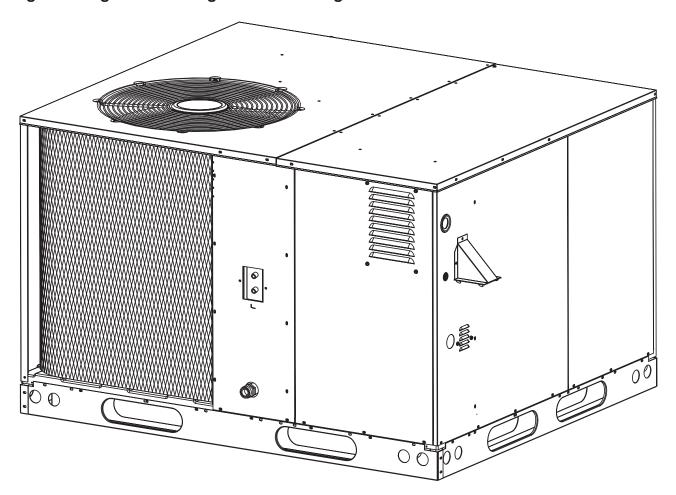
Installation Instructions

Single Package Gas Heating/Electric Cooling



A WARNING:

FOR YOUR SAFETY

FOR YOUR SAFETY WHAT TO DO IF YOU SMELL GAS

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

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

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- Extinguish any open flame.

DO NOT DESTROY. PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.

These instructions are primarily intended to assist qualified individuals experienced in the proper installation of this appliance. Some local codes require licensed installation/service personnel for this type of equipment. Read all instructions carefully before starting the installation.

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GENERAL SPECIFICATIONS

GR4 Series Single Package Gas Heating/Electric Cooling units are designed for outdoor rooftop or ground level slab installations. The units are shipped ready for horizontal duct connections and are easily converted for down flow connections.

All models are shipped from the factory with the following:

- 1. Multispeed direct-drive blower.
- 2. Horizontal or down flow duct connections.
- 3. 24V fuse protection.

The unit dimensions are shown in Figure 1.

SAFETY CONSIDERATIONS

It is the responsibility of the installer to ensure that the installation is made in accordance with all applicable local and national codes.

WARNING:

Improper installation, service, adjustment, or maintenance may cause explosion, fire, electrical shock or other hazardous conditions which may result in personal injury or property damage. Unless otherwise noted in these instructions, only factory authorized kits or accessories may be used with this product.

Literature, Labels, and Tags — When working with this equipment, follow all precautions in the literature, on tags, and on labels provided with the unit and/or approved field installed kits. The type of hazard and severity are described on each label or tag.

Pressures Within The System—This equipment contains liquid and gaseous refrigerant under high pressure. Installation or servicing should only be performed by qualified trained personnel thoroughly familiar with this type equipment.

INSTALLATION REQUIREMENTS

Equipment Application — Before beginning the installation, verify that the unit model is correct for the job. The unit model number is printed on the data label. This unit is **NOT** to be used for temporary heating of buildings or structures under construction.

Equipment Check—All units have been securely packaged at the point of shipment. After unpacking the unit, carefully inspect it for apparent and concealed damage. Claims for damage should be filed with the carrier by the consignee.

Requirements and Codes — The installer must comply with all local codes and regulations which govern this type equipment. Local codes and regulations take precedence over any recommendations contained in these instructions. In the absence of local codes, the installation must conform with the National Fuel Gas Code (ANSI 2223.1, NFPA-54), or Canadian installations must conform with CAN/ CGA-B149 installation codes. All electrical wiring must be made in accordance with codes and regulations and with the National Electric Code (ANSI/NFPA 70) or in Canada the Canadian Electric Code Part 1 CSA C.22.1. Air Ducts must be installed in accordance with the standards of the National Fire Protection Association "Standards for Installation of Air Conditioning and Ventilation Systems" (NFPA 90A), "Standard for Installation of Residence Type Warm Air Heating and Air Conditioning Systems" (NFPA 90B), these instructions, and all applicable local codes.

The National Fuel Gas Code is available by writing:

American National Standards Institute, Inc. 1430 Broadway New York, NY 10018

NFPA publications are available by writing:

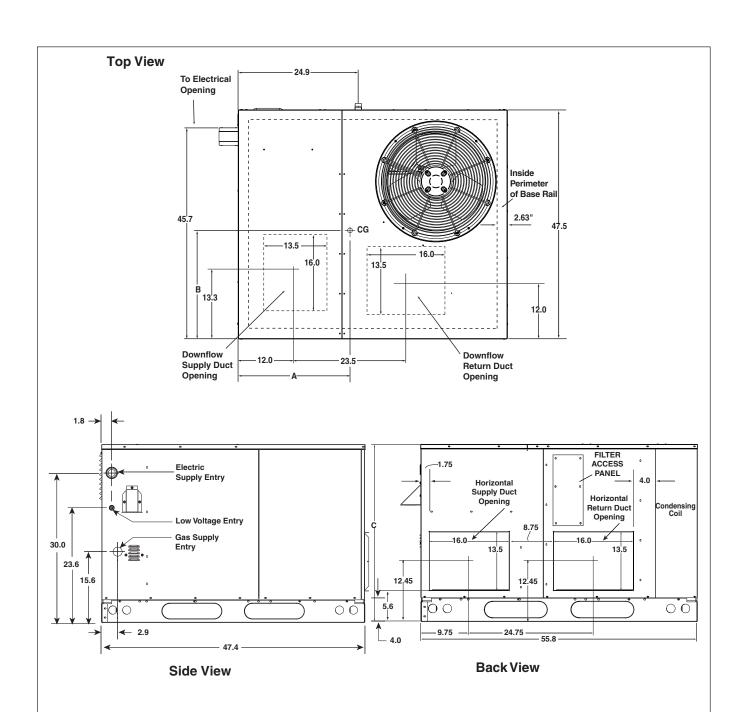
National Fire Protection Association Batterymarch Park Quincy, ME 02269

Unit Location — The GR4 series gas/electric unit is designed only for outdoor installations. Choosing the location of the unit should be based on minimizing the length of the supply and return ducts. Consideration should also be given to availability of fuel, electric power, service access, noise, and shade.

Venting Requirements — This unit has been equipped with an integral venting system and designed to operate only with this venting system. No additional venting shall be used. This unit must be vented to the outdoors.

MARNING:

Do not vent unit through a conventional venting system.



	Unit	Center o	f Gravity	Height (i	n inches)
Model No.		Α	В		C
GR4GM-	Weight	^	Ь	with base rails	without base rails
072(*)096C	574	27.5	27.0	43.0	39.3
072(*)120C	586	27.0	27.0	43.0	39.3

*C or D

Figure 1. Unit Dimensions.

A vent cover assembly has been supplied with the unit. It can be found secured to the gas controls within the control area of this unit. **Figure 2** shows the proper installation of the vent cover assembly over the vent outlet on the exterior of the corner panel. The fasteners used to secure the vent cover assembly have been included in the homeowner's package.

WARNING:

The vent cover assembly must be installed to assure proper operation of the unit.

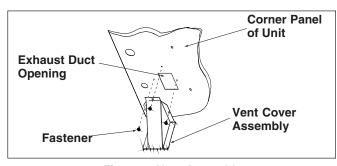


Figure 2. Vent Assembly

The following list is a summary of the requirements for the location of the termination of the venting system:

- 1. The location of the vent termination must be consistent with the National Fuel Gas Code (ANSI Z223.1) or CAN/CGA-B149 Installation Codes.
- 2. The vent termination must be located at least four (4) feet horizontally from any electric meters, gas meters, regulators, and relief equipment.
- 3. The vent termination must be located at least three (3) feet above any forced air inlet located within ten (10) feet.
- 4. The vent termination must be located at least four (4) feet below, four (4) feet horizontally from, or one (1) footabove any door, window, or gravity air inlet into any building.
- The vent termination must be located at least one (1) foot above grade.
- The unit should be installed in such a manner as to prevent snow accumulation from obstructing the vent termination.
- The unit installation shall avoid areas where condensate drainage may cause problems by dropping on planters or patios, etc. Furthermore, ensure that the exhaust gases will not impinge on windows or building surfaces,

which may be compromised or damaged by condensation. Do not install the unit such that exhaust from the vent termination is directed into window wells, stairwells, under decks, or in alcoves or similarly recessed areas. The vent termination must not be located above any public walkways.

Clearances to Combustible Materials — See **Table 2** for required clearances to combustible materials. Refer to the unit data label for the model number.

The GR4 series gas/electric unit is suitable for installation on combustible flooring or class A, B, or C roofing materials. A clearance of at least 36 inches from the blower access panel and from the louvered control access panel is recommended to allow for servicing and maintenance. Where accessibility to combustibles clearances are greater than minimum clearances, accessibility clearances must take preference. Sufficient clearance for unobstructed airflow through the louvered control access panel and through the outdoor coil must be maintained in order to achieve rated performance. See Figure 3 for minimum clearances to obstructions.

