

WILLIAMS™

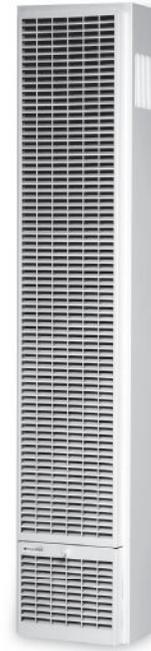
OWNER'S MANUAL INSTALLATION INSTRUCTIONS

VISITEZ NOTRE SITE WEB POUR LA VERSION FRANÇAISE DE CE MANUEL
VISITE NUESTRA PÁGINA WEB PARA LA VERSIÓN EN ESPAÑOL DE ESTE MANUAL
<https://www.williamscomfortprod.com/products/furnaces/>

CARMEL™ TG2030TN TOP VENT GAS WALL HEATER

SINGLE SIDED MODEL NUMBERS:
TG2030TN (*natural gas*)

SAVE THIS MANUAL FOR FUTURE REFERENCE.
READ THIS OWNER'S MANUAL CAREFULLY BEFORE YOU
INSTALL YOUR NEW WILLIAMS WALL FURNACE.



20,000 - 30,000 BTU/hr.

⚠ WARNING: INSTALLATION IN MANUFACTURED HOMES Williams Top-Vent Furnaces are allowed in manufactured homes when the following conditions are met:

- The manufactured home is permanently sited per local codes.
- The manufactured home is manufactured after 6/15/1976 and is HUD approved with a red certification label (US only). These models are allowed only in the USA. This applies to aftermarket manufactured home installations where the home is sold, installed and permanently sited. Not for manufactured home manufacturer (factory) installation. These units may not be installed in trailers or recreational vehicles.

⚠ WARNING: This product can expose you to chemicals including epichlorohydrin which is known to the State of California to cause cancer and birth defects and/or other reproductive harm. For information go to www.p65warnings.ca.gov

⚠ WARNING: Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or for additional information consult a qualified installer, service agency or the gas supplier.

⚠ 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 liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS:

- Open all windows.
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone or cell phone in your building.
- Extinguish any open flame.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach the gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

WARRANTY

The manufacturer, Williams Furnace Co., warrants this wall furnace or heater to the original purchaser under the following conditions:

ANY WARRANTY CONSIDERATIONS ARE CONTINGENT ON INSTALLATION BY A QUALIFIED INSTALLER (CONTRACTOR). SELF-INSTALLATION IS PROHIBITED AND WILL INVALIDATE YOUR WARRANTY.

LIMITED ONE-YEAR WARRANTY

1. Any part thereof which proves to be defective in material or workmanship within one year from date of original purchase for use will be replaced at the Manufacturer's option, FOB to its factory.
2. No liability is assumed by the Manufacturer for removal or installation labor costs, nor for freight or delivery charges.

LIMITED EXTENDED WARRANTY

1. In addition to the above limited one year warranty on the complete unit, any combustion chamber which burns out or rusts under normal installation, use and service conditions during a period of nine years following expiration of the one-year warranty period will be exchanged for a like or functionally similar part.
2. No liability is assumed by the Manufacturer for removal or installation labor costs, nor for freight or delivery charges.

LIMITATIONS

1. THIS LIMITED WARRANTY IS THE ONLY WARRANTY MADE BY THE MANUFACTURER, IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE ARE LIMITED TO THE SAME ONE YEAR TERM AS THE EXPRESS WARRANTY. UNDER NO CIRCUMSTANCES SHALL THE MANUFACTURER BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL OR CONTINGENT DAMAGES OR EXPENSES ARISING DIRECTLY OR INDIRECTLY FROM ANY DEFECT IN THE PRODUCT OR ANY COMPONENT OR FROM THE USE THEREOF. THE REMEDIES SET FORTH HEREIN ARE THE EXCLUSIVE REMEDIES AVAILABLE TO THE USER AND ARE IN LIEU OF ALL OTHER REMEDIES.

Some states do not allow limitation on how long an implied warranty lasts, and some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

2. This warranty does not include any charge for labor or installation.
3. This warranty does not extend to painted surfaces or to damage or defects resulting from accident, alteration, misuses or abuse or improper installation.
4. This warranty does not cover claims which do not involve defective workmanship or materials.

DUTIES OF THE CONSUMER

1. The heating equipment must be installed by a qualified installer and operated in accordance with the installation and homeowner's instructions furnished with the equipment.
2. Any travel, diagnostic costs, service labor, and labor to repair the defective unit will be the responsibility of the owner.
3. A bill of sale, canceled check, payment record or permit should be kept to verify purchase date to establish the warranty period.
4. Have the installer enter the requested information in the space below.

GENERAL

1. The manufacturer neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with said equipment.
2. Service under this warranty should be obtained by contacting your dealer. Provide the dealer with the model number, serial number, and purchase date verification.
3. If, within a reasonable time after contacting your dealer, satisfactory service has not been received, contact: Customer Service Department, 250 West Laurel Street, Colton, CA 92324 for assistance.
4. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

INSTALLATION RECORD

Model No. _____ Serial No. _____

Original Purchaser _____

Address _____

City and State _____ Zip _____

Dealer _____

Address _____

City and State _____ Zip _____

Installation Date _____ Name _____ Signature _____

(Dealer or authorized representative who certifies that this appliance is installed in accordance with Manufacturer's instructions and local codes.)

CONTENTS

YOUR WILLIAMS WARRANTY	
INSTALLATION RECORD	
TABLE OF CONTENTS	
SAFETY RULES	
INTRODUCTION	
BASIC MATERIALS NEEDED	
BASIC TOOLS NEEDED	
OPTIONAL ACCESSORIES	
INSTALLING YOUR WALL FURNACE	
LOCATING WALL FURNACE AND THERMOSTAT	
INSTALLATION	
COMBUSTION & VENTILATION AIR	
RECESSED MOUNT INSTALLATION	
SURFACE MOUNT INSTALLATION	
VENT INSTALLATION	
ATTACHING YOUR FURNACE	
GAS SUPPLY AND PIPING	
FRONT PANEL INSTALLATION	
THERMOSTAT INSTALLATION	
BATTERY INSTALLATION	
OUTGASSING/CHARGING THE BATTERY	
START UP PROCEDURE	
OPERATING YOUR FURNACE	
CARING FOR YOUR FURNACE	
WIRING DIAGRAM	
INSTALLING POWER SUPPLY KIT M119046	
INSTALLING EXTERNAL POWER SUPPLY KIT M119015	
FURNACE REPLACEMENT PARTS	
TROUBLESHOOTING YOUR FURNACE	
HINTS AND INFORMATION	
SERVICE RECORD	
2 Quick Reference	
2 Here's how to:	
3 INSTALLING YOUR FURNACE	7
4 Recessed Mount, Surface Mount,	
5 and Vent Installation are	
5 explained starting on page 8.	
6 OPERATING YOUR FURNACE	23
6 Igniting your furnace for the first time.	
6 CARING FOR YOUR FURNACE	24
7 Learn how to keep your new	
7 Williams Furnace operating.	
7	
7	
8	
11	
13	
15	
16	
17	
19	
20	
21	
21	
22	
23	
24	
25	
26	
27	
31	
32	
34	
35	

SAFETY RULES

⚠ WARNING: Read these rules and the instructions carefully. Failure to follow these rules and instructions could cause a malfunction of the furnace. This could result in death, serious bodily injury and/or property damage. INSTALLATION MUST CONFORM TO LOCAL CODES. IN THE ABSENCE OF LOCAL CODES, INSTALLATION MUST CONFORM TO THE NATIONAL FUEL GAS CODE, ANSI Z223.1. THE APPLIANCE, WHEN INSTALLED MUST BE ELECTRICALLY CONNECTED AND GROUNDED IN ACCORDANCE WITH LOCAL CODES OR, IN THE ABSENCE OF LOCAL CODES, WITH THE CURRENT NATIONAL ELECTRICAL CODE ANSI/NFPA NO. 70.

IN CANADA: Installation must conform to local codes or, in the absence of local codes, the current CAN/CGA B149 Installation code. The appliance, when installed, must be grounded in accordance with local codes, with the current CSA C22.1 Canadian Electrical Code. References made in this manual regarding gas type as Propane, be advised that Propane is not available in Canada; refer to Propane.

⚠ WARNING: Do not use this furnace if any part has been under water. Immediately call a qualified service technician to inspect the furnace and to replace any part of the control system and any gas control which has been under water.

1. Use only manufacturer's replacement parts. Use of any other parts could cause injury or death.
2. DO NOT install the furnace where it could be isolated by closing doors to the heated space.
3. DO NOT install these furnaces in a travel trailer, recreational vehicle or mobile home.
4. MAINTAIN all clearances specified in section "Locating Wall Furnace and Thermostat" and "Vent Installation."
5. BE SURE the furnace is for type of gas being used. Check the nameplate by the gas valve in the lower cabinet. Do not change it to use other gases without the proper manufacturer's gas conversion kit.
6. For natural gas, the minimum inlet gas supply pressure for the purpose of input adjustment is 5" water column. The maximum inlet gas supply pressure is 7" water column.
7. Any safety screen, guard or parts removed for servicing this appliance must be replaced prior to operating the appliance to avoid property damage, bodily injury or death.
8. Vent the furnace directly to the outdoors, so that harmful gases will not collect inside the building. Follow the venting instructions for your type installation exactly. Use only the type and size of vent pipe and fittings specified.
9. Provide for adequate combustion and ventilation air. See page 7. The flow of this air to the furnace must not be blocked.

or any space inside a building. This could cause property damage, bodily injury or death.

11. NEVER test for gas leaks with an open flame. Use a soap solution to check all gas connections. This will avoid the possibility of fire or explosions.
12. ALLOW furnace to cool before servicing. Always shut off electricity and gas to furnace when working on it. This will prevent any electrical shocks or burns.
13. DUE TO HIGH TEMPERATURES, locate the furnace out of traffic and away from furniture and draperies.
14. ALERT children and adults to the hazards of high surface temperatures and warn them to keep away to avoid burns or clothing ignition.
15. CAREFULLY supervise young children when they are in the same room with the furnace.
16. DO NOT place clothing or other flammable material on or near furnace.
17. INSTALLATION and REPAIR must be done by a qualified service person. The appliance should be inspected before use and at least annually by a professional service person. More frequent cleaning may be required due to excessive lint from carpeting, bedding material, etc. It is imperative that control compartments, burners and circulating air passages be kept clean.
18. BEFORE INSTALLING: To avoid electrical shock, turn off electrical circuits that pass through the wall where you are going to install the furnace.
19. BE AWARE of good safety practices by wearing personal protective equipment such as gloves and safety glasses to avoid being injured by sharp metal edges in or around the furnace while cutting or drilling holes in wood and/or sheet metal.
20. CAUTION: Label all wires prior to disconnection when servicing controls.
21. DO NOT store or use gasoline or other flammable liquids or vapors near the furnace.

⚠ WARNING: Do not install any of these furnaces in mobile homes, trailers or recreational vehicles.

10. NEVER vent flue gases into another room, a fireplace

INTRODUCTION

The following steps are all needed for proper installation and safe operation of your furnace. If you have any doubts as to any requirements, check with local authorities. Obtain professional help where needed. All of the checks and adjustments in the Start-Up Procedures are vital to the proper and safe operation of the furnace. Please read the instructions before you install and use your furnace. This will help you obtain the full value from this furnace. It could also help you avoid needless service costs if the answer to the problem is found within this instruction manual.

Always consult your local heating or plumbing inspector, building department or gas utility company regarding regulations codes or ordinances which apply to the installation of a vented wall furnace.

Check the furnace nameplate, located in the burner compartment, to make sure your furnace is equipped to operate on the type of gas available (DO NOT convert the furnace from natural gas to propane).

Combustion air is drawn in from the room where the furnace is located and is vented out of the top of the furnace vertically through vent piping in the stud space to a roof vent top. Vent material is not supplied with the furnace.

This furnace is equipped with a vent safety shutoff system designed to protect against improper venting of combustion products. Operation of this wall furnace when not connected to a properly installed and maintained venting system or tampering with the vent safety shutoff system can result in carbon monoxide (CO) poisoning and possible death.

The efficiency rating of this furnace is a product thermal efficiency rating determined under continuous operating conditions and was determined independent of any installed system. The furnace will not function unless the venting system is installed.



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 the 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.

INTRODUCTION

Basic Materials Needed

- Pipe and fittings to make gas connections to the furnace.
- Vertical venting materials. **See page 15, Figure 8.**
- Pipe Joint Compound resistant to Propane.
- Electrical wiring supplies as needed. Minimum wire size is #14 gauge copper.

Basic Tools Needed

- Hand drill or properly grounded electric drill
- Expansion bit 1/2" to 1-5/8" or 1/2" and 1-1/2" blade bits
- 1/8" and 3/16" drill bit (metal)
- 6 ft. folding rule or tape measure
- Screwdriver (medium blade)
- Screwdriver (Phillips and Flat Head)
- Pliers (wire cutting)
- Hammer
- Stud Locator or small finishing nails
- Tin Snips
- 8" adjustable wrench
- 12" adjustable wrench
- 7/8" wrench
- 3/4" wrench
- 1" wrench
- Gloves and safety glasses

Helpful Installation Information

The following booklets will help you in making the installation: ANSI/NFPA 70, or current edition "National Electrical Code". In Canada: CSA C22.1 Canadian Electrical Code.

American National Standard Z223.1 or current edition of the "National Fuel Gas Code."

Obtain from the American National Standard Institute, Inc., 1430 Broadway, New York, NY 10018. In Canada, CAN/CGA B149.

Optional Accessories

Free Standing Accessory 4901 - This accessory allows the furnace to be mounted on the surface of a wall.

Face Panel 4917 - Front Panel

Vent Adapter Kit 9902 - Optional vent adapter, typically used when the furnace is vented into a properly lined chimney.

Oval B/W Vent Kit 9929 / 9930 CANADA - This U.L. Listed B/W vent kit contains four feet of oval, double-walled vent pipe, plate spacers and base or hold-down plate that starts the venting from the top of furnace. See Vent Installation on page 14 for additional items you will need.

POWER SUPPLY KIT M119046: Power adapter for unit.

EXTERNAL POWER SUPPLY KIT M119015:

The unit's standard power adapter may not be long enough to reach an outlet. Instead, this external power supply kit can be used to wire through the wall and into the home's power supply.

INSTALLING YOUR FURNACE

The following steps are needed for proper installation and safe operation of your furnace. If you have any doubts as to any requirements, obtain professional help. Remember to ALWAYS consult your local heating or plumbing inspector, building department or gas utility company regarding regulations, codes, or ordinances which apply to the installation and location of a vented wall furnace.

IMPORTANT

For satisfactory and trouble-free operation, be sure to:

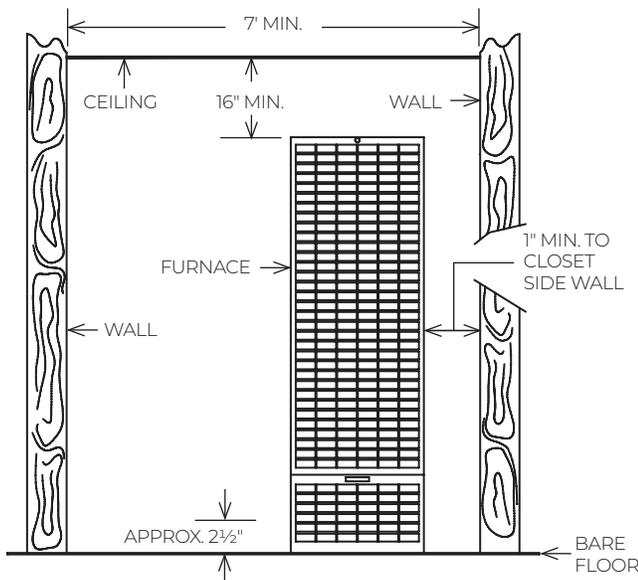
1. Locate the furnace properly within the space to be heated.
2. Install the furnace in accordance with local codes or ordinances and instructions provided. In the absence of local codes or ordinances, install the furnace to conform with the current edition of the National Fuel Gas Code, NFPA 54, ANSI Z223.1/Canadian Installation Code, CAN/CGA B149.
3. Maintain minimum clearances: Floor 2½-inches, ceiling 16-inches, side wall 1-inch.
4. Provide enough combustion and ventilation air.

