallel with a cooling unit, the damper, or other means used to control the flow of air, must be adequate to prevent chilled air from entering the furnace. If manually operated, it must be equipped with means to prevent operation of the other unit unless the damper is in the full heat or cool position.

CONTINUED...

COLD AIR RETURN AIR DUCTS

When a cooling coil is used in connection with a furnace, it must be installed downstream of the furnace (outlet end of furnace) or parallel with the furnace to avoid condensation in the heating element.

IMPORTANT: One of the most common causes of trouble in forced air heating systems is insufficient return air to the furnace. The return air system should be approximately equal to or greater than the area of the warm air discharge.

The blower speed should be adjusted to maintain the air temperature rise range shown on the rating plate.

NOTE: It is recommended that the outlet duct be provided with a removable access panel. It should be accessible after installation so that smoke or reflected light may be observed inside the casing to indicate the presence of leaks in the heat exchanger.

RETURN AIR:

WARNING: Never allow products of combustion or the flue products to enter the return air duct-work, or the circulating air supply. All return ductwork must be adequately sealed and secured to the furnace with sheet metal screws, and joints taped. All other duct joints must be secured with approved connections and sealed airtight. When a furnace is mounted on a platform, with return through the bottom, it must be sealed airtight between the furnace and the return air plenum. The return air plenum must be permanently enclosed. Never use a door as part of the return air plenum. The floor or platform must provide sound physical support of the furnace, without sagging, cracks, gaps, etc., around the base as to provide a seal between the support and the base.

Failure to prevent products of combustion from being circulated into the living space can create potentially hazardous conditions, including carbon monoxide poisoning that could result in personal injury or death.

Do not, under any circumstances, connect return or supply ductwork to or from any other heat producing device such as a fireplace insert, stove, etc. Doing so may result in fire, carbon monoxide poisoning, explosion, personal injury or property damage.

UPFLOW UNITS: Install the cold air return to terminate through the floor under the furnace. A direct connection should be made to the bottom of the furnace. For installations where return air ducts cannot be run under the floor, return air may be taken from the side or rear as required. A side or rear return air cabinet is available from the manufacturer.

Where the maximum airflow is 1800 CFM or more, both sides or the bottom must be used for return air.

GARAGE

Approved. Must meet requirements of UMC and the Good Practice Book.

GENERAL

The RGRA and RGSA series furnaces are design certified by AGA/CGA for use with natural and propane gases as follows:

- 1) As central forced air furnaces taking combustion air from the installation area or using air ducted from the outside.
- 2) As direct vent central forced air furnaces with all combustion air supplied directly to the furnace burners through a special air intake system outlined in these instructions.

IMPORTANT: This furnace is not intended for use in a building under construction.

This furnace can be severely damaged due to the abnormal environment caused by construction. Air laden with compounds of chlorine and fluorine, when burned during combustion, will form acids which cause corrosion of heat exchangers. Some of these compounds are: paneling, dry wall, floor and tile adhesives, paints, stains and varnishes, solvents and masonry cleaning materials. Sheet rock dust can destroy motor bearings, clog filters and damage electrical controls. Low return air temperature can cause condensation in the furnace and damage internal parts which can shorten the life of the furnace.

IMPORTANT: Do not install the furnace in an unconditioned space where below freezing temperatures are expected.

The furnace must be level to assure proper operation. If it is not level, condensate may accumulate in the secondary coil, reducing efficiency or causing the furnace to shut down.

Upflow furnaces are shipped with a bottom closure panel installed. When bottom return air is used, remove the panel.

HIGH ALTITUDE INSTALLATIONS

Deration	Altitudes over 2,000 ft, see conversion kit index 92-21519-XX for derating and orifice spud sizes. Standard deration.
Orifice	Replace with proper factory size orifice
Regulator Pressure	3.5" w.c. \pm .3" w.c.
Pressure Switch	

MOBILE HOME

Not approved.

VENTING MATERIAL AND REQUIREMENTS

Vent Pipe	Schedule 40 PVC, PVC-DWV, SDR-21 and SDR26-26 PVC, ABS-DWC or schedule 40 ABS-DWV
Vent Fittings	See venting installation guidelines (included).

VENT CLEARANCE FROM COMBUSTIBLE MATERIAL

0"

VENTING PROCEDURE

INSTALLATION GUIDELINES: All exhaust piping must be installed in compliance with Part 7, Venting of Equipment and these instructions.

- 1) Vertical piping is preferred.
- 2) All piping must slope upward a minimum of 1/4 inch per foot of run.
- 3) All horizontal runs must be supported at least every four feet. No sags or dips are permitted.
- 4) Use only long radius elbows.
- 5) Do not install piping in the same chase with a metal or high temperature plastic pipe from another gas or fuel burning appliance.
- 6) All vent runs through unconditioned spaces should be insulated with 1 inch thick medium density fiberglass.
- 7) The minimum pipe length is 5 feet.
- 8) **SIZE THE INTAKE AND EXHAUST PIPING FROM FURNACE TO OUTSIDE WALL OR ROOF AS LISTED BELOW:**
 - a) **Direct Vent-2 Pipe System** - The maximum exhaust and intake air pipe length is 40 ft. of 3 in. PVC pipe plus 4- 90 degree sweep ells. Reduce the pipe to 2 in. PVC before passing through outside wall or ceiling. See Figures 10A and 10B.
 - b) **Single Pipe Systems** - The maximum exhaust pipe length is 40 ft. of 3 in. PVC pipe plus 3- 90 degree elbows. Reduce the pipe to 2 in. PVC before passing through the outside wall or ceiling. See Figures 10A and 10B.

VENT AND COMBUSTION AIR PIPE TERMINATIONS:

Standard Vertical Terminations:

- 1) **COMBUSTION AIR PIPING** - Use two 90 degree sweep elbows to keep the inlet downward to prevent entry of rain. See Figures 10A and 11A for proper relationship of combustion air to exhaust termination.
- 2) **EXHAUST PIPING** - Vertical through-the-roof applications do not require an exhaust terminal. The exhaust vent must terminate at least 12 in. above the intake air termination. The exhaust vent for models with inputs of 90,000 through 120,000 BTUH is 2 in. PVC pipe and must be reduced to 1 1/2 inch the last 12 inches for models with inputs of 45,000 through 75,000 BTUH. See Figures 10A and 11A.

Standard Horizontal Terminations:

- 1) **COMBUSTION AIR PIPING:** When 3 inch pipe is used between the furnace and outside wall, reduce it to 2 inch before penetrating the wall. Up to 18 inch of 2 inch pipe may be used.
The standard horizontal intake air termination for all models is a 2 inch PVC coupling with a wind deflector vane attached. Cut a 2 1/4 inch length of 2 inch PVC pipe and connect this and another 2 inch PVC coupling to the coupling at the wall. The outer coupling must terminate 4 inches from the wall. See Figure 10B or 11B, Detail B, for vane location. Attach vane in vertical position with PVC solvent.
The combustion air intake terminal must be located with respect to the exhaust terminal as shown in Figure 10B, Detail C, and Figure 11B, Detail C.
All furnace with horizontal air intakes must have a drain tee assembly and trap installed as close to the furnace as possible to drain any water that may be in the intake air pipe to prevent it from entering the furnace combustion chamber. These parts are included in kits RXGY-D02 (for 2 in pipe), RXGY-D03 (for 2 in. pipe), and RXGY-D04 (special for the 120,000 BTU furnace installed with the alternate horizontal termination). Attach trap to bottom of tee with PVC solvent and connect other end to a suitable drain, as to the downstream of a condensate trap on the furnace.

- 2) **EXHAUST PIPING:** For conventional single pipe systems use a standard 2 in. PVC tee spaced 12 in. from the wall. When 3 in. pipe is used between the furnace and outside wall, reduce it to 2 in. before penetrating the wall. Up to 18 in. of 2 in. pipe may be used. Refer to section on horizontal venting options when higher snow levels are anticipated.
- For direct vent systems, the standard termination is 2 in. PVC pipe extending 12 in. from the wall for furnaces with inputs from 90,000 to 120,000 BTUH. Install 2 in. coupling at outside wall to prevent termination from being pushed inward. When 3 in. pipe is used between furnace and outside wall, reduce to 2 in. before penetrating wall. The standard termination is 1 1/2 in. PVC pipe extending outward 12 in. from the wall for models with inputs of 45,000 to 75,000 BTUH. Install 2 in. to 1 1/2 in. coupling at outside wall to prevent pushing termination back into wall. See Figures 10B and 11B, Detail C.
- The combustion air and exhaust terminations must be at least 12 in. above grade and must be oriented with respect to each other as shown in Figure 10B, Details A and B, and Figure 11B, Details C and D. Refer to section on alternate venting options when higher snow levels are anticipated.

