

INSTALLATION INSTRUCTIONS

FOR UPFLOW/HORIZONTAL (-)GPR AND DOWNFLOW (-)GLR TWO STAGE INDUCED DRAFT GAS FURNACES

115 VOLTS, 60 HZ, SINGLE PHASE



RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION!

▲ WARNING

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

▲ WARNING

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS UNIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING INSTALLATION OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTENANCE, POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, CARBON MONOXIDE POISONING, EXPLOSION, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

▲ WARNING

PROPOSITION 65 WARNING: THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

▲ WARNING

- Do not store or use gasoline or other flammable vapors and liquids, or other combustible materials in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS
 - Do not try to light any appliance.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
 - Do not return to your home until authorized by the gas supplier or fire department.
- DO NOT RELY ON SMELL ALONE TO DETECT LEAKS. DUE TO VARIOUS FACTORS, YOU MAY NOT BE ABLE TO SMELL FUEL GASES.
 - U.L. recognized fuel gas and CO (carbon monoxide) detectors are recommended in all applications, and their installation should be in accordance with the manufacturer's recommendations and/or local laws, rules, regulations, or customs.
- Improper installation, adjustment, alteration, service or maintenance can cause injury, property damage or death. Refer to this manual. Installation and service must be performed by a qualified installer, service agency or the gas supplier. In the commonwealth of Massachusetts, installation must be performed by a licensed plumber or gas fitter for appropriate fuel.

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

Before beginning any troubleshooting procedure, complete the following installation checklist. A furnace malfunction is sometimes caused by an improper installation. By completing this checklist, the problem may be found and corrected. Make copies of the checklist and complete one for every Low Profile Furnace service call for your records.

INSTALLATION CHECKLIST

(Refer to this manual for specifics.)

GAS SUPPLY

- _____ Adequate pipe size
- _____ No gas leaks
- _____ Proper supply and manifold gas pressure (check with an accurate U-tube manometer with the furnace and all other gas appliances operating.)

ELECTRICAL

- _____ Correct thermostat and subbase _____ Thermostat model _____ Subbase model
- _____ Correct thermostat mode and setting
- _____ Correct line supply voltage
- _____ Correct power supply polarity is required with electronic ignition
- _____ Correct furnace ground to electrical panel
- _____ DC microamp (μ A) flame signal (hot surface ignition units)
- _____ Correct control voltage
- _____ Measure and set heat anticipator amperage
- _____ Air conditioning low voltage wires connected to terminals "Y" "C" - **not with wire nuts**

VENTING

- _____ Correct vent pipe diameter and length (according to CSA tables) _____ Vent connection size
- _____ Correct venting material (according to CSA tables)
- _____ Correct lining for masonry chimneys
- _____ Adequate clearance from combustibles
- _____ Proper negative pressure reading in the vent
- _____ Vent pipe secured to induced draft blower housing

COMBUSTION AIR

- _____ Proper source of combustion air _____ Optional attic combustion air pull
- _____ Correct combustion air opening size _____ Non-attic combustion air pull

FURNACE INSTALLATION

- _____ Adequate clearance from combustibles
- _____ Adequate clearance for service
- _____ Proper air temperature rise (See furnace rating plate)
- _____ External static pressure _____ inches w.c.
- _____ Correct filter(s)
- _____ Correct cooling coil or accessories (if equipped)
- _____ Adequate supply and return air ducting _____ Return Air Duct Size _____ Supply Air Duct Size
- _____ Air ducts sealed to prevent leakage

Important: All manufacturer products meet current Federal OSHA Guidelines for safety. California Proposition 65 warnings are required for certain products, which are not covered by the OSHA standards.

California's Proposition 65 requires warnings for products sold in California that contain, or produce, any of over 600 listed chemicals known to the State of California to cause cancer or birth defects such as fiberglass insulation, lead in brass, and combustion products from natural gas.

All "new equipment" shipped for sale in California will have labels stating that the product contains and/or produces Proposition 65 chemicals. Although we have not changed our processes, having the same label on all our products facilitates manufacturing and shipping. We cannot always know "when, or if" products will be sold in the California market.

You may receive inquiries from customers about chemicals found in, or produced by, some of our heating and air-conditioning equipment, or found in natural gas used with some of our products. Listed below are those chemicals and substances commonly associated with similar equipment in our industry and other manufacturers.

- Glass Wool (Fiberglass) Insulation
- Carbon Monoxide (CO)
- Formaldehyde
- Benzene

More details are available at the Websites for OSHA (Occupational Safety and Health Administration), at www.osha.gov and the State of California's OEHHA (Office of Environmental Health Hazard Assessment), at www.oehha.org. Consumer education is important since the chemicals and substances on the list are found in our daily lives. Most consumers are aware that products present safety and health risks, when improperly used, handled and maintained.

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IMPORTANT: TO INSURE PROPER INSTALLATION AND OPERATION OF THIS PRODUCT, COMPLETELY READ ALL INSTRUCTIONS PRIOR TO ATTEMPTING TO ASSEMBLE, INSTALL, OPERATE, MAINTAIN OR REPAIR THIS PRODUCT. UPON UNPACKING OF THE FURNACE, INSPECT ALL PARTS FOR DAMAGE PRIOR TO INSTALLATION AND START-UP.

SAFETY INFORMATION

▲ WARNING

USE ONLY WITH TYPE OF GAS APPROVED FOR THIS FURNACE. REFER TO THE FURNACE RATING PLATE.

▲ WARNING

INSTALL THIS FURNACE ONLY IN A LOCATION AND POSITION AS SPECIFIED IN THE LOCATION REQUIREMENTS AND CONSIDERATIONS SECTION OF THESE INSTRUCTIONS. PROVIDE ADEQUATE COMBUSTION AND VENTILATION AIR TO THE FURNACE SPACE AS SPECIFIED IN THE VENTING SECTION OF THESE INSTRUCTIONS.

▲ WARNING

PROVIDE ADEQUATE COMBUSTION AND VENTILATION AIR TO THE FURNACE SPACE AS SPECIFIED IN THE COMBUSTION AND VENTILATION AIR SECTION OF THESE INSTRUCTIONS.

▲ WARNING

COMBUSTION PRODUCTS MUST BE DISCHARGED OUTDOORS. CONNECT THIS FURNACE TO AN APPROVED VENT SYSTEM ONLY, AS SPECIFIED IN VENT PIPE INSTALLATION SECTION OF THESE INSTRUCTIONS.

▲ WARNING

DO NOT OPERATE THE SYSTEM WITHOUT FILTERS. A PORTION OF THE DUST ENTRAINED IN THE AIR MAY TEMPORARILY LODGE IN THE AIR DUCT RUNS AND AT THE SUPPLY REGISTERS. ANY CIRCULATED DUST PARTICLES WILL BE HEATED AND CHARRED BY CONTACT WITH THE FURNACE HEAT EXCHANGER. THIS SOOTY RESIDUE WILL SOIL CEILINGS, WALLS, DRAPES, CARPETS AND OTHER HOUSEHOLD ARTICLES. SOOT DAMAGE MAY ALSO RESULT WITH, OR WITHOUT, FILTERS IN PLACE, WHEN CERTAIN TYPES OF CANDLES ARE BURNED, OR CANDLEWICKS ARE LEFT UNTRIMMED.

▲ WARNING

NEVER TEST FOR GAS LEAKS WITH AN OPEN FLAME. USE A COMMERCIALY AVAILABLE SOAP SOLUTION MADE SPECIFICALLY FOR THE DETECTION OF LEAKS TO CHECK ALL CONNECTIONS, AS SPECIFIED IN GAS SUPPLY AND PIPING SECTION OF THESE INSTRUCTIONS.

▲ WARNING

ALWAYS INSTALL FURNACE TO OPERATE WITHIN THE FURNACE'S INTENDED TEMPERATURE-RISE RANGE WITH A DUCT SYSTEM WHICH HAS AN EXTERNAL STATIC PRESSURE WITHIN THE ALLOWABLE RANGE, AS SPECIFIED IN DUCTING SECTION OF THESE INSTRUCTIONS. SEE ALSO FURNACE RATING PLATE.

▲ WARNING

WHEN A FURNACE IS INSTALLED SO THAT SUPPLY DUCTS CARRY AIR CIRCULATED BY THE FURNACE TO AREAS OUTSIDE THE SPACE CONTAINING THE FURNACE, THE RETURN AIR SHALL ALSO BE HANDLED BY DUCT(S) SEALED TO THE FURNACE CASING AND TERMINATING OUTSIDE THE SPACE CONTAINING THE FURNACE.

▲ WARNING

DO NOT INSTALL THIS FURNACE IN A MOBILE HOME!! THIS FURNACE IS NOT APPROVED FOR INSTALLATION IN A MOBILE HOME. DOING SO COULD CAUSE FIRE, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

▲ WARNING

WHEN THIS FURNACE IS INSTALLED IN A RESIDENTIAL GARAGE, IT MUST BE INSTALLED SO THE BURNERS AND IGNITION SOURCE ARE LOCATED NO LESS THAN 18 INCHES ABOVE THE FLOOR. THIS IS TO REDUCE THE RISK OF IGNITING FLAMMABLE VAPORS WHICH MAY BE PRESENT IN A GARAGE. ALSO, THE FURNACE MUST BE LOCATED OR PROTECTED TO AVOID PHYSICAL DAMAGE BY VEHICLES. FAILURE TO FOLLOW THESE WARNINGS CAN CAUSE A FIRE OR EXPLOSION, RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

▲ WARNING

THE FURNACE MAY BE USED FOR HEATING OF BUILDINGS OR STRUCTURES UNDER CONSTRUCTION.

INSTALLATION MUST COMPLY WITH ALL INSTALLATION INSTRUCTIONS INCLUDING:

- PROPER VENT INSTALLATION;
- FURNACE OPERATING UNDER THERMOSTATIC CONTROL;
- RETURN AIR DUCT SEALED TO THE FURNACE;
- AIR FILTERS IN PLACE;
- SET FURNACE INPUT RATE AND TEMPERATURE RISE PER RATING PLATE MARKING;
- MEANS FOR PROVIDING OUTDOOR AIR REQUIRED FOR COMBUSTION;
- RETURN AIR TEMPERATURE MAINTAINED BETWEEN 55°F (13°C) AND 80°F (27°C); AND
- CLEAN FURNACE, DUCT WORK AND COMPONENTS UPON SUBSTANTIAL COMPLETION OF THE CONSTRUCTION PROCESS, AND VERIFY FURNACE OPERATING CONDITIONS INCLUDING IGNITION, INPUT RATE, TEMPERATURE RISE AND VENTING, ACCORDING TO THE INSTRUCTIONS AND CODES.

▲ WARNING

DUCT LEAKS CAN CREATE AN UNBALANCED SYSTEM AND DRAW POLLUTANTS SUCH AS DIRT, DUST, FUMES AND ODORS INTO THE HOME CAUSING PROPERTY DAMAGE. FUMES AND ODORS FROM TOXIC, VOLATILE OR FLAMMABLE CHEMICALS, AS WELL AS AUTOMOBILE EXHAUST AND CARBON MONOXIDE (CO), CAN BE DRAWN INTO THE LIVING SPACE THROUGH LEAKING DUCTS AND UNBALANCED DUCT SYSTEMS CAUSING PERSONAL INJURY OR DEATH (SEE FIGURE 1).

- IF AIR-MOVING EQUIPMENT OR DUCTWORK IS LOCATED IN GARAGES OR OFF-GARAGE STORAGE AREAS - ALL JOINTS, SEAMS, AND OPENINGS IN THE EQUIPMENT AND DUCT MUST BE SEALED TO LIMIT THE MIGRATION OF TOXIC FUMES AND ODORS INCLUDING CARBON MONOXIDE FROM MIGRATING INTO THE LIVING SPACE.
- IF AIR-MOVING EQUIPMENT OR DUCTWORK IS LOCATED IN SPACES CONTAINING FUEL BURNING APPLIANCES SUCH AS WATER HEATERS OR BOILERS - ALL JOINTS, SEAMS, AND OPENINGS IN THE EQUIPMENT AND DUCT MUST ALSO BE SEALED TO PREVENT DEPRESSURIZATION OF THE SPACE AND POSSIBLE MIGRATION OF COMBUSTION BYPRODUCTS INCLUDING CARBON MONOXIDE INTO THE LIVING SPACE.

NOTICE

IMPROPER INSTALLATION, OR INSTALLATION NOT MADE IN ACCORDANCE WITH THE CSA INTERNATIONAL (CSA) CERTIFICATION OR THESE INSTRUCTIONS, CAN RESULT IN UNSATISFACTORY OPERATION AND/OR DANGEROUS CONDITIONS AND ARE NOT COVERED BY THE UNIT WARRANTY.

NOTICE

IN COMPLIANCE WITH RECOGNIZED CODES, IT IS RECOMMENDED THAT AN AUXILIARY DRAIN PAN BE INSTALLED UNDER ALL EVAPORATOR COILS OR UNITS CONTAINING EVAPORATOR COILS OR GAS FURNACES USED WITH EVAPORATOR COILS THAT ARE LOCATED IN ANY AREA OF A STRUCTURE WHERE DAMAGE TO THE BUILDING OR BUILDING CONTENTS MAY OCCUR AS A RESULT OF AN OVERFLOW OF THE COIL DRAIN PAN OR A STOPPAGE IN THE PRIMARY CONDENSATE DRAIN PIPING.

GENERAL INFORMATION

The (-)GPR/(-)GLR series furnaces are design certified by CSA for use with natural and propane gases as follows:

As a Category I furnace, it may be vented vertically with type B-1 vent pipe and also may be common vented as described in these instructions.

This furnace should be installed in accordance with the American National Standard Z223.1 - latest edition booklet entitled "National Fuel Gas Code" (NFPA 54) (in Canada, CSA B149.1 and .2 Installation Codes for gas burning appliances), and the requirements or codes of the local utility or other authority having jurisdiction including local plumbing or waste water codes.

The National Appliance Energy Conservation Act (NAECA) of 1987 states that any gas furnace manufactured after January 1, 1992, must have a minimum Annual Fuel Utilization Efficiency (AFUE) of 78%. The higher the AFUE percentage the more usable heat energy the consumer gets for every dollar of fuel purchased. This is similar to the EPA's minimum gas mileage requirement for automobiles. It gives the consumer a relatively easy way to make direct efficiency comparisons between different furnace brands and styles.

A high AFUE value, which translates into a low operating cost, is not the only concern that consumers have. They also want a furnace with a reasonable installed cost. They want a furnace that provides them with comfort – their main concern. And they expect a furnace with exceptional reliability and longevity.

Gas furnace manufacturers are always striving to provide consumers with the best furnace value. The Low Profile Furnace addresses all those consumer needs. It gives exceptional efficiency with a low installation cost. It delivers the comfort the customer wants along with the reliability they expect.

The key to all these customer benefits is the furnace's heat exchanger. The materials used to construct the furnace in general and the heat exchanger in particular make it a rugged, long lasting unit. The unique heat exchanger design provides the customer with a furnace only 34 inches high. This gives the consumer a unit easily installed in almost every location that accepts all customary accessories.

With the introduction of higher efficiency furnaces, special attention must be paid to the venting system. Only listed venting systems may be used as stated in the installation instructions and the *National Fuel Gas Code, ANSI Z223.1 (NFPA 54), or the Canadian CAN/CGA B149.1 and B149.2 Installation Codes for Gas Burning Appliances*. Since furnace technology and venting requirements are changing, awareness

of local, state, and federal codes and industry changes is imperative.

NOTE: Always perform a proper heat loss calculation before specifying the furnace size. This ensures that the furnace is sized to adequately, economically, heat the building and provide the correct airflow for your application.

IMPORTANT: PROPER APPLICATION, INSTALLATION AND MAINTENANCE OF THIS FURNACE IS A MUST IF CONSUMERS ARE TO RECEIVE THE FULL BENEFITS FOR WHICH THEY HAVE PAID.

Additional helpful publications available from the "National Fire Protection Association" are: NFPA-90A – Installation of Air Conditioning and Ventilating Systems 1985 or latest edition. NFPA-90B – Warm Air Heating and Air Conditioning Systems 1984.

These publications are available from:

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

CSA-INTERNATIONAL
178 Rexdale Blvd.
Etobicoke (Toronto), Ontario
Canada M9W, 1R3

IMPORTANT INFORMATION ABOUT EFFICIENCY AND INDOOR AIR QUALITY

Central cooling and heating equipment is only as efficient as the duct system that carries the cooled or heated air. To maintain efficiency, comfort and good indoor air quality, it is important to have the proper balance between the air being supplied to each room and the air returning to the cooling and heating equipment.

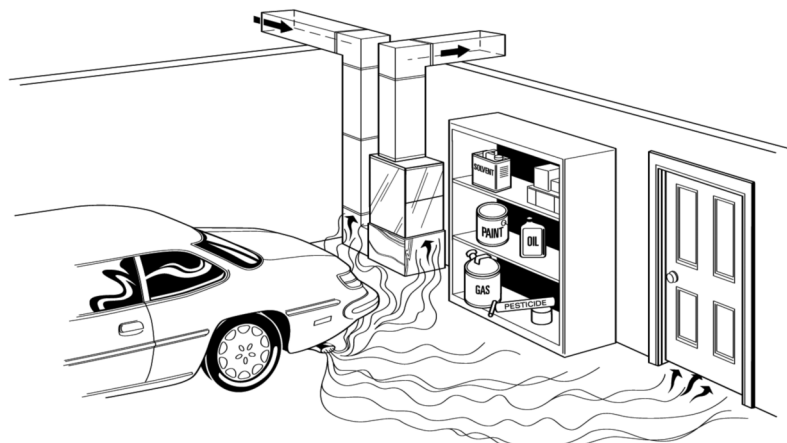
Proper balance and sealing of the duct system improves the efficiency of the heating and air conditioning system and improves the indoor air quality of the home by reducing the amount of airborne pollutants that enter homes from spaces where the ductwork and/or equipment is located. The manufacturer and the U.S. Environmental Protection Agency's Energy Star Program recommend that central duct systems be checked by a qualified contractor for proper balance and sealing.

▲ WARNING

DUCT LEAKS CAN CREATE AN UNBALANCED SYSTEM AND DRAW POLLUTANTS SUCH AS DIRT, DUST, FUMES AND ODORS INTO THE HOME CAUSING PROPERTY DAMAGE. FUMES AND ODORS FROM TOXIC, VOLATILE OR FLAMMABLE CHEMICALS, AS WELL AS AUTOMOBILE EXHAUST AND CARBON MONOXIDE (CO), CAN BE DRAWN INTO THE LIVING SPACE THROUGH LEAKING DUCTS AND UNBALANCED DUCT SYSTEMS CAUSING PERSONAL INJURY OR DEATH (SEE FIGURE 1).

- IF AIR-MOVING EQUIPMENT OR DUCTWORK IS LOCATED IN GARAGES OR OFF-GARAGE STORAGE AREAS - ALL JOINTS, SEAMS, AND OPENINGS IN THE EQUIPMENT AND DUCT MUST BE SEALED TO LIMIT THE MIGRATION OF TOXIC FUMES AND ODORS INCLUDING CARBON MONOXIDE FROM MIGRATING INTO THE LIVING SPACE.
- IF AIR-MOVING EQUIPMENT OR DUCTWORK IS LOCATED IN SPACES CONTAINING FUEL BURNING APPLIANCES SUCH AS

FIGURE 1
MIGRATION OF DANGEROUS SUBSTANCES, FUMES, AND ODORS INTO LIVING SPACES



Adapted from *Residential Duct Diagnostics and Repair*, with permission of Air Conditioning Contractors of America (ACCA).

WATER HEATERS OR BOILERS - ALL JOINTS, SEAMS, AND OPENINGS IN THE EQUIPMENT AND DUCT MUST ALSO BE SEALED TO PREVENT DEPRESSURIZATION OF THE SPACE AND POSSIBLE MIGRATION OF COMBUSTION BYPRODUCTS INCLUDING CARBON MONOXIDE INTO THE LIVING SPACE.

NOTICE

IMPROPER INSTALLATION, OR INSTALLATION NOT MADE IN ACCORDANCE WITH THE CSA INTERNATIONAL (CSA) CERTIFICATION OR THESE INSTRUCTIONS, CAN RESULT IN UNSATISFACTORY OPERATION AND/OR DANGEROUS CONDITIONS AND ARE NOT COVERED BY THE UNIT WARRANTY.

NOTICE

IN COMPLIANCE WITH RECOGNIZED CODES, IT IS RECOMMENDED THAT AN AUXILIARY DRAIN PAN BE INSTALLED UNDER ALL EVAPORATOR COILS OR UNITS CONTAINING EVAPORATOR COILS OR GAS FURNACES USED WITH EVAPORATOR COILS THAT ARE LOCATED IN ANY AREA OF A STRUCTURE WHERE DAMAGE TO THE BUILDING OR BUILDING

CONTENTS MAY OCCUR AS A RESULT OF AN OVERFLOW OF THE COIL DRAIN PAN OR A STOPPAGE IN THE PRIMARY CONDENSATE DRAIN PIPING.

RECEIVING

Immediately upon receipt, all cartons and contents should be inspected for transit damage. Units with damaged cartons should be opened immediately. If damage is found, it should be noted on the delivery papers, and a damage claim filed with the last carrier.

- After unit has been delivered to job site, remove carton taking care not to damage unit.
- Check the unit rating plate for unit size, electric heat, coil, voltage, phase, etc. to be sure equipment matches what is required for the job specification.
- Read the entire instructions before starting the installation.
- Some building codes require extra cabinet insulation and gasketing when unit is installed in attic applications.
- If installed in an unconditioned space, apply caulking around the power wires, control wires, refrigerant tubing and condensate line where they enter the cabinet. Seal the power wires on the inside

where they exit conduit opening. Caulking is required to prevent air leakage into and condensate from forming inside the unit, control box, and on electrical controls.

- Install the unit in such a way as to allow necessary access to the coil/filter rack and blower/control compartment.
- Install the unit in a level position to ensure proper condensate drainage. Make sure unit is level in both directions within 1/8".
- Install the unit in accordance with any local code which may apply and the national codes. Latest editions are available from: "National Fire Protection Association, Inc., Batterymarch Park, Quincy, MA 02269." These publications are:
 - ANSI/NFPA No. 70-(Latest Edition) National Electrical Code.
 - NFPA90A Installation of Air Conditioning and Ventilating Systems.
 - NFPA90B Installation of warm air heating and air conditioning systems.
- The equipment has been evaluated in accordance with the Code of Federal Regulations, Chapter XX, Part 3280.

LOCATION REQUIREMENTS AND CONSIDERATIONS

GENERAL INFORMATION

1. **NOTE:** This furnace is shipped with heat exchanger support brackets installed under the back of the heat exchanger. These may be removed before installation, but it is not required.

LOCATION

▲ WARNING

THIS FURNACE IS NOT APPROVED FOR INSTALLATION IN A MOBILE HOME. DO NOT INSTALL THIS FURNACE IN A MOBILE HOME. INSTALLATION IN A MOBILE HOME COULD CAUSE FIRE, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

2. **IMPORTANT:** *This furnace is not approved or recommended for installation on its back, with access doors facing upwards.*
3. This furnace is suitable for installation in buildings constructed on-site. This heating unit should be centralized with respect to the heat distribution system as much as practicable.
4. **NOTE:** These furnaces are approved for installation in attics, as

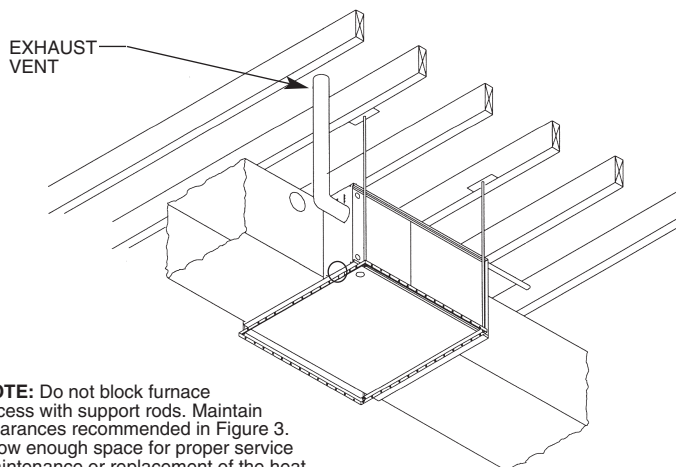
well as alcoves, utility rooms, closets and crawlspaces.