LOCATING WALL FURNACE & THERMOSTAT

The furnace is installed between 2x4 inch wall studs spaced on 16-inch centers or a stud space that can be framed in to 16-inches. Consider the following points before attempting to install the furnace:

CAUTION: Do not make cutouts in the wall or ceiling before checking in the attic for ceiling joist locations and proposed venting.

FIGURE 1 – MINIMUM SPACING



1. Locate the furnace near the center of the space to be heated for good air circulation. Do not put it behind a door or draperies. Do not install the furnace where it could be isolated by closing doors to the heated space. Do not locate the furnace where a door could swing over the front panel or where circulation could be retarded by furniture or cabinets.
2. Check the minimum spacing needs as shown in **Figure 1**.
3. The top of the furnace must be at least 16-inches from the ceiling.
4. When the furnace is properly installed with legs resting on the floor plate, it sets the dimension from the face panel to the bare floor. (Approximately 2½-inches depending on the thickness of floor plate).
5. A protective barrier (metal or wood), cut to match the width and depth of the furnace, should be used to cover over any floor coverings such as carpet or vinyl under the furnace. At no time should the dimension from the bottom of the face panel to the protective barrier be less than 1½-inches.
6. In the space to be heated, the side of the furnace may be as close as 1-inch to an intersecting wall. The recessed portion may have 0-inches clearance to combustible material.
7. Select a location that will provide adequate accessibility clearance for servicing and proper operation.
8. After picking a location, inspect the wall, floor, attic and roof areas. Make sure there are no pipes, wiring, bracing, etc., that will interfere with furnace or vent installation. If required, move them or pick a new installation location.
9. Be sure that gas piping and electrical wiring can be brought to the location. Electrical wiring is required for optional blower accessory.
10. If installing the thermostat on the wall, locate the thermostat approximately 5-feet above the floor on an inside wall where it will sense the average room temperature.

The thermostat should be sensing average room temperature; avoid the following:

HOT SPOTS:

- Concealed pipes or ducts
- Fireplaces
- Registers
- TV sets
- Radios
- Lamps
- Direct sunlight
- Kitchen

COLD SPOTS:

- Concealed pipes or ducts
- Stairwell - drafts
- Door - drafts

- Unheated rooms on other side of wall

DEAD SPOTS:

- Behind doors
- Corners and alcoves

INSTALLING YOUR FURNACE

After picking a location that meets the requirements, check the walls, attic and roof to make sure there are no obstructions such as pipes, electrical wiring, etc., which could interfere with the installation of the furnace or vent pipe. If required, move them or pick a new location.

⚠ WARNING: Danger of property damage, bodily injury or loss of life. Do not install the furnace in any area where oxygen is in use.

Combustion & Ventilation Air

When an existing category I heater is removed or replaced, the original venting system may no longer be sized to properly vent the attached appliances.

⚠ 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 the 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 8149.1 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 8149.1

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 gashed burning appliance to their previous conditions of use.

⚠ WARNING: Danger of property damage, bodily injury or loss of life. The furnace and any other fuel-burning appliances must be provided with enough fresh air for proper combustion and ventilation of flue gases. Most homes will require that outside air be supplied into the heated area.

The high cost of energy for home heating has brought about new materials and methods used to construct or remodel most current homes. The improved construction and additional insulation has reduced the heat loss and made these homes much tighter around windows and doors so that infiltrated air is minimal. This creates a problem to supply combustion and ventilation air for gas-fired or other fuel burning appliances. Any use of appliances that pull air out of the house (clothes dryers, exhaust fans, fireplaces, etc.) increases this problem and appliances could be starving for air.

The combination of a tight energy efficient home with the use of exhaust fans, fireplaces, clothes dryers, and gas appliances result in more and more air being drawn from the house until fresh air may be sucked back into the house down a furnace flue or fireplace chimney. Carbon monoxide can be the result. Carbon monoxide (CO) is a colorless, odorless gas produced when fuel is not burned completely or when the flame does not receive sufficient oxygen. Automobiles, charcoal, wood fires and improperly vented or air-starved coal, oil and gas furnaces or other appliances can produce carbon monoxide.

Do not install furnace in the same room or near a wood solid fuel burning fireplace.

BE AWARE OF THESE AIR-STARVATION SIGNALS:

1. Headaches, nausea, dizziness.
2. Excessive humidity shown by heavily frosted windows or a moist "clammy" sensation.
3. Fireplace smoke fills the room or will not draw.
4. Furnace flue backs up.

AIR REQUIREMENTS

The requirements for providing air for combustion and ventilation are listed in the National Fuel Gas Code NFPA 54/ANSI Z223.1 (in Canada: CAN/CGA B149). Most homes will require that outside air be supplied to the heated area by means of ventilation grilles or ducts connecting directly to the outside or spaces open to the outdoors such as attic or crawl space. The only exception is when the heated area meets the requirements and definitions for an unconfined space with adequate air infiltration.

All air openings and connecting ducts must comply with the following: *(continued on next page)*

If the furnace is installed in an area with another gas appliance(s), the total input rating of all appliances must be considered when determining the free area requirements for combustion and ventilation air openings.

Ducts must have the same cross-sectional area as the free area of the openings to which they connect. The minimum dimension of rectangular air ducts must not be less than 3-inches in length or height.

⚠ WARNING: Danger of property damage, bodily injury or loss of life. Even when a house meets requirements for unconfined space with adequate air infiltration, it is recommended that a fresh air intake be installed to lessen the possible dangers from any future changes on the home.

LOUVERS / GRILLES AND SCREENS COVERING FREE AREA OPENINGS

If a screen is used to cover the opening(s), it must not be smaller than 1/4-inch mesh. Use the free area of a louver or grille to determine the size opening required to provide the free area specified. If the free area is not known, assume a 20% free area for wood and a 60% free area for metal louvers or grilles.

INFILTRATION AIR

If your furnace is in an open area (unconfined space), the air that leaks through the cracks around doors and windows may be enough for combustion and ventilation air. The doors should not fit tightly. The cracks around windows should not be caulked or weather stripped.

Spillage means air starvation. A fresh air duct or air intake opening must be installed to provide air directly to the furnace or other gas appliances.

If spillage exists or when the furnace is in a building of tight construction where the windows and doors are weather stripped, air for combustion and ventilation must be obtained from outdoors or space open to the outdoors.

To determine if infiltration air is adequate, perform the following checks:

1. Close all doors and windows. If you have a fireplace, start a fire and wait until flames are burning vigorously.
2. Turn on all exhausting devices, i.e., kitchen and bathroom exhaust fans; water heaters (gas and electric).
3. Turn on all vented gas appliances, i.e., heating equipment (includes any room heaters), water heaters.
4. Wait ten (10) minutes for drafts to settle.
5. Check for draft hood spillage at each appliance. Hold a lit match two-inches from the draft opening. **(Figure 2).**

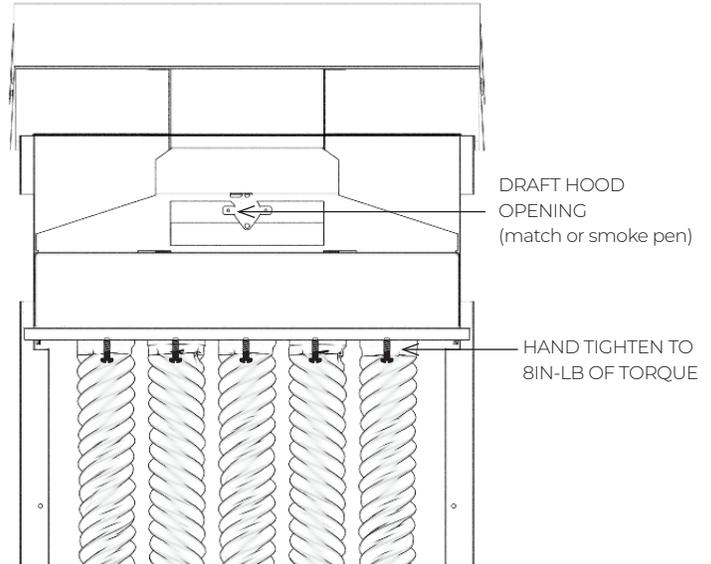
A. No Spillage

If the match flame pulls toward draft hood, this indicates sufficient infiltration air. Return exhausting devices and appliances to the condition you found them.

B. Draft Hood Spills

If there is spillage at a draft hood (match goes out or flame wavers away from draft hood), check for plugged flue connectors and chimneys. Repair blockage and test again.

FIGURE 2 – DRAFT HOOD SPILLAGE



If you have a fireplace, open a window or door near the fireplace and then check for spillage. If spillage stops, do not use the fireplace without a nearby window or door open until you can supply fresh air by a permanent duct.

If you have kitchen and bathroom exhaust fans, turn them off and check for spillage. If spillage stops, do not use exhaust fans (circuit breakers for fans should be turned off) until you can supply fresh air by a permanent duct.

Provide opening(s) having a total free area of one-square-inch per 4,000 BTU/hr. of the total combined input ratings for all appliances in the area. The required free area is shown in **Figure 3**. This fresh air opening or duct must terminate at a point not more than one-foot above the floor. It must have at least one-square inch of free area for each 4,000 BTU/hr. of input of all appliances in area.

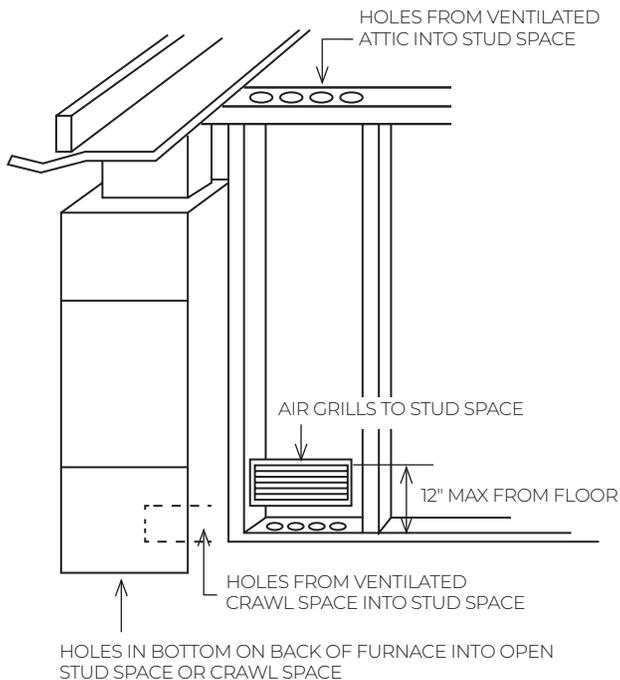
FIGURE 3 – FREE AREA

Free Area in Square Inches.
Each opening is based on one square inch per 4,000 BTU/hr

BTU/hr input	Square inches of opening	Required number of holes sill or header plates		
		1 - 1/2"	2"	3"
30,000	7.5	7	4	2
35,000	8.75	8	5	2
40,000	10.00	9	5	3
45,000	11.25	10	6	3
50,000	12.50	11	8	3
60,000	15.00	13	8	4

INSTALLING YOUR FURNACE

HOLE PLACEMENT - EXAMPLE



FURNACE LOCATED IN UNCONFINED SPACE

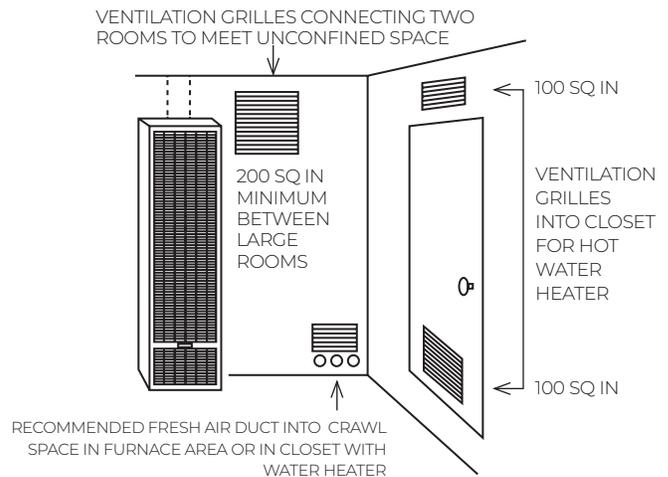
An unconfined space must have a volume of a minimum 50 cubic feet per 1,000 BTU/hr. of the total combined input of all appliances in the area. Adjoining rooms may be included only if there are no doors between the rooms or if special provisions are made such as ventilation grilles installed between connecting rooms. **Figure 4** outlines the minimum area in square feet, based on 8-foot ceiling heights for various BTU/hr. input ratings.

FIGURE 4 - MINIMUM AREA

4,000 BTU/hr. per square inch opening			
Round duct dia.	Rectangular square duct size	Max. BTU/hr input	*Uncontained space min. area in sq. ft. 8' ceiling height
4"	3" x 3"	30,000	145
4"	3" x 3"	35,000	219
4"	3" x 4"	40,000	240
4"	3" x 4"	45,000	281
4"	3" x 5"	50,000	312
4 1/2"	3" x 5"	60,000	375

* Can be two or more rooms separated by ventilation gas fire.

EXAMPLES OF GRILL PLACEMENT



FURNACE LOCATED IN CONFINED SPACE

If a furnace is installed in a confined space, it must be provided with free air for proper combustion and ventilation of flue gases by one of the following methods:

A. Air From Inside the Building

If the confined space adjoins an unconfined space, provide two permanent openings. One within 12-inches of the top and another within 12-inches of the bottom of the room directly connected to the unconfined space. Each opening must have a free area of at least 100-square inches or 1-square inch per 1,000 BTU/hr. of input for all appliances combined.

⚠ WARNING: Danger of property damage, bodily injury or death. The adjoining unconfined space must have adequate air infiltration.

B. Air From Outdoors

If confined space does not adjoin an unconfined space, then air must be provided from outdoors or spaces open to the outdoors such as an attic or crawl spaces.

Openings for inlet or outlet air should NOT be made into an attic area if the attic is equipped with a thermostat controlled power vent.

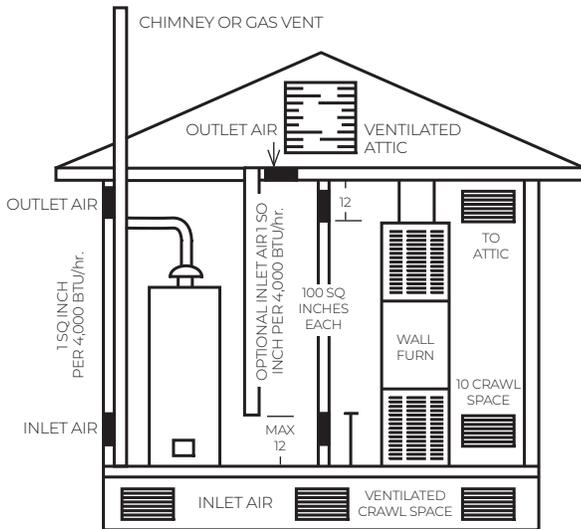
Provide two permanent openings, one within 12-inches of the top and bottom of the room connecting directly to, or by using ducts, with the outdoors or areas open to fresh air.

