TRANE

Product Catalog

Indoor Gas Heating Products

Unit Heaters
Duct Furnaces

September 2009

UH-PRC002-EN

Introduction

Trane unit heaters, offered in both propeller and centrifugal models, are a complete heat generating and distributing plant, equipped with automatic controls, and packaged in an attractive streamlined housing. Designed for ceiling mounting, they provide a convenient low-cost method of comfortably heating stores, factories, warehouses, and other large open areas.

Trane unit heaters represent a technological breakthrough in quality. Trane offers customers the most complete line of unit heaters anywhere. And every unit in the line has been rated for 80 percent thermal efficiency or better.

But higher thermal efficiency and lower operating costs are just two features of this product line. Innovation—the engineering advances you've come to expect from Trane—can also be found across this entire line of unit heaters. And rugged, quality construction provides years of dependable service.

Quality products mean Trane value. So does fair, competitive pricing. The 10-year warranty tells you Trane will be here for the long haul—keeping our commitment to you. You can count on Trane standing behind every unit shipped. That is what Trane value means.

Trademarks

Trane and the Trane logo are trademarks of Trane in the United States and other countries.

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Features Highlights

Ten-Year Warranty

The complete heat exchanger, draft hood assembly of the unit heater and burners are warranted by Trane to be free from defects in material and workmanship for a period of 10 years from the date of manufacture. (Warranty not applicable on duct furnaces or Separated Combustion units.)

Quiet Operation

Trane unit heaters incorporate an exceptionally balanced fan blade to assure quiet operation.

Heat Exchangers

All Trane heat exchangers are available in three types of steel:

- Aluminized Steel (Standard)
- 409 Grade Stainless Steel (Optional) (30–400 MBh units)
- 321 Grade Stainless Steel (Optional) (100–400 MBh units)

24V System

All units are equipped with a 24Vcontrol system which is powered by a 24V transformer as standard equipment.

Fan Time Delay

The fan time delay switch is mounted at the factory as standard equipment on all unit heaters (optional on duct furnaces). This feature eliminates an initial blast of cold air by allowing the unit to fire for a short period of time before actuating the fan motor. After the thermostat is satisfied (with burners off), the fan continues to operate for approximately one minute, removing residual heat from heat exchanger.

Burners

All sizes 30,000 through 400,000 Btu input are equipped with a proven design pressed steel burner having a unique “burner shade” protective device to prevent scale or foreign matter from plugging the burner ports.

Energy Saving Ignition Pilot Control

The pilot burner is ignited only during each cycle of operation, thereby conserving energy during the off cycle.

LP/Natural Operation

All units are available for operation on either natural or LP gas from our factory.

Easy Access For Maintenance

All Trane unit heaters are so designed that the burner access panel is removed with just two screws. Burners are individually removable for inspection and servicing. Pilot is also accessible through side panel access door.

Test Fire

All Trane unit heaters are test fired to assure proper operation.

Ideal For Retrofit

Trane unit heaters let you pocket fuel savings from day one and provide years of dependable service.

Features and Benefits

Propeller Fan / Tubular Heat Exchanger Unit Heaters

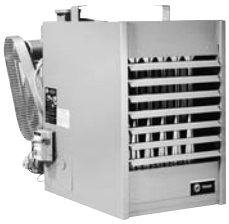
Trane has added a new unit heater to enhance its broad line of heating products. The Trane tubular heat exchanger is a very durable unit heater that provides an alternative to the traditional clam shell style. These are propeller style units that combine the latest tubular heat exchanger style with inshot burner technology to create a very efficient operating unit.

High Efficiency Propeller Fan Unit Heaters

Trane high-efficiency propeller fan unit heaters achieve annual fuel savings of 20 to 25 percent over conventional gravity vented heaters. Each unit features a factory-installed power venter fan and sealed flue collector that controls combustion and excess air during the on-cycle.

Heated air no longer escapes through the draft diverter opening during the off-cycle. Energy saving spark ignition reduces gas losses. The pilot only operates when required.

Horizontal power venting allows side wall venting, smaller openings, and single-walled vent pipe, reducing heat loss. Higher efficiencies can reduce equipment and material costs as well as installation time.



High Efficiency Centrifugal Fan Unit Heaters

The high-efficiency centrifugal fan unit heater keeps energy costs down. The design advances achieve annual fuel savings of 20 to 25 percent over conventional gravity vented heaters.

The high-efficiency centrifugal unit features integral power venting (factory-installed) and sealed flue collector for optimum combustion. Electronic spark ignition reduces pilot gas losses, and the power venter allows for horizontal venting through side walls. It adds up to higher seasonal efficiencies and lower installation time.

High Efficiency Indoor Duct Furnace

The high efficiency indoor gas duct furnace complements our current centrifugal and propeller fan lines. All high efficiency lines were designed to achieve fuel savings of up to 25 percent over conventional gravity vented heaters.

Conventional gravity vented heaters lost heated room air through the draft diverter opening. The high efficiency line features an integral flue vent fan and sealed flue collector for improved combustion. It reduces air requirements and wind effects on the system's efficiency. Intermittent pilot ignition reduces pilot gas losses and the flue vent fan allows for horizontal venting through side walls.

Note: *DUCT FURNACES ARE APPROVED FOR BLOW-THROUGH APPLICATIONS ONLY.*

Horizontal Blower Assemblies

Trane horizontal blower assemblies have been specially designed for air handling systems of high static pressure in combination with Trane duct furnaces. They are matched against the proper furnace size for greatest efficiency of operation.

Separated Combustion Propeller Fan Unit Heaters

The Trane separated combustion propeller type unit heater keeps energy costs down by offering 80 percent thermal efficiencies. With model inputs available from 100 through 400 MBH, they are designed to be installed in mildly hostile environments where dusty, dirty and mildly corrosives exist or high humidity or slightly negative pressures prevail.

The Trane propeller unit separates the combustion process from the environment where the unit is installed. A power venting system draws a controlled quantity of combustion air from outside the building. The same system exhausts flue gas products to the outside. The burners, pilot and flue system are enclosed within the unit. The entire combustion process is literally unaffected by the atmosphere in the space where the unit is located.

Combustion and exhaust air may be piped horizontally through a side wall, or vertically through the roof via our standard two-pipe venting arrangement or optional concentric vent kit which utilizes one 8-inch side wall or rooftop penetration for both the combustion and exhaust air. Both venting systems are C.S.A. International certified.

Separated Combustion Centrifugal Fan Unit Heaters

The Trane separated combustion centrifugal type unit heater keeps energy costs down by offering 80 percent thermal efficiencies. With model inputs available from 100 through 400 MBh, they are designed to be installed in mildly hostile environments where dusty, dirty and mildly corrosives exist or high humidity or slightly negative pressures prevail. This unit operates at a static pressure up to 0.2" water column, and is available with a louvered (standard) or flanged outlet (optional) when discharge duct work is desired.

These units separate the combustion process from the environment where the unit is installed. A power venting system draws a controlled quantity of combustion air from outside the building. The same system exhausts flue gas products to the outside. The burners, pilot and flue system are enclosed within the unit. The entire combustion process is literally unaffected by the atmosphere in the space where the unit is located.

Separated Combustion Duct Furnace

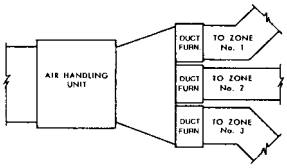
The Trane separated combustion duct furnace is designed for installation in dusty, dirty or mildly corrosive environments or where high humidity or slightly negative pressures exist. Ideal applications include HVAC equipment rooms, manufacturing facilities, automotive garages and greenhouses.

Application Considerations

General

Propeller fan unit heaters and centrifugal fan unit heaters are designed for use in space heating applications. The units are typically used in areas with high ceilings, and are exposed in the space to be heated. Unit heaters offer low installed cost, and are able to heat large volume areas without requiring extensive duct systems.

Duct furnaces are designed for use in ducted applications with a separate air handling device such as a horizontal blower assembly. By utilizing a separate air source, greater application flexibility in airflow delivery can be obtained. Multiple duct furnaces can be used with an air handling unit to provide zone heating.

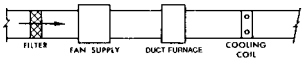


Note: *When installing duct furnaces in parallel or in series, minimum clearance requirements must be considered. This is required for serviceability of the gas valve and the high limit. "All duct furnaces are approved in blow-thru applications only."*

All duct furnaces are AGA approved upstream or downstream of the cooling coil. Recommend optional field installed drain pan when installed on the downstream side of the cooling coil.

Note: *Downstream denotes cooling coil ahead of the fan section.*

When used in conjunction with filters, cooling coils and an air handler, the duct furnace can become part of a built-up heating and cooling system.



Typical Upstream Installation

Gas Heating Value

The majority of gas heating units are installed in applications where natural gas is readily available. In areas where natural gas is not available, Trane units may be ordered directly from the factory for use on LP (propane) gas.

Gas heat content varies by fuel type and location. The standard gross heating value for natural gas is 1,000 Btu per cubic foot, and for propane, 2,500 Btu per cubic foot. Significant variations from these standard values should be taken into consideration in equipment selections. To account for variations in the gross heating value of the fuel, adjust the total heat input required and select the unit on the basis of the adjusted load using the following formula:

$$\text{Adjusted load} = \frac{\text{Calculated load} \times \text{gross heat value (Btu/ft}^3\text{)}}{\text{Actual gross heat value (Btu/ft}^3\text{)}}$$

Low Temperature Rise

Trane recommends against the setup of a unit which will result in a temperature rise of less than 30°F. With such low temperature rises, the flue gases passing through the heat exchanger are cooled to condensate before reaching the flue outlet. This condensate is corrosive and will result in shortened heat exchanger life.

Air Density

Catalog performance data is based on elevations up to 2,000 feet above sea level. Above 2,000 feet the unit's heating capacity must be derated four percent for each 1,000 feet above sea level, and

special orifice selections are required. Table 8, p. 24 contains correction factors that can be applied to the unit's cataloged heating capacity, fan rpm, and fan bhp to obtain actual values for elevations above 2,000 feet.

Corrosive Atmospheres

Corrosion of heat exchangers and draft diverters have two basic variables—moisture (condensation) and sulphur. These two ingredients form to make sulfuric acid in the combustion process. Condensation occurs commonly in makeup air systems, using large amounts of fresh air, when air temperatures entering the heat exchanger drop to 40°F or below. This reaction can also occur in recirculating systems where some quantity of outside air is introduced upstream of the exchanger. The sulphur will always be present as an integral component of the gas. The resulting concentration of the acid is governed by the amount of sulphur in the gas. This concentration varies from gas to gas and geographically within the same type of gas.

Beyond sulfuric acid corrosion there is the area of chlorinated or halogenated hydrocarbon vapor corrosion. This type of corrosion occurs when substances are mixed with combustion air that will cause the formation of hydrochloric or hydrofluoric acid when burned. These basic substances are found in degreasers, dry cleaning solvents, glues, cements, paint removers and aerosol propellants. Specific chemicals included in this group are trichloroethylene, perchloroethylene, carbon tetrachloride, methylene chloride, methyl chloroform and refrigerants 11, 12, 21, 22 and 114.

If sufficient PPM content of these corrosives is present, none of the common heat exchanger materials will hold up. The dilemma becomes whether to place the gas heating equipment outside of the area to be conditioned, or use equipment in the space which does not burn a fuel such as gas (i.e., electric or hydronic).

Units should not be installed in areas with corrosive or inflammable atmospheres. Locations containing solvents or chlorinated hydrocarbons will produce corrosive acids when coming in contact with burner flames. This reaction will greatly reduce the life of the heat exchanger and may void the warranty. For added protection against heat exchanger corrosion, optional 409 and 321 stainless steel construction is available. On units using outside air, with entering air temperature below 40°F, condensation of flue gas in the heat exchanger is possible. In these cases, stainless steel heat exchangers are recommended.

Careful review of the job application with respect to use, probable contaminants within a conditioned space or the amount of fresh air to be brought in, will help to make the proper selection of heat exchanger material. This review will help to eliminate problems before they begin.

Indoor Units

Indoor gas unit heaters and duct furnaces are used primarily in commercial and industrial structures such as manufacturing areas, warehouses, garages, stores, showrooms, lobbies, and corridors.

Separated combustion units are used primarily in industrial work areas with wood or textile dust, non-explosive contaminated environments, nonchlorine process areas, automotive and truck garages and greenhouses.

Unit Placement

Refer to the applicable Trane Installation, Operation and Maintenance literature for specific installation instructions. Installations must conform with local building codes or in the absence of local codes with the National Fuel Gas Code ANSI Z223.1.

When selecting a location for an indoor unit heater, both the size and weight of the unit, as well as the heating requirements of the building, should be considered. Installation of units in airplane hangars or public garages should be in accordance with NFPA No. 409 for aircraft hangars, and NFPA No. 88 for garages.

For proper distribution, air should be directed towards areas of maximum heat loss. When multiple units are used, circulation of heated air around the space perimeter is recommended. Satisfactory results can also be obtained where multiple units are located toward the center of the area, with

heated air being discharged toward the outside walls. Throw data for standard unit heaters and unit heaters utilizing optional discharge nozzles is shown in "General Data," p. 20.

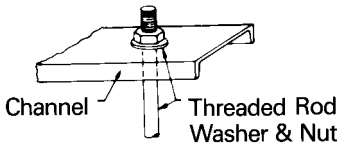
Locations where extreme drafts can affect burner operation should be avoided. Strong drafts may cause pilot outage. Units with intermittent pilot ignition may be preferable in areas where drafts are likely.

Minimum clearances required for accessibility and safety are listed in Table 2, p. 20.

Mounting Detail

(Hanging Hardware Supplied by Others)

Figure 1. Steel Construction



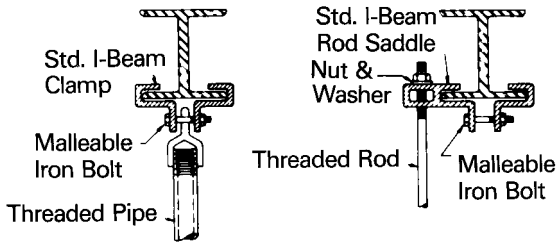
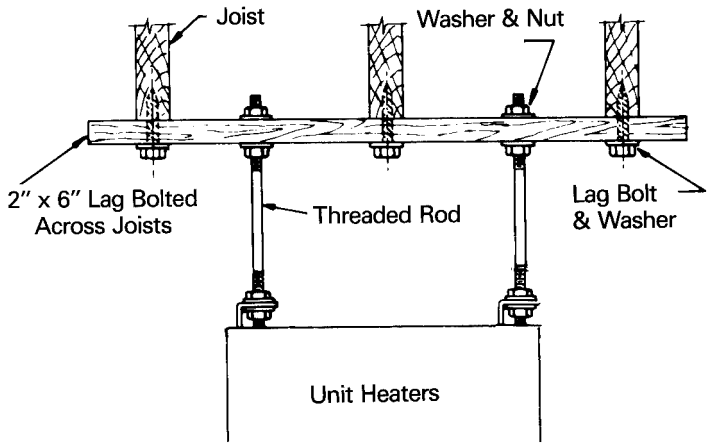


Figure 2. Wood Construction



Throw Data

Throw data for units with standard louvers and for units with optional discharge nozzles are in "General Data," p. 20. Optional nozzles are for use on propeller fan unit heaters, centrifugal fan unit heaters and duct furnaces. When greater throw distance is desired, a 45° nozzle is recommended. For high mounting heights, a 90° nozzle may be used. When wide diffusion is needed, a Y splitter nozzle should be considered. A five-way nozzle can be used for applications requiring even air

distribution over a large floor area. (Five-way nozzles are not available on propeller fan unit heaters.)

Indoor Units—Venting

Gas fired indoor units require venting to remove the products of combustion. To help assure safe, trouble-free operation, follow the guidelines listed below:

Power Vented Units

Units with a factory installed flue vent fan.

1. All units must be vented. Power vented units are designed to use single wallvent pipe. A Breidert Type L, Field Starkap, or equivalent unit vent cap must be furnished by the customer.
2. The venting system for these appliances shall terminate at least 4 feet below, 4 feet horizontally from, or 1 foot above any door, window or gravity air inlet into any building.
3. Through-the-wall vents for these appliances 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.
4. The vent pipe diameter must be as shown under "Recommended Flue Size" in the specification charts. An adaptor must be field supplied if required.
5. **Each furnace must have an individual vent pipe and vent terminal.** Vent pipe equivalent length must not exceed 50 feet. Equivalent length is the total length of straight sections, plus 15 feet for each 90° elbow and 8 feet for each 45° elbow.
6. Maintain 6 inch clearance between vent pipe and combustible materials. Vent terminal must be installed with a minimum clearance of 4 feet from electric meters, gas meters, regulators, and relief equipment.
7. Seal vent pipe joints to prevent leakage. Use General Electric RTV-108 or Dow Corning RTV-732 Silicone Sealant or 3M #425 aluminum foil tape.
8. Pitch horizontal pipes downward 1/4-inch per foot toward outlet for condensate drainage. Horizontal portions of the venting system shall be supported at maximum intervals of 4 feet to prevent sagging.
9. Vertical vent pipes should be equipped with condensate drains.
10. Insulate single wall vent pipe exposed to cold air or running through unheated areas.

FM and IRI Requirements

IRI, which stands for Industrial Risk Insurers, and FM, which stands for Factory Mutual, are both basically insurance companies which insure commercial/industrial firms against a variety of losses. Both publish requirements which must be met by certain equipment operating in the facilities they are preparing to insure.

Listed below is our interpretation of the requirements of both insurers pertaining to heating units only to the extent of features/controls required by IRI and/or FM. There are a number of additional requirements which pertain to electrical service, details of installation, etc., and we urge you to obtain copies of the publications pertaining to these details if you are involved in a job where IRI or FM adherence has been indicated. The requirements detailed herein are our interpretations of the latest publications in our possession and we must disclaim any responsibility for errors due to our interpretation and/or lack of any updated revision of these standards. Our intent is to provide you with an understanding of the application of these standards and how we believe our indirect-fired gas heating equipment applies.

IRI Requirements

1. All input sizes require 100 percent shutoff. This requires that any natural gas unit, equipped with intermittent pilot ignition, must employ a "lock out" type ignition system which will shut off pilot gas if the pilot fails to light at any time. This system is required by AGA on LP gas units

as standard equipment. However, for natural gas units, you need to specify on the order "Natural Gas, 100 percent shutoff."

2. All units require AGA certification or UL "listed" controls. Our units are AGA certified and meet this requirement.
3. Models with inputs of 150,000 to 400,000 Btu require "mechanical exhaust" and a "safety interlock." For our units, this means a power vented or drafter-equipped unit. In both instances, if the flue vent fan (factory or field installed) does not get up to speed, the unit will not fire, satisfying the safety interlock portion.

FM Requirements

1. All units must be AGA certified or UL listed. Our units are AGA certified.
2. The high limit control must be in a circuit, the voltage of which does not exceed 120 Vac. All of our high limits would meet this requirement.

The specific requirement for an "IRI or FM Gas Train," while it applies to direct and indirect-fired gas heating equipment as well as oil-fired, comes into play only with units having an input in excess of 400,000 Btu. This may be one of the reasons why the majority of gas heating equipment manufacturers (indirect-fired) limit their largest individual furnace to 400,000 Btu.

Minimum/Maximum Gas Inlet Pressures

Gas valves are suitable to a maximum inlet pressure of 0.5 psi (14 inches water column) on natural gas. If the main gas supply pressure is greater than 14 inches wc, a step-down pressure regulator must be field-installed ahead of the gas valve. Minimum inlet pressure for natural gas units is 5 inches wc.

For LP (propane) gas, the minimum inlet pressure is 11.0 inches wc and the maximum inlet pressure is 14.0 inches wc.

High Pressure Regulators—Natural Gas Only

The Trane indoor gas heating products contained in this catalog are designed to operate at a pressure of 3.5-inch wc (water column) when firing on natural gas. This is the "manifold" pressure or that which is present at the burner orifices. All five- and six-function valves provide a built-in pressure regulator which is capable of reducing "supply" pressures from a maximum of 14-inch wc (1/2 psi) down to 3.5-inch wc on the leaving side of the valve. The valve typically "drops" about 1-1/2 inches so the minimum supply pressure is 5-inch wc.

Whenever supply pressures exceed 14 inches wc, a high pressure regulator should be selected. We supply a Rockwell regulator which is fitted with pressure springs and capacity orificing to meet the requirements of each specific job. In order to select the proper spring/orifice combination, we need to know what the supply pressure is on that particular job and the input size of the unit being ordered. More than one unit can be run from one regulator; however, we recommend that each unit have its own regulator.

We require that the "job" supply pressure be included on all jobs requiring high pressure regulators along with the unit size. Table 1 displays the regulators range as it pertains to inlet pressure and MBh. A dash (—) requires the customer to contact a local utility or an industrial supply house.

These devices are **not available** from Trane for LP gas. LP accessories must be secured from the gas supplier/ supply house.

Table 1. Orifice chart: Rockwell 043–182 regulator

Inlet Pressure (psi)	Capacity in Mbh for Natural Gas						Spring Required
	25–200	225–300	350–500	600	700	800	
1	3/8”	—	—	—	—	—	Blue (only)
2	3/8”	3/8”	—	—	—	—	Blue (only)
3	3/8”	3/8”	3/8”	—	—	—	Blue or Green
5	3/8”	3/8”	3/8”	3/8”	3/8”	3/8”	Blue or Green
10	3/8”	3/8”	3/8”	3/8”	3/8”	3/8”	Blue or Green
20	1/4”	1/4”	1/4”	1/4”	1/4”	5/16”	Blue or Green
40	1/4”	1/4”	1/4”	1/4”	1/4”	1/4”	Blue or Green
60	1/8”	1/8”	1/8”	1/8”	1/8”	3/16”	Blue or Green
80	1/8”	1/8”	1/8”	1/8”	1/8”	—	Blue or Green
100	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	Blue or Green
125	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	Blue or Green

Venting Unit Heaters

Venting unit heaters and duct furnaces used to be as simple as remembering that warm air rises. With the introduction of new venting equipment and safety controls, things have become a little more technical. Today’s contractor has to know a lot more about proper venting to get the job done within code at a reasonable price.

For starters, ANSI now categorizes vented appliances into four categories. Category I includes non-condensing appliances with negative vent pressure, like the traditional atmospheric unit heater. Category II groups condensing appliances with negative vent pressure.

