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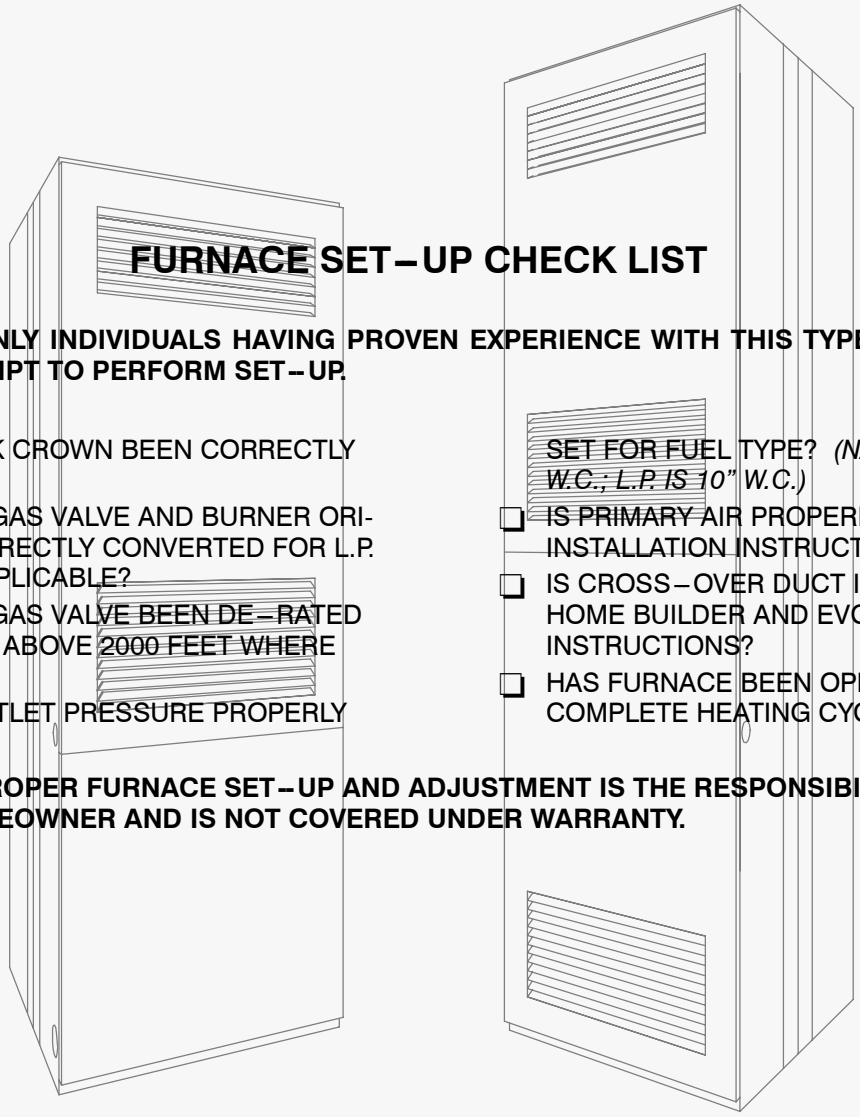
INSTALLATION INSTRUCTIONS

SEALED COMBUSTION DOWNFLOW GAS FURNACES

Forced Draft with Direct Ignition (Hot Surface)



FURNACE SET–UP CHECK LIST

IMPORTANT: ONLY INDIVIDUALS HAVING PROVEN EXPERIENCE WITH THIS TYPE OF EQUIPMENT SHOULD ATTEMPT TO PERFORM SET–UP.

- ❑ HAS ROOF JACK CROWN BEEN CORRECTLY INSTALLED?
- ❑ HAS FURNACE GAS VALVE AND BURNER ORIFICE BEEN CORRECTLY CONVERTED FOR L.P. GAS WHERE APPLICABLE?
- ❑ HAS FURNACE GAS VALVE BEEN DE–RATED FOR ALTITUDES ABOVE 2000 FEET WHERE APPLICABLE?
- ❑ IS GAS LINE OUTLET PRESSURE PROPERLY SET FOR FUEL TYPE? *(NATURAL GAS IS 3.5" W.C.; L.P. IS 10" W.C.)*
- ❑ IS PRIMARY AIR PROPERLY ADJUSTED PER INSTALLATION INSTRUCTIONS?
- ❑ IS CROSS–OVER DUCT INSTALLED PER HOME BUILDER AND EVCON INSTALLATION INSTRUCTIONS?
- ❑ HAS FURNACE BEEN OPERATED THROUGH A COMPLETE HEATING CYCLE?

IMPORTANT: PROPER FURNACE SET–UP AND ADJUSTMENT IS THE RESPONSIBILITY OF THE RETAILER/HOMEOWNER AND IS NOT COVERED UNDER WARRANTY.

DLAS MODELS
(No Coil Cabinet)

DGAT & DGAM MODELS
(With Built–In Coil Cabinet)

For Installation In:
1. Manufactured (Mobile) Homes
2. Recreational Vehicles & Park Models
3. Modular Homes & Buildings

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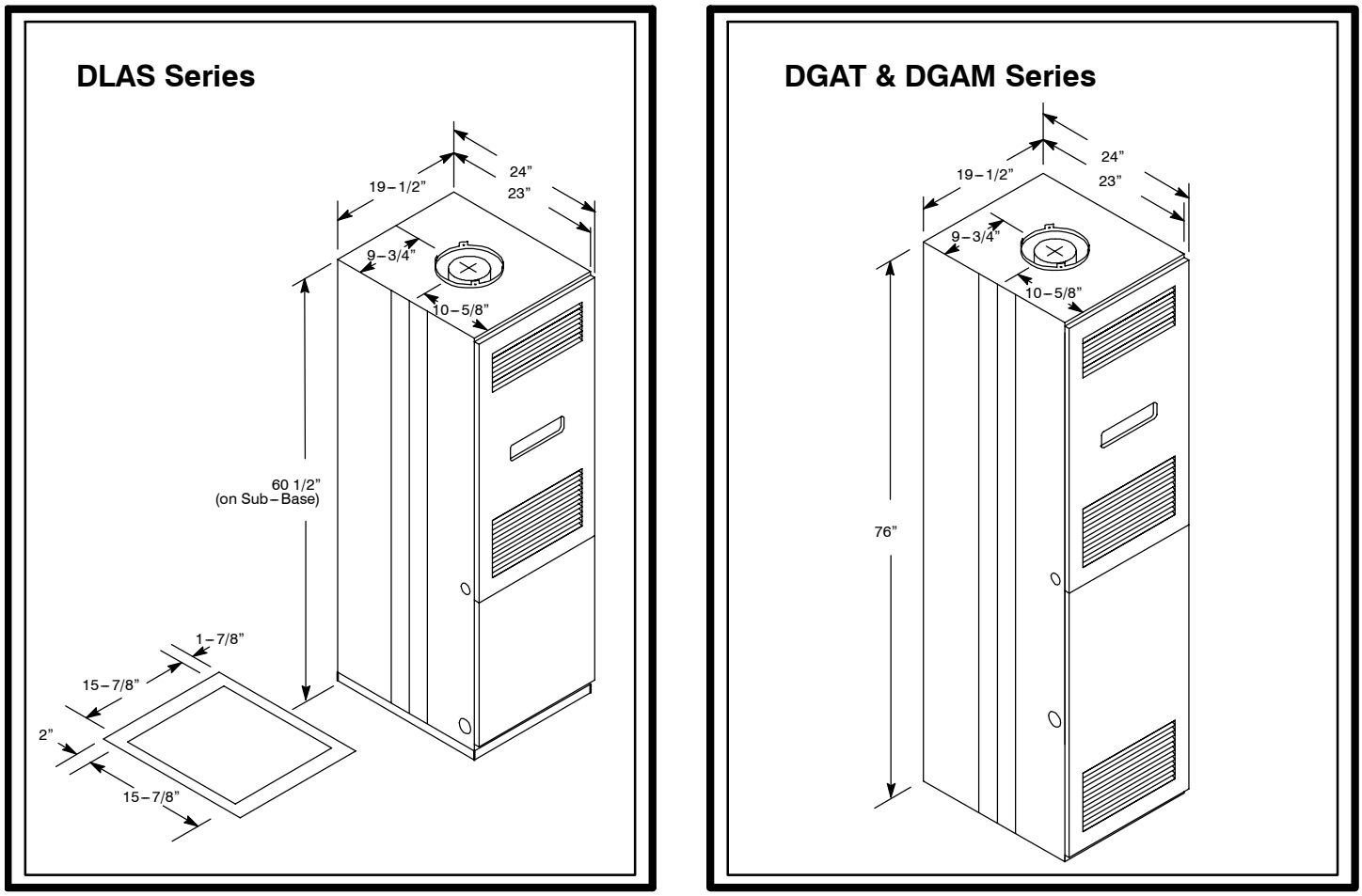


Figure 1 – DLAS, DGAT, and DGAM Series Furnace Dimensions

WARNING

IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTENANCE CAN CAUSE INJURY OR PROPERTY DAMAGE.

PLEASE REFER TO ALL THE INSTRUCTIONS OF THIS MANUAL FOR PROPER INSTALLATION PROCEDURES. IMPROPER INSTALLATION WILL VOID THE WARRANTY.

THE FURNACE SHALL BE INSTALLED SO THE ELECTRICAL COMPONENTS ARE PROTECTED FROM WATER.

DO NOT TEST THE FUEL SYSTEM AT MORE THAN 14 INCHES WATER COLUMN AFTER FURNACE HAS BEEN CONNECTED TO THE FUEL LINE. SUCH TESTING MAY VOID THE WARRANTY. ANY TEST RUN ABOVE 14 INCHES WATER COLUMN MAY DAMAGE THE FURNACE CONTROL VALVE WHICH COULD CAUSE AN EXPLOSION, FIRE, OR ASPHYXIATION.

IMPORTANT NOTICE

These instructions are intended for the use of qualified individuals specially trained and experienced in installation of this type of equipment and related system components.

Installation and service personnel are required by some states to be licensed.

Persons not qualified shall not install this equipment or interpret these instructions.

NOTE

The words *"Shall"* or *"Must"* indicate a requirement which is essential to satisfactory and safe product performance.

The words *"Should"* or *"May"* indicate a recommendation or advice which is not essential and not required but which may be useful or helpful.

FURNACE SPECIFICATIONS

TABLE 1 — Furnace Specifications

DGAM — Automatic ignition — with Built–in Coil Cabinet — 4 Ton – A/C Ready			
Model No.	Factory Equipped for use with:	Input/BTUH	Output/BTUH
DGAM056BDD	NATURAL GAS	56,000	46,000
DGAM075BDD	NATURAL GAS	75,000	61,000

DGAT — Automatic Ignition — with Built–in Coil Cabinet — 3 Ton – A/C Ready			
Model No.	Factory Equipped for use with:	Input/BTUH	Output/BTUH
DGAT056BDD	NATURAL GAS	56,000	46,000
DGAT070BDD	NATURAL GAS	70,000	57,000
DGAT075BDD	NATURAL GAS	75,000	61,000
DGAT090BDD	NATURAL GAS	90,000	72,000

DLAS — Automatic Ignition — Heating Only — No Coil Cabinet			
Model No.	Factory Equipped for use with:	Input/BTUH	Output/BTUH
DLAS056BDD	PROPANE	56,000	47,000
DLAS075BDD	PROPANE	75,000	62,000

TABLE 2 — Electrical Specifications	
Electrical Power Supply —	**120 Volts — 60 Hz — 1 Phase**
Breaker or Fuse —	**15 Amp**
Thermostat Circuit —	**24 Volt — 60 Hz — 40 VA**
Nominal Anticipator Setting —	**.50**
Gas Valve Inlet —	**$^1/_2$" NFPT**

Comply with Local Codes

The installer shall familiarize himself with and comply with all local codes and regulations which govern the installation of this appliance. Local codes and regulations shall take precedent over these regulations where applicable. In lieu of local codes, the appliance shall be installed in accordance with:

In the U.S.A.:

the National Electrical Code, in accordance with recommendations made by the National Board of Fire Underwriters, in accordance with the the American National Standard Institute National Fuel Gas Code (Ansi Z223.1/NFPA–54).

The installation must conform with:

local building codes,
Federal Manufactured Home Construction & Safety Standard (H.U.D. Title 24, Part 3280),
or in the absence of local codes with:
American National Standard Mobile Homes A225.1 for installation in mobile homes, and American National Standard (ANSI–C1/NFPA–70) for all electrical wiring, and American National Standard (A119.2/NFPA–501C) for installation in recreational vehicles.

In Canada:

Manufactured (Mobile) Homes:
Unit installation shall comply with current CSA standard CAN/CSA–Z240.4.1 – Installation Requirement for Gas Burning Appliances in Mobile Homes.

Unit electrical wiring and grounding shall comply with current standard CSA C22.1 – Canadian Electrical Code Part 1.

Recreational Vehicles:
Unit installation shall comply with current CSA standard CAN/CGA–Z240.4.2 – Installation Requirements for Propane Appliances and Equipment in Recreational Vehicles.

Unit electrical wiring and grounding shall comply with current CSA standard C22.2 No.148/CAN/CSA–Z240.6.2 – Electrical Requirements for recreational vehicles.

HIGH ALTITUDE INSTALLATION

For elevation above 2,000 feet, derate furnace orifice 2% for each 1,000 feet of elevation above sea level. Derating is accomplished by reducing the orifice size.
See Derating Chart for orifice size and output adjustment.

MINIMUM FURNACE CLEARANCES

Access for servicing is an important factor in the location of any furnace. A minimum of 24 inches should be provided in front of the furnace for access to the heating elements and controls. This access may be provided by a closet door or by locating the furnace 24 inches from a facing wall or partition.