5. **IMPORTANT:** *Support this unit when installed. For attic or crawl space installation, horizontal furnaces may be installed on combustible wood flooring or by using support brackets. See Figure 2.*

6. **IMPORTANT:** *If installing in a utility room, be sure the door is wide enough to:*

- a. *allow the largest part of the furnace to pass; or*
- b. *allow any other appliance (such as a water heater) to pass.*

**FIGURE 2
HORIZONTAL FURNACE INSTALLED W/SUPPORT BRACKETS**



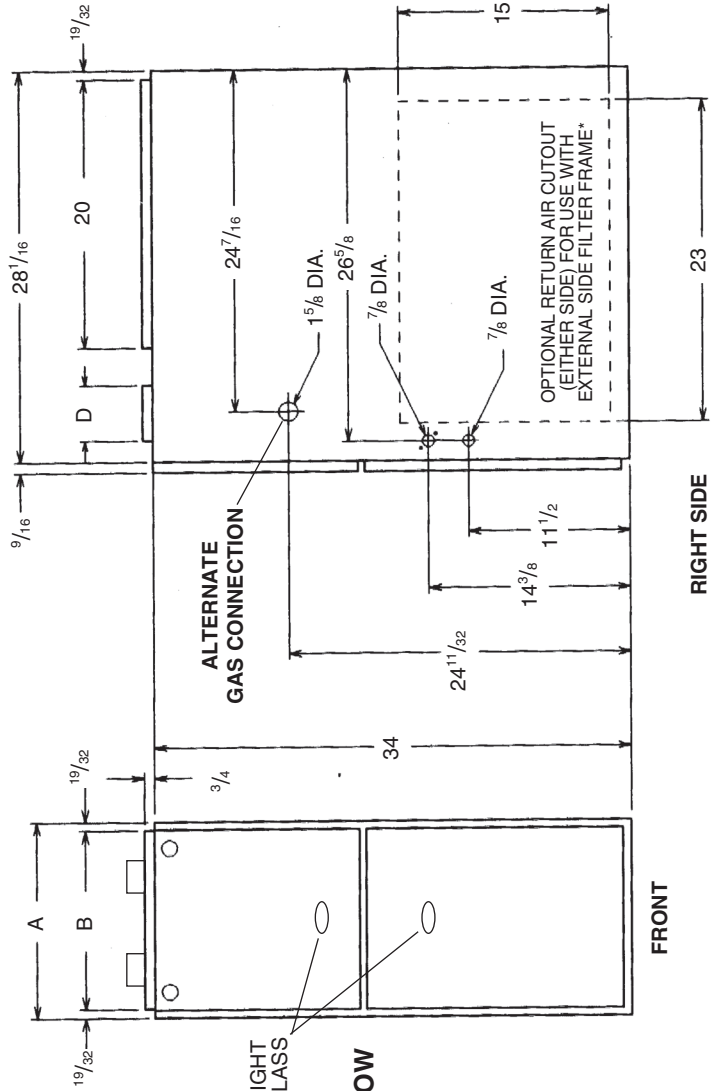
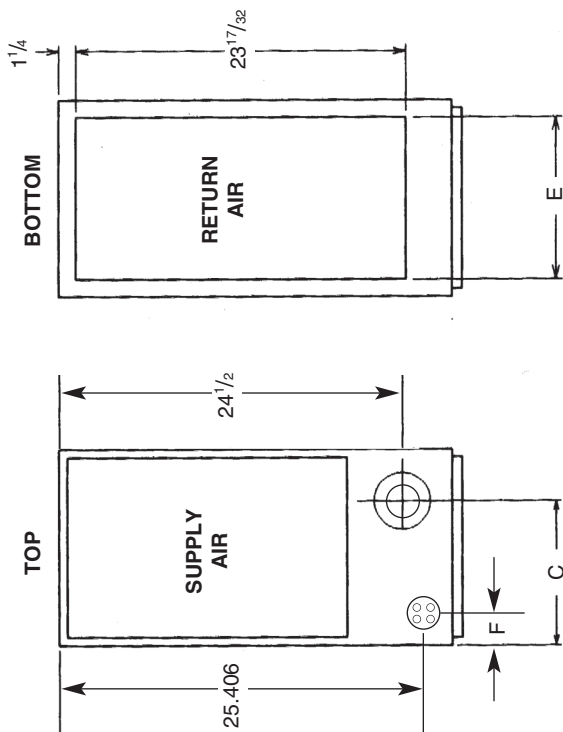
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**FIGURE 3
UPFLOW/HORIZONTAL DIMENSIONS**

**CLEARANCE TO COMBUSTIBLE MATERIAL (INCHES)
UPFLOW/HORIZONTAL MODELS**

Model (-)GPR	REDUCED CLEARANCE (IN.)						Ship. Wgts.						
	A	B	C	D	E	F		Left Side	Right Side	Back	Top	Front	Vent
05	17 1/2	16 11/32	12 3/8	①	15	2 1/2	0	3 ②	0	1	3	6 ③	105 lbs.
07(A)	17 1/2	16 11/32	12 3/8	①	15	2 1/2	0	3 ②	0	1	3	6 ③	115 lbs.
07(B), 10	21	19 27/32	14 1/8	①	18 1/2	2 1/2	0	0	0	1	3	6 ③	120 lbs.
12	24 1/2	23 11/32	15 1/8	①	22	2 1/2	0	0	0	1	3	6 ③	140 lbs.

- ① May require 3" to 4" or 3" or 5" adapter.
- ② May be 0" with type B vent.
- ③ May be 1" with type B vent.



*Both sides for 1800 CFM or above.

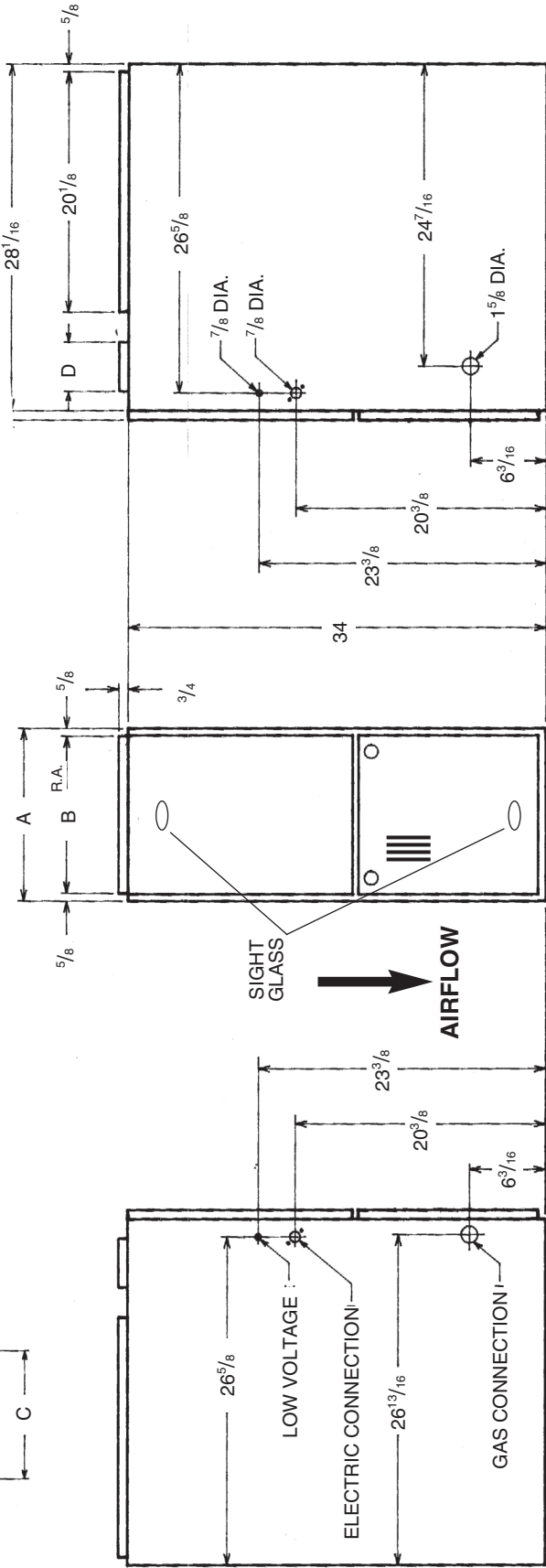
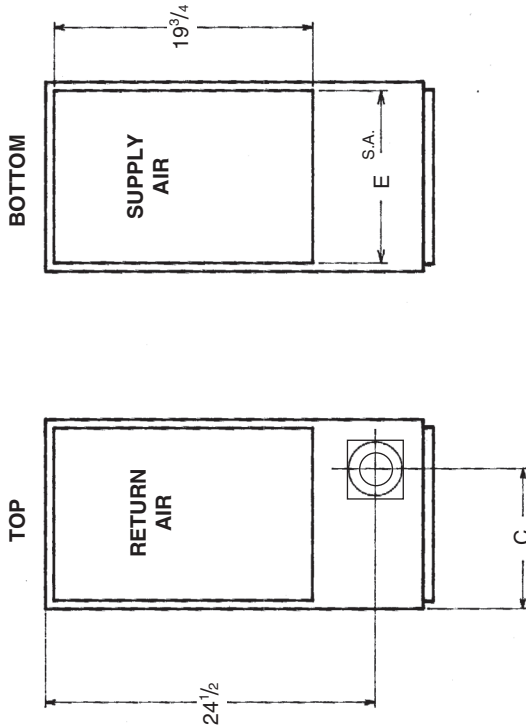
IMPORTANT: This furnace is not approved or recommended for installation on its back, with access doors facing upwards.

**FIGURE 4
DOWNFLOW DIMENSIONS**

**CLEARANCE TO COMBUSTIBLE MATERIAL (INCHES)
DOWNFLOW MODELS**

Model (-)/GLR	REDUCED CLEARANCE (IN.)						Ship. Wgts.					
	A	B	C	D	E	Left Side		Right Side	Back	Top	Front	Vent
07(A)	17 1/2	16 11/32	12 1/8	①	16 5/8	0	3 ②	0	1	3	6 ③	105 lbs.
07(B), 10	21	19 27/32	13 7/8	①	20 1/8	0	0	0	1	3	6 ③	120 lbs.
12	24 1/2	23 11/32	15 5/8	①	23 5/8	0	0	0	1	3	6 ③	140 lbs.

- ① May require 3" to 4" or 3" or 5" adapter.
- ② May be 0" with type B vent.
- ③ May be 1" with type B vent.



NOTE: IN DOWNFLOW CONFIGURATION, OPTIONAL AIR CUTOUT IS NOT PERMITTED. COMBUSTIBLE FLOOR BASE REQUIRED IF FURNACE IS NOT INSTALLED ON COIL BOX.

CLEARANCE – ACCESSIBILITY

The design of forced air furnaces with input ratings as listed in the tables on the following pages are certified by CSA for the clearances to combustible materials shown in inches.

See name/rating plate and clearance label for specific model number and clearance information.

Service clearance of at least 24 inches is recommended in front of all furnaces.

ACCESSIBILITY CLEARANCES, WHERE GREATER, MUST TAKE PRECEDENCE OVER FIRE PROTECTION CLEARANCES.

▲ WARNING

UPFLOW AND HORIZONTAL FURNACES MUST NOT BE INSTALLED DIRECTLY ON CARPETING, TILE OR OTHER COMBUSTIBLE MATERIAL OTHER THAN WOOD FLOORING. INSTALLATION ON A COMBUSTIBLE MATERIAL CAN RESULT IN FIRE CAUSING PROPERTY DAMAGE, SEVERE PERSONAL INJURY OR DEATH.

A gas-fired furnace for installation in a residential garage must be installed so that the burner(s) and the ignition source are located not less than 18" above the floor and the furnace is located or protected to avoid physical damage by vehicles.

▲ WARNING

DOWNFLOW UNIT DESIGN IS CERTIFIED FOR INSTALLATION ON NON-COMBUSTIBLE FLOOR. A SPECIAL COMBUSTIBLE FLOOR SUB-BASE, FIGURE 5, IS REQUIRED WHEN INSTALLING ON A COMBUSTIBLE FLOOR. FAILURE TO INSTALL THE SUB-BASE MAY RESULT IN FIRE, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH. THIS SPECIAL BASE IS OFFERED AS AN ACCESSORY FROM THE FACTORY. SEE THE CLEARANCE LABEL LOCATED INSIDE THE FURNACE FOR THE APPROPRIATE MODEL NUMBER.

THE SPECIAL BASE IS NOT REQUIRED WHEN THE FURNACE IS INSTALLED ON TOP OF AN AIR CONDITIONING PLENUM.

SITE SELECTION

1. Select a site in the building near the center of the proposed, or existing, duct system.
2. Give consideration to the vent system piping when selecting the furnace location. Be sure the venting system can travel from the furnace to the termination with minimal length and elbows.
3. Locate the furnace near the existing gas piping. Or, if running a new gas line, locate the furnace to minimize the length and elbows in the gas piping.
4. Locate the furnace to maintain proper clearance to combustibles as shown in Figures 3 and 4.

▲ CAUTION

WHEN COILS ARE INSTALLED ABOVE A FINISHED CEILING OR LIVING AREA, IT IS RECOMMENDED THAT AN AUXILIARY SHEET METAL CONDENSATE DRAIN PAN BE FABRICATED AND INSTALLED UNDER ENTIRE UNIT. FAILURE TO DO SO CAN RESULT IN PROPERTY DAMAGE. RUN CONDENSATE TO A LOCATION WHERE IT IS NOTICEABLE.

▲ WARNING

COMBUSTIBLE MATERIAL MUST NOT BE PLACED ON OR AGAINST THE FURNACE JACKET OR WITHIN THE SPECIFIED CLEARANCES OF THE VENT PIPE. THE AREA AROUND THE FURNACE MUST BE KEPT CLEAR AND FREE OF ALL COMBUSTIBLE MATERIALS INCLUDING GASOLINE AND OTHER FLAMMABLE VAPORS AND LIQUIDS. PLACEMENT OF COMBUSTIBLE MATERIALS ON, AGAINST OR AROUND THE FURNACE JACKET CAN CAUSE AN EXPLOSION OR FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH. THE FURNACE OWNER SHOULD BE CAUTIONED THAT THE FURNACE AREA MUST NOT BE USED AS A BROOM CLOSET OR FOR ANY OTHER STORAGE PURPOSES.

DUCTING

Proper air flow is required for the correct operation of this furnace. Too little air flow can cause erratic operation and can damage the heat exchanger. The duct system must carry the correct amount of air for heating and cooling. Position the unit to minimize long runs or runs with many turns and elbows.

Size and install the ducts according to acceptable industry standards and methods. The total static pressure drop (including evaporator coil, if used) of the entire system should not exceed 0.8" w.c. Be sure to have adequate space for unit filter. **NOTE:** Airflow external static pressure measurements do not include filter or coil.

IMPORTANT: *Some high efficiency filters have a greater than normal resistance to air flow. This can adversely affect furnace operation. BE SURE TO CHECK AIR FLOW if using any filter other than the factory-provided filter.*

NOTE: DO NOT take return air from bathrooms, kitchens, furnace rooms, garages, utility or laundry rooms, or cold areas.

IMPORTANT: *Return air temperature must be **above 55°F** during the heating season.*

▲ WARNING

NEVER ALLOW PRODUCTS OF COMBUSTION OR THE FLUE PRODUCTS TO ENTER THE RETURN AIR DUCTWORK, OR THE CIRCULATING AIR SUPPLY. ALL RETURN DUCTWORK MUST BE ADEQUATELY SEALED AND SECURED TO THE FURNACE WITH SHEET METAL SCREWS, AND JOINTS TAPED. WHEN A FURNACE IS MOUNTED ON A PLATFORM, WITH RETURN THROUGH THE BOTTOM, IT MUST BE SEALED AIRTIGHT BETWEEN THE FURNACE AND THE RETURN AIR PLENUM. THE RETURN AIR PLENUM MUST BE PERMANENTLY ENCLOSED. NEVER USE A DOOR AS A PART OF THE RETURN AIR PLENUM. THE FLOOR OR PLATFORM MUST PROVIDE SOUND PHYSICAL SUPPORT OF THE FURNACE, WITHOUT SAGGING, CRACKS, GAPS, ETC., AROUND THE BASE AS TO PROVIDE A SEAL BETWEEN THE SUPPORT AND THE BASE.

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.

DO NOT, UNDER ANY CIRCUMSTANCES, CONNECT RETURN OR SUPPLY DUCTWORK TO OR FROM ANY OTHER HEAT PRODUCING DEVICE SUCH AS A FIREPLACE INSERT, STOVE, ETC. DOING SO MAY RESULT IN FIRE, CARBON MONOXIDE POISONING, EXPLOSION, PERSONAL INJURY OR PROPERTY DAMAGE.

▲ WARNING

BLOWER AND BURNERS MUST NEVER BE OPERATED WITHOUT THE BLOWER DOOR IN PLACE. THIS IS TO PREVENT DRAWING GAS FUMES (WHICH COULD CONTAIN HAZARDOUS CARBON MONOXIDE) INTO THE HOME THAT COULD RESULT IN PERSONAL INJURY OR DEATH.

UPFLOW UNITS

1. Set furnace in place and connect the return duct or return air cabinet to unit. Make the connection air-tight to prevent entraining combustion gases from any adjacent fuel-burning appliances. Unit return air may be connected on the sides or bottom of the return air compartment.
 - a. Openings in the side must be cut out the full width of the knockouts on the unit. If using side return air, **THE BOTTOM base plate must be installed.**

NOTE: Where the maximum airflow is 1800 CFM or more, both sides or the bottom must be used for return air.
 - b. If using bottom return air, place furnace over return air plenum and seal furnace bottom to return air plenum.

▲ WARNING

A SOLID METAL BASE PLATE, (SEE TABLE 1) MUST BE IN PLACE WHEN THE FURNACE IS INSTALLED WITH SIDE AIR RETURN DUCTS. FAILURE TO INSTALL A BASE PLATE COULD CAUSE PRODUCTS OF COMBUSTION TO BE CIRCULATED INTO THE LIVING SPACE AND CREATE POTENTIALLY HAZARDOUS CONDITIONS, INCLUDING CARBON MONOXIDE POISONING OR DEATH.

TABLE 1		
FURNACE WIDTH	BASE PLATE NO.	BASE PLATE SIZE
17 ¹ / ₂ "	RXGB-D17	15 ¹ / ₈ " x 23 ⁹ / ₁₆ "
21"	RXGB-D21	18 ⁵ / ₈ " x 23 ⁹ / ₁₆ "
24 ¹ / ₂ "	RXGB-D24	25 ⁵ / ₈ " x 23 ⁹ / ₁₆ "

2. If summer air conditioning is desired, position the indoor coil on the supply air side of the furnace. Insure that no air can bypass this coil.
3. Connect the supply air plenum to the furnace plenum opening, or indoor coil.

NOTE: The (-)GLR has louvers to cool the inducer motor bearings.

DOWNFLOW UNITS

▲ WARNING

THE DOWNFLOW FURNACE DESIGN IS CERTIFIED FOR INSTALLATION ON A NON-COMBUSTIBLE FLOOR. IF INSTALLED ON A COMBUSTIBLE FLOOR, USE THE SPECIAL BASE SPECIFIED ON THE FURNACE CLEARANCE LABEL. FAILURE TO INSTALL THE SPECIAL BASE MAY RESULT IN FIRE, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH. THIS SPECIAL BASE IS

SHIPPED FROM THE FACTORY AS AN ACCESSORY.

1. Position the unit over the supply air plenum and connect.
 - a. If installing on a combustibile floor **and not using an evaporator coil box**, install the special combustibile floor base. See Figure 5.
 - b. If summer air conditioning is desired, position the indoor coil on the supply air side. Insure that no air can bypass this coil.
2. Connect the return air ducting to the return air opening at the top of the unit. Make the connection air tight to prevent entraining combustion gases from an adjacent fuel-burning appliance.

HORIZONTAL UNITS

1. Unit can be mounted left or right side airflow configuration.
2. Position the unit on adequate supports or by using support brackets (see Figure 2) and connect supply plenum and return.
3. If summer air conditioning is desired, position the indoor coil on the supply air side of the unit. Insure that no air can bypass this coil.
4. Secure the four angle brackets shipped with the unit to the return air opening. See Figure 6. Connect the return air ducting to the return air opening at the top of the unit. Make the connection air tight to prevent entraining combustion gases from an adjacent fuel-burning appliance.

NOTE: Do not block furnace access with support rods. Maintain clearances recommended in Figure 3. Allow enough space for proper service maintenance or replacement of the heat exchanger and blower assembly.

FIGURE 5
COMBUSTIBLE FLOOR BASE (RXGC-B17, -B21, -B24)

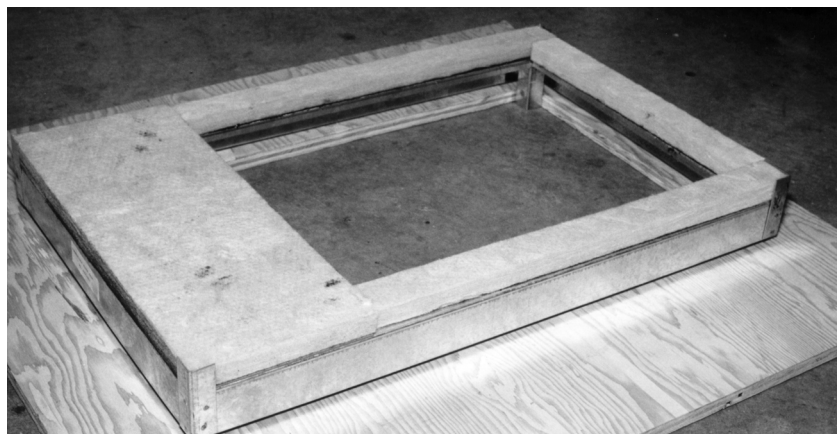
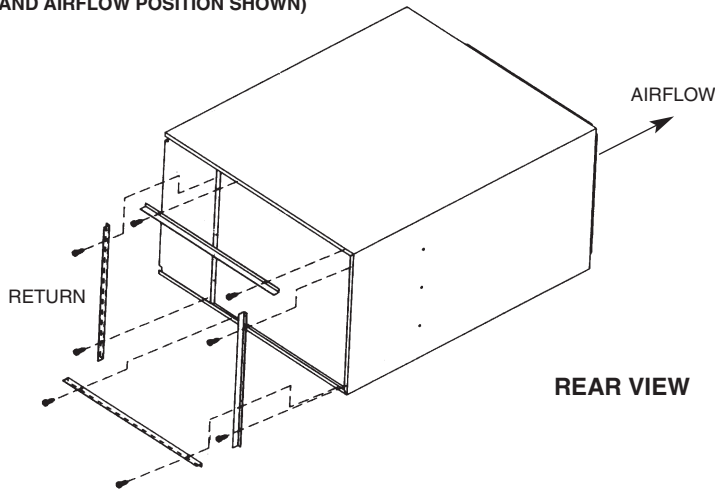


FIGURE 6
HORIZONTAL RETURN AIR DUCT
(LEFT-HAND AIRFLOW POSITION SHOWN)



FOUR ANGLE BRACKETS ARE SHIPPED WITH EACH UNIT THAT CAN BE USED TO SECURE THE RETURN AIR DUCT TO A HORIZONTAL UNIT.

- Commercial buildings
- Buildings with indoor pools
- Furnaces installed in laundry rooms
- Furnaces in hobby or craft rooms
- Furnaces installed near chemical storage areas.

