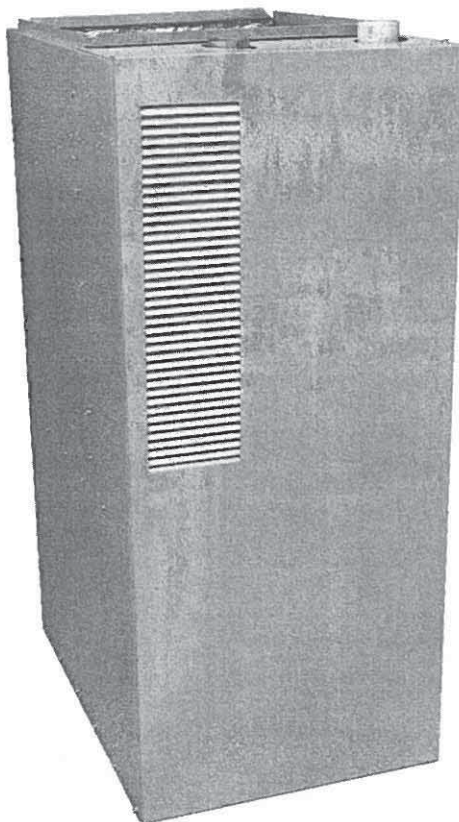



# G5RC Series High Efficiency Upflow Condensing Furnace

## Installation Instructions

Induced Draft Residential Gas Furnace

**NORDYNE**  
Manufacturer of  
**INTERTECH**  
and  
**MILLER**  
products



 <b>WARNING:</b>	<b>For Your Safety</b>	<b>What To Do If You Smell Gas</b>
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.	<ul style="list-style-type: none"><li>• Do not try to light any appliance. Extinguish any open flame.</li><li>• Do not touch any electrical switch; do not use any phone in your building.</li><li>• Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.</li><li>• If you cannot reach your gas supplier, call the fire department.</li></ul>
<b>Do Not Destroy. Please Read Carefully and Keep In A Safe Place For Future Reference.</b>		

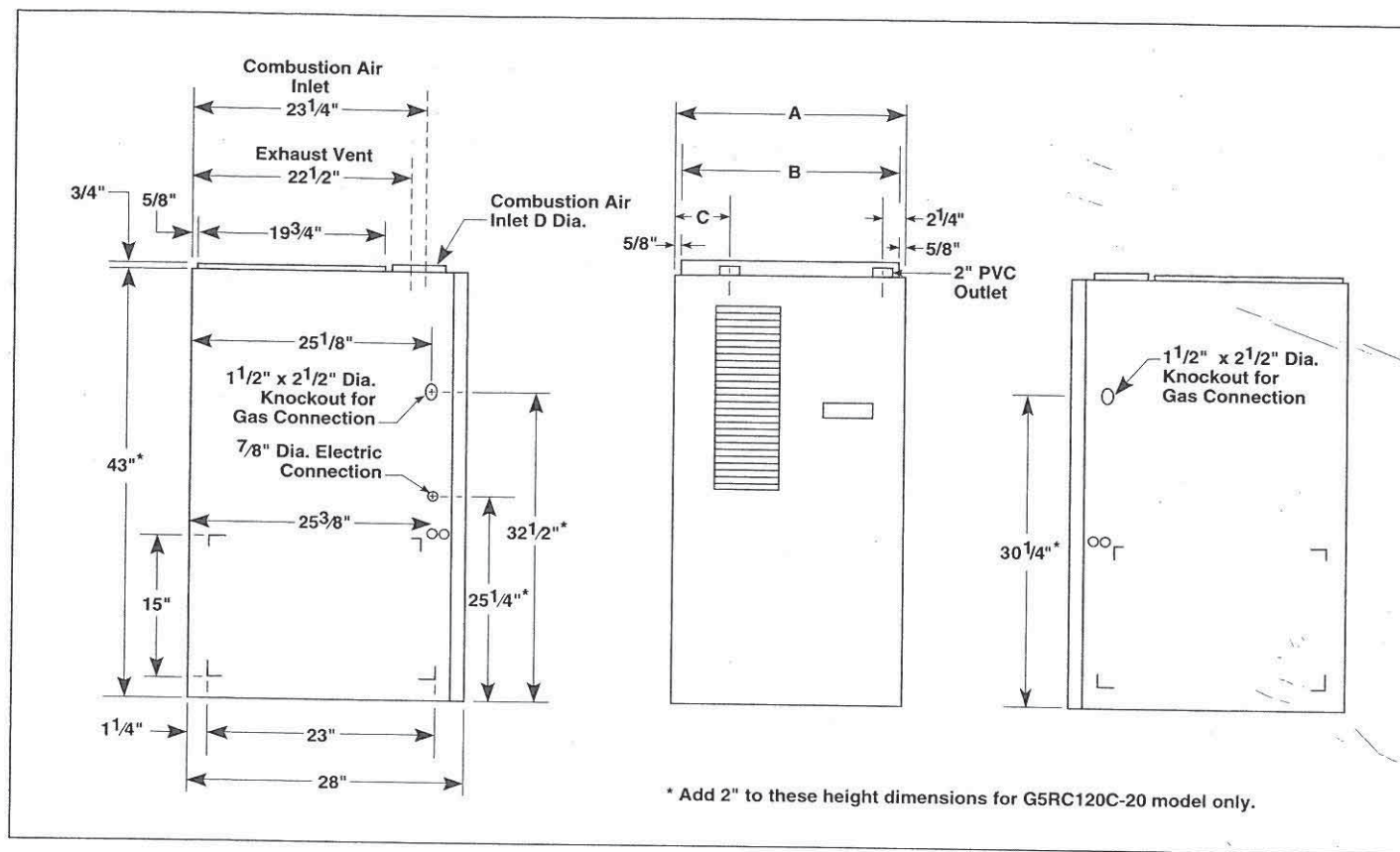
These instructions are primarily intended to assist qualified individuals experienced in the proper installation of this appliance. Some local codes require licensed installation/service personnel for this type of equipment. Read all instructions carefully before starting the installation.

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## Furnace Specifications



Furnace Input (Btu/hr)	Dimensions				Shipping Weight (lbs)
	A (inches)	B (inches)	C (inches)	D (inches)	
40,000	14 <sup>1</sup> / <sub>4</sub>	12 <sup>7</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	116
60,000	14 <sup>1</sup> / <sub>4</sub>	12 <sup>7</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	122
80,000	19 <sup>3</sup> / <sub>4</sub>	18 <sup>3</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	156
100,000	19 <sup>3</sup> / <sub>4</sub>	18 <sup>3</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	170
120,000	22 <sup>1</sup> / <sub>2</sub>	21 <sup>1</sup> / <sub>8</sub>	9 <sup>1</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>2</sub>	195

Table 1. Furnace Dimensions and Shipping Weights

## Capacities

Furnace Model Number	Furnace Input (Btu/hr)	Motor Hp	Motor Speed	External Static Pressure (Inches Water Column)															
				0.8		0.7		0.6		0.5		0.4		0.3		0.2		0.1	
				CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise
G5RC040C-12	40,000	1/3	High *	912	—	1031	—	1091	—	1162	—	1235	—	1299	—	1347	—	1405	—
			Medium	841	—	925	—	1010	—	1078	—	1132	—	1180	—	1238	—	1275	—
			Low **	635	61	704	58	763	55	814	52	855	51	884	50	898	48	925	47
G5RC060C-12	60,000	1/3	High *	934	—	1021	—	1096	—	1156	—	1232	—	1291	—	1338	—	1392	—
			Medium	852	64	928	58	1010	54	1076	51	1137	50	1186	49	1228	48	1269	47
			Low**	621	86	700	78	751	73	787	70	828	68	868	66	889	65	910	64
G5RC080C-16	80,000	1/2	High *	1205	61	1315	56	1400	53	1480	48	1545	46	1610	44	1675	41	1735	37
			Med-High	1105	65	1200	60	1275	57	1340	54	1400	51	1455	49	1500	46	1552	42
			Med-Low**	980	69	1070	63	1145	60	1205	56	1255	54	1305	51	1348	48	1380	46
			Low	860	75	948	68	1005	64	1055	61	1100	58	1145	56	1170	54	1180	52
G5RC100C-16	100,000	1/2	High *	1160	69	1263	62	1395	60	1415	56	1480	53	1555	52	1615	49	1680	—
			Med-High**	1060	75	1165	69	1240	65	1310	60	1375	58	1438	54	1490	53	1550	—
			Med-Low	960	84	1050	77	1135	71	1195	68	1258	64	1305	62	1350	61	1400	53
			Low	860	—	938	—	1000	80	1010	75	1120	72	1155	68	1200	67	1225	66
G5RC120C-16	120,000	1/2	High* **	1195	85	1310	78	1400	71	1478	67	1550	65	1625	63	1685	60	1745	57
			Med-High	1078	—	1180	82	1255	80	1340	76	1400	74	1455	70	1500	67	1548	65
			Med-Low	958	—	1050	—	1125	—	1205	80	1255	79	1285	75	1310	73	1350	71
			Low	850	—	935	—	1010	—	1052	—	1105	—	1140	—	1160	—	1180	83
G5RC120C-20	120,000	3/4	High*	1761	64	1829	61	1907	60	1994	59	2066	57	2123	57	2180	54	2235	—
			Med-High	1655	68	1724	65	1778	64	1844	63	1882	61	1919	60	1955	60	1991	—
			Med-Low**	1456	73	1502	71	1547	70	1598	67	1622	65	1654	64	1685	64	1701	64
			Low	1311	81	1362	80	1408	80	1436	79	1459	70	1475	78	1486	78	1498	70

\* Factory wired cooling speed tap.  
- Data is for operation with filter(s).

\*\* Factory wired heating tap.  
- Airflow rates of 1800 cfm or more require two return air connections. See section on "Circulation Air Supply."

Table 2. Furnace Airflow Data



## Installation Requirements

### Requirements and Codes

This furnace must be installed in accordance with these instructions, all applicable local building codes, and with the current revision of the National Fuel Gas Code (ANSI-Z223.1). The current revision of the National Fuel Gas Code is available from:

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

For Canada, installations shall comply with CAN/CGA-B149 installation codes, local plumbing or waste water codes and other applicable codes.

Additional helpful publications are:

- NFPA-90A - Installation of Air Conditioning and Ventilating Systems.
- NFPA-90B - Warm Air Heating and Air Conditioning Systems.

These publications are available from:

National Fire Protection Association, Inc.  
Batterymarch Park  
Quincy, Maine 02269

### Location

This furnace is designed and certified for installation in buildings constructed on-site. The furnace must be installed on a level surface, located as close to the vent (or chimney) and as close to the center of the air distribution system as possible. See the furnace specifications (Section 1) for overall dimensions to determine the required clearances in hallways, doorways, stairs, etc. to allow the furnace to be moved to the installation point. The furnace must be installed so that all electrical components are protected from water.

### Clearances To Combustible Materials

This furnace is Design Certified by AGA/CGA Laboratories for the clearances to combustible materials listed in Table 3. See the furnace name plate for specific model number and clearance information.

Furnace Input (Btu/hr)	Cabinet Width (Inches)	Minimum Clearances (Inches)				
		Side	Vent	Back	Top	Front
40,000	14 1/4	0"	0"	0"	1"	6"
60,000	14 1/4	0"	0"	0"	1"	6"
80,000	19 3/4	0"	0"	0"	1"	6"
100,000	19 3/4	0"	0"	0"	1"	6"
120,000	22 1/2	0"	0"	0"	1"	6"

Table 3. Minimum Clearances to Combustible Materials

### WARNING:

**This furnace is not approved for installation in manufactured structures. Do not install this furnace in a mobile home. Installation in a mobile home could cause fire, property damage, and/or personal injury.**

A clearance of at least 36 inches from the front of the furnace is recommended to allow for servicing and maintenance. Provide at least 6 inches clearance on one side for external condensate trap location. **Where accessibility clearances are greater than the minimum clearances to combustible materials, accessibility clearances must take precedence.**

This furnace is certified for use on a combustible floor. The furnace must be installed on a solid surface and **must be level** front to back and side to side.

