

# INSTALLATION INSTRUCTIONS AND HOMEOWNER'S MANUAL: GAS FIRED FURNACE



MODULATING GAS FURNACE  
MULTIPOSITION

MODEL  
CC15-M-V



By / Par:  
**INNOVAIR**  
SOLUTIONS

## CAUTION

Outdoor design temperature below 5°F (-15°C) could cause blockage of the exhaust. Refer to section 7.2 for more details.

### **INSTALLER / SERVICE TECHNICIAN:**

Use the information in this manual for the installation/servicing of the furnace and keep the document near the unit for future reference.

#### **Caution:**

Do not tamper with the unit or its controls. Call a qualified service technician.

**HOMEOWNER:** Please keep this manual near the furnace for future reference.

Manufactured by: **Dettson Industries Inc. Sherbrooke, Qc, Canada [www.dettson.com](http://www.dettson.com)**

Gas furnace manufactured on or after May 1, 2017 are not permitted to be used in Canada for heating of buildings or structures under construction

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# 1 SAFETY

## 1.1 SAFETY LABELING AND WARNING SIGNS

The words **DANGER**, **WARNING** and **CAUTION** are used to identify the levels of seriousness of certain hazards. It is important that you understand their meaning. You will notice these words in the manual as follows:



**Immediate hazards which WILL result in death or serious bodily and/or material damage.**



**Hazards or unsafe practices which CAN result in death or serious bodily and /or material damage.**



**Hazards or unsafe practices which CAN result in minor bodily and /or material damage.**

## 1.2 IMPORTANT INFORMATION



**Non-observance of the safety regulations outlined in this manual will potentially lead to consequences resulting in death, serious bodily injury and/or property damage.**



**Installation and repairs performed by unqualified persons can result in hazards to them and to others. Installations must conform to local codes or, in the absence of such codes, to codes of the country having jurisdiction.**

**The information contained in this manual is intended for use by a qualified technician, familiar with safety procedures and who is equipped with the proper tools and test instruments.**

**Failure to carefully read and follow all instructions in this manual can result in death, bodily injury and/or property damage.**

1. It is the homeowner's responsibility to engage a qualified technician for the installation and subsequent servicing of this furnace;
2. Do not use this furnace if any part of it was under water. Call a qualified service technician immediately to assess the damage and to replace all critical parts that were in contact with water;
3. Do not store gasoline or any other flammable substances, such as paper or carton, near the furnace;
4. Do not stack items or boxing within the required clearances to combustible materials specified in Table 2;
5. Never block or otherwise obstruct the filter and/or return air openings;
6. Ask the technician installing your furnace to show and explain to you the following items:
  - The main disconnect switch or circuit breaker;
  - The gas shut off valve;
  - The air filter and how to change it (at least twice a year);
7. Before calling for service, be sure to have the information of section 10 of your manual close by in order to be able to provide the contractor with the required information, such as the model and serial numbers of the furnace.



**Failure to follow this warning could result in dangerous operation, personal injury, death, or property damage. Improper installation, adjustment, servicing or repair can cause carbon monoxide poisoning, explosion, fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified service agency, local gas supplier, or your distributor for information or assistance. The qualified service agency must use only factory authorized and listed kits or accessories when modifying this product.**



### **INJURY HAZARD**

**Ignoring this warning could result in personal injury.**

**Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts, and servicing furnaces**

## 1.3 SAFETY CONSIDERATION

Untrained personnel can perform basic maintenance functions such as cleaning and replacing air filters. All

other operations must be performed by trained service personnel. When working on heating equipment, observe precautions in literature, on tags, and on labels attached to or shipped with the furnace. Other safety precautions may apply.

These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances, these instructions exceed certain local codes and ordinances, especially those that may not have kept up with changing residential construction practices. We require these instructions as a minimum for a safe installation.

Follow all safety codes. Wear safety glasses, protective clothing and work gloves. Have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in the literature and attached to the unit.

1. Use only with type of gas approved for this furnace. Refer to the furnace rating plate and section 5 : GAS SUPPLY AND PIPING.
2. Install this furnace only in a location and position as specified in section 3 : INSTALLATION.
3. Provide adequate combustion and ventilation air to the furnace as specified in section 7 : VENTING AND COMBUSTION AIR PIPING.
4. Combustion products must be discharged outdoors. Connect this furnace to an approved vent system only, as specified in section 7 : VENTING AND COMBUSTION AIR PIPING.
5. Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections, as specified in section 5 : GAS SUPPLY AND PIPING.
6. Always install furnace to operate within the furnace's intended temperature-rise range with a duct system which has an external static pressure within the allowable range, as specified in section 4 : DUCT INSTALLATION of these instructions. See furnace rating plate.
7. When a furnace is installed so that supply ducts carry air circulated by the furnace to areas outside the space containing the furnace, the return air shall also be handled by duct(s) sealed to the furnace casing and terminating outside the space containing the furnace. See section 4 : DUCT INSTALLATION.

**This furnace may be installed, with a two pipe sealed combustion configuration, in a space utilized as part of the return air supply. A filter must be installed at the return opening of the furnace and a grill should be installed in the space to allow proper circulation of air.**

8. Gas furnace manufactured on or after May 1, 2017 are not permitted to be used in Canada for heating of buildings or structures under construction.
9. A gas-fired furnace for installation in a residential garage must be installed as specified in the

WARNING box below:

## WARNING

### **FIRE, INJURY OR DEATH HAZARD**

**Failure to follow this warning could result in personal injury, death and/or property damage.**

**When the furnace is installed in a residential garage, the burners and ignitions sources must be located at least 18 in. (457 mm) above the floor. The furnace must be located or protected to avoid damage by vehicles. When the furnace is installed in a public garage, airplane hangar, or other building having a hazardous atmosphere, the furnace must be installed in accordance with the NFPA 54/ANSI Z223.1-2009 or CAN/CSA B149.2-2010.**

**Do not install the furnace on its back or hang furnace with control compartment facing downward. Safety control operation will be adversely affected. Never connect return air duct to the back of the furnace.**

## WARNING

### **ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD**

**Improper servicing could result in dangerous operation, serious injury, death or property damage.**

**-Before servicing, disconnect all electrical power to furnace.**

**-When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.**

**-Verify proper operation after servicing.**

## WARNING

### **CARBON MONOXIDE POISONING HAZARD**

**Failure to follow this warning could result in personal injury or death. The operation of exhaust fans, kitchen ventilation fans, clothes dryers, attic exhaust fans or fireplaces could create a NEGATIVE PRESSURE CONDITION at the furnace. Make-up air MUST be provided for the ventilation devices, in addition to that required by the furnace.**

## **WARNING**

### **CARBON MONOXIDE POISONING HAZARD**

Failure to follow the steps outlined below for each appliance connected to the venting system being placed into operation could result in carbon monoxide poisoning or death. The following steps shall be followed for each appliance connected to the venting system being placed into operation, while all other appliances connected to the venting system are not in operation:

1. Seal any unused openings in venting system;
2. Inspect the venting system for proper size and horizontal pitch, as required in the National Fuel Gas Code, ANSI Z223.1/NFPA 54 or the Natural Gas and Propane Installation Code, CSA B149.1 and these instructions. Determine that there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition;
3. As far as practical, close all building doors and windows and all doors between the space in which the appliance(s) connected to the venting system are located and other spaces of the building;
4. Close fireplace dampers;
5. Turn on clothes dryers and any appliance not connected to the venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they are operating at maximum speed. Do not operate a summer exhaust fan;
6. Follow the lighting instructions. Place the appliance being inspected into operation. Adjust the thermostat so appliance is operating continuously;
7. Test for spillage from draft hood equipped appliances at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle;
8. If improper venting is observed during any of the above tests, the venting system must be corrected in accordance with the National Fuel Gas Code, ANSI Z223.1/NFPA 54 and/or Natural Gas and Propane Installation code, CSA B149.1;
9. After it has been determined that each appliance connected to the venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-fired burning appliance to their previous conditions of use;

## **1.4 DETECTION SYSTEMS**

It is recommended that carbon monoxide detectors be installed wherever oil or gas fired heaters are used. Carbon monoxide can cause bodily harm or death. For this reason, agency approved carbon monoxide detectors should be installed in your residence and properly maintained to warn of dangerously high carbon monoxide levels.

Also, the house should be equipped with approved and properly maintained fire extinguishers.

Your unit is equipped with safety devices that can prevent it from functioning when anomalies are detected such as a blocked venting system.

## **1.5 DANGER OF FREEZING**

### **CAUTION**

#### **FROZEN AND BURST WATER PIPE HAZARD**

Failure to protect against the risk of freezing may result in property damage. Special precautions **MUST** be made if installing furnace in an area which may drop below freezing. This can cause improper operation or damage to equipment. If furnace environment has the potential of freezing, the drain trap and drain line must be protected.

### **CAUTION**

#### **PROPERTY DAMAGE HAZARD**

Failure to follow this caution may result in burst water pipes and/or property damage. If a condensate pump is installed, a clogged condensate drain or a failed pump may cause the furnace to shut down. Do not leave the home unattended during freezing weather without turning off water supply and draining water pipes or otherwise protecting against the risk of frozen pipes.

Ensure all condensate drain connections are secured and liquid tight. Use the furnished tube clamps and verify tightness

**Table 1: Codes and Standards**

## 2 INTRODUCTION

This multiposition Category IV condensing furnace is CSA design certified direct vent (2 pipes) and non-direct vent (1 pipe). The furnace is factory shipped for use with natural gas. The furnace can be converted in the field for use with propane gas when a conversion kit is used (B40574-03)

This furnace is designed for minimum continuous return air temperature of 60 °F (16 °C) or intermittent operation down to 55 °F (13 °C) such as when used with a night setback thermostat. Return air temperature must not exceed 80 °F (27 °C). Failure to follow these return air temperature limits may affect reliability of heat exchangers, motors, and controls.

### 2.1 CODES AND STANDARDS

Follow all national and local codes and standards in addition to these instructions. The installation must comply with regulations of the serving gas supplier, local building, heating, plumbing, and other codes. In absence of local codes, the installation must comply with the national codes listed below and all authorities having jurisdiction. In the United States and Canada, follow all codes and standards for the following:

TOPIC	USA	CANADA
<b>Safety</b>	National Fuel Gas Code (NFGC) NFPA 54-2009/ANSI Z223.1 and the Installation Standards, Warm Air Heating and Air Conditioning Systems ANSI/NFPA 90B	National Standard of Canada, Natural Gas and Propane Installation Code (NSCNGPIC) CAN/CSA B149.1
<b>General installation</b>	NFGC and the NFPA 90B. For copies, contact the National Fire Protection Association Inc., Battery march Park, Quincy, MA 02269; or for only the NFGC contact the American Gas Association, 400 N. Capitol, N.W., Washington DC 20001	NSCNGPIC. For a copy, contact Standard Sales, CSA International, 178 Rexdale Boulevard, Etobicoke (Toronto), Ontario, M9W 1R3, Canada
<b>Combustion and and air ventilation</b>	Section 9.3 of the NFPA54/ANSI Z223.1 Air for Combustion and Ventilation	Part 8 of the CAN/CSA B149.1, Venting Systems and Air Supply for Appliances
<b>Duct systems</b>	Air Conditioning Contractors Association (ACCA) (Manual D), Sheet Metal and Air Conditioning Contractors National Association (SMACNA), or American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE).	
<b>Acoustical lining and fibrous glass duct</b>	current edition of SMACNA, NFPA 90B as tested by UL Standard 181 for Class I Rigid Air Ducts.	
<b>Gas piping and pipe pressure testing</b>	NFPA 54/ANSI Z223.1 NFGC; Chapters 5, 6, 7, and 8 and national plumbing codes.	CAN/CSA-B149.1, Part 6
<b>Manufactured Mobile housing</b>	Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280 or The Standard for Manufactured Home Installations ANSI/NCS A225.1	Canadian Standard for Series M92 Mobile Homes, CAN/CSA Z240MH
<b>Electrical connections</b>	National Electrical Code (NEC) ANSI/NFPA 70	Canadian Electrical Code CSA C22.1
<b>Venting</b>	Part 7, Venting of equipment, latest edition of the National Fuel Gas Code NPFA 54, 90A and 90B ANSI Z223.1-	CAN/CSA-B149.1-05 latest edition

## 2.2 ELECTROSTATIC DISCHARGE

### CAUTION

#### FURNACE RELIABILITY HAZARD

Failure to follow this caution may result in unit component damage. Electrostatic discharge can affect electronic components. Take precautions during furnace installation and servicing to protect the furnace electronic control. These precautions will help to avoid exposing the control to electrostatic discharge by putting the furnace, the controls, and the technician at the same electrostatic potential.

## 2.3 LOCATION

This furnace must :

- Be installed so the electrical components are protected from water;
- Not be installed directly on any combustible material other than wood flooring;
- Be located close to the chimney or vent and attached to an air distribution system. Refer to section 7.
- Be provided ample space for servicing and cleaning. Always comply with minimum clearances shown in table 2 or on the furnace rating label.
- The furnace must be installed in a conditioned space.

Place the unit so that proper venting can be achieved, with a minimum number of elbows, in accordance with the instructions in this manual. The furnace should be located as close to the chimney (vertical venting) or to the outside vent wall (horizontal venting) as possible.

### 2.3.1 Location relative to cooling equipment

The cooling coil can either be installed in the supply air duct or in the return air duct. If the coil is installed in the

supply air duct, it must be at a minimum of 6" over the furnace primary heat exchanger.

Table 2: Minimum clearance

Position	Clearance in (mm)
Rear	0
Front	24 (610)
All sides of supply plenum	1 (25)
Right side	8 (204)
Other Sides	0
Vent	0
Top of furnace Chinook compact	0

## 3 INSTALLATION

The furnace is factory built for upflow position. When installing the furnace in other orientation than the upflow position, simply re-route the tubing accordingly with the instructions provided in this section of the manual.

### CAUTION

#### PROPERTY DAMAGE HAZARD

Failure to follow this caution may result in water spillage and/or property damage.

For any position other than upflow, the multiposition pressure switch must be connected pneumatically to the condensate box and electrically to the control to allow the furnace to stop in the event of drain blockage.