Category III appliances are non-condensing and operate with a positive vent pressure, like the traditional power vented unit heater. Category IV covers condensing appliances with positive vent pressure.

Venting Categories

	Non-Condensing	Condensing
Negative Vent Pressure	I	II
Positive Vent Pressure	III	IV

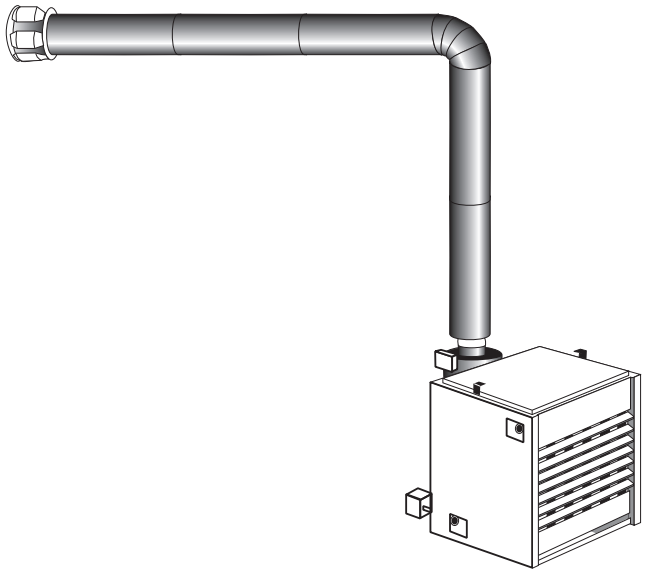
Sharing Flues with Other Appliances

Never connect power vented devices to common flues. Mechanically vented appliances must have dedicated vents to the point of termination.

Power Vented Unit Heaters

Mechanically vented appliances have enjoyed increasing acceptance in American facilities. Power vented unit heaters allow installation without the need to penetrate expensive roofing materials. They also offer more flexibility in placement of individual unit heaters.

Figure 3. Power vented unit heater



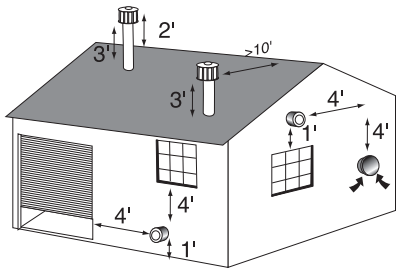
Mechanical venting occurs when a power blower provides a positive air flow to exhaust vent gas. The blower may be mounted at the unit heater or at the point of termination. With a factory-installed power venter, a pressure switch detects the flow of vent gas before the gas valve is allowed to open. With third party drafters, a centrifugal switch usually monitors the operation of the blower motor. When properly installed, the switch senses motor rotation and allows the gas valve to operate. Interlocking the blower to the gas valve provides some control over the combustion process. Using a factory unit with a pressure sensitive switch ensures that control.

With all their advantages, power venters bring some requirements as well. Each manufacturer determines the maximum length of pipe and fittings that his system can use for safe operation. Remember to count the fittings and allow for their higher resistance to flow. The total length of run includes not only the piping length, but the resistance of all the fittings including the termination cap.

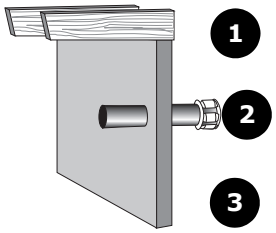
Many contractors have become accustomed to using B vent with natural draft units. Used with power vented appliances indoors, B vent is unacceptable. B vent does not allow positive pressure in the vent piping to be sealed from the heated space. Proper installation uses 24-gauge, single wall vent pipe and each joint sealed with temperature resistant sealant or tape.

Contractors must also be aware of the conditions at the point of termination. The National Fuel Gas Code NFPA 54/ANSI Z223.1-1992 mandates that vent system should terminate at least 4 feet below, 4 feet horizontally or 1 foot above any window, door, or gravity inlet to a building. Termination with a vent cap approved by the manufacturer should occur well above the snow line.

Figure 4. Vent termination locations (minimum distance)



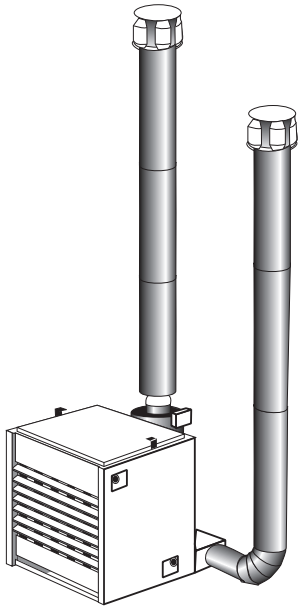
Beyond satisfying the codes, vents should be positioned away from shrubs and plants that might be affected by unseasonable warming by the exhaust. Sidewall vents release a considerable amount of water vapor that may condense on cold siding, adversely affecting painted surfaces. Placing these vents in locations that get natural air circulation from prevailing winds may help to reduce these negative effects.



1. Heat
2. Fumes
3. Humidity

Separated Combustion Venting

Another form of mechanical venting includes those unit heaters that use a powered exhaust also to pull in outside air. Most often found on condensing furnaces, separated combustion does not use room air for combustion. Instead these unit heaters use a second run of pipe to supply fresh outdoor air.



The separated combustion approach offers several advantages. First, it does not use warm indoor air to fire the unit heater. This saves energy by avoiding drawing unheated make-up air into the living space. Second, the unit heater has an unlimited source of air for combustion. In many of the new super insulated buildings appliances can be starved for combustion air. In contaminated atmospheres the use of separated combustion unit heaters assures that the heat exchanger sees only non-corrosive air.

When positioning the intake and exhaust vents on separated combustion equipment, the intake and outlet must mount on the same outside surface. This ensures that any wind effects balance out. Remember to keep the vents at least 18" apart to avoid drawing exhaust air into the intake air.

With Trane's separated combustion unit heaters intake air and exhaust air run through standard 24-gauge galvanized pipe. Remember that separated combustion unit heaters still have high vent

temperatures. Use of PVC, CPVC and other plastic vent materials are inappropriate and hazardous. Check the manufacturer's instructions before piping any appliance.

The vent gases of power vented and separated combustion unit heaters may condense on a cold start-up or when vent piping runs through unheated areas. To protect the heater always pitch both intake and exhaust piping toward the outside of the building. Remember also that no power vented equipment can share a common flue with any other appliance. Should a flue become blocked one appliance could vent into the occupied space.

Approved vent caps should be used on both the intake and exhaust terminations. For greater convenience Trane offers a concentric vent adapter that allows venting through a single perforation through the building wall or roof.

Selection Procedure

Determine the total heating load requirements in accordance with methods recommended by the ASHRAE Handbook of Fundamentals or other acceptable means.

High Efficiency Propeller Fan Unit Heater

1. From the performance data tables, select the unit whose heating output meets or exceeds the heating load requirement.
2. Airflow (cfm) and temperature rise can be read directly from the performance data tables.
3. Knowing the mounting height of the unit, throw can be determined from the performance data table. If the throw is not adequate, consider using a larger propeller fan unit heater or a centrifugal fan unit heater with an optional discharge nozzle for greater throw.

   Selection Example—A natural gas propeller fan unit heater that can provide 75 MBh heating output is required. The unit will be mounted 10 feet above the floor and a 40-foot throw is required.

   Select the unit as follows:

   a. From Table 10, p. 25, select a GHND-010 with 100.0 MBh input and 80.0 MBh heating output, 1,480 cfm and a 50°F temperature rise.

   b. From Table 3, p. 20, throw at a mounting height of 10 feet is 54 feet.

High Efficiency Centrifugal Fan Unit Heater

1. From the performance data tables, select the unit whose heating output meets or exceeds the heating load requirement.
2. Airflow (cfm) ranges are listed for each unit size in the performance data tables. Knowing either the desired airflow or temperature rise, the other can be calculated using the following formulas:

$$cfm = \frac{Output \times 1{,}000}{1.085 \times \Delta T}$$

$$\Delta T = \frac{Output \times 1{,}000}{1.085 \times cfm}$$

3. Knowing the mounting height of the unit, throw can be determined from the performance data table. If the throw is not adequate, a discharge nozzle can be used to obtain additional throw.

   Selection Example—An LP (Propane) gas centrifugal fan unit heater that can provide 150 MBh heating output is required. An airflow of 2,000 cfm is desired. The unit will be mounted 12 feet above the floor and a 65-foot throw is required.

   Select the unit as follows:

   a. From Table 11, p. 25, select a GBPD-020 with a 200.0 MBh input and 160.0 MBh heating output. An airflow of 2,000 cfm is within the allowable range, and temperature rise is calculated as follows:

$$\Delta T = \frac{MBh \times 1{,}000}{1.085 \times \chi\phi\mu}$$

$$\Delta T = \frac{160 \times 1{,}000}{1.085 \times 2{,}000} = 74.0°F$$

   b. From Table 3, p. 20, throw at a 12-foot mounting height is 61 feet. As a 61-foot throw is not adequate, a 60-degree nozzle can be selected (from Table 5, p. 21) which provides a throw of 76 feet.

High Efficiency Duct Furnace

1. From the performance data tables, select the unit whose heating output meets or exceeds the heating load requirement.
2. Given the airflow to be supplied to the duct furnace, temperature rise and pressure drop through the duct furnace can be read directly from the performance data charts. If the air temperature rise is below 30°F, some supply air must be bypassed around the duct furnace. If the air temperature rise is over 80°F, additional supply air must be delivered to the duct furnace.

   Selection Example—A natural gas duct furnace that can provide 300 MBh heating output is required. An airflow of 5,000 cfm is being provided to the duct furnace.

   Select the unit as follows:

   a. From Table 14, p. 27, select a GLND-040 with a 400.0 MBh input and 320.0 MBh heating output.

   b. From Figure 10, p. 29, temperature rise at 5,000 cfm is 58°F and pressure drop is 0.16 inches.

Horizontal Blower Assembly

1. From the performance data tables, select the blower assembly that provides the needed airflow at the required static pressure, and determine the required motor size and fan speed.
2. If a blower assembly is to be used with a duct furnace, refer to the dimensional data table to determine which blower to use with the given duct furnace. The duct furnace pressure drop must be added to the pressure drop of the duct system before entering the blower assembly performance data tables. Enter the performance data table at the required airflow and at the total external static pressure to determine the motor size and fan speed.

   Selection Example—A GLND-040 high efficiency duct furnace is to be used with a horizontal blower assembly. An airflow of 5,000 cfm is required. The pressure drop of the duct system is 0.54 inches, and the pressure drop of the duct furnace is 0.16 inches.

   Select the unit as follows:

   a. From Table 29, p. 55, select a HBAC-45 for use with the GLND-040 duct furnace.

   b. From Table 16, p. 28, an HBAC-45 at 5,000 cfm and 0.7 inches static pressure (0.54-inch ductwork + 0.16-inch furnace) requires a 1-1/2 hp motor with a fan speed of 720 rpm.

Model Number Descriptions

Indoor Gas Heating Units

Note: *All units are AGA approved. For CGA approved units, contact Air Handling Product Support.*

Digit 1 — Gas Heating Equipment

Digit 2 — Product Type

B = High Efficiency Centrifugal Fan Unit Heater
L = High Efficiency Indoor Duct Furnace
H = High Efficiency Propeller Fan Unit Heater
A = Separated Combustion Propeller Fan Unit Heater
K = Separated Combustion Centrifugal Fan Unit Heater
M = Separated Combustion Indoor Duct Furnace
T = Propeller Fan / Tubular Heat Exchanger

Digit 3 — Fuel

N = Natural Gas
P = LP Gas (Propane)

Digit 4 — Development Sequence

D = Fourth Generation

Digits 5, 6, 7 — Input Capacity

Single Furnace

003[a] =	30 MBh	015 =	150 MBh
004[a] =	45 MBh	017 =	175 MBh
006[a] =	60 MBh	020 =	200 MBh
007[a] =	75 MBh	022 =	225 MBh
009 =	90 MBh	025 =	250 MBh
010[b] =	100 MBh	030 =	300 MBh
011[c] =	105 MBh	035 =	350 MBh
120[c] =	120 MBh	040 =	400 MBh
012[b] =	125 MBh		

(a) Not available for high efficiency propeller fan.
(b) Not available for tubular.
(c) Available for tubular only.

Digit 8 — Main Power Supply

A =	115/60/1	D =	230/60/3
B =	230/60/1	E =	460/60/3
C =	208/60/3	F =	575/60/3

Digit 9 — Gas Control Option

D = Single-Stage, Intermittent Pilot Ignition
E = Two-Stage, Intermittent Pilot Ignition
H = Electronic Modulating with Room T-Stat, Intermittent Pilot Ignition
J = Electronic Modulating with Duct-Stat, Intermittent Pilot Ignition
L = Electronic Modulating with External 4–20 mA Input
N = Electronic Modulating with External 0–10 Vdc Input
T = Single Stage Direct Spark Ignition
V = Two-Stage, Direct Spark Ignition

Digit 10 — Design Sequence

G = Seventh Design

Digit 11 — Heat Exchanger Material

1 = Aluminized Steel
2 = #409 Stainless Steel
3 = #321 Stainless Steel

Digit 12 — Rooftop Arrangements

0 = None (Indoor Unit)

Digit 13 — Rooftop Heating Unit Motor Selection

0 = None (Indoor Unit and Rooftop Duct Furnace)

Digit 14 — Rooftop Fan Section

0 = None (Indoor Unit and Rooftop Duct Furnace)

Digit 15 — Miscellaneous Options

All Units
0 = None
A = #409 Stainless Steel Burners[1]
B = Orifices For Elevation Above 2000 Feet (Specify Elevation)

Propeller Fan Unit Heater (High Efficiency and Separated Combustion)
C = #409 Stainless Steel Draft Diverter
D = Summer-Winter Switch
E = Vertical Louvers
J = Totally Enclosed Motor
7 = OSHA Fan Guard

Centrifugal Fan Unit Heater (High Efficiency and Separated Combustion)
C = #409 Stainless Steel Draft Diverter
D = Summer-Winter Switch
E = Vertical Louvers
H = Duct Discharge Flange
J = Totally Enclosed Motor

Duct Furnace (Indoor) (High Efficiency)
C = #409 Stainless Steel Draft Diverter
D = Summer-Winter Switch
F = Horizontal Louvers
G = Horizontal and Vertical Louvers
K = Side Access Burner Drawer (Left Hand)[2]
L = Fan Time Delay Control
M = Side Access Burner Drawer (Right Hand)[2]

Separated Combustion, Indoor Duct Furnace
C = #409 Stainless Steel Draft Diverter
D = Summer-Winter Switch
F = Horizontal Louvers
G = Horizontal and Vertical Louvers

Propeller Type / Tubular Heat Exchanger
J = Totally Enclosed Motor
7 = OSHA Fan Guard

[1] Not available for tubular.
[2] The left or right hand side of the side access burner drawer, options K & M, is determined by facing the air outlet side of the duct furnace.

Horizontal Blower Assembly

Digit 1, 2, 3 — Horizontal Blower Assembly

Digit 4 — Development Sequence

C = Third Generation

Digit 5, 6 — Blower Size

15 = Nominal 1500 cfm
20 = Nominal 2000 cfm
30 = Nominal 3000 cfm
45 = Nominal 4500 cfm

Digit 7 — Transition Size

(Specifies Duct Furnace Size)

0	=	None			
A	=	100 MBh	F	=	225 MBh
B	=	125 MBh	G	=	250 MBh
C	=	150 MBh	H	=	300 MBh
D	=	175 MBh	J	=	350 MBh
E	=	200 MBh	K	=	400 MBh

Digit 8 — Main Power Supply

A	=	115/60/1	D	=	230/60/3
B	=	230/60/1	E	=	460/60/3
C	=	208/60/3			

Digit 9 — Motor Horsepower

A	=	1/3 hp	D	=	1 hp
B	=	1/2 hp	E	=	1-1/2 hp
C	=	3/4 hp	F	=	2 hp

Digit 10 — Design Sequence

D = Fourth Design

Digit 11 — Miscellaneous Options

0 = None
1 = Insulation
3 = Totally Enclosed Motor

General Data

Service Clearances

Table 2. Minimum clearances

	Duct Furnace	Propeller & Centrifugal Fan U.H.
Sides	18”	18”
Top	6”	6”
Bottom	21”[(a)]	21”
Flue	6”	6”

(a) 21” clearance is required for bottom access to burners and pilot. If a side pull-out burner drawer is ordered (duct furnace only), bottom clearance can be reduced to six inches. Side clearance, however, must be increased such that it is adequate for burner drawer removal. Reference Table 27, p. 53.

Heat Throw Data

Figure 5. Standard unit heater applications

Table 3. Standard unit heater—approximate distance of throw at nominal airflow

Distance From Floor to Bottom of Unit “H” ft (m)	Unit Size Input MBh (kW)													
	30 (8.8)	45 (13.2)	60 (17.6)	75 (22.0)	100 (29.3)	125 (36.6)	150 (43.9)	175 (51.2)	200 (58.6)	225 (65.9)	250 (73.2)	300 (87.8)	350 (102.5)	400 (117.1)
8 (2.4)	33 (10.1)	33 (10.1)	33 (10.1)	40 (12.2)	60 (18.3)	65 (19.8)	70 (21.3)	75 (22.9)	80 (24.4)	85 (25.9)	90 (27.4)	105 (32.0)	110 (33.5)	120 (36.6)
10 (3.0)	28 (8.5)	28 (8.5)	28 (8.5)	35 (10.7)	54 (16.5)	56 (17.1)	60 (18.3)	64 (19.5)	68 (20.7)	72 (21.9)	78 (23.8)	90 (27.4)	95 (29.0)	100 (30.5)
12 (3.7)	—	—	—	—	44 (13.4)	46 (14.0)	49 (14.9)	57 (17.4)	61 (18.6)	65 (19.8)	68 (20.7)	80 (24.4)	84 (25.6)	90 (27.4)
15 (4.6)	—	—	—	—	—	—	45 (13.7)	49 (14.9)	52 (15.8)	56 (17.1)	60 (18.3)	70 (21.3)	74 (22.6)	80 (24.4)
20 (6.1)	—	—	—	—	—	—	—	—	46 (14.0)	50 (15.2)	54 (16.5)	63 (19.2)	66 (20.1)	70 (21.3)

Figure 6. 30° nozzle

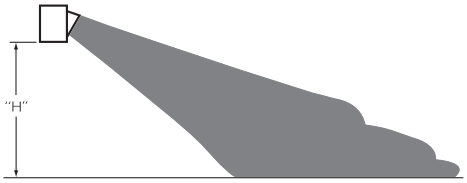


Table 4. 30-degree nozzle—approximate distance of throw at nominal airflow

Distance From Floor to Bottom of Unit "H" ft (m)	Unit Size Input MBh (kW)									
	100 (29.3)	125 (36.6)	150 (43.9)	175 (51.2)	200 (58.6)	225 (65.9)	250 (73.2)	300 (87.8)	350 (102.5)	400 (117.1)
8	65	70	75	80	85	90	95	115	120	125
(2.4)	(19.8)	(21.3)	(22.9)	(24.4)	(25.9)	(27.4)	(29.0)	(35.1)	(36.6)	(38.1)
10	57	60	64	68	72	78	86	99	105	110
(3.0)	(17.4)	(18.3)	(19.5)	(20.7)	(21.9)	(23.8)	(26.2)	(30.2)	(32.0)	(33.5)
12	50	54	57	60	64	70	77	88	94	100
(3.7)	(15.2)	(16.5)	(17.4)	(18.3)	(19.5)	(21.3)	(23.5)	(26.8)	(28.7)	(30.5)
15	—	45	48	50	53	59	64	74	79	84
(4.6)		(13.7)	(14.6)	(15.2)	(16.2)	(18.0)	(19.5)	(22.6)	(24.1)	(25.6)
20	—	—	—	44	47	53	58	66	71	75
(6.1)				(13.4)	(14.3)	(16.2)	(17.7)	(20.1)	(21.6)	(22.9)

Notes:
1. All throw data figures are approximate.
2. — = not recommended at these mounting heights.
3. Nozzles are not available on units below size 100 MBh.
4. Nozzles are available for high-efficiency units. Specify High Efficiency when ordering due to difference in nozzle configuration.