### CAUTION:

**This furnace must not be installed directly on carpeting, tile, or any combustible material other than wood flooring.**



## **WARNING:**

The solid base of the furnace must be in place when the furnace is installed with side return air ducts. Removal of all or part of the base could cause products of combustion to be circulated into the living space and create potentially hazardous conditions, including carbon monoxide poisoning that could result in personal injury or death.

A gas-fired furnace installed in a residential garage must be installed so the burners and the ignitor are located not less than 18 inches (457 mm) above the floor, and the furnace must be located or protected to avoid physical damage by vehicles.

## **WARNING:**

Do not place combustible materials, including gasoline and any other flammable vapors and liquids, in the vicinity of the furnace.

## **Combustion Air Supply**

### **General**

Provisions must be made in the installation of this furnace 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) or in applicable local building codes. Consult local codes for special requirements.

Warm air registers and return air grilles must not be restricted. This furnace is a direct vent unit and requires outside combustion air for adequate combustion.

To maximize heat exchanger life, the combustion air must be free of chemicals which form corrosive acidic compounds in the combustion gases. Some examples of these chemicals are chlorine, fluorine, and sulphur. Some common sources of these chemicals are detergents, bleaches, aerosol sprays, cleaning solvents, and a wide variety of commercial and household products. Do not locate supply air outside vent opening in a location where these chemicals are used.

## **CAUTION:**

Combustion air must not be drawn from a corrosive atmosphere.

## **Venting/Condensate Drain**

### **General Information**

Combustion air must be taken from outdoors. This furnace must be vented to the outdoors. Do not common vent this unit with another appliance.

Proper venting is essential to obtain maximum efficiency from a condensing furnace. Proper installation of the vent system is necessary to assure drainage of the condensate and prevent deterioration of the vent system.

American Gas Association has certified the design of condensing furnaces for a minimum of 0" clearance from combustible materials with a single wall plastic vent pipe.

Arrangement of vent fittings must conform to National Fuel Gas Code ANSI: Z223.1 – "latest edition" (American Standard). The recommended system is assembled from schedule 40 PVC pipe and fittings, or schedule 40 ABS pipe and fittings.

The G5RC series of central furnaces has been classified as CATEGORY IV furnaces in accordance with ANSI Z21.47 (1993) Direct Vent Central Furnace. Category IV furnaces operate with a positive vent pressure and with a moist vent gas. These conditions require special venting systems, which must be gas-tight and watertight.

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



The following steps shall be followed with each appliance connected to the venting system placed in operation, while and other appliances remaining connected to the venting system are not in operation.

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

**NOTE: If this furnace is to be located in a garage it must be protected to avoid physical damage by vehicles.**

Procéder comme suit pour chaque appareil raccordé à la tuyauterie d'évacuation et en état normal de fonctionnement; tous les autres appareils raccordés à la même tuyauterie d'évacuation doivent être mis hors service :

1. Sceller toute ouverture non utilisée de la tuyauterie d'évacuation;
2. S'assurer que la tuyauterie d'évacuation présente des dimensions et une pente horizontale conformes à la norme ANSI Z223.1, intitulée National Fuel Gas Code ou aux codes d'installation CAN/CGA-B149, ainsi qu'aux présentes instructions. S'assurer que la tuyauterie n'est pas bloquée, restreinte, corrodée, qu'elle ne fuit pas et qu'elle ne présente aucun autre défaut potentiellement dangereux;
3. Dans la mesure du possible, fermer toutes les portes et fenêtres du bâtiment, et toutes les portes entre la pièce où se trouve l'appareil raccordé à la tuyauterie d'évacuation et les autres pièces du bâtiment. Mettre en service les sècheuses et tout autre appareil qui n'est pas raccordé à la tuyauterie d'évacuation. Faire fonctionner à régime maximal tout ventilateur d'évacuation, tel que les hottes de cuisinière et les ventilateurs de salles de bains. Ne pas mettre en service les ventilateurs d'été. Fermer les registres des foyers;
4. Respecter les instructions d'allumage. Mettre en service l'appareil à l'essai. Régler le thermostat de manière à ce que l'appareil fonctionne sans interruption;
5. S'assurer qu'un appareil muni d'un coupe-tirage ne présente aucune fuite à l'ouverture du coupe-tirage après que le brûleur principal ait fonctionné pendant cinq minutes. Employer la flamme d'une allumette ou d'une chandelle;
6. Après avoir déterminé que tous les appareils raccordés à la tuyauterie d'évacuation évacuent correctement tel que prescrit ci-dessus, rouvrir les portes et les fenêtres et remettre les ventilateurs d'évacuation, les registres de foyers et tout autre appareil fonctionnant au gaz à leur état de fonctionnement initial.
7. Si un appareil n'évacue pas correctement à la suite de l'un des essais ci-dessus, corriger la tuyauterie d'évacuation.



## Location of Combustible Air Inlet and Vent

Outside air inlet may be installed through any convenient wall. Refer to view on Figure 2.

It is required that both the combustion air inlet and exhaust vent be routed to the same side of the building vertically or horizontally to minimize outdoor wind pressure conditions. See Figure 2. The vent outlet shall be installed so as to be in the same atmospheric pressure zone as the combustion air intake.

Maintain 18" minimum distance separation of inlet and outlet openings on both vertical and horizontal venting.

## Horizontal and Vertical Venting

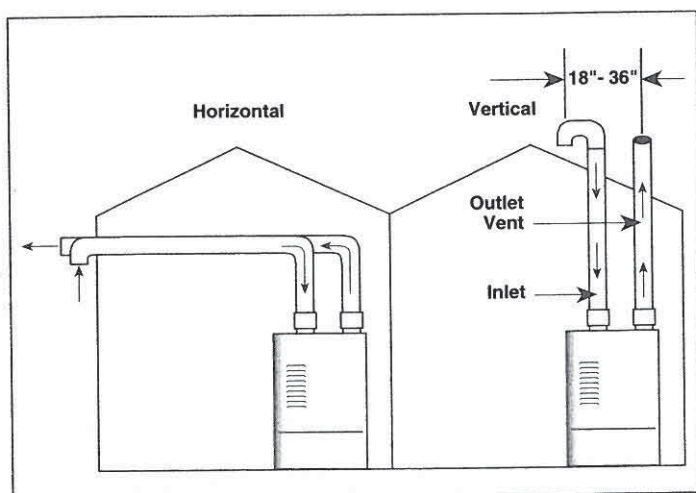


Figure 2. Horizontal and Vertical Venting

1. **NOTE:** When the vent pipe is exposed to temperatures below freezing, i.e., when it passes through unheated spaces, chimneys, etc., the pipe must be insulated with  $\frac{1}{2}$  inch thick sponge rubber insulation, Armaflex-type insulation or equal. Insulating pipe is important to avoid condensate icing during below freezing temperatures. For extremely cold climates or for conditions of short furnace cycles (i.e.: set back thermostat conditions) it is recommended that the last 3 feet of exhaust vent going outdoors be sized down one incremental diameter. (Example: 3" to 2 $\frac{1}{2}$ ", 2 $\frac{1}{2}$ " to 2" or 2" to 1 $\frac{1}{2}$ ".) This will help provide additional warming of the exhaust termination to avoid condensate icing.
2. For outlet exhaust venting maintain a  $\frac{1}{4}$  inch per foot slope to drain any condensate in flue pipe back to furnace. Maintain 12" minimum outlet height above snow level and a 12" clearance from any opening

where flue gas can enter the building, see Figure 5. Do not point terminals into window wells, stairwells, under decks, alcoves or other recessed areas. Also maintain a 3 ft. clearance from plumbing vent stacks and 7 ft. clearance above public walkways. For horizontal vented furnace maintain a minimum clearance of 4 ft. from electric meters, gas meters, regulators and relief equipment.

3. Combustion air and exhaust vent pipe and fittings must conform to ANSI and ASTM standards D1785 for Sch.40 PVC, D2665 for PVC-DWV, D2241 for SDR-21 and SDR-26 PVC, D2661 for ABS-DWV and F628 for Sch.40 ABS. Pipe cement and primer must conform to ASTM STD.D2564 for PVC or D2235 for ABS.

Note: SDR pipe is not approved for use in Canada.

Use only approved PVC solvent cement or ABS solvent cement for ABS pipe and seal all joints to avoid moisture/flue gas leakage. Under some conditions flue condensate may be acidic and corrosive, therefore avoid areas where staining or condensate drippage may be a problem. Also provide adequate pipe mechanical supports as shown on Figure 3 and Figure 6 to avoid damaging internal combustion blower.

Note: When joining ABS to PVC materials, use PVC solvent cement. (For reference, see procedure specified in ASTM D3138.)

4. To avoid nuisance pressure switch cycling follow the vent table specifications addressing the length, diameter of pipe and number of fittings. See Table 5. All model furnaces have 2" PVC at the outlet. All model furnaces have a combustion air inlet collar designed for a 3" dia. coupling or reducer coupling. Use the same diameter pipe size for the inlet and exhaust pipe run.

	2" PVC	3" PVC
Horizontal Exterior Vent Mounting Kit	9023730	9023750
Neutralizer Kit – All Models	9023770	

Table 4. Accessory Kit Table

The vent outlet shall be installed so as to be in the same atmospheric pressure zone as the combustion air intake.

For Canadian installations please refer to the Canadian Installation Code CAN/CGA-B149.1 or .2 and/or local codes.



## Horizontal Venting Through Wall

### ⚠ CAUTION:

For optimum performance vent furnace through wall with least exposure to winter winds.

Vent pipe must be secured through building wall. For exiting through wood or frame construction, drill hole for a snug fit to pipe. Be sure to use a coupling on each side of wall to provide a secure stop to prevent horizontal movement. For exiting through masonry wall, a horizontal vent mounting kit must be used which consists of 2 face plates and insulation gasket to seal off/secure pipe exit location. Again, the pipe must be secured with a coupling on each side of the faceplate to prevent horizontal movement. See Figure 4 showing mounting kit on wall. See Table 4 on page 9 for accessory kits and part numbers.

