



INSTALLATION AND SERVICE MANUAL

Concentric Venting and Two Pipe Venting

for Models DFS/DBS/DCS/IFS/IBS/ICS/PSH/BSH

WARNING

1. Gas fired heating equipment must be vented - do not operate unvented.
2. A built-in power exhauster is provided - additional external power exhausters are not required or permitted.
3. If you are replacing an existing heater, it may be necessary to resize the venting systems. Improperly sized venting systems can result in vent gas leakage or the formation of condensate. Refer to the National Fuel Gas Code ANSI Z223.1 (NFPA 54) or CSA B149.1 - latest edition. Failure to follow these instructions can result in serious injury or death.
4. Under no circumstances should two sections of double wall vent pipe be joined together within one horizontal vent system due to the inability to verify complete seal of inner pipes.

IMPORTANT

Installation must conform with local building codes or in the absence of local codes, with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) - latest edition. In Canada installation must be in accordance with CSA B149.1.

Section A - General Instructions - All Units

- A1. If the unit heater being installed is replacing existing equipment and using the existing vent system from that equipment, inspect the venting system for proper size and horizontal pitch, as required in the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) or CSA B149.1 Installation Code - latest edition and these instructions. Determine that there is no blockage or restriction, leakage, corrosion and other deficiencies, which could cause an unsafe condition.
- A2. The vent pipe should be galvanized steel or other suitable corrosion resistant material. Follow the National Fuel Gas Code for minimum thickness of vent material. The minimum thickness for connectors varies depending on the pipe diameter. Do not vent unit with PVC or other forms of plastic venting material. (**EXCEPTION:** PTC55-260 units are vented with PVC.)
- A3. All heaters come with factory installed vent and combustion air adapters for attaching the vent pipe to the heater. Attach the vent pipe to the adapter with 3 corrosion resistant screws. (Drill pilot holes through the vent pipe and adapter prior to screwing in place). Vent pipe must not be smaller than the connector size.

Table 1.1 - Concentric Vent Pipe Sizes

Model	Size	Single Wall Pipe		Type B Vent Pipe
		Combustion Air (to unit)	Combustion Air (external)	
PTS/BTS/HDS/HDC	30	4"	4"-6"	3"
	45	4"	4"-6"	3"
	60	4"	4"-6"	4"
	75	4"	4"-6"	4"
	100	4"	4"-6"	4"
	125	4"	4"-6"	4"
	150	4"	4"-6"	4"
	175	4"	4"-6"	4"
	200	4"	4"-6"	4"
	250	6"	6"-8"	6"
	300	6"	6"-8"	6"
	350	6"	6"-8"	6"
	400	6"	6"-8"	6"
DFS/DBS/DCS IFS/IBS/ICS	75	4"	4"-6"	4"
	100	4"	4"-6"	4"
	125	4"	4"-6"	4"
	150	4"	4"-6"	4"
	175	4"	4"-6"	4"
	200	6"	6"-8"	6"
	225	6"	6"-8"	6"
	250	6"	6"-8"	6"
	300	6"	6"-8"	6"
	350	6"	6"-8"	6"
400	6"	6"-8"	6"	
PTC	55		3"	3"
	65		3"	3"
	85		3"	3"
	110		3"	3"
	135		3"	3"
	156		4"	4"
	180		4"	4"
	215		4"	4"
	260		4"	4"
	310		4"-6"	4"

① B-Vent must have 1/4" air gap (OD is 1/2" larger than ID).

- A4. Make the vent system as straight as possible and limit the total vent pipe lengths as shown in the applicable Installation & Service manual..
- A5. A minimum of 12" straight pipe is recommended from the flue outlet before turns in the vent pipe.
- A6. Horizontal sections of vent pipe are to be installed with a minimum downward slope from the appliance of 1/4 inch per foot and suspended securely from overhead structures at points not greater than 3' apart.

