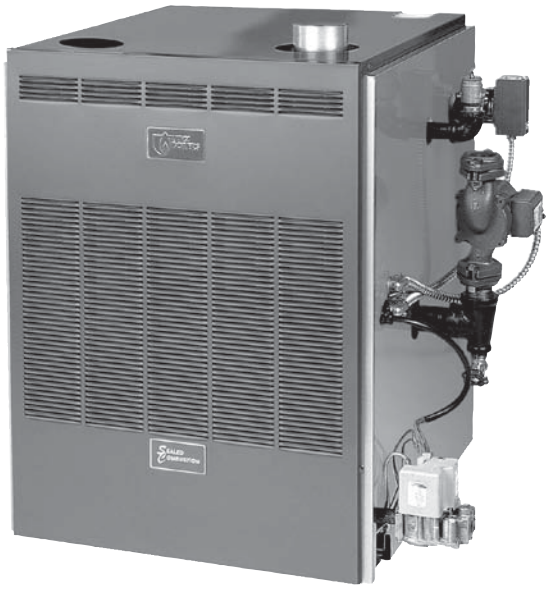
UTICA BOILERS

# USC SERIES

Direct Vent
Gas Fired Hot Water Boiler

# INSTALLATION, OPERATION & MAINTENANCE MANUAL



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# SEALED COMBUSTION, GAS FIRED, FORCED HOT WATER BOILER

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## SAFETY SYMBOLS

The following defined symbols are used throughout this manual to notify the reader of potential hazards of varying risk levels.

**DANGER**

Indicates an imminently hazardous situation which, if not avoided, WILL result in death, serious injury or substantial property damage.

**WARNING**

Indicates an imminently hazardous situation which, if not avoided, may result in death, serious injury or substantial property damage.

**CAUTION**

Indicates an imminently hazardous situation which, if not avoided, may result in injury or property damage.

**NOTICE**

Indicates information which should be followed to ensure proper installation and operation.

IMPORTANT: Read the following instructions COMPLETELY before installing!

**NOTICE**

KEEP THIS MANUAL NEAR BOILER AND

RETAIN FOR FUTURE REFERENCE.

**WARNING**

1. Keep boiler area clear and free from combustible materials, gasoline and other flammable vapors and liquids.

2. DO NOT obstruct air openings to the boiler room.

3. Modification, substitution or elimination of factory equipped, supplied or specified components may result in property damage, personal injury or the loss of life.

4. To the owner: Installation and service of this boiler must be performed by a qualified installer.

5. **To the installer:** Leave all instructions with the boiler for future reference.

6. When this product is installed in the Commonwealth of Massachusetts the installation must be performed by a Licensed Plumber or Licensed Gas Fitter.

C.S.A. Certified for Natural gas or Propane

Tested for 100 lbs. ASME Working Pressure

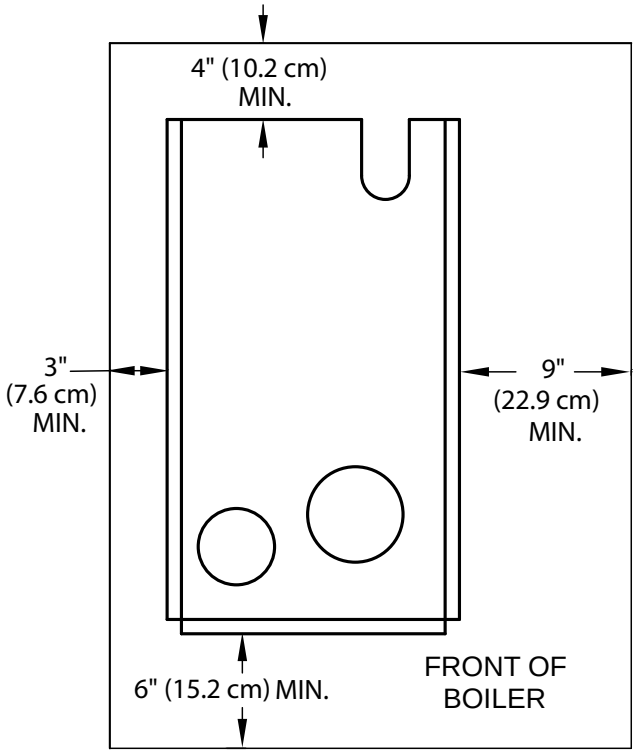
**WARNING**

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.

1. The installation must conform to the requirements of the authority having jurisdiction or, in absence of such requirements, to the latest revision of the National Fuel Gas Code, ANSI Z223-1. (Available from the American Gas Association, Pleasant Valley Road, Cleveland, Ohio 44134.) Reference should also be made to local gas utility regulations and other codes in effect in the area in which the installation is to be made.
2. Where required by the authority having jurisdiction, the installation must conform to American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME No. CSD-1.
3. This boiler is classified as a Category I and II and vent installation shall be in accordance with Part 7 of the latest revision of the National Fuel Gas Code, ANSI Z223.1 or applicable provisions of the local building codes.
4. LOCATE BOILER on level, solid base as near the outside wall as possible and centrally located with respect to the heat distribution system as practicable.
5. Allow 24 inches at the front and right side for servicing and cleaning.
6. When installed in utility room, the door should be wide enough to allow the largest boiler part to enter, or to permit replacement of another appliance such as a water heater.
7. The boiler shall be installed such that the gas ignition system components are protected from water, (dripping, spraying, rain, etc.), during appliance operation and service, (circulator replacement, condensate trap, control replacement, etc.).
8. FOR INSTALLATION ON NON-COMBUSTIBLE FLOORS ONLY. The boiler must not be installed on carpeting (For installation on combustible flooring Special Base Part NO.325-2-8.00 MUST BE USED). Minimum clearances to combustible constructions are:

| | |
|---|---|
| TOP | 18 in. (46 cm) |
| FLUE CONNECTOR | 2 in. (5 cm) |
| FRONT | 6 in. (15 cm) |
| REAR | 4 in. (10 cm) |
| RIGHT SIDE | 9 in. (23 cm) |
| LEFT SIDE | 3 in. (8 cm) |
| Refer to Figure 1. Greater clearances for access should supersede fire protection clearances. | |

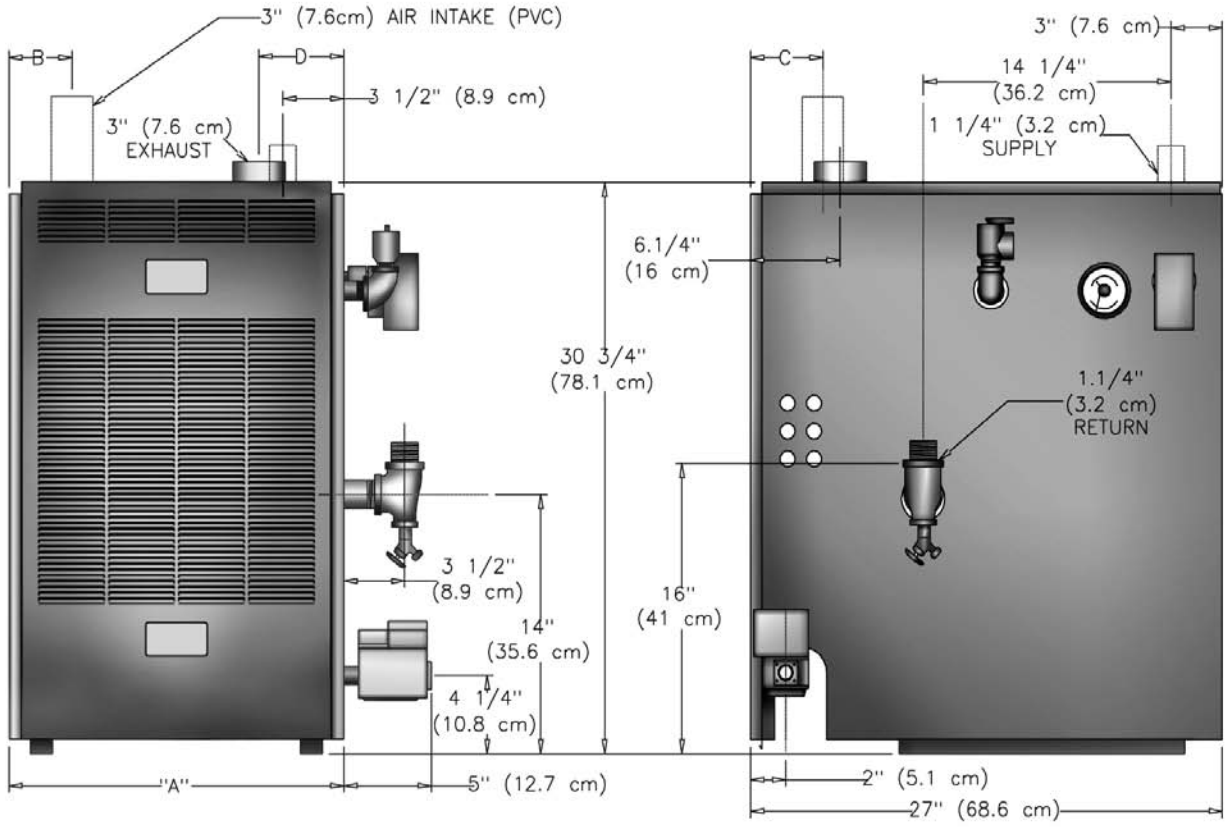
**Figure 1 - Min. Clearances To Combustible Materials**




**WARNING**

All installations of boilers and venting should be done only by a qualified expert and in accordance with the appropriate boiler manual. Installing or venting a boiler or any other gas appliance with improper methods or materials may result in serious injury or death due to fire or to asphyxiation from poisonous gases such as carbon monoxide which is odorless and invisible.

## BOILER RATINGS, CAPACITIES & DIMENSIONS




| Boiler No. | A.G.A Input Btu/Hr. | Heating Capacity Btu/Hr. | I=B=R Net Output Btu/Hr. | Natural Gas Inlet | Dimensions | | | | Supply & Return Tappings | No. Of Burners | Water Content | AFUE Ratings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | B | C | D | | | | |
| 3 Section | 50,000 (14.7 KW) | 44,000 (12.9 KW) | 38,000 (11.1 KW) | 1/2" (1.27 cm) | 15.1/8" (38 cm) | 3.1/2" (9 cm) | 3.1/2" (9 cm) | 5" (12.7 cm) | 1.1/4" (3.2 cm) | 2 | 4.0 gals (15.14 liters) | 87% |
| 4 Section | 100,000 (29.3 KW) | 87,000 (25.5 KW) | 76,000 (22.3 KW) | 1/2" (1.27 cm) | 19" (48 cm) | 3.1/2" (9 cm) | 3.1/2" (9 cm) | 6.1/2" (16.5 cm) | 1.1/4" (3.2 cm) | 3 | 5.6 gals (21.20 liters) | 87% |
| 5 Section | 140,000 (41.0 KW) | 122,000 (35.7 KW) | 107,000 (31.3 KW) | 1/2" (1.27 cm) | 22.7/8" (58 cm) | 4.1/4" (11 cm) | 4.1/8" (11 cm) | 8.3/8" (21.3 cm) | 1.1/4" (3.2 cm) | 4 | 7.2 gals (27.25 liters) | 87% |
| NOTE: For altitudes above 2,000 ft. ratings should be reduced at the rate of 4% for each 1,000 ft. above sea level. | | | | | | | | | | | | |

### STANDARD EQUIPMENT:

Boiler Jacket, Cast Iron Boiler Battery, Limit Control, Removable Transformers, Plug in Relay, Theraltimeter Gauge, Circulator (field mounted), Main Gas Burners, Hot Surface Pilot; A.S.M.E Relief Valve, Drain Cock, Induced Draft Fan, Safety Pressure Switch, and Combination Intake/Exhaust Termination Kit.

All boilers are design certified for installation on non-combustible floors. For installation on combustible floors, use combustible floor kit.

This boiler is a Direct Vent Designed Certified appliance which requires a special horizontal through the wall venting system.

Use ONLY the venting material products listed below:

- HEAT-FAB® SAF-T-VENT™
- FLEX-L® STAR-34™
- ProTech™ FasNSeal®
- Z-FLEX® Z-VENT™

Consult venting addendum for maximum vent lengths and proper configurations.

Electrical service to be 120 Volts, 15 Amps, 60 Hz.

## CONNECTING SUPPLY AND RETURN PIPING

**1.** Connect supply and return piping as suggested in ***Figure #2*** below when the boiler is used in connection with refrigerated systems:

A. The chilled medium MUST BE IN PARALLEL with the boiler.

B. Use appropriate valves to prevent the chilled medium from entering the heating boiler.

- During heating cycle open valves A and B. Close valves C and D.
- During cooling cycle open valves C and D, close valves A and B.

C. Maintain a minimum clearance of 1 inch (2.54 cm) to hot water pipes. In air handling units where they may be exposed to refrigerated air circulation, the boiler piping system MUST be supplied with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

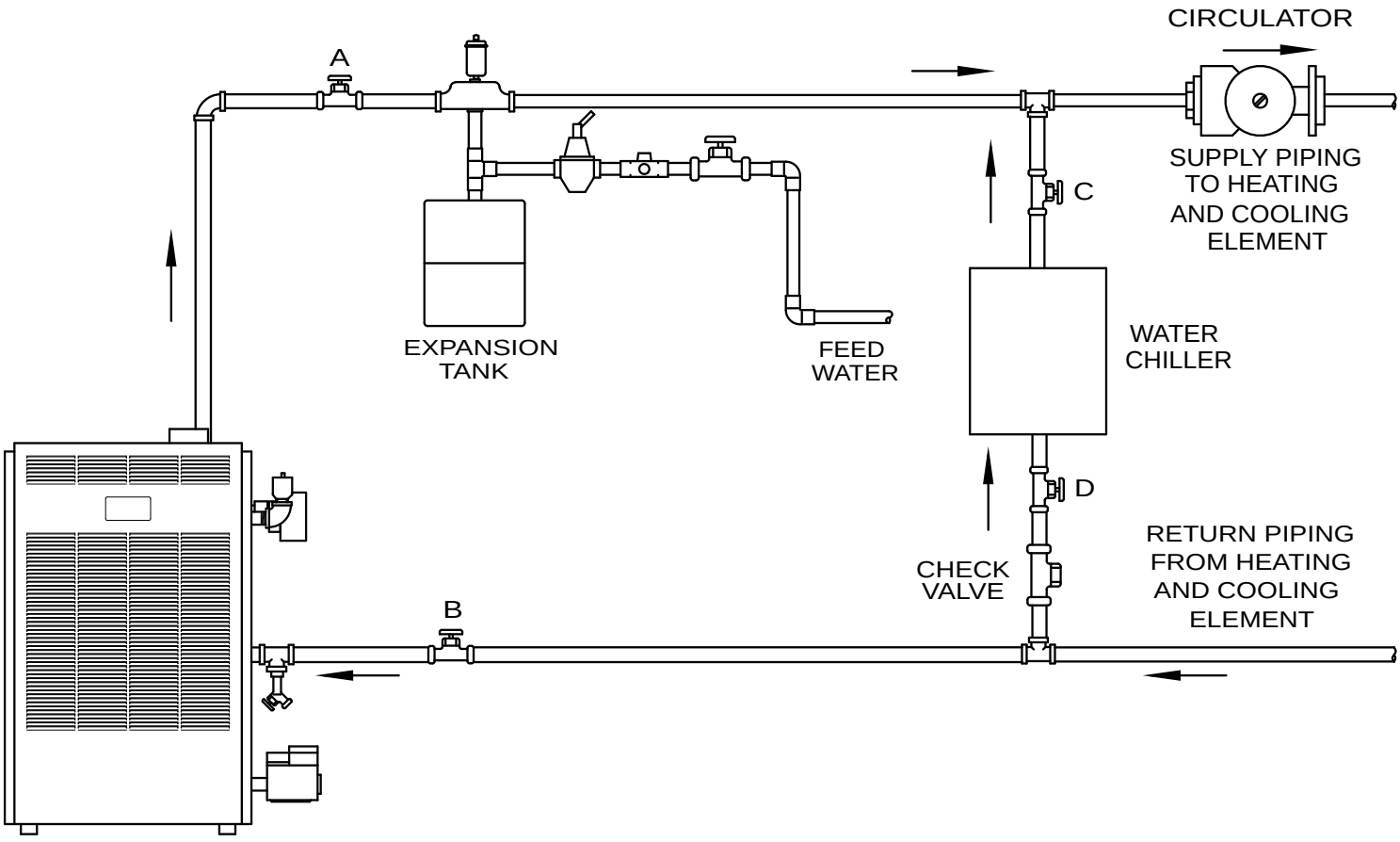
**2.** Hot water boilers installed above radiation level must be provided with a low water cut-off device at the time of boiler installation.

**3.** When a boiler is connected to a heating system that utilizes multiple zoned circulators, each circulator must be supplied with a flow control valve to prevent gravity circulation.

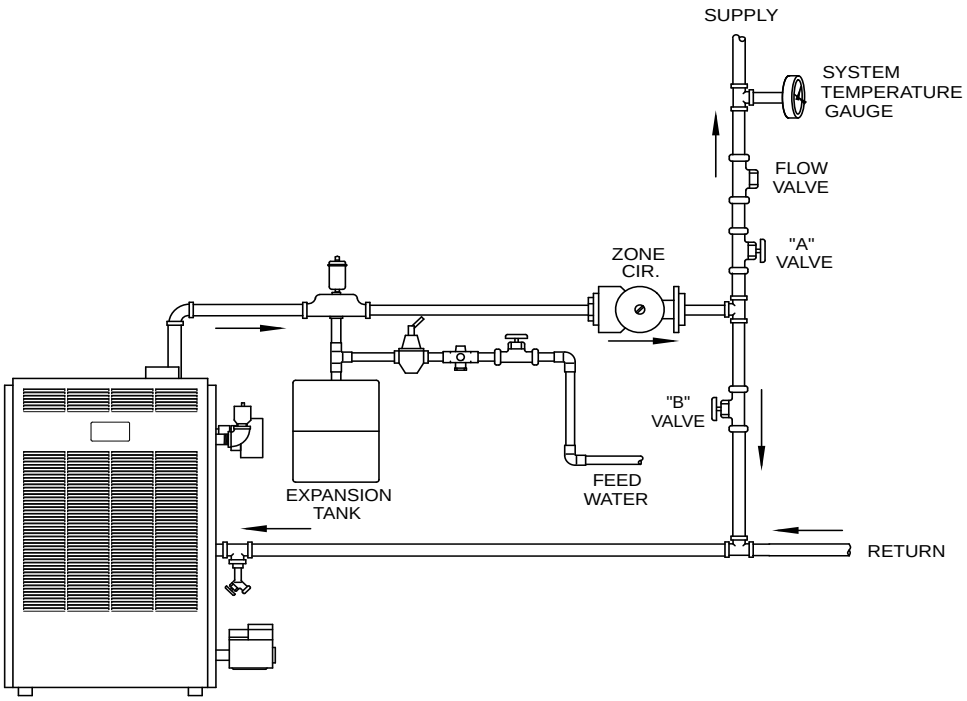
**NOTICE**

* Reduced pressure back flow preventer must be used under provisions required by the Environmental Protection Agency, (EPA).