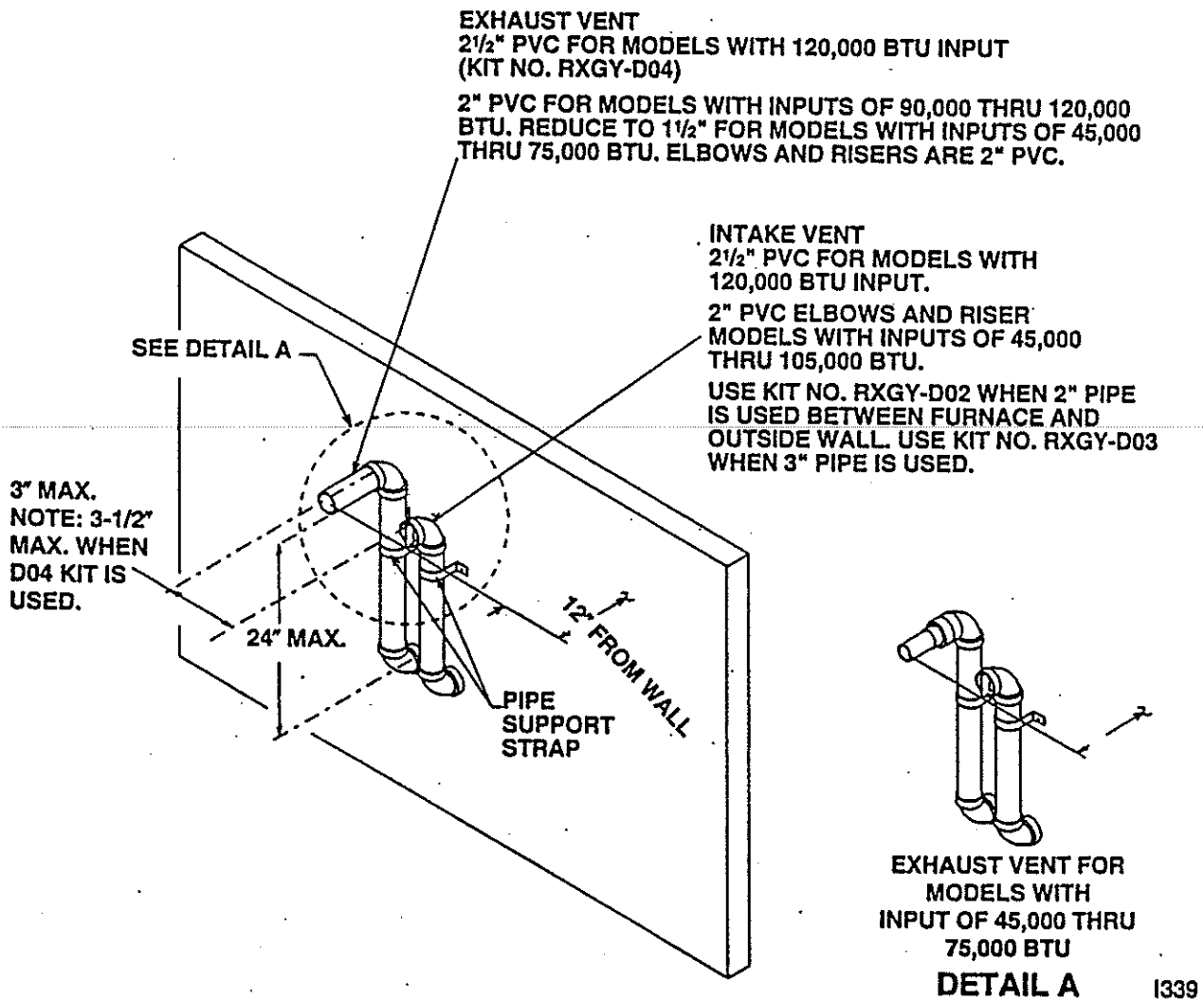


FIGURE 6 - ALTERNATE VENT TERMINATION KIT NOS. RXGY-D02, RXGY-D03 & RXGY-D04 (FOR DIRECT VENT INSTALLATIONS)

ALTERNATE HORIZONTAL VENT TERMINATION: The intake air and exhaust terminations may be raised up 24 inches above the wall penetrations if required for anticipated snow levels. The 2 inch elbows required are provided in kit no. RXGY-D03.

The 120,000 BTU model requires 2 1/2 in. pipe for the terminations and this is available in kit no RXGY-D04. The general arrangement is as is shown in Figure 6. The pipe should be increased to 2 1/2 in. before passing through the outside wall.

The alternate termination for single pipe systems is as shown in Figure 7. Use 2 - 1/4 bend 2 in. PVC elbows and a length of PVC pipe so that the elbows are on 24 in. centers Using 2 in. PVC pipe, attach a standard 2 in. PVC tee so that the vertical center line is 12 in. from the wall. Secure the vertical pipe to the wall with a pipe strap. See Figure 7.

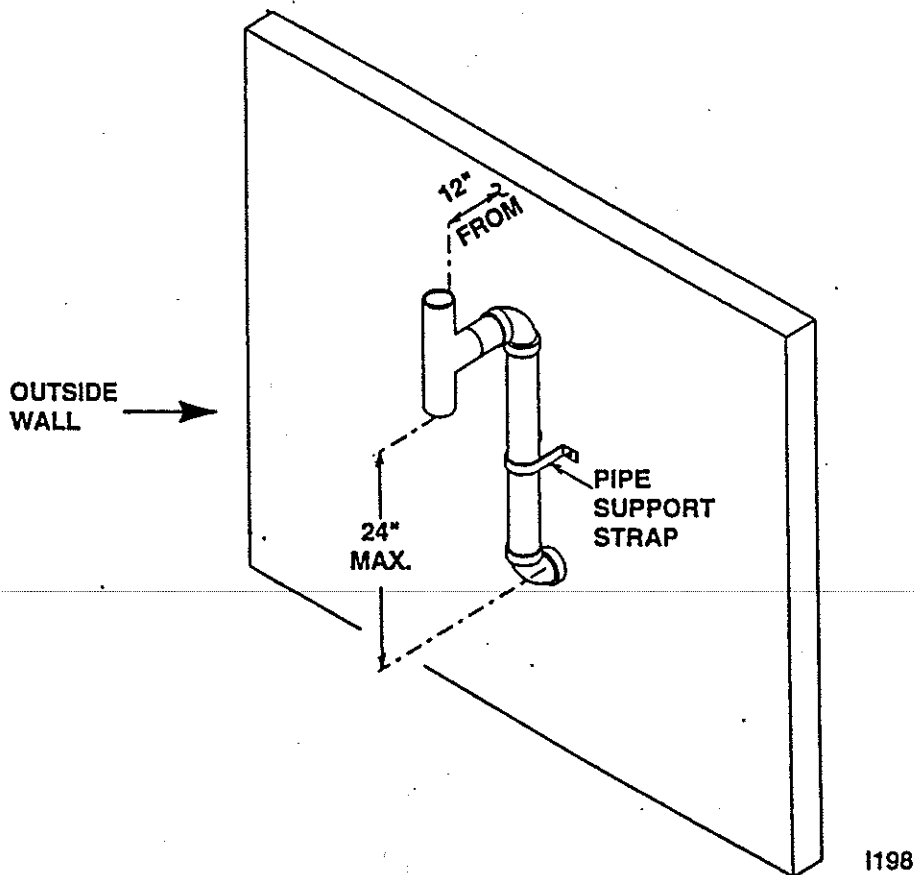


FIGURE 7 - FIELD ASSEMBLED ALTERNATE TEE TERMINATION FOR HIGHER THAN NORMAL SNOW LEVELS (FOR NON-DIRECT VENT INSTALLATION)

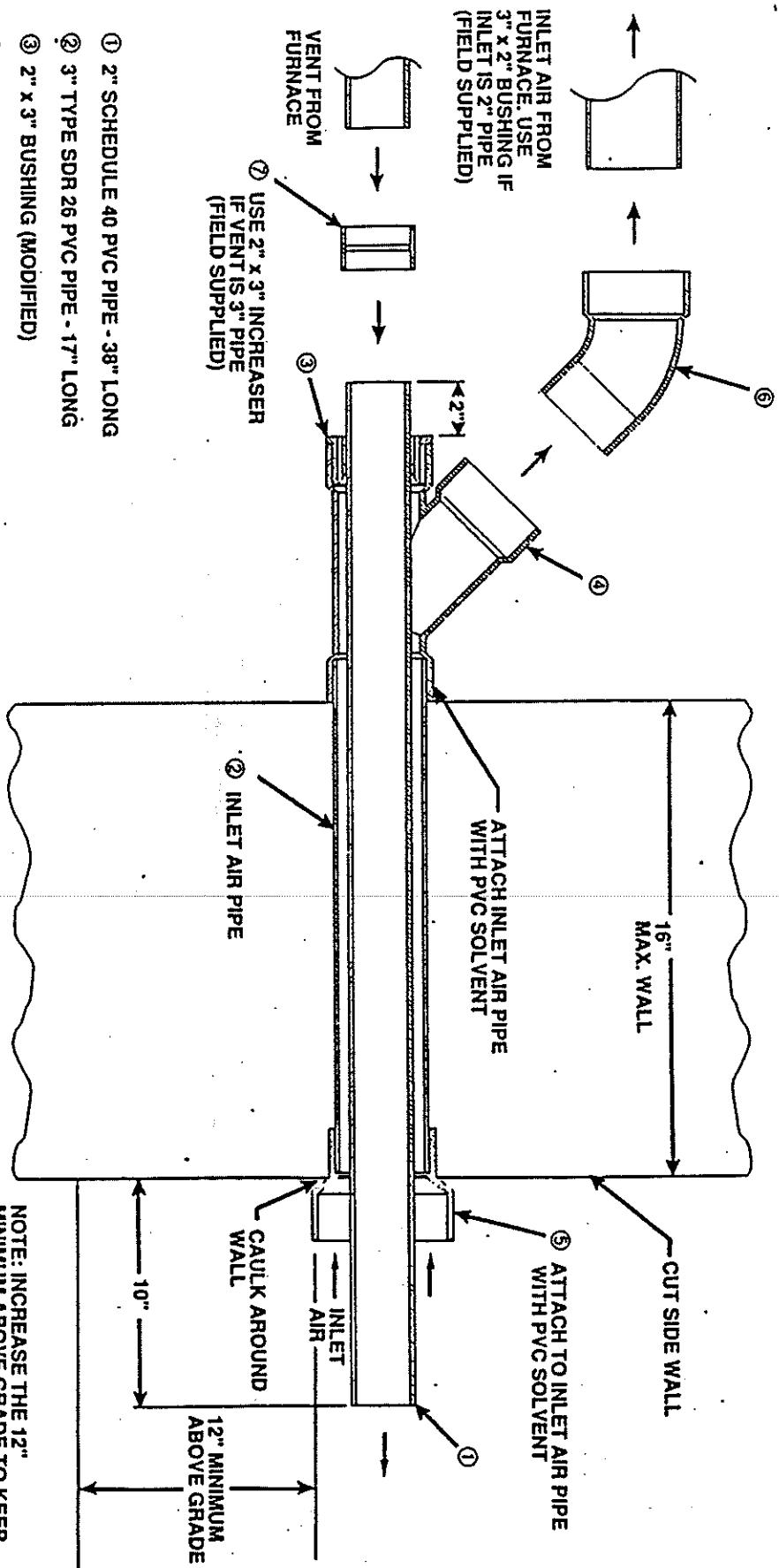
- 3) **HORIZONTAL CONCENTRIC VENT KIT NO. RXGY-C01** - This kit is for horizontal intake/vent runs and may be installed through walls up to 16 inches thick. One 4 1/8 in. diameter hole is required for the installation. Complete installation instructions are supplied with the kit.
- 4) **VERTICAL CONCENTRIC KIT NO. RXGH-E02** - This kit is for vertical intake air/vent runs and may be installed through roofs up to 9 in. thick. One 4 1/8 in. diameter hole is required through the roof for the installation. See Figure 9 for the general layout. Complete installation instructions are included with the kit.