Thermostat — A single stage cooling/single stage heating 24VAC thermostat should be used with these units. A two-stage cooling/single-stage heating thermostat is recommended for economizer operation.

Air Filter Requirements — Three phase units "Only" are supplied from the factory with an internal filter rack assembly. Air filters are not supplied; a suitable air filter must be installed in the unit or in the return air system for all units. Refer to **Table 1** for recommended filter sizes when the factory installed filter system is not used. Air filter pressure drop must not exceed 0.08 inches WC. Air filter(s) must be installed in the return air ductwork ahead of the evaporator coil of this unit. All return air to this unit must pass through the filter(s) before entering this unit. See **Table 1a** for internal filter size requirements. When utilizing an Economizer or Fresh Air Equipment, the factory installed filter rack assembly must be removed prior to installation.

⚠ WARNING:

Never operate unit without a filter. A failure to follow this warning could result in a fire, personal injury, or death.

Nominal Cooling	Approx Air Flow		Appro Filter Area	ximate a (Sq. In.)*	Recomme Filter Size (Ir	
Tonnage	(CF	·M)	Disposable	High Velocity	Disposable	High Velocity
	Low	1700	825	500	20 x 25 (2 Required)	20 x 25
6 Ton	Med	1900	900	550	20 x 25 (2 Required)	25 x 25
	High	2100	1000	600	20 x 25 (2 Required)	25 x 25

^{*}Based on velocity of 300 ft/min for disposable filters and 500 ft/min for high velocity (cleanable) filters.

IMPORTANT NOTICE TO INSTALLER: After installing or replacing the filtration system for this unit, add the following marking on the filter service panel or reasonably adjacent thereto: "Replace filter(s) installed in your system only with the same dimensional size filters that are being replaced."

Removal of Internal Filter Rack — First remove the Return Air Panel from the unit. Remove the height adjustment screw from the inside of the rack, and the (1) screw securing the assembly to the coil located on the left leg of the rack. The assembly can easily be collapsed and removed from the unit. See **Figure 3a** for filter rack securing screw locations.

INSTALLING FILTERS IN THE FACTORY INSTALLED FILTER RACK

- Remove access panel screws from return air panel. (You may want to loosen the unit's Top Panel screws that are located near the top edge of the access panel. The access panel was designed to be captured underneath the Top Panel.)
- 2. To install media, slide filter between guide channels of filter rack. The first filter will easily drop into place. (Check to insure that the bottom of filter is within the channels of the rack.) Insert the second media in the same manner as the first. (Again, check to insure that the media is captured by the channels of the filter rack.

UNIT SIZE	INTERNAL FILTER SIZE
R4GA 024-042, R4BC 024	(2) 14" x 25" x 1"
P4SA 036, P4SA 048	or
P4SC 036, Q4SA 036	(2) 14" x 25" x 2"
R4GA 048-060, R4GC 030-042	(2) 16" x 25" x 1"
P4SA 060, P4SC 048-060,	or
Q4SA 048-060, Q4SC-048-060	(2) 16" x 25" x 2"
R4GC 048-060	(2) 18" x 25" x 1"
R4GM 024-072	or
Q4SC 048-060	(2) 18" x 25" x 2"

Table 1a. Internal Filter Size Requirements.

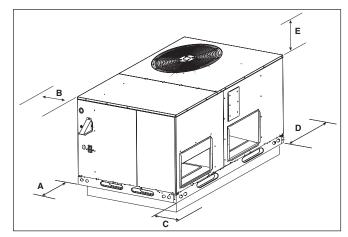


Figure 3. Minimum Clearances.

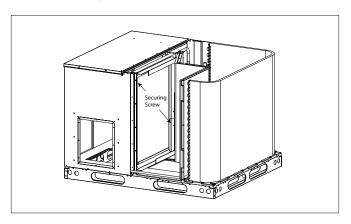


Figure 3a. Internal Filter Rack Location

3. Replace access cover by sliding the top edge of panel under the lip of the unit's Top Panel. Secure Access Panel by replacing the screws.

Condensate Drain — Condensate is removed from the unit through the 3/4" female pipe fitting located on the front side of the unit. (See **Figure 4**.) Install a 2 inch deep condensate trap in the drain line of the same size and prime with water.

When connecting rigid drain line, hold the female fitting with a wrench to prevent twisting. **Do not over tighten!** Refer

	Minimum	Clearances	to Combust	ible Material	**	
Model	Heating		Minimun	n Clearances	(Inches)	
Number GR4GM-	Input	Blower	Control	Duct	Coil	Ton (E)
GR4GIVI-	(Btuh)	Panel (A)	Panel (B)	Panel (C)	End (D)	Top (E)
072(-)096C	96,000	36	36	1*	36	36
072(-)120C	120,000	36	36	1*	36	36

^{*} If accessories (filters, economizers, fresh air dampers . . .) are installed, see accessory installation instructions for proper clearances.

Table 2. Minimum Clearances to Combustible Materials.

^{**} Suitable for installation on combustible flooring or class A, B, or C roofing material.

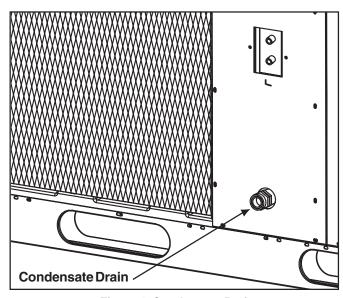


Figure 4. Condensate Drain.

to local codes and restrictions for proper condensate disposal requirements.

UNIT INSTALLATION

Ground Level — When installing the unit at ground level (See **Figure 5**), provide a concrete mounting pad separate from the building foundation. The pad must be level to insure proper condensate disposal and strong enough to support the unit's weight (Refer to **Figure 1**). Make sure the slab is a minimum of 2" above the grade and in an area that drains well.

Rigging and Hoisting — The unit should be lifted using slings and spreader bars. The spreader bars are necessary to prevent damaging the top of the unit's cabinet. Make sure that the lifting equipment is adequate for the load. Refer to **Figure 1** for unit weights. Keep the unit in an upright position at all times. The rigging must be located

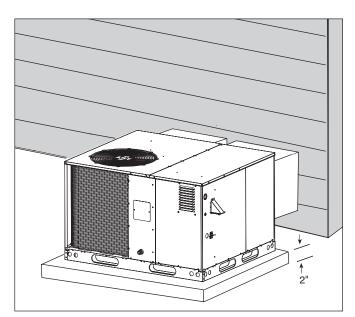


Figure 5. Ground Level Installation.

outside the unit's center of gravity. Refer to **Figure 1** for center of gravity location. **For rooftop installations**, **remove and discard the two supports attached beneath the unit.**

WARNING:

To avoid the risk of property damage or personal injury, it is the rigger's responsibility to ensure that whatever means are used to hoist the unit are safe and adequate.

A CAUTION:

All panels must be securely in place when rigging and hoisting.

Rooftop—For rooftop installations (See **Figure 6**) use the appropriate accessory roof curb and follow all instructions included with it. Make sure the supports beneath the unit have been removed. Locate the unit according to local building codes and ordinances. The curb must be level to insure proper condensate drainage.

The roof must be capable of handling the weight of the unit. See **Figure 1** for unit weights. Reinforce the roof if required.

WARNING:

Do not place combustible material on or against the unit cabinet. Do not place combustible materials, including gasoline and any other flammable vapors and liquids, in the vicinity of the unit.

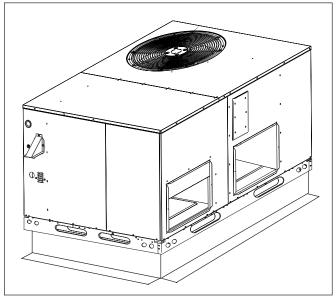


Figure 6. Roof Curb Installation.

AIR SUPPLY FOR COMBUSTION AND VENTILATION

Provisions must be made in the installation of this unit to provide an adequate supply of air for combustion. Detailed instructions for determining the adequacy of an installation can be found in the current revision of the National Fuel Gas Code (ANSI Z223.1) and NFPA54, or in Canadian installation codes (CAN/CGA-B149), or in applicable local building codes. Consult local codes for special requirements.

WARNING:

Installation using methods other than those described in the following sections must comply with the National Fuel Gas Code and all applicable local codes to provide sufficient combustion air for the unit.

If the unit is operated with inadequate combustion air supply the flame roll-out control located above the burners will open, turning off the gas supply to the burners. The flame roll-out control is a manually re-setable device. DO NOT install a jumper wire across this control to defeat its function. DO NOT reset the control without identifying and correcting the fault condition which caused the control to trip. If this control must be replaced, use only the replacement part specified in the Replacement Parts List.

Air Openings in the door of the unit, warm air registers, and return air grilles must not be restricted.