These furnaces are design certified for the following minimum clearances from combustible material in alcove or closet installation:

TABLE 3 — Minimum Clearances

	CLOSET	ALCOVE
BACK	0”	0”
SIDES	0”	0”
FRONT	6”	24”
TOP	2”	2”
ROOF JACK	0”	0”
DUCT	0”	0”

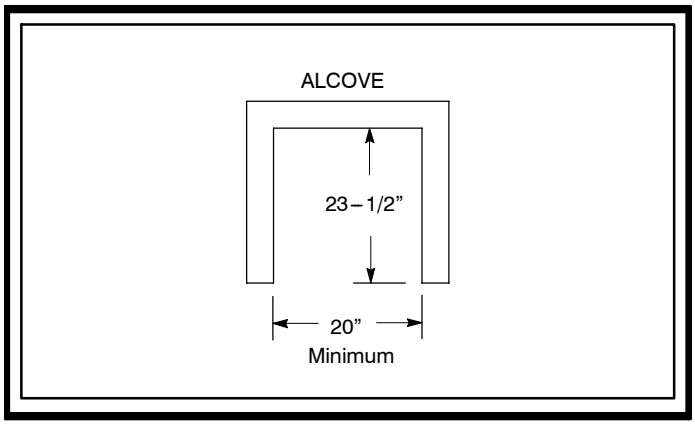


Figure 2 — Alcove Installation

RETURN AIR REQUIREMENTS
CLOSET INSTALLATIONS

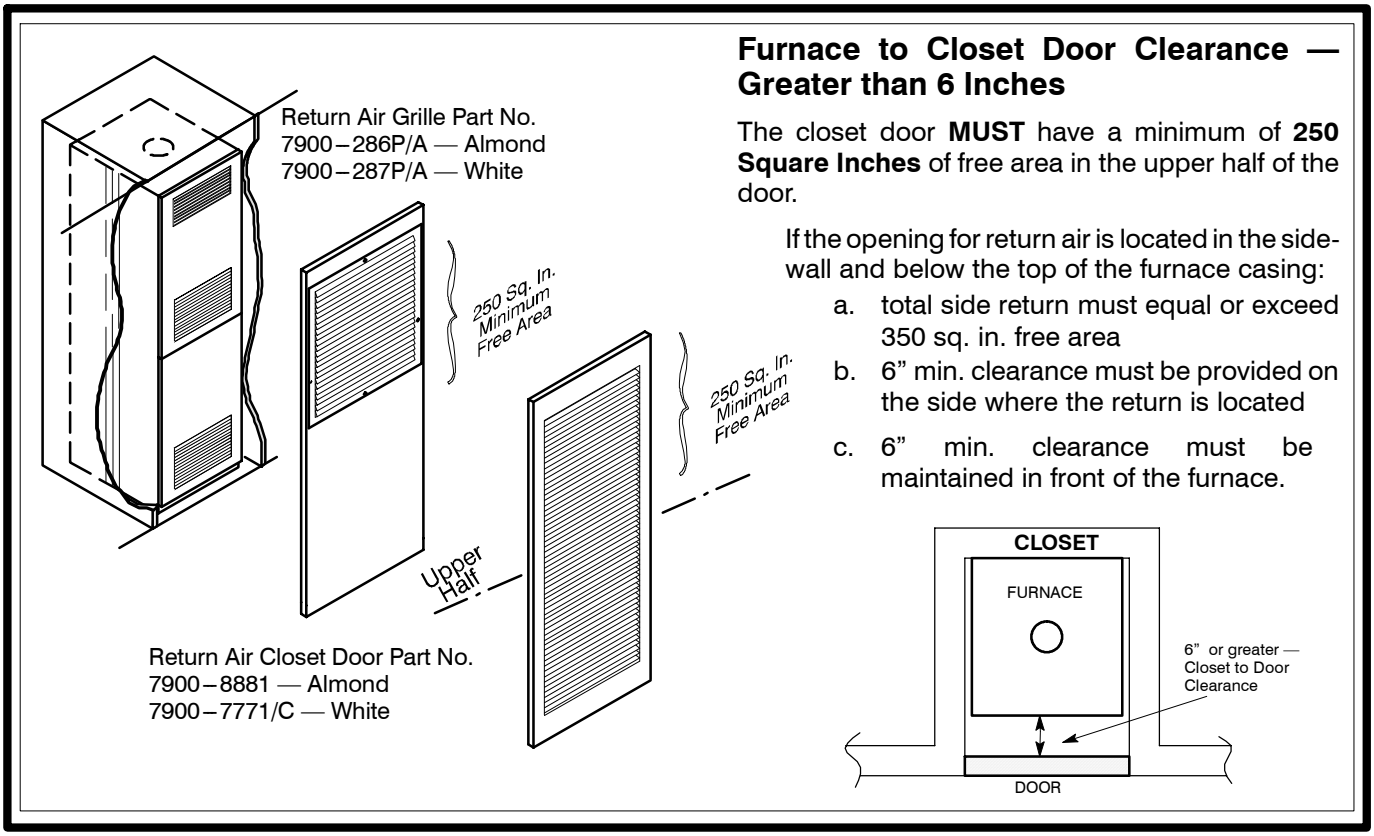


Figure 3 — Closet to Door Clearance — 6" or greater

Additional Requirements

Additional requirements for floor and ceiling return system for closet installed sealed combustion heating appliance are given in the next paragraph.

Floor or Ceiling Return Air System

Floor or ceiling return air system for closet installed direct vent forced air heating appliance.

Listed in the next paragraph are the conditions to be met by Mobile Home Manufacturers to have U.L. acceptance of in–floor or ceiling return air systems of closet installed direct vent forced air heating appliances for Mobile Homes to be sold in the United States.

A. The return–air opening into the closet, regardless of location, is to be sized not less than specified on the appliance's rating plate.

B. If the return–air opening is located in the floor of the closet (versus the vertical front or side wall), the opening is to be provided with means to prevent its inadvertent closure by a flat object placed over the opening.

C. The cross–sectional area of the return duct system (when located in the floor or ceiling of the mobile home) leading into the closet is to be not less than that of the opening specified on the appliance's rating plate.

D. The total free area of openings in the floor or ceiling registers serving the return–air duct system is to be not less than 150% of the size of the opening specified on the appliance's rating plate. At least one such register is to be located where likelihood of its being covered by carpeting, boxes, and other objects is minimized.

E. Materials located in the return duct system have a flame spread classification of 200 or less.

F. Non–combustible pans having one–inch upturned flanges are located beneath openings in the floor return duct system.

G. Wiring materials located in the return duct system conform to Article 300–22 (b&c) of the National Electric Code (ANSI C1 / NFPA–70).

H. Gas piping is not run in or through the return duct system.

I. The negative pressure in the closet as determined by test with the air–circulating fan operating at high heating speed and the closet door closed is to be not more negative than minus 0.05–inch water column.

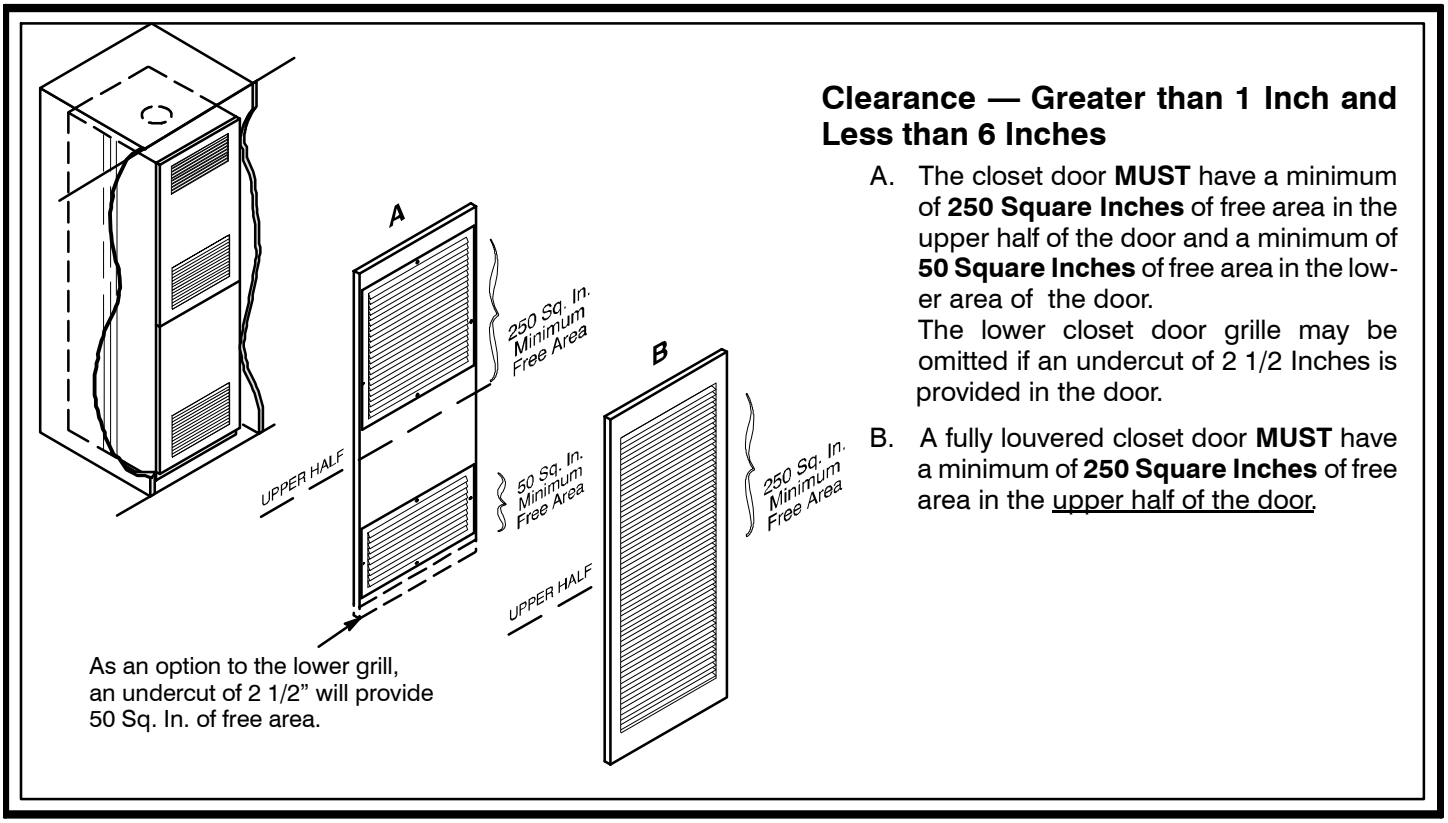
J. For floor return systems, the mobile home manufacturer or installer shall affix a prominent marking on or near the appliance where it is easily read when the closet door is open. The marking shall read:

WARNING
HAZARD OF ASPHYXIATION
DO NOT COVER OR RESTRICT FLOOR OPENING

or equivalent.

SPECIAL CLOSET INSTALLATIONS

Furnace to Closet Door Clearance — Greater than 1 Inch and Less than 6 Inches



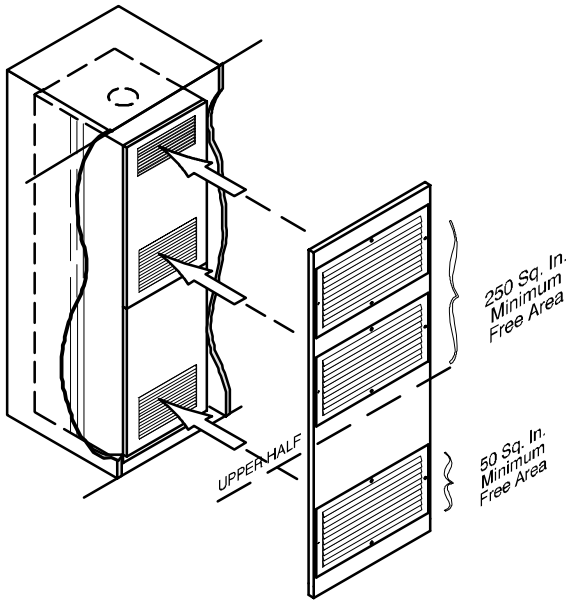
Clearance — Greater than 1 Inch and Less than 6 Inches

A. The closet door **MUST** have a minimum of **250 Square Inches** of free area in the upper half of the door and a minimum of **50 Square Inches** of free area in the lower area of the door.
The lower closet door grille may be omitted if an undercut of 2 1/2 Inches is provided in the door.

B. A fully louvered closet door **MUST** have a minimum of **250 Square Inches** of free area in the upper half of the door.

Figure 4 — Furnace to Closet Door Clearance — 1" to 6"

Furnace to Closet Door Clearance — Less than 1 Inch



Clearance — Less than 1"

The closet door **MUST** have three return air grilles. The total free area of the two **upper** grilles must be a minimum of **250 Square Inches.** The total free area of the **lower** grille **MUST** be a minimum of **50 Sq. In.**

NOTE: Each grille MUST BE ALIGNED directly opposite the corresponding return air grille of the furnace door.

Figure 5 — Furnace to Closet Door Clearance — Less than 1"

AIR DISTRIBUTION SYSTEMS

For proper air distribution, the supply duct system shall be designed so that the static pressure does not exceed the listed static pressure rating on the furnace rating plate.

Three typical distribution systems are illustrated in Figure 6.

Location, size and number of registers should be selected on the basis of best air distribution and floor plan of the home.

The Air Temperature Rise is to be adjusted to obtain a temperature rise within the range(s) specified on the furnace rating plate.

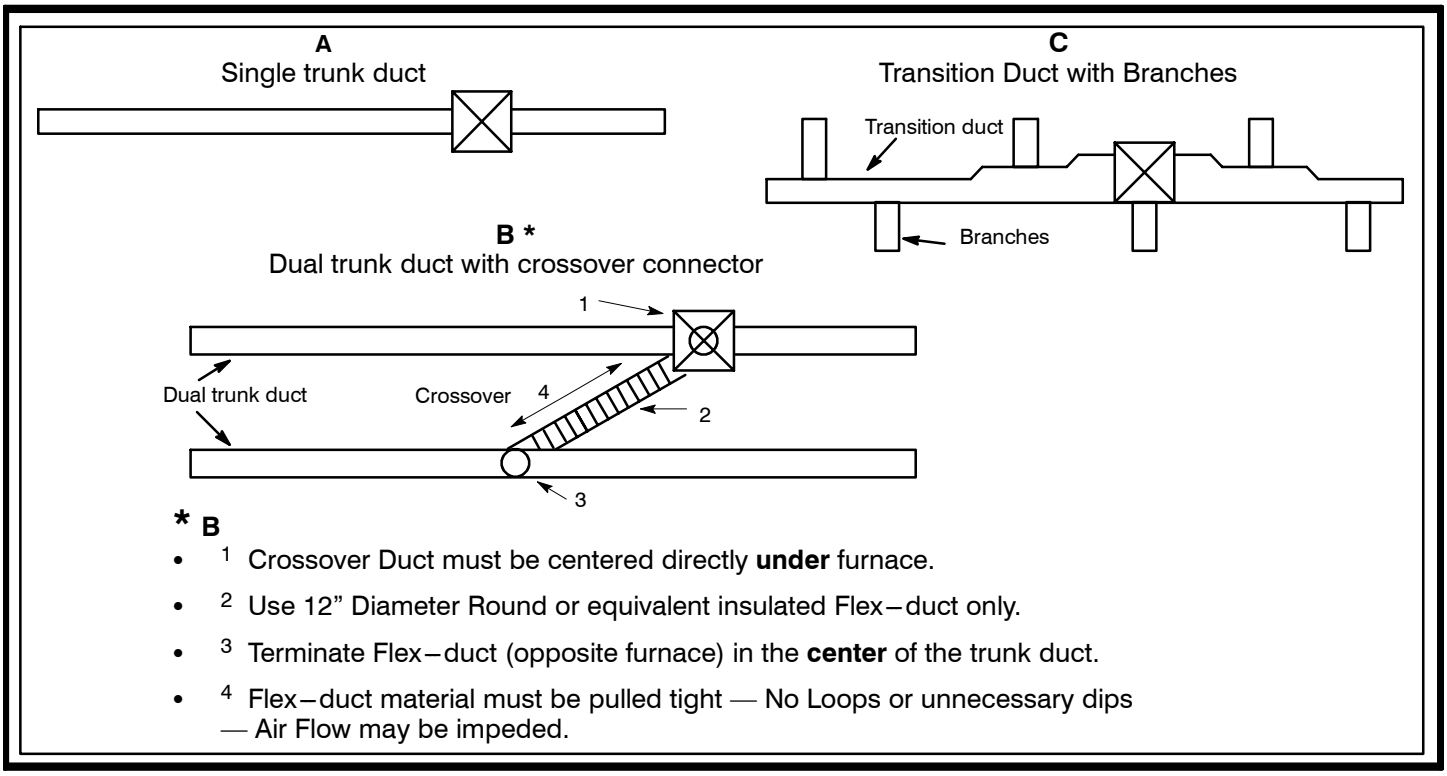


Figure 6 — Air Distribution Systems

CAUTION

Only use the appropriate roof jack.
See TABLE 4 & TABLE 5 for correct application.

Do not exceed the maximum height as determined from TABLE 4 & TABLE 5. Installer should allow an additional 1 – 1/2" travel before the flue pipe assembly is fully extended against the built – in stop. This provides an additional safeguard against the flue assembly being pulled from the roof jack during transportation or other stress conditions.