Figure 7. 60° nozzle

Table 5. 60-degree nozzle—approximate distance of throw at nominal airflow

Distance From Floor to Bottom of Unit "H" ft (m)	Unit Size Input MBh (kW)									
	100 (29.3)	125 (36.6)	150 (43.9)	175 (51.2)	200 (58.6)	225 (65.9)	250 (73.2)	300 (87.8)	350 (102.5)	400 (117.1)
8	75	80	85	90	95	100	110	125	130	138
(2.4)	(22.9)	(24.4)	(25.9)	(27.4)	(29.0)	(30.5)	(33.5)	(38.1)	(39.6)	(42.1)
10	65	70	75	79	83	88	95	109	115	120
(3.0)	(19.8)	(21.3)	(22.9)	(24.1)	(25.3)	(26.8)	(29.0)	(33.2)	(35.1)	(36.6)
12	60	64	68	72	76	80	84	100	103	108
(3.7)	(18.3)	(19.8)	(20.7)	(21.9)	(23.2)	(24.4)	(25.6)	(30.5)	(31.4)	(32.9)
15	50	54	56	61	65	68	71	85	88	94
(4.6)	(15.2)	(16.5)	(17.1)	(18.6)	(19.8)	(20.7)	(21.6)	(25.9)	(26.8)	(28.7)
20	—	49	52	55	59	61	65	77	81	85
(6.1)		(14.9)	(15.8)	(16.8)	(18.0)	(18.6)	(19.8)	(23.5)	(24.7)	(25.9)

Figure 8. 90° nozzle

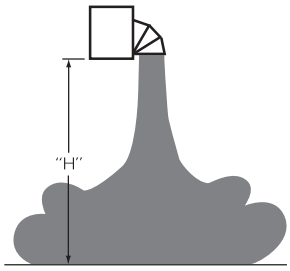


Table 6. 90-degree nozzle—approximate floor coverage at nominal airflow

	Distance From Floor to Bottom of Unit "H" ft (m)				
Unit Size	10 (3.0)	15 (4.6)	20 (6.1)	25 (7.6)	30 (9.1)
100	—	30 x 25 (9.1 x 7.6)	—	—	—
125	—	35 x 30 (10.7 x 9.1)	—	—	—
150	—	40 x 35 (12.2 x 10.7)	—	—	—
175	—	45 x 40 13.7 x 12.2)	—	—	—
200	—	50 x 40 (15.2 x 12.2)	40 x 35 (12.2 x 10.7)	—	—
225	—	55 x 40 (16.8 x 12.2)	48 x 35 (14.6 x 10.7)	—	—
250	—	60 x 45 (18.3 x 13.7)	56 x 40 (17.1 x 12.2)	50 x 35 (15.2 x 10.7)	—
300	—	70 x 45 (21.3 x 13.7)	65 x 40 (19.8 x 12.2)	60 x 35 (18.3 x 10.7)	55 x 35 (16.8 x 10.7)
350	—	80 x 50 (24.4 x 15.2)	70 x 45 (21.3 x 13.7)	65 x 40 (19.8 x 12.2)	60 x 35 (18.3 x 10.7)
400	—	100 x 50 (30.5 x 15.2)	80 x 45 (24.4 x 13.7)	75 x 40 (22.9 x 12.2)	65 x 40 (19.8 x 12.2)

Figure 9. "Y" splitter

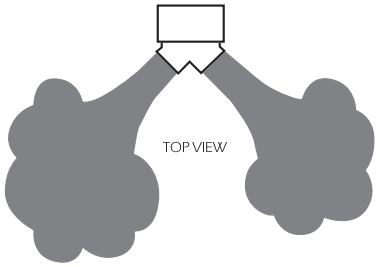


Table 7. "Y" splitters—approximate distance of throw at nominal airflow

Distance From Floor to Bottom of Unit "H" ft (m)	Unit Size Input MBh (kW)									
	100 (29.3)	125 (36.6)	150 (43.9)	175 (51.2)	200 (58.6)	225 (65.9)	250 (73.2)	300 (87.8)	350 (102.5)	400 (117.1)
8 (2.4)	47 (14.3)	51 (15.5)	60 (18.3)	65 (19.8)	70 (21.3)	72 (21.9)	80 (24.4)	95 (29.0)	100 (30.5)	103 (31.4)
10 (3.0)	41 (12.5)	44 (13.4)	52 (15.8)	56 (17.1)	61 (18.6)	63 (19.2)	69 (21.0)	82 (25.0)	87 (26.5)	92 (28.0)
12 (3.7)	37 (11.3)	40 (12.2)	47 (14.3)	51 (15.5)	55 (16.8)	57 (17.4)	63 (19.2)	75 (22.9)	79 (24.1)	82 (25.0)

Notes:
1. All throw data figures are approximate.
2. Nozzles are not available on units below size 100 MBh.
3. Nozzles are available for high-efficiency units. Specify High Efficiency when ordering due to difference in nozzle configuration.

Performance Data

Table 8. Correction factors for high altitude installations

Altitude Above Sea Level (ft)	0	2,000	3,000	4,000	5,000	6,000	7,000
Gas Heating Capacity	1.00	0.92	0.88	0.84	0.8	0.76	0.72
Fan rpm	1.00	1.04	1.06	1.09	1.12	1.15	1.19
Fan bhp	1.00	1.07	1.12	1.18	1.25	1.33	1.41

Notes:
1. For high altitude installations above 2,000 feet, reduce ratings 4 percent for each 1,000 feet above sea level.
2. Multiply standard unit by correction factor to get actual input and required rpm and hp.

Table 9. Tubular Heat Exchanger performance data—model GTND/GTPD

Unit Size		003	004	006	007	009	011	120	015	017	020	025	030	035	040
Input															
	MBh	30	45	60	75	90	105	120	150	175	200	250	300	350	400
	kW	8.8	13.2	17.6	22.0	26.4	30.8	35.2	43.9	51.2	58.6	73.2	87.8	102.5	117.1
Output															
	MBh	24.9	37.35	49.8	61.5	73.8	86.1	98.4	124.5	145.25	166.0	207.5	249.0	290.5	332.0
	kW	7.2	10.9	14.5	18.0	21.6	25.2	28.8	36.4	42.5	48.6	60.7	72.9	85.1	97.2
Thermal Efficiency		83	83	83	82	82	82	82	83	83	83	83	83	83	83
Free Air Delivery															
	cfm	370	550	740	920	1,100	1,300	1,475	2,400	2,850	3,200	3,450	5,000	5,600	5,800
	m^3/s	0.175	0.260	0.349	0.434	0.519	0.614	0.696	1.133	1.346	1.511	1.629	2.361	2.644	2.738
Air Temperature Rise															
	°F	60	60	60	60	60	60	60	47	46	47	54	45	47	51
	°C	15	15	15	15	15	15	15	26	26	26	30	25	26	28
Full Load Amps at 120V		3.0	3.0	4.1	4.1	6.4	6.4	6.4	5.8	8.0	8.0	8.0	11.3	13.5	13.5
Motor Data															
	hp	1/20	1/20	1/12	1/12	1/10	1/10	1/10	1/4	1/3	1/3	1/3	1/4	1/3	1/3
	kW	0.04	0.04	0.06	0.06	0.075	0.075	0.075	0.19	0.25	0.25	0.25	0.19	0.25	0.25
	Type	SP	SP	SP	SP	SP	SP	SP	PSC	PSC	PSC	PSC	PSC	PSC	PSC
	rpm	1,650	1,650	1,050	1,050	1,050	1,050	1,050	1,140	1,140	1,140	1,140	1,140	1,140	1,140
	Amps at 115V	1.9	1.9	2.6	2.6	4.2	4.2	4.2	4.7	5.8	5.8	5.8	9.4	11.6	11.6

Notes:
1. Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet, input must be derated 4 percent for each 1,000 feet above sea level.
2. CS = Capacitor Start; SPH = Split Capacitor
3. Standard motors are 115/60/1 open drip-proof.
4. 0.2 maximum external static pressure.
5. Unit amps are based on hot surface pilot ignition.

Table 10. High Efficiency Propeller Fan Gas Unit Heater performance data—model GHND/GHPD

Unit Size		010	012	015	017	020	022	025	030	035	040
Input											
	MBh	100	125	150	175	200	225	250	300	350	400
	kW	29.3	36.6	43.9	51.2	58.6	65.9	73.2	87.8	102.5	117.1
Output											
	MBh	80	100	120	140	160	120	200	240	280	320
	kW	23.4	29.3	35.1	41.0	46.9	52.7	58.6	70.3	82.0	93.7
Thermal Efficiency		80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Free Air Delivery											
	cfm	1,480	1,650	2,200	2,530	2,640	2,700	3,100	4,400	5,000	5,300
	m^3/s	0.699	0.779	1.038	1.194	1.246	1.274	1.463	2.077	2.360	2.502
Air Temperature Rise											
	°F	50	56	50	51	56	61	60	50	52	56
	°C	28	31	28	28	31	34	33	28	29	31
Output Velocity											
	fpm	775	910	1,045	1,070	1,010	950	980	1,100	1,150	1,050
	m/s	3.94	4.62	5.31	5.44	5.13	4.83	4.98	5.59	5.84	5.33
Full Load Amps at 115V		5.8	6	7.2	8.2	8.2	8.2	8.2	11.2	13.2	13.2
Motor Data											
	hp	1/20	1/10	1/4	1/3	1/3	1/3	1/3	(2) 1/4	(2) 1/3	(2) 1/3
	kW	0.037	0.075	0.186	0.249	0.249	0.249	0.249	(2) 0.186	(2) 0.249	(2) 0.249
	Type	SP	SP	PSC	PSC	PSC	PSC	PSC	PSC	PSC	PSC
	rpm	1,050	1,050	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140
	Amps at 115V	2.6	2.8	4.0	4.5	4.5	4.5	4.5	8.0	9.0	9.0

Notes:
1. Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet, input must be derated 4 percent for each 1,000 feet above sea level.
2. Standard 115/60/1 open drip-proof motor.
3. The flue vent fan motors used on all high efficiency units are 115/60/1; 1/20 hp and 1.5 amps.

Table 11. High Efficiency Centrifugal Fan Unit Heater performance data—model GBND/GBPD

Unit Size		010	012	015	017	020	022	025	030	035	040
Input											
	MBh	100	125	150	175	200	225	250	300	350	400
	kW	29.3	36.6	43.9	51.2	58.6	65.9	73.2	87.8	102.5	117.1
Output											
	MBh	80	100	120	140	160	180	200	240	280	320
	kW	23.4	29.3	35.1	41.0	46.9	52.7	58.6	70.3	82.0	93.7
Thermal Efficiency		80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Free Air Delivery											
	cfm	1,200	1,575	1,975	2,300	2,400	2,600	2,850	3,950	4,600	4,800
	m^3/s	0.566	0.743	0.932	1.086	1.133	1.227	1.345	1.864	2.171	2.266
Air Temperature Rise											
	°F	62	59	56	56	62	64	65	56	56	62
	°C	34	33	31	31	34	36	36	31	31	34
Output Velocity											
	fpm	880	950	1,030	1,045	965	935	930	1,080	1,090	1,000
	m/s	4.47	4.83	5.23	5.31	4.90	4.72	4.72	5.49	5.54	5.08
Full Load Amps at 115V		8.3	9.8	10.6	10.6	15.2	15.2	15.2	15.2	18.6	18.6
Motor Data											
	hp	1/4	1/3	1/2	1/2	3/4	3/4	3/4	3/4	1	1
	kW	0.19	0.25	0.37	0.37	0.56	0.56	0.56	0.56	0.75	0.75
	Type	SHP	SHP	SHP	SHP	SHP	SHP	SHP	SHP	CS	CS
	rpm	1,725	1,725	1,725	1,725	1,725	1,725	1,725	1,725	1,725	1,725
	Amps at 115V	5.1	6.6	7.4	7.4	12.0	12.0	12.0	12.0	15.4	15.4

Notes:
1. Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet, input must be derated 4 percent for each 1,000 feet above sea level.
2. Standard motors are 115V 60 Hz, single-phase open drip-proof.
3. The flue vent fan motors used on all high efficiency units are 115/60/1; 1/20 hp and 1.5 amps. All other voltages will require an additional transformer.
4. SPH = Split Phase; CS = Capacitor Start
5. 0.2" maximum external static pressure.

Table 12. Separated Combustion Propeller Fan Gas Unit Heater performance data—model GAND/GAPD

Unit Size		010	012	015	017	020	022	025	030	035	040
Input											
	MBh	100	125	150	175	200	225	250	300	350	400
	kW	29.3	36.6	43.9	51.2	58.6	65.9	73.2	87.8	102.5	117.1
Output											
	MBh	80	100	120	140	160	180	200	240	280	320
	kW	23.4	29.3	35.1	41.0	46.9	52.7	58.6	70.3	82.0	93.7
Thermal Efficiency		80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Free Air Delivery											
	cfm	1480	1650	2200	2530	2640	2700	3100	4400	5000	5300
	m^3/s	0.699	0.779	1.038	1.194	1.246	1.274	1.463	2.077	2.360	2.502
Air Temperature Rise											
	°F	50	56	50	51	56	61	60	50	52	56
	°C	28	31	28	28	31	34	33	28	29	31
Output Velocity											
	fpm	775	910	1045	1070	1000	950	980	1100	1150	1050
	m/s	3.9	4.6	5.3	5.4	5.1	4.8	5.0	5.6	5.8	5.3
Full Load Amps at 115V		5.8	6.0	7.2	7.8	7.8	7.8	8.8	11.2	12.2	12.2
Motor Data											
	hp	1/20	1/10	1/4	1/3	1/3	1/3	1/2	(2) 1/4	(2) 1/3	(2) 1/3
	kW	0.037	0.075	0.186	0.249	0.249	0.249	0.373	(2) 0.186	(2) 0.249	(2) 0.249
	Type	SP	SP	PSC	PSC	PSC	PSC	PSC	PSC	PSC	PSC
	rpm	1,050	1,050	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140
	Amps at 115V	2.6	2.8	4.0	4.5	4.5	4.5	5.5	8.0	9.0	9.0

Notes:
1. Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet, input must be derated 4 percent for each 1,000 feet above sea level.
2. Standard motor is 115/60/1 open drip-proof.
3. SP = Shaded Pole; PSC = Permanent Split Capacitor.

Table 13. Separated Combustion Centrifugal Fan Gas Unit Heater performance data—model GKND/GKPD

Unit Size		010	012	015	017	020	022	025	030	035	040
Input											
	MBh	100	125	150	175	200	225	250	300	350	400
	kW	29.3	36.6	43.9	51.2	58.6	65.9	73.2	87.8	102.5	117.1
Output											
	MBh	80	100	120	140	160	180	200	240	280	320
	kW	23.4	29.3	35.1	41.0	46.9	52.7	58.6	70.3	82.0	93.7
Thermal Efficiency		80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Free Air Delivery											
	cfm	1,200	1,575	1,975	2,300	2,400	2,600	2,850	3.950	4,600	4,800
	m^3/s	0.566	0.743	0.932	1.086	1.133	1.227	1.345	1.864	2.171	2.266
Air Temperature Rise											
	°F	62	59	56	56	62	64	65	56	56	62
	°C	34	33	31	31	34	36	36	31	31	34
Output Velocity											
	fpm	880	950	1030	1045	965	935	930	1080	1090	1000
	m/s	4.47	4.83	5.23	5.31	4.90	4.75	4.72	5.49	5.54	5.08
Full Load Amps at 115V		8.3	9.8	10.6	10.6	15.2	15.2	15.2	15.2	18.6	18.6
Motor Data											
	hp	1/4	1/3	1/2	1/2	3/4	3/4	3/4	3/4	1	1
	kW	0.19	0.25	0.37	0.37	0.56	0.56	0.56	0.56	0.75	0.75
	Type	SPH	SPH	SPH	SPH	SPH	SPH	SPH	SPH	CS	CS
	rpm	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725
	Amps at 115V	5.1	6.6	7.4	7.4	12.0	12.0	12.0	12.0	15.4	15.4

Notes:
1. Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet, input must be derated 4 percent for each 1,000 feet above sea level.
2. Standard motor is 115/60/1 open drip-proof.
3. SPH = Split Phase; CS = Capacitor Start.

Table 14. High Efficiency Indoor Gas Duct Furnace performance data—model GLND/GLPD

	Input																	
	MAX		MIN		Output		MIN		Temp. Rise		P.D.		MAX		Temp. Rise		P.D.	
Unit Size	MBh	kW	MBh	kW	MBh	kW	cfm	m^3/s	°F	°C	in. of H_2O	kPa	cfm	m^3/s	°F	°C	in. of H_2O	Pascals
010	100	29.3	50	14.6	80	23.4	929	0.438	80	44	0.12	0.03	2469	1.165	30	17	0.85	0.21
012	125	36.6	62.5	18.3	100	29.3	1157	0.546	80	44	0.13	0.03	3086	1.457	30	17	0.85	0.21
015	150	43.9	75	22.0	120	35.1	1389	0.656	80	44	0.15	0.04	3704	1.748	30	17	0.85	0.21
017	175	51.2	87.5	25.6	140	41.0	1620	0.765	80	44	0.14	0.03	4321	2.040	30	17	0.85	0.21
020	200	58.6	100	29.3	160	46.9	1852	0.874	80	44	0.14	0.03	4938	2.331	30	17	0.85	0.21
022	225	65.9	112.5	32.9	180	52.7	2083	0.983	80	44	0.14	0.03	5556	2.622	30	17	0.85	0.21
025	250	73.2	125	36.6	200	58.6	2315	1.093	80	44	0.14	0.03	6173	2.914	30	17	0.85	0.21
030	300	87.8	150	43.9	240	70.3	2778	1.311	80	44	0.13	0.03	7407	3.496	30	17	0.87	0.22
035	350	102.5	175	51.2	280	82.0	3241	1.530	80	44	0.13	0.03	8642	4.079	30	17	0.87	0.22
040	400	117.1	200	58.6	320	93.7	3704	1.748	80	44	0.14	0.03	9877	4.662	30	17	0.90	0.22

Note: Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet input must be derated four percent for each 1,000 feet above sea level.

Table 15. Separated Combustion Indoor Gas Duct Furnace performance data—model GMND/GMPD

	Input																	
	MAX		MIN		Output		MIN		Temp. Rise		P.D.		MAX		Temp. Rise		P.D.	
Unit Size	MBh	kW	MBh	kW	MBh	kW	cfm	m^3/s	°F	°C	in. of H_2O	kPa	cfm	m^3/s	°F	°C	in. of H_2O	Pascals
010	100	29.3	50	14.6	80	23.4	822	0.388	90	50	0.10	0.02	3700	1.746	20	11	2.03	0.51
012	125	36.6	62.5	18.3	100	29.3	1028	0.485	90	50	0.09	0.02	4625	2.183	20	11	1.92	0.48
015	150	43.9	75	22.0	120	35.1	1233	0.582	90	50	0.09	0.02	5550	2.620	20	11	1.81	0.45
017	175	51.2	87.5	25.6	140	41.0	1439	0.679	90	50	0.09	0.02	6475	3.056	20	11	1.86	0.46
020	200	58.6	100	29.3	160	46.9	1645	0.776	90	50	0.09	0.02	7401	3.493	20	11	1.90	0.47
022	225	65.9	112.5	32.9	180	52.7	1850	0.873	90	50	0.09	0.02	8326	3.930	20	11	1.93	0.48
025	250	73.2	125	36.6	200	58.6	2056	0.970	90	50	0.09	0.02	9251	4.366	20	11	1.96	0.49
030	300	87.8	150	43.9	240	70.3	2467	1.164	90	50	0.10	0.02	11101	5.240	20	11	2.00	0.50
035	350	102.5	175	51.2	280	82.0	2878	1.358	90	50	0.10	0.02	12951	6.113	20	11	2.02	0.50
040	400	117.1	200	58.6	320	93.7	3289	1.552	90	50	0.10	0.02	14801	6.986	20	11	2.05	0.51

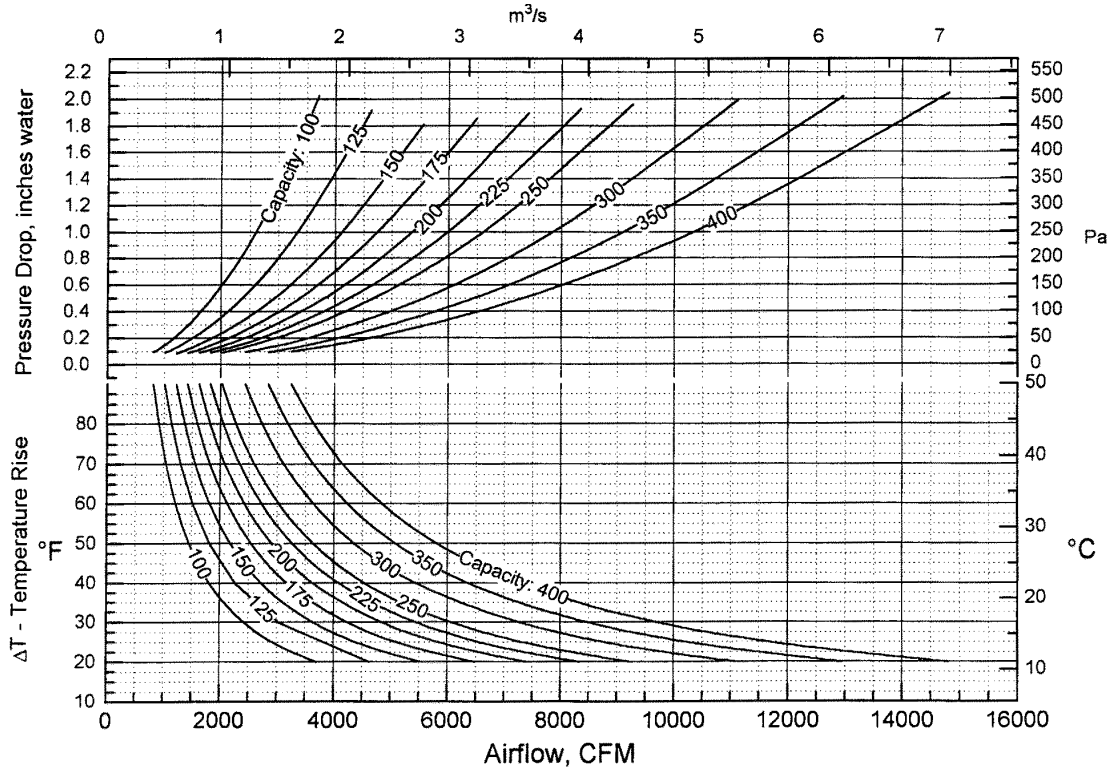
Note: Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet input must be derated four percent for each 1,000 feet above sea level.