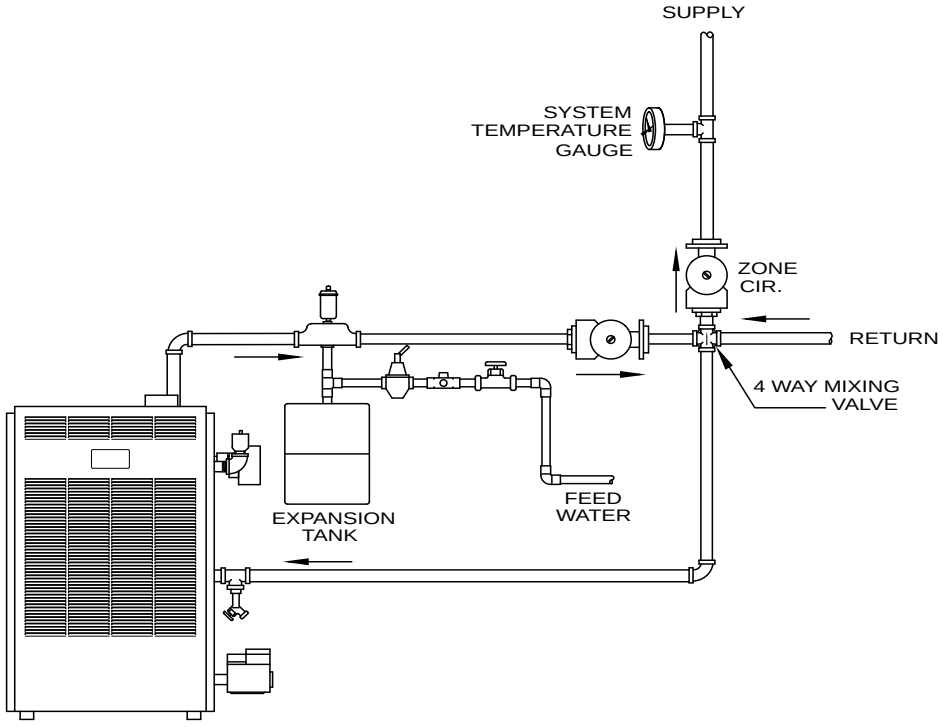
**Figure 1 - Near Boiler Supply & Return Piping**



## Figure 3 - Bypass Piping

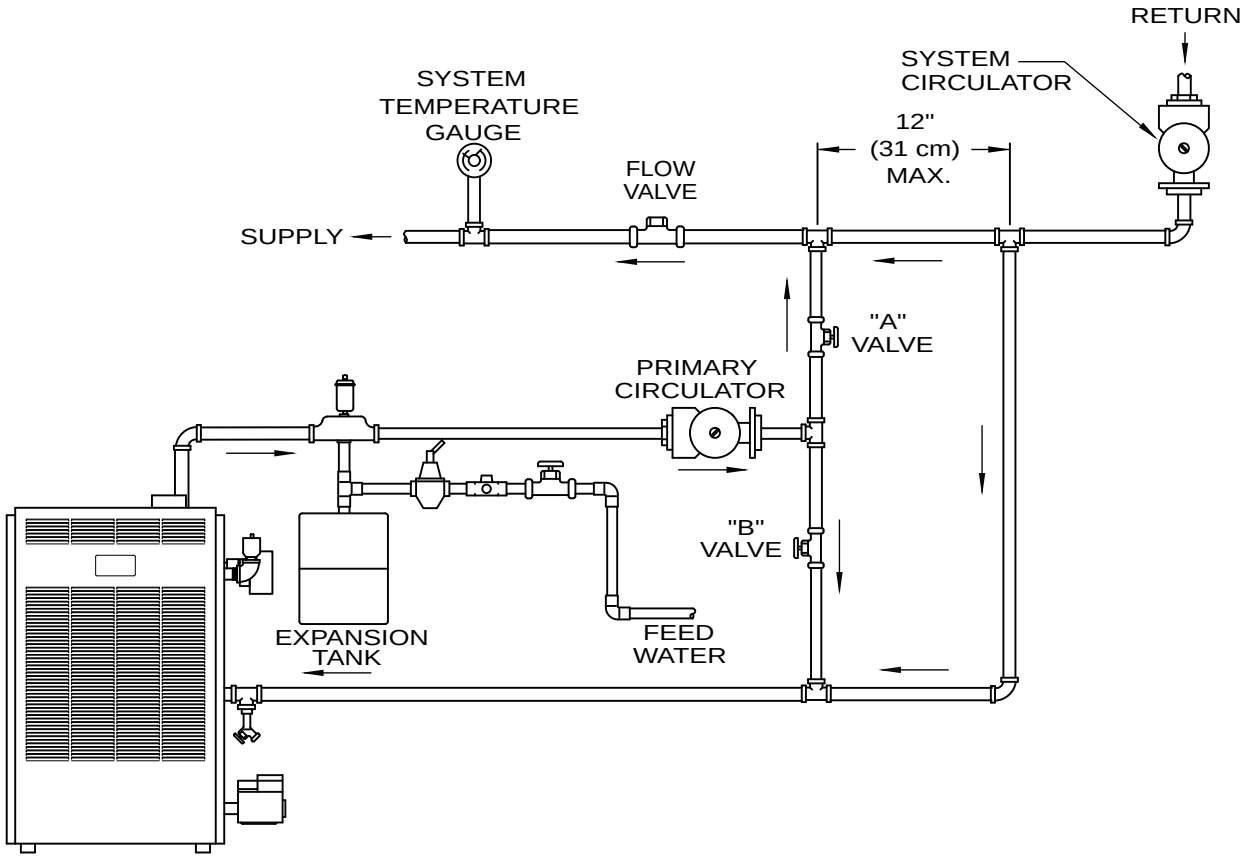



## Figure 3 - Mixing Valve Piping




4. Bypass piping is an option which gives the ability to adjust the supply boiler water temperature to fit the system or condition of the installation. This method of piping is not typically required for baseboard heating systems.
   A. This method is used to protect boilers from condensate forming due to low temperature return water. Generally noticed in large converted gravity systems or other large water volume systems. See ***Figure #3***.
   B. These methods are used to protect systems using radiant panels and the material they are encased in from high temperature supply water from the boiler and protect the boiler from condensation. See ***Figures #4*** & ***#5***.
5. ***NOTE:*** When using bypass piping, adjust valves A and B, in ***Figures #3*** & ***#5***, until desired system temperature is obtained.
6. ***NOTE:*** When using a 4-way mixing valve, set control knob until desired temperatures are met. See instruction supplied with valve.
7. Bypass loop piping must be the same size piping as the supply and the return.
8. Typical installation using circulators is shown in Figure #6 on following page.
9. Typical installation using zone valves is shown in ***Figure #7*** on following page.
10. For further piping information refer to the I=B=R installation and piping guide.

## Figure 5 - Primary Secondary Piping with Bypass




## Figure 6

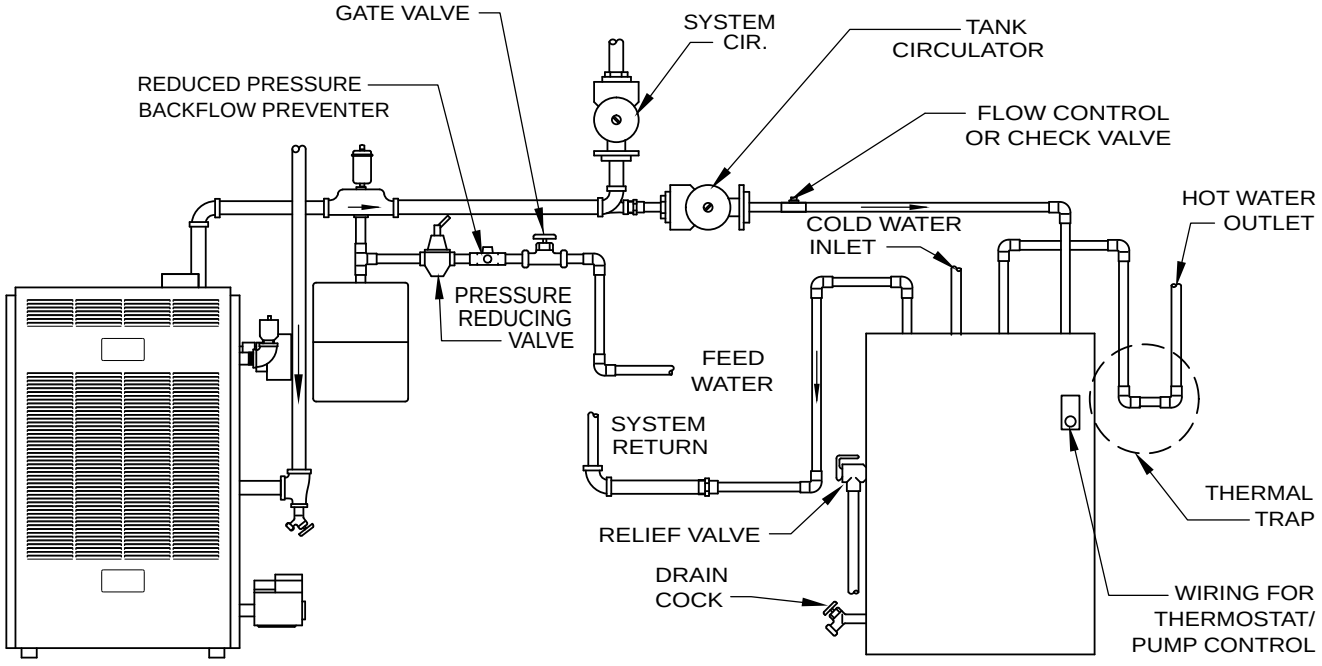
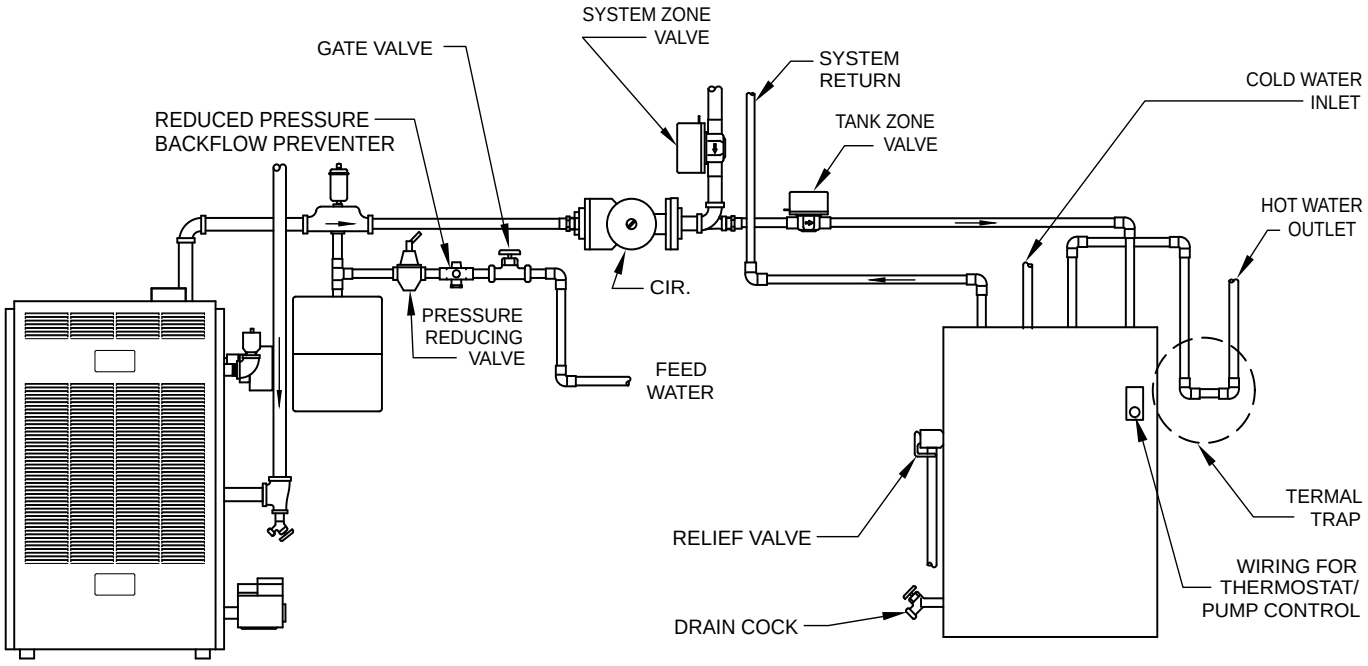


**Figure 7**




## GENERAL INFORMATION GAS VENTS AND APPLIANCES

By Federal Codes, gas appliances are categorized by the pressure and temperature of the flue gas vented from the appliance.

Category I and II appliances are natural draft (draft hood) vented, with high flue gas temperatures (Category I), or low flue gas temperatures (Category II).

Category III and IV appliances are fan forced vents with high temperature (Category III) or low temperature (Category IV) flue gasses. Appliance efficiency is directly related to flue gas temperature. Higher efficiency appliances remove more heat from the gas, so they will have lower temperature flue products.

When flue gas temperatures are lowered, corrosive condensates may form in the gas vent or in the appliance. Condensates may form in Category II, III, IV appliance vents, so special corrosive resistant venting systems are required for higher efficiency appliances.

Proper operation of the vent system and appliance is dependent upon the use of all parts specified by the manufacturer for use in the particular installation. Appliance and vent system performance may be affected by improper assembly.

**WARNING**

⚠

Vents for Category I appliances may not be suitable for use with Category II, III, or IV appliances because condensate may corrode the vent.

Vents for Category III appliances may not be suitable for use with Category I appliances because flue gas temperatures may be too high.

When an existing boiler is removed from a common venting system, the common venting system is likely to be too large for the proper venting of the appliances remaining connected to it. If this situation occurs, the following test procedure must be followed:

## REMOVAL OF BOILER FROM VENTING SYSTEM

At the time of removal of an existing boiler, the following steps shall be followed with each appliance remaining connected to the common venting system placed in operation, while the other appliances remaining connected to the common venting system are not in operation.

1. Seal any unused openings in the common venting system.
2. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
3. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
4. Place in operation the appliance being inspected. Follow the lighting instructions. Adjust thermostat so appliance will operate continuously.
5. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar or pipe.
6. After it has been determined that each appliance remaining connected to a common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas burning appliance to their previous conditions of use.
7. Any improper operation of the common venting system should be corrected so the installation conforms with either the latest revision of the National Fuel Gas Code, ANSI Z223.1, (when installed in the United States) or the CAN1-B149.1 and/or B149.2 Installation Codes for Gas-Burning Equipment, (when installed in Canada). When resizing any portion of the common venting system, the common venting system should be resized to approach the minimum size as determined using the appropriate tables in appendix G in the latest revision of the National Fuel Gas Code, ANSI Z223.1 or the CAN1-B149.1 and/or B149.2 Installation Codes for Gas-Burning Equipment.

Connect gas service meter to control assembly in accordance with the latest revision of ANSI Z223.1 and local codes or utility. A ground joint union should be installed for easy removal of gas control for servicing. A drip or trap must be installed at the bottom of a vertical section of piping at the inlet to the boiler. A pipe compound resistant to the action of liquefied petroleum gases must be used on all threaded pipe connections. Check with the local utility for location of manual shutoff valve if required. (See ***Figure #8***)

1. The gas line should be of adequate size to prevent undue pressure drop and never smaller than the pipe size of the main gas control valve. See chart below.
2. To check for leaks in gas piping, use a soap and water solution or other approved method.

**WARNING**

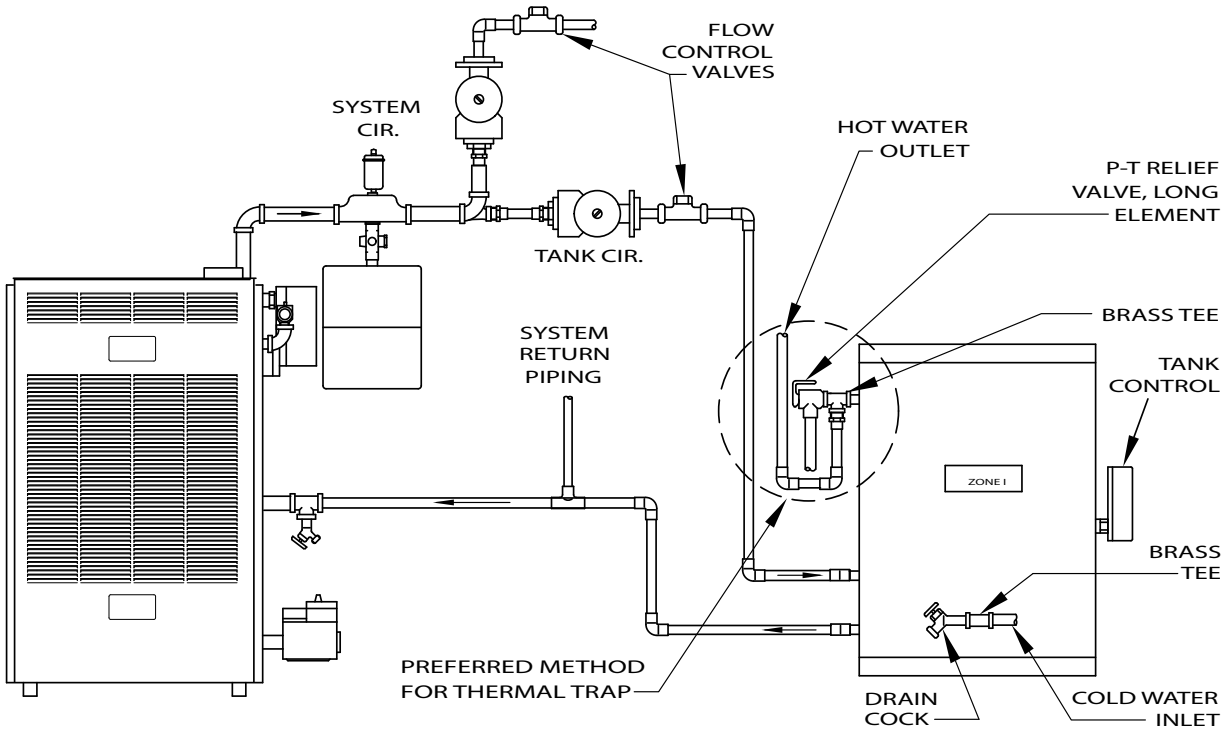
DO NOT USE AN OPEN FLAME.

3. The boiler and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of ½ psig (3.5 kPa).
4. The boiler must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psig (3.5 kPa).

**NOTICE**

For additional information refer to Part 10, table 10-2 of the National Fuel Gas Code Handbook, latest revision, or in Canada, the CAN1-B149.1 and/or B149.2 Installation Codes for Gas-Burning Equipment.

## Figure 8



Electrical wiring must conform with National Electrical Code, ANSI/NFPA No. 70 when installed in the United States, the CSA C22.1 Canadian Electrical Code, Part 1, when installed in Canada, and/or the local authority having jurisdiction. (See figure #8)

1. 1. When an external electrical source is utilized, the boiler, when installed, MUST BE electrically grounded in accordance with these requirements.
2. 2. Install a fused disconnect switch between boiler and meter at a convenient location.

## Component And Wire Coding Keys

The keys that follow pertain to the HOT WATER CONTROL AND HOT SURFACE PILOT WIRING FOR SEALED COMBUSTION SERIES (diagrams on following page).

3. Honeywell hot water control and intermittent ignition wiring for ODVB series boiler with fail safe relay.

| COMPONENT KEY | CODING |
|---|---|
| Thermostat (24 Volt) | TH-2 |
| Transformer (120V/24V 40VA) | TR-1 |
| Transformer (120V/24V 40VA) | TR-2 |
| 24 Volt Gas Valve | SV9501H |
| Pressure Switch | PS |
| Control Terminal |  |
| Relay Coil | 1K |
| Relay Contacts | 1K1 |
| Relay Contacts | 1K2 |
| Limit Switch | LS |
| Circulator | CIR |
| Wire Connection |  |
| Not all components listed are used in all control systems. | |

**NOTICE**

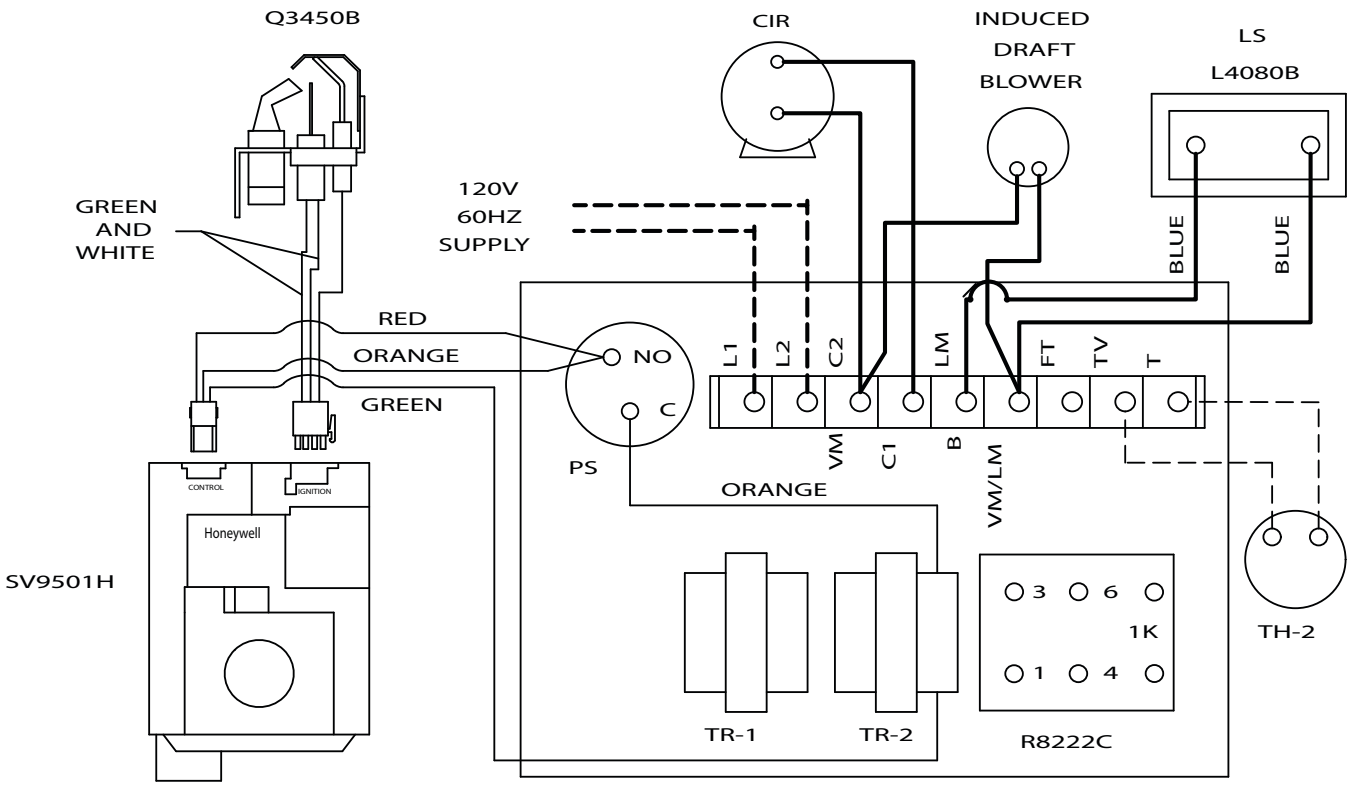
- Switches are shown in position during the heating cycle.
- If any of the original wiring supplied with the boiler is replaced it must be replaced with like wire size and type of insulation or equivalent.

| WIRING CODE KEY | |
|---|---|
|  | LINE VOLTAGE BY FACTORY |
|  | LOW VOLTAGE BY FACTORY |
|  | LINE VOLTAGE BY INSTALLER |
|  | LOW VOLTAGE BY INSTALLER |

## THERMOSTAT INSTALLATION

1. Thermostat should be installed on an inside wall about four feet above the floor.
2. ***Never*** install a thermostat on an outside wall.
3. Check thermostat operation by raising and lowering thermostat setting as required to start and stop the burners.
4. Instructions for the final adjustment of the thermostat are packaged with the thermostat (adjusting heating anticipator, calibration, etc.)

| THINGS TO AVOID WHEN LOCATING THERMOSTATS | |
|---|---|
| DEAD SPOTS: | |
| Corners and alcoves | Behind doors |
| COLD SPOTS: | HOT SPOTS: |
| Concealed pipes or ducts | Concealed pipes |
| | Fireplace or chimney |
| Stairwells - drafts | TV sets |
| | Radios |
| Unheated rooms on other side of wall | Lamps |
| | Direct sunlight |
| outside wall | Kitchens |


