Installation Instructions for *R9S96/*D9S96 & *R9S92 Single-Stage Gas Furnace

(Type FSP CATEGORY IV Direct or Non Direct Vent Air Furnace)

(Type FSP CATÉGORIE IV Direct ou four á air soufflé non direct)

These furnaces comply with requirements embodied in the American National Standard / National Standard of Canada ANSI Z21.47·CSA-2.3 Gas Fired Central Furnaces.

Intertek

Installer: Affix all manuals adjacent to the unit.

As a professional installer you have an obligation to know the product better than the customer. This includes all safety precautions and related items.

Prior to actual installation, thoroughly familiarize yourself with this Instruction Manual. Pay special attention to all safety warnings. Often during installation or repair it is possible to place yourself in a position which is more hazardous than when the unit is in operation.

Remember, it is your responsibility to install the product safely and to know it well enough to be able to instruct a customer in its safe use.

Safety is a matter of common sense...a matter of thinking before acting. Most dealers have a list of specific good safety practices...follow them.

The precautions listed in this Installation Manual are intended as supplemental to existing practices. However, if there is a direct conflict between existing practices and the content of this manual, the precautions listed here take precedence.

WARNING

This furnace may be paired with a cooling unit that uses R-32 refrigerant. If the cooling unit paired with this furnace does not use R-32, the R-32 function in the furnace control board needs to be turned off. please see the electrical and the R-32 sections for more details.

Refrigerant systems other than R-410A or R32 may require an additional mitigation control board. Refer to the installation manual of the indoor evaporator coil to determine installation requirements for that supplier's refrigerant detection system.

RECOGNIZE THIS SYMBOL AS A SAFETY PRECAUTION.

***NOTE: Please contact your distributor or our website for the applicable Specification Sheet referred to in this manual.**

WARNING

Only personnel that have been trained to install, adjust, service, maintenance or repair (hereinafter, "service") the equipment specified in this manual should service the equipment.

This equipment is not intended for use by persons (including children) with reduced physical, sensory or mental capacities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

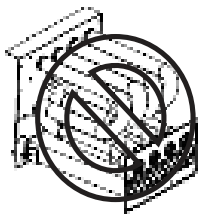
Children should be supervised to ensure that they do not play with the equipment.

The manufacturer will not be responsible for any injury or property damage arising from improper supervision, service or service procedures. If you service this unit, you assume responsibility for any injury or property damage which may result. In addition, in jurisdictions that require one or more licenses to service the equipment specified in this manual, only licensed personnel should service the equipment. Improper supervision, installation, adjustment, servicing, maintenance or repair of the equipment specified in this manual, or attempting to install, adjust, service or repair the equipment specified in this manual without proper supervision or training may result in product damage, property damage, personal injury or death.

WARNING

Do not bypass safety devices.

90% HEX



DO NOT LIFT PRODUCT USING HEAT EXCHANGER

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SAFETY CONSIDERATIONS

Adhere to the following warnings and cautions when installing, adjusting, altering, servicing, or operating the furnace. To ensure proper installation and operation, thoroughly read this manual for specifics pertaining to the installation and application of this product.

This furnace is manufactured for use with natural gas. It may be field converted to operate on L.P. gas by using the appropriate L.P. conversion kit listed in the **PROPANE GAS/HIGH ALTITUDE INSTALLATIONS** section of this manual

Install this furnace only in a location and position as specified in **LOCATION REQUIREMENTS & CONSIDERATIONS** section and **INSTALLATION POSITIONS** section of this manual.

Provide adequate combustion and ventilation air to the furnace as specified in **COMBUSTION & VENTILATION AIR REQUIREMENTS** section of this manual.

Combustion products must be discharged to the outdoors. Connect this furnace to an approved vent system only, as specified in **VENT/FLUE PIPE & COMBUSTION AIR PIPE** section of this manual.
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 **GAS SUPPLY AND PIPING** section of this manual.

Always install a furnace to operate within the furnace's intended temperature-rise range with a duct system which has external static pressure within the allowable range, as specified on the furnace rating plate and **OPERATIONAL CHECKS** section of these instructions.

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.

A gas-fired furnace for installation in a residential garage must be installed as specified in the **LOCATION REQUIREMENTS AND CONSIDERATIONS** section of this manual.

This furnace may be used as a construction site heater only if certain conditions are met. These conditions are listed in the **PRODUCT APPLICATION** section of this manual.

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 the furnace environment has the potential of freezing, the drain trap and drain line must be protected. The use of electric heat tape and/or pipe insulation is recommended for these installations.

WARNING

To prevent personal injury or death due to improper installation, adjustment, alteration, service, or maintenance, refer to this manual. For additional assistance or information, consult a qualified installer, servicer agency or the gas supplier.

WARNING

HEATING UNIT SHOULD NOT BE UTILIZED WITHOUT REASONABLE ROUTINE, INSPECTION, MAINTENANCE AND SUPERVISION. IF THE BUILDING IN WHICH ANY SUCH DEVICE IS ROUTINELY INSPECTED, MAINTAINED AND MONITORED. IN THE EVENT THAT THE BUILDING MAY BE EXPOSED TO FREEZING TEMPERATURES AND WILL BE VACANT, ALL WATER-BEARING PIPES SHOULD BE DRAINED. THE BUILDING SHOULD BE PROPERLY WINTERIZED AND THE WATER SOURCE CLOSED. IN THE EVENT THAT THE BUILDING MAY BE EXPOSED TO FREEZING TEMPERATURES AND WILL BE VACANT, ANY HYDRONIC COIL UNITS SHOULD BE DRAINED AS WELL AND, IN SUCH CASE, ALTERNATIVE HEAT SOURCES SHOULD BE UTILIZED.

WARNING

IF THE INFORMATION IN THESE INSTRUCTIONS IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

– DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUID IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

– WHAT TO DO IF YOU SMELL GAS:
  - DO NOT TRY TO LIGHT ANY APPLIANCE.
  - DO NOT TOUCH ANY ELECTRICAL SWITCH; DO NOT USE ANY PHONE IN YOUR BUILDING.
  - IMMEDIATELY CALL YOUR GAS SUPPLIER FROM A NEIGHBOR'S PHONE. FOLLOW THE GAS SUPPLIER'S INSTRUCTIONS. IF YOU CAN NOT REACH YOUR GAS SUPPLIER, CALL THE FIRE DEPARTMENT.

– INSTALLATION AND SERVICE MUST BE PERFORMED BY A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.

WARNING

TO PREVENT POSSIBLE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, THE FURNACE MUST BE LOCATED TO PROTECT THE ELECTRICAL COMPONENTS FROM WATER.

NOTE: THIS UNIT SHOULD BE INSTALLED IN A MANNER SO THAT IT IS NOT ACCESSIBLE TO THE PUBLIC.

Drain trap must be primed at time of installation. Trap is internally partitioned; add water to both inlet ports until water appears at both sides of the outlet opening. Failure to prime trap at time of installation may have a negative effect on combustion quality and pressure switch action.

WARNING

FIRE OR EXPLOSION HAZARD

FAILURE TO FOLLOW THE SAFETY WARNINGS EXACTLY COULD RESULT IN SERIOUS INJURY, DEATH OR PROPERTY DAMAGE.

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. A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

AVERTISSEMENT

RISQUE D'INCENDIE OU D'EXPLOSION

SI LES CONSIGNES DE SÉCURITÉ NE SONT PAS SUIVIES À LA LETTRE, CELA PEUT ENTRAÎNER LA MORT, DE GRAVES BLESSURES OU DES DOMMAGES MATÉRIELS.

NE JAMAIS VÉRIFIER LA PRÉSENCE DE FUITES DE GAZ AU MOYEN D'UNE FLAMME NUE. VÉRIFIER TOUS LES RACCORDS EN UTILISANT UNE SOLUTION SAVONNEUSE COMMERCIALE CONÇUE SPÉCIALEMENT POUR LA DÉTECTION DE FUITES. UN INCENDIE OU UNE EXPLOSION RISQUE DE SE PRODUIRE, CE QUI PEUT ENTRAÎNER LA MORT, DES BLESSURES OU DES DOMMAGES MATÉRIELS.

Shipping Inspection

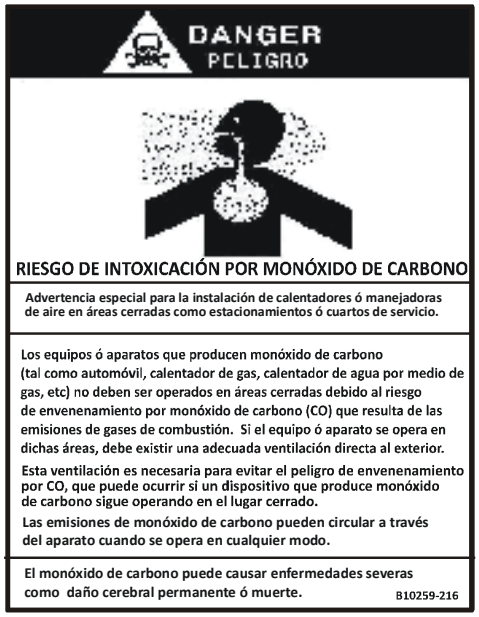
All units are securely packed in shipping containers tested according to International Safe Transit Association specifications. The carton must be checked upon arrival for external damage. If damage is found, a request for inspection by the carrier's agent must be made in writing immediately.

The furnace must be carefully inspected on arrival for damage and bolts or screws which may have come loose in transit. In the event of damage the consignee should:

1. Make a notation on delivery receipt of any visible damage to shipment or container.
2. Notify the carrier promptly and request an inspection.
3. With concealed damage, the carrier must be notified as soon as possible - preferably within five days.
4. File the claim with the following support documents within a nine month statute of limitations.
   - Original or certified copy of the Bill of Lading, or indemnity bond.
   - Original paid freight bill or indemnity in lieu thereof.
   - Original or certified copy of the invoice, showing trade and other discounts or reductions.
   - Copy of the inspection report issued by the carrier's representative at the time damage is reported to carrier.