- ① 2" SCHEDULE 40 PVC PIPE - 38" LONG
- ② 3" TYPE SDR 26 PVC PIPE - 17" LONG
- ③ 2" x 3" BUSHING (MODIFIED)
- ④ 3" x 3" x 3" WYE
- ⑤ 3" x 4" COUPLING (MODIFIED)
- ⑥ 3" x 45° ST. EL
- ⑦ 2" COUPLING (FIELD SUPPLIED)

ALL ITEMS SCHEDULE 40 PVC UNLESS NOTED.

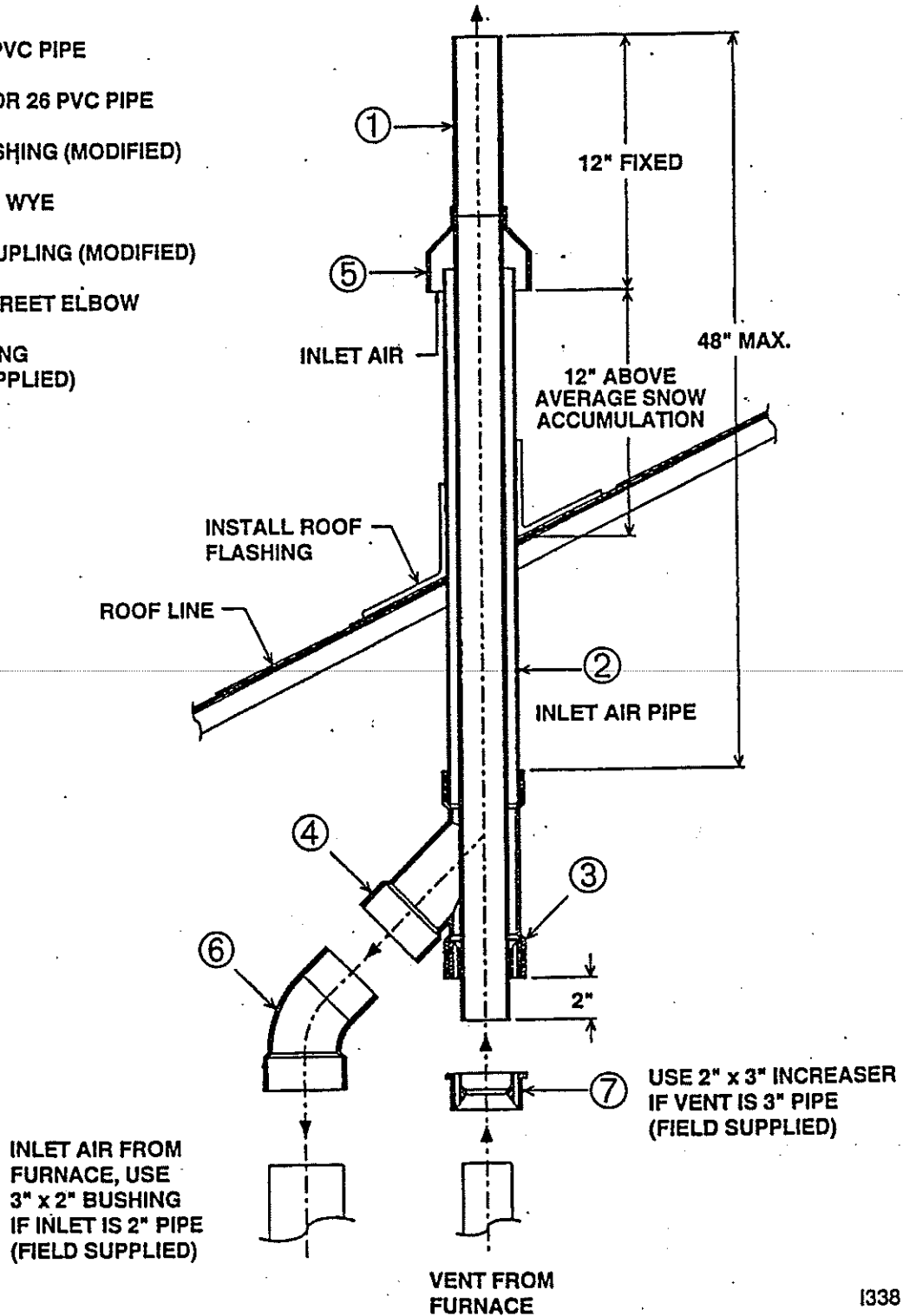
NOTE: INCREASE THE 12" MINIMUM ABOVE GRADE TO KEEP TERMINAL OPENINGS ABOVE LEVEL OF SNOW ACCUMULATION, WHERE APPLICABLE.

HORIZONTAL CONCENTRIC VENT KIT NO. RXGY-C01 (DIRECT VENT INSTALLATIONS)



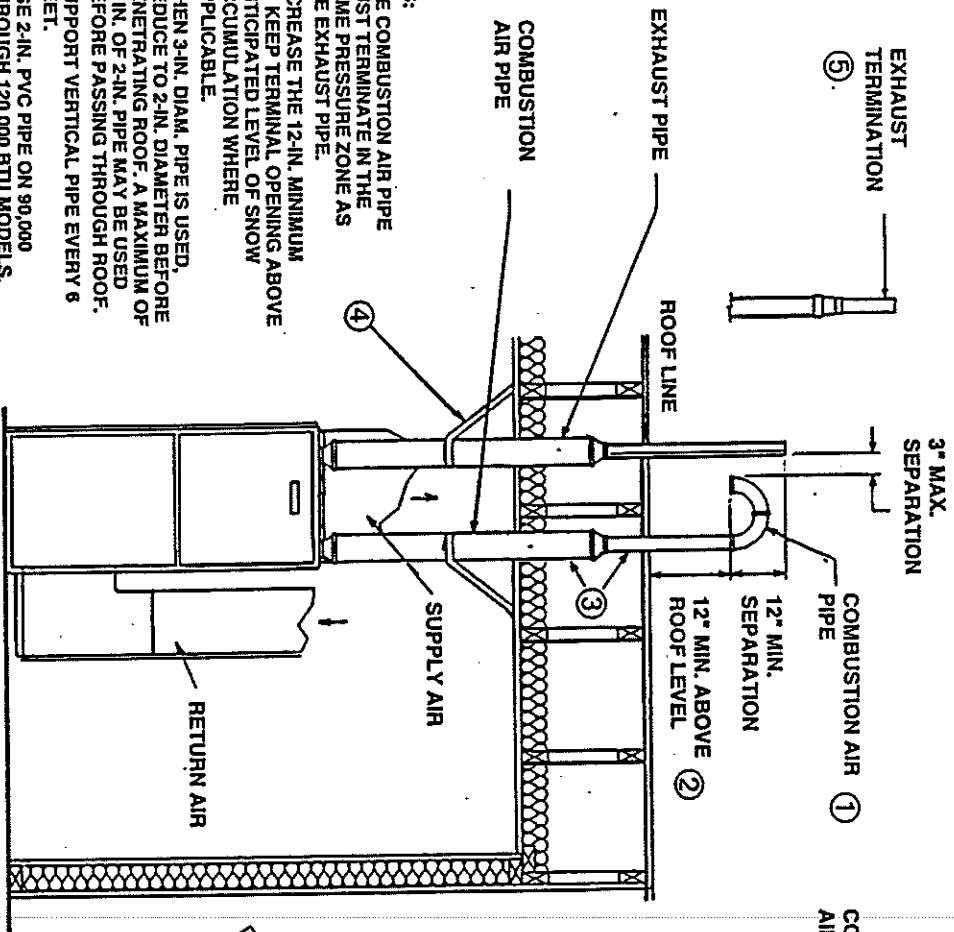
VERTICAL CONCENTRIC VENT KIT - RXGY - E02

- ① 2" SCH40 PVC PIPE
- ② 3" TYPE SDR 26 PVC PIPE
- ③ 2" x 3" BUSHING (MODIFIED)
- ④ 3" x 3" x 3" WYE
- ⑤ 2" x 4" COUPLING (MODIFIED)
- ⑥ 3" x 45° STREET ELBOW
- ⑦ 2" COUPLING (FIELD SUPPLIED)

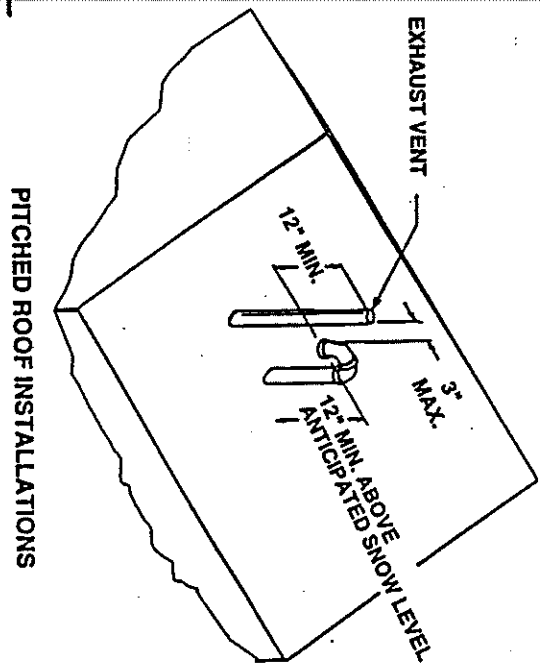
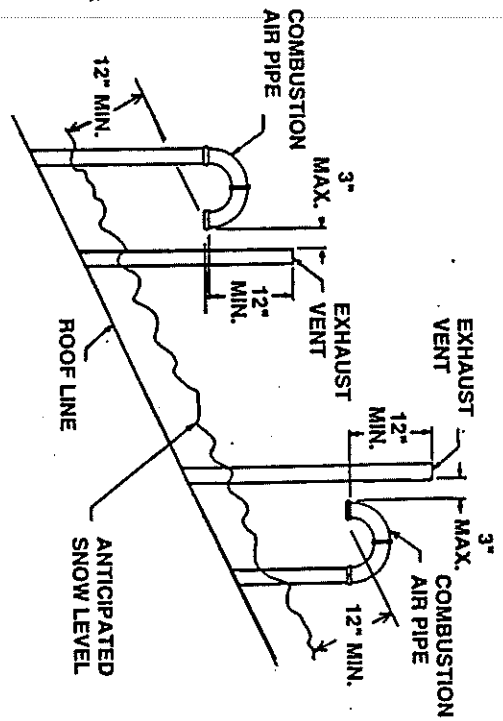