To maximize heat exchanger life, the combustion air must be free of chemical contaminants which form corrosive acidic compounds when combusted. Some examples of these chemical contaminants are chlorine, fluorine, and sulphur. Some common sources of these chemical contaminants are detergents, bleaches, aerosol sprays, cleaning solvents, and a wide variety of commercial and household products.

WARNING:

Combustible air must not be drawn from a contaminated atmosphere. Excessive exposure to contaminated combustion air will result in safety and performance related problems.

CIRCULATING AIR SUPPLY

WARNING:

Products of combustion must not be allowed to enter the return air ductwork or the circulating air supply. Failure to prevent products of combustion from being circulated into the living space can create potentially hazardous conditions including carbon monoxide poisoning that could result in personal injury or death.

All return ductwork must be adequately sealed, all joints must be taped, and the ductwork must be secured to the unit with sheet metal screws. When return air is provided through the bottom of the unit, the joint between the unit and the return air plenum must be air tight.

The roof curb or cement pad on which the unit is mounted must provide sound physical support of the unit with no gaps, cracks, or sagging between the unit and the curb or pad.

Return air and circulating air ductwork must not be connected to any other heat producing device such as a fireplace insert, stove, etc. Doing so may result in fire, explosion, carbon monoxide poisoning, personal injury, or property damage.

This unit is designed only for use with a supply and return duct. Air ducts should be installed in accordance with all applicable local codes and the standards of the National Fire Protection Association "Standard for Installation of Air Conditioning Systems" (NFPA 90A), and "Standard for Installation of Residence Type Warm Air Heating and Air Conditioning Systems" (NFPA 90B).

Design the ductwork according to methods described by the Air Conditioning Contractors of America (ACCA) Manual D. The ducts must be properly sized not to exceed 0.2 inches WC pressure drop at 400 scfm per nominal ton of cooling capacity.

Ductwork should be attached directly to the unit flanges for horizontal applications. On roof curb installations the ducts must be attached to the curb duct supports, not the unit.

Model	Heating	Heating	Model Heating Heating Cooling	Cooling							ű	External Static Pressure (Inches Water Column)	Static	Press	sure ((Inches	s Wat	er Colu	(mm)				
Number	Input	Output	Input Output Rise Output	Output	Motor Speed	Blower Motor Size HP	Motor HP	0.1	_	0.2		0.3		0.4		0.5		9.0		0.7		0.8	
GR4GM-	(Btuh)	(Btuh)	(Btun) (Btuh) Kange (F) (Btuh)	(Btuh)	•			CFM	Rise	CFM	Rise	Rise CFM	ise	FMR	ise C	FM R	ise	FM Ri	ise C	FM F	lise (Rise
					High			2115		2071	,	2032	-	1957	- 1	1877	-	1797	-	1718	,	1650	
072(*)096C 96,000 75,000 45-75	96,000	75,000	45-75		71,000 Medium	11 X 10	3/4	1917		1862	•	1829	-	1762	-	1705	<u> </u>	1639	Ť	1555	45 1	1445	48
					Low* **			1568		1549	45	45 1513 46 1476 47 1446 48	46	476 4	17 1	446	18	1412 49	1 61	1310	53 1	1204	28
					High			2075		2031		1992 4	46 19	1917 45	15 1	1837	47 1757	757 5	50 10	1678	52	1610	54
072(*)120C 120,000 94,000	120,000	94,000	45-75	71,000 Medium		11 X 10	3/4	1887	46	1832	48	1799 4	18	48 1732 50 1675	20 1	675	52	1609 5	54	1531	57 1	1415	62
					** *wo7			1558	56	1529	22	1493	28	1456 6	60 1426	426 (61 1392		63 13	1290	67 1	1184	74

Table 3. GR4GM-072 Series Airflow Data.

^{*} Can be C or D

** Factory Set Heating Speed

** Factory Set Cooling Speed

It is recommended that the outlet duct be provided with a removable access panel. This opening should be accessible when the unit is installed in service and shall be of a size such that the smoke or reflected light may be observed inside the casing to indicate the presence of leaks in the heat exchanger. The cover for the opening shall be attached in such a manner as to prevent leaks.

If outside air is utilized as return air to the unit for ventilation or to improve indoor air quality, the system must be designed so that the return air to the unit is not less than 50°F (10°C) during heating operation. If a combination of indoor and outdoor air is used, the ducts and damper system must be designed so that the return air supply to the unit is equal to the return air supply under normal, indoor return air applications.

Unconditioned Spaces — All ductwork passing through unconditioned space must be properly insulated to minimize duct losses and prevent condensation. Use insulation with an outer vapor barrier. Refer to local codes for insulation material requirements.

Acoustical Ductwork—Certain installations may require the use of acoustical lining inside the supply ductwork. Acoustical insulation must be in accordance with the current revision of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) application standard for duct liners. Duct lining must be UL classified batts or blankets with a fire hazard classification of FHC-25/50 or less. Fiber ductwork may be used in place of internal duct liners if the fiber ductwork is in accordance with the current revision of the SMACNA construction standard on fibrous glass ducts. Fibrous ductwork and internal acoustical lining must be NFPA Class 1 air ducts when tested per UL Standard 181 for Class 1 ducts.

Horizontal to Down flow Conversion — The unit is shipped ready for horizontal duct connections. If down flow ducts are required, the unit must be converted following the steps below for both the supply and return ducts.

- Locate the duct cap inside the duct openings and remove the screw holding it in place.
- 2. Lift the cap out of the unit. The cap can be pushed up from the bottom by reaching through the fork slot.
- 3. Cover the horizontal duct opening with the cap. The insulation will be on the indoor side.
- 4. Fasten the cover with screws and seal to prevent air leakage.

GAS SUPPLY AND PIPING

This unit has right side gas entry. A typical gas service hookup is shown in **Figure 7**. When making the gas connection, provide clearance between the gas supply line and the entry hole in the unit's casing to avoid unwanted noise and/or damage to the unit.

All gas piping must be installed in compliance with local codes and utility regulations. Some local regulations require the installation of a manual main shut-off valve and ground joint union external to the unit. The shut-off valve should be readily accessible for service and/or emergency use. Consult the local utility or gas supplier for additional requirements regarding placement of the manual main gas shut-off. In the absence of local codes the gas line installation must comply with the latest edition of the National Fuel Gas Code ANSI Z223.1 or CAN/CGA B149 Installation Codes.

A CAUTION:

Do not use matches, lighters, candles or other sources of open flame to check for gas leaks.

A 1/8 inch NPT plugged tap must be installed in the gas line immediately upstream of the gas supply connection to the unit for use when measuring the gas supply pressure. The plug should be readily accessible for service use. A drip leg should be installed in the pipe run to the unit. **Table 4** lists gas flow capacities for standard pipe sizes as a function of length in typical applications based on nominal pressure drop in the line.

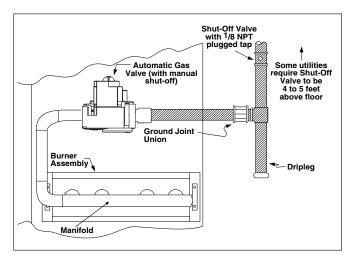


Figure 7. Typical Right Side Entry Gas Service Connection.

IMPORTANT NOTES:

- 1. Gas piping must not be run in or through air ducts, chimneys, gas vents, elevator shafts, etc.
- Compounds used on threaded joints of gaspiping must be resistant to the actions of liquefied petroleum gases.
- The main manual gas valve and main power disconnect to the unit must be properly labeled by the installer in case emergency shutdown is required.

Leak Check — After the gas piping to the unit is complete, all connections must be tested for gas leaks. To check for leaks in gas piping systems, use only a soap and water solution or other approved method.

IMPORTANT NOTE: When pressure testing the gas supply lines at pressures greater than 1/2 psig (14 inches WC), the unit must be disconnected from the gas supply piping system to prevent damage to the gas control valve.

If the test pressure is less than or equal to 1/2 psig (14 inches WC), the unit must be isolated from the gas supply line by closing the manual shut-off valve.

! WARNING:

This unit was equipped at the factory for use with natural gas only. A special kit, supplied by the manufacturer, is required to convert the unit to operate on LP/propane gas. Failure to use the proper conversion kit can cause fire, explosion, property damage, carbon monoxide poisoning, personal injury, or death.

CAPACITY O					•			R)
NOMINAL BLACK IRON			LE	NGTH C	F PIPE eet)	RUN		
PIPE DIAMETER (in.)	10	20	30	40	50	60	70	80
1/2	130	90	75	65	55	50	45	40
3/4	280	190	150	130	115	105	95	90
1	520	350	285	245	215	195	180	170
1 1/4	1050	730	590	500	440	400	370	350
1 1/2	1600	1100	890	760	670	610	560	530

The cubic feet per hour listed in the table above must be greater than the cubic feet per hour of gas flow required by the unit.

To determine the cubic feet per hour of gas flow required by the unit, divide the input rate of the unit by the heating value of the gas:

Cubic Feet Per Hour Required = Input To Unit (Btu/hr)

Heating Value of Gas (Btu/Cu. Ft.)

