

Amana® AIR COMMAND 80

Model GUI-E

Canadian/Common Vent
(UPFLOW)

GAS FIRED WARM AIR FURNACE Installation and Operation INSTRUCTIONS



WARNING

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

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS
 - Extinguish any open flame.
 - 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.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

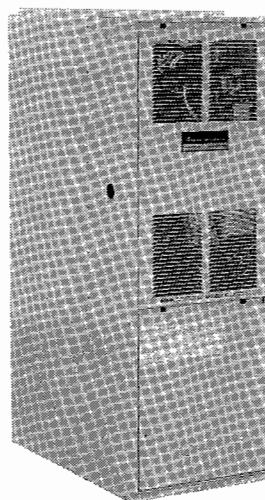


WARNING

Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the furnace before shutting off the electrical supply.



RECOGNIZE THIS SYMBOL AS A SAFETY PRECAUTION



IMPORTANT TO THE INSTALLER

Before installing this unit please read this manual to familiarize yourself on the specific items which must be adhered to such as maximum external static pressure to unit, air temperature rise, min. or max. cfm and motor speed connections. Affix these Installation Instructions adjacent to the furnace.

TO THE OWNER

It is important that you fill out the owner's registration card and mail it today. This will assist Amana in contacting you if any service or warranty information should change in the future. When filling in the registration card, be sure to include the Model, Manufacturing and Serial Numbers, plus the installation date.

Your warranty certificate is also supplied with the unit. Read the warranty carefully and note what is covered. Keep the warranty certificate in a safe place, so you can find it, if necessary.

If additional operating instructions are required, call the dealer through whom the purchase was made.

Keep this literature in a safe place for future reference.

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Amana Refrigeration, Inc.
Amana, Iowa 52204



Amana GUI Series Forced Air Central
Furnace Design Complies With
Requirements Embodied In The Ameri-
can National Standard Shown Below.
ANSIZ21.47 Central Furnaces

I. SAFETY AND UNIT LOCATION



RECOGNIZE THIS SYMBOL AS A SAFETY PRECAUTION



WARNING

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



WARNING

This product contains or produces a chemical or chemicals which may cause serious illness or death and which are known to the State of California to cause cancer, birth defects or other reproductive harm.

LOCATING THE FURNACE



WARNING

To avoid possible equipment damage, fire, personal injury or death, the following points must be observed when installing the unit.



WARNING

The furnace must be located so that the electrical components are protected from water.



CAUTION

This unit should not be used as a "construction heater" during the finishing phases of construction on a new structure. This type of use may result in premature failure of the unit due to extremely low return air temperatures and exposure to corrosive or very dirty atmospheres.



When the furnace is used in conjunction with a cooling unit, the furnace must be upstream of or in parallel with the cooling unit. For details, see Section VIII.



The furnace must be set on a level floor. If the floor may become wet or damp at times, the furnace should be supported above the floor on a concrete base sized approximately 1½" larger than the base of the furnace.



Do not install the furnace where combustion air for the furnace is frequently heavily contaminated with compounds containing chlorine or fluorine. Common sources of such compounds include: indoor swimming pools and chlorine bleaches, paint strippers, adhesives, paints, varnishes, sealers, waxes (which are not yet dried) and solvents used during construction and remodeling. Various commercial and industrial processes may also be sources of chlorine/fluorine compounds.



If the furnace is installed near an area which will be frequently contaminated by chlorine/fluorine compounds, the furnace should be sealed from this area so that little contaminated air can reach the furnace. The furnace must still have an adequate supply of combustion air, either from a neighboring uncontaminated room or from outdoors. For details, see "AIR REQUIREMENTS" Section IV.



The furnace should be as centralized as is practical with respect to the air distribution system.



Provisions must be made for venting combustion products outdoors through a proper venting system as outlined in the Venting Manuals. The length of flue pipe could be a limiting factor in locating the furnace. For details, see the Venting Manuals shipped with the furnace.



Allow clearances from the enclosure as shown in TABLE 1 (page 5) for fire protection, proper operation, and service access. These clearances must be permanently maintained. The combustion and ventilating air openings in the front and top panels of the furnace must never be obstructed.



When installed in a residential garage the furnace must be positioned so the burners and ignition source are located not less than 18 inches above the floor and protected from physical damage by vehicles.



Do not install the furnace directly on carpeting, tile, or combustible material other than wood flooring.



When the furnace is heating, the temperature of the return air entering the furnace must be between 55°F and 100°F.

II. SPECIFICATIONS

Induced Draft Gas Furnace

Upflow Model	BTUH		Temp. Rise Range °F	No. of Burners	F.L.A. ⁽⁴⁾	Blower D x W	Blower H.P.	Blower Speeds	Max. CFM @ .50 ESP	Filters			Net Weight	Appr. Sh. Weight
	Input	Output								Size	Type	Qty.		
GUI045E25A	(1) 45,000 (2) 45,000 (3) 40,500	36,000 36,000 32,400	35-65	2	9.2	9 x 8	1/4	3	1050	16x25x1	Semi-Permanent	1	132	145
GUI070E30A	(1) 70,000 (2) 70,000 (3) 63,000	56,000 55,300 49,770	35-65	3	12.7	10 x 8	1/8	4	1275	16x25x1	Semi-Permanent	1	148	161
GUI70E40A	(1) 70,000 (2) 70,000 (3) 63,000	56,000 55,300 49,770	35-65	3	14.5	10 x 8	1/2	4	1700	16x25x1	Semi-Permanent	2	148	161
GUI090E30A	(1) 90,000 (2) 90,000 (3) 71,000	71,000 70,200 63,180	45-75	4	12.7	10 x 8	1/8	4	1220	16x25x1	Semi-Permanent	1	160	178
GUI90E50A	(1) 90,000 (2) 90,000 (3) 81,000	71,000 70,200 63,180	35-65	4	15.7	10 x 10	3/4	4	2125	16x25x1	Semi-Permanent	2	160	178
GUI115E35A	(1) 115,000 (2) 115,000 (3) 103,500	92,000 90,850 81,760	40-70	5	14.5	10 x 10	1/2	4	1800	16x25x1	Semi-Permanent	1	178	196
GUI115E50A	(1) 115,000 (2) 115,000 (3) 103,500	92,000 90,850 81,760	45-75	5	16.9	10 x 10	3/4	3	2125	16x25x1	Semi-Permanent	2	178	196
GUI140E35A	(1) 140,000 (2) 140,000 (3) 126,000	111,000 111,300 100,170	45-75	6	14.5	10 x 10	1/2	4	1750	16x25x1	Semi-Permanent	1	188	206
GUI140E50A	(1) 140,000 (2) 140,000 (3) 126,000	111,000 111,300 100,170	45-75	6	16.9	10 x 10	3/4	3	2050	16x25x1	Semi-Permanent	2	188	206

(1) For United States Installations

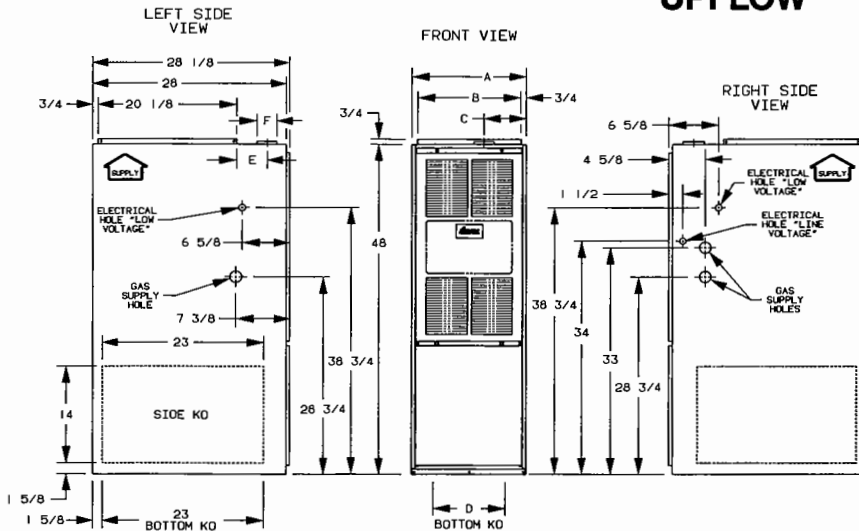
(2) For Canadian Installation at 0-2000 ft.

(3) For Canadian Installation at 0-4500 ft.

(4) Full load amps (FLA) includes 5 amps drawn by ignitor during 21 second start-up cycle. Flame sensor output is 1 to 4 microamps at 115 volts.

NOTE: As shipped, the pressure switch on all furnaces is suitable for altitudes of 0 to 4,000 feet, and is set for $-.54 \pm .05$ inches W.C.

UPFLOW



(All dimensions in inches)

	A	B	C	D	E	F
GUI045	16 1/2	15	6 1/8	10 1/2	2 5/16	3
GUI070	16 1/2	15	6 1/8	10 1/2	2 5/16	3
GUI090	20 1/2	19	8 1/8	14 1/2	2 5/16	3
GUI115	24 1/2	23	10 1/8	18 1/2	2 13/16	4
GUI140	24 1/2	23	10 1/8	18 1/2	2 13/16	4

NOTES:

1. All furnaces have a redundant gas valve and blower door inter-lock switch.
2. All furnaces are manufactured for use on 120V, 60 Hertz and single phase electrical power supply.
3. **Important:** While the data is presented as a guide it is very important to electrically connect the unit and properly size fuses and wires in accordance with the National Electrical Code and/or all Existing Local Codes.
4. Performance figures are based on Department of Energy information and requirements under continuous operating conditions. Performance will vary with weather conditions and use.