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STANDARD VERTICAL DIRECT VENTING UPFLOW MODEL SHOWN (TYPICAL FOR DOWNFLOW MODELS)

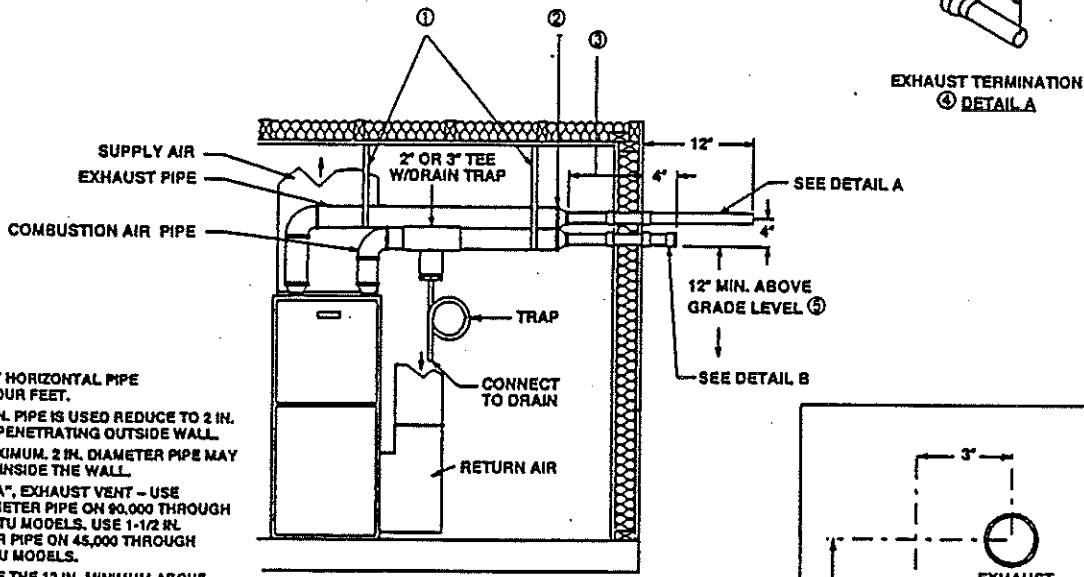


- NOTES:
- 1 THE COMBUSTION AIR PIPE MUST TERMINATE IN THE SAME PRESSURE ZONE AS THE EXHAUST PIPE.
 - 2 INCREASE THE 12-IN. MINIMUM TO KEEP TERMINAL OPENING ABOVE ANTICIPATED LEVEL OF SNOW ACCUMULATION WHERE APPLICABLE.
 - 3 WHEN 3-IN. DIAM. PIPES ARE USED, REDUCE TO 2-IN. DIAMETER BEFORE PENETRATING ROOF. A MAXIMUM OF 18 IN. OF 2-IN. PIPE MAY BE USED BEFORE PASSING THROUGH ROOF.
 - 4 SUPPORT VERTICAL PIPE EVERY 6 FEET.
 - 5 USE 2-IN. PVC PIPE ON 90,000 THROUGH 120,000 BTU MODELS. REDUCE TO 1 1/2-IN. PIPE THE LAST 12 IN. ON 45,000 THROUGH 75,000 BTU MODELS.



PITCHED ROOF INSTALLATIONS

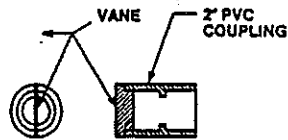
**STANDARD HORIZONTAL DIRECT VENTING
UPFLOW MODEL SHOWN (TYPICAL FOR DOWNFLOW MODELS)**



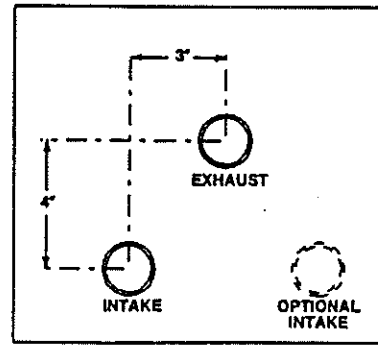
**EXHAUST TERMINATION
④ DETAIL A**

NOTES:

- ① SUPPORT HORIZONTAL PIPE EVERY FOUR FEET.
- ② WHEN 3 IN. PIPE IS USED REDUCE TO 2 IN. BEFORE PENETRATING OUTSIDE WALL.
- ③ 18 IN. MAXIMUM. 2 IN. DIAMETER PIPE MAY BE USED INSIDE THE WALL.
- ④ DETAIL "A", EXHAUST VENT - USE 2 IN. DIAMETER PIPE ON 90,000 THROUGH 120,000 BTU MODELS. USE 1-1/2 IN. DIAMETER PIPE ON 45,000 THROUGH 75,000 BTU MODELS.
- ⑤ INCREASE THE 12 IN. MINIMUM ABOVE GRADE TO KEEP TERMINAL OPENINGS ABOVE ANTICIPATED LEVEL OF SNOW ACCUMULATION WHERE APPLICABLE.
- ⑥ DETAIL "B", INSTALL WIND DEFLECTOR VANE IN 2 IN. PVC COUPLING IN VERTICAL POSITION USING PVC SOLVENT. THE COMBUSTION AIR TERMINATION MUST BE IN THE SAME PRESSURE ZONE AS THE EXHAUST TERMINATION.

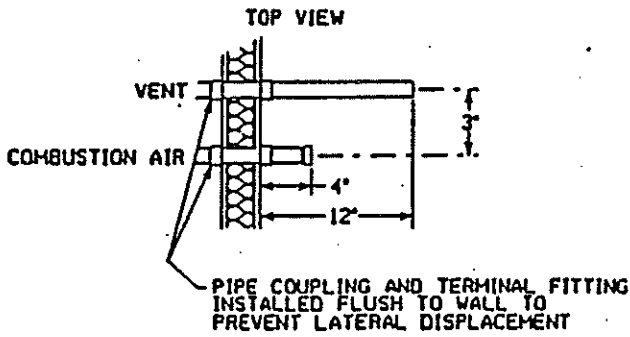


**COMBUSTION AIR TERMINATION
⑥ DETAIL B**

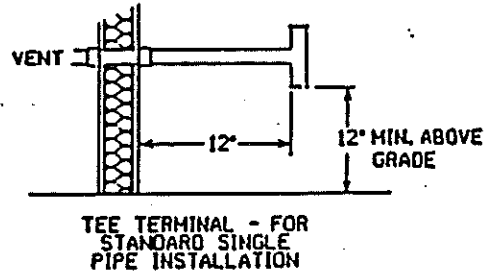


**DETAIL C
EXHAUST / INTAKE RELATIONSHIP**

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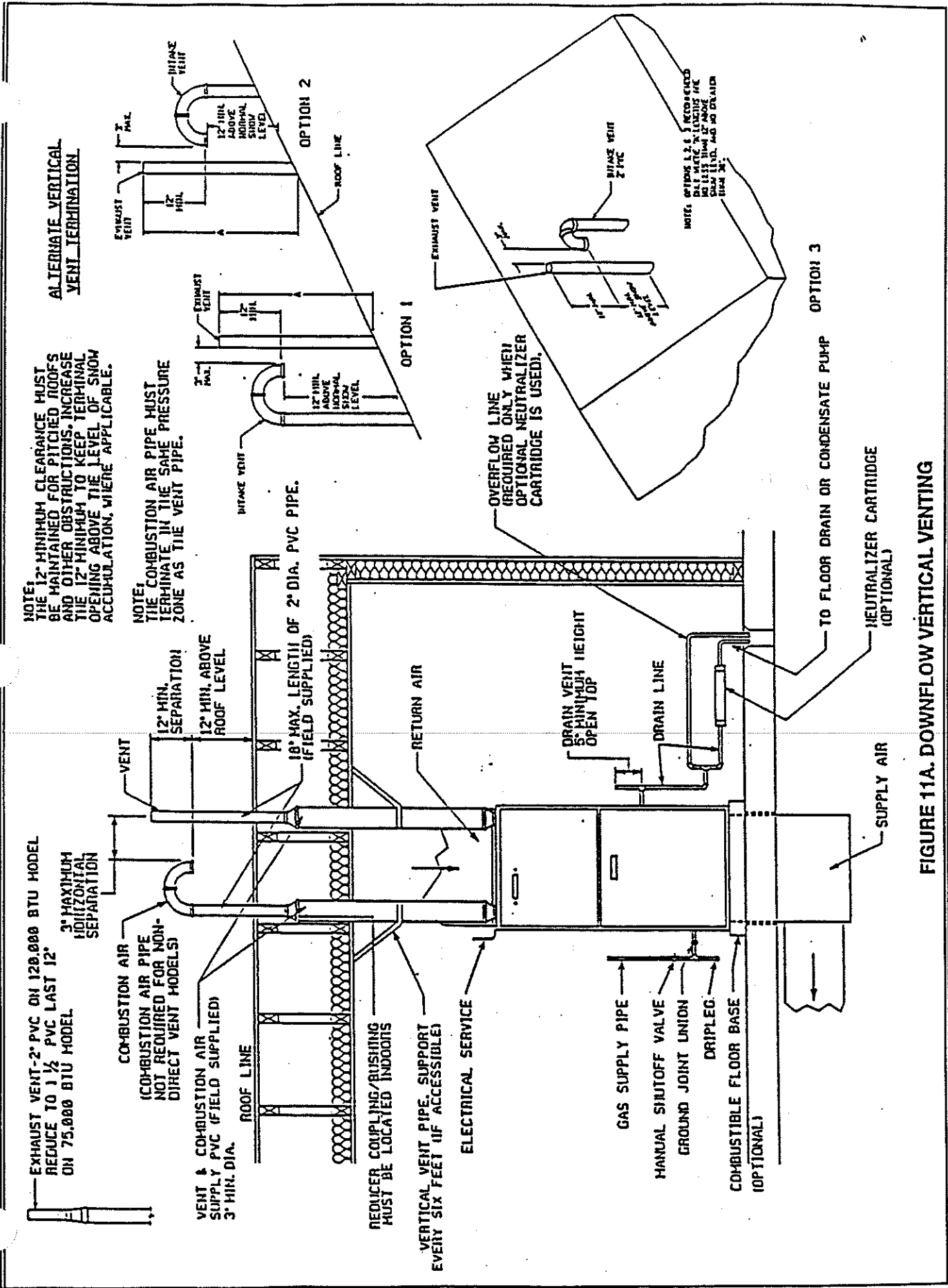


