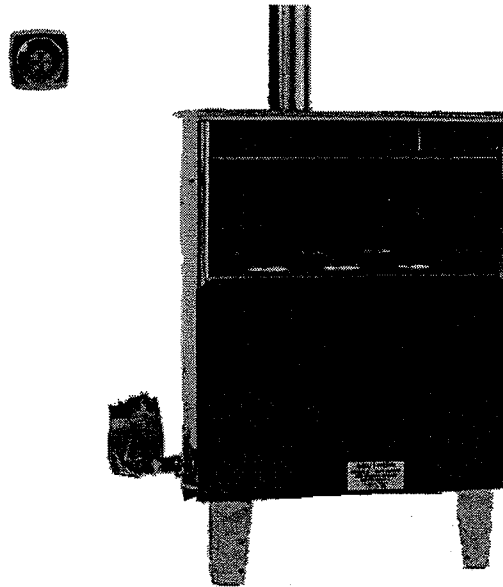


Southern Burner Company

Gas – Fired Vented Greenhouse Heater

Models: A –1 250N & A-1 250P



Warning! If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury, or loss of life.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- **WHAT TO DO IF YOU SMELL GAS**
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from your neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- Installation and service must be preformed by a qualified installer, service agency or gas supplier.

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Safety Information and Warnings!

WARNINGS

IMPORTANT: Read this owner's manual carefully and completely before trying to assemble, operate, or service this greenhouse heater. Improper use of this greenhouse heater can cause serious injury or death from burns, fire, explosion and carbon monoxide (CO) poisoning.

DANGER

Carbon monoxide poisoning may lead to death!

Carbon monoxide poisoning: Early signs of carbon monoxide poisoning resemble the flu, with headaches, dizziness or nausea. If you have these signs; the greenhouse heater may not be working properly. **GET FRESH AIR AT ONCE!** Have heater serviced. Some people are more affected by carbon monoxide than others. These include pregnant women, people with heart or lung disease or anemia, those under the influence of alcohol and those at high altitudes.

Natural Gas: Natural gas is odorless. An odor-making agent is added to natural gas. The odor helps you detect a natural gas leak. However, the odor added to natural gas can fade. Natural gas may be present even though no odor exists.

Make certain you read and understand all Warnings. Keep this manual for reference. It is your guide to safe and proper operation of this greenhouse heater.

WARNING! Any change in this greenhouse heater or its controls can be dangerous.

1. This appliance is only for the type gas indicated on the rating plate. Any additions, changes or conversions required in order for this greenhouse heater to satisfactorily meet the application needs must be made by a professional gas appliance service person using factory specified and approved parts.
2. If you smell gas:
 - Shut off gas supply.
 - Do not try to light appliance.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Immediately call your gas supplier from your neighbor's phone. Follow the gas suppliers instructions.
 - If you cannot reach your gas supplier, call the fire department.
3. This greenhouse heater shall not be installed in a bedroom or bathroom, garage or workshop.

Safety Information and Warnings! continued

4. Never install the greenhouse heater:
 - In a recreational vehicle.
 - In a mobile home.
 - In a trailer.
 - Where curtains, furniture, clothing or other flammable objects are less than 12 inches from the front, top or sides of the greenhouse heater.
 - As a fireplace insert.
 - In high traffic areas.
 - In windy or drafty areas.
 - On combustible flooring.
5. **This greenhouse heater needs fresh, outside air ventilation to run properly.**
 - **See Fresh Air for Combustion and Ventilation (page 12).**
6. Never run greenhouse heater in small, closed room.
7. Do not run greenhouse heater:
 - Where flammable liquids or vapors are used or stored.
 - Under dusty conditions.
8. Heaters are controlled by thermostat; heater may start at any time.
9. Never place any object on greenhouse heater.
10. Surface of greenhouse heater becomes hot when running heater. Keep children, adults and pets away from hot surface to avoid burns or clothing ignition. Greenhouse heater will remain hot for a time after shutdown. Allow surface to cool before touching.
11. Carefully supervise young children when they are in the same room with greenhouse heater.
12. Do not use greenhouse heater if any part has been under water. Immediately call a qualified service technician to inspect the greenhouse heater and replace any part of the control system and gas control that has been under water.
13. **DO NOT** obstruct the flow of combustion and ventilation air.
14. Operating this heater when not connected to a properly installed and maintained venting system can result in carbon monoxide (CO) poisoning and possible death.
15. Turn off greenhouse heater and let cool before servicing. Only a qualified service person should install, service or repair this greenhouse heater. The heater should be inspected before use and at least annually by a qualified service person. It is imperative that the control, burner and circulating air passageways be kept clean at all times.

Unpacking

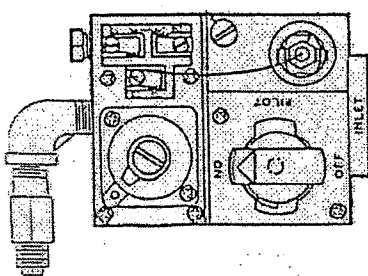
1. Open bottom end of the carton and remove the greenhouse heater from the carton.
2. Remove all protective packing applied to the greenhouse heater for shipment.
3. Check heater for any shipping damage. If there is damage, immediately notify the dealer where the heater was purchased or Southern Burner Company.
4. Remove the packing from the inside of the heater. Dispose of all packing material properly. You will find packed inside a gas control valve with lock nut and washer, thermostat, thermostat wire, thermopile, pilot line, pilot burner and draft hood tee (see packing list figure 1 page 5). The thermopile has been attached to the gas valve, and the pilot burner, pilot line have been attached to the main burner.

If there is a shortage of any parts, notify the dealer where the greenhouse heater was purchased or Southern Burner Company.

Packing list

1. (1) gas control valve
2. (1) lock nut
3. (1) ½" washer
4. (1) thermostat
5. (1) thermostat wire
6. (1) pilot line
7. (1) pilot burner
8. (1) thermopile
9. (1) draft hood

Gas control valve



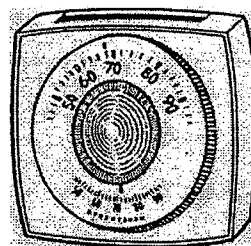
Lock nut



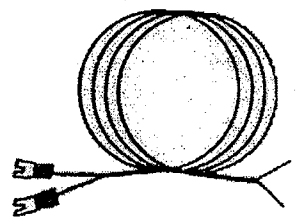
½" washer



Thermostat



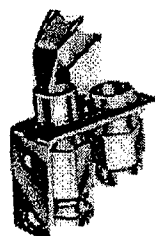
Thermostat wire



Pilot line



Pilot burner



Thermopile



Draft Hood

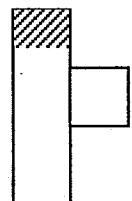


Figure 1

Assembling Millivolt Gas Control Valve to Heater

Select a work area; place a towel, blanket or piece of cardboard on the work area. Place heater upside down on the work area.

Unscrew the brass lock nut off the brass orifice connector leaving the $\frac{1}{2}$ " zinc washer on the brass connector.

Insert the brass connector into the burner orifice bracket. Hold the gas control valve with the bottom facing up and with the inlet of the valve to the back of heater. Secure gas valve with the brass lock nut (see figure 2 page 6). Tighten brass lock nut with a $\frac{3}{4}$ " box end wrench or pair of pliers. Be careful not to bend the burner orifice bracket.

Next loosen the $\frac{7}{16}$ " brass nut holding the pilot line to the pilot burner. **Caution! Do not remove pilot line from the pilot burner** this could let the pilot orifice get misplaced. Swing the pilot line around and over the leg of the heater. Insert the pilot line into the pilot line outlet in the gas control valve (see figure 2 page 6). Tighten both ends of the pilot line finger-tight plus $\frac{1}{4}$ of a turn with a $\frac{7}{16}$ " wrench. **Check for leaks later (see checking gas connections page 21).**

Now uncurl the thermopile wire pulling it toward the pilot burner. Insert the thermopile into the hole on the pilot burner next to the pilot line (see figure 3 page 7). Tighten the $\frac{7}{16}$ " nut finger-tight plus $\frac{1}{4}$ of a turn with a $\frac{7}{16}$ " wrench. **Turn the heater right side up at this time.**

Next connect the spade ends of the thermostat wire to the red terminal block on the gas control valve. The **red** wire goes to the screw marked **TH & PP** which has the red thermopile wire attached. The **white** wire goes to the other screw marked **TH** (see figure 4 page 7).