INSTALLATION - VENTING

- A7. Fasten individual lengths of vent together with at least 3 corrosion resistant sheet metal screws.
- A8. Keep single wall vent pipe at least 6" from combustible materials. For double wall vent pipe, follow the vent pipe manufacturer's clearances to combustibles. The minimum distance from combustible materials is based on the combustible material surface not exceeding 160°F. Clearance from the vent pipe (or the top of the unit) may be required to be greater than 6" if heat damage other than fire could result (such as material distortion or discoloration).
- A9. Avoid venting through unheated space when possible. When venting does pass through an unheated space or if the unit is installed in an environment that promotes condensation, insulate runs greater than 5' to minimize condensation. Inspect for leakage prior to insulating and use insulation that is noncombustible with a rating of not less than 400°F. Install a tee fitting at the low point of the vent system and provide a drip leg with a clean out cap.

- A12. The following are General Instructions for Double Wall (Type B) Terminal Pipe Installation:
How to attach a single wall vent terminal to double wall (Type B) vent pipe:

1. Look for the "flow" arrow on the vent pipe.
2. Slide the vent terminal inside the exhaust end of the double wall vent pipe.
3. Drill (3) holes through the pipe and the vent terminal. Using 3/4" long sheet metal screws, attach the cap to the pipe. Do not over tighten.

How to connect a single wall vent system to a double wall (Type B) vent pipe:

1. Slide the single wall pipe inside the inner wall of the double wall pipe.
2. Drill (3) holes through both walls of the single and double wall vent pipes. Using 3/4" sheet metal screws, attach the two pieces of pipe.
3. The gap between the single and double wall pipe must be sealed but it is not necessary to fill the full volume of the annular area. To seal, run a large bead of 400°F silastic around the gap.

- A13. Vent termination clearances must be maintained:

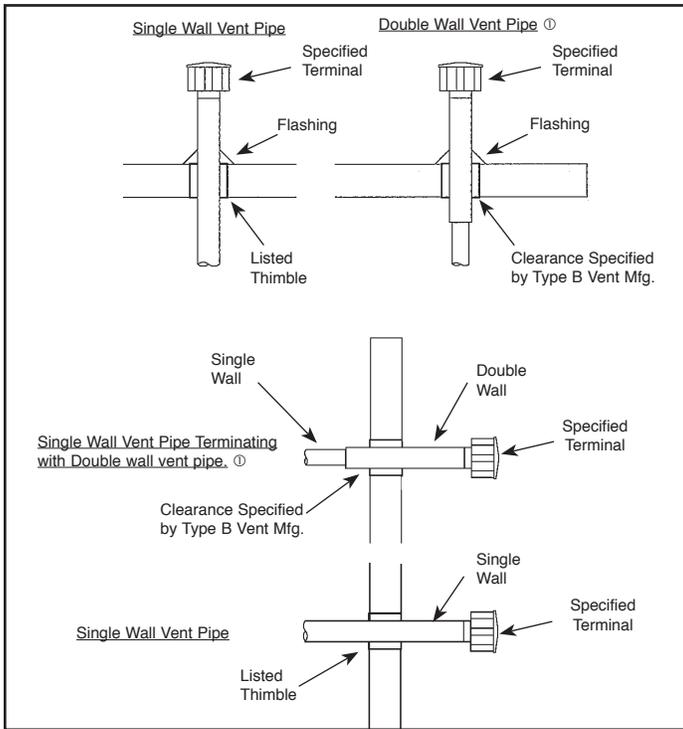
Table 2.1 - Vent Termination Clearances

Structure	Minimum Clearances for Vent Terminal Location
Forced air inlet within 10 feet	3 feet above
Combustion air inlet of another appliance	6 feet all directions
Door, window, gravity air inlet, or any building opening	4 feet horizontal and below 1 foot above
Electric meter, gas meter, gas regulator, and relief equipment ①	4 feet horizontal (U.S.) 6 feet horizontal (Canada)
Gas regulator ①	3 feet horizontal (U.S.) 6 feet horizontal (Canada)
Adjoining building or parapet wall	6 feet all directions
Adjacent public walkways	7 feet all directions
Grade (ground level)	3 feet above ②

① Do not terminate the vent directly above a gas meter or regulator.
 ② The vent must be at least 6" higher than anticipated snow depth.