Q3450B
CIR
INDUCED
DRAFT
BLOWER
LS
L4080B
GREEN
AND
WHITE
120V
60HZ
SUPPLY
BLUE
BLUE
RED
ORANGE
GREEN
NO
C
PS
L1
L2
C2
LM
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TV
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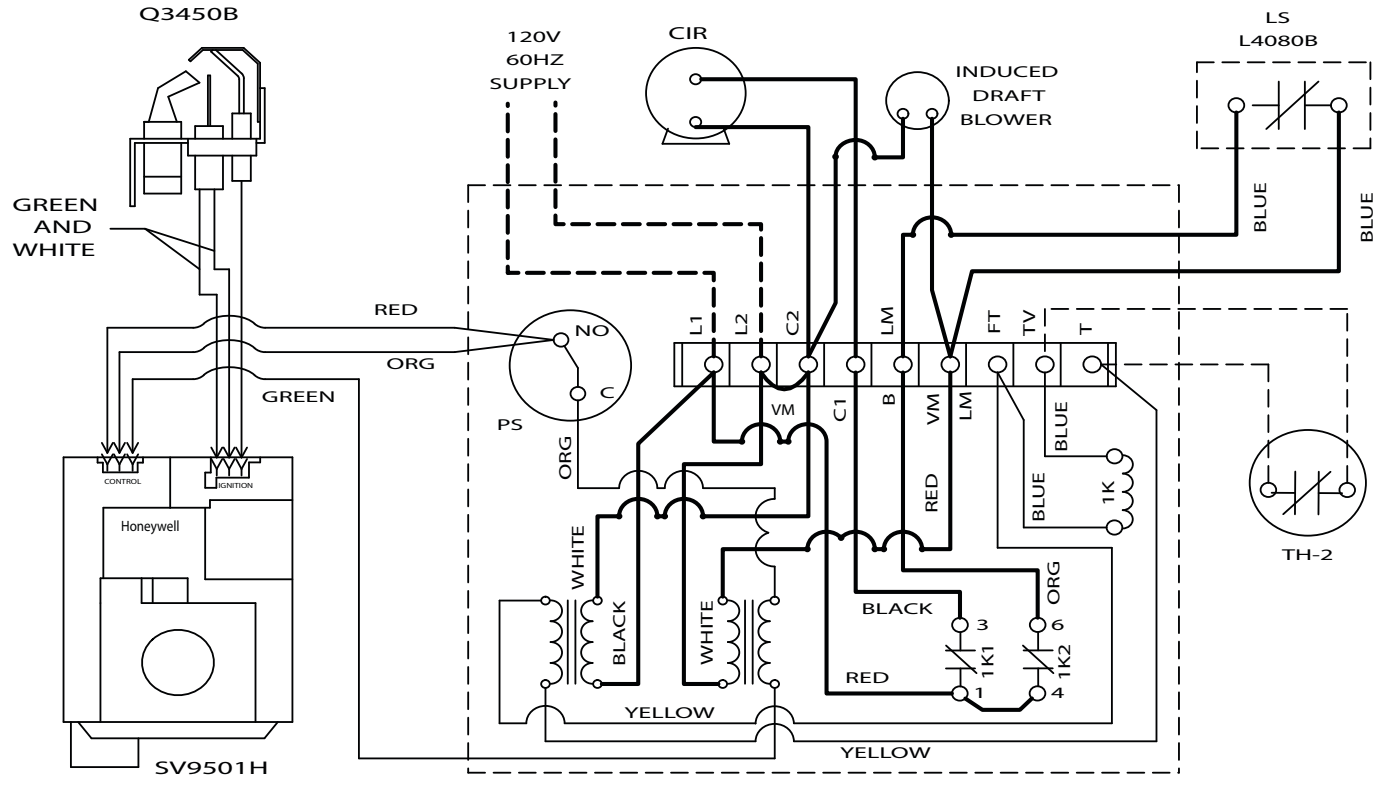
TH-2
TR-1
TR-2
R8222C


Q3450B
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3
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1K2
RED
1
4
YELLOW
YELLOW
CONTROL
IGNITION
Honeywell
SV9501H
TH-2

## LIGHTING INSTRUCTIONS
## FOR BOILER WITH A HOT SURFACE PILOT SYSTEM

**WARNING**

IF YOU DO NOT FOLLOW THESE INSTRUCTIONS EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

**CAUTION**

Before operating, make certain the boiler and system are full of water to minimum pressure (this is usually 12 lbs. per square inch on most systems) and system is vented of air. See the operating and lighting instructions.

## FOR YOUR SAFETY, READ BEFORE OPERATING!

1. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
2. BEFORE OPERATING 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.

3. Use only your hand to move the system control switch. Never use tools. If the switch will not move by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

**WARNING**

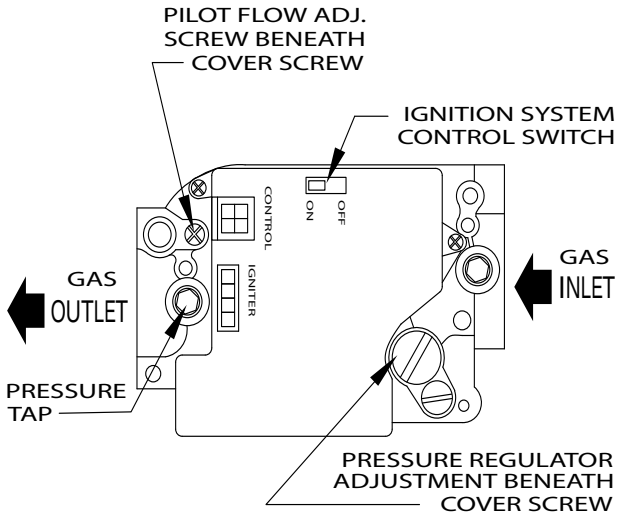
Force or attempted repair may result in a fire or explosion.

4. 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 any gas control which has been under water.

## OPERATING INSTRUCTIONS

1. STOP! Read the safety information in the user's information manual.
2. Set thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the pilot. DO NOT try to light the pilot by hand.
5. Move the ignition system control switch to the "OFF" position. See figure #10.
6. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP. Follow step 2 in the lighting procedure previous page, "What To Do If You Smell Gas." If you don't smell gas, go to the next step.
7. Move the ignition system control switch to the "ON" position. See figure #10 above.
8. Turn on all electric power to the appliance.
9. Set thermostat to desired setting.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" (Below) and call a qualified service technician or your gas supplier.

**Figure 10**




## TO TURN OFF GAS TO APPLIANCE

1. Set thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Move the ignition system control switch to the "OFF" position. DO NOT FORCE

## SEQUENCE OF OPERATION

### On a call for heat:

1. The thermostat will actuate, completing the circuit between terminals T and T.
2. The R8222C relay coil will energize thus pulling in the relay contacts.
3. The circulator starts and power is switched to the limit. If limit circuit is closed the venter motor and TR-2 transformer are energized.
4. The venter motor starts and develops static pressure.
5. When the static pressure is reached the pressure switch pulls in completing the circuit between TR-2 and the SV9501H gas valve system.
6. The SV9501H opens the pilot valve and ignites pilot. After pilot is proven the main burner will ignite.
7. In the event the boiler water temperature exceeds the high limit setting the power will be interrupted to the venter motor, and TR-2, thus interrupting power to the ignition system. Power will remain off until the water temperature drops below the high limit setting. The circulator will continue to operate under this condition until the thermostat is satisfied.
8. Should the air flow (static pressure) be interrupted (ie. blocked flue), the pressure switch will sense a drop in pressure, opening the circuit between the ignition system and TR-2. The venter motor will continue to operate until static pressure is reached or thermostat is satisfied.
9. In the event the flow of combustion products through the boiler flueways becomes reduced or blocked, the Q34505 pilot will lose flame rectification and shut off the main burners. The boiler will try for ignition but will not light. If this condition occurs, turn off the main power and do not put the unit into operation.
10. When the thermostat is satisfied power is interrupted to the relay coil and the relay drops out cutting power to the circulator, venter motor, and TR-2.

It is suggested that a qualified service agency be employed to make an annual inspection of the boiler and the heating system. They are experienced in making the inspection outlined below.

In the event repairs or corrections are necessary they can make the proper changes for safe operation of the boiler.

**CAUTION**

⚠ Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after service.

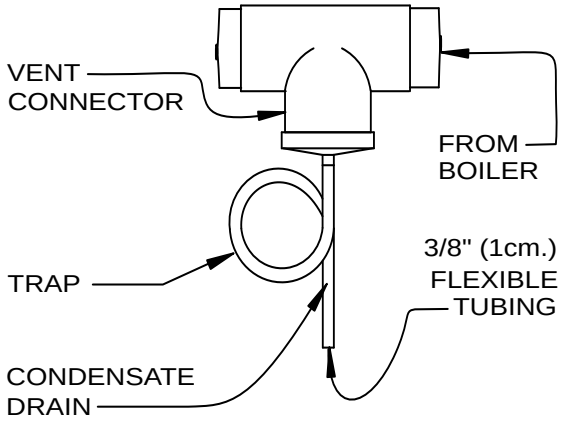
## BEGINNING OF EACH HEATING SEASON

1. Before seasonal start up it is advisable to have a competent service agency check the boiler for soot and scale in the flues, clean the burners and check the gas input rate to maintain high operating efficiency and safe operation.
2. The service agency should make certain the system is filled with water to minimum pressure and open air vents - if used - to expel any air that may have accumulated in the system.
3. Check automatic air vents for leakage.
4. Inspect the venting system at the start of each heating season. Check the pipe from the boiler for signs of deterioration and sagging joints. Repair if necessary. Remove the vent pipe from the boiler and check for obstructions.
5. Clean condensate tee & trap.
6. Periodically check the condensate trap for water/condensate. The trap should always have water in it. Refill the trap if it runs dry. If the trap runs dry then flue gasses can escape.

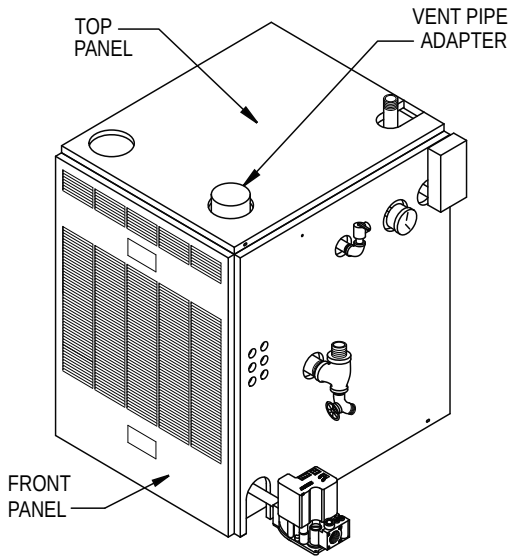
Periodic cleaning of the condensate collection system is required. When a condensate collection system is installed in a venting system, it is recommended that the cleaning become a part of the annual servicing. The procedure for cleaning this system is as follows:

1. Remove tubing from condensate tee.
2. Empty all liquid from tubing.
3. Rinse tubing inside & out in a sink with water.
4. If the inside of the tubing cannot be cleaned, the tubing should be replaced with the same type and size of tubing.
5. Add water to trap before replacing.
6. Replace tubing as described in **figure #11**.
7. Visually inspect entire piping system and if any leaks appear, have them repaired as soon as possible. DO NOT use petroleum based stop leak compounds.

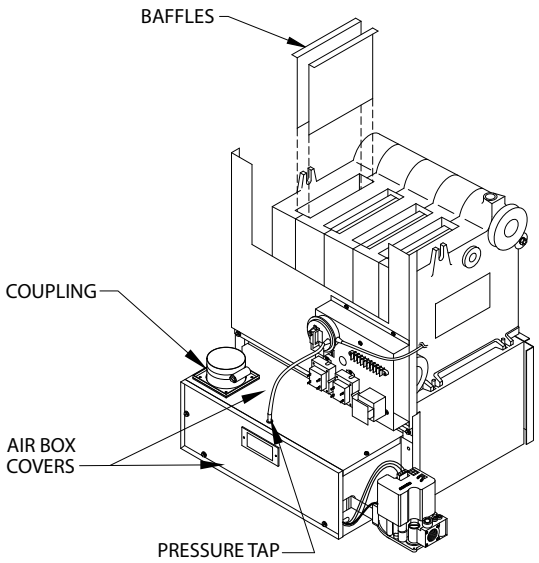
**Figure 11 - Condensate Collection System**



## Figure 12



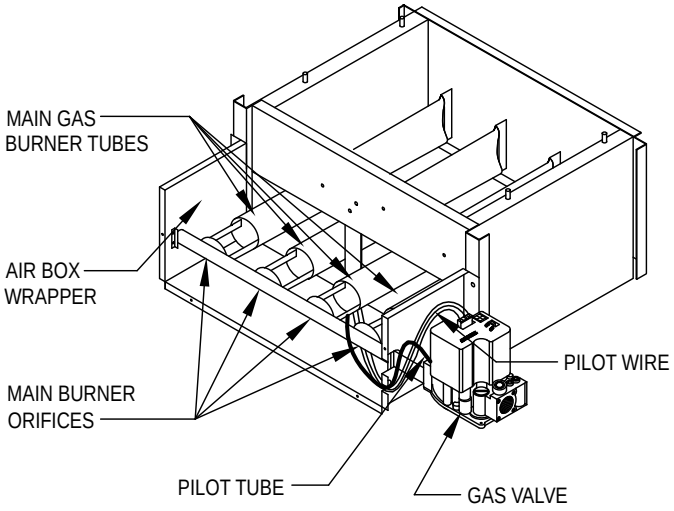

## Figure 13



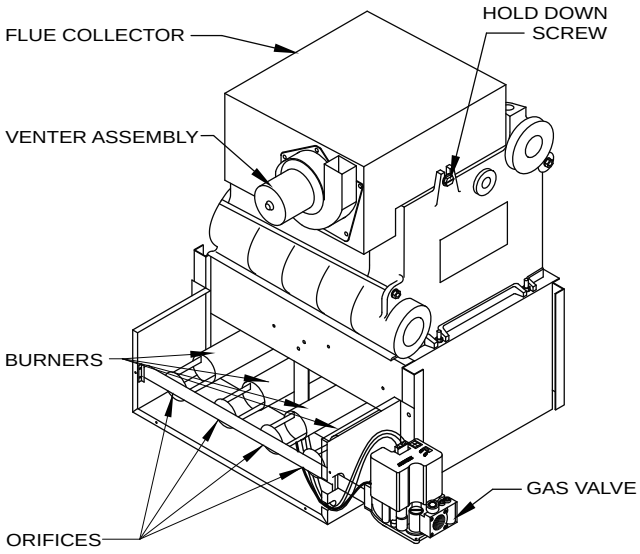

### The following procedure should be followed to clean and check the flue gas passageways:

1. Turn off gas to the boiler at the manual gas
2. Remove the jacket front panel. (See **figure #12**)
3. Disconnect the vent pipe from the vent pipe adapter.
4. Disconnect the air inlet pipe from the coupling. (See **figure 13** for coupling location.)
5. Remove the air box covers. (See **figure #13**)
6. Remove the burners from the combustion chamber by raising the burners up from the manifold orifices and pulling toward the front of the boiler. (See **figure #14**)
7. Remove the top panel. (See **figure #12**)
8. Remove the flue collector and venter assembly from the boiler castings by removing the hold-down screws located on each side of the flue collector. (See **figure #15**)
9. Remove the baffles from the heat exchanger. **(See figure #13)**

## Figure 14




## Figure 15



**10.** Visually inspect the baffles for any unusual wear or soot build up. Clean if necessary.

**11.** Visually inspect the venter assembly for any unusual wear or dirt build up. Vacuum if necessary.

**12.** Place a sheet of heavy paper or similar material in the bottom of the combustion chamber and brush down the flue passageways. The soot and scale will collect on the paper and is easily removed with the paper.

**13.** Replace the Flue Collector using the hold down screws and silicone in place with GE IS 808 silicone or similar. (See **figure #15**)

**14.** Repeat steps A-E in reverse order to reassemble the boiler.

**15.** Start boiler to insure proper operating condition.

**16.** KEEP the area around the boiler clean and free of combustible materials such as gasoline, paints, paint thinner and other such flammable vapors and liquids.

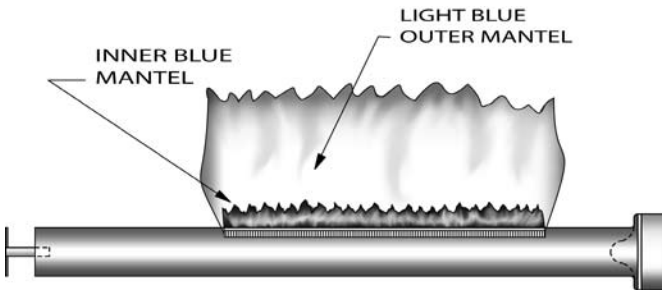
**17.** The free flow of combustion and ventilating air to the boiler and boiler room must not be restricted or blocked.

**18.** Some circulators require periodic servicing. These circulators usually have oil cups or openings at each end of the motor and one for the shaft bearing. Put about one teaspoon of SAE 20 or 30 non-detergent motor oil in each opening twice per year. DO NOT OVER OIL. Follow the manufacturer's instructions attached to the circulator. When oil cups or holes are not provided, bearings are either permanently lubricated or water lubricated.

**Visually check the main burners and pilot flame at the start of each heating season and again midway through the season.**

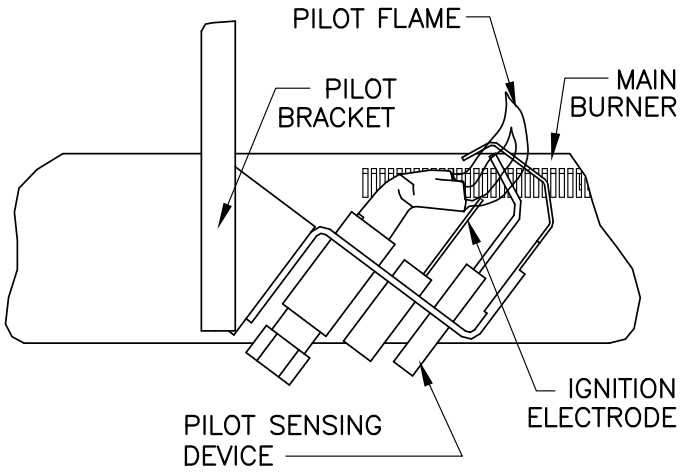
a. Check the burner throats and burner orifices for lint and dust obstructions. (See figure #15)
b. The main burner flame should have a well defined inner blue mantel with a lighter blue outer mantel. (See figure #16)
c. The pilot flame should envelop 3/8" (.95 cm) to 1/2" (1.27 cm) of the tip of the pilot sensing device. (See figure #17)

**Figure 16 - Burner Flame**




The main burner flame should form a sharp blue inner mantel with no yellow.

**Figure 1 - Pilot**



## Adjusting the pilot flame:

1. Remove the pilot adjustment cover screw.
2. Turn inner screw (adjustment screw) clockwise to decrease and counterclockwise to increase the pilot flame, see figure #10.
3. After adjustment, be sure to replace cover screw to prevent possible gas leakage.
4. The main burners and the pilot burner should be checked for signs of corrosion or scale build up.
5. Clean main burners and pilot burner with a steel bristle brush.

## Check Venter Static Pressure

(Refer to figure #18 for the following instructions)

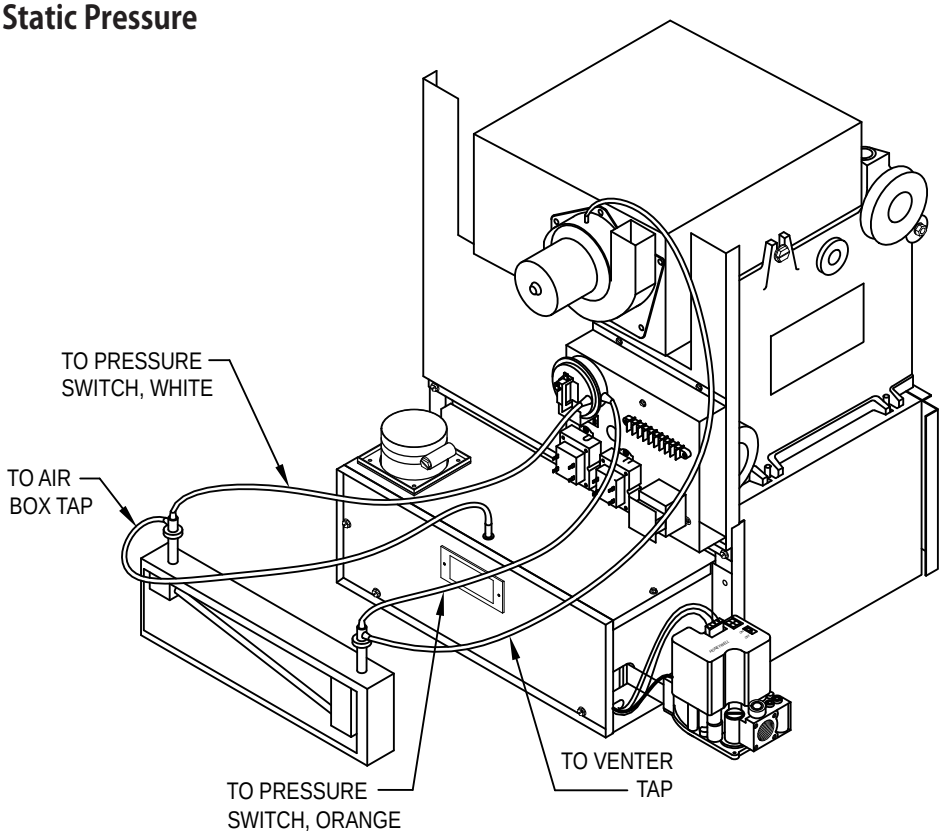
1. With the boiler off, disconnect the orange and white tubings from the pressure switch on the air box and venter motor.
2. Install a 3/16" (.48 cm) plastic barbed tee between a slope manometer and the pressure switch.
3. The other part of the tee goes to the air box and venter pressure taps.
   A. Orange being the high negative.
   B. White being the low negative.
4. Turn the boiler back on and read the static pressure. The reading should be -.55 ±.05 inches water column or higher for the Sealed Combustion series boilers.
5. If the static pressures are not at the minimum allowable level, check the intake and exhaust pipes for obstructions or damage.
6. To reassemble, remove the tees and additional tubing and replace the orange tube to the venter tap, and the white tube to the air box tap.