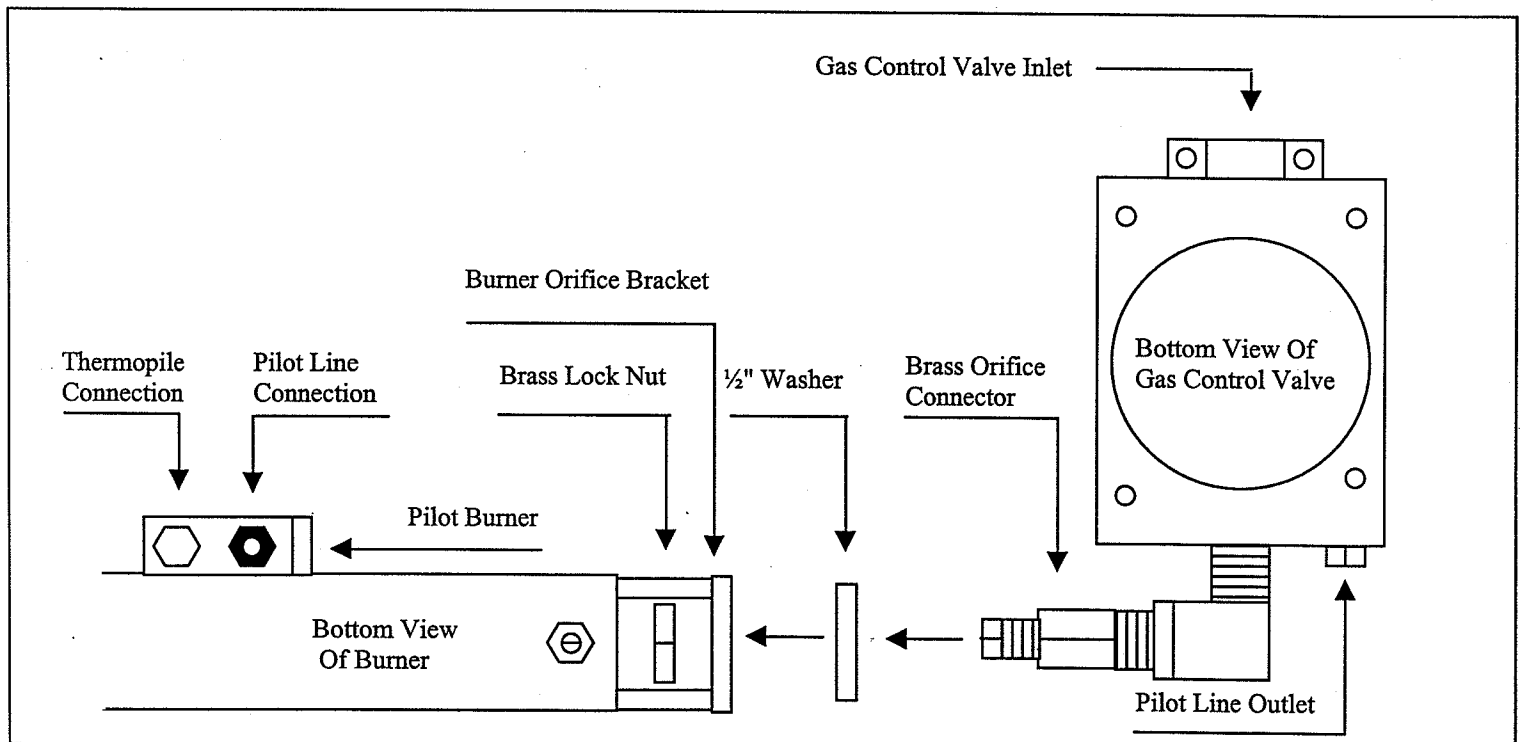


Figure 2

Assembling Millivolt Gas Control Valve to Heater continued

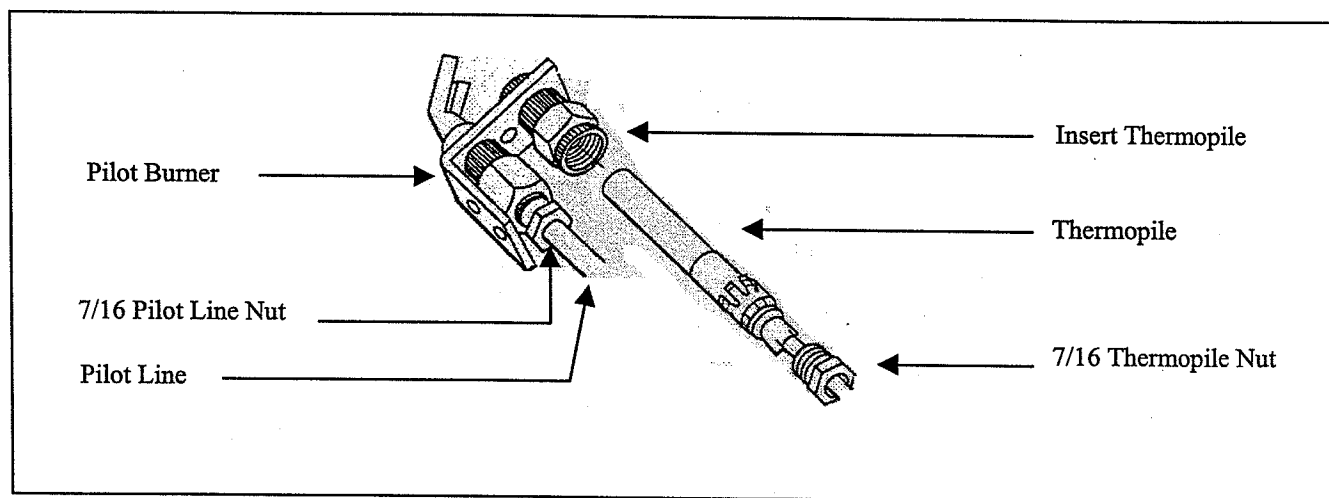


Figure 3

Wiring Diagram

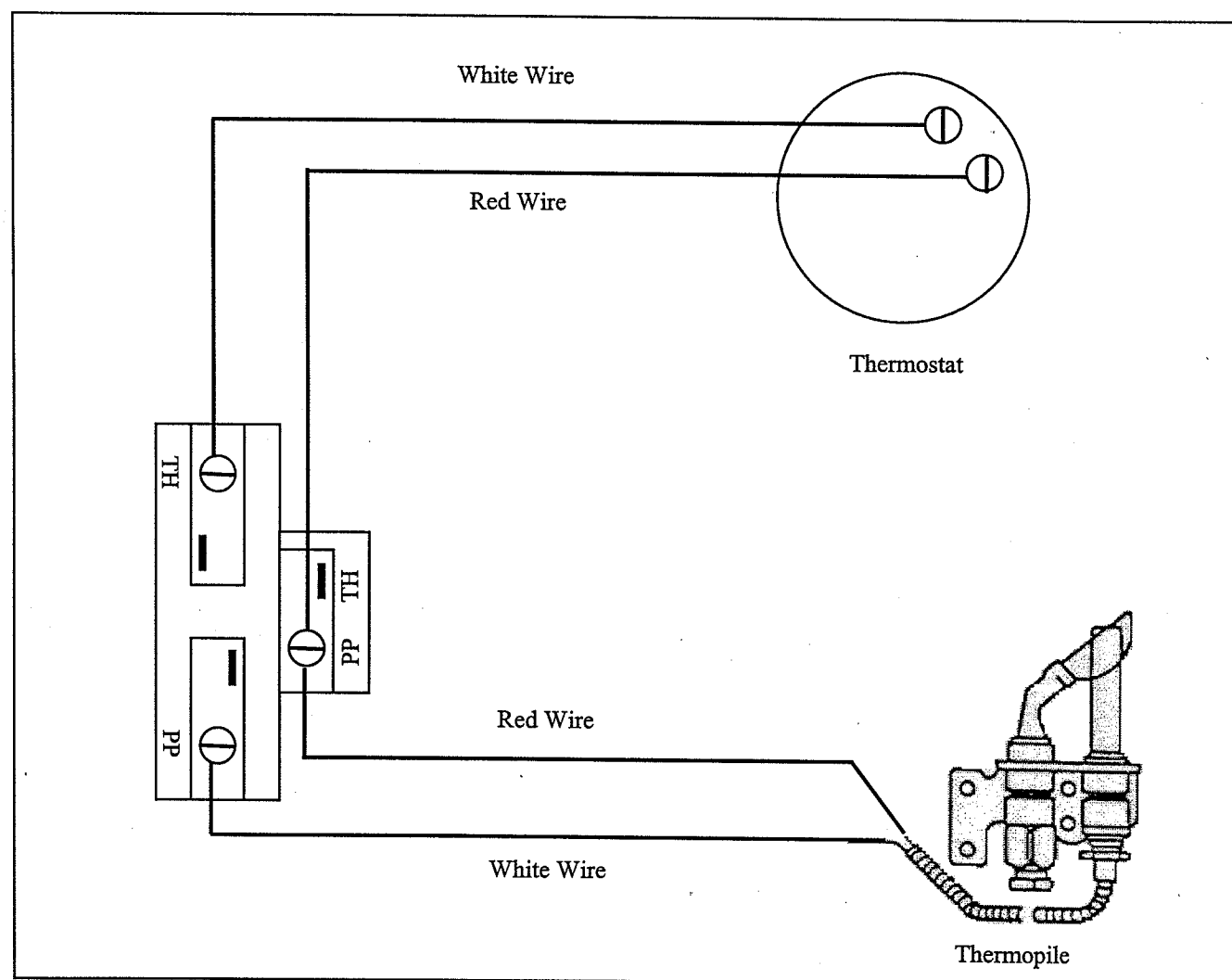


Figure 4

Heater Installation

It is recommended that this heater be installed by a professional gas appliance service person. It should be inspected before use and at least once a year by a professional gas appliance service person.

Choosing heater location

This heater is to be installed on the floor. The floor in the greenhouse **can not** be made of **combustible material**. If the floor in the greenhouse is dirt or pea gravel we recommend that a concrete pad, patio blocks or floor pad be used. The pad should extend the full width and depth of the heater.

▲ WARNING

Never Install the Greenhouse Heater

- In a bedroom.
- In a recreation vehicle.
- Where curtains, furniture, clothing or flammable objects are less than 36" from the front, top or sides of the greenhouse heater.
- As a fireplace insert.
- In high traffic areas.
- In windy or drafty areas.
- On combustible flooring.

▲ WARNING

Maintain the minimum clearances shown below:

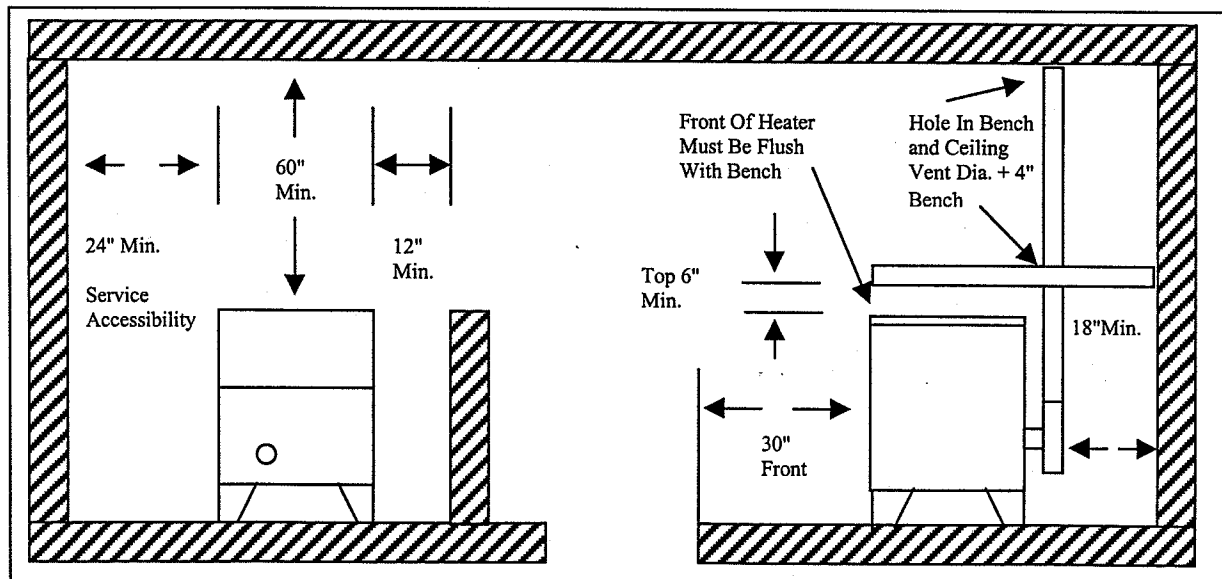


Figure 5

Heater Installation continued

▲ NOTICE

A qualified service person must install heater. Follow all local codes

1. Install the greenhouse heater on the floor at the end of an isle, under side or center bench.
2. Position the greenhouse heater following the minimum clearances from combustible materials as noted (in figure 5 page 8).
 - a) Left side (service accessibility) – 24"
 - b) Right side – 12"
 - c) Front – 30"
 - d) Back – 18"
 - e) Top of heater (ceiling height) – 60"
 - f) Top of heater (if installed under a growing bench) 6" **heater must face isle.**
 - g) **Not for installation on combustible flooring.**

* Sides of heater are determined by facing the heater.

