

# LENNOX GSR-14

MODEL NUMBER:	Downflow/Horizontal - "PULSE"
BTU SIZES:	50,000 - 100,000 BTU's

## ACCESSIBILITY CLEARANCE

No specific distance is mentioned.

## CLEARANCE FROM COMBUSTIBLE MATERIAL

	Counterflow	Horizontal
Sides .....	1" .....	3"
Rear .....	1" .....	3"
Top .....	1" .....	3"
Front .....	6" .....	6"
Floor .....	* combustible .....	combustible
Flue Pipe .....	0 .....	0

\* When downflow unit is installed on a combustible floor, an additive base (ordered separately) must be installed between the furnace and the floor.

## COLD AIR RETURN AIR DUCTS

Sealed to the furnace casing and terminating outside the space containing the furnace.

## GARAGE

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

## GENERAL

Furnace must be electrically grounded. Wiring replaced shall be of the same type and gauge as that being replaced. Gas piping not to come in contact with furnace casing, must be centered in piping hole and rigidly piped outside of unit.

Flexible connector must be installed in a "U" shape fashion external to the unit.

Special consideration must be given to exhaust piping drip leg and condensate line when unit is installed where freezing temperatures are possible. (Protect with a 3-watt grounded and sheathed self-regulating heating cable and insulation.)

Unit will lock out when blockage occurs in drip leg or condensate line.

### HIGH ALTITUDE INSTALLATIONS

Deration	No deration of this unit is required because of the self compensating gas valve unless installed at elevations above 6,000 ft, then deration is 4% for each 1,000 ft above sea level.
Orifice	Specifically designed for each unit. Standard atmospheric orifices or orifice blanks cannot be used.
Regulator Pressure	See rating plate.
Pressure Switch	Differential pressure switch - normally closed - opens on blockage of intake or exhaust venting.

### MOBILE HOME

Approved.

### VENTING MATERIAL AND REQUIREMENTS

Vent Pipe	PVC Schedule 40 Type 1130 or 1220
Vent Fittings	PVC1 or PVC12

Installation of mufflers is optional on 50,000 and 80,000 BTU models, but is required on 100,000 BTU model.

Horizontal runs of exhaust piping properly sealed must be sloped back to furnace with no dips or sags and be supported every 5 feet with isolation hangers. Maximum length is 35 feet with 5 elbows.

Exhaust piping must be insulated with 1/2" Armaflex when going through unconditioned space.

Combustion air intake should not be within 6 feet of a dryer vent, condensing unit, or combustion air inlet or outlet of another appliance. Venting should not exit less than 3 feet from opening into another building. Maximum separation of intake and exhaust pipes at point of termination is 3" on roof terminations and 6" on side walls.

Vertical venting is preferred. Exhaust and intake exits must be in the same pressure zone. Do not exit one vertical and one horizontal. Both must terminate on the same side of the building.

### VENT CLEARANCE FROM COMBUSTIBLE MATERIAL

PVC - 0"

### VENTING PROCEDURE

Termination ends must be a minimum of 12" above grade level. Do not point into window wells, stairwells, alcoves, courtyard or other recessed areas.

MISCELLANEOUS INFORMATION/NOTES

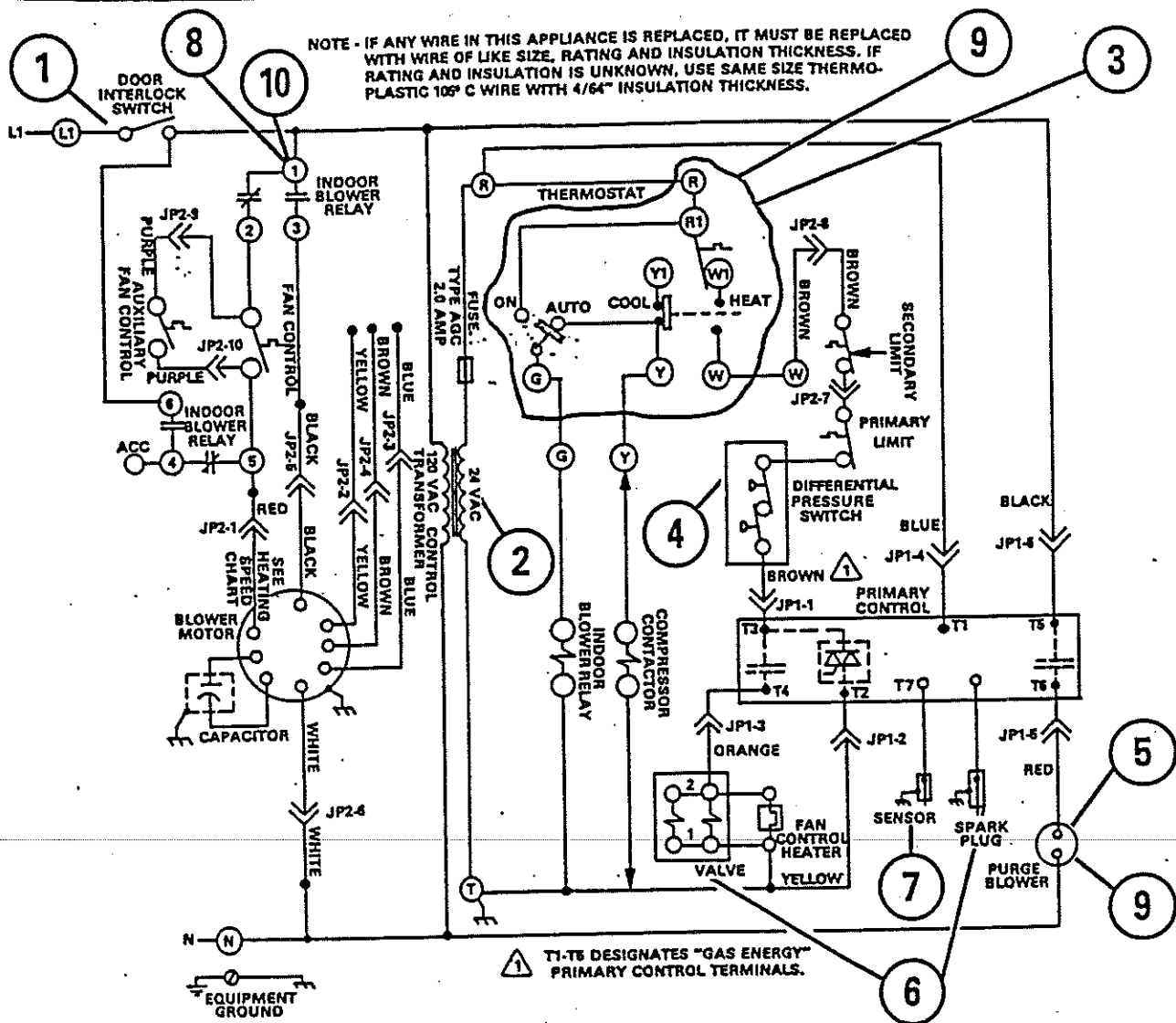
Two shipping bolts and brackets at the discharge end of the unit and holes must be plugged with snap plugs provided.