### CAUTION

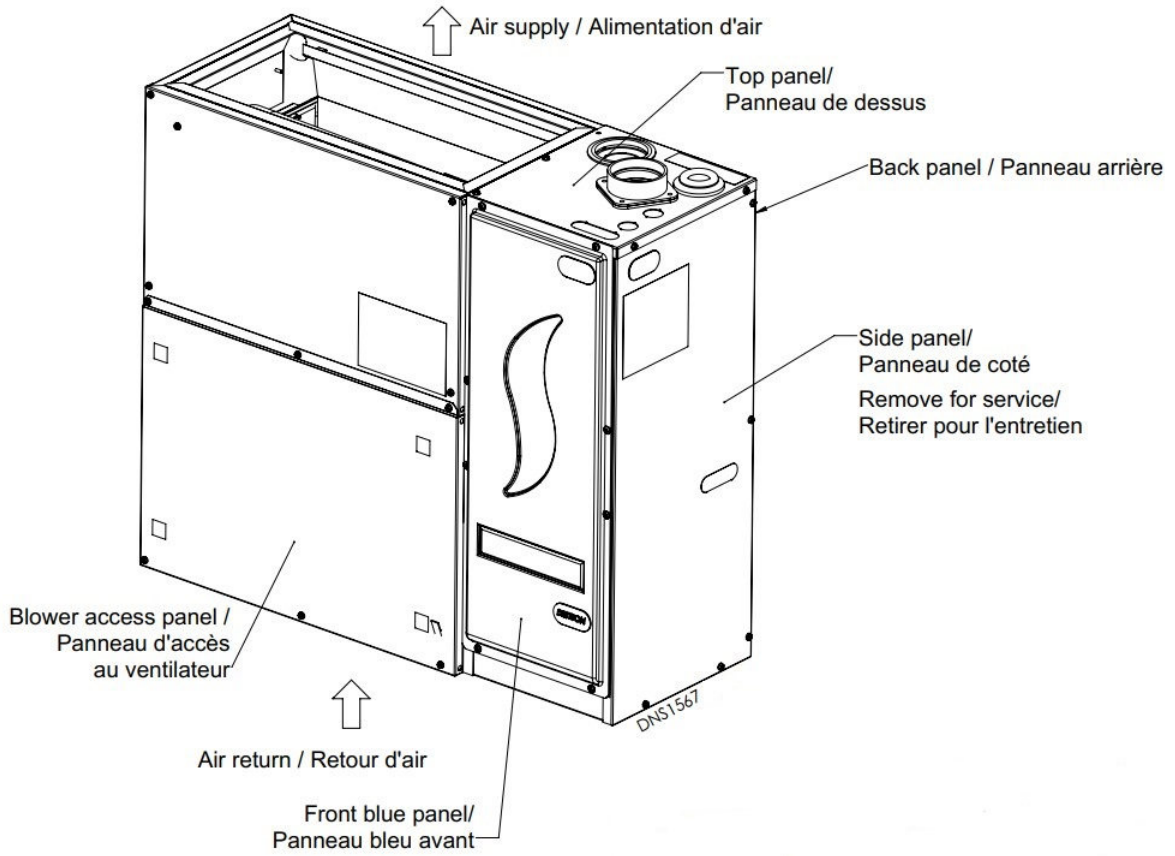
#### FURNACE MALFUNCTIONING

Failure to follow this caution may result in furnace malfunctioning

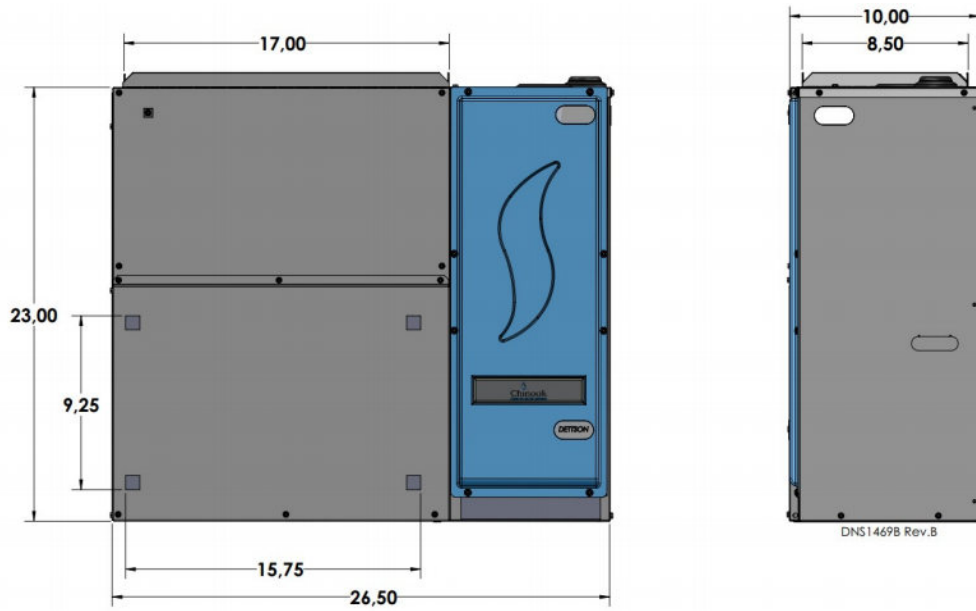
For any position other than upflow, the furnace must be incline of at least 1°. Refer to the furnace position section for more details.



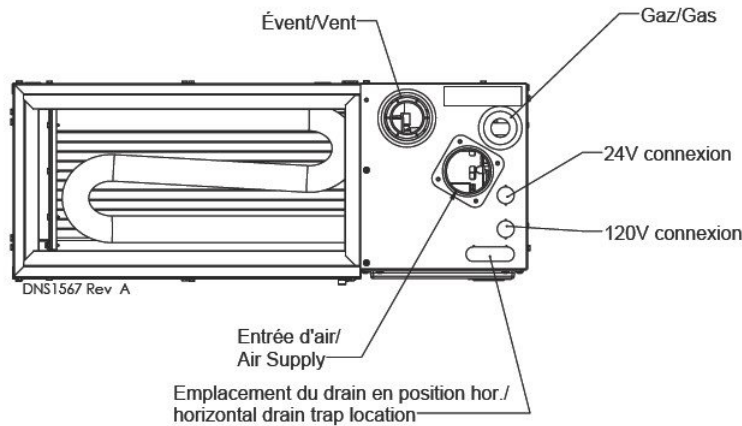
**Figure 1: Panel Identification**



**Figure 2: Dimensions**



**Figure 3: Top view**



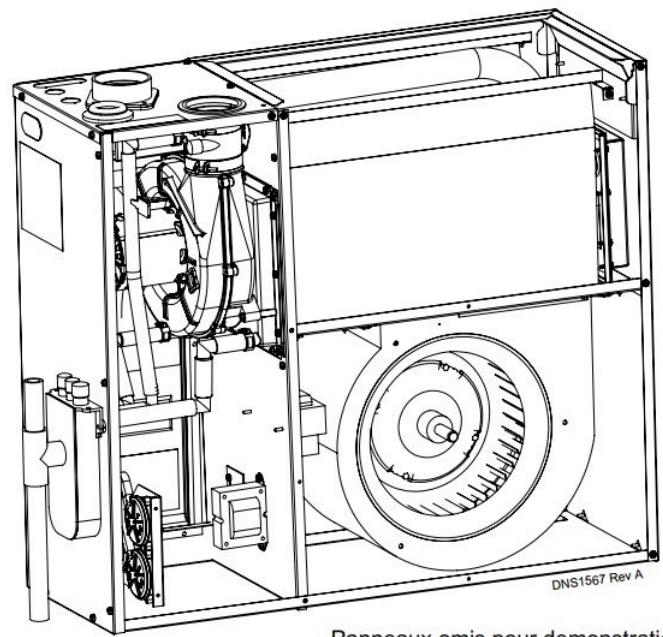
### 3.1 UPFLOW

The drain trap must be outside the furnace casing. Use the 3 ports drain trap. The condensate drain hoses must be routed to the trap through the furnace casing. Remove the metal knock out on the side of the casing and route the hoses to the drain trap. Refer to Figure 4. The drain trap can be install to the side or the back of the panel. Refer to figures 5 and 6 and choose which configuration is better for the installation.

#### 3.1.1 Upflow Condensate drain connection

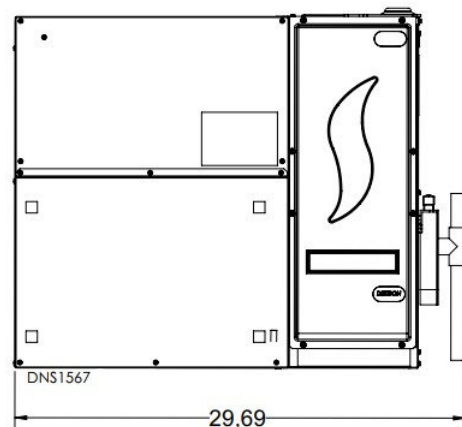
1. Remove the appropriate drain trap knock out on the furnace the casing.
2. Place the drain trap gasket on the drain trap.
3. Install the drain trap and its gasket
4. Screw in place the drain trap with two head tapping screws
5. Connect the outlet drain from the drain trap to an additional condensate piping using a 1/2" tee for an adequate drainage of the condensate. DO NOT vent using the remaining 3 outlet stubs. Such a drain shall be in compliance with local building codes.
6. Prime the drain trap with water. This will ensure proper furnace drainage at startup and will avoid any recirculation of flue gas.

**Figure 4: Upflow orientation**



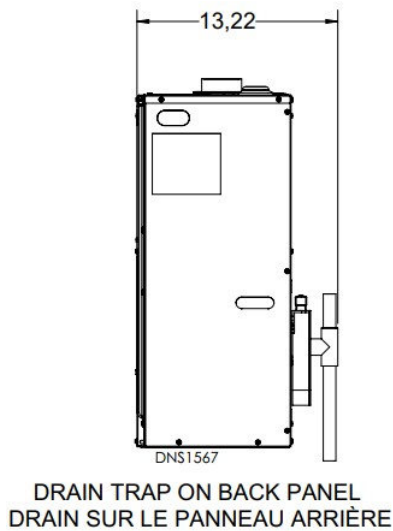
Panneaux omis pour demonstration  
Panels not shown for demonstration

**Figure 5: Side drain trap**



DRAIN TRAP ON SIDE PANEL  
DRAIN SUR LE PANNEAU DE COTÉ

**Figure 6: Back drain trap**



### 3.2 DOWNFLOW

When installing the furnace in Downflow orientation you must incline the furnace of at least 1° to ensure proper drainage of the condensate. Refer to figure 7

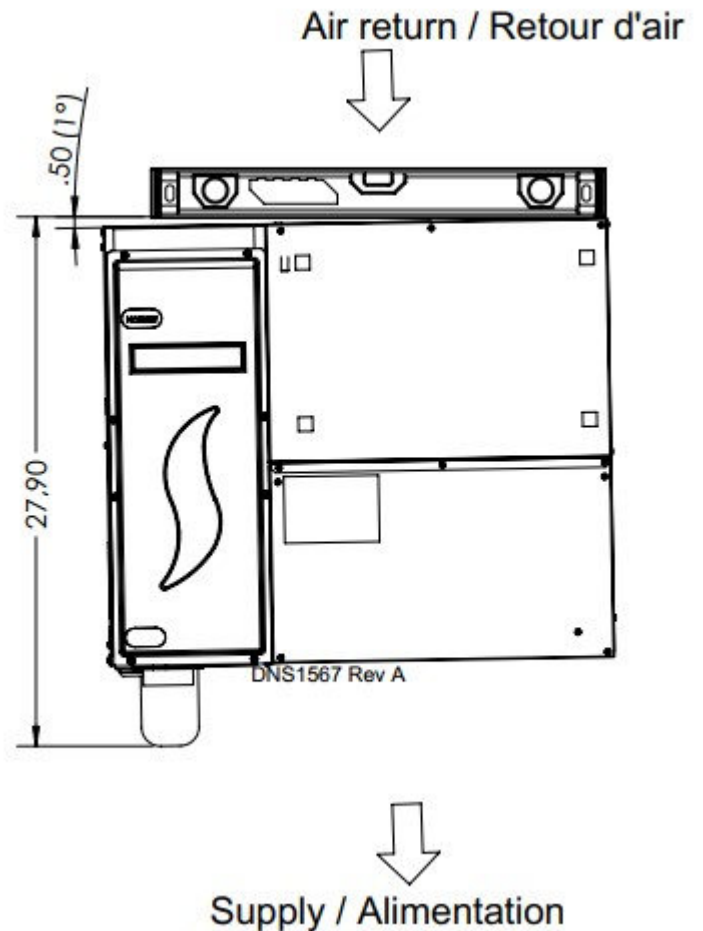
Make sure to allow enough space for inclination, venting and drain trap.

#### 3.2.1 Downflow Condensate drain connection

1. Remove all PVC tubes from the ID blower, condensate box and vent collector and block the stub openings with furnished 1/2" black caps.
2. Use the furnished extra tubing and cut those 2 lengths : (1) 4.5" and (2) 9.25".
3. Remove the appropriate drain trap knock-out for downflow orientation.
4. Cut open the pressure port, located on the condensate box. See figure 8 for its location. It will be connected to the multiposition pressure switch in section 3.5.
5. **Use the MULTIPosition DRAIN TRAP, which has only two ports.**
6. Place the drain trap gasket on drain trap.
7. Install the drain trap and screw in place with two self-tapping screw to the furnace casing.
8. Reroute the condensate box drain tube to the drain trap. Starting from condensate box use length (1) 4.5", a 90° elbow and length (2) 9.25"
9. Prime the drain trap with water. This will ensure proper furnace drainage at startup and will avoid any recirculation of flue gas.
10. Install one 1/2" black plastic caps on the remaining stub of the drain trap.

11. Connect the outlet of drain trap to the condensate drain piping with a tee. Such a drain shall be in compliance with local building codes.
12. The venting must be drained using a PVC 636 tee. Connect this tee to a P-trap and connect it to your condensate drain. Commercially available condensate trap exist for use with IPEX system 636.