3. When installing the heater in a greenhouse with a dirt or pea gravel. It is recommended that concrete pad or patio blocks be used. The pad should extend the full width and depth of heater.

Thermostat Location

Your thermostat is a sensitive instrument. For accurate temperature control; correct location is very important.

Locate your thermostat about 5' above the floor and within 15' of the heater.

Avoid the following:

Direct path of watering either by hand or misting head.

HOT SPOTS

- Direct sunlight
- Concealed pipes & ducts
- Fireplaces within walls
- Registers
- Lights
- Front of heater
- Fans

COLD SPOTS

- Concealed pipes & ducts
- Doors – drafts
- Windows – drafts
- Behind doors
- Corners & alcoves
- Dead spots
- Fans

Thermostat Location continued:

The following precautions must be taken when installing this thermostat:

1. Use only the thermostat wire provided with the greenhouse heater. DO NOT splice for increased length or use a longer thermostat wire. Contact the factory for a longer thermostat wire if needed. The maximum length of wire is 25" of 18/2 wire.
2. Make certain all conductors are secure.
3. Use only the thermostat provided or one rated for 750 millivolt use.

Mounting Thermostat

1. Remove friction fit cover (see figure 6 page 10) from the thermostat body by gripping at top and bottom and lifting from thermostat body. Use extreme care not to damage working parts.
2. Remove subbase from the thermostat body by loosening the 3 captive screws (see figure 6 page 10).
3. Pull approximately 3" of wire through the center hole of the subbase.
4. Hold the subbase level and against the location chosen. It is not necessary to accurately level subbase, merely position for appearance. With a pencil, mark the location where the screws will attach the subbase in position. Use designated mounting holes only. Now lay the subbase to one side. Drill the mounting holes with 3/32" bit. *If you are mounting the thermostat on an exterior wall be sure to insulate thermostat with a piece of wood or other material that will not transfer temperature easily.*
5. Connect thermostat wires to applicable terminal screws (see figure 6 page 10). The red wire to one and the white wire to the other. It does not make any difference, which wire or screw. Push excess wire back through hole in subbase.
6. Mount thermostat body on subbase using three captive screws (see figure 6 page 10). Captive screw in the lower left corner of body is self threading into subbase. Use care not to over-tighten.
7. Replace thermostat cover being careful to align "D" shaped dial shaft with matching hole in hub of setting dial.

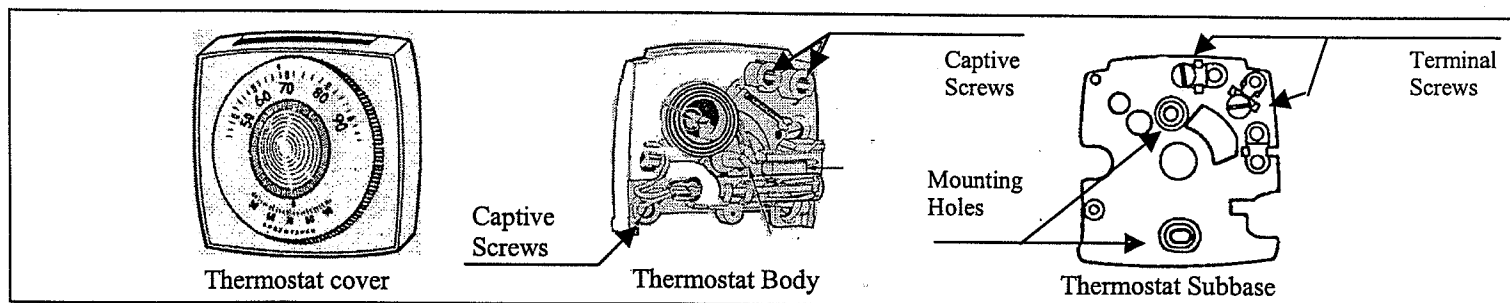


Figure 6

Combustion & Air Ventilation Air

▲ WARNING

This heater must be provided with enough fresh air for proper combustion and ventilation of flue gases. Improper ventilation may cause illness, bodily injury or death. Most greenhouses will require that outside air be supplied into heater area.

▲ WARNING

Even when your greenhouse meets requirements for * unconfined space with adequate air infiltration, illness, bodily injury, or death may occur. It is recommended that a fresh air intake be installed to lesson the possible dangers from any changes to the greenhouse.

***An unconfined space is defined as a minimum volume of 50 cubic feet per 1,000 BTU/HR (total of all fuel burning appliances in the area).**

Today's greenhouses are built more energy efficient than ever. New materials, increased insulation and new construction methods help reduce heat loss in greenhouses. Some greenhouse owner's weather-strip and caulk around windows and doors to keep the cold air out and the warm air in.

While it is good to make your greenhouse energy efficient, you can get your greenhouse to tight. ***Your greenhouse needs to breathe; fresh air must enter your greenhouse.*** All fuel-burning appliances need fresh air for proper combustion and ventilation.

All heaters of this type will burn some oxygen out of the air. This makes it necessary to provide a means of bringing fresh or combustible air into the greenhouse. Failure to do this will cause the plants to starve for oxygen and as a result the leaves will turn brown and drop.

▲ WARNING

FAILURE TO PROVIDE FRESH OR COMBUSTION AIR MAY CAUSE CARBON MONOXIDE (CO) TO BE PRODUCED AND COULD CAUSE ILLNESS, BODILY INJURY OR POSSIBLE DEATH

Combustion & Air Ventilation Air continued

INSTRUCTION FOR FRESH OR COMBUSTION AIR INTAKE

⚠ WARNING

Provide extra air by using ventilation grill or ducts. You must provide two permanent openings: one within 12" of the ceiling and one within 12" of the floor. Connect these items directly to the outdoors.

One way to provide fresh air is shown (see figure 7 page 12). Use a piece of 3" PVC pipe, or similar material to come through the wall of the greenhouse. Have the bottom of the pipe about 4" from the floor, and stop the pipe about 3" from the heater shell.

A small or equal amount of top ventilation is necessary at all times. This allows air to escape, and will cause fresh air to be drawn through the air intake pipe at the bottom. If you do not have top vents end louvers will do. *Intake air is regulated by the amount of top ventilation.*

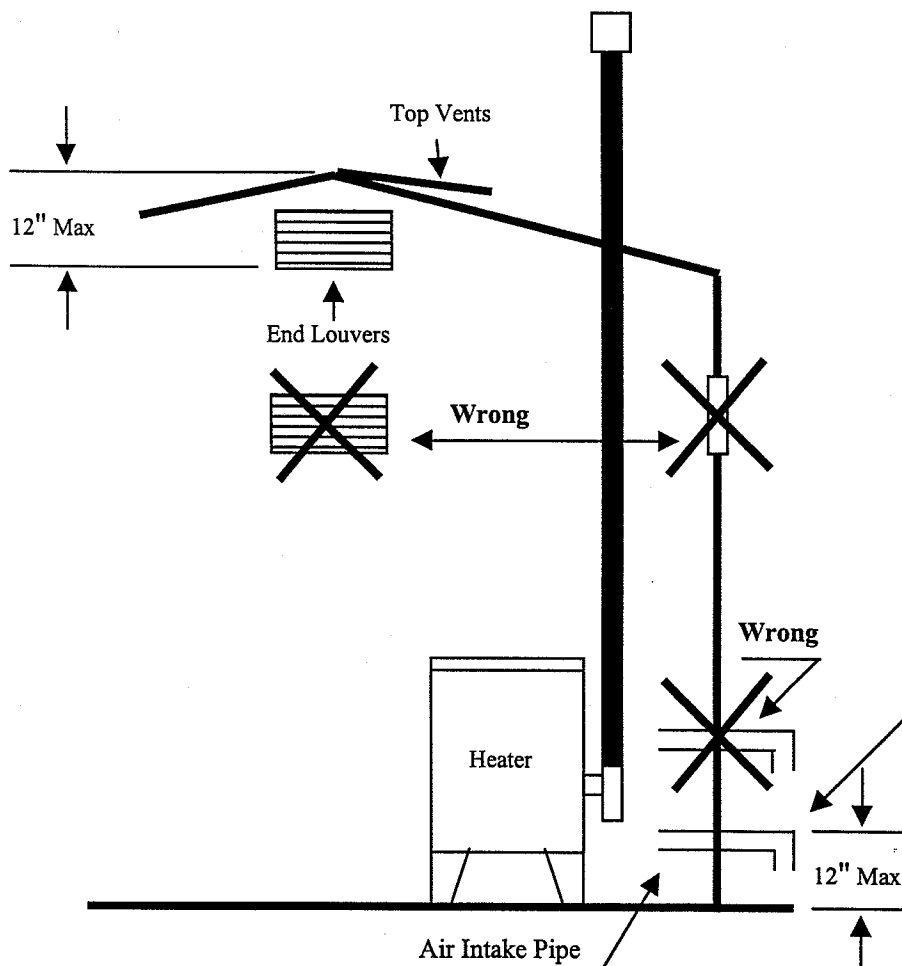


Figure 7

⚠ Important

In unusually tight constructed greenhouses you should have 12.5 square inches of free area, of fresh air for every 25,000 BTU. The intake pipe would be increased to 4" in diameter. If wood louvered vents are used calculate the free area at 20% to 25% of the vent area. If metal louvered vents are used calculate the free area at 60% to 75% of the vent area. Screens should not be used if smaller than 1/4" mesh.

If you experience large amounts of condensation forming on the inside of the greenhouse, this could mean an inadequate amount of fresh and combustion air supply.

3' air intake pipe - Have elbow turned down to keep out water, and screened no smaller than 1/4" mesh to keep out rodents. Intake pipe can be offset to one side. It does not install directly under the draft hood tee.

⚠ IMPORTANT

In areas where there is heavy snowfall, it is necessary to arrange to keep the air intake pipe open. This may be accomplished by tilting something over the outside opening while it is snowing.

Proper Venting

⚠ WARNING

Operating this heater when not connected to a properly installed venting system can result in carbon monoxide (CO) poisoning and possible death.

This heater must be connected to a properly vented and maintained venting system that is engineered and constructed so as to develop a positive flow adequate to remove flue gases to the outside.