Horizontal installation: Exhaust outlet must always be on the bottom, gas piping should exit only through top, drip pan to catch moisture must be installed under furnace, service platform required, requires support frame kit, isomode pads are required for vibration.

Copper tubing cannot be used for condensate line.



**GSR 14 LENNOX  
COUNTERFLOW-HORIZONTAL  
V - SEQUENCE OF OPERATION**



- 1 - Line voltage feeds through the door interlock switch. The blower access panel must be in place to energize unit.
- 2 - Transformer provides 24 volt control circuit power.
- 3 - A heating demand closes the thermostat heating bulb contacts.
- 4 - The control circuit feeds from 'W' leg through the secondary limit, the primary limit and the differential pressure switch to energize the primary control.
- 5 - Through the primary control the purge blower is energized for prepurge (see Figure 8 for length of prepurge).
- 6 - At the end of prepurge the purge blower continues to run and the gas valve, fan control heater and spark plug are energized (see Figure 8 for start attempt timings).
- 7 - The sensor determines ignition by flame rectification and de-energizes the spark plug and purge blower. Combustion continues.

- 8 - After approximately 30 to 45 seconds the fan control has warmed enough to close the contacts. The closed contacts energize the indoor blower motor on heating speed. If, at any time during a heating cycle, combustion is lost and heating demand is still present, the ignition control immediately returns to step 5 above.
- 9 - When heating demand is satisfied the thermostat contacts open. The primary control is then de-energized removing power from the gas valve and fan control heater. At this time the purge blower is energized for postpurge. The indoor blower motor remains on.
- 10 - When the air temperature lowers to 90°F the fan control contacts open - shutting the indoor blower off.

**LENNOX GSR-14**  
**Schematic Explanation**

Line voltage power enters at "L1" passing through the fan door interlock switch (Fan door must be in place). From the fan door switch power goes 2 ways. One to the open set of contacts at terminal "6" on the indoor blower relay. The other one goes to terminal "1" also on the indoor blower relay through the normally closed set of contacts at terminal "2" of the indoor blower relay and on to the open set of contacts of the fan control. Power also branches off and goes through connection "9" of the "JP2" connector to the open set of contacts of the auxiliary fan control. Line voltage power also goes over to provide 110 volts to the line voltage side of the transformer and then completes back to "N". Line voltage power also continues over through connection "6" of the JP1 connector to the open set of contacts at terminal "T5" of the module.

Low voltage power leaves the secondary side of the transformer and goes through the 2.0 amp fuse to the "R" terminal of the low voltage terminal strip, completion for the low voltage system is at terminal "T" of the low voltage terminal strip. From the "R" terminal low voltage power is sent through connection "4" of the JP1 connector to terminal "T1" of the module which provides power for the operation of the purge blower during the post purge cycle. From the "R" terminal power also goes to the "R" terminal of the thermostat.

As the thermostat closes power goes from "R" to "W" and leaves the thermostat and goes back to the "W" terminal on the low voltage terminal strip. It leaves the "W" terminal and goes through connection "8" of the JP2 connector to the normally closed contacts of the secondary limit, then through connection "7" of the JP2 connection of the JP2 connector to the primary limit switch to the double set of contacts in the differential pressure switch through connection 1 of the JP1 connector to terminal "T3" on the module which provides power to the timer control of the module this completes from terminal "T2" through connection "2" on the JP1 connector to the "T" terminal on the low voltage terminal strip.

With the thermostat closed and power between terminals "T3" and "T2" the open contacts between "T5" and "T6" close sending line voltage through connection "5" of the JP1 connector causing the purge blower which completes back to "N" to begin the prepurge cycle. At the end of the prepurge cycle the purge blower continues to operate. The open set of contacts between "T3" and "T4" close energizing the gas valve and fan control heater from "T4" of the module through connection "3" of the JP1 connector, the spark plug is also energized. Ignition of the flame should occur and the pulse combustion should begin.

The flame sensor at terminal "T7" verifies ignition by flame rectification which shuts off the spark and the purge blower. The pulse combustion process continues.

After approximately 30 seconds the fan control heater will close the normally open contacts of the fan control causing power to be sent through connection "1" of the JP2 connector to the blower motor and capacitor which completes through connection "6" of the JP2 connector back to "N".

After the thermostat is satisfied and opens removing power from the module. The low voltage power at "T1" activates the purge blower for the post purge cycle. The indoor blower will continue to run until the air temperature lowers to 90 degrees.