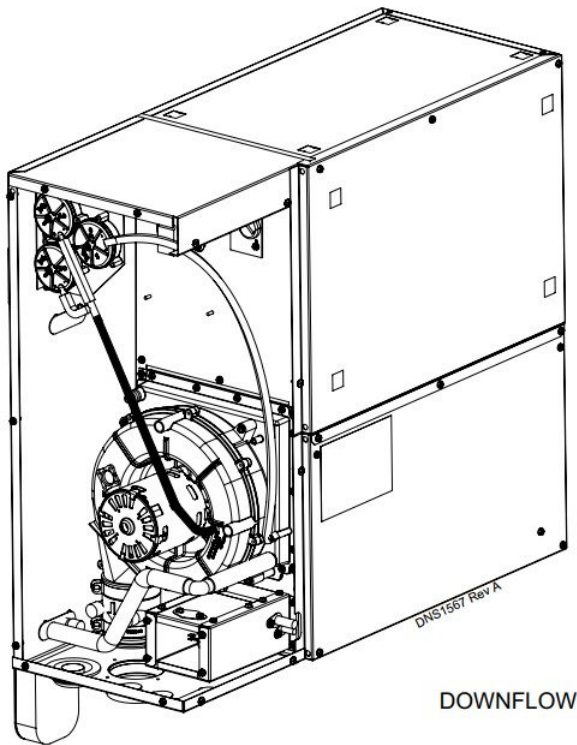
**Figure 7: Installation slope for downflow application**



**Figure 8: Downflow condensate box pressure port**



**Figure 9: Downflow installation detailed**



### 3.3 HORIZONTAL

Horizontal application is perfect for ceiling installation. Allow enough space for inclination of the furnace and drain trap. Figure 10 will help you figure orientation, inclination and space needed.

**When installing the furnace in horizontal orientation you must tilt the furnace at least 0.5 in toward the heat exchanger to ensure proper drainage of the condensate. See figure 10**

#### 3.3.1 Horizontal Condensate drain connection

1. Remove PVC tubes from the ID blower, condensate box and vent collector and block the openings with furnished 1/2" black caps.
2. Use the furnished extra tubing and cut those 4 lengths : (1) 3.75" , (2) 5.5" , (3) 5.5" and (4) 3.25".
3. Remove the appropriate knock-out for drain trap. Refer to Figure 3, and look for horizontal drain trap location.
4. Cut open the pressure port, located on the condensate box behind the inducer. It will be connected to the multiposition pressure switch in section 3.5. For pressure port location see figure 12.
5. **Use the MULTIPOSITION DRAIN TRAP, which has only two ports.**

6. Place the drain trap gasket on the drain trap.
7. Install the drain trap and screw in place with two self-tapping screws to the furnace casing.
8. Reroute the ID blower drain tube from the ID blower casing to the drain trap.

Starting from the ID blower use length (1) 3.75", 90° elbow and length (2) 5.5"

9. Reroute the condensate box drain tube from the bottom of the condensate box to the drain trap.

Starting from the condensate box use length (3) 5.5", 90° elbow and length (4) 3.25".

10. Prime the drain trap with water. This will ensure proper furnace drainage at startup and will avoid any recirculation of flue gas.
11. Connect the outlet of drain trap to the condensate drain piping with a tee. Such a drain shall be in compliance with local building codes.
12. The venting must be drained using a PVC 636 tee. Connect this tee to a P-trap and connect it to your condensate drain. Commercially available condensate trap exist for use with IPEX system 636. See figure 11.

### 3.4 VENTING DRAINAGE

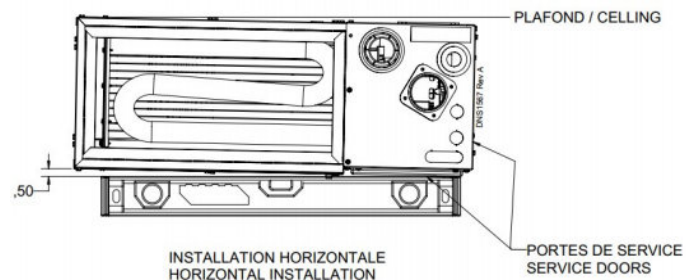
All furnaces with horizontal exhaust vent piping must have a PVC 636 drain tee assembly and trap installed in the exhaust pipe as close to the furnace as possible.

### 3.5 MULTIPOSITION PRESSURE SWITCH CONNECTION

The 3/16 stub just beside the drain of the condensate box must be drilled or cut open. The black squared PVC tubing of the multiposition pressure switch (-0.2 in w.c.) must be connected to this stub. This tubing is furnished with the furnace.

The pressure switch must now be electrically connected in series with the low fire pressure switch (top) with the brown jumper furnished in the part bag. See wiring diagrams.

**Figure 10: Installation slope for horizontal application**



**Figure 11: Horizontal installation**

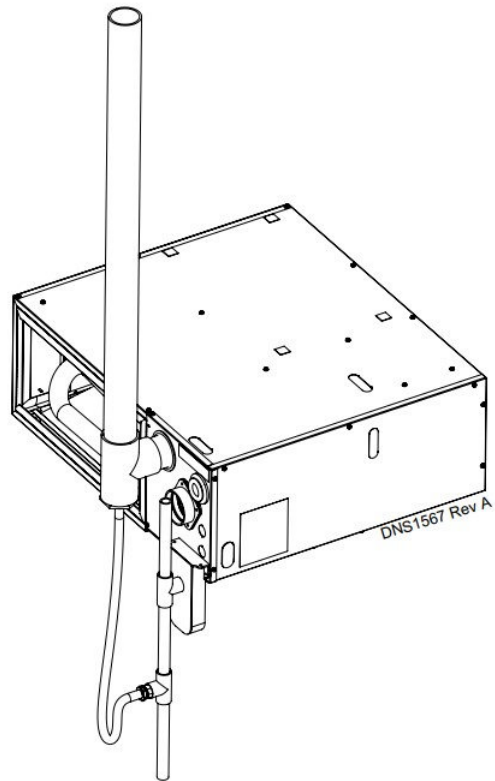
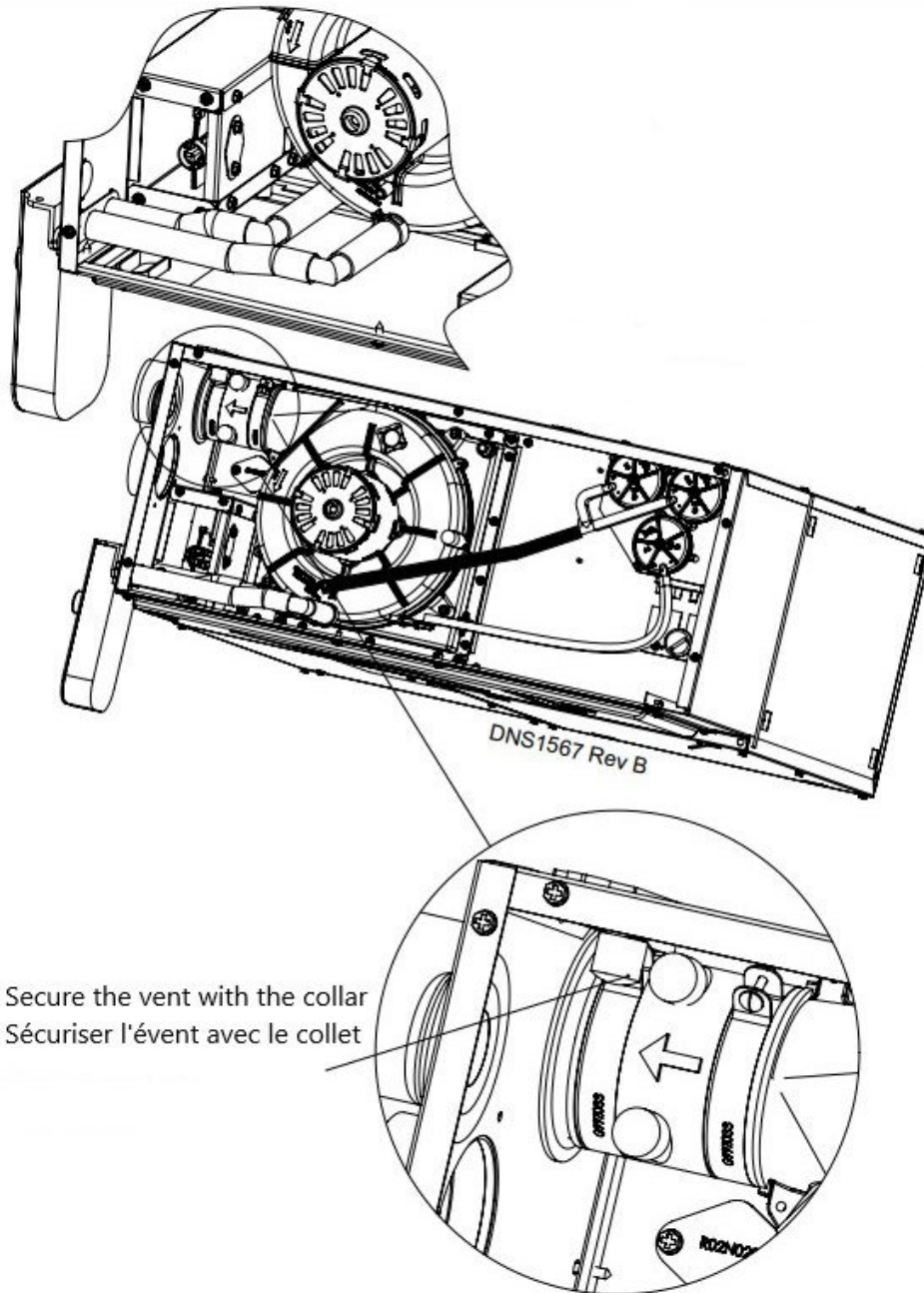


Figure 12: Horizontal installation detailed



Secure the vent with the collar  
Sécuriser l'évent avec le collet

## 4 DUCT INSTALLATION

### 4.1 GENERAL REQUIREMENTS

The duct system should be sized to handle the required system design airflow at the design external static pressure. When a furnace is installed so that the supply ducts carry air circulated by the furnace to areas outside the space containing the furnace, the return air shall also be handled by duct(s) sealed to the furnace casing and terminating outside the space containing the furnace. This furnace may be installed, with a two pipe sealed combustion configuration (direct vent), in a space utilized as part of the return air supply. A filter must be installed in the return opening of the furnace and a grill should be installed in the space to allow proper circulation of air.

Secure ductwork with proper fasteners for type of ductwork used. Seal supply and return duct connections to the furnace with code approved tape or duct sealer.

Ductwork passing through an unconditioned space should be insulated to enhance system performance. When air conditioning is used, a vapour barrier is recommended.

Maintain a 1 in. (25 mm) clearance from combustible materials to supply air ductwork for a distance of 36 in. (914 mm) horizontally from the furnace. See NFPA 90B or local code for further requirements.

Flexible connections can be used between ductwork and furnace to prevent transmission of vibration.

Many states, provinces and localities are considering or have implemented standards and/or restrictions on duct sizing practices, ductwork leakage, and/or ductwork thermal, airflow and electrical efficiencies. CONSULT LOCAL CODE OFFICIALS for ductwork design and performance requirement in your area.

### 4.2 DUCT EXTERNAL STATIC PRESSURE

Higher than prescribed static pressure will decrease the air flow, causing excessive temperature rise, opening of the thermostat, failure of the heat exchanger and / or poor performance of the heat pump / air conditioning.

To measure total external static pressure, proceed as follow:

1. Run the furnace at the system maximum airflow
2. Return duct : Make sure the furnace filter is clean and measure the static pressure between the filter and the inlet of the furnace (negative pressure reading)
3. Supply duct : Measure the static pressure between the furnace and the cooling coil (positive static pressure). Tape up the hole when test is complete.

4. Subtract the inlet pressure from the supply pressure. For example, if you measured 0.3"w.c. in the supply and -0.2" in the return:

$$0.3\text{"w.c.} - (-0.2\text{"w.c.}) = 0.5\text{"w.c.}$$

If the total external static pressure exceeds the maximum listed on the furnace rating plate, check for closed dampers, register, improperly size duct work or incorrect dipswitch settings. Make sure the temperature rise is coherent with the furnace rating plate.

### 4.3 SMART DUCT SYSTEM

Dettson Industries also offers the Smart Duct System. Please refer to the Smart Duct Manual (X40240) for proper installation of this system.

Please note Smart Duct system can only be used with approved Smart Duct furnaces.

### 4.4 RETURN AIR CONNECTIONS

The return air duct must be connected to the bottom or side. Knock-outs are available on the bottom, front side and back side. Avoid front side, since it is the only panel giving access to the blower and motor.

In downflow configuration, it must be connected to bottom.

Static pressure in the return air duct should be -0.2"w.c. at system maximum airflow.

### 4.5 SUPPLY AIR DUCTS

The supply air duct must be connected to the furnace supply outlet air duct flanges. DO NOT cut furnace casing to attach supply air duct, humidifier, or other accessories. All accessories must be connected to the supply or return ductwork, external to furnace's casing. It is recommend that the outlet duct be provided with a removable access panel. This opening shall be accessible when the furnace is installed and shall be sized to allow the heat exchanger to be viewed or a probe to be inserted for sampling the air stream. The cover attachment should prevent leaks.

#### 4.5.1 Ductwork acoustical treatment

Metal duct systems that do not have a 90 degree elbow and 10 ft. (3 M) of main duct to the first branch take-off may require internal acoustical lining. As an alternative, fibrous ductwork may be used if constructed and installed in accordance with the latest edition of SMACNA construction standard on fibrous glass ducts. Both acoustical lining and fibrous ductwork shall comply with NFPA 90B as tested by UL Standard 181 for Class 1 Rigid air ducts.

## 5 GAS SUPPLY AND PIPING

### 5.1 GENERAL

Use a back-up wrench on the inlet of the gas valve when connecting the gas line to the gas valve.

Report to Table 5 for recommended gas pipe sizing. Support all gas piping with appropriate straps and

hangers. Use a minimum of 1 hanger every 6 ft (1.8 m). Joint compound (pipe dope) should be applied sparingly and only to male threads of joints. Pipe dope must be resistant to the action of propane gas.