This heater is arranged for a 3" double wall **Type B** vent pipe. This size of vent pipe can be found at most hardware stores. A **Draft Hood Tee** is furnished with each heater it must attached directly to the vent connector of the heater. The crimped end of the draft hood tee goes up. *Secure the draft hood tee with sheet metal screws (see figure 8 page 13).*

Suggested Venting Through The Roof

The vent pipe **MUST RUN VERTICALLY** from the draft hood tee, going straight up passing through a 7" hole in the bench if necessary. Then going straight up through a 7" hole in the top of the greenhouse. The vent pipe will need to be supported so that all the weight of the system is not on the vent connector of the heat exchanger (see figure 8 page 13). Depending on the structure you will need a roof flashing, storm collar and roof sealant.

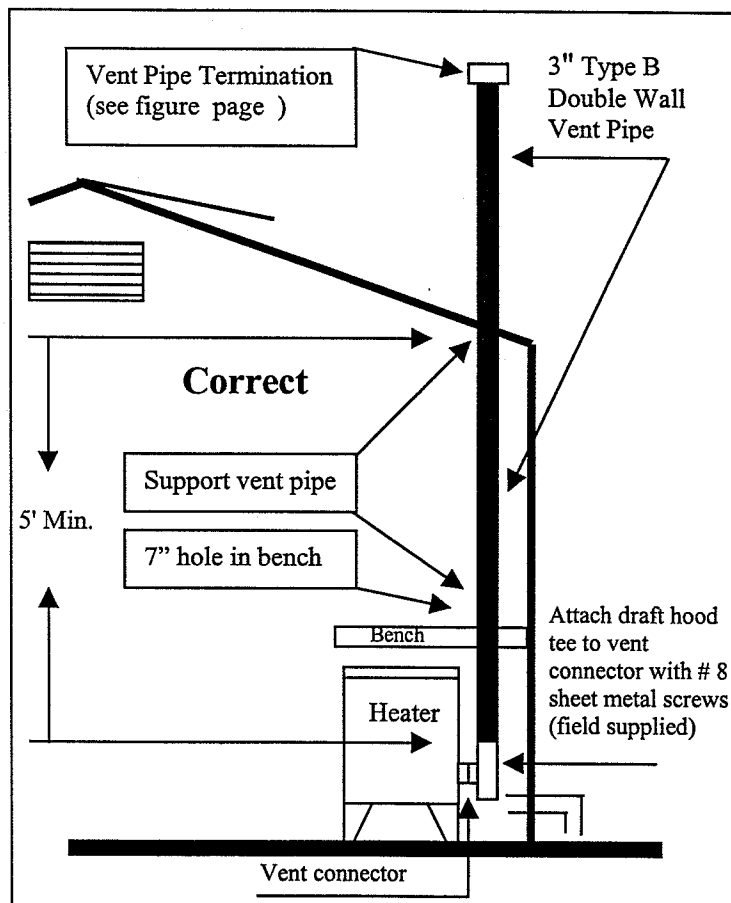


Figure 8

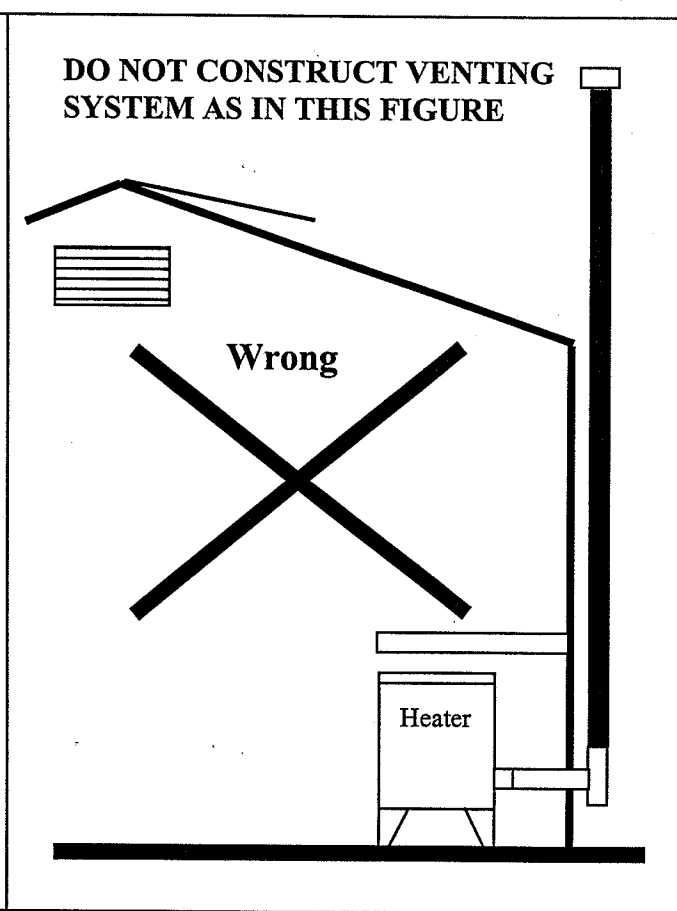


Figure 9

Proper Venting continued

Alternate Venting Through Side, End Wall Or Gable

This heater is arranged for a 3" double wall **Type B** vent pipe. This size of vent pipe can be found at most hardware stores. A **Draft Hood Tee** is furnished with each heater it must attached directly to the vent connector of the heater. The crimped end of the draft hood tee goes up. *Secure the draft hood tee with sheet metal screws (see figure 10 page 14).*

The vent pipe **MUST RUN VERTICALLY WITH A MINIMUM OF 5 FEET** from the draft hood tee, passing through a 7" hole in the bench if necessary. Then run the vent pipe to the top portion of the side or end wall, then ell out through a 7" hole and ell back up. The horizontal piece of vent pipe should be as short as possible and shall be a **MAXIMUM OF 2 FEET** with an upward pitch of $\frac{1}{4}$ " per foot going out. The vent pipe will need to be supported so that all the weight of the system is not on the vent connector of the heat exchanger (see figure 10 page 14). Depending on the structure you will need a flashing or wall thimble, storm collar and roof sealant.

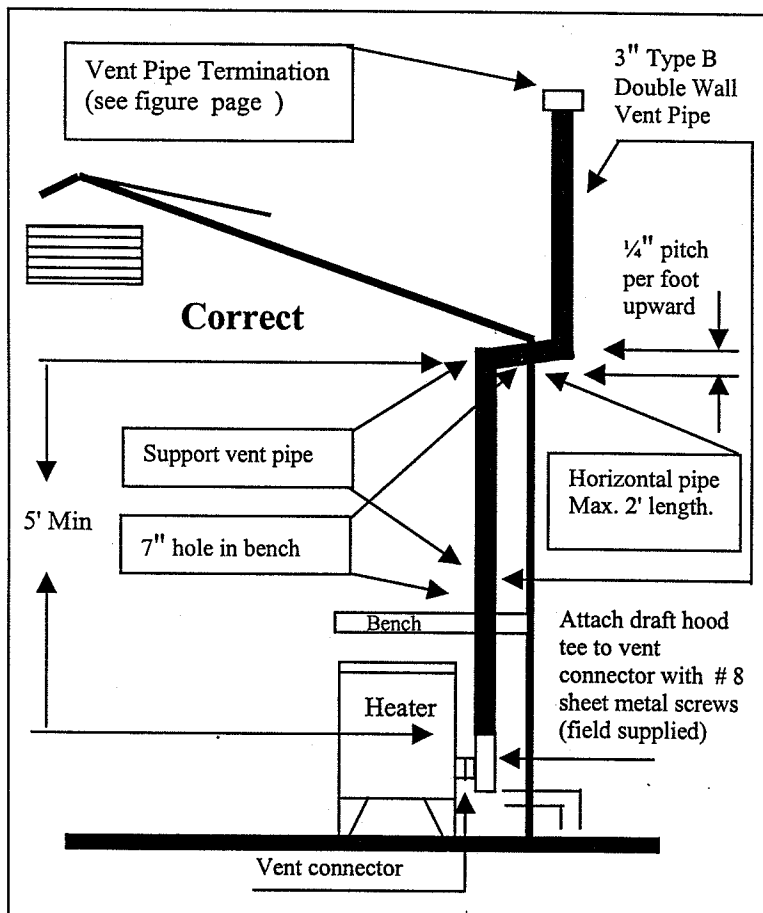


Figure 10

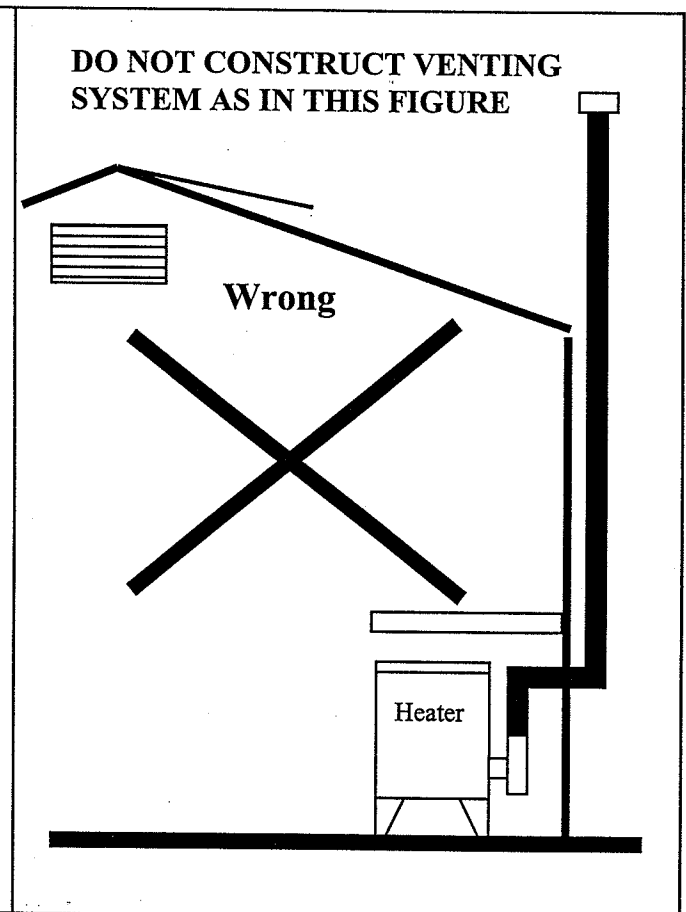


Figure 11

Proper Venting continued

PATICULAR ATTENTION MUST BE GIVEN TO THE FOLLOWING:

1. Vent pipe must be vertical from the draft tee.
2. When venting through the top of a side, end wall or gable of a greenhouse, the horizontal pipe must be as short and direct as possible with a maximum length of 2 feet. The horizontal pipe must have a 1/4" pitch upward to the outside without any sags or dips
3. Manually operated dampers **MUST NOT** be placed in the vent pipes from heater.
4. The size of the vent pipe must be the same as the draft hood tee outlet.
5. The draft hood tee and vent pipe must be firmly attached to the vent connector outlet of the heater by use of sheet metal screws.
6. The vent system must be in good condition and free of obstructions to provide adequate draft for the heater. If you have any doubts about your venting system, call a professional gas appliance service person.
7. Type B double wall vent pipe must be used.
8. The vent pipe **MUST NOT** be connected to a chimney flue serving a solid fuel appliance.