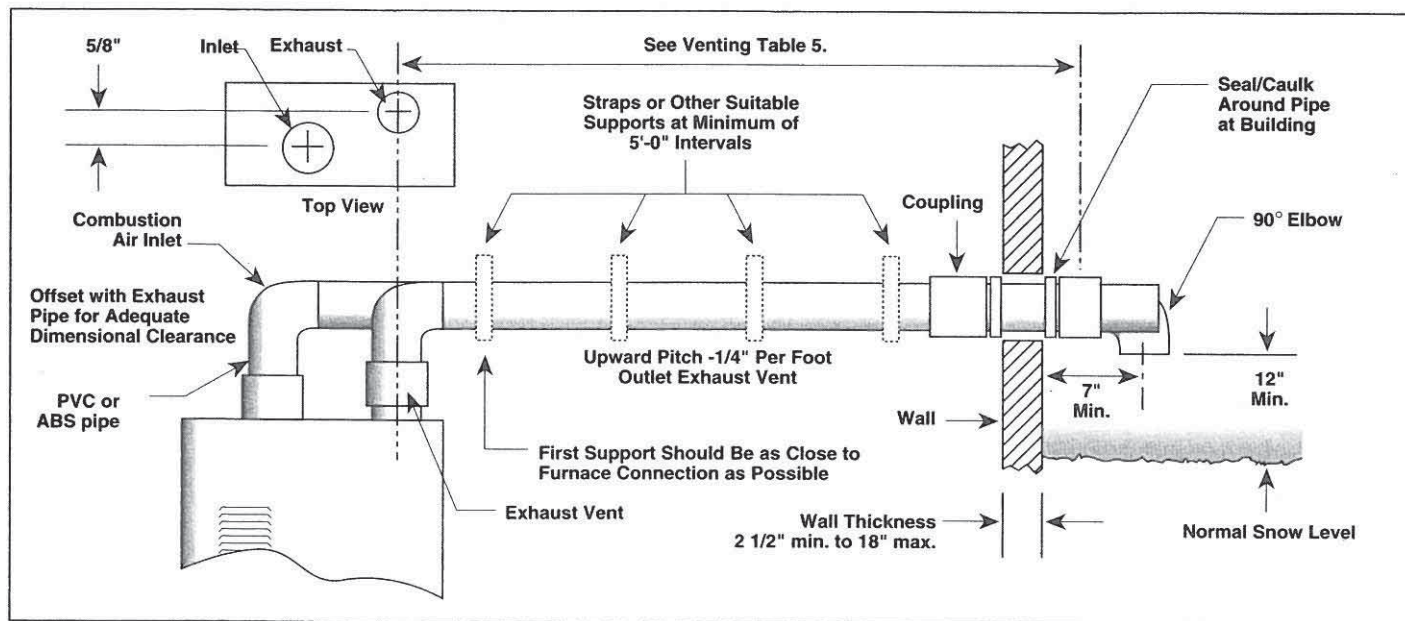
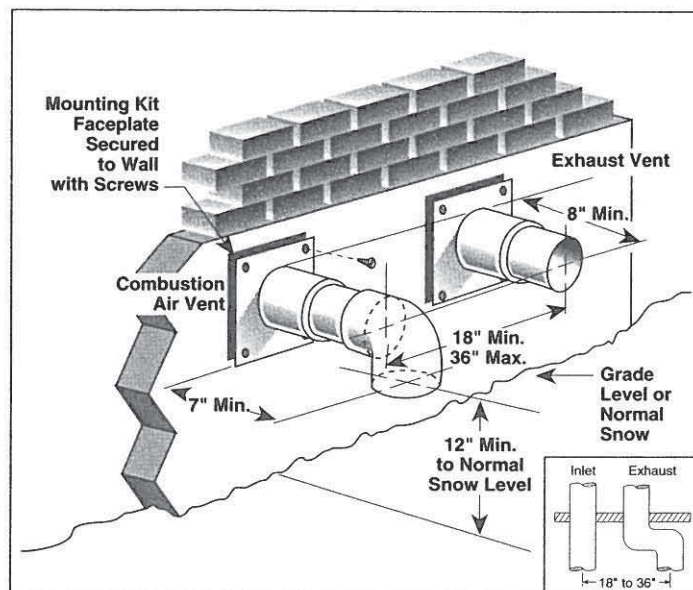


Figure 3. Horizontal Venting Through Wall



Note: Pipes may be closer together for run through building but openings must be offset outside structure to maintain 18" to 36" spacing.

Figure 4. Exhaust and Combustion Air Vent Clearances

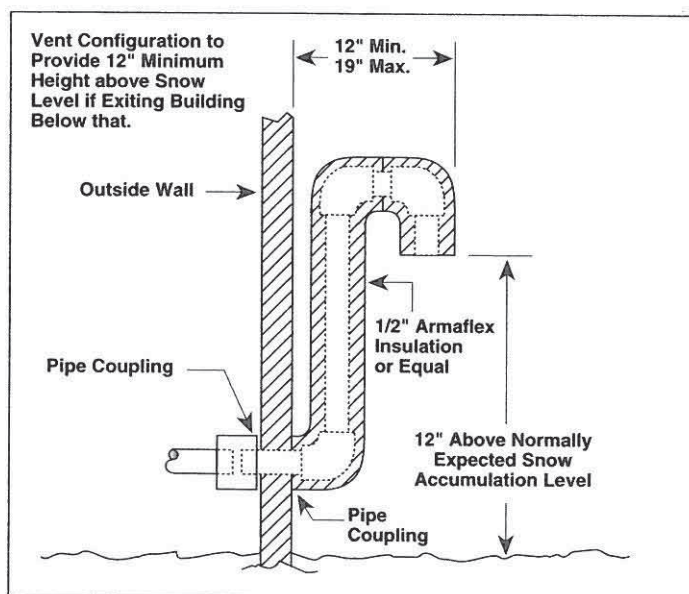


Figure 5

Maximum Allowable Pipe Length (ft) for Each Length - Combustion Inlet Air or Exhaust Vent Pipe							
Furnace Model	PVC or ABS SCH. 40 Pipe Size (Inches)	Total 90° Long Radius Elbows (Excluding Termination Elbows)					
		0	1	2	3	4	5
G5RC040C-12	1 1/2"	25	20	15	10	5	—
	2"	75	75	75	70	65	60
	2 1/2"	75	75	75	75	75	75
G5RC060C-12	1 1/2"	20	15	10	5	—	—
	2"	65	60	55	50	45	40
	2 1/2"	75	75	75	75	75	75
G5RC080C-16	2"	45	40	35	30	25	20
	2 1/2"	70	65	60	55	50	45
	3"	75	75	75	75	75	75
G5RC100C-16	2"	20	15	10	5	—	—
	2 1/2"	35	30	25	20	15	10
	3"	75	75	75	75	75	75
G5RC120C-16 G5RC120C-20	2 1/2"	20	15	10	5	—	—
	3"	75	75	75	75	75	75

**NOTE:** 1. Use the same pipe size for inlet and exhaust. Use appropriate reducer couplings as necessary to join vent pipe to furnace inlet and exhaust. Blank areas indicate that pipe size is not allowable. Use next larger size.  
2. This table applies to installations at elevations from sea level to 2000 feet. For higher elevations, decrease maximum length by 8% per 1000 feet above sea level.  
3. Assume two, 45° elbows are equivalent to one 90° elbow.

Table 5. Vent Table.

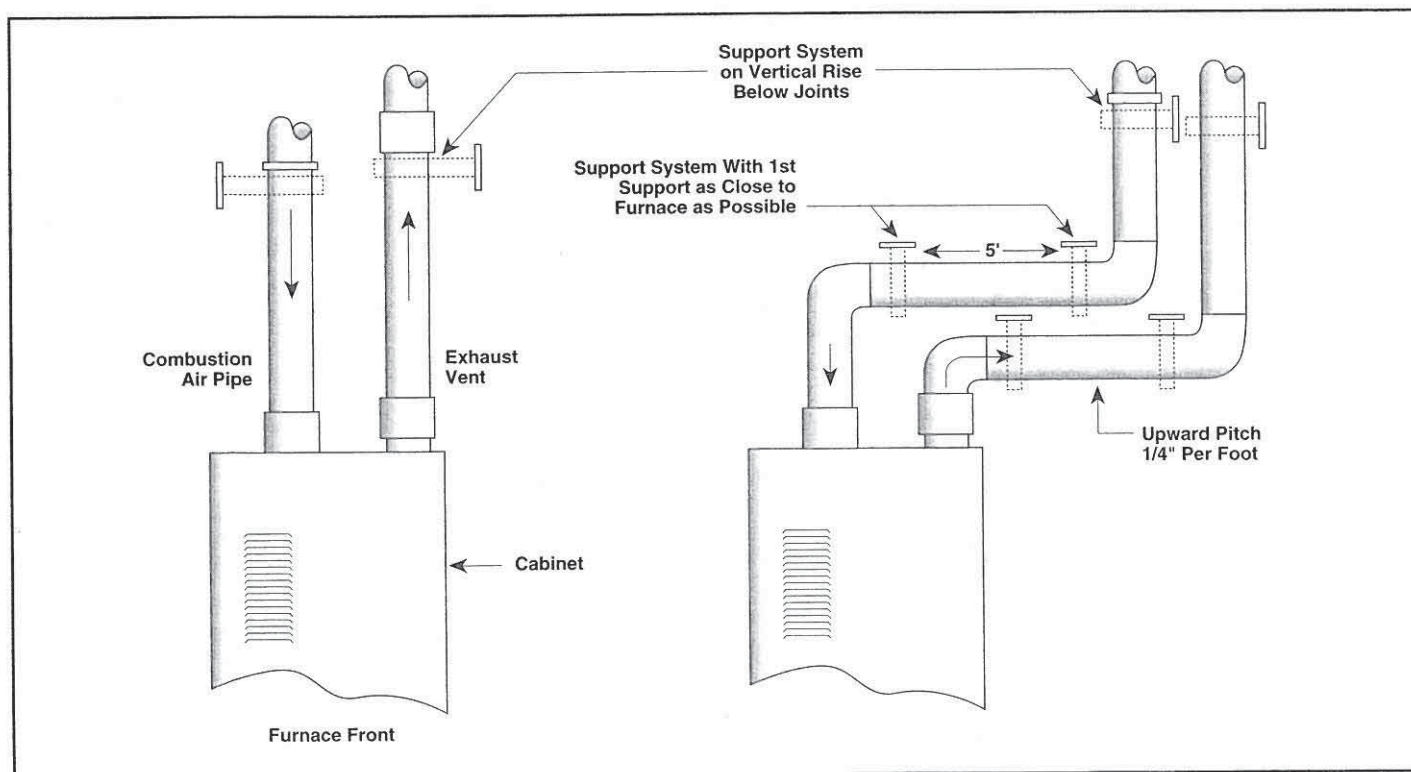


Figure 6. Vertical Venting



## Vertical Vent Termination

- Figure 7 shows the proper installation and clearances for vertical vent termination. The vertical roof termination should be sealed with a plumbing roof boot or equivalent flashing. The inlet of the intake pipe and end of the exhaust vent must be terminated no less than 12" above the roof or snow accumulation level, and 12" away from a vertical wall or other protrusion.
- In no case should the air intake or exhaust vent extend more than 24" above the roof penetration. The vent system can be installed in an existing chimney which is not in use for other combustion equipment provided that:
  - Both the exhaust vent and air intake run the length of the chimney.
  - The top of the chimney is sealed and weather-proofed.
  - The termination clearances shown in Figure 7 are maintained.
  - No other gas fired appliance is vented into the chimney.

NOTE: Pipes may be closer together for run through building, but openings must be offset outside structure to maintain 18-36" spacing.

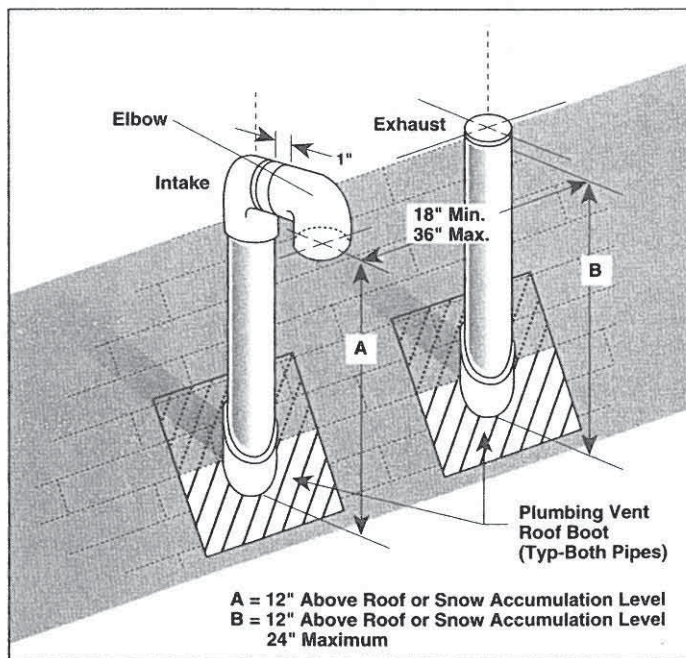


Figure 7. Vertical Vent Termination

## Exhaust and Combustion Air Vent Installation

- Pre-assemble the exhaust and combustion air piping from the furnace to the vent termination. DO NOT cement any joints together until the preassembly process is complete.

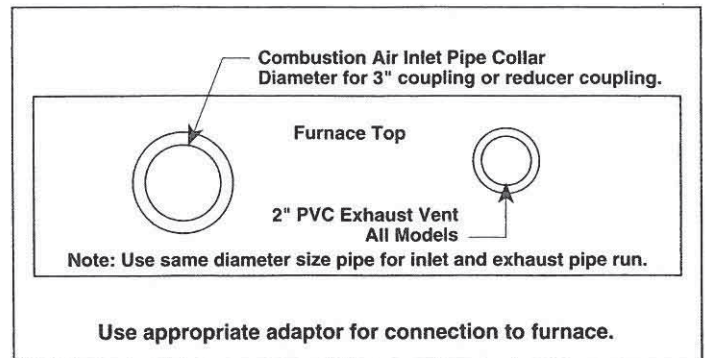


Figure 8. Furnace Top

Be sure to match the pipe up to the furnace collars as shown above. A coupling, elbow or reducer coupling can be used for attachment. Secure these connections and seal with RTV-Silicone sealant or equivalent.