CFM & Temperature Rise vs. External Static Pressure

Model	Motor Speed	External Static Pressure, Inches Water Column													
		0.2		0.3		0.4		0.5		0.6*		0.7*		0.8*	
		CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise
GUI045E25A	LO	690	48	675	49	660	51	640	52	590	54	530	60	450	—
	MED	965	—	950	—	915	36	875	38	820	39	760	42	675	47
	HI	1240	—	1170	—	1100	—	1050	—	950	—	870	37	780	41
GUI070E30A	LO	725	—	720	—	700	—	675	—	580	—	515	—	420	—
	M-LO	935	55	920	56	900	58	865	60	820	61	770	—	690	—
	MED	1190	44	1150	45	1115	47	1065	49	1010	49	945	53	860	58
GUI070E40A	HI	1470	—	1410	37	1345	39	1275	41	1200	42	1110	45	1000	50
	LO	1135	46	1135	46	1130	46	1125	46	1095	46	1070	47	1035	48
	M-LO	1340	39	1335	39	1325	39	1300	40	1270	39	1235	40	1180	42
GUI090E30A	MED	1570	—	1560	—	1525	—	1485	—	1450	—	1400	36	1330	37
	HI	1895	—	1835	—	1775	—	1700	—	1630	—	1550	—	1450	—
GUI090E50A	LO	850	—	830	—	800	—	775	—	730	—	680	—	610	—
	M-LO	910	73	900	74	870	—	840	—	800	—	750	—	690	—
	MED	1120	60	1080	62	1050	63	1010	66	960	67	900	72	820	—
GUI115E35A	HI	1395	48	1335	50	1275	52	1220	55	1150	56	1065	61	970	67
	LO	1230	54	1220	55	1210	55	1200	56	1170	55	1135	57	1090	59
	M-LO	1530	44	1525	44	1520	44	1515	44	1485	44	1455	44	1410	46
GUI115E50A	MED	1770	38	1770	38	1755	38	1725	39	1700	38	1660	39	1600	40
	HI	2330	—	2280	—	2220	—	2125	—	2055	—	1965	—	1850	—
GUI140E35A	LO	1180	—	1175	—	1150	—	1125	—	1090	—	1050	—	995	—
	M-LO	1410	60	1400	61	1375	62	1350	63	1310	64	1265	66	1200	69
	MED	1655	51	1645	52	1620	53	1575	54	1480	56	1410	59	1310	64
GUI140E50A	HI	2000	43	1950	44	1875	45	1800	47	1725	48	1630	51	1520	55
	LO	1530	56	1520	56	1500	57	1475	58	1430	58	1370	61	1280	65
	MED	1730	49	1720	50	1700	50	1675	51	1620	51	1560	53	1470	57
GUI140E35A	HI	2375	—	2275	—	2200	—	2125	—	2030	—	1920	—	1760	47
	LO	1160	—	1150	—	1135	—	1124	—	1090	—	1040	—	980	—
	M-LO	1330	—	1315	—	1295	—	1275	—	1230	—	1175	—	1100	—
GUI140E50A	MED	1585	65	1560	66	1525	68	1475	70	1425	71	1340	—	1230	—
	HI	1930	54	1875	55	1835	57	1750	59	1680	60	1600	63	1480	68
GUI140E50A	LO	1490	70	1470	71	1450	72	1425	73	1380	73	1330	—	1260	—
	MED	1660	62	1650	63	1635	63	1625	64	1590	64	1550	65	1490	68
	HI	2290	—	2230	47	2130	49	2050	51	1960	52	1850	55	1700	59

NOTE:

1. CFM in chart above, is with filter(s) as shipped with furnace. If furnace is shipped with two side return filters, this chart assumes both filters are used.
2. INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
3. The above chart is for information only. For satisfactory operation, external static pressure should not exceed value shown on rating plate. The shaded area indicates ranges in excess of maximum external static pressure allowable when heating.
4. The above chart is for U.S. furnaces installed at 0-2000 feet. At higher altitudes, a properly derated unit will have approximately the same temperature rise at a particular CFM, while the ESP at that CFM will be lower.

CLEARANCES TO COMBUSTIBLE SURFACES. (inches) TABLE 1

Front	6
Left	1
Right	2**
Rear	0
Top	1
Flue	6*
Floor	C

C = Combustible Floor (Wood Only)

* = May be 1" if Type B vent is used.

** = 2" clearance for GUI045E25A, GUI070E30A, & GUI070E40A only (May be 1" when Type B vent is used.) All others may be 1".

ACCESSIBILITY CLEARANCES (MINIMUM)

36" at front is required for servicing or cleaning.

NOTE: In all cases accessibility clearance shall take precedence over clearances from the enclosure where accessibility clearances are greater.

III. GENERAL INFORMATION



WARNING

Property damage, bodily injury, or death from hazards such as fire, explosion, smoke, soot, condensation, electrical shock, or carbon monoxide may result from improper installation, repair, operation, or maintenance on this product.



WARNING

To avoid fire, property damage, and personal injury, do not install this unit in a mobile home, trailer, or recreational vehicle.

This is an upflow type furnace. To assure that your unit operates safely and efficiently, it must be installed, operated and maintained in accordance with these installation and operating instructions, all local building codes and ordinances, or, in their absence, with the latest edition of the National Fuel Gas Code, ANSI Z223.1*, in Canada with the CAN/CGA-B149 Installation Code.

The rated heating capacity of the furnace should be greater than or equal to the total heat loss of the area to be heated. The total heat loss should be calculated by an approved method or in accordance with "A.S.H.R.A.E. Guide" or "Manual J-Load Calculations" published by the Air Conditioning Contractors of America.

*Obtain from:
American National Standards Institute
1430 Broadway
New York, NY 10018

TRANSPORTATION DAMAGE

All furnaces are securely packed in shipping containers approved by the National Safe Transit Committee. The carton should be checked upon arrival for external damage. If damage is found, a request for inspection by carrier's agent should be made in writing immediately.

The furnace should be carefully inspected upon arrival for damage and bolts or screws which may have loosened in transit. In the event of damage, the consignee should:

1. Make notation on delivery receipt of any visible damage to shipment or container.
2. Notify carrier promptly and request an inspection.
3. In case of concealed damage, carrier should be notified as soon as possible — preferably within 5 days.
4. File the claim with the following supporting documents within the 9-month statute of limitations.
 - a. Original Bill of Lading, certified copy, or indemnity bond.
 - b. Original paid freight bill or indemnity in lieu thereof.
 - c. Original invoice or certified copy thereof, showing trade and other discounts or reductions.
 - d. Copy of the inspection report issued by carrier's representative at the time damage is reported to the carrier.

The carrier is responsible for making prompt inspection of damage and for a thorough investigation of each claim. The distributor or manufacturer will not accept claims from dealers for transportation damage.

LOCATING THE THERMOSTAT

Thermostat should be mounted 4 to 5 feet above the floor, on inside wall of the living room, dining room, or a hallway that has good air circulation from the other rooms being controlled by the thermostat.

Movement of air should not be obstructed by furniture, door, draperies, etc. The thermostat should not be mounted where it will be affected by drafts, hot or cold water pipes or air ducts in walls, radiant heat from fireplace, lamps, the sun, T.V., etc. or on an outside wall. Consult the Instruction Sheet packaged with thermostat for mounting instructions.

IV. AIR REQUIREMENTS

COMBUSTION AND VENTILATION AIR



WARNING

Property damage, bodily injury or death may occur if the furnace and any other fuel-burning appliances are not provided with enough fresh air for proper combustion and ventilation of flue gases. Most homes require outside air to be supplied into the furnace area.

Improved construction and additional insulation in homes has reduced the heat loss and made these homes much tighter around doors and windows so that air infiltration is minimal. This creates a problem to supply combustion and ventilation air for gas fired or other fuel burning appliances. Any use of appliances that pull air out of the house (clothes dryers, exhaust fans, fireplaces, etc.) increases this problem and appliances could be starving for air.

In addition, these energy saving measures mean that your home will retain more water vapor and have a higher relative humidity. High humidity, especially during cold weather, may be damaging to buildings because condensation forms on windows and inside walls.

AIR REQUIREMENTS

Most homes will require that outside air be supplied to the furnace area by means of ventilation grilles or ducts connecting directly to the outdoors or spaces open to the outdoors such as attics or crawl spaces. The following information on air for combustion and ventilation is reproduced from the National Fuel Gas Code NFPA54/ANSI Z223.1 Section 5.3 or Canadian Installation Code and CANI-B149.2.

5.3.1 General:

(a) The provisions of 5.3 apply to gas utilization equipment installed in buildings and which require air for combustion, ventilation and dilution of flue gases from within the building. They do not apply to (1) direct vent equipment which is constructed and installed so that all air combustion is obtained from the outside atmosphere and all flue gases are discharged to the outside atmosphere, or (2) enclosed furnaces which incorporate an integral total enclosure and use only outside air for combustion and dilution of flue gases.

(b) Equipment shall be installed in a location in which the facilities for ventilation permit satisfactory combustion of gas, proper venting and the maintenance of ambient temperature at safe limits under normal conditions of use. Equipment shall be located so as not to interfere with proper circulation of air. When normal infiltration does not provide the necessary air, outside air shall be introduced.

(c) In addition to air needed for combustion, process air shall be provided as required for: cooling of equipment or material, controlling dew point, heating, drying, oxidation or dilution, safety exhaust, odor control, and air for compressors.

(d) In addition to air needed for combustion, air shall be applied for ventilation, including all air required for comfort and proper working conditions for personnel.

(e) While all forms of building construction cannot be covered in detail, air for combustion, ventilation and dilution of flue gases for gas utilization equipment vented by natural draft normally may be obtained by application of one of the methods covered in 5.3.3 and 5.3.4.

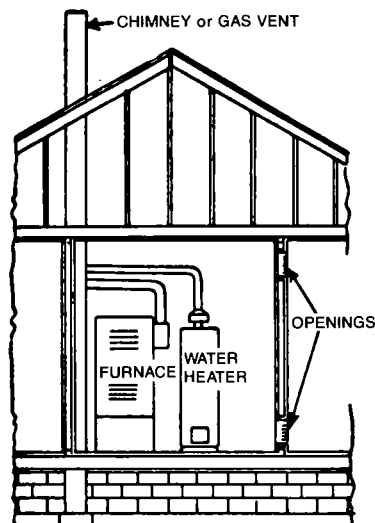
(f) Air requirements for the operation of exhaust fans, kitchen ventilation systems, clothes dryers, and fireplaces shall be considered in determining the adequacy of a space to provide combustion air requirements.

5.3.2 Equipment Located in Unconfined Spaces: In unconfined spaces (see definition below) in buildings, infiltration may be adequate to provide air for combustion, ventilation and dilution of flue gases. However, in buildings of tight construction (for example, weather stripping, heavily insulated, caulked, vapor barrier, etc.), additional air may need to be provided using the methods described in 5.3.3-b or 5.3.4.

Space, Unconfined. For purposes of this Code, a space whose volume is not less than 50 cubic feet per 1,000 Btu per hour of the aggregate input rating of all appliances installed in that space. Rooms communicating directly with the space in which the appliances are installed, through openings not furnished with doors, are considered a part of the unconfined space.

5.3.3 Equipment Located in Confined Spaces:

(a) *All Air from Inside the Building:* The confined space shall be provided with two permanent openings communicating directly with an additional room(s) of sufficient volume so that the combined volume of all spaces meets the criteria for an unconfined space. The total input of all gas utilization equipment installed in the combined space shall be considered in making this determination. Each opening shall have a minimum free area of 1 square inch per 1,000 Btu per hour of the total input rating of all gas utilization equipment in the confined space, but not less than 100 square inches. One opening shall be within 12 inches of the top and one within 12 inches of the bottom of the enclosure. (See Figure 1.)

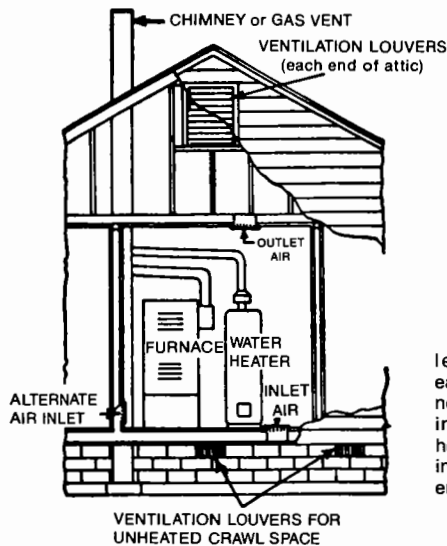


Note: Each opening shall have a free area of not less than one square inch per 1,000 Btu per hour of the total input rating of all equipment in the enclosure, but not less than 100 square inches.