**CAUTION**

⚠ Do not cut original tubing. Additional tubing is required. If the tubing is cut, replace it only with O.E.M. high temperature silicone tubing.

Do not replace with vinyl or plastic tubing because it will melt.

**Figure 18 - Checking Static Pressure**



## CHECK GAS INPUT RATE TO BOILER

**1.** 1. Maximum permissible gas supply pressure must not be higher and minimum supply pressure must not be lower than what is specified on the rating plate.

**2.** 2. To check for proper flow of natural gas to boiler using the gas meter, proceed as follows:

A. Turn off the gas supply to all other appliances, except the boiler.

B. With the boiler operating, determine the flow of gas through the meter for two minutes and multiply by 30 to get the hourly rate.

C. Divide the input rate shown on the rating plate by the heating value of the gas as obtained from the local gas company. This will determine the number of cubic feet of gas required per hour.

D. If minor adjustment is necessary, install a manometer on the outlet side of the gas valve. Adjust the pressure regulator on the combination gas control. Increase or decrease manifold pressure to obtain gas input required as described on the rating plate. To increase, turn the regulator adjusting screw clockwise or counterclockwise to decrease pressure, see **figure #10.**

E. After adjustment has been completed, turn the boiler off and remove the manometer and the shut-off cock.

F. Relight all the other appliances turned off in step A above. Be sure all pilot burners are operating.

## APPLICABLE FEDERAL CODES

### UNITED STATES

NFPA 54/ANSI Z223.1 …National Fuel Gas Code (Part 7)

NFPA/ANSI211 …Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances

### CANADA

CAN1-B149.1 …Installation Codes for Gas-Burning Equipment

B149.2 …Installation Codes for Gas-Burning Equipment

These codes contain information on special gas vents for Category II, III and IV appliances, vent sizing, location, air space clearances to combustibles and safe installation practices. The gas vent installer should be familiar with these National or Canadian Codes as well as Local Codes and Regulations.

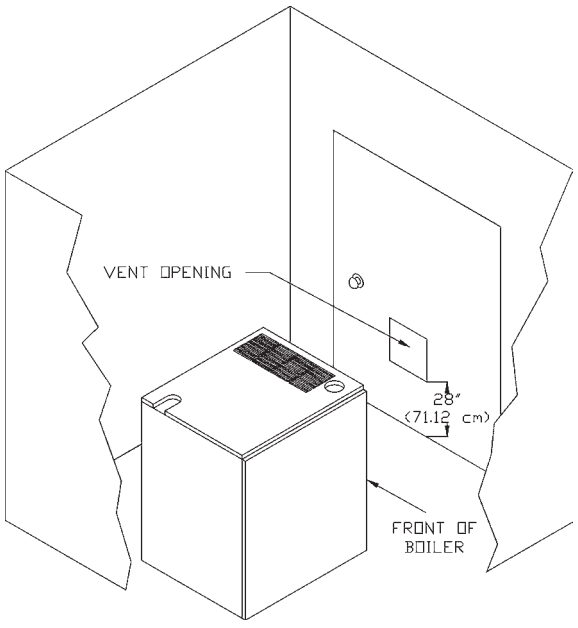
## VENTILATION & COMBUSTION AIR

**WARNING**

air openings to combustion area must not be obstructed. By following the chart below, adequate combustion air can be maintained.

| Venting Requirements | | Combustion Air Requirements |
|---|---|---|
| Boiler Size | Vent Opening Dimensions | 3" (8cm) Inlet Pipe length |
| 3 Section | 5" X 5" (13 cm x 13 cm) | 30 Ft (914cm) with 2 Elbows |
| 4 Section | 8" x 8" (20 cm x 20 cm) | 30 Ft (914cm) with 2 Elbows |
| 5 Section | 9" x 9" (23 cm x 23 cm) | 20 Ft (610 cm) with 2 Elbows |

**Figure 1 - Closet Installation**




For Closet Installation a vent opening must be placed in wall or door directly across from the front of the boiler with a minimum opening as listed above. The vent opening must be located 28" (71.12 cm) up from the floor. (See figure 1)

Note: If covering the hole with screen or using louvers, the opening must have the same free flowing area as the opening in the wall with no screen or louvers.

## Installation Requirements Specific To The State Of Massachusetts For Direct Vent, Mechanical Vent, And Domestic Hot Water Appliances

In the State of Massachusetts, boiler installation must conform to state code 248 CMR which includes but is not limited to:

- This product must be installed by a licensed Plumber or Gas Fitter.
- When flexible connectors are used, the maximum length shall not exceed 36 inches.
- When lever type gas shut-offs are used, they shall be T-handle type.

For all side wall horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the commonwealth and where the side wall exhaust vent termination is less than seven (7) feet above finished grade in the area of the venting including but not limited to, decks and porches, the following requirements shall be satisfied:

1. **Installation of carbon monoxide detectors**: At the time of installation of the side wall horizontal vented gas fueled equipment, the installing plumber or gasfitter shall observe that a hard wired carbon monoxide detector with an alarm and battery back-up is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professionals for the installation of hard wired carbon monoxide detectors.

   A. In the event that the side wall horizontally vented gas fueled equipment is installed in a crawl space or an attic, the hard wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.

   B. In the event that the requirements of this subdivision can not be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

2. **Approved carbon monoxide detectors:** Each carbon monoxide detector as required in accordance with the above provisions shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.

3. **Signage**: A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment. The sign shall read, in print size no less than one-half (1/2) inch in size,

   GAS VENT DIRECTLY BELOW.

   KEEP CLEAR OF ALL OBSTRUCTIONS.

4. **Inspection**: The state or local gas inspector of the side wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08(2)(a)1 through 4.

5. **Product-approved vent/air intake**: A product-approved vent terminal must be used and, if applicable, a product-approved air intake must be used. Installation shall be in strict compliance with the manufacturer's instructions.

6. **Installation instructions**: A copy of all installation instructions for all Product Approved side wall horizontally vented gas fueled equipment, all venting instructions, all parts lists for venting instructions, and/or all venting design instructions shall remain with the appliance or equipment at the completion of the installation.

## VENT PIPE INSTALLATION INSTRUCTIONS

This boiler is design certified for use with the following venting systems.

| Company | HEAT-FAB® | FLEX-L® | Z-FLEX® | ProTech® |
|---|---|---|---|---|
| Product | SAF-T-VENT™ | STAR-34™ | Z-VENT™ | FasNSeal™ |

**CAUTION**

⚠ the above vent pipe and fittings are used for venting gas burning category iii, iv, and direct vent appliances. Do not use this vent pipe or fittings for venting appliances burning fuels such as wood, oil, kerosene or coal.

do not use this vent pipe and fittings for venting incinerators of any kind.

**WARNING**

For correct installation of vent system, read all of these instructions.

Failure to use this venting system will void the manufacturer's warranty and may result in rapid deterioration of the venting system, a potential health hazard.

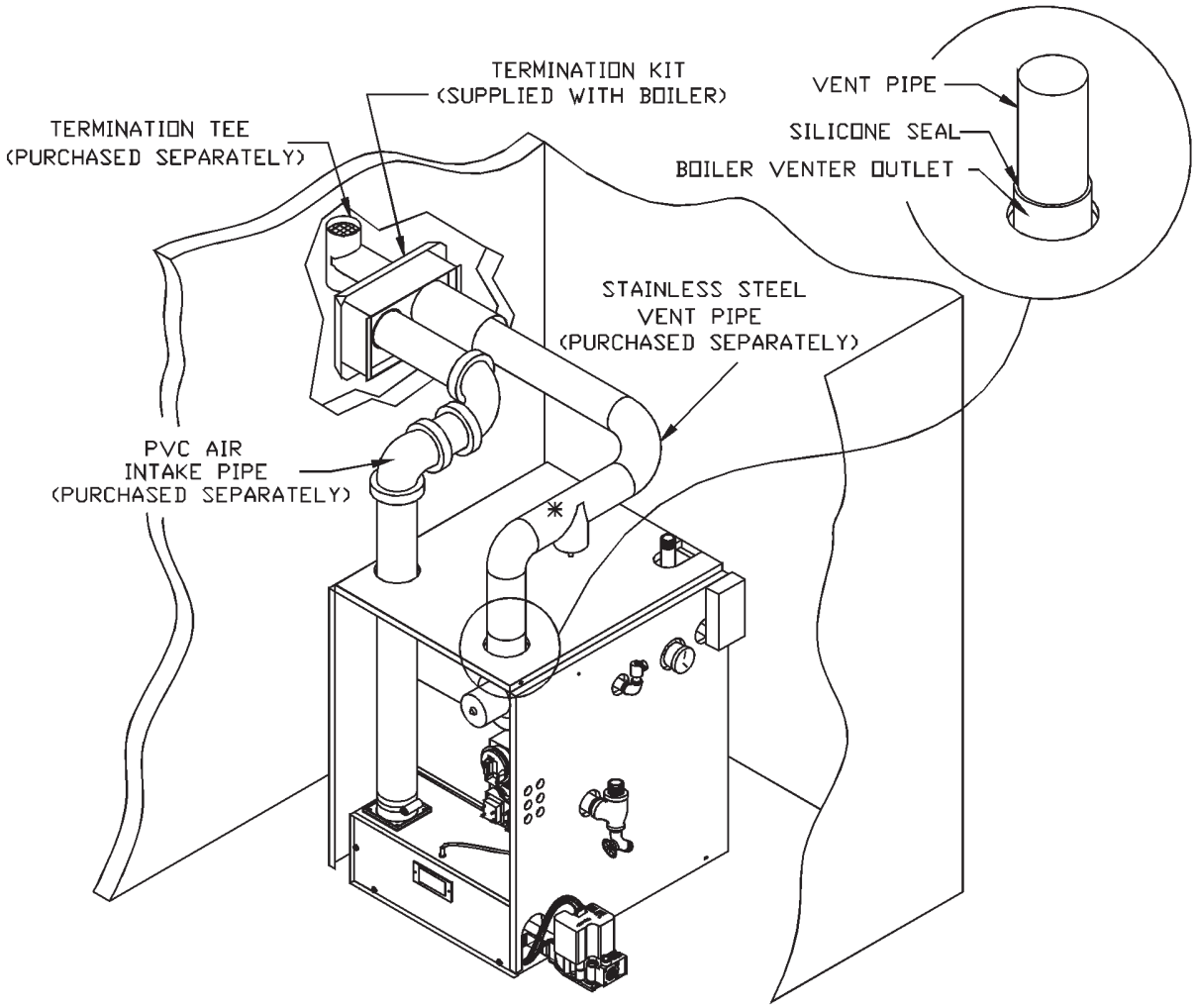
⚠ Faulty vent installation can allow toxic fumes to be released into living areas. This may cause serious bodily injury or property damage. Vent performance may also be affected by improper assembly.

Install separate vents for forced exhaust appliances and natural draft appliances. A common vent between natural draft and forced exhaust appliances may cause toxic gases to exhaust through the natural draft appliance rather than to outside air. Breathing exhaust gases will cause serious personal injury or death.

**WARNING**

⚠ all installations of boilers and venting should be done only by a qualified expert and in accordance with the appropriate olsen technology, inc. Manual. Installing or venting a boiler or any other gas appliance with improper methods or materials may result in serious injury or death due to fire or to asphyxiation from poisonous gases such as carbon monoxide which is odorless and invisible.

## Figure 2 - HORIZONTAL VENT PIPING (TYPICAL INSTALLATION)




Notes:

*1 : A condensate tee/drain is only needed when horizontal vent lengths exceed 10 feet.

*2 : Insert vent pipe in boiler venter outlet (vent adapter), apply silicone completely around edge of outlet and tighten clamp.

| Horizontal Vent Pipe Lengths | | | | |
|---|---|---|---|---|
| Boiler Size | Vent Pipe Dia | Max Vent Length* | Min Vent Length* | Inlet Pipe |
| 3 Section | 3" (8 cm) | 30 ft (914 cm) with condensate tee & 2 elbows. | 2 ft (61 cm) with 1 elbow | 30 ft (914 cm) with 2 elbows |
| 4 Section | 3" (8 cm) | 30 ft (914 cm) with condensate tee & 2 elbows. | 2 ft (61 cm) with 1 elbow | 30 ft (914 cm) with 2 elbows |
| 5 Section | 3" (8 cm) | 20 ft (610 cm) with condensate tee & 2 elbows. | 2 ft (61 cm) with 1 elbow | 20 ft (610 cm) with 2 elbows |
| Example: 20 ft (610 cm) of vent pipe with 1 elbow is equivalent to 15 ft (457 cm) of vent pipe with 2 elbows. | | | | |
| ***Note: A condensate trap is only required on models over 10 ft (305 cm) of horizontally run vent piping.** | | | | |

**WARNING**

⚠ DO NOT INSULATE OR OTHERWISE WRAP VENT PIPE OR FITTINGS. FOLLOW THE VENT PIPE MANUFACTURERS INSTALLATION INSTRUCTIONS FOR HORIZONTAL VENTING.

## INSTALLATION PROCEDURE FOR VENTING SYSTEM THROUGH A WALL

**1. The Vent Termination Must Be Located:**

(Refer to figure 9 when determining the location of the vent outlet.)

A. At least 12 inches (30.4 cm) above finished grade, or at least 12 inches (30.4 cm) above the normally expected snow accumulation level in geographical areas where snow accumulates.

B. With a vent termination clearance of at least 12 inches (30.4 cm) from any air openings into a building.

C. At least 3 feet (92 cm) above any forced air inlet located within 10 feet (305 cm).

D. At least 12 inches (31 cm) horizontally from electric meters, gas meters, regulators and relief equipment.

E. For horizontal runs; keep a minimum air space clearance from any combustible material, electric wires, and building insulation of 2 inches (5.1 cm) for 3" (7.6 cm) vent pipe.

F. Do not terminate vent over public walkways or over an area where condensate or vapor could be detrimental to regulators, relief valves, or other equipment.

G. Do not locate the vent termination too close to shrubbery as flue products may stunt growth or kill them.

H. Some building materials may be affected by flue products expelled near unprotected surfaces. Sealing or shielding of exposed surfaces with a corrosion resistant material (such as aluminum sheet) may be required to prevent staining or deterioration.

I. When installing vent cap secure it to a noncombustible wall or a combustible wall thimble. Fasten vent cap and seal passage as shown in f**igures 3, 5a and 5b**.

J. See the National or Canadian Codes listed at the beginning of these instructions for additional information on termination location.

2. Using the template provided as a guide, cut a hole through the wall. Then secure the template to the inside of the wall over the hole. (**See figures 5a and 5b.**
3. NOTE: If installing through a non combustible wall make (2) 3-1/2" (8.9 cm) holes on center through the wall. (Approximately 5-1/4" (13.3 cm) apart on center
4. For venting through a non-combustible wall, remove the vent termination thimble plate assembly from the termination assembly. (**See figures 5a and 5b.**
5. Install the vent termination assembly through the opening and secure it to the outside wall.
6. Install the PVC pipe from the vent termination assembly to the boilers air inlet.
7. Assemble and install the vent pipe according to the vent pipe manufacturers instructions.
8. Install the vent pipe through the termination assembly and extend it 3" (7.6 cm) beyond the termination assembly. (**See figures 5a and 5b.**
9. Install the termination wind deflector with the four (4) screws provided. (**See figures 5a and 5b.**
10. Install the draw collar around the pipe and tighten the nut and bolt until tightly secured. (**See figures 5a and 5b.**
11. Secure the termination tee according to the vent pipe manufacturers instructions.

**Figure 3 - Front View Of Termination Kit**

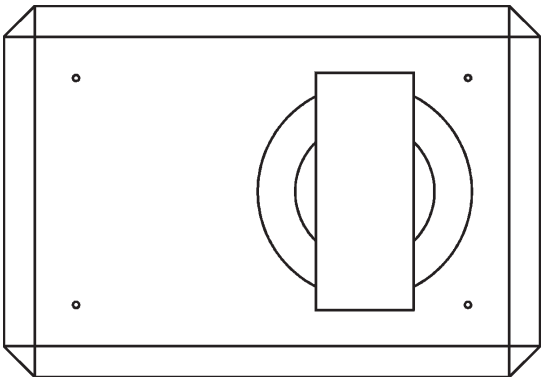
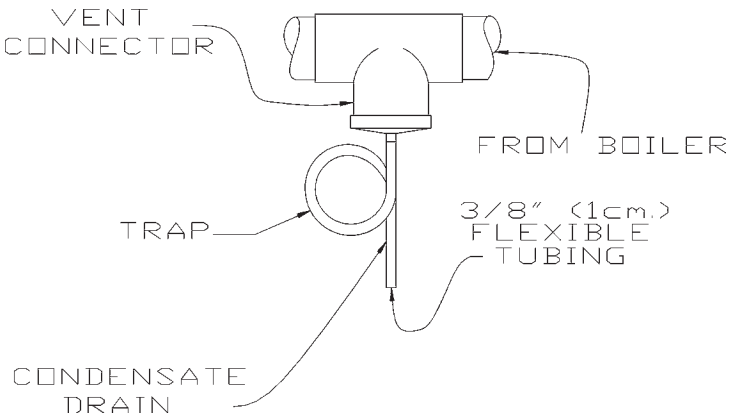
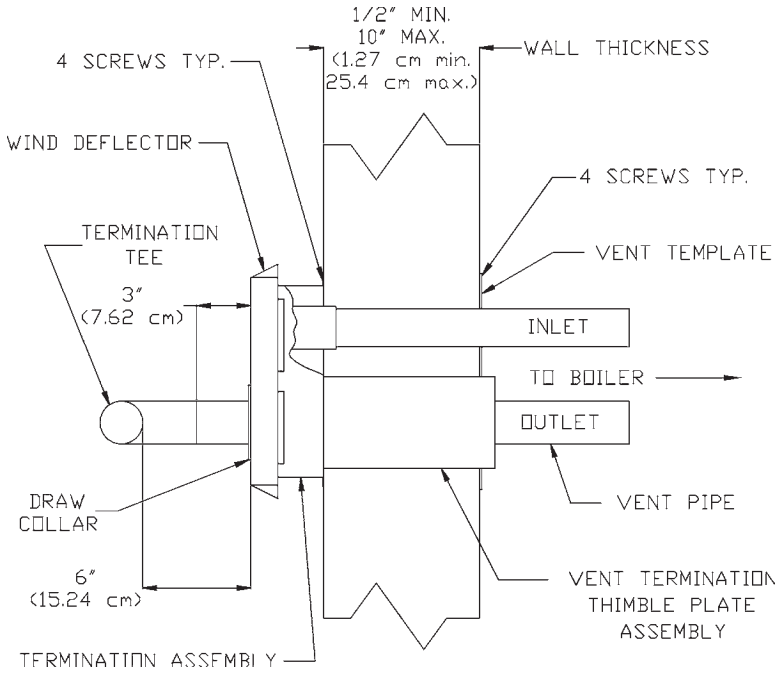


**Figure 4 - Condensate Tee & Drain**

Only Required If The Horizontal Vent Lengths Exceed 10'

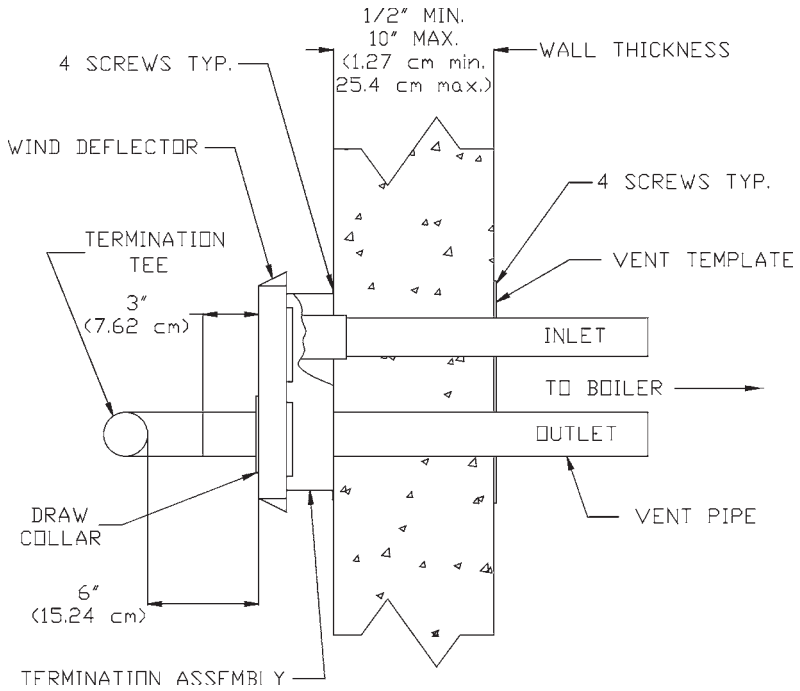


## Figure 5a - Top View Of Termination Kit And Wall (For Combustible Wall Installation)




## Figure 5b - Top View Of Termination Kit And Wall

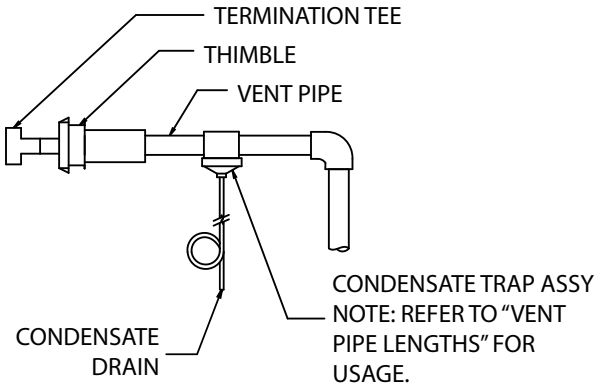
## (For Non-Combustible Wall Installation Remove Thimble wall Plate Assembly)