Improper installation may damage the equipment, can create a hazard, and will void the warranty.

Carefully follow all instructions and warnings to avoid Fire, Explosion, Or Asphyxiation.

Locating and Cutting Roof Jack Opening

To facilitate the proper installation of the roof jack, it is very important that the roof jack opening in the ceiling and roof be on the same vertical center line as the furnace flue collar. See Figure 7.

The dimensions shown in Figure 7 may be used if the furnace is flush with the walls or adjusted to allow for any spacing away from either wall.

Mark this location on ceiling and scribe a circle with a 5" radius (10" diameter) around this mark. Cut opening for roof jack through ceiling and roof. **(If furnace was installed during construction, cover furnace and flue opening to prevent debris from entering flue and combustion air when hole is cut for roof jack.)**

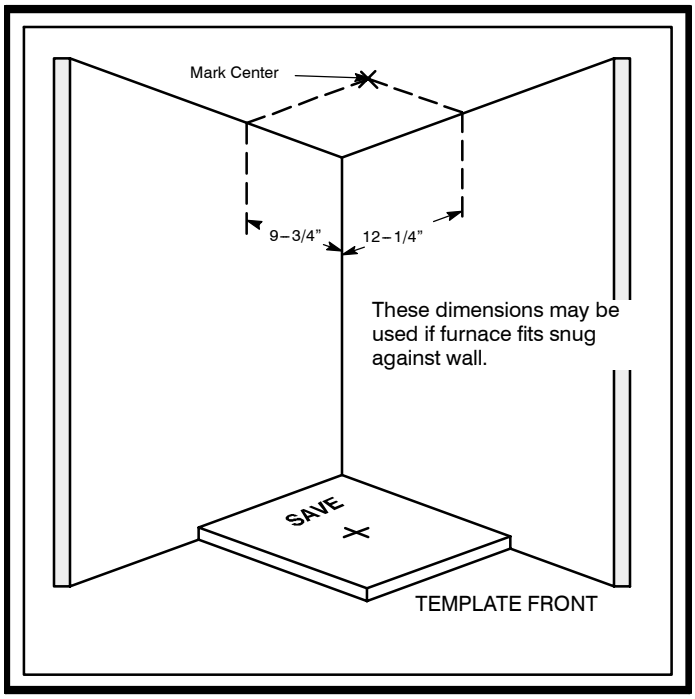


Figure 7 — Location of Roof Jack Opening

Installing Roof Jack in Roof

(See Figure 8 & Figure 9 for Dimensional requirements.)

Insert roof jack into opening in the roof.

The roof jack should be secured to the furnace before roof flange (flashing) is secured to the roof. This will insure a better alignment of the flue pipe and furnace flue collar. Caulk completely around the underside of the roof jack flashing to provide a rain tight seal, before securing roof jack flashing to roof. After roof jack flashing has been secured to the roof, caulk carefully all around swivel joint with sealant supplied by furnace manufacturer.

TABLE 4 — DLAS Roof Jacks

Roof Jack Model Number	Installation Dimensions	
	[1] Adjustable Height	
4000–7121/C	75” to 86”	These dimensions are from the floor to the top side of the roof. (See Figure 8.)
4000–7141/C **	83” to 104”	
4000–7151/C **	90” to 116”	
4000–7171/C	127” to 157”	
4000–8161/C *+	85” to 101”	
4000–8181/C *+	99” to 129”	

* These jacks have removable crowns.

Note: It is recommended that the 7900–6171 (17”) Interior extension be used with these models. If used refer to TABLE 5 for sizing of roof jack.

** Available with 3–1/2, 12 Pitch Fixed Flashing.
Models 4000–6141 and 4000–6151
+ Available with 3–1/2, 12 Pitch Fixed Flashing.
Models 4000–9161 and 4000–9181

TABLE 5 — DGAT & DGAM Roof Jacks

Roof Jack Model Number	Installation Dimensions	
	[1] Adjustable Height	
4000–7101/C	86” to 95”	These dimensions are from the floor to the top side of the roof. See Figure 9.
4000–7121/C	91” to 102”	
4000–7141/C **	99” to 120”	
4000–7151/C **	106” to 132”	
4000–7171/C	143” to 173”	
4000–8161/C *+	101” to 117”	
4000–8181/C *+	115” to 145”	

* These jacks have removable crowns.

** Available with 3–1/2, 12 Pitch Fixed Flashing.
Models 4000–6141 and 4000–6151
+ Available with 3–1/2, 12 Pitch Fixed Flashing.
Models 4000–9161 and 4000–9181

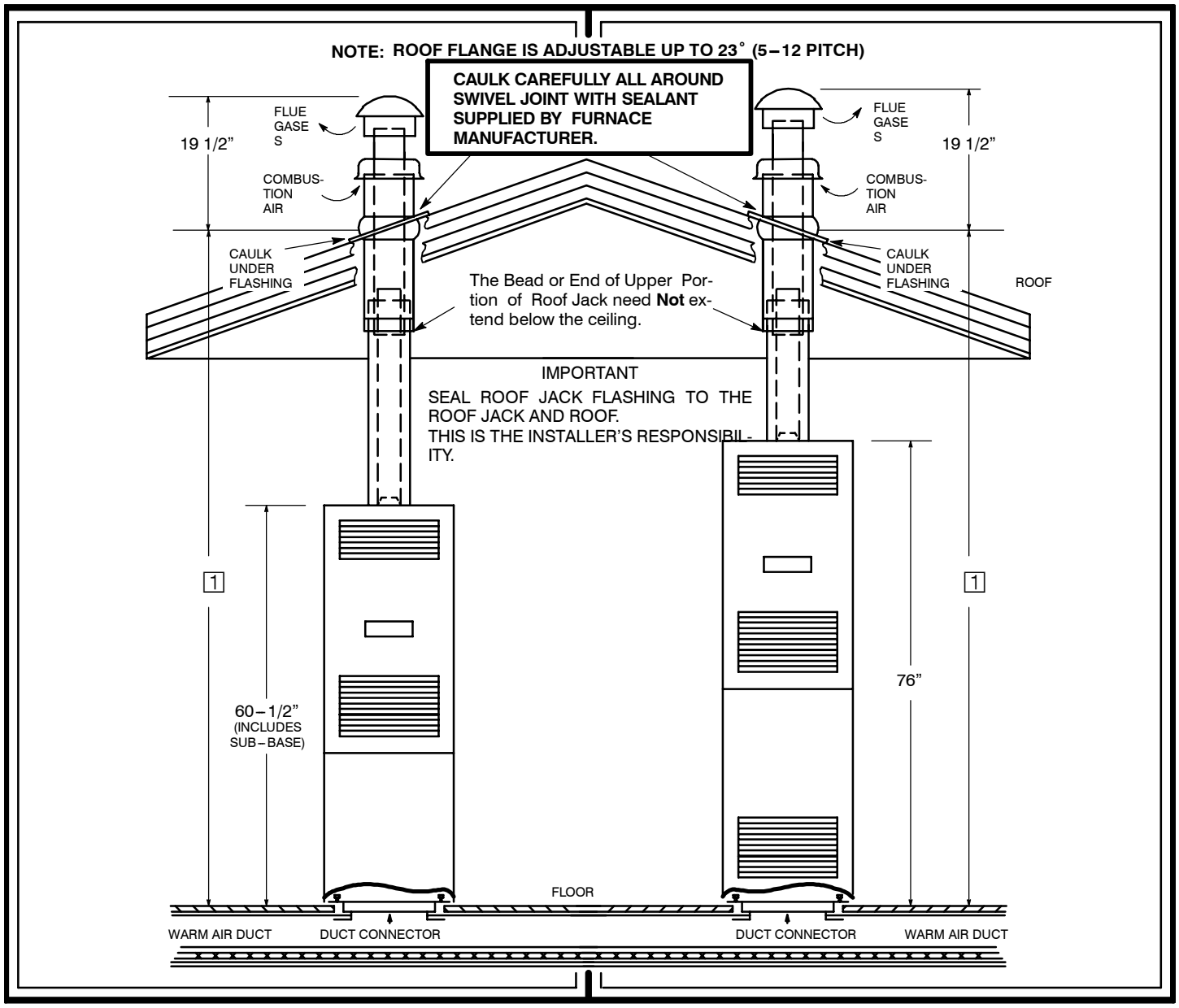


Figure 8 — DLAS Models

Figure 9 — DGAT & DGAM Models

CEILING RINGS

The ceiling ring is to meet fire stop requirements. Accessory Ceiling Ring (P/N 7660–2841) may be used, (see Figure 10) or the mobile home manufacturer or the installer may use other approved methods to stop fire.

If required, three (3) sections of Accessory Ring may be used as shown in Figure 10B to provide closer clearance around roof jack.

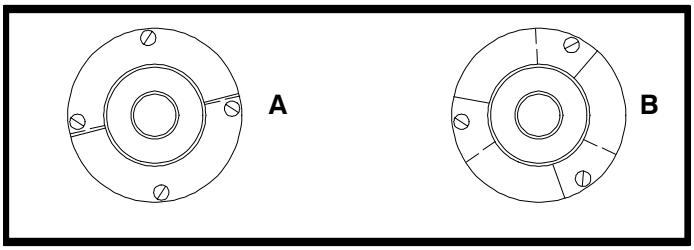


Figure 10 — Ceiling Rings

DUCT CONNECTORS

The duct connector is designed for use on ducts down to 12” in width. When using the connector on smaller width ducts, there will not be sufficient clearance to bend the tabs on two sides of the duct connector.

In such cases the tabs may be attached to the sides of the duct by using sheet metal screws or other suitable fasteners. Holes for sheet metal screws are provided in three (3) tabs on each side of the duct connector. If more than 3 tabs need to be used to provide a more secure and air tight connection, the remaining tabs can also be fastened to the duct with screws after drilling the required screw holes.

If tape is used to provide a better air seal, it should be a type approved by the applicable national or local codes.

TABLE 6 — Duct Connectors

Sales Package	Part Number	Depth
7681–6621	7681–602	2” Duct Connector — For Ducts 1–1/8” below top of floor surface
7681–6631	7681–603	3” Duct Connector — For Ducts 2–1/8” below top of floor surface
7681–6651	7681–605	5” Duct Connector — For Ducts 4–1/8” below top of floor surface
7681–6661	7681–606	6” Duct Connector — For Ducts 5–1/8” below top of floor surface
7681–6671	7681–607	7” Duct Connector — For Ducts 6–1/8” below top of floor surface
7681–6681	7681–608	8” Duct Connector — For Ducts 7–1/8” below top of floor surface
7681–6691	7681–609	9” Duct Connector — For Ducts 8–1/8” below top of floor surface
7681–6611	7681–611	11” Duct Connector — For Ducts 10–1/8” below top of floor surface
7681–6711	7681–612	12” Duct Connector — For Ducts 11–1/8” below top of floor surface

TEMPLATE & CUTOUT DIMENSIONS

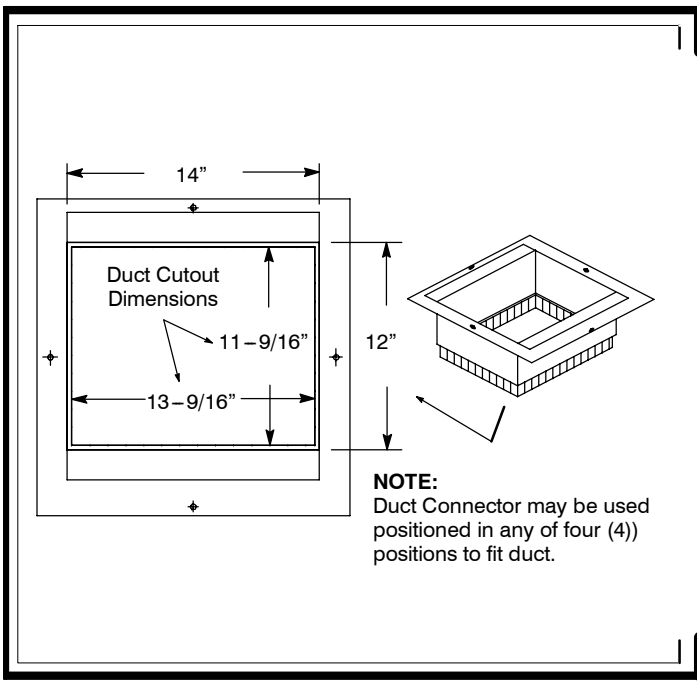


Figure 11 — Duct Connector Dimensions

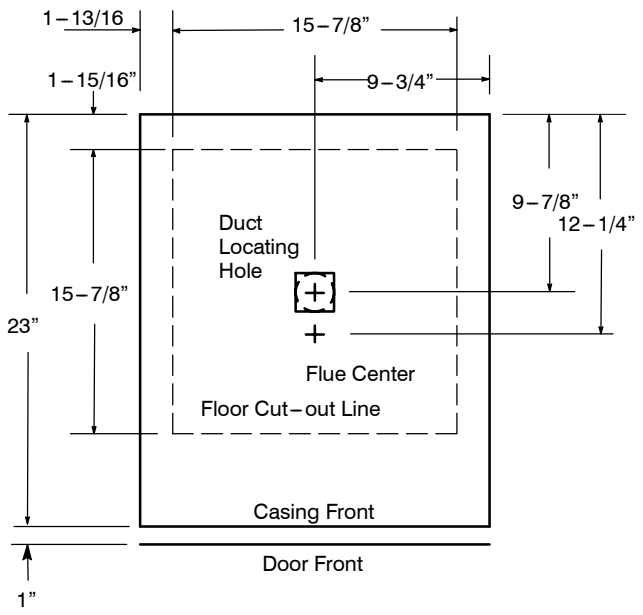


Figure 12 — Template

Installation Procedure for DLAS Furnace

The following steps are listed for installation of furnace and need not be performed in the exact order as listed.

Follow this procedure to avoid serious misalignment of furnace duct connector opening and supply duct.

A. This Furnace requires a SUB–BASE (Included)

For convenience, a template is provided on the furnace shipping carton. This may be cut out and used to accurately locate furnace, floor and vent openings. See Figure 12.

Locate template on floor to provide proper clearances to the walls and the front. Cut 2" diameter hole or small square hole as indicated on template.

Locate template so that furnace opening outline is centered over under–floor supply duct as accurately as possible. This is important because of the limited adjustment from side to side, and from front to rear of the duct connector.

Locate under–floor duct through hole and center "floor cut–out opening" on template over duct.

Accurately cut "floor cut–out opening" from template, mark floor opening, remove template and cut floor on outside edge of marked line.

Position sub–base over hole.

Duct connectors will fit openings of sub–base in any one of four (4) positions. Place proper duct connector in the opening in the best position, (duct connector may be shifted in either direction for best location).

Mark duct opening with a scribe or marking pen, then remove duct connector. Cut hole in duct to correct size according to dimensions shown in Figure 11. Cut duct accurately to prevent air leakage.

Reinstall duct connector with tabs inside of hole in the duct and bend tabs up firmly against underneath side of duct.

Secure duct connector with four (4) sheet metal screws using holes provided in the connector, and the sub–base. See Figure 13.

Secure sub–base to floor with 2 or more screws or nails.

B. Install Furnace

Check to make sure roof jack is not extending too far down into furnace location. Slide furnace into location and align over floor opening.

Pre–cut openings and knock–outs are provided in furnace base to install a front fuel line and/or front refrigerant lines. **If rear entrance lines are to be used, they must be installed before the duct connector is installed and secured in place.**

For air conditioning lines, remove the knock–out.