If the opening connects directly to, or with vertical ducts, the free area of each opening must be at least 1-square inch per 4,000 BTU/hr. of the combined input of all appliances in the area.

If horizontal ducts are used, the free area of each opening must be at least 1-square inch per 2,000 BTU/hr. of the combined input of all appliances in the area.

⚠ WARNING: Danger of illness, bodily injury or death. Draft hood spillage, with unobstructed vents, indicates that additional air must be brought into the structure from the outside. Keep a window open (minimum 2-inches near the appliance until a permanent air duct is installed).

EXAMPLES OF AIR INLETS AND OUTLETS



Recessed Wall Mount Installation

The maximum recess depth from rear of furnace forward is 4½-inches.

FIND THE STUDS AND CEILING JOINTS

Use a stud locator or small finishing nails. Repeatedly drive and remove a nail into the wall in the area of the stud until it is located. Then find the inside edge of the stud. Leave the nail at this location.

The other stud should be about 14½-inches from the one found. Drive finishing nails on the inside of this stud. Draw wall cutout to required size as shown in Figure 5. If wall studs are not on 16-inch centers. See "CLOSE OFF STUD SPACE."

Figure 6

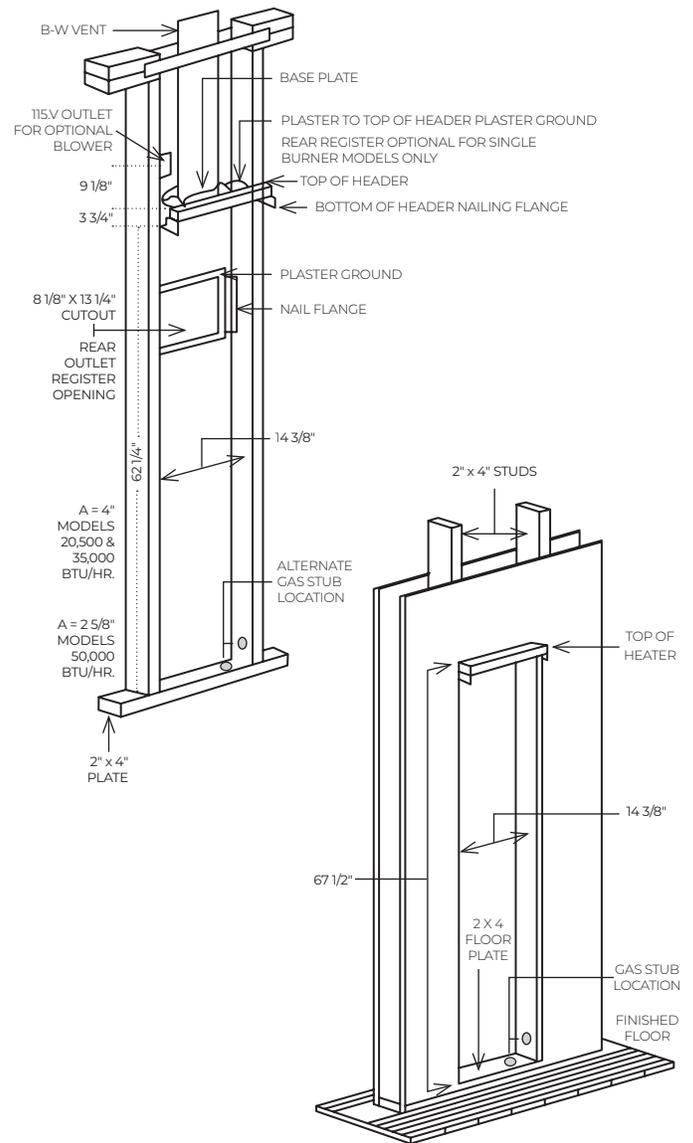
CUT WALL OPENING

Cut wall opening 14⅜-inches wide and 66⅞-inches high measured from the top of the floor plate. **Figure 5.** All corners must be square.

GAS SUPPLY OPENING

A hole must be drilled for the gas line. Decide whether the gas line will come through the floor or wall. Drill a 1½-inch hole through the floor or wall as needed. (Figure 5).

FIGURE 5- RECESSED WALL MOUNT INSTALLATION



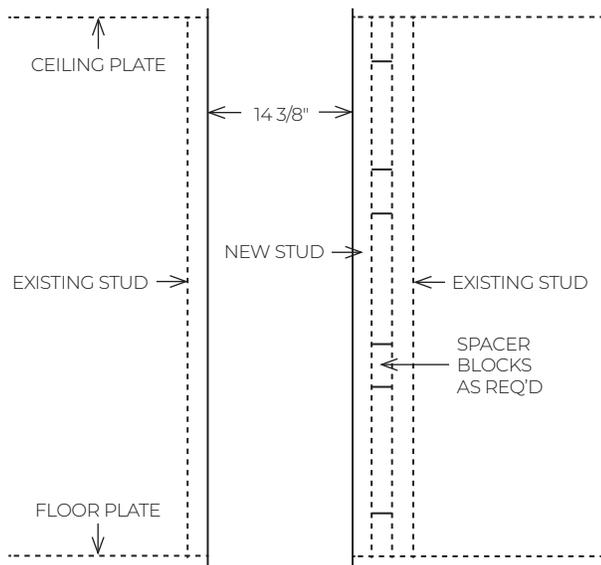
CAUTION: Be careful not to damage any furnace components while making any alternate hole.

INSTALLING YOUR FURNACE

CLOSE OFF STUD SPACE (IF REQUIRED)

If studs are not on 16-inch centers, cut the hole for the furnace next to an existing stud and frame in the other side using a 2x4 and spacer blocks as required. **Figure 6**

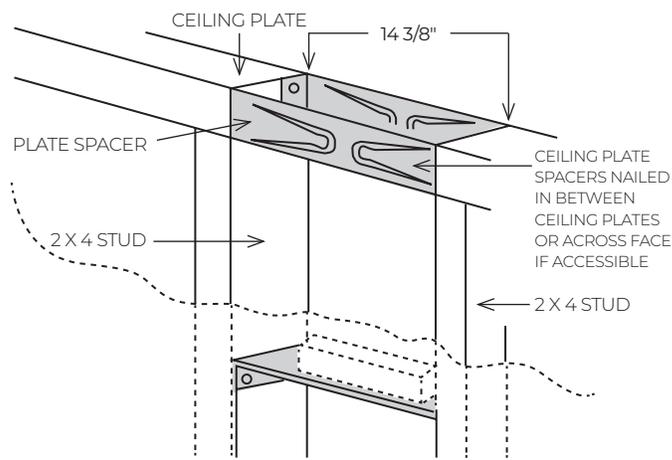
FIGURE 6 – CLOSE OFF STUD SPACE



INSTALL CEILING PLATE SPACER

Nail the ceiling plate spacers either across or in between the cut out section of ceiling plate. If nailed between, ends must be bent at 90 degrees. They must be fastened along each long edge of the ceiling plate hole to hold the oval vent pipe in the center of the hole. Ceiling plate spacers preserve structural strength and position oval vent pipe in the center of the cut out opening. **Ceiling plate spacers are not included. Figure 7**

FIGURE 7 – CEILING PLATE OPENING



CEILING PLATE OPENING

Cut away the ceiling plate between the studs where the furnace is to be installed. Work from the top in the attic. If there is no access to the top, remove the wall covering between the two wall studs all the way to the ceiling. Work through this opening. Cut out the entire plate so the plate edges will be even with the inner face of the 2 x 4 studs. **(Figure 7).**

INSTALL VENT BASE PLATE (HOLD-DOWN PLATE)

Position base plate on top of header plate and fasten with screws. **Note: Hold down plate is not included.**

HEADER PLATE (VENT SUPPORT)

Measure upward 62 1/4-inches from the top of the floor plate. Place a mark on each stud at this distance. **(Figure 5).** Place the header plate between the studs with the lower edges even with marks on the studs. Make sure header plate is level.

Locate rear edge of nailing tabs at back of the header. Nail header plate to the 2 x 4 studs which will center the vent collar in the wall.

Note: Header plate should stick out from the wall 2 5/8 inches.

Surface Mount Installation

The use of the optional **Free Standing Accessory No. 4901** allows single-sided furnaces to be surface mounted instead of recessed into a wall. This is ideal for remodeling existing masonry wall construction or when studding is substandard. This kit drastically cuts installation time and eliminates the expense of cutting into the walls and ceiling plates. Be sure this accessory is of the type and design required for the use with your furnace.

NOTE: After picking a location that meets the requirements, check the wall, attic, and roof to make sure there are no obstructions such as pipes, electrical wiring, etc., which could interfere with the installation of the furnace or vent pipe. If required, move them or pick a new location.

FIND THE WALL STUDS OR CEILING JOISTS

Find two studs or joists at the spot where the furnace is to be located. Use a stud locator or small finishing nails. Repeatedly drive and remove a nail into the wall or ceiling in the area of the stud or joist until you find it. Then find the its side and leave the nail there. Drive another nail just on the other side of the same stud or joist.

The inside of the next stud or joist should be about 14½ inches from the first one found. Drive a nail on the inside of this stud or joist.

Using the nails as a guide, draw two lines down the side of the wall from the ceiling to locate the furnace and ceiling hole cutout for venting.

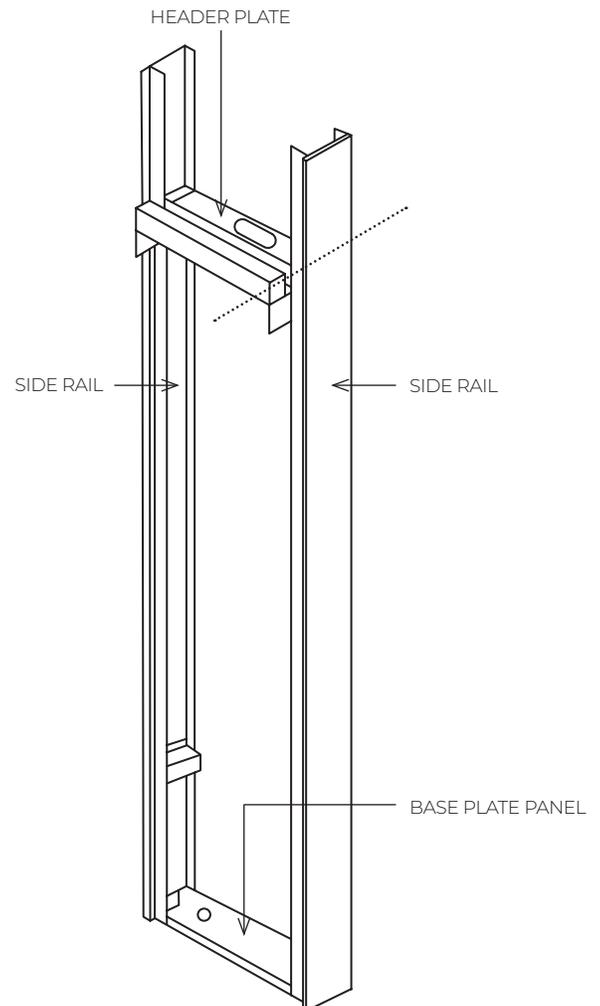
FREE STANDING ACCESSORY ASSEMBLY & INSTALLATION

1. Attach the base plate panel as shown in **Figure A** to the bottom of the side rails with four (4) # 6, ⅜" screws.
2. Attach the header plate, (included with the furnace), to the side rails using four (4) #8, ⅜" screws. Flanges of the header plate go against the wall. **Figure A**
3. Install extension side rails as shown in **Figure A**, by telescoping them inside the lower side rails. Adjust the extension side rails by sliding them up or down to ceiling height. Maximum: 8 feet 9 inches, Minimum: 7 feet 9 inches.
4. If the wall has a baseboard, cut the baseboard out to fit against the side rails. Stand the side rails against the wall and fasten them to the wall securely with screws or bolts in the holes provided. Use a level to assure the enclosure is plumb. **Screws and bolts for wall fastening are not included.**
5. After positioning the enclosure, cut a 3½ X 14 inch hole in the ceiling, centered between the studs or joists as shown in **Figure B**.
6. Cut ¼ inch off each end of the ceiling spacer plate. Place the ceiling spacer plate to the back of the wall and centered in the enclosure as shown in **Figure C**.
7. Install Type B/W vent though the roof and studs or joists in accordance with the installation instructions packed with the furnace and local codes. **See Vent**

Installation, page 15.

8. Set the furnace body into position. **Figure 10**, page 16. The furnace legs will rest on the bottom of the base plate panel. Utilizing the holes provided in the furnace legs, secure the furnace to the brackets attached to the bottom panel with two (2) #10, ¾" screws.
9. Install the vent enclosure panel, fastening it to the side rails with six (6) #6, ⅜" screws. Trim the bottom of the panel to fit the header plate.
10. Install gas inlet through the back wall or one of the two holes provided in the bottom base plate panel. **Figure D.** Connect gas line to furnace. **See Gas supply and Piping, page 17.**
11. Install furnace face panel. **See Front Panel Installation, page 19.** NOTE: The panel recesses ¼-inch between the vertical edges of the enclosure.