The carrier is responsible for making prompt inspection of damage and for a thorough investigation of each claim. The distributor or manufacturer will not accept claims from dealers for transportation damage.







ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS

WARNING

SHOULD OVERHEATING OCCUR OR THE GAS SUPPLY FAIL TO SHUT OFF, TURN OFF THE MANUAL GAS SHUTOFF VALVE EXTERNAL TO THE FURNACE BEFORE TURNING OFF THE ELECTRICAL SUPPLY.

WARNING

POSSIBLE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO FIRE, EXPLOSION, SMOKE, SOOT, CONDENSATION, ELECTRICAL SHOCK, OR CARBON MONOXIDE MAY RESULT FROM IMPROPER INSTALLATION, REPAIR OPERATION, OR MAINTENANCE OF THIS PRODUCT.

NOTE: DISCHARGE YOUR BODY'S STATIC ELECTRICITY BEFORE TOUCHING UNIT. AN ELECTROSTATIC DISCHARGE CAN ADVERSELY AFFECT ELECTRICAL COMPONENTS.

Use the following precautions during furnace installation and servicing to protect the integrated control module from damage. By putting the furnace, the control, and the person at the same electrostatic potential, these steps will help avoid exposing the integrated control module to electrostatic discharge. This procedure is applicable to both installed and non-installed (ungrounded) furnaces.

1. Disconnect all power to the furnace. Do not touch the integrated control module or any wire connected to the control prior to discharging your body's electrostatic charge to ground.
2. Firmly touch a clean, unpainted, metal surface of the furnace near the control. Any tools held in a person's hand during grounding will be discharged.
3. Service integrated control module or connecting wiring following the discharge process in step 2. Use caution not to recharge your body with static electricity; (i.e., do not move or shuffle your feet, do not touch ungrounded objects, etc.). If you come in contact with an ungrounded object, repeat step 2 before touching control or wires.
4. Discharge your body to ground before removing a new control from its container. Follow steps 1 through 3 if installing the control on a furnace. Return any old or new controls to their containers before touching any ungrounded object.

TO THE INSTALLER

Before installing this unit, please read this manual thoroughly to familiarize yourself with specific items which must be adhered to, including but not limited to: unit maximum external static pressure, gas pressures, BTU input rating, proper electrical connections, circulating air temperature rise, minimum or maximum CFM, and motor speed connections.

PRODUCT APPLICATION

This furnace is primarily designed for residential home-heating applications. It is not designed or certified for use in mobile homes, trailers or recreational vehicles. Neither is it designed or certified for outdoor applications. The furnace must be installed indoors (i.e., attic space, crawl space, or garage area provided the garage area is enclosed with an operating door).

This furnace can be used in the following non-industrial commercial applications:

Schools, Office buildings, Churches, Retail stores, Nursing homes, Hotels/motels, Common or office areas

In such applications, the furnace must be installed with the following stipulations:

- It must be installed per the installation instructions provided and per local and national codes.
- It must be installed indoors in a building constructed on site.
- It must be part of a ducted system and not used in a free air delivery application.
- It must not be used as a “make-up” air unit.
- It must be installed as a two-pipe system for combustion air.
- All other warranty exclusions and restrictions apply This furnace is an ETL dual-certified appliance and is appropriate for use with natural or propane gas (**NOTE:** If using propane, a propane conversion kit is required).

Dual certification means that the combustion air inlet pipe is optional and the furnace can be vented as a:

Non-direct vent (single pipe) central forced air furnace in which combustion air is taken from the installation area or from air ducted from the outside or,

Direct vent (dual pipe) central forced air furnace in which all combustion air supplied directly to the furnace burners through a special air intake system outlined in these instructions.

WARNING

TO PREVENT PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH DUE TO FIRE, DO NOT INSTALL THIS FURNACE IN A MOBILE HOME, TRAILER, OR RECREATIONAL VEHICLE.

This furnace may be used as a construction site heater ONLY if all of the following conditions are met:

- The vent system is permanently installed per these installation instructions.
- A room thermostat is used to control the furnace. Fixed jumpers that provide continuous heating CANNOT be used and can cause long term equipment damage. Bimetal thermostats, or any thermostat affected by vibration, must not be used during construction.
- Return air ducts are provided and sealed to the furnace.
- A return air temperature range between 60ºF (16ºC) and 80ºF (27ºC) is maintained.
- MERV 11 air filter(s) are installed in the system and inspected daily and replaced as needed during construction and upon completion of construction.
- The input rate and temperature rise are set per the furnace rating plate.
- The furnace must be installed as a two-pipe system, using 100% outside air for combustion during construction.
- The furnace heat exchanger, components, duct system, air filters and evaporator coils are thoroughly cleaned following final construction clean up by a qualified person.
- All furnace operating conditions (including ignition, input rate, temperature rise and venting) are verified according to these installation instructions.
- Furnace doors must be in place on the furnace while the furnace is operating in any mode.
- Damage or repairs due to failure to comply with these requirements are not covered under the warranty.

NOTE: THE COMMONWEALTH OF MASSACHUSETTS REQUIRES THAT THE FOLLOWING ADDITIONAL REQUIREMENTS MUST ALSO BE MET:

- Gas furnaces must be installed by a licensed plumber or gas fitter.
- A T-handle gas cock must be used.
- If the unit is to be installed in an attic, the passageway to and the service area around the unit must have flooring.

To ensure proper furnace operation, install, operate and maintain the furnace in accordance with these installation and operation instructions, all local building codes and ordinances. In their absence, follow the latest edition of the National Fuel Gas Code (NFPA 54/ANSI Z223.1), and/or CAN/CSA B149.1-15 Installation Codes, local plumbing or wastewater codes, and other applicable codes.

A copy of the National Fuel Gas Code (NFPA 54/ANSI Z223.1) can be obtained from any of the following:

American National Standards Institute
23 West 43rd Street, 4th Floor
New York, NY 10036

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

CSA International
8501 East Pleasant Valley
Independence, OH 441311

The rated heating capacity of the furnace should be greater than or equal to the total heat loss of the area to be heated. The total heat loss should be calculated by an approved method or in accordance with “ASHRAE Guide” or “Manual J-Load Calculations” published by the Air Conditioning Contractors of America.

A copy of the CAN/CSA B149.1-15 Installation Codes can also be obtained from:
CSA International
178 Rexdale Boulevard
Etobicoke, Ontario, Canada M9W 1R3

LOCATION REQUIREMENTS & CONSIDERATIONS

Follow the instructions listed below and the guidelines provided in the *Combustion and Ventilation Air Requirements* section when selecting a furnace location.

WARNING

To prevent possible equipment damage, property damage, personal injury, or death, the following bullet points must be observed when installing this unit.

WARNING

Possible property damage, personal injury or death due to fire, explosion, smoke, soot, condensation, electrical shock, or carbon monoxide may result from improper installation, repair operation, or maintenance of this product.

- Centrally locate the furnace with respect to the proposed or existing air distribution system.
- Ensure the temperature of the return air entering the furnace is between 55°F and 100°F when the furnace is heating.
- Provide provisions for venting combustion products outdoors through a proper venting system. Special consideration should be given to vent/flue pipe routing and combustion air intake pipe when applicable. Refer to *Vent/Flue Pipe and Combustion Air Pipe -Termination Locations* for appropriate termination locations and to determine if the piping system from furnace to termination can be accomplished within the guidelines given. **NOTE:** The length of flue and/or combustion air piping can be a limiting factor in the location of the furnace.
- Locate the furnace so condensate flows downwards to the drain. Do not locate the furnace or its condensate drainage system in any area subject to below freezing temperatures without proper freeze protection.
- Ensure adequate combustion air is available for the furnace. Improper or insufficient combustion air can expose building occupants to gas combustion products that could include carbon monoxide. Refer to *Combustion and Ventilation Air Requirements.*
- Set the furnace on a level floor to enable proper condensate drainage. If the floor becomes wet or damp at times, place the furnace above the floor on a concrete base sized approximately 1-½” larger than the base of the furnace. Refer to the *Horizontal Applications and Considerations* for leveling of horizontal furnaces.
- Ensure upflow or horizontal furnaces are not installed directly on carpeting, or any other combustible material. The only combustible material allowed is wood.
- A special accessory sub-base must be used for upright counterflow unit installations over any combustible material (including wood). Refer to sub-base instructions for installation details. (**NOTE**: A sub-base will not be required if an air conditioning coil is located beneath the furnace between the supply air opening and the combustible floor.
- Exposure to contaminated combustion air will result in safety and performance-related problems. Do not install the furnace where the combustion air is exposed to the following substances:
  permanent wave solutions
  chlorinated waxes or cleaners
  chlorine-based
  carbon tetrachloride
  water softening chemicals
  swimming pool chemicals
  deicing salts or chemicals
  halogen type refrigerants
  printing inks
  cleaning solutions (such as perchloroethylene)
  paint removers
  varnishes
  hydrochloric acid
  cements and glues
  antistatic fabric softeners for clothes dryers
  masonry acid washing materials
- Enclose a *non-direct vent* furnace if it is installed near an area frequently contaminated by any of the above substances. This protects the *non-direct vent* furnace from airborne contaminants. To ensure that the enclosed *non-direct vent* furnace has an adequate supply of combustion air, provide air from a nearby uncontaminated room or from outdoors. Refer to the *Combustion and Ventilation Air Requirements* for details.
- If the furnace is used in connection with a cooling coil unit, install the furnace upstream of the cooling coil.
- A coil installed above an upflow furnace or under a counterflow furnace may be the same width as the furnace or may be one size larger than the furnace. *Example: a “C” width coil may be installed with a “B” width furnace.*
- **For all applications, the front of the coil and furnace must face the same direction.**

- If the furnace is installed in a residential garage, position the furnace so that the burners and ignition source are located not less than 18 inches (457 mm) above the floor. Protect the furnace from physical damage by vehicles.
- If the furnace is installed horizontally, ensure the access doors are not on the “up/top” or “down/bottom” side of the furnace.
- Do not connect this furnace to a chimney flue that serves a separate appliance designed to burn solid fuel.
- On Counterflow Installations, the air conditioning coil must be downstream on the supply (positive) side of the furnace heat exchanger.
- *Counterflow Installation over a noncombustible floor.* Before setting the furnace over the plenum opening, ensure the surface around the opening is smooth and level. A tight seal should be made between the furnace base and floor by using a silicone rubber caulking compound or cement grout.
- *Counterflow Installation over a combustible floor.* **If installation over a combustible floor becomes necessary, use an accessory sub-base** (see Specification Sheet applicable for your model for details.) **A special accessory sub-base must be used for upright counterflow unit installations over any combustible material including wood.** Refer to sub-base instructions for installation details. Follow the instructions with the sub-base for proper installation. Do not install the furnace directly on carpeting, tile, or other combustible material other than wood flooring. (**NOTE**: The sub-base will not be required if an air conditioning coil is installed between the supply air opening on the furnace and the floor.)