An accessible manual equipment shut off valve **MUST** be installed external to furnace casing.

Install a sediment trap in riser leading to furnace. Connect a capped nipple into lower end of tee.

Install a union between the manual shut off gas and the gas valve in order to remove it easily.

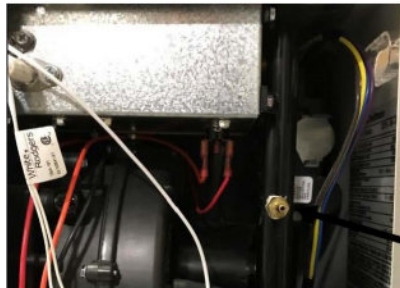
Piping should be pressure and leak tested in accordance with the current edition of the NFGC in the United States, local, and national plumbing and gas codes before the furnace has been connected. Refer to current edition of NSCNPIC in Canada.

The gas supply pressure shall be within the maximum and minimum inlet supply pressures marked on the rating plate and in Table 3.

The furnace gas valve inlet pressure tap connection is suitable to use as test gauge connexion providing test pressure.

## 5.2 SETTING GAS PRESSURE

Figure 13: Outlet pressure port



Gas outlet pressure should be set according to table 4. A calibrated pressure gauge is required for gas pressure measurements. Follow those steps to properly adjust the servo gas valve :

1. Remove the square outlet pressure tap on the manifold. Refer to figure 13.
2. Connect hose from a gauge to the pressure tap (1/8" NPT).
3. Operate the unit to the flow rate mentioned in table 4. Installer can either use test mode (see table:16) or t-stat fixed rate mode.
4. Adjustment or verification should be made on at least two points, which are at flow rates 100% and 40%.
5. Note the manifold gas pressure.
6. To adjust the pressure, take off the regulator cap on the gas valve and use a small slotted screwdriver in the opening.

7. Only small variation in gas pressure should be made by adjusting the pressure regulator (+/- 0.6 maximum)
8. Allow up to 20 seconds between each change to the rotary dipswitch.
9. Once adjustment is made at 40% and 100% input, turn off the power to the unit.
10. Turn the power back on, and verify pressure adjustment.
11. Shut off the unit and replace the regulator cap.
12. Place the manifold pressure tap plug.
13. Check for leak.

Table 3: Inlet Gas Pressure

	Gas Pressure in.w.c. (psig)	
	Minimum	Maximum
Natural Gas	4.5	10.5
Propane	11.0	13.0

Table 4: Outlet gas pressure

Input	Gas Pressure in. w.c.	
	Natural Gas	Propane
High fire (100%)	3.2 +/- 0.3	8.35 +/- 0.5
Low fire (40%)	0.8 +/- 0.3	2.09 +/- 0.3

## 5.3 PROPANE CONVERSION

To convert from natural gas to L.P. gas, installer should use the appropriate conversion kit, in this case B40574-03.

The conversion kit consist an orifice #56, jumper and stickers to clearly identify conversion on the gas valve. Follow the steps bellow to convert the gas valve to propane :

1. Move the switch located on the valve to the «off» position.
2. Remove the «NAT. GAS» label from the top of the gas valve.
3. Using a pair of tweezers or needle nose pliers, place the jumper (supplied) on the receptacle located beneath the label that was removed in step 2. Use care to make sure that both prongs of receptacle engage the jumper.
4. Place the «LP» label (supplied with the kit) on the gas valve over the opening to the jumper.
5. Attach the "WARNING" label (supplied with this kit) to the gas valve where it can readily be seen.
6. Move the switch located on gas valve back to the "ON" position.
7. Unscrew the manifold.



8. Replace the natural gas burner orifices with the LP orifice (# 56) supplied with the kit.
9. Replace the manifold and make sure it's properly aligned with the burners.
10. Make sure the gas valve outlet pressure (measured on the outlet pressure tap) is compliant with the

outlet pressure. Outlet pressure is specified in table 4 and on the nameplate of the furnace.

## 5.4 GAS PIPE GROMMET

For direct vent applications, the hole for the gas pipe on the cabinet must be sealed to prevent air leakage. Install the grommet in the hole, then insert the gas pipe.

**Table 5: Maximum capacity of pipe Cu.ft./Hr for pipe length ft (m)**

Nominal Iron pipe size in. (mm)	Internal dia. in. (mm)	10 (3.0)	20 (6.0)	30 (9.1)	40 (12.1)	50 (15.2)
1/2 (13)	0.622 (15.8)	175	120	97	82	73
3/4(19)	0.824 (20.9)	360	250	200	170	151
1 (25)	1.049 (26.6)	680	465	375	320	285
1-1/4 (32)	1.380 (35.0)	1400	950	770	660	580
1-1/2 (39)	1.610 (40.9)	2100	1460	1180	990	900

## 6 ELECTRICAL CONNECTION

### 6.1 120V WIRING

Furnace must have a 120 V power supply properly connected and grounded. Proper polarity must be maintained for 120 V wiring. If polarity is incorrect, furnace will NOT operate. Verify that the voltage, frequency, and phase correspond to that specified on unit rating plate. Also, check to be sure that service provided by utility is sufficient to handle load imposed by this equipment. Use a separate fused branch electrical circuit with a properly sized fuse or circuit breaker for this furnace. A readily accessible means of electrical disconnect must be located within sight of the furnace. Refer to rating plate or Table 8.

### 6.2 THERMOSTAT/24V Wiring

#### 6.2.1 Non-communicating, one-stage or two-stage thermostat

**NOTE:** Do not use 24 volt control wire smaller than No. 18 AWG.

Wire all non-communicating thermostats to the 24V connections on the integrated furnace control.

**NOTE:** A larger wire gage may be required for longer lengths of thermostat wire.

Operations with a non-communicating thermostat (one-stage or two-stage) are not fully modulating. See table 7 for configuration details.

Operation with a 2-stage thermostat requires disswitch configuration (see table 7) and will proceed as follow : call on W1 will result in a 40% input, call on W2 will result in 60% input for 6 minutes followed by 100% input until

thermostat demand is satisfied.

Operation with a single stage thermostat will operate in three phase, as describe in table 6 below.

**Table 6: OPERATION WITH SINGLE STAGE T-STAT**

PHASE	TIME	INPUT
PHASE 1	0-5 minutes	40%
PHASE 2	5-12 minutes	60%
PHASE 3	12 +	100%

**Table 7: THERMOSTAT TYPE SELECTION**

S4-2	S4-3	DESCRIPTION
OFF	OFF	Modulating, communicating or 1-stage t-stat
ON	OFF	40% TEST MODE
OFF	ON	100% TEST MODE
ON	ON	2-STAGE T-STAT

#### 6.2.2 Communicating thermostat

This furnace is capable of communicating with a thermostat and heat pump. Installation of the communicating thermostat allow full modulation of the furnace and heat pump. Connections of the thermostat must be made at the furnace control.

### 6.3 ALTERNATE POWER SUPPLY

Dettson doesn't recommend to operate the furnace on a generator or other alternate power supply. If so it must produce a smooth sinusoidal waveform for compatibility with the furnace electronics. The alternate power supply must generate the same voltage, phase, and frequency (Hz) as shown on the furnace rating plate.

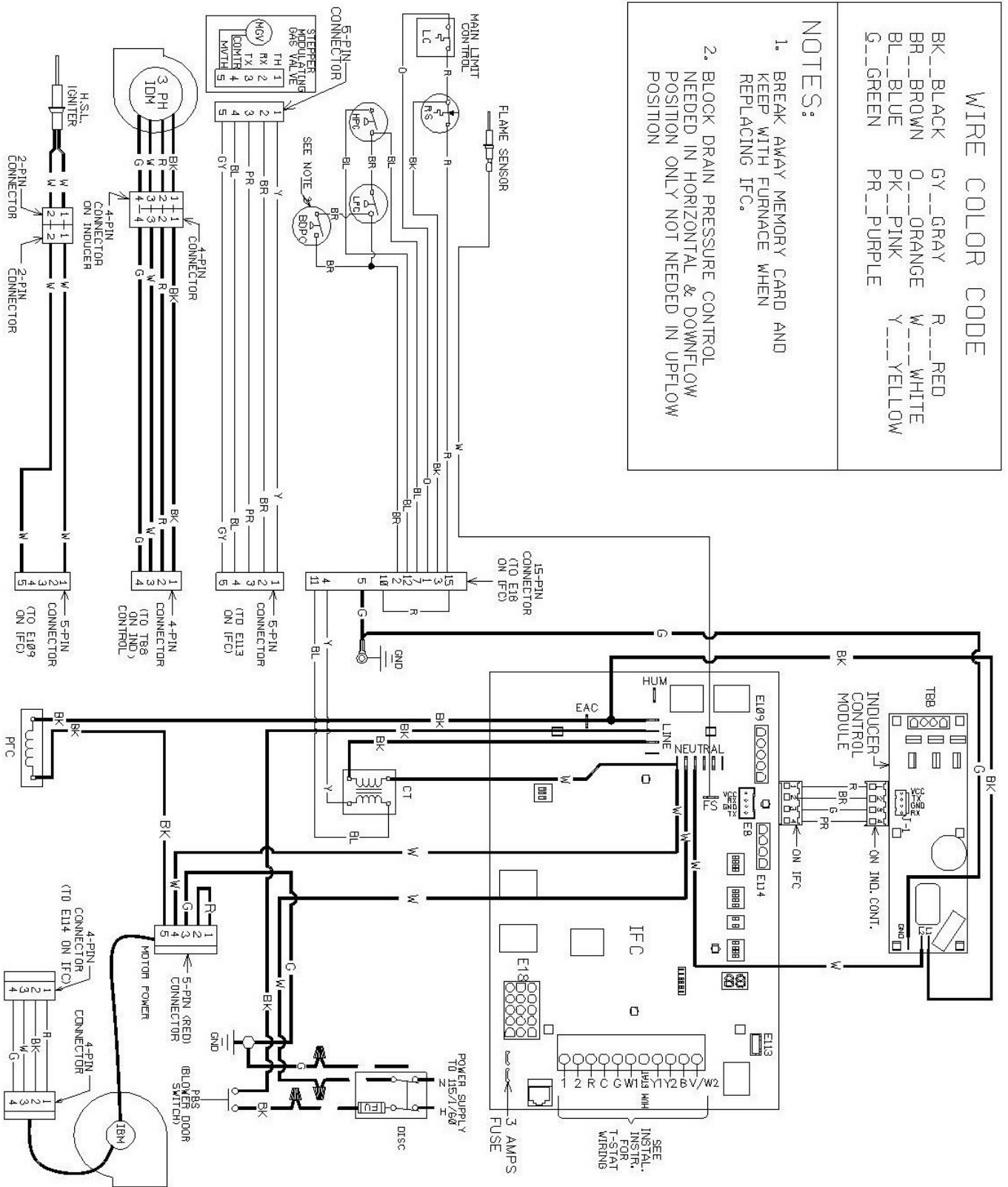
Power from an alternate power supply that is non-sinusoidal may damage the furnace electronics or cause erratic operation.

Contact the alternate power supply manufacturer for specifications and details.

**Table 8: Electrical Data**

Unit size	Volts-Hertz-Phase	Operating range Min	Operating range Max	Maximum unit amp	Unit ampacity	Maximum fuse CKT BRK amp
15,000	120-60-1	127	104	10.7	12.6	15

**Figure 14: Wiring Diagram**



DNS1403 rev.B

## 7 VENTING AND COMBUSTION AIR PIPING

### WARNING

**CARBON-MONOXIDE POISONING HAZARD**  
Failure to follow instruction could result in severe personal injury or death due to carbon-monoxide poisoning, if combustion products infiltrate into the building. Check that all openings in the outside wall around the vent (and air intake) pipe(s) are sealed to prevent infiltration of combustion products into the building. Check that furnace vent (and air intake) terminals are not obstructed in any way during all seasons.

### WARNING

Corrosive or contaminated air may cause failure of parts containing flue gas, which could leak into the living space. Air for combustion must not be contaminated by halogen compounds, which include fluoride, chloride, bromide and iodide. These elements can corrode the heat exchanger and burner cabinet component. This conditions would shorten the furnace life. Air contaminants are found in aerosol sprays, detergents, bleaches, cleaning solvents, salts, air fresheners, and other household products. Do not install the furnace in a corrosive or contaminated atmosphere. Make sure all combustion and circulating air requirements are met, in addition to all local codes and ordinances.

### 7.1 GENERAL

If this furnace replaces a furnace that was connected to a vent system or chimney, the vent or vent connectors of other remaining appliances may need to be re-sized. Vent systems or vent connectors of other appliance must be sized to the minimum size allowable.

An abandoned masonry chimney may be used as a raceway for properly insulated and supported combustion-air (when applicable) and vent pipes. Each furnace must have its own set of combustion air and vent pipes.

A furnace shall not be connected to a chimney flue serving a separate appliance designed to burn solid fuel.

Other gas appliances with their own venting system may also use the abandoned chimney as a raceway providing it is permitted by local code, the current edition of the National Fuel Gas Code, and the vent or liner manufacturer's installation instructions. Care must be

taken to prevent the exhaust gases from one appliance from contaminating the combustion air of other gas appliances.

- The vent pipe and combustion air pipe must be the same diameter.
- Slope horizontal vent piping upward a minimum of 1/4" per foot of run so that condensate drains toward the furnace.
- Support horizontal vent piping at least every five feet. No sags or dips are permitted
- The vent pipe and combustion air pipe must terminate on the same building side.
- Installation of self regulating 5 or 7 watt heating cable at the termination of venting could be a necessity if ice build up is expected. See section 7.2.

### 7.2 VENT/EXHAUST BLOCKAGE DUE TO ICE BUILD UP

#### WARNING

If outdoor design conditions are 5°F (-15°C) or colder, there is a significant risk of ice blockage at the vent termination. To mitigate this risk, provision should be made for a heating cable at the exhaust. Additionally, ensure the exhaust termination is easily accessible to allow for manual deicing if the heating cable proves insufficient.