Vent Pipe Termination and Location

- A gas vent extending through an exterior wall shall not terminate adjacent to the wall or below eaves or parapets.
- The gas vent pipe shall extend at least 3 feet above the highest point where it passes through a roof of a greenhouse, and at least 2 feet higher than any portion of a building within a horizontal distance of 10 feet.
- A vent pipe shall extend at least 5 feet above the highest connected equipment draft hood outlet of flue collar.
- A gas vent pipe shall extend at least 3 feet above any forced air inlet located within 10 feet.
- The venting system shall terminate at least 4 feet below, 4 feet horizontally from or 1 foot above any door, window or gravity air inlet into any building.

This heater must be vented as shown (in figure 8 page 10 or figure10 page14) and in accordance with the National fuel Gas Code ANSI Z223.1, Section 7.6, the National Building Code and all local building codes.

Vent Pipe Termination and Location continued

The top of the vent pipe must be **3 FEET above the roof it passes through or by** and **2 FEET higher than the highest part of the greenhouse or any obstruction within 10 FEET horizontal distance**. If there is a 10' horizontal distance from the vent pipe to the greenhouse or other obstruction the 3 feet above the roof it passes through is all that applies (see figure 12 page 16). A listed 3" vent cap must be installed on top of the vent pipe (see figure 12 page 16).

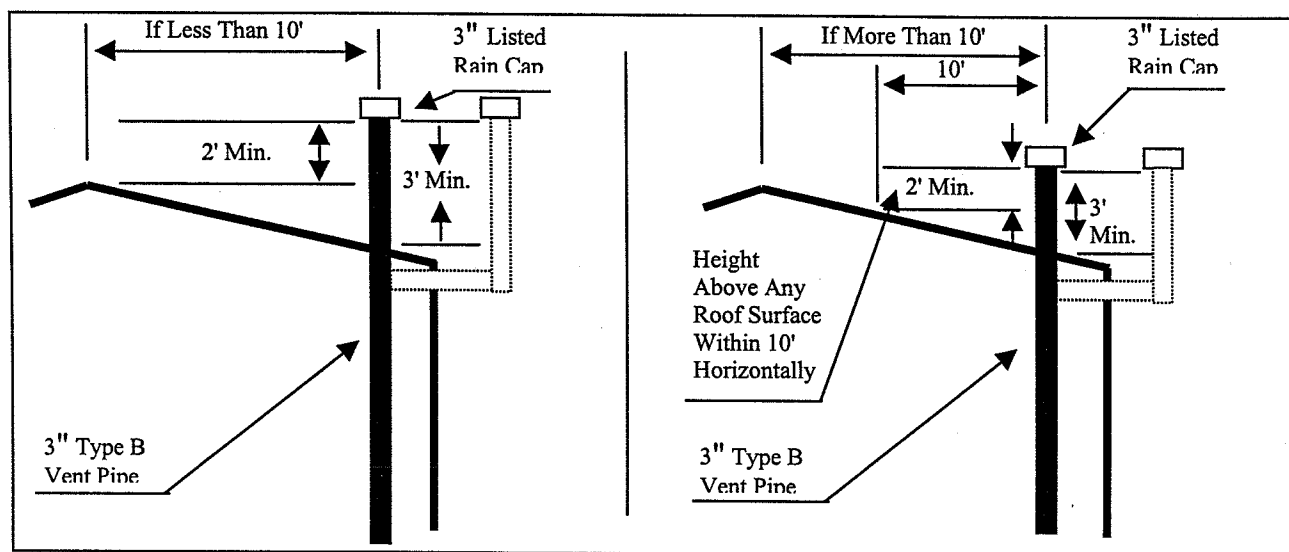


Figure 12

If the greenhouse is a *lean-to style*, the vent pipe must be **3 FEET above the roof it passes through or by** and shall be **2 FEET higher than the highest point of the roof of the structure it adjoins**. Unless a **10 FEET horizontal distance** can be achieved with a shorter pipe (see figure 13 page 16). A listed 3" vent cap must be installed on top of the vent pipe (see figure 13 page 16).

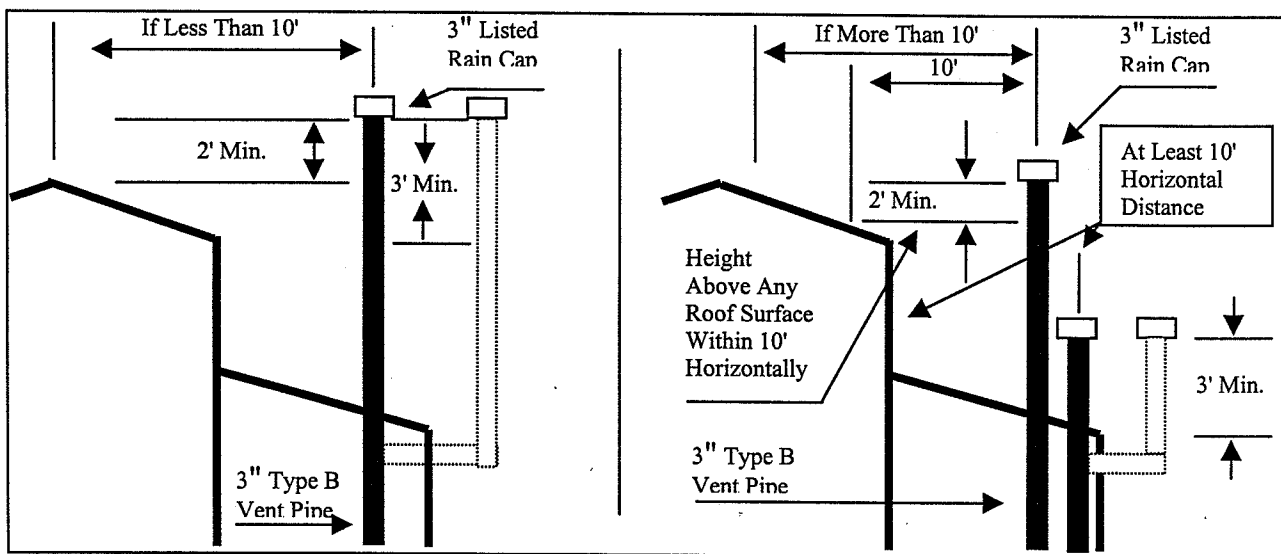


Figure 13

Specifications

	A1 – 250N	A1 – 250P
Input BTU/HR:	25,000	25,000
Type Gas:	Natural Only	Propane Only
Manifold Pressure:	6" W.C.	11" W.C.
Inlet Gas Pressure		
Minimum:	7"	12"
Maximum:	10.5"	14"
Dimensions, inches (H x W x D)		
Heater:	25 x 12.25 x 12.5	25 x 12.25 x 12.5
Carton:	27.25 x 19.2 x 20.75	27.25 x 19.2 x 20.75

Check Gas Type

WARNING

Use only gas specified on the heater rating tag (left side). If your gas supply does not match specified gas for greenhouse heater; **DO NOT** install greenhouse heater. Call the dealer where you bought the greenhouse heater or the factory for proper type of greenhouse heater.

Typical Pipe Diameters

A1-250 = ½" or larger depending on length

Piping

WARNING

The installation of piping and testing for leaks must be completed by a professional gas appliance service person.

WARNING

Never connect greenhouse heater to a private (non-utility) gas well. This is commonly known as well head gas.

Piping continued

▲ CAUTION

Use only new, black iron or steel pipe. Internally tinned copper may be used in certain areas. Check your local codes. Use pipe large enough diameter to allow proper gas volume to heater. If pipe is too small, undue loss of pressure will occur.

1. Installation of a ground pipe joint union is required at the gas inlet connection to the gas control valve of the greenhouse heater. All components upstream of the gas control valve are field supplied by the installer (see figure 14 page 18).
2. Installation of the gas line sediment trap (drip leg) is required at the inlet connection to the gas control valve on the greenhouse heater. Failure to provide a drip leg could result in condensation and foreign matter in the gas control valve.
3. Installation of a manual shut-off valve and 1/8" NPT tap and plug is required for test gauge connection within reach of the gas control valve. Installation of the NPT tap and plug must be upstream from the control valve (see figure 14 page 18) and within reach of the valve.

An AGA design certified manual shutoff valve with 1/8" NPT tap is an acceptable alternative to test gauge connection. Purchase the optional A.G.A. design certified manual shutoff valve from your dealer (see figure 16 page 22).

4. Apply pipe joint sealant to the male threads. This will prevent excess sealant from going into pipe. Excess sealant in pipe could result in clogged heater control valves.

▲ WARNING

Use pipe joint sealant that is resistant to liquid petroleum (L.P.) gas.

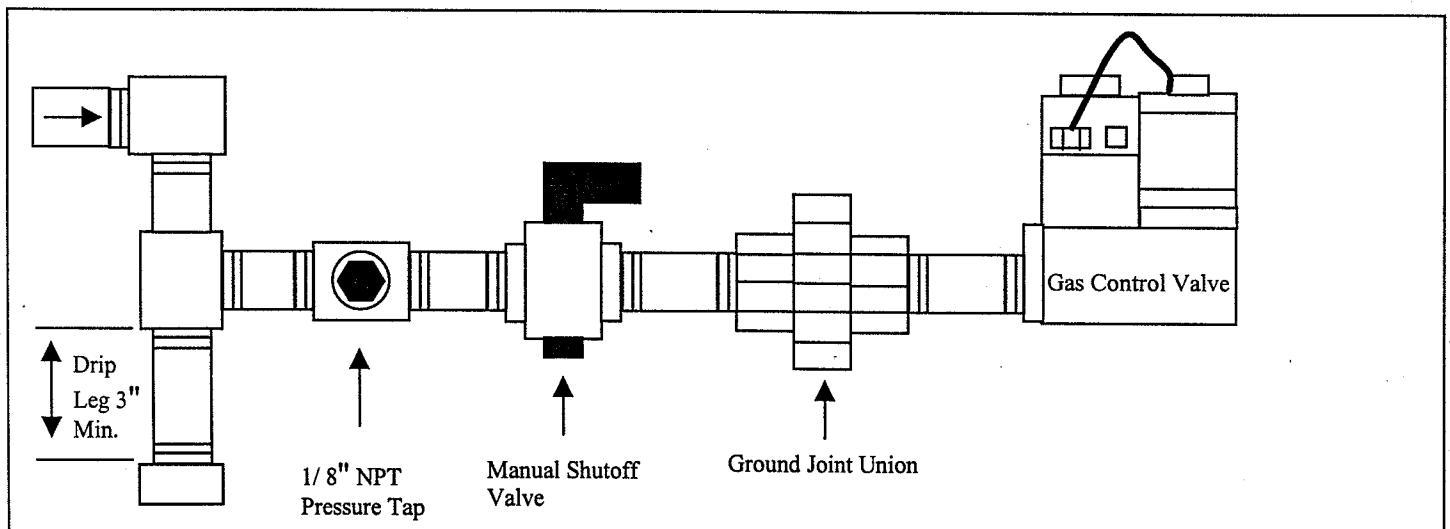


Figure 14

Connecting Gas Supply

⚠ WARNING

A qualified service person must connect heater to gas supply. Follow all local codes.