*R9S96 & *R9S92 MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS (INCHES)						
POSITION*	SIDES	REAR	FRONT	BOTTOM	FLUE	TOP
Upflow	0"	0"	3"	C	0"	1"
Horizontal	6"	0"	3"	C	0"	6"

C= If placed on combustible floor, floor MUST be wood only.

*D9S96 MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS (INCHES)						
POSITION*	SIDES	REAR	FRONT	BOTTOM	FLUE	TOP
Upflow	0"	0"	3"	NC	0"	1"
Horizontal	6"	0"	3"	C	0"	6"

C= If placed on combustible floor, floor MUST be wood only.
NC= For installation on non-combustible floor only. A combustible subbase must be used for installations on combustible flooring.

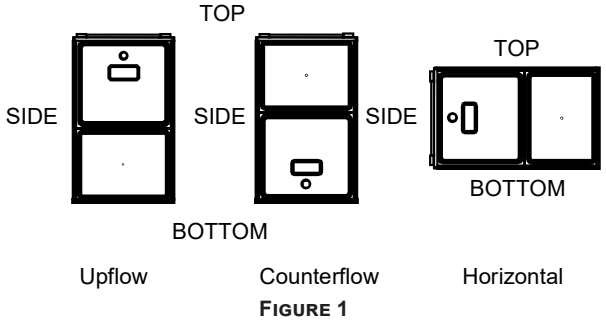


Figure 1

CLEARANCES AND ACCESSIBILITY

NOTES:

- For servicing or cleaning, a 24” front clearance is required.
- Unit connections (electrical, flue and drain) may necessitate greater clearances than the minimum clearances listed above.
- Clearance in accordance with local installation codes, the requirements of the gas supplier and the manufacturer’s installation instructions.
- Dégaugement conforme aux codes d’installation locaux, aux exigences du fournisseur de gaz et aux instructions d’installation du fabricant.
- In all cases, accessibility clearance must take precedence over clearances from the enclosure where accessibility clearances are greater.

Installations must adhere to the clearances to combustible materials to which this furnace has been certified. The minimum clearance information for this furnace is provided on the unit’s clearance label. These clearances must be permanently maintained. Clearances must also accommodate an installation’s gas, electrical, and drain trap and drain line connections. If the alternate combustion air intake or vent/flue connections are used additional clearance must be provided to accommodate these connections. Refer to *Vent/Flue Pipe and Combustion Air Pipe* for details.

NOTE: In addition to the required clearances to combustible materials, a minimum of 24 inches service clearance must be available in front of the unit.

A furnace installed in a confined space (i.e., a closet or utility room) must have two ventilation openings with a total minimum free area of 0.25 square inches per 1,000 BTU/hr of furnace input rating. Refer to Specification Sheet applicable to your model for minimum clearances to combustible surfaces. One of the ventilation openings must be within 12 inches of the top; the other opening must be within 12 inches of the bottom of the confined space. In a typical construction, the clearance between the door and door frame is usually adequate to satisfy this ventilation requirement.

Existing Furnace Removal

NOTE: When an existing furnace is removed from a venting system serving other appliances, the venting system may be too large to properly vent the remaining attached appliances.

The following vent testing procedure is reproduced from the American National Standard/National Standard of Canada for Gas-Fired Central Furnaces ANSI Z21.47, CSA-2.3 latest edition Section 1.23.1.

Thermostat Location

WARNING

To avoid property damage, personal injury or death, sufficient fresh air for proper combustion and ventilation of flue gas must be supplied. Most homes require outside air be supplied into the furnace area.

The thermostat should be placed approximately five feet from the floor on a vibration-free, inside wall in an area having good air circulation. Do not install the thermostat where it may be influenced by any of the following:

- Drafts, or dead spots behind doors, in corners, or under cabinets.
- Hot or cold air from registers.
- Radiant heat from the sun.
- Light fixtures or other appliances.
- Radiant heat from a fireplace.
- Concealed hot or cold water pipes, or chimneys.
- Unconditioned areas behind the thermostat, such as an outside wall. Consult the instructions packaged with the thermostat for mounting instructions and further precautions.

COMBUSTION & VENTILATION REQUIREMENTS

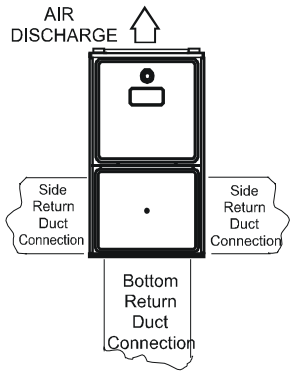
Improved construction and additional insulation in buildings have reduced heat loss by reducing air infiltration and escape around doors and windows. These changes have helped in reducing heating/cooling costs but have created a problem supplying combustion and ventilation air for gas fired and other fuel burning appliances. Appliances that pull air out of the house (clothes dryers, exhaust fans, fireplaces, etc.) increase the problem by starving appliances for air.
House depressurization can cause back drafting or improper combustion of gas-fired appliances, thereby exposing building occupants to gas combustion products that could include carbon monoxide.

If this furnace is to be installed in the same space with other gas appliances, such as a water heater, ensure there is an adequate supply of combustion and ventilation air for the other appliances. Refer to the latest edition of the National Fuel Gas Code NFPA 54/ANSI Z223.1 or CAN/CSA B1491-15 Installation Codes or applicable provisions of the local building codes for determining the combustion air requirements for the appliances.

Most homes will require outside air be supplied to the furnace area by means of ventilation grilles or ducts connecting directly to the outdoors or spaces open to the outdoors such as attics or crawl spaces.

INSTALLATION POSITIONS

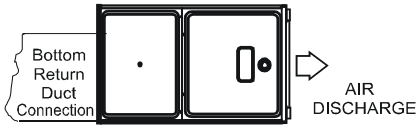
This furnace may be installed in an upright position or horizontal on either the left or right side panel. Do not install this furnace on its back. For upright upflow furnaces, return air ductwork may be attached to the side panel(s) and/or base pan. For *upright counterflow* furnaces, return air ductwork must be attached to the top end of the blower compartment. For any horizontally installed furnaces, return ductwork must be attached to the blower compartment end of the furnace. **NOTE:** Ductwork must never be attached to the back of the furnace. Contact your distributor for proper airflow requirements and number of required ductwork connections. Refer to “Recommended Installation Positions” figure for appropriate installation positions, ductwork connections, and resulting airflow arrangements.



UPFLOW
UPRIGHT
Figure 2A



UPFLOW HORIZONTAL
LEFT AIR DISCHARGE
Figure 2B



UPFLOW HORIZONTAL
RIGHT AIR DISCHARGE
Figure 2C

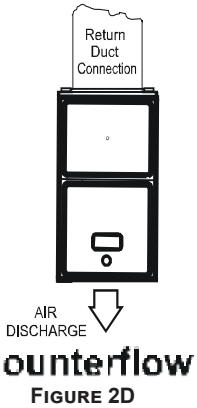


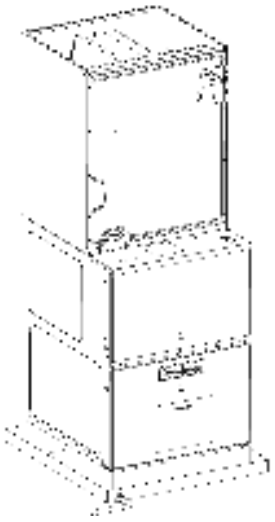
Figure 2D

AuxiliaryDrain Pan

An auxiliary/secondary drain pan should be installed under a condensing furnace and/or indoor coil when any potential leakage could cause damage to ceilings, floors or other areas below the installation location. The auxiliary drain pan should be at least 1-1/2 inches deep, 3 inches larger than the unit and constructed of corrosion-resistant material. The drain pan should have a drain line connected to the pan and the drain line should be pitched downward away from the pan a minimum of 1/8" per foot of drain line. The drain line should terminate in a location where the water dripping from the drain line will alert the occupant that a problem exists. The auxiliary drain pan should also be equipped with a water level detection device conforming to UL 508 that will shut off the equipment served prior to overflow of the pan.

For upflow and horizontal installations, the furnace and/or indoor coil should be installed so that the equipment is at least 1-1/2 inches above the drain pan. Do not install the furnace and/or indoor coil directly into the auxiliary/secondary drain pan and do not use any wood product in the drain pan to elevate the furnace. Bricks, 2-inch concrete cap blocks, metal furnace stands, or furnace blocks can be used to elevate the furnace. For an upflow furnace installation, seal the entire bottom of the furnace before setting the furnace at least 1-1/2 inches above the drain pan.

Failure to properly install an auxiliary/secondary drain pan for a furnace and/or indoor coil can result in water damage to components and the furnace's metal cabinet.