FIG. 1 — Equipment Located in Confined Spaces; All Air from inside the Building. See 5.3.3-a.

(b) **All Air From Outdoors:** The confined space shall be provided with two permanent openings, one commencing within 12 inches of the top and one commencing within 12 inches of the bottom of the enclosure. The openings shall communicate directly, or by ducts, with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors.

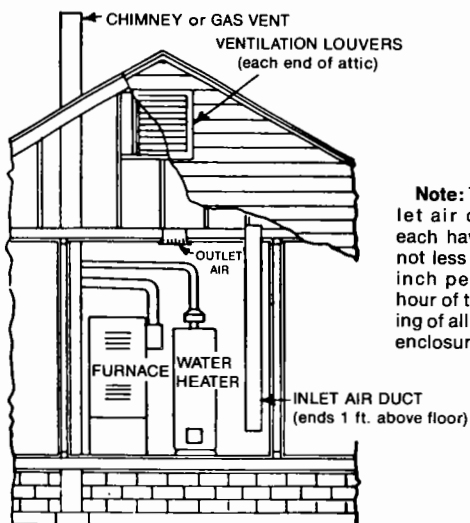
1. When directly communicating with the outdoors, each opening shall have a minimum free area of 1 square inch per 4,000 Btu per hour of total input rating of all equipment in the enclosure. (See Figure 2.)



Note: The inlet and outlet air openings shall each have a free area of not less than one square inch per 4,000 Btu per hour of the total input rating of all equipment in the enclosure.

FIG. 2 — Equipment Located in Confined Spaces; All Air from Outdoors — Inlet Air from Ventilated Crawl Space and Outlet Air to Ventilated Attic. See 5.3.3-b

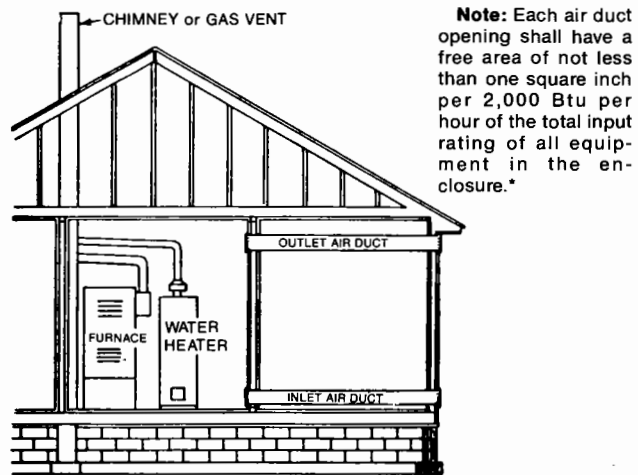
2. When communicating with the outdoors through vertical ducts, each opening shall have a minimum free area of 1 square inch per 4,000 Btu per hour of total input rating of all equipment in the enclosure. (See Figure 3.)



Note: The inlet and outlet air openings shall each have a free area of not less than one square inch per 4,000 Btu per hour of the total input rating of all equipment in the enclosure.

FIG. 3 — Equipment Located in Confined Spaces; All Air from Outdoors Through Ventilated Attic. See 5.3.3-b.

3. When communicating with the outdoors through horizontal ducts, each opening shall have a minimum free area of 1 square inch per 2,000 Btu per hour of total input rating of all equipment in the enclosure. (See Figure 4.)



Note: Each air duct opening shall have a free area of not less than one square inch per 2,000 Btu per hour of the total input rating of all equipment in the enclosure.*

*If the appliance room is located against an outside wall and the air openings communicate directly with the outdoors, each opening shall have a free area of not less than one square inch per 4,000 Btu per hour of the total input rating of all appliances in the enclosure.

FIG. 4 — Equipment Located in Confined Space; All Air from Outdoors. See 5.3.3-b.

4. When ducts are used, they shall be of the same cross-sectional area as the free area of the openings to which they connect. The minimum dimension of rectangular air ducts shall be not less than 3 inches.

5.3.4 Specially engineered Installations:

The requirements of 5.3.3 shall not necessarily govern when special engineering, approved by the authority having jurisdiction, provides an adequate supply of air for combustion, ventilation, and dilution of flue gases.

5.3.5 Louvers and Grilles:

In calculating free area in 5.3.3, consideration shall be given to the blocking effect of louvers, grilles or screens protecting openings. Screens used shall not be smaller than 1/4 inch mesh. If the area through a design of louver or grille is known, it should be used in calculating the size of opening required to provide the free area specified. If the design and free area is not known, it may be assumed that wood louvers will have 20-25 percent free area and metal louvers and grilles will have 60-75 percent free area. Louvers and grilles shall be fixed in the open position or interlocked with the equipment so that they are opened automatically during equipment operation.

5.3.6 Special Conditions Created by Mechanical Exhausting or Fireplaces:

Operation of exhaust fans, ventilation systems, clothes dryers, or fireplaces may create conditions requiring special attention to avoid unsatisfactory operation of installed gas utilization equipment.

V. VENTING

For information on venting, please consult the venting manual(s) shipped with the furnace. **NOTE:** The horizontal venting system described in 10290102 is not approved for use in Canada.



WARNING

Failure to follow these instructions can result in bodily injury or death from asphyxiation. Therefore, carefully read the following instructions given in this section and the Venting Manual(s) shipped with the furnace.

WHEN AN EXISTING FURNACE IS REMOVED FROM A VENTING SYSTEM SERVING OTHER APPLIANCES, the venting system may be too large to properly vent the remaining attached appliances.

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

- (a) Seal any unused openings in the common venting system.
- (b) Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.

(c) Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. 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.

(d) Follow the lighting instructions. Place the appliance being inspected in operation. Adjust thermostat so appliance will operate continuously.

(e) 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.

(f) After it has been determined that each appliance remaining 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.

(g) If improper venting is observed during any of the above tests, the common venting system must be corrected in accordance with the latest edition of the National Fuel Gas Code, ANSI Z223.1.

If resizing any portion of the common venting system, use the appropriate table in Appendix G in the latest edition of the National Fuel Gas Code, ANSI Z223.1. Also consult the venting manual shipped with the furnace.

VI. GAS PIPING

The rating plate is stamped with the model number, type of gas and gas input rating. Make sure the furnace is equipped to operate on the type of gas available.

INLET GAS PRESSURE	
Natural	MIN. 5.0", MAX. 10.0"
Propane	MIN. 11.0", MAX. 14.0"

Inlet Gas Pressure Must Not Exceed the Maximum Value Shown in Table Above.

The minimum supply pressure should not be varied downward because this could lead to unreliable ignition. In addition, gas input to the burners must not exceed the rated input shown on the rating plate. Over firing of the furnace could result in premature heat exchanger failure.

HIGH ALTITUDE DERATE (U.S. Installations Only)

When this furnace is installed at altitudes above 2000 feet, the furnace input must be derated 4% for each 1000 feet above sea level because the density of the air is reduced.

In some areas the gas supplier will derate the gas at a rate of 4% for each 1,000 feet above sea level. If he does not

do so, smaller orifices will be required at altitudes above 3,500 feet (non-derated natural gas) or 4,500 feet (non-derated propane).

A different pressure switch will be required at altitudes more than 4000 feet above sea level. This is required regardless of the heat content of the fuel used.

High altitude kits can be purchased depending upon the altitude and usage of propane or natural gas. Refer to the high altitude instruction manual included with this furnace to determine which high altitude components to use and also for detailed installation instructions.

Adjustment of the manifold pressure to a lower pressure reading than what is specified on the furnace nameplate is not a proper derate procedure. With a lower density of air and a lower manifold pressure at the burner orifice, the orifice will not aspirate the proper amount of air into the burner. This can cause incomplete combustion of the gas, flash back, and possible yellow tipping.

GAS PIPING



CAUTION

To avoid possible unsatisfactory operation or equipment damage due to underfiring of equipment, do not undersize the natural gas/propane piping from the meter/tank to the furnace. When sizing a trunk line per the tables, include all appliances on that line that could be operated simultaneously.

The gas pipe supplying the furnace must be properly sized based on the cubic feet per hour of gas flow required, specific gravity of the gas and length of the run. The gas line installation must comply with local codes, or in the absence of local codes, with the latest edition of the National Fuel Gas Code ANSI Z223.1 or CAN/COA B149 Installation Codes.

**NATURAL GAS CAPACITY OF PIPE
IN CUBIC FEET OF GAS PER HOUR (CFH)**

Length of Pipe in Feet	Nominal Black Pipe Size				
	1/2"	3/4"	1"	1 1/4"	1 1/2"
10	132	278	520	1,050	1,600
20	92	190	350	730	1,100
30	73	152	285	590	980
40	63	130	245	500	760
50	56	115	215	440	670
60	50	105	195	400	610
70	46	96	180	370	560
80	43	90	170	350	530
90	40	84	160	320	490
100	38	79	150	305	460

(Press. .5 PSIG or less and Pressure Drop of 0.3" W.C.; Based on 0.60 Specific Gravity Gas)

$$CFH = \frac{BTUH \text{ FURNACE INPUT}}{\text{CALORIFIC VALUE OF GAS}}$$

CONNECTING THE GAS PIPING - NATURAL GAS

Refer to Figure 5 for the general layout of the furnace. The following rules apply:

1. Use black iron or steel pipe and fittings for the building piping.
2. Use pipe joint compound on male threads only. Pipe joint compound must be resistant to the action of the fuel used.
3. Use ground joint unions.
4. Install a drip leg to trap dirt and moisture before it can enter the gas valve. The drip leg must be a minimum of three inches long.
5. Use two pipe wrenches when making connection to the gas valve to keep it from turning.
6. Install a manual shutoff valve. This shutoff valve should be conveniently located within (6) six feet of the unit, and between the meter and the unit.
7. Tighten all joints securely.
8. The furnace shall be connected to the building piping by one of the following:
 - a. Rigid metallic pipe and fittings.

- b. Semi-rigid metallic tubing and metallic fittings. Aluminum alloy tubing shall not be used in exterior locations.
- c. Listed gas appliance connectors used in accordance with the terms of their listing that are completely in the same room as the equipment.
- d. In "b" and "c" above, the connector or tubing shall be installed so as to be protected against physical and thermal damage. Aluminum-alloy tubing and connectors shall be coated to protect against external corrosion where they are in contact with masonry, plaster or insulation or are subject to repeated wettings by such liquids as water (except rain water), detergents or sewage.