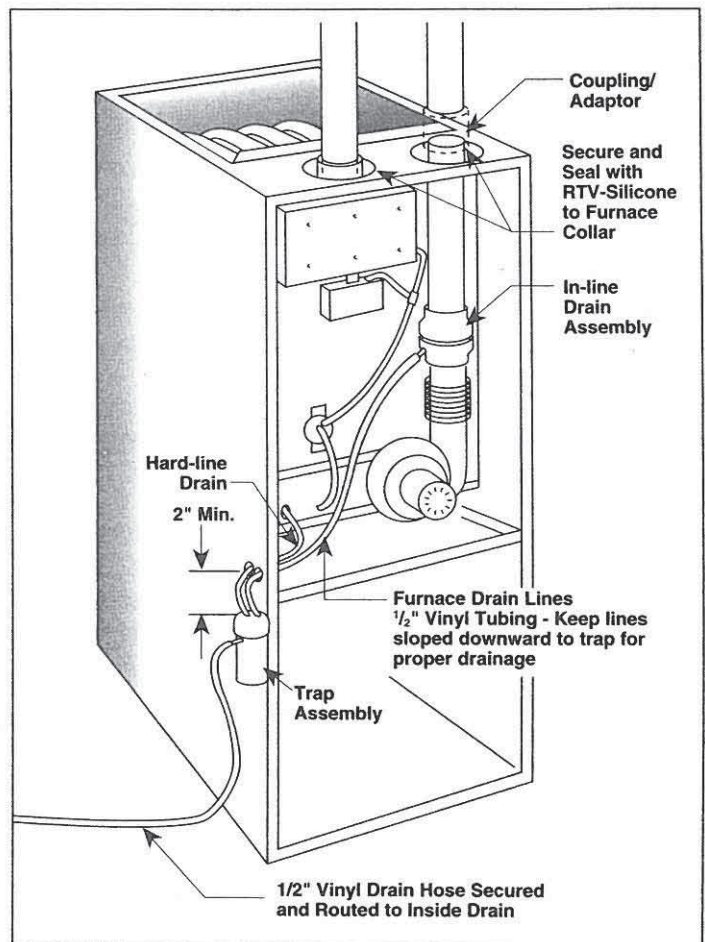


Figure 9

## Condensate Drain From Furnace

The condensate drain trap assembly supplied with the furnace must be installed prior to operation. It can be located on either side of the furnace but must be located below the two 7/8" diameter knockouts on the side of the furnace cabinet. (See Figure 9).



Remove the appropriate side knockout and route the in-line drain assembly hose and front header box drain tube to obtain the required length and location of drain line through the removed  $\frac{7}{8}$ " diameter knockout openings. Remove from the parts package measure and cut to length the hard line drain tube. See Figure 11 and Table 6 for correct size for each model. Connect the hard line drain to the front header drain using a coupling and hose clamp. Connect the 90° formed tube to the other end just inside the furnace and route the other end through the  $\frac{7}{8}$ " diameter knockout hole and into the trap. See Figure 11 and Table 6 for hard-line drain installation.

The 90° formed hard-line drain tube will have to be cut to length for the appropriate side and model of furnace that the trap is used. See the following figure and length table for correct size. The tube can be cut using a pipe cutter or saw. Be sure to remove any burrs from both the I.D. and O.D. The hard tube fits snugly in the  $\frac{1}{2}$ " I.D. vinyl tubing and no clamp is necessary. Moisten the PVC vinyl to simplify the connection to the hard tube.

## Sequence of Assembly

1. Use the small hose clamp to connect the 1  $\frac{5}{8}$ " length vinyl coupling to the header box drain in the lower left corner.
2. Connect the "cut to length" hard line drain into the other end of the coupling.
3. Connect the short 3" leg of the 90° formed  $\frac{1}{2}$ " vinyl tube to the other end of the hard line drain.
4. Route the longer 10" leg of the formed vinyl tube through the oval (or  $\frac{7}{8}$ " diameter knockout hole) and into the trap assembly. Be sure this hose is at the bottom of the oval below the in-line drain hose as shown in the figure on back side. Route the in-line drain hose through the oval or  $\frac{7}{8}$ " diameter knockout as shown in the figure and cut to length to fit inside trap to within 1" from bottom. **All drain lines must slope downward into the trap.**

Mount the trap assembly (2" PVC) by attaching one side of the "U" shaped mounting bracket to the cabinet side using a No. 10 sheet metal screw as shown in Figure 10. Insert the trap assembly locating the bracket just under the outlet nipple and then secure the remaining side of the bracket with the other screws. The 2-holed cap can then be rotated for the best alignment of the drain lines into it. Align the drain lines into it. Align the drain tubing alongside trap and with a knife cut the line so as to provide an open drain for the front header and in-line drain blower into the trap. Fill trap with water just below drain nipple and then insert each tube through the cap hole into the trap. **Pull and secure drain lines to maintain downward slope into trap.**

The hose (tube) draining from the front header panel will drain most of the water from the furnace during operation. The hose from the in-line drain assembly will sometimes drain water during operation. The moisture that accumulates here is additional condensation coming from the flue gas which condenses in the fan or in the vent pipe.

Be sure to fill outside trap assembly with water prior to operating furnace to avoid nuisance pressure switch cycling. If condensate does not drain properly from trap, the pressure switch sensor tap located in the front header box will block and open the pressure switch shutting off the furnace for approximately 45 seconds to allow the front header and trap to drain. If there is a call for heat by the thermostat, the ignition sequence will begin again and the furnace will resume operation.

**NOTE: Industry research studies indicate that when condensate is routed to an active drain, household detergents, etc., buffer its acidity. If the drain is not actively used or if codes require, obtain a neutralizer kit (usually contains limestone). NORDYNE P/N 902377. Proper drains and connections to trap are required as NORDYNE cannot be held responsible for water leakage which occurs due to loose hose connections or improperly sealed drain line pipes.**

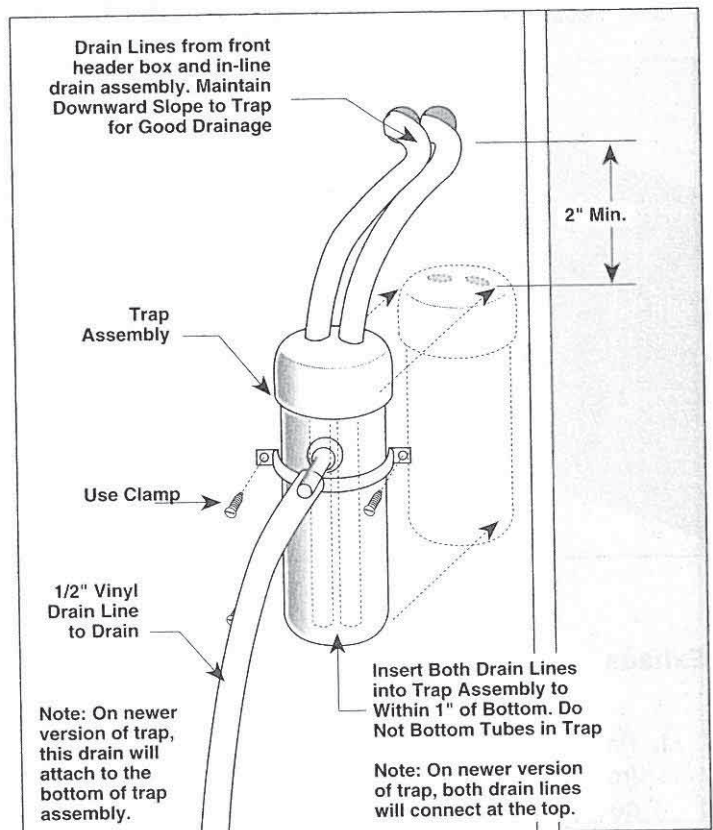


Figure 10. Furnace Cabinet Side View



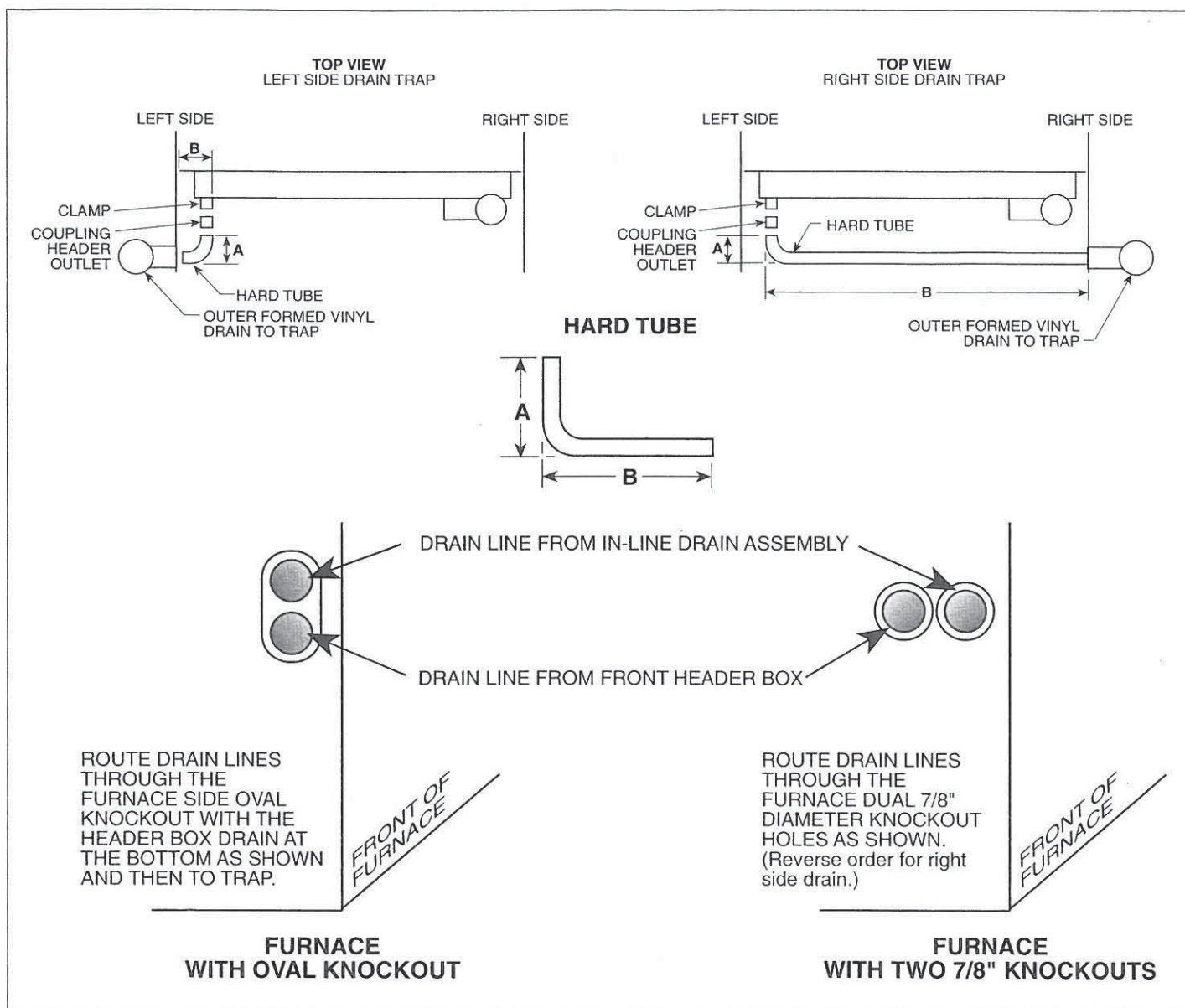


Figure 11. Installation of Hard Line Drain to Furnace.