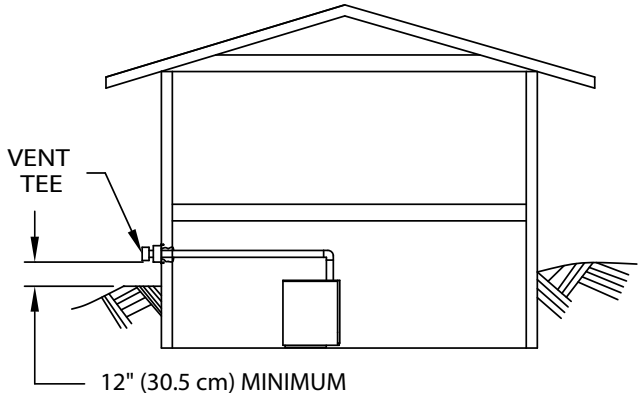
## VENTING INSTRUCTIONS

**For vent pipe installation refer to the vent pipe manufacturers instructions.**

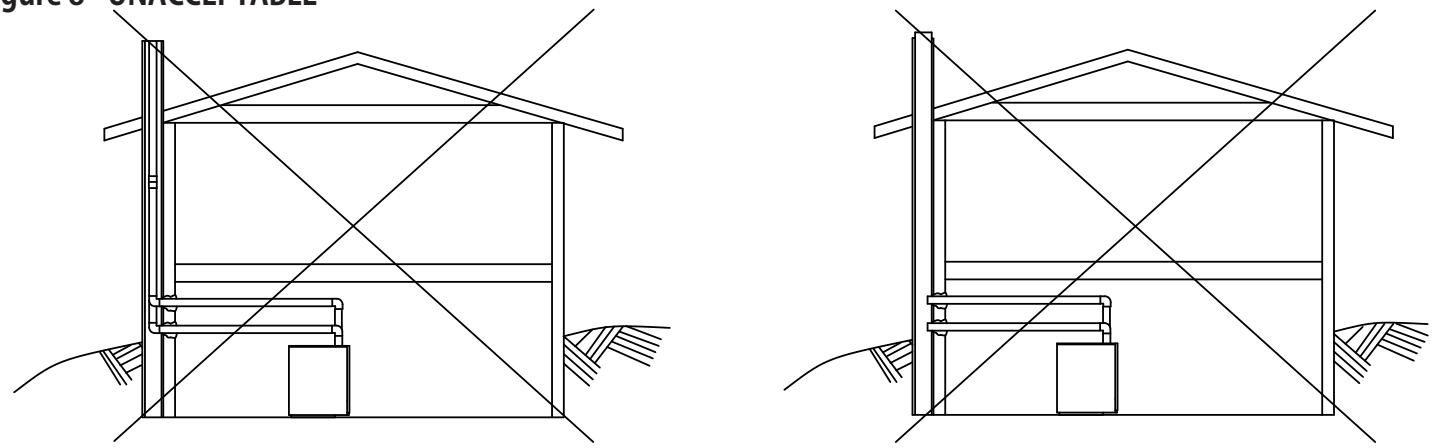
### Figure 6 - Vent System For All Models




### Figure 7 - RECOMMENDED




### Figure 8 - UNACCEPTABLE



## CONDENSATE DRAINS

**NOTICE**

Condensate Drains are only needed when horizontal vent lengths exceed 10 feet

**WARNING**

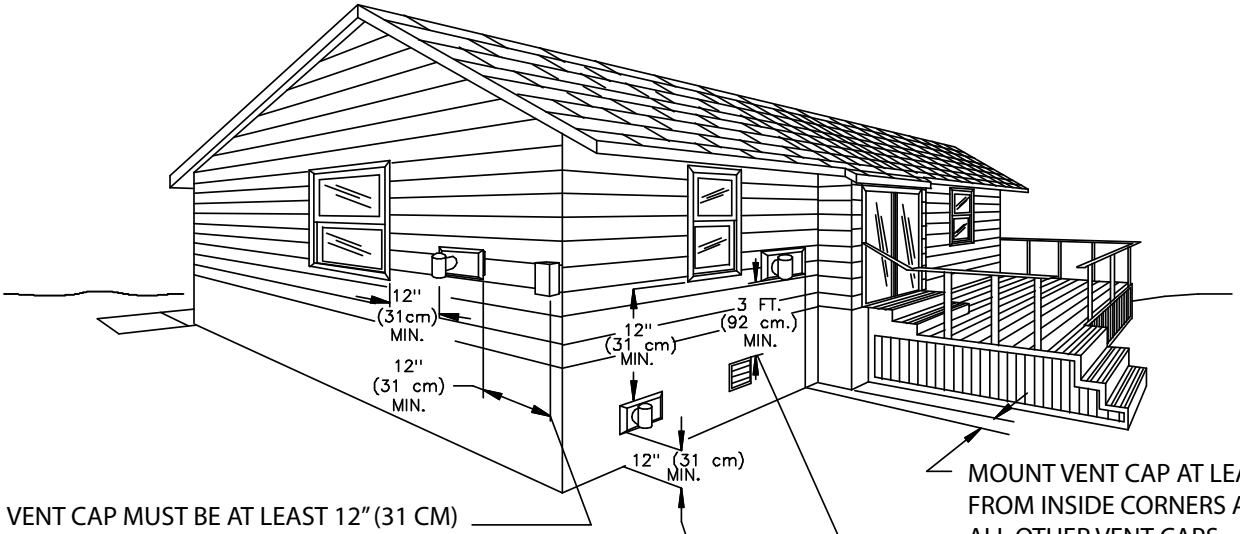
Do not place condensate drain where freezing may occur. Condensate drains are required in the vent when using the condensate tee. The condensate drain fitting must be plumbed to a sanitary drain for liquid condensate disposal.

Condensate drain is plumbed with 3/8" (1 cm) inside diameter flexible tubing. (See **Figure 4**) Refer to "GENERAL INSTRUCTION FOR SEASONAL STARTUP AND MAINTENANCE", in the Installation Manual for maintenance recommendations and schedule.

1. **Flexible Tubing Condensate Drain.** In the vent, and close to the appliance, install a tee with a run outlet. Install condensate drain in the down outlet with high temperature adhesive. (See **Figure 4**) Connect the condensate drain outlet to commercially available flexible tubing (minimum length 40" (102 cm)). Below the drain outlet, make a 6" (15.2 cm) diameter loop in 3/8" (1 cm) ID tubing, or a 9" (22.9 cm) diameter loop in 5/8" (1.6 cm) ID tubing. Secure the loop with a plastic cable tie. Run the other end of the flexible tubing to a sanitary drain (Use a condensate pump if necessary). Fill loop with water before firing the boiler.

## Figure 9 - Vent Clearances

NOTE: IF THERE IS A POTENTIAL FOR EXCESSIVE WINDS,
SPECIAL CONSIDERATION SHOULD BE GIVEN TO LOCATE THE
VENT TERMINATION AWAY FROM THE WINDWARD SIDE OF THE BUILDING.




VENT CAP MUST BE AT LEAST 12" (31 CM)
HORIZONTALLY FROM ANY ELECTRIC METERS,
GAS METERS, OR RELIEF EQUIPMENT

LOCATE VENT CAP TO ALLOW 12"
(31 CM) MIN ABOVE GRADE.

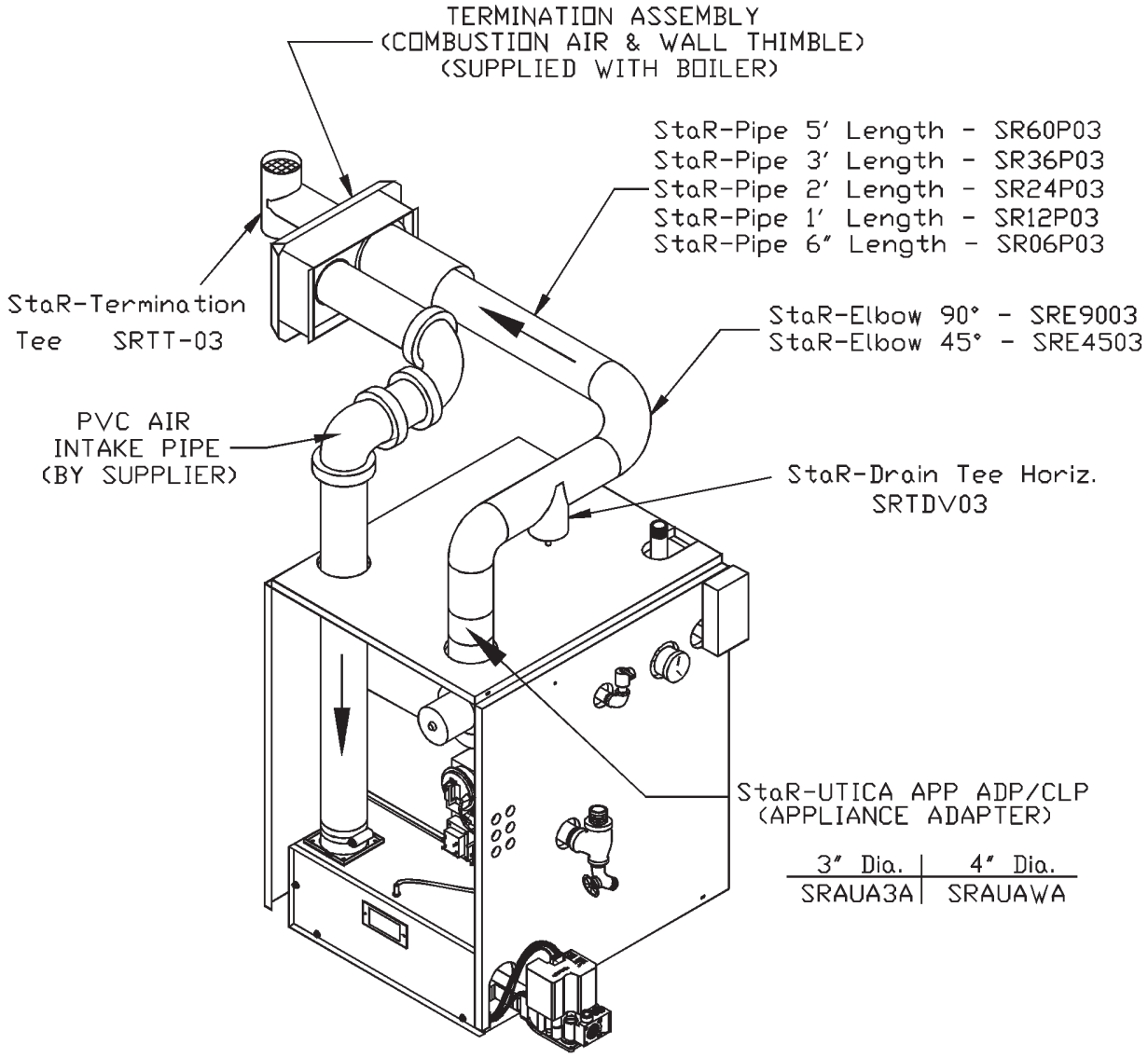
MOUNT VENT CAP AT LEAST 12" (31CM)
FROM INSIDE CORNERS AND
ALL OTHER VENT CAPS.

VENT CAP MUST BE AT LEAST 3'-0" (92 CM)
ABOVE ANY FORCED AIR INLET
LOCATED WITHIN 10'-0" (305 CM)

**VENT CAP MUST BE INSTALLED WITH
A VENT TERMINATION CLEARANCE OF
AT LEAST 12" (31 CM) FROM ANY
AIR OPENING INTO A BUILDING.**

When multiple boilers are used, a clearance of 12" (31 ccm) is required between vent caps.

**Figure 10 - Flex-L® Star-34™ Vent Pipe Components**

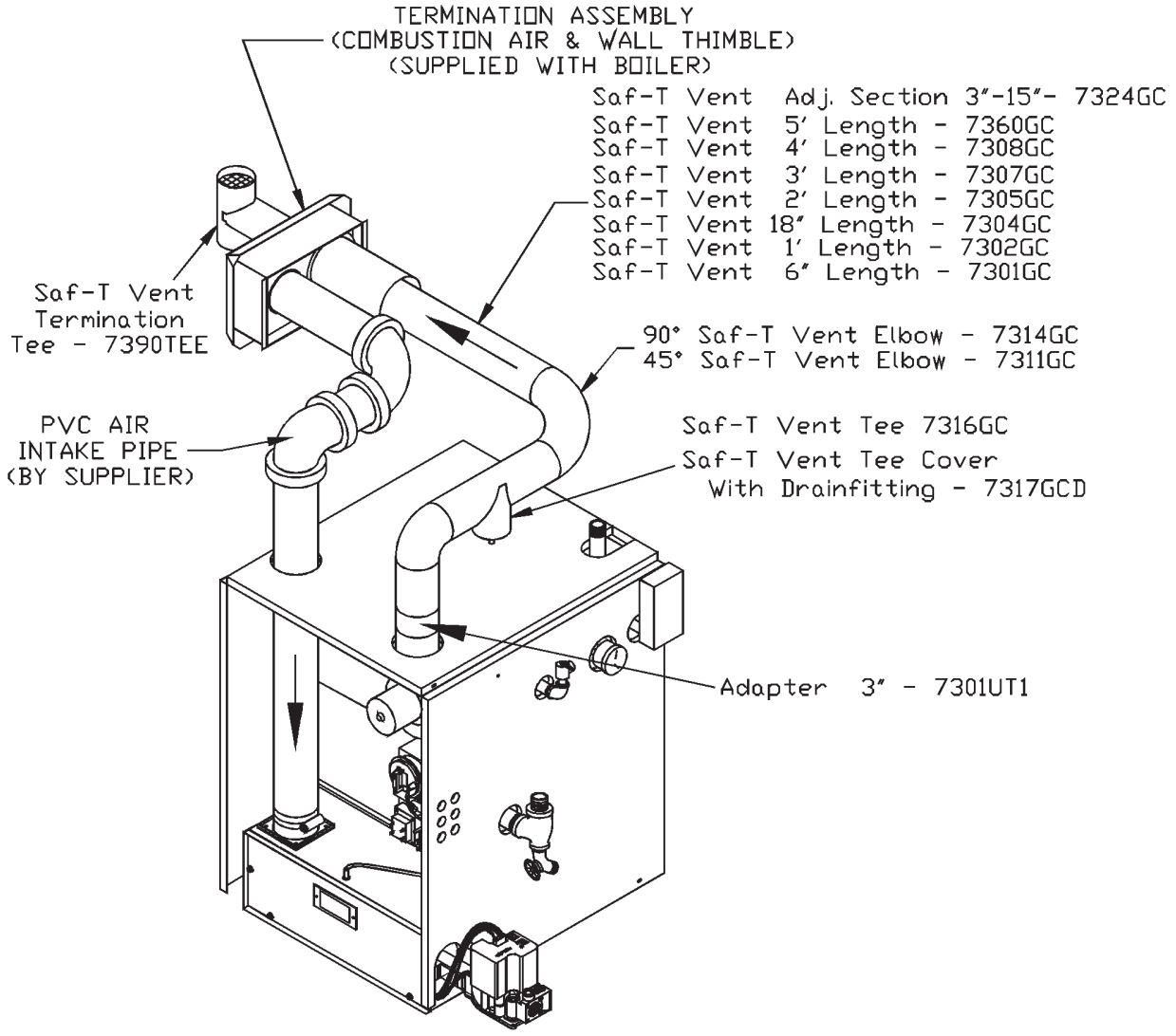



Notes:

*1 : A condensate tee/drain is only needed when horizontal vent lengths exceed 10 feet.

*2 : Insert vent pipe in boiler venter outlet (vent adapter), apply silicone completely around edge of outlet and tighten clamp.

## Figure 11 - Heat Fab® Saf-T Vent™ Vent Pipe Components

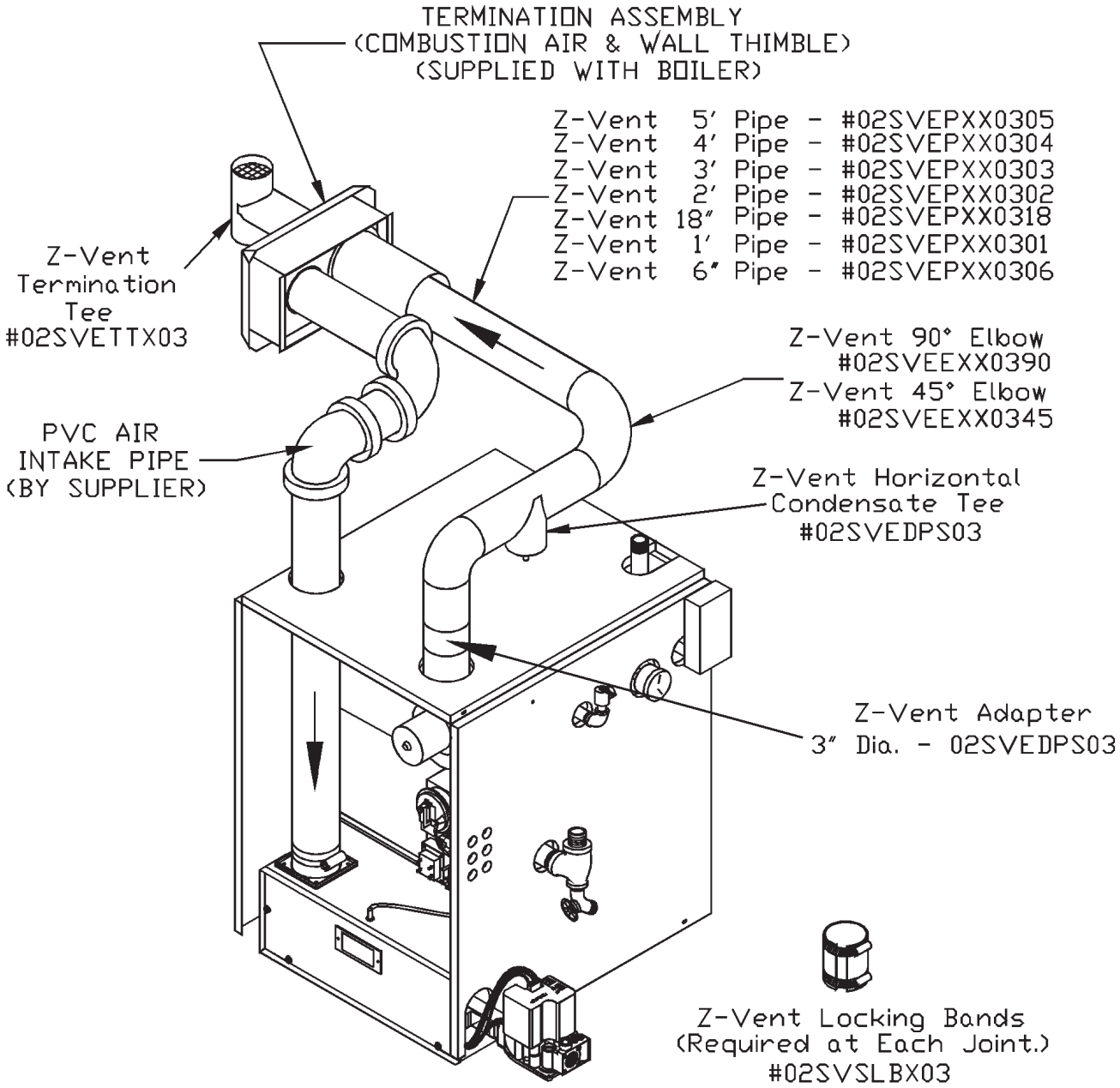



Notes:

*1 : A condensate tee/drain is only needed when horizontal vent lengths exceed 10 feet.

*2 : Insert vent pipe in boiler venter outlet (vent adapter), apply silicone completely around edge of outlet and tighten clamp.

**Figure 12 - Z-Flex® Z-vent™ Vent Pipe Components**

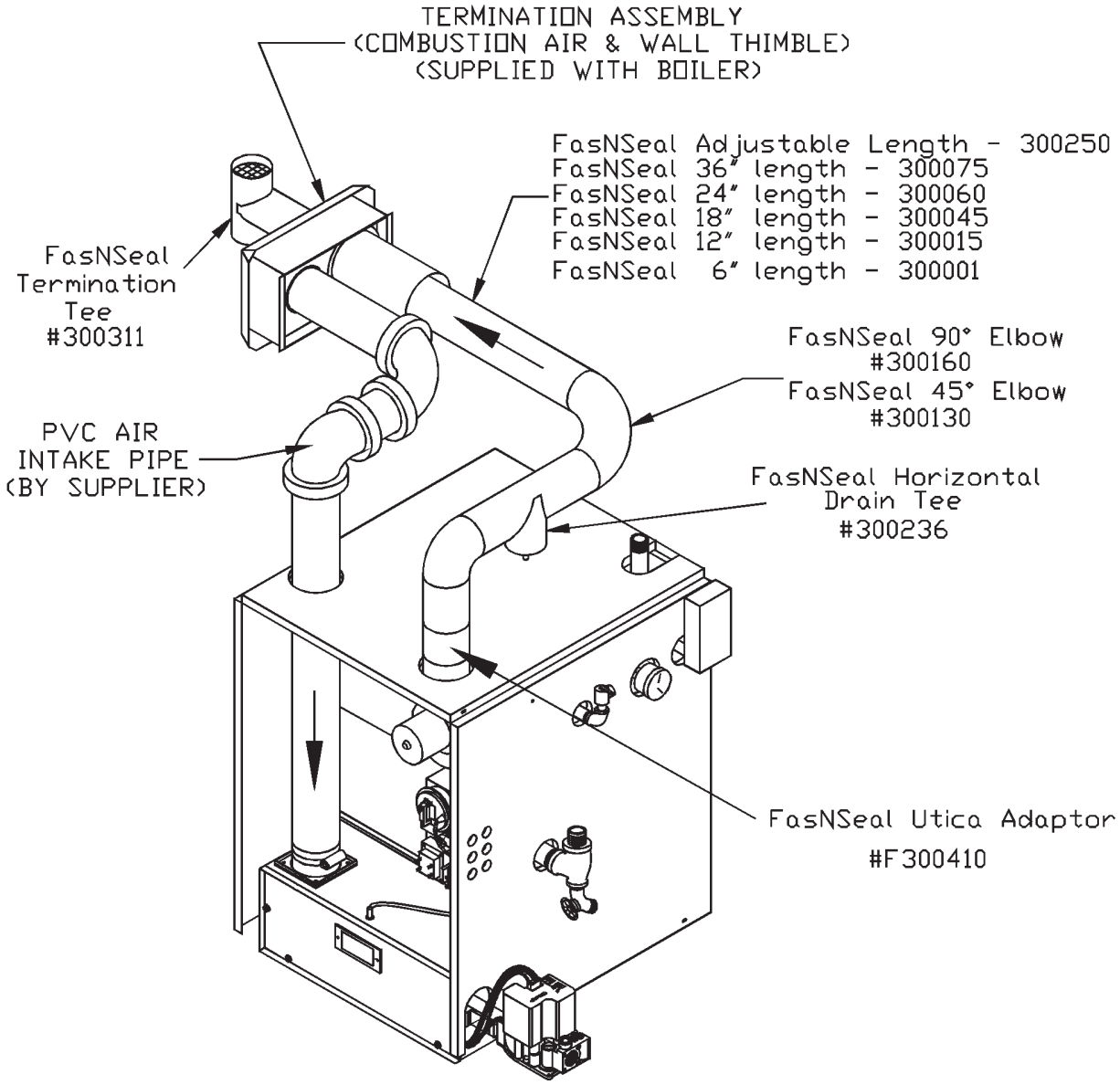



Notes:

*1 : A condensate tee/drain is only needed when horizontal vent lengths exceed 10 feet.