Table 16. Horizontal Blower Assembly performance data

				External Static Pressure															
			in. of H_2O	0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9	
			kPa	0.05		0.07		0.10		0.12		0.15		0.17		0.20		0.22	
	Nominal	Blower	cfm		hp		hp		hp		hp		hp		hp		hp		hp
Models	cfm	Size	m^3/s	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
HBAC-15	1,500	10”	1,250	525	1/3	650	1/3	680	1/3	760	1/3	780	1/3	840	1/3	—	—	—	—
			0.590		0.25		0.25		0.25		0.25		0.25		0.25				
			1,500	600	1/3	680	1/3	715	1/3	790	1/3	810	1/2	860	1/2	895	1/2	970	1/2
			0.708		0.25		0.25		0.25		0.25		0.37		0.37		0.37		0.37
			1,750	650	1/3	710	1/3	750	1/2	805	1/2	850	1/2	890	1/2	940	3/4	990	3/4
			0.826		0.25		0.25		0.37		0.37		0.37		0.37		0.56		0.56
			2,000	700	1/2	760	1/2	800	1/2	850	1/2	890	1/2	925	3/4	980	3/4	1,010	3/4
			0.944		0.37		0.37		0.37		0.37		0.37		0.56		0.56		0.56
HBAC-20	2,000	12”	1,500	425	1/3	500	1/3	550	1/3	630	1/3	—	—	—	—	—	—	—	—
			0.708		0.25		0.25		0.25		0.25								
			1,750	450	1/3	515	1/3	560	1/3	635	1/2	680	1/2	725	1/2	—	—	—	—
			0.826		0.25		0.25		0.25		0.37		0.37		0.37				
			2,000	475	1/3	530	1/3	590	1/2	640	1/2	690	1/2	740	1/2	785	1/2	810	3/4
			0.944		0.25		0.25		0.37		0.37		0.37		0.37		0.37		0.56
			2,250	515	1/2	560	1/2	610	1/2	650	1/2	700	3/4	750	3/4	790	3/4	815	3/4
			1.062		0.37		0.37		0.37		0.37		0.56		0.56		0.56		0.56
			2,500	540	1/2	590	1/2	625	1/2	670	1/2	710	3/4	760	3/4	795	3/4	820	3/4
			1.180		0.37		0.37		0.37		0.37		0.56		0.56		0.56		0.56
			2,750	575	1/2	615	1/2	650	3/4	690	3/4	730	3/4	780	3/4	800	3/4	830	1
			1.298		0.37		0.37		0.56		0.56		0.56		0.56		0.56		0.75
HBAC-30	3,000	12”	1,750	450	1/3	510	1/3	560	1/3	630	1/3	675	1/2	720	1/2	—	—	—	—
			0.826		0.25		0.25		0.25		0.25		0.37		0.37				
			2,000	475	1/3	525	1/3	590	1/2	635	1/2	680	1/2	735	1/2	785	1/2	810	3/4
			0.944		0.25		0.25		0.37		0.37		0.37		0.37		0.37		0.56
			2,250	500	1/2	550	1/2	600	1/2	645	1/2	685	1/2	740	3/4	785	3/4	810	3/4
			1.062		0.37		0.37		0.37		0.37		0.37		0.56		0.56		0.56
			2,500	525	1/2	580	1/2	615	1/2	665	1/2	700	3/4	750	3/4	790	3/4	815	3/4
			1.180		0.37		0.37		0.37		0.37		0.56		0.56		0.56		0.56
			2,750	560	1/2	605	1/2	640	3/4	685	3/4	715	3/4	775	3/4	805	3/4	825	1
			1.298		0.37		0.37		0.56		0.56		0.56		0.56		0.56		0.75
			3,000	610	1/2	640	3/4	660	3/4	710	3/4	750	1	790	1	815	1	845	1
			1.416		0.37		0.56		0.56		0.56		0.75		0.75		0.75		0.75
			3,250	630	3/4	675	3/4	700	1	735	1	750	1	790	1	830	1	860	1
			1.534		0.56		0.56		0.75		0.75		0.75		0.75		0.75		0.75
			3,500	675	3/4	700	1	725	1	775	1	800	1	840	1-1/2	875	1-1/2	890	1-1/2
			1.652		0.56		0.75		0.75		0.75		0.75		1.12		1.12		1.12
HBAC-45	4,500	12”	2,750	400	3/4	450	3/4	510	3/4	—	—	—	—	—	—	—	—	—	—
			1.298		0.56		0.56		0.56										
			3,000	425	3/4	475	3/4	550	3/4	600	3/4	650	3/4	—	—	—	—	—	—
			1.416		0.56		0.56		0.56		0.56		0.56						
			3,500	430	3/4	480	3/4	560	3/4	610	3/4	660	3/4	700	1	730	1	—	—
			1.652		0.56		0.56		0.56		0.56		0.56		0.75		0.75		
			4,000	450	3/4	500	3/4	565	3/4	615	3/4	670	1	710	1	740	1	790	1
			1.888		0.56		0.56		0.56		0.56		0.75		0.75		0.75		0.75
			4,500	475	3/4	525	3/4	575	3/4	620	1	680	1	715	1	750	1	800	1-1/2
			2.124		0.56		0.56		0.56		0.75		0.75		0.75		0.75		1.12
			5,000	500	3/4	540	3/4	600	1	630	1	690	1	720	1-1/2	760	1-1/2	810	1-1/2
			2.360		0.56		0.56		0.75		0.75		0.75		1.12		1.12		1.12
			5,500	530	1	575	1	615	1	650	1-1/2	700	1-1/2	700	1-1/2	730	1-1/2	820	1-1/2
			2.596		0.75		0.75		0.75		1.12		1.12		1.12		1.12		1.12
			6,000	575	1-1/2	615	1-1/2	660	1-1/2	690	1-1/2	715	1-1/2	760	2	800	2	830	2
			2.832		1.12		1.12		1.12		1.12		1.12		1.49		1.49		1.49
			6,500	610	1-1/2	660	2	710	2	750	2	800	2	840	2	890	3	930	3
			3.068		1.12		1.49		1.49		1.49		1.49		1.49		2.24		2.24
			7,000	720	1-1/2	790	2	830	2	860	2	910	3	940	3	960	3	—	—
			3.304		1.12		1.49		1.49		1.49		2.24		2.24		2.24		
			7,500	800	2	860	2	900	3	930	3	960	3	—	—	—	—	—	—
			3.540		1.49		1.49		2.24		2.24		2.24						
			8,000	860	2	930	3	960	3	—	—	—	—	—	—	—	—	—	—
			3.776		1.49		2.24		2.24										

Note: External Static Pressure in inches of water. Add pressure drop of indoor duct furnace, if used, to pressure drop of ductwork, to determine total external static pressure. HBAC units are for use with specific duct furnace sizes. Reference Table 29, p. 55.

Figure 10. Performance data curves for all duct furnaces



Controls

Pilot Control

High efficiency units (centrifugal, propeller and duct furnaces) ship as standard with intermittent pilot ignition. The separated combustion propeller and centrifugal fan unit heaters also ship as standard with intermittent pilot ignition.

Intermittent pilot ignition contains a solid-state ignition control system that ignites the pilot by spark for each cycle of operation. When the pilot flame is proven, the main burner valve opens to allow gas flow to the burners. Both the pilot and burners are extinguished during the off cycle.

Intermittent pilot ignition is ideal for limited access installations where manual lighting of the pilot may be difficult. Nuisance pilot outages on units mounted in areas subject to occasional severe drafts can also be eliminated. Energy savings will be realized using this system as the pilot is extinguished during the off cycle. Intermittent pilot ignition should be considered on units that have long shutoff periods.

Fan Control

The supply fan motor is activated directly through the fan time delay relay on indoor units provided with single-phase motors up to one hp. Contactors or starters are required on all other units with single-phase motors, 1-1/2 hp and above, and with all three-phase motors. On indoor units, contactors and starters, where required, are provided (see Table 17.)

Table 17. Contactors provided on indoor units

	hp								
Voltage	**1/2**	**3/4**	**1**	**1-1/2**	**2**	**3**	**5**	**7-1/2**	**10**
115/60/1	1	1	1	2	2	N/A	N/A	N/A	N/A
230/60/1	1	1	1	2	2	N/A	N/A	N/A	N/A
208/60/3	2	2	2	2	2	2	2	4	4
230/60/3	2	2	2	2	2	2	2	4	4
460/60/3	3	3	3	3	3	3	3	5	5

Notes:
1. Contactors not required or provided on units with single phase motors up to one hp.
2. Provided with contactor with line voltage holding coil on all 1-1/2 hp and above single-phase motors and on all 208/230V three-phase motors up to five hp.
3. Provided with contactor with low (24V) holding coil on all 460 V three-phase motors up to five hp.
4. Provided with size 2 starter on all units with 7-1/2 and 10 hp 208/230V three-phase motors.
5. Provided with size 1 starter on all units with 7-1/2 and 10 hp 460V three-phase motors.

Gas Controls

Single-Stage Control

Indoor gas heating units are provided with an automatic single-stage gas valve as standard. This valve is an on/off type control, typically activated by a low voltage single-stage thermostat.

Two-Stage Control

Indoor units with optional two-stage control are provided with a two-stage gas valve capable of firing at 100 percent and 50 percent of rated input. Ignition is at low fire (50 percent of the unit's rated input) and the unit is typically controlled by a low voltage two-stage thermostat.

Electronic Modulating Control

This optional control is available for use with natural gas units only. Units with electronic modulating control are provided with an electronic modulating valve capable of firing from 100 percent to 50 percent of rated input. Ignition is at full fire (100 percent of unit's rated input). The electronic modulating valve is controlled by a room thermostat or a duct thermostat with remote setpoint adjustment which modulates the gas input from 100 percent to 50 percent of rated input. An optional override room thermostat is available for use with the duct thermostat. The override room thermostat allows full fire and overrides the duct thermostat when the room temperature falls below the override room thermostat's setpoint.

Note: *N/A on 30–75 MBh units.*

Electronic Modulating, 4–20 mA/0–10 Vdc Input

Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input.

The modulating gas valve shall operate in response to a 4–20 mA or a 0–10 Vdc input from an external DDC control.

Thermostats

Electronic Modulating Room Thermostat (Included with Gas Control)
- Low Voltage (24 V)
- 60 to 85°F Range
- 5-13/16” W 3-1/4” H 1-7/8” D
- Natural Gas Only

Single-Stage Room Thermostat (Order No. 350-0015-01)
- Low Voltage (24 V)
- 55 to 95°F Range
- 2-7/8” W x 4-3/4” H x 1-1/8” D

Single-Stage Duct Thermostat (Order No. 350-0015-07)
- Low Voltage (24 V)
- 55 to 175°F Range
- 5’ Capillary
- 2” W x 5-5/8” H x 2-7/16” D

Electronic Modulating Duct Thermostat (Included with Gas Control)
- Low Voltage (24 V)
- 55 to 90°F Range
- Sensor: 10-inch Probe
- Remote Temperature Selector: 4-1/4” W 4-1/4” H 1-7/8” D
- Duct Thermostat: 4-1/4” W 4-1/4” H 1-5/8” D
- Natural Gas Only

Single-Stage Room Thermostat with Summer/Winter Switch (Order No. 350-0015-02)
- Low Voltage (24 V)
- 55 to 95°F Range
- Fan Auto-On Switch
- 3-1/2” W x 4-1/5” H x 1-3/8” D

Two-Stage Duct Thermostat Order No. 350-0015-08)
- Low Voltage (24 V)
- 55 to 175°F Range
- 5’ Capillary
- 2” W x 5-5/8” H x 2-7/16” D

Electronic Modulating Override Room Thermostat for use with Duct Thermostats (Order No. 350-0015-05)
- Line Voltage (115 V)
- 50 to 90°F Range
- 2-7/8” W 4-9/16” H 1-1/4” D
- Natural Gas Only

Two-Stage Room Thermostat (Order No. 0135-THT025320-01, or 0135-THT02532G-01 with guard)
- Low Voltage (24 V)
- 42 to 88°F Range
- Fan Auto-On Switch
- System Off-Auto Switch
- 5-5/8” W x 3-1/2” H x 2-1/8” D

Universal Guard (Order No. 350-0015-06)
- Clear Plastic
- Ring Base
- Tumbler Lock and Two Keys
- Cover: 6-7/8” W x 5-5/8” H x 3” D
- Base: 6-9/16” W x 5-1/2” H x 3/8” D

Sequence of Operations

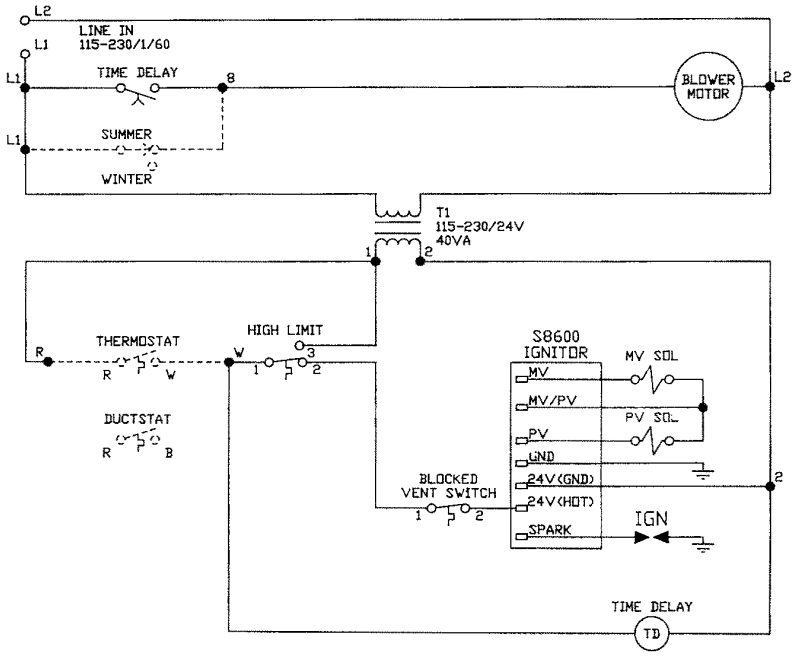
Typical wiring diagrams and sequence of operations for indoor units with intermittent pilot ignition or direct spark ignition are included in this section. On duct furnaces, the fan motor and associated controls shown in the wiring diagrams are not integral to the unit. It is essential, however, that the air handling system be interlocked with the duct furnace to prevent duct furnace operation without airflow.

Single-Stage Control

With power applied to the unit:

1. The thermostat calls for heat.
2. The pilot valve opens.
3. The ignitor sparks continuously to ignite the pilot.
4. The sensor proves pilot ignition and shuts off the ignitor.
5. With the pilot lit, the main gas valve opens.
6. Main burners are lit at 100 percent of unit's rated input.
7. The fan time delay relay (optional on duct furnaces) allows the heat exchanger to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.[1]
8. The unit continues to fire until the thermostat is satisfied and no longer calls for heat.
9. The main and pilot valves close.
10. The fan time delay relay remains closed, keeping the fan operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.

Note: *This unit is equipped with a blocked vent shutoff (spill) switch. If the venting system becomes blocked or there is continuous spillage, the vent shutoff switch will shut off the unit heater.*



- Caution - Disconnect power before servicing.
- Unit must be grounded.
- Use copper conductors only.
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 125°C.
- Refer to installation instructions for venting, gas piping, and start-up procedures.
- - - - Indicates Field Wiring.
- ___ Indicates Factory Wiring.

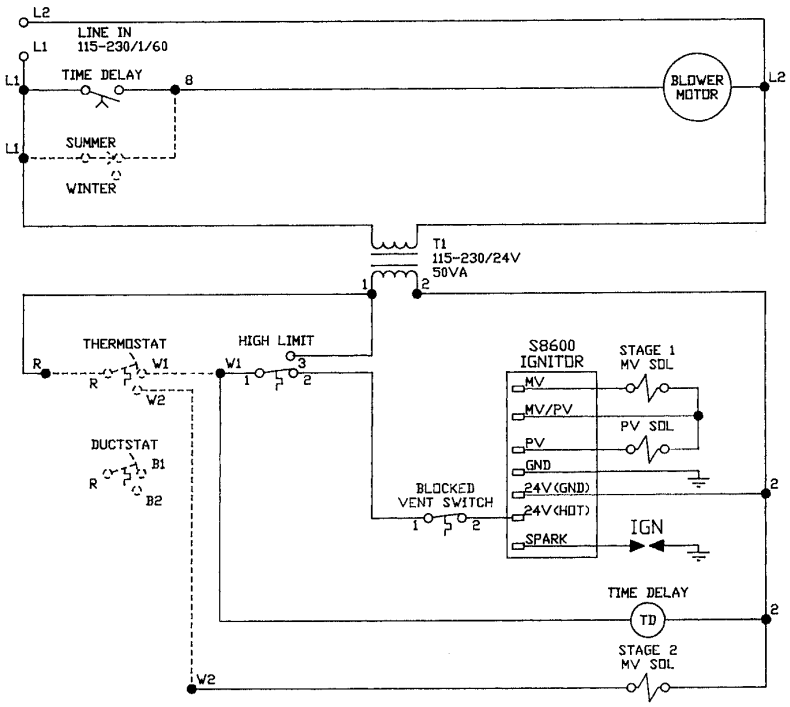
[1] See "Fan Control," p. 30.

Two-Stage Control

With power applied to the unit:

1. The first stage of the thermostat calls for heat.
2. The pilot valve opens.
3. The ignitor sparks continuously to ignite the pilot.
4. The sensor proves pilot ignition and shuts off the ignitor.
5. With the pilot lit, the main gas valve opens to low fire.
6. Main burners are lit at 50 percent of unit's rated input.
7. The fan time delay relay (optional on duct furnaces) allows the heat exchanger to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.[1]
8. If additional heat is required, the second stage of the thermostat calls for heat.
9. The main gas valve opens to full fire. The main burners are now at full fire. The unit continues at full fire until the second stage of the thermostat is satisfied and no longer calls for heat.
10. The main valve closes to low fire. The main burners are now at low fire. The unit continues at low fire until the first stage of the thermostat is satisfied and no longer calls for heat.
11. The main and pilot valves close.
12. The fan time delay relay remains closed, keeping the fan operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.

Note: *This unit is equipped with a blocked vent shutoff (spill) switch. If the venting system becomes blocked or there is continuous spillage, the vent shutoff switch will shut off the unit heater.*



- Caution - Disconnect power before servicing.
- Unit must be grounded.
- Use copper conductors only.
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 125°C.
- High-limit and blocked vent (spill) wires minimum 200°C.
- Refer to installation instructions for venting, gas piping, and start-up procedures.
- - - - Indicates Field Wiring.
- ___ Indicates Factory Wiring.

[1] See "Fan Control," p. 30.

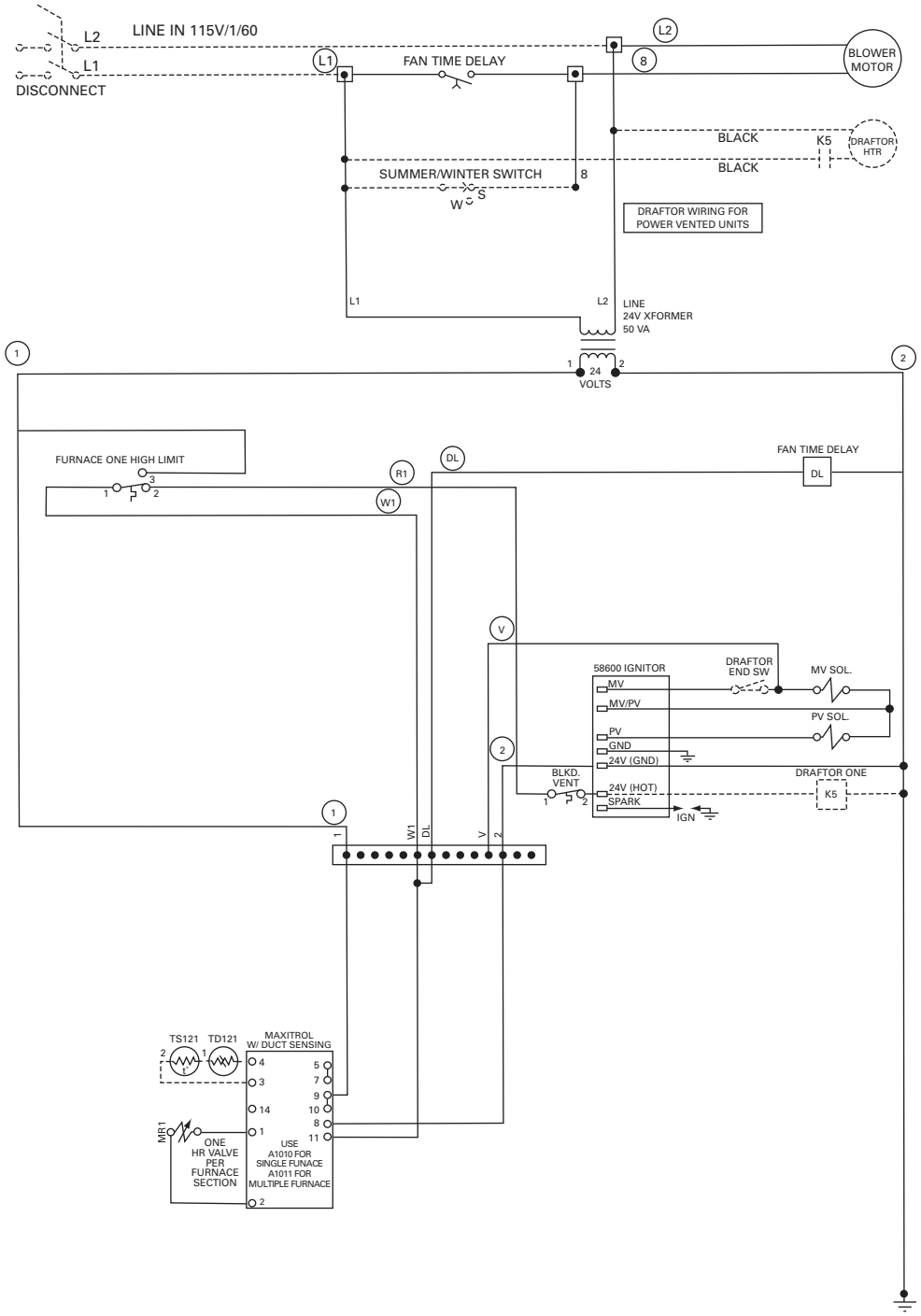
Electronic Modulating Control (with duct thermostat)

With power applied to the unit:

1. The thermostat calls for heat.
2. The pilot valve opens.
3. The ignitor sparks continuously to ignite the pilot.
4. The sensor proves pilot ignition and shuts off the ignitor.
5. With the pilot lit, the gas valve opens.
6. Main burners are lit at 100 percent of unit's rated input.
7. The fan time delay relay (optional on duct furnaces) allows the heat exchanger to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.
8. The unit is controlled by the duct thermostat which modulates the unit from 100 to 50 percent of unit's rated input. An amplifier receives a small electrical signal from the thermostat and converts this into a working voltage. This working voltage determines the position of the modulating valve. With no voltage applied to the valve, the valve will be full open and full fire will occur. As increasing voltage is applied to the valve, the valve will modulate closed. At approximately 12V dc, the valve will be at its minimum low fire position. If the voltage continues to increase, indicating a further reduction in the unit's firing is required, the increased voltage closes a relay which closes the automatic gas valve. As temperature drops, the voltage also drops causing the relay to re-open the valve. The unit will continue to cycle in this manner until either an increase in the unit's firing rate is required or the thermostat is satisfied and no longer calls for heat.
9. When the thermostat is satisfied, the main and pilot valves close.
10. The fan time delay relay (optional on duct furnaces) remains closed keeping the fan motor operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.
11. If optional room override thermostat is ordered…when setpoint is reached, it will cause the unit to go to full-fire, overriding both the duct sensor and the remote setpoint adjustment.