⚠ 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 with each appliance connected to the venting system placed in operation, while any other appliances connected to the venting system are not in operation:

1. **Seal any unused openings in the venting system.**
2. **Inspect the venting system for proper size and horizontal pitch, as required by the National Fuel Gas Code, ANSI Z223.1 or the Natural Gas and Propane Installation Code, CSA B149.1-15 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 shall operate at maximum speed.**
   Do not operate a summer exhaust fan.
6. **Follow the lighting instructions. Place the appliance being inspected in operation. Adjust thermostat so appliance shall operate continuously.**
7. **Test for spillage from draft hood 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 National Gas and Propane Installation Code CSA B149.1-15.**
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 burning appliance to their previous conditions of use.**

AVERTISSEMENT

RISQUE D'INTOXICATION AU MONOXYDE DE CARBONE
Si les étapes décrites ci-dessous ne sont pas suivies pour chacun des appareils raccordés au système de ventilation au moment de sa mise en marche, cela peut entraîner une intoxication au monoxyde de carbone ou la mort.

Les étapes suivantes doivent être suivies pour chacun des appareils raccordés au système de ventilation au moment de sa mise en marche, alors que tous les autres appareils raccordés au système de ventilation ne sont pas en marche:

1. **Sceller toutes les ouvertures inutilisées du système de ventilation.**
2. **Inspecter le système de ventilation afin de vérifier si la taille et l'inclinaison par rapport à l'horizontale sont conformes aux exigences du National Fuel Gas Code, ANSI Z223.1/NFPA 54 ou du Code d'installation du gaz naturel et du propane, CSA B149.1 et à ces instructions. Vérifier qu'il n'y a pas d'obstruction ou de restriction, de fuite, de corrosion et d'autres problèmes qui pourraient entraîner une situation dangereuse.**
3. **Si possible, fermer toutes les portes et fenêtres du bâtiment ainsi que toutes les portes séparant l'endroit où se trouvent les appareils raccordés au système de ventilation et les autres zones du bâtiment.**
4. **Fermer le registre des foyers.**
5. **Mettre les sécheuses en marche ainsi que tous les autres appareils qui ne sont pas raccordés au système de ventilation. Mettre en marche tous les ventilateurs de tirage, comme celui des hottes de cuisine et des salles de bains, et les régler à la puissance maximale. Ne pas mettre en marche les ventilateurs d'été.**
6. **Suivre les instructions d'allumage. Mettre en marche l'appareil soumis à l'inspection. Régler le thermostat de manière à ce que l'appareil fonctionne en continu.**
7. **Vérifier la présence de fuite au niveau de l'ouverture du coupe-tirage des appareils qui en sont dotés après 5 minutes de fonctionnement du brûleur principal. Utiliser la flamme d'une allumette ou d'une bougie.**
8. **Si un problème de ventilation est observé pendant l'un des essais décrits ci-dessus, des correctifs doivent être apportés au système de ventilation conformément au National Fuel Gas Code, ANSI Z223.1/NFPA 54 et (ou) au Code d'installation du gaz naturel et du propane, CSA B149.1.**
9. **Une fois qu'il a été déterminé que chaque appareil raccordé au système de ventilation fonctionne correctement au moyen des essais décrits ci-dessus, les portes, les fenêtres, les ventilateurs, les registres de foyer et tous les autres appareils de combustion alimentés au gaz doivent être remis dans leur état initial.**

HORIZONTAL APPLICATIONS & CONSIDERATIONS

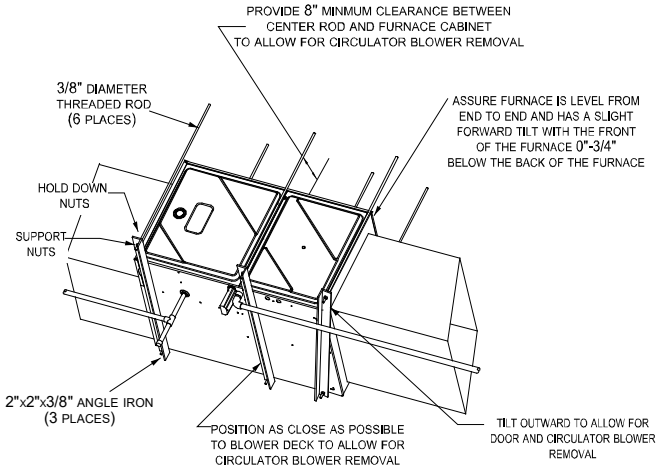


Figure 3

When installing a furnace horizontally, additional consideration must be given to the following:

Furnace Suspension

If suspending the furnace from rafters or joists, use ⅜" threaded rod and 2"x2"x⅜" angle iron as shown in the following diagram. The length of rod will depend on the application and the clearances necessary.

If the furnace is installed in a crawl space it must be suspended from the floor joist or supported by a concrete pad. Never install the furnace on the ground or allow it to be exposed to water.

Front Cover Pressure Switch Tube Location

When a furnace is installed horizontally with left side down, the front cover pressure switch tube must be re-located to the lower port of the collector box cover.

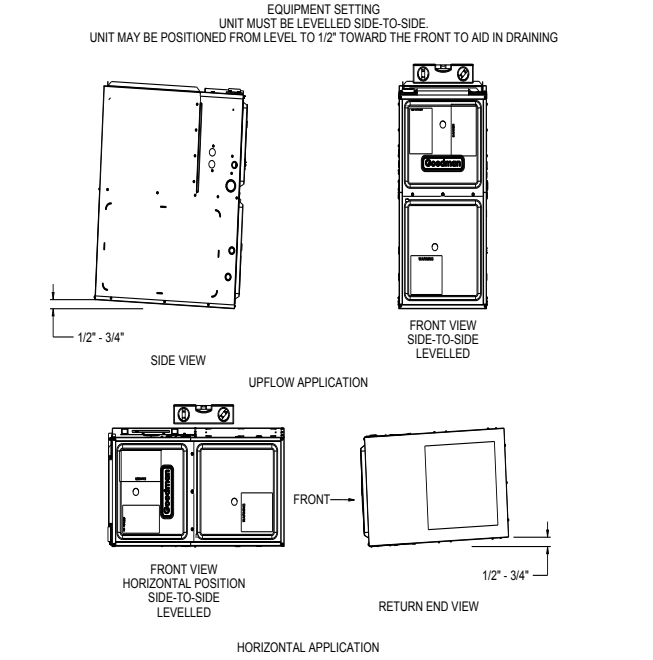
1. Remove tube from front cover pressure switch and collector box cover.
2. Remove rubber plug from bottom collector box port and install on top collector box port.
3. Locate 24" x ¼" tube in bag assembly.
4. Install one end on front cover pressure switch.
5. Route tube to lower port on collector box cover and cut off excess tubing.

Drain Trap and Lines

In horizontal applications the condensate drain trap is secured to the furnace side panel, suspending it below the furnace. A minimum clearance of 5.5" below the furnace must be provided for the drain trap. Additionally, the appropriate downward piping slope must be maintained from the drain trap to the drain location. Refer to Condensate Drain Trap and Lines for further details. If the drain trap and drain line will be exposed to temperatures near or below freezing, adequate measures must be taken to prevent condensate from freezing.

Leveling

Leveling ensures proper condensate drainage from the heat exchanger. For proper flue pipe drainage, the furnace must be level lengthwise from end to end. The furnace should have a slight tilt from back to front with the access doors downhill from the back panel approximately ½ to ¾ inches. The slight tilt allows the heat exchanger condensate, generated in the secondary heat exchanger, to flow forward to the secondary heat exchanger front cover.



Alternate Electrical and Gas Line Connections

This furnace has provisions allowing for electrical and gas line connections through either side panel. In horizontal applications the connections can be made either through the "top" or "bottom" of the furnace.

Freeze Protection

If the drain line is routed through an area which may see temperatures near or below freezing, precautions must be taken to prevent condensate from freezing within the drain line.

VENT PIPE & COMBUSTION AIR PIPE

WARNING

Upon completion of the furnace installation, carefully inspect the entire flue system both inside and outside of the furnace to assure it is properly sealed. Leaks in the flue system can result in serious personal injury or death due to exposure to flue products, including carbon monoxide.

WARNING

Failure to follow these instructions can result in bodily injury or death. Carefully read and follow all instructions given in this section.

This manual will refer to the pipe that discharges products of combustion to the outdoors as the “vent” pipe or “flue” pipe. The pipe that supplies air for combustion to the furnace will be referred to as the “intake” pipe or “combustion air” pipe.

This furnace is dual certified and may be installed as a non-direct vent (single pipe) or direct vent (dual pipe) appliance.

MATERIALS – INSTALLATIONS IN THE U.S.A.

PVC, CPVC, or ABS pipe & fittings are typically used as venting and intake pipe materials. All 90° elbows must be medium or long radius types. A medium radius elbow should measure ~3-1/16” minimum from the plane of one opening to the center line of the other opening for 2” diameter pipe, and ~4-9/16” minimum for 3” pipe.

In addition to these materials, Innoflue® by Centrotherm Eco Systems is also an approved vent and combustion air materials for installations in the U.S.A. Manufacturers Installation instructions for these products must be followed. These products have specific instructions for installing, joining and terminating. Do not mix materials or components of one manufacturer with materials or components of another manufacturer. Refer to the following chart for plastic pipe & fittings specifications.

MATERIALS – INSTALLATIONS IN CANADA

All installations in Canada must conform to the requirements of CAN/CSA B149.1-15 code. All vent components, including primer and cement, must be listed to ULC S636. The certified pipe and fittings should be clearly marked with the ULC standard “S636”. The primer and cement used must be of the same manufacturer as the vent system. For Royal Pipe System 636; use GVS-65 Primer (Purple) and GVS-65 PVC Solvent Cement. For IPEX System 636, use PVC/CPVC Primer, Purple or clear. Use PVC Solvent cement (Gray). For Canadian installations, ABS may be used as a combustion air pipe only. ABS is not an approved vent material in Canada.

If ABS is used as a combustion air pipe, it must be CSA certified. Always follow the manufacturer’s instructions in the use of primer and cement. Do not use primer and cement around potential sources of ignition. Do not use primer or cement beyond its expiration date.