Table 4. Capacity of Black Iron Gas Pipe (cubic feet per hour) for Natural Gas (specific gravity = .60).

GAS AND HIGH ALTITUDE CONVERSIONS

Conversion: conversion of this unit must be performed by qualified service personnel, using only approved parts.

High Altitude Application

High altitude application with this unit can be field performed by a simple adjustment of manifold pressure and if necessary, a change of the orifices. The changes required depend on the installation altitude and the heating value of the gas. The gas heating value based on sea level can be obtained from your local gas utility. The heating value of gas at high altitude is always lower than the sea level heating value. The heating values used in the **Tables 5a & 5b** are based on sea level values.

Natural Gas High Altitude Conversion

All factory shipped units are ready to operate between zero and 4999 ft. above sea level. For higher altitudes (between 5000 and 10,000 ft. above sea level), conversion can be achieved simply by adjusting the unit manifold pressure as shown in **Table 5a**.

LP/Propane Gas Conversion

Conversion of this unit to utilize LP/Propane gas must be made by qualified service personnel, using approved parts. Conversion for the LP/Propane gas can be accomplished by adjusting the manifold pressure, after replacing the natural gas orifices with the appropriate LP/Propane orifices shown in **Table 5b**. Note: that for installations between zero and 5000 ft. above sea level, a #54 drill size orifice should be used. However for installations above 5000 ft. over sea level, a #55 drill size orifice should be used. Then use **Table 5b** to determine the appropriate manifold pressure for your altitude installation. Conversion to LP/Propane (sea level and high altitude) is detailed in the installation instructions provided with the conversion kit. Approved conversion kits are:

United States LP/Propane Gas Sea Level and High Altitude Conversion Kit - P/N 903616

This kit is for LP/propane conversion in the United States at altitudes between zero and 10,000 ft. above sea level. Follow the installation instructions supplied with the kit for proper installation.

Canadian LP/Propane Gas Sea Level and High Altitude Conversion Kit - P/N 903617

This kit is for LP/propane conversions in Canada at altitudes between zero and 4500 ft. above sea level. Follow the installation instructions supplied with the kit for proper installation.

For a Natural Gas Sea Le	evel Heatir	ng Value o	f 800 to 8	99 Btu/cu.	ft.
		Elevation (feet above	sea level)
	zero to	2000 to	5000 to	6000 to	8000 to
	1999	4999	5999	7999	10000
Manifold Pressure Setting (in WC)	3.5	3.5	3.5	3.5	3.0

For a Natural Gas Sea Le	evel Heatir	ng Value o	f 900 to 9	99 Btu/cu.	ft.
		Elevation (feet above	e sea level)
	zero to	2000 to	5000 to	6000 to	8000 to
	1999	4999	5999	7999	10000
Manifold Pressure Setting (in WC)	3.5	3.5	3.5	3.2	2.8

For a Natural Gas Sea Leve	el Heating	Value of	1,000 to 1,	,100 Btu/c	u.ft.
		Elevation (feet above	e sea level)
	zero to	2000 to	5000 to	6000 to	8000 to
	1999	4999	5999	7999	10000
Manifold Pressure Setting (in WC)	3.5	3.5	3.0	2.8	2.5

Table 5a. Manifold Pressure (in WC) for Natural Gas at Various Altitudes and Heating Values

•	Ele	evation, (feet abov	e sea lev	el)
	0 to	2,000 to	5,000 to	6,000 to	8,000 to
	1,999	4,999	5,999	7,999	10,000
Manifold Pressure in (WC)					
Based on Sea Level LP	10.0	8.5	10.0	9.0	8.5
Heating Value of 2,500 Btu/ft. ³					
Orifice Size	54	54	55	55	55

Table 5b. Manifold Pressure (in WC) for LP/Propane Gas at Various Altitudes

MARNING:

To avoid the risk of electrical shock, personal injury, or death, disconnect all electrical power to the unit before performing any maintenance or service. The unit may have more than one electrical power supply.

ELECTRICAL WIRING

General — Electrical power wiring must be made in accordance with all applicable local codes and ordinances, and with the current revision of the National Electric Code NFPA 70 or in Canada CSA C.22.1 Canadian Electrical Code Part 1. If any of the original wire as supplied with the unit must be replaced, it must be replaced with material of the same gauge and temperature rating.

Line Voltage — Before proceeding with the electrical connections, make certain that the voltage, frequency and phase of the supply source are the same as those specified on the unit rating plate. Also verify that the service provided by the utility is sufficient to handle the additional load imposed by this equipment.

This unit must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code (ANSI/NFPA 70) or the CSA C22.1 Electrical Code.

See **Figure 9** or the unit wiring label for proper high and low voltage wiring. Make all electrical connections in accordance with all applicable codes and ordinances.

Use a separate branch electrical circuit for this unit. A means of electrical disconnect must be located within sight of and readily accessibility to the unit.

For maximum circuit ampacity and maximum over current protection, see the unit rating plate or **Table 6.**

Overcurrent protection must be provided at the branch circuit distribution panel and sized as shown in **Table 6** or on the unit rating label and according to the National Electric Code and applicable local codes.

Provide power supply (or supplies) for the unit in accordance with the unit wiring diagram, and the unit rating plate. Connect the line-voltage leads to the corresponding terminals on the contactor inside the control compartment. Use only copper

WARNING:

The unit cabinet must have and uninterrupted or unbroken electrical ground to minimize personal injury if an electrical fault should occur. This ground may consist of electrical wire or approved conduit when installed in accordance with existing national or local codes.

wire for the line voltage power supply to this unit. Use proper code agency listed conduit and a conduit connector for connecting the supply wires to the unit and for obtaining proper grounding. Grounding may also be accomplished by using the grounding lug provided in the control box. Do not use gas piping as an electrical ground.

Room Thermostat — Several options are available for a room thermostat depending on the accessories installed with the unit. The available thermostats recommended for use with these units are listed with the accessories in the NORDYNE GR4 Technical Specification sheets. Select a thermostat which operates in conjunction with the installed accessories. The thermostat should be mounted about five feet above the floor on an inside wall. The thermostat should be kept away from drafts, slamming doors, lamps, direct sunlight and the supply air flow.

Blower Speed — The blower speeds are preset at the factory. See **Table 3** for factory settings. For optimum system performance and comfort, it may be necessary to change the factory set speed. To change the blower speed:

- Disconnect all electrical power to the unit and remove the louvered control access panel.
- 2. Find the appropriate model and wire as instructed on the following page.
- 3. Check all factory wiring per the unit wiring diagram and inspect the factory wiring connections to be sure none loosened during shipping or installation.

A CAUTION:

To avoid personal injury or property damage, make certain that the motor leads cannot come into contact with any uninsulated metal components of the unit.

GR4GM-072C (230V) Single Speed Selection Wiring

- Leave the Red Jumper Wire connected to "Heat" and "Cool" on the integrated circuit board.
- Remove the Low Speed (Red) motor lead from the "Cool" terminal and replace with either the Med. Speed (Blue) or High Speed (Black) motor lead for desired airflow.
- 3. Place the Low Speed (Red) wire on the open M1, M2, or M3 terminal of the integrated circuit board.

GR4GM-072C (230V) Two Speed Wiring

- 1. Remove the Red Jumper Wire connected to "Heat" and "Cool" on the integrated circuit board.
- 2. Place the desired Heating and Cooling speeds, (Red-Low, Blue-Med., Black-High on the appropriate "Heat" and "Cool" terminals of the integrated circuit board.
- 3. Place the remaining blower speed tap wire on the open M1, M2, or M3 terminal of the integrated circuit board.