Note: *Sensor and selector wires to amplifier must not be run close to, or in conduit with, power or ignition wires.*

Electronic Modulating Control (with Duct Thermostat)



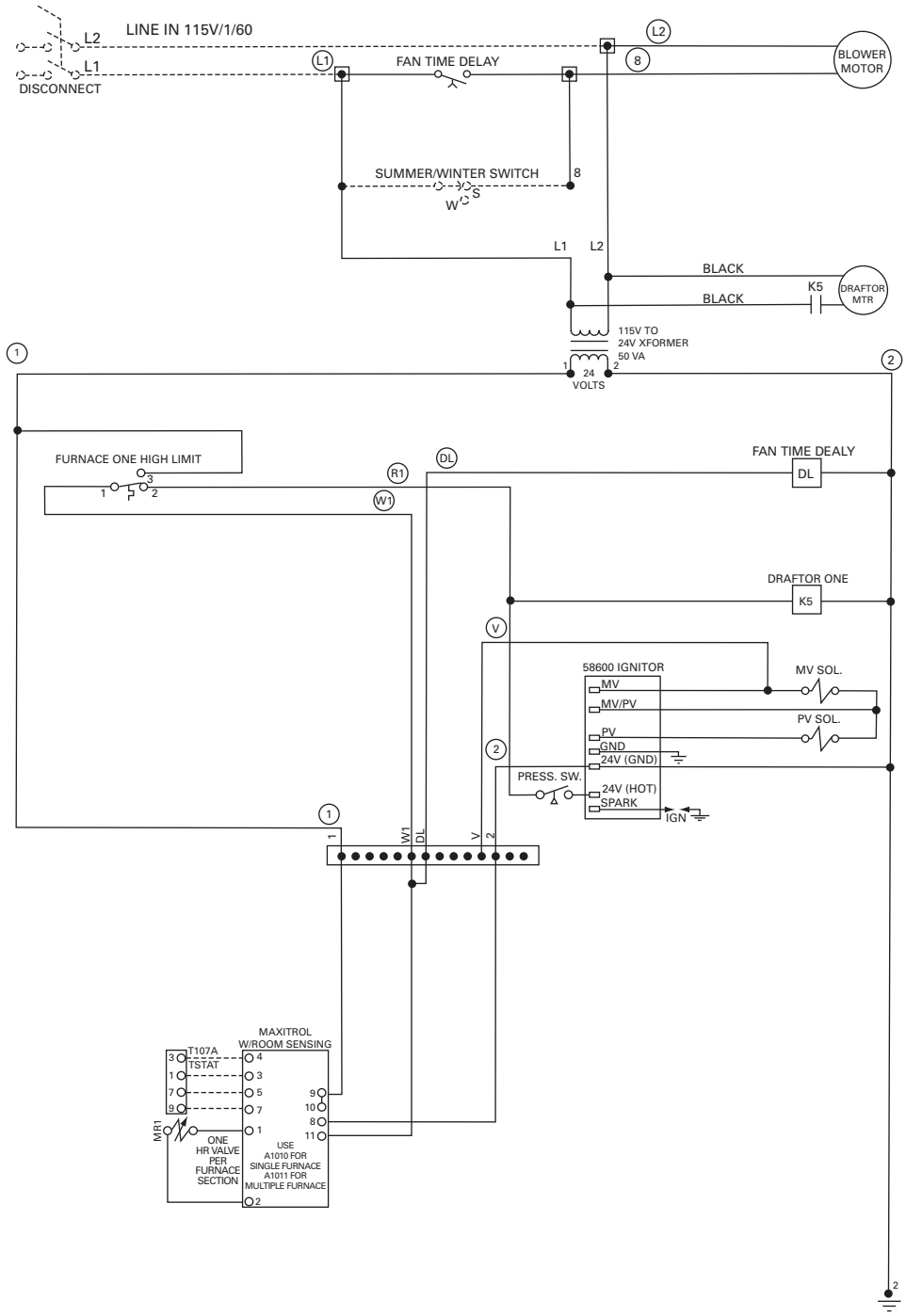
Electronic Modulating Control (with room thermostat)

With power applied to the unit:

1. The thermostat calls for heat.
2. The pilot valve opens.
3. The ignitor sparks continuously to ignite the pilot.
4. The sensor proves pilot ignition and shuts off the ignitor.
5. With the pilot lit, the gas valve opens.
6. Main burners are lit at 100 percent of unit's rated input.
7. The fan time delay relay (optional on duct furnaces) allows the heat exchanger to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.[1]
8. The unit is controlled by the electronic thermostat which modulates the unit from 100 to 50 percent of unit's rated input. An amplifier receives a small electrical signal from the thermostat and converts this into a working voltage. This working voltage determines the position of the modulating valve. With no voltage applied to the valve, the valve will be full open and full fire will occur. As increasing voltage is applied to the valve, the valve will modulate closed. At approximately 12 Vdc, the valve will be at its minimum low fire position. If the voltage continues to increase, indicating a further reduction in the unit's firing is required, the increased voltage closes a relay which closes the automatic gas valve. As temperature drops, the voltage also drops causing the relay to re-open the valve. The unit will continue to cycle in this manner until either an increase in the unit's firing rate is required or the thermostat is satisfied and no longer calls for heat.
9. When the room thermostat is satisfied, the main and pilot valves close.
10. The fan time delay relay (optional on duct furnaces) remains closed keeping the fan motor operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.

[1] See "Fan Control," p. 30.

Electronic Modulating Control (with room thermostat)



High-Efficiency Units

Note: *On duct furnaces, the fan motor and associated controls shown in the wiring diagrams are not integral to the unit. It is essential, however, that the air handling system be interlocked with the duct furnace to prevent duct furnace operation without airflow.*

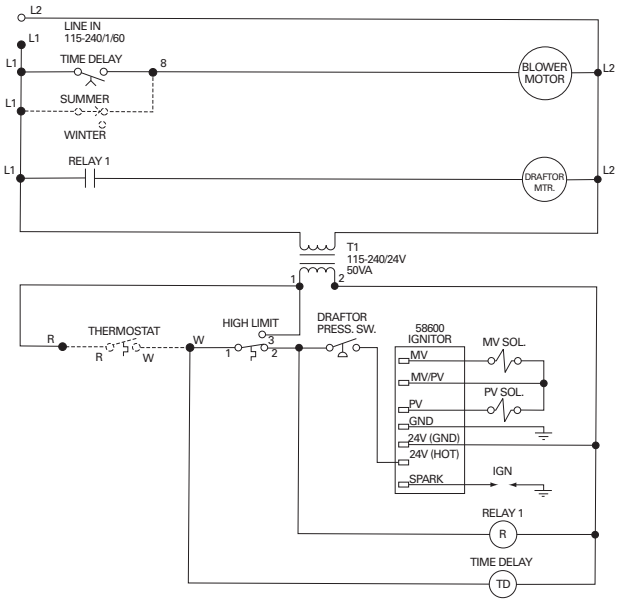
Single-Stage Control, Intermittent Pilot

With power applied to the unit:

1. The thermostat calls for heat.
2. The pressure switch measures the flow through the vent system and energizes the intermittent pilot when the flow is correct.

Important: *CAUTION: THE PRESSURE SWITCH MUST NOT BE BYPASSED. THE UNIT MUST NOT BE FIRED UNLESS THE FLUE VENT FAN IS OPERATING. If this procedure is not followed, there may be a gas buildup that could cause an explosion.*

3. The pressure switch closes and activates the flue vent fan.
4. The pilot valve opens.
5. The ignitor sparks continuously to ignite the pilot.
6. The sensor proves pilot ignition and shuts off the ignitor.
7. With the pilot lit, the main gas valve opens.
8. Main burners are lit at 100 percent of the unit's rated input.
9. The fan time delay relay allows the heater to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.[1]
10. The unit continues to fire until the thermostat is satisfied and no longer calls for heat.
11. The main and pilot valve close.
12. The fan time delay relay remains closed, keeping the fan operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.



- Caution - Disconnect power before servicing.
- Unit must be grounded.
- Use copper conductors only.
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 125°C.
- High-limit wires minimum 200°C.
- Refer to installation instructions for venting, gas piping and start-up procedures.
- - - - Indicates Field Wiring.
- ___ Indicates Factory Wiring.

[1] See "Fan Control," p. 30.

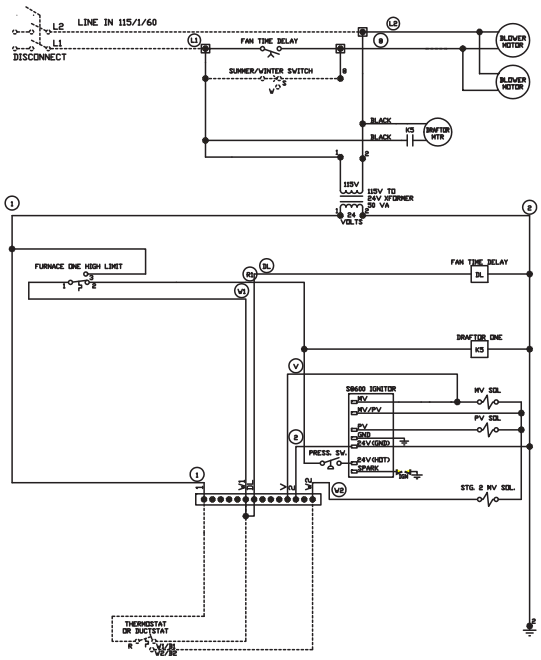
Two-Stage Control, Intermittent Pilot

With power applied to the unit:

1. The first stage of the thermostat calls for heat.
2. The pressure switch measures the flow through the vent system and energizes the intermittent pilot when the flow is correct.

Important: *CAUTION: THE PRESSURE SWITCH MUST NOT BE BYPASSED. THE UNIT MUST NOT BE FIRED UNLESS THE FLUE VENT FAN IS OPERATING. If this procedure is not followed, there may be a gas buildup that could cause an explosion.*

3. The pressure switch closes and activates the flue vent fan.
4. The pilot valve opens.
5. The ignitor sparks continuously to ignite the pilot.
6. The sensor proves pilot ignition and shuts off the ignitor.
7. With the pilot lit, the main gas valve opens to low fire.
8. Main burners are lit at 50 percent of unit's rated input.
9. The fan time delay relay allows the heater to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.[1]
10. If additional heat is required, the second stage of the thermostat calls for heat.
11. The main gas valve opens to full fire. The main burners are now at full fire. The unit continues at full fire until the second stage of the thermostat is satisfied and no longer calls for heat.
12. The main valve closes to low fire. The main burners are now at low fire. The unit continues at low fire until the first stage of the thermostat is satisfied and no longer calls for heat.
13. The fan time delay relay remains closed, keeping the fan operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.



- Caution - Disconnect power before servicing.
- Unit must be grounded.
- Use copper conductors only.
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 125°C.
- High-limit wires minimum 200°C.
- Refer to installation instructions for venting, gas piping and start-up procedures.
- - - - Indicates Field Wiring.
- ___ Indicates Factory Wiring.

[1] See "Fan Control," p. 30.

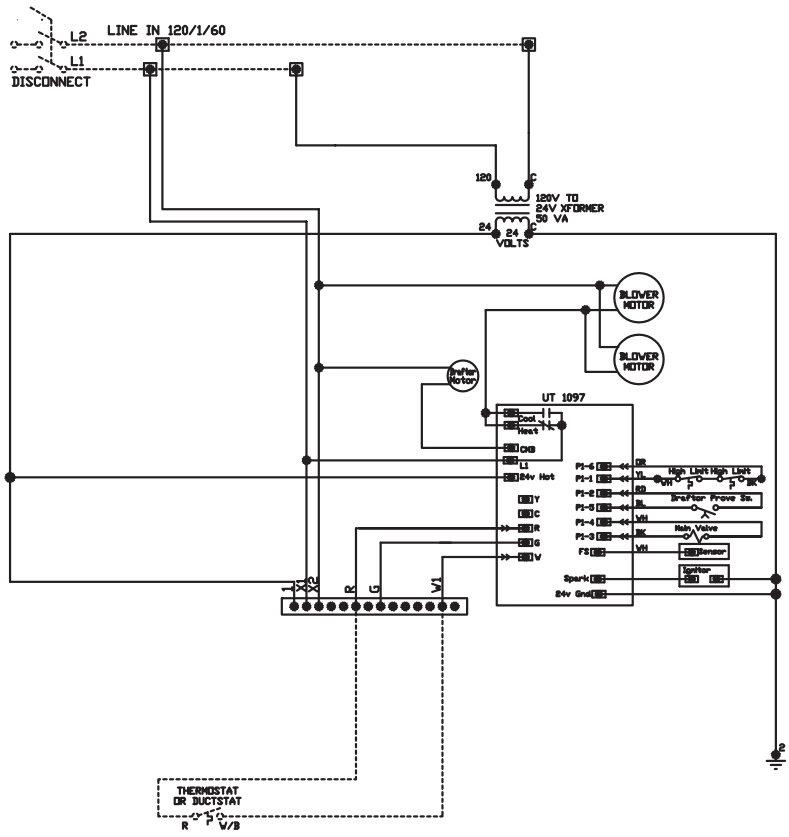
Single-Stage Control, Direct Spark

With power applied to the unit:

1. The thermostat calls for heat.
2. The power venter is energized and the pressure switch measures the flow through the vent system and energizes the direct spark ignition system beginning the pre-purge timing when the flow is correct.

Important: *CAUTION: THE PRESSURE SWITCH MUST NOT BE BYPASSED. THE UNIT MUST NOT BE FIRED UNLESS THE FLUE VENT FAN IS OPERATING. If this procedure is not followed, there may be a gas buildup that could cause an explosion.*

3. The direct spark ignition lights the main gas. The sensing device has seven seconds to prove flame.
4. The fan time delay in the board allows the heater to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.[1]
5. The unit continues at full fire until the thermostat is satisfied and no longer calls for heat.
6. The main valve closes.
7. The fan time delay relay remains closed, keeping the fan operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.



- Caution - Disconnect power before servicing.
- Unit must be grounded.
- Use copper conductors only.
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 125°C.
- High-limit wires minimum 200°C.
- Refer to installation instructions for venting, gas piping and start-up procedures.
- - - - Indicates Field Wiring.
- ___ Indicates Factory Wiring.

[1] See "Fan Control," p. 30.

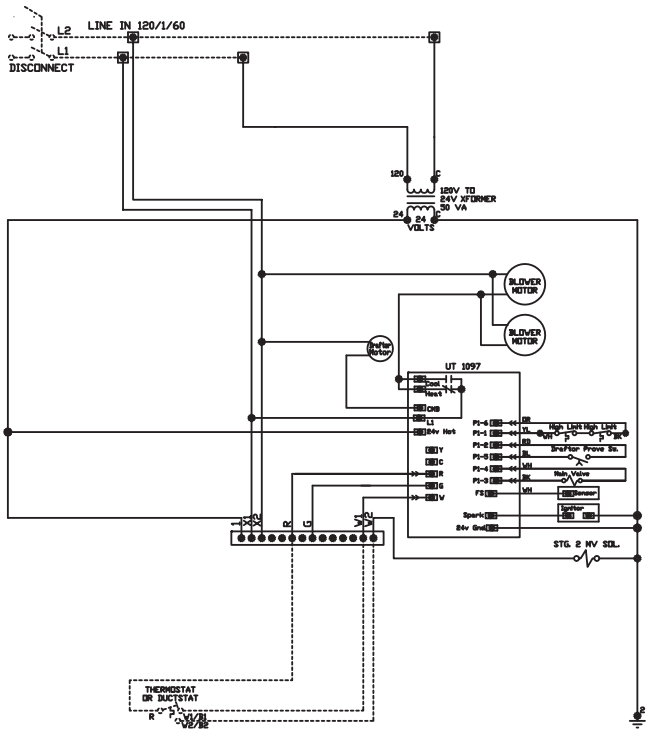
Two-Stage Control, Direct Spark

With power applied to the unit:

1. The thermostat calls for heat.
2. The power venter is energized and the pressure switch measures the flow through the vent system and energizes the direct spark ignition system beginning the pre-purge timing when the flow is correct.

Important: *CAUTION: THE PRESSURE SWITCH MUST NOT BE BYPASSED. THE UNIT MUST NOT BE FIRED UNLESS THE FLUE VENT FAN IS OPERATING. If this procedure is not followed, there may be a gas buildup that could cause an explosion.*

3. The direct spark ignition lights the first stage main gas. The sensing device has seven seconds to prove flame. Main burners are lit at 50 percent of unit's rated input.
4. The fan time delay in the board allows the heater to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.[1]
5. If additional heat is required, the second stage of the thermostat calls for heat.
6. The main gas valve opens to full fire. The main burners are now at full fire. The unit continues at full fire until the second stage of the thermostat is satisfied and no longer calls for heat.
7. The main valve closes to low fire. The main burners are now at low fire. The unit continues at low fire until the first stage of the thermostat is satisfied and no longer calls for heat.
8. The gas valve closes.
9. The fan time delay relay remains closed, keeping the fan operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.



- Caution - Disconnect power before servicing.
- Unit must be grounded.
- Use copper conductors only.
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 125°C.
- High-limit wires minimum 200°C.
- Refer to installation instructions for venting, gas piping and start-up procedures.
- - - - Indicates Field Wiring.
- ___ Indicates Factory Wiring.

[1] See "Fan Control," p. 30.

Separated Combustion Units

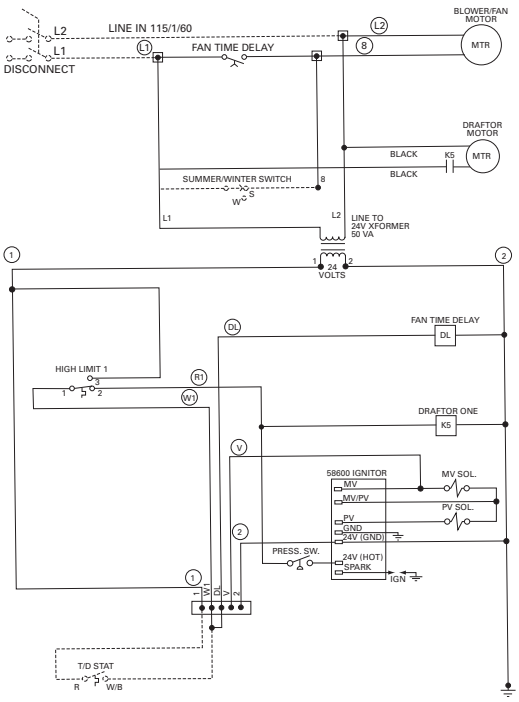
Single-Stage Control

With power applied to the unit:

1. The thermostat calls for heat.
2. The pressure switch measures the pressure differential between the air inlet and exhaust vent systems. If the differential is correct, the intermittent pilot ignition is energized.

Important: *CAUTION: THE PRESSURE SWITCH MUST NOT BE BYPASSED. THE UNIT MUST NOT BE FIRED UNLESS THE FLUE VENT FAN IS OPERATING.*

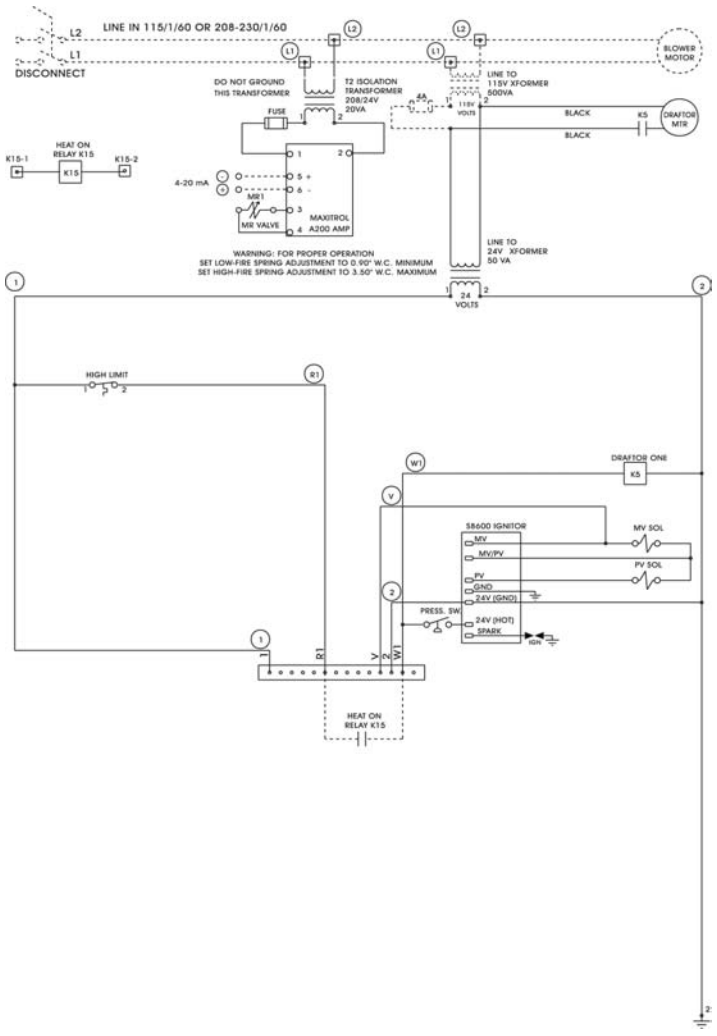
3. When the pressure switch is closed, the power venter motor is energized.
4. The pilot valve opens.
5. The ignitor sparks continuously to ignite the pilot.
6. The sensor proves pilot ignition and shuts off the ignitor.
7. With the pilot lit, the main gas valve opens.
8. Main burners are lit at 100 percent of the unit's rated input.
9. The fan time delay relay allows the heater to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.[1]
10. The unit continues to fire until the thermostat is satisfied and no longer calls for heat.
11. The main and pilot valve close.
12. The pressure switch opens and deactivates the gas control.
13. The fan time delay relay remains closed, keeping the fan operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.



- Caution - Disconnect power before servicing.
- Unit must be grounded.
- Use copper conductors only.
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 125°C.
- High-limit wires minimum 200°C.
- Refer to installation instructions for venting, gas piping and start-up procedures.
- - - - Indicates Field Wiring.
- ___ Indicates Factory Wiring.

[1] See "Fan Control," p. 30.