# GSR14 TROUBLESHOOTING FLOW CHART

NOTE: REFER TO ILLUSTRATIONS ON ADJACENT PAGE FOR NUMBERED CHECKS

## UNIT WILL NOT RUN

### ELECTRICAL CHECKS

IS THERMOSTAT PROPERLY SET?  
 YES - SYSTEM MAY BE LOCKED OUT. TURN THERMOSTAT HEATING DEMAND OFF & ON AGAIN. NOTE - CONTINUE THROUGH FLOWCHART TO LOCATE REASON FOR LOCKOUT.  
 NO - SET FOR HEAT DEMAND.

CHECK FOR 120VAC POWER TO UNIT & ADEQUATE GROUNDING (GROUNDING REQUIRED FOR PROPER OPERATION OF IGNITION SYSTEM)  
 IS BLOWER DOOR CLOSED PROPERLY ON INTERLOCK SWITCH?

NO - CLOSE DOOR TO ACTUATE SWITCH.  
 YES - ① IS 24VAC PRESENT ACROSS TERMINALS R & T ON LOW VOLTAGE STRIP?

NO - DOUBLE CHECK WIRING CONNECTIONS & DOOR INTERLOCK SWITCH.  
 YES - ② CHECK FOR HEAT DEMAND AT UNIT. IS 24VAC PRESENT ACROSS TERMINALS T & W ON LOW VOLTAGE STRIP?

NO - REPLACE TRANSFORMER.  
 YES - CHECKOUT & REPAIR THERMOSTAT AND/OR WIRING.

③ 1. CONNECT 24VAC METER ACROSS GAS VALVE TERMINALS.  
 2. BREAK & REMAKE THERMOSTAT DEMAND TO RESTART UNIT CYCLE.  
 3. AFTER 30 TO 25 SECONDS PREPURGE - IS 24VAC PRESENT AT GAS VALVE TERMINALS FOR APPROXIMATELY 7 SECONDS?

NO - SEE GAS CHECKS SECTION ON PAGE 32  
 YES -

TURN OFF POWER TO UNIT  
 ④ IS DIFFERENTIAL PRESSURE SWITCH CLOSED? MAKE OHMMETER CHECK.

NO - REPLACE SWITCH.  
 YES - ARE LIMITS CLOSED? MAKE OHMMETER CHECK. ⑤

CHECK TO SEE IF ONE OR BOTH ARE OPEN

IF PRIMARY IS OPEN DETERMINE CAUSE OF OPEN LIMIT AND REPLACE IF DEFECTIVE  
 IF SECONDARY IS OPEN, PUSH TO RESET. REPLACE BLOWER ACCESS PANEL AND RESTORE POWER TO UNIT.  
 IF FURNACE OPERATES NORMALLY, REPLACE ACCESS PANEL.

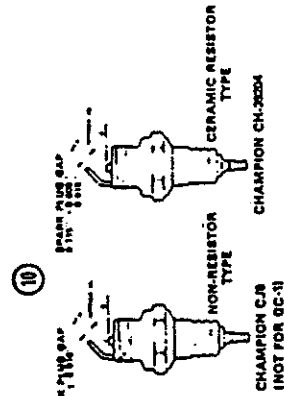
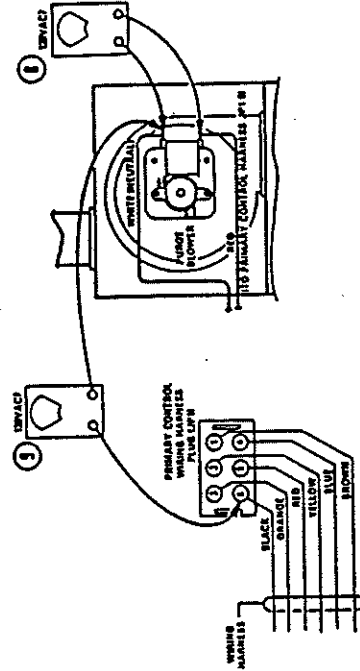
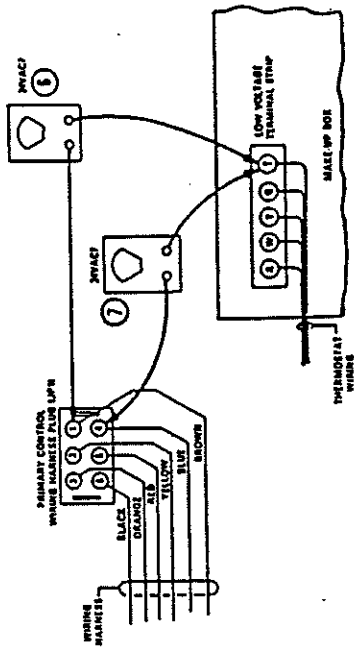
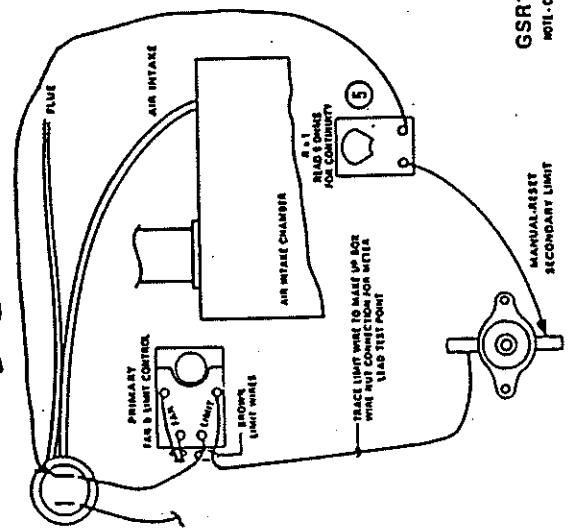
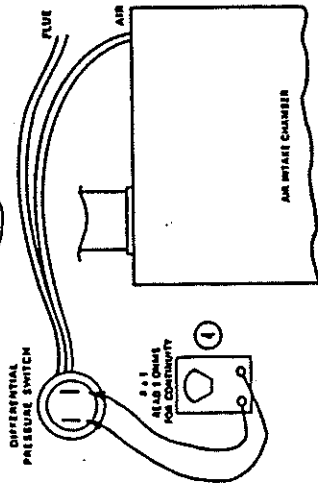
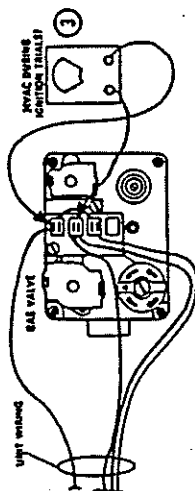
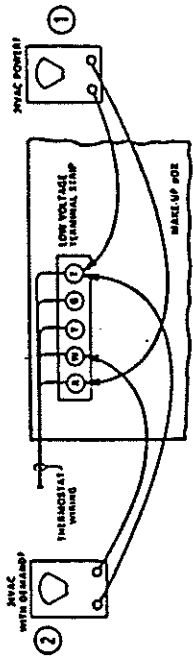
IF UNIT CONTINUES TO OPEN, CHECK AUXILIARY FAN CONTROL JUMPER CONTACTS AND OBSERVE ROOM AIR BLOWER  
 IF BLOWER RUNS DETERMINE IF AUXILIARY FAN CONTROL IS CLOSING. IF NOT, REPLACE.  
 IF BLOWER DOES NOT RUN SUSPECT WIRING AND BLOWER MOTOR. REPLACE IF DEFECTIVE.