DETAIL C



**TEE TERMINAL - FOR
STANDARD SINGLE
PIPE INSTALLATION**

DETAIL D



NOTE: 12" MINIMUM CLEARANCE MUST BE MAINTAINED FOR PITCHED ROOFS AND OTHER OBSTRUCTIONS. INCREASE THE 12" MINIMUM TO KEEP TERMINAL OPENING ABOVE THE LEVEL OF SNOW ACCUMULATION, WHERE APPLICABLE.

NOTE: THE COMBUSTION AIR PIPE MUST TERMINATE IN THE SAME PRESSURE ZONE AS THE VENT PIPE.

NOTE: OPTIONS 1, 2 & 3 RECOMMENDED ONLY FOR USE WITH DIRECT VENT MODELS. ALL MODELS MUST HAVE NO DRAIN.

OVERFLOW LINE (REQUIRED ONLY WHEN OPTIONAL NEUTRALIZER CARTRIDGE IS USED).

EXHAUST VENT-2" PVC ON 120,000 BTU MODEL REDUCE TO 1 1/2" PVC LAST 12" ON 75,000 BTU MODEL

3" MAXIMUM HORIZONTAL SEPARATION

COMBUSTION AIR PIPE (COMBUSTION AIR PIPE NOT REQUIRED FOR NON-DIRECT VENT MODELS)

VENT & COMBUSTION AIR SUPPLY PVC (FIELD SUPPLIED) 3" MIN. DIA.

ROOF LINE

NEUTRALIZER COUPLING/BUSHING MUST BE LOCATED INDOORS

VERTICAL VENT PIPE SUPPORT EVERY SIX FEET (IF ACCESSIBLE)

ELECTRICAL SERVICE

GAS SUPPLY PIPE

HANDL SHUTOFF VALVE

GROUND JOINT UNION

DRIPLEG.

COMBUSTIBLE FLOOR BASE (OPTIONAL)

RETURN AIR

DRAIN VENT 5" MINIMUM HEIGHT OPEN TOP

DRAIN LINE

TO FLOOR DRAIN OR CONDENSATE PUMP

NEUTRALIZER CARTRIDGE (OPTIONAL)

SUPPLY AIR

FIGURE 11A. DOWNFLOW VERTICAL VENTING

LOCATION REQUIREMENTS HORIZONTAL VENTS:

WARNING: The combustion products and moisture in the flue gases will condense as they leave the termination. The condensate can freeze on the exterior wall, under the eaves and on surrounding objects. Some discoloration to the exterior of the building is to be expected. However, improper location or installation can result in structural or exterior finish damage to the building and may recirculate products of combustion into the combustion air terminal and freeze.

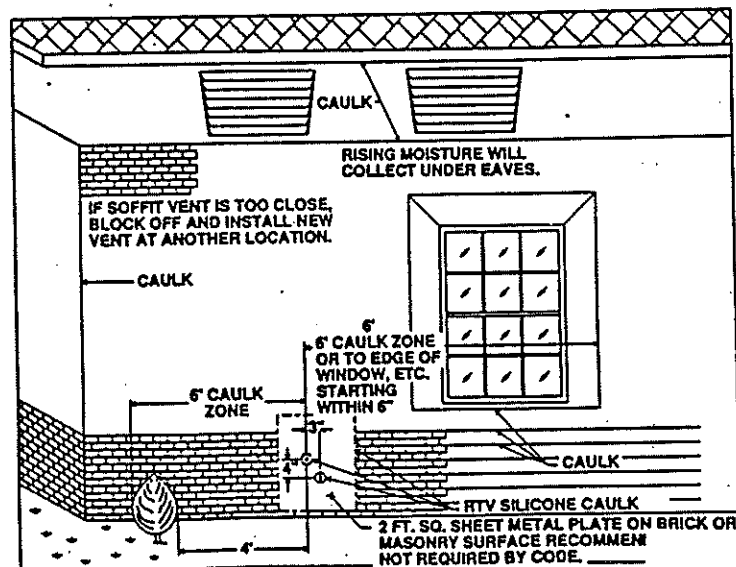
The vent must be installed with the following minimum clearances. See Figures 12 and 13.

- 1) The bottom of the vent terminal and the air inlet shall be located at least 12 inches above grade. Increase the 12 inch minimum to keep the terminal openings above the level of snow accumulation, where applicable.
- 2) The vent shall not terminate over public walkways or over an area where condensate or vapor could create a nuisance or hazard.
- 3) The vent terminal shall be located at least one foot from any opening through which flue gases could enter a building.
- 4) The vent terminal shall be at least 3 feet above any forced air inlet located within 10 feet, except the combustion air inlet of a direct vent appliance.
- 5) The vent terminal shall have a minimum horizontal clearance of 4 feet from electric meters, gas meters, regulators, and relief equipment.

In addition to the minimum clearance listed above, the vent location should also be governed by the following guidelines.

- 1) Do not install under any kind of patio or deck.
- 2) Do not locate on the side of a building with prevailing winter winds. This will help prevent moisture from freezing on walls and overhangs (under eaves).
- 3) Do not extend vent directly through brick or masonry surfaces. Use a rust resistant sheet metal or plastic backing plate behind vent. See Figure 12.
- 4) Do not locate too close to shrubs as condensate may stunt or kill them. See Figure 12.
- 5) Minimum vertical clearance of 1 foot are recommended for overhangs up to 1 foot horizontal. The vertical clearance should be increased equally for each additional increase in horizontal overhang to a maximum vertical clearance of 6 feet.
- 6) Caulk all cracks, seams, and joints within 6 feet horizontally and above and below vent. See Figure 12.
- 7) Painted surfaces must be sound and in good condition with no cracking, peeling, etc. Painted surfaces will require maintenance.
- 8) Do not expose 3" x 2" reduce/bushing to outdoor ambient temperatures.