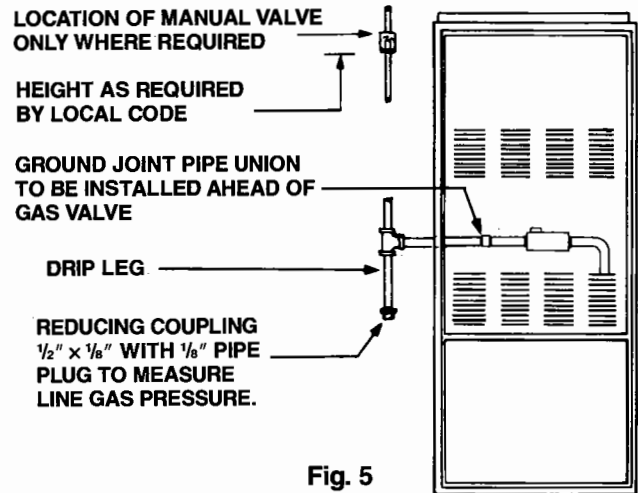


Fig. 5

When the gas piping enters through the left side of the furnace (see section II. for the gas inlet hole locations), the installer must supply the following fittings (starting from the gas valve):

- 90 degree elbow
- 1 1/2" closed nipple
- 90 degree elbow
- Straight pipe to reach exterior of furnace. See Fig. 5A.

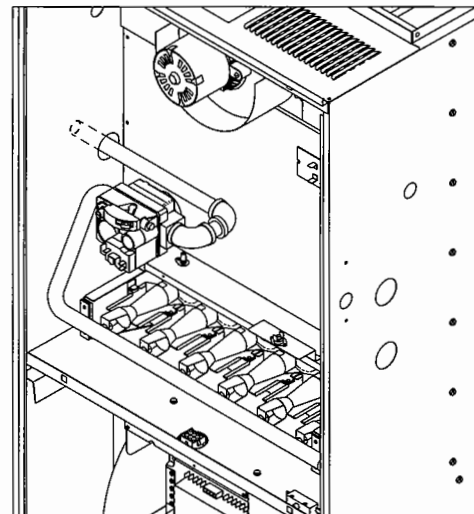


Fig. 5A — Gas Inlet Through Furnace Left Side

A ground joint union, drip leg, and manual shutoff valve must also be supplied by the installer. In some cases, the installer may also need to supply a transition piece from 1/2" to another pipe size.

When the gas piping enters through the bottom side of the furnace (see section II. for the gas inlet hole locations), the installer must supply the following fittings (starting from the gas valve):

- Straight pipe to reach the exterior of the furnace. See Fig. 5B.

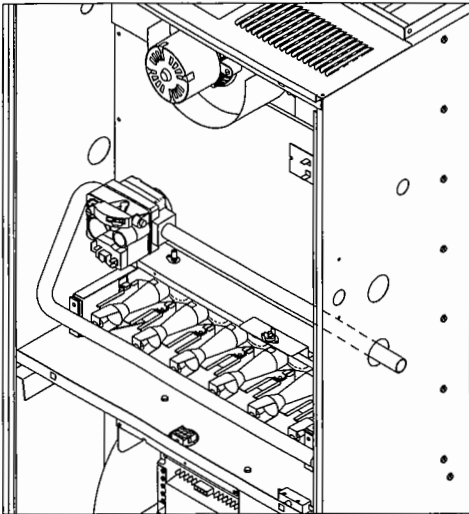


Fig. 5B — Gas Inlet Through Furnace Right Side

CHECKING THE GAS PIPING



CAUTION

To avoid the possibility of property damage, personal injury or fire, the following instructions must be performed regarding gas connections and pressure testing.

The unit and its gas connections must be leak tested before placing in operation. Because of the danger of explosion or fire, never use a match or open flame to test for leaks. Never exceed specified pressures for testing. Higher pressure may damage the gas valve and cause overfiring which may result in heat exchanger failure.

This unit and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of $\frac{1}{2}$ psig (3.48 kPa).

This unit must be isolated from the gas supply system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than $\frac{1}{2}$ psig (3.48 kPa).

TANKS AND PIPING — PROPANE UNITS



WARNING

PERSONAL INJURY HAZARD

Iron oxide (rust) can reduce the level of odorant in propane gas. A gas detecting device is the only reliable method to detect a propane gas leak. Contact your local propane supplier about installing a gas detecting warning device to alert you in the event that a gas leak should develop. Failure to detect a propane gas leak could result in an **EXPLOSION** or **FIRE** which could cause **SERIOUS PERSONAL INJURY** OR **DEATH**.

All propane gas equipment must conform to the safety standards of the National Board of Fire Underwriters (See NBFU Manual 58) or Natural Standards of Canada B149.2, Installation Code for Propane Gas Burning Appliances and Equipment.

For satisfactory operation, propane gas pressure must be 10 inch W.C. at the furnace manifold with all gas appliances in operation. Maintaining proper gas pressure depends on three main factors:

1. Vaporization rate, which depends on (a) temperature of the liquid, and (b) "wetted surface" area of the container or containers.
2. Proper pressure regulation. (Two-stage regulation is recommended from the standpoint of both cost and efficiency.)
3. Pressure drop in lines between regulators, and between second stage regulator and the appliance. Pipe size required will depend on length of pipe run and total load of all appliances.

Complete information regarding tank sizing for vaporization, recommended regulator settings, and pipe sizing is available from most regulator manufacturers and propane gas suppliers.

Propane is an excellent solvent, and special pipe dope must be used when assembling piping for this gas as it will quickly dissolve white lead or most standard commercial compounds. Shellac base compounds resistant to the actions of liquified petroleum gases such as Gasolac, Stalactic, Clyde's or John Crane are satisfactory.

Refer to Fig. 6 for typical propane gas installations.

TYPICAL PROPANE PIPING

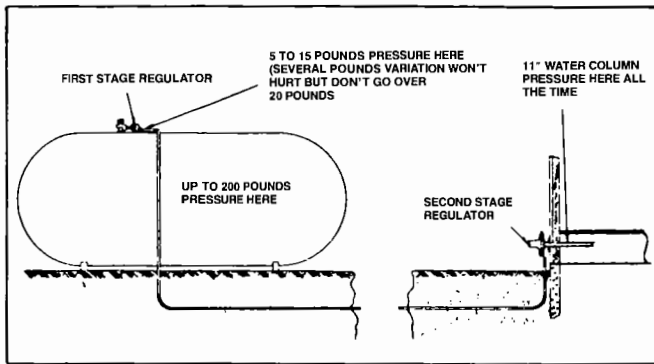


Fig. 6

PROPANE PIPING CHARTS

Sizing Between First and Second Stage Regulator
Maximum Propane Capacities listed are based on 2 PSIG Pressure Drop at 10 PSIG Setting. Capacities in 1,000 BTU/HR

PIPE OR TUBING LENGTH, FEET	TUBING SIZE, O.D., TYPE L					NOMINAL PIPE SIZE, SCHEDULE 40	
	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/4"
10	730	1,700	3,200	5,300	8,300	3,200	7,500
20	500	1,100	2,200	3,700	5,800	2,200	4,200
30	400	920	2,000	2,900	4,700	1,800	4,000
40	370	850	1,700	2,700	4,100	1,600	3,700
50	330	770	1,500	2,400	3,700	1,500	3,400
60	300	700	1,300	2,200	3,300	1,300	3,100
80	260	610	1,200	1,900	2,900	1,200	2,600
100	220	540	1,000	1,700	2,600	1,000	2,300
125	200	490	900	1,400	2,300	900	2,100
150	190	430	830	1,300	2,100	830	1,900
175	170	400	780	1,200	1,900	770	1,700
200	160	380	730	1,100	1,800	720	1,500

To Convert to Capacities at 15 PSIG Settings — Multiply by 1.130

To Convert to Capacities at 5 PSIG Settings — Multiply by 0.879

Sizing Between Single or Second Stage Regulator and Appliance*
Maximum Propane Capacities Listed are Based on 1/2" W.C. Pressure Drop at 11" W.C. Setting. Capacities in 1,000 BTU/HR

PIPE OR TUBING LENGTH, FEET	TUBING SIZE, O.D., TYPE L						NOMINAL PIPE SIZE, SCHEDULE 40					
	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
10	39	92	199	329	501	935	275	567	1,071	2,205	3,307	
20	26	62	131	216	346	630	189	393	732	1,496	2,299	
30	21	50	107	181	277	500	152	315	590	1,212	1,858	
40	19	41	90	145	233	427	129	267	504	1,039	1,559	
50	18	37	79	131	198	376	114	237	448	913	1,417	
60	16	35	72	121	187	340	103	217	409	834	1,275	
80	13	29	62	104	155	289	89	185	346	724	1,086	
100	11	26	55	90	138	255	78	162	307	630	976	
125	10	24	48	81	122	224	69	146	275	567	866	
150	9	21	43	72	109	202	63	132	252	511	787	
200	8	19	39	66	100	187	54	112	209	439	665	
250	8	17	36	60	93	172	48	100	185	390	590	

*DATA IN ACCORDANCE WITH NFPA PAMPHLET NO. 54



WARNING

If your propane gas furnace is installed in a basement, an excavated area or a confined space, we strongly recommend that you contact your propane supplier about installing a warning device that would alert you to a gas leak.

...Propane gas is heavier than air and any leaking gas can settle in any low areas or confined spaces.

... Propane gas odorant may fade, making the gas undetectable except with a warning device.

An undetected gas leak would create a danger of explosion or fire. If you suspect the presence of gas, follow the instructions on the cover of this manual. Failure to do so could result in **SERIOUS PERSONAL INJURY OR DEATH.**

VII. ELECTRICAL WIRING



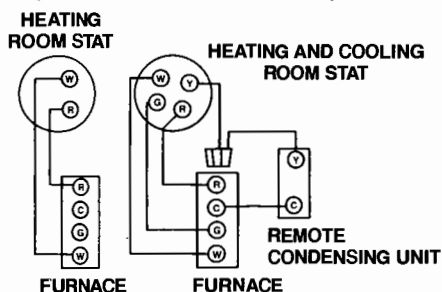
WARNING

To avoid electrical shock, injury or death, disconnect electrical power before changing any electrical wiring.

The wiring harness on this unit is furnished as an integral part of the furnace. Field alteration to comply with electrical codes should not be required.

Power supply to the furnace must be N.E.C. Class 1, and must comply with all applicable codes. The furnace must be electrically grounded in accordance with the local codes or, in their absence, with the latest edition of the National Electrical Code, ANSI/NFPA No. 70. A fused disconnect should be provided and sized in accordance with the unit minimum circuit ampacity.

TYPICAL FIELD WIRING (24V CONTROL CIRCUIT)



A 40VA transformer and auxiliary fan relay are built into the furnace so that it may be used with most cooling equipment.

Line voltage wiring must enter through the right side of the furnace. See Section II for hole location. Use washers to connect field-supplied conduit to the junction box in accordance with NEC and local codes. Connect hot, neutral, and ground wires as shown in the wiring diagram located on the blower door of the unit. The ground screw is located inside of the junction box. See Figure 7A.

Low voltage wiring may enter through the right or left side of the furnace. See Section II for hole locations. Run the thermostat wires through either hole, up through a grommet in the blower deck, and through a hole provided in the ignition control box (top or right side). See Figure 7B.