Exposure to the following substances in the combustion air supply may also require OUTDOOR AIR for combustion:

- Permanent wave solutions
- Chlorinated waxes and cleaners
- Chlorine-based swimming pool chemicals
- Water softening chemicals
- De-icing salts or chemicals
- Carbon tetrachloride
- Halogen type refrigerants
- Cleaning solvents (such as perchloroethylene)
- Printing inks, paint removers, varnishes, etc.
- Hydrochloric acid
- Cements and glues
- Antistatic fabric softeners for clothes dryers
- Masonry acid washing materials

COMBUSTION AND VENTILATION AIR

IMPORTANT: This is not a direct vent furnace. Review venting instructions before installing.

⚠ WARNING

THIS FURNACE AND ANY OTHER FUEL-BURNING APPLIANCE MUST BE PROVIDED WITH ENOUGH FRESH AIR FOR PROPER COMBUSTION AND VENTILATION OF THE FLUE GASES. MOST HOMES WILL REQUIRE THAT OUTSIDE AIR BE SUPPLIED INTO THE FURNACE AREA. FAILURE TO DO SO CAN CAUSE DEATH FROM CARBON MONOXIDE POISONING.

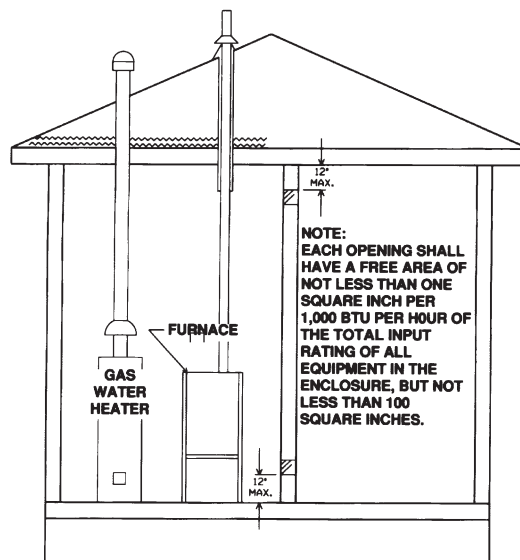
Adequate facilities for providing air for combustion and ventilation must be provided in accordance with section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code, ANSI, Z223.1 latest edition or CSA B149.1 and .2 or, applicable provisions for the local building codes, and not obstructed so as to prevent the flow of air to the furnace.

COMBUSTION AIR REQUIREMENTS

IMPORTANT: Air for combustion and ventilation must not come from a corrosive atmosphere. Any failure due to corrosive elements in the atmosphere is excluded from warranty coverage.

The following types of installation may require OUTDOOR AIR for combustion, due to chemical exposures:

FIGURE 7
AIR FROM HEATED SPACE



NOTE:
EACH OPENING SHALL HAVE A FREE AREA OF NOT LESS THAN ONE SQUARE INCH PER 1,000 BTU PER HOUR OF THE TOTAL INPUT RATING OF ALL EQUIPMENT IN THE ENCLOSURE, BUT NOT LESS THAN 100 SQUARE INCHES.

Combustion air must be free of acid forming chemicals; such as sulphur, fluorine and chlorine. These elements are found in aerosol sprays, detergents, bleaches, cleaning solvents, air fresheners, paint and varnish removers, refrigerants and many other commercial and household products. Vapors from these products when burned in a gas flame form acid compounds. The acid compounds increase the dew point temperature of the flue products and are highly corrosive after they condense.

⚠ WARNING

ALL FURNACE INSTALLATIONS MUST COMPLY WITH THE NATIONAL FUEL GAS CODE AND LOCAL CODES TO PROVIDE ADEQUATE COMBUSTION AND VENTILATION AIR FOR THE FURNACE. FAILURE TO DO SO CAN CREATE HAZARDOUS CONDITIONS RESULTING IN PROPERTY DAMAGE, BODILY INJURY OR DEATH FROM SMOKE, FIRE OR CARBON MONOXIDE.

Combustion air requirements are determined by whether the furnace is in an open (unconfined) area or in a confined space such as a closet or small room. See Figures 7 and 8.

EXAMPLE 1. FURNACE LOCATED IN AN UNCONFINED SPACE

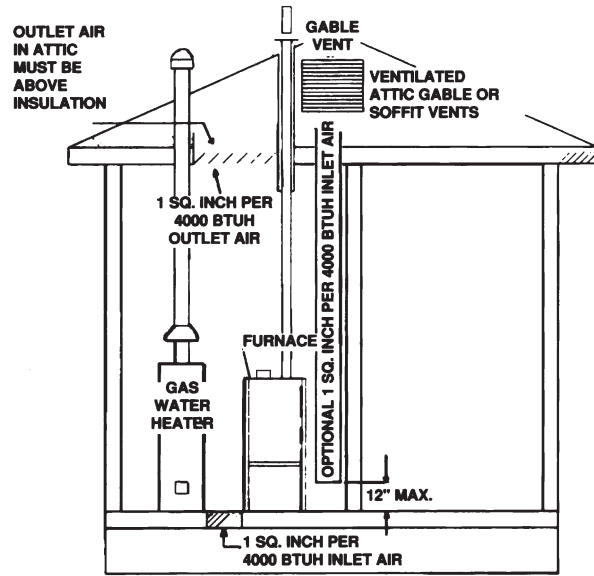
Using indoor air for combustion.

An unconfined space must have at least 50 cubic feet for each 1,000 BTUH of the total input for all appliances in the space. Here are a few examples of the room sizes required for different inputs. The sizes are based on 8 foot ceilings.

BTUH Input	Minimum Sq. Feet With 8' Ceiling	Typical Room Size With 8' Ceiling
50,000	312	14*x24* or 18*x18*
75,000	469	15*x31* or 20*x24*
100,000	625	20*x31* or 25*x25*
125,000	833	23*x34* or 26*x30*

If the open space containing the furnace is in a building with tight construction (contemporary construction), outside air may still be required for the furnace to operate and vent properly. Outside air openings should be sized the same as for a confined space.

FIGURE 8
AIR FROM ATTIC/CRAWL SPACE



EXAMPLE 2. FURNACE LOCATED IN A CONFINED SPACE

A confined space (any space smaller than shown above as “unconfined”) must have openings into the space which are located in accordance with the requirements set forth in the following subsections A and B. Size the openings by how they are connected to the heated area or to the outside, and by the input of all appliances in the space.

If confined space is within a building with tight construction, combustion air must be taken from outdoors or area freely communicating with the outdoors.

A. USING INDOOR AIR FOR COMBUSTION, ALL OF THE MODELS

IMPORTANT: *Air should not be taken from a heated space with a fireplace, exhaust fan or other device that may produce a negative pressure.*

If combustion air is taken from the heated area, the openings must each have at least 100 square inches of free area. Each opening must have at least one square inch of free area for each 1,000 Btuh of total input in the space. Here are some examples of typical openings required.

Btuh Input	Free Area Each Opening
100,000	100 Square Inches

AIR INTAKE PIPE CONNECTION ((-)GPR UPFLOW/HORIZONTAL ONLY)

A double-elbow may be installed to top inlet air opening, BUT IS NOT REQUIRED. This will help to prevent accidental blockage of the intake opening. Reference Figure 9 for proper elbow diameter.

NOTE: Inlet is specifically designed to prevent material from being pulled into furnace. If elbows are not used, the intake opening must be kept clean and free of debris.

It is also acceptable to run the condensate drain (or refrigerant) line access over the air intake hole as long as a 1" minimum clearance is maintained.

B. USING OUTDOOR AIR FOR COMBUSTION, ALL OF THE MODELS

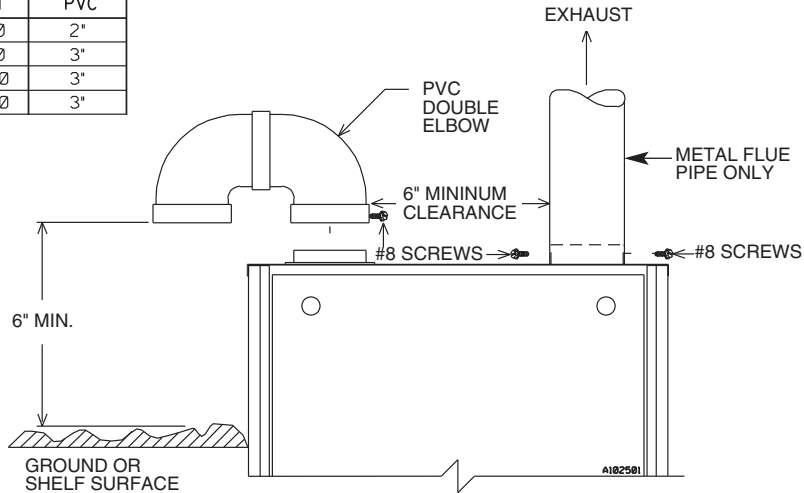
IMPORTANT: Never take combustion air from an attic space that is equipped with power ventilation.

The confined space must communicate with the outdoors according to Methods 1 and 2. The minimum air opening dimension shall not be less than 3 inches. When using ducts, they shall be of the same cross-sectional area as the free area of the openings to which they connect.

FIGURE 9
COMBUSTION AIR FITTING – NON-ATTIC COMBUSTION AIR PULL, GPR ONLY

ATTACH OPTIONAL DOUBLE ELBOW TO TOP INLET AIR OPENING TO PREVENT ACCIDENTAL BLOCKAGE OF INTAKE OPENING. THIS IS NOT A REQUIREMENT. (SEE PREVIOUS PAGE.) SINGLE ELBOW IS ALLOWED BUT MAY NOT PREVENT DEBRIS FROM BEING DROPPED INTO THE FURNACE.

FURNACE BTU/H	DIA. OF PVC
50,000	2"
75,000	3"
100,000	3"
125,000	3"



NOTE: PREDRILL HOLES FOR SCREWS TO PREVENT CRACKING.

B: Method 1

Provide two permanent openings, one located within 12 inches of the top and one located within 12 inches of the bottom of the enclosure. Each opening shall communicate directly, or by ducts, with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors.

- a. Where directly communicating with the outdoors or where communicating to the outdoors through **VERTICAL DUCTS**, each opening shall have a minimum free area of **1 square inch for each 4000 BTUH** of total appliance input rating in the enclosure. Here are typical duct sizes:

VERTICAL OUTDOOR AIR OPENING DIMENSIONS		
BTUH Input	Free Area Each Opening	Round Pipe Size
50,000	12.50 sq. inches	4"
75,000	18.75 sq. inches	5"
100,000	25.00 sq. inches	6"
125,000	31.25 sq. inches	7"

- b. Where communicating with outdoors through **HORIZONTAL DUCTS**, each opening shall have a minimum free area of **1 square inch for each 2000 BTUH** of total input rating for all equipment in the enclosure. Here are typical duct sizes:

HORIZONTAL OUTDOOR AIR OPENING DIMENSIONS		
BTUH Input	Free Area Each Opening	Round Pipe Size
50,000	25.00 sq. inches	6"
75,000	37.50 sq. inches	7"
100,000	50.00 sq. inches	8"
125,000	62.50 sq. inches	9"

B: Method 2

One permanent opening, located within 12 inches of the top of the enclosure, shall be permitted where the equipment has clearances of at least 1 inch from the sides and back and 6 inches from the front of the appliance. The opening shall directly communicate with the outdoors or communicate through a vertical or horizontal duct to the outdoors or spaces (crawl or attic) that freely communicate with the outdoors and have a minimum free area of:

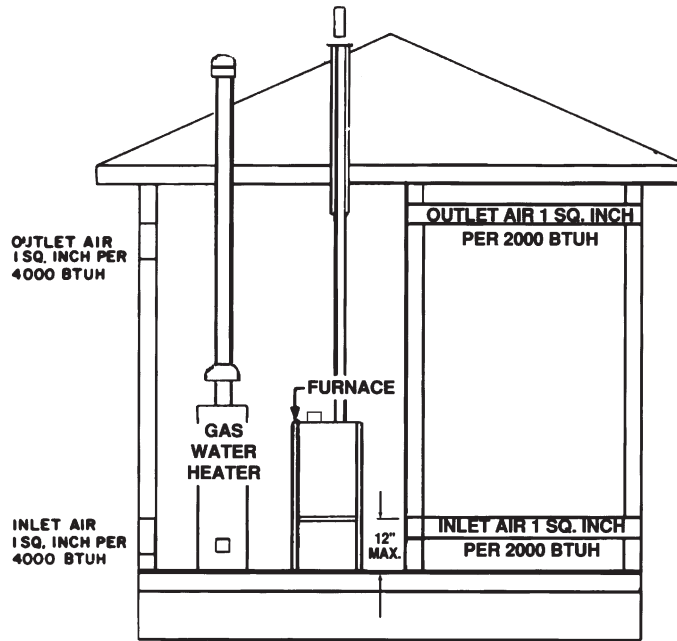
- a. One square inch for each 3000 BTUH of the total input rating of all equipment located in the enclosure, **AND**
- b. Not less than the sum of the areas of all vent connectors in the confined space.

IMPORTANT: If the furnace is in a location with an exhaust fan, there must be sufficient ventilation to prevent the exhaust fan from creating a negative pressure in the room.

Combustion air openings must **NOT BE RESTRICTED** in any manner.

CONSULT LOCAL CODES FOR SPECIAL REQUIREMENTS.

FIGURE 10
OUTSIDE AIR USING A HORIZONTAL INLET & OUTLET



B: Method 3, GPR only

For the optimum in quiet operation, attic air may be brought directly to the furnace.

IMPORTANT: In applications using Method 3 for combustion air, the attic must be ventilated by gable or soffit vents. See Figure 8.

It is not required to provide any permanent openings as described in Method 1 or Method 2.

CAUTION

COMBUSTION AIR INTAKES CANNOT BE TERMINATED OUTSIDE. DOING SO CAN CAUSE

IMPROPER OPERATION OF THE FURNACE.

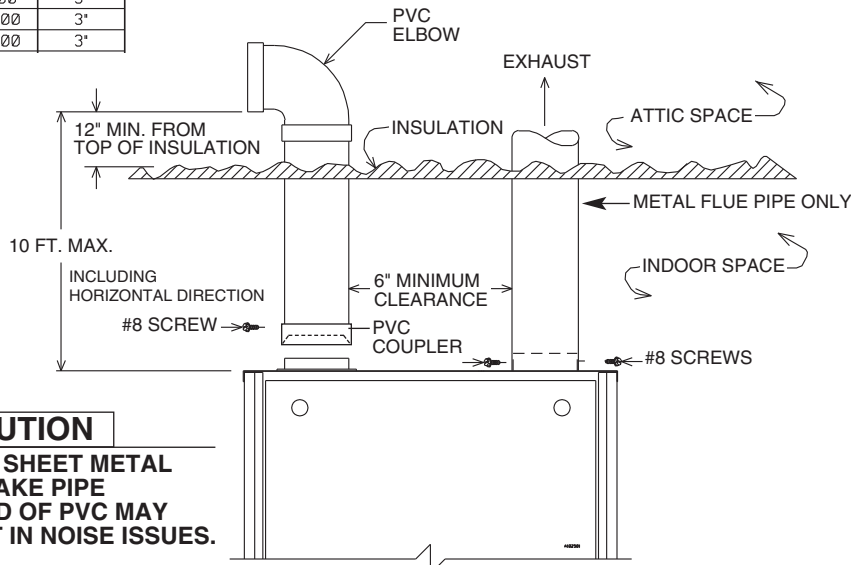
If attic combustion air is used, the inlet air opening at the furnace must be protected from accidental blockage. Install a 90° elbow pointing horizontally at the top of inlet air pipe. See Figure 11 (maximum of 2, 22½°, 45° or 90° elbows, allowed).

NOTE: Maximum length of pipe that may be used for combustion air is 10 feet with two elbows. Lengths of more than 10 feet can result in nuisance pressure switch trips.

FIGURE 11
COMBUSTION AIR FITTING – OPTIONAL ATTIC COMBUSTION AIR PULL, GPR ONLY

FURNACE BTU/H	DIA. OF PVC
50,000	2"
75,000	3"
100,000	3"
125,000	3"

ATTACH A 90° ELBOW TO TOP INLET AIR OPENING TO PREVENT ACCIDENTAL BLOCKAGE OF INTAKE OPENING.



CAUTION

USE OF SHEET METAL AIR INTAKE PIPE INSTEAD OF PVC MAY RESULT IN NOISE ISSUES.

NOTE: PREDRILL HOLES FOR SCREWS TO PREVENT CRACKING.

VENTING

GENERAL INFORMATION

The furnace must be vented in accordance with these instructions, National Fuel Gas Code, ANSI Z223.1 and/or the Natural Gas Installation Code, CSA-B149.1 & .2 and requirements or codes of the local utility or other authority having jurisdiction.

▲ WARNING

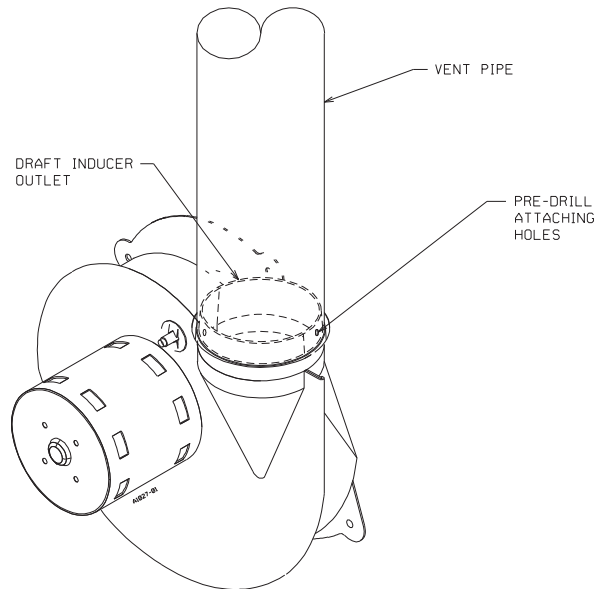
DEVICES ATTACHED TO THE FLUE OR VENT FOR THE PURPOSE OF REDUCING HEAT LOSS UP THE CHIMNEY HAVE NOT BEEN TESTED AND HAVE NOT BEEN INCLUDED IN THE DESIGN CERTIFICATION OF THIS FURNACE. WE, THE MANUFACTURER, CANNOT AND WILL NOT BE RESPONSIBLE FOR INJURY OR DAMAGE CAUSED BY THE USE OF SUCH UNTESTED AND/OR UNCERTIFIED DEVICES, ACCESSORIES OR COMPONENTS.

DRAFT INDUCER

▲ WARNING

VENT PIPE ATTACHING HOLES MUST BE PREDRILLED IN THE DRAFT INDUCER COLLAR TO PREVENT DAMAGING THE INDUCER. DRILL 1/8" DIAMETER HOLES THROUGH THE VENT PIPE AND COLLAR AND USE #8 SCREWS TO ATTACH. SEE FIGURE 12. FAILURE TO FOLLOW THIS WARNING CAN CAUSE RECIRCULATION OF FLUE PRODUCTS CAUSING CARBON MONOXIDE POISONING RESULTING IN PERSONAL INJURY OR DEATH.

FIGURE 12
ATTACHING TO DRAFT INDUCER COLLAR



A0991-01

FURNACE CATEGORY INFORMATION

This furnace is shipped as a Category I type induced draft furnace. A Category I furnace operates with a nonpositive vent pressure and has a vent gas temperature at least 140°F above the dew point of the vent gases. A Category I type may be a draft hood equipped furnace or have a fan assisted combustion system (induced draft). The inducer is used to pull flue products through the combustion chamber and as they leave the furnace, most of the energy has been dissipated. The buoyant effect of the flue gases provides venting to the outdoors.

During the off cycle, the inducer is off and there is very little flow through the vent, cooling the vent. During the on cycle there is no dilution airflow, as with a draft hood type furnace. Although the vent heats up rapidly without dilution air, the flue products contain more water vapor, which results in a higher dew point temperature. It is most **important** that you follow the guidelines in these instructions to prevent the possible formation of condensation in the venting system.

As a Category I furnace it may be vented vertically with type B-1 vent pipe and also may be common vented, as described in these instructions.

IMPORTANT APPLICATION NOTES

When the furnace is used as a replacement, the existing vent system should be inspected to assure that there are no obstructions, blockage, or any signs of corrosion and is properly sized for use with this furnace.

NOTE: When the vent table permits more than one diameter of pipe for a connector or vent, the smallest permitted diameter must be used.

Vent pipe may be type "B-1," either rigid or suitable flexible construction that carries a u.l. listing.

Common venting is allowed with vertical B-1 vent systems, and lined masonry chimneys. Follow the National Fuel Gas Code, ANSI Z223.1 and/or the Natural Gas Installation Code, CSA-B149.1 & .2 for proper installation practices.

NOTE: Follow combustion air instructions as outlined in this manual.

Single wall vent connectors to "B-1 vent or masonry chimneys" may be used under the guidelines of the National Fuel Gas Code, ANSI Z223.1 and/or the Natural Gas Installation Code, CSA-B149.1 & .2.

The entire length of the vent connector shall be readily accessible for inspection, cleaning and replacement.

"B-1" VERTICAL VENTING

Type "B-1" vents must be installed in accordance with the terms of their listings and the vent manufacturer's instructions.

"B-1" vents must be supported and spaced in accordance with their listings and the manufacturer's instructions. All vents must be supported to maintain their minimum clearances from combustible material.

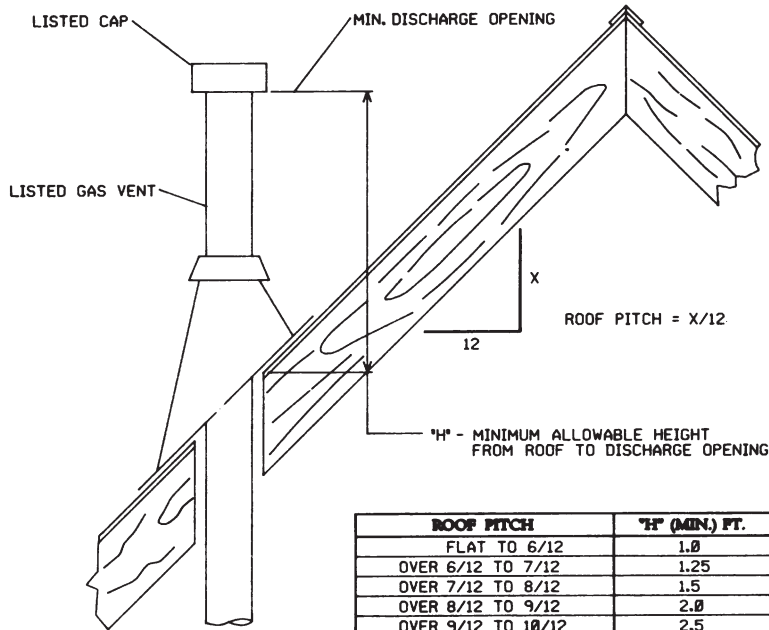
VERTICAL VENTING	
Input	Categorized Furnace Vent Size Required
50K	3"
75K	*4"
100K	*4"
125K	*5"

*NOTE: All furnaces have a 3" vent connection as shipped from the factory. A 3" to 4" or 3" to 5" vent transition is required on all but the 50,000 BTUH models when vertically vented or common vented with metal vent pipes. **THE VENT TRANSITION CONNECTION MUST BE MADE AT THE FURNACE VENT EXIT.** It must originate with an adapter if required, at the furnace flue collar and terminate either in a listed cap or roof assembly. When common venting, the vent connector size may differ from the above diameters depending on application. See ANSI Z21.47-1993/CSA-2.3-M93 or latest edition tables.

VERTICAL VENT SYSTEMS:

1. A gas vent shall terminate above the roof surface with a listed cap or listed roof assembly. Gas vents 12 inches in size or smaller with listed caps shall be permitted to be terminated in accordance with Figure 13, provided they are at least 8 feet from a vertical wall or similar obstruction. All other gas vents shall terminate not less than 2 feet above the highest point where they pass through the roof and at least 2 feet higher than any portion of a building within 10 feet.
2. A type B-1 gas vent shall terminate at least 5 feet in vertical height above the highest connected equipment draft hood or flue collar.
3. Must rise 1/4" per foot away from the furnace on horizontal runs and be supported with straps or hangers so it has no sags or dips. Supports at 4 foot intervals and at all elbows are recommended.
4. The vent connector must be mechanically fastened to the outlet collar of the furnace with at least (2) sheet metal screws except vent connectors that are B-1 material.