If design outdoor conditions are 5°F (-15°C) or less, this section should be thoroughly considered before final installation of the furnace.

Dettson is proud to offer one of the most efficient furnaces (+97% AFUE) on the market as well as being the only supplier of perfectly sized furnace in terms of footprint and input. The energy supplied to the furnace is delivered throughout the home for the comfort of the occupant rather than outside.

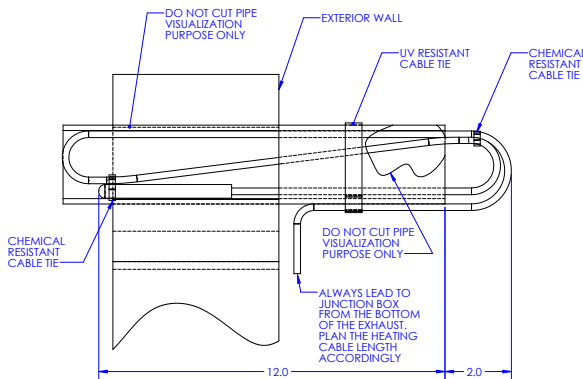
In these installations, residual energy in the chimney/vent are minimized and flue gases are expelled at low velocity. In some weather conditions, it leads to condensate freeze up at the termination and the furnace shuts down because of the ice blockage.

To prevent this phenomenon, Dettson highly suggests installing 5-watt/ft or 7-watt/ft self-regulating heating cable at the termination, inside of the pipe. Heating cable must be UL listed. Dettson recommends installing cable as per figure 15. While the figure depicts a straight vent termination, the insertion pattern applies to any permitted termination type.

The exhaust termination should be easily accessible in case the heating cable is insufficient, allowing for easy

removal of any ice blockage.

**Figure 15: Suggested heating cable insertion in vent termination**



### 7.3 DIRECT VENT

When this furnace is installed as a direct vent (2 pipes) furnace, no special provisions for combustion air are required.

Direct vent installations require a dedicated combustion air and exhaust vent piping. The system is only using outside air for combustion.

The vent and combustion air pipe can terminate vertically, through the roof or horizontally through and outside wall. Refer to figures for approved termination.

Penetration through a roof requires appropriate sealing and proper flashing.

**In Canada**, refer to manufacturer's instructions for supporting ULC S636 venting. ABS can be used for the combustion air pipe.

### 7.4 NON DIRECT VENT

All air for combustion comes directly to the furnace from a space that is well ventilated with outdoor air (such as an attic or crawlspace). In addition, other gas appliances installed in the space with the furnace may require outside air for combustion. The combustion air pipe cannot be terminated in attics or crawlspaces that uses ventilation fans designed to operate during the heating season. If ventilation fans are present in these areas, the combustion pipe must terminate outdoors as a direct vent (2 pipe) system.

### 7.5 SPECIAL VENTING REQUIREMENTS FOR INSTALLATION IN CANADA

In Canada, S636 certified primers and cements must be used and be of the same manufacturer of the S636 venting system- do not mix primers and cements from one manufacturer with a vent system from a different manufacturer. Follow the manufacturer's instructions in

the use of primer and cement and never use primer or cement beyond its expiration date.

All fire stop and roof flashing used with this system must be UL listed material.

Acceptability under Canadian standard CAN/CSA B149 requires full compliance with all installation instructions.

The authority having jurisdiction (gas inspection authority, municipal building department, fire department, etc.) should be consulted before installation to determine the need to obtain a permit.

### 7.6 MATERIAL

#### USA:

Combustion air and vent pipe, fittings, primers and solvents must conform to American National Standard Institute (ANSI) and American Society for Testing and Material (ASTM) and be of the same manufacturer. See table 9

**Table 9: Approved Vent and Combustion air pipe material USA installation**

Material	Standards
PVC - DWV	ANSI/ASTM D2265
PVC schedule 40	ANSI/ASTM D1785
CPVC Schedule 40	ANSI/ASTM F441
SDR-21, SDR-26-26 PVC	ANSI/ASTM D2241
ABS-DWV Schedule 40	ANSI/ASTM D2661
Stainless steel (SS)	UL-1738
Polypropylene (PP)	UL-1738 and ULC-S636

**All vent piping and combustion air piping MUST conform to local and national codes.**

Pipe cement must be PVC (ANSI/ASTM D2564) or CPVC (ANSI/ASTM F493).

Primers must be PVC/CPVC (ANSI/ASTM F656).

#### CANADA:

Vent pipe installations in Canada must conform to the requirements of CAN/CSA B149 code. PVC and CPVC vent systems must be composed of pipe, fittings, cements, and primers listed to ULC S636 and must be of the same manufacturer.

Combustion air pipe can use ABS material meeting the ASTM standard D2661 / CSA B181.1.

All vent piping and combustion air piping MUST conform to local and national codes.

### 7.7 SIZE DE VENT AND COMBUSTION AIR PIPES

Furnace combustion air and vent pipe connections are sized for 2" pipe.

The maximum allowable vent length for the vent and combustion air pipe (when used) is listed in table 10

and depends on the furnace input. The maximum length must include straight pipe and any fitting and termination. Equivalent length of various fitting is list in table 11.

A minimum linear length of 5 ft must be respected.

To properly measure the Equivalent Vent Length :

1. Measure the linear pipe distance from the furnace to the termination for each pipe.
2. Count the number of elbows for each pipe.
3. For each pipe, multiply the number of elbows by the equivalent length for the type of elbow used (see table 11). Record the equivalent length of all the elbows for each pipe.
4. Record the equivalent length of the termination used (see table 11 ).
5. Add the equivalent length of the elbows and termination to the linear distance measured for each pipe.
6. If the calculated vent length is greater than the maximum allowed vent length (for either vent pipe or combustion air pipe), consider modifying the termination location.

**Table 10: Maximum equivalent vent length (ft) for 2-stage unit and altitude up to 4500 ft**

Unit size BTU/hr	Vent pipe dia. 2"
15,000 compact	300

**Table 11: Deduction for fittings**

Type of elbow	Equivalent Length (ft)
45° standard	5
45° long sweep	2.5
90° standard	10
90° long sweep	5
Tee	1.5

## 7.8 CONNECTING TO FURNACE

Never common vent with any other appliance. Do not install in the same chase or chimney as a metal or high temperature plastic pipe from another gas or fuel-burning appliance unless the required minimum clearances to combustibles are maintained between the approved PVC pipe and the other pipes. Clean and deburr all pipe cuts.

In the included parts bag, an exhaust venting gasket is supplied and needs to be installed on the exhaust of the top panel.

For proper installation of venting/exhaust pipe:

1. Position the supplied venting gasket on the top panel exhaust.
2. Slowly slide a 2" diameter pipe through the venting gasket. This step will be easier if pipe is chamfered and using a soap solution.
3. Position this venting pipe length on the rubber vent collector and tighten the collar.
4. Install the remaining vent pipes. It is recommended that all pipes be cut, prepared, and preassembled before permanently cementing any joint.
5. Working from furnace to outside, cut the pipe to the required length(s).
6. Deburr the inside and outside of the pipe.
7. Chamfer the outside edge of pipe for better distribution of primer and cement.
8. Clean and dry all surfaces to be joined.
9. Check dry fit of the pipe and mark insertion depth on the pipe.
10. After the pipes have been cut and preassembled, apply a generous layer of cement primer to the pipe fitting socket and end of the pipe to insertion mark. Quickly apply approved cement to end of the pipe and fitting socket (over primer). Apply cement in a light, uniform coat on the inside of socket to prevent build-up of excess cement. Apply second coat.
11. While cement is still wet, twist pipe into the socket with 1/4" turn. Be sure the pipe is fully inserted into the fitting socket.
12. Wipe excess cement from the joint. A continuous bead of cement will be visible around perimeter of a properly made joint.
13. Handle pipe joints carefully until cement sets.
14. Horizontal portions of the venting system shall be supported to prevent sagging. Support any piping at a minimum of every 5 ft. using perforated metal hanging strap or commercially available hangers designed to support plastic pipe.
15. Prevent condensate from accumulating in the pipes by sloping the combustion air piping and vent piping downward toward furnace a minimum of 1/4" per linear ft. with no sags between hangers.
16. Complete the vent installation by installing the required termination. See figures 18 to 22 for allowed termination.

- Use appropriate methods to seal the openings where combustion air pipe and vent pipe pass through roof or sidewall.

## 7.9 COMBUSTION AIR

Connection of the combustion air is made using the venting flange supplied.

Use a 90° elbow or two medium-radius sweep elbows to keep the inlet downward and prevent the entry of rain. The inlet opening of the combustion air termination must be a minimum of 12" above the anticipated level of snow accumulation.

**Horizontal combustion air pipe should have a drain tee assembly and trap installed in the as close to the furnace as possible.** This is to drain any water or condensate that may enter the furnace vestibule area.

**A vertical combustion air pipe could necessitate the installation of rubber vent coupling B40580 in the air intake pipe to drain any possible condensate that could enter the cabinet.**

## 7.10 VENT TERMINATION

All clearance specified in this manual are in accordance with the current CSA B149.1, Natural and Propane Installation Code and the current ANSI Z223.1/NFPA 54, National Fuel Gas Code. For clearance not specified in these codes, clearance should be in accordance with local installation codes and the requirements of the gas supplier and the instructions in this manual.

A vent for this appliance shall not terminate:

- over public walkways;
- near soffit vents or crawl space vents or other areas where condensate or vapor could create a nuisance or hazard;
- near regulators, relief valves, or other equipment where condensate or vapor could be detrimental to their operation;

See figures 23 and 24 for venting clearance.

The flue gas of those high efficiency furnace is slightly acidic and may affect some building materials. A resistant shield (minimum of 24 inches square) should be used to protect the wall surface.

Clearance to outside corner should be of a minimum of 36".

### 7.10.1 Multiple venting termination

If more than one furnace needs to be installed near each other, no common venting is allowed. Each furnace needs to have its own set on exhaust. A minimum distance of 36" is required between the vents.

### 7.10.2 Concentric vent

Figures 16 and 17 show the required clearance for concentric installation.

For installation through the roof or side wall, cut one 4" (102 mm) diameter hole for 2" (51 mm) kit, or one 5"

(127 mm) diameter hole for 3" (76 mm) kit in the desired location. Loosely assemble concentric vent/combustion air termination components together following the kit instructions. Slide the assembled kit with rain shield REMOVED through the hole in the wall or roof flashing.

**NOTE:** Do not allow insulation or other materials to accumulate inside the pipe assembly when installing it through the hole. Disassemble loose pipe fittings. Clean and cement using the same procedures as used for system piping.

Figure 16: Roof concentric termination

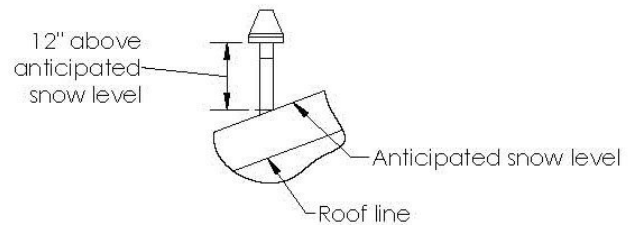
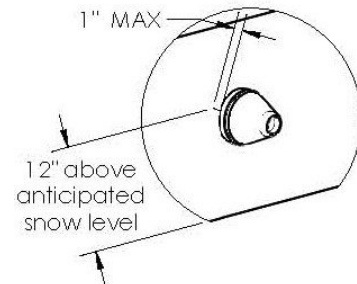


Figure 17: Sidewall concentric termination

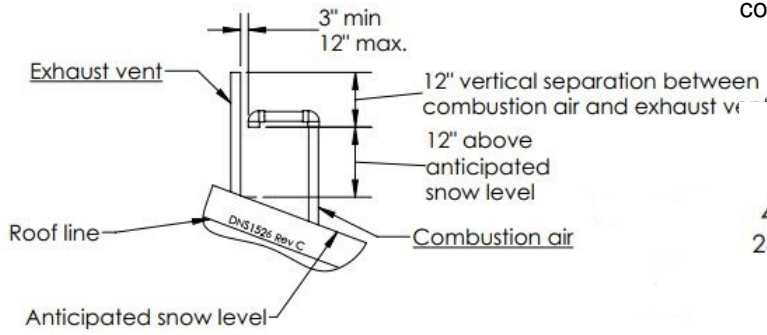


### 7.10.3 Two pipe termination

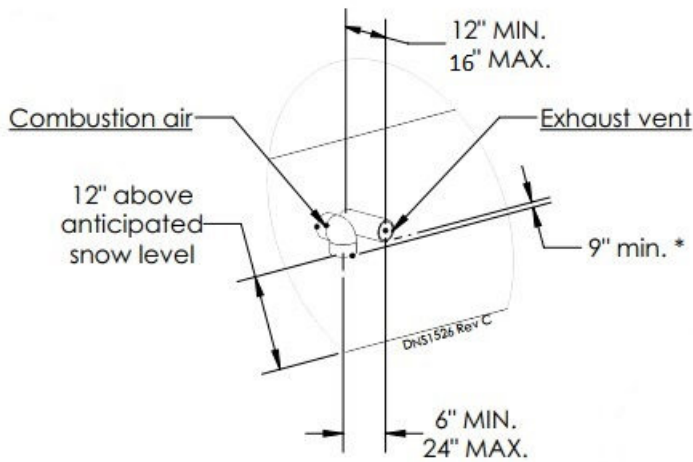
Maintain the required distance between vents or pairs of vents (36"). Cut the required number of holes in the roof or sidewall for vent and combustion air pipes. Sidewall holes for two pipes vent terminations should be side-by-side, allowing space between the pipes for the elbows to fit on the pipes. Holes in the roof for two pipe terminations should be spaced no more than 18" (457 mm) apart. Termination elbows will be installed after the vent and combustion air pipe are installed.

In side wall venting, combustion air intake can be snorkeled to achieve 12" min distance from expected level of snow and/or ground.