GR4GM-072D (460V) Single Speed Selection Wiring

- 1. Leave the Red Jumper Wire connected to "Heat" and "Cool" on the integrated circuit board.
- 2. Remove the Low Speed (Red) motor lead from SSR(1) T(1) and replace with either the Med. Speed (Blue motor lead) located on SSR(2) T(1)) or High Speed (Black and Yellow motor leads located on M2 on the integrated circuit board)
- Place the Low Speed (Red) wire on the open M1, M2, or M3 terminal of the integrated circuit board.
- SSR() T () Speed Selector Relay (number) Terminal (number)

Blue Wire identifies Speed Selector Relay #1 Brown Wire identifies Speed Selector Relay #2

GR4GM-072D (460V) Two Speed Wiring

- 1. Remove the Red Jumper Wire connected to "Heat" and "Cool" on the integrated circuit board.
- 2. Place the Blue SSR(1) Coil wire on the "Heat" terminal of the integrated circuit board.
- 2. Place the Brown SSR(2) Coil wire on the "Cool" terminal of the integrated circuit board.
- 2. Place the desired Heating and Cooling speeds, (Red-Low, Blue-Med., Black & Yellow-High) on the appropriate "Heat"-SSR(1)T(1) and "Cool" - SSR(2)T(1) terminals.
- Place the remaining blower speed tap wire on the open M1, M2, or M3 terminal of the integrated circuit board.
- SSR() T() Speed Selector Relay (number) Terminal (number)

Blue Wire identifies Speed Selector Relay #1

Brown Wire identifies Speed Selector Relay #2

					ELE	ELECTRICAL DATA	ICA	L D	ATA	1							
Model	Heating Cooling	Cooling	Nominal		Voltage	age	Indoor	or	Fan	_			eonpul	Inducer Mtr.	Sinç	Single Circuit	cuit
Number	Input	Input Capacity	Electrical		Range	ıge	Blower	ver	Motor		Compi	Compressor					R-22
GR4GM-	Btu/Hr	Btu/Hr	Supply	RLA	Min.	RLA Min. Max.	НР	FLA	НР	FLA	RLA	HP FLA HP FLA RLA LRA	НР	FLA MCA MOP (Oz.)	MCA	MOP	(Oz.)
072C096C	96,000	72,000	072C096C 96,000 72,000 208-230/60/3	29.4	29.4 187	253	3/4	5.0	3/4	3.7	20.7	156	156 1/12th 0.5	0.5	34.6	20	270
072D096C 96,000 72,000	000'96	72,000	460/60/3	14.9	14.9 414 506	909	3/4	3.0	3/4	1.9	10	75	1/12th 0.5 17.4	0.5	17.4	25	270
072C120C	120,000	72,000	072C120C 120,000 72,000 208-230/60/3	29.4	29.4 187 253	253	3/4	5.0	3/4	4 3.7 2	20.7	156	156 1/12th 0.5	0.5	34.6	20	270
072D120C 120,000 72,000	120,000	72,000	460/60/3	14.9	14.9 414 506	506	3/4	3.0 3/4	3/4	1.9	10	75	75 1/12th 0.5 17.4	0.5	17.4	25	270

Notes: FLA = Full Load Amps; LRA = Lock Rotor amps; RLA = Rated Load Amps.

Table 6. Electrical Data.

To install the thermostat:

- 1. Position the subbase on an inside wall and mark the mounting holes and thermostat cable openings.
- 2. Cut out the cable opening and route the thermostat cable from the unit's low voltage compartment to the thermostat location. The thermostat cable is supplied by the installer.
- 3. Connect the cable leads to the subbase or thermostat terminals and to the unit's low voltage connector on the unit board as shown in Figure 8. A system wiring diagram is also provided on the inside of the louvered control access panel and in Figure 9a, and 9b of these installation instructions.
- Secure the subbase or thermostat to the wall using screws provided with the thermostat.
- 5. If subbase is used, install the correct thermostat housing to subbase.
- 6. Refer to thermostat instruction sheet for complete detailed mounting information.

To determine the heat anticipator setting, either:

- 1. Add the current draw of the system components or,
- Measure the current flow on the thermostat R-W circuit after the circulating blower motor has started.

SYSTEM CHECK

Pre-Start Check List

- Verify that the unit is level to allow proper condensate drainage.
- Verify that there is free airflow to and from the outdoor coil and that all clearance requirements are met.
- Verify that the ductwork is sealed to prevent air leakage.
- Verify that the line voltage power leads are securely connected and the unit is properly grounded.
- Verify that the low voltage wires are securely connected to the correct leads in the low voltage area of the control box.

- Verify that the gas line service pressure does not exceed 10.0 inches WC (0.36 psig), and is not less than 4.5 inches WC (0.16 psig) for natural gas. For LP gas the line service pressure must not exceed 14 inches WC (0.51 psig) and must not be less than 11.0 inches WC (0.40 psig).
- Verify that the flame roll-out control is closed. If necessary, press the red button to reset the control. DO NOT install a jumper wire across the control to defeat its function. If the control reopens upon startup, DO NOT reset the control without identifying and correcting the fault condition which caused the control to trip.
- Verify that the gas line has been purged and all connections are leak tight.
- Verify that all exterior panels are replaced and securely fastened.
- · Verify that the outdoor fan turns freely.
- Verify that the power supply branch circuit overcurrent protection is sized properly.
- Verify that the thermostat is wired correctly. The thermostat function switch should be set to "Off" and the thermostat fan switch should be set to "Auto."

MARNING:

If the unit is equipped with a crankcase heater, allow 24 hours prior to continuing the start up procedures to allow for heating of the refrigerant compressor crankcase. Failure to comply may result in damage and could cause premature failure of the system. This warning should be followed at initial start up and any time the power has been removed for 12 hours or longer.

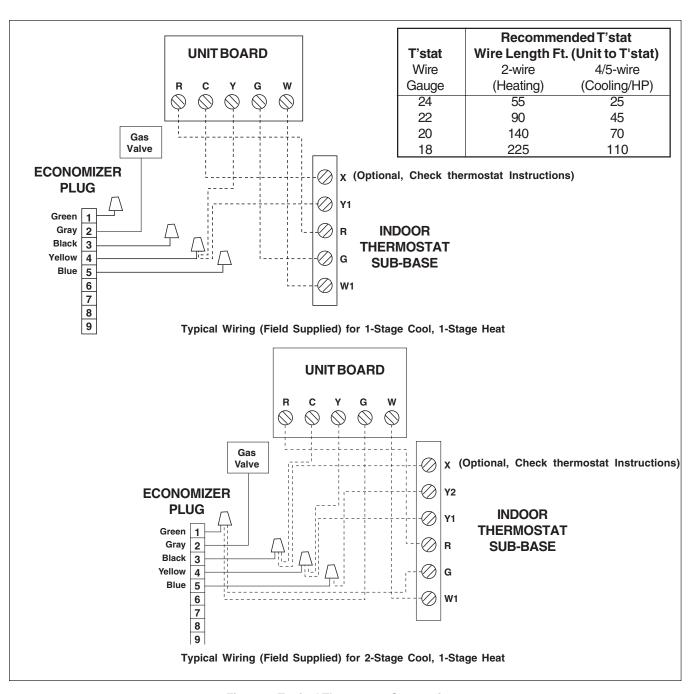


Figure 8. Typical Thermostat Connections.

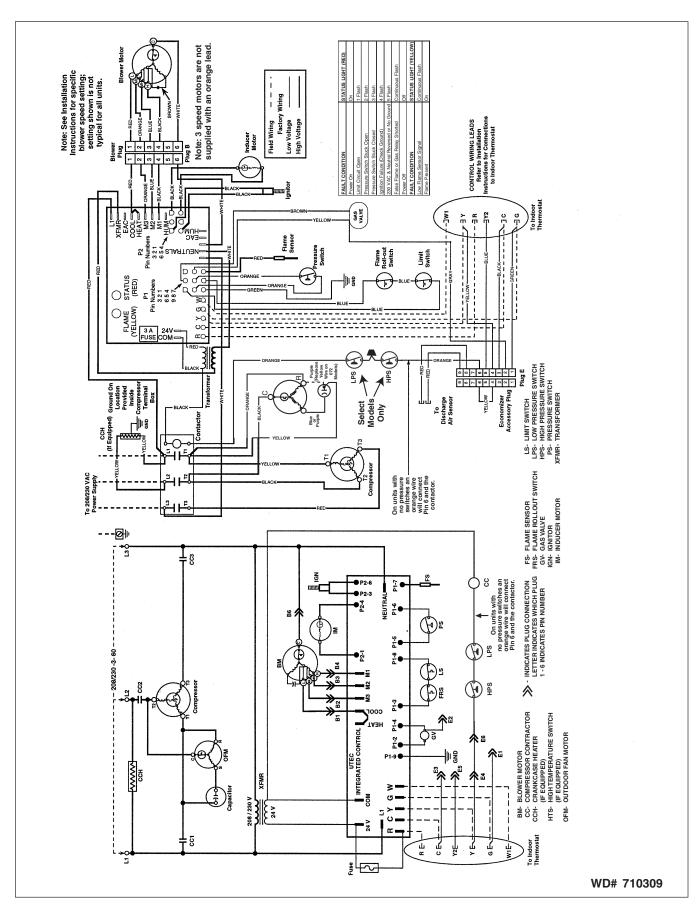


Figure 9a. 208-230 Volt Three-Phase Wiring Diagram.