FIGURE 13
TYPICAL VENTING WITH "B-1" VENT



ROOF PITCH	"H" (MIN.) FT.
FLAT TO 6/12	1.0
OVER 6/12 TO 7/12	1.25
OVER 7/12 TO 8/12	1.5
OVER 8/12 TO 9/12	2.0
OVER 9/12 TO 10/12	2.5
OVER 10/12 TO 11/12	3.25
OVER 11/12 TO 12/12	4.0
OVER 12/12 TO 14/12	5.0
OVER 14/12 TO 16/12	6.0
OVER 16/12 TO 18/12	7.0
OVER 18/12 TO 20/12	7.5
OVER 20/12 TO 21/12	8.0

These shall be assembled in accordance with the manufacturer's instructions. See Figure 12.

5. Any angle greater than 45 degrees from the vertical is considered horizontal. The total horizontal distance of a vent plus the horizontal vent connector serving draft-hood equipped appliances shall not be greater than 75 percent of the vertical height of the vent.

NOTE: Refer to the National Fuel Gas Code, ANSI Z223.1 and/or the Natural Gas Installation Code, CSA-B149.1 & .2.

Single appliance venting of a fan assisted furnace into a tile-lined masonry chimney is prohibited. The chimney must be lined with either Type B vent or with a listed, single wall, metal lining system. Reference National Fuel Gas Code, ANSI Z223.1 and/or the Natural Gas Installation Code, CSA-B149.1 & .2. See Figure 14 for typical B-1 vent chase.

▲ WARNING

DO NOT CONNECT THIS FURNACE TO A CHIMNEY USED TO VENT A SOLID FUEL APPLIANCE (WOOD OR COAL). VENTING WITH A SOLID FUEL APPLIANCE CAN LEAD TO IMPROPER FUNCTIONING OF THE UNIT, AND DUE TO SOOTING, THE POSSIBILITY OF FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

SPECIAL VENT SYSTEMS (SVS)

IMPORTANT: It is *THE FURNACE MANUFACTURER's* position now that *new installations of any HTPV pipe used in a category III vent application, including Selkirk's Selvent™ II HTPV product, should cease immediately.*

POWER VENT SYSTEMS

When vertical venting is not possible, the only acceptable method for horizontal venting is with the use of Tjernlund model GPAK-1TR or Field Controls models SWG-4R power venter. Type B vent pipe and fittings must be used. Common venting is not permitted

All application and installation instructions supplied with the power venter must be followed.

Please address all questions regarding power venter installation, agency listings and furnace model compatibility to:

Tjernlund Products, Inc.
(800) 255-4208 or (612) 426-2993

Field Controls L.L.C.
(800) 742-8368 or (919) 522-0214

RXGW-B01 CHIMNEY ADAPTER

IMPORTANT: CHIMNEY ADAPTER IS CERTIFIED FOR USE ON UPFLOW (-GPR) ONLY.

This appliance is CSA certified for use with RXGW-B01 Chimney Adapter. Refer to Kit Installation Instructions 92-101682-01.

EXISTING VENT SYSTEMS IMPORTANT RETROFIT VENTING INSTRUCTIONS

If this furnace is a replacement installation, **ALWAYS INSPECT** the existing vent system to be sure there are no obstructions, blockages, or signs of corrosion.

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

The following steps shall be followed with each appliance that remains connected to the common venting system, while the other appliances that remain connected to the common venting systems are not in operation.

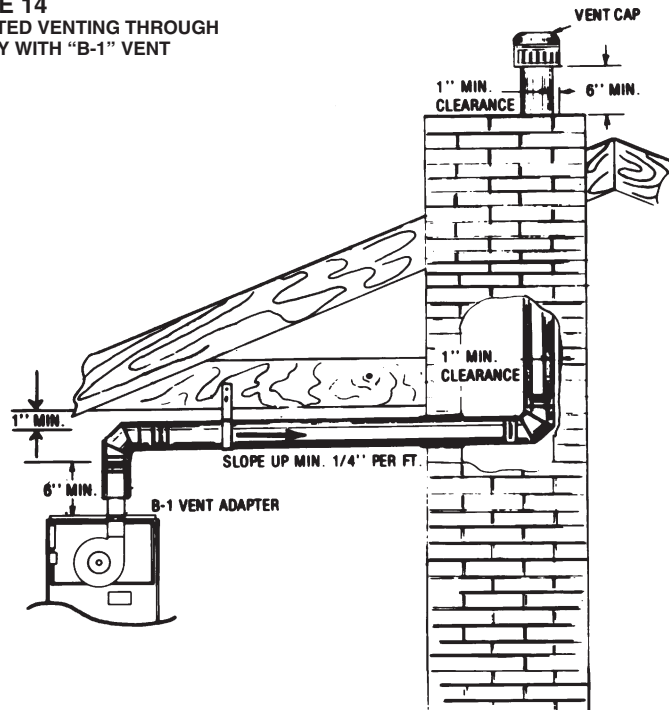
NOTE: When the vent table permits more than one diameter of pipe for a connector or vent, the smallest permitted diameter must be used. 1. Seal any unused openings in the common venting system.

1. Visually inspect the venting system for proper size and horizontal pitch and determine that there is no blockage, restriction, leakage, corrosion or other deficiencies which could cause an unsafe condition.
2. Insofar as is practical, close all building doors, windows and all doors between the space where the appliances remaining connected to

the common venting system are located. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.

3. Follow the lighting instructions. Place the appliance being inspected into operation. Adjust the thermostat so the appliance will operate continuously.
4. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar, or pipe.
5. After it has been determined that each appliance that remains connected to the common 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.
6. If improper venting is observed during any of the above tests, the common venting system must be resized. Refer to National Fuel Gas Code, ANSI Z223.1 and/or the Natural Gas Installation Code, CSA-B149.1 & .2.

FIGURE 14
DEDICATED VENTING THROUGH
CHIMNEY WITH "B-1" VENT



GAS SUPPLY AND PIPING

GAS SUPPLY

⚠ WARNING

THIS FURNACE IS EQUIPPED AT THE FACTORY FOR USE ON NATURAL GAS ONLY. CONVERSION TO LP GAS REQUIRES A SPECIAL KIT AVAILABLE FROM THE DISTRIBUTOR. FAILURE TO USE THE PROPER CONVERSION KIT CAN CAUSE FIRE, CARBON MONOXIDE POISONING, EXPLOSION, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

See the conversion kit index supplied with the furnace. This index identifies the proper LP Gas Conversion Kit required for each particular furnace.

IMPORTANT: Any additions, changes or conversions required for the furnace to satisfactorily meet the application should be made by a qualified installer, service agency or the gas supplier, using factory-specified or approved parts. In the commonwealth of Massachusetts, installation must be performed by a licensed plumber or gas fitter for appropriate fuel.

IMPORTANT: Connect this furnace only to gas supplied by a commercial utility.

IMPORTANT: A U.L. recognized fuel gas and CO detector(s) are recommended in all applications, and their installation should be in accordance with the detector manufacturer's recommendations and/or local laws, rules, regulations or customs.

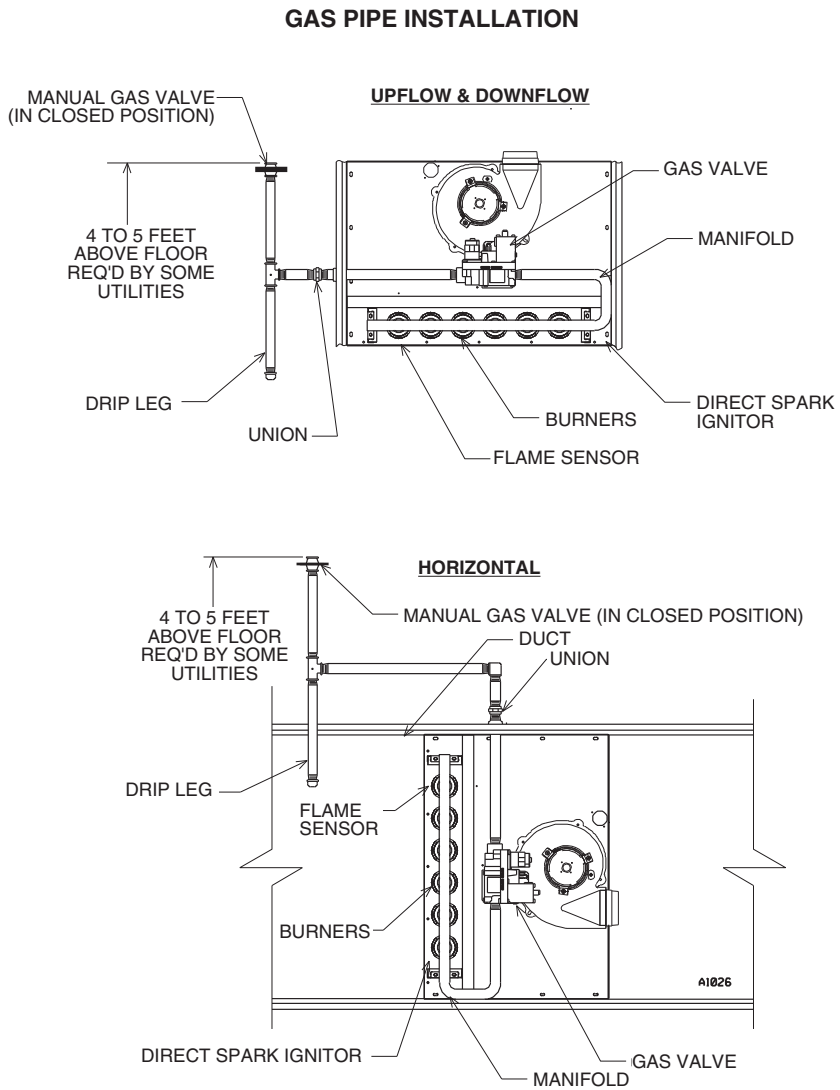
GAS PIPING (SEE FIGURE 15)

Install the gas piping according to all local codes, state codes and regulations of the utility company, whichever holds jurisdiction.

If possible, run a separate gas supply line directly from the meter to the furnace. Consult the local gas company for the location of the manual main shut-off valve. **The gas line and manual gas valve must be adequate in size to prevent undue pressure drop and never smaller than the pipe size to the combination gas valve on the furnace.** Refer to Table 2 for the recommended pipe size for natural gas and Table 3 for LP gas pipe sizes.

IMPORTANT: It is permissible to run flexible gas connector inside the unit to a piece of black pipe. If local codes

FIGURE 15
GAS PIPING INSTALLATION



allow the use of a flexible gas appliance connector, always use a new listed connector. Do not use a connector which has previously serviced another gas appliance. Massachusetts law limits flexible gas connectors to a maximum of 36".

Install a ground joint union outside the cabinet to easily remove the control valve assembly. Install a manual shut-off valve in the gas line outside the cabinet. The valve should be readily accessible to turn the gas supply on or off. Install a drip leg in the gas supply line as close to the furnace as possible. Always use a pipe compound resistant to the action of liquefied petroleum gases on all threaded connections.

IMPORTANT: When making gas pipe connections, use a back-up wrench to prevent any twisting of the control assembly and gas valve. Do not overtighten the connection.

Any strains on the gas valve can change the position of the gas orifices in the burners. This can cause erratic furnace operation.

IMPORTANT: ENSURE that the furnace gas control valve not be subjected to high gas line supply pressures.

DISCONNECT the furnace and its individual shut-off valve from the gas supply piping during **any pressure testing that exceeds 1/2 PSIG (14" W.C.) (3.48 kPa).**

GAS PRESSURE

IMPORTANT: Natural gas supply pressure should operate between 5" to 10.5" w.c. LP gas supply pressure should be 11" to 13" w.c. **This pressure must be maintained with all other gas-fired appliances in operation.**

NOTE: Do not exceed a gas pressure of 13" w.c.

WARNING

ELEVATIONS ABOVE 2000 FT REQUIRE THAT THE FURNACE INPUT RATING BE ADJUSTED AND THAT THE SIZE OF THE BURNER ORIFICES BE RE-CALCULATED BASED ON ELEVATION AND GAS HEATING VALUE. THE BURNER ORIFICES MAY (OR MAY NOT) NEED TO BE CHANGED. SEE THE SECTION TITLED "HIGH ALTITUDE INSTALLATIONS" OF THIS BOOK FOR INSTRUCTIONS.

WARNING

NEVER PURGE A GAS LINE INTO THE COMBUSTION CHAMBER. NEVER USE MATCHES, FLAME OR ANY IGNITION SOURCE FOR CHECKING LEAKAGE. FAILURE TO FOLLOW THIS WARNING CAN CAUSE AN EXPLOSION OR FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

To check for gas leakage, use an approved chloride-free soap and water solution, or other approved method.

LP CONVERSION

NOTE: For installation, see specific LP kit installation instructions. Orifice must be ordered for the correct elevation.

NOTE: Order the correct LP conversion kit from the local distributor. Furnace conversion to LP gas must be performed by a qualified technician.

More information found in the high altitude and orifice section.

NOx MODELS

When converting furnaces equipped with NOx inserts to LP gas, remove the NOx insert assemblies. Steps for removal are listed below:

1. Turn off all electrical power and the gas supply to the furnace.
2. Remove the burner door from the furnace.
3. Remove the igniter assembly – **handle with care.**
4. Remove the two screws attaching the NOx insert retainer brackets to the center panel. Pull the retainer rod.
5. Put the two screws back into the holes in the center panel.
6. Re-install the igniter and burner assemblies.
7. Replace burner door.
8. Turn on electrical power and gas supply to the unit.

NOTE: Some NOx models may have one less NOx insert.

SETTING GAS PRESSURE

The maximum gas supply pressure to the furnace should be 10.5" w.c. natural gas, or 13" w.c. LP gas. The minimum supply gas pressure to the gas valve should be 5" w.c. natural gas or 11" w.c. LP gas. A properly calibrated manometer is required for accurate gas pressure measurements.

Supply Gas Pressure Measurement.

A line pressure tap is on the inlet side of the gas valve.

1. With gas shut off to the furnace at the manual gas valve outside the unit, remove the input pressure tap plug.
2. Connect a U-Tube manometer to the pressure tap.
3. Turn on the gas supply and operate the furnace and all other gas-fired units on the same gas line as the furnace.
4. Adjust the line gas pressure to supply:
 - A. 5" - 10.5" w.c. for natural gas.
 - B. 11" - 13" w.c. for LP gas.
5. Shut off the gas at the manual gas valve and remove the U-Tube manometer.
6. Replace the pressure tap plug.
7. Turn gas on, and check for leaks.

NATURAL GAS:

If the supply gas line pressure is above the operating range, install an in-line gas regulator to the furnace. If supply gas line pressure is below the operating range, either remove any restrictions in the gas supply piping or enlarge the gas pipe. See Table 2.

LP GAS:

If the supply gas line pressure is above the operating range, have the LP supplier reduce the line pressure at the regulator. If supply gas line pressure is below operating range, have the LP supplier adjust the line pressure at the regulator. See Table 3.

NOTE: Depending on the amount of LP vapor and the outdoor ambient temperature, the LP storage tank may require supplemental heat to maintain proper pressure levels. Ensure LP storage tank does not drop below 15% capacity during heating season.

FIGURE 16
TYPICAL HOSE CONNECTION TO LINE PRESSURE TAP

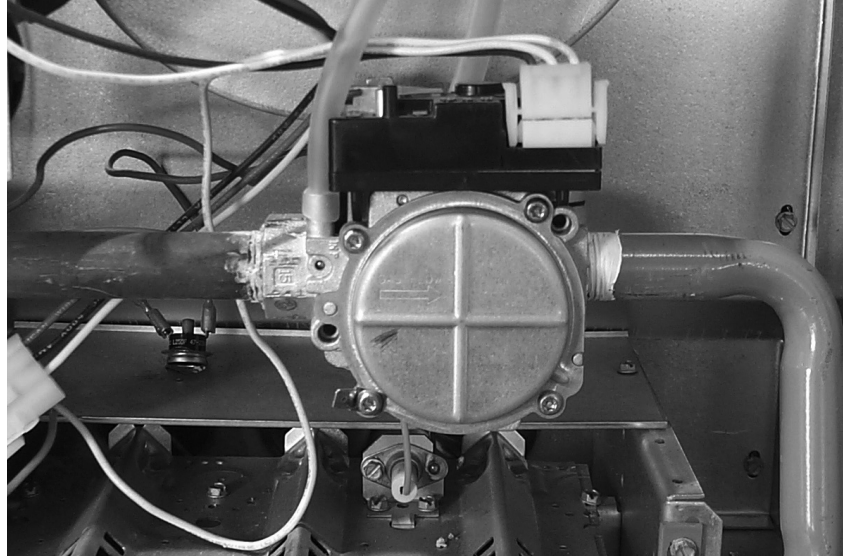


TABLE 2
NATURAL GAS PIPE CAPACITY TABLE (CU. FT./HR.)

Capacity of gas pipe of different diameters and lengths in cu. ft. per hr. with pressure drop of 0.3 in. and specific gravity of 0.60 (natural gas).

Nominal Iron Pipe Size, Inches	Length of Pipe, Feet							
	10	20	30	40	50	60	70	80
1/2	132	92	73	63	56	50	46	43
3/4	278	190	152	130	115	105	96	90
1	520	350	285	245	215	195	180	170
1-1/4	1,050	730	590	500	440	400	370	350
1-1/2	1,600	1,100	890	760	670	610	560	530

After the length of pipe has been determined, select the pipe size which will provide the minimum cubic feet per hour required for the gas input rating of the furnace. By formula:

$$\text{Cu. Ft. Per Hr. Required} = \frac{\text{Gas Input of Furnace (BTU/HR)}}{\text{Heating Value of Gas (BTU/FT}^3\text{)}}$$

The gas input of the furnace is marked on the furnace rating plate. The heating value of the gas (BTU/FT³) may be determined by consulting the local natural gas utility or the LP gas supplier.

TABLE 3
LP GAS PIPE CAPACITY TABLE (CU. FT./HR.)

Maximum capacity of pipe in thousands of BTU per hour of undiluted liquefied petroleum gases (at 11 inches water column inlet pressure).

(Based on a Pressure Drop of 0.5 Inch Water Column)

Nominal Iron Pipe Size, Inches	Length of Pipe, Feet											
	10	20	30	40	50	60	70	80	90	100	125	150
1/2	275	189	152	129	114	103	96	89	83	78	69	63
3/4	567	393	315	267	237	217	196	182	173	162	146	132
1	1,071	732	590	504	448	409	378	346	322	307	275	252
1-1/4	2,205	1,496	1,212	1,039	913	834	771	724	677	630	567	511
1-1/2	3,307	2,299	1,858	1,559	1,417	1,275	1,181	1,086	1,023	976	866	787
2	6,221	4,331	3,465	2,992	2,646	2,394	2,205	2,047	1,921	1,811	1,606	1,496

Example (LP): Input BTU requirement of unit, 150,000
Equivalent length of pipe, 60 ft. = 3/4" IPS required.

ADJUSTING OR CHECKING FURNACE INPUT

NATURAL GAS:

The maximum gas supply pressure to the furnace should be 10.5" W.C. for natural gas. The minimum gas supply pressure for purposes of input adjustment to the furnace should be 5" W.C.

A properly calibrated manometer or gauge is required for accurate gas pressure readings.

1. When adjusting the furnace input, the high fire input should be checked. The high fire manifold pressure should be 3.5' W.C. Follow these steps to be sure the furnace is high fire mode:
 - a. With a single stage thermostat, the furnace runs for 12 minutes on low fire before shifting to high fire. To be certain that it is on high fire, jump terminals "W" and "W2" on the control board in the blower compartment.
 - b. With a two stage thermostat, set the thermostat to its highest setting to keep the furnace operating in the high fire mode.
2. To adjust high fire manifold pressure, remove the adjustment cover screw on the outlet end of the gas valve and turn the adjustment screw clockwise to increase the pressure and counterclockwise to reduce the pressure. Replace the cover screw securely.
3. The low fire manifold pressure should be 1.7" W.C. As mentioned above, the furnace remains in the low fire mode for 12 minutes upon a heat call with a single stage thermostat. With a two stage thermostat, disconnect the thermostat lead to the "W2" terminal on the control board and the furnace will remain in the low fire mode. To adjust the pressure, remove the regulator cover, on top of the valve, and adjust as noted under Step 2, above. After the adjustment replace the screw cover securely.

NOTE: Use a 3/32" allen wrench for making the pressure adjustment.

LP GAS:

Furnaces for use on LP gas, the LP gas supply pressure must be set between 11.0" and 13.0" W.C. by means of the tank or branch supply regulators. The furnace manifold pressure should be set at 10" W.C. at the gas control valve. For elevations up to 7,000 feet, rating plate input ratings apply. For high altitudes (elevations 7,000 and over) and for any necessary major changes in the gas flow rate the orifice spud must be changed.

TO CHANGE ORIFICE SPUDS:

1. Shut off the manual main gas valve and remove the gas manifold.
2. Replace the orifice spuds.
3. Reassemble in reverse order.
4. Turn the gas supply back on and check for leaks.
5. Check for proper operation and set to proper manifold pressure.

Check of input is important to prevent over firing of the furnace beyond its design-rated input. NEVER SET INPUT ABOVE THAT SHOWN ON THE RATING PLATE.

TO CHECK FURNACE INPUT:

1. Make certain that all other gas appliances are shut off, with the exception of pilot burners.
2. Start the furnace
3. Time the meter to measure the time required to burn one cubic foot of gas.
4. Use Table 4 to determine input rate.

TABLE 4

METER TIME IN MINUTES AND SECONDS FOR NORMAL INPUT RATING OF FURNACES EQUIPPED FOR NATURAL OR LP GAS											
INPUT BTU/HR	METER SIZE CU. FT.	HEATING VALUE OF GAS BTU PER CU. FT.									
		900		1000		1040		1100		2500	
		MIN.	SEC.	MIN.	SEC.	MIN.	SEC.	MIN.	SEC.	MIN.	SEC.
50,000	ONE TEN	1 10	5 50	1 12	12 00	1 12	15 30	1 13	18 12	3 30	20 00
75,000	ONE TEN	0 7	44 12	0 8	48 0	0 8	50 19	0 8	53 48	2 20	0 0
100,000	ONE TEN	0 5	33 24	0 6	36 0	0 6	38 15	0 6	40 36	1 15	30 0
125,000	ONE TEN	0 4	26 19	0 4	29 48	0 5	30 0	0 5	32 17	1 12	12 0
150,000	ONE TEN	0 3	31 36	0 4	24 0	0 4	25 10	0 4	26 20	1 10	0 0

$$\text{Input BTU/HR} = \frac{\text{Heating Value of Gas (BTU/Ft}^3) \times 3600 \times \text{correction factor}}{\text{Time in Seconds (for 1 cu.ft.) of Gas}}$$

ELECTRICAL WIRING

⚠ WARNING

TURN OFF ELECTRIC POWER AT THE FUSE BOX OR SERVICE PANEL BEFORE MAKING ANY ELECTRICAL CONNECTIONS.

ALSO, THE GROUND CONNECTION MUST BE COMPLETED BEFORE MAKING LINE VOLTAGE CONNECTIONS. FAILURE TO DO SO CAN RESULT IN ELECTRICAL SHOCK, SEVERE PERSONAL INJURY OR DEATH.

IMPORTANT: The furnace must be installed so that the electrical components are protected from water due to improper flue installation or evaporator condensate drain run-off, etc.

NOTE: Electric power to the furnace must be supplied by a commercial utility. Proper operating voltage is 110-125 volts.