- A14. Do NOT vent this appliance into a masonry chimney.
- A15. Do NOT use dampers or other devices in the vent or combustion air pipes.
- A16. The venting system must be exclusive to a single appliance and no other appliance is allowed to be vented into it.
- A17. Precautions must be taken to prevent degradation of building materials by flue products.
- A18. Single wall vent pipe must not pass through any unoccupied attic, inside wall, concealed space, or floor.
- A19. Uninsulated single wall vent pipe must not be used outdoors for venting appliances in regions where the 99% winter design temperature is below 32°F.
- A20. Long runs of horizontal or vertical combustion air pipes may require insulation in very cold climates to prevent the buildup of condensation on the outside of the pipe where the pipe passes through conditioned spaces.
- A21. Vertical combustion air pipes should be fitted with a tee with a drip leg and a clean out cap to prevent against the possibility of any moisture in the combustion air pipe from entering the unit. The drip leg should be inspected and cleaned out periodically during the heating season.
- A22. In addition to following these General Instructions, specific instructions for Vertical and Horizontal vent systems in 2-Pipe or Concentric Vent configurations must also be followed.

Figure 2.1 - Venting Through Combustible Roof or Wall



① See Instruction A12 for attaching single wall pipe to double wall pipe

- A10. When the vent passes through a combustible INTERIOR wall or floor, a metal thimble 4" greater than the vent diameter is necessary. If there is 6' or more of vent pipe in the open space between the appliance and where the vent pipe passes through the wall or floor, the thimble need only be 2" greater than the diameter of the vent pipe. If a thimble is not used, all combustible material must be cut away to provide 6" of clearance. Where authorities have jurisdiction, Type B vent may be used for the last section of vent pipe to maintain clearance to combustibles while passing through wall or floor. See Figure 2.1. Any material used to close the opening must be noncombustible.
- A11. All seams and joints of the single wall pipe must be sealed with metallic tape or silastic suitable for temperatures up to 400°F. Wrap the tape two full turns around the vent pipe. One continuous section of double wall vent pipe may be used within the vent system. Refer to instruction A12 in "Section A – General Instructions – All Units" for attaching double wall pipe to single wall pipe.

INSTALLATION - VENTING

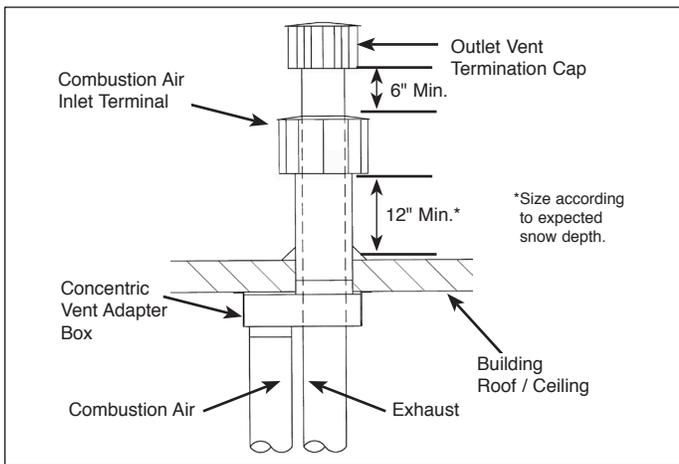
Section D - Concentric Vent System Installation

- D1. This section applies to both horizontally and vertically vented concentric vent systems as defined in "Section A – General Instructions – All Units", and is in addition to the instructions in that section.
- D2. When utilizing the concentric vent option, it should have been predetermined whether the appliance will be horizontally or vertically vented. Before proceeding, verify that the concentric vent kit received contains the correct components for the installation:

For Vertically Vented Units (Refer to Figure 3.1):

- Concentric adapter assembly (same for horizontal and vertical kits)
- Standard Gary Steel 1092 vent termination
- Specially designed inlet terminal (part #5H75154B1)

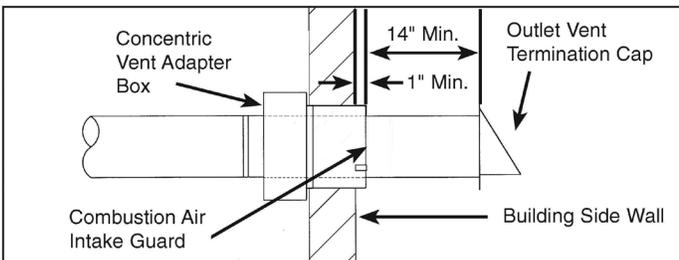
Figure 3.1 - Vertical Concentric Vent Kit Components