MOISTURE ZONES



DIRECT VENT MINIMUM CLEARANCES

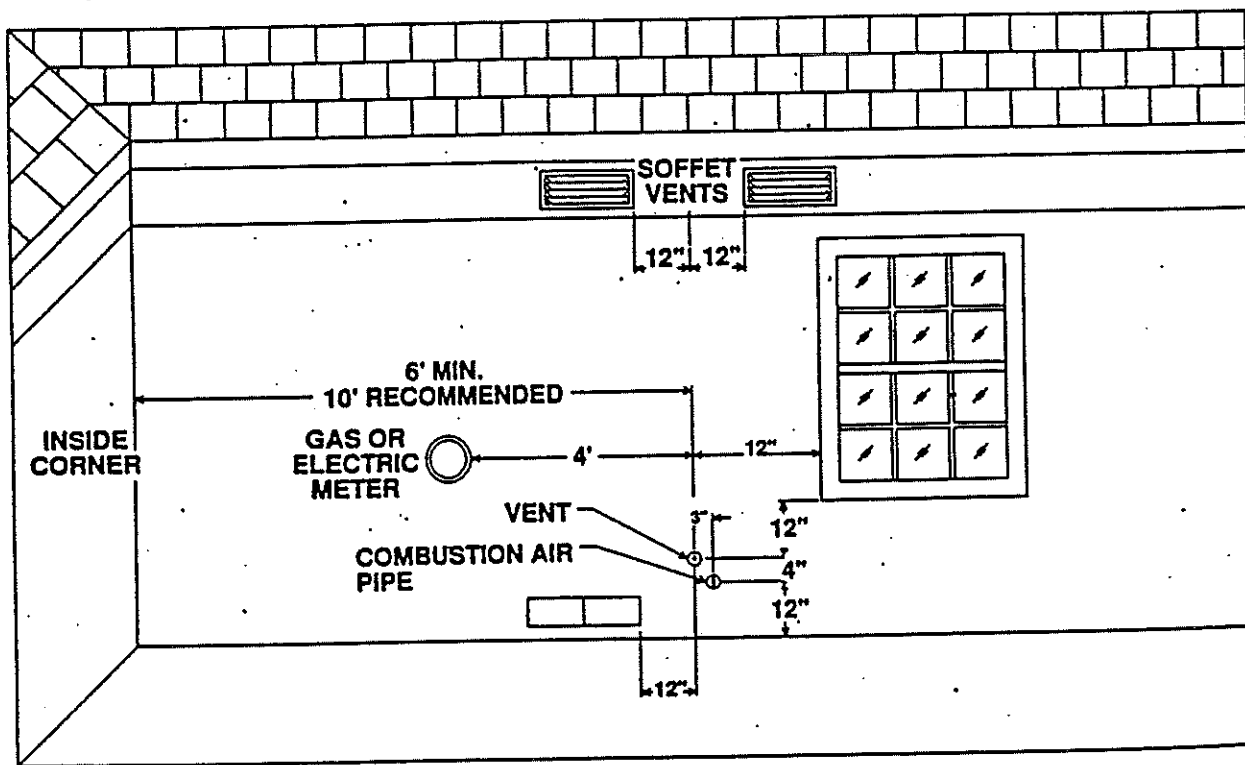


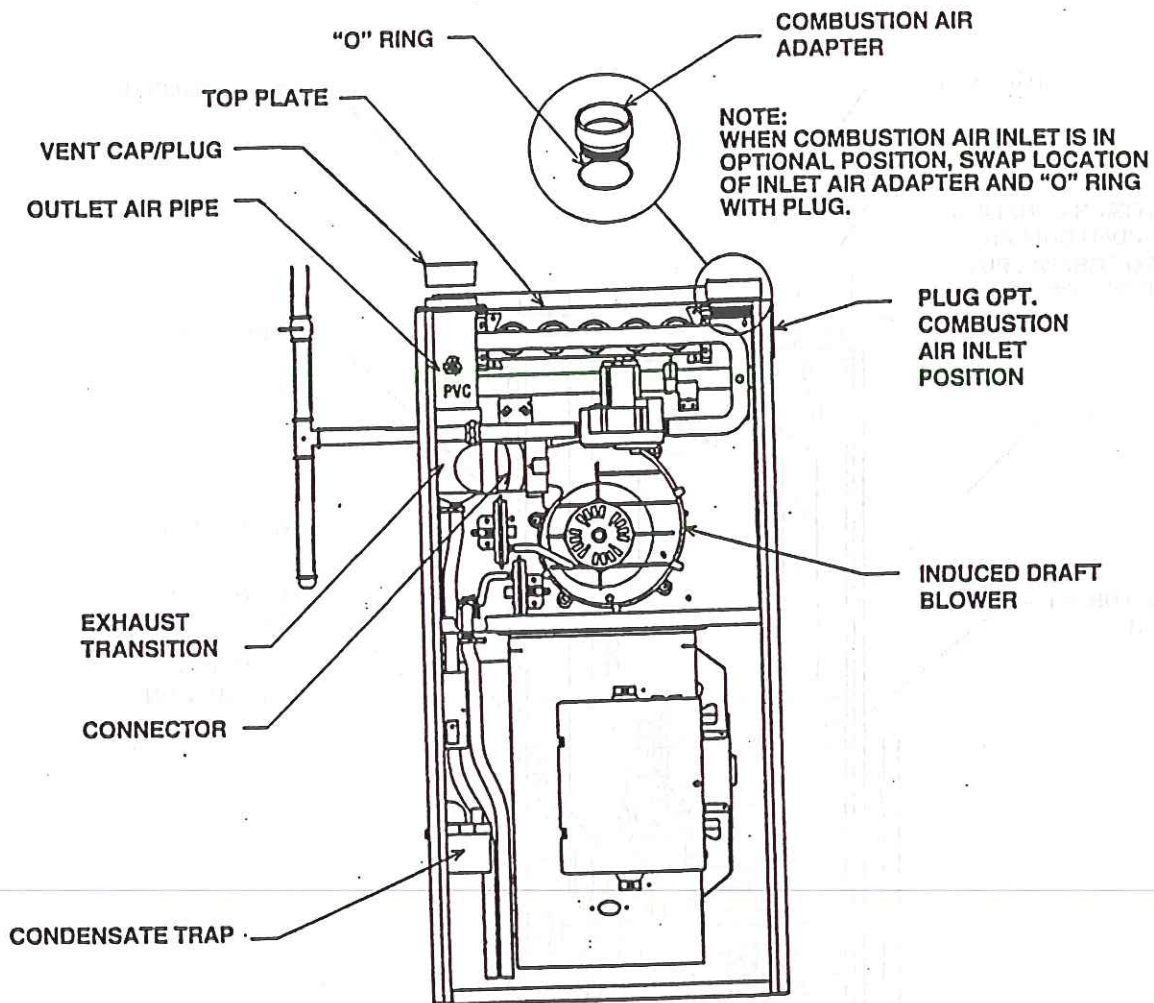
FIGURE 13 - MINIMUM CLEARANCES

CONNECTING TO FURNACE:

IMPORTANT: Clean and debur all pipe cuts. The shavings must not be allowed to block the exhaust, inlet or condensate drain pipes.

- 1) **UPFLOW FURNACES** - The exhaust pipe connection is a 2 in. female PVC pipe fitting extending through the left side of the furnace top plate. This opening has a protective cap which should be removed just prior to installing the exhaust pipe. When 2 in. pipe is used, connect it directly to this fitting. When 3 in. pipe is used, connect a 2 to 3 in. coupling to this fitting with a short piece of 2 in. PVC pipe. The inlet air connection is at the right side of the top plate. An alternate inlet air connection may be made on the right side of the jacket. This opening has a plastic cap. An inlet air connection fitting is supplied with the furnace and it must be installed in the furnace by screwing it into the opening.

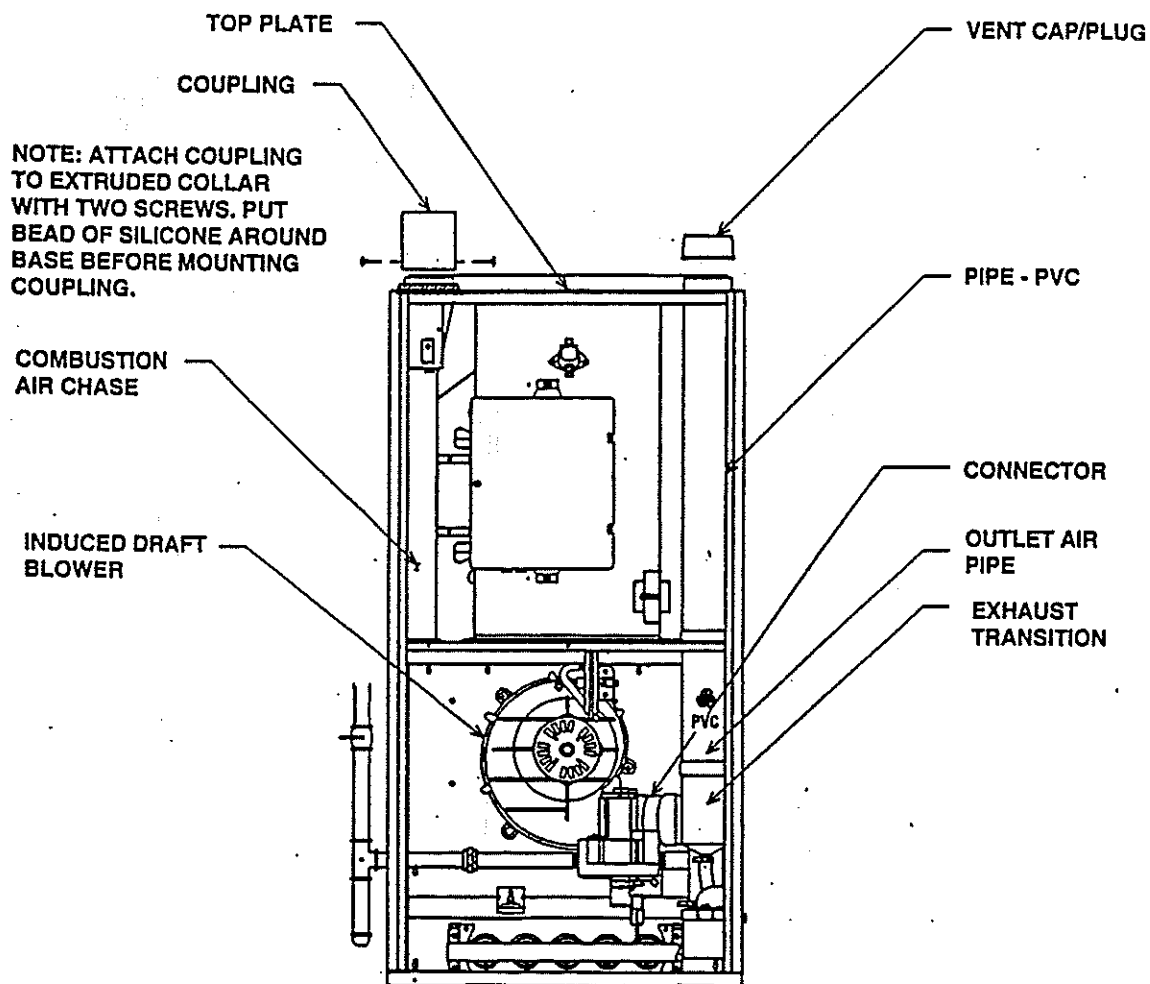
IMPORTANT: When the side inlet air opening is used, remove the plastic cap and install it in the top opening. This must be in place for proper operation of the furnace. See Figure 14A.



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FIGURE 14A - UPFLOW COMBUSTION AIR AND VENT PIPE CONNECTION

- 2) **DOWNFLOW FURNACE** - The exhaust pipe connection is a 2 in. female PVC pipe fitting extending through the right side of the furnace top cover. This opening has a protective cap which should be removed just prior to installing the exhaust pipe. When 2 inch pipe is used, connect it directly to this fitting. When 3 inch pipe is used, connect a 2 to 3 inch coupling to this fitting with a short piece of 2 inch pipe. The inlet air connection is a 2 inch extruded hole on the left side of the top plate. When 2 inch pipe is used, attach a 2 inch PVC coupling over this hole with RTV sealant and also add two sheet metal screws through the coupling into the extrusion to secure it in place, and add the required piping. When 3 inch pipe is required, use a 2 to 3 inch coupling and add the required piping. See Figure 14B.