	HEADER OUTLET DRAIN			
	LEFT SIDE		RIGHT SIDE	
	" A "	" B "	" A "	" B "
<b>Small Cabinet -040 and -060 Models</b>				
Hard Tube Length	5"	1 1/2"	5"	12 1/2"
<b>Mid-Size Cabinet -080 and -100 Models</b>				
Hard Tube Length	5"	1 1/2"	5"	18"
<b>Large Size Cabinet -120 Model</b>				
Hard Tube Length	5"	1 1/2"	5"	20 1/2"

Table 6. Installation of Hard Line Drain to Furnace.



## Circulating Air Supply

### General

Plenums and air ducts must be installed in accordance with the Standard for the Installation of Air Conditioning and Ventilating Systems (NFPA No. 90A) or the Standard for the Installation of Warm Air Heating and Air Conditioning Systems (NFPA No. 90B).

For Canadian installations, provide an accessible, removable access panel in the plenum outlet duct of a minimum size of 10" wide by 8" high to allow for heat exchanger inspection. The panel cover shall be attached in such a manner as to prevent leaks.

If outside air is utilized as return air to the furnace for ventilation or to improve indoor air quality, the system must be designed so that the return air to the furnace 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 furnace is equal to the return air supply under normal, indoor return air applications.

When a cooling system is installed which uses the furnace blower to provide airflow over the indoor coil, the coil must be installed downstream (on the outlet side) of the furnace or in parallel with the furnace.

If a cooling system is installed in parallel with the furnace, a damper must be installed to prevent chilled air from entering the furnace and condensing on the heat exchanger. If a manually operated damper is installed, it must be designed so that operation of the furnace is prevented when the damper is in the cooling position and operation of the cooling system is prevented when the damper is in the heating position.

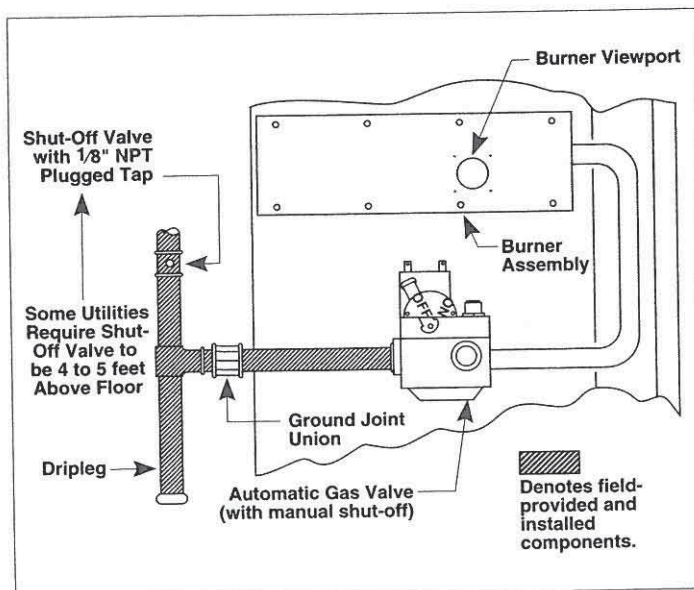


Figure 12. Typical Left Side Entry Gas Service Connection

## ! 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 furnace with sheet metal screws. When return air is provided through the bottom of the furnace, the joint between the furnace and the return air plenum must be airtight.

The floor or platform on which the furnace is mounted must provide sound physical support of the furnace with no gaps, cracks, or sagging between the furnace and the floor or platform.

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.

### Return Air

In applications where the supply ducts carry heated air to areas outside the space in which the furnace is installed, the return air must be delivered to the furnace by duct(s) sealed to the furnace casing, running full size and without interruption between the outside space and the one in which the furnace is installed.

## ! WARNING:

The solid base of the furnace must be in place when the furnace is installed with side return air ducts. Removal of all or part of the base could cause products of combustion to be circulated into the living space and create potentially hazardous conditions, including carbon monoxide poisoning that could result in personal injury or death.



The return air ductwork may be connected to any or all of the following: left side return, right side return, or bottom return. Table 2 shows the airflow data for each furnace model. Where maximum airflow is 1800 CFM or more, two openings should be used for maximum return air.

## Gas Supply and Piping

### General

This furnace is shipped with knockouts for either left or right side gas entry. A typical gas service hook-up is shown in Figure 12. When making the gas connection provide clearance between the gas supply line and the entry hole in the furnace casing to avoid unwanted noise and/or damage to the furnace.

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 furnace. 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 1/8" NPT plugged tap must be installed in the gas line 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 vertical 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.

**NOTE:** Gas piping must not be run in or through air ducts, chimneys, gas vents, elevator shafts, etc.

**Compounds used on threaded joints of gas piping must be resistant to the actions of liquefied petroleum gases.**

**The main manual gas valve and main power disconnect to the furnace must be properly labeled by the installer in case emergency shutdown is required.**

### CAUTION:

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

### Leak Check

After the gas piping to the furnace 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.

Capacity of Black Iron Gas Pipe (Cu.-ft. Per Hour) For Natural Gas (Specific Gravity 0.60)								
Nominal Black Iron Pipe Diameter (in.)	Length of Pipe Run (Feet)							
	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 furnace.

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

$$\text{Cubic Feet Per Hour Required} = \frac{\text{Input To Furnace (Btu/hr)}}{\text{Heating value of Gas (Btu/Cu. Ft.)}}$$

**Table 8. Capacity of Black Iron Gas Pipe (cubic feet per hour) for Natural Gas (specific gravity = .60)**

**NOTE:** When pressure testing gas supply lines at pressures greater than 1/2 psig (14 in. water column), the furnace 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 in. water column), the furnace must be isolated from the gas supply line by closing the manual shut-off valve.

### Conversion

Conversion of this furnace to utilize LP/propane gas must be made by qualified service personnel, using *only* factory authorized or approved parts. Approved conversion kits are listed in the Replacement Parts List included with these instructions.

### WARNING:

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



Furnace Model Number	Furnace Rating Plate Input (Btuh)	Number of Burners	Elevation 0' - 2000'		Elevation 2000' - 4500'	
			NAT.	LP	NAT.	LP
G5RC040C-12	40,000	2	44	55	45	55
G5RC060C-12	60,000	3	44	55	45	55
G5RC080C-16	80,000	4	44	55	45	55
G5RC100C-16	100,000	5	44	55	45	55
G5RC120C-16	120,000	6	44	55	45	55
G5RC120C-20	120,000	6	44	55	45	55

a. Canadian Orifice Size.

Furnace Model Number	Furnace Rating Plate Input (Btuh)	Number of Burners	Manifold Pressure 3.5 (NAT) and 10.0 (LP) Inches Water Column											
			Elevation 0' - 2000'		Elevation 2000' - 4000'		Elevation 4000' - 6000'		Elevation 6000' - 8000'		Elevation 8000' - 10000'		Elevation 10000' - 12000'	
			NAT	LP	NAT	LP	NAT	LP	NAT	LP	NAT	LP	NAT	LP
G5RC040C-12	40,000	2	44	55	45	55	48	56	48	56	49	57	50	58
G5RC060C-12	60,000	3	44	55	45	55	48	56	48	56	49	57	50	58
G5RC080C-16	80,000	4	44	55	45	55	48	56	48	56	49	57	50	58
G5RC100C-16	100,000	5	44	55	45	55	48	56	48	56	49	57	50	58
G5RC120C-16	120,000	6	44	55	45	55	48	56	48	56	49	57	50	58
G5RC120C-20	120,000	6	44	55	45	55	48	56	48	56	49	57	50	58

b. United States Orifice Size.

Table 8 (a and b). Approximate (Canadian and U.S.) Orifice Sizes for Natural and LP Gases.

Example 1		Example 2	
Elevation	3,890 feet	Elevation	5,500 feet
Type of Gas	Natural	Type of Gas	Propane
Furnace Model	G5RC100C-20	Furnace Model	G5RC100C-20
Orifice as Shipped	#44 Drill	Orifice in Natural to LP	
		Conversion Kit No. 902201	
		as Installed at Sea Level	#55 Drill
What burner orifices are needed?		What burner orifices are needed for 5,500 ft.?	
The required input for 3,890 feet is 84,000 Btuh or 16% less than the sea level rating of 100,000 Btuh.		The required input for 5,500 feet is 76,000 Btuh or 24% less than the sea level rating of 100,000 Btuh.	
See Table 8 for natural gas, find the Furnace Model Number and follow across the table for the elevation 2,000 - 4,000 ft column. From the table, choose a #45 orifice. Install a #45 orifice in every burner and check firing rate per <b>Verifying and Adjusting Rate</b> section. The firing rate in this example must not exceed 84,000 Btuh.		See Table 8 for LP gas, find the Furnace Model Number and follow across the table for the elevation 4,000 - 6,000 ft column. From the table, choose a #56 orifice. Install a #56 orifice in every burner and adjust the manifold pressure to 10.0 inches water column. The firing rate in this example must not exceed 76,000 Btuh.	



## High Altitude De-Rate

The nameplate input rating for the furnaces apply for elevations up to 2,000 feet (610m) above sea level. For elevations over 2,000 feet, reduce the input by 4% for each 1,000 feet above sea level. For example, a furnace applied at an elevation of 5,000 feet should be de-rated by 20%. See Table 8 describing the correct orifice for de-rate.

NOTE: The gas heating value must be for the altitude at which the furnace is applied. At 5000 feet for example, the heating value of the gas is about 84% of the sea level value. Kit are available for proper conversion and/or de-rate of a furnace. This is a list of available kits:

**Natural Gas Conversion kit – P/N 902260.** For high altitude use (2000-4500 feet). Follow the installation instructions with the kit for proper installation.

**Propane (LP) Gas Conversion kit – P/N 902259.** For high altitude use (2000-4500 feet). Follow the installation instructions with the kit for proper installation.

**Propane (LP) Gas Conversion kit – P/N 902201.** For use from sea level to 2000 ft altitude. Follow the installation instructions with the kit for proper installation.

## WARNING:

**To avoid electric shock, personal injury, or death, turn off the electric power at the disconnect or the main service panel before making any electrical connections.**

## Electrical Wiring

### General

Electrical connections must be made in accordance with all applicable local codes and ordinances, and with the current revision of the National Electric Code (ANSI/NFPA 70).

For Canadian installations electrical connections and grounding shall be done in accordance with the current Canadian Electrical Code CSA C22.1 Part 1 and/or local codes. If any of the original wire as supplied with the furnace must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C. Refer to the furnace nameplate and Table 9 for electrical requirements.

### Line Voltage

The line voltage (115 volt) to the furnace must be supplied from a dedicated branch circuit containing the correct fuse or circuit breaker for the furnace. See Table 9. An electrical switch should be readily accessible from and located within sight of the furnace. All line voltage connections must be made within the junction box located on the left side of the furnace. (See the Wiring Diagram label in the furnace and Figure 13.)

The furnace cabinet must have an uninterrupted, unbroken ground to minimize injury should an electrical fault condition occur. The controls used in this furnace require an earth ground to operate properly. Acceptable methods for grounding are electrical wire or conduit approved for electrical ground service. Do not use gas piping as an electrical ground.

**NOTE: Proper line voltage polarity must be maintained in order for the control system to operate correctly.**

Furnace Input (Btu/hr.)	Cabinet Width (in.)	Nominal Electrical Supply	Maximum Operating Voltage	Minimum Operating Voltage	Maximum Furnace Amperes	Minimum Wire Gauge	Maximum Fuse or Circuit Breaker Amps*
40,000	14.25	115-60-1	127	103	8.9	14	15
60,000	14.25	115-60-1	127	103	8.9	14	15
80,000	19.75	115-60-1	127	103	11.3	14	15
100,000	19.75	115-60-1	127	103	15.3	14	15 **
120,000	22.50	115-60-1	127	103	15.3	14	15 **

\* Time-delay fuses or HACR-type circuit breakers are required.

\*\* May be 20 amp if 12 gauge wire used.

Thermostat Wire Gauge	Recommended Thermostat Wire Length (Unit to Thermostat)	
	2-wire (Heating, 20VA)	4 or 5-wire (Cooling/HP, 40VA)
24	55 ft.	25 ft.
22	90 ft.	45 ft.
20	140 ft.	70 ft.
18	225 ft.	110 ft.