Separated Combustion Units—Single-Stage Control—Electronic Modulating 4–20 mA/0–10 Vdc Input



Electrical Data

Table 18. Motor electrical data—centrifugal fan

Current Characteristics	Full Load Amps[a]				
	1/4 hp	1/3 hp	1/2 hp	3/4 hp	1 hp
115/60/1	5.0	5.9	7.2	11.0	14.0
230/60/1	2.5	3.3	3.9	5.5	7.0
208/60/3	NR	NR	2.7	3.1	4.0
230/60/3	NR	NR	2.4	2.8	3.6
460/60/3	NR	NR	1.2	1.4	1.8

Note: NR = Motor available, but not rated by NEC.

(a) FLA based on NEC ratings. All motors are 1,725 rpm.

Table 19. Motor electrical data—horizontal blower

Current Characteristics	Full Load Amps[a]						
	1/2 hp	1/2 hp	3/4 hp	1 hp	1-1/2 hp	2 hp	3 hp
115/60/1	5.9	7.2	11.0	14.0	16.4	24.6	34.0
230/60/1	3.3	3.9	5.5	7.0	8.2	12.3	17.0
208/60/3	NR	2.7	3.1	4.0	4.9	6.4	9.2
230/60/3	NR	2.4	2.8	3.6	4.4	5.8	8.6
460/60/3	NR	1.2	1.4	1.8	2.2	2.9	4.3
Motor weight (lb)	18	33	33	36	39	40	44

Note: NR = Motor available, but not rated by NEC.

(a) FLA based on NEC ratings. All motors are 1,725 rpm.

Dimensions and Weights

Table 20. Tubular Heat Exchanger dimensional data—model GTND/GTPD

Unit Sizes		30	45	60	75	90	105	120
"A" Jacket Height	in.	12-3/8	12-3/8	15-7/8	15-7/8	22-5/8	22-5/8	22-5/8
	mm	314	314	403	403	574	574	574
"B" Overall Height	in.	13-1/4	13-1/4	16-13/16	16-13/16	23-9/16	23-9/16	23-9/16
	mm	337	337	427	427	598	598	598
"C" Overall Depth	in.	25-7/8	25-7/8	26-3/16	26-3/16	26-3/8	26-3/8	26-3/8
	mm	632	632	665	665	670	670	670
"D1" Center Line Height of Flue	in.	8-1/2	8-1/2	10-3/8	10-3/8	13-5/8	13-5/8	13-5/8
	mm	216	216	364	364	346	346	346
"D2" Center Line Height of Air Intake	in.	8-1/2	8-1/2	8	8	8-5/8	8-5/8	8-5/8
	mm	216	216	203	203	219	219	219
"E" Fan Diameter	in.	10	10	14	14	16	16	16
	mm	254	254	356	356	406	406	406
"F" Discharge Opening Height	in.	10-13/16	10-13/16	14-7/16	14-7/16	21-3/16	21-3/16	21-3/16
	mm	275	275	367	367	538	538	538
"G" Vent Connection Diameter	in.	4	4	4	4	4	4	4
	mm	102	102	102	102	102	102	102
"H1" Center Line of Flue Connection From Side	in.	7-1/4	7-1/4	7-1/4	7-1/4	7-3/4	7-3/4	7-3/4
	mm	184	184	184	184	197	197	197
"H2" Center Line of Air Intake From Side	in.	2-3/4	2-3/4	2-3/4	2-3/4	3-1/2	3-1/2	3-1/2
	mm	70	70	70	70	89	89	89
Flue Size Requirements								
Category I Horizontal[a]	in.	4	4	4	5	5	5	5
	mm	102	102	102	127	127	127	127
Category III Horizontal	in.	4	4	4	4	4	4	4
	mm	102	102	102	102	102	102	102
Category I & III Vertical	in.	4	4	4	4	4	4	4
	mm	102	102	102	102	102	102	102
Unit Weight	lb	60	65	80	85	95	105	110
	kg	27	29	36	39	43	48	50
Shipping Weight	lb	70	75	90	95	110	115	120
	kg	32	34	41	43	50	52	54

Note: For all installations, the flue collar is included with the unit and should be field installed per the instructions included with the unit.

(a) 4–5" reducer supplied where required.

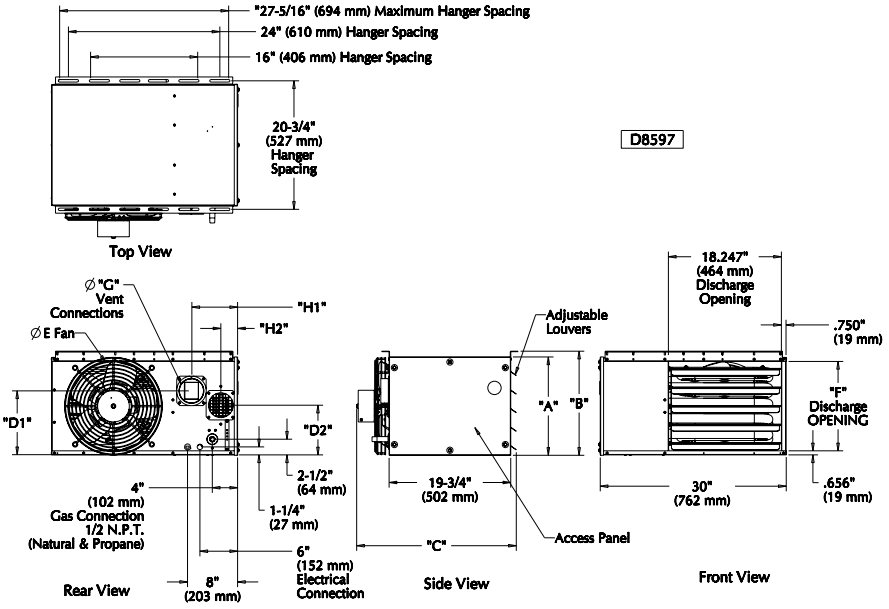
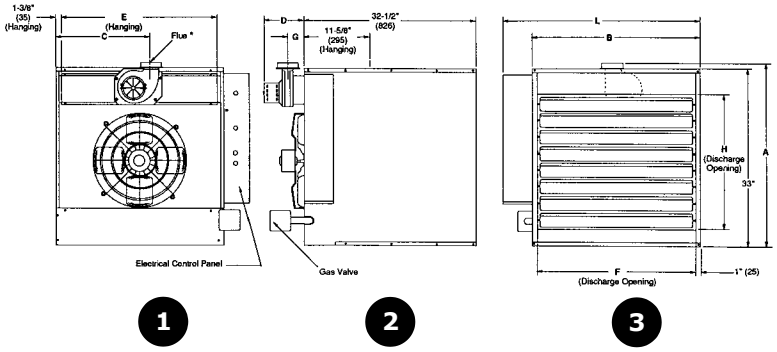


Table 21. Tubular Heat Exchanger unit heater dimensional data—model GTND/GTPD

Model	Input MBh		A	B	C	D	E	F	G	H	L	Diameter Flue	Diameter Fan	Gas Inlet Nat.	Gas Inlet LP		Weight Unit	Weight Shipping
015	150.0																	
		in.	33-3/4	20-3/4	13-3/8	11	18-5/8	18-3/4	4-3/4	24-1/2	25-1/4	5	16	1/2	1/2	lb	155	195
		mm	857	527	340	279	473	476	121	622	641	127				kg	70	88
017	175.0																	
		in.	33-3/4	32-3/4	19-3/8	11	30-5/8	30-3/4	4-3/4	24-1/2	37-1/4	5	18	1/2	1/2	lb	191	241
		mm	857	831	492	279	778	781	121	622	946	127				kg	87	109
020	200.0																	
		in.	33-3/4	32-3/4	19-3/8	11	30-5/8	30-3/4	4-3/4	24-1/2	37-1/4	5	18	1/2	1/2	lb	201	251
		mm	857	831	492	279	778	781	121	622	946	127				kg	91	114
025	250.0																	
		in.	33-3/4	32-3/4	19-3/8	11	30-5/8	30-3/4	4-3/4	24-1/2	37-1/4	5	18	3/4	1/2	lb	211	261
		mm	857	831	492	279	778	781	121	622	946	127				kg	96	118



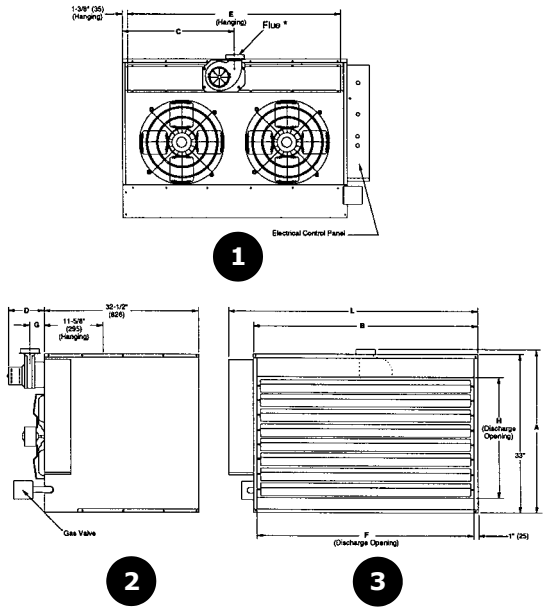
1. Rear view
2. Side view
3. Front view

Dimensions are in inches.

Dimensions in ( ) are in millimeters.

Table 22. Tubular Heat Exchanger unit heater dimensional data—model GTND/GTPD

Model	Input MBh		A	B	C	D	E	F	G	H	L	Diameter Flue	Diameter Fan	Gas Inlet Nat.	Gas Inlet LP		Weight Unit	Weight Shipping
030	300.0																	
		in.	34	50-3/4	28-3/8	12-1/4	48-5/8	48-3/4	5-1/8	24-1/2	55-1/4	6	(2) 16	3/4	1/2 or 3/4	lb	307	367
		mm	864	1289	721	311	1235	1238	130	622	1403	152				kg	139	166
035	350.0																	
		in.	34	50-3/4	28-3/8	12-1/4	48-5/8	48-3/4	5-1/8	24-1/2	55-1/4	6	(2) 18	3/4	1/2 or 3/4	lb	321	381
		mm	864	1289	721	311	1235	1238	130	622	1403	152				kg	145	173
040	400.0																	
		in.	34	50-3/4	28-3/8	12-1/4	48-5/8	48-3/4	5-1/8	24-1/2	55-1/4	6	(2) 18	3/4	1/2 or 3/4	lb	335	395
		mm	864	1289	721	311	1235	1238	130	622	1403	152				kg	152	179



1. Rear view
2. Side view
3. Front view

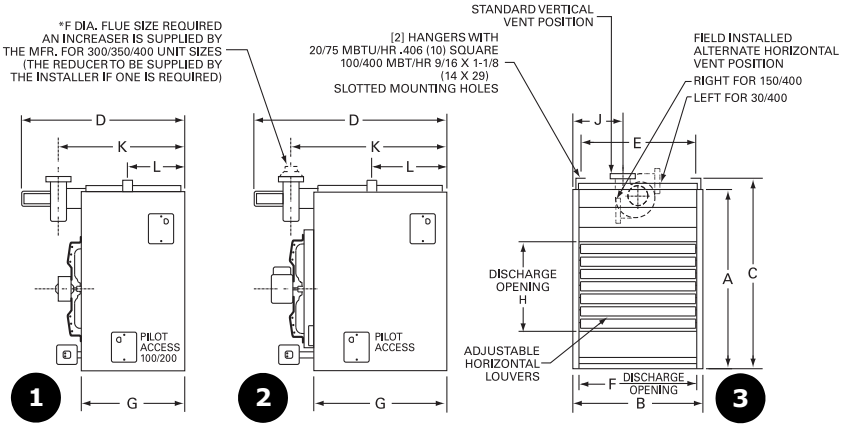
Dimensions are in inches.

Dimensions in ( ) are in millimeters.

Table 23. High-efficiency propeller fan gas unit heater dimensional data—model GHND/GHPD

Unit Sizes		100	125	150	175	200	225	250	300	350	400
"A" Height to Top of Unit											
	in.	31.25	31.25	36.25	36.25	36.25	36.25	36.25	36.25	36.25	36.25
	mm	794	794	921	921	921	921	921	921	921	921
"B" Width of Unit											
	in.	17.875	20.625	20.625	23.375	26.125	28.875	31.625	37.125	42.625	48.125
	mm	454	524	524	594	664	733	803	943	1083	1222
"C" Height to Top of Hanger											
	in.	34.125	34.125	39.125	39.125	39.125	39.125	39.125	39.125	39.125	39.125
	mm	867	867	994	994	994	994	994	994	994	994
"D" Depth to Rear of Housing											
	in.	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
	mm	953	953	953	953	953	953	953	953	953	953
"E" Hanging Distance Width											
	in.	14.5	17.25	17.25	20	22.75	25.5	28.25	33.75	39.25	44.75
	mm	368	438	438	508	578	648	718	857	997	1137
"F" Discharge Opening Width											
	in.	15.375	18.125	18.125	20.875	23.625	26.375	29.125	34.625	40.125	45.625
	mm	391	460	460	530	600	670	740	879	1019	1159
"G" Depth to Unit Side Jacket											
	in.	26.75	26.75	26.75	26.75	26.75	26.75	26.75	26.75	26.75	26.75
	mm	679	679	679	679	679	679	679	679	679	679
"H" Discharge Opening Height											
	in.	18	18	18	18	18	18	18	18	18	18
	mm	457	457	457	457	457	457	457	457	457	457
"J" to Centerline of Flue											
	in.	5.872	7.25	7.25	8.625	10	11.25	12.75	15.5	18.25	21
	mm	149	184	184	219	254	286	324	394	464	533
"K" Depth to Centerline of Flue											
	in.	30.625	30.625	30.625	30.625	30.625	30.625	30.625	30.625	30.625	30.625
	mm	778	778	778	778	778	778	778	778	778	778
"L" Hanger Location											
	in.	16.25	16.75	16.375	16.375	16.375	16.75	16.75	16.75	16.75	16.75
	mm	413	425	416	416	416	425	425	425	425	425
Flue Size Diameter[a]											
	in.	4	4	4	4	5	5	5	6	6	6
	mm	102	102	102	102	127	127	127	152	152	152
Fan Diameter											
	in.	14	16	16	18	18	18	18	(2) 16	(2) 18	(2) 18c
Gas Inlet-Natural Gas											
	in.	0.5	0.5	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.75
Gas Inlet-LP Gas											
	in.	0.5	0.5	0.5	0.5	0.5	1/2 or 3/4	1/2 or 3/4	1/2 or 3/4	1/2 or 3/4	1/2 or 3/4
Approximate Shipping Weight											
	lb	174	197	219	238	249	275	305	350	414	461
	kg	79	89	99	108	113	125	138	159	188	209

(a) The flue opening on all "GH" units is 5-1/8" diameter. Therefore, a transition adapter is required by installer on these units.



1. Side view, sizes 100–200
2. Side view, sizes 225–400
3. Front view, sizes 30–400

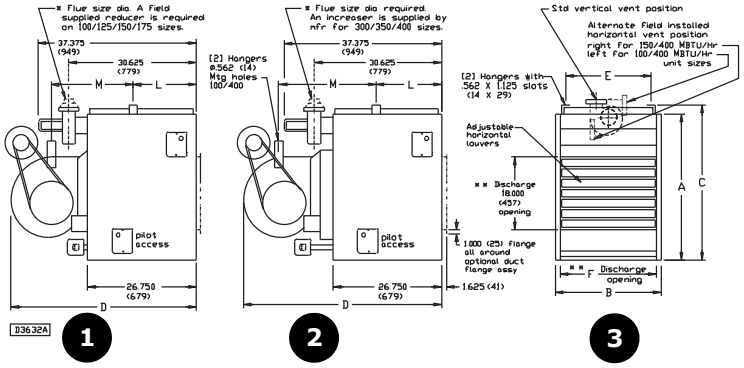
*Canadian units include vent cap and reducer/increaser (if required).

Dimensions in ( ) are in millimeters.

Table 24. High-efficiency centrifugal fan unit heater dimensional data—model GBND/GBPD

Unit Sizes		100	125	150	175	200	225	250	300	350	400
"A" Height to Top of Unit											
	in.	31.25	31.25	36.25	36.25	36.25	36.25	36.25	36.25	36.25	36.25
	mm	794	794	921	921	921	921	921	921	921	921
"B" Width of Unit											
	in.	17.875	20.625	20.625	23.375	26.125	28.875	31.625	37.125	42.625	48.125
	mm	454	524	524	594	664	733	803	943	1083	1222
"C" Height to Top of Hanger											
	in.	34.125	34.125	39.125	39.125	39.125	39.125	39.125	39.125	39.125	39.125
	mm	867	867	994	994	994	994	994	994	994	994
"D" Depth to Rear of Housing											
	in.	42.625	44.25	44.25	47	47	51	51	48.25	51	51
	mm	1083	1124	1124	1194	1194	1295	1295	1226	1295	1295
"E" Hanging Distance Width											
	in.	14.5	17.25	17.25	20	22.75	25.5	28.25	33.75	39.25	44.75
	mm	368	438	438	508	578	648	718	857	997	1137
"F" Discharge Opening Width											
	in.	15.375	18.125	18.125	20.875	23.625	26.375	29.125	34.625	40.125	45.625
	mm	391	460	460	530	600	670	740	879	1019	1159
"J" to Centerline of Flue											
	in.	5.875	7.25	7.25	8.625	10	11.25	12.75	15.5	18.25	21
	mm	149	184	184	219	254	286	324	394	464	533
"L" Hanger Location											
	in.	16.375	16.375	16.375	16.375	16.375	16.375	16.375	16.375	16.375	16.375
	mm	416	416	416	416	416	416	416	416	416	416
"M" Hanging Distance Depth											
	in.	16.375	16.375	16.375	17.875	17.875	21.875	21.875	21.875	21.875	21.875
	mm	416	416	416	454	454	556	556	556	556	556
Flue Size Diameter[a]											
	in.	4	4	4	4	5	5	5	6	6	6
	mm	102	102	102	102	127	127	127	152	152	152
Blower Size											
	in.	9	10	10	12	12	12	12	(2) 10	(2) 12	(2) 12
Gas Inlet-Natural Gas											
	in.	0.5	0.5	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.75
Gas Inlet-LP Gas											
	in.	0.5	0.5	0.5	0.5	0.5	1/2 or 3/4	1/2 or 3/4	1/2 or 3/4	1/2 or 3/4	1/2 or 3/4
Approximate Shipping Weight											
	lb	262	279	314	336	363	408	427	471	561	594
	kg	119	127	142	152	165	185	194	214	254	269

(a) The flue opening on all "GB" units is 5-1/8" diameter. Therefore, a transition adapter is required by installer on these units.



1. Side view, sizes 100–200
2. Side view, sizes 225–400
3. Front view, sizes 100–400

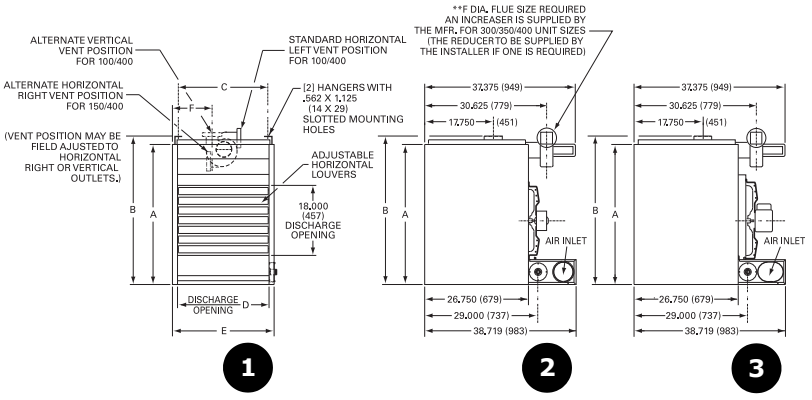
*Canadian units include vent cap and reducer/increaser (if required).

Dimensions in ( ) are in millimeters.

Table 25. Separated combustion propeller fan gas unit heater dimensional data—model GAND/GAPD

Unit Sizes		100	125	150	175	200	225	250	300	350	400
"A" Height to Top of Unit											
	in.	31.25	31.25	36.25	36.25	36.25	36.25	36.25	36.25	36.25	36.25
	mm	794	794	921	921	921	921	921	921	921	921
"B" Height to Top of Hanger											
	in.	34.062	34.062	39.062	39.062	39.062	39.062	39.062	39.062	39.062	39.062
	mm	865	865	992	992	992	992	992	992	992	992
"C" Hanging Distance Width											
	in.	14.75	17.5	17.5	20.25	23	25.75	28.5	34	39.5	45
	mm	375	445	445	514	584	654	724	864	1003	1143
"D" Discharge Opening Width											
	in.	15.375	18.125	18.125	20.875	23.625	26.375	29.125	34.625	40.125	45.625
	mm	391	460	460	530	600	670	740	879	1019	1159
"E" Width of Unit											
	in.	17.875	20.625	20.625	23.375	26.125	28.875	31.625	37.125	42.625	48.125
	mm	454	524	524	594	664	733	803	943	1083	1222
"F" to Centerline of Flue											
	in.	5.875	7.25	7.25	8.625	10	11.25	12.75	15.5	18.25	21
	mm	149	184	184	219	254	286	324	394	464	533
Flue Size Diameter[a]											
	in.	4	4	4	4	5	5	5	6	6	6
	mm	102	102	102	102	127	127	127	152	152	152
Fan Diameter											
	in.	14	16	16	18	18	18	18	(2) 16	(2) 18	(2) 18
Gas Inlet-Natural Gas											
	in.	0.5	0.5	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.75
Gas Inlet-LP Gas											
	in.	0.5	0.5	0.5	0.5	0.5	1/2 or 3/4	1/2 or 3/4	1/2 or 3/4	1/2 or 3/4	1/2 or 3/4
Approximate Shipping Weight											
	lb	200	228	256	284	312	340	368	432	488	545
	kg	91	103	116	129	142	154	167	196	221	247

(a) The flue opening on all units is 5-1/8" diameter. Therefore, a transition adapter is required by installer on these units.



1. Front view, sizes 100–400
2. Side view, sizes 100–200
3. Side view, sizes 225–400

Note: Air intake is round on 225/250 units. For 300/400 units, air intake is as shown.