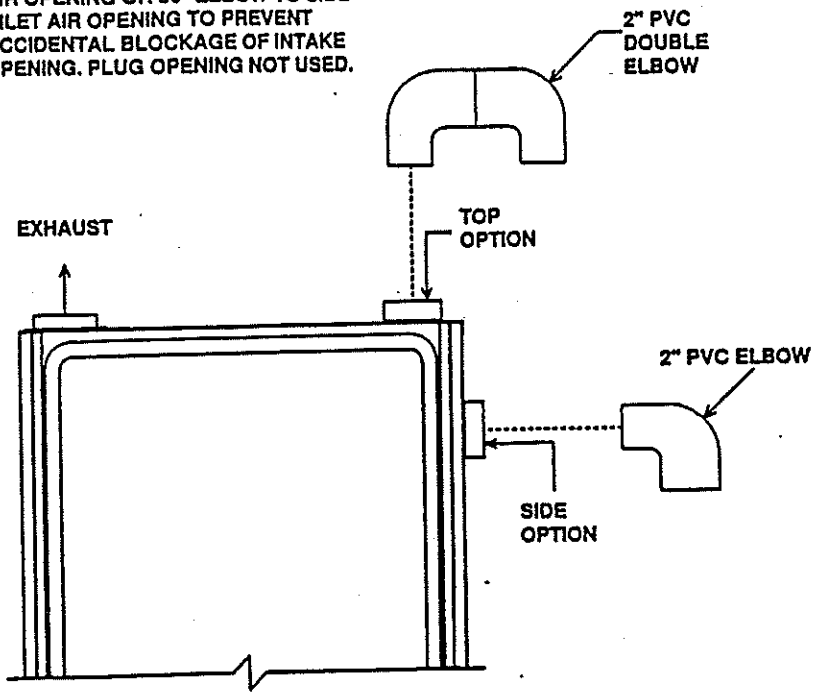
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FIGURE 14B - DOWNFLOW COMBUSTION AIR AND VENT PIPE CONNECTION

IMPORTANT: When indoor combustion air is used, the inlet air opening at the furnace must be protected from accidental blockage. On upflow models, install a 90 degree elbow pointing downward in the top inlet air opening. Be sure to install the plastic cap in the opening not used. On downflow models, install a double elbow in the inlet air opening. See Figures 15A and B.

UPFLOW

ATTACH DOUBLE ELBOW TO TOP INLET AIR OPENING OR 90° ELBOW TO SIDE INLET AIR OPENING TO PREVENT ACCIDENTAL BLOCKAGE OF INTAKE OPENING. PLUG OPENING NOT USED.



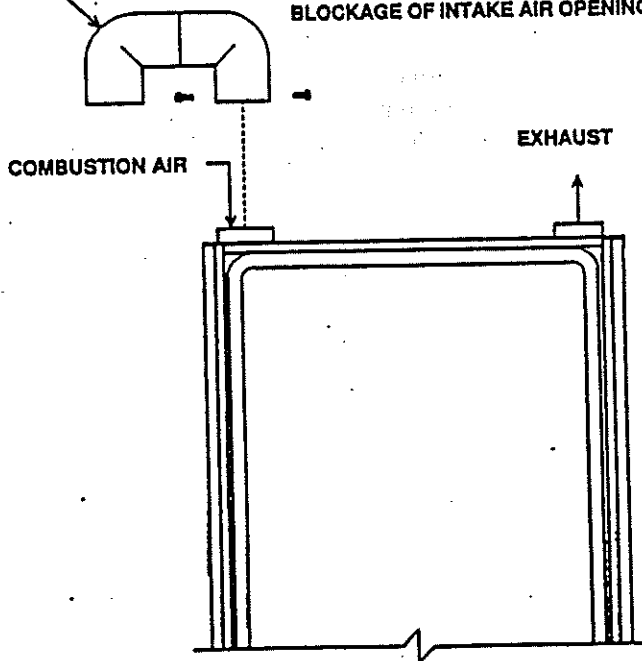
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FIGURE 15A - INLET AIR-NON-DIRECT VENT FURNACE

DOWNFLOW

2" PVC DOUBLE ELBOW

ATTACH DOUBLE ELBOW TO INTAKE AIR COLLAR AND SECURE WITH TWO SHEET METAL SCREWS TO PREVENT ACCIDENTAL BLOCKAGE OF INTAKE AIR OPENING.



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15B - INLET AIR-NON-DIRECT VENT FURNACE

MISCELLANEOUS INFORMATION/NOTES

COMBUSTION AIR FOR DIRECT VENT INSTALLATIONS: The combustion air system designed for this furnace must be used. This system consists of field supplied schedule 40 or 26 SDR PVC pipe and one of the following horizontal vent termination kits: RXGY-D02, RXGY-D03, RXGY-D04, RXGY-C01, or RXGY-E02.

IMPORTANT: It is required that 3 inch PVC pipe be used for all installations at altitudes above 4,000 feet.

CONDENSATE DRAIN/NEUTRALIZER - The drain trap is located in the blower compartment on the left side in upflow models and on the right side in the control compartment on downflow models. The traps may be moved to the opposite side of the cabinet if required. A short piece of 1/2 inch PVC pipe and a 1/2 inch Tee are supplied with the furnace. Connect the 1/2 inch pipe to the elbow on the trap and the Tee to this pipe so that the open end is upward. Connect a 5 inch riser to the top of the Tee and run a drain tube from the bottom of the Tee to a floor drain or condensate pump, as may be required. Use a solvent cement that is compatible with ABS and PVC material. The drain times may be PVC, nylon or low density polyethylene. See Figures 10A and 11A.

IMPORTANT: Do not connect into a common drain line with an air conditioner evaporator coil drain located below the furnace. A blocked or restricted drain line can result in overflow of the coil pan and negate the furnace blocked drain shut off control.

If local codes require, install a condensate neutralizer cartridge in the drain line. Install cartridge in horizontal position only. Also install an overflow line if routing to a floor drain. See Figures 10A and 11A.

Fill trap assembly with water before operating the furnace. This can be done by removing the drain hose from the trap and pouring about a cup of water into the vent trap. Water will flow into the house drain when trap is full.

If no floor drain is available, install a condensate pump that is resistant to acidic water. Pumps are available from your local distributor. If pump used is not resistant to acidic water, a condensate neutralizer must be used ahead of the pump. The condensate pump must have an auxiliary safety switch to prevent operation of furnace and resulting in overflow of condensate in the event of pump failure. The safety switch must be wired through the "R" circuit only (low voltage) to provide operation in either heating or cooling modes.

WARNING: Do not run drain outdoors, freezing of condensate could cause property damage.

HEAT ANTICIPATOR SETTINGS: To determine the thermostat heat anticipator setting, add the current draw of the various components in the system or measure the current flow on either R or W thermostat circuit and set the heat anticipator to the current flow measured. The recommended setting is .75 amps.

SEQUENCE OF OPERATION

(Honeywell or UTEC Integrated Control Board)

The furnace is equipped with a Honeywell S9201E1029, S9201E2001 or UTEC 1012-832 integrated ignition blower control board. These controls combine the functions of a hot surface ignition (100% lockout) control and a fixed time on/off blower control. They provide a low voltage heat/cool thermostat terminal board and connection points for field installed humidifier and electronic air cleaner optional accessories. All of these control boards have direct flame sense. Two green indicator lights are also provided to aid the service technician. The Honeywell S9201E2001 control has an additional indicator light (yellow) which verifies the flame sense signal. If the light flashes, the signal is marginal, and if it is off, there is no signal.

When the heating thermostat closes (connection of R and W terminals), the induced draft blower starts and runs through a 30 second prepurge cycle. After the induced draft blower starts, the air proving negative pressure switch closes and starts the main burner ignition cycle. (The 30 second timing starts after the pressure switch closes.) The hot surface ignitor is energized for 34 seconds to heat up, then the gas valve is energized to start gas flow to the main burner for ignition. The main burner flame is sensed by the flame sensor within 1 second, the last 1 second of the trial time. If the main burner flame is not sensed within the second maximum trial for ignition time, the control will repeat the prepurge and ignition cycle for three additional retries. After a total of four cycles without sensing the main burner flame, the system will go into a 100% lockout mode. After one hour, the control will repeat the prepurge and ignition cycles for four tries. The control will then go into a 100% lockout mode again. It will continue this sequence of cycles and lockout each hour until ignition is successful. During the lockout mode neither the hot surface ignitor or the gas valve will be energized until the system is reset by opening the thermostat (disconnecting the R and W terminals) or interrupting the electrical power for 1 sec. or longer.

The fixed time blower control will start the circulating air blower on heat speed approximately twenty seconds after the burner is ignited. The circulating air blower will continue to run during burner operation then shut down at a present time after the burner shuts off. The circulating air blower will start and run on heating speed if the thermostat fan switch is in the "On" position. When the thermostat closes while in the heating mode, the blower will stop and go through a delay after the burner lights. When the thermostat is in the cooling mode, the blower control will start and stop the circulating air blower on cooling speed when the cooling thermostat contacts close or open respectively. The circulating air blower will start and run continuously on heating speed with the thermostat fan

switch in the "On" position. The blower will step up to cooling speed when both terminals G and Y are energized.

NOTE: The heating blower speed and the heating off delay come from the factory set for cooling applications. A lower heating speed and shorter off delay may be more desirable for heating only applications. See Figure 17 for blower "OFF" timings and method of setting with the Hamilton Standard control board and Figures 18 and 19 for the Honeywell controls.

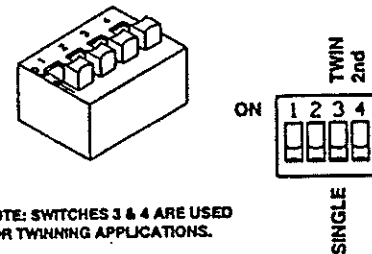
The Honeywell S9201E2001 control board has four quick connect terminals for connecting the motor speed leads. See Figure 20. These are:

- 1) FAN SPEED - motor runs on this speed when thermostat is in the "fan" position.
- 2) COOL - connect desired cooling speed.
- 3) HEAT - connect desired heating speed.
- 4) HEAT/COOL - connect desired speed when heating and cooling speed are the same.

IMPORTANT: Do not connect any motor speeds to "HEAT" and "COOL" if you see the HEAT/COOL terminal.