**Figure 18: Roof termination**

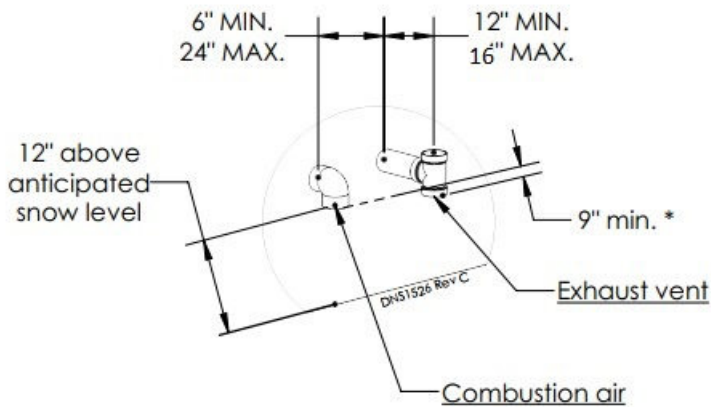


**Figure 19: Horizontal straight termination**



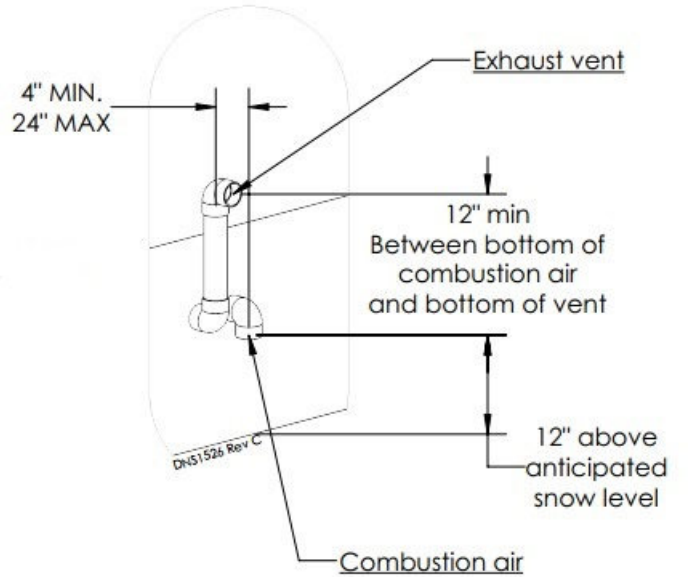
\*9" minimum from end of exhaust pipe to end of combustion air pipe.

**Figure 20: Horizontal straight tee termination**

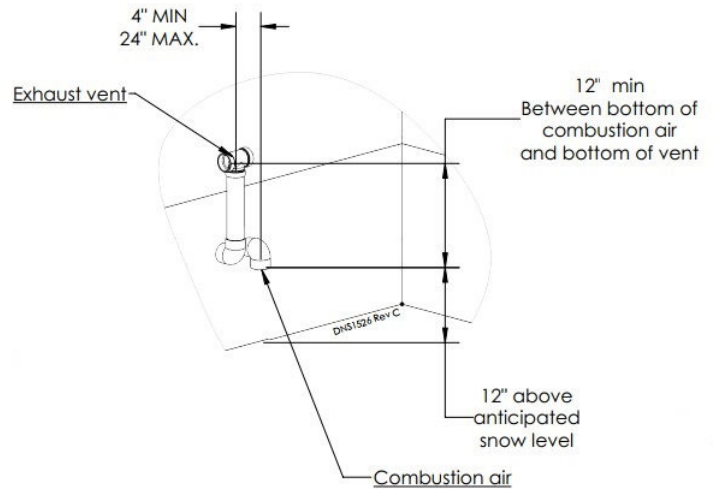


\*9" minimum from end of exhaust pipe to end of combustion air pipe.

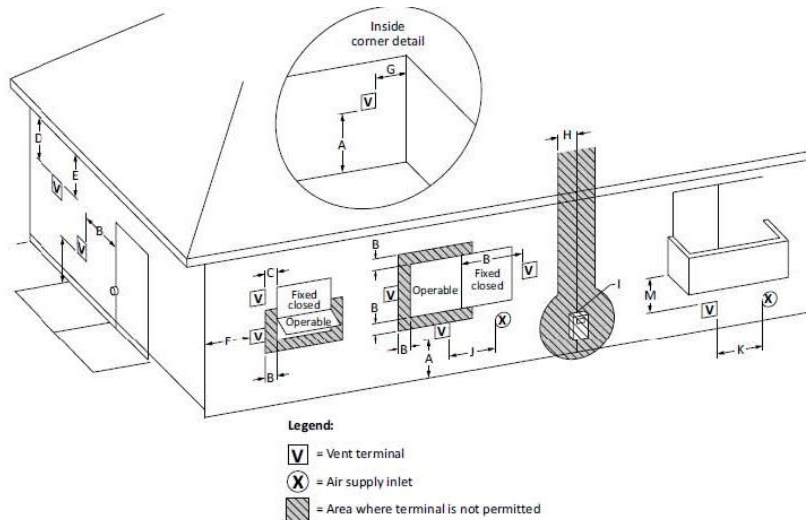
**Figure 21: Snorkel termination**



**Figure 22: Snorkel termination with Tee**



**Figure 23: Direct vent clearance**



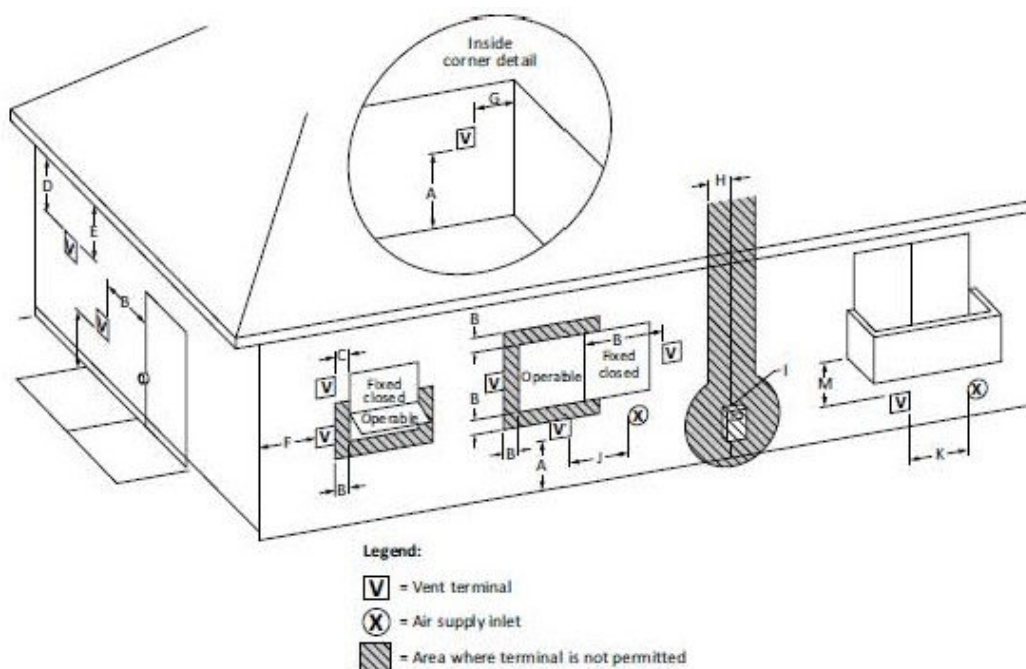
		Canadian Installations	US Installations
A	Clearance above grae, veranda, porch, deck or balcony	12 inches (30 cm)	12 inches (30 cm)
B	Clearance to window or door that may be opened	6 inches (15 cm) for appliances 10,000 Btuh (3kW), 12 inches (30 cm) for appliances > 10,000 Btuh(3kW) and 100,000 Btuh(30kW), 36 inches (91 cm) for appliances > 100,000BTUH (30kW)	6 inches (15 cm) for appliances 10,000 Btuh (3kW), 9 inches (23 cm) for appliances > 10,000 Btuh(3kW) and 50,000 Btuh(15kW), 12 inches (30 cm) for appliances > 50,000BTUH (15kW)
C	Clearance to permanently closed window	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
D	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (61 cm) from the center line of the terminal	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
E	Clearance to unventilated soffit	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
F	Clearance to outside corner	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
G	Clearance to inside corner	36 inches	36 inches
H	Clearance to each side of center line extended above meter/regulator assembly	3 feet (91 cm) within a height 15 feet (4.5 m) above the meter/regulator assembly	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
I	Clearance to service regulator vent outlet	3 feet (91 cm)	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
J	Clearance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance	6 inches (15 cm) for appliances 10,000 Btuh (3kW), 12 inches (30 cm) for appliances > 10,000 Btuh(3kW) and 100,000 Btuh(30kW), 36 inches (91 cm) for appliances > 100,000BTUH (30kW)	6 inches (15 cm) for appliances 10,000 Btuh (3kW), 9 inches (23 cm) for appliances > 10,000 Btuh(3kW) and 50,000 Btuh(15kW), 12 inches (30 cm) for appliances > 50,000BTUH (15kW)
K	Clearance to a mechanical air supply inlet	6 feet (1.83 m)	3 feet (91 cm) above if within 10 feet (3 m) horizontally
L	Clearance above paved sidewalk or paved driveway located on public property	7 feet (2.13 m) <sup>1</sup>	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
M	Clearance under veranda, porch deck or balcony	12 inches (30 cm) <sup>ii</sup>	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.

Notes :

- 1) In accordance with the current CSA B149.1, Natural Gas and Propane Installation code
- 2) In accordance with the current ANI Z223.1/NFPA 54, National Fuel Gas Code
  - i- A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings
  - ii- Permitted only if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.



Figure 24: Other than Direct vent clearance



		Canadian Installations	US Installations
A	Clearance above gable, veranda, porch, deck or balcony	12 inches (30 cm)	12 inches (30 cm)
B	Clearance to window or door that may be opened	6 inches (15 cm) for appliances 10,000 Btuh (3kW), 12 inches (30 cm) for appliances > 10,000 Btuh(3kW) and 100,000 Btuh(30kW), 36 inches (91 cm) for appliances > 100,000 BTUH (30 kW)	4 feet (1.2 m) below or to side of openings; 1 foot (300 mm) above opening
C	Clearance to permanently closed window	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
D	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (61 cm) from the center line of the terminal	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
E	Clearance to unventilated soffit	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
F	Clearance to outside corner	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
G	Clearance to inside corner	36 inches	36 inches
H	Clearance to each side of center line extended above meter/regulator assembly	3 feet (91 cm) within a height 15 feet (4.5 m) above the meter/regulator assembly	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
I	Clearance to service regulator vent outlet	3 feet (91 cm)	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.
J	Clearance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance	6 inches (15 cm) for appliances 10,000 Btuh (3kW), 12 inches (30 cm) for appliances > 10,000 Btuh(3kW) and 100,000 Btuh(30kW), 36 inches (91 cm) for appliances > 100,000 BTUH (30 kW)	4 feet (1.2 m) below or to side of openings; 1 foot (300 mm) above opening
K	Clearance to a mechanical air supply inlet	6 feet (1.83 m)	3 feet (91 cm) above if within 10 feet (3 m) horizontally
L	Clearance above paved sidewalk or paved driveway located on public property	7 feet (2.13 m)	7 feet (2.13 m)
M	Clearance under veranda, porch deck or balcony	12 inches (30 cm)	Clearance in accordance with local installation codes and the requirements of the gas supplier and this manual.

Notes :

- 1) In accordance with the current CSA B149.1, Natural Gas and Propane Installation code
  - 2) In accordance with the current ANSI Z223.1/NFPA 54, National Fuel Gas Code
- i- A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings
  - ii- Permitted only if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.

## 8 START UP

### 8.1 GENERAL

- Furnace must have a 120 V power supply properly connected and grounded (**NOTE:** Proper polarity must be maintained for 120 V wiring. Control status indicator light flashes rapidly and furnace does not operate if polarity is incorrect.)
- Natural gas service pressure must not exceed 0.38 psig (10.5 in. w.c.), but must be no less than 0.16 psig (4.5-in. w.c.). Propane service pressure must not exceed 0.47 psig (13 in. w.c.) but must be no less than 0.40 psig (11 in. w.c.).
- Blower door must be in place to complete 120 V electrical circuit to furnace.
- Outlet gas pressure needs to be verified at 100% and 40%. Refer to section 5.2
- Section 10 should be filled during commissioning of the furnace

### 8.2 SETUP SWITCHES

The furnace control has setup switches (dipswitches) that may be set to meet the application requirements. **These switches are ignored on communicating system (using the Dettson heat pump and the communicating T-stat). In communicating system, settings are made through the thermostat. See thermostat manual for more details**

To set these setup switches for the appropriate requirement:

- Turn off electrical power.
- Remove upper door.
- Locate setup switches on furnace control.
- Configure the set-up switches as necessary for the application.
- Replace upper door and turn on electrical power.

#### 8.2.1 CFM Heat adjust

DIP switch bank S1 is used to fine-tune the airflow in the heating mode. The switches of bank S1 can be set to adjust either the minimum heat rate airflow or the maximum heat rate airflow or both. Also, every firing rate in between these points will be adjusted accordingly.

**NOTE:**All DIP switches on S1 will be shipped in the "OFF" position. See Table 12.

**Table 12: Heating Airflow Adjustment - S1**

	S1-1	S1-2	S1-3	S1-4	DESCRIPTION
DEFAULT	OFF	OFF	OFF	OFF	NO ADJUSTMENT
LOW FIRE	OFF	ON	OFF	OFF	-7.5%
	OFF	ON	OFF	ON	-15%
	OFF	ON	OFF	ON	+7.5%
	OFF	ON	OFF	ON	+15%
HIGH FIRE	ON	OFF	OFF	OFF	-7.5%
	ON	OFF	OFF	ON	-15%
	ON	OFF	ON	OFF	+7.5%
	ON	OFF	ON	ON	+15%
BOTH INPUT	ON	ON	OFF	OFF	-7.5%
	ON	ON	OFF	ON	-15%
	ON	ON	ON	OFF	+7.5%
	ON	ON	ON	ON	+15%

#### 8.2.2 Cooling airflow select

These DIP switches are used to select the appropriate cooling airflow based on the amount required. The switch settings do not affect cooling airflow when installed in fully communicating system. In that case, the condenser supplies the information for cooling airflow which is pre-set at the factory and not adjustable.