CHECK ALL WIRING CONNECTIONS - INTERNAL & EXTERNAL TO UNIT. REPAIR ANY LOOSE OR DAMAGED CONNECTIONS  
 TURN ON POWER. SET THERMOSTAT FOR HEAT DEMAND

⑥ IS 24VAC PRESENT ACROSS TERMINAL T OF LOW VOLTAGE STRIP & BROWN WIRE TO PRIMARY CONTROL PLUG (P1 T1)?

NO - REPAIR WIRING CONNECTION BETWEEN UNIT & PRIMARY CONTROL PLUG (BROWN WIRE)  
 YES - ⑦ IS 24VAC PRESENT ACROSS TERMINAL T OF LOW VOLTAGE STRIP & BLUE WIRE TO PRIMARY CONTROL PLUG (P1 B1)?

NO - REPAIR WIRING CONNECTION BETWEEN PRIMARY CONTROL & T<sub>1</sub> SIDE OF TRANSFORMER  
 YES - REPLACE PRIMARY CONTROL



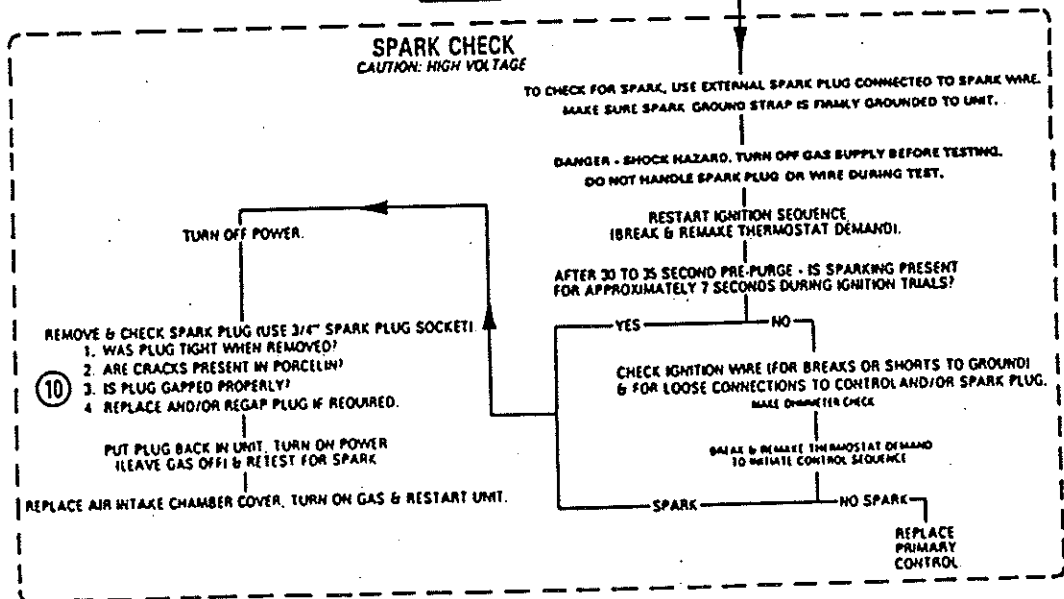
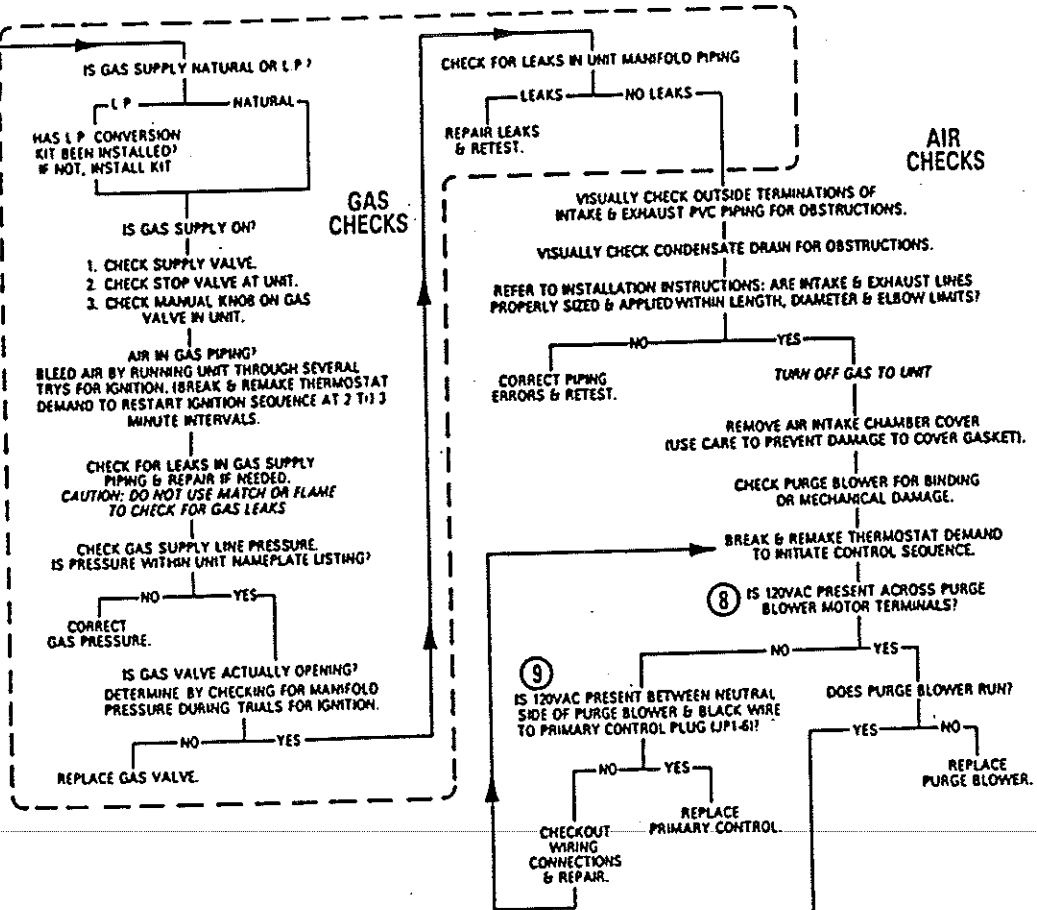
### GSR14 TROUBLESHOOTING -- UNIT WILL NOT RUN