ELECTRICAL CONNECTIONS

⚠ WARNING

THE CABINET MUST BE PERMANENTLY GROUNDED. A GROUND SCREW IS PROVIDED IN THE JUNCTION BOX FOR THIS PURPOSE. FAILURE TO DO SO CAN RESULT IN FIRE, ELECTRICAL SHOCK, PERSONAL INJURY OR DEATH.

The electrical supply requirements are listed on the furnace rating plate.

Use a separate fused branch electrical circuit containing a properly sized fuse or circuit breaker. Run this circuit directly from the main switch box to an electrical disconnect which must be readily accessible and located within sight of the furnace. Connect from the disconnect to the junction box on the left side of the furnace, inside the control compartment. See appropriate wiring diagram.

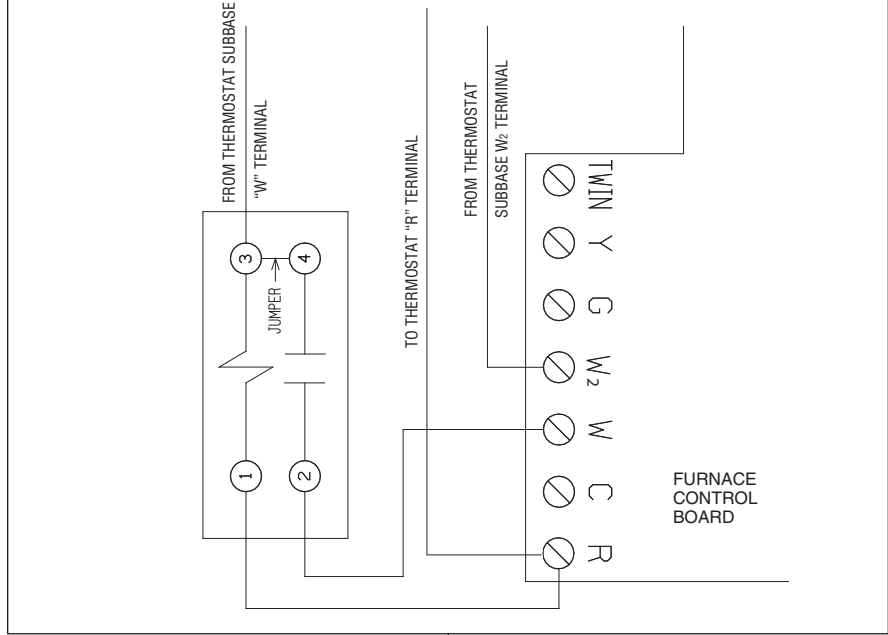
NOTE: The electrical junction box inside the furnace control compartment may be relocated to the right side if necessary. A knockout is provided.

NOTE: L1 (hot) and neutral polarity must be observed when making field connections to the furnace. The ignition control on electric ignition models will not sense flame if L1 and neutral are reversed.

When "Line" and Neutral are reversed, a diagnostic code of 6 blinks followed by a pause and 6 blinks (repeats) will be displayed on the "Status" L.E.D.

Installation of the electric supply line should be in accordance with the National Electric Code ANSI/NFPA No. 70, latest edition, or Canadian Electrical Code Part 1 - CSA Standard C22.1 and local building codes.

FIGURE 17
ISOLATION RELAY



These can be obtained from:

National Electric Code:
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

CSA Standards:
Canadian Standards Association
178 Rexdale Blvd.
Etobicoke (Toronto), Ontario
Canada M9W, 1R3

TABLE 5
FIELD WIRE SIZE FOR 24 VOLT CONTROL CIRCUITS

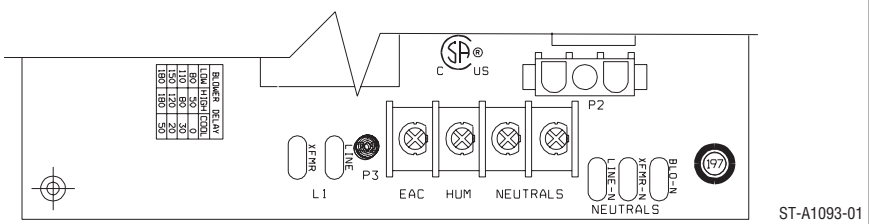
		SOLID COPPER WIRE - AWG			
THERMOSTAT LOAD - AMPS	3.0	16	14	12	
	2.5	16	14	12	
	2.0	18	16	14	
		50	100	150	
LENGTH OF RUN - FEET ①					

① Wire length equals twice the run distance

NOTE: Do not use 24 volt control wiring smaller than No. 18.

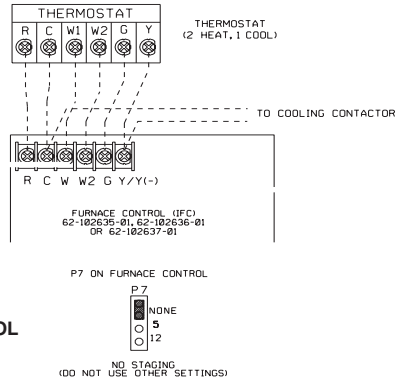
FIGURE 18
LINE VOLTAGE CONNECTIONS

UT ELECTRONIC CONTROLS 1095-205 CONTROL BOARD

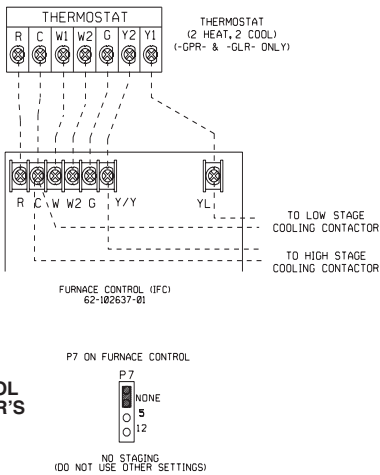


ST-A1093-01

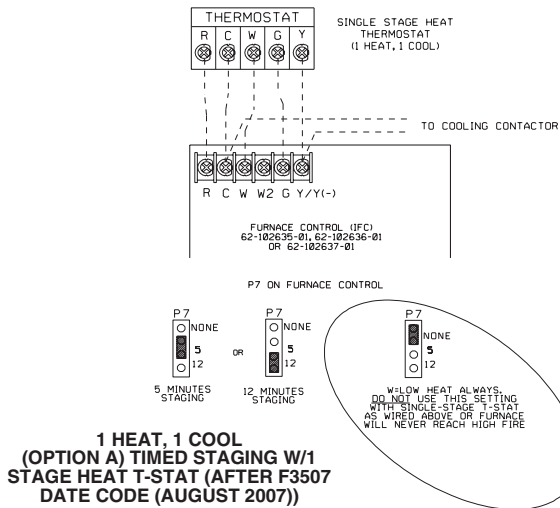
FIGURE 19
THERMOSTAT WIRING OPTIONS



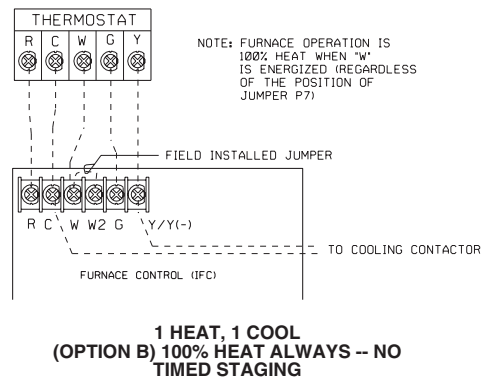
2 HEAT - 1 COOL



**2 HEAT - 2 COOL
GRP'S AND GLR'S
ONLY**



**1 HEAT, 1 COOL
(OPTION A) TIMED STAGING W/1
STAGE HEAT T-STAT (AFTER F3507
DATE CODE (AUGUST 2007))**



**1 HEAT, 1 COOL
(OPTION B) 100% HEAT ALWAYS -- NO
TIMED STAGING**

THERMOSTAT

A single or two stage thermostat may be used, however a two stage thermostat is recommended for optimum performance.

See Figure 19 for thermostat wiring options.

HEAT ANTICIPATOR SETTINGS

If a current reading taken at the thermostat is not performed, an initial setting of .15 amps is recommended. Adjust as needed to improve comfort level.

ISOLATION RELAY

IMPORTANT: Not all electronic night setback thermostats are compatible with the furnace control system. Some may require an isolation relay.

If an isolation relay is needed, install it as close to the control board as possible. Use a single-pole, single-throw relay with a 24 volt operating coil. The relay contacts should be designed for 24 volt loads.

Connect one end of the operating coil to the thermostat "W" terminal. Connect the other end of the coil to the "C" terminal on the control board.

> Connect a jumper from the coil terminal connected to the thermostat to

one of the normally open relay contacts.

> Connect the other side of the normally open relay contacts to the control board "W" terminal if using a two stage thermostat. Connect that one side of the normally open relay contacts to the control board "W2" terminal if using a single stage thermostat.

When the thermostat calls for heat, it powers the 24 volt operating coil. This closes the relay contacts and conducts power from terminal 3 and 4 to terminal "W" on the control board and starts the furnace ignition sequence. See Figure 17.

> **NOTE:** Use of an isolation relay with the two stage furnace is not normally needed.

Install the room thermostat in accordance with the instruction sheet in the box with the thermostat. Run the thermostat lead wires inside the control compartment. Connect the thermostat as shown on the wiring diagram. Never install the thermostat on an outside wall or where it will be influenced by drafts, concealed hot or cold water pipes, lighting fixtures, radiation from fireplace, rays of sun, lamps, television, radios or air streams from registers. Refer to the instructions

packed with the thermostat for best anticipator adjustment or selection or see below.

FIELD INSTALLED OPTION ACCESSORIES

ELECTRONIC AIR CLEANER

Electronic air cleaner line voltage power can be supplied from the screw terminal "EAC" and a line voltage neutral screw terminal on the control board. Power is on any time the blower is activated. See Figure 18.

HUMIDIFIER

Humidifier line voltage power can be supplied from screw terminal "HUM" to a line voltage neutral screw terminal on the control board. See Figure 18. This will power the humidifier whenever the indoor blower motor is operating in the heating mode.

NOTE: Maximum current –1.0 amps for each option.

FOSSIL FUEL KIT

Use of a heat pump with the two stage furnace requires a heat pump thermostat used in conjunction with the fossil fuel kit. For proper operation use the following procedures:

- With the RXPF-F01 kit, connect the thermostat "E" terminal, one side of the plenum switch, and the black

wire from the fossil fuel kit to "W2" on the IFC.

- b. For the RXPF-F02 kit, connect "W" on the fossil fuel kit interface wiring board to "W2" on the IFC.

Regardless of which fossil fuel kit is used, when activated, the two stage furnace follows the sequence of operation for a single stage thermostat.

➤ **IMPORTANT:** ALWAYS FOLLOW THE MANUFACTURER'S FOSSIL FUEL KIT INSTRUCTIONS.

NOTE: (-)GLR (-)GPR cannot be twinned.

RXGW-B01 CHIMNEY ADAPTER

IMPORTANT: Chimney adapter is certified for use on upflow only.

This appliance is CSA certified for use with RXGW-B01 chimney adapter. Refer to kit installation instructions 92-101682-01.

START-UP PROCEDURE

DIRECT SPARK IGNITION LIGHTING INSTRUCTIONS

This appliance is equipped with a direct spark ignition device. This device lights the main burners each time the room thermostat (closes) calls for heat. See lighting instructions on the furnace.

During initial start-up, it is not unusual for odor or smoke to come out of any room registers. It is recommended to ensure proper ventilation by opening windows and doors, before initial firing.

The furnace has a negative pressure switch that is a safety during a call for heat. The induced draft blower must pull a negative pressure on the heat exchanger to close the negative pressure switch. The induced draft blower must maintain at least the negative pressure switch set point for the furnace to operate. If the induced draft blower fails to close or maintain the closing of the negative pressure switch, a "no heat call" would result.

TO START FURNACE

1. Remove the control access door.

▲ WARNING

2. **BE SURE THAT THE MANUAL GAS CONTROL HAS BEEN IN THE "OFF" POSITION FOR AT LEAST FIVE MINUTES. DO NOT ATTEMPT TO MANUALLY LIGHT THE MAIN BURNERS. FAILURE TO FOLLOW THIS WARNING CAN CAUSE A FIRE OR AN EXPLOSION RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**
3. Turn off the furnace electrical power and set the room thermostat to the lowest setting.
4. Turn the gas control knob to the "On" position, or move the gas control lever to the "On" position.
5. Replace the control access door.
6. Turn on the electrical power.
7. Set the room thermostat to a point above room temperature to light the main burners. After the burners are lit, set room thermostat to a desired temperature.

TO SHUT DOWN FURNACE

1. Set the room thermostat to off and its lowest setting.
2. Turn manual gas stop to the closed position.

3. Turn off the electrical power to the furnace.
4. Remove burner compartment door.
5. Move the main gas valve knob or lever to the off position.
6. Replace the burner compartment door.

▲ WARNING

SHOULD OVERHEATING OCCUR OR THE GAS SUPPLY FAIL TO SHUT OFF, SHUT OFF THE MANUAL GAS VALVE TO THE APPLIANCE BEFORE SHUTTING OFF THE ELECTRICAL SUPPLY. FAILURE TO DO SO CAN CAUSE AN EXPLOSION OR FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

SEQUENCE OF OPERATION

See the section of this book titled "Electrical Wiring - Thermostat" for a wiring diagram showing how to connect a thermostat.

SINGLE-STAGE HEAT THERMOSTAT

NOTE: Single-stage heat operation is determined by the position of the jumper at P7 on the control board. Options are: 5 minutes between 1st and 2nd stage, or 12 minutes between 1st and 2nd stage (see Figure 22).

For single-stage operation, "W" from the thermostat must be connected to "W" on the furnace control.

Do not leave jumper at P7 in the "NONE" position when using a single-stage thermostat with the timed staging feature. If the jumper is left on "NONE", the furnace will never reach high heat (100% heat).

- a. Connect the "W" terminal on the thermostat to the "W" terminal on the control board.
- b. When there is a call for heat, the "R" and "W" contacts close and the IFC runs a self check routine to verify that the pressure switch contacts are open. The limit switch contacts are constantly monitored.
- c. The induced draft motor starts on high until the low pressure switch contacts close (a maximum of 60 seconds), and then changes to low speed. After a 30 second pre-purge, the spark ignitor energizes and the low fire gas valve opens, lighting the burners.
- d. After the gas valve opens, the remote flame sensor must prove ignition for one second using the process of flame rectification. If the burners do

- not light, the system goes through another ignition sequence. It does this up to 4 times. (2 tries on low fire and 2 tries on high fire.)
- e. The main blower starts on low heat speed 30 seconds after the flame is sensed. The furnace operates on low fire for 5 or 12 minutes and then, if the thermostat is not satisfied, shifts to high fire, causing the draft inducer to go to high speed, the gas valve to shift to 100% and the main blower goes to high heat speed.
 - f. When the thermostat cycle ends, the gas valve closes, and the burners go out.
 - g. The draft inducer will continue running for a 10 second (low speed) or 5 second (high speed) post purge.
 - h. The main blower runs for 50-140 seconds on high heat speed or 80-170 seconds on low heat speed (this timing is field adjustable). See Figure 22 for switch settings.

Sequence if the system doesn't light or doesn't sense flame

- a. If flame is not sensed within 8 seconds after the gas valve opens, the valve closes and the ignitor is de-energized. The induced draft motor will run for 60 seconds on low, and then begins another heat cycle.
- b. The ignition process goes through one more try on low fire. If this fails, there are two attempts on high fire with a 30 second inter-purge between trials. During high fire ignition attempts, the inducer steps to high speed, the high pressure switch closes (both pressure switches are now closed), and the gas valve steps to high fire.
- c. If there is no ignition after the 2nd trial on high fire, the furnace goes into soft lockout for one hour.
- d. The sequence repeats after a one hour delay and continues repeating until ignition is successful or the call for heat is terminated.
- e. To reset the lockout, break power either at the thermostat or at the unit disconnect switch for 5 to 10 seconds. The furnace then goes through another set of trials for ignition (provided call for heat is still present).
- f. If flame is established and maintained during the trial for ignition period and flame is lost, the gas valve is de-energized, the draft inducer continues to run, and control begins timing the inter-purge delay. The indoor blower motor will be energized and/or remain energized

on low speed for low fire and heat speed for high fire for the selected delay off time.

When the inter-purge delay is over, the control initiates another ignition trial period. The control will recycle up to 5 flame losses (4 re-cycles) within a single call for heat before going into lockout.

TWO STAGE HEAT THERMOSTAT

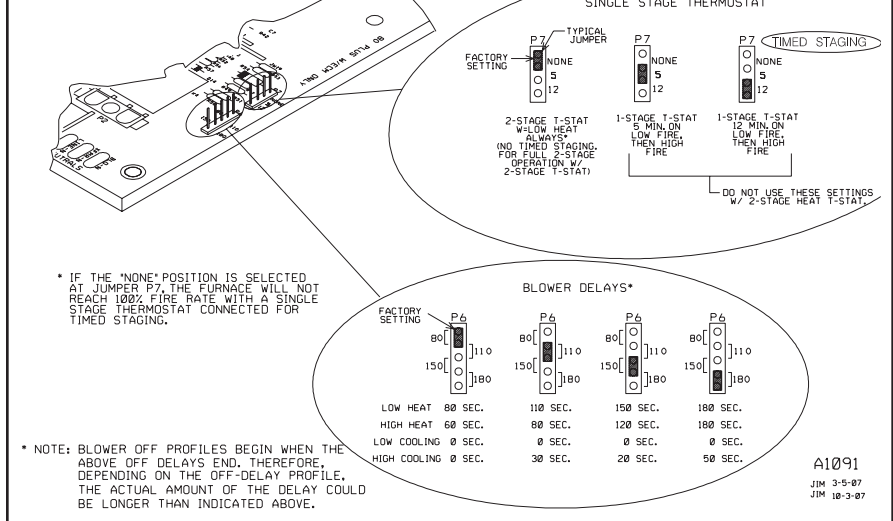
Connect "W1" and "W2" terminals on the thermostat to "W" and "W2" terminals on the control board.

See the section of this book titled "Electrical Wiring - Thermostat" for a wiring diagram showing how to connect a thermostat.

Call for 1st stage heat

- The "R" and "W" thermostat contacts close and the control module runs a self-check routine. After the control module verifies that both sets of pressure switch contacts are open, the induced draft motor starts on high until the low pressure switch contacts close (a maximum of 60 seconds), then changes to low speed.
- After a 30 second pre-purge the spark igniter energizes and the low fire gas valve opens, lighting the burners.
- After the burners light, the remote flame sensor must prove ignition. If the burners do not light, the system goes through another ignition sequence. It does this up to 4 times (2 attempts on low fire and 2 tries on high fire).
- The main blower starts on low-heat speed 30 seconds after the flame is proven. The furnace continues to run on low fire until the call for heat is satisfied or the 2nd stage contacts close. If the 1st stage call for heat is satisfied the gas valve closes and the

FIGURE 22
TWO-STAGE 80 PLUS WITH ECM MOTOR IFC JUMPER
SELECTIONS



induced draft motor continues running for a 10 second post purge time. the main blower runs for its blower off delay (this timing is field adjustable). See Figure 22 for switch settings.

Call for 2nd stage heat after 1st stage

The "R" and "W2" thermostat contacts close, calling for 2 stage heat. The induced draft motor switches to high speed and the high pressure switch contacts close. The gas valve switches to high fire and the main blower switches to high heat speed.

2nd stage heat satisfied, 1st stage heat still required

The "R" and "W2" thermostat contacts open. The induced draft motor switches

TABLE 6
DIP SWITCH BANK SW1

SWITCHES	FUNCTION
1 & 2	Not Used
3 & 4	Cooling Off/On Delay Profiles
5 & 6	Nominal Cooling/Heat Pump Air Flow
7 & 8+	Latent/Sensible Airflow Adjustment
9	Continuous Fan Airflow
10 & 11*	On Demand Dehumidification Settings
12	1 or 2 Stage Cool

to low speed, the main blower motor switches to low heat speed and the gas valve changes to low fire. The furnace continues to run in this mode until the 1st stage heat call is satisfied. The system will shut down as noted in "d," under 1st stage call for heat.

NOTE: Under extreme cold conditions, the 2-stage thermostat may call for the furnace to cycle between 1st and 2nd stage operation.

INTEGRATED FURNACE CONTROL & ECM MOTOR SETTINGS

These furnaces have ECM blower motors. These motors deliver a constant level of air flow over a wide range of external static pressures (0.1 to 0.8" W.C.). The interface board, found

FIGURE 20
BLOWER OFF TIMINGS
UTEAC 1095-101 CONTROL WITH INTERFACE BOARD AND ECM MOTOR

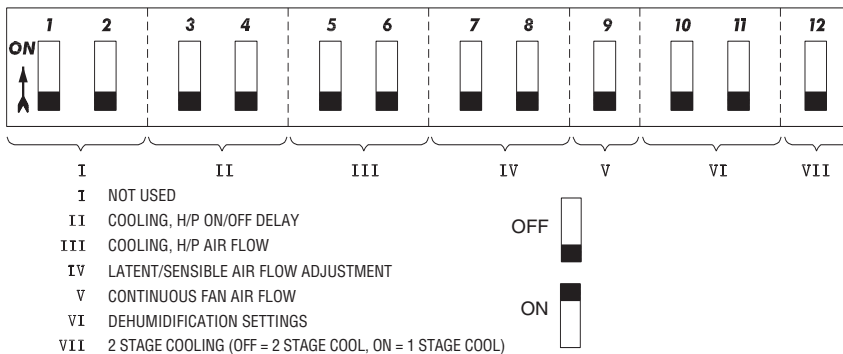


FIGURE 21

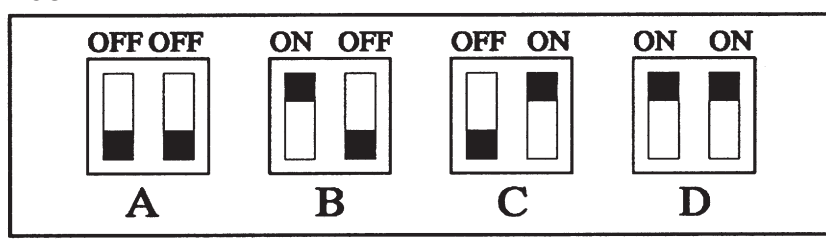


TABLE 7
AIR FLOW ADJUSTMENT (SWITCHES 7 & 8)

Switch Selection	Air Flow Adjustment
A	No Adjustment
B	+10%
C	-10%
D	No Adjustment

beside the furnace integrated control board, provides the required communications between the main integrated furnace control and the ECM blower motor. There is a bank of 4 dip switches on the integrated furnace control which controls the blower off timings. See section on BLOWER OFF TIMINGS FOR ECM MOTORS and Figure 22 for proper switch settings.

There is a bank of 12 dip switches (SW1) on the interface board which define the operation of the ECM motor. (See Table 6.) Only switches 3-11 are used for this application. (See Figure 20.) These switches (except for switches 1, 2, 9 and 12) are actually broken down into four dip switch pairs. Switches 3 and 4 act as a pair as do switches 5 and 6, and 7 and 8 and 10 and 11. The assignments of the switch pairs are shown in Table 6 and Figure 20.

***IMPORTANT:** Only traditional humidistats will work with this feature. Dehumidistats will not work properly with this feature.

HEATING AIRFLOW ADJUSTMENTS

The furnace is shipped with low and high fire heating airflows. These are set from the factory to let the furnace operate at the mid point of the temperature rise range. The temperature may vary slightly due to furnace input and voltage variations.

In the heating mode, the ECM motor is programmed to ramp up to its target CFM over a fifteen (15) second period. After any of the user selected "Off" delays, see Figures 22 and 23, the ECM motor will ramp down to 50% of steady state CFM for approximately thirty (30) seconds. The motor will then ramp down to an off position.