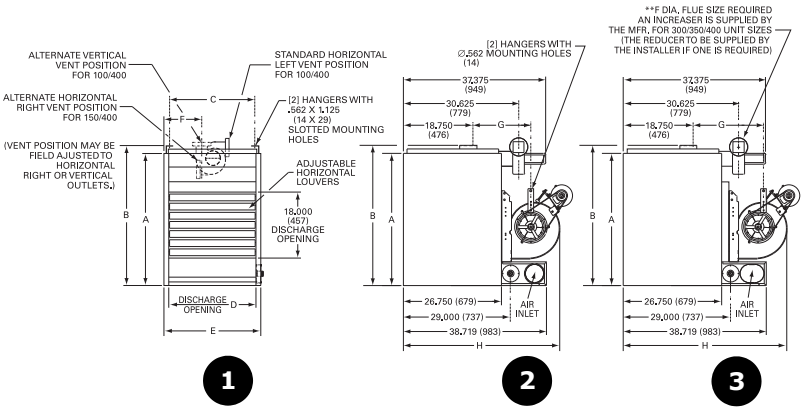
*Canadian units include vent cap and reducer/increaser (if required).

Dimensions in ( ) are in millimeters.

Table 26. Separated combustion centrifugal fan unit heater dimensional data—model GKND/GKPD

Unit Sizes		100	125	150	175	200	225	250	300	350	400
"A" Height to Top of Unit											
	in.	31.25	31.25	36.25	36.25	36.25	36.25	36.25	36.25	36.25	36.25
	mm	794	794	921	921	921	921	921	921	921	921
"B" Height to Top of Hanger											
	in.	34.062	34.062	39.062	39.062	39.062	39.062	39.062	39.062	39.062	39.062
	mm	865	865	992	992	992	992	992	992	992	992
"C" Hanging Distance Width											
	in.	14.75	17.5	17.5	20.25	23	25.75	28.5	34	39.5	45
	mm	375	445	445	514	584	654	724	864	1003	1143
"D" Discharge Opening Width											
	in.	15.375	18.125	18.125	20.875	23.625	26.375	29.125	34.625	40.125	45.625
	mm	391	460	460	530	600	670	740	879	1019	1159
"E" Width of Unit											
	in.	17.875	20.625	20.625	23.375	26.125	28.875	31.625	37.125	42.625	48.125
	mm	454	524	524	594	664	733	803	943	1083	1222
"F" to Centerline of Flue											
	in.	5.875	7.25	7.25	8.625	10	11.25	12.75	15.5	18.25	21
	mm	149	184	184	219	254	286	324	394	464	533
"G" Hanging Distance Depth											
	in.	18.5	18.5	18.5	20	20	23	23	23	23	23
	mm	470	470	470	508	508	584	584	584	584	584
"H" Depth to Rear of Housing											
	in.	42.75	44.375	44.375	47.187	47.187	50.875	48	50.875	50.875	51
	mm	1086	1127	1127	1199	1199	1292	1219	1292	1292	1295
Flue Size Diameter[a]											
	in.	4	4	4	4	5	5	5	6	6	6
	mm	102	102	102	102	127	127	127	152	152	152
Blower Size											
	in.	9	10	10	12	12	12	12	(2) 10	(2) 12	(2) 12
Gas Inlet-Natural Gas											
	in.	0.5	0.5	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.75
Gas Inlet-LP Gas											
	in.	0.5	0.5	0.5	0.5	0.5	1/2 or 3/4	1/2 or 3/4	1/2 or 3/4	1/2 or 3/4	1/2 or 3/4
Approximate Shipping Weight											
	lb	298	330	362	394	426	458	490	558	618	678
	kg	135	150	164	179	193	208	222	253	280	308

(a) The flue opening on all units is 5-1/8" diameter. Therefore, a transition adapter is required by installer on these units.



1. Front view, sizes 100–400
2. Side view, sizes 100–200
3. Side view, sizes 225–400

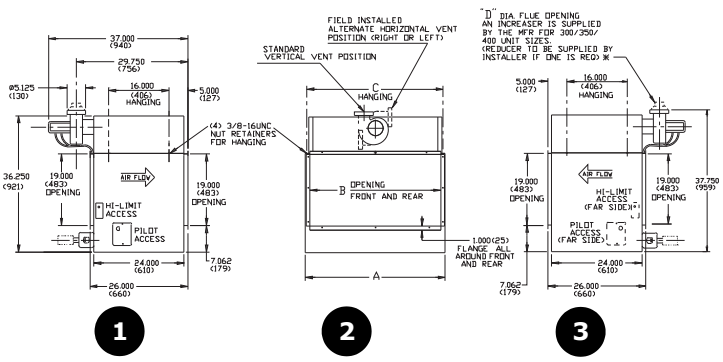
   Note: Air intake is round on 225/250 units. For 300/400 units, air intake is as shown.

*Canadian units include vent cap and reducer/increaser (if required).

Dimensions in ( ) are in millimeters.

Table 27. High-efficiency duct furnaces—model GLND/GLPD

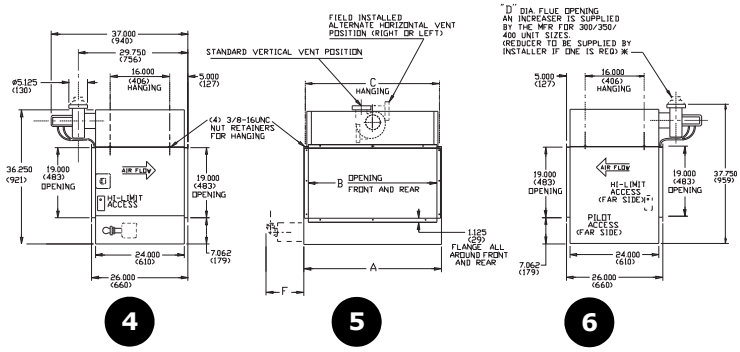
Model	Input MBh		A	B	C	D (Dia.)	F	Gas Inlet Nat.	Gas Inlet LP		Weight
010	100										
		in.	17.875	15.5	17.125	4	23.875	1/2	1/2	lb	173
		mm	454	394	435	102	606			kg	78
012	125										
		in.	20.625	18.25	19.875	4	25.625	1/2	1/2	lb	186
		mm	524	464	505	102	651			kg	84
015	150										
		in.	20.625	18.25	19.875	4	26.625	1/2	1/2	lb	197
		mm	524	464	505	102	676			kg	89
017	175										
		in.	23.375	21	22.625	4	29.375	1/2	1/2	lb	216
		mm	594	533	575	102	746			kg	98
020	200										
		in.	26.125	23.75	25.375	5	32.125	1/2	1/2	lb	232
		mm	664	603	645	127	816			kg	105
022	225										
			28.875	26.5	28.125	5	34.875	3/4	1/2 or 3/4	lb	254
			733	673	714	127	886			kg	115
025	250										
		in.	31.625	29.25	30.875	5	37.625	3/4	1/2 or 3/4	lb	263
		mm	803	743	784	127	956			kg	119
030	300										
		in.	37.125	34.75	36.375	6	43.125	3/4	1/2 or 3/4	lb	312
		mm	943	883	924	152	1095			kg	142
035	350										
		in.	42.625	40.25	41.875	6	48.625	3/4	1/2 or 3/4	lb	389
		mm	1083	1022	1064	152	1235			kg	176
040	400										
		in.	48.125	45.75	47.375	6	54.125	3/4	1/2 or 3/4	lb	403
		mm	1222	1162	1203	152	1375			kg	183



1. Side view, sizes 100–125
2. Front view, sizes 100–400
3. Side view, sizes 150–400
4. Side view, sizes 100–125
5. Front view, sizes 100–400
6. Side view, sizes 150–400
7. Detail G positions: front, rear, right, left

*Canadian units include vent cap and reducer/ increaser (if required).
Rear vent position shown. See Detail G for optional top vent position.

Dimensions are in inches.
Dimensions in ( ) are in millimeters.



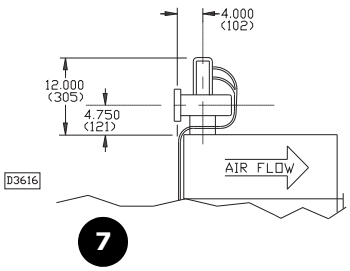
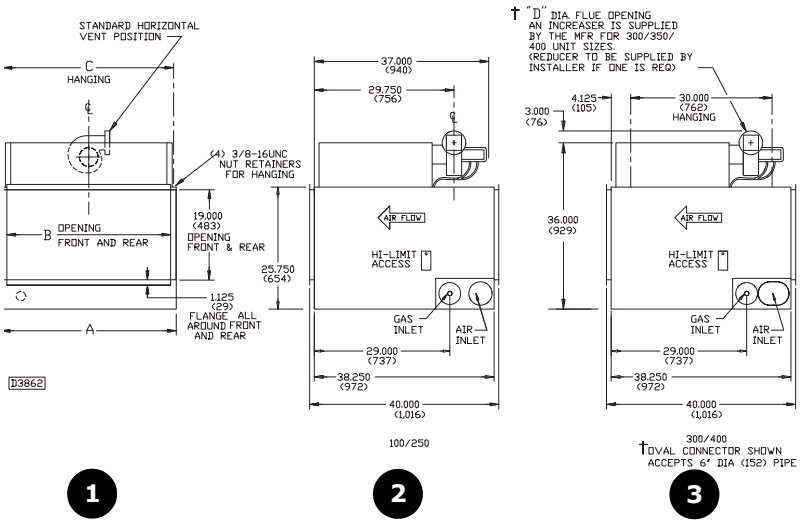


Table 28. Separated combustion indoor gas duct furnaces—model GMND/GMPD

Model	Input MBh		A	B	C	D (Dia.)[a]	Gas Inlet Nat.	Gas Inlet LP		Weight
010	100									
		in.	17-7/8	15-1/2	17-1/8	4	1/2	1/2	lb	161
		mm	454	394	435	102			kg	73
012	125									
		in.	20-5/8	18-1/4	19-7/8	4	1/2	1/2	lb	180
		mm	524	464	505	102			kg	82
015	150									
		in.	20-5/8	18-1/4	19-7/8	4	1/2	1/2	lb	188
		mm	524	464	505	102			kg	85
017	175									
		in.	23-3/8	21	22-5/8	4	1/2	1/2	lb	207
		mm	594	533	575	102			kg	94
020	200									
		in.	26-1/8	23-3/4	25-3/8	5	1/2	1/2	lb	227
		mm	664	603	645	127			kg	103
022	225									
			28-7/8	26-1/2	28-1/8	5	3/4	1/2 or 3/4	lb	246
			733	673	714	127			kg	112
025	250									
		in.	31-5/8	29-1/4	30-7/8	5	3/4	1/2 or 3/4	lb	266
		mm	803	743	784	127			kg	121
030	300									
		in.	37-1/8	34-3/4	36-3/8	6	3/4	1/2 or 3/4	lb	305
		mm	943	883	924	152			kg	138
035	350									
		in.	42-5/8	40-1/4	41-7/8	6	3/4	1/2 or 3/4	lb	344
		mm	1083	1022	1064	152			kg	156
040	400									
		in.	48-1/8	45-3/4	47-3/8	6	3/4	1/2 or 3/4	lb	383
		mm	1222	1162	1203	152			kg	174

(a) "D" diameter equals the air inlet opening and the flue discharge opening.



1. Sizes 100–250
2. Sizes 300–400

†Oval connector shown accepts 6" Dia. (152) pipe.

*Canadian units include vent cap and reducer/increaser (if required).

Rear vent position shown. See Detail G for optional top vent position.

Dimensions are in inches.

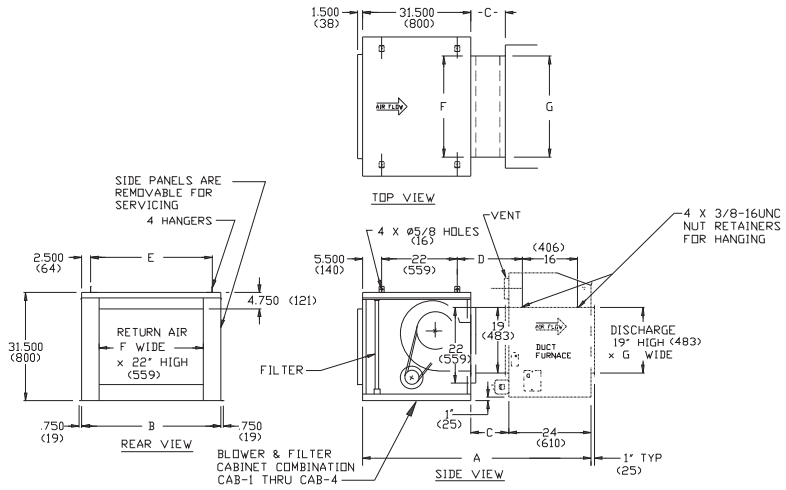
Dimensions in ( ) are in millimeters.

Table 29. Horizontal blower assembly dimension data

Model	Nominal cfm	Input MBh[a]		A	B	C	D	E	F	G	Filter Size**	Filter # Req.		Ship Weight[b]
HBAC-15	1500	100												
			in.	65-1/2	26	10	18	21-1/4	15-3/4	15-5/8	25 x 25 x 1	1	lb	135
			mm	1664	660	254	457	540	400	397			kg	61
		125												
			in.	65-1/2	26	10	18	21-1/4	15-3/4	18-3/8	25 x 25 x 1	1	lb	135
			mm	1664	660	254	457	540	400	467			kg	61
HBAC-20	2000	150												
			in.	65-1/2	26	10	18	21-1/4	15-3/4	18-3/8	25 x 25 x 1	1	lb	155
			mm	1664	660	254	457	540	400	467			kg	70
		175												
			in.	65-1/2	26	10	18	21-1/4	15-3/4	21-1/8	25 x 25 x 1	1	lb	155
			mm	1664	660	254	457	540	400	537			kg	70
HBAC-30	3000	200												
			in.	65-1/2	40-1/2	10	18	35-3/4	30-3/8	23-7/8	25 x 20 x 1	2	lb	200
			mm	1664	1029	254	457	908	772	606			kg	91
		225												
			in.	65-1/2	40-1/2	10	18	35-3/4	30-3/8	26-5/8	25 x 20 x 1	2	lb	200
			mm	1664	1029	254	457	908	772	676			kg	91
		250												
			in.	65-1/2	40-1/2	10	18	35-3/4	30-3/8	29-3/8	25 x 20 x 1	2	lb	200
			mm	1664	1029	254	457	908	772	746			kg	91
HBAC-45	4500	300												
			in.	65-1/2	60-1/2	10	18	55-3/4	50-3/8	34-7/8	25 x 20 x 1	3	lb	296
			mm	1664	1537	254	457	1416	1280	886			kg	134
		350												
			in.	69-1/2	60-1/2	14	22	55-3/4	50-3/8	40-3/8	25 x 20 x 1	3	lb	296
			mm	1765	1537	356	559	1416	1280	1026			kg	134
		400												
			in.	69-1/2	60-1/2	14	22	55-3/4	50-3/8	45-7/8	25 x 20 x 1	3	lb	296
			mm	1765	1537	356	559	1416	1280	1165			kg	134

Notes:
1. Nominal 4,500 cfm unit has two blowers driven by one motor.
2. Transition designed for specific duct furnace referenced in the table above. Variations from standard will require field-supplied transitions.

(a) Size of duct furnace used with horizontal blower assembly.
(b) Ship weight is approximate and does not include motor.



Dimensions are in inches.

Dimensions in ( ) are in millimeters.

Table 30. Factory-installed flue vent data (standard on high-efficiency units)

Unit Size															
	Input MBh	**30**	**45**	**60**	**75**	**100**	**125**	**150**	**175**	**200**	**225**	**250**	**300**	**350**	**400**
Flue Outlet															
	in.	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8
Recommended Flue Size															
	in.	4 R	4 R	4 R	4 R	4 R	4 R	4 R	4 R	5 R	5 R	5 R	6 R	6 R	6 R
Maximum Length of Run[a]															
	ft	50	50	50	50	50	50	50	50	50	50	50	50	50	50

Notes:
1. Horizontal vent pipes should be pitched downward 1/4-inch per foot toward the outlet for condensate drainage.
2. Motors are 1/20 hp. All fans are 115 V and draw 1.5 amps.

(a) Vent pipe equivalent length must not exceed 50 feet. Equivalent length is the total length of straight sections, plus 15 feet for each 90° elbow and 8 feet for each 45° elbow.

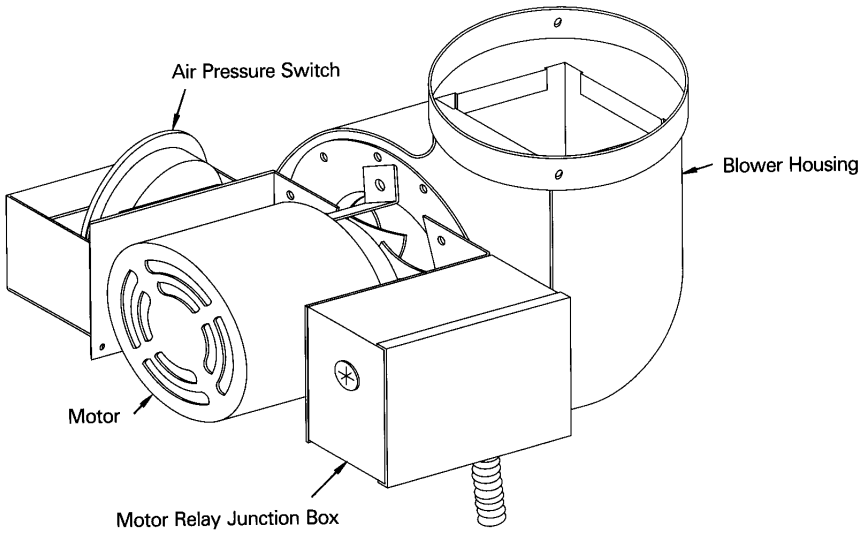
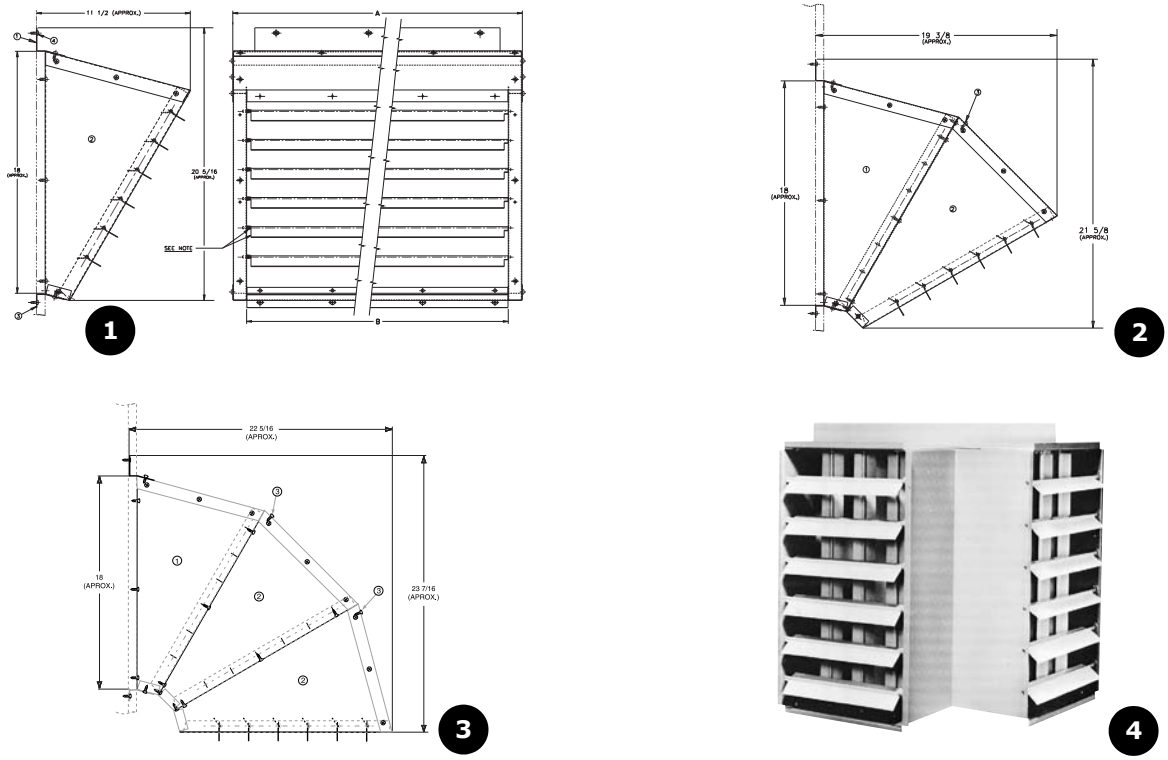


Table 31. Factory-installed flue vent data (standard on separated combustion units)

	Unit Size														
	Input MBh	**30**	**45**	**60**	**75**	**100**	**125**	**150**	**175**	**200**	**225**	**250**	**300**	**350**	**400**
Flue															
	Flue Outlet														
	in.	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8	5-1/8
	Recommended Flue Size														
	in.	4 R	4 R	4 R	4 R	4 R	4 R	4 R	4 R	5 R	5 R	5 R	6 R	6 R	6 R
	Maximum Length of Run[a]														
	ft	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Combustion Air															
	Combustion Air Inlet														
	in.	4 R	4 R	4 R	4 R	4 R	4 R	4 R	4 R	5 R	5 R	5 R	6 OV	6 OV	6 OV
	Maximum Length of Run[a]														
	ft	50	50	50	50	50	50	50	50	50	50	50	50	50	50

Notes:
1. Horizontal vent pipes should be pitched downward 1/4-inch per foot toward the outlet for condensate drainage.
2. Motors are 1/20 hp. All fans are 115 V and draw 1.5 amps.

(a) Flue outlet or combustion air inlet pipe equivalent length must not less than 5 feet and must not exceed 50 feet. Equivalent length is the total length of straight sections, plus 15 feet for each 90° elbow and 8 feet for each 45° elbow.