VENTING MATERIAL REQUIREMENTS	
PVC	ASTM STANDARD
SCHEDULE 40 PIPE	D1785
SDR 21 or 26 PIPE	D2241
SYSTEM 1738® (IPEX)	D1784, UL 1738
SCHEDULE 40 FITTINGS	D2466
SYSTEM 1738® FITTINGS	D1784, UL 1738
ABS	
SCHEDULE 40 PIPE	D1527
SCHEDULE 40 FITTINGS	D2468
CPVC	
SCHEDULE 40 PIPE	F441
SDR 21 or 26 PIPE	F442
FITTINGS	F438
POLYPROPYLENE	
INNOFLUE® (CENTROTHERM)	UL 1738
POLYPRO® (DURAVENT)	ULC S636
PRIMER & SOLVENT CEMENT	
PVC PRIMER	F656
CPVC PRIMER	F656
PVC SOLVENT CEMENT	D2564
CPVC SOLVENT CEMENT	F493
ABS SOLVENT CEMENT	D2235
ABS / PVC / CPVC ALL PURPOSE CEMENT (FOR PIPE & FITTINGS OF THE SAME MATERIAL)	D2564, D2235, F493
TRANSITION CEMENT FOR ABS to PVC or CPVC	D3188
INSTALLATIONS IN CANADA	
PVC & CPVC PIPE & FITTINGS	ULC S636
PVC & CPVC SOLVENT CEMENT	
TRANSITION CEMENT	
INNOFLUE® (CENTROTHERM)	
POLYPRO® (DURAVENT)	
SYSTEM 636® (IPEX)	

PIPE INSTALLATION

This furnace is manufactured with 2” CPVC vent & intake couplings. Use transition cement to connect PVC or ABS pipe to these fittings. For furnaces requiring installation of 3” pipe, the transition from 2” to 3” should be done as close to the furnace as possible, and only when the piping is sloped enough to prevent condensation from collecting.

This furnace must not be connected to Type B, BW, or L vent or vent connector, and must not be vented into masonry chimney. A masonry chimney may be used as a chase or passageway for approved venting materials providing the masonry chimney is not also being used to vent products of combustion. Never common vent this appliance with another appliance. Never use a vent which is used by a solid fuel appliance.

Piping may run vertically or horizontally and must be adequately supported to prevent strain on joints, sagging, separation, and detachment from the furnace. Horizontal runs of piping must be supported every three to five feet. Condensation within the furnace secondary heat exchanger and in the vent pipe is a normal occurrence.

Vent pipe must be installed to maintain a minimum ¼ inch per foot downward slope toward the furnace to return condensate to the furnace's drain system. Condensation may also occur in the intake pipe. This commonly takes place during the summer months when humid air enters an intake pipe that runs through a cool basement or other conditioned space.

Precautions should be taken to prevent condensate from freezing inside the flue/vent pipe, combustion air intake pipe and/or at the pipe terminations. All flue/vent and/or combustion air piping exposed to temperatures below 35°F for extended periods of time should be insulated with 1/2" thick closed cell foam. All vent/flue piping exposed to outdoors in excess of the terminations permitted as described in the provided installation manual should be insulated with 1/2" thick closed cell foam. Inspect piping for leaks prior to installing insulation. If the combustion air intake or flue vent pipe is to be installed above a finished ceiling or other area where dripping of condensate will be objectionable, insulating the combustion air pipe may be necessary. Use 1/2" thick closed cell foam insulation where required. Refer to vent & intake options for using the RF000142 kit and managing condensation.

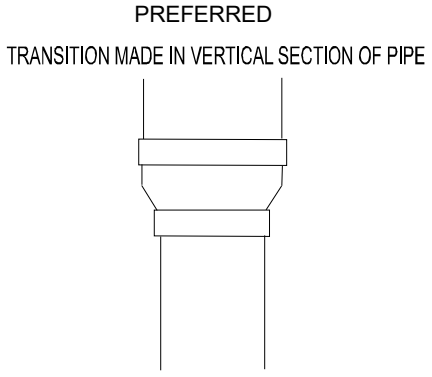


Figure 4

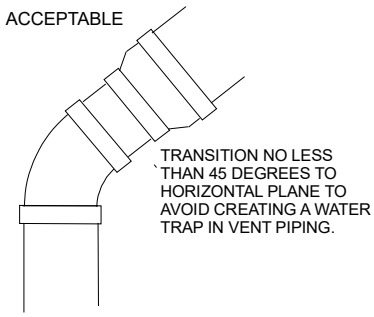


Figure 5

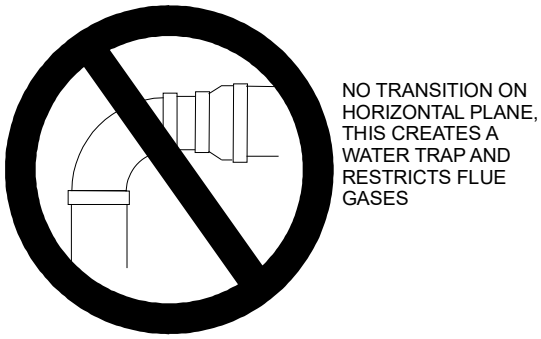


Figure 6

WARNING

To avoid bodily injury, fire or explosion, solvent cements must be kept away from all ignition sources (i.e., sparks, open flames, and excessive heat) as they are combustible liquids. Avoid breathing cement vapors or contact with skin and/or eyes.

Pipe Sizing

Consult tables 4 & 5 to determine what diameter piping is required for your installation. Lengths shown in the chart apply to single pipe & two pipe installations. In a two pipe installation the length shown refers to only one pipe, vent or intake. Both pipes would normally be equal in length, if different, then the longest pipe must be within the limits of table 4. It is preferable to up-size from 2" to 2.5" or 3" pipe if the pipe length & elbow count are near maximum. This will help avoid nuisance pressure switch opening caused by prevailing winds & sudden changes in atmospheric pressure.

		Number of Elbows							
MODEL	PIPE SIZE	1	2	3	4	5	6	7	8
*R9S960403AN	2	75	70	65	60	55	50	45	40
	3	114	107	100	93	86	79	72	65
*R9S960603BN	2	45	40	35	30	25	20	15	10
	3	168	161	154	147	140	133	126	119
*R9S960803BN	2	35	30	25	20	15	10	5	N/A
	3	168	161	154	147	140	133	126	119
*R9S960804CN	2	60	55	50	45	40	35	30	25
	3	113	106	99	92	85	78	71	64
*R9S960805CN	2	45	40	35	30	25	20	15	10
	3	120	113	106	99	92	85	78	71
*R9S961005CN	2	40	35	30	25	20	15	10	5
	3	151	144	137	130	123	116	109	102
*R9S961205DN	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3	158	151	144	137	130	123	116	109
*D9S960403BN	2	100	95	90	85	80	75	70	65
	3	137	130	123	116	109	102	95	88
*D9S960603BN	2	45	40	35	30	25	20	15	10
	3	168	161	154	147	140	133	126	119
*D9S960804CN	2	40	35	30	25	20	15	10	5
	3	120	113	106	99	92	85	78	71
*D9S961005CN	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3	113	106	99	92	85	78	71	64
*D9S961205DN	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3	110	103	96	89	82	75	68	61

NOTE: FOR INSTALLATIONS AT OR ABOVE 5,000 FEET ALTITUDE, USE 3" PIPE.
R9S960803BN - add 20' of 2" pipe for upflow position
1) Maximum allowable limits listed on individual lengths for inlet and flue and NOT a combination
2) Minimum requirement for each vent pipe is five (5) feet in length and one elbow/tee
3) Tee used in the vent/flue termination must be included when determining the number of elbows in the piping system.
4) 2 1/2" or 3" diameter pipe can be used in place of 2" diameter pipe

Table 4

MODEL	PIPE SIZE	Number of Elbows 1	2	3	4	5	6	7	8
*R9S920403AN	2	75	70	65	60	55	50	45	40
	3	114	107	100	93	86	79	72	65
*R9S920603BN	2	55	50	45	40	35	30	25	20
	3	127	120	113	106	99	92	85	78
*R9S920803BN	2	30	25	20	15	10	5	N/A	N/A
	3	72	65	58	51	44	37	30	23
*R9S920804CN	2	30	25	20	15	10	5	N/A	N/A
	3	72	65	58	51	44	37	30	23
*R9S920805CN	2	40	35	30	25	20	15	10	5
	3	72	65	58	51	44	37	30	23
*R9S921004CN	2	60	55	50	45	40	35	30	25
	3	168	161	154	147	140	133	126	119
*R9S921005CN	2	30	25	20	15	10	5	N/A	N/A
	3	113	106	99	92	85	78	71	64
*R9S921205DN	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3	65	58	51	44	37	30	23	16

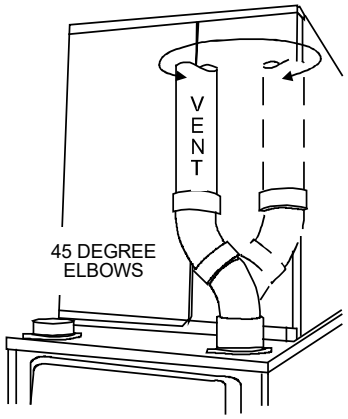
NOTE: FOR INSTALLATION AT OR ABOVE 5,000 FEET ALTITUDE, USE 3" PIPE.
***R9S920803BN - add 10' of 2" pipe for up flow position, add 66' of 3" pipe for up flow position**
***R9S920804CN - add 25' of 2" pipe for up flow position, add 58' of 3" pipe for up flow position**
***R9S920805CN - add 15' of 2" pipe for upflow position, add 58' of 3" pipe for upflow position**
1) Maximum allowable limits listed on individual lengths for inlet and flue and NOT a combination
2) Minimum requirement for each vent pipe is five (5) feet in length and one elbow/tee
3) Tee used in the vent/flue termination must be included when determining the number of elbows in the piping system.

TABLE 5

1. Maximum allowable limits listed on individual lengths for inlet and flue and NOT a combination.
2. Minimum requirement for each vent pipe five (5) feet in length and one elbow/tee.
3. Tee used in the vent/flue termination must be included when determining the number of elbows in the piping system.
4. 2 ½" or 3" diameter pipe can be used in place of 2" diameter pipe.
5. Increased Clearance Configuration using (2) 45 deg. Long Sweep elbows should be considered equivalent to one 90 deg. elbow.
6. One 90° elbow should be secured to the combustion air intake connection.