C. Securing Furnace

Make any minor adjustments in the furnace location necessary to insure that the opening in the furnace bottom is centered over the opening in the duct. Secure furnace to sub–base, as required, through holes at front and rear of furnace. Holes for screws are located in bottom flange front corners and rear flanges.

Secure furnace to wall at top by using metal strap provided. (See Figure 13.)

Manufacturers may add straps equivalent to provided straps, if required, for securing furnace to structural member.

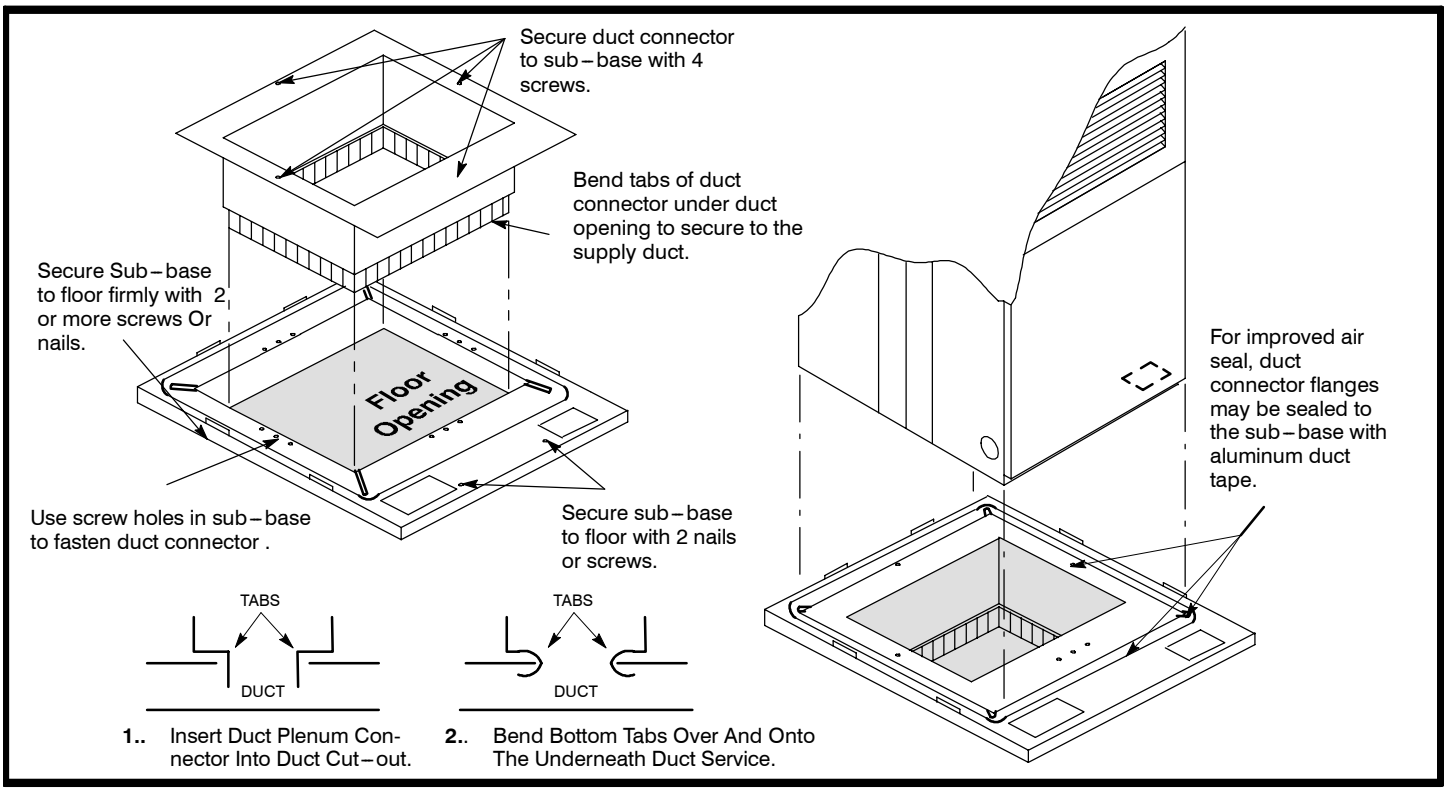


Figure 13 — Sub–base / Duct Connector

Installation Procedure for DGAT & DGAM Furnaces

The following steps are listed for installation of furnace and need not be performed in the exact order as listed:

Follow this procedure to avoid serious misalignment of furnace duct connector opening and supply duct.

A. This Furnace requires NO sub–base

For convenience, a template is provided on the furnace shipping carton. This may be cut out and used to accurately locate furnace, floor and vent openings. See Figure 12.

Locate template on floor to provide proper clearances to the walls and the front. Cut 2" diameter hole or small square hole as indicated on template.

Locate template so that furnace opening outline is centered over under–floor supply duct as accurately as possible. This is important because of the limited adjustment from side to side, and from front to rear of the duct connector.

Locate under–floor duct through hole and center "floor cut–out opening" on template over duct.

Accurately cut "floor cut–out opening" from template, mark floor opening, remove template and cut floor on outside edge of marked line.

Duct connectors will fit opening in any one of four (4) positions. Place proper duct connector in the opening in the best position, (duct connector may be shifted in either direction for best location).

Mark duct opening with a scribe or marking pen, then remove duct connector. Cut hole in duct to correct size according to dimensions shown in Figure 11. Cut duct accurately to prevent air leakage.

Reinstall duct connector with tabs inside of hole in the duct and bend tabs up firmly against underneath side of duct.

Secure duct connector to floor with four (4) sheet metal screws using holes provided in the connector. See Figure 14.

B. Install Furnace

Remove panel from air conditioning compartment. Check to make sure roof jack is not extending too far down into furnace location. Slide furnace into location and align over floor opening.

Pre–cut openings and knock–outs are provided in furnace base to install a front fuel line and/or front refrigerant lines. **If rear entrance lines are to be used, they must be installed before the duct connector is installed and secured in place.**

For air conditioning lines, remove the knock–out.

C. Securing Furnace

Make any minor adjustments in the furnace location necessary to insure that the opening in the furnace bottom is centered over the opening in the duct. Secure furnace to floor, as required, through holes at front and rear of furnace. Holes for screws are located in bottom flange front corners and rear flanges.

Secure furnace to wall at top by using metal strap provided. (See Figure 14.)

Manufacturers may add straps equivalent to provided straps, if required, for securing furnace to structural member.

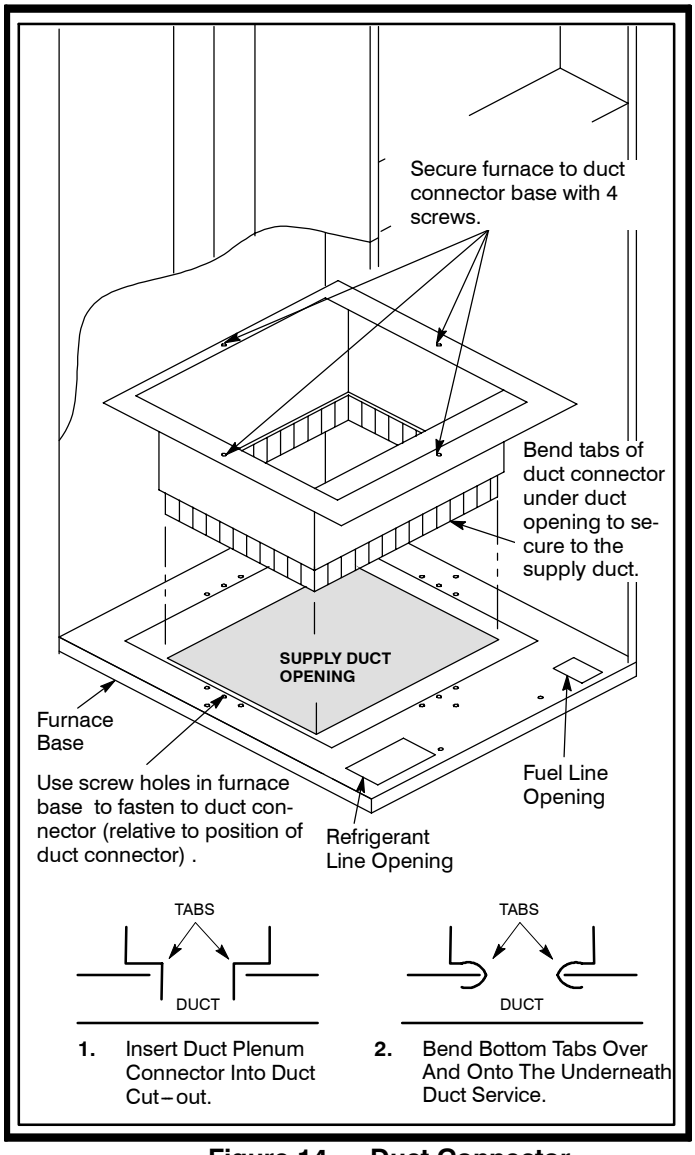


Figure 14 — Duct Connector

CONNECTING ROOF JACK TO FURNACE

CAUTION

The inner flue pipe must be present.

It is mandatory that the combustion air pipe and flue pipe assembly be fully engaged. The combustion air pipe MUST be securely fastened to the furnace with sheet metal screws in the holes provided.

Use $^1/_2$" blunt or sharp end sheet metal screws to fasten roof jack combustion air pipe to furnace combustion air collar. Screw holes are provided in the pipe and collar. Excessively long screws may extend to flue pipe and puncture it. Screws are not to exceed 1 $^1/_2$" in length.

NOTE

Combustion air tube and flue pipe are part of the same assembly. Only the combustion air tube need be fastened to the furnace.

1. Check to be certain that the flue pipe and combustion air tube are present.
2. Pull the telescoping flue tube and combustion air tube assembly down from the roof jack. Slide the flue tube/combustion air tube assembly down firmly over the furnace flue outlet and combustion air collar. Insure that the back, side and front of combustion air tube collar is fully engaged. Fasten the combustion air tube to the furnace combustion air collar using two (2) $^1/_2$ inch sheet metal screws. (Screw holes are provided in combustion air tube and furnace combustion air collar. (See Figure 15.)

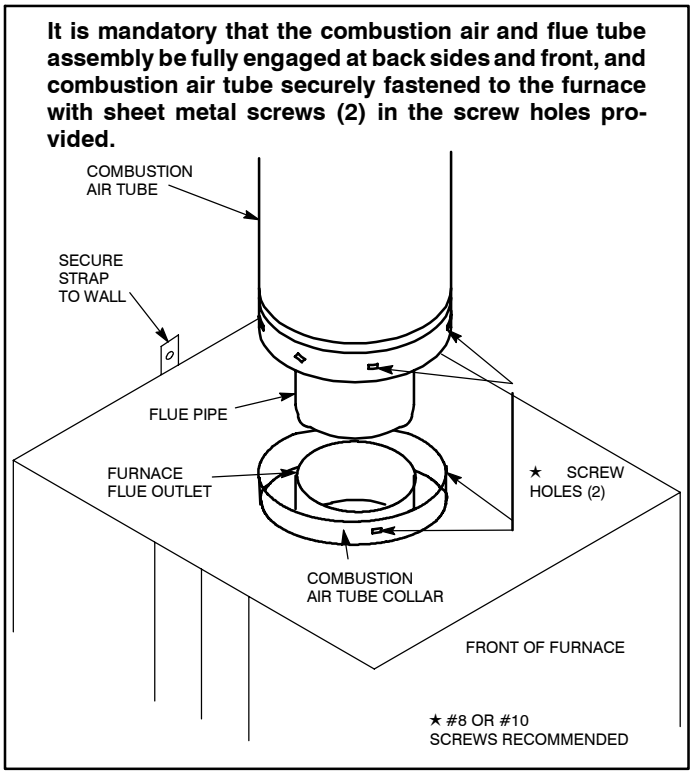


Figure 15 — Connecting Roof Jack to Furnace

IMPORTANT

VENT SYSTEM INSTALLATION INSTRUCTIONS

WARNING

FAILURE TO FOLLOW ALL VENTING INSTRUCT–IONS CAN RESULT IN FIRE, ASPHYXIATION, OR EXPLOSION.

The vent system is an important part of your furnace installation. Carefully read and observe the following basic instructions, as well as those packed with the vent system.

EXISTING FURNACE REPLACEMENT

IF THIS FURNACE REPLACES AN **EXISTING FURNACE**, DO THE FOLLOWING.

1. If a 2nd roof, roof cap or addition has been made to the existing roof of the home, **remove the old vent system completely!... to avoid the possibility of an improperly installed pipe or gaps in the old vent system, INSTALL A NEW VENT SYSTEM. Your ceiling and roof height will determine the correct vent system to use. Refer to the vent selection table, of the furnace installation instructions.**
2. After unpacking the vent system, check the rain caps. Insure they are not damaged, tilted or crooked. **Do not twist, crush or sit on the roof caps during installation.** Damaged roof caps will cause improper furnace operation. The furnace will not heat properly and could result in explosion.
3. After installing vent pipe on furnace top collar, check to make sure there is no gap in back or side between the pipe collar and the furnace casing top.
4. Use only the pipes provided with the roof jack assembly. Do not add to or adapt other sheet metal pipes. **Do not cut, insert or add other pipes to this assembly.**
5. In no case should there be a gap between sections of the flue pipe or the combustion air pipe.

NEW HOME INSTALLATION

IF THIS FURNACE IS INSTALLED ON A **NEW HOME** DO THE FOLLOWING

1. Inspect the furnace top collars for signs of insulation or ceiling debris which might have fallen in during cutting of the ceiling and roof holes. Remove all debris before continuing.
2. After unpacking the vent system, check the rain caps. Insure they are not damaged, tilted or crooked. **Do not twist, crush or sit on the roof caps during installation.** Damaged roof caps will cause improper furnace operation. The furnace will not heat properly and could result in explosion.
3. Before inserting the vent pipe into the furnace top, inspect the furnace flue and combustion air opening for debris or insulation which might have fallen in during pre–installation steps. Do not proceed unless all debris have been cleaned out or removed.
4. After installing vent pipe on furnace top collar, check to make sure there is no gap in back or side between the pipe collar and the furnace casing top.

INSTALLATION IN SNOW REGIONS

When the combustion air pipe inlet is covered or blocked with snow, the furnace will not operate properly due to the depleted combustion air supply.

Therefore, if the furnace will be located in regions where snow accumulation on the roof exceeds 7" or in H.U.D. Snow Load Zones, a # 7680B6541 roof jack extension is recommended.

ELECTRICAL WIRING

CAUTION

TO INSTALLER: INCOMING POWER MUST BE POLARIZED. OBSERVE COLOR CODING.

DANGER

-- SHOCK HAZARD --

DISCONNECT ELECTRICAL POWER SUPPLY TO THE UNIT BEFORE SERVICING TO AVOID THE POSSIBILITY OF SHOCK INJURY OR DAMAGE TO THE EQUIPMENT.

CONNECT POWER SUPPLY WIRES

a. Remove the field wiring cover.

b. Insert 115 volt wires through the large plastic bushing on the left side of the furnace (See Figure 16). If conduit is used it should be secured to the control box.

c. Connect the "hot" wire to the BLACK pigtail lead, and the "neutral" wire to the WHITE pigtail lead. Secure all connections with suitable wire nuts and wrap with electrical tape.

d. Connect the "ground" wire to the grounding screw.

e. Reinstall the control panel cover and secure mounting screw.

CONNECT THERMOSTAT WIRES

a. Insert 24 volt wires through the small plastic bushing just above the control panel.

b. Connect the thermostat wires to the furnace low voltage pigtails (See Figure16).

c. Connect low – voltage circuit to the wall thermostat pigtails.