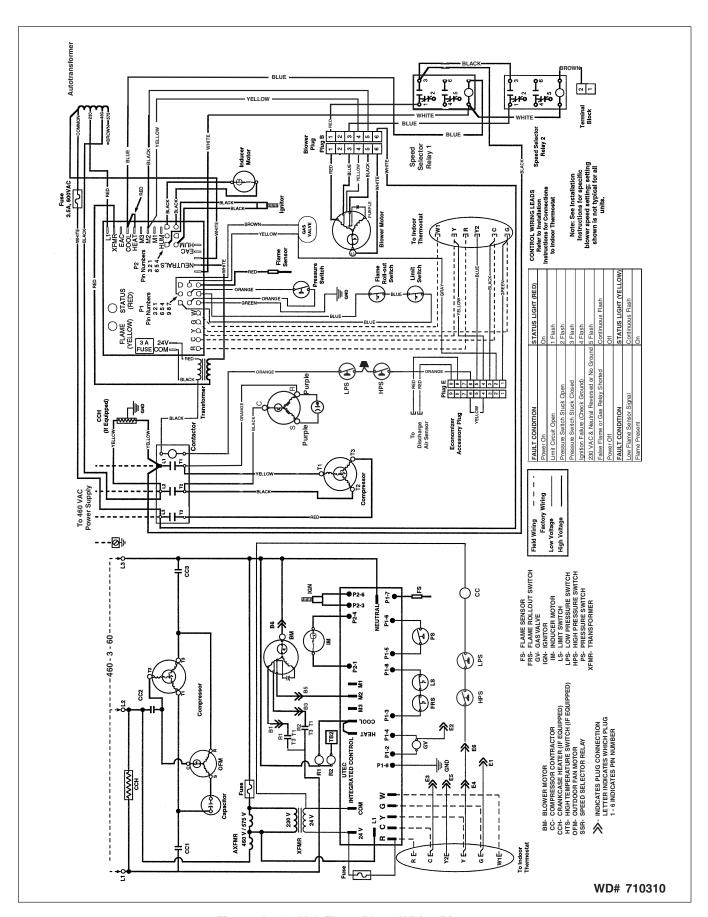


Figure 9b. 460 Volt Three-Phase Wiring Diagram.

START-UP PROCEDURE

Close all electrical disconnects to energize the system.

Air Circulation — Leave the thermostat system switch set to "Off" and set the thermostat fan switch to "On." The blower motor should run continuously. Check for air delivery at the register(s). Ensure that there are no obstructions at the registers or in the ductwork. Set thermostat fan switch to "Auto," the blower will shut down in 60 seconds.

System Cooling

- Set the thermostat system switch to "Cool" and the thermostat fan switch to "Auto." Gradually lower the thermostat temperature switch below room temperature and observe that the blower, compressor and fan energize. Check that air cooler than room temperature is being discharged at the register. Listen for any unusual noises. Locate the source and correct as needed.
- 2. After allowing the unit to run for several minutes, set the temperature selector above room temperature, verify that:
 - The fan and compressor cycle off with the thermostat.
 - b. The blower also stops after the 90 second delay.

System Heating

- 1. Set the thermostat to the lowest setting.
- Follow the procedures given on the operating instruction label, in this installation instructions or attached inside the louvered control access panel.
- 3. Set the thermostat above room temperature and verify the sequence of operation. (See Operating Sequence on page 25.)
- Verify that the compressor and outdoor fan motor are not energized.
- 5. After the unit has run for approximately five minutes, set the thermostat below room temperature and verify the shutdown sequence. (See Operating Sequence on page 25.)

Verifying and Adjusting Firing Rate — The firing rate must be verified for each installation to prevent over-firing of the unit.

A CAUTION:

Do not re-drill the burner orifices. If the orifice size must be changed, use only new orifices.

IMPORTANT NOTE: The firing rate must not exceed the rate shown on the unit data label. At altitudes above 2,000 ft. it must not exceed that on the data label less 4% for each 1,000 ft.

Follow the procedure below to determine the firing rate:

- 1. Shut off all other gas fired appliances.
- 2 Start the unit in heating mode and allow it to run for at least three minutes.
- 3. Measure the time (in seconds) required for the gas meter to complete one revolution.
- 4. Convert the time per revolution to cubic feet of gas per hour using **Table 7**.
- 5. Multiply the gas flow rate in cubic feet per hour by the heating value of the gas in Btu per cubic foot to obtain the firing rate in Btu per hour. Example:
 - a. Time for one revolution of a gas meter with a one cubic foot dial = 40 seconds.
 - b. From **Table 7** read 90 cubic feet per hour of gas.
 - c. Heating value of the gas (obtained from gas supplier) = 1040 Btu per cubic foot.
 - d. Firing rate = $1040 \times 90 = 93,600$ Btuh.
- Adjustments to the firing rate can be made by adjusting the gas manifold pressure. See the High Altitude Application section for additional information of firing rate at elevations above 2000 ft.

The manifold pressure must be set to the appropriate value for your installation. Refer to either **Table 5a** for natural gas or **Table 5b** for LP/propane gas to verify the manifold pressure setting required for your particular installation. To adjust the manifold pressure, remove the regulator cap and turn the adjusting screw clockwise to increase pressure or counterclockwise to reduce pressure. Replace the regulator cap after adjustments are complete.

FORYOUR SAFETY READ BEFORE OPERATING

À LIRE AVANT L'EMPLOI ATTENTION! L'inobservation de ces

POUR VOTRE SÉCURITÉ.

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury, or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in vour building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or move by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

instructions peut entraîner un incendie ou une explosion pouvant causer des dammages à votre propriété à votre personne, ou la mort.

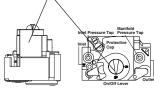
- A. Cet appareil ménager n'a pas de veilleuse. Il est doté d'un système d'allumage automatique. Ne pas essayer d'allumer le brûleur manuellement.
- B. AVANT L'USAGE. Attention à une possible odeur de gaz surtout au niveau du plancher où les gaz les plus lourds ont la tendance de se concentrer.

EN CAS D'ODEUR DE GAZ.

- Ne mettre en marche aucun appareil électrique.
- Ne toucher à aucun commutateur électrique, ne pas employer le
- Quitter le bâtiment immédiatement et avertir la compagnie du gaz en utili sant le téléphone d'un voisin.
- A défaut de la compagnie du gaz, avertir le service des pompiers.
- C. Enfoncer ou faire tourner le robinet à gaz à la main seulement. Ne jamais utiliser d'outils. S'il n'est pas possible de faire tourner ou d'enfoncer le robinet à la main, ne pas essayer de le réparer. Faire appel à un spécialiste. Forcer ou tenter de réparer le robinet pourrait être à l'origine d'une explosion ou d'un incendie.
- D. Il est déconseillé d'utiliser cet appareil en contact prolongé avec l'eau. Faire inspecter ou remplacer toute commande par un technicien qualifié si un des systèmes de contrôle du gaz s'est trouvé sous l'eau.

OPERATING INSTRUCTIONS

- 1. **STOP!** Read the safety information above on this label.
- Set the thermostat to the lowest setting.
- Turn off all electrical power to the appliance.
- The appliance's ignition device automatically lights the burner. Do not try to light burner by hand.
- Remove the control access door/panel (upper door if two-door model).
- Move the gas control knob clockwise (See Figure 11)
- 7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in above information. If you don't smell gas, go to the next step.
- 8. Move the gas control knob counterclockwise (See Figure 11)
- Replace the control access door/panel (ROBINET) (upper door if two-door model).
- 10. Turn on all electrical power to the appliance.
- 11. Turn the thermostat to a desired setting.
- 12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.



MODE D'EMPLOI

- 1. ATTENTION! Lire d'abord la liste des mesures de sécurité ci-
- Mettre le thermostat à la position minimale.
- Couper le courant électrique qui mène à l'appareil.
- Cet appareil ménager étant doté d'un système d'allumage automatique, ne pas essayer d'allumer le brûleur manuellement.
- 5. Retirer le panneau/volet d'accès de commande (panneau supérieur s'il s'agit d'un modèle à deux panneaux).
- 6. Faire tourner le robinet à gaz dans le sens des aiguilles d'une your l'amener sur la position OFF (Arrêt) (Voir Figure 11).
- Attendre cinq (5) minutes pour s'assurer de la dissipation du gaz En cas d'odeur, ARRÊTER LE PROCÉDÉ. Suivre les instructions ci-dessus (Section B). En l'absence de toute odeur de gaz, avancer à l'étape suivante.
- Faire tourner le robinet à gaz dans le sens inverse des aiguilles pour l'amener sur la position ON (Marche) d'une montre (Voir Figure 11).
- 9. Remettre le panneau/volet d'accès de commande en place (panneau supérieur s'il s'agit d'un modèle à deux panneaux).
- 10. Rebrancher l'appareil sur le réseau électrique.
- 11. Ajuster le thermostat à la position désirée.
- 12. Si l'appareil ne fonctionne pas, suivre les "Directives d'arrêt" cidessous et appeler le technicien de service.

TO TURN OFF GAS TO APPLIANCE

- 1. Set the thermostat to the lowest setting.
- 2. Turn off all electrical power to the appliance if service is to be performed.
- 3. Remove the control access door/panel (upper door if twodoor model).
- 4. Move the gas control knob clockwise to "OFF". Do not use force. (See Figure 11)
- 5. Replace the control access door/panel (upper door if twodoor model).