Low voltage wires may be connected to the terminal strip as shown in Figure 7B.



CAUTION

To avoid possible equipment malfunction, be careful to route the low voltage wires so as not to interfere with filter removal or other maintenance.



CAUTION

Wiring to the unit must be properly polarized and grounded.

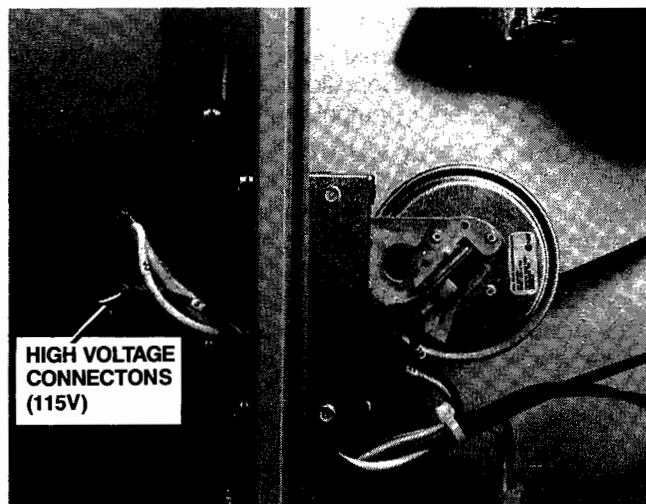


Fig. 7A — Field Wiring Connections

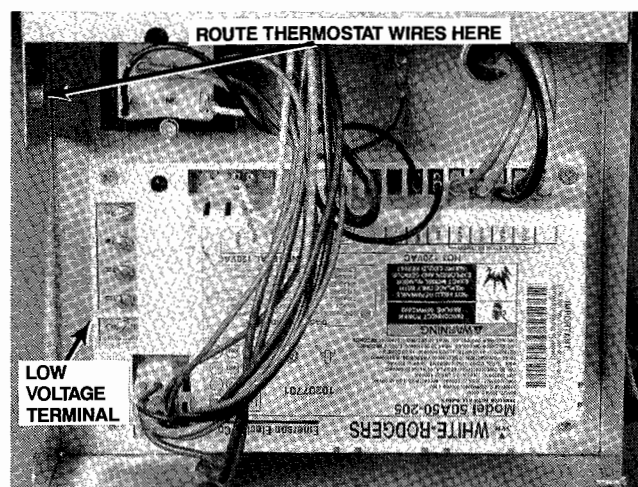


Fig. 7B — Low Voltage Wiring

VIII. CIRCULATING AIR AND FILTERS

DUCTWORK — AIR FLOW

Duct systems and register sizes must be properly designed for the C.F.M. and external static pressure rating of the furnace. Ductwork should be designed in accordance with the recommended methods of "Air Conditioning Contractors of America" Manual D.

A duct system should be installed in accordance with Standards of the National Board of Fire Underwriters for the Installation of Air Conditioning, Warm Air Heating and Ventilating Systems. Pamphlets No. 90A and 90B.

Furnace models GUI045E25A, GUI070E30A, GUI090E30A, GUI115E35A and GUI140E35A are shipped with one filter, (refer to Pg. 4 for size), intended for the return air duct to be attached to either side of the furnace cabinet. If the return air duct is to be attached to the bottom of the furnace cabinet, the filter that was supplied with the furnace may not be of the proper size. Refer to the chart below for filter sizes when using bottom return.

BOTTOM RETURN AIR FILTERS

Model	Filter Size	Type
GUI045E25A, GUI070E(30,40)A	14 × 25 × 1	P
GUI090E(30,50)A	16 × 25 × 1	P
GUI115E(35,50)A, GUI140E(35,50)A	20 × 25 × 1	P

The sketch below shows how the filter is retained over the bottom return air opening.



Furnace models GUI070E40A, GUI090E50A, GUI115E50A and GUI140E50A are shipped with two filters (refer to Pg. 4 for size). If these furnaces are to be operated at high speed, then two return air connections must be made. These may be made on both sides of the furnace cabinet, or on one side and the bottom. If one of the returns is connected to the bottom, refer to the chart above for proper filter size. Failure to have two return air connections, when these furnaces are operated on high speed can result in insufficient airflow for air conditioning requirements and excessive air velocity through the filter. If these furnaces will not be run on high speed, one return air connection will be adequate.

Guide dimples locate the bottom or side cutouts. Use a straight edge to scribe lines connecting the dimples. Cut out the opening on these lines. For bottom return air connection the bottom of the cabinet has to be removed before the furnace is positioned on the raised platform or set on top of the return air duct.

It is a must that a closed return duct system be used, with the return duct connected to the furnace. Supply and return duct connections to the unit may be made with flexible joints to minimize noise transmission. If a central return is used, a connecting duct must be installed between the unit and the utility room wall so the furnace blower will not interfere with combustion air or draft. The room, closet or alcove must not be used as a return air chamber.

When the furnace is used in connection with a cooling unit the furnace should be installed in parallel with or on the upstream side of the cooling unit to avoid condensation in the heating element. With a parallel flow arrangement, the dampers or other means used to control the flow of air must be adequate to prevent chilled air from entering the furnace and if manually operated, must be equipped with means to prevent operation of either unit unless the damper is in the full heat or cool position.

When the furnace is heating, the temperature of the return air entering the furnace must be between 55°F and 100°F.

LINE VOLTAGE CONNECTION OF OPTIONAL HUMIDIFIER AND ELECTRONIC AIR CLEANER

The control module in this furnace is equipped with line voltage accessory terminals to be used for controlling the power to an optional field-supplied humidifier and/or electronic air cleaner.

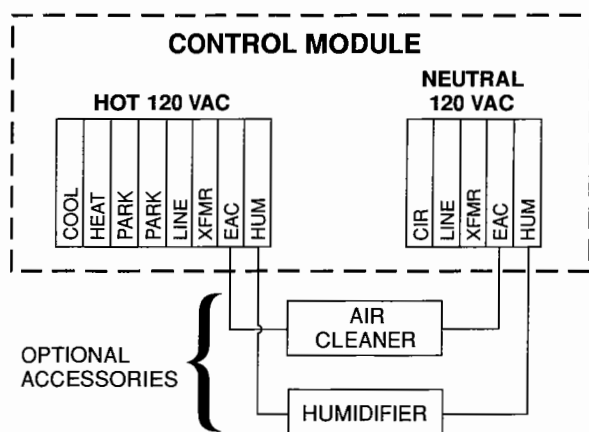
Accessory Load Specifications.

Air Cleaner: 1.0 Amp max. at 120 VAC

Humidifier: 1.0 Amp max. at 120 VAC

Accessory Installation. Follow the electronic air cleaner and humidifier manufacturers' instructions for mounting and electrically grounding these accessories. Check that the power supply to the furnace has been disconnected. Wire the accessories to the furnace control module as shown below. All connections to the control module are to be made through $\frac{1}{4}$ (.250") receptacle (female) terminals.

If it is necessary for the installer to supply additional line voltage wiring to the inside of the furnace, the wiring must comply with all local codes. This wiring must have a minimum temperature rating of 105°C and must be routed away from the burner compartment. All line voltage wire splices must be made inside the furnace junction box.



Accessory Operation. The furnace control module energizes the humidifier whenever the combustion blower is energized (if there is an optional air cleaner on the system, the humidifier is **not** energized until the air cleaner is energized). The control module energizes the air cleaner whenever the air circulation blower is energized.

IX. SEQUENCE OF OPERATION

NORMAL SEQUENCE

1. Thermostat calls for heat.
2. The vent blower is energized.
3. The ignitor is energized and allowed to preheat for 17 seconds.
4. The gas valve is energized delivering gas to the burners and starting combustion.
5. The control checks for a signal from the flame sensor within seven seconds after the gas valve is energized. Gas will only continue to flow if a signal is present.
6. The control waits 30 seconds and turns on the air circulation blower to the speed that was selected for heating operation.
7. The thermostat is satisfied and opens.
8. The control de-energizes the gas valve.
9. There is a 15 second delay while flue products are purged from the furnace heat exchanger and then the vent blower motor is de-energized.
10. There is another 75 second delay to allow heat in the heat exchanger to be transferred to the conditioned space and then the air circulation blower will stop.

ABNORMAL OPERATION

1. **Internal Control Failure with White-Rodgers Control**
If the control during one of its self test cycles determines it has an internal fault, it stops and the diagnostic light will **light continuously**. The control should be replaced.
2. **System Lockout**
If a flame was not sensed during the first 7 seconds after the gas valve was energized, the control turns off the gas. There will then be a 60 second delay with the combustion blower energized to purge the heat exchanger. The ignitor will next be energized and preheated for 27 seconds. The gas valve will be energized. If flame is not sensed in 7 seconds the gas valve will be de-energized and another purge will occur. The control will cycle the gas valve a total of three tries before it determines it cannot establish measurable combustion and enters a locked out state. If flame is sensed but lost after 10 seconds, the control will recycle this series of three tries four more times before locking out. The diagnostic light will indicate this condition with **one short flash** followed by a longer off. The control can be reset and brought out of lockout mode by turning the thermostat off and then back on.

3. Pressure Switch Stuck Closed

If the control senses the pressure switch is closed when the vent blower is off, it waits until the fault is corrected. The light code for this problem is **two short flashes** followed by a longer pause. The probable cause is faulty pressure switch or wiring.

4. Pressure Switch Stuck Open

If, after the vent blower is energized, the pressure switch does not close, the control will keep the blower on and wait for the switch to close. The diagnostic light code for this problem is **three short flashes** followed by a pause. The probable cause is either: disconnected hose to the pressure switch, faulty pressure switch or wiring, or restricted air intake or flue piping.

5. Open Limit Control

If the limit control opens, the air circulation and vent blower will be turned on until the limit closes. The diagnostic light code for this is **four short flashes** followed by a pause. The probable cause is either: low conditioned air flow due to dirty filter or resistance in duct work, faulty limit, faulty blower, or blower speed set too low.