A separate 120 V.A.C. supply circuit must be used for the furnace. The circuit should be protected by a 15 amp fuse or circuit breaker.

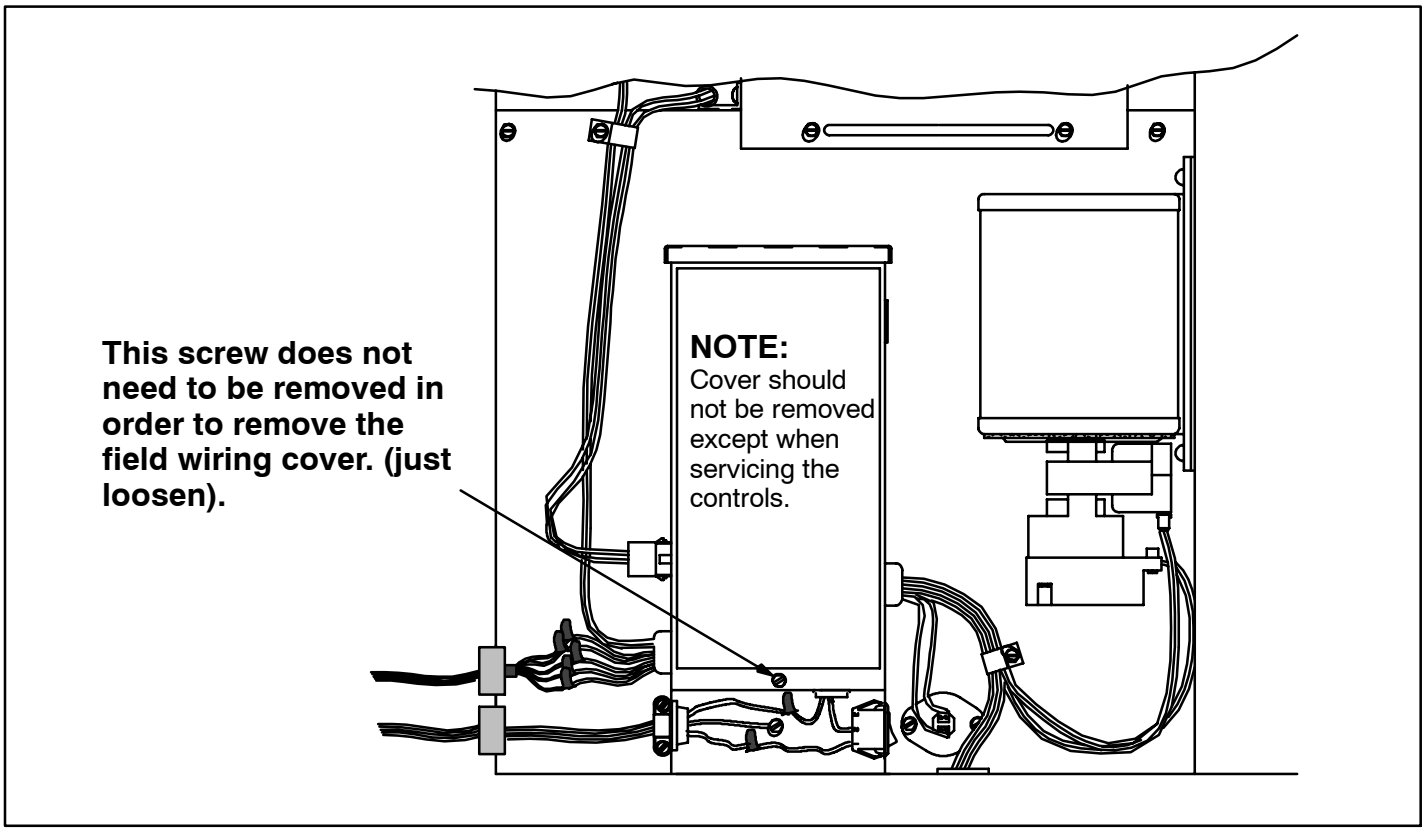


Figure 16

WALL THERMOSTAT

Avoid locations where the thermostat could be subject to drafts from outside, or exposed to direct light from lamps, sun, fireplaces, etc., or affected by air from a duct register blowing directly on the thermostat.

The wall thermostat should be mounted approximately 5 feet from the floor. The preferred location is on an inside wall situated in an area with good air circulation, and where the temperature will be reasonably representative of other living areas the thermostat is controlling.