FIGURE A



INSTALLING YOUR FURNACE

FIGURE B

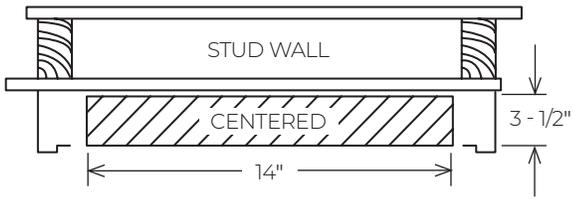


FIGURE C

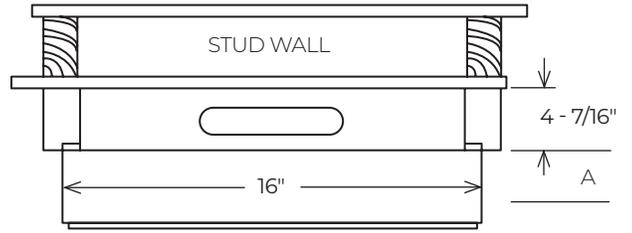
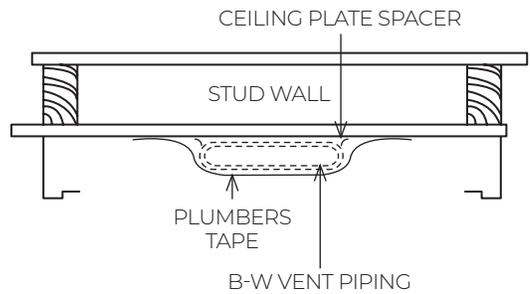
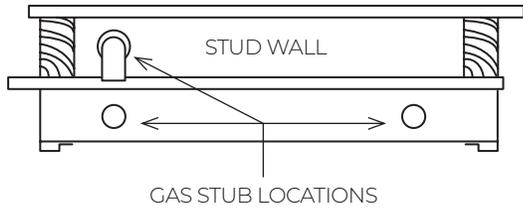
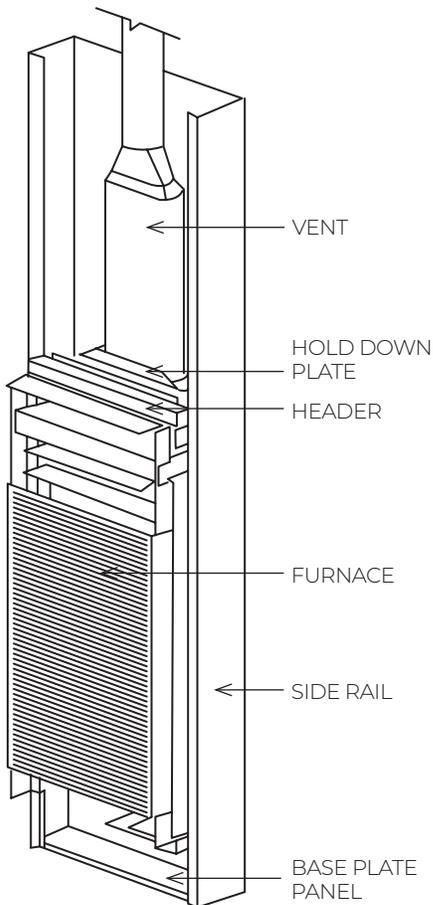


FIGURE D



VENT INSTALLED



FRONT PANEL INSTALLED

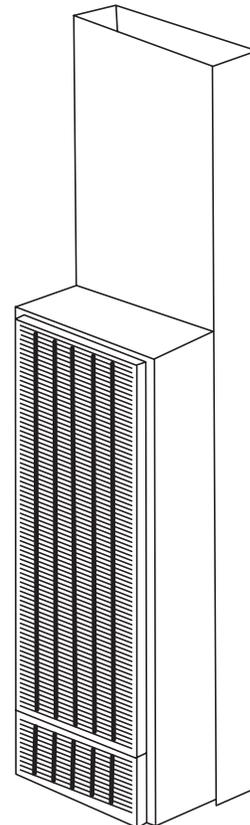
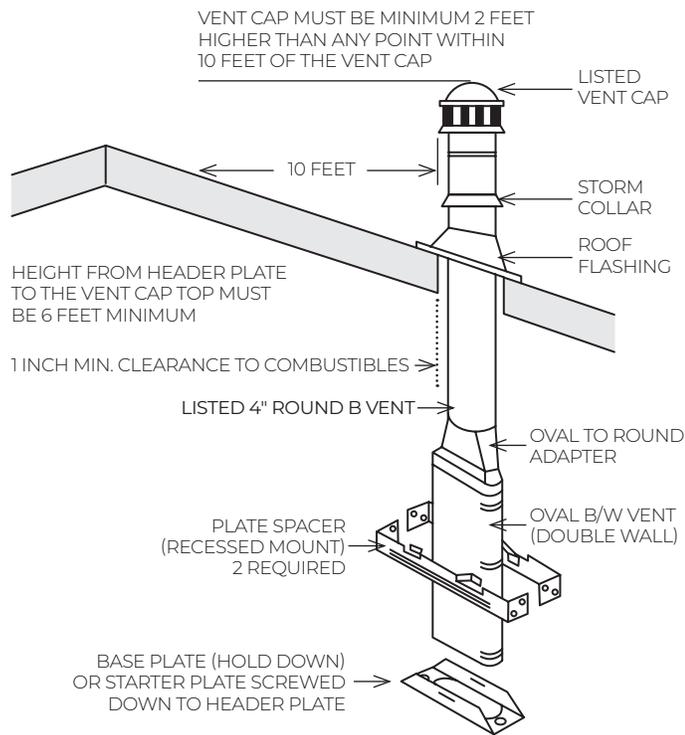


FIGURE 8 – TYPICAL VENT INSTALLATION



NOTE: THESE PARTS ARE SUPPLIED WITH THE FURNACE

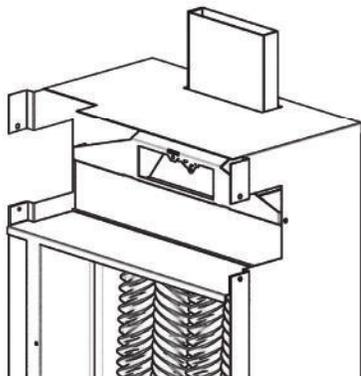
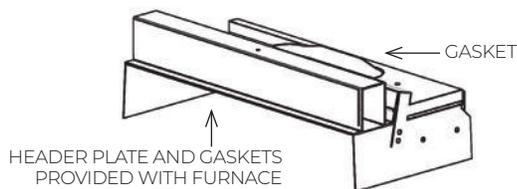
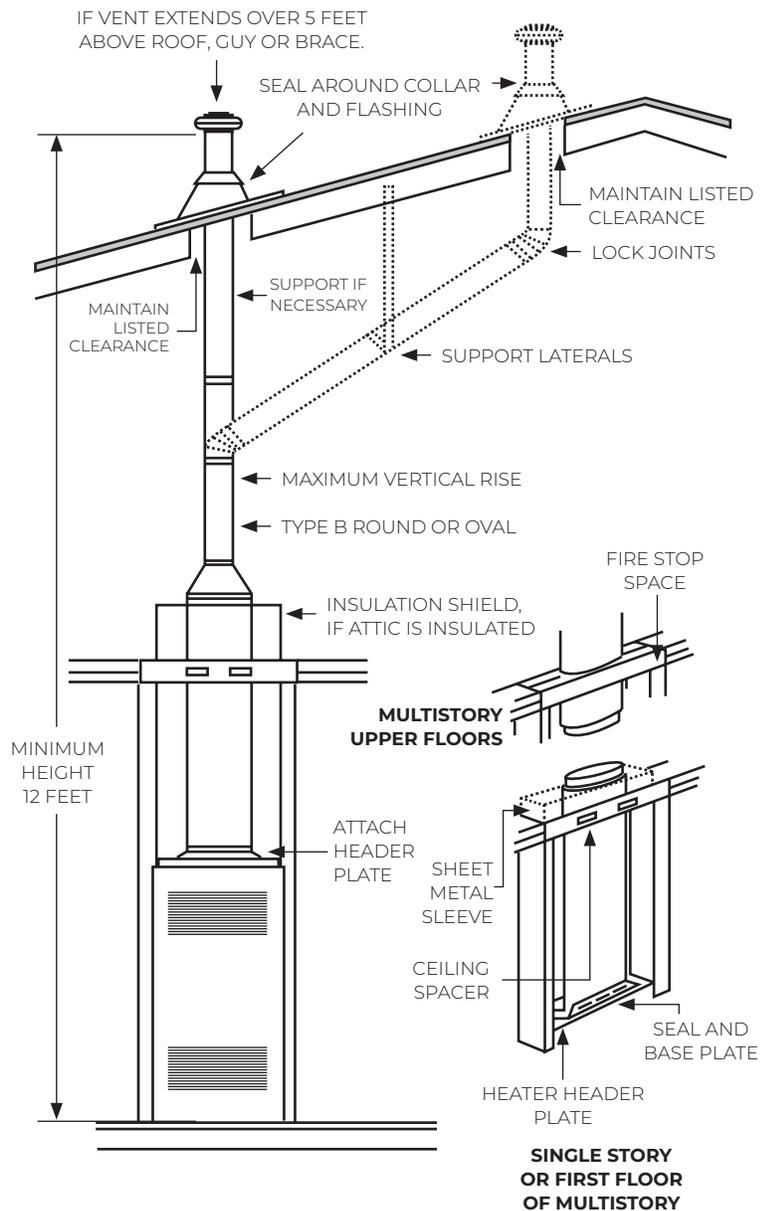


FIGURE 8 – ALTERNATIVE VENTING



Vent Installation

The vent installation must comply with all local codes and ordinances. If in doubt, consult your local codes or inspector.

The furnace vent must be directed to the outdoors so that harmful combustion gases will not collect inside the building.

This furnace must not be connected to a chimney flue serving a separate solid-fuel burning appliance.

This product is design certified to ANSI Z21.86. It must be installed with a U.L. tested and listed type "B" approved vent and type "B/W" approved vent **Figure 8**. Older style terra-cotta, transite pipe, clay, concrete or masonry type vent pipe cannot be used with this appliance. These types of vent pipe will not heat fast enough to establish a draft, which

INSTALLING YOUR FURNACE

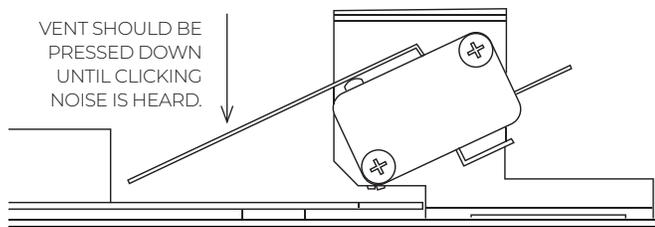
will result in improper venting of combustion products. Consequently, this could cause the vent safety control system to shut down the furnace.

The area above header within the stud space **MUST** be kept clear of any attic insulation to allow the free circulation of air around the oval vent piping. In some areas the building code requires the use of an attic shield.

The B/W vent must extend through the ceiling and roof terminating at least 12-feet above the finished floor on which the furnace rests.

The vent should also be pressed down until the vent presence switch on the header plate makes a clicking sound, as shown below in **Figure 9**.

FIGURE 9 - VENT PRESENCE SWITCH



INSTALL FURNACE VENT

Attach a 4-foot length of oval, double-wall vent pipe through the plate spacers to the hold-down plate. Push the vent pipe into the hold-down plate until it is completely seated. The hold-down cleat will engage the groove in the vent pipe.

COMPLETE THE VENTING

Type B/W gas vent shall extend from the header plate of the furnace to a point above the highest ceiling plate within the stud space through which the vent passes, without any offsets or crossovers. The first vent pipe offset, (if required), may not be any closer than 2-feet from the header and needs to extend past the ceiling plate. After a type B/W gas vent passes through the highest ceiling plate within a stud space above the furnace to which it serves, the vent system may be completed with a Type B gas vent, from the **SAME** manufacturer (do not mix brands of pipe). Offsets cannot be greater than 45 degrees from vertical. Refer to The Uniform Mechanical Code.

Install the oval-to-round adapter. Complete the piping extending it through the roof. Use a 4-inch round, double-wall (Type B) vent pipe, roof flashing, storm collar and vent cap as shown. The vent cap must be at least 2-feet higher than any point that is within 10- feet of the vent cap. There must be at least a 1-inch clearance between the vent pipe and any combustible material.

CAUTION: To avoid damage to wiring, be sure to route the wires away from the path of the furnace vent

Attaching Your Furnace

Clear the wall recess of all debris, remove any wood or plaster. Stand the furnace in front of recess, holding the furnace body at an angle. Insert flue collar into the opening in the header plate and raise furnace carefully **Figure 10**. Swing bottom of furnace into wall recess with front edges of legs flush with 2x4 floor plate. In the holes provided, nail through the legs into studs or floor plate **Figure 11**.

Avoid nailing the legs so tightly that it disturbs the inner furnace casing. Do not try to force the furnace into a smaller-than-specified recess.

If an existing gas line is preventing the installation of this, a cut-out may be made using tin snips on one of the legs to clear this existing gas line. This cut-out will be on one side of the unit on the rear side of the leg and only if necessary.

FIGURE 10 - INSERT FURNACE

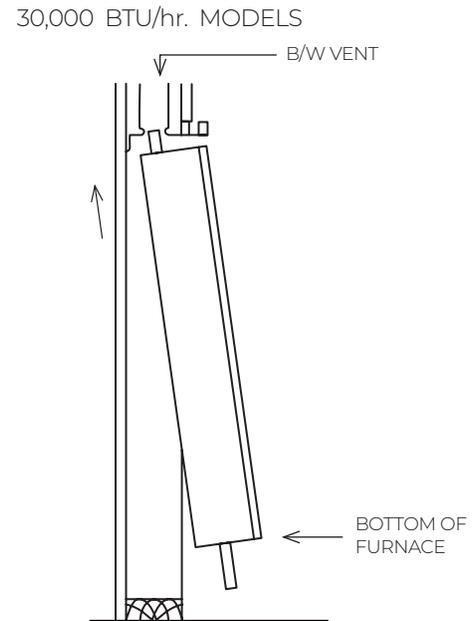
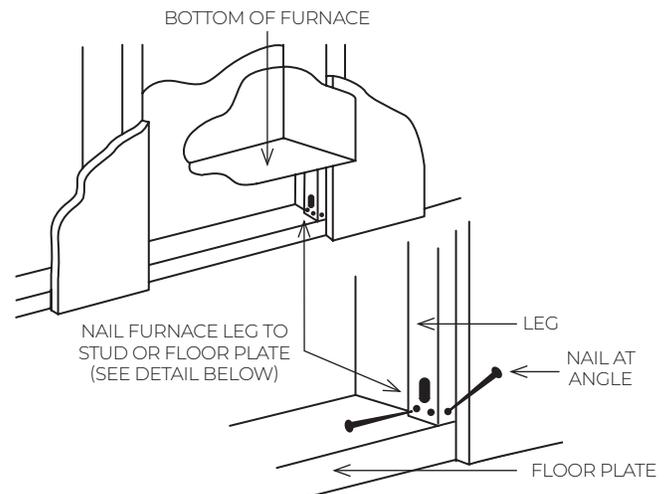


FIGURE 11 - NAIL PLACEMENT



Gas Supply and Piping

The gas control valve, in the furnace, is shipped with a seal over the gas inlet tapping. Do not remove the seal until ready to connect the piping.

⚠ WARNING: Danger of property damage, bodily injury or death. Make sure the furnace is equipped to operate the type of gas available. Models designed as natural gas are to be used with natural gas only. Models designed for use with liquefied petroleum propane gas have orifices sized for commercially pure propane gas. They cannot be used with butane or a mixture of butane and propane.

GAS SUPPLY

For natural gas, the minimum inlet gas supply pressure for the purpose of input adjustment is 5-inches water column. The maximum inlet gas supply pressure is 7-inches water column.

Gas pressure and input to the burners must not exceed the rated input and pressure shown on the nameplate. The natural gas manifold pressure should be 4-inches water column.

ORIFICE SIZES

The efficiency rating of this appliance is a product thermal efficiency rating determined under continuous operating conditions and was determined independently of any installed system.

This furnace is equipped with a computer controlled modulating valve and power burner. For elevations above 2,000 feet, adjust thermostat settings to the appropriate elevation during installation.

The gas supply line must be of adequate size to handle the BTU/hr. requirements and length of the run for the unit being installed.

Determine the minimum pipe size from **Figure 12**, based on the length of the run from the gas meter to the unit.

FIGURE 12 - PIPE CAPACITY

PIPE CAPACITY - BTU/hr. WITH FITTINGS

NATURAL GAS			
LENGTH OF PIPE FEET	PIPE SIZE		
	1/2"	3/4"	1"
20	92,000	190,000	350,000
40	63,000	130,000	245,000
60	50,000	105,000	195,000

All piping must comply with local codes and ordinances or with the National Fuel Gas Code (ANSI Z223.1 NFPA No. 54), whichever applies. (In Canada: CAN/C.GA B149). Refer to **FIGURE 13** for the general layout of the unit. It shows the basic fittings needed.