COOLING AIRFLOW ADJUSTMENTS

The furnace motor is programmed to provide cooling airflows of 1½, 2, 2½ and

CFM	LOW	HIGH
50 UP	413	625
75k (1/2)	438	980
75k (3/4)	413	1125
100k UP	525	1300
125k UP	525	1420
75k DN	438	980
75k (3/4) DN	413	1125
100k DN	525	1300
125K DN	525	1480

3 tons in the (-)GPR-05 EBMKR and -07 EAMKR units. Airflows of 2½, 3, 3½, and 4 tons are available in the (-)GPR/LR-07 EBRQR units. Airflows of 3, 3½, 4 and 5 tons are available in the -10 EBRMR and -12 EARMR units. See Tables 8 and 9 for airflow options. Furnaces are shipped from the factory set for maximum cooling airflow. Adjustments to the cooling airflow may be made using switches 7 and 8 as shown in Table 7.

TWO-STAGE COOLING SELECTION

Dipswitch SW1, Position #12 on the Integrated Furnace Control (IFC) now ships from the factory in the "ON" position. This dipswitch is to be used to designate single or two-stage cooling to the IFC. The "ON" (as now shipped) position designates a single-stage air conditioning system or heating-only application. The "OFF" position designates a two-stage air conditioning system. Turn the switch to the "OFF" position when using two-stage cooling with separate contactors, Y1 and Y2. Failure to do this will mean that the air conditioner will never go into low stage.

2-Stage Cooling Systems = #12 OFF
1-Stage Cooling Systems = #12 ON

CONTINUOUS FAN ADJUSTMENTS

There are two options for the adjustment of continuous fan. With

switch 9 "ON" the speed will be high fan. With switch 9 "OFF" the speed will be low fan.

SETTING BLOWER OFF TIMINGS FOR COOLING AND HEAT PUMP OPERATION

There is a jumper (P6) on the main furnace control board for setting blower off timings. (See Figure 22.)

Cooling and heat pump blower on and off delay profiles can be customized as shown in Figures 23 and 24. The blower will enter one of four "on" and "off" delay profiles as shown in Figures 23 and 24. The profile is determined by the settings of Switches 3 and 4 of SW1 (see Figure 20). For example: If the switches are in position "A" (as shown in Figure 21), then profile "A" (as shown in Figure 22) is entered after the blower off timing.

These switch combinations allow for a range of "off" delay timings of SW1.

A corresponding cooling/heat pump "On" delay is also chosen by Switches 3 and 4 of SW1 on the interface control as shown in Figure 24. For example, if "Off" delay profile "A" is chosen in Figure 23, then "ON" delay profile "A" in Figure 24 is automatically chosen.

DEHUMIDIFICATION

The interface control has two optional 24 volt AC only inputs. The "B" terminal input is provided for heat pump applications. This signal comes from a heat pump thermostat and tells the heat pump to switch its reversing valve to heat mode. If this "B" signal is also routed to the furnace control, all airflow adjust switches (7 & 8 of SW1) and "On Demand Dehumidification" are bypassed in the heat mode only. The airflow will remain at the normal airflow as selected by switches 5 & 6 throughout the heat mode. This allows the user to have a switched (reduced) airflow adjustment for dehumidification or the "On Demand Dehumidification" in cooling mode, but not the adverse

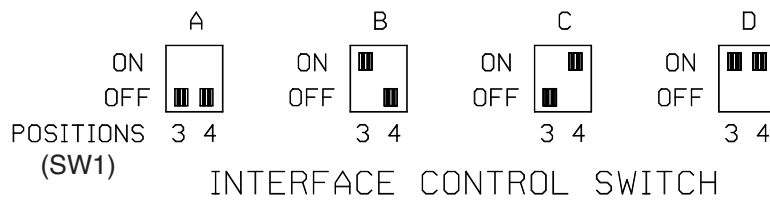
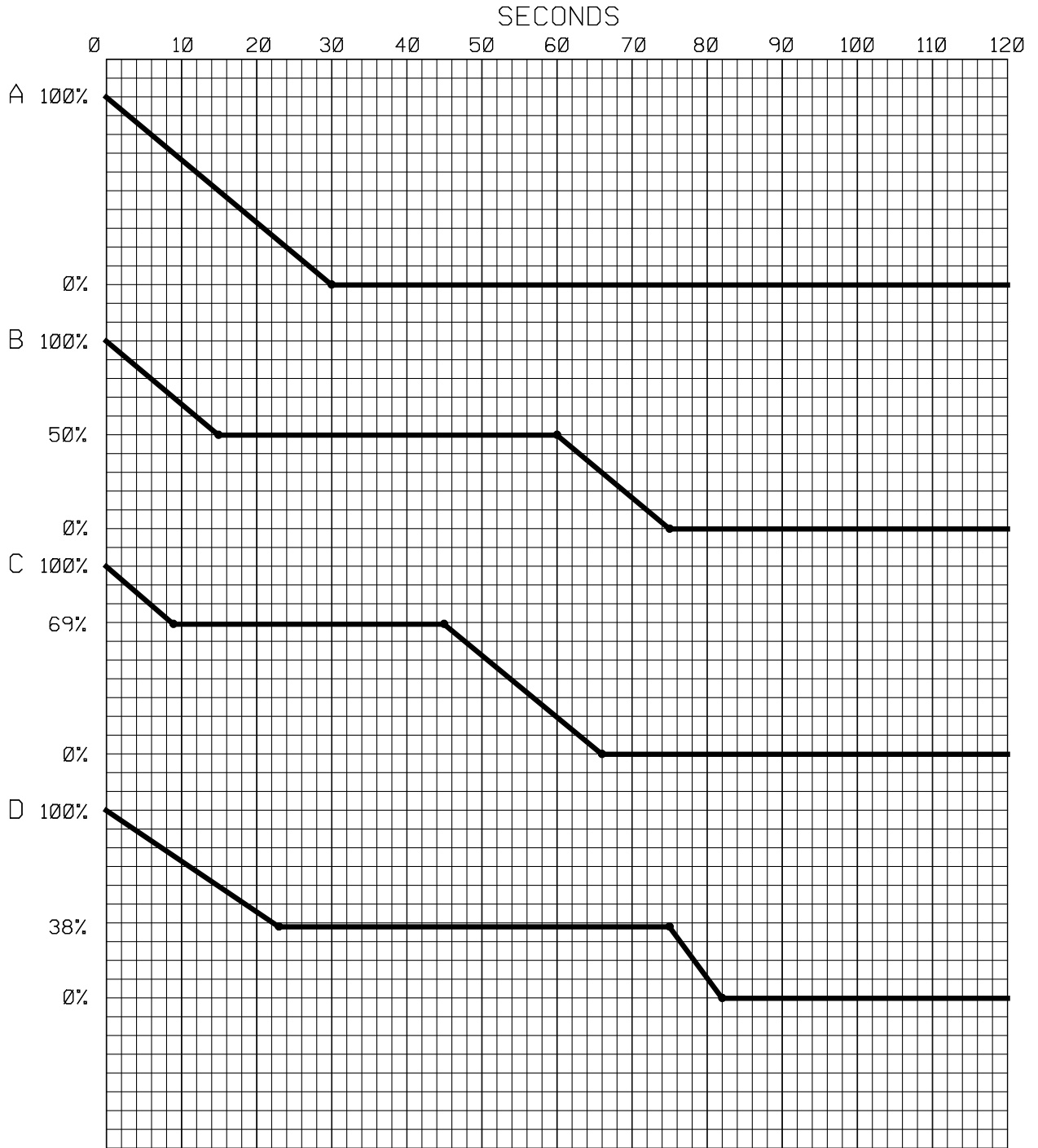
TABLE 8
COOLING AIR FLOW (SWITCHES 5 & 6)

Switch Selection	(-)GPR-05EBMKR	(-)GPR/GLR-07EAMKR	(-)GPR/GLR-07EBRQR	(-)GPR/GLR-10EBRMR	(-)GPR/(-)GLR-12EARMR Air Flow
A	1200	1200	1600	2000	2000
B	1000	1000	1400	1600	1600
C	800	800	1200	1400	1400
D	600	600	1000	1200	1200

TABLE 9
OPTIMIZED AIRFLOW OPTIONS (SWITCHES 10 & 11 OF SW1)

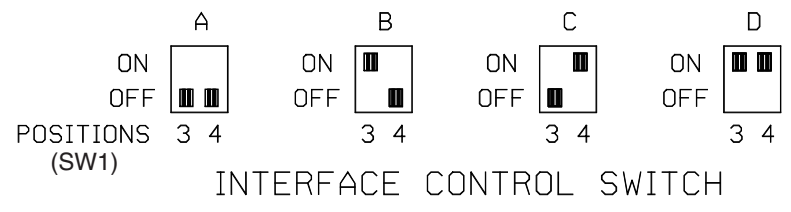
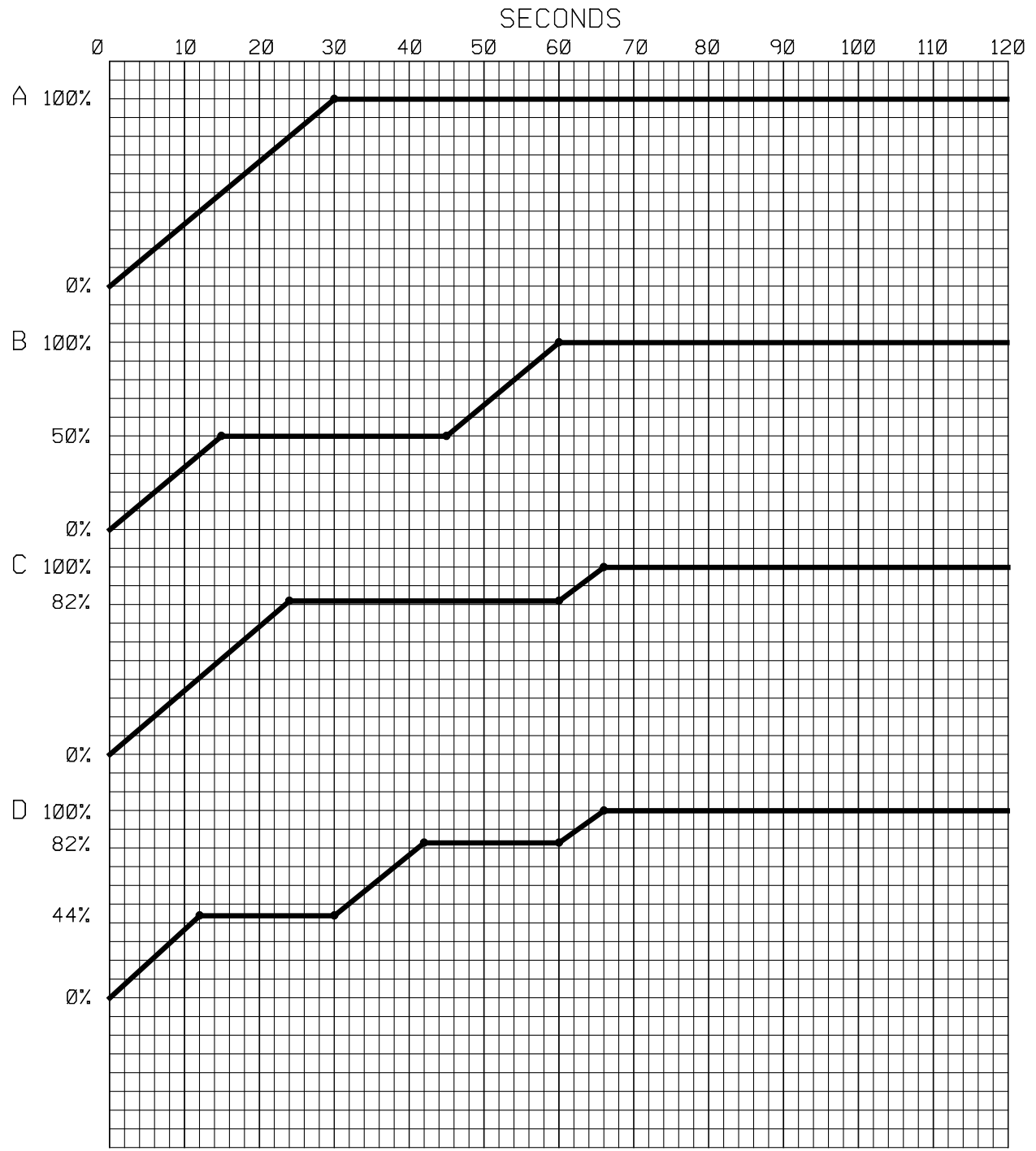
Switch Selection	Air Flow Adjustment
A	15% Less cooling Airflow
B	Normal Cooling Air Flow for Table 6
C	On Demand Dehumidification (Humidistat controls cooling airflow)
D	Normal Cooling Air Flow

FIGURE 23
COOLING/HEAT PUMP "OFF" DELAY PROFILES



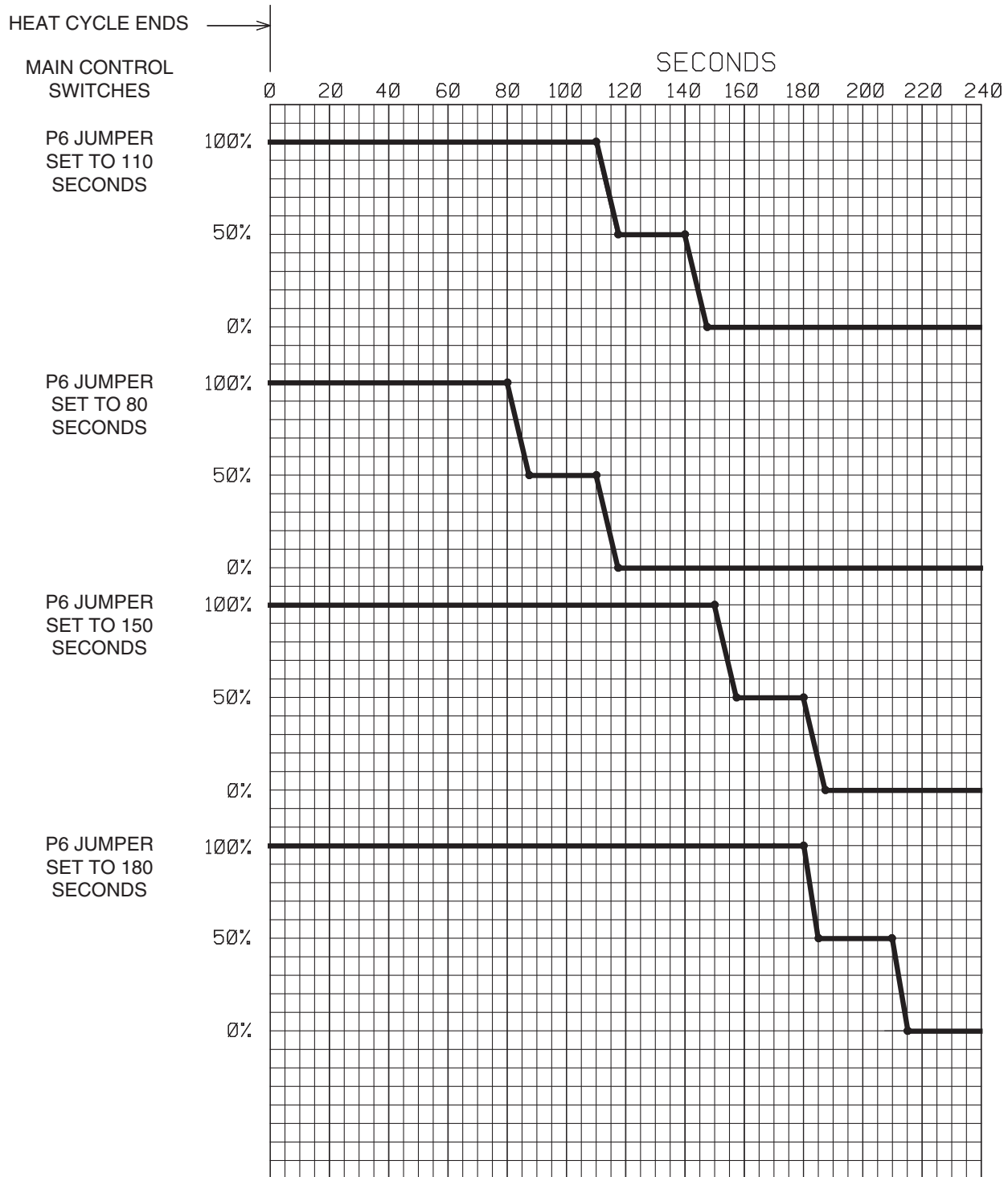
ST-A0827-01

FIGURE 24
COOLING/HEAT PUMP "ON" DELAY PROFILES



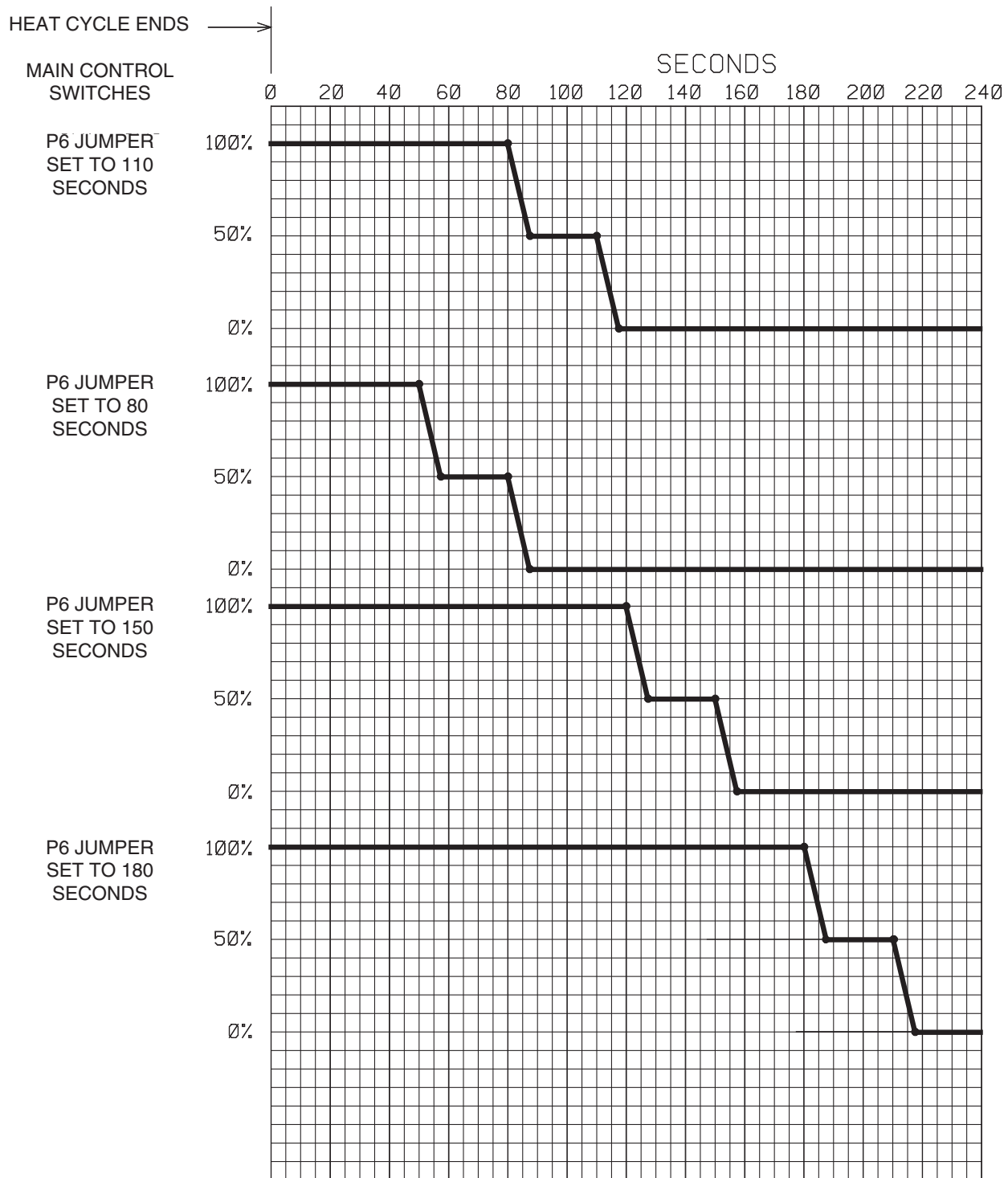
ST-A0828-01

FIGURE 25
LOW HEAT "OFF" DELAY PROFILES



ST-A0829-01

FIGURE 26
HIGH HEAT "OFF" DELAY PROFILES



humidity and heat rise effects of using these adjustments during a heat pump's heat mode. The "B" terminal does not apply to gas operation.

The "On Demand Dehumidification" input allows the user to have automatic dehumidification that is controlled by the user's humidistat setting. Dehumidistats are not compatible with the furnace control. When the humidity exceeds the humidistat setting, it routes a 24 volt, AC only, signal to the "On Demand Dehumidification" terminal. This will in turn decrease the airflow by 15%. This results in higher latent capacity and increases the level of comfort. This feature is only available in the cooling mode.

80+ HIGH ALTITUDE INSTRUCTIONS (TABLE 12)

▲ CAUTION

INSTALLATION OF THIS FURNACE AT ALTITUDES ABOVE 2000 FT (610 m) SHALL BE IN ACCORDANCE WITH LOCAL CODES, OR IN THE ABSENCE OF LOCAL CODES, THE NATIONAL FUEL GAS CODE, ANSI Z223.1/NFPA 54 OR NATIONAL STANDARD OF CANADA, NATURAL GAS AND PROPANE INSTALLATION CODE, CAN B149.1.

34" 80 Plus furnaces installed above 2,000 ft. require the furnace to be de-rated 4% per thousand feet.

IMPORTANT: *Factory installed orifices are calculated and sized based on a sea level Natural Gas heating value of 1075 BTU per cubic ft.*

NOTE: Orifices are available through your local distributor.

Reference Tables 10, 11 and 12 for appropriate orifice sizing.

NOTE: Keep any parts removed during LP conversion procedure stored with the product literature for future use.

The following are examples of orifice sizing using the National Fuel Gas Code Appendix F:

Example: 900 BTU/ft³ Regional Natural Gas Heating Value

$$I/H = Q$$

$$25000 / 900 = 27.78 \text{ ft}^3$$

I = Sea Level input (per burner): 25000
H = Sea Level Heating Value: 900
Q = 27.78 ft³ Natural Gas per hour.

From Table F.1 of *National Fuel Gas Code Handbook, 2002* (3.5" w.c. column).

Orifice required at Seal Level: #40

From Table F.4 of *National Fuel Gas Code Handbook, 2002*

Orifice required at 5000 ft. elevation (4% de-rate per thousand ft.): #42

Orifice required at 8000 ft. elevation (4% de-rate per thousand ft.): #44

Example: 1050 BTU/ft³ Regional Natural Gas Heating Value

$$I / H = Q$$

$$25000 / 1050 = 23.81 \text{ ft}^3$$

I = Sea Level input (per burner): 25000
H = Sea Level Heating Value: 1050
Q = 23.81 ft³ Natural Gas per hour.

From Table F.1 of *Natural Fuel Gas Code Handbook, 2002* (3.5" w.c. column).

Orifice required at Sea Level: #43

From Table F.4 of *National Fuel Gas Code Handbook, 2002*

Orifice required at 5000 ft. elevation (4% de-rate per thousand ft.): #45

Orifice required at 8000 ft elevation (4% de-rate per thousand ft): #47

LP GAS (TABLE 10)

LP Gas is a manufactured gas that has consistent heating value across most regions.

The NFGC guidelines are used with the following exception:

The recommended LP Gas high altitude orifice selections differ slightly in that the NFGC LP orifice chart, as they are not accurate for Rheem products. The National Fuel Gas Code LP orifices are based on an 11" of water column pressure at the orifice, which differs from products that use 10" of water column at the orifice. This difference requires a deviation from the NFGC orifice size recommendations. The Sea Level input should still be reduced by 4% per thousand ft. and the orifice size must be selected based on the reduced input in Table 10.