NOTE: CHECKS ILLUSTRATED CORRESPOND TO CSN1. INSTALL/REPAIRING FLOW CHART ON OPPOSITE PAGE.

# GSR14 TROUBLESHOOTING FLOW CHART

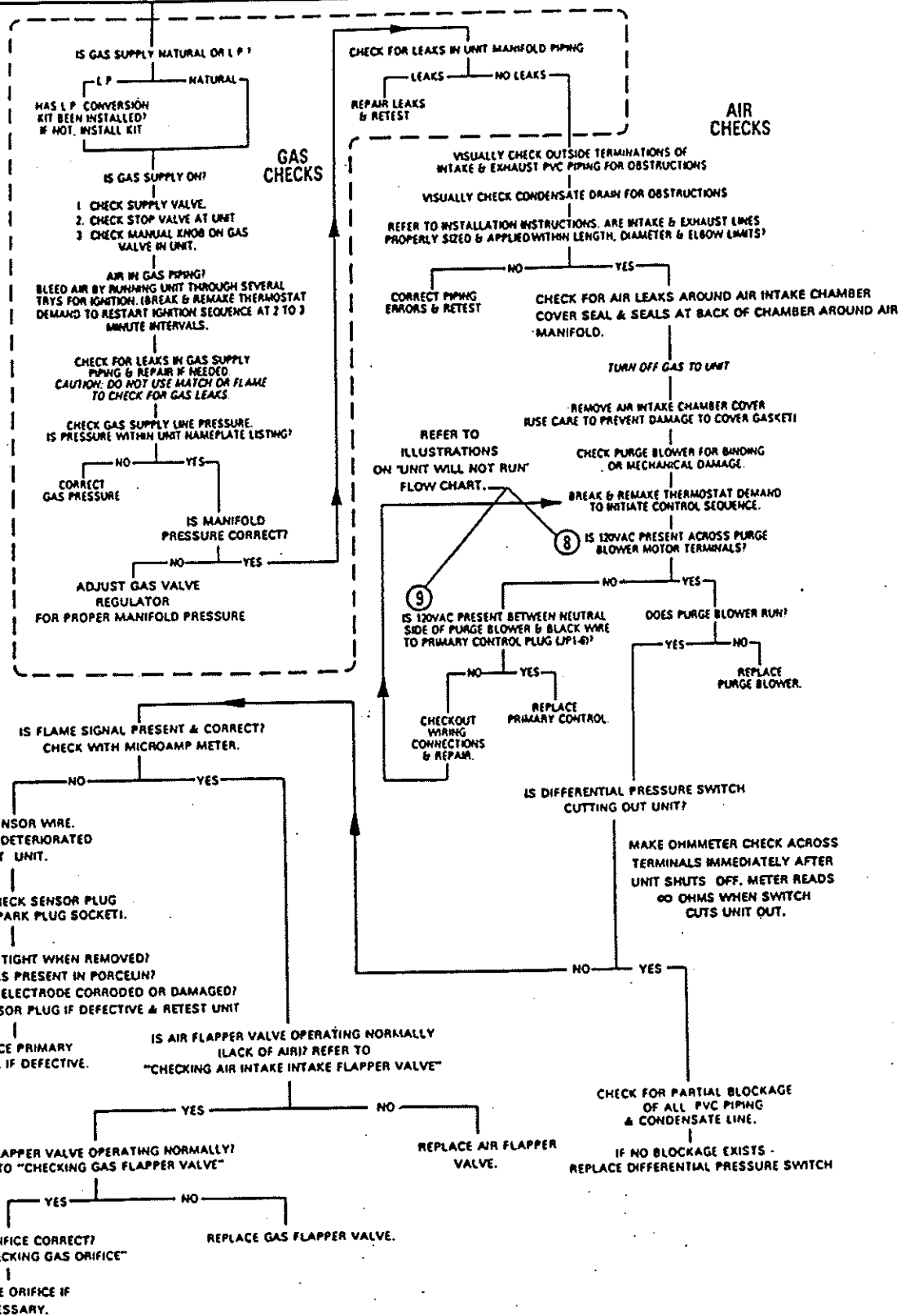
NOTE - REFER TO ILLUSTRATIONS ON PREVIOUS PAGE FOR NUMBERED CHECKS.