*2 : Insert vent pipe in boiler venter outlet (vent adapter), apply silicone completely around edge of outlet and tighten clamp.

## Figure 13 - ProTech® FasNSeal™ Vent Pipe Components

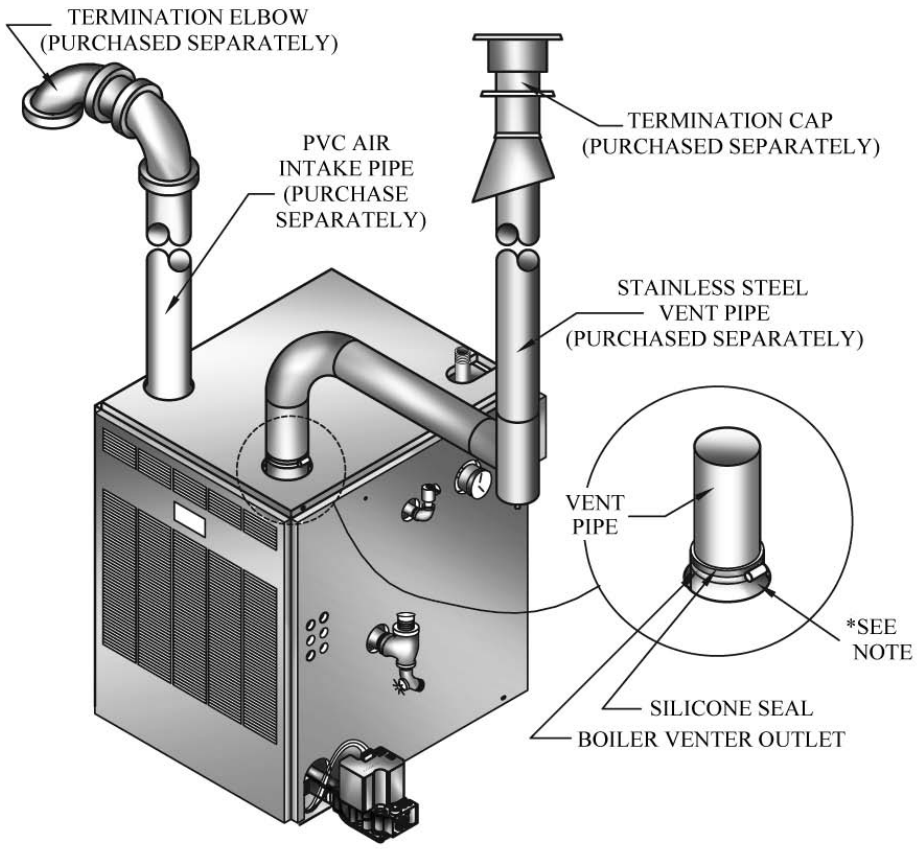



Notes:

*1 : A condensate tee/drain is only needed when hoizontal vent lenghts exceed 10 feet.

*2 : Insert vent pipe in boiler venter outlet (vent adapter), apply silicone completely around edge of outlet and tighten clamp.

## Figure 14 - Vertical Vent Piping Typical Installation




Notes:

* Insert vent pipe in boiler venter outlet (vent adapter), apply silicone completely around edge of outlet and tighten clamp.

## INSTALLATION PROCEDURE FOR VERTICAL VENTING

**WARNING**

do not insulate or other wise wrap vent pipe or fittings. Follow the vent pipe manufacturers installation instructions for vertical venting.

**1.** The Vent Termination Must Be Located:

A. With a 2" (5.1 cm) clearance to combustible materials.

B. 4 feet minimum above the ridge (see **fig. 17**).

C. Vent air intake must be 2' (61 cm) below vent outlet and facing away from the exhaust outlet (see **fig. 17,18**).

D. Use vent pipe manufacturer's vent cap fire stop, support collar, roof flushing, and storm collar.

E. Install a vertical vent drain tee (see **fig. 15**). Also see the section explaining condensate drain installation.

F. Fill the 3/8 flexible tubing with water before firing the boiler.

**2.** Configuration of vent air intake (see **figure. 16**).

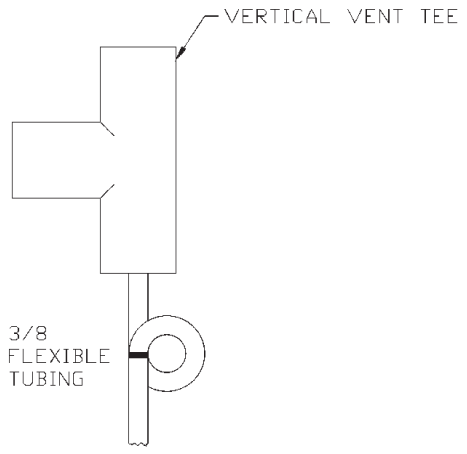
### Vent Pipe Lengths

- Vent Pipe Diameter: 3" (7.6 cm)
- Max Vent Length: 30 ft (914 cm) with (1) vertical drain tee, (1) 90° Elbow and (1) Termination Cap. 5 Ft (152 cm) Max Horizontal.
- Minimum Vent Length: 2 ft (61 cm)
- Inlet Pipe: 30 ft (914 cm) Max, 2 ft (61 cm) Min, (4) 90 ° Elbows (including intake 90° Elbow on Roof.)

**NOTICE**

Boiler installation must use 90° elbow off boiler for horizontal run to the vertical drain tee.

### Figure 15 - Vertical Drain Tee




### Figure 16 - Vent Air Intake

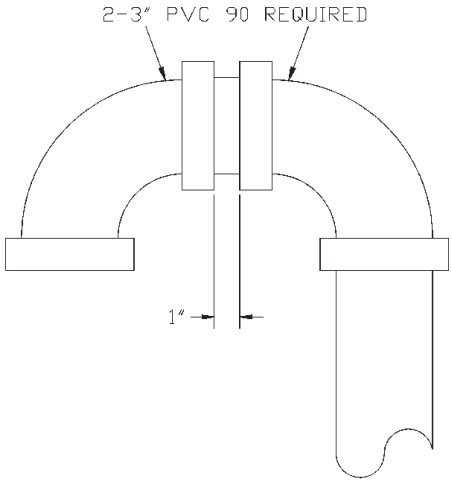


**Figure 17 - Termination 10 Ft (305 cm) Or Less From Ridge**

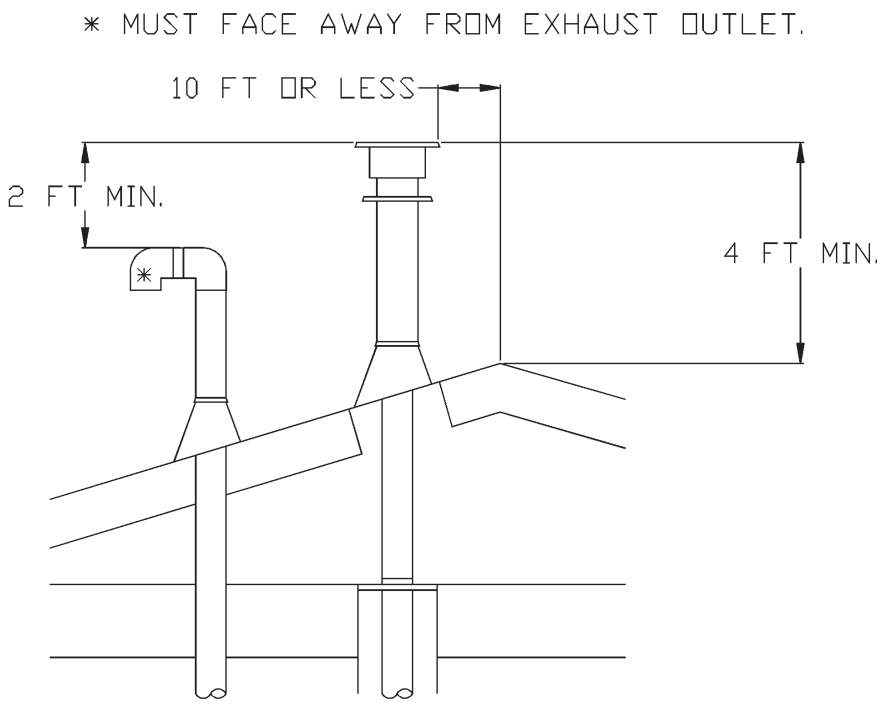
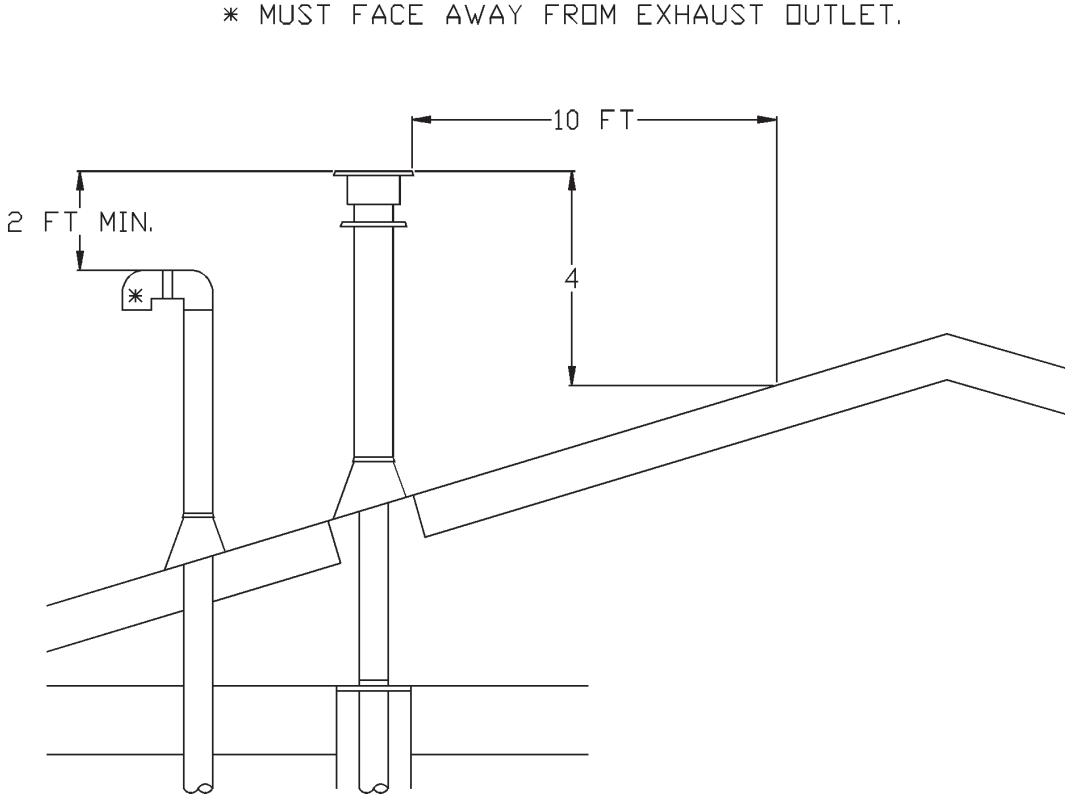