See tables 13 and 14 for target CFM and CFM adjust.

**Table 13: Cooling Airflow Adjustment**

S3-1	S3-2	CFM	Cooling capacity
OFF	OFF	600	1.5 T.
ON	OFF	400	1.0 T.
OFF	ON	300	0.75 T.
ON	ON	200	0.5T.

**Table 14: Cooling Airflow % Adjustment**

S3-3	S3-4	DESCRIPTION
OFF	OFF	0%
ON	OFF	+10%
OFF	ON	-10%
ON	ON	0%

#### 8.2.3 Heat rise adjust

This DIP switch is used to select desired temperature rise in the heating mode.

Refer to table 15.

**Table 15: Heat rise adjust**

S4-1	RISE
OFF	35 °F
ON	30 °F

#### 8.2.4 Continuous fan speed

Using the communicating thermostat R02P032, select the LOW continuous fan speed. In User Menu, go to "Fan Settings" and choose "LOW".

#### 8.2.5 Furnace test mode

S4-2 and S4-3 - The Test Switches will place the furnace into a test mode, operating the furnace at continuous input rates of either 100% of full rate (maximum fire) or 40% of full rate (minimum fire). This is accomplished by setting the Test Switches. See table 16.

To enter the furnace test mode, proceed as follows:

1. Switch the 120 volt power to the furnace OFF. Do not change settings with control energized.
2. Position Test Switches for the desired test mode.
3. Switch the 120 volt power to the furnace ON.
4. Set the thermostat mode to HEAT; adjust the set point at least 4°F above room temperature to demand a call for heating.

The furnace will operate at the fixed test mode until one of the following conditions :

- The thermostat is satisfied and the call for heat is removed.
- The furnace has been in test mode continuously for sixty minutes, at which time the furnace control will exit the test mode and proceed to normal heating operation as configured. Test mode cannot be activated again unless line voltage power to the furnace is cycled off and back on. This is true even if the DIP switches remain configured to the test settings

**Table 16: Test mode**

S4-2	S4-3	DESCRIPTION
ON	OFF	40% TEST
OFF	ON	100% TEST

### 8.3 NORMAL OPERATION

The control will display codes under normal operation. Please refer to table 17. The number displayed after the codes represent the heat demand. The number displayed with no letter before represent the CFM. For example, H4 followed by 3 means heating at 40% with 300 CFM.

### 8.4 FAULT CODE RESET

To clear the fault code memory, push and hold the Fault Recall Button for more than 5 seconds and less than 10 seconds. The display will energize horizontal upper and lower segments for four seconds. This will clear faults in the buffer displayed at power-up.

### 8.5 DIAGNOSTIQUE FEATURES

The control continuously monitors its own operation and the operation of the system. If the failure is internal to the control, the entire control should be replaced, as the control is not field repairable.

If the sensed failure is in the system (external to control), the control will show error codes. Refer to table 17 for diagnostic.

### 8.6 SEQUENCE OF OPERATION

The heating cycle is always initiated by a 24 volt signal on W of the thermostat. When the controller senses 24 volts on W or the communicated message for heat call, the following sequence occurs:

- High and low pressure switches are checked to insure contacts are open.
- Pre-purge.

There are two different types of pre-purge; a normal pre-purge and a learning-sequence pre-purge. During a learning-sequence pre-purge, the inducer motor will incrementally increase in RPM (stepping) until the low and high pressure switches are both closed. After both switches are sensed to be closed, the inducer motor will continue to run for an additional 30 seconds before the ignition trial.

A learning sequence pre-purge will be initiated under the following conditions:

- First heat call after power reset.
- Every 25th heat call.
- Next heat attempt after a failed pre-purge (pressure switch (es) does not close).
- Next heat attempt after a pressure switch has opened unexpectedly during normal heating operation.

A normal pre-purge will not go through the incremental stepping process of the inducer motor and should be much quicker. The inducer will start at a pre-determined RPM (determined during learning-sequence pre-purge) and this should close both pressure switches quickly. Once both pressure switches are sensed to be closed, the inducer will run for 25 seconds before the ignition trial starts.

- Hot-surface igniter is energized during the pre-purge period.
- The modulating gas valve is set to the highest possible rate (no flow yet).
- The main solenoids on the gas valve are energized allowing gas to flow to the burners.
- When flame is proven, the ignition control is de-energized - 8 second maximum trial times.
- The gas valve maintains 85% rate through the warm-up period - 20 seconds (aka «Blower On Delay»).

### 8.7 SETTING INPUT RATE

Checking furnace input is important to prevent over firing beyond its design-rated input. Prior to checking the furnace input, make certain that all other gas appliances are shut off, with the exception of pilot burners. Refer to section 5.2.

The furnace is shipped from the factory with #48 orifices. They are sized for natural gas having a heating value of 1030 BTU/cu. ft. and a specific gravity of .64.

Since heating values vary geographically, the manifold pressure may need to be changed. Consult the local gas utility to obtain the yearly average heating value.

## 8.8 120 VAC TERMINALS

These terminals supply 120 VAC to the furnace control. Spare terminals are provided for use with electronic air cleaners and other accessories as needed (Check the voltage rating of your equipment.)

### 8.8.1 Electronic air cleaner EAC (E103)

This output is used to energize an electronic air cleaner. The output will provide 1.0 amp at 120 VAC. This output is energized any time the blower motor is above 40% of maximum airflow capacity. Airflow below this value is not considered to be enough for a typical electronic air cleaner to perform properly.

Electronic air cleaner is energized any time the blower is above 320 CFM

### 8.8.2 HUM terminal

HUM terminal is only energized when blower is energized in heating.

## 8.9 COMMUNICATIONS L.E.D.

“RX” (Green) L.E.D. – This L.E.D. indicates that communications is being sensed to or from (i.e.: something on the network is trying to communicate) other components (e.g. a condenser) on the network. This L.E.D. will blink randomly any time a message is received by the furnace control. If no blinking is seen within five minutes, it can be assumed that there is not valid communications established. Check wiring to make sure that all points are connected properly.

Further, if this L.E.D. is on continuously, it is an indication that mis-wiring has occurred.

“STAT” (STATUS) (Red) L.E.D. – This L.E.D. blinks twice slowly (1/4 second ON, 3/4 second OFF) upon power-up. Pressing the learn button for two seconds will cause the green “RX” L.E.D. to blink rapidly (for a short period) to indicate an attempt at communications. If the L.E.D. does not blink, communications cannot be established.

## 8.10 MEMORY CARD

### WARNING

**Do not replace the furnace control or memory card of the furnace with a furnace control or memory card of another furnace or another component (e.g. a memory card from a condenser or air handler). The wrong furnace control or memory card may specify parameters which will make the furnace run at undesired conditions including (but not limited to) reduced airflow during heating causing excessive undesired operation of the main limit control. Further, the memory card is specific to the model number and BTU input rating for a specific furnace and this information should not be transported from one furnace (or component) to another.**

Furnace shared data is defined as data specific to a given furnace that is critical for proper furnace operation. More specifically, it is data which defines the operation of the furnace and is unique to a given furnace platform and model. The most critical of these data are the coefficients that control the blower operation (i.e. define the blower speed-torque operation). Because of this, each furnace control is programmed with furnace shared data for that model furnace only. The furnace shared data from any given furnace can NOT be transferred to another furnace for any reason. Doing so can adversely affect operation of the furnace. Further, if no furnace shared data is present, the furnace will not operate in any mode and a fault will be displayed.

## 8.11 REPLACING FURNACE CONTROL

In the event that the furnace control must be replaced, the memory card must be detached from the original furnace control and retained with the furnace. Failure to save and connect the memory card properly to the replacement control may result in no operation or undesired operation of the furnace.

When replacing the furnace control, be sure to match the DIP switch settings of the original control on the replacement.

## 9 USER'S INFORMATION MANUAL

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. Installation and service must be performed by a qualified installer, service agency, or the gas supplier.

Read all instructions in this manual and retain this and all additional instructions for future reference.

To keep your operating costs low and to eliminate unnecessary service calls, we have provided a few guidelines. These guidelines will help you understand how your gas furnace operates and how to maintain it so you can get years of safe and dependable service. Read all the instructions in this manual, and keep all manuals for future reference.

For your safety, read the following before operating your furnace:

1. The furnace area must be kept clear and free of combustible materials, gasoline, and other flammable vapors and liquids.
2. Insulating materials may be combustible. A furnace installed in an attic or other insulated space must be kept free and clear of insulating materials. Examine the furnace when it is installed and also any time insulation is added.
3. For proper safe operation, the furnace needs air for combustion and ventilation. Do not block or obstruct air openings to the area in which the

furnace is installed, and the spacing around the furnace.

4. This furnace is equipped with an ignition device which automatically lights the burners.
5. Should the gas supply fail to shut off or if overheating occurs, shut off the gas valve to the furnace before shutting off the electrical supply.
6. Do not use the furnace if any part has been under water. A flood damaged furnace is extremely dangerous. Attempts to use the furnace can result in fire or explosion. A qualified service agency should be contacted to inspect the furnace and to replace all gas controls, control system parts, electrical parts that have been wet, or the entire furnace if deemed necessary.
7. Examine the furnace installation to determine that:
  - All flue gas carrying areas external to the furnace, such as the chimney and vent connector, are clear and free of obstructions.
  - Vent connector is in place, slopes upward, and is physically sound without holes or excessive corrosion.
  - Return air duct connection(s) is physically sound, sealed to the furnace casing, and terminates outside the space containing the furnace.
  - Physical support of the furnace is sound without sagging, cracks, gaps, etc. around the base as to provide a seal between the support and the base.
  - There are no obvious signs of deterioration of

the furnace.

- Burner flames are in good adjustment.
8. It is important that you conduct a physical inspection of the furnace at least twice a year. It is also recommended that the furnace should be inspected by a qualified service agent at least once per year.

## **9.1 WHAT TO DO IF YOU SMELL GAS**

Follow those step if you can smell gas :

1. Do not try to light any appliance
2. Do not touch any electrical switch; do not use any phone in your building
3. Leave the building immediately
4. Immediately call your gas supplier. Follow the gas supplier's instructions.
5. If you cannot reach the gas supplier, call the fire department.

## **9.2 OPERATING YOUR FURNACE**

These furnaces are equipped with an ignition device which automatically lights the burners. Do not try to light the burners by hand.

Before operating, smell around furnace area for gas. Be sure to smell near floor because some gas is heavier than air and will settle to the lowest point. See section 9.1 if the odour of gas is present. Use only your hand to turn the gas control knob; never use tools. If the knob will not turn by hand, don't try to repair it. Call a qualified service technician. Attempted repair may result in a fire or explosion.

**Table 17: Fault Code**

CODE	DESCRIPTION	SOLUTION
0	Stand-by	No fault
H"0"	Gas Heating mode.The furnace is in heating mode. The digit displayed after in the input of the furnace. For example, H0 means the furnace is heating at 100%. H5 means the furnace is heating at approximately 50%.	
C	Indicates the furnace is in cooling mode (any stage) for communicating system and high stage for legacy system	
HP	This code indicates the furnace is in heat pump heating mode (any stage)	
F	Fan Mode : The furnace is in continuous fan mode	
dF	Defrost mode : Indicate the heat pump is in defrost mode and gives supplemental heat	
d4	The memory card is corrupt, invalid or there is no memory card installed. This is a none critical fault and the furnace may operate if it finds shared data on the network (t-stat and control). d4 will only be display when furnace is in standy mode	Replace the memory card
d1	No shared data : displayed when no shared data is available. The furnace cannot function.	Replace the memory card
10	Displayed after four failed ignition attempts. The furnace will goes inot a lockout mode and will not attempt to ignite again for 1 hour.	It all depends on what caused the 4 failed ignition. The error codes prior to 10 shall be retrieve on the communicating thermostat or by pushing the fault recall button for 3 sec. Usually, clean the flame sensor, check your gas pressure, check the ignitor. If some burners seems to have difficulties to stay on, replace the burner box.
11	Failed ignition.	(1) Make sure the gas valve is on (2)Clean or replace de flame sensor (3) Make sure the furnace is grounded (4) Make sure gas outlet pressure is fine (5) Replace gas valve if it is not functioning
12	The flame sense current is weak or weird	(1) Clean or replace de flame sensor (2) Check gas outlet pressure (3) Take a combustion analysis. A dirty flamme sensor needs to be investigate.
13	Flame lost	(1) Clean or replace de flame sensor (2) Check gas outlet pressure (3) Check the burner box assembly
14	This fault indicate flame is present when it should not be	(1) Wire properly (2) Check gas valve (3) Check furnace control
16	Igniter fail : could be the ignitor itself or the control relay.	(1) Change ignitor (2) Change control
22	The main limit has opened or sensed opened. Temperature in the heat exchanger has gone above prescribe temperatures	(1) Check for blower operation. Change motor if needed (2) Check ductwork an filters (3) Check for temperature rise and furnace gas valve pressure
26	Indicates that line voltage and neutral are reversed to the furnace control.	Check voltage with meter and reverse if necessary
30	3 amps fuse open	Replace the 3 amp fuse on the furnace control
33	The rollout limit switch on the burner box is open	(1) Check gas pressure (2) Check for proper venting and venting length (3) Check pressure switch operation and connection (4) Check for proper ID blower operation
44	The low pressure switch is close when it should not be	(1) Check for venting length, less than 5ft is not enough, adding 90° elbow could be a solution (2) Check for wind draft at the venting termination, if necessary, relocate termination (3) Check pressure switch et replace if necessary (4) Check for ID blower function
45	Indicates the low pressure switch is open when the inducer is energized at high speed	Check pressure switch and its wiring
46	Indicates the low pressure switch is open when the inducer is energized at low speed	(1) Check the vent system for blockage (2) Check the vent length , remove excessive vent (3) Faulty or disconnected ID blower (4) Faulty control board (5) Wind gust (6) Faulty pressure switch