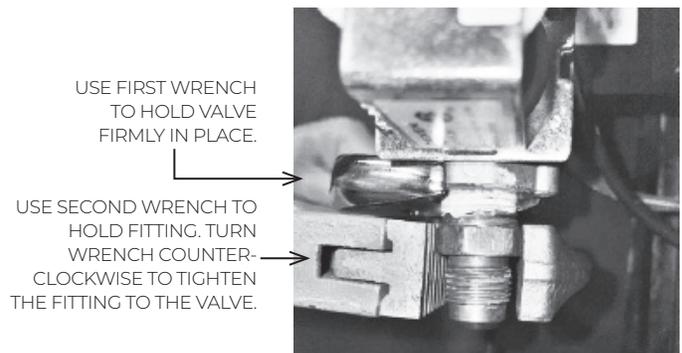
The following rules apply:

1. Use new, properly reamed steel or black iron pipe and fittings free of metal chips and debris that are approved by local codes. Metal chips and debris can damage the valve.
2. Do not thread pipe too far. Valve distortion or malfunction may result from excess pipe within the gas control valve. Apply a moderate amount of good quality dope to the pipe only. Leave the two end threads bare. **Figure 14**.
3. Use ground joint unions.
4. Install a drip leg (sediment trap) to trap dirt and moisture before it can enter the gas valve. The nipple must be a minimum of 3-inches long.
5. Install a manual shutoff valve.
6. Provide a 1/8" NPT test gauge connection immediately before the gas supply connection to the furnace.

GAS CONNECTION

Use two pipe wrenches when making the connection to the valve to prevent turning and/or damage to the valve or orifice. Use one pipe wrench to maintain the valve's position and use another to install the gas nipple and line. Refer to **Figure 15** below.

FIGURE 15 - VALVE CONNECTION



Use two pipe wrenches when making the connection to the valve to prevent turning and/or damage to the valve.

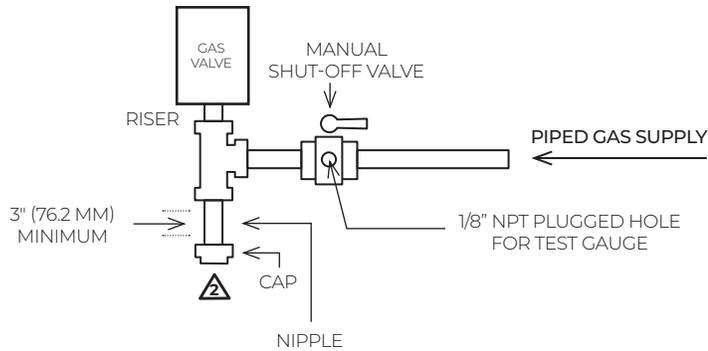
Connections between the manual shutoff valve and burner control assembly can be made with an A.G.A./C.G.A. design certified flexible connector if allowed by local codes. Drip leg and ground joint unions are still required.

Tighten all joints securely.

Test all piping for leaks. When checking gas piping to the furnace with gas pressure less than 1/2 PSI, shut off manual gas valve to the furnace. If gas piping is to be checked with the pressure at or above 1/2 PSI, the furnace and manual shutoff valve must be disconnected during testing. (SEE WARNING). Apply soap solution (or a liquid detergent) to each joint. Bubbles forming indicate a leak. Correct even the slightest leak at once.

INSTALLING YOUR FURNACE

FIGURE 13 – GAS PIPING



⚠ WARNING: Danger of property damage, bodily injury or death. Never use a match or open flame to test for leaks. Never exceed specified pressures for testing. Higher pressures may damage the gas valve and cause over-firing which may result in component(s) failure. Never attempt start-up of unit before thoroughly ventilating the area and smelling near the floor for gas odor.

⚠ CAUTION: All bends in metal tubing must be smooth.

⚠ CAUTION: Shut off the main gas supply before removing the end cap to prevent gas from filling the work area. Test for gas leakage when installation is complete.

FIGURE 14 – PROPER PIPING PRACTICE

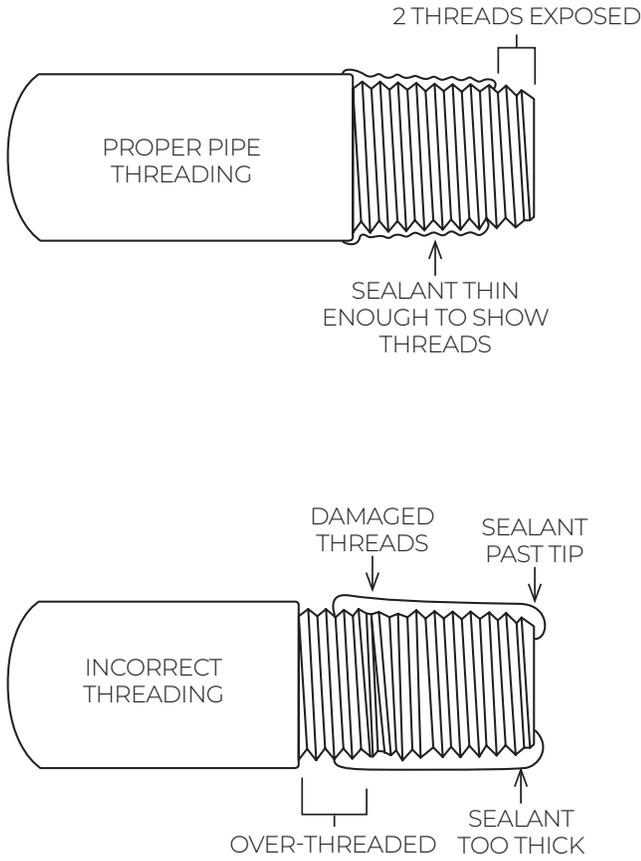
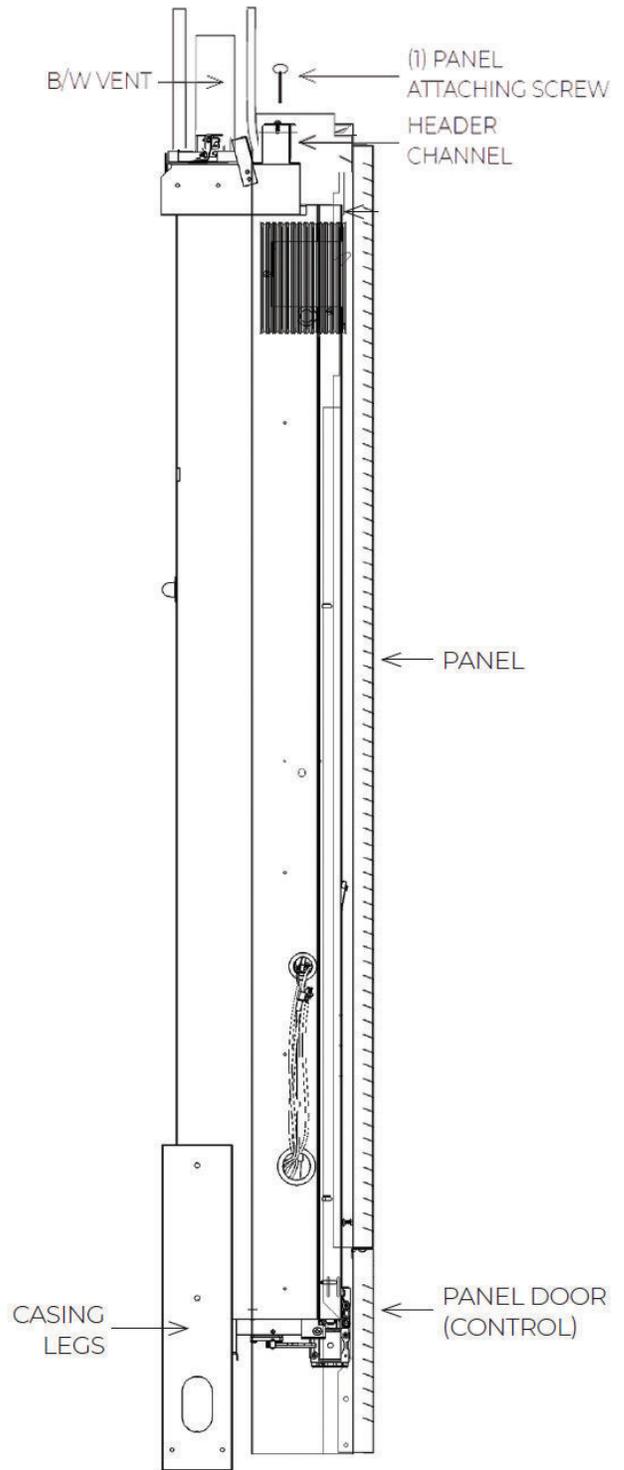


FIGURE 16 – PANEL PLACEMENT



Front Panel Installation

Place the front panel top over the channel on the header plate, as shown in **Figure 16**. Press the panel tight against the wall, and secure it to the header channel with the screw provided in final assembly package. Open the control door at bottom of panel and fasten the panel at each side through slots in flanges with screws provided.

Attach handle to the front panel door with the screw provided.

INSTALLING YOUR FURNACE

Thermostat Installation

Use the thermostat supplied with the unit.

1. Use cable supplied with the unit.
2. If a new location is chosen or if this is a new installation, thermostat cable must first be run to the location selected. These instructions cover bringing the cable down from the attic but it may be run from a basement or crawl space using similar methods.
3. Before drilling a hole in the wall at the selected location, drive a small finish nail through the ceiling in the corner of the wall and ceiling above the thermostat location. Pull the nail out and push a small, stiff wire through the hole so it can be found in the attic. Drill a ½-inch hole through the ceiling wall plate.
4. Probe for obstructions in the partition. Then, drill a ½-inch to 1-inch hole through the wall at the selected location for the thermostat.
5. From the attic, feed the thermostat cable through the wall until even with the thermostat location.

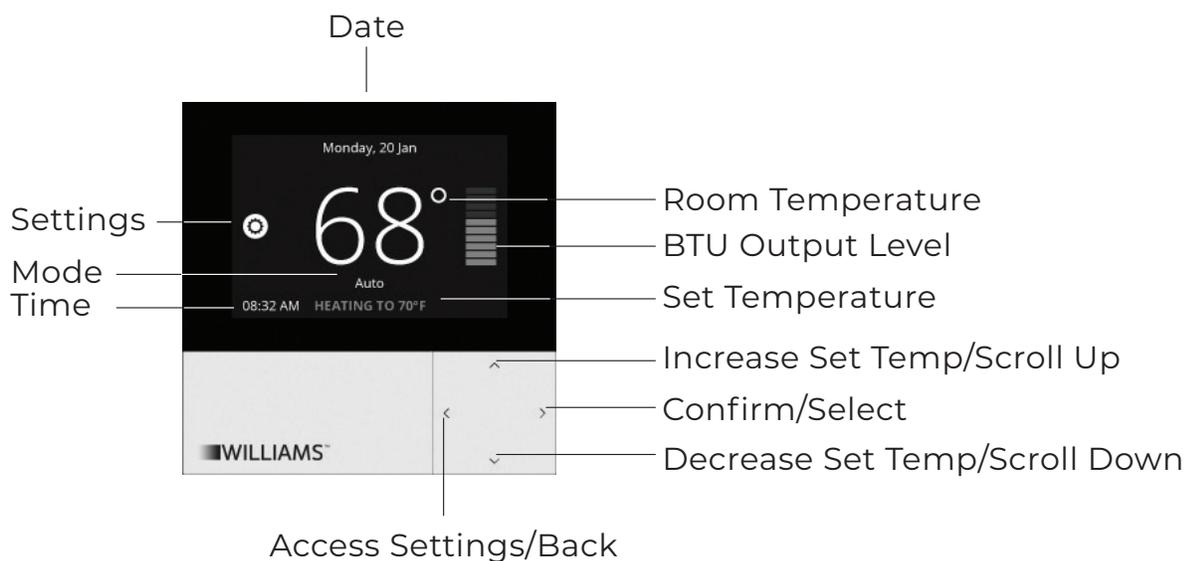
6. Snag the thermostat cable through the hole and pull the cable through the hole in the wall so that 6-inches of the cable protrude.
7. Route cable to the furnace.
8. Never use nails or staples across the thermostat cable.

WALL-MOUNTED THERMOSTAT INSTALLATION

1. Mount thermostat mounting plate on wall making sure the opening on the plate matches up with the hole in the wall where the thermostat cable will be threaded through.
2. Thread thermostat cable through the hole in the wall and mounting plate.
3. Connect thermostat cable to thermostat.
4. Mount thermostat onto mounting plate.

IMPORTANT: Keep the thermostat cable away from the combustion chamber.

FIGURE 17 – THERMOSTAT SETTINGS

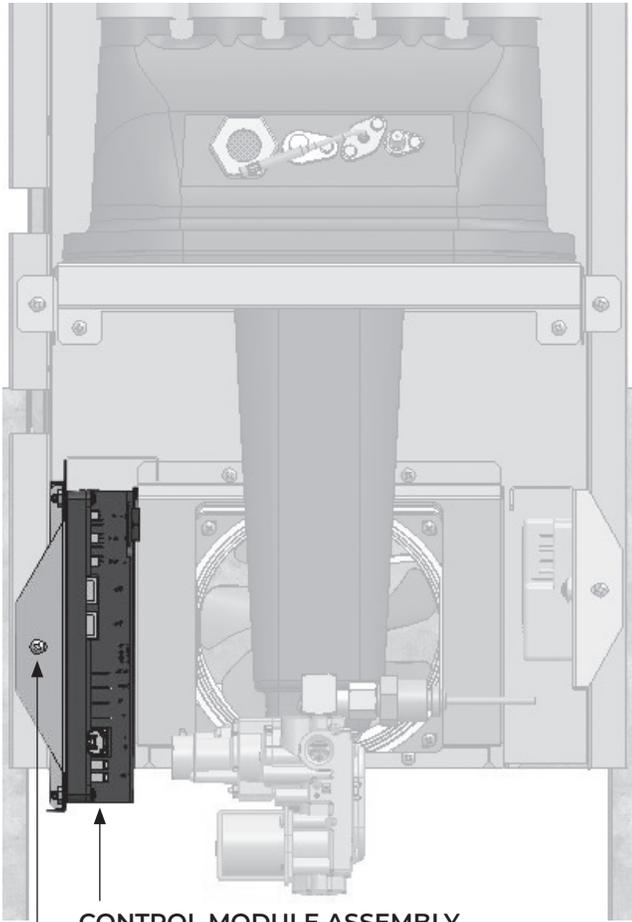


NOTE: A step-by-step "Customer Thermostat Settings" instructions sheet is included in your shipping box. These instructions will guide you through programming your thermostat and other important settings. This instruction document can also be found online at:

<https://www.williamscomfortprod.com/products/furnaces/carmel-tg2030tn/>

Battery Installation

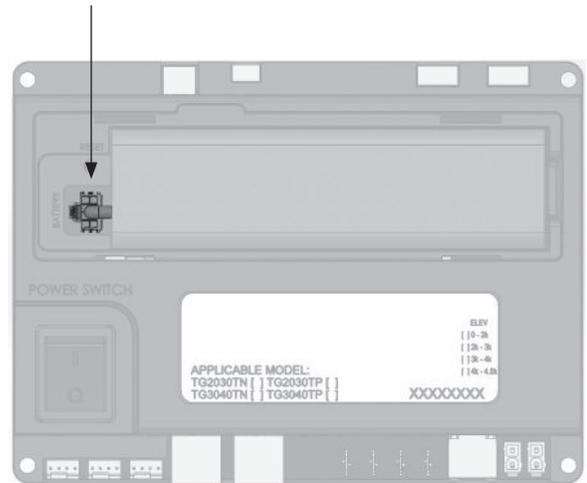
1. Disassemble the control module assembly from the cabinet, (see below).