⚠ WARNING

Check gas line pressure before connecting greenhouse heater to gas line. Gas line pressure must be no greater than 14 inches of water. If gas line pressure is higher, heater gas control valve damage, gas valve regulator damage and leaks will occur.

1. The line pressure can be measured at the 1/8" pipe tap in the main gas line. Pressure measurements should be taken with a water manometer.

Line Pressure: (water column inches)

NATURAL GAS

Minimum: 6"

Maximum: 10.5"

PROPANE GAS

Minimum: 11"

Maximum: 14"

⚠ WARNING

A pressure regulator is an integral part of the automatic gas control valves on all models for both NATURAL and PROPANE gas. This pressure regulator will compensate for minor fluctuations in input pressure, but is **NOT A SUITABLE SUBSTITUTE** for the **LINE PRESSURE REGULATOR** on NATURAL or PROPANE gas line.

Manifold Pressure Checking

▲ IMPORTANT

Be sure to check the manifold pressure with a water manometer to verify operation of the greenhouse heater.

1. The manifold pressure can be measured at the 1/8" pipe tap in the control valve. Pressure measurements should be taken with a water manometer.

Manifold Pressure: (water column inches)

NATURAL GAS

Minimum: 6"

Maximum: 10.5"

PROPANE GAS

Minimum: 11"

Maximum: 14"

▲ WARNING

Input Rating Should Never Exceed That Shown on the Rating Plate

Checking Gas Connections

▲ WARNING

Test all gas piping and connections for leaks after installation or servicing. Correct all leaks at once.

▲ WARNING

Never use an open flame to check for a leak. Apply a mixture of liquid soap and water to all joints. Bubbles forming show a leak. Correct all leaks at once.

Pressure Testing Gas Supply Piping System

Test Pressure In Excess of ½" PSIG

1. Disconnect greenhouse heater and its individual manual shutoff valve from gas supply piping system. Pressure in excess of ½" PSIG will damage heater regulator.
2. Cap off open end of gas pipe where manual shutoff valve was connected.
3. Pressurize supply piping system by either using compressed air or open main gas valve located on or near gas meter.
4. Check all joints of gas supply piping system. Apply mixture of liquid soap and water to gas joints. Bubbles foaming show leak.
5. Correct all leaks at once.

Test Pressure Equal To Less Than ½" PSIG

1. Close manual shutoff valve (see figure 15 and figure 17 page 22).
2. Pressurize supply piping system by either using compressed air or opening main gas valve located on or near gas meter.
3. Check all joints from gas meter to manual shutoff valve. Apply mixture of liquid soap and water to all gas joints. Bubbles foaming show leak.
4. Correct all leaks at once.

Pressure Testing Heater Gas Connections

1. Open manual shutoff valve.
2. Open main gas valve located on or near gas meter.
3. Make sure control valve knob of greenhouse heater is in the OFF position.
4. Check all joints from gas shutoff valve to control valve. Apply mixture of soap and water to gas joints. Bubbles foaming show leak.
5. Correct all leaks at once.
6. Light greenhouse heater (see lighting instructions page 23). Check the rest of the internal joints for leaks.

Checking Gas Connections continue

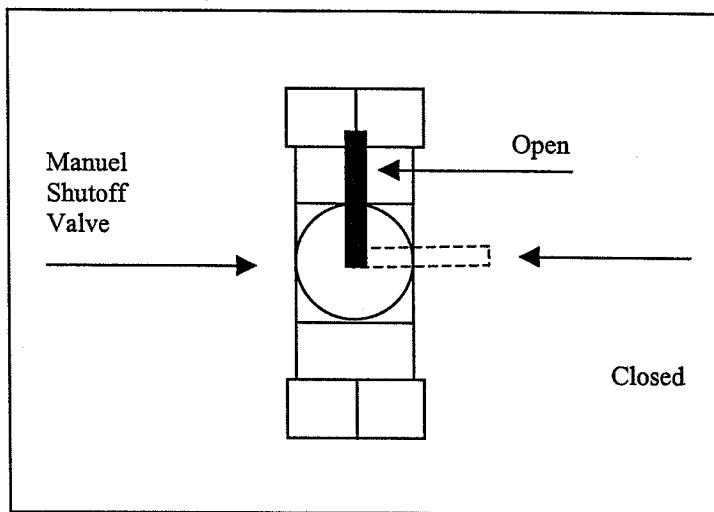


Figure 15

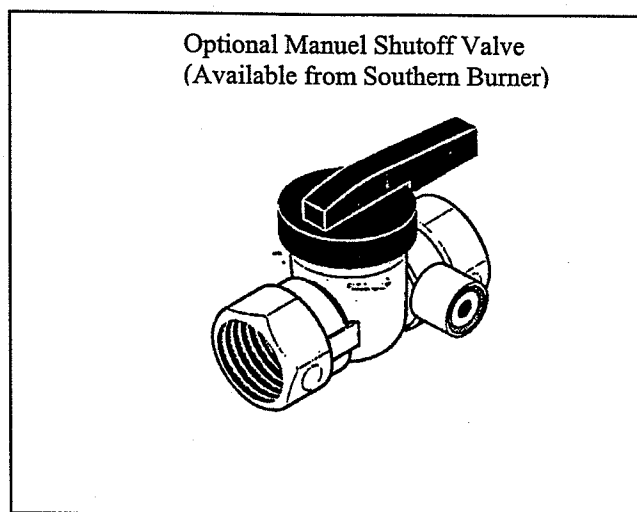


Figure 16

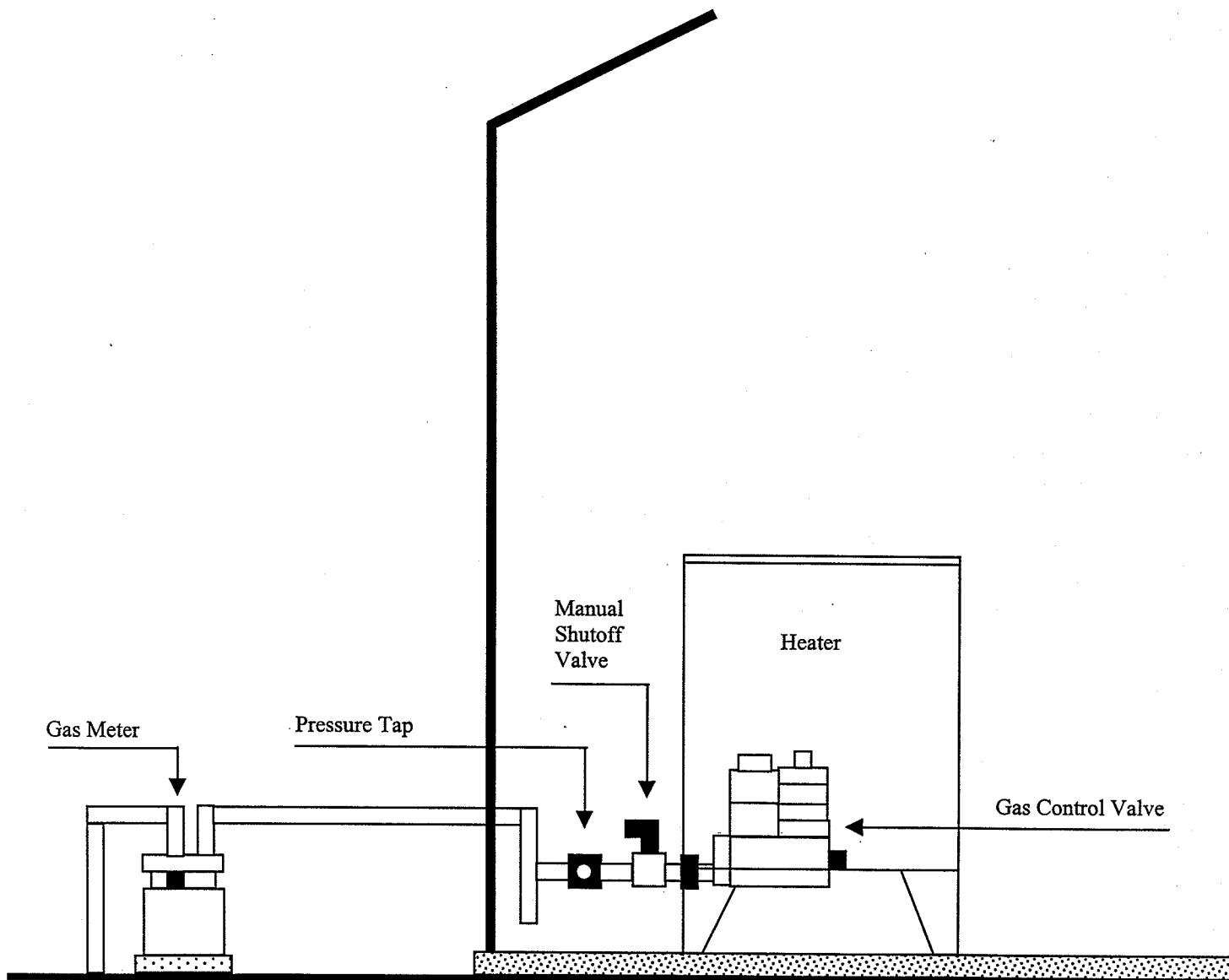


Figure 17

LIGHTING INSTRUCTIONS

FOR YOUR SAFETY READ BEFORE LIGHTING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.
- B. **BEFORE LIGHTING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.


WHAT TO DO IF YOU SMELL GAS

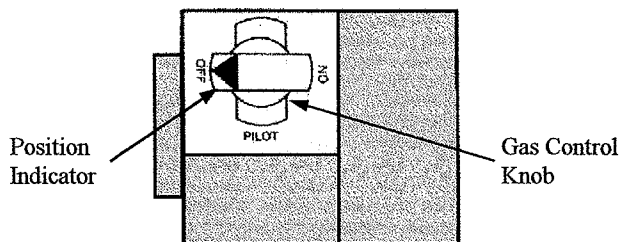
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

- If you cannot reach your gas supplier, call the fire department.



- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it; call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and gas control which has been under water.