- 5) If heating and low speed are the same, jump across "LOW" and "HEAT".

See Figures 17, 18, or 19 for instructions for setting the blower "OFF" timings.

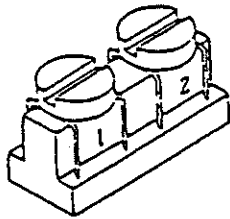


NOTE: SWITCHES 3 & 4 ARE USED FOR TWINNING APPLICATIONS.

1402

OFF TIME	SWITCH 1	SWITCH 2
90 SEC.	OFF	ON
120 SEC.	OFF	OFF
160 SEC.	ON	OFF
180 SEC.	ON	ON

FIGURE 17 - BLOWER OFF TIMINGS
UTEK 1012-832 CONTROL BOARD



MODEL ST9201A



FIGURE 18 - BLOWER OFF TIMINGS
HONEYWELL S9201E1029 CONTROL BOARD

Adjust blower time off delay by loosening or tightening the switch screws on the control board as shown in Figure 17.

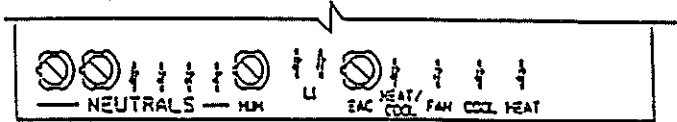


FIGURE 20 - LINE VOLTAGE CONNECTIONS
HONEYWELL S9201E2001 CONTROL BOARD



(TIMER IS
RED BLOCK
ON BOARD)


1335

OFF TIME	SWITCH 1	SWITCH 2
90 SEC.	ON	OFF
120 SEC.	OFF	OFF
160 SEC.	OFF	ON
180 SEC.	ON	ON

FIGURE 19 - BLOWER OFF TIMINGS
HONEYWELL S9201E2001 CONTROL BOARD

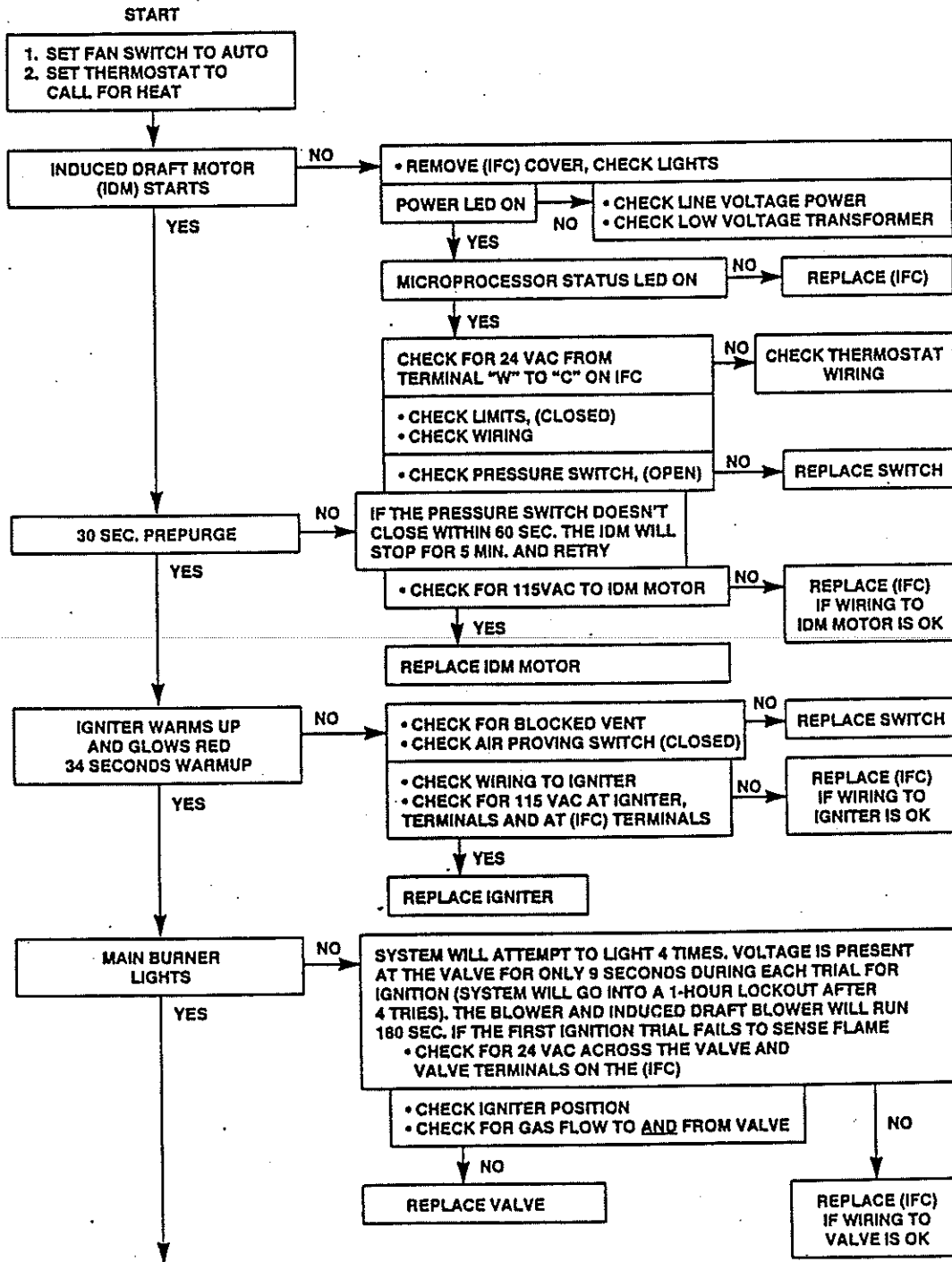
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(115 VAC IGNITER)**

⚠ WARNING

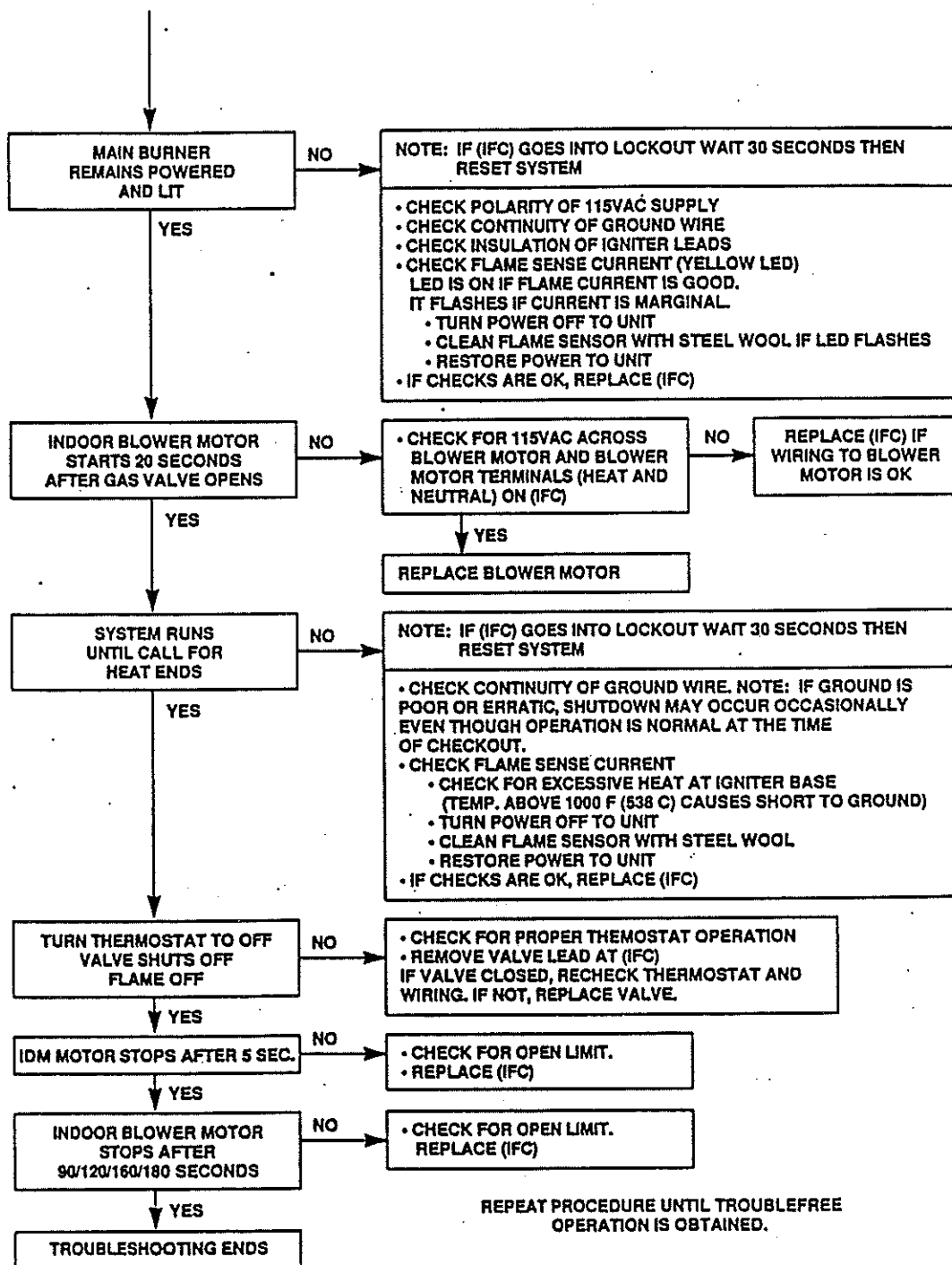


HAZARDOUS VOLTAGE
LINE VOLTAGE CONNECTIONS CAN CAUSE PERSONAL INJURY OR DEATH

DISCONNECT POWER BEFORE SERVICING.
SERVICE MUST BE BY A TRAINED, QUALIFIED SERVICE TECHNICIAN.



FLOW CHART CONTINUED ON NEXT PAGE



NOTE: STATIC DISCHARGE CAN DAMAGE INTEGRATED FURNACE CONTROL (IFC)