6. Missing Jumper Wire

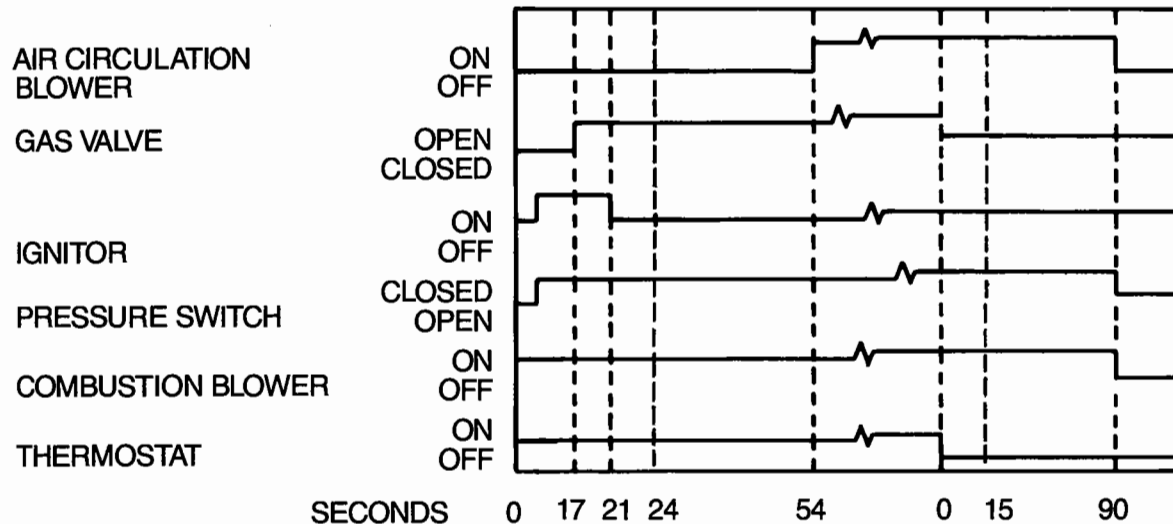
If the jumper between R01 and R02 is not present, the air circulation blower and vent blower will be energized all the time. The diagnostic light code for this is **five flashes** followed by a pause. Probable cause is a missing jumper.

7. Flame Sensed with No Call for Heat

If the control senses a flame when the gas valve is de-energized it will run the air circulation blower and the vent blower continuously. The diagnostic light code for this is **continuous light flashing**. Probable cause is miswiring.

IX. SEQUENCE OF OPERATION (cont.)

TIMING CHART FOR NORMAL WHITE-RODGERS 50A50 OPERATION



WHITE-RODGERS 50A50 CONTROL DIAGNOSTIC LIGHT SIGNAL MEANINGS

LIGHT SIGNAL	REFER TO ABNORMAL OPERATION NUMBER
Continuous Light	1. Internal Control Failure
1 Flash	2. System Lockout
2 Flashes	3. Pressure Switch Stuck Closed
3 Flashes	4. Pressure Switch Stuck Open
4 Flashes	5. Open Limit Control
5 Flashes	6. Missing Jumper Wire on Control Connector
Continuous Flashing	7. Flame Sensed No Call For Heat

Thermostat ON
Gas Valve Opens

End of trial for ignition.
Gas valve would close
if flame is not proven.

Air Blower ON

Thermostat OFF
Combustion products
purge ends.

Air Blower OFF

X. START-UP AND ADJUSTMENT

GENERAL OPERATION

This furnace is equipped with an electronic ignition device which lights the burners. It also has a induced draft blower to draw combustion air into the heat exchanger.

Keep the blower doors in place except for inspection and maintenance. An interlock switch prevents furnace operation if the blower door is not in place.

On new installations, or if a functional part such as the gas valve, pressure switch, or limit control has been replaced, the operation of the furnace should be checked.

Check furnace operation as outlined in the following instructions. If any sparking, odors, or unusual noises are encountered, shut off electrical power and recheck for wiring errors, or obstructions in or near the blower motors. Various shipping materials must be removed before the blower motor is operated.

HEAT ANTICIPATOR SETTING

The heat anticipator in the room thermostat must be correctly adjusted to obtain the proper number of heating cycles per hour and to prevent the room temperature from "overshooting" the room thermostat setting. Heat anticipator must be set at 0.7 amps.

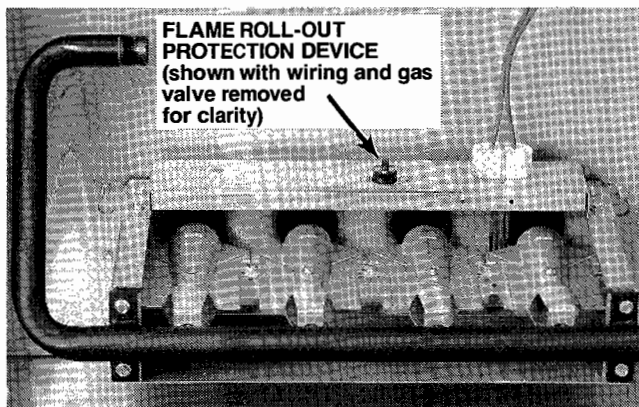


Fig. 8 — Roll-Out Protection Device for Alcove — Upflow Installations

ROLL-OUT PROTECTION CONTROL (Fig. 8)

If the flames from the burners are not properly drawn into the heat exchanger, a protection device will open causing the furnace to shut off. The protection device is located on the manifold assembly. (See Fig. 8.)



CAUTION

If the roll-out protection device should open, a qualified servicer must investigate the cause of its opening before it is manually reset.

VENT SAFETY SWITCH

The vent safety switch is located in the spillage box extending to the side of the induced draft blower outlet. If there is a restriction in the flue and a sufficient draft does not develop, hot flue gases will move through the spillage box. As a result of the high temperatures, the switch will open, stopping combustion. AFTER DISCONNECTING

THE ELECTRICAL POWER, the switch must be manually reset. See Fig. 9A.



WARNING

To avoid possible illness or death, the vent safety switch must only be reset once. If it should open a second time, the cause for its opening must be determined and corrected.

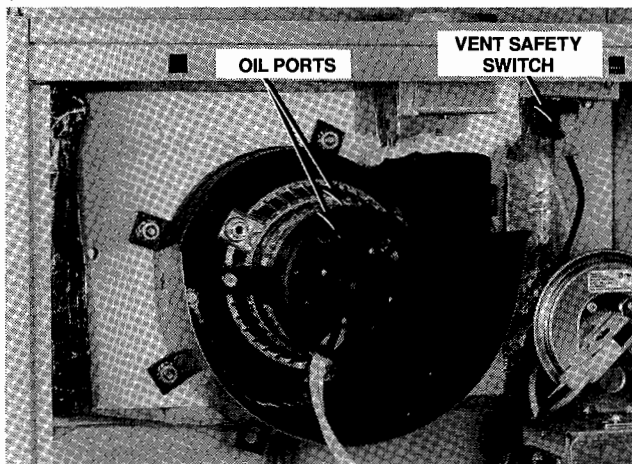


Fig. 9A — Vent Blower Motor

SELF DIAGNOSTIC IGNITION CONTROL

In this furnace, there may be a red indicator light located on the ignition control board near the MV terminal. This light is designed to help the servicer diagnose potential service problems with either the furnace or the ignition control itself. If the furnace is malfunctioning, and the red light is on continuously, the ignition control is faulty. If the red light is flashing, the furnace is probably in a lockout condition. If the indicator light is not on and the furnace does not operate properly, then the problem likely exists elsewhere in the furnace and not in the ignition control board.

RESET AFTER CONTROL LOCK-OUT

If ignition has not been achieved for any reason after three ignition cycles, the electronic control module will lock-out the furnace. A lock-out causes both the air blower and the vent blower to run continuously, and ignition is no longer attempted. The control's diagnostic light will then repeatedly flash once and then pause. When this occurs, it may be necessary to reset the control by turning the thermostat setting below room temperature for thirty seconds and then returning the setting to the desired temperature. The control may also be reset after a lock-out by turning off the electrical disconnect switch to the furnace for thirty seconds.

IMPORTANT: If you have to frequently reset your furnace to obtain satisfactory operation, it means that a problem exists with your furnace that should be corrected. Contact a qualified servicer for further information.

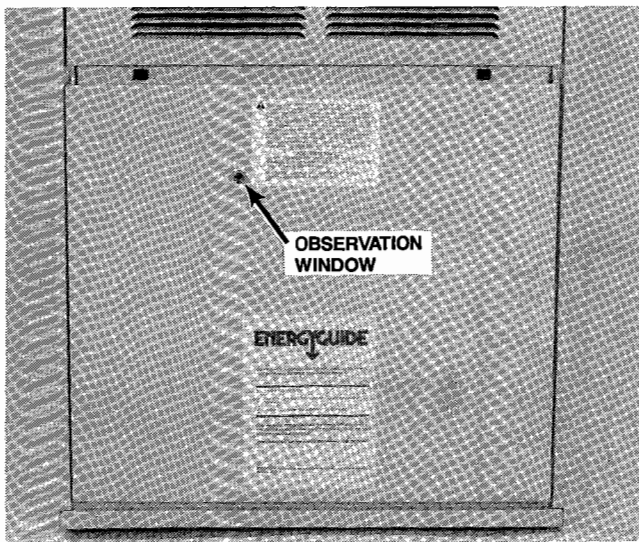


Fig. 9B — Observation Port

OPERATING INSTRUCTIONS

1. Close the manual gas valve external to the furnace.
2. Turn off the electrical power supply to the furnace.
3. Set room thermostat to lowest possible setting.
4. Remove the door on the front of the furnace.
5. This furnace is equipped with an ignition device which automatically lights the burner. Do not try to light burner by hand.
6. Turn the gas control knob clockwise  to the "Off" position for either the White Rodgers 36-E gas valve (Fig. 10B) or the Honeywell VR-8205 gas valve (Fig. 10A). For the Robertshaw 7200 gas valve push in and slide the lever to the "Off" position (Fig. 10C). Do not force.
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor.
8. If you smell gas following the 5 minute waiting period in Step 7, follow the instructions on the cover of this manual. If you do not smell gas, then turn the gas control knob counterclockwise  to the "On" position for either the White Rodgers 36-E gas valve (Fig. 10B) or the Honeywell VR-8205 gas valve (Fig. 10A). For the Robertshaw 7200 gas valve push in and slide the lever to the "On" position (Fig. 10C). Do not force.
9. Replace the door on the front of the furnace.
10. Open the manual gas valve external to the furnace.
11. Turn on the electrical power supply to the furnace.
12. Set thermostat to desired setting.

NOTE: There is an approximate 20 second delay between thermostat energizing and burner firing.