LIGHTING INSTRUCTIONS

1. **STOP!** Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Push in gas control knob slightly and turn clockwise  to "OFF."



NOTE: Knob cannot be turned from "PILOT" to "OFF" unless knob is pushed in slightly. Do not force.


4. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
5. On vented heater only swing open pilot access door located on the front of heater cabinet.
6. Find pilot - follow metal tube from gas control. The pilot
7. Turn knob on gas control counterclockwise  to "PILOT."
8. Push in control knob all the way and hold in. Immediately light the pilot with a match. Continue to hold the control knob in for about one (1) minute after the pilot is lit. Release knob and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 4 through 10.
9. Close pilot access door.
10. Turn gas control knob counterclockwise  to "ON."
11. Set thermostat to desired setting.

is beside the burner tube behind the pilot access door.



Pilot Ther-
Burner mopile

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Push in gas control knob slightly and turn clockwise  to "OFF." Do not force.

Operating heater

To light your greenhouse heater, refer to the lighting instructions on (page 23).

WARNING

Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, do not try to repair it, call a qualified service technician or gas supplier. Force or attempted repair may result in a fire or explosion.

Important

You may be running this greenhouse heater for the first time after hooking up to the gas supply. If this is so, you may need to press in the gas control valve knob for 30 seconds. This will allow air to bleed from the gas system.

If the pilot does not stay lit after several tries

- Refer to the troubleshooting guide (page 29 and 30).
- Contact a qualified service person or gas supplier.

Caution

Do not try to adjust heating levels or the height of the burner flame by using the manual shutoff valve or the gas control valve knob.

To increase temperature of greenhouse adjusts thermostat to desired setting

Important

Since the thermostat measures the temperature of air near the thermostat, this may not always agree with the greenhouse temperature (depending on greenhouse construction, thermostat location, heater location, greenhouse size, open-air temperatures, etc.). Frequent operation of your greenhouse heater will enable you to determine your thermostat setting for proper greenhouse temperature.

Important

The gas control valve must be protected from excessive moisture or water. Protect the gas control valve by using the bottom 3 inches of a 1/2-gallon plastic container. Place the container over the gas control valve leaving the bottom open. An optional plastic cover is available from Southern Burner Co. (see figure 23 page 26).

Operating Heater continued

Turn Off Gas to Greenhouse Heater

To turn off your greenhouse heater, refer to the lighting instructions on (page 23 *see turn off gas to appliance*).

Inspecting Burner

Check pilot flame and burner flame pattern often.

Pilot Burner

Figure 18 page 25 shows a correct pilot flame. Figure 19 page 25 shows an incorrect pilot flame. The incorrect pilot flame is not touching the thermopile. This will cause the thermopile to cool. When the thermopile cools, the heater will shut down.



Figure 18

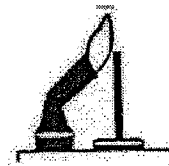


Figure 19

If pilot flame pattern is incorrect, as shown in figure 19 page 25.

- Turn heater off, refer to lighting instructions on (page 23 *see turn off gas to appliance*).
- See troubleshooting, pages 29 through 30.

Inspecting Burner continued

Burner Flame Pattern

Figure 20 page 25 shows a correct burner flame pattern. Figure 21 page 25 shows an incorrect burner flame pattern.



Figure 20



Figure 21

If burner flame pattern is incorrect, as in figure 21.

- Turn heater off, refer to lighting instructions on (page 23 *see turn off gas to appliance*).
- See troubleshooting page 31.

Cleaning and Maintenance

▲ WARNING

Turn off heater and let cool before cleaning.

▲ CAUTION

You must keep control areas, burner and circulating air passageways clean. Inspect these areas of the heater before each use. Have heater inspected yearly by a qualified gas service person. Heater may need more frequent cleaning in some cases.

The exterior finish on your Southern Burner greenhouse heater is made of high quality non-rusting mill finished polished aluminum. With proper care your heater should resist rust and corrosion for many years. Observe the following precautions.

- 1 Do not apply any type of polish or solvents.
- 2 Clean by wiping with a dry damp cloth after heater has been turned off and is completely cool.
- 3 Do not expose heater to excessive water either by hand or sprinkler system watering.
- 4 Make sure gas control valve is protected from water and moisture. Use the bottom 3" of a ½ gallon plastic container for protection (see figure 22 page 26). Or use the optional valve cover available from the factory (see figure 22 page 26) .
- 5 Keep heater area clean and free from combustible materials, gasoline, other flammable vapors and liquids.
- 6 Make sure that the flow of combustion and ventilation air is not obstructed.
- 7 Make sure all passageways are kept clean. Use a vacuum cleaner or pressurized air to clean.

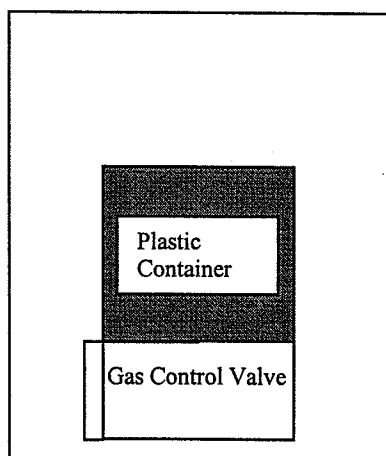


Figure 22

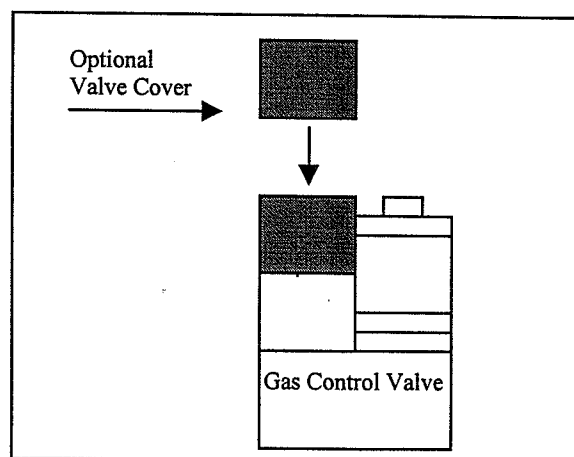


Figure 23

Cleaning and Maintenance continued

The following maintenance checks should be conducted before the start of each heating season.

▲ CAUTION

These should be checked only by a qualified gas service person.

1. Inspect the venting system before starting up. Make the necessary repairs or replacements before using your heater.
 - a) Visually inspect the heat exchanger for excessive rust, holes or defects. Replace heat exchanger or complete heater if necessary.
2. To inspect main burner orifice:
 - a) Shut off the main gas supply at the shut off valve to the heater (see figure 15 page 22).
 - b) Remove the burner orifice spud with a 3/8" hex wrench. Remove any foreign matter with a soft bristle brush or pressurized air. **DO NOT** alter the size of the burner orifice, reinstall after cleaning.
3. To inspect the main burner:
 - a) Shut off the main gas supply at the shut off valve to the heater. Disconnect the main gas supply to the gas control valve.
 - b) Unscrew the pilot line and disconnect the thermopile from the gas control valve.
 - c) Disconnect the gas control valve from the main burner by removing the 3/4" hex brass nut. Caution should be used NOT TO BEND the orifice bracket.
 - d) Remove the three screws holding the burner in position. Remove the burner and pilot assembly as a unit.
 - e) Check the burner and remove any foreign matter from the deck ports and Ventura opening. A wire brush or pressurized air can be used to do this.
4. Inspect the pilot burner orifice:
 - a) Remove pilot burner line to expose the pilot burner orifice. Check orifice remove any foreign matter with a soft bristle brush or pressurized air. **DO NOT** alter the size of the pilot orifice. Replace pilot burner or pilot orifice if necessary.
5. Inspect the thermopile generator:
 - a) Visually inspect thermopile generator for any rust or pits replace if necessary.

Cleaning and Maintenance continued:

6. Once main burner, pilot burner orifice and thermopile generator reinstall all parts in the order you removed them. Make sure all gas connections are tight. Check for leaks before relighting greenhouse heater (see checking gas connections page 20).
7. Make all the necessary adjustments or replacements before using your heater.
8. Relight heater follow lighting instructions (see page 23).
9. Visually inspect the pilot flame. The pilot flame must surround the thermopile as shown (in figure 18 page 25). If pilot flame is incorrect turn off gas (see To Turn Off Gas page 23), then (see trouble shooting page 31).
10. Visually inspect main burner flame it should be a nice blue luminous flame with an occasional flash or flicker of red, yellow or orange. If main burner flame is incorrect turn off heater immediately (see turning off heater page 23).

▲ CAUTION

If the main burner flame is a predominate red, yellow or orange flame across the burner turn off heater immediately. Call a professional gas appliance service person and refer to the trouble-shooting guide.

Service Persons Trouble Shooting Guide

▲ WARNING

Turn off heater and let cool before servicing. Only a qualified service person should service or repair heater.

<u>Symptoms</u>	<u>Possible Causes</u>	<u>Remedy</u>
1. Pilot light will not light	<ul style="list-style-type: none"> a) Gas supply is turned off or manual cutoff valve is closed b) Gas control valve knob is not in the PILOT position c) Gas control valve knob is NOT fully depressed while in the pilot position d) Air in gas line when installed e) Pilot orifice or pilot line is obstructed 	<ul style="list-style-type: none"> a) Turn on gas supply or open manual shutoff valve b) Turn gas control valve knob to the pilot position c) Fully depress gas control valve knob while in the PILOT position d) Continue to perform the lighting procedure (see page 23) until air is purged from system e) Check pilot orifice or pilot line for obstruction and replace if necessary
2. Pilot flame goes out when gas control knob is released	<ul style="list-style-type: none"> a) Gas control knob is not fully depressed b) Gas control knob was not depressed long enough c) Thermopile connections are loose or corroded at the terminal block on the control valve d) Improper pilot flame adjustment 	<ul style="list-style-type: none"> a) Fully depress gas control valve knob during lighting procedure b) After pilot lights continue to hold gas control knob depressed for 60 seconds c) Hand tighten connections until snug and clean if necessary d) Pilot flame should impinge on the top ½" of the thermopile and be blue in color (see figure 19 page 25)