TABLE 10
LP GAS

Altitude	Input (per burner) 25000	Orifice Size
0 to 2000 ft.	25000	#54
2000'-3000'	24000	#54
3000'-4000'	23000	#54
4000'-5000'	22000	#54
5000'-6000'	21000	#54
6000'-7000'	20000	#54
7000'-8000'	19000	#55
8000'-9000'	18000	#55
9000'-10000'	17000	#55

ORIFICE ORDERING INFORMATION

Orifice sizes are selected by adding the 2-digit drill size required in the orifice part number. Drill sizes available are 39 through 64; metric sizes available 1.10mm (-90) and 1.15mm (-91):

Orifice Part Number 62-22175-(drill size)

Example 1:
60 drill size orifice required
Part # 62-22175-60

Example 2:
1.15mm drill size orifice required
Part # 62-22175-91

TABLE 11
ALTERNATE METHOD FOR CANADIAN HIGH-ALTITUDE DERATE

NATURAL GAS					LP GAS				
ALTITUDE	INPUT	OUTPUT	ORIFICE SIZE	MANIFOLD PRESSURE	ALTITUDE	INPUT	OUTPUT	ORIFICE SIZE	MANIFOLD PRESSURE
0' - 2000'	50,000	40,000	#42	3.5" W.C.	0' - 2000'	50,000	40,000	#54	10" W.C.
	75,000	60,000				75,000	60,000		
	100,000	80,000				100,000	80,000		
	125,000	100,000				125,000	100,000		
	150,000	120,000				150,000	120,000		
2001' - 4500'	45,000	36,000	#42	2.9" W.C.	2001' - 4500'	45,000	36,000	#54	8.1" W.C.
	67,500	54,000				67,500	54,000		
	90,000	72,000				90,000	72,000		
	112,500	90,000				112,500	90,000		
	135,000	108,000				135,000	108,000		

FIGURE 27
MANIFOLD PRESSURE-CHANGE LABEL

THE MANIFOLD PRESSURE OF THIS APPLIANCE HAS BEEN FIELD ADJUSTED TO OBTAIN THE CORRECT INPUT RATING FOR INSTALLATION AT ALTITUDES BETWEEN 2,000 FEET AND 4,500 FEET ELEVATION.

LA PRESSION DU DISTRIBUTEUR D'ALIMENTATION DE CET APPAREIL A ÉTÉ AJUSTÉ SUR LES LIEUX AFIN D'OBTENIR LA BONNE PUISSANCE D'ENTRÉE POUR UNE INSTALLATION ENTRE 2000 ET 4500 PIEDS D'ALTITUDE.

92-24399-01-01

TABLE 12
SUPPLEMENTAL ORIFICE SIZE CHART

80 Plus Models with 25,000 Btu's per Burner

		NATURAL GAS QUICK REFERENCE CHART FOR ORIFICE SELECTION, AT 3.5" W.C. AND APPROXIMATE FINAL FIRING RATES																
Sea Level Orifice Size	Sea Level Cubic Foot at 3.5" W.C.	80 Plus Heat Value at 25,000	ELEVATION CHART (NFG recommended orifice based on 4% derate for each 1000 foot of elevation, based on the intersection of the orifice required at Sea Level and the elevation required below)															
			0-999	1000-1999	2000-2999	3000-3999	4000-4999	5000-5999	6000-6999	7000-7999	8000-8999	9000-9999						
37	30.63	816	37	37	38	39	39	39	40	41	41	42	42	42	42	42	42	43
38	29.25	855	38	38	39	40	40	41	41	42	42	42	42	42	42	42	43	43
39	28.2	887	39	39	40	41	41	41	42	42	42	42	43	43	43	43	43	44
40	27.03	925	40	40	41	42	42	42	42	42	43	43	43	43	44	44	44	44
41	25.98	962	41	41	42	42	42	42	42	43	43	43	44	44	44	44	44	45
42	24.95	1002	42	42	42	43	43	43	43	43	44	44	44	44	45	45	45	46
43	22.39	1117	43	43	44	44	44	44	44	45	45	45	46	46	46	47	47	47
44	21.01	1190	44	44	45	45	45	45	45	46	46	47	47	47	48	48	48	48
Final Firing Rate per Burner			25,000	24,000	23,000	22,000	22,000	21,000	21,000	20,000	19,000	19,000	18,000	18,000	17,000	17,000	16,000	16,000

All calculations are performed by using the first three columns of information only. Before beginning any calculations, determine the individual burner Btu size and heating value at Sea Level for the installation site. Each value shown in the Heat Value column is per burner at 3.5" W.C.

NOTE:

Heat Value at Sea Level, for the location of the installation, is available from the Natural Gas Supplier to that site. Orifices for all altitudes are based on Sea Level values.

Divide the individual burner capacity (25,000 for 80 plus) by the Heat Value for the site to determine the Cubic Foot value at Sea Level, or divide burner capacity by the Cubic Foot value for the Heat Value. Once you have either the Cubic Foot Value or the Heat Value you can estimate the Sea Level orifice for the site. To select the corresponding high altitude orifice, locate the site elevation on the chart above and the orifice required at Sea Level from your calculation in the first column. The correct high altitude orifice that must be installed in each individual burner is the intersection of these two points on the chart above.

ALTERNATE METHOD FOR CANADIAN HIGH-ALTITUDE DERATE

In Canada, unless an orifice change is specifically mandated by local codes, an alternate method of altitude deration through a reduction in manifold pressure is acceptable as described in Table 11. This information is based on a heating value of 1000 BTU per cubic feet of natural gas, and 2500 BTU per cubic feet of LP gas.

IMPORTANT: Actual input rates must be measured onsite with manifold pressure adjustment to ensure that an actual 10% reduction in input rate is achieved.

Once this field adjustment has been made, the label shown in Figure 27 must be affixed in a conspicuous location on the front of the furnace cabinet.

NOTE: This label is supplied in the information packet shipped with each furnace.

AIR FLOW

The importance of proper air flow over the heat exchanger cannot be over emphasized.

CAUTION

IT IS IMPORTANT THAT EACH DUCT SYSTEM BE SIZED AND INSTALLED FOR THE SPECIFIC APPLICATION BY PROPERLY APPLYING THE APPROPRIATE INDUSTRY ACCEPTED STANDARD. IF LESS THAN MINIMUM STANDARDS ARE APPLIED, THE EQUIPMENT USER COULD EXPECT TO EXPERIENCE HIGHER UTILITY BILLS, MAJOR COMPONENT FAILURE, VARYING DEGREES OF AIR NOISE OR OTHER UNSATISFACTORY ISSUES, OVER WHICH THE MANUFACTURER HAS NO CONTROL.

One of the most common causes of heat exchanger failure is overheating due to low air flow. An air flow table is located inside the blower door and on the following pages.

ZONING SYSTEMS

The manufacturer does not currently provide or support zoning. However, zoning systems can be installed with the system as long as the zoning equipment manufacturers specifications and installation instructions are met and followed.

The preferred zoning method is to use a "bypass" system which is properly installed for maximum efficiency. In these systems, excess air is routed back through the system to be used again – this is opposed to a "dump"

FIGURE 28
TEMPERATURE RISE MEASUREMENT

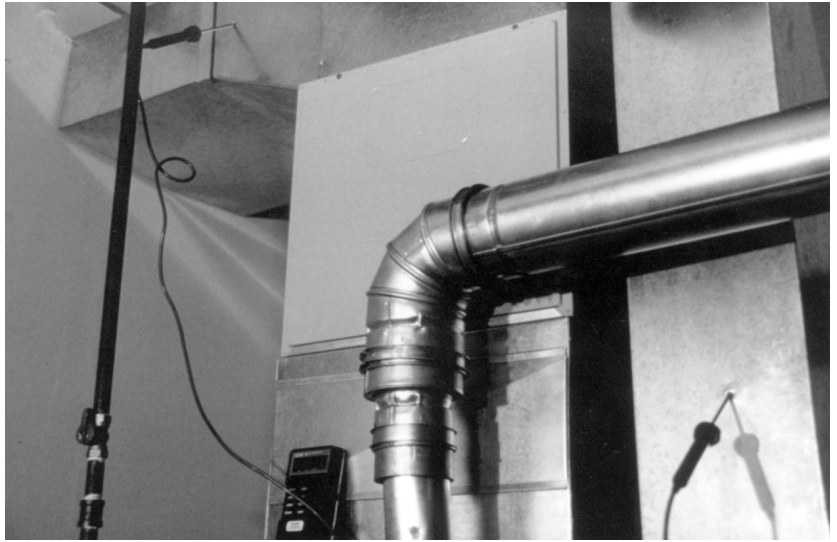





FIGURE 29
TYPICAL FURNACE NAME PLATE

AIR CONDITIONING DIVISION
FORT SMITH, ARKANSAS

CANADIAN ENERGY PERFORMANCE VERIFIED

RENDÉMENT ÉNERGÉTIQUE VÉRIFIÉ

MODEL NO./NUMERO DE MODELE: _____ MFG. DATE _____
 SERIAL NO./NUMERO DE SERIE: _____

CATEGORY IV FORCED AIR FURNACE WHEN USING INDOOR AIR FOR COMBUSTION. CATEGORY IV TYPE FSP DIRECT VENT FORCED AIR FURNACE WHEN USING OUTDOOR AIR FOR COMBUSTION. FOR INDOOR INSTALLATION ONLY IN A BUILDING CONSTRUCTED ON-SITE.
 CATEGORIE IV GÉNÉRATEUR D'AIR CHAUD À AIR FORCÉE LORSQUE DE L'AIR INTÉRIEUR EST EMPLOYÉ POUR LA COMBUSTION. CATEGORIE IV TYPE FSP ÉVACUATION DIRECTE GÉNÉRATEUR D'AIR CHAUD À AIR FORCÉE LORSQUE DE L'AIR EXTÉRIEUR EST EMPLOYÉ POUR LA COMBUSTION. POUR INSTALLATION À L'INTÉRIEUR SEULEMENT, DANS UN BATIMENT CONSTRUIT SUR LE SITE.

ELECTRIC 115 V 60 HZ 1 PH., MAXIMUM TOTAL INPUT 6.3 AMPS
 ELECTRIQUE 115 V 60 HZ 1 PH., PUISSANCE D'ENTRÉE TOTALE MAXIMUM 6.3 A.
 MAXIMUM OVERCURRENT PROTECTION 15 AMPERES. DISJONCTEUR À MAXIMA 15 A.

HOURLY INPUT RATING DEBIT CALORIFIQUE MAXIMUM Btu/hr (Kw)	HOURLY INPUT RATING DEBIT CALORIFIQUE MINIMUM Btu/hr (Kw)	FACTORY EQUIPPED FOR AGENCE A L'USINE POUR FOR GAS / GAZ
75000 (21.98)		NATURAL / NATUREL

***PLEASE REFER TO BOOKLET #92-101825-01 FOR INPUT CALCULATIONS
 IN THE U.S., AT ELEVATIONS ABOVE 2,000 FT. (610M), DERATE THE INPUT 4% PER 1,000 FT (305M) ABOVE SEA LEVEL.
 THIS APPLIANCE EQUIPPED FOR ALTITUDES / CET APPAREIL EST EQUIPÉ POUR ALTITUDES COMPRISES
 ENTIRE 0-2,000' / (0-610) FT.(M)/PIEDS(M)

ORIFICE / INJECTEUR 50 DMS	NATURAL GAS/ LP GAS OR PROP/	GAS NATUREL / GAZ DE PÉTROLE LIQUIFIÉ OU PROP.
LIMIT SETTING/LIMITE COUPE-CIRCUIT 190° (88°) * F(° C)		
AUXILIARY LIMIT SETTING/ LIMITE COUPE-CIRCUIT AUXILIAIRE	* F(° C)	

MAXIMUM PERMISSIBLE GAS SUPPLY PRESSURE TO FURNACE PRESSION MAXIMUM D'ALIMENTATION EN GAZ À CHAUDIÈRE	10.5 (2.61)	13.0 (3.23)
MINIMUM GAS SUPPLY PRESSURE FOR PURPOSES OF INPUT ADJUSTMENT PRESSION MINIMUM D'ALIMENTATION EN GAZ POUR LE RÉGLAGE DE PUISSANCE D'ENTRÉE	5.0 (1.24)	11.0 (2.73)
MANIFOLD PRESSURE / PRESSION A LA TUBULURE	5.0 (1.24)	11.0 (2.73)
	3.5 (0.87)	10.0 (2.49)

AIR TEMPERATURE RISE/
 AUGMENTATION DE LA TEMPÉRATURE DE L'AIR 45° (25°) - 75° (42°) * F (° C)

MAXIMUM EXTERNAL STATIC PRESSURE PRESSION STATIQUE EXTÉRIEURE MAXIMAL	BLOWER/ SOUFFLEUR	MOTOR FORCE
INCHES W.C. (kPa)-PO C.E. (kPa)	INCH (mm)/PO.(mm)	HP (W)
.12 (0.30)	11-7 (279-178)	1/2 (373)
.50 (1.25)	11-7 (279-178)	1/2 (373)

ASSEMBLED IN THE USA 91-22176-09

system in which excess air is routed to a zone where it is expected that the extra heat or cooling would be least noticed.

If installed as a “bypass” system, the installation must have an optional freeze stat installed to prevent the coil from icing with excess bypass cooling. Also, if the zoning equipment manufacturer provides a limit switch (usually provided by the zoning manufacturer), this limit must be installed in the system to prevent the furnace from overheating.

TEMPERATURE RISE CHECK

To determine if the air flow is correct, make a temperature rise check.

1. Insert a thermometer in the supply air duct as close to the furnace as possible yet out of a direct line from the heat exchanger. See Figure 28.
2. Insert a thermometer in the return air duct as close to the furnace as possible.
3. Operate the furnace.
4. When the thermometer in the supply air duct stops rising (approximately five minutes), subtract the return air temperature from the supply air temperature. The difference is the temperature rise.

5. Compare the measured temperature rise to the approved temperature rise range listed on the furnace name plate. See product specification sheet and nameplate located on furnace.

If the measured temperature rise is above the approved range, either the air flow is too low or the manifold pressure needs to be adjusted. More air must be moved by speeding up the blower, by removing restrictions in the duct system, or by adding more supply or return air duct. If the measured temperature rise is below the approved range, either the air flow is too much or the manifold pressure needs to be adjusted. Use lower speed tap on the multi-speed blower.

IMPORTANT: *The measured temperature rise should be in the middle of the range. See product specification sheet and name plate located on furnace.*

IMPORTANT: *Some high-efficiency filters have a greater than normal resistance to airflow. This can adversely affect furnace operation. BE SURE TO CHECK AIRFLOW if using any filter other than factory-provided filter.*

SAFETY FEATURES

LIMIT CONTROL

The high limit cut-off temperature is set at the factory and cannot be adjusted. The temperature setting prevents the air temperature leaving the furnace from exceeding the maximum outlet air temperature, which, if exceeded, will shut the furnace down.

There are several reasons for a limit switch to open and almost always involve low airflow through the furnace.

1. A dirty or restricted air filter.
2. A dirty or restricted cooling coil.
3. Undersized or restricted return air system.
4. Undersized or restricted supply air system.
5. A problem affecting the main blower:
 - A. A wrong speed tap selection.
 - B. Failing motor bearings.
 - C. Low voltage to the motor.
 - D. Dirty blower wheel.
 - E. Wrong motor rotation.
 - F. Blower wheel slipping on the motor shaft.
6. Overfiring the furnace with too much gas pressure.
7. Ventilation problems.

FLAME ROLL-OUT SAFETY SWITCHES

Furnaces are equipped with safety switches to protect against flame roll-out conditions in the burner compartment, which, if tripped, will terminate the heating cycle. In the event of a flame roll-out condition, the switch will shut the furnace down. If a switch is tripped, it must be manually reset. DO NOT jumper or reset this switch. If this switch should trip, a qualified installer, service agency or the gas supplier should be called to diagnose and/or correct the source of tripping. If this unit is mounted in a closet, the door must be closed when making this check.

PRESSURE SWITCH

This furnace is equipped with a normally-open pressure switch that monitors pressure conditions within the furnace vent system during the heating cycle.

There are several reasons for the pressure switch not to close.

1. An inoperative induced draft blower.
2. A loose or leaky pressure switch hose.
3. A blockage in the vent.
4. Severe downdrafts canceling the draft from the inducer fan.
5. A leaky gasket at the induced draft blower.
6. Improperly sized or installed vent.

The pressure switch contacts must open before the unit can go through another heating cycle.

See troubleshooting chart in this book for troubleshooting recommendations.

MAINTENANCE

⚠ WARNING

DISCONNECT MAIN ELECTRICAL POWER TO THE UNIT BEFORE ATTEMPTING ANY MAINTENANCE. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN SEVERE PERSONAL INJURY OR DEATH.

FILTERS

Filter application and placement are critical to airflow, which may affect the heating and cooling system performance. Reduced airflow can shorten the life of the systems major components, such as motor, limits, elements, heat exchanger, evaporator coil or compressor. Consequently, we recommend that the return air duct system have only one filter location. The most common location will be inside the furnace or a filter base. For systems with a return air filter grill or multiple filter grills, can have a filter installed at each of the return air openings. **DO NOT DOUBLE FILTER THE RETURN AIR DUCT SYSTEM. DO NOT FILTER THE SUPPLY AIR DUCT SYSTEM.**

If high efficiency filters or electronic air cleaners are used in the system, it is important that the airflow is not reduced to maximize system performance and life. Always verify

TABLE 13 FILTER SIZES				
UPFLOW FILTER SIZES AS SHIPPED				
FURNACE WIDTH	INPUT BTUH	BOTTOM SIZE	SIDE SIZE	QUANTITY
17½"	50, 75	15¾" X 25"	15¾" X 25"	1
21"	75, 100	19¼" X 25"	15¾" X 25"	1
24½"	125	22¾" X 25"	15¾" X 25"	1

***NOTE:** Some filters must be ordered or resized to fit certain units and applications.

that the systems airflow is not impaired by the filtering system that has been installed, by performing a temperature rise and temperature drop test.

Keep the air filters clean at all times. Vacuum dirt from filter, wash with detergent and water, air dry thoroughly and reinstall.

See Table 13 and Figures 30 through 32 for proper filter sizes and locations.

1. 21"-100,000 BTUH unit requires removal of 3½" segment of filter and frame to get proper width for a side filter.
2. 24½"-125,000 BTUH units require removal of 7" segment of filter and frame to get proper width for a side filter.

IMPORTANT: Do not operate the system without filters. A portion of the dust entrained in the air may temporarily lodge in the air duct runs and at the supply registers. Any circulated dust particles will be heated and charred by contact with the furnace heat exchanger. This sooty residue will soil ceilings, walls, drapes, carpets, and other household articles. Soot damage may also result when certain types of candles are burned, or candlewicks are left untrimmed.

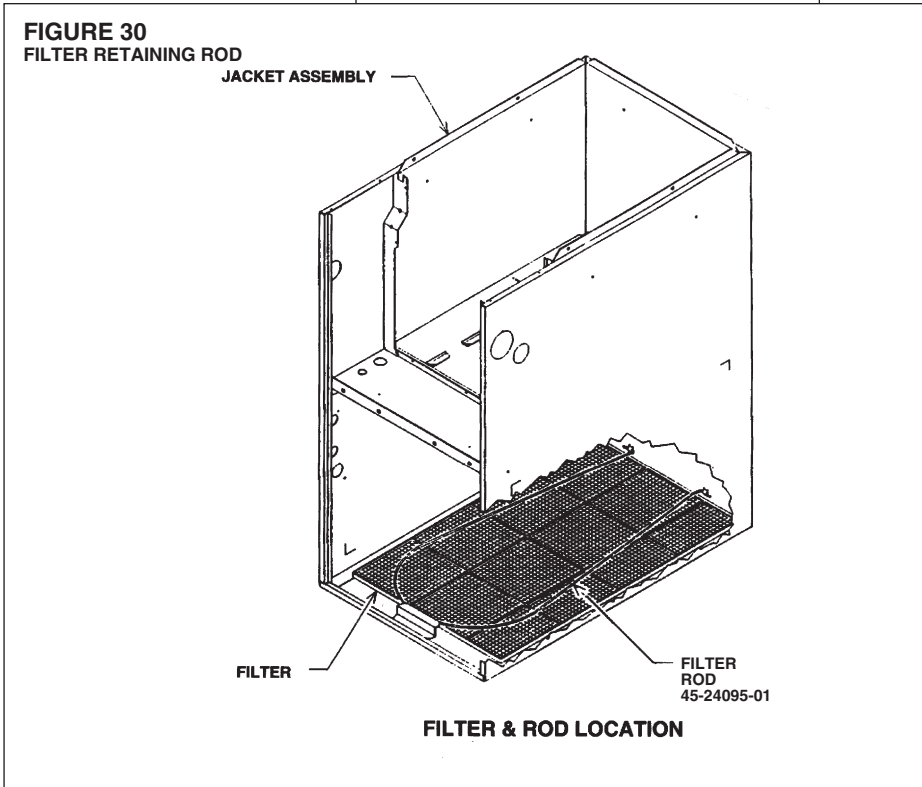
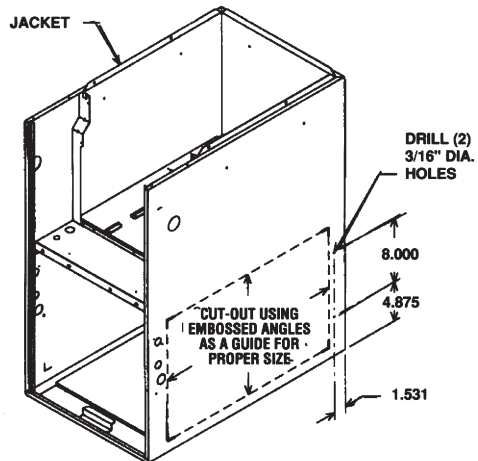
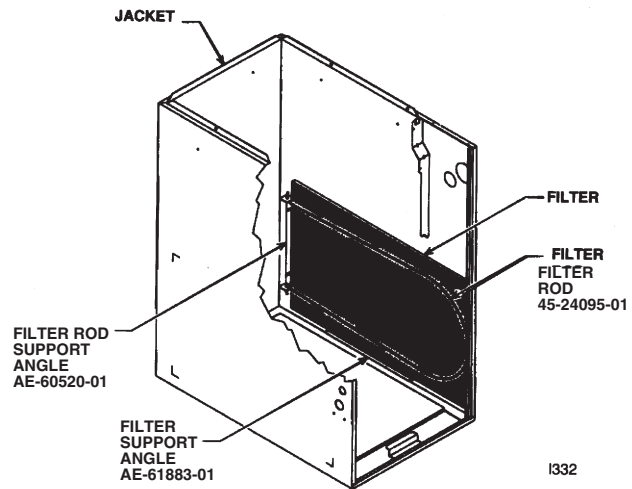


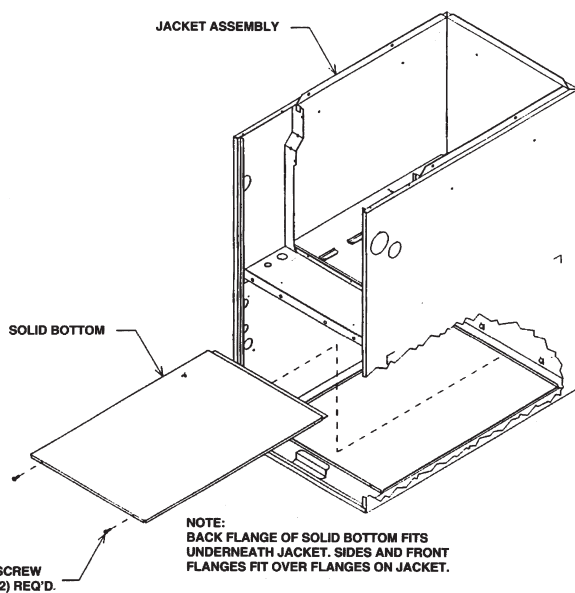
FIGURE 31
UPFLOW FILTER RETAINING ROD (SIDE RETURN)



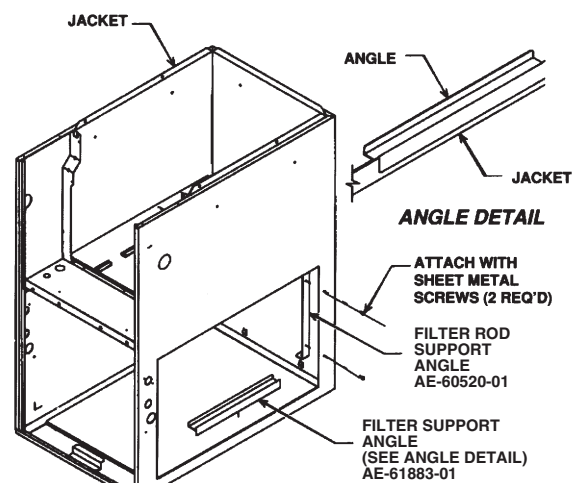
CUT-OUT AND DRILL DETAIL



FILTER AND ROD ASSEMBLY



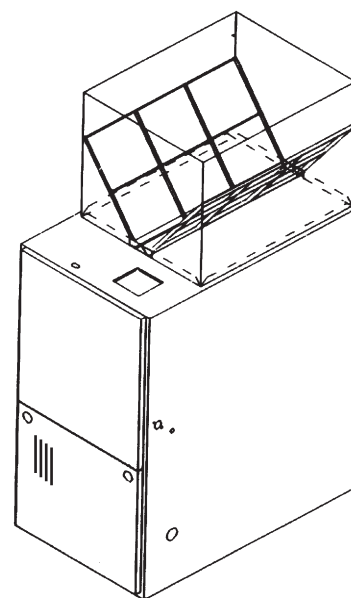
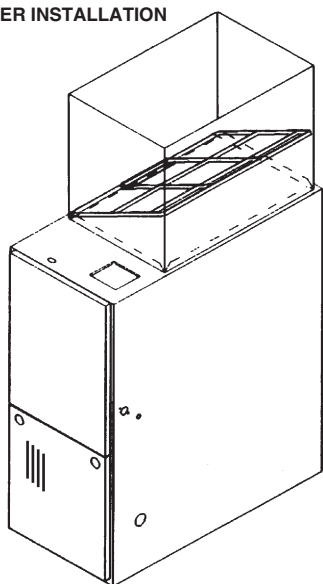
SOLID BOTTOM MAY BE ORDERED FROM THE FACTORY.