Table 10. Electrical Data



Verify that the incoming neutral line is connected to the white wire and the incoming "hot" line is connected to the black wire in the furnace junction box.

## ⚠ CAUTION:

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

Verify proper operation after servicing.

## ⚠ ATTENTION:

Lors des opérations d'entretien des commandes, étiqueter tous les fils avant de les déconnecter. Toute erreur de câblage peut être une source de danger et de panne.

S'assurer du bon fonctionnement de l'appareil après tout entretien.

### Low Voltage

Install the thermostat per the manufacturer's instructions. The low voltage (24 volt) connections from the thermostat are made at the terminal strip on the left side of the control box in the furnace. See Figures 14 and 15 for the proper

connections for heating only (two-wire) and heating/cooling (four-wire) applications. The recommended minimum wire gauge for thermostat wiring is shown in Table 9 below.

The thermostat must not be installed on an outside wall or any other location where its operation may be adversely affected. Adverse affects include radiant loading from fireplaces, sunlight, or lighting fixtures, and convective loading from warm air registers or electrical appliances.

To check the heat anticipator setting either:

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

Set the heat anticipator according to the determined current stat manufacturer's instructions for heat anticipator settings, heating cycle adjustments and selection.

## Start-Up and Adjustments

### General

Prior to start-up, verify that:

1. The line voltage power leads are securely connected, that the polarity of the connections is correct, and that the furnace is properly furnace
2. The thermostat wires (R, W, Y, and G) are securely connected to the correct leads on the terminal strip on the left side of the control box.

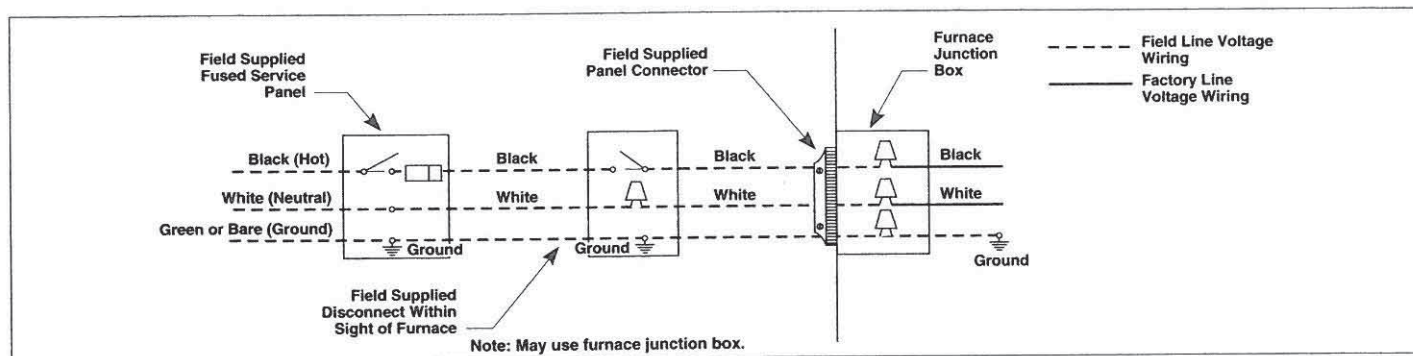


Figure 13. Line Voltage Field Wiring

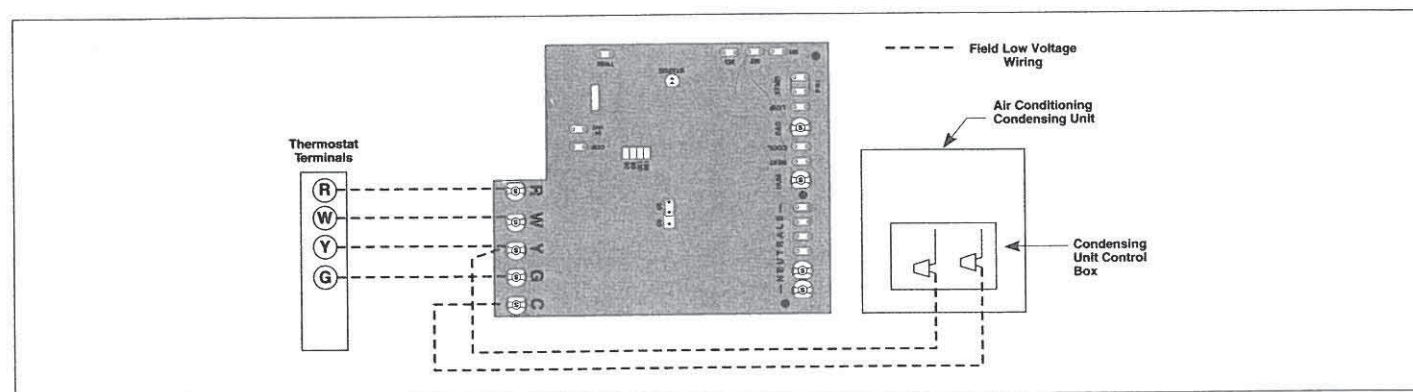
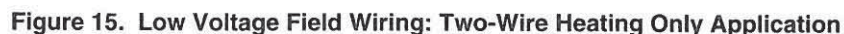


Figure 14. Low Voltage Field Wiring: Four-Wire Heating/Cooling Application





- | Gas Flow Rate (Cubic feet Per Hour)     |                                    |      |      |   |                                    |     |     |
|---|------------------------------------|------|------|---|------------------------------------|-----|-----|
| Time For<br>One Revolution<br>(Seconds) | Cubic Feet Per Revolution of Meter |      |      | Time For<br>One Revolution<br>(Seconds) | Cubic Feet Per Revolution of Meter |     |     |
|   | 1                                  | 5    | 10   |   | 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 | 409 |
| 32                                      | 113                                | 563  | 1125 | 88                                      | 41                                 | 205 | 419 |
| 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 |

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## Start-Up Procedure

1. Set the thermostat to the lowest setting.
2. Close the disconnect(s) to provide line voltage to the furnace.
3. Follow the procedures given on the lighting instruction label attached to the furnace.
4. Set the thermostat above room temperature and verify the sequence of operation. (See the Sequence of Operation described on Page 24.)
5. After the furnace has run for approximately five minutes, set the thermostat below room temperature and verify the shutdown sequence. (See the Sequence of Operation described on Page 24.)

## Verifying and Adjusting Firing Rate

The firing rate must be verified for each installation to prevent over-firing of the furnace.

**NOTE:** The firing rate must not exceed the rate shown on the furnace rating plate.

Follow the procedure below to determine the firing rate.

1. Shut off all other gas fired appliances.
2. Start the furnace 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 10.
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:

## ⚠ CAUTION:

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

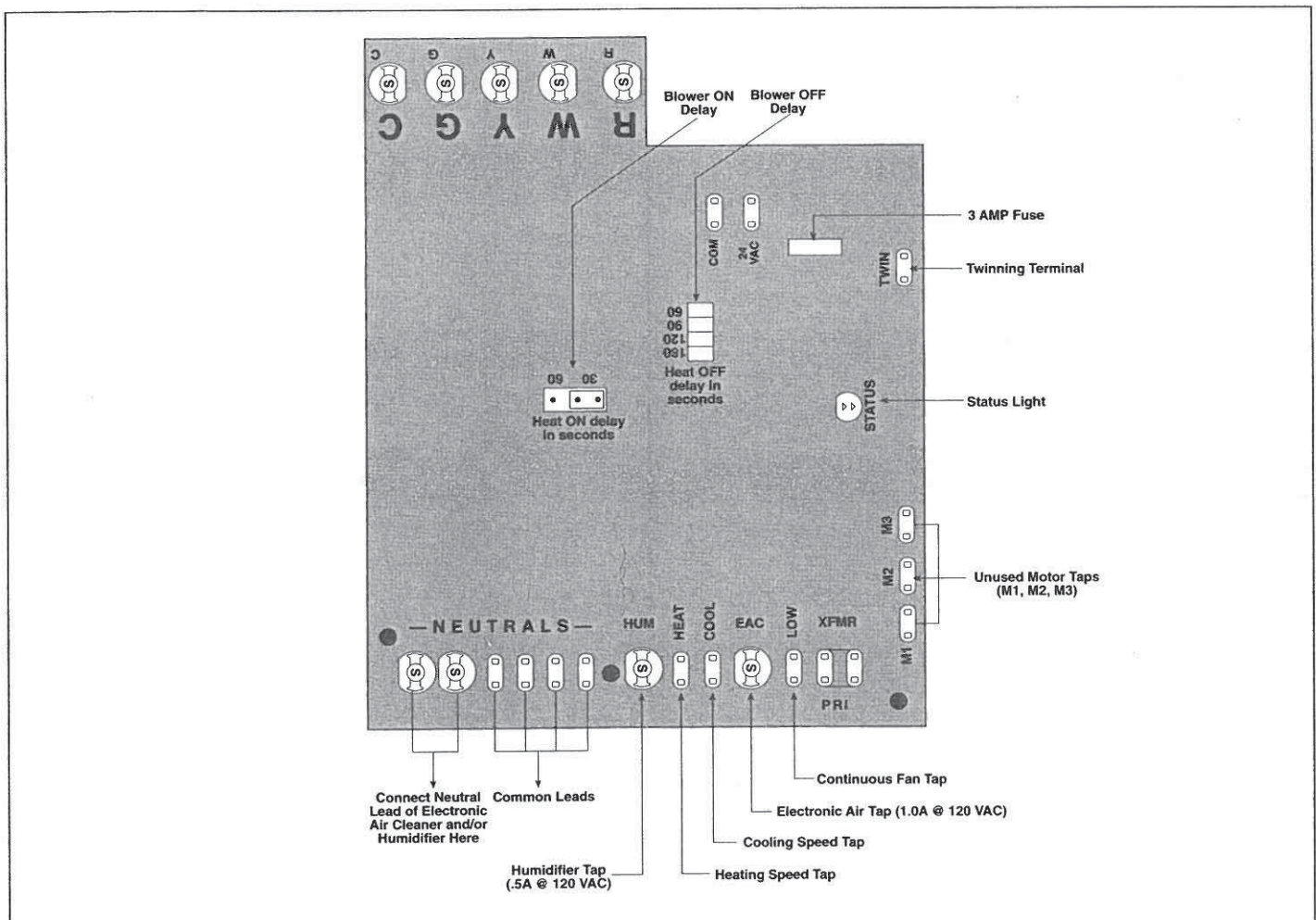


Figure 16. Blower Speed Tap Location



## G5RA, G5RC and G5RK Residential Furnace

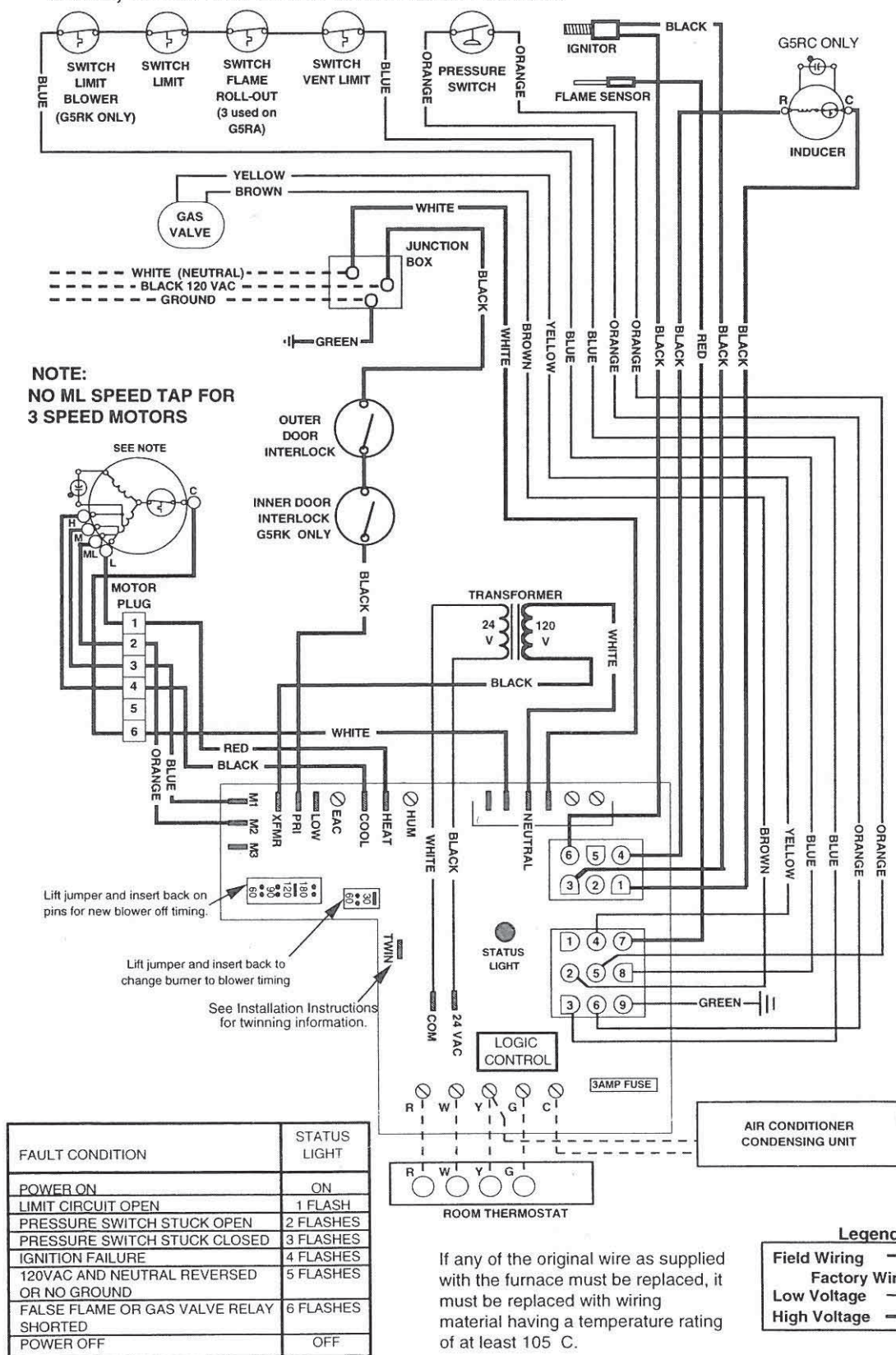


Figure 17a. Integrated Control Board System Diagram.

WD# 7035030



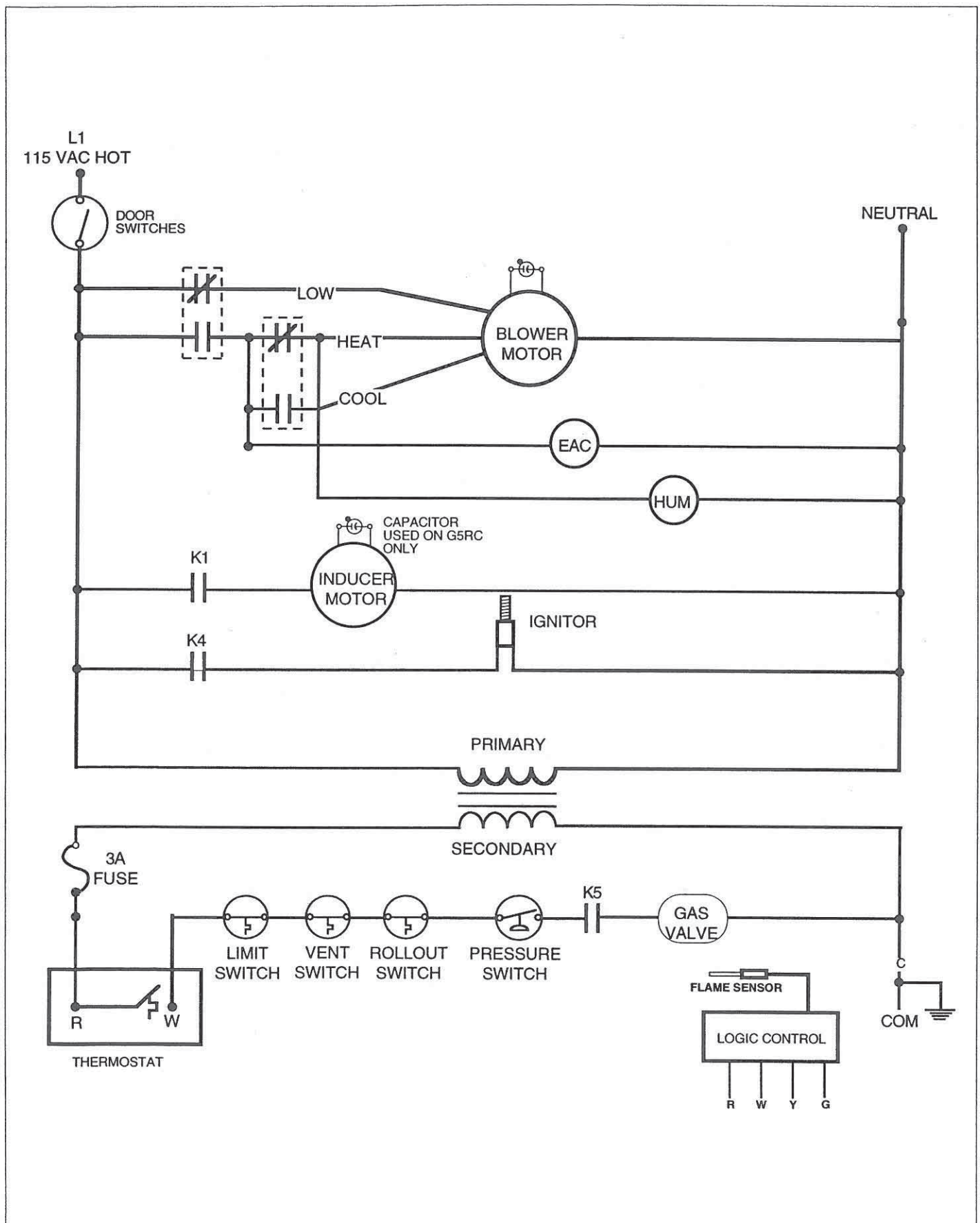


Figure 17b. Integrated Control Board System Diagram.



- Time for one revolution of a gas meter with a one cubic foot dial = 40 seconds.
- From Table 6 read 90 cubic feet per hour of gas.
- Heating value of the gas (obtained from gas supplier) = 1040 Btu per cubic foot.
- Firing rate =  $1040 \times 90 = 93,600$  Btuh.

6. Relatively small adjustments to the firing rate can be made by adjusting the gas manifold pressure.

The gas valve regulator is set at a nominal value of 3.5 in. water column for use with natural gas. The manifold pressure must be set at 10.0 in. water column for use with LP gas. 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. When adjusting the firing rate, do not set the manifold pressure more than 0.3 in. water column above or below these pressures. If pressures outside this range are required to achieve the desired firing rate, change the burner orifices.

## ⚠ WARNING:

**To avoid electrical shock, personal injury or death, turn off the electric power at the disconnect or the main service panel before making any electrical connections.**

### Verifying and Adjusting Temperature Rise

Verify that the temperature rise through the furnace is within the range specified on the furnace rating plate. 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 furnace 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 furnace 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 rating plate with the blower speed at the factory recommended setting. 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 furnace is equipped with a multispeed motor. Heating and cooling speed selection is made by moving the leads on the blower control located in the furnace control box. The wiring diagram on the furnace and in Figure 17 show the speed taps for adjusting motor speed.

If it is desired that the blower operate at the same speed for heating and cooling, tape off the unused blower tap and install the jumper wire found in the plastic instruction bag. Remove the desired blower tap, and install the jumper wire piggyback to the heating speed tap, and straight quick connect to the cooling speed tap. Reconnect the desired blower tap to piggyback quick connect. See Figure 17.

The blower control is designed to start the circulating air blower 30 seconds after the gas valve is opened. The blower control is factory wired to turn the blower motor off 120 seconds after the gas valve is closed. This timing can be changed by lifting the small plastic leg jumper and moving to a different timing. See Figure 16 for jumper configuration on integrated control board.

### Verifying Burner Operation

To verify operation of the burners, make sure that the blower door is in place and that there is power to the furnace. Set the thermostat to a temperature above room temperature and observe the ignition sequence. The flame can be observed by viewing through the small clear window on the upper burner box. The burner flame should carry over immediately between all burners. The flames should be blue, without yellow tips. Flames should extend from each

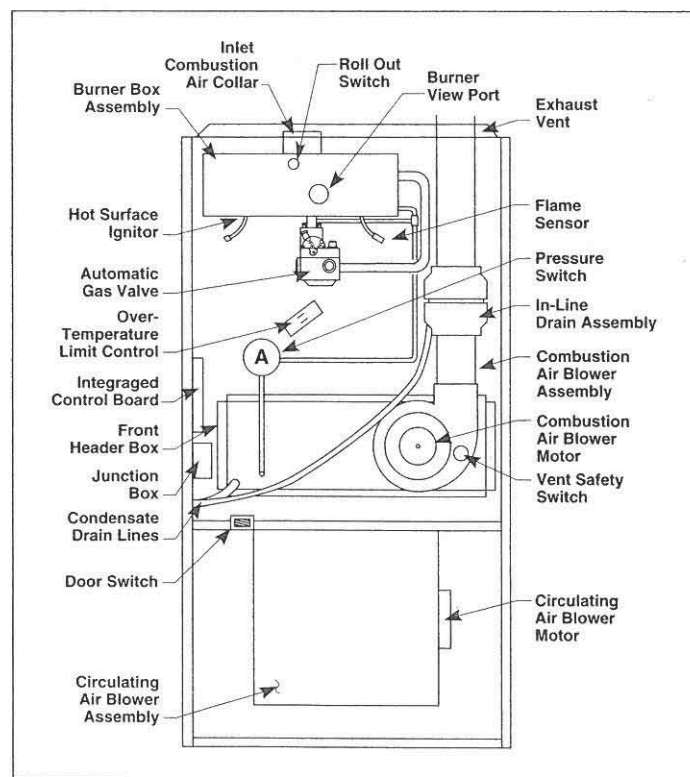


Figure 18. Location of Major Components



burner without lifting off, curling, or floating. After verifying ignition, set the thermostat to a temperature below room temperature and verify that the burner flame extinguishes completely.

### Verifying Operation of Over Temperature Limit Control

To verify operation of the over-temperature limit control, make sure that the blower door is in place and that there is power to the furnace. Block the return airflow to the furnace by installing a close-off plate in place of or upstream of the filter(s). Set the thermostat to a temperature above room temperature and verify that the Sequence of Operation is as described on Page 24. The over-temperature 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 furnace). 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 furnace 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 furnace, and replace the over-temperature limit control.

### Description of Components

Figure 18 shows the location of each of the functional components described below. Also, refer to the Sequence of Operation described on Page 24. If any component of the furnace must be replaced, use only factory authorized replacement parts. See the Replacement Parts List for the factory authorized replacement for each component.

**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 furnace will be shut down automatically.

**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. The pressure switch also senses a blocked condensate drain condition and a blocked combustion inlet or exhaust condition.

**Over-Temperature Limit Control** — The over-temperature limit control acts to prevent the air temperature leaving the furnace from exceeding the maximum outlet air temperature.

**Vent Safety Switch** — The vent safety switch acts to shut the furnace down in the event that outlet flue products increase above 130°F. This switch protects the plastic flue system and combustion air blower from over-temperature conditions.

**Burner Box Roll Out Switch** — This switch provides flame roll out protection to the furnace and combustion inlet air vent pipe.

### ⚠ WARNING:

**To avoid electrical shock, personal injury or death, disconnect electrical power before performing any maintenance.**

### Maintenance

It is recommended that the furnace be checked at least once a year, before the heating season begins, to ensure proper operation. At a minimum, this check should include the following items.