Service Persons Troubleshooting Guide continued

<u>Symptoms</u>	<u>Possible Causes</u>	<u>Remedy</u>
Pilot flame goes out when gas control knob is released	<ul style="list-style-type: none"> e) Pilot flame is not impinging on thermopile, which allows thermopile to cool. This problem could be caused by a dirty or partially clogged pilot orifice f) Thermopile damaged g) Defective gas control valve 	<ul style="list-style-type: none"> e) Replace pilot orifice or complete pilot burner f) Replace thermopile g) Replace gas control valve
3. Burner does not light after pilot is lit	<ul style="list-style-type: none"> a) Gas control knob is not in the ON position b) Pilot flame is not adequate causing the thermopile to cool. A dirty pilot orifice could cause this problem. c) Thermopile damaged d) Terminal connections on gas control valve terminal block are corroded or loose e) Defective thermostat or thermostat wire f) Defective gas control valve g) Burner orifice is clogged h) Inlet pressure to low 	<ul style="list-style-type: none"> a) Turn the gas control valve knob to the ON position b) Replace pilot orifice or pilot burner c) Replace thermopile d) Clean, tighten and replace terminal connectors as needed e) Replace defective thermostat or thermostat wire f) Replace gas control valve g) Clean burner orifice (see cleaning page 27) h) Contact a qualified service person or local gas company
4. Delayed ignition of burner	<ul style="list-style-type: none"> a) Manifold pressure to low b) Burner orifice clogged 	<ul style="list-style-type: none"> a) Contact a qualified service person or local gas company b) Clean burner orifice (see cleaning page 27)

Service Persons Trouble Shooting Guide continued

<u>Symptoms</u>	<u>Possible Causes</u>	<u>Remedy</u>
5. Burner backfiring during combustion	<ul style="list-style-type: none"> a) Burner orifice is clogged b) Burner damaged or logged c) Gas regulator defective 	<ul style="list-style-type: none"> a) Clean burner orifice (see cleaning page 27) b) Replace burner c) Replace gas regulator (contact a qualified gas service person or local gas company)
6. Yellow flame on pilot burner	<ul style="list-style-type: none"> a) A small yellow tip is normal, but the majority of the pilot flame should be blue 	<ul style="list-style-type: none"> a) Replace pilot orifice or pilot burner
7. Yellow flame on main burner	<ul style="list-style-type: none"> a) Burner or burner orifice is dirty b) Line or manifold pressure is incorrect 	<ul style="list-style-type: none"> a) Clean or replace main burner and burner orifice (contact a qualified gas service person) b) Check line and manifold pressure (contact a qualified gas service person)
8. Slight odor or smoke during initial start operation	<ul style="list-style-type: none"> a) Residues from manufacturing processes 	<ul style="list-style-type: none"> a) This problem should stop after a few hours of operation
9. Heater produces a clicking or ticking noise just after the burner is lit or shuts off	<ul style="list-style-type: none"> a) Metal expands while heating and contracts while cooling 	<ul style="list-style-type: none"> a) This is common with most heaters. If the noise is excessive, contact a qualified gas serviceperson or the factory

Service Persons Troubleshooting Guide continued

▲ WARNING

If you smell gas

- **Shut off gas supply.**
- **Do not try to light any appliance.**
- **Do not touch any electrical switch.**
- **Do not use any phone in your building.**
- **Immediately call your gas supplier from a neighbor's phone.**
- **Follow the gas suppliers instructions.**
- **If you can not reach your gas supplier; call the fire department.**

<u>Symptoms</u>	<u>Possible Causes</u>	<u>Remedy</u>
10. Heater produces unwanted odors	a) Gas leak (see warning statement above) b) Foreign matter between gas control valve and burner c) Venting system is not adequate or operating sufficiently d) Check for yellow flame on main burner	a) Locate and correct all gas leaks (see checking gas connections page 20) b) Remove any foreign matter c) Check venting system for obstructions, defects or incorrect construction (see proper venting page 13 through 16) d) Contact a qualified gas service person
11. Gas odor even when gas control valve knob is in the OFF position	a) Gas leak (see warning statement above) b) Control valve defective	a) Locate and correct all gas leaks (see checking gas connections page 20) b) Replace defective control valve
12. Heater shuts off while in use	a) Thermostat satisfied	a) Normal operation

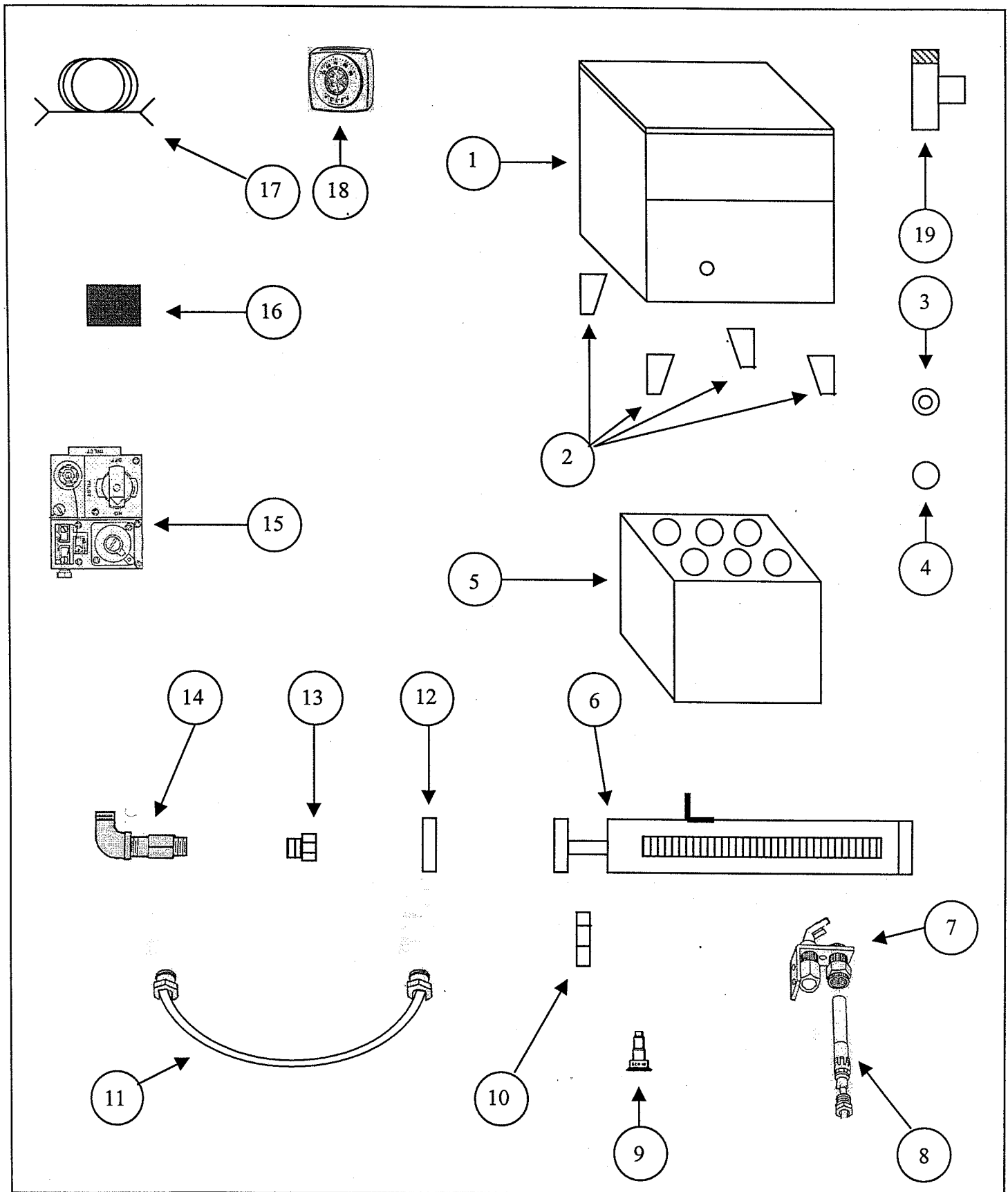
Service Persons Trouble Shooting Guide continued

<u>Symptoms</u>	<u>Possible Causes</u>	<u>Remedy</u>
13. Heater and pilot burner shuts off while in use	<ul style="list-style-type: none">a) Not enough combustion or ventilation air availableb) Low gas line pressurec) Pilot is partially cloggedd) Venting system is not operating adequately	<ul style="list-style-type: none">a) Check combustion air and ventilation air instructions (see page 11 & 12).b) Contact a qualified gas service person or local gas companyc) Replace pilot orifice or pilot burnerd) Check venting system for obstructions, defects or improper construction (see proper venting page 13 through 16).
14. Poor thermostatic control	<ul style="list-style-type: none">a) Check thermostat for proper setting and operationb) Thermostat mounted incorrectly	<ul style="list-style-type: none">a) Replace thermostat and or gas control valveb) See mounting thermostat page 10.
15. Excessive moisture or condensation noticed	<ul style="list-style-type: none">a) Not enough combustion and ventilation air	<ul style="list-style-type: none">a) See combustion and ventilation air page 11 & 12.

If you have any further questions about installation, operation or troubleshooting contact
Southern Burner Company at 1-800-375-5001 or 1-405-224-5000.

Illustrated Parts Breakdown

Models A-1 250N & A-1 250P



Replacement Parts

Use only original replacement parts. This will protect your warranty coverage for parts replaced under warranty.

Parts under warranty

Contact the dealer from whom you purchased this heater. If they are unable to supply original replacement part(s), call Southern Burner Company's service Department at 1-800-375-5001 for information. When contacting your dealer or Southern Burner Company, have ready:

- Your name
- Your address
- Model number of heater
- How heater was malfunctioning
- Type of gas used (natural or propane)
- Purchased date

You will need to return the defective part to the factory for credit.

Parts Not Under Warranty

Contact the dealer from whom you purchased this heater. If they are unable to supply original replacement part(s), call Southern Burner Company's service Department at 1-800-375-5001 for information. When calling Southern Burner Company, have ready:

- Model number
- The replacement part number

Key NO.	Part Number	Description	QTY.
1	SBA100001	Cabinet Assembly	1
2	SBA100002	Legs	4
3	SBA100003	Lighter Hole Ring	1
4	SBA100004	Lighter Hole Cover	1
5	SBA100005	Heat Exchanger	1
6	SBA125006	Jet Tube Burner	1
7	Q314 A - 3729 - N	Pilot Burner	1
7	Q314 A - 3729 - P	Pilot Burner	1
8	Q313 A 1014	Thermopile	1
9	390686 - 4 - N	Pilot Orifice (natural gas)	1
9	390686 - 1 - P	Pilot Orifice (propane gas)	1
10	SBA100010	Lock Nut	1
11	SBA100011	Pilot Line	1
12	SBA100012 -	1 / 2" Zinc Washer	1
13	SBA100013 - N	Main Burner Orifice (natural gas)	1
13	SBA100013 - P	Main Burner Orifice (propane gas)	1
14	SBA100014	Manifold	1
15	VS821A - 1046 - N	Gas Control Valve (natural gas)	1
15	VS821A - 1046 - P	Gas Control Valve (propane)	1
16	SBA100016	Optional Valve Cover	1
17	SBA100017	Thermostat Wire	1
18	200 - 503	Thermostat	1
18	1F70 - 352S1	Optional Set Back Thermostat	1
19	SBA100019	Draft Hood Tee	1