VENT PIPE CONNECTION

The vent pipe outlet is sized to accept 2" pipe. Secure vent pipe directly into the furnace fitting with the appropriate glue. Alternately, a small section of 2" pipe may be glued in the furnace socket and a rubber coupling installed to allow removal for future service. Piping should be routed in a manner to avoid contact with refrigerant lines, metering devices, condensate drain lines, etc. If necessary, clearances may be increased by creating an offset using two 45° elbows (Figure 7).



INCREASED CLEARANCE CONFIGURATION
FIGURE 7

COMBUSTION AIR PIPE CONNECTION

If the furnace is being installed without a combustion air pipe, a 90° elbow should be used on the combustion air intake to guard against blockage.

On up flow / horizontal models, secure the combustion air intake pipe to the air intake coupling using a rubber coupling supplied with the furnace. The rubber coupling may be omitted by inverting the intake coupling and gluing pipe directly to it. Piping may also be glued to the intake coupling in its original position by using a plastic coupling. On counterflow units secure the combustion air intake pipe to the air intake coupling using the rubber coupling and worm gear hose clamps provided with the unit. The counterflow rubber coupling allows service removal of air intake piping internal to the furnace blower compartment. The combustion air intake pipe can also be secured directly to the counterflow unit air intake pipe coupling.

VENT & INTAKE PIPE OPTIONS FOR CONDENSATE MANAGEMENT

The RF000142 coupling (Figure 9) can be secured directly to the furnace intake and/or vent if condensation/rain water is a concern. If the RF000142 is used on the combustion air inlet, it must be installed with the arrow pointing up. It should be noted, the combustion air will actually be moving in a direction opposite of the arrow on the RF000142 coupling. It must have a field supplied, trapped drain tube free-draining to a proper condensate disposal location. A loop in the drain tube can serve as a trap. The unused RF000142 drain fitting must be capped. A field supplied tee installed in the and/or vent pipe is also an acceptable method of catching condensation. For vertical vent piping, a PVC wye can be used for catching condensation (see Figure 8B). Any of these options must have a field supplied, trapped drain tube or pipe, free-draining to a proper condensate disposal location. A loop in the drain tube can serve as a trap.

WARNING

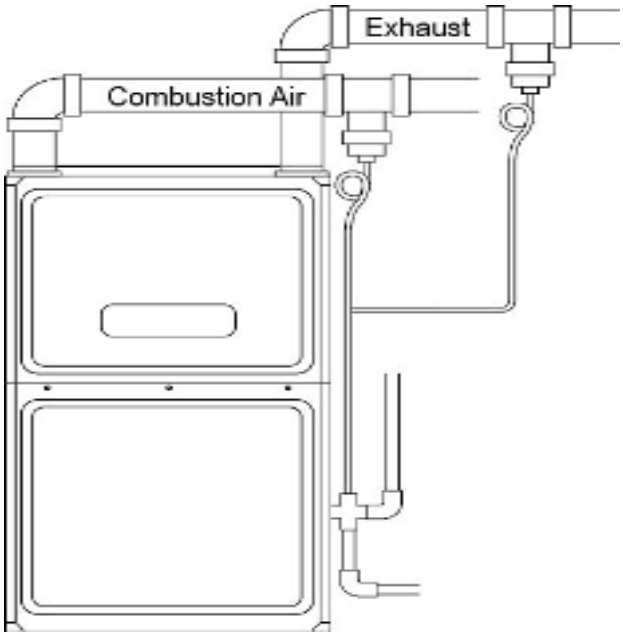
Edges of sheet metal holes may be sharp. Use gloves as a precaution when removing hole plugs.

Alternate Vent & Intake Pipe Connections

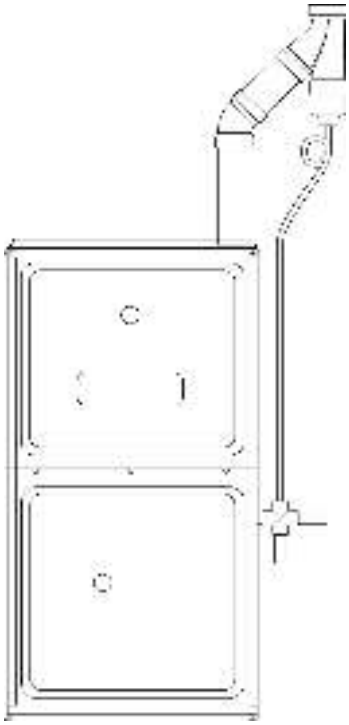
When installing a furnace horizontally with the left side down, alternate flue and combustion air pipe connections may be used. This method allows the flue and combustion air piping to be run vertically through the side of the furnace (facing up in horizontal left). The alternate vent location is the 3" hole directly in line with the induced draft blower outlet.

When using the horizontal alternate vent configuration, you must use the RF000142 vent drain kit. For Upflow models, see Figures 8-11 & follow the steps below.

NOTE: In the horizontal left installation position, a means of condensate collection must be provided to keep vent pipe condensate from entering the draft inducer housing. If the vent drain elbow is eliminated from the installation, the RF000142 kit must be used.



Tee Installation in Intake Pipe
Figure 8A



Vent Piping with PVC WYE
Figure 8B

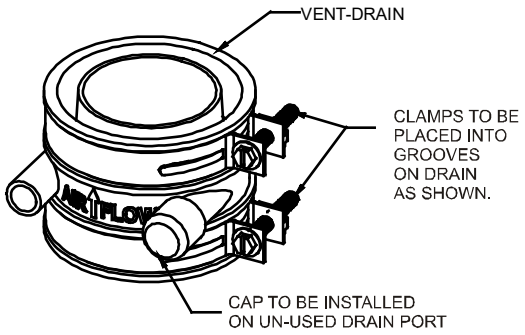


Figure 9

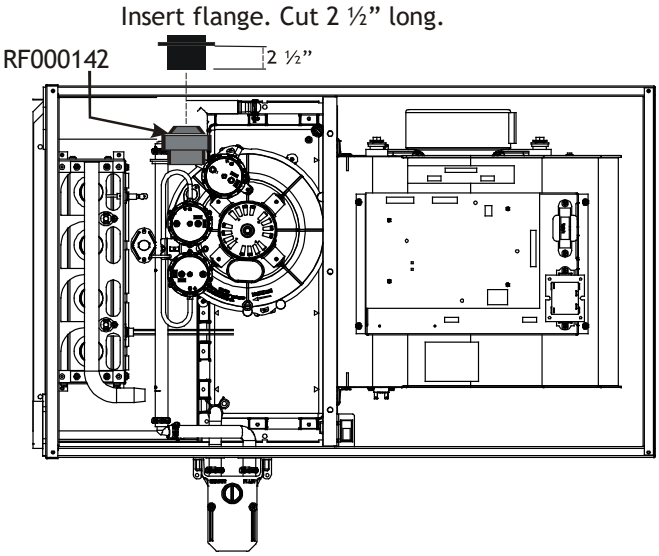


Figure 10

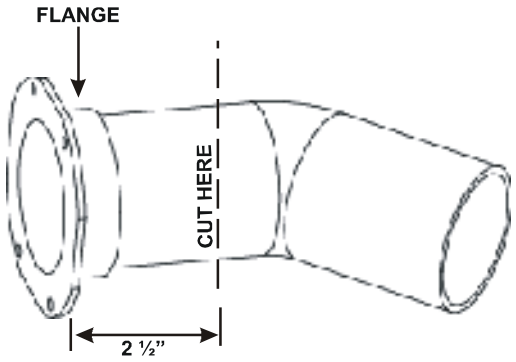


Figure 11

1. Remove the four screws from the vent pipe flange on top of the furnace.
2. Remove the internal elbow, vent pipe & gasket.
3. Cut the internal vent pipe 2 ½” from the flange. Discard the un-flanged section.
4. Remove the 3” plastic plug (in line with the inducer outlet) and insert it in the space vacated by removal of the internal vent pipe.
5. Install the RF000142 drain coupling with arrow facing up, on the draft inducer outlet.
6. Insert the 2 ½” flanged section of pipe with gasket through the 3” hole and connect to RF000142 drain coupling. Secure it with gear clamp provided.
7. Use the four self-tapping screws removed in step 1 to secure flange to cabinet.
8. Connect drain hose to the uncapped port on the RF000142 coupling, refer to page xx, section entitled “Horizontal Installation with Left Side Down – Alternate” for drain connection details

When using the alternate venting location, either in a horizontal left side down installation or a vertical installation using down – venting, the alternate combustion air opening can be used. A locating dimple is located on the right side of the furnace cabinet. The locating dimple is 1-⅞” measured from the front edge of the cabinet in line with the knock out.

To use the alternate combustion air location:

1. Remove screws and combustion air flange and gasket from cabinet.
2. Insert the 3” cabinet plug from the drain bag assembly in the unused combustion air hole.
3. Drill a pilot hole at the cabinet dimple (size dictated by knockout tool used).
4. Use a knockout tool to create a 3” diameter hole.
5. Secure the combustion air flange & gasket to the furnace cabinet using the self-tapping screws removed in step 1.