GAS VALVE

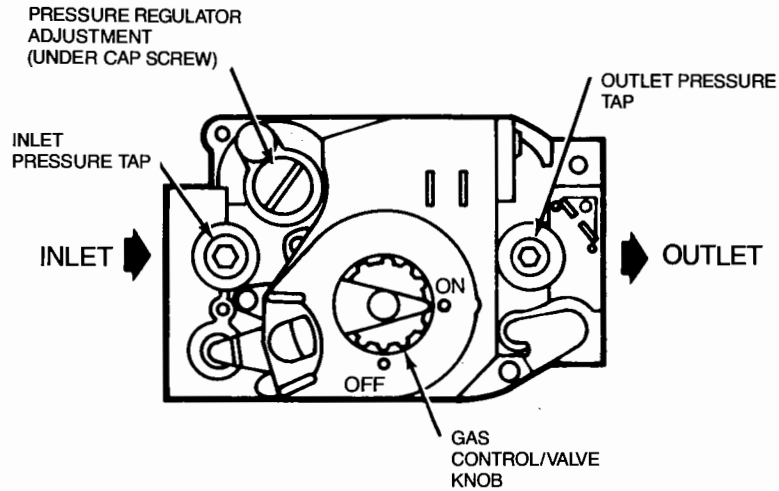


**FIG. 10A — HONEYWELL
MODEL: VR-8205**

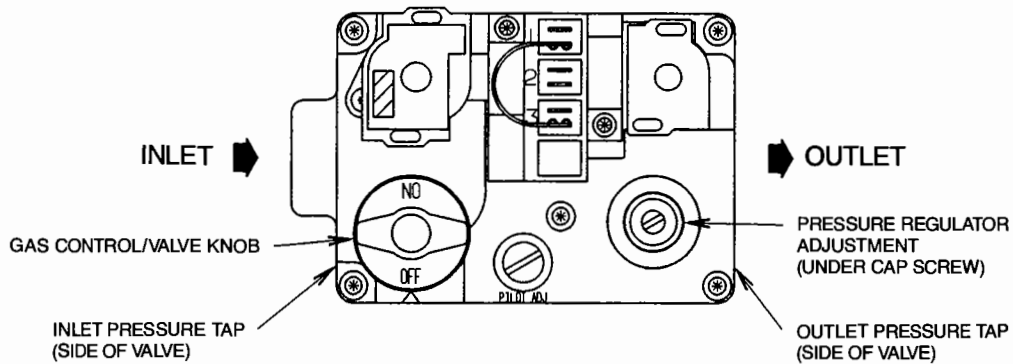


**FIG. 10B — WHITE RODGERS
MODEL: 36E36 TYPE 230**

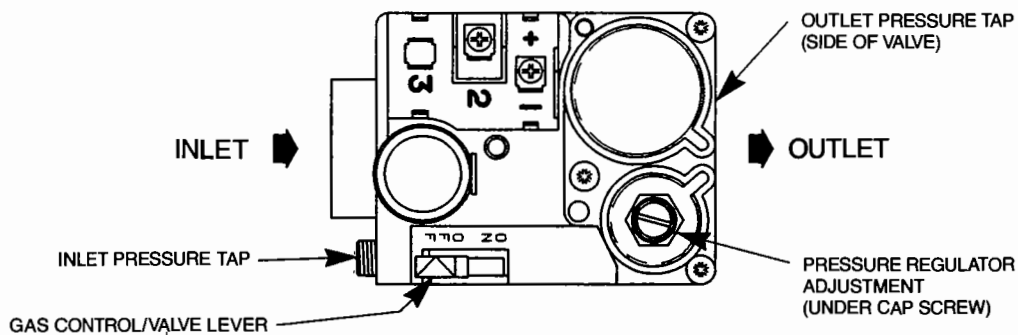


**FIG. 10C — ROBERTSHAW (GRAYSON)
MODEL: 7200**

CHECK GAS INPUT AND PRESSURES

Gas supply pressure and manifold pressure with the burners operating must be as specified on the rating plate.

CHECKING GAS PRESSURE

Gas inlet pressure should be checked and adjusted in accordance to the type of fuel being consumed.

WITH POWER AND GAS OFF:

1. Connect a water manometer or adequate gauge to the "inlet gas pressure" tap of the gas valve. (See Fig. 10A, 10B, 10C.)

As an alternative method, inlet gas pressure can also be measured by removing the cap from the dripleg and installing a predrilled cap with a hose fitting. (See Fig. 11.)

WITH POWER AND GAS ON:

2. Put furnace into heating cycle and turn on all other gas consuming appliances.

INLET GAS PRESSURE	
NATURAL	MIN. 5.0", MAX. 10.0"
PROPANE	MIN. 11.0", MAX. 14.0"

Inlet Gas Pressure Must Not Exceed the Maximum Value Shown in Table Above.

If operating pressures differ from above, make necessary pressure regulator adjustments, check piping size, etc., and/or consult with local utility.

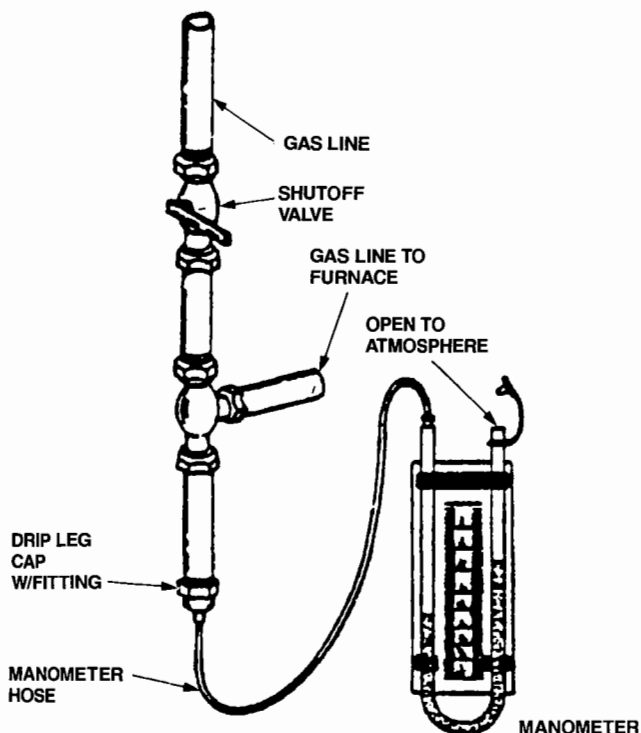


Fig. 11 — Measuring Inlet Gas Pressure (Alternate method)

CHECK THE MANIFOLD PRESSURE

A tapped opening is provided in the gas valve to facilitate measurement of the manifold pressure. See the "Outlet Pressure Tap" in Fig. 10A, 10B and 10C. A "U Tube" man-

ometer having a scale range from 0 to 12 inches of water should be used for this measurement. The manifold pressure must be measured with the burners operating.

To adjust the pressure regulator, remove the adjustment screw or cover on the gas valve. Turn out (counterclockwise) to decrease pressure, turn in (clockwise) to increase pressure. Only small variations in gas flow should be made by means of the pressure regulator adjustment. In no case should the final manifold pressure vary more than plus or minus 0.3 inches water column from the pressure specified on the furnace nameplate. Any major changes in flow should be made by changing the size of the burner orifice.

CHECK THE GAS INPUT (NATURAL GAS ONLY)

To measure the gas input using the gas meter proceed as follows:

1. Turn off gas supply to all other appliances except the furnace.
2. With the furnace operating, time the smallest dial on the meter for one complete revolution. If this is a 2 cubic foot dial, divide the seconds by 2; if it is a 1 cubic foot dial, use the seconds as is. This gives the seconds per cubic foot of gas being delivered to the furnace.
3. INPUT = GAS HTG VALUE $\times$ 3600 $\div$ SEC. PER CUBIC FOOT

Example: Natural gas with a heating value of 1000 BTU per cubic foot and 34 seconds per cubic foot as determined by Step 2, then:

$$\begin{aligned}\text{Input} &= 1000 \times 3600 \div 34 \\ &= 106,000 \text{ BTU per Hour}\end{aligned}$$

NOTE: BTU content of the gas should be obtained from the gas supplier.

This measured input must not be greater than the input indicated on the rating plate of the furnace.

4. Relight all other appliances turned off in step 1 above. Be sure all pilot burners are operating.

CHECK MAIN BURNER FLAME

Flames should be stable, soft and blue, (dust may cause orange tips but they must not be yellow). They should extend directly outward from the burner without curling, floating or lifting off. (Fig. 12)

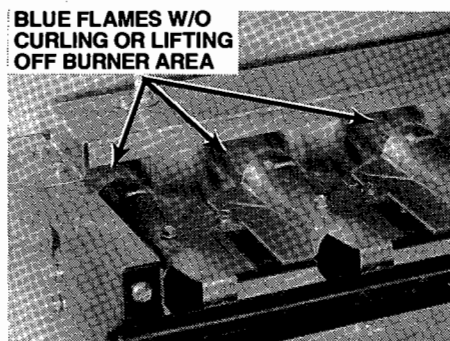


Fig. 12 — Burner Flame

CHECK TEMPERATURE RISE

Check the temperature rise through the unit by placing thermometers in supply and return air registers as close to the furnace as possible. Thermometers must not be able to "see" the furnace's heat exchangers, or false readings could be obtained.

1. All registers must be open; all duct dampers must be in their final (fully or partially open) position, and the unit operated for 15 minutes before taking readings.
2. The temperature rise must be within the range specified on the rating plate.

NOTE: Air temperature rise is the temperature difference between supply and return air.

With a properly designed system, the proper amount of temperature rise will normally be obtained when the unit is operated at rated input with the recommended blower speed.

If the correct amount of temperature rise is not obtained, it may be necessary to change the blower speed. A higher blower speed will lower the temperature rise. A slower blower speed will increase the temperature rise.

NOTE: Blower speed must be set to give the correct air temperature rise through the furnace as marked on the rating plate.



CAUTION

Some installations will use a different blower speed for cooling than is used for heating. If this is the case, do not set the thermostat fan switch to ON (constant fan operation) during the heating season without first confirming that the cooling fan speed will give a temperature rise within the limits listed on the unit nameplate. Temperature rises outside of the limits listed could result in premature failure of the heat exchanger.

CHANGING BLOWER SPEEDS



WARNING

To avoid electrical shock, injury or death, when changing speed taps turn off power to the furnace.

A multi-speed motor is used in the furnace blower. It provides easy speed selection for both heating and cooling air flow. Page 5 shows the CFM and E.S.P. relationship for proper selection of heating and cooling speeds.

Refer to the WIRING DIAGRAM on the furnace to connect the proper wires to the correct motor leads. All unused motor leads must have wirenuts.

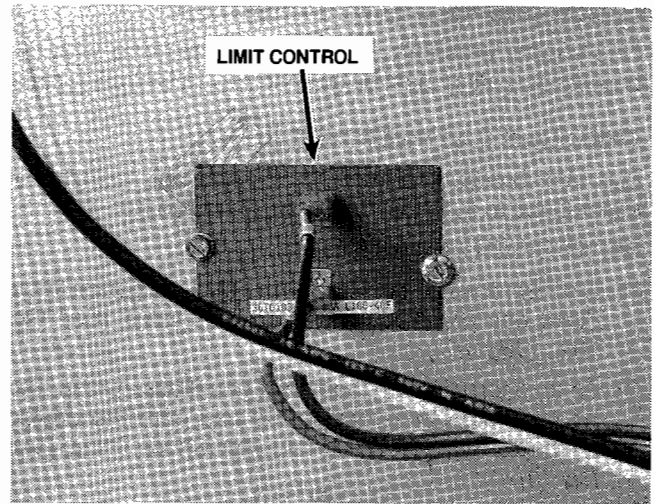


Fig. 13 — Limit Control

CHECK LIMIT AND FAN CONTROL



WARNING

To avoid premature failure of heat exchanger or possible property damage, injury or fire, do not adjust the limit control, which is factory preset.

Check limit control operation after 15 minutes of operation by blocking the return air grille(s).

1. After several minutes the main burners must go OFF. Blower will continue to run.
2. Remove air restrictions, and main burners will relight after a cooldown period of a few minutes.

Adjust the thermostat setting below room temperature.