ROD & FILTER SUPPORT ANGLE ASSEMBLY

*BOTH SIDES FOR 1800 CFM OR ABOVE.

FIGURE 32
DOWNFLOW FILTER INSTALLATION



SYSTEM OPERATION INFORMATION

Advise The Customer To:

1. Advise customer of filter location. Keep the air filters clean. The heating system will operate better, more efficiently and more economically.
2. Arrange the furniture and drapes so that the supply air registers and the return air grilles are unobstructed.
3. Close doors and windows. This will reduce the heating load on the system.
4. Avoid excessive use of kitchen & bathroom exhaust fans.
5. Do not permit the heat generated by television, lamps or radios to influence the thermostat operation.
- 6 Except for the mounting platform, keep all combustible articles three feet from the furnace and vent system.
7. **IMPORTANT:** *Replace all blower doors and compartment covers after servicing the furnace. Do not operate the unit without all panels and doors securely in place.*

▲ WARNING

COMBUSTIBLE MATERIAL MUST NOT BE PLACED ON OR AGAINST THE FURNACE JACKET OR WITHIN THE SPECIFIED CLEARANCES OF THE VENT PIPE. THE AREA AROUND THE FURNACE MUST BE KEPT CLEAR AND FREE OF ALL COMBUSTIBLE MATERIALS INCLUDING GASOLINE AND OTHER FLAMMABLE VAPORS AND LIQUIDS. PLACEMENT OF COMBUSTIBLE MATERIALS ON, AGAINST OR AROUND THE FURNACE JACKET CAN CAUSE AN EXPLOSION OR FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH. THE FURNACE OWNER SHOULD BE CAUTIONED THAT THE FURNACE AREA MUST NOT BE USED AS A BROOM CLOSET OR FOR ANY OTHER STORAGE PURPOSES.

ANNUAL INSPECTION

The furnace should operate for many years without excessive scale build-up in the flue passageways, however, it is recommended that a qualified installer, service agency, or the gas supplier annually inspect the flue passageways, the vent system and the main burners for continued safe operation paying particular attention to deterioration from corrosion or other sources.

▲ WARNING

HOLES IN THE VENT PIPE OR HEAT EXCHANGER CAN CAUSE TOXIC FUMES TO ENTER THE HOME RESULTING IN CARBON MONOXIDE POISONING OR DEATH. THE VENT PIPE OR HEAT EXCHANGER MUST BE REPLACED IF THEY LEAK.

- **IMPORTANT:** *It is recommended that at the beginning of the heating season and approximately midway in the heating season a visual inspection be made of the main burner flames for the desired flame appearance by a qualified installer, service agency, or the gas supplier.*
- **IMPORTANT:** *It is also recommended that at the beginning of the heating season, the flame sensor be cleaned with steel wool by a qualified installer, service agency, or the gas supplier.*
- **IMPORTANT:** *It is recommended that an annual inspection and cleaning of all furnace markings be made to assure legibility. Attach a replacement marking, which can be obtained through the distributor, if any are found to be illegible or missing.*

IMPORTANT: FOR Nox MODELS – *At the beginning of the heating season a visual inspection of the Nox device should be made to ensure they have not become obstructed by insects nests or anything else which may effect performance.*

LUBRICATION

The indoor blower motor and induced draft motor are prelubricated by the motor manufacturer and do not require further attention.

The motors must be cleaned periodically by a qualified installer, service agency, or the gas supplier to prevent the possibility of overheating due to an accumulation of dust and dirt on the windings or on the motor exterior. Air filters should be kept clean. Dirty filters can restrict airflow and results in motor overheating.

REPLACEMENT PARTS

Contact your local distributor for a complete parts list.

NOx MODELS

When converting furnaces equipped with NOx inserts to LP gas, remove the NOx insert assemblies.

TROUBLESHOOTING

Refer to Figure 33.

WIRING DIAGRAM


Figure 34 is a complete wiring diagram for the furnace.

FIGURE 33
TROUBLESHOOTING FLOWCHART

TWO-STAGE INTEGRATED FURNACE CONTROL (IFC) TROUBLESHOOTING GUIDE USING TWO-STAGE THERMOSTAT

NOTE: Most failures are not due to the IFC. Double check all other possibilities, including the ground connection, before replacing the IFC.

WARNING



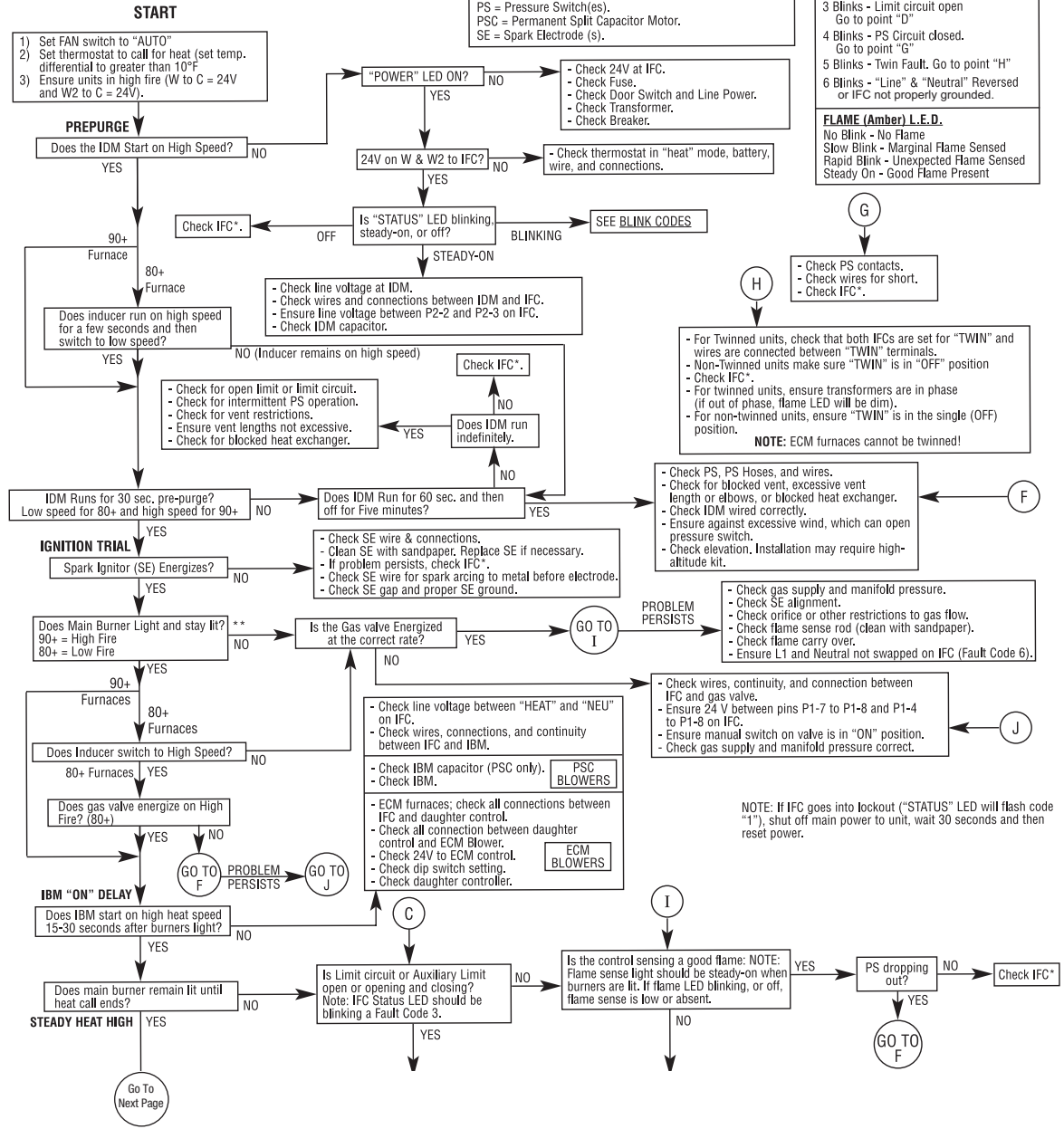
HAZARDOUS VOLTAGE
LINE VOLTAGE CONNECTIONS

DISCONNECT POWER BEFORE SERVICING.
SERVICE MUST BE BY A TRAINED, QUALIFIED SERVICE TECHNICIAN.

KEY TO ABBREVIATIONS
 ECM = Constant CFM Blower (electrically commutated motor)
 IBM = Indoor Blower Motor (or Blower Motor).
 IDM = Induced Draft Motor (or Inducer).
 IFC = Integrated Furnace Control (or control board).
 PS = Pressure Switch(es).
 PSC = Permanent Split Capacitor Motor.
 SE = Spark Electrode (s).

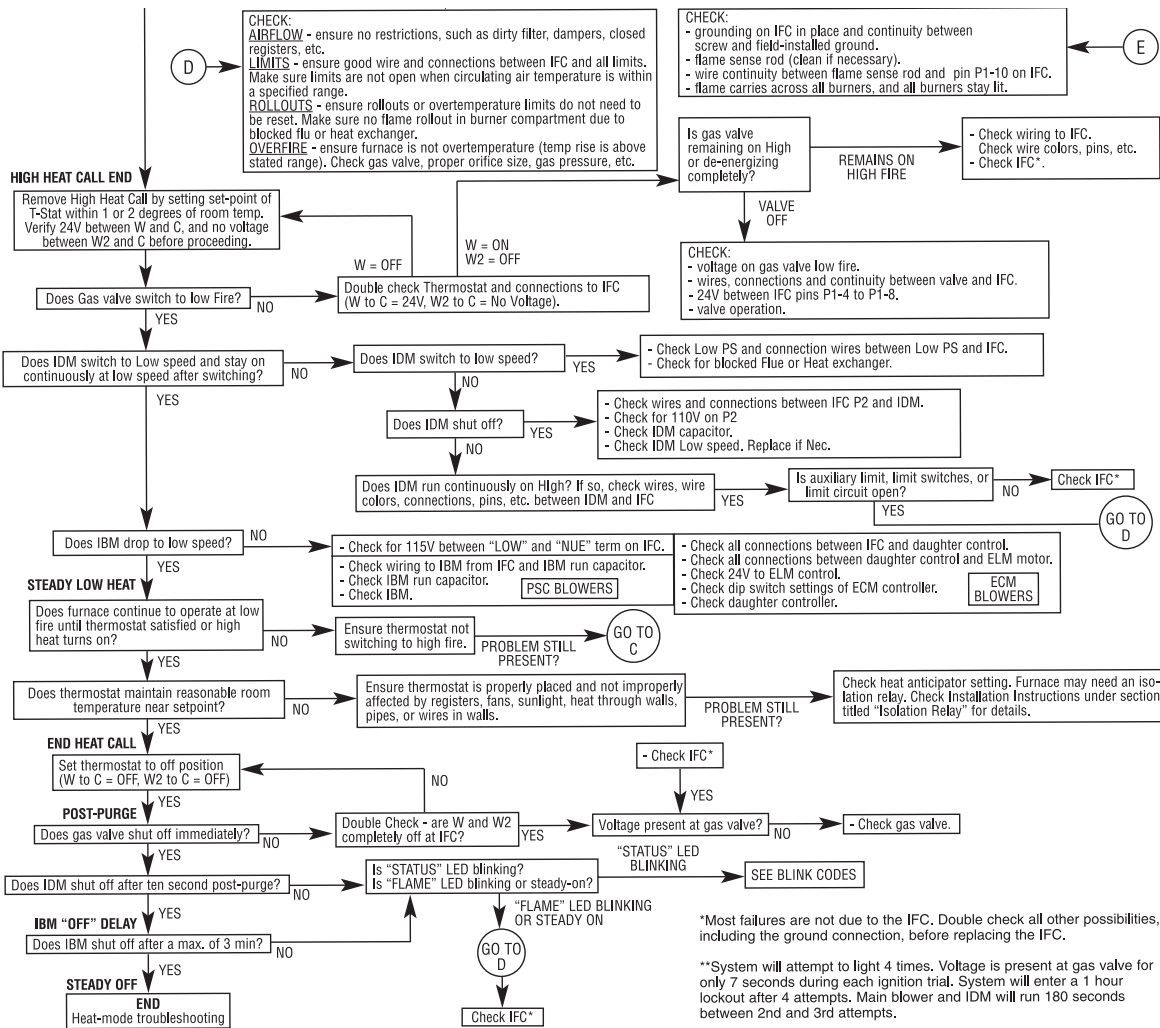
BLINK CODES – STATUS (Green) L.E.D.
 1 Blink - Soft lockout Reset System power and start over from beginning
 2 Blinks - PS Circuit open Go to point "F"
 3 Blinks - Limit circuit open Go to point "D"
 4 Blinks - PS Circuit closed. Go to point "G"
 5 Blinks - Twin Fault. Go to point "H"
 6 Blinks - "Line" & "Neutral" Reversed or IFC not properly grounded.

FLAME (Amber) L.E.D.
 No Blink - No Flame
 Slow Blink - Marginal Flame Sensed
 Rapid Blink - Unexpected Flame Sensed
 Steady On - Good Flame Present



CONTINUED ➡

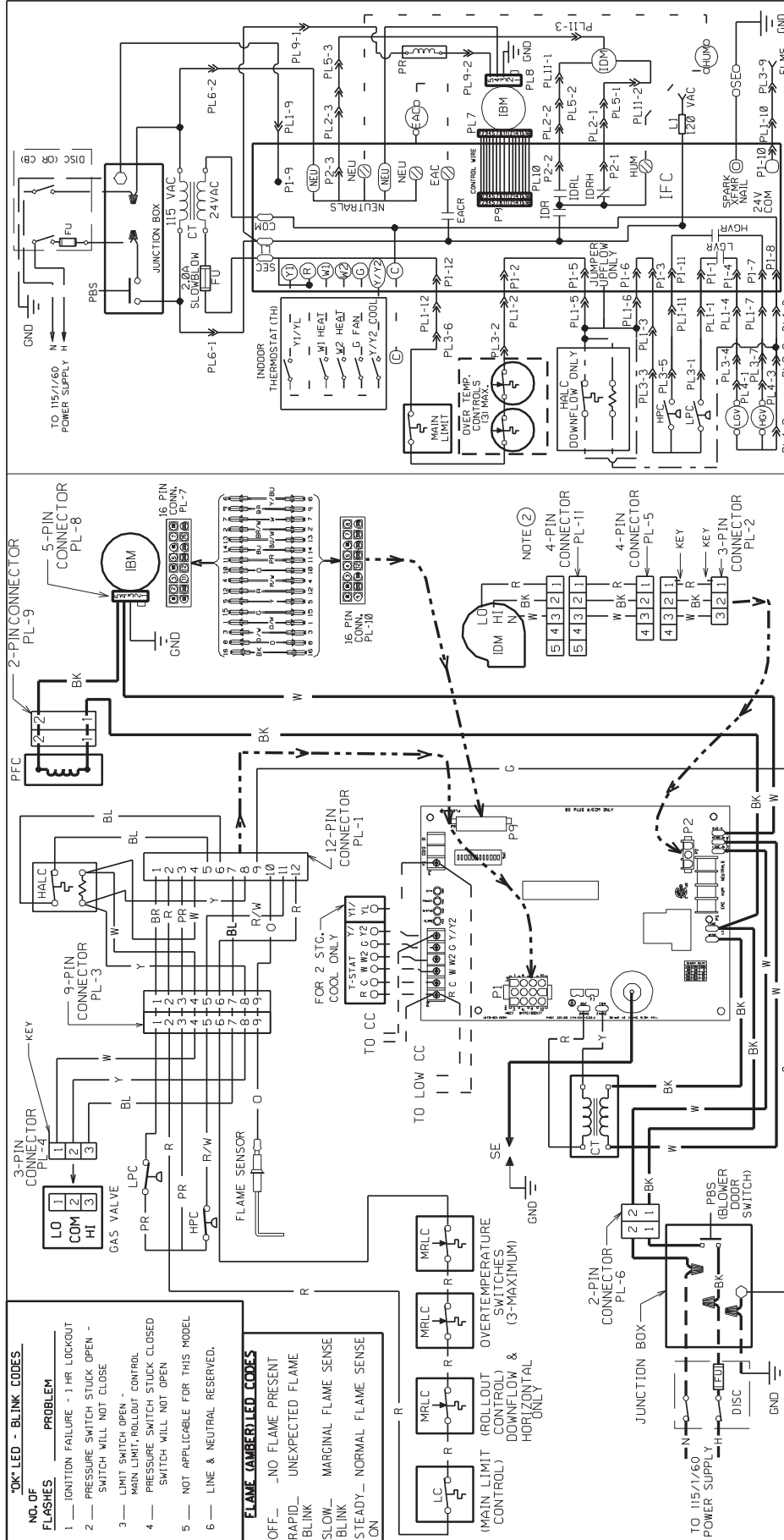
FIGURE 33 (continued)
TROUBLESHOOTING FLOWCHART



REPEAT THIS PROCEDURE UNTIL TROUBLE-FREE OPERATION IS OBTAINED.

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FIGURE 34
FOR MODELS WITH UT ELECTRONIC CONTROLS 1095-101 INTEGRATED FURNACE CONTROL AND ECM BLOWER MOTOR

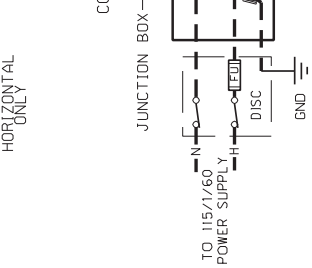
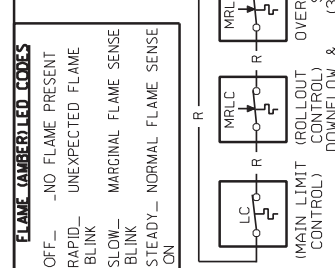


"OK" LED - BLINK CODES

NOL. OF FLASHES	PROBLEM
1	IGNITION FAILURE - 1 HR LOCKOUT
2	PRESSURE SWITCH STUCK CLOSED - SWITCH WILL NOT CLOSE
3	LIMIT SWITCH OPEN - MAIN LIMIT, ROLLOUT CONTROL SWITCH WILL NOT OPEN
4	PRESSURE SWITCH STUCK CLOSED - SWITCH WILL NOT OPEN
5	NOT APPLICABLE FOR THIS MODEL
6	LINE & NEUTRAL REVERSED.

FLAME LAMPBLED CODES

OFF_ NO FLAME PRESENT
 RAPID_ UNEXPECTED FLAME
 BLINK
 SLOW_ MARGINAL FLAME SENSE
 BLINK
 STEADY_ NORMAL FLAME SENSE
 ON



WIRE COLOR CODE

BK_	BLACK
BR_	BROWN
BL_	BLUE
G_	GREEN
W_	WHITE
Y_	YELLOW

ELECTRICAL WIRING DIAGRAM

UPFLOW, DOWNFLOW & HORIZONTAL
 BLOWER, INDUCED DRAFT
 GAS FIRED, FORCED AIR FURNACE
 2 STAGE HEAT, 1 STAGE COOL
 WHITE-RODGERS GAS VALVE
 80+ DIRECT SPARK IGNITION, G.E. ECM MOTOR
 ECM INTERFACE CONTROL
 DR. BY APP. BY DATE DWG. NO. REV

WIRING INFORMATION

LINE VOLTAGE
 -FACTORY STANDARD
 -FACTORY OPTION
 -FIELD INSTALLED
 LOW VOLTAGE
 -FACTORY STANDARD
 -FACTORY OPTION
 -FIELD INSTALLED
 REPLACEMENT WIRE
 -MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105 C. MIN.)
 WARNING
 -CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., NATIONAL WIRING REGULATIONS, AND LOCAL CODES AS APPLICABLE.

NOTES:

- WITH SINGLE STAGE THERMOSTAT CONNECT "W" TO "W2" ON IFC.
- 50K AND 75K BTU/H MODELS HAVE 4 PIN CONNECTORS.

COMPONENT CODE

P PLUG MOUNTED ON CONTROL BOARD
 PBS PUSH BUTTON SWITCH
 PFC POWER FACTOR CHOKE PLUG
 RC RUN CAPACITOR
 TH THERMOSTAT (H/C)
 SE SPARK IGN. ELECTRODE
 ▲ WIRE NUT

COMPONENT CODE

ALC	AUX. LIMIT CONTROL (TEMP)
B	HEAT PUMP "B" SIGNAL FROM HOSSIL LABEL KIT
BR	COMPRESSOR CONTACTOR
CC	COOL RELAY
CT	CONTROL TRANSFORMER
ICR	DISCONNECT SWITCH
EAC	ELECTRIC AIR CLEANER
FLMS	FLAME SENSOR
FUSE	FUSE
GND	GROUND
HVC	GAS VALVE RELAY
HALC	HEAT ASSISTED LIMIT CNTRL
HCBR	HEAT COOL BLU. CLR. RELAY
HPC	HIGH PRESSURE CONTROL
HUM	HUMIDIFIER RELAY
IBM	INDOOR BLOWER MOTOR
IDM	INDUCED DRAFT
IDR	INDUCED DRAFT RELAY
IDRH	HIGH DRAFT RELAY
IDRL	INDUCED DRAFT RELAY
IFC	INDOOR FURNACE CNTRL
IR	IGNITION RELAY
ICM15	ICM 15 RELAY
LC	LIMIT CONTROL
LHBR	LOW HEAT BLOWER RELAY
LPC	LOW PRESSURE CONTROL
MCV	MAIN GAS VALVE
MRLC	MAIN, RESET LIMIT CNTRL
NPC	NEIN PRESSURE CNTRL
ODD	ON DEMAND
ODD	DEHUMIDIFICATION INPUT

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