THERMOSTAT WIRING FOR DGAT AND DGAM SERIES

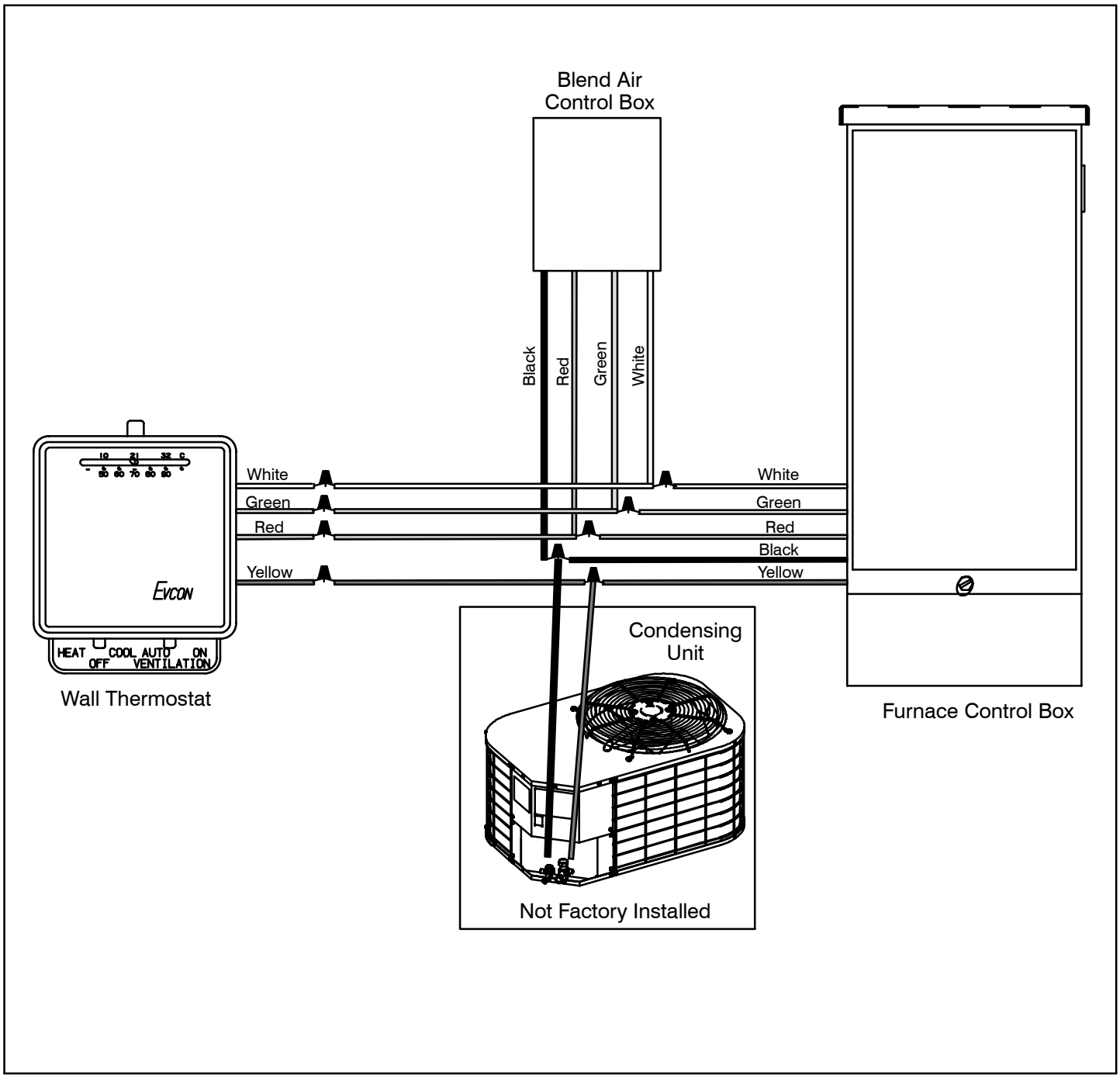


Figure17 -- Thermostat Wiring

THERMOSTAT WIRING FOR DLAS (HEAT ONLY) SERIES

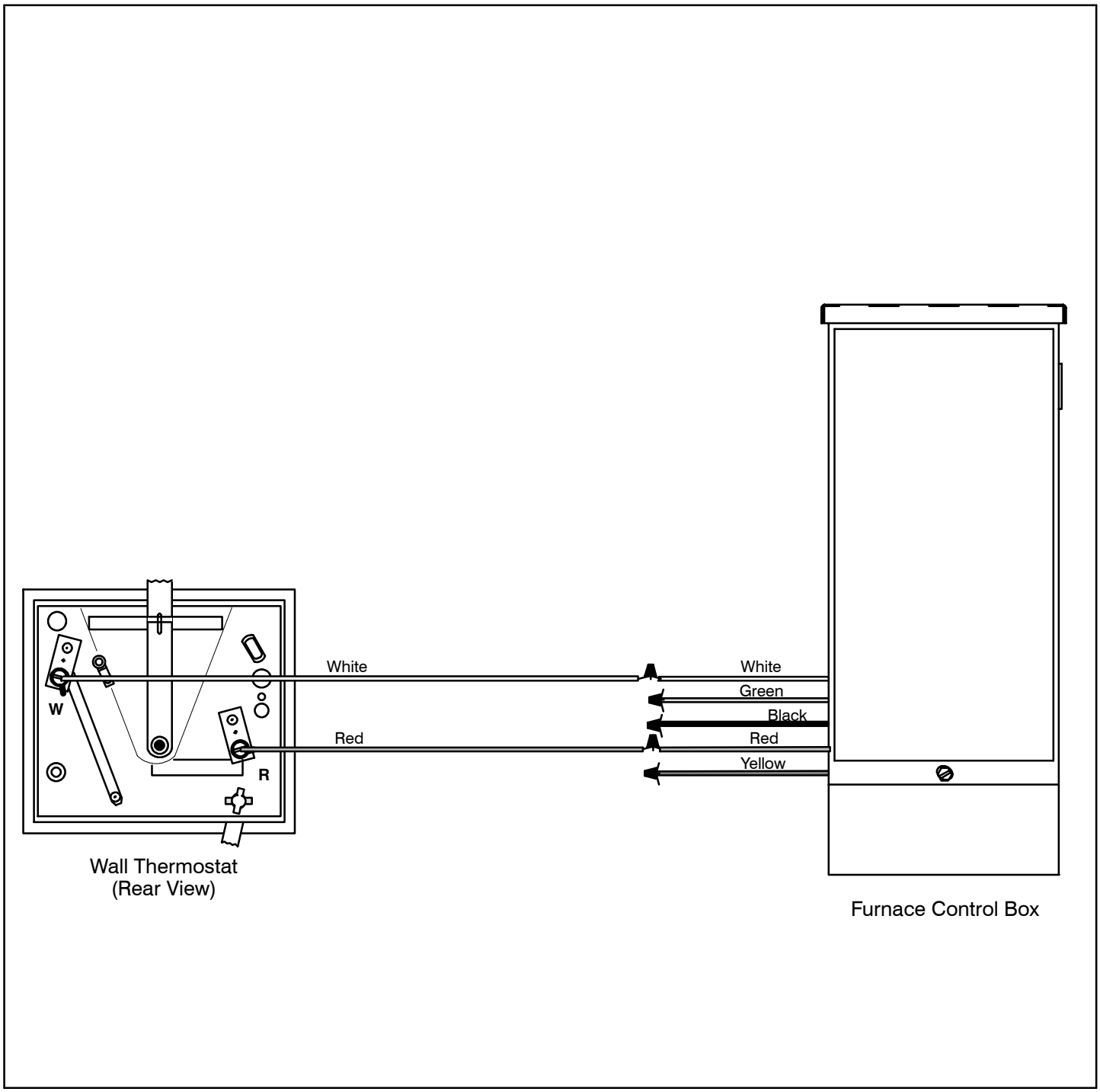


Figure17a – Thermostat Wiring for DLAS Series

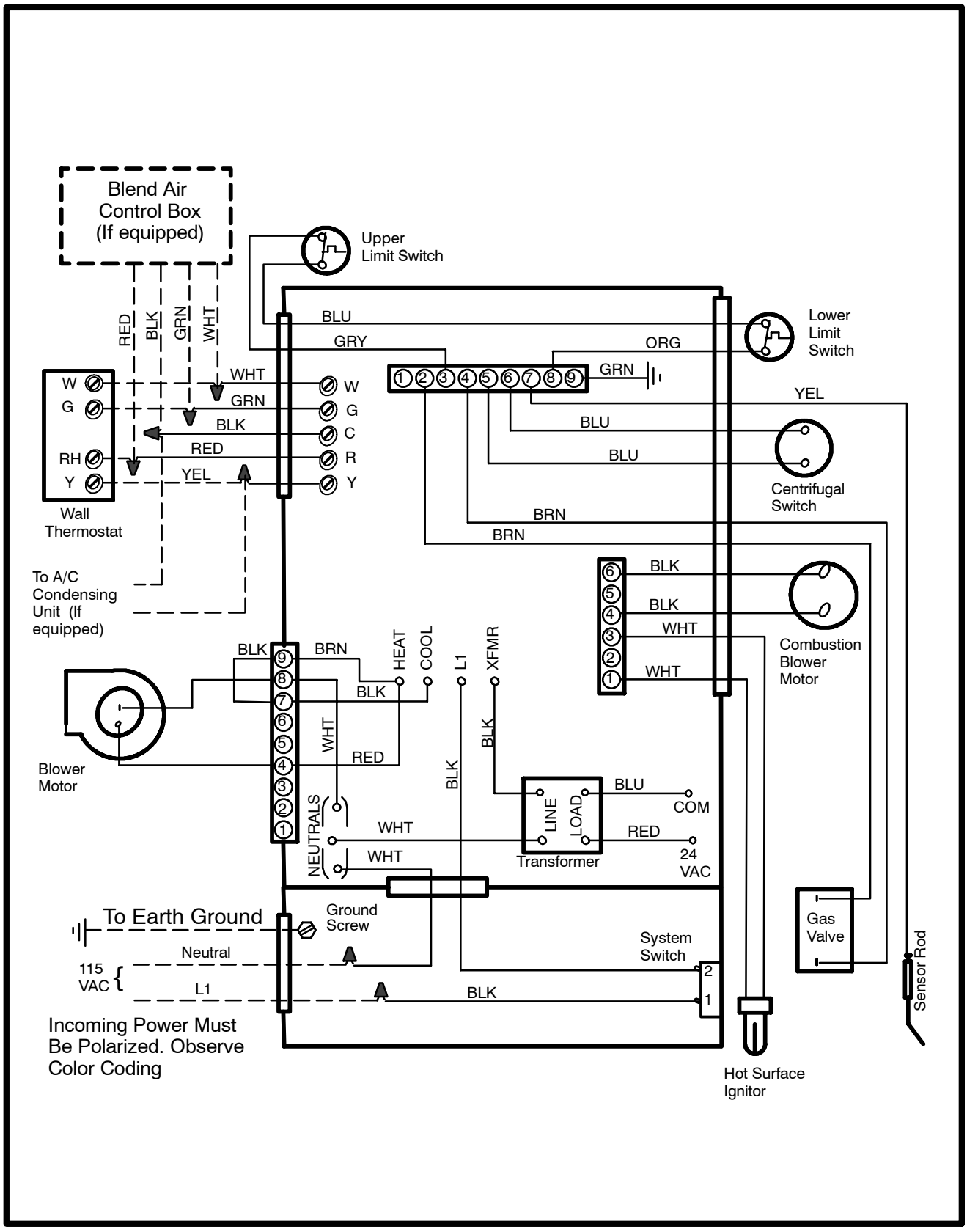


Figure 18 -- DGAT Series Wiring Diagram

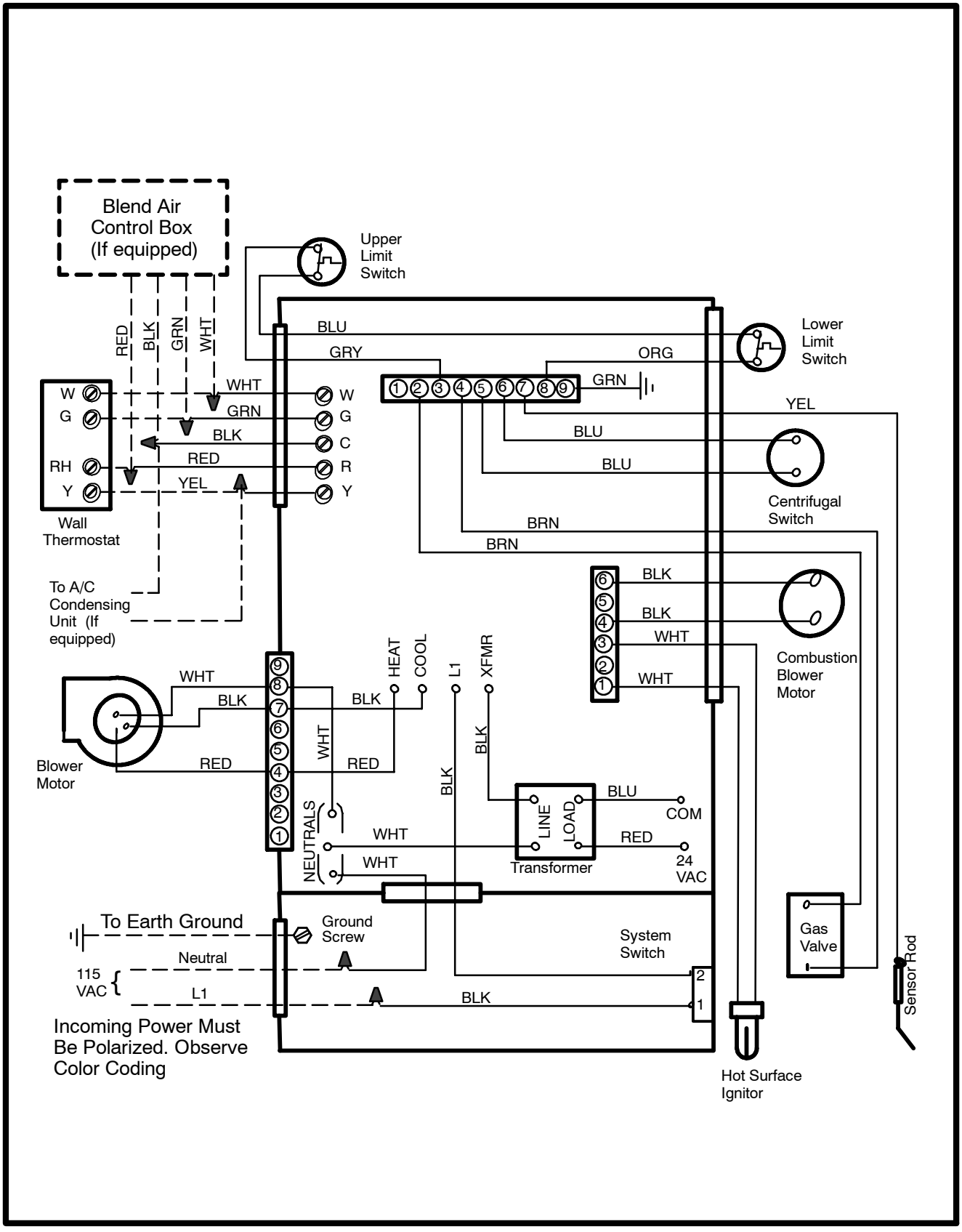


Figure 19 -- DGAM Series Wiring Diagram

INSTALLATION AND CHECKING OF GAS LINE

Gas Supply piping must be sized in accordance with the recommendations contained in "American National Standard Institute Installation of Gas Piping" ANSI 223.1 unless local codes or regulations state otherwise.

Materials used and pipe sizing for U.S. mobile homes must comply with requirements contained in Mobile Homes A119.1, Recreational Vehicles A119.2 and H.U.D. Title 24, Section 280.705 and any local or state codes.

NOTE

The gas line inlet on the gas valve is $^1/_2$ – 14 N.P.T. The gas line may be installed through the furnace floor or furnace side to the gas valve.

CAUTION

To install gas line and to connect it to the gas valve, care must be taken to hold gas valve firmly to prevent misalignment of the burner orifice, or to damage gas valve which could result in improper heating, explosion, fire or asphyxiation.

DO NOT USE EXCESSIVE PIPE SEALANT ON PIPE JOINTS. Pipe sealant, metal chips or other foreign material that could be deposited in the inlet of the gas valve, when gas pipe is installed or carried through the gas piping into the gas valve inlet after installation, may cause the gas valve to malfunction and could result in possible improper heating, explosion, fire or asphyxiation. Also, pipe sealant must be resistant to Propane gas.

Where regulations require, a main shut–off valve shall be installed externally of furnace casing. After piping has been installed, turn gas on and check all connections with a leak detector or soap solution.
NEVER USE OPEN FLAME. FIRE OR EXPLOSION COULD OCCUR.

Do not test the fuel system at more than 14" W.C. after furnace has been connected to fuel line. Such testing could void the warranty. Any test run above 14" W.C. may damage furnace control valve which could cause an explosion, fire or asphyxiation.

A dirt leg may be required by some local codes to trap moisture and contaminations.

For NAT. gas operation, the furnace is designed for 7" W.C. inlet gas pressure. Pressure to main burner is then reduced to 3 $^1/_2$" W.C.

For Propane gas operation, the furnace is designed for 11" W.C. inlet gas pressure. Pressure to main burner is then reduced to 10" W.C.

IMPORTANT

When converting valve from or to Propane gas, it will be necessary to change main burner orifice to prevent an underfired or overfired condition. See furnace nameplate for complete instructions.

CAUTION

If the gas input to the furnace is too great because of excessive gas pressure, wrong size orifice, high altitude, etc., the burner flame will be sooty and may produce carbon monoxide, which could result in unsafe operation, explosion, and/or fire or asphyxiation.

Observing Burner Operation

1. Observe burner to make sure it ignites. Observe color of flame. On natural gas the flame will burn blue with appreciably yellow tips. On Propane gas a yellow flame may be expected. If flame is not the proper color call a qualified serviceman for service.
2. Let furnace heat until blower cycles on.
3. Turn thermostat down.
4. Observe burner to make sure it shuts off.
5. Let the furnace cool and blower cycle off.

WARNING

Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the furnace and allow burner to run until furnace cools down and blower shuts off before shutting off the electrical supply.

If any abnormalities are observed when checking for correct operation, such as burner failing to ignite or to turn off, sooty flame, etc., call your nearest authorized service technician as shown in the Service Center List included in the home owner envelope with the furnace.

Combustion Air

In order for the burner flame to burn efficiently, it must receive adequate combustion air.

The amount of combustion air can be changed by operating the combustion air adjustment rod located beneath the gas valve. (See Figures 19 and 20.)

The adjustment rod is set at an "average" position at the factory and may be properly set for many applications.

However, the amount of combustion air required will vary depending on altitude, actual BTU. content of the gas being used, gas pressure, conversion to another gas, and other variable factors.

Therefore, it is essential that the burner flame be observed and any necessary adjustments are made before the furnace is put into service at the final home site. Adjusting the burner air is considered part of the normal home set–up procedure and is the responsibility of either the home seller or buyer, depending on their agreement. Adjustments of this type are not covered by the warranty.

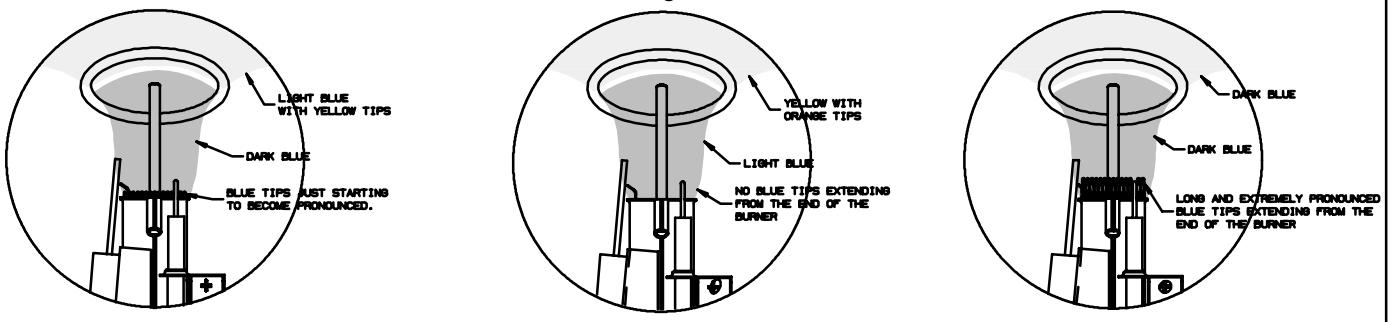
CAUTION

Combustion air adjustments must be made only by a qualified technician. Improper air adjustment may cause unsafe operation, explosion or asphyxiation.

To adjust the combustion air:

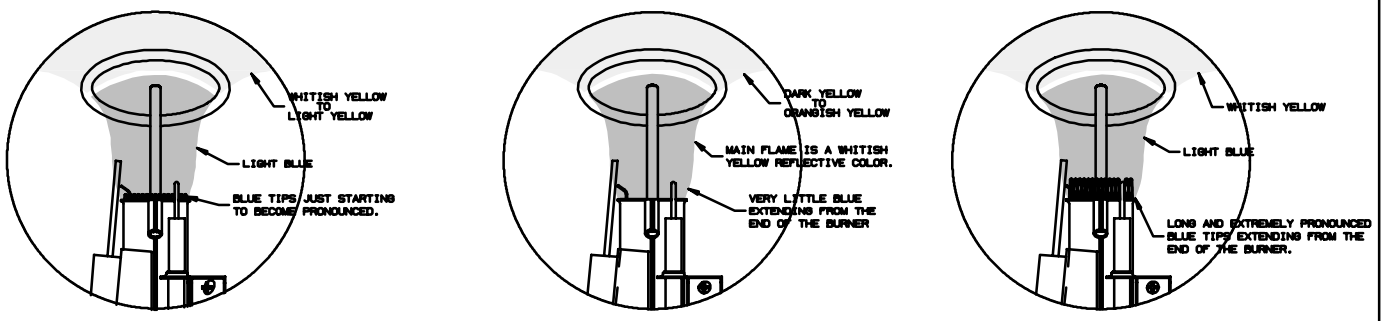
1. To light and operate furnace see label inside lower furnace door.
2. Allow the burner to burn for about 1 MINUTE.
3. Look through the observation window and observe the appearance of the flame.
4. On natural gas, the base of the flame should be blue but the tips of the flame will be yellow. (See Figure 20.)
5. On Propane gas, almost all of the flame will be yellow although some blue should still be present at the base of the flame next to the end of the burner. (See Figure 21.)
6. If the flame is too yellow, the combustion air should be increased. If the flame is excessively blue (no yellow) the combustion air should be decreased.
7. To adjust the combustion air, loosen the lock screw holding the combustion air rod in place. Push in on the rod to increase the combustion air. Pull out on the combustion air rod to decrease the combustion air. Tighten lock screw after adjustment is made. Do not completely close air damper at any time. Complete closure of air damper to burner will result in improper operation. See caution above.

View of Burner Through the Observation Window



Correct Amount of Primary Air | Too Little Primary Air Push Shutter Rod In | Too Much Primary Air Pull Shutter Rod Out

Figure 20 – Natural Gas Flame Appearance



Correct Amount of Primary Air | Too Little Primary Air Push Shutter Rod In | Too Much Primary Air Pull Shutter Rod Out

Figure 21 – Propane Gas Flame Appearance

If Furnace Fails to Operate Properly

1. Check setting of thermostat – and position of HEAT/COOL switch if air conditioning is installed. If a set–back type thermostat is employed be sure that the thermostat is in the correct operating mode.
2. Check to see that electrical power is ON.
3. Check to see that the knob on the gas control valve is in the full ON position.
4. Make sure filters are clean, return grilles are not obstructed, and supply registers are open.
5. Be sure that furnace flue piping is open and unobstructed.

If the cause for the failure to operate is not obvious, do not attempt to service the furnace yourself. Call a qualified service agency or your gas supplier.

FINAL PROCEDURE

Install Furnace Doors

Install the bottom door first by holding the door flush against the casing and sliding the door down until the door top and bottom flanges rest in the casing channels. Then install the upper door in the same manner.

Finish and Trim

Alcove and Closet Installations may now be finished and trimmed as necessary.

Leave enough gap above upper furnace door to allow it to be lifted and removed.

NOTE

See nameplate for conversion and lighting instructions. Obtain a temperature rise within the ranges specified on the name plate.

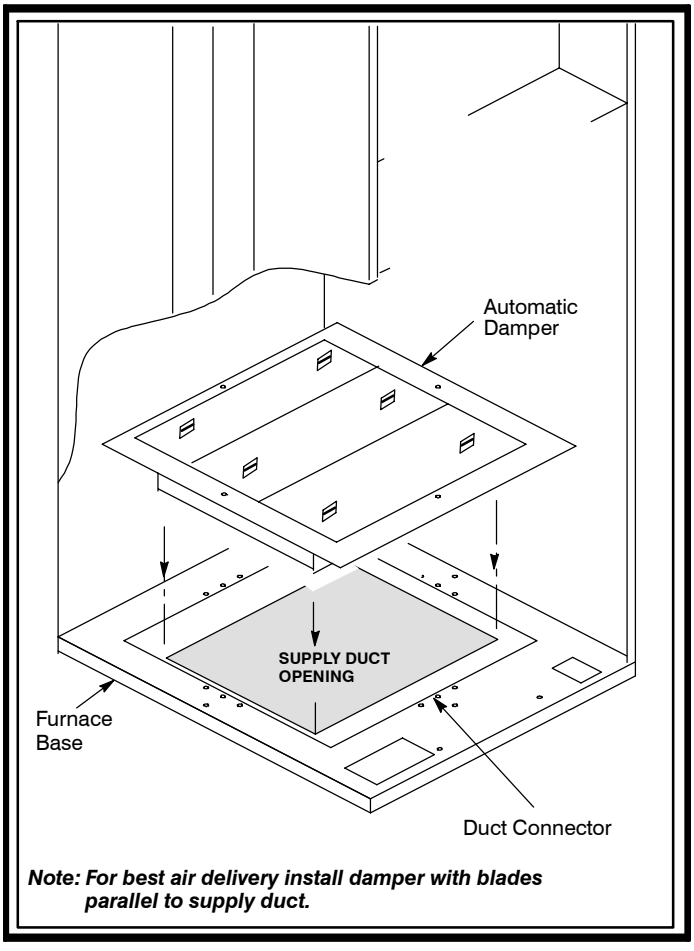


Figure 22 – Anti–Backflow Damper

Furnace and Air Conditioner Installations

In an air conditioner is installed which does not use the blower for air distribution and operates completely independent of the furnace, the thermostat system must have an interlock to prevent the furnace and air conditioner form operating at the same time. This interlock system usually contains a heat–cool switch which must be turned to either HEAT or COOL to activate either heating or cooling operation, or a positive OFF switch on the cooling thermostat.