**Figure 18 - Termination More than 10 Ft (305 cm) from Ridge**



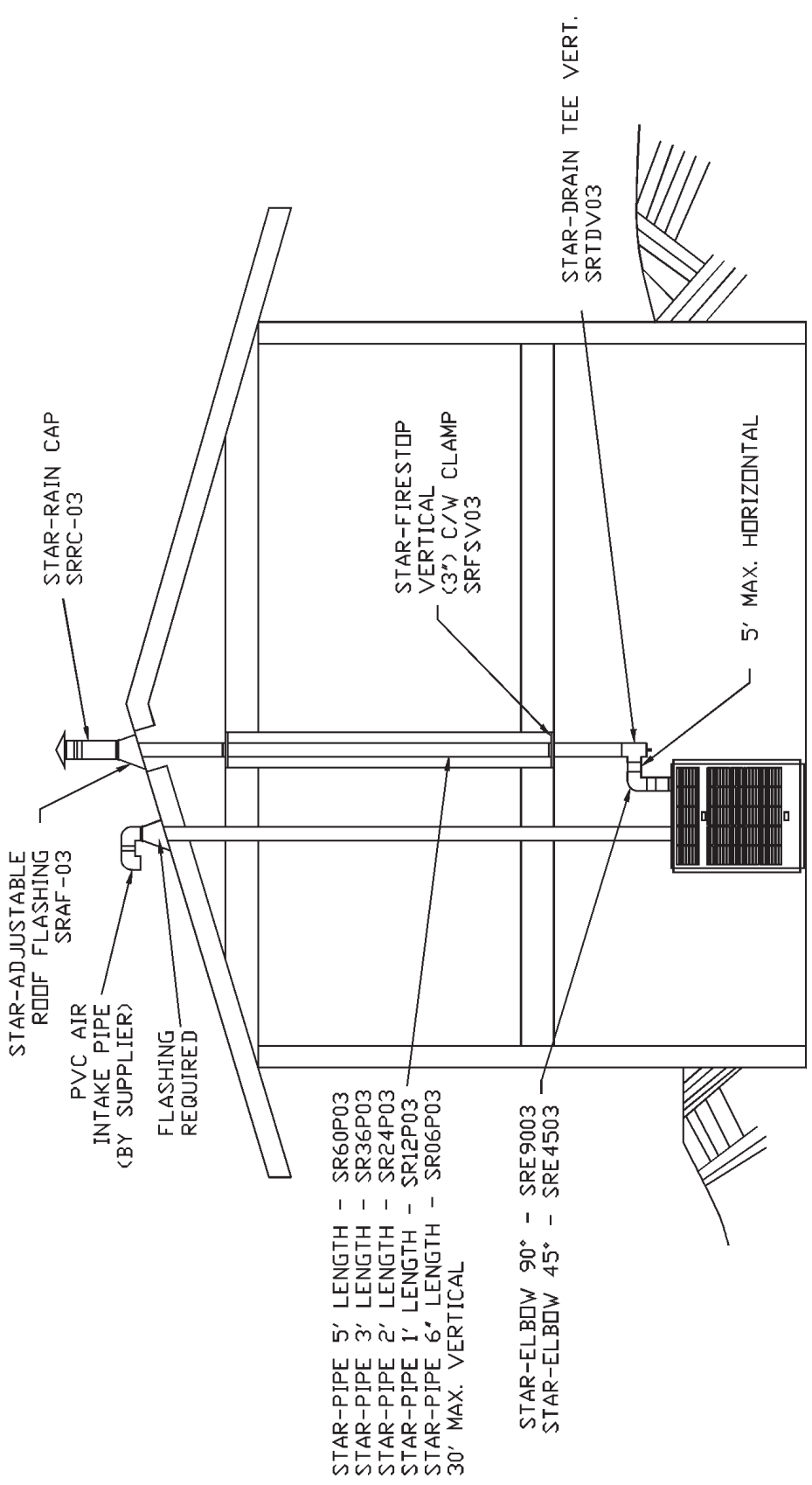



**Figure 19 - Flex-L® Star-34™ Vent Pipe Components**

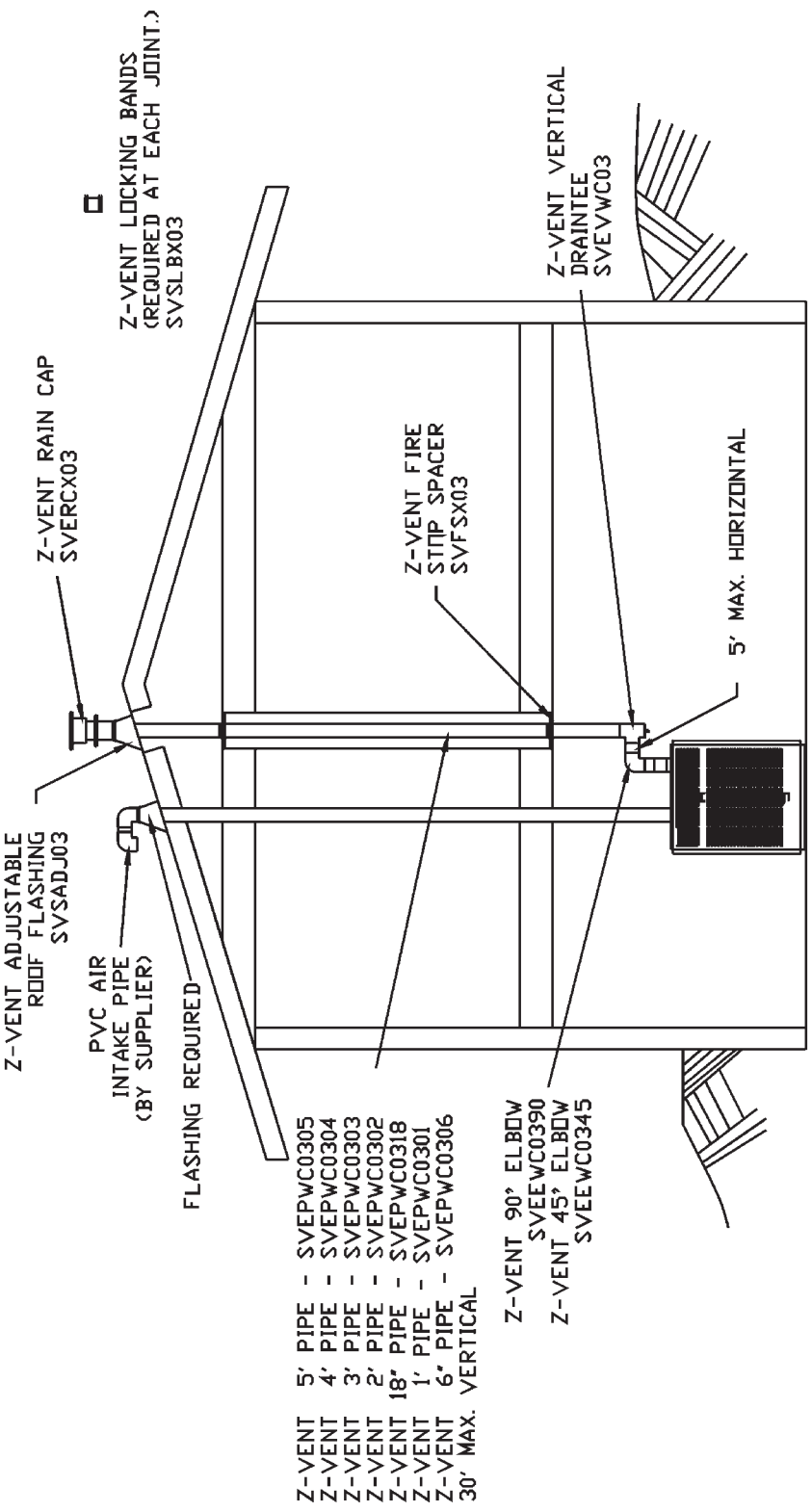



**Figure 20 - Z-Flex® Z-vent™ Vent Pipe Components**

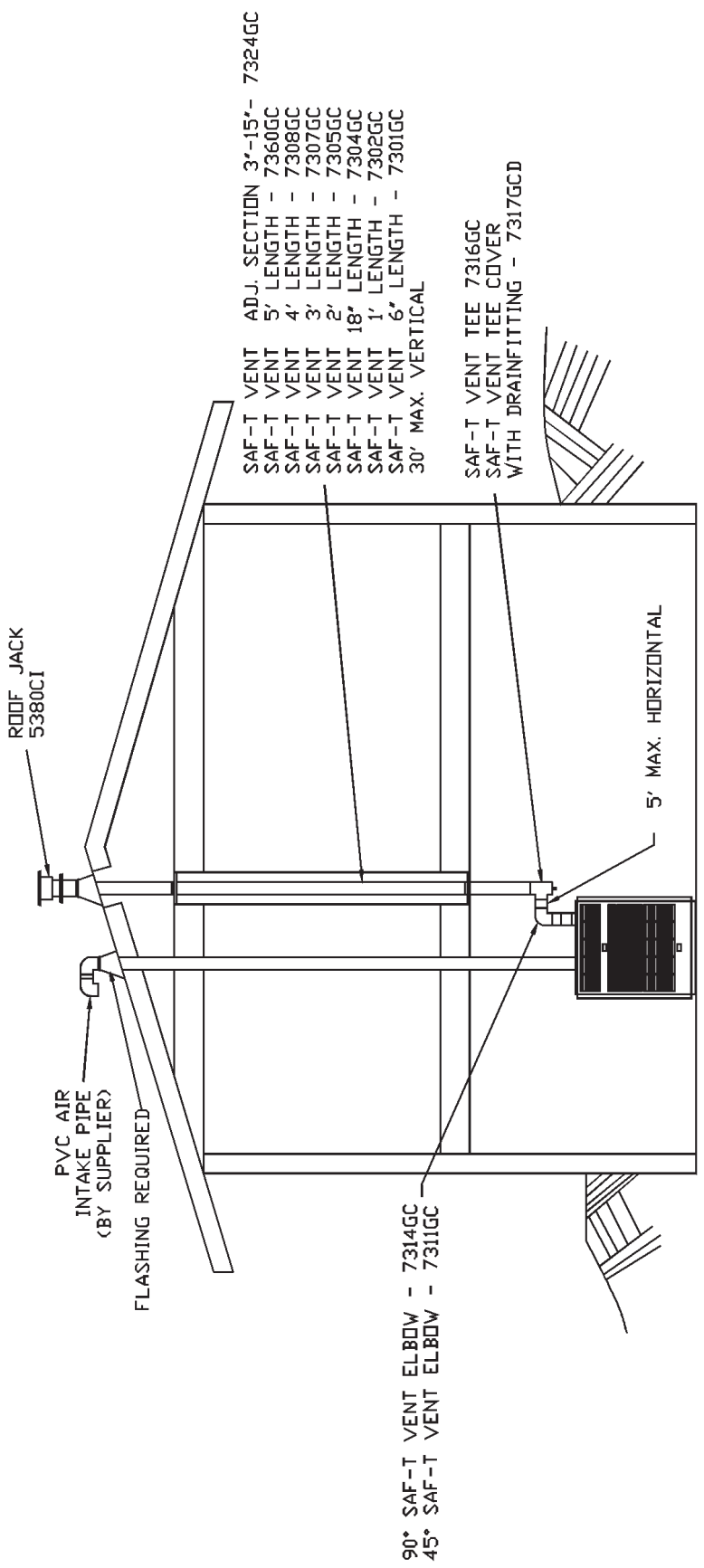
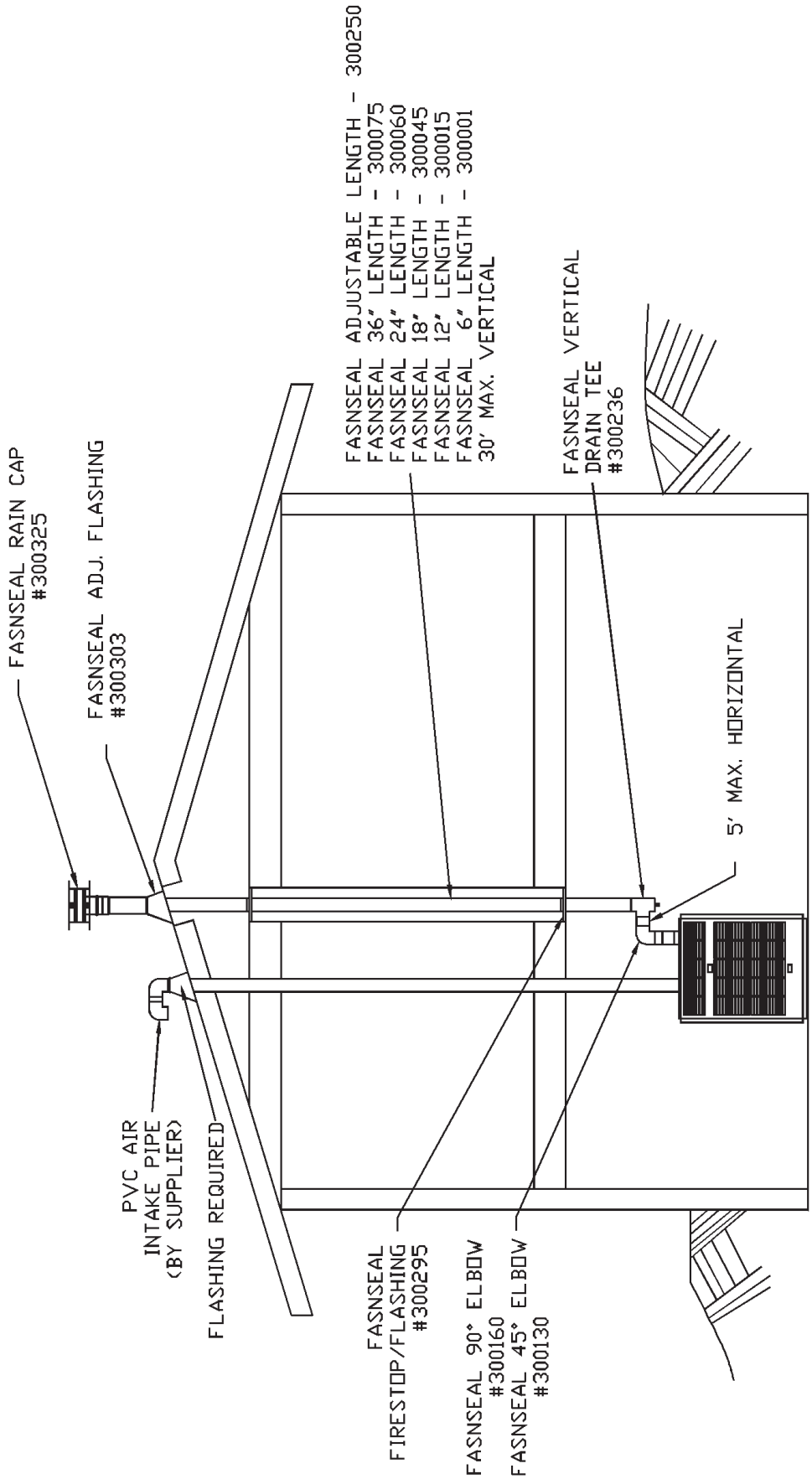
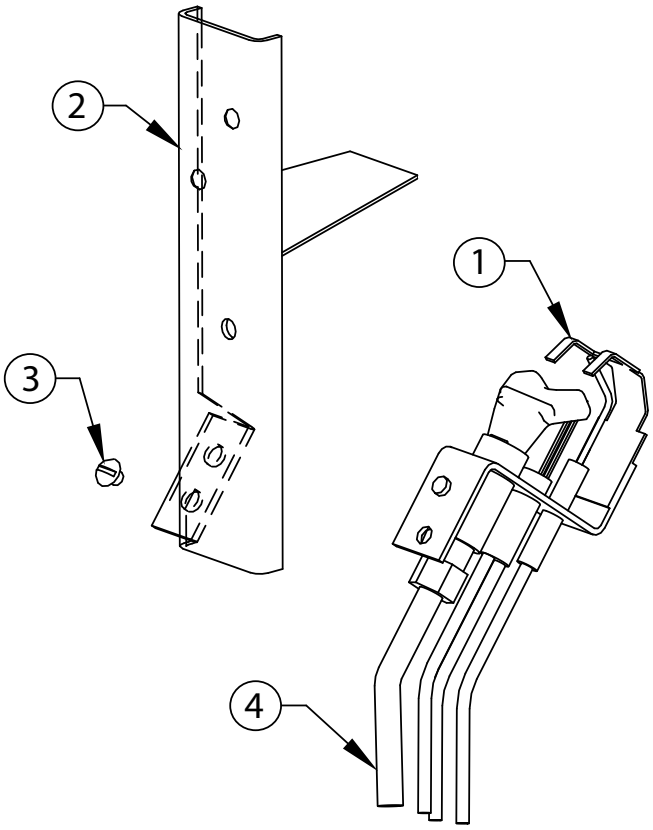



**Figure 21 - Heat Fab® Saf-T Vent™ Vent Pipe Components**

**Figure 20 - ProTech® FasNSeal™ Vent Pipe Components**

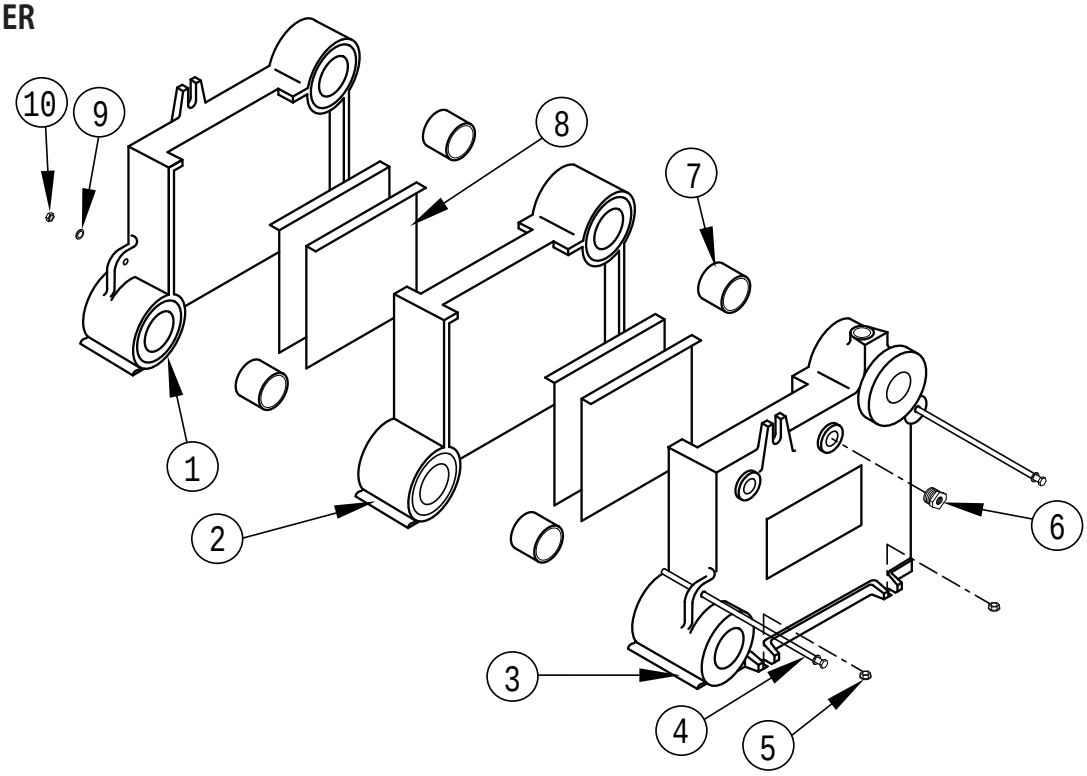


## PILOT



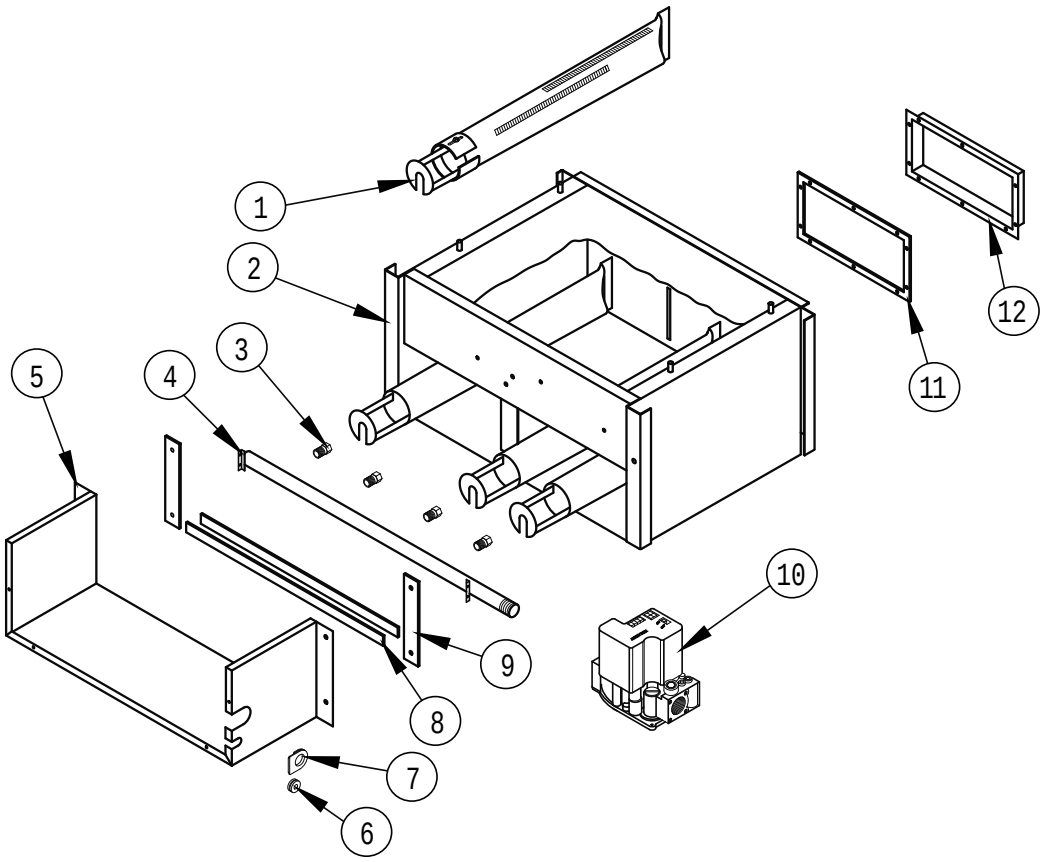

| ITEM # | PART # | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | PBO1401 | Pilot Q3450b 1039 HW NAT (For Natural Gas Only) | 1 |
| | PB01402 | Pilot Q3450b 1112 LP (For Propane Gas Only) | |
| 2 | 3771101 | Pilot Assembly | 1 |
| 3 | HW-024.01 | Screw #10 32x3/16 | 1 |
| 4 | 43300201 | Pilot Tube 1/4"X24-1/4" Aluminum | 1 |

## HEAT EXCHANGER




| ITEM # | P/N | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 100-2-2.01 | B-Left Hand Section | 1 |
| 2 | 100-2-1.01 | B-Center Section 3 Section | 1 |
| | | B-Center Section 4 Section | 2 |
| | | B-Center Section 5 Section | 3 |
| 3 | 100-2-3.01 | B-Right Section | 1 |
| 4 | HW-011.01 | Tie Rod 1/4x11.1/2 3 Section | 2 |
| | HW-011.03 | Tie Rod 1/4x15.1/2 4 Section | |
| | HW-011.05 | Tie Rod 1/4x19.1/2 5 Section | |
| 5 | 1330001 | Nut 5/16-18 Wislock | 4 |
| 6 | 1060002 | Pip Fit - Bushing 3/4" X 1/4" | 1 |
| 7 | 43300976 | Nipple 2" Mach. 3 Section | 4 |
| | | Nipple 2" Mach. 4 Section | 6 |
| | | Nipple 2" Mach. 5 Section | 8 |
| 8 | 3472301 | Flue Collector Baffle 3 Section | 4 |
| | | Flue Collector Baffle 4 Section | 6 |
| | | Flue Collector Baffle 5 Section | 8 |
| 9 | HW-008.01 | Wash-5/16 Flat Stl Zp | 4 |
| 10 | HW-003.02 | Nut-1/4-20 Hex-Stl Zp | 2 |
| FULLY ASSEMBLED HEAT EXCHANGERS | | | |
| | 100-2-7.01 | Heat Exchanger 3 Section | |
| | 100-2-7.02 | Heat Exchanger 4 Section | |
| | 100-2-7.03 | Heat Exchanger 5 Section | |

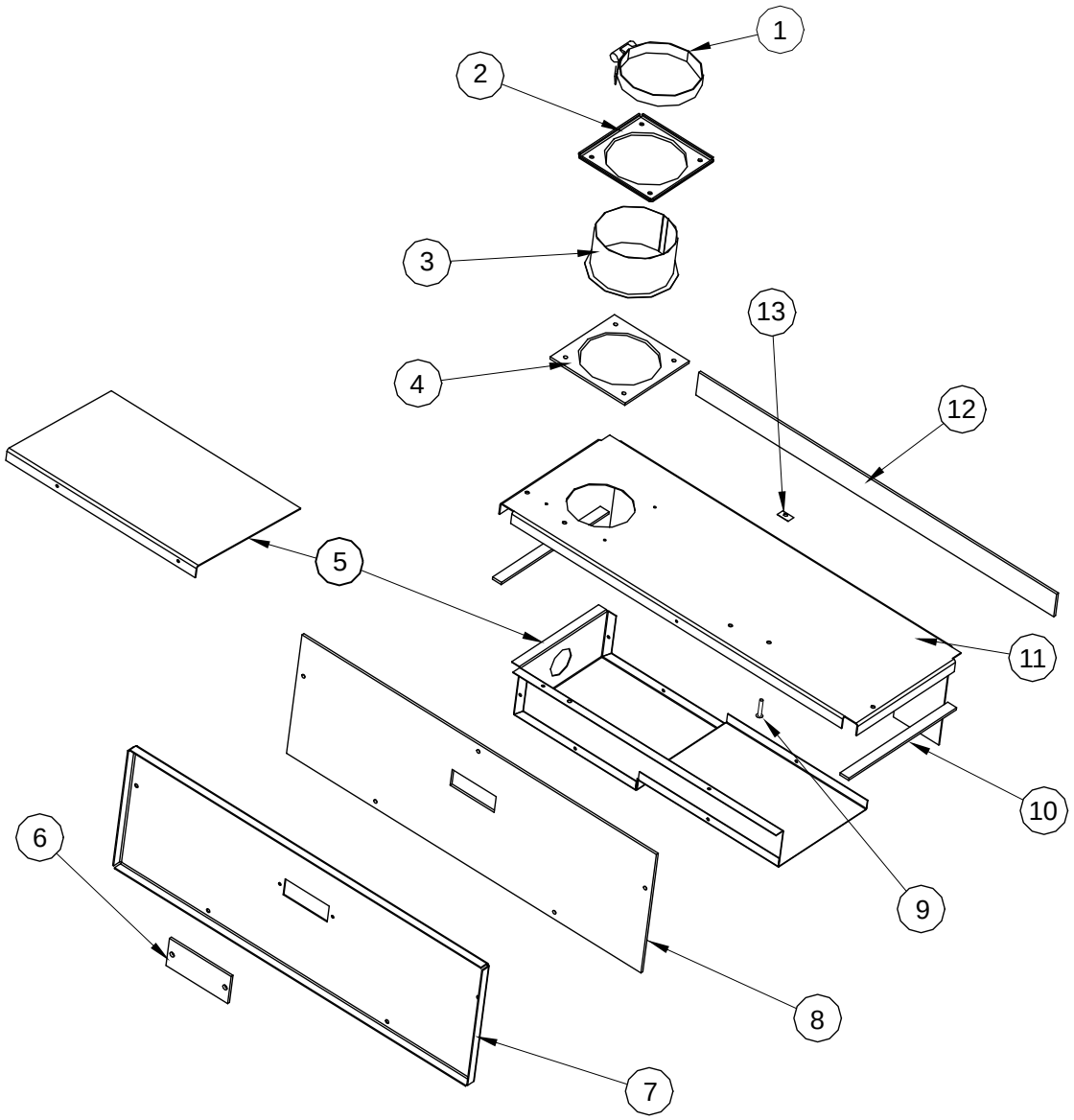
## BASE




| ITEM # | PART # | DESCRIPTIONS | QTY. |
|---|---|---|---|
| 1 | 240005543 | Burner Tube 3 Section | 2 |
| | | Burner Tube 4 Section | 3 |
| | | Burner Tube 5 Section | 4 |
| 2 | 5611602 | Kit - Base With Insul 3 Section | 1 |
| | 5611603 | Kit - Base With Insul 4 Section | |
| | 5611604 | Kit - Base With Insul 5 Section | |
| 3 | 355-1-5.09 | Orifice #36 5 Section | 4 |
| | 355-1-5.10 | Orifice #37 4 Section | 3 |
| | 355-1-5.11 | Orifice #43 3 Section | 2 |
| | 355-1-5.12 | Orifice #52 4 Section LP | 3 |
| | 355-1-5.12 | Orifice #52 5 Section LP | 4 |
| | 355-1-5.13 | Orifice #54 3 Section LP | 2 |
| 4 | 3572201 | Manifold 3 Section | 1 |
| | 3572202 | Manifold 4 Section | |
| | 3572203 | Manifold 5 Section | |

| ITEM # | PART # | DESCRIPTIONS | QTY. |
|---|---|---|---|
| 5 | 3272101 | Air Box Wrapper 3 Section | 1 |
| | 3272102 | Air Box Wrapper 4 Section | |
| | 3272103 | Air Box Wrapper 5 Section | |
| 6 | 240007769 | Pilot Grommet | 1 |
| 7 | HW10201 | Manifold Grommet | 1 |
| 8 | 3271901 | Air Box Wrapper Gskt-Bot 3 Section | 2 |
| | 3271902 | Air Box Wrapper Gskt-Bot 4 Section | |
| | 3271903 | Air Box Wrapper Gskt-Bot 5 Section | |
| 9 | 3271801 | Air Box Wrapper Gasket | 2 |
| 10 | (FOR NATURAL GAS ONLY) | | |
| | VG01701 | GAS VALVE (SV9501H2417) | 1 |
| | (FOR PROPANE GAS ONLY) | | |
| | VG01702 | GAS VALVE (SV9501H2425) | 1 |
| 11 | 3271501 | BRN TUBE COVER INS. 3 Section | 1 |
| | 3271502 | BRN TUBE COVER INS. 4 Section | |
| | 3271503 | BRN TUBE COVER INS. 5 Section | |
| 12 | 32721001 | BRN TUBE COVER 3 Section | 1 |
| | 32721002 | BRN TUBE COVER 4 Section | |
| | 32721003 | BRN TUBE COVER 5 Section | |