CONTINUED FROM  
UNIT-WILL-NOT-RUN  
FLOWCHART ON  
PAGE 30



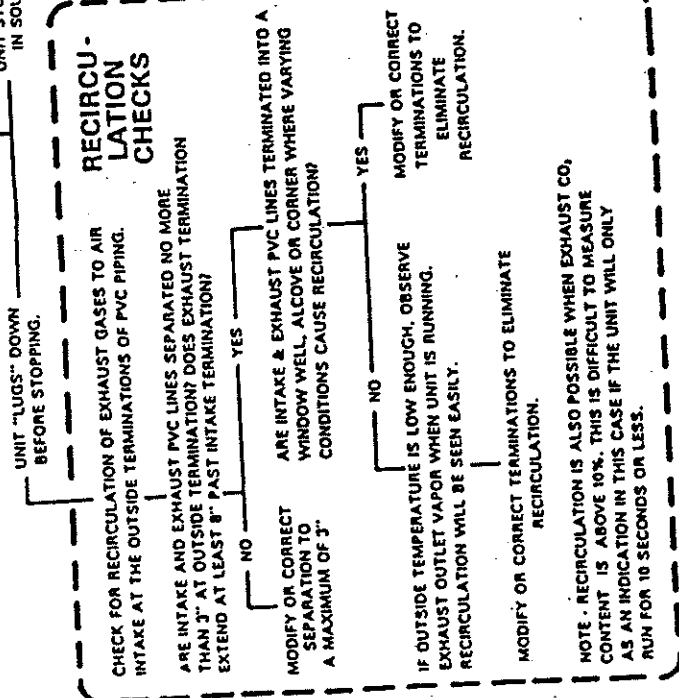


# UNIT SPUTTER STARTS & DIES



# UNIT STARTS CLEAN BUT RUNS LESS THAN 10 SECONDS

RESET UNIT IF LOCKED OUT. LISTEN FOR CHANGE IN SOUND OF UNIT BEFORE IT STOPS.



1

ARE LIMITS CUTTING OUT UNIT? CHECK FOR OPEN LIMIT IMMEDIATELY FOLLOWING UNIT CUTOFF. SHUT OFF POWER AND MAKE OHMMETER CHECK.

NO

YES

DETERMINE CAUSE OF LIMIT CUTOFF AND CORRECT PROBLEM.

2

IS DIFFERENTIAL PRESSURE SWITCH CUTTING OUT UNIT?

NO

YES

MAKE OHMMETER CHECK ACROSS TERMINALS IMMEDIATELY AFTER UNIT SHUTS OFF. METER READS ∞ OHMS WHEN SWITCH CUTS UNIT OUT.

3

CHECK FOR PARTIAL BLOCKAGE OF ALL PVC PIPING & CONDENSATE LINE.

IF NO BLOCKAGE EXISTS - REPLACE VACUUM SWITCH.

IS FLAME SIGNAL PRESENT & CORRECT? CHECK WITH MICROAMP METER.

NO

YES

GO TO LEFT SIDE OF CHART & MAKE RECIRCULATION CHECKS.

IF RECIRCULATION IS NOT PRESENT, CHECK FOR ADEQUATE GROUNDING OF UNIT & PRIMARY CONTROL. IF OKAY, CHECK PRIMARY CONTROL TIMING.

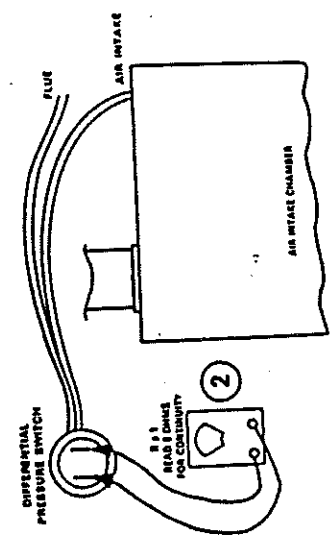
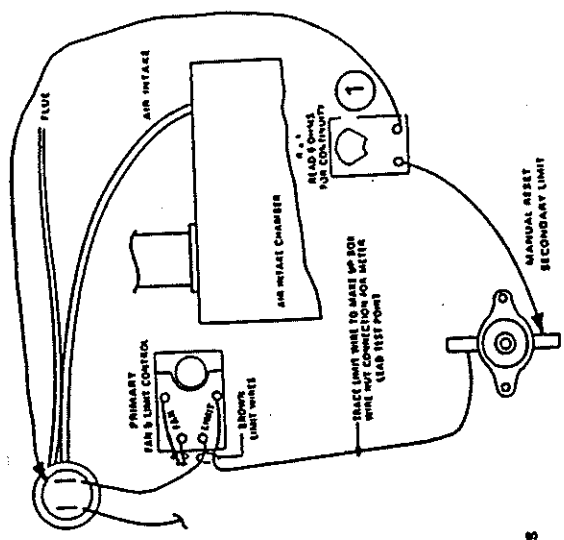
MONITOR MANIFOLD PRESSURE OR GAS VALVE COIL, PURGE BLOWER (120 VAC), SPARK PLUG WIRE WITH SPARK TESTER & FLAME SIGNAL. USE THE TIMING CHARTS IN FIGURE 8 OF THIS MANUAL TO DETERMINE IF PRIMARY CONTROL IS DEFECTIVE.

REPLACE PRIMARY CONTROL IF DEFECTIVE.