### Combustion Air and Vent System

Check the combustion air and vent pipe to ensure that it is not damaged, corroded or blocked by debris. Any damaged section of vent pipe must be replaced, and any obstruction or blockage must be removed prior to operating the furnace.

### ⚠ WARNING:

**Products of combustion must not be allowed to enter the living space. 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.**

### Air Filter(s)

**Air Filter(s) are not supplied with the furnace as shipped from the factory.**

The installer should provide a filter rack for a high velocity type filter in the return air duct adjacent to the furnace. Filters should be changed or cleaned monthly during the heating season. New or newly renovated homes may require more frequent changing until the construction dust has been removed.



## **WARNING:**

Never operate the furnace 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.

### **Lubrication**

The bearings in the circulating air blower motors used in these furnaces are pre-lubricated and sealed at the factory. No further oiling of the bearings is required for the life of the motor.

### **Condensate Drain Assembly**

Be sure condensate trap is filled with water and all drain lines are free and open( i.e.: avoid kinking hoses). Also make sure all hose clamps are tight on the front header box and in-line drain assembly.

### **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. Buildups 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 furnace should operate for many years without excessive scale buildup in the flue passageways, however, the flue passageways, 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. **Note the quantity and color of water draining from the furnace. If any discoloration or black residue appear, call your serviceman immediately. If water stops draining out of unit from the front header box (See Figure 18) during furnace operation call your serviceman immediately.**

## **WARNING:**

Holes in the exhaust vent pipe or heat exchanger can cause products of combustion to enter the home. Replace the vent pipe or 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.

## **System Operation Information**

### **General**

Proper maintenance is most important to achieve the best performance from a furnace. Follow these instructions for years of safe, trouble free operation.

- Do not place combustible materials on or against the furnace cabinet or the vent pipe.
- Do not store gasoline or any other flammable vapors and liquids in the vicinity of the furnace.
- Change or replace the air filters monthly during any period when the circulating blower is operating regularly.
- Always replace the doors on the furnace after servicing. Do not operate the furnace without all doors and covers in place.
- Avoid operating the furnace when windows and doors are open.
- Be sure that the thermostat is properly installed and is not being affected by drafts or heat from lamps or other appliances.

### **Sequence of Operation**

The operating sequences for the heating, cooling, and fan modes are described below. Refer to the wiring diagram for the furnace (Figure 17) and the field wiring diagram (Figures 13).

#### **Heating Mode:**

1. On a call for heat the thermostat closes, applying 24 VAC to the W terminal on the furnace control.
2. The furnace control checks for continuity on the 24 VAC limit control circuit (over-temperature limit control, flame roll-out switch and blocked vent switch in series). If an open limit is detected the



system will energize the inducer and the heating speed circulating blower and render all the system's functions inoperable until limit circuit closes and the fault LED will blink at a rate of 1 blink.

3. The furnace control checks for continuity across the pressure switch circuit (24 VAC). If the pressure switch is closed the control will not continue the heat mode operation, and if it remains closed for 10 seconds the fault LED will blink 3 times until the fault condition clears.
4. The inducer starts.
5. The pressure switch will close. If the pressure switch does not close after 10 seconds the fault LED will blink 2 times until the fault condition clears.
6. The inducer will prepurge for 30 seconds and then the ignitor will start its warm-up. After 15 seconds of ignitor warm-up the gas valve (24 VAC) will open. The ignitor circuit stays energized for 6 more seconds.
7. The furnace control must prove flame via the flame sensor within six seconds after the gas valve circuit is energized. If flame is sensed, all burners are on and the ignitor cools off. If no flame is sensed, the gas valve closes immediately and the inducer blower continues to run. A second trial for ignition (step 6) is initiated. If no flame is proved by the fifth try for ignition, the furnace control locks out and the fault LED will blink 4 times. The thermostat must be opened for at least ten seconds to reset the furnace control after a lock out.
8. After the gas valve circuit is energized for (factory set at 30-seconds and field adjustable to 60-seconds), the furnace control energizes the main circulating blower circuit at the heating speed (115 VAC).
9. When the thermostat is satisfied, the W terminal on the integrated control is de-energized.
10. The gas valve circuit is de-energized.
11. The inducer blower circuit (115 VAC) is de-energized after 30-seconds of postpurge.
12. The furnace control keeps the main circulating blower circuit energized per the "blower off" position (factory set at 120 seconds, field adjustable to 60, 90, or 180 seconds). (See Figure 16)

13. After the "blower off" timer has been satisfied, the furnace control de-energizes the main circulating blower circuit.

14. Abnormal conditions: If the limit circuit opens during operation, the inducer blower and circulating air blower continue to operate. The gas valve circuit is de-energized immediately. The blowers continue to operate until the limit control circuit closes. When the limit control circuit closes, the inducer blower is de-energized immediately and the circulating blower continues to operate for the specified delay (factory set at 120 seconds).

#### **Cooling Mode:**

1. On a call for cooling the thermostat closes, applying 24 VAC to the G and Y terminals on the furnace control.
2. The furnace control energizes the main circulating blower circuit (115 VAC) at the cooling speed.
3. The furnace control energizes the 24 VAC circuit between the G and Y terminals to close the compressor contactor and turn on the main circulating blower on cooling speed.
4. When the thermostat is satisfied, the G and Y terminals on the furnace control are de-energized.
5. The G and Y terminals are de-energized, opening the compressor contactor.
6. The circulating blower motor is de-energized after a 90-second delay.

#### **Fan Mode:**

1. On a call for fan operation, the thermostat applies 24 VAC to the G terminal on the furnace control.
2. The circulating blower is energized immediately at the cooling speed.
3. If a call for heat occurs, the circulating blower runs at the heating speed.
4. If furnace is operated in continuous ON at the thermostat and is then switched to AUTO, the circulating blower will operate for a specified delay (factory set at 120 seconds).

#### **Continuous Blower Operation Option:**

1. Install the low speed blower speed tap (red wire) to the terminal on the furnace control marked LOW.



- Whenever the furnace has power (115 VAC) the blower will run at the low blower speed.

### Furnace Fails to Operate

If the furnace does not operate check the following:

- Is the thermostat operating properly?
- Is the louvered door in place?
- Is the furnace disconnect closed?
- Has the circuit breaker tripped (or fuse blown)?
- Is the gas turned on?
- Is the manual shut-off valve open?
- Is the filter dirty or plugged?

If the furnace locks out after 5 tries for ignition, it will try again every hour for ignition if the call for heat is still present. If the inducer and circulating air blowers are operating, and items 1 through 7 have been checked without identifying the

cause of the problem, press the red reset button on the vent safety switch (See Figure 18). If the furnace operates after depressing the reset button, contact a qualified serviceman to identify and repair the problem.

If the furnace will still not operate, depress the red reset button on one or more of the flame roll-out switches (See Figure 18). If the furnace operates after depressing the reset button, contact a qualified servicemen to identify and repair the problem.

### Twinning

The furnace control on the G5 series furnaces are capable of being twinned to another G5 furnace. The thermostat wires and a 1/4 inch quick-connect terminal on the furnace control must be wired to the other furnace control for twinning (See Figure 19 below).

Fault Condition	Number of Blinks	Fault Clearing
No Fault	LED On	
Limit circuit open	1	Limit circuit closes
Pressure switch stuck open	2	Pressure switch closes
Pressure switch stuck closed	3	Pressure switch opens
Ignition failure	4	Thermostat resets or power resets. Auto reset after on hour.
115 VAC and neutral reversed	5	Reverse 115 VAC and neutral, and/or attach ground.
False flame or gas valve relay shorted. Power off.	Continuous Blink	Thermostat resets or power resets. Auto reset after one hour.

Table 10. Integrated Control Board Troubleshooting Sequence.

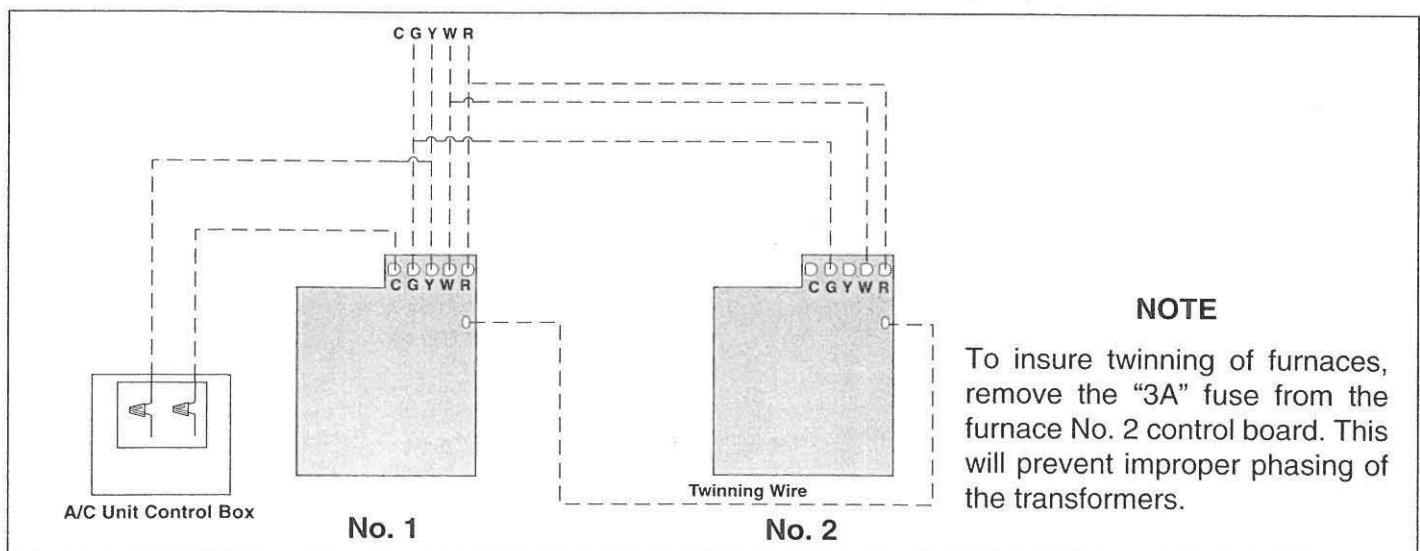


Figure 19. Twinning.



## Installation/Performance Checklist

Location \_\_\_\_\_  
Installer \_\_\_\_\_  
Unit Model Number \_\_\_\_\_

Minimum Clearances per Table 3? \_\_\_\_\_  
Electrical Connections tight? \_\_\_\_\_  
Line Voltage Polarity correct? \_\_\_\_\_  
Supply Voltage: \_\_\_\_\_ Volts  
Blower Motor HP: \_\_\_\_\_

Fuel Type:  
Natural Gas \_\_\_\_\_ LP/Propane \_\_\_\_\_  
Gas Piping Connections leak-tested? \_\_\_\_\_  
Gas Line Pressure: \_\_\_\_\_  
(in. water column, with furnace operating)  
Manifold Pressure: \_\_\_\_\_  
(in. water column, with furnace operating)

Furnace Input: \_\_\_\_\_ (Btu/hr)  
Supply Air Temperature: \_\_\_\_\_ (°F)  
Return Air Temperature: \_\_\_\_\_ (°F)

Temperature Rise: \_\_\_\_\_ (°F)  
City \_\_\_\_\_ State \_\_\_\_\_  
Unit Model Number \_\_\_\_\_

Are Vent and Combustion Air Connections tight? \_\_\_\_\_  
Are Vent and Combustion Air Pipes free from  
restrictions? \_\_\_\_\_  
Is Drain Trap installed and filled? \_\_\_\_\_

Is the Filter secured in place? \_\_\_\_\_  
Is the Filter clean? \_\_\_\_\_

Is the Thermostat level? \_\_\_\_\_  
Is the Heat Anticipator Setting correct? \_\_\_\_\_

Has the Owner's Information been reviewed with the  
home owner? \_\_\_\_\_

Has the Literature Package been left near the furnace?  
\_\_\_\_\_

### INSTALLER

**Leave these Installation  
Instructions with the new  
owner of this equipment.**

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**NORDYNE**

Specifications and illustrations subject to change  
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