DIRECTIVES D'ARRÊT

- 1. Mettre le thermostat à la position minimale.
- 2. Débrancher l'appareil en prévision de la réparation.
- 3. Retirer le panneau/volet d'accès de commande (panneau supérieur s'il s'agit d'un modèle à deux panneaux).
- 4. Faire tourner le robinet à gaz dans le sens des aiguilles d'une montre pour l'amener sur la position OFF (Arrêt) Ne pas forcer (Voir Figure 11).
- 5. Remettre le panneau/volet d'accès de commande en place (panneau supérieur s'il s'agit d'un modèle à deux panneaux).

Verifying and Adjusting Temperature Rise—Verify that the temperature rise through the unit is within the range specified on the unit data label. Temperature rises outside the specified range could result in premature heat exchanger failure.

Place thermometers in the return and supply air stream as close to the duct connections as possible. The thermometer on the supply air side must be shielded from direct radiation from the heat exchanger to avoid false readings. Adjust all registers and duct dampers to the desired position and run the unit for ten to fifteen minutes before taking any temperature readings. The temperature rise is the difference between the supply and return air temperatures.

For typical duct systems, the temperature rise will fall within the range specified on the data label with the blower speed at the factory recommended setting (see Table 3). If the temperature rise measured is outside the range specified, it may be necessary to change the blower speed. Lower blower speeds will increase the temperature rise and higher blower speeds will decrease the temperature rise.

The unit is equipped with a multi-speed motor. Heating and cooling speed selection is made by moving the leads on the integrated control located in the unit control box. The wiring diagram on the unit and in **Figure 9** show the speed taps for adjusting motor speed. Refer to the Blower Speed Section of this installation instruction for more details.

The integrated control is designed to start the circulating air blower 30 seconds after the gas valve is opened. The integrated control is factory wired to turn the blower motor off 120 seconds after the gas valve is closed.

Verifying Burner Operation — To verify operation of the burners remove the louvered control access panel to ensure there is power to the unit. Set the thermostat to a temperature above room temperature and observe the ignition sequence. The burner flame should carry over immediately between all burners. The flames should be blue, without yellow tips. Flames should extend from each burner without lifting off, curling, or floating. After verifying satisfactory flame characteristics, set the thermostat to a temperature below room temperature and verify that the burner flame extinguishes completely.

MARNING:

Uninsulated live components are exposed when louvered control access panel is removed.

Verify Operation of Over-Temperature Limit Control –

To verify operation of the over-temperature limit control, make sure that the louvered control access panel is in place and that there is power to the unit. Block the return airflow to the unit by installing a close-off plate in place of or upstream of the filter. Set the thermostat to a temperature above room temperature and verify the unit operates with the correct sequence of operation (see page 25). The overtemperature limit control should function to turn off the gas valve within approximately four minutes (the exact time depending on the efficiency of the close-off in blocking the return air to the unit). The circulating air and combustion blowers should continue to run when the over-temperature limit control switch opens. Remove the close-off immediately after the over-temperature limit control opens. If the unit operates for more than four minutes with no return air, set the thermostat to a temperature below room temperature. shut off the power to the unit, and replace the overtemperature limit control.

COMPONENT FUNCTIONS

Flame Sensor — The flame sensor acts to prove that flame has carried over from the ignitor to the right-most burner. If no flame is sensed, the unit will be shut down automatically.

Flame Roll-Out Control — The flame roll-out control acts to verify that the burner flame is being drawn into the heat exchanger tubes. If the burner flame is not being drawn into the heat exchanger tubes, the roll-out control will open within several seconds and the integrated control diagnostic light will flash one time. The circulating air blower and combustion blower will continue to operate if the flame roll-out control opens.

Gas Valve — The gas valve acts to control the flow of gas to the burners. When the gas valve is energized it automatically opens and regulates the gas pressure in the manifold.

Pressure Switch—The pressure switch acts to verify that the inducer motor is drawing the combustion gases through the heat exchanger tubes and venting the gases through the vent system.

Over-Temperature Limit Control — The over-temperature limit control acts to prevent the air temperature leaving the unit from exceeding the maximum outlet air temperature. If the limit opens, the integrated control diagnostic will flash one time. The circulating air blower and combustion blower will continue to operate if the over-temperature limit control opens.

UNIT MAINTENANCE

MARNING:

To avoid risk of electrical shock, personal injury, or death, disconnect all electrical power to the unit before performing any maintenance or service. The unit may have more than one electrical supply.

A CAUTION:

Use care when removing parts from this unit. Personal injury can result from sharp metal edges present in all equipment of sheet metal construction.

Refrigerant Charging—The GR4 packaged gas/electric units are fully charged at the factory. The system refrigerant charge can be checked and adjusted through the service ports provided behind the service panel. Use only gauge

lines which have a "Schrader" depression device present to actuate the valve. Refrigerant charging must be done by qualified personnel familiar with safe and environmentally responsible refrigerant handling procedures.

WARNING:

The GR4 units are shipped fully charged and ready for installation. When a system is installed according to these instructions, no refrigerant charging is required. If repairs make it necessary for evacuation and charging, it should only be done by qualified, trained personnel thoroughly familiar with this equipment. Some local codes require licensed installation/service personnel to service this type of equipment. Under no circumstances should the owner attempt to install and/or service this equipment. Failure to comply with this warning could result in property damage, personal injury, or death.

GAS FLOW RATE (CUBIC FEET PER HOUR)								
TIME FOR ONE REVOLUTION (SECONDS)	CUBIC FEET PER REVOLUTION OF METER			TIME FOR ONE REVOLUTION	CUBIC FEET PER REVOLUTION OF METER			
	1	5	10	(SECONDS)	1	5	10	
10	360	1800	3600	66	55	273	545	
12	300	1500	3000	68	53	265	529	
14	257	1286	2571	70	51	257	514	
16	225	1125	2250	72	50	250	500	
18	200	1000	2000	74	49	243	486	
20	180	900	1800	76	47	237	474	
22	164	818	1636	78	46	231	462	
24	150	750	1500	80	45	225	450	
26	138	692	1385	82	44	220	439	
28	129	643	1286	84	43	214	429	
30	120	600	1200	86	42	209	419	
32	113	563	1125	88	41	205	409	
34	106	529	1059	90	40	200	400	
36	100	500	1000	92	39	196	391	
38	95	474	947	94	38	191	383	
40	90	450	900	96	38	188	375	
42	86	429	857	98	37	184	367	
44	82	409	818	100	36	180	360	
46	78	391	783	102	35	176	353	
48	75	375	750	104	35	173	346	
50	72	360	720	106	34	170	340	
52	69	346	692	108	33	167	333	
54	67	333	667	110	33	164	327	
56	64	321	643	112	32	161	321	
58	62	310	621	114	32	158	316	
60	60	300	600	116	31	155	310	
62	58	290	581	118	31	153	305	
64	56	281	563	120	30	150	300	

Table 7. Gas Flow Rate (Cubic Feet Per Hour).

Routine Maintenance — Proper maintenance is important to achieve optimum performance from the air conditioner. The ability to properly perform maintenance on this equipment requires certain mechanical skills and tools. If you do not possess these skills, contact your dealer for maintenance. Consult your local dealer about the availability of maintenance contracts. At a minimum, routine maintenance should include the following:

Air Filter — Inspect and clean or replace the air filter every three to four weeks.

WARNING:

Never operate the unit without a filter in place. Dust and lint in the return air can build up on internal components, resulting in loss of efficiency, equipment damage, and possible fire risk.

Vent Cover Assembly — Inspect and clean the screen of the vent cover assembly at the beginning of each heating and cooling seasons.

Condensate Drain and Outdoor Coil — Inspect the condensate drain and outdoor coil at the beginning of each cooling season. Remove any debris. Clean the outdoor coil and hail guard louvers (optional) as necessary using a mild detergent and water. Rinse thoroughly with water.

Electrical—Inspect the electrical connections for tightness at the beginning of each heating and cooling season. Service as necessary.

A CAUTION:

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

Motor Lubrication — The motors for the circulating air blower, outdoor fan, and combustion blower are prelubricated at the factory. No further oiling is required for the life of this product.

! WARNING:

Lubrication of the motors in this unit is not required. Do not lubricate any motor in this product.

Blower Compartment — The blower compartment should be cleaned monthly during the heating and cooling seasons to remove any dirt and lint that may have accumulated in the compartment or on the blower and motor. Buildup of dirt and lint on the blower and motor can create excessive loads on the motor resulting in higher than normal operating temperatures and possible shortened service life.

Heat Exchanger and Burner Maintenance — The unit should operate for many years without excessive scale buildup in the heat exchanger, however, the heat exchanger, the vent system, and the burners should be inspected and cleaned (if required) by a qualified serviceman annually to ensure continued safe operation. Particular attention must be given to identify deterioration from corrosion or other sources.

WARNING:

Holes in the heat exchanger can cause products of combustion to enter the home. Replace the heat exchanger if leaks are found. Failure to prevent products of combustion from being circulated into the living space can create potentially hazardous conditions including carbon monoxide poisoning that could result in personal injury or death.