GROUND-CHASSIS CONNECTION

2. Remove the battery cover from the control board
3. Make sure the control board on-off button is switched to off (O)
4. With the Li-ion battery pack already inside the control board, take the 8-pin battery connector and plug it into the outlet located inside the battery holder
5. Replace the battery cover
6. Reassemble the control module assembly while making sure the ground cable (green) is attached to the chassis
7. Switch on the control board (I)

8-PIN CONNECTOR



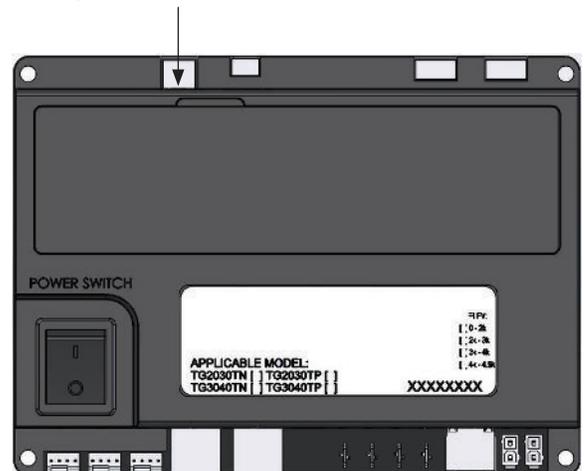
Outgassing/Charging the Battery

Outgassing is required for a brand new unit to remove the fumes out. The battery shipped with the unit comes with a partial charge. Outgassing and the initial battery charging can be done simultaneously.

1. Open all doors and windows to keep the room well-ventilated
2. Set the thermostat to a temperature that is well beyond the room temperature
3. Let the unit run for an hour to make sure oils have vaporized and the battery is sufficiently charged

NOTE: If the battery charge is too low to support ignition (unit does not start), use an AC/DC adapter (optional accessory) to externally supply power. This will only be required to support the initial ignition but can also be used to charge the battery.

AC/DC ADAPTER INPUT



START-UP PROCEDURE

Check the furnace operation as outlined in the following instructions. If any sparking, odors or unusual noises are encountered, shut off electric power immediately. Recheck for wiring errors or obstructions in or near fan motor (if equipped).

⚠ WARNING: Natural gas heating value (BTU per cubic foot) can vary significantly. Therefore, it is the installer's responsibility to see that BTU/hr. input to the furnace is adjusted properly. Failure to do so could cause combustion chamber failure, asphyxiation, fire or explosion resulting in damage, bodily injury or death. Refer to the National Fuel Gas Code (NFPA 54) to be sure the furnace is burning fuel at the proper rate.

CHECK GAS INPUT AND PRESSURES

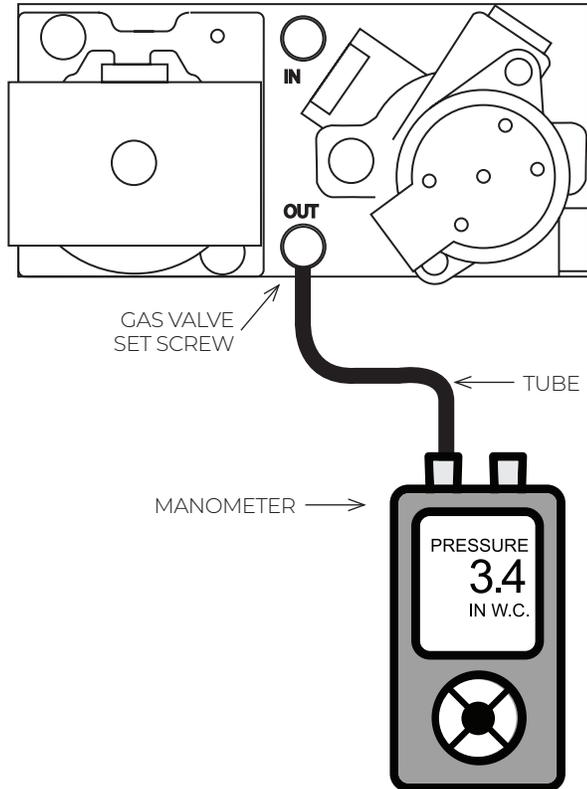
This furnace **may not be used at elevations above 4,500 Feet.**

Gas supply pressure and manifold pressure with the burner operating must also be as specified on the nameplate.

CHECK THE MANIFOLD GAS PRESSURE ON MANOMETER

Natural Gas Input Rate	TG2030 Manifold Pressure in W.C.
20,000	1.5
30,000	3.5

FIGURE 18



A tapped opening is provided in the gas valve to facilitate measuring manifold gas pressure. A water column manometer having a scale range from 0 to 12-inches of water column should be used for this measurement.

The manifold pressure must be measured with the burner. Make sure the gas is shut off first before the tap is loosened. The pin inside is captive so it will not pop out once it is loose.

1. Connect a tube between the valve outlet and the manifold as shown in **FIGURE 18**
2. Turn on the gas supply.
3. Refer to D112079 - Installer Thermostat Manual to test fire the furnace at 30,000 BTU and 20,000 BTU.
4. Verify the gas pressures at each setting. The manifold pressure can vary by +/- .2 in WC
5. Once complete, turn off the furnace before disconnecting the tube.
6. **Tighten the captive pin to 6 in-lbs of torque.**

CHECK THE GAS INPUT (NATURAL GAS ONLY)

Refer to D112079 installer thermostat manual to test fire the furnace at 30,000 BTU and 20,000 BTU. Under firing could cause inadequate heat, excessive condensation or ignition problems. Over firing could cause shooting flame impingement or overheating of the combustion chamber. Before starting natural gas input check, obtain the heating value of gas (BTU per cubic foot) at standard conditions from your local gas supplier. To measure the input, using the gas meter, proceed as follows:

1. Turn off gas supply to all other appliances except the furnace.
2. With the furnace operating, time the smallest dial on the meter for one complete revolution. If this is a 2-cubic-foot dial, divide the seconds by 2. If it is a 1-cubic-foot dial, use the time in seconds as is. This gives the seconds per cubic foot of gas being delivered to the furnace.
3. Assuming natural gas with a heating value of 1,000 BTU per cubic foot and 34-seconds per cubic foot used as determined by step (2), then: Seconds per hour = 3,600
Input = 1,000 x 3,600 / 34 = 106,000 BTU/hr. This measured input must not be greater than the input indicated on the nameplate of the furnace.
4. Relight all other appliances turned off in Step 1 above. Be sure all pilots are operating.

CHECK THERMOSTAT

Check thermostat operation. The thermostat will turn on the furnace when room temperature falls 2° F below the thermostat set point for more than 1 minute. The thermostat will turn off the furnace when the room temperature is more than 1° F over set point for more than 1 minute.

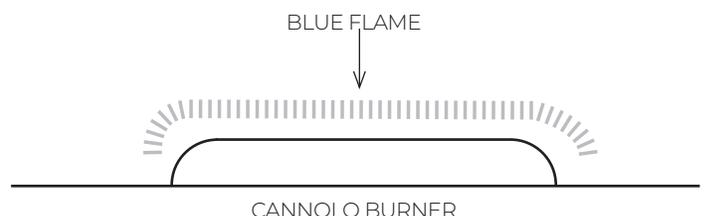
CHECK CONTROL WIRING CONNECTIONS

Refer to wiring diagram on page 28.

BURNER FLAME CHARACTERISTICS

Start the furnace and let it operate at least ten minutes. Observe the flame from the Sight Window. The flame should turn to blue color with scattered dots of yellow color within 2 minutes of ignition. Limit your movements near the furnace for a few more minutes before making your final observations. The flame may look yellow due to dust particles in the room air or a clogged filter on the combustion fan. An occasional flash of orange might be seen as dust particles burn in the flame. This is normal. No burner adjustment is provided, or is necessary. **Figure 18.**

FIGURE 19 – BURNER FLAME CHARACTERISTICS



NORMAL APPEARANCE

NATURAL GAS:

1. Blue Colored Flame with scattered yellow dots.
2. Flame would rise approximately 1/2 inch - 3/4 inch above the burner ports.

ABNORMAL APPEARANCE

LAZY FLAME:

1. Completely yellow colored flame indicating a very rich mixture.
2. Blue Colored Flame rising very high above the burner ports and almost detaching from the ports indicating a very lean mixture.

FAST FLAME:

Flame will not hold to ports—entire cone sections blow off from noisy ports (too much pressure).

⚠ WARNING: If flame appears abnormal, contact the gas company or a qualified service technician immediately.

Operation Of Your Furnace

The furnace operates in the following sequence:

1. Switch on the Thermostat. The gas valve opens to allow gas flow to the burner and the combustion fan starts to supply combustion air to ignite the burner
2. Heat builds up in the furnace and starts the fan. The heated air comes out the circulation fans.
3. When thermostat setting is reached, the gas valve stops gas to the burner and the unit is shutoff.

⚠ WARNING: The surface of the furnace is hot during operation. Keep children, clothing, furniture, and flammable material away from it. Keep all access doors and panels in place except for inspection and maintenance. On new installations, the gas lines will be filled with air and it may take several minutes to establish the flame.

⚠ WARNING: Danger of property damage, bodily injury or death. If the furnace overheats or fails to shut off, close manual shutoff gas valve to the furnace before turning off electrical power to the accessory fan.

⚠ IMPORTANT: KEEP BURNER AND CONTROL COMPARTMENT CLEAN. BURNER IS INACCESSIBLE AND CANNOT BE CLEANED UNLESS REPLACED

⚠ WARNING: OBSERVE ANY LOUD NOISE OR FLASH BACK WHEN THE COMBUSTION IS INITIATED. IF IT DOES, CONTACT THE REPRESENTATIVE

FOR YOUR SAFETY READ BEFORE LIGHTING

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

- A. BEFORE LIGHTING: smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- B. Use only the thermostat and power ON/OFF switch on the control unit at the bottom of the furnace to turn the gas control on/off. Any attempted repairs or adjustments should be performed by a qualified service technician. Applying force or attempted repair may result in a fire or explosion.
- C. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.
- 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.

LIGHTING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Turn off the remote thermostat and power ON/OFF switch on the control unit at the bottom of the furnace.
3. Open bottom louver assembly, or open the service access panel.
4. Turn off all electric power to the appliance.
5. Turn gas line valve to "ON"
6. Wait five (5) minutes to clear out any gas. Then smell for gas including near the floor. If you smell gas, STOP! Follow A in the safety above. If you do not smell gas, go to the next step.
7. Turn on all electric power to the appliance.
8. Turn on the thermostat and power ON/OFF switch on the control unit at the bottom of the furnace, and set thermostat to desired setting (if available). Activate appliance using display panel .
9. This appliance is equipped with an ignition device that automatically lights the burner. Do not try to light the burner by hand.
10. If the appliance will not operate, follow the instruction "TO TURN OFF GAS TO APPLIANCE", and call your service technician or gas supplier.
11. Close bottom louver assembly, or close the service access panel.

TO TURN OFF GAS TO APPLIANCE

1. STOP! Read the safety information above.
2. Open bottom louver assembly, or open the service access panel.
3. Turn off all electric power to the appliance.
4. Turn gas line valve to "OFF".
5. Close bottom louver assembly, or close service access panel.

IMPORTANT: KEEP BURNER AND CONTROL COMPARTMENT CLEAN.

⚠ WARNING: Due to high surface temperatures, keep children, clothing, furniture or any combustible material away from the furnace.

CARING FOR YOUR FURNACE

How To Care For Your Furnace

⚠ WARNING: Danger of bodily injury or death. Turn off electric power supply at disconnect switch, fuse box or service panel before removing any doors or access service panels from unit.

ANNUAL UPKEEP NEEDED

It is recommended that a qualified service technician perform these maintenance checks at the beginning of each heating season.

CABINET FINISH

Clean cabinet with damp cloth. Never use abrasive cleaners. Cabinets are finished with heat resistant powder paint. Never refinish or paint.

FURNACE AREA

Keep the area near the furnace clear and free from combustible materials, gasoline and other flammable liquids and vapors.

COMBUSTION AND VENTILATION AIR

The combustion and ventilation air supply must not be blocked. Do not put anything in or on the furnace cabinet. For better circulation and more effective heating, do not place obstructions, furniture or other items closer than four-feet in front of the furnace or two-feet from each side of the furnace.

CLEANING BLOWER

Shut off electricity. Clean any lint or dirt from fan blades, fan motor and exposed air passages.

VENT SYSTEM

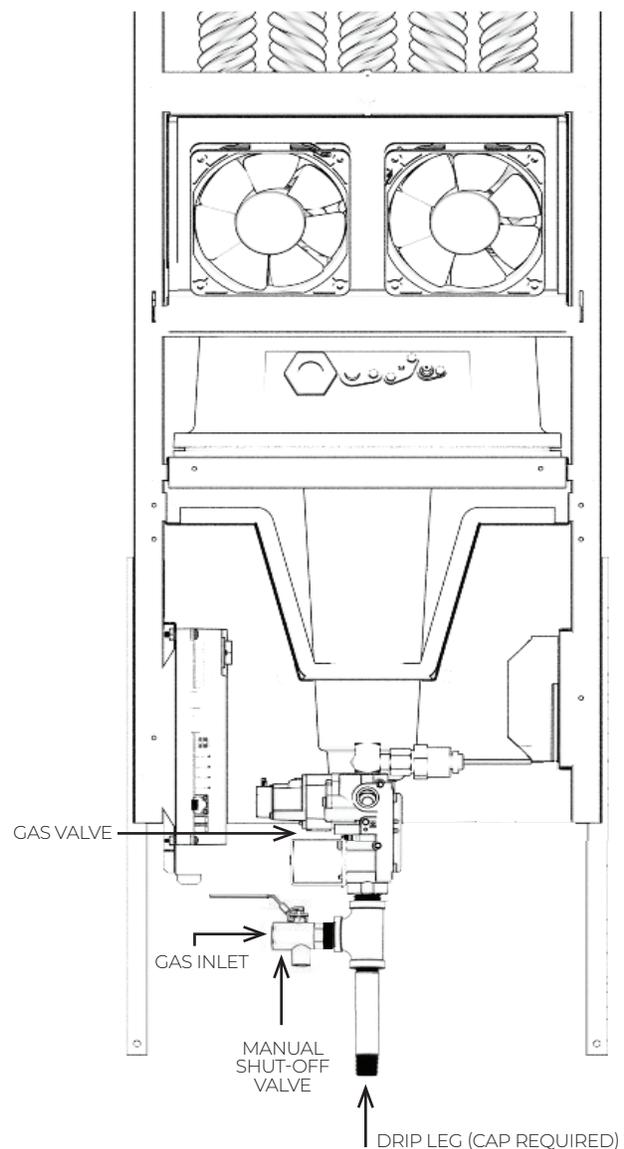
Make sure that no parts of the venting system are blocked or rusted. Clean or replace before using the furnace.

NOTE: It is recommended to replace the hot surface igniter annually.