1. 30° nozzle
2. 60° nozzle
3. 90° nozzle

Note: *30°, 60°, and 90° nozzles are shipped unassembled with bagged hardware and field assembling and installation instruction sheet. The six (6) louvers and louver springs are removed from the unit heaters and transferred to the nozzles in the field.*

4. Y-splitter

Table 32. Nozzle dimensional data

Unit MBh		100	125	150	175	200	225	250	300	350	400
A											
	in.	17.44	20.19	20.19	22.94	25.69	28.44	31.19	36.69	42.19	47.69
	mm	445	513	513	583	653	722	792	932	1072	1211
B											
	in.	15.368	18.118	18.118	20.868	23.618	26.368	29.118	34.618	40.118	45.618
	mm	391	460	460	530	600	670	740	879	1019	1159

Table 33. Y-splitter dimensional data

Unit MBh		100	125	150	175	200	225	250	300	350	400
Width											
	in.	15-3/8	18-1/8	18-1/8	20-7/8	23-5/8	26-3/8	29-1/8	34-5/8	40-1/8	45-5/8
	mm	391	461	461	527	600	671	740	880	1019	1159
Height											
	in.	21-1/8	21-1/8	21-1/8	21-1/8	21-1/8	21-1/8	21-1/8	21-1/8	21-1/8	21-1/8
	mm	537	537	537	537	537	537	537	537	537	537
Depth											
	in.	11	11	11	11	11	13-1/8	13-1/8	15-1/8	20-5/8	20-5/8
	mm	279	279	279	279	279	334	334	384	524	524

Mechanical Specifications

Tubular Heat Exchanger Indoor Gas Unit (model GT)

Unit is completely factory assembled, piped, wired and test fired. Unit is AGA and CGA certified, over 80 percent thermal (combustion) efficient. These propeller type units are provided with aluminized tubular heat exchanger, in-shot burner, hot surface pilot ignition, individually adjustable and removable louvers, 100 percent baked enamel finish, 115/60/1 supply voltage, removable access door on size 30 to 120 MBh, and hinged access control panel on 150 to 400 MBh, power vented, single-stage combination gas valve, two-stage available on 150 to 400 MBh, 24V control transformer and 115/60/1 volt fan motor with internal overload protection. The size 30 to 120 MBh are available in low profile design. OSHA fan guard is standard on all units size 30 to 120 MBh. Units sized 150 to 400 MBh are shipped with a non-OSHA type guard; the OSHA guard is available as a selectable option.

Tubular Heat Exchanger

Heat exchanger construction consists of 20-gauge aluminized steel. The tubular design provides maximum and uniform heat transfer. The low pressure drop enables heated air to be evenly distributed. The curved, non-welded serpentine design, experiences less thermally induced stress making it highly durable for longer service life.

Cabinet

The cabinet is constructed of 20-gauge cold rolled steel. All components are individually electrostatically painted.

Hot Surface Pilot Ignition

This ignition is constructed of shock resistant ceramic composite hot surface element. This system does not permit pilot gas to flow unless the hot surface element is present and powered. The low voltage hot surface element lights the pilot quickly for fast heat delivery. All wiring is 24V with no line voltage in the burner area.

Venting

The tubular design is AGA/CGA certified in accordance with Categories I and III venting requirements. Category I enables units to be vented vertically with either single or double wall venting material. Category III allows for horizontal venting utilizing single wall venting material. This venting flexibility makes installation easier and more cost effective.

Control Accessibility

All controls are easily accessible with ignition and fan controls located in one centrally located control panel. The removable door on size 30 to 75 MBh and the hinged access door on the 100 to 400 MBh provide control isolation.

Motor –115V ODP

Motor is 115V, 60 Hz, single phase, open drip-proof with built-in thermal overload protection.

Optional Feature

Motor — 115V totally enclosed. Motor is 115V, 60 Hz, single phase, totally enclosed with built-in thermal overload protection.

Warranty

The heat exchanger, flue collector and burners are covered by a 10-year warranty from the date of manufacture.

High Efficiency Propeller (model GH) and Centrifugal Fan Gas Unit Heaters (model GB)

General

Units are completely factory assembled, piped, wired, and test fired. All units are AGA Certified and conform with the latest ANSI Standards for safe and efficient performance. Units are provided with two-point suspension hangers on propeller fan unit heaters and with four-point suspension hangers on centrifugal fan unit heaters. All units are available for operation on either natural or LP (liquid propane) gas.

Casing

Casings are die-formed, 20-gauge galvanized steel and finished in baked enamel. The bottom panel is easily removed to provide service access to the burners, pilot and orifices. The pilot is also accessible through a side panel access plate. All units are provided with independently adjustable horizontal louvers with stops to prevent total closure.

Heat Exchanger

Standard heat exchanger construction consists of seam welded 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

The heat exchanger, burner, and draft hood assembly carry a non-prorated warranty to be free from defective material and workmanship for a period of ten years from date of manufacture, excluding loss due to misuse, negligence, or corrosion by chemicals precipitated in the air.

Burners

Burners are die-formed, corrosion resistant aluminized steel, with stainless steel port protectors. Port protectors reduce scale or foreign matter from obstructing the burner ports. Burners are individually removable for ease of inspection and servicing. Each burner is provided with an individually adjustable, manually rotated air shutter adjustment.

Fans

Fan blades are constructed of aluminum with an aerodynamic contour. All fans are dynamically balanced for quiet, efficient operation and supplied with a protective type fan guard. Rubber-in-shear isolators provide isolation between the fan/motor combination and the unit heater casing.

All Motors

Standard motors are 115V, 60 Hz, single phase, open drip-proof with built-in thermal overload protection.

Optional Fan Unit Motors

All motors are 115V, 60 Hz, single-phase totally enclosed with built-in thermal overload protection and permanently lubricated bearings.

Controls

A factory installed junction box is provided for all power connections. Standard units are provided with a 24V combination single stage redundant gas valve, consisting of a combination pilot solenoid valve, automatic electric gas valve, pilot filter, pressure regulator, pilot adjustment and manual shutoff. A flue vent fan relay and combustion air proving switch is also provided as standard. Standard equipment includes spark-ignited intermittent pilot system with electronic flame supervision. A 24V control transformer, high limit and fan time delay relay are provided. The fan time delay relay delays the fan start until the heat exchanger reaches a predetermined temperature. It also allows the fan to operate after burner shutdown, removing residual heat from the heat exchanger.

Two-Stage Gas Valve

Provides two stages of heat. Ignition is at low fire (50 percent of the furnace's rated input). Requires the use of a two-stage thermostat.

Electronic Modulating Gas Valve (Natural Gas Units Only)

Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 50 percent rated input. Available for use with room thermostat or duct thermostat with remote setpoint adjustment. Duct thermostat available with optional override room thermostat which causes the unit to go to full fire when the room temperature falls below the override room thermostat.

Electronic Modulating, 4–20 mA/0–10 Vdc Input

Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input. The modulating gas valve shall operate in response to a 4–20 mA or a 0–10 Vdc input from an external DDC control.

Flue Vent Fan

Flue vent fan provides power venting. Provided factory assembled to a sealed flue collection chamber. The flue vent fan is activated in response to a low voltage (24V) single-stage thermostat.

Note: *Thermostat must be ordered.*

A combustion air pressure switch is provided as standard to verify proper powered vent flow prior to allowing the gas valve to operate.

Factory-Installed Options

Heat Exchanger Options

Type 409 Stainless Steel

Heat exchanger tubes and headers are seam welded 20-gauge Type 409 stainless steel.

Type 321 Stainless Steel

Heat exchanger tubes and headers are seam welded 20-gauge Type 321 stainless steel. (Not available on 30, 45, 60 and 75 MBh units.)

Additional Options

Type 409 Stainless Steel Burners

Type 409 Stainless Steel Draft Diverter

Orifices for elevations over 2,000 feet

Summer/Winter Switch

Vertical Louvers

Duct Discharge Flange (Centrifugal fan units only) Provided in lieu of louvers on units for use with field ductwork.

OSHA Fan Guards—All Propeller Units

OSHA fan guards are available as a factory-installed or field-installed option.

Field-Installed Accessories

High Gas Line Pressure Regulator (Natural gas units only)

Reduces main gas line pressure to a minimum of seven inches wc (water column). Pressure at the jobsite must be specified. The regulator is selected to accommodate that specific pressure.

Thermostats

Low voltage room thermostat, single-stage.

Low voltage room thermostat, single-stage with summer/winter switch.

Low voltage duct thermostat, single-stage.

Universal tamper-proof guard for all room thermostats.

Low voltage room thermostat, two-stage.

Low voltage duct thermostat, two-stage.

Room thermostat, electronic modulating control.

Duct thermostat, electronic modulating control.

Override room thermostat, for use with duct thermostat and electronic modulating control.

Discharge Nozzles

Y Splitter

30° Downward

60° Downward

90° Downward

Separated Combustion Centrifugal (model GK) and Propeller Fan Gas Unit Heaters (model GA)

General

Units are completely factory assembled, piped, wired, and test fired. All units are AGA Certified, 80 percent efficient and conform with the latest ANSI Standards for safe and efficient performance. Units are provided with two-point suspension hangers on propeller fan unit heaters and with four-point suspension hangers on centrifugal fan unit heaters. Units are available for operation on either natural or LP (propane) gas. Standard terms and conditions apply.

Casing

Casings are die-formed, 20-gauge galvanized steel and finished in baked enamel. The bottom panel is easily removed to provide service access to the burners, pilot and orifice. All units provided with independently adjustable horizontal louvers with stops to prevent total closure.

Heat Exchanger

Standard heat exchanger construction consists of seam welded 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

Burners

Burners are die-formed, corrosion resistant aluminized steel, with stainless steel port protectors. Port protectors prevent scale or foreign matter from obstructing the burner ports. Burners individually removable for ease of inspection and servicing. Each burner is provided with an individually adjustable, manually rotated air shutter adjustment.

Fans

Propeller fan blades are constructed of aluminum with an aerodynamic contour.

All fans are dynamically balanced for quiet, efficient operation and supplied with a protective type fan guard. Rubber-in-shear isolators provide isolation between the fan/motor combination and the unit heater casing.

Centrifugal fan is belt driven with adjustable pitch motor sheave. Motor and fan are dynamically balanced for quiet operation.

Centrifugal Unit Motors

Standard motors are 115V, 60 Hz, single phase, open drip-proof with built-in thermal overload protection. Optional 230/60/1 motors are available on all units. Optional 208, 230, 460/60/3 motors are available on 125 through 400 MBh units.

All Motors

All motors are 115V, 60 Hz, single-phase open drip-proof with built-in thermal overload protection and permanently lubricated bearings.

Controls

A factory installed junction box is provided for all power connections. Standard units are provided with a 24V combination single-stage redundant gas valve, consisting of a combination pilot solenoid valve, automatic electric gas valve, pilot filter, pressure regulator, pilot adjustment and manual shutoff. A flue vent fan relay and combustion air proving switch is also provided as standard. Standard equipment includes spark-ignited intermittent pilot system with electronic flame supervision. A 24V control transformer, high limit and fan time delay relay are provided. The fan time delay relay delays the fan start until the heat exchanger reaches a predetermined temperature. It also allows the fan to operate after burner shutdown, removing residual heat from the heat exchanger.

Electronic Modulating, 4–20 mA/0–10Vdc Input

Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input.

The modulating gas valve shall operate in response to a 4–20 mA or a 0–10 Vdc input from an external DDC control.

Flue Vent Fan

Flue vent fan provides power venting. Provided factory assembled to a sealed flue collection chamber. The flue vent fan is activated in response to a low voltage (24V) single-stage thermostat.

Note: *The thermostat is not included with the gas control option).*

A combustion air pressure switch is provided as standard to verify proper powered vent flow prior to allowing the gas valve to operate.

Factory-Installed Options

Two-Stage Gas Valve

Provides two stages of heat. Ignition is at low fire (50 percent of the furnaces rated input). Requires the use of a two-stage thermostat.

Heat Exchanger Options

Type 409 Stainless Steel

Heat exchanger tubes and headers are seam welded 20-gauge Type 409 stainless steel.

Type 321 Stainless Steel

Heat exchanger tubes and headers are seam welded 20-gauge Type 321 stainless steel.

Additional Options

Type 409 Stainless Steel Burners

Type 409 Stainless Steel Draft Diverter

Totally Enclosed Motor

Orifices for elevations over 2000 feet

Summer/Winter Switch

Vertical Louvers

Duct Discharge Flange

(Centrifugal fan units only) Provided in lieu of louvers on units for use with field ductwork.

OSHA Fan Guards

OSHA fan guards are available as a factory installed or field installed option.

Field-Installed Accessories

LP (Propane) to Natural Gas Conversion Package

High Gas Line Pressure Regulator (Natural gas units only)

Reduces main gas line pressure to a minimum of seven-inches wc (water column). Pressure at the jobsite must be specified. The regulator is selected to accommodate that specific pressure.

Thermostats

Low voltage room thermostat, single-stage.

Low voltage room thermostat, single-stage with summer/winter switch.

Low voltage duct thermostat, single-stage.

Low voltage room thermostat, two-stage.

Low voltage duct thermostat, two-stage.

Universal tamperproof guard for all room thermostats.

Discharge Nozzles

Y Splitter

30° Downward

60° Downward

90° Downward

Concentric Vent Terminals

Vertical Concentric Vent Kit

Kit includes 5" cap with special attached non-recirculation disc, special 8" cap with 5" hole and concentric vent box.

Horizontal Concentric Vent Kit

Kit includes 5" cap with special attached non-recirculation disc, inlet air screen and concentric vent box.

High Efficiency Indoor Gas Duct Furnaces (model GL)

General

Units are completely factory assembled, piped, wired, and test fired. All units are AGA Certified and conform with the latest ANSI Standards for safe and efficient performance. Units are provided with four point suspension hangers, and are available for operation on either natural or LP (propane) gas.

Casing

Casings are die-formed, 20-gauge galvanized steel and finished in baked enamel. The bottom panel is easily removed to provide access to the burners, pilot, and orifices. The pilot is also accessible

through a side panel access plate. The high limit switch is accessible through a side panel access. Duct discharge flanges for simple ductwork connection are provided.

Heat Exchanger

Standard heat exchanger construction consists of seam welded 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

Burners

Burners are die-formed, corrosion resistant aluminized steel, with stainless steel port protectors. Port protectors prevent foreign matter from obstructing the burner ports. Burners individually removable for ease of inspection and servicing. Each burner is provided with an individually adjustable, manually rotated air shutter adjustment. Air shutter adjustment is fixed when side access burner drawer is supplied.

Controls

A factory installed junction box is provided for all power connections. Standards units are provided with a 24-volt combination single-stage redundant gas valve, consisting of a combination pilot solenoid valve, automatic electric gas valve, pilot filter, pressure regulator, pilot adjustment and manual shutoff. A flue vent fan relay and combustion air proving switch is also provided as standard. Standard equipment includes spark-ignited intermittent pilot system with electronic flame supervision. A 24V control transformer and a high limit are provided.

Flue Vent Fan

Flue vent fan is factory assembled to a sealed flue collection chamber and provides power venting. The flue vent fan is activated in response to a low voltage (24V) single-stage thermostat. A combustion air pressure switch is provided as standard to verify proper powered vent flow prior to allowing the gas valve to operate.

Control Options

Two-Stage Gas Valve

Provides two stages of heat. Ignition is at low fire (50 percent of the furnace's rated input). Requires the use of a two-stage thermostat. (Thermostat not included.)

Electronic Modulating Gas Valve (Natural Gas Units Only)

Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 50 percent rated input. Available for use with room thermostat or duct thermostat with remote setpoint adjustment. Duct thermostat available with optional override room thermostat which causes the unit to go to full fire when the room temperature falls below the override room thermostat.

Electronic Modulating 4–20 mA/0–10 Vdc Input

Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input. The modulating gas valve shall operate in response to a 4–20 mA or a 0–10 Vdc input from an external DDC control.

Heat Exchanger Options

Type 409 Stainless Steel

Heat exchanger tubes and headers are seam welded 20-gauge Type 409 stainless steel

Type 321 Stainless Steel

Heat exchanger tubes and headers are seam welded 20-gauge Type 321 stainless steel

Additional Options

Type 409 Stainless Steel Burners

Orifices for Elevations over 2000 feet

Type 409 Stainless Steel Draft Diverter

Summer/Winter Switch

Horizontal Louvers

Horizontal and Vertical Louvers

Side Access Burner Drawer

Allows entire burner drawer to slide out from the side of the unit for service or inspection.

Fan Time Delay Relay

The fan time delay relay delays the fan start until the heat exchanger reaches a predetermined temperature. It also allows the fan to operate after burner shutdown, removing the residual heat from the heat exchanger. (Recommended on applications that require intermittent fan.)

Field-Installed Accessories

Natural to LP (Propane) Gas Conversion Package (Standing Pilot Only)

LP (Propane) to Natural Gas Conversion Package

High Gas Line Pressure Regulator—Reduces main gas line pressure to a minimum of 7 inches wc (water column). Pressure at the jobsite must be specified. The regulator is selected to accommodate that specific pressure.

Discharge Nozzles

"Y" Splitter

30° Downward

60° Downward

90° Downward

Drain Pan

Recommended for use with installations on the downstream side of a cooling coil.

Thermostats

Low voltage room thermostat, single-stage

Low voltage room thermostat, two-stage

Low voltage duct thermostat, single-stage

Low voltage duct thermostat, two-stage

Universal tamper-proof guard for all room thermostats

Low voltage room thermostat, single-stage with summer/winter switch

Room thermostat, electronic modulating control

Duct thermostat, electronic modulating control

Override room thermostat, for use with duct thermostat and electronic modulating control.

Separated Combustion Duct Furnaces (model GM)

General

Units are completely factory assembled, piped, wired, and test fired. All units are AGA Certified, 80 percent efficient and conform with the latest ANSI Standards for safe and efficient performance.

Units are provided with two-point suspension hangers on propeller fan unit heaters and with four-point suspension hangers on centrifugal fan unit heaters. Units are available for operation on either natural or LP (propane) gas. Standard terms and conditions apply.

Casing

Casings are die-formed, 20-gauge galvanized steel and finished in baked enamel. The bottom panel is easily removed to provide service access to the burners, pilot and orifice. All units provided with independently adjustable horizontal louvers with stops to prevent total closure.

Heat Exchanger

Standard heat exchanger construction consists of seam welded 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

Burners

Burners are die-formed, corrosion resistant aluminized steel, with stainless steel port protectors. Port protectors prevent scale or foreign matter from obstructing the burner ports. Burners individually removable for ease of inspection and servicing. Each burner is provided with an individually adjustable, manually rotated air shutter adjustment.

Controls

A factory installed junction box is provided for all power connections. Standard units are provided with a 24V combination single-stage redundant gas valve, consisting of a combination pilot solenoid valve, automatic electric gas valve, pilot filter, pressure regulator, pilot adjustment and manual shutoff. A flue vent fan relay and combustion air proving switch is also provided as standard. Standard equipment includes spark-ignited intermittent pilot system with electronic flame supervision. A 24V control transformer, high limit and fan time delay relay are provided. The fan time delay relay delays the fan start until the heat exchanger reaches a predetermined temperature. It also allows the fan to operate after burner shutdown, removing residual heat from the heat exchanger.

Electronic Modulating 4–20 mA/0–10 Vdc Input

Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input.

The modulating gas valve shall operate in response to a 4–20 mA or a 0–10 Vdc input from an external DDC control.

Flue Vent Fan

Flue vent fan provides power venting. Provided factory assembled to a sealed flue collection chamber. The flue vent fan is activated in response to a low voltage (24V) single-stage thermostat.

Note: *The thermostat is not included with the gas control option.*

A combustion air pressure switch is provided as standard to verify proper powered vent flow prior to allowing the gas valve to operate.

Factory-Installed Options

Two-Stage Gas Valve

Provides two stages of heat. Ignition is at low fire (50 percent of the furnace's rated input). Requires the use of a two-stage thermostat.

Heat Exchanger Options

Type 409 Stainless Steel

Heat exchanger tubes and headers are seam welded 20-gauge Type 409 stainless steel.

Type 321 Stainless Steel

Heat exchanger tubes and headers are seam welded 20-gauge Type 321 stainless steel.

Additional Options

Type 409 Stainless Steel Burners

Type 409 Stainless Steel Draft Diverter

Totally Enclosed Motor (Centrifugal fan units only)

Orifices for elevations over 2000 feet

Summer/Winter Switch

Vertical Louvers

Duct Discharge Flange

(Centrifugal fan units only) Provided in lieu of louvers on units for use with field ductwork.

Field-Installed Accessories

LP (Propane) to Natural Gas Conversion Package

High Gas Line Pressure Regulator (Natural gas units only) Reduces main gas line pressure to a minimum of 7 inches wc (water column). Pressure at the jobsite must be specified. The regulator is selected to accommodate that specific pressure.

Thermostats

Low voltage room thermostat, single-stage.

Low voltage room thermostat, single-stage with summer/winter switch.

Low voltage duct thermostat, single-stage.

Low voltage room thermostat, two-stage.

Low voltage duct thermostat, two-stage.

Universal tamperproof guard for all room thermostats.

Discharge Nozzles

Y Splitter

30° Downward

60° Downward

90° Downward

Concentric Vent Terminals

Vertical Concentric Vent Kit

Kit includes 5” cap with special attached non-recirculation disc, special 8” cap with 5” hole and concentric vent box.

Horizontal Concentric Vent Kit

Kit includes 5” cap with special attached non-recirculation disc, inlet air screen and concentric vent box.

Horizontal Blower Assembly (model HBAC)

General

Units are completely factory assembled, and have four-point suspension hangers and filter racks as standard.

Casing

Casings are 18-gauge galvanized steel with baked enamel finish. Side panels are removable for easy servicing and motor maintenance. Duct flanges are provided for simple ductwork connection. Standard filters are one-inch permanent washable type.

Motors

Factory-mounted motors are open drip-proof, 115, 230/60/1 or 208, 230, 460/60/3 with built-in thermal overload protection.

Fans

Centrifugal fan is belt driven with adjustable pitch motor sheave. Fan is dynamically balanced for quiet operation.

Factory-Installed Options

Insulation

Blower assembly and transition are insulated with fire-resistant, odorless, matte-faced one-inch glass fiber material.

Floor Mounting Legs

Legs allow floor mounting of the blower assembly.

Totally Enclosed Motor

Field Installed Accessories

Optional Filters

(One-Inch Permanent Standard)

One-inch throwaway

One-inch permanent

Transition

When used with a duct furnace, a sheet metal transition is supplied to connect the blower assembly to the duct furnace.

Literature Order Number	UH-PRC002-EN
Date	September 2009
Supersedes	UH-PRC002-EN July 2009

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For more information, contact your local Trane office or e-mail us at comfort@trane.com