1. Main burners must go off.
2. Circulating Air Blower will continue to run for 90 seconds.



CAUTION

This unit should not be used as a "construction heater" during the finishing phases of construction on a new structure. This type of use may result in premature failure of the unit due to extremely low return air temperatures and exposure to corrosive or very dirty atmospheres.

TO TURN OFF FURNACE

1. Set the thermostat to lowest setting.
2. Turn off the electrical power supply to the furnace.
3. Turn the gas control knob clockwise  to the "Off" position for either the White Rodgers 36-E gas valve (Fig. 10B) or the Honeywell VR-8205 gas valve (Fig. 10A). For the Robertshaw 7200 gas valve, push in and slide the lever to the "Off" position (Fig. 10C). Do not force.
4. Close manual gas shutoff valve external to the furnace.
5. Replace the door on the unit.

XI. MAINTENANCE



WARNING

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



CAUTION

If you must handle the ignitor, handle with care. Touching the ignitor body with bare fingers, rough handling, or vibration could result in early ignitor failure. Only a qualified servicer should ever handle the ignitor.

Have the furnace checked at least once every year, before the heating season begins, to be sure that there is adequate combustion air and that the vent system is working properly.

Have vent pipe checked to be sure it is not blocked by debris, which could permit fumes to enter the house. Replace any rusted sections of vent pipe.

AIR FILTER



WARNING

Never operate furnace without a filter installed as dust and lint will build up on internal parts resulting in loss of efficiency, equipment damage and possible fire.

This furnace is equipped with a permanent type washable high-velocity filter(s). Filter(s) should be inspected and cleaned every two months as required. If the replacement of the filter(s) becomes necessary, it must be replaced with a filter(s) of the same type and size.

Remember that dirty filters are the most common cause of inadequate heating or cooling performance.

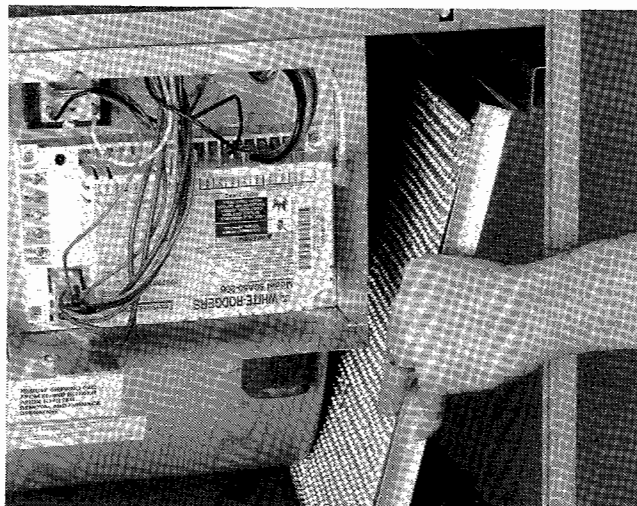


Fig. 14 — Filter Removal



WARNING

Disconnect the electrical power to the furnace before removing the filter or performing any other maintenance.

To remove the filter, turn the latches on lower door. Remove the door. The blower motor will automatically stop through interlock switch.

To remove the filter, grasp the lower portion of the filter, lift up to disengage it from the lower railing, move towards blower, drop filter down. Pull filter outward. (Fig. 14)

The filter must be of the permanent washable type with dimensions of 16 x 25 x 1. (Side return(s) only.)

Use a vacuum cleaner to clean out the blower area and the adjacent area of the return air duct.

Clean, wash and dry the permanent filter. Both sides should then be sprayed with a dust adhesive as recommended on adhesive container. Re-install filter by placing it into the furnace along the side of the blower. Engage filter in the top rail, move towards side of furnace and drop it into the bottom rail. BE SURE AIRFLOW DIRECTION ARROW POINTS TOWARDS BLOWER.

When the filter is located in the bottom of the furnace on a bottom return system the filter is held in its location by a sheet metal retainer strap. To change or clean the filter, merely slide one end of the retainer towards the front and remove the filter.

BLOWER MOTOR (QUALIFIED SERVICER ONLY)

If desired, the blower motor may be oiled by adding 4 to 6 drops of SAE #20 oil to each oil port, once a year. TO AVOID PREMATURE MOTOR FAILURE, DO NOT OVER OIL.

(NOTE: Some blower motors which are permanently lubricated do not have oil ports. Oil cannot be added to these motors.)

VENT BLOWER MOTOR (QUALIFIED SERVICER ONLY)

If desired, the vent blower motor may be oiled annually with 6 drops of Anderoil 465 oil. (3 drops in each oil port—Fig. 9). TO AVOID PREMATURE MOTOR FAILURE, DO NOT OVER OIL.

FLUE PASSAGES (QUALIFIED SERVICER ONLY)

At the start of each heating season, inspect and if necessary, clean the furnace flue passages.

CLEANING FLUE PASSAGES (QUALIFIED SERVICER ONLY)

1. Shut off electric power and gas supply to the furnace.
2. Remove burner assembly by disconnecting the gas line and removing the manifold brackets from the partition panel.
3. Remove the flue from the induced draft blower and the collector box from the partition panel.
4. The primary heat exchanger tubes can be cleaned using a round wire brush attached to a length of high grade stainless steel cable, such as drain cleanout cable. Attach a variable speed reversible drill to the other end of the spring cable. Slowly rotate the cable with the drill and insert it into one of the primary heat exchanger tubes. While reversing the drill, work the cable in and out several times to obtain sufficient cleaning. Repeat for each tube.
5. When all heat exchanger tubes have been cleaned, replace the parts in the reverse order in which they were removed.
6. To reduce the chances of repeated fouling of the heat exchanger, perform the steps listed in "Startup and Adjustment", Section X.

BURNERS



WARNING

Electrical components are contained in the upper compartment. To avoid electrical shock, injury or death, do not remove any internal compartment covers or attempt any adjustment. Contact a qualified service agent at once if an abnormal flame appearance should develop.

Periodically during the heating season make a visual check of the burner flames. Turn the furnace on at the thermostat. Wait a few minutes, since any dislodged dust will alter the normal flame appearance. Flames should be stable, quiet, soft and blue with slightly orange tips. They should not be yellow. They should extend directly outward from the burner ports without curling downward, floating or lifting off the ports. (See Fig. 12)

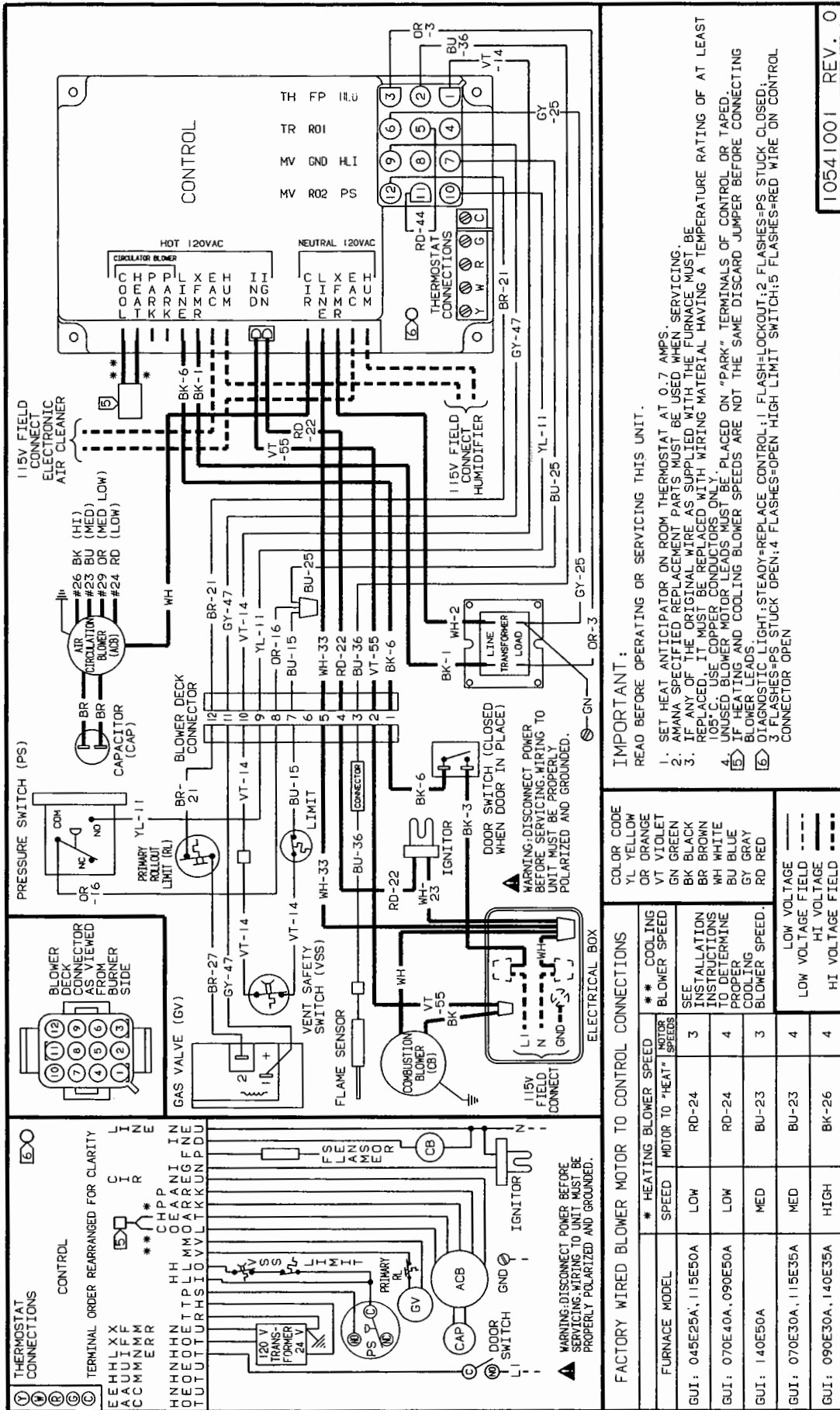
XII. FUNCTIONAL PARTS LIST

GENERAL INFORMATION

1. When ordering any of the listed functional parts, be sure to provide the furnace model, manufacturing, and serial numbers with the order.
2. Although only functional parts are shown in the parts list, all sheet metal parts, doors, etc. may be ordered by description.
3. Parts are available from your Amana distributor.

Gas Valve	Heat Exchanger
Gas Orifice, Natural	Door Switch
Gas Orifice, Propane	Transformer
Burner	Blower Relay
Ignitor	Combustion Relay
Flame Sensor	Terminal Board
Ignitor Clip	Blower Wheel
Gas Manifold	Blower Housing
Ignition Control	Blower Cutoff
Limit Switch	Blower Motor
Pressure Switch	Motor Mount Bracket
Pressure Switch Hose	Capacitor
Induced Draft Blower	Filter, 16 x 25 x 1,
Collector Box	Permanent
Blower/Box Gasket	Vent Safety Switch
Flame Roll-out Switch	

XIII. WIRING DIAGRAM



Disconnect electrical power before servicing.