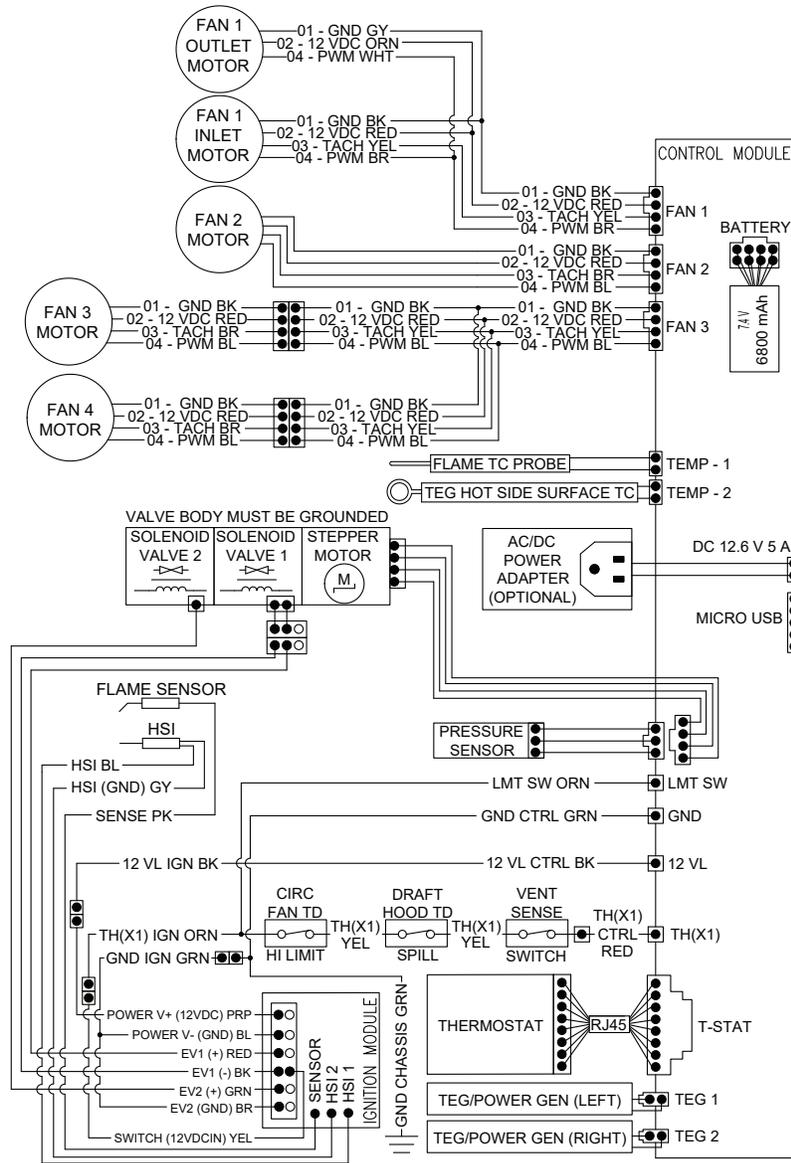
DANGER: The build-up of any dust, lint or foreign material in the primary air opening of the burner can interfere with the proper air gas mixture and can result in a yellow flame which can produce carbon monoxide and soot. This condition, if allowed to develop, can lead to bodily injury including death. It is imperative that the burner be kept clean. Make sure both ends of combustion fan is clear. Use a pipe cleaner or run vacuum over both ends of the fan if needed.

CAUTION: Danger of property damage, bodily injury or death. Turn off electric power supply at the disconnect switch, fuse box or service panel before removing or working on the fan cabinet.

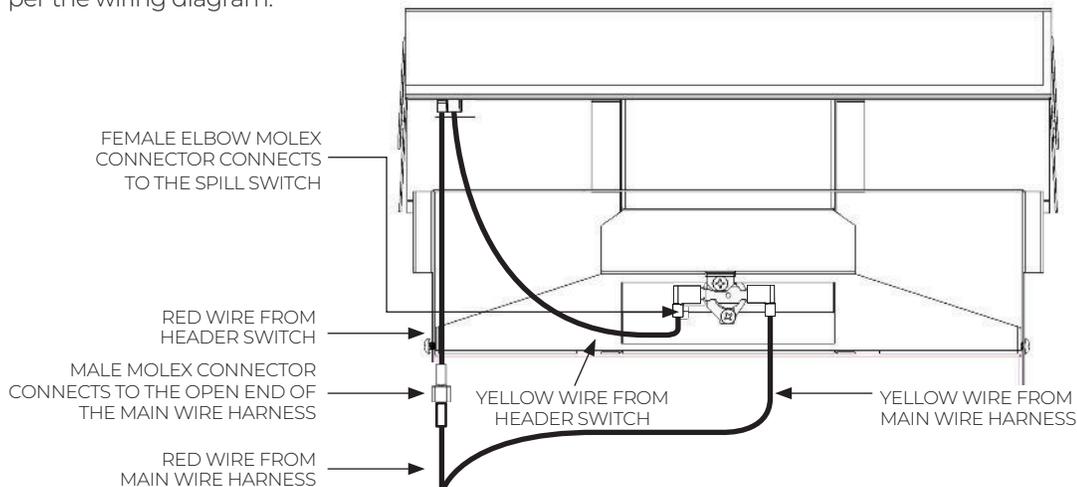
FIGURE 20 – DISCONNECTING GAS LINE



WIRING DIAGRAM



Note: These two wires from the header switch should not be connected directly to each other. All switches should be in series as per the wiring diagram.



INSTALLING POWER SUPPLY KIT M119046

INSTALLATION INSTRUCTIONS FOR MODELS: AC2030TNA / TG2030TN

NOTE: Be sure to follow national electrical code, ANSI/NFPA 70, or Canadian Electrical Code, Part I, CSA C221 and all local codes for electrical wiring when following these instructions. Keep power wires away from any hot surfaces on the furnace. Any cuts, drills or notches made to any studs or joists must be approved per local codes.

REPLACEMENT PARTS TABLE

REFERENCE #	ITEM NUMBER	DESCRIPTION	QUANTITY
1	P323856	AC power adapter	1
2	P012900	1/2 in. strain relief	1

INSTALLING THE POWER SUPPLY KIT:

1. Locate and temporarily free the control module by unscrewing it from the heat shield.
2. Find the power socket on the control module.
NOTE: Do not allow any wiring to contact the gas line. See local codes for gas lines and electrical wiring for more info.
3. Place the power cable through the hole on the bottom of the bracket and clip the new strain relief onto it.
4. Plug the power cable into the control module, then secure the strain relief to the bracket.
5. Reinstall the control module and make sure all wires are properly secured and in place.
6. Plug power cable into the nearest outlet.
7. Turn on control module when ready to fire up.



INSTALLING EXTERNAL POWER SUPPLY KIT M119015

INSTALLATION INSTRUCTIONS FOR MODELS:

AC2030TN / AC2030TNA / TG2030TN

If the standard power adapter is not long enough to reach an outlet, this kit can be used to wire the unit through the wall, to the power adapter, and into the house's power line instead.

NOTE: Be sure to follow national electrical code, ANSI/NFPA 70, or Canadian Electrical code, Part I, CSA C22.1 and all local codes for electrical wiring when following these instructions. Keep power wires away from any hot surfaces on the furnace. Wires that run from the furnace to the adapter must be stranded, rated for 105°C, and no smaller than 18 AWG. Any cuts, drills or notches made to any studs or joists must be approved per local codes.

BASIC TOOLS NEEDED:

- Phillips screw drivers
- Pliers
- Wire splitter
- Drill gun / drill bits (optional)
- Digital Multimeter
- J-BOX (RECOMMENDED, NOT PROVIDED)

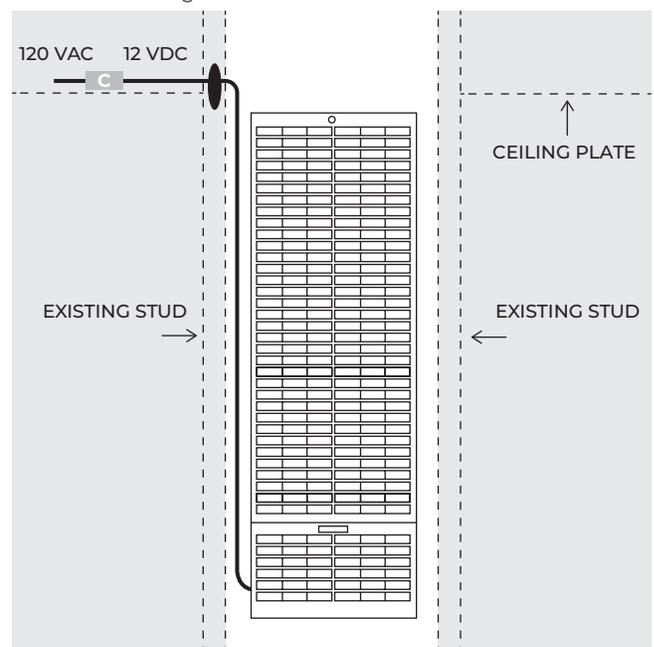
INSTALLING EXTERNAL POWER SUPPLY:

1. Shut off the circuit for the area of wiring you are going to splice into. Remember to wear all proper PPE for this portion of the installation.
2. First, consider where to place the power supply. See examples listed below for placement options (**Figure 1A-1D**).
 - If the power supply is placed under the unit, it is strongly advised to use CSST piping. Do not allow any wiring to contact the gas line. NOTE: See local codes for gas lines and electrical wiring for more info.
3. Measure 18 AWG wire lengths needed for the furnace power*. Cut to length and fasten to the appropriate adapter pins (see **Figure 4** for wire diagram).
4. Run wiring for neutral, load and common into the AC adapter pins labeled accordingly. Cut them to length and splice them into the house's main line** (see **Figure 4** for wire diagram).
5. Secure the wiring along the housing studs as needed to keep from any snagging during unit installation.
 - You can run the wire through the header plate grommet if needed. (**Figure 2**)
 - If you are running wire between the furnace and stud, secure the wire to the leg as shown to prevent wire pinching (**Figure 3**). To prevent risk of damaging furnace, screw taps are permissible only on the 6 1/2" overhang portion of the leg as shown. Do not drill in the grayed out area. Screw taps are permissible only on the 6 1/2" overhang portion of the leg as shown. Do not drill in the grayed out area.

6. Wire the positive and negative leads to the pigtail DC plug with wire nuts.
7. Adjust power supply to 12.6V by following the instructions below:
 - A. Set DMM to read DC voltage
 - B. Tap the positive and negative with their respective terminals on the power supply.
 - C. Using a screwdriver, slowly adjust the dial located on the bottom right of the power supply until the output voltage reads 12.6V (**FIGURE 5**) Note: Once the voltage is set, there is no need to adjust any further. If the unit is not igniting, verify connections and see the troubleshooting guide in the unit manual.
 - D. Optional: Secure the power supply to the J-BOX (NOT INCLUDED). Apply the wire diagram foil label to the J-BOX wherever desired.
8. Temporarily free the control module by unscrewing it from the heat shield.
9. To replace the wire jack:
 - For model **AC2030TN**, locate the power plug in the back of the module. Unplug the old jack and use pliers to remove the strain relief on the bracket. Remove the plug and strain relief. Place the new wire through the bracket and clip the new strain relief onto the wire. Plug the new jack back into the control module, then secure the strain relief to the bracket.
 - For models **AC2030TNA / TG2030TN**, place the new wire through the bracket and clip the new strain relief onto the wire. Plug the new jack back into the control module, then secure the strain relief to the bracket.
10. Reinstall the control module and make sure all wires are properly secured and in place.
11. Turn the circuit power back on. Turn control module on when ready to fire up

FIGURE 1A

Adapter in attic, 120 VAC fed through outside of stud & furnace leg at bottom.



* Max wire length is 15 feet for 12VDC output from furnace power to power supply adapter.

** Wire length from power supply adapter to house power can be as long as needed.

INSTALLING EXTERNAL POWER SUPPLY KIT M119015

FIGURE 1B

Adapter in attic, 12 VDC wire fed through inside of stud & down next to unit, through leg.

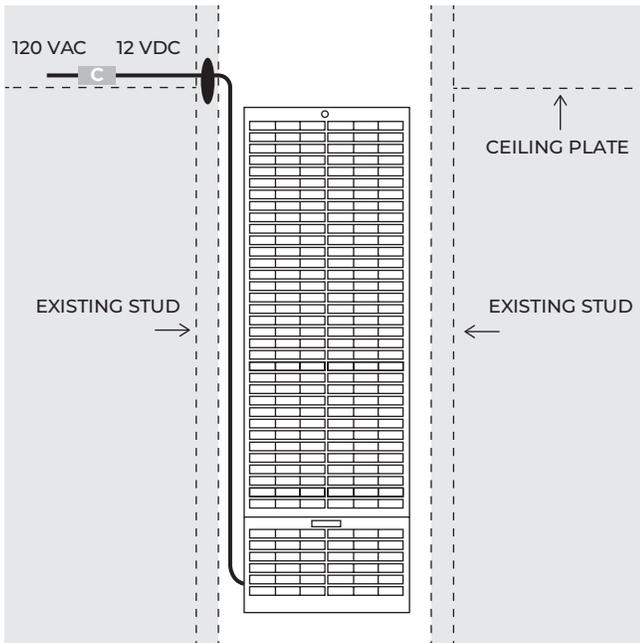


FIGURE 1D

Adapter outside unit on floor, inside the wall 12VDC power fed through hole in stud.

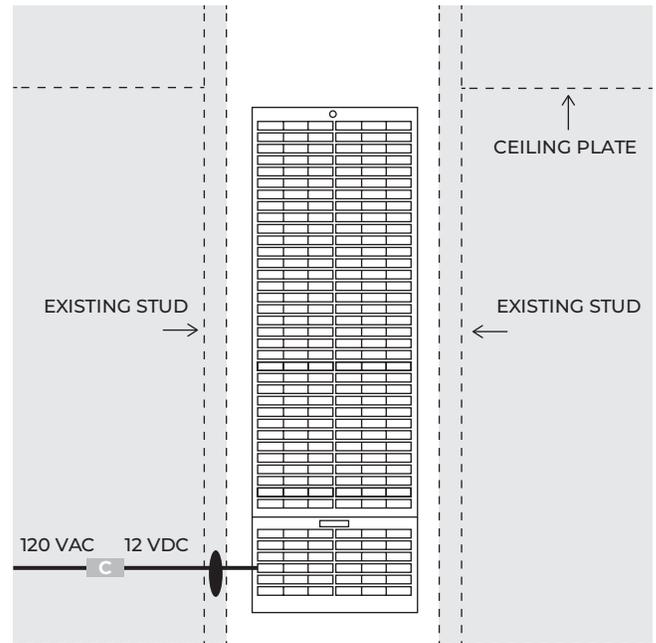


FIGURE 1C

Adapter on floor plate under modules 120 VAC wired through leg.

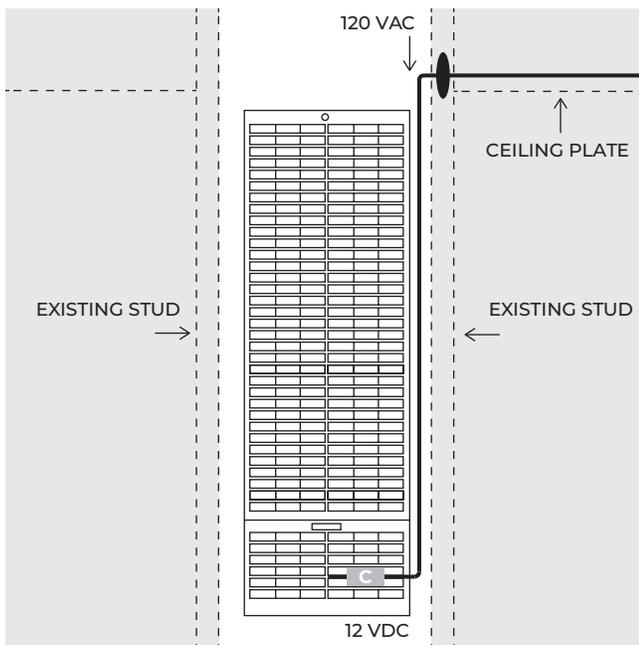
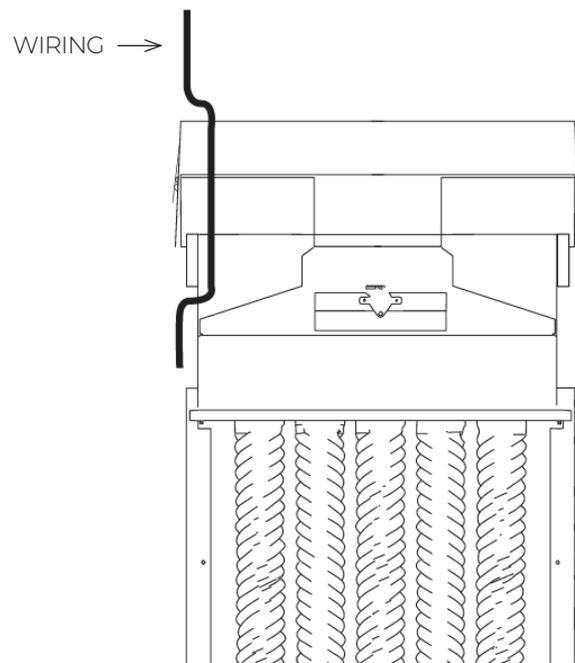


FIGURE 2

Wiring through header



INSTALLING EXTERNAL POWER SUPPLY KIT M119015

FIGURE 3

Wiring through leg.