When used in connection with a cooling unit the furnace shall be installed parallel with or on the upstream side of the cooling unit to avoid condensation in the heat exchanger.

For installations with a parallel flow arrangement, the furnace must be equipped with a damper to prevent cold air from being discharged up around the heat exchanger. Cold air causes condensation inside the exchanger and can cause it to rust out which can allow products of combustion to be circulated into the living area by the furnace blower resulting in possible asphyxiation. An air flow activated automatic damper, P/N 7900–6771, is available from furnace manufacturer.

MANUFACTURED HOUSING DERATION CHART — DGAM, DGAT, DLAS Series

PROPANE

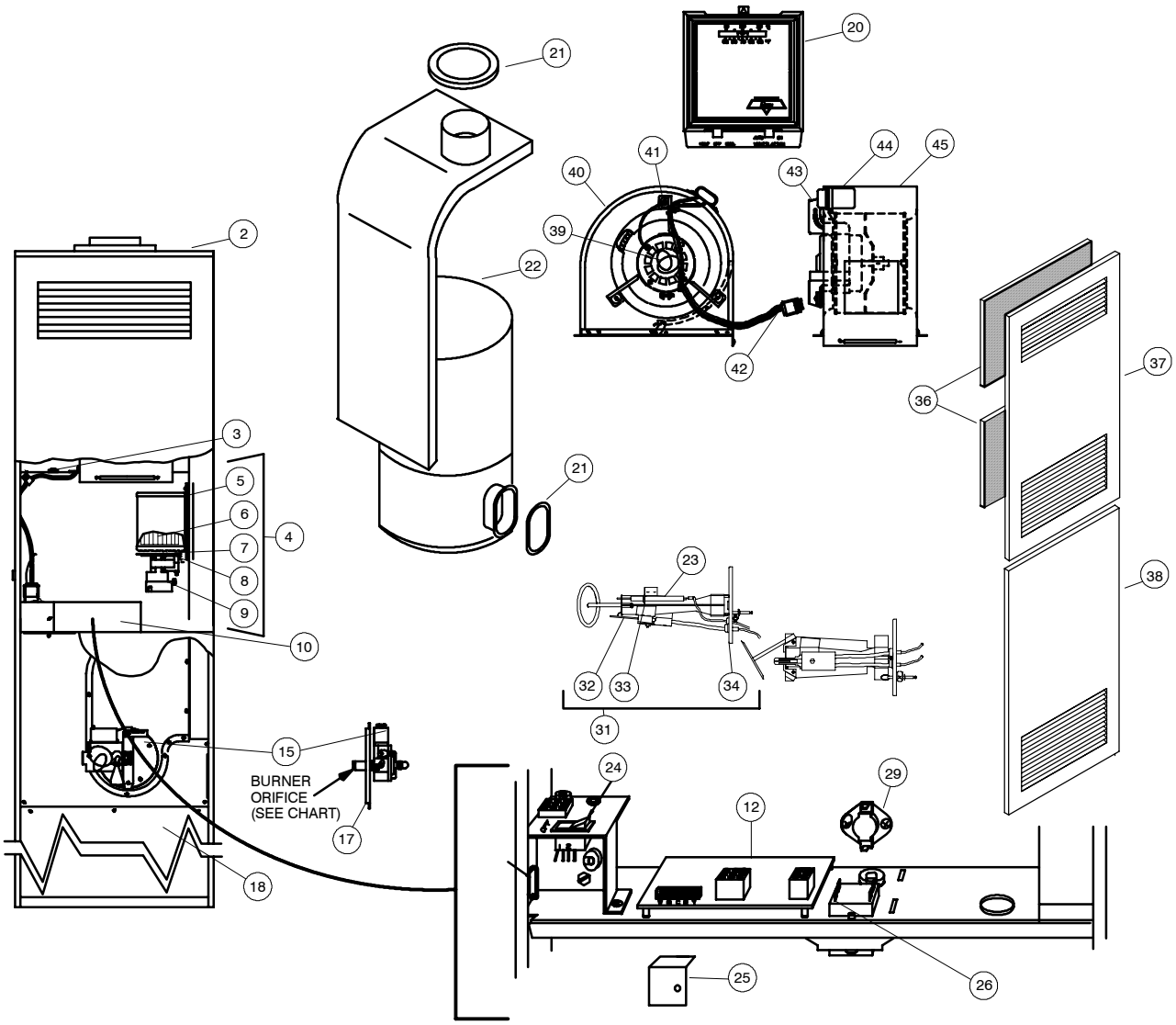
Elevation	56,000 — Input			70,000 — Input			75,000 — Input			90,000 — Input		
	Output	Orifice / Drill	Part #	Output	Orifice / Drill	Part #	Output	Orifice / Drill	Part #	Output	Orifice / Drill	Part #
0–2000 (Factory)	47,000	.082 / 45	9951–0821	57,000	.093 / 42	9951–0931	60,000	.096 / 41	9951–0961	72,000	. 104/ 37	9951–1041
2,000	43,240	.082 / 46	9951–0821	52,440	.093 / 42	9951–0931	55,200	.093 / 42	9951–0931	66,240	.101 / 38	9951–1011
3,000	41,360	.078 / 47	9951–0781	50,160	.089 / 43	9951–0891	52,800	.093 / 42	9951–0931	63,360	.099 / 39	9951–0991
4,000	39,480	.078 / 47	9951–0781	47,880	.089 / 43	9951–0891	50,700	.093 / 42	9951–0931	60,430	.099 / 39	9951–0991
5,000	37,600	.078 / 47	9951–0781	45,600	.089 / 43	9951–0891	48,000	.089 / 43	9951–0891	57,600	.098 / 40	9951–0981
6,000	35,720	.076 / 48	9951–0761	43,320	.086 / 44	9951–0861	45,600	.089 / 43	9951–0891	54,720	.096 / 41	9951–0961
7,000	33,840	.076 / 48	9951–0761	41,040	.086 / 44	9951–0861	43,200	.086 / 44	9951–0861	51,840	.093 / 42	9951–0931
8,000	31,960	.073 / 49	9951–0731	38,760	.082 / 45	9951–0821	40,800	.086 / 44	9951–0861	48,960	.093 / 42	9951–0931
9,000	30,080	.073 / 49	9951–0731	36,480	.082 / 45	9951–0821	38,400	.082 / 45	9951–0821	46,080	.089 / 43	9951–0891
10,000	28,200	.073 / 50	9951–0731	34,200	.078 / 47	9951–0781	36,000	.082 / 46	9951–0821	43,200	.089 / 43	9951–0891

NATURAL GAS

Elevation	56,000 — Input			70,000 — Input			75,000 — Input			90,000 — Input		
	Output	Orifice / Drill	Part #	Output	Orifice / Drill	Part #	Output	Orifice / Drill	Part #	Output	Orifice / Drill	Part #
0–2000 (Factory)	46,000	.128 / 30	9951–1281	56,000	.149 / 25	9951–1491	59,000	.154 / 23	9951–1541	72,000	.177 / 16	9951–1771
2,000	42,320	.128 / 30	9951–1281	51,520	.149 / 25	9951–1491	54,280	.149 / 25	9951–1491	66,240	.173 / 17	9951–1731
3,000	40,480	.120 / 31	9951–1201	49,280	.144 / 27	9951–1441	51,920	.149 / 25	9951–1491	63,360	.169 / 18	9951–1691
4,000	38,640	.120 / 31	9951–1201	47,040	.144 / 27	9951–1441	49,560	.144 / 27	9951–1441	60,480	.169 / 18	9951–1691
5,000	36,800	.120 / 31	9951–1201	44,800	.140 / 28	9951–1401	47,200	.144 / 27	9951–1441	57,600	.166 / 19	9951–1661
6,000	34,960	.120 / 31	9951–1201	42,560	.140 / 28	9951–1401	44,840	.144 / 27	9951–1441	54,720	.166 / 19	9951–1661
7,000	33,120	.116 / 32	9951–1161	40,320	.136 / 29	9951–1361	42,480	.140 / 28	9951–1401	51,840	.161 / 20	9951–1611
8,000	31,280	.116 / 32	9951–1161	38,080	.136 / 29	9951–1361	40,120	.136 / 29	9951–1361	48,960	.157 / 22	9951–1571
9,000	29,440	.113 / 33	9951–1131	35,840	.128 / 30	9951–1281	37,760	.136 / 29	9951–1361	46,080	.154 / 23	9951–1541
10,000	27,600	.110 / 35	9951–1101	33,600	.128 / 30	9951–1281	35,400	.128 / 30	9951–1281	43,200	.149 / 25	9951–1491

Above 2,000 feet: Derate furnace output capacity @ 4% per 1,000 feet of elevation.
Orifice deration = 2% for each 1,000 feet of elevation. High altitude oxygen level deration = 2% per 1000 feet of elevation.
Adjust air shutter for correct flame color.

Repair Parts List for:							
DGAM056BDD	DGAT056BDD	DLAS056BDD	DGAT070BDD	DGAM075BDD	DGAT075BDD	DLAS075BDD	DGAT090BDD



	CODE	USED ON MODEL	NO. REQ.	PART NUMBER	DESCRIPTION
	—	ALL	X	8B246P 8B247P	Enamel (Spray 15 oz. Almond) Enamel (Spray 15 oz. White)
	2	ALL	1	7945A5721	Casing Top
*	3	ALL	1	7990–3591▼	Limit Switch (Upper) (180˚ Manual Reset)
	4	ALL	1	7990–6451	Booster Assembly (Includes Code 5 – 9)
	5	ALL	1	7995A386	Booster Gasket
	6	ALL	1	2900–3601	Impellor ($3\ ^{13}/_{16}$ x $1\ ^{7}/_{8}$ x $^{1}/_{4}$)
	7	ALL	1	2900–147	Mount Plate (Booster Motor)
	8	ALL	1	7990–300	Motor Mount Plate Gasket
*	9	ALL	1	7990–317P	Booster Motor – 3000 RPM

▼ **NOTE:** The 7624A3591 (180˚ Manual Reset) is a designed approved alternate for this limit switch.

DGAM, DGAT, & DLAS SERIES
HSI GAS DOWN FLOW FURNACE

	CODE	USED ON MODEL	NO. REQ.	PART NUMBER	DESCRIPTION
	10	ALL	1	7945–1351/B	Cover (Control Box)
*	12	ALL	1	7990–319P	Integrated Control
*	15	ALL	1	7990–326P▼▼	Gas Valve (24V .5 Amp $^1/_2$" x $^3/_8$")
	16	––	–	–––––––	–––––––––––––
	17	ALL	1	7945–5151/C	Valve Bracket
	18	DGAM,DGAT	1	7956A5201	Panel (Coil Cavity 19 $^{13}/_{16}$"
	19	––	–	–––––––	–––––––––––––––
*	20	ALL	1	7670–368P/A	Thermostat (Adj. Ant.)
	21	ALL	1	7945–3011	Gasket Pkg. (Heat Exchanger)
	22	ALL	1	7995–5751	Heat Exchanger (with Gaskets)
*	23	ALL	1	7975–3881	Remote Sensor
	24	ALL	1	7681–3301	System Switch
	25	ALL	1	7956–1121	Junction Box Cover
*	26	ALL	1	2940A3541	Transformer (115–24V 40VA)
*	29	056 070,075 090	1	7945–3281/A 7970–3281/A 7995–3381/A	Limit Switch (OPEN–140° CLOSE–110°) Limit Switch (OPEN–145° CLOSE–115°) Limit Switch (OPEN–150° CLOSE–120°)
	31	ALL	1	7970–5851/A	Burner Assembly (Less Gas Valve – Includes Codes 32, 33, 34)
*	32	ALL	1	1474–0521	Hot Surface Ignitor
	33	ALL	1	7970–179	Ignitor Shield
	34	ALL	1	7945–1631/A	Mounting Plate (Burner)
	35	––	–	––––––	–––––––––––––
*	36	ALL	1	1214–2511	Filter (16 x 20 x 1 Disposable) (2 Required)
	37	DGAM	1	7975–1561/B	Panel (Upper)(White)
		DLAS, DGAT	1 1	7990–1561/A	Panel (Upper)(White)
	38	DGAM,DGAT	1	7956–1571/A	Panel (Lower)(White)
		DLAS	1	7956–1631/A	Panel (Lower)(White)

BLOWER PARTS

*	39	DGAM	1	1468–220P	Motor
		DGAT, DLAS (057, 070, 075)	1	7966–311P	Motor
		090	1	1468–212P	Motor
	40	All	1	7966A530	Scroll
	41	All	1	2702–4091	Motor Mount(3/Pkg.)
	42	All	1	7680–348	Connector Plug
	43	All	1	7670–6391	Motor Clamp
*	44	090 DGAM	1 1	1499–4461 1499–4471	Run Capacitor Run Capacitor
	45	All	1	1472–2751	Blower Wheel (10 5/8 Dia. x 7 1/8 x 1/2)

BURNER ORIFICE CHART

MODEL	056	070	075	090
Nat.	9951–1281	9951–1491	9951–1541	9951–1771
LP	9951–0821	9951–0931	9951–0961	9951–1041

▼▼ **NOTE:** The 7707–326P is a designed approved alternate for this valve.

NOTE: All parts with three digit suffix numbers are "Special Order" Parts. These parts are subject to factory availability and require extra time for delivery.

***** Suggested Parts Inventory (2% of Units Installed–Minimum 1 each)

Evcon Industries, Inc.
3110 North Mead
P.O. Box 19014
Wichita, KS 67204–9014

1973–106/B Rev.5 (4/97) P.I.

USER'S INFORMATION MANUAL
for
Gas Downflow Furnace

NOTICE TO OWNER / USER – THIS BOOKLET CONTAINS THE OPERATING INSTRUCTIONS AND OTHER RELATED INFORMATION FOR YOUR FURNACE AND SHOULD BE RETAINED FOR FUTURE REFERENCE.

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**

- **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: If not installed, operated, and maintained in accordance with the manufacturer's instructions, this product could expose you to substances in fuel or from fuel combustion which are known to the State of California to cause cancer, birth defects or other reproductive harm. Also, operation, installation and servicing of this product could expose you to airborne particles of glasswool fibers known to the State of California to cause cancer through inhalation.

TABLE OF CONTENTS

LIST OF FIGURES

Your furnace will give you all the comforts of complete winter air conditioning – heating, circulation, filtering – you have control and yet the furnace is as automatic as you desire it to be.

If you will observe the few operating and maintenance instructions in this booklet, this high efficiency forced warm air furnace will give you many years of dependable service.

WARNING

Failure to observe the following safety precautions could cause fire, explosion, or asphyxiation.

NOTE

The words “Shall” or Must” indicate a requirement which is essential to satisfactory and safe product performance.

The words “Should” or “May” indicate a recommendation or advice which is not essential and not required but which may be useful or helpful.

SAFETY PRECAUTIONS

For your safety – Do not store or use flammable liquids, vapors, or materials in the immediate area near the furnace or other heating appliance. Do not store brooms, mops, or equipment or materials near the furnace in any confined space which may be around or in front of the furnace.

WARNING

Adequate ventilation and combustion air must be provided to insure satisfactory and safe operation of the furnace. Air openings in casing front panel and vestibule top panel must not be obstructed. Any openings into the furnace closet or confined room in which the furnace is located, for the entrance of combustion and ventilation air must be kept open and unobstructed. failure to observe these requirements could result in asphyxiation.