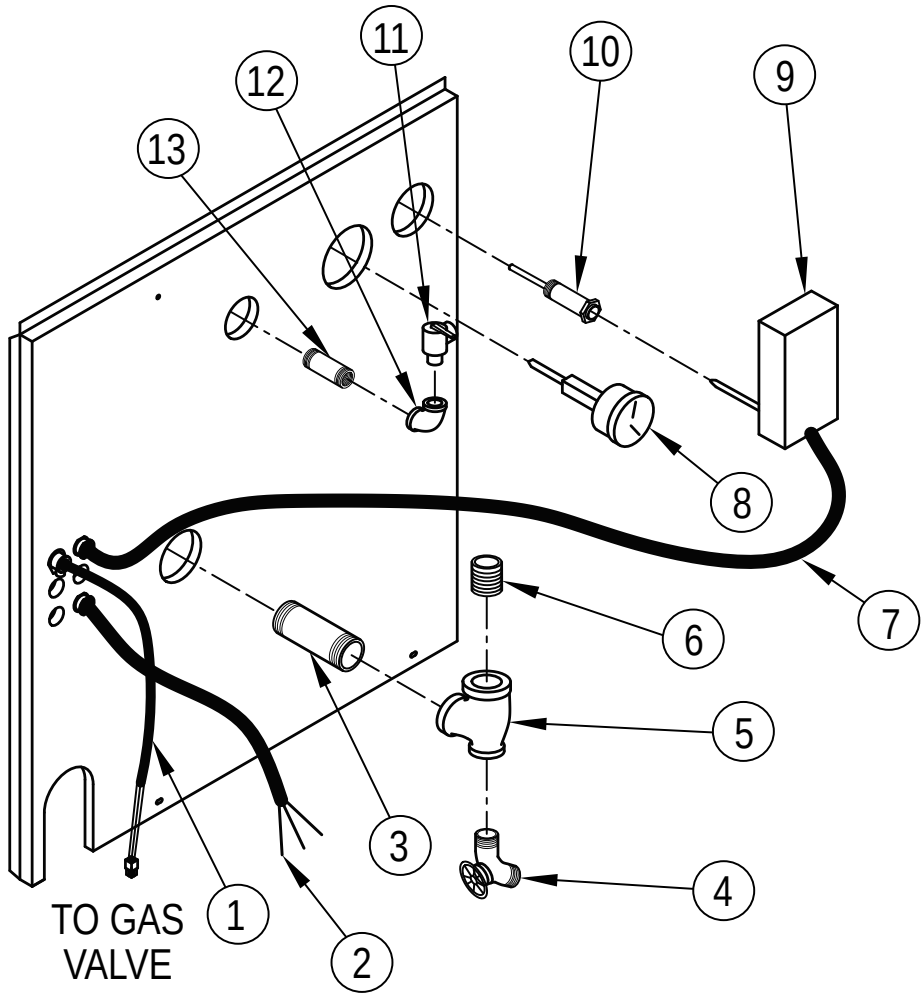
## AIR BOX COVERS




| ITEM # | PART # | DESCRIPTIONS | QTY. |
|---|---|---|---|
| 1 | HW10301 | Hose Clamp Sst | 1 |
| 2 | 3271601 | Air Intake Adapter | 1 |
| 3 | 3271203 | Air Intake Sleeve | 1 |
| 4 | 3271701 | Air Intake Adapter Insul | 1 |
| 5 | 3271301 | Air Deflector 3 Section | 1 |
| | 32721501 | Intake Box Assy 4 Section | |
| | 32721502 | Intake Box Assy 5 Section | |
| 6 | 3571201 | Base Obs. Window | 1 |
| 7 | 3272701 | Air Box Frt Pnl Assy 3 Section | 1 |
| | 3272702 | Air Box Frt Pnl Assy 4 Section | |
| | 3272703 | Air Box Frt Pnl Assy 5 Section | |
| (Includes Obs. Window, #9, & Insul #11) | | | |

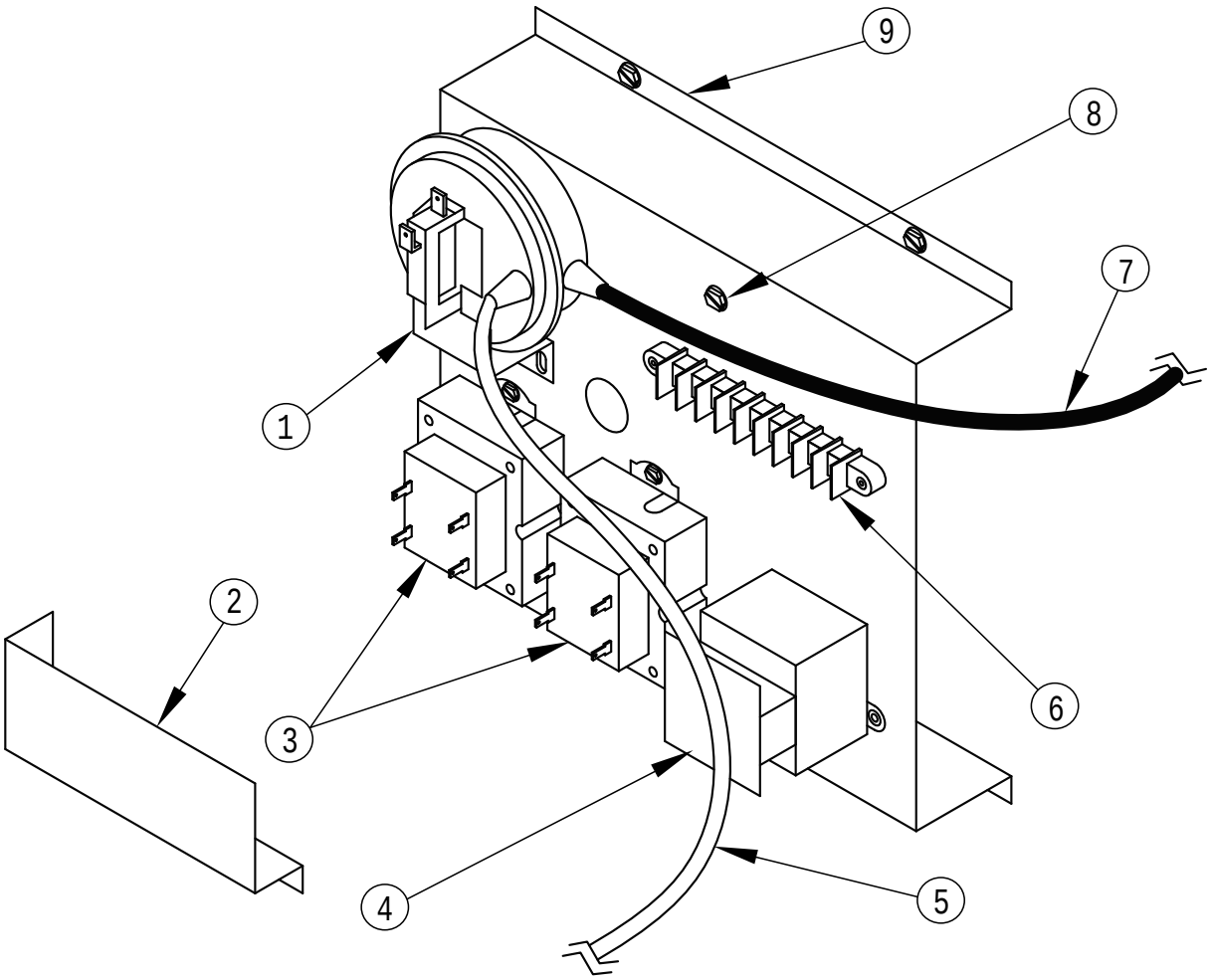
| ITEM # | PART # | DESCRIPTIONS | QTY. |
|---|---|---|---|
| 8 | 3572401 | Insul Frt Cov. 3 Section | 1 |
| | 3572402 | Insul Frt Cov. 4 Section | |
| | 3572403 | Insul Frt Cov. 5 Section | |
| 9 | HW10001 | Air Box Tap 2230 Rl | 1 |
| 10 | 3572304 | Insul Air Box Cover | 2 |
| 11 | 3272401 | Air Box Cover Assy 3 Section | 1 |
| | 3272402 | Air Box Cover Assy 4 Section | |
| | 3272403 | Air Box Cover Assy 5 Section | |
| (Includes Insulation #12 & # 13, And Air Box Tap #6 & Washer #7) | | | |
| 12 | 3572301 | Insul Air Box Cov. 3 Section | 1 |
| | 3572302 | Insul Air Box Cov. 4 Section | |
| | 3572303 | Insul Air Box Cov. 5 Section | |
| 13 | HW09901 | Lock Washer | 1 |

## PIPING & CONTROLS



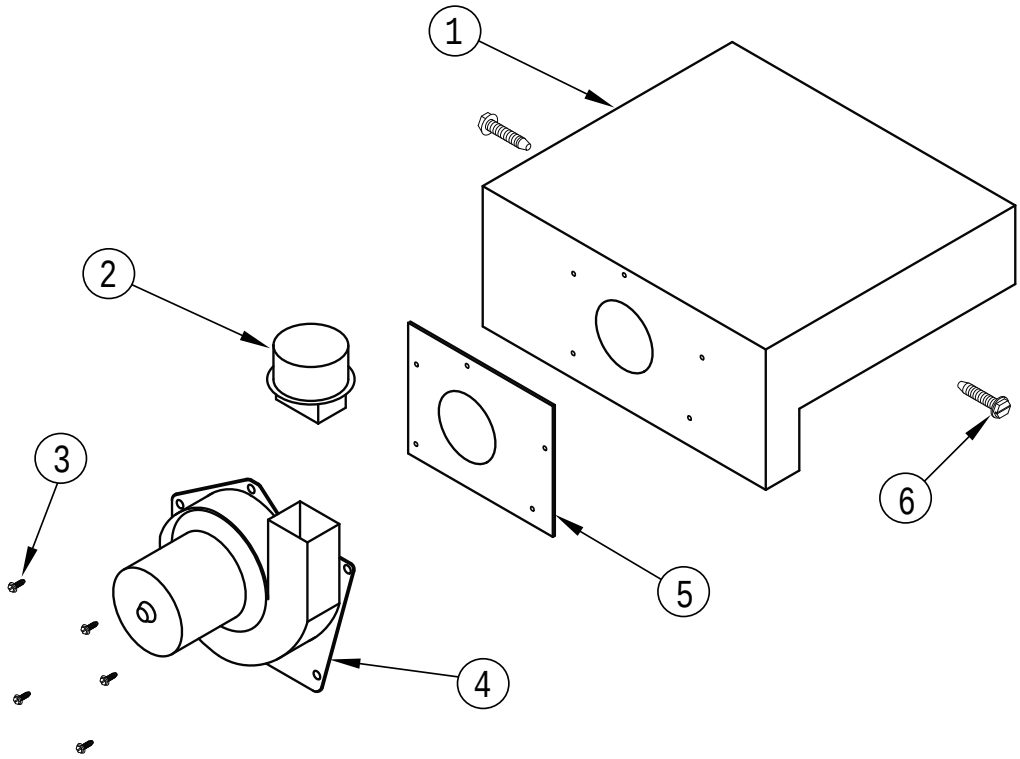

| ITEM # | PART # | DESCRIPTIONS | QTY. |
|---|---|---|---|
| 1 | 3772301 | WIRE HARNESS - GAS VALVE 28" | 1 |
| 2 | 37519501 | HARNESS CIRCULATOR 72" | 1 |
| 3 | 1310002 | PIPE - NIPPLE 1.1/4 X 4.1/2 NPT | 1 |
| 4 | HW-016.03 | DRAIN SHORT | 1 |
| 5 | 1510001 | PIPE FIT TEE - 1.1/4X3/4X1.1/4 | 1 |
| 6 | PF-006.01 | PIPE FIT NIPPLE 1.1/4 CLOSE | 1 |
| 7 | 37518901 | HARNESS - CONTROL TO LIMIT | 1 |
| 8 | 1260006 | GAUGE-THERALTIMETER | 1 |
| 9 | AQ02201 | CONTROL - LIMIT L4080B-1212 HW | 1 |
| 10 | AQ-020.01 | WELL 3/4 X 3 HW | 1 |
| 11 | VR-001.01 | RELIEF VALVE 30# 3/4" | 1 |
| 12 | 1190001 | PIPE FIT ELBOW 3/4 NPT 90° | 1 |
| 13 | 1310001 | PIPE - NIPPLE 3/4 X 4 NPT | 1 |

## ELECTRICAL



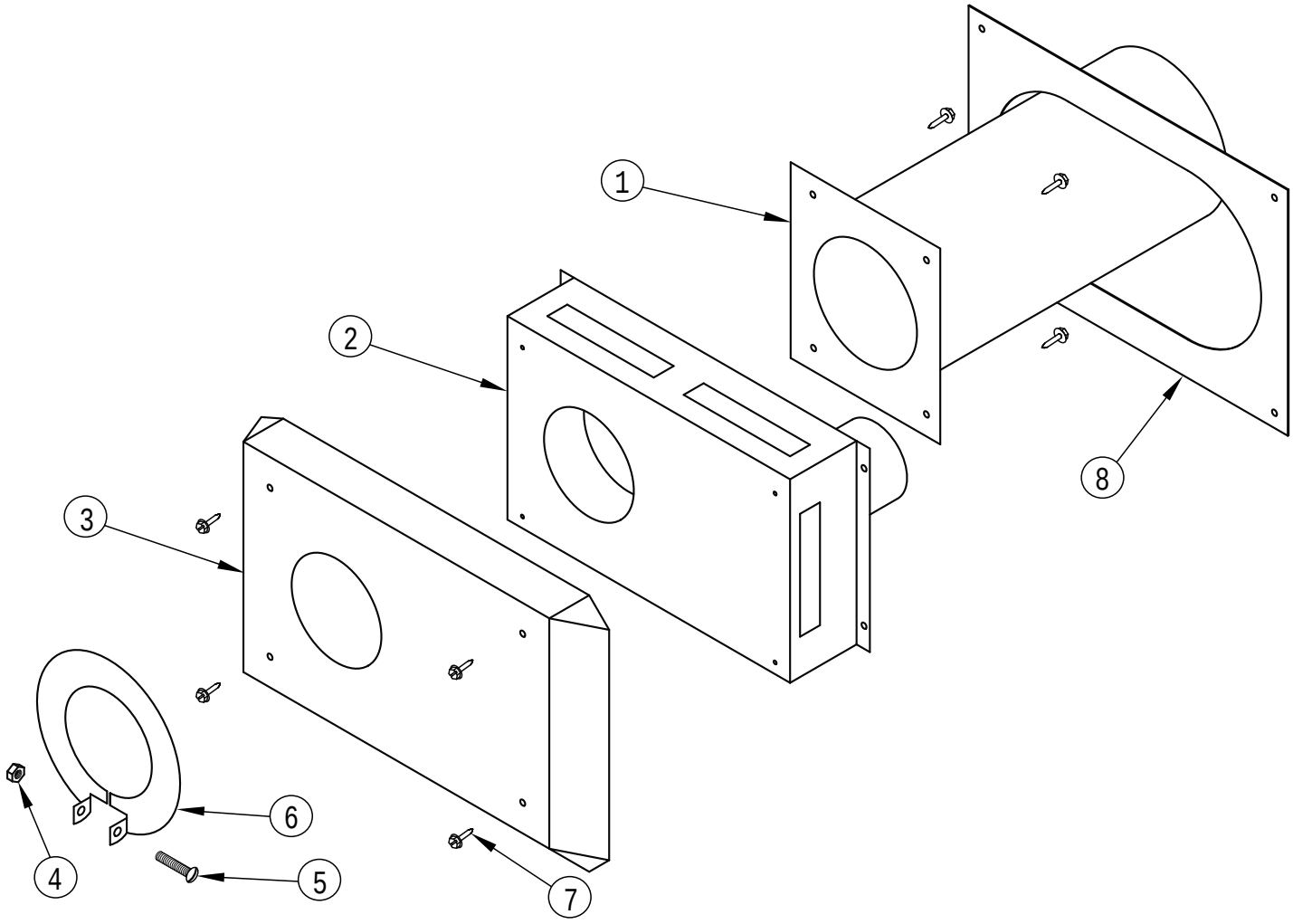

| ITEM # | PART # | DESCRIPTIONS | QTY. |
|---|---|---|---|
| 1 | SS00801 | PRESSURE SWITCH (FS6205A) | 1 |
| 2 | 3171101 | TERMINAL STRIP COVER | 1 |
| 3 | 550001339 | TRANSFORMERS - 40VA | 2 |
| 4 | 1410001 | CONTROL R8222C-1008 | 1 |
| 5 | HW09601 | TUBING - SILICON - CLEAR | 12" |
| 6 | EF04001 | 9 TERM STRIP | 1 |
| 7 | HW09701 | TUBING - SILICON - ORANGE | 17" |
| 8 | HW09001 | SCREW 10-32X5/16 GREEN GROUND | 1 |
| 9 | 3172701 | PANEL CONTROL SUPPORT BRACKET | 1 |
| | 3772201 | COMPLETE CONTROL BRACKET ASSEMBLY (THIS INCLUDES PART # 1,2,3,5,7,8, & ALL WIRING) | 1 |

## FLUE COLLECTOR & VENTER COMPONENTS



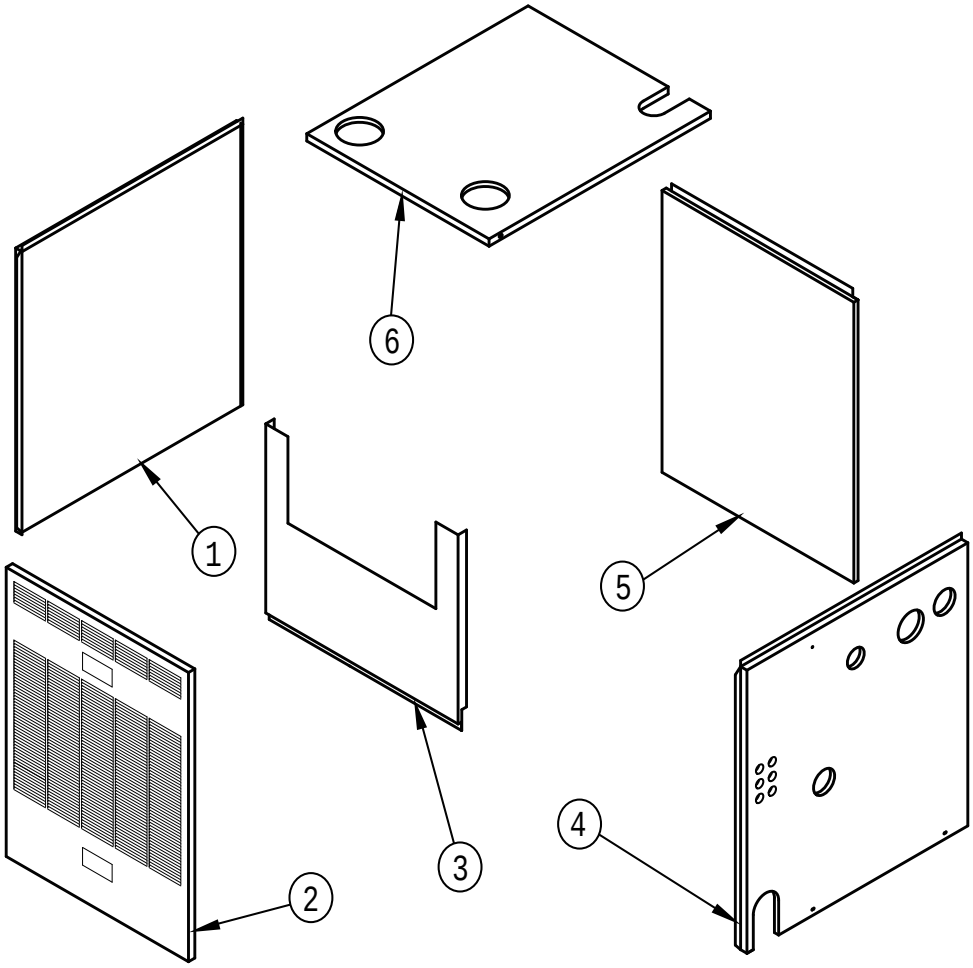

| ITEM # | PART # | DESCRIPTIONS | QTY. |
|---|---|---|---|
| 1 | 3472501 | FLUE COLLECTOR ASSY 3 Section | 1 |
| | 3472502 | FLUE COLLECTOR ASSY 4 Section | |
| | 3472503 | FLUE COLLECTOR ASSY 5 Section | |
| 2 | 345-2-7.01 | VENT ADAPTER | 1 |
| 3 | HW-005.01 | SCREW 1/4-20X1/2 SELF TAP | 5 |
| 4 | DC00402 | VENTER - JAKEL | 1 |
| 5 | 3571501 | GASKET - VENTER | 1 |
| 6 | HW09501 | BOLT 5/16"-18X1.1/2" TYPE F | 2 |

## TERMINATION KIT




| ITEM # | PART # | DESCRIPTIONS | QTY. |
|---|---|---|---|
| 1 | 34721501 | VENT TERMINATION THIMBLE PLATE ASSY | 1 |
| 2 | 34721002 | TERMINATION ASSEMBLY | 1 |
| 3 | 34721401 | VENT TERMINATION DEFLECTOR | 1 |
| 4 | 1330006 | NUT #10-24 HEX | 1 |
| 5 | 30A004312 | SCREW #10-24 X 1.1/2" ROUND HEAD | 1 |
| 6 | 3471701 | DRAW COLLAR - | 1 |
| 7 | HW-009.01 | SCR #8-18X1/2" SLT HX WASH | 8 |
| 8 | 3471901 | VENT TEMPLATE | 1 |
| 5612601 | | TERMINATION KIT (INCLUDES ALL OF THE ABOVE) | |

## JACKET




| ITEM # | PART # | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 31710202 | Panel - Left Hand Side | 1 |
| 2 | 3172801 | Panel - Front 3 Section | 1 |
| | 3172802 | Panel - Front 4 Section | |
| | 3172803 | Panel - Front 5 Section | |
| 3 | 3172401 | Panel - Separator Plate 3 Section | 1 |
| | 3172402 | Panel - Separator Plate 4 Section | |
| | 3172403 | Panel - Separator Plate 5 Section | |
| 4 | 31721101 | Panel - Right Hand Side | 1 |
| 5 | 31721401 | Panel - Rear 3 Section | 1 |
| | 31721402 | Panel - Rear 4 Section | |
| | 31721403 | Panel - Rear 5 Section | |
| 6 | 3172201 | Panel - Top 3 Section | 1 |
| | 3172202 | Panel - Top 4 Section | |
| | 3172203 | Panel - Top 5 Section | |