CODE	DESCRIPTION	SOLUTION
55	The high pressure control (or switch) should not be closed when the inducer is not running. If it is, this is a sign of a serious condition. The switch may be welded closed or purposely bypassed in the field. Before any heat cycle can begin, the pressure switch is tested to make sure that it is opened.	(1) Replace high pressure control (switch). (2) Remove bypass and restore correct operation. Determine reason for bypass (e.g. vent length too long) and correct issue. Notify homeowner and proper authorities of illegal tampering if necessary. (3) Check wiring and connections. Replace and/or repair as necessary. (4) Check for proper venting and terminations as defined in the furnace installation instructions.
57	This fault indicates that the high pressure switch is open when the inducer is energized at high speed. This fault can be displayed any time during the heat call except during low heat call and only after the pre-purge and blower on delays are complete.	(1) Check the vent system for blockage and proper termination and repair as necessary. (2) Check the specification sheets and/or installation instructions. Remove excess venting. (3) Repair or replace inducer and/or inducer wiring and/or electrical connections. (4) Replace control board. (5) Check wiring and connections. Replace and/or repair as necessary. (6) Replace hoses as necessary. (7) Insure proper termination. (8) Replace the pressure switch.
68	If the furnace was in heating operation when this fault occurred, the gas valve will immediately close (flame will be lost), blower motor operation will immediately stop and the furnace will shut down normally with Inducer post-purge at the correct speed. After the post purge (or immediately if no heat call was present), no other operation (including thermostat calls) will occur until this fault is cleared.	(1) Check wiring, connectors and terminals – repair or replace as necessary. (2) Check line voltage wiring, connectors and terminals to the inductance and ECM motor. Repair and replace as necessary. (3) Replace the furnace memory card with the correct replacement part. (4) Replace the motor.
71	When attempting to communicate with the inducer controller module (electronic control to the back of the main board), communications cannot be established or response from the inducer controller module is not as expected.	Check the wiring between the furnace controller (I.F.C.) and the inducer controller module. Check wiring between the inducer controller module and the inducer. Check line voltage to the inducer controller module. If these are ok, replace the inducer controller module and/or inducer.
77	The furnace control has lost communications with the gas valve.	(1) Check the wires, connectors or terminals between the gas valve and furnace control (or I.F.C.). Replace or repair as necessary. (2) Replace the gas valve. (3) Replace the furnace control.
93	This is a severe fault that should rarely (if ever) be discovered in the field. It is an indicator of an internal microprocessor fault on the furnace control (or I.F.C.) or voltage applied to the main gas valve solenoid when there should be none.	(1) Check for miswiring in the furnace. (2) Replace the furnace control (or I.F.C.).

## 10 COMMISIONNING CHECK LIST AND FURNACE INFO

Furnace model: .....  
Serial number: .....  
Furnace orientation: .....  
Fuel (N.gas/propane): .....  
Conversion kit number: .....  
Inlet gas pressure: .....  
Outlet gas pressure high fire (100%): .....  
Temperature rise at 100%: .....  
Combustion analysis at 100%:  
O2 [%]: .....  
CO2 [%]: .....  
CO undiluted [%]: .....  
Outlet gas pressure low fire (40%): .....  
Temperature rise at 40%: .....  
Combustion analysis at 40%:  
O2 [%]: .....  
CO2 [%]: .....  
CO undiluted [%]: .....  
Static pressure in return at system maximum CFM: .....  
Static pressure in supply at system maximum CFM: .....  
Is drain trap filled with water?: .....  
Is drain trap outlet vented with a Tee?: .....  
Are condensate tubing properly slopped towards drain trap?: .....  
Furnace leveled or slopped?: .....  
Venting pipe diameter: .....  
Venting length: .....  
Venting termination: .....



**Table 18: Specification table**

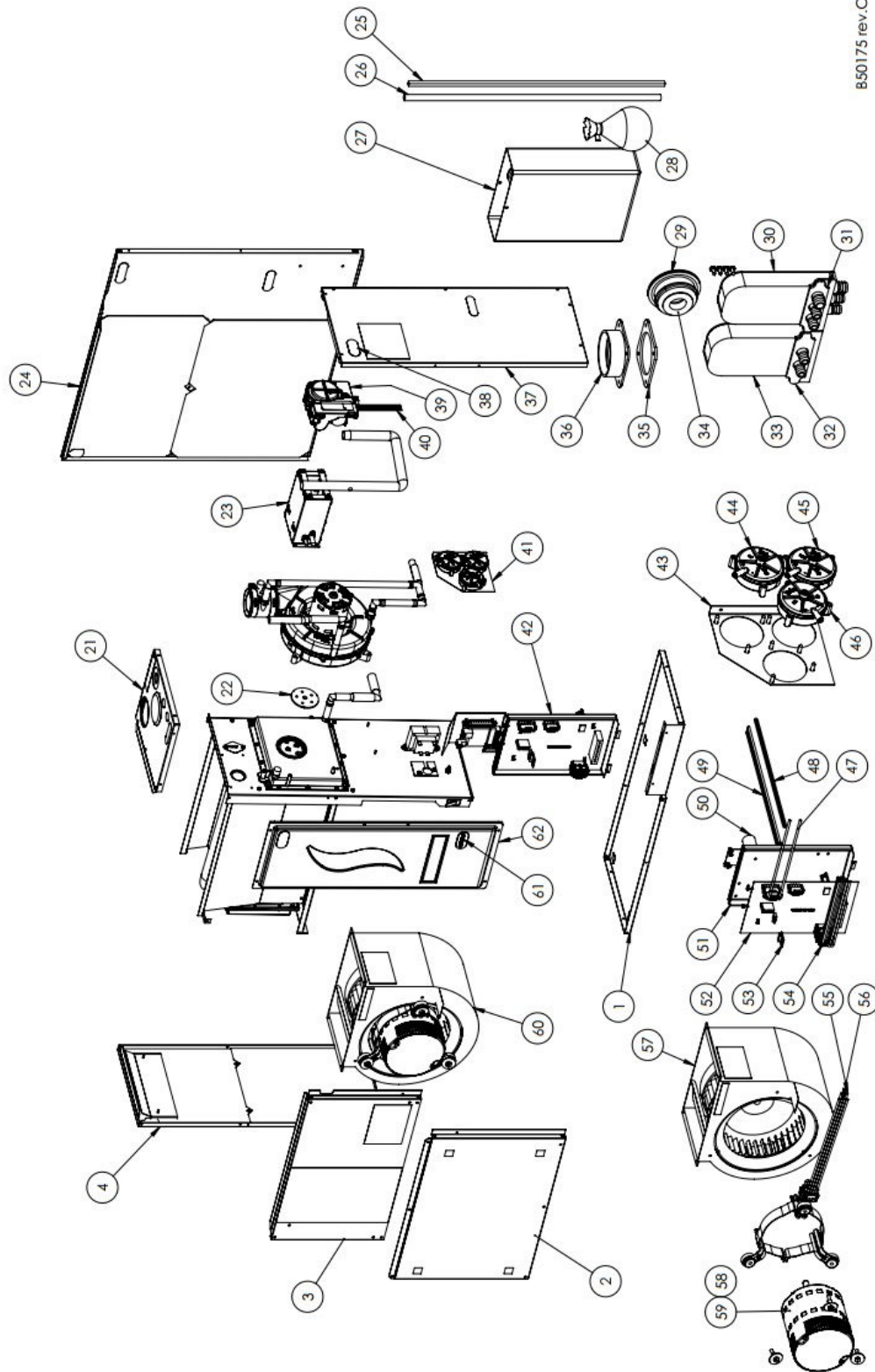
Model		CC15-M-V
INPUT (BTU/hr)	HIGH (100%)	15 000
	LOW (40%)	6 000
OUTPUT (BTU/hr)	HIGH (100%)	14 445
	LOW (40%)	5 778
EFFICIENCY (%)		96.3
TEMP. RISE		20 - 55°F (11 - 30°C)
AIRFLOW (CFM)	HEATING HIGH (100%)	330
	HEATING LOW (40%)	160
	MAX <sup>1</sup>	400
	MAX <sup>2</sup>	400
MAX COOLING CAPACITY (TONS)		1
MOTOR HP		1/3
BLOWE SIZE		9" X 4"

1 - Maximum CFM acheived in standard duct systems

2 - Maximum CFM acheived using SmartDuct system

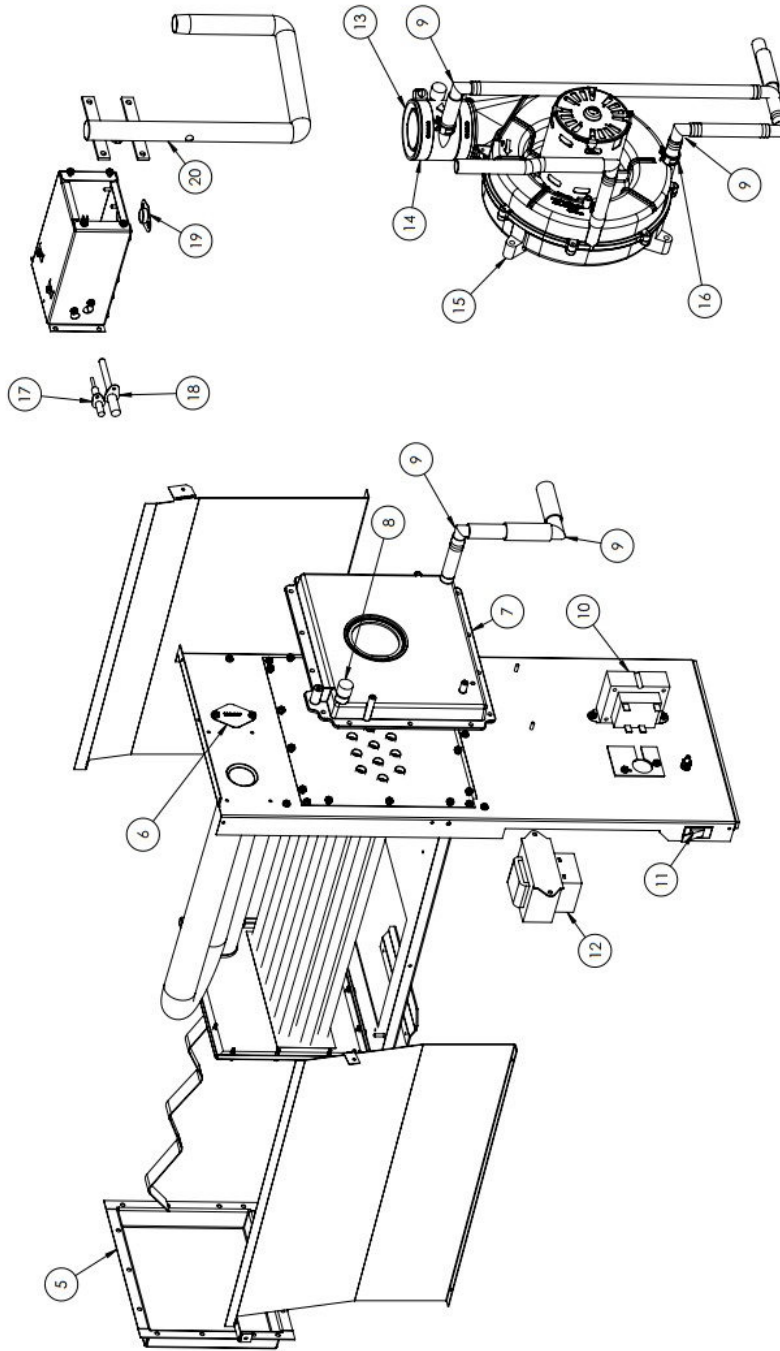
# 11 PART LIST

Figure 25: Exploded view



B50175 rev.C

Figure 26: Exploded view continued



**Table 19: Parts List**

#	ITEM	DESCRIPTION
1	B40715	Floor
2	B40794	Bottom front panel assembly
3	B40793	Top front panel assembly
4	B40791	Left panel assembly
5	B40714	Smoke box
6	R02N029	High Limit
7	B40789	Condensate box
8	G14G013	1/2"dia. black cap
9	G07J006	1/2"dia. elbow
10	L01F009	TRANSFORMER 120-24V
11	L07H001	Door switch
12	B03141-02	Inductor
13	B40580	Venting drain
14	G99Z033	Hose clamp 40-64mm
15	Z01K005K	ID blower kit (includes extruded sealant)
16	G99Z034	Spring hose clamp 16mm
17	R03J005	Flame sensor
18	R03K005	Ignitor
19	R02N022	Thermodisk 250°F
20	B40703	Manifold with orifice #48
21	B40921	Top panel assembly
22	B40779	Restriction disk
23	B40908-09	Burner Box (item 17,18,19,20 excluded)
24	B40917	Back panel assembly
25	B30157-40	Square tube 3/16" dia. (L=24")
26	B30157-38	PVC tube 1/2" dia. (L=24")
27	B40803	Component bag
28	J06L002	Extruded seal kit (L=25')
29	B40903	Venting gasket
30	B40760	Drain trap
31	B40568	Drain trap gasket
32	B40811	Two port drain trap gasket
33	B40810	Multiposition drain trap
34	G14F017	Gas pipe grommet
35	B40567	Combustion air flange gasket
36	B40533	Combustion air flange
37	B40919	Right panel assembly
38	L04Z022	Window plug
39	R01K005K	Gas valve
40	B40582-02	Electric kit gas valve
41	B40675-33	Pressure switches assembly

42	B40799	Control box assembly
43	B40560	Pressure switch support
44	R99F041	High fire pressure switch (-0.9)
45	R99F050	Low fire pressure switch (-0.35)
46	R99F035	Multiposition pressure switch (-0.2)
47	B40586-01	Ignitor electrical kit
48	B40830	Inducer electrical kit
49	B40583-01	Board/inducer electrical kit
50	R99G017	Inducer board
51	B40731	Control board support
52	R99G014	Control board
53	B40634-14	Memory card (SD021801248 and over)
54	B40588-02	Electrical main harness
55	B40587-01	Blower communication kit
56	B40581-04	Blower 120V electrical kit
57	Z011043	Blower (SD021801248 and over)
58	B40801-01	Motor and bracket 1/3HP assembly
59	L06G020	Motor
60	B40800-01	Blower assembly (SD021801248 and over)
61	L04Z022	Window plug
62	B40798	Plastic door assembly
-	B40574-03	Propane conversion kit