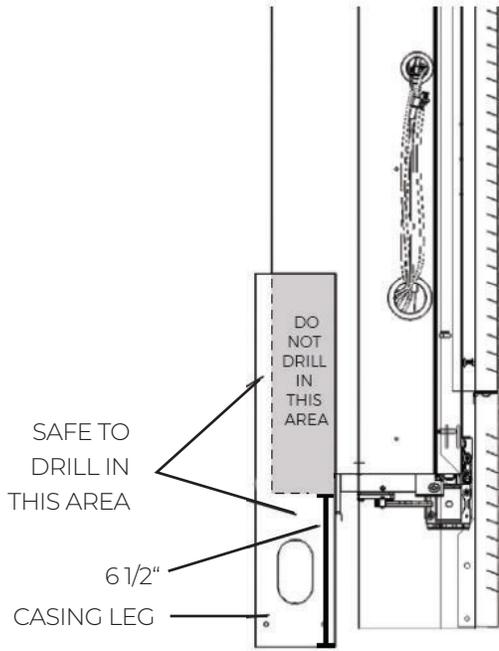


FIGURE 5

Adjust dial until output voltage reads 12.60V

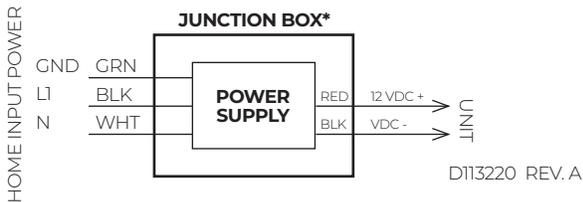


POWER SUPPLY DIAL

FIGURE 4

Wiring diagram.

Manufactured by Williams Furnace Co.
 External power supply Installation Kit No. M119015
WARNING: Disconnect the electric power before servicing
 Avertissement: Deconnecter DU circuit D'alimentation
 électrique avant l'entretien

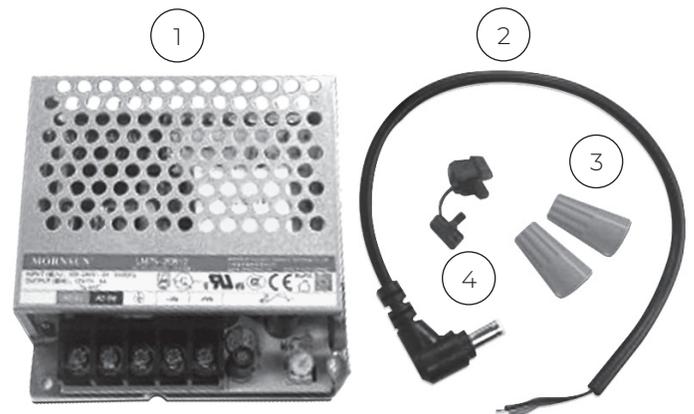


***NOTE:** Be sure to follow all local codes for electrical wiring when following provided instructions. Keep power wires away from any hot surfaces on the furnace. Wires that run from the furnace to the adapter must be stranded, rated for 105° C, and no smaller than 18 AWG. Any cuts, drills or notches made to any studs or joists must be approved per local codes.

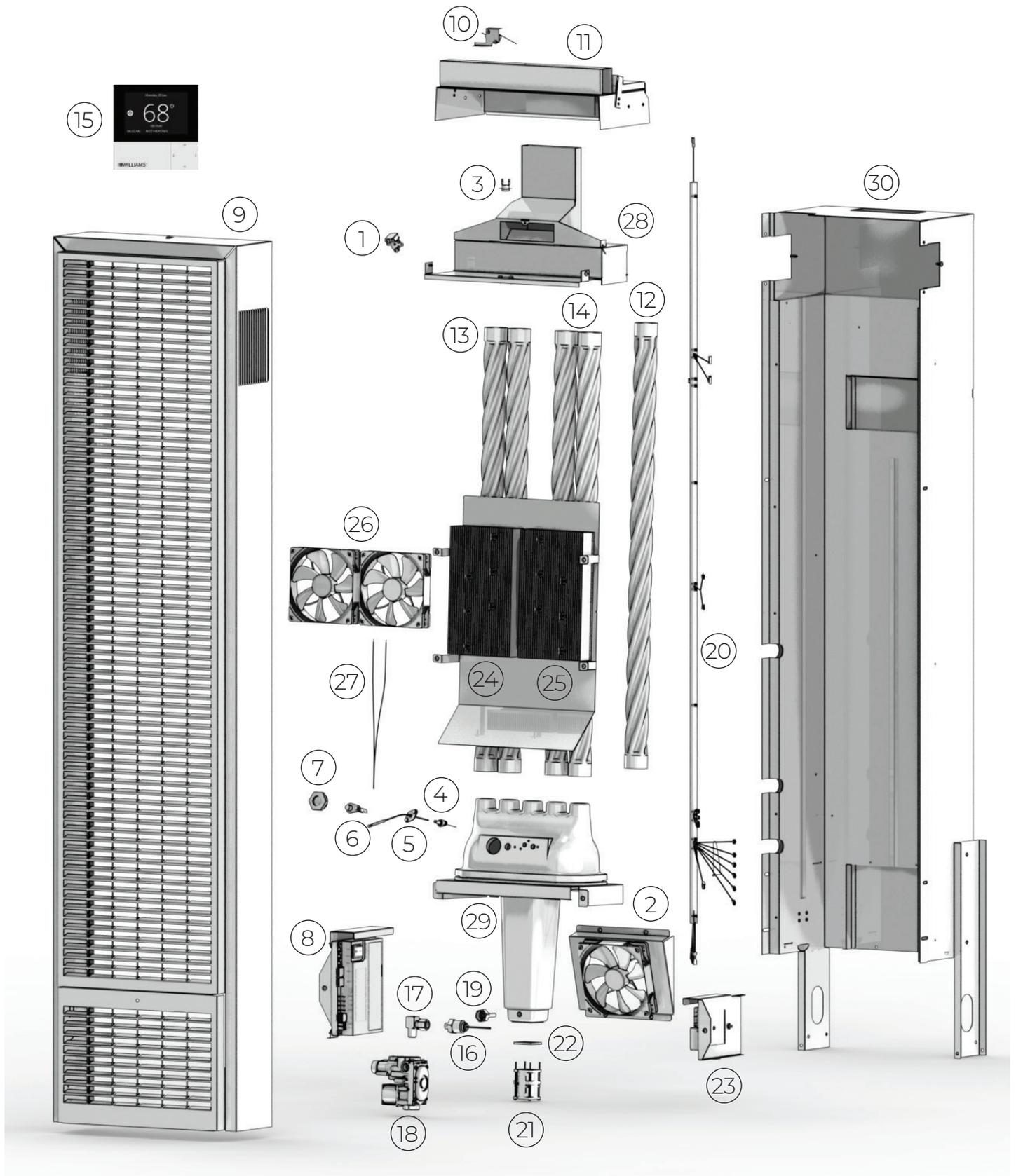
D113220 REV. A

REPLACEMENT PARTS TABLE

	ITEM NUMBERS	DESCRIPTION	QUANTITY
1	P323995	external power supply adapter	1
2	P323992	power jack connector adapter	1
3	P045300	wire nuts	2
4	P012900	1/2 in. strain relief	1
See Figure 4	D113220	wire diagram label	1



FURNACE EXPLODED VIEW



FURNACE REPLACEMENTS PARTS

DRAWING REF NO.	PART NUMBER TG2030TN	DESCRIPTION
1	M118099	Vent limit switch assembly
2	M117883	Circulation fan assembly
3	P323885	High Limit switch
4	M118100	Flame sensor
5	M118101	Thermocouple probe
6	M118102	Hot surface igniter
7*	M117255	Sight window
8	M117754	Control module assembly
9	4917	Front panel
10	P323812	Vent presence switch
11	M117283	Header assembly
12	M118103	Heat exchanger tube (center)
13	M118104	Heat exchanger tube assembly (left/right)
14	M118104	Heat exchanger tube assembly (Left/right)
15	P323744	Thermostat
16**	P323806	Pressure sensor
17**	P323790	Manifold assembly
18**	P323822	Stepper gas valve
19	P323777	Orifice
20	P323878	Wire harness
21	M118106	Combustion fan assembly
22	P323768	Combustion fan filter
23	M117772	Ignition module assembly
24	M118107	Power generation assembly (left)
25	M118108	Power generation assembly (right)
26	P323855	Heat sink cooling fan
27	P323870	Dual surface mount thermocouple
28	M118088	Draft hood assembly
29	M117842	Combustion assembly
30	M117839	Shield assembly

* Apply DEACON 8875-THIN high temperature thread sealant (P323827) while installing 7

** Apply regular thread sealant (or P141101) while installing 14, 16, 17, 18

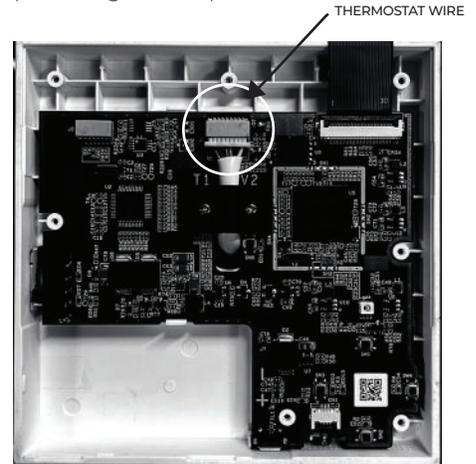
TROUBLESHOOTING YOUR FURNACE

ISSUE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
1. Furnace won't turn on	<ul style="list-style-type: none"> A. AC power is not connected B. Control module power button is set to OFF C. Thermostat is set to OFF D. Thermostat cable is not connected 	<ul style="list-style-type: none"> A. Check power cord connection B. Control module power ON C. Turn thermostat to ON D. Connect thermostat cable
2. Furnace calls for heat but won't ignite	<ul style="list-style-type: none"> A. Exhaust vent not installed correctly and not closing safety switch B. Gas supply off C. Unit is overheating, high temp limit switch tripped D. Hot surface igniter failed E. Thermostat not calling for heat F. Plugged furnace orifice. G. Defective thermostat H. Defective valve. I. Combustion fan is defective J. Control module defective K. Ignition Module defective L. Temperature probe faulty M. Ground is not connected 	<ul style="list-style-type: none"> A. Verify exhaust vent is installed per instructions B. turn on gas supply C. Verify nothing is blocking the front panel, check circulation fan operation D. Replace igniter E. Increase Set Point Temperature F. Check clean or replace. G. Replace thermostat H. Check connections at valve terminals. If valve operates, Check for blocked burner orifices. I. Check wiring connections or replace J. Replace control module K. Replace ignition module L. Check wiring connections or replace M. Check wiring connections or replace
3. Furnace operates but turns off before room temperature is attained	<ul style="list-style-type: none"> A. Thermostat location. B. Defective thermostat. C. Unit is overheating, high temp limit switch tripped D. Room fans defective E. Flame sensor defective F. Exhaust vent is blocked 	<ul style="list-style-type: none"> A. Check thermostat location. It should not be in the path of warm air discharge from furnace, near a lamp or above a T.V. or stereo unit. B. Check thermostat calibration or replace. C. Verify nothing is blocking the front panel, check circulation fan operation D. Verify room fan operation E. Replace flame sensor F. Verify exhaust vent is installed per instructions
4. Furnace not producing sufficient heating.	<ul style="list-style-type: none"> A. Furnace may be too small for space being heated. 	<ul style="list-style-type: none"> A. Check heat sizing calculations.
5. Furnace operates but will not shut off when room temperature is attained.	<ul style="list-style-type: none"> A. Thermostat wiring defective. B. Thermostat location. C. Defective thermostat. 	<ul style="list-style-type: none"> A. Thermostat lead wires may be shorted together, caused by a nail or staple. Check by removing thermostat leads from valve terminals. B. Check thermostat location. If on an outside wall, or there is a hole in the wall behind the thermostat, cold air may be coming in contact with the thermostat. Relocate. C. Check thermostat calibration; verify thermostat temperature reading; or replace.

6. Thermostat on but cannot call for heat.

A. Internal wire disconnected.

A. Open thermostat and reconnect wire (see image below).



7. Drafthood screw sticking out 1/2 inch or more

A. Screw is loose

A. Tighten by hand to 8 in-lbs. (see Page 9, Figure 2).

TROUBLESHOOTING ERROR CODES

ERROR CODE	ROOT CAUSE	SOLUTION
33:	TEG temperature sensor read error	Check if the TEG temperature sensor is installed correctly. If so, replace the temperature sensor.
34:	Combustion temperature sensor read error	Check if the Combustion temperature sensor is installed correctly. If so, replace the temperature sensor.
35:	Limit switch alarm. The temperature is too high and has triggered the limit switch.	Check if the limit switch is installed correctly, and make sure the system is not overheating. If so, replace the limit switch.
36:	Thermostat offline	Check if the Thermostat RJ45 (CAT-6) cable is connected properly. If so, replace the cable.
37:	Flameout after ignition. After the ignition is successful, the temperature continues to drop. After dropping below the default specified temperature of 600 °C, an alarm occurs. Wait for the temperature to fall below 300 °C to start re-ignition.	The furnace will automatically rectify this in the next run. If not, replace the combustion temperature sensor.
38:	Ignition failure warning. Appears after 3 consecutive ignition failures.	Make sure there's gas supply. Check if the igniter lights up, through the observation window. If not, replace the igniter.
39:	TEG temperature is too high.	Check if the TEG temperature sensor is installed correctly, and make sure the system is not overheating. If so, replace the sensor.
47:	Controller low battery warning.	Plug in the external power supply (if applicable) to the Controller, to recharge the battery. If it still doesn't charge, replace the battery.

HINTS AND INFORMATION

If your furnace fails to work correctly, you may avoid the inconvenience and cost of a service call by checking the troubleshooting section on pages 34 and 35 before you call for service.

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

DO NOT store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

HOW TO ORDER REPAIR PARTS

When ordering repair parts, always give the following information:

1. MODEL NUMBER
2. MFG. DATE CODE
3. PART NUMBER
4. PART DESCRIPTION

All parts listed herein may be ordered from your equipment supplier. The Model Number of your Williams wall furnace will be found on the nameplate near gas valve, inside control compartment.

WHAT TO DO IF YOU SMELL GAS

- Open all of the windows.
- Do not try to light any appliance.
- Do not touch any electrical switch.
- Do not use any phone or cell phone in your building.
- Extinguish any open flame.
- Immediately call your gas supplier from a neighbor's phone. If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

SERVICE RECORD

DATE	MAINTENANCE PERFORMED	COMPONENTS REQUIRED

WILLIAMS™



www.williamscomfortprod.com | 888-444-1212 | 250 West Laurel Street, Colton CA 92324 USA

Subject to change without notice | © 2024