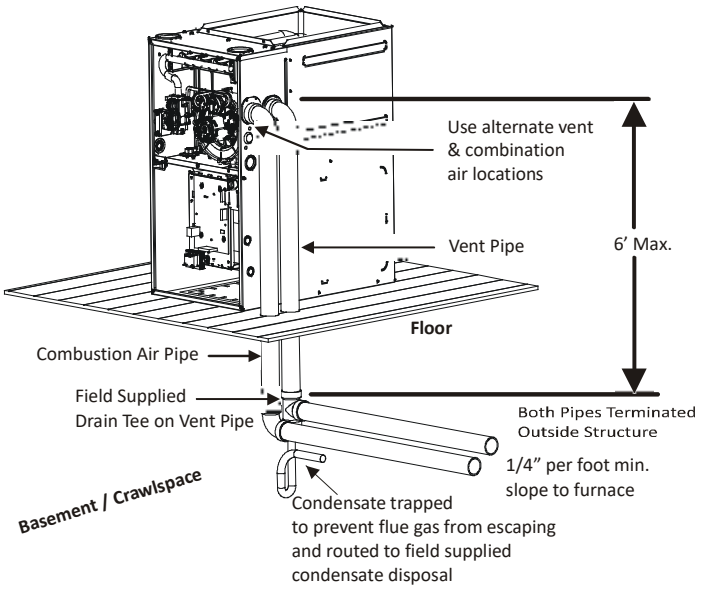
⚠ WARNING

The rubber elbow is not designed to support a load. When the rubber elbow is mounted externally to the furnace cabinet, extreme care must be taken to adequately support field-supplied vent/flue piping, as damage can result in leaks causing bodily injury or death due to exposure to flue gases, including carbon monoxide.

⚠ CAUTION

Be sure not to damage internal wiring or other components when reinstalling coupling and screws.

DOWN VENTING UPFLOW MODEL FURNACES ONLY



All piping and fittings must be joined per material manufacturers specifications to prevent separation and flue gas leaks.

Figure 12

For Downflow models, see Figures 9, 12A-12B & follow the steps below for using the alternate vent location.

1. Remove the four screws from the vent pipe flange on top of the furnace.
2. Remove the two screws from the blower deck holding the flue elbow as well as the clamp hose holding it to the internal vent pipe.
3. Remove the internal elbow, and internal vent pipe with gasket.
4. Remove the 3” plastic plug from the furnace wrapper (in line with the inducer outlet).
5. Seal up the unused vent hole on the top panel and the unused vent hole on the blower deck from the burner cabinet side. These holes should be sealed up using sheet metal squares and then metallic tape. Please make sure to seal up the openings really well.
6. Install the RF000142 drain coupling on the draft inducer outlet with the arrow facing away from the inducer outlet. Secure it with the gear clamp provided.
7. Measure and cut the internal vent pipe so that the gasket and flange side of the pipe are flush with the furnace side wrapper when the pipe is inserted into the RF000142 drain coupling. Discard the un-flanged cut section.
   a. B Cabinet: Pipe would need to be about 3.75” long from the flange.
   b. C Cabinet: Pipe would need to be about 7” long from the flange.
   c. D Cabinet: Pipe would need to be about 11” long from the flange.

8. Insert the flanged section of pipe with gasket through the 3” hole and connect to RF000142 drain coupling. Secure it with gear clamp provided.
9. Use the four self-tapping screws removed in step 1 to secure flange to cabinet.
10. Connect drain hose to the uncapped port on the RF000142 coupling, refer to page 24, section entitled “CounterFlow Models Installed Horizontally with Left Side Down – Alternate” for drain connection details.

The alternate vent location may also be used when installing the downflow furnace in the vertical orientation using either vertical venting or down venting. When using the alternate vent location, you must use the RF000142 vent drain kit. When installing in this configuration, please follow the steps from the paragraph above to remove the internal vent pipe in order to utilize the alternate vent location.

When using the alternate venting location, either in a horizontal left side down installation or a vertical installation, an alternate combustion air opening can be used. The flat area located underneath the alternate vent hole on the right side of the furnace wrapper may be used as an alternate combustion air opening.
To use the alternate combustion air location:

1. Remove the 4 screws holding the internal combustion air pipe from the cabinet. Remove the internal combustion air pipe.
2. Remove the 4 screws holding the combustion air flange & gasket from the blower deck.
3. Insert the 3” cabinet plug that was removed from the alternate vent hole into the blower deck hole from the burner cabinet side. Seal up the rest of the unused combustion air holes using sheet metal squares and then metallic tape. Please make sure to seal up the openings really well.
4. Drill a pilot hole in the area below the vent hole (size dictated by knockout tool used).
5. Use a knockout tool to create a 3” diameter hole.
6. Secure the combustion air flange & gasket to the outside of the furnace cabinet using the self-tapping screws removed in step 1.

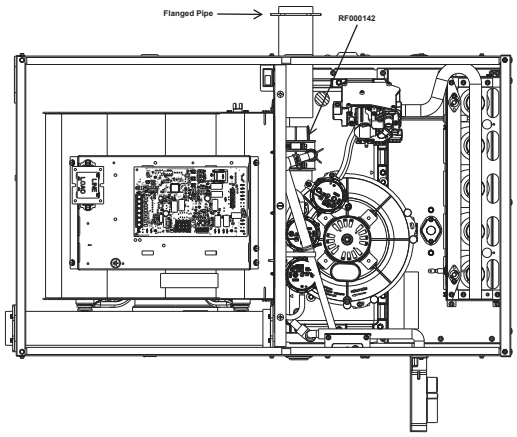


Figure 12A

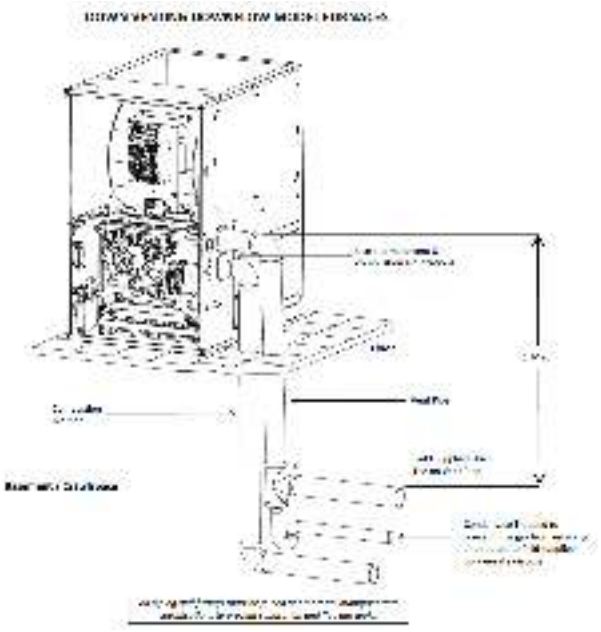


Figure 12B

Pipe Termination

Products of combustion must always be vented outside. A vent pipe must never terminate in an attic, crawl space, or any other part of a dwelling. Follow the vent pipe & intake pipe termination requirements listed below as well as all applicable local, State and National codes.
All terminations (vent and/or intake) must be located at least 12” above ground level or the anticipated snow level.

All vent terminations (non-direct and direct vent) must terminate at least 3 feet above any forced air inlet located within 10 feet.

The vent termination of a non-direct vent application must terminate at least 4 feet below, 4 feet horizontally from, or 1 foot above any door, window, or gravity air inlet into any building.

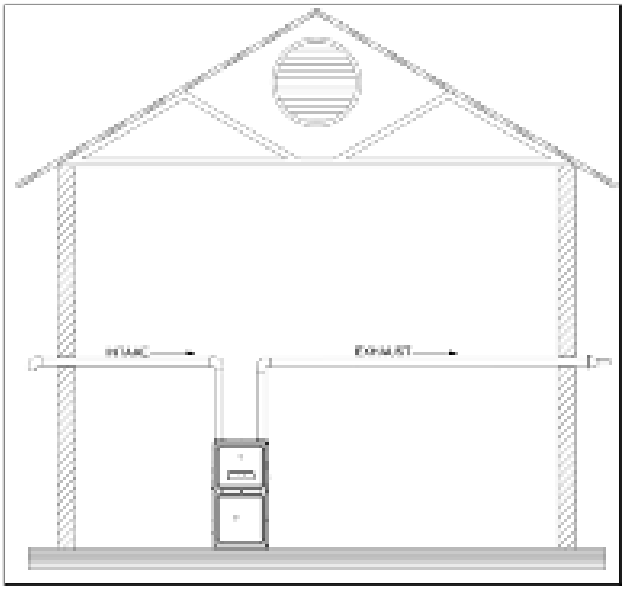
The vent termination of a direct vent application must terminate at least 12” from any opening through which flue gases may enter a building (door, window, or gravity air inlet).

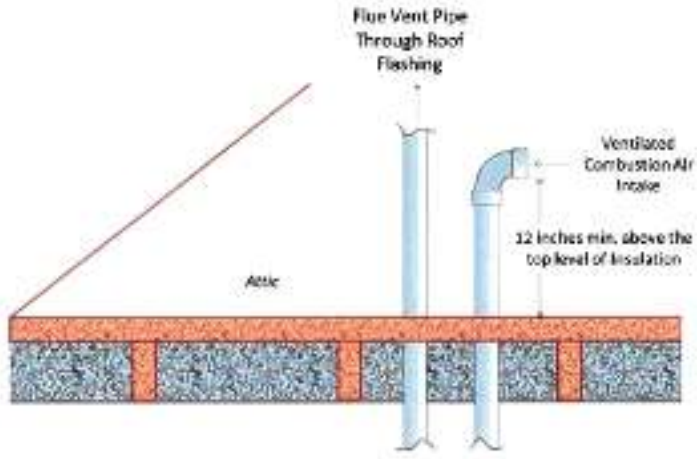
The vent termination of vent pipe run vertically through a roof must terminate at least 12” above the roof line (or the anticipated snow level) and be at least 12” from any vertical wall (including any anticipated snow build up).

A vent termination shall not terminate over public walkways or over an area where condensate or vapor could create a nuisance or hazard or could be detrimental to the operation of regulators, relief valves, or other equipment.

The combustion air intake termination of a direct vent application should not terminate in an area which is frequently dusty or dirty.