For Horizontally Vented Units (Refer to Figure 3.2):

- Concentric adapter assembly (same for horizontal and vertical kits)
- Special vent termination cap (part #5H75150B1)
- Special inlet air guard

Figure 3.2 - Horizontal Concentric Vent Kit Components



CAUTION

The concentric vent adapter box must be installed inside of the structure or building. Do not install this box on the exterior of a building or structure.

- D3. Once the kit contents have been verified as correct for the direction of venting, the concentric vent adapter box is to be installed. Determine the location of the box. Be sure to maintain all clearances as listed in these instructions.
- D4. The adapter box is to be mounted on the interior side of the building. It must not be mounted outside the building. The adapter box has integral mounting holes for ease of installation.
- D5. The adapter box can be mounted flush to the wall (for horizontal kits) or to the ceiling (for vertical kits). The box can also be offset from the wall or ceiling by using field supplied brackets. When mounting the box, consider serviceability and access to the vent and combustion air pipes. If the box is to be mounted using field supplied brackets, these brackets must be strong enough to rigidly secure the box to the wall or ceiling, and should be made from corrosion resistant material.
- D6. Determine the length of the vent pipe and combustion air inlet pipe for the selected location. THE VENT PIPE WILL PASS THROUGH THE CONCENTRIC VENT BOX. THE LAST SECTION OF VENT PIPE IS A CONTINUOUS LENGTH OF DOUBLE WALL "B" VENT. See section A12 for attaching and terminating double wall pipe. Begin with pipe lengths on the concentric pipe side of the adapter box referring to Figure 4.1. These pipes will extend through the building wall or roof as well as any added length for the thickness of the wall and the offset from any field installed brackets.

For Vertical Concentric Vent Kits (refer to Figure 3.1):

- The bottom of the combustion air intake pipe must terminate above the snow line, or at least 12 inches above the roof, whichever distance is greater.
- The bottom of the vent cap must terminate at least 6 inches above the top of the combustion air intake cap.

For Horizontal Concentric Vent Kits (refer to Figure 3.2):

- The combustion air intake pipe must terminate at least 1 inch from the wall to prevent water from running down the wall and into the pipe.
- The back of the vent cap must terminate at least 14 inches from the combustion air intake pipe.