CHECK SENSOR WIRE. REPLACE IF DETERIORATED & RETEST UNIT.

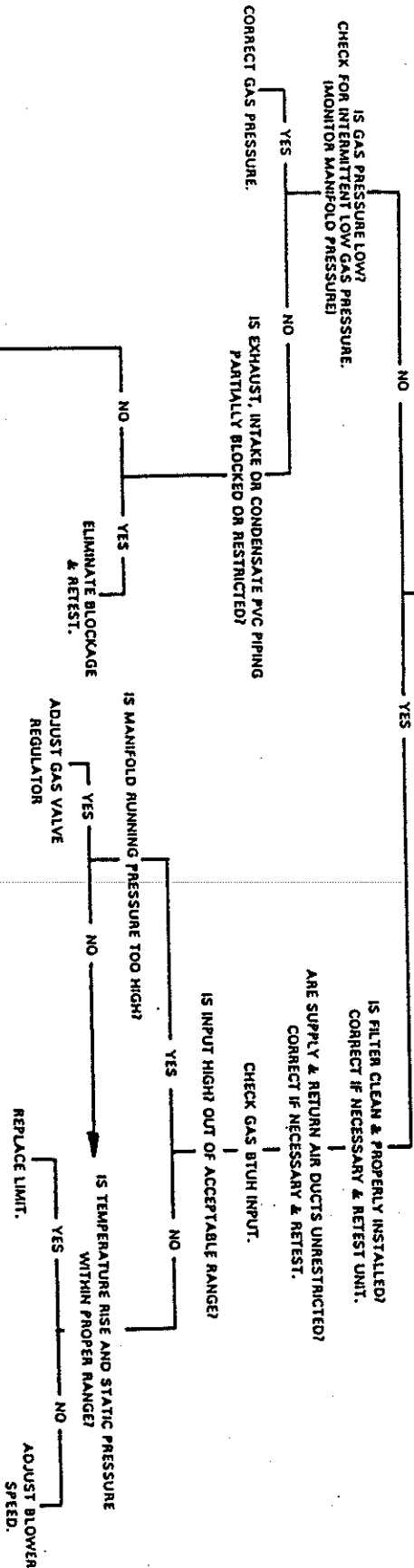
REMOVE & CHECK SENSOR PLUG (USE 11/16" SPARK PLUG SOCKET).

1. WAS PLUG TIGHT WHEN REMOVED?  
2. ARE CRACKS PRESENT IN PORCELAIN?  
3. IS SENSOR ELECTRODE CORRODED OR DAMAGED?  
REPLACE SENSOR PLUG IF DEFECTIVE & RETEST UNIT.



# UNIT RUNS BUT SHUTS OFF BEFORE THERMOSTAT IS SATISFIED - INSUFFICIENT HEAT

1 DOES EITHER UNIT CUTOFF CAUSING UNIT TO SHUT OFF? TURN OFF POWER & MAKE CHAMBER CHECK IMMEDIATELY FOLLOWING CUTOFF OF UNIT.



## RECIRCULATION CHECKS

CHECK FOR RECIRCULATION OF EXHAUST GASES TO AIR INTAKE AT THE OUTSIDE TERMINATION OF PVC EXHAUST PIPING.

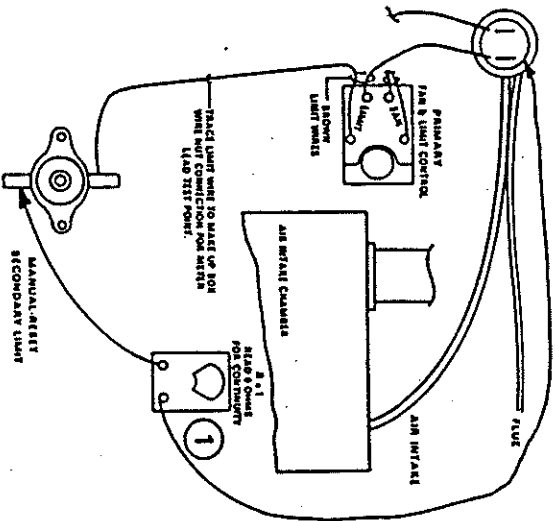
ARE INTAKE & EXHAUST PVC LINES SEPARATED NO MORE THAN 3" AT OUTSIDE TERMINATION? DOES EXHAUST TERMINATION EXTEND AT LEAST 6" PAST INTAKE TERMINATION?

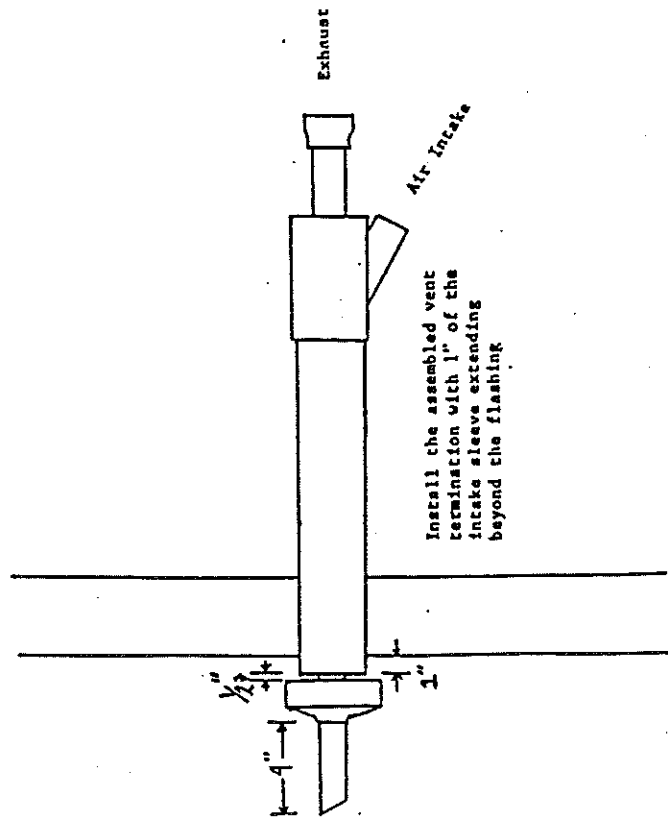
NO  
MODIFY OR CORRECT SEPARATION TO A MAXIMUM OF 3".