Cleaning of Heat Exchanger — If the heat exchanger must be cleaned due to soot or scale build up, follow the steps below.

- 1. Shut off the gas supply to the unit either at the meter or at the manual valve in the gas supply piping.
- 2. Turn off all power to the unit and set the thermostat to the lowest temperature setting.
- Remove the louvered control access panel from the unit.
- 4. Turn the gas control knob on the gas valve to the "OFF" position.
- Disconnect the wires from the gas valve, ignitor, flame sensor, combustion air motor, flame roll-out control, over-temperature limit switch, and pressure switch.
- 6. Remove the silicone rubber tube from the collector pan to the pressure switch.
- Remove the four nuts that hold the combustion blower to the collector pan and remove the complete combustion blower.

- 8. Remove the screws that hold the collector pan in place, and remove the collector pan from the unit.
- Remove the turbulator from each heat exchanger tube.
- 10. Using wrenches, separate the ground-joint union in the gas supply piping at the unit.
- 11. Remove the piping between the gas valve and the ground-joint union, if necessary.
- Remove the screws that hold the burner assembly in place and remove the burner assembly. BE EXTREMELY CAREFUL NOT TO DAMAGE THE IGNITOR WHILE REMOVING THE BURNER ASSEMBLY.
- 13. The unit heat exchanger tubes can now be cleaned by the use of a round wire brush attached to a length of high grade stainless steel cable, such as drain cleanout cable. Attach variable speed reversible drill to the other end of the spring cable. Slowly rotate the cable with the drill and insert it into the top portion of the heat exchanger. While reversing the drill, work the cable in and out several times to obtain sufficient cleaning. Repeat this sequence for each heat exchanger tube.
- 14. When all heat exchanger tubes have been cleaned, any debris inside the tubes can be removed with the nozzle of a vacuum cleaner.
- 15. With a light, check the condition of the upper and lower sections of the heat exchanger tube.
- 16. Inspect the burners and clean them (if necessary) with a soft wire brush and/or the nozzle of a vacuum cleaner. BE EXTREMELY CAREFUL NOT TO DAMAGE THE IGNITOR WHILE CLEANING THE BURNER.
- 17. Replace all the parts in reverse order from which they were removed.
- 18. Follow the operating instructions found on the right side door and the User's Information Manual to return the unit to operation.

Cleaning of Burners — If the burners must be cleaned, follow the steps below.

- 1. Shut off the gas supply to the unit either at the meter or at a manual valve in the supply piping.
- 2. Turn off all power to the unit and set the thermostat to the lowest temperature setting.

- 3. Remove the louvered control access panel from the unit
- 4. Turn the gas control knob to the "OFF" position.
- Disconnect the wires from the gas valve, ignitor, and flame sensor.
- 6. Using wrenches, separate the ground-joint union in the gas supply piping at the unit.
- 7. Remove the piping between the gas valve and the ground-joint union, if necessary.
- Remove the screws that hold the burner assembly in place and remove the burner assembly. BE EXTREMELY CAREFUL NOT TO DAMAGE THE IGNITOR WHILE REMOVING THE BURNER ASSEMBLY.
- Inspect the burners and clean them (if necessary)
 with a soft wire brush and/or the nozzle of a vacuum
 cleaner. BE EXTREMELY CAREFUL NOT TO
 DAMAGE THE IGNITOR WHILE CLEANING THE
 BURNER.
- Replace all the parts in reverse order from which they were removed.
- 11. Follow the lighting instructions found on the lower unit door to return the unit to operation.

A CAUTION:

Verify proper operation after servicing.

Operating Sequence

The operating sequences for the heating, cooling, and fan modes are described below. Refer to the wiring diagram for the unit (Figure 10).

Cooling Mode:

- On a call for cooling the thermostat closes, applying 24 VAC to the green and yellow leads in the low voltage area.
- 2. The green lead applies 24VAC to the "G" terminal of the integrated control energizing the main circulating blower circuit at the cooling speed.
- The yellow lead applies 24VAC through the normally closed high and low pressure switches and then to the contactor.

- 4. When the thermostat is satisfied the contactor and integrated control are de-energized.
- 5. The circulating blower motor is de-energized after a 90-second delay.

Blower Mode:

- On a call for fan operation, the thermostat applies 24 VAC to the green lead connected to the "G" terminal of the integrated control.
- 2. The circulating blower is energized immediately at the heating speed.
- 3. If a call for heat occurs, the circulating blower deenergizes prior to normal heating cycle.

Heating Mode:

- On a call for heat the thermostat closes, applying 24 VAC to the "W" terminal on the integrated control.
- The integrated control monitors the safety circuit at all times. If either the roll-out control or the overtemperature limit control opens, both the main blower and combustion blower will continue to run until the circuit closes. After the safety circuit closes the main blower and blower will run for a specified post purge time.
- The integrated control checks the pressure switch at the beginning of the heating cycle. If it is closed, the inducer will run 30 seconds, the control will go into lock out, and the diagnostic light will flash three times. If it is open, it will start the inducer motor.
- 4. The inducer motor starts and closes the pressure switch. If the pressure switch does not close in 10 seconds the integrated control will go into lock out and the diagnostic light will flash two times.
- 5. The inducer will prepurge for 30 seconds and the ignitor will start the warm up cycle.
- 6. The flame must be proven through the flame sensor in five seconds to hold the gas valve open. The integrated control will monitor the gas flame with the flame sensor for the entire time the gas valve is open. If for any reason the gas flame drops out the gas valve will immediately close.
- 7. 30 seconds from the gas valve opening the main blower starts and continues to run.
- 8. When the thermostat is satisfied, the "W" terminal on the integrated control is de-energized.
- The gas valve circuit is de-energized and the gas valve closes.
- 10. The inducer motor will continue to run for the post purge period of 25 seconds.

- The main blower will continue to run for the blower off delay of 120 seconds.
- After the "blower off" timer has been satisfied, the integrated control de-energizes the main circulating blower circuit.
- If the unit fails to prove ignition after five attempts, it will go into soft lockout. The unit will re-attempt the start-up procedure every hour until the thermostat is satisfied.

Unit Fails to Operate

If the unit does not operate in the cooling mode, be certain to check the following:

- 1. The thermostat is operating properly.
- 2. Electrical power to the unit is turned on.
- 3. The filters are not dirty.
- 4. The service doors are in place.
- 5. The circuit board fuse is operational.
- 6. The auto transformer fuse is operational.
- 7. The high and low pressure switches are closed.

If the unit does not operate in the heating mode, be certain to check the following:

- 1. The thermostat is operating properly.
- 2. Electrical power to the unit is turned on.
- 3. The filters are not dirty.
- 4. The gas is turned on.
- 5. The manual shut-off valve is open.
- 6. The service doors are in place.
- 7. The flame roll-out control is closed.
- 8. Refer to the diagnostic code table on the wiring diagram or see **Table 8**.
- 9. The circuit board fuse is operational.
- 10. The auto transformer fuse is operational.

FAULT CONDITION	STATUS LIGHT (RED)
Power On Power On	On
Limit Circuit Open	1 Flash
Pressure Switch Stuck Open	2 Flash
Pressure Switch Stuck Closed	3 Flash
Ignition Failure (Check Ground)	4 Flash
460/575 VAC & No Ground	5 Flash
False Flame or Gas Relay Shorted	Continuous Flash
Power Off	Off
FAULT CONDITION	STATUS LIGHT (YELLOW)
Low Flame Sensor Signal Flame Present	Continuous Flash On

Table 8. Diagnostic Codes.

INSTALLATION/PERFORMANCE CHECK LIST

LOCATION	CITY	STATE			
INSTALLER	CITY	STATE			
UNIT MODEL NUMBER	UNIT SERIAL NUMBI	ER			
Minimum Clearances per Table 1?	Is the vent ho	ood installed?			
Electrical Connections tight?	Is there Prope	Is there Proper Draft?			
Supply Voltage: Volts	Is vent hood f	Is vent hood free from restrictions?			
Blower Motor H.P.:	Is the Filter(s)) clean?			
FUEL TYPE:	Has the Therr	mostat been calibrated?			
Natural Gas LP/Propane	Is the Thermo	Is the Thermostat level?			
Gas Piping Connections leak-tested?	Is the Heat Ar	Is the Heat Anticipator Setting correct?			
Gas Line Pressure:					
(in. water column, with unit operating)	Has the Owne	Has the Owner's Information been reviewed with the			
Manifold Pressure:	homeowner?	homeowner?			
(in. water column, with unit operating)					
Is there adequate fresh air supply for combustion	and Has the Litera	Has the Literature Package been left with the			
ventilation?	homeowner?				
Unit Input: (Btu/hr					
Supply Air Temperature: (°F)					
Return Air Temperature: (°F)					
Temperature Rise: (°F)					

INSTALLER: PLEASE LEAVE THESE INSTALLATION **INSTRUCTIONS WITH** THE OWNER.







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