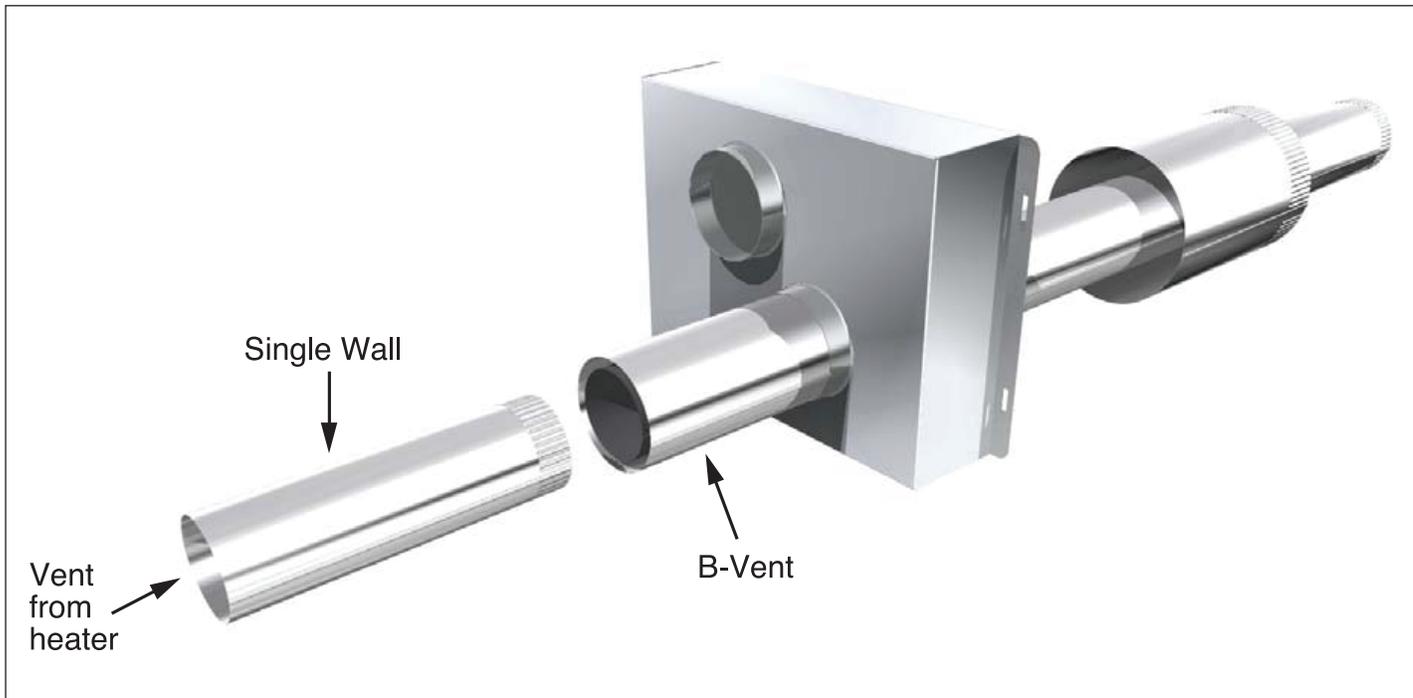
- D7. Cut the concentric side vent and combustion air pipes to the proper length as determined in the previous step. See Table 4.1 for Combustion Air and Vent Pipe sizes. The pipes must be single wall galvanized or stainless steel material, except for the last section of vent pipe, which must be one continuous length of double wall B-vent extended through the concentric vent box and combustion air inlet pipe on the concentric side of the box. **NOTE:** No clearance to combustible material is required for the building penetration, which should be sized according to the external Combustion Air Inlet pipe diameter.
- D8. Allow the concentric side vent pipe to pass through the concentric vent adapter box, as shown in Figure 4.1. Attach the double wall vent pipe to the single wall vent pipe that goes to the unit. Be sure to seal the joint and the open area around the double wall vent. Seal all joints and seams using sealant suitable for temperatures up to 400°F.
- D9. Slide the combustion air pipe over the vent pipe and attach to the air inlet of the concentric adapter box, as shown in Figure 4.1, using at least 3 corrosion resistant sheet metal screws. Seal the joint and seam using sealant suitable for temperatures up to 400°F.
- D10. Place this assembly (the adapter box, vent pipe and combustion air pipe) through the wall or roof and verify that the distance requirements as defined in Step D7 are met. Securely attach the assembly to the building.

INSTALLATION - VENTING

- D11. From outside the building, caulk the gap between the combustion air intake pipe and the building penetration.
- D12. Attach the combustion air intake and vent pipe terminations as follows:

- D13. Install vent pipe and combustion air pipe between unit heater and concentric vent adapter box as outlined in "Section A – General Instructions – All Units".
- D14. Once venting is complete, proceed to the section titled "Installation - Gas Connections" in the unit Installation & Service Manual.

Figure 4.1 - Adapter Box with Combustion Air Intake Pipe Attached



For Vertical Concentric Vent Kits (refer to Figure 3.1):

- Slide the combustion air cap down over the vent pipe and fasten it to the combustion air pipe with at least 3 corrosion resistant sheet metal screws.
- Attach the vent cap to the vent pipe using at least 3 corrosion resistant sheet metal screws. Refer to instruction A12 for connecting terminal to double wall pipe.
- Caulk the gap between the combustion air cap and the vent pipe with silicone sealant, or other appropriate sealants suitable for metal to metal contact and for temperatures up to 400° F.

For Horizontal Concentric Vent Kits (refer to Figure 3.2):

- Attach the combustion air intake guard using corrosion resistant screws at the end of the combustion air intake pipe to prevent animals and debris from entering.
- Attach the vent cap to the vent pipe using at least 3 corrosion resistant sheet metal screws.