YES  
ARE INTAKE & EXHAUST PVC LINES TERMINATED INTO A WINDOW WELL, ALCOVE OR CORNER WHERE VARYING CONDITIONS CAUSE RECIRCULATION?

NO  
IF OUTSIDE TEMPERATURE IS LOW ENOUGH, OBSERVE EXHAUST OUTLET VAPOR WHEN UNIT IS RUNNING. RECIRCULATION WILL BE SEEN EASILY.

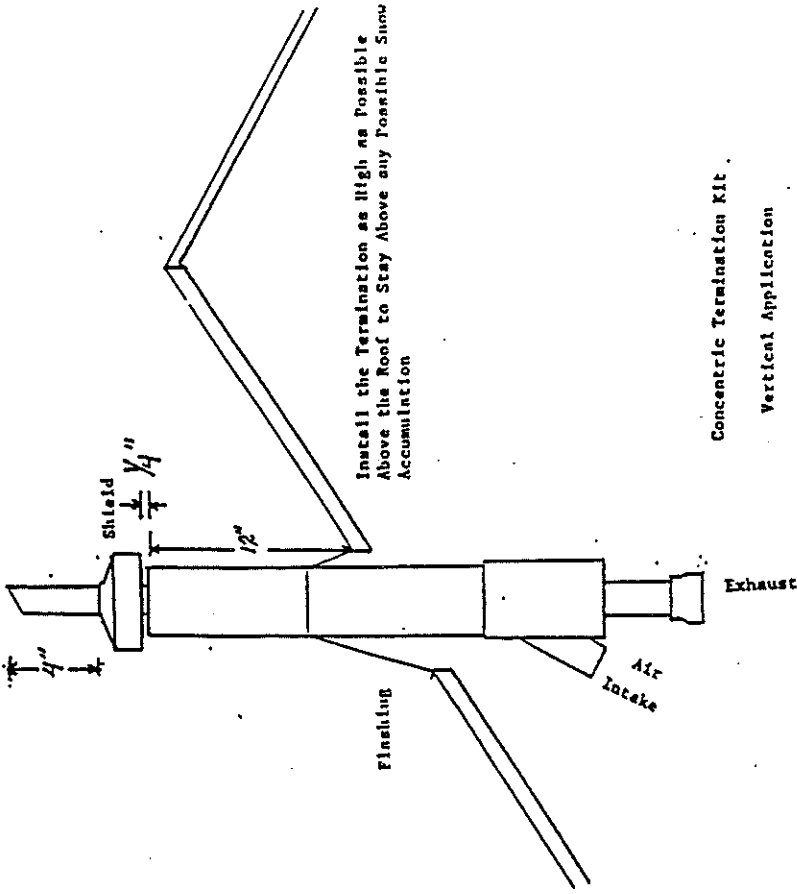
YES  
IF OUTSIDE TEMPERATURE IS TOO HIGH TO SEE EXHAUST VAPOR OR RECIRCULATION CANNOT BE DETERMINED, CHECK CO<sub>2</sub> CONTENT OF EXHAUST GAS. IF CO<sub>2</sub> CONTENT IS ABOVE 10% RECIRCULATION IS POSSIBLE.





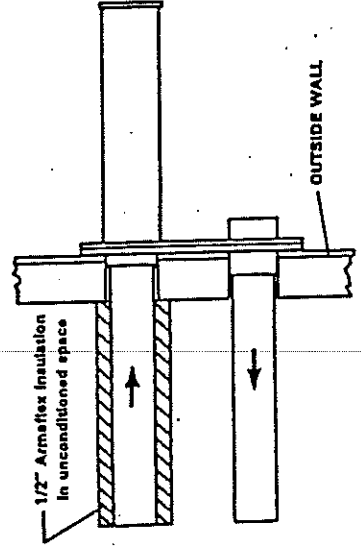
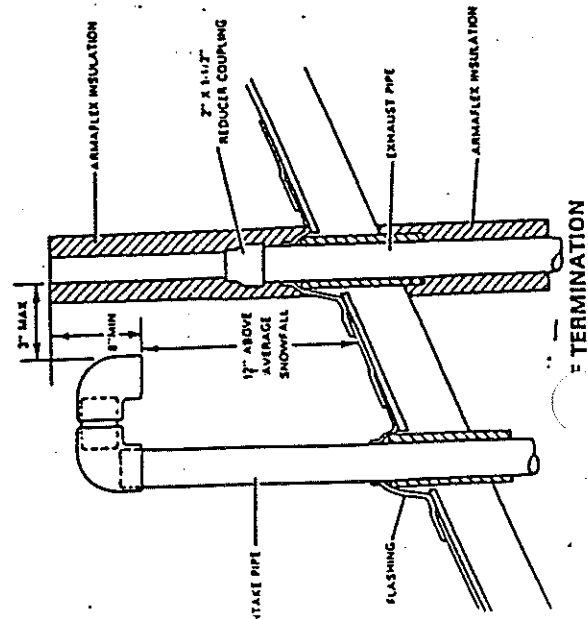
Install the assembled vent termination with 1" of the intake sleeve extending beyond the flashing

Concentric Termination Kit  
Horizontal Application



Install the Termination as High as Possible Above the Roof to Stay Above any Possible Snow Accumulation

Concentric Termination Kit  
Vertical Application



TOP VIEW  
WALL TERMINATION