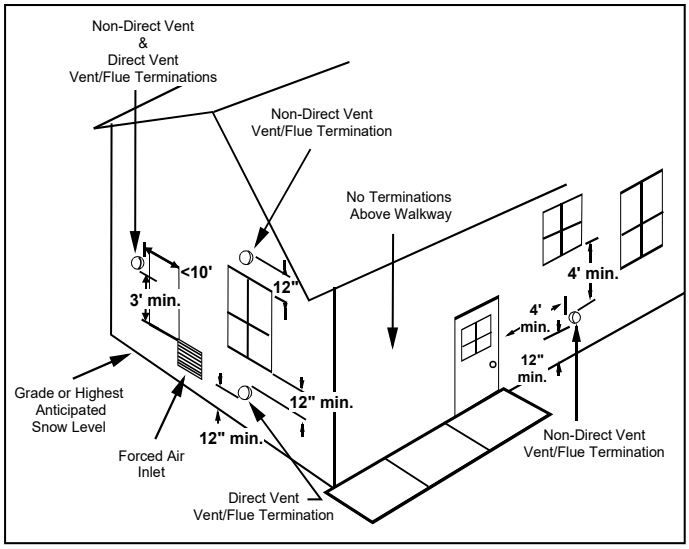
Vent & combustion air pipes may terminate vertically through a roof, or horizontally through an outside wall. The combustion air intake and vent pipe can be terminated in two different pressure zones. The intake vent can terminate on one side of the building, while the flue vent can be terminated on another side of the building or through the roof. In addition, the combustion air intake can be terminated in a sufficiently ventilated attic. Vertical vent pipe terminations should be as shown in figure 14. The penetration of pipes through the roof must be sealed water tight with proper flashing such as is used with a plastic plumbing vent.





Exhaust Flue and Ventilated Combustion Air Vent Terminations

Horizontal vent pipe terminations should be as shown in the following figures. To secure the pipe passing through the wall and prohibit damage to piping connections, a coupling should be installed on either side of the wall and solvent cemented to a length of pipe connecting the two couplings. The length of pipe should be the wall thickness plus the depth of the socket fittings to be installed on the inside and outside of the wall. The wall penetration should be sealed with silicone caulking material.



Vent Termination Clearances
Figure 13

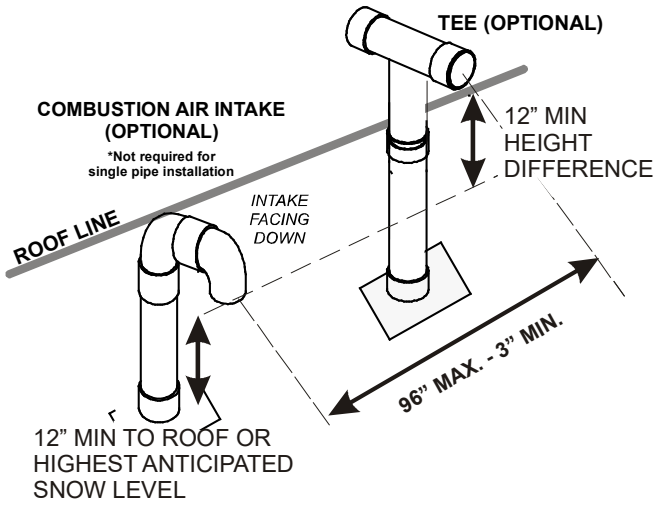
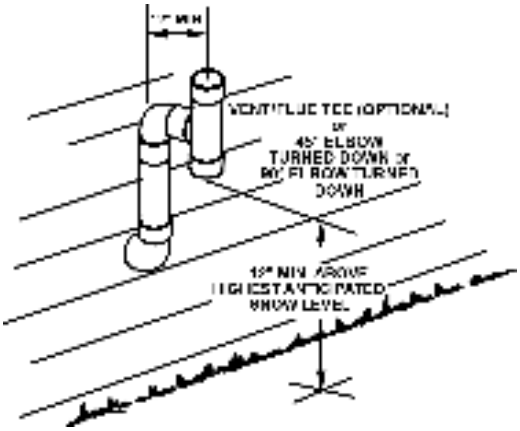


Figure 14

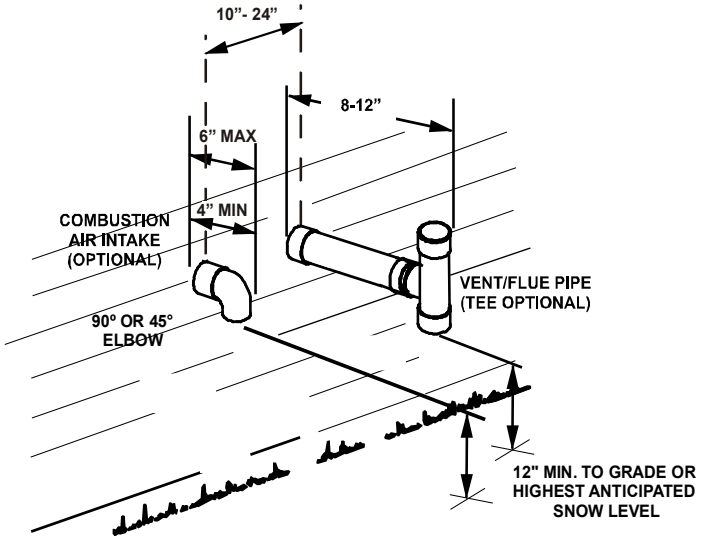
VENT PIPE TERMINATION OPTIONS



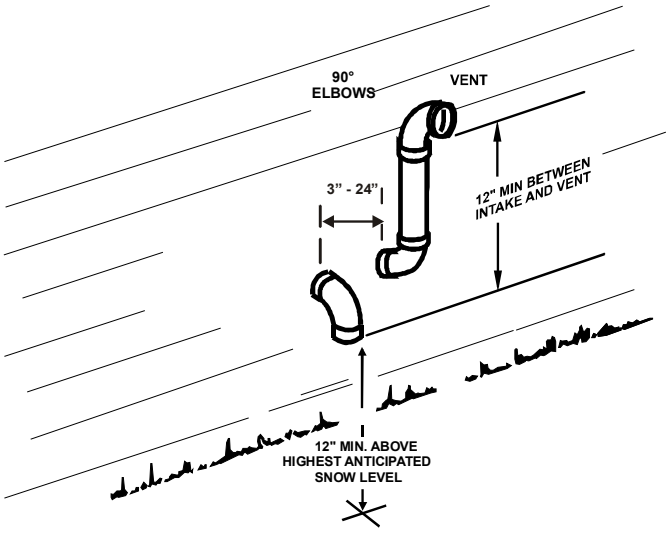
Figure 15



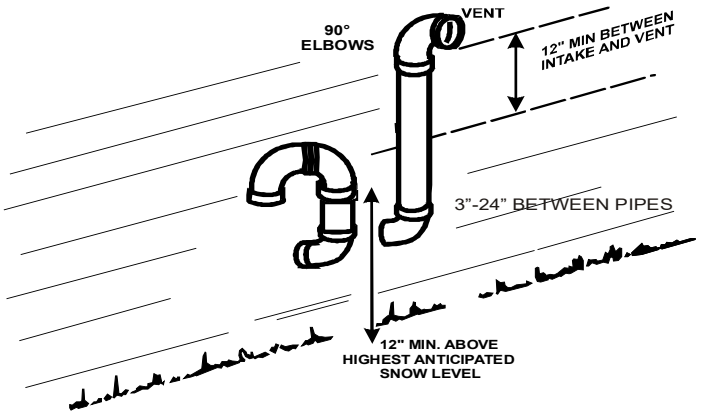
Horizontal Termination (Single Pipe) Above Highest Anticipated Snow Level
Figure 16



Standard Horizontal Terminations (Dual Pipe)
Figure 17



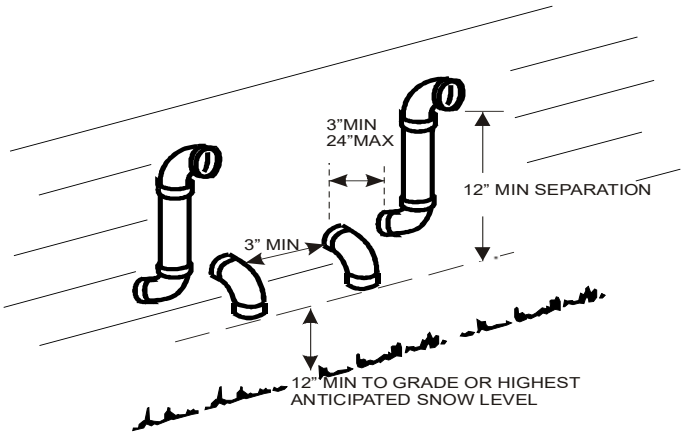
Alternate Horizontal Vent Termination (Dual Pipe)
Figure 18



Combustion Air Intake may also be snorkeled to obtain 12" min ground clearance.
Alternate Vent Termination Above Anticipated Snow Level (Dual Pipe)
Figure 19

Vent & Combustion Air Intake Measurements for Standard Horizontal Terminations (Dual Pipe)

Center to center = 10" min / 24" max.
Vertical separation: 0" - 24"
Vent termination from wall = 8" min / 12" max.
Combustion air intake from wall = 6" max.
Vent and intake clearance to ground or anticipated snow level = 12" min.

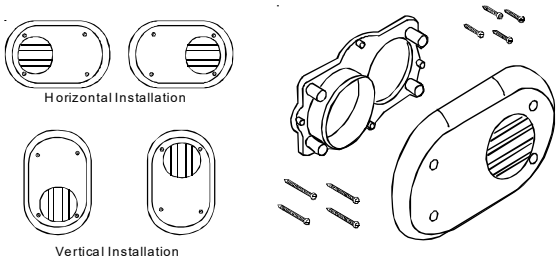


Termination of Multiple Direct Vent Furnaces
Figure 20

VENT/INTAKE TERMINATIONS FOR INSTALLATION OF MULTIPLE DIRECT VENT FURNACES

If more than one direct vent furnace is to be installed vertically through a common roof top, maintain the same minimum clearances between the exhaust vent and air intake terminations of adjacent units as with the exhaust vent and air intake terminations of a single unit.

If more than one direct vent furnace is to be installed horizontally through a common side wall, maintain the clearances as in the Figure 20. Always terminate all exhaust vent outlets at the same elevation and always terminate all air intakes at the same elevation.



Side Wall Vent Kit
Figure 21

Concentric Vent Termination

Refer to the directions provided with the Concentric Vent Kit or IO-619 for installation specifications.