Do not use this furnace if any part has been under water. Immediately call a qualified service technician to inspect the furnace and to replace any part of the control system and any gas control which has been under water.

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.

Do not store or use halogen emitting substances in the vicinity of this appliance. Such substances include chlorine based cleaners and swimming pool chemicals, water softening chemicals, de–icing salts and chemicals, cleaning solvents such as carbon tetrachloride or perchloroethylene, halogen type refrigerants, printing inks, paint and paint removers, varnishes, hydrochloric acid, cements and glues, and masonry acid washing materials.

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer, service agency or the gas supplier.

DANGER

Never attempt to modify this furnace. Fire, explosion, or asphyxiation may result. If malfunction occurs, obtain the assistance of a qualified service agent.

WARRANTY AND RESPONSIBILITIES

It is the sole responsibility of the home owner to make certain that the gas furnace has been correctly set up and converted to the proper fuel (Propane or Natural gas) and adjusted to operate properly.

The manufacturer warrants the furnace to be free from defects in material or workmanship for the stated time in the warranty agreement (see warranty certificate packed with the furnace).

However, the manufacturer will not be responsible for any repair costs to correct problems due to improper set–up, improper installation, furnace adjustments, improper operating procedure by the user, etc.

Some specific examples of service calls which cannot be included in warranty payments are:

1. Converting the furnace to use another type of gas.
2. Correcting faulty duct work in the home.
3. Correcting wiring problems in the electrical circuit to the furnace.
4. Resetting circuit breakers or other switches.
5. Adjusting the burner air shutter or service calls made to correct problems caused by improper air adjustment.
6. Correcting problems caused by improper gas supply pressure to the furnace.
7. Instructional training on how to light and operate furnace.
8. Furnace problems caused by installation of air conditioner, heat pump, or other air quality device which is not approved.
9. Problems caused by improper installation of the furnace flue assembly (roof jack).
10. Adding a roof jack extension because of unusual wind conditions.
11. Adjusting or calibrating the thermostat.

You should establish a **firm** understanding of these responsibilities with your manufactured housing dealer, service company or gas supplier so there will be no misunderstanding at a later time.

SEQUENCE OF OPERATION

This furnace is equipped with an electronic control system which automatically supervises burner and fan operation. A green indicator light displays during normal operation. This indicator light also informs the home owner when certain basic services are needed. In response to a call for heat by the room thermostat, the burners are lighted by a hot glowing ignitor at the beginning of each operation cycle. The burner will continue to operate until the thermostat is satisfied at which time all burner flame is extinguished. During the off cycle no gas is consumed. With the room thermostat set below room temperature, and with the electrical power and gas supply to the furnace on, the normal sequence of operation is as follows:

1. When the room temperature falls below the setting of the room thermostat, the thermostat energizes the furnace control board.
2. When the furnace control board is activated, the combustion air blower is turned on.
3. As the combustion air blower increases in speed, the contacts of the centrifugal switch will close and complete the electrical circuit to the gas valve.
4. During the next 40 to 50 seconds, the combustion air blower will bring fresh air into the heat exchanger and the ignitor will begin to glow. At the end of this period, the gas valve will open and the burners will light.
5. After the burners light, a separate sensor acts as a flame probe to check for the presence of flame. As long as flame is present, the system will monitor it and hold the gas valve open.
6. If the burners fail to light within 6–8 seconds after the gas valve opens, the gas valve will close and the ignitor will be turned off. After a short pause, the system will recycle and try again for ignition. If the burners fail to light after three tries, the ignition system will lock out. The system will remain in lock–out mode for a period of one hour, then the furnace will try for ignition again.
7. The lapsed time from the moment the room thermostat closes to when the burners light may be 45–60 seconds. This delay is caused by
   a. the time required for the ignitor to heat up and
   b. the time required for fresh air to be brought into the heat exchanger.
8. 90 to 120 seconds after the burners have lighted, the fan switch will close and the furnace air circulation blower will run.
9. When room thermostat is satisfied, the circuit to the furnace control board is opened. The circuit to the combustion air blower and the gas valve is opened and the burners are extinguished. Then the furnace control board will keep the circulating blower running for a fixed period of time to allow additional heat to be drawn from the heat exchanger.
10. Diagnostic Light

    If furnace does not maintain home temperature as set, check the light indicator, located behind the upper front door of the furnace.

    The electronic furnace control is equipped with a diagnostic light which flashes when there is a service problem. The diagnostic codes are:

NO Flashes (steady green):	Normal Operation.
ONE flash:	Ignition Failure.
TWO flashes:	Centrifugal Switch Stuck Closed.
THREE flashes:	Centrifugal Switch Stuck Open.
FOUR flashes:	Limit Cycling, may indicate that return air filter needs to be cleaned.
FIVE flashes:	Gas Valve Energized with No Call for Heat
SIX flashes:	Wrong Polarity Wired to Furnace Power.

If a problem is indicated, contact your authorized service person.

THE FURNACE CONTROLS AND THEIR FUNCTION

System Switch – this system switch turns **ON** or **OFF** the 120 volt electrical circuit that powers the furnace controls and the blower motor. The system switch must be turned **ON** for the furnace to operate. Turn the switch to **OFF** when oiling the blower motor, cleaning the blower, etc.

Limit Control – this furnace is protected by two (2) high temperature limit switches. The lower limit switch is an automatic reset type.

IMPORTANT

THE UPPER LIMIT SWITCH NEAR LEFT SIDE OF BLOWER IS A MANUAL RESET TYPE LIMIT SWITCH. (See Figure 1). IF BURNER DOES NOT FUNCTION, TURN SYSTEM SWITCH TO *OFF* AND PUSH RESET BUTTON IN CENTER OF LIMIT SWITCH.

If the upper limit switch trips again soon after resetting, turn the furnace System Switch to the **OFF** position and call your authorized service technician.

CAUTION

THE CHUTE TO LEFT OF BLOWER IS HOT. USE CARE WHEN RESETTING LIMIT SWITCH TO AVOID BURNS TO HAND AND ARM.

Gas Valve – gas valves are 100% shut–off type and will fail safe if for some reason the gas is turned off or the pilot goes out. They are also of the modulating or "**step--open**" type which means they open to a "**low fire**" position and after a few seconds "**step--open**" to **"high fire**".

1. THIS APPLIANCE DOES NOT HAVE A PILOT. IT IS EQUIPPED WITH AN IGNITION DEVICE WHICH AUTOMATICALLY LIGHTS THE BURNERS. DO NOT TRY TO LIGHT THE BURNERS BY HAND.
2. BEFORE OPERATING SMELL ALL AROUND THE APPLIANCE AREA FOR GAS. BE SURE TO SMELL NEXT TO THE FLOOR BECAUSE SOME GAS IS HEAVIER THAN AIR AND WILL SETTLE ON THE FLOOR.

What To Do If You Smell Gas

- Do not try to light any appliance.
- Do not touch any electric 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.

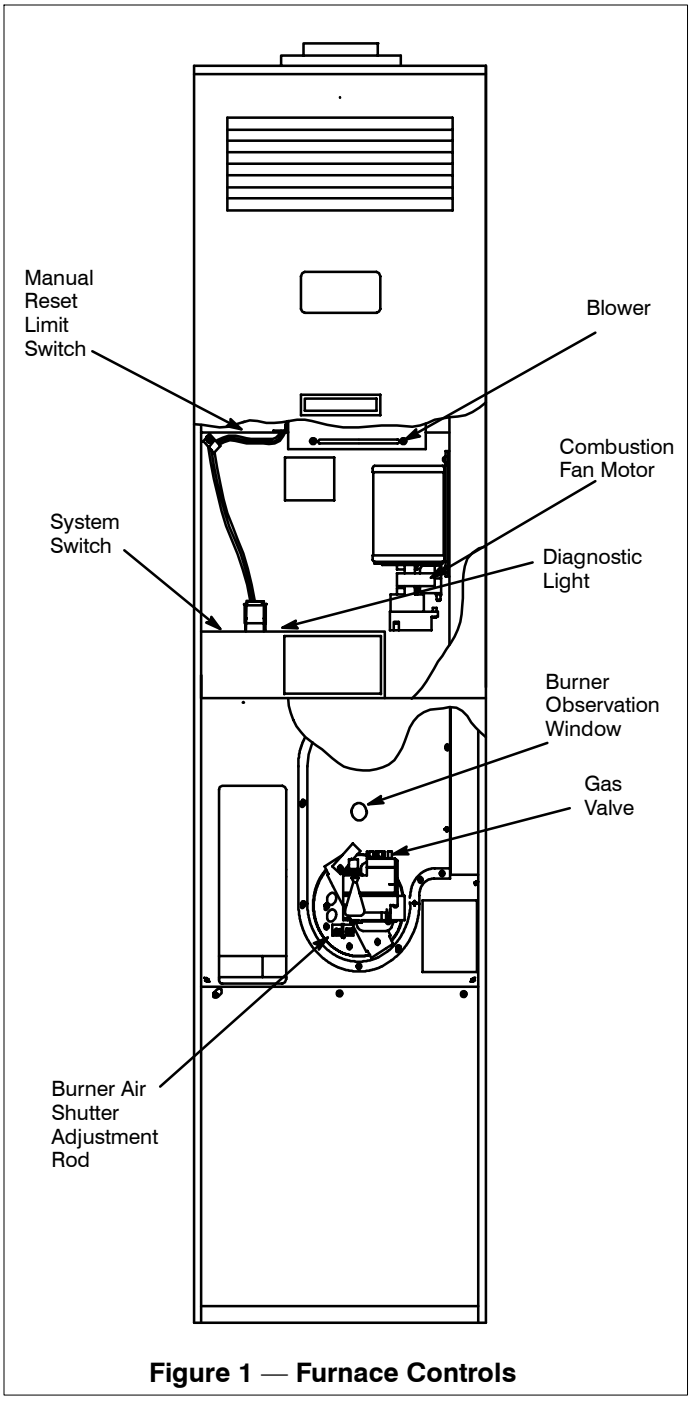


Figure 1 — Furnace Controls

3. USE ONLY YOUR HAND TO TURN THE GAS CONTROL KNOB. NEVER USE TOOLS. IF THE KNOB WILL NOT TURN BY HAND, DON'T TRY TO REPAIR IT, CALL A QUALIFIED SERVICE TECHNICIAN. FORCE OR ATTEMPTED REPAIR MAY RESULT IN A FIRE OR EXPLOSION.
4. DO NOT USE THIS APPLIANCE IF ANY PART HAS BEEN UNDER WATER. IMMEDIATELY CALL A QUALIFIED SERVICE TECHNICIAN TO INSPECT THE APPLIANCE AND TO REPLACE ANY PART OF THE CONTROL SYSTEM AND ANY GAS CONTROL WHICH HAS BEEN UNDER WATER.

OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information listed above.
2. Set the thermostat to the lowest setting, or **OFF**.
3. Turn off all electric power to the furnace.
4. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burners. **Do not** try to light the burners by hand.
5. Remove upper door panel.
6. Move gas valve control lever to **OFF**. See Figure 2.
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!** Follow Step 2., in the safety information above. If you don't smell gas, go to the next step.
8. Move gas control lever to **ON**.
9. Replace upper door panel.
10. Turn on all electric power to the furnace.
11. Set thermostat to desired setting.

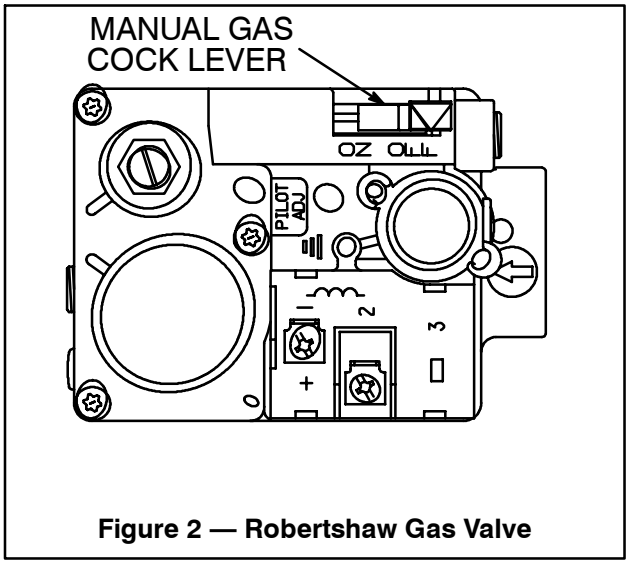


Figure 2 — Robertshaw Gas Valve

Gas Shutoff

The furnace gas valve is equipped with a manual gas shutoff. Figure 2 shows the location of the manual shutoff valve. To turn off gas to the furnace, move the lever or knob on the gas valve to the **OFF** position. It may be necessary to depress the knob or lever in order to move it to the **OFF** position.

The furnace installation should also have a manual shutoff valve in the gas piping to the furnace, similar to what is shown in Figure 3. To turn off the gas to the furnace, use a wrench and turn the knob or lever so that it is pointing 90 degrees from the gas pipe, as shown in Figure 3.

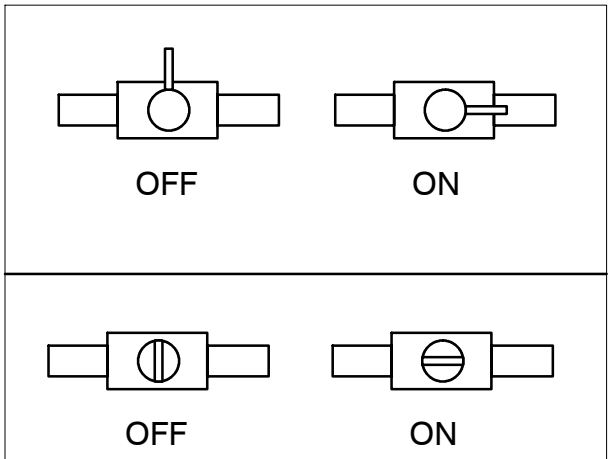


Figure 3 — Manual Gas Shutoff Valve

Thermostat

Set the room thermostat at the desired room temperature. Greatest comfort will be achieved when the setting is not changed frequently.

For energy conservation and economy it is recommended that the thermostat be set at 68°for heating and 80°for cooling.

For Heating with Air Conditioning Applications – Set HEAT/COOL switch to HEAT position and set FAN switch to AUTO position.

Gas Supply

CAUTION

Before placing furnace in service, it must be checked to make sure it is equipped for the type of gas being used. The burner flame must also be observed and adjusted if necessary. Failure to observe this caution may result in unsafe operation, explosion, and/or fire or asphyxiation. See following sections "Gas Supply" and "Combustion Air".

The gas supply to your home will either be Natural Gas or Propane gas (bottle gas). Your furnace will be factory equipped to operate on only one of these two different gases.

A small metal tag secured to the furnace next to the gas valve will specify the type of gas your furnace is equipped to use.

If the gas is different from that specified on the metal tag, the furnace can be converted by following the instructions on the furnace safety label inside lower front panel. Parts for conversion are contained in the small cloth bag attached to the gas valve. Be sure the proper size orifice is used, as specified on the furnace name plate.

CAUTION

The furnace must be converted by a qualified technician. Improper conversion can cause unsafe operation, explosion, and/or fire or asphyxiation.

Natural Gas Operation: The furnace is designed for 7" W.C. inlet pressure. Pressure is reduced to 3 1/2" W.C. by the pressure regulator in the gas valve.

Propane Gas Operation: Inlet pressure to the gas valve must be 11" W.C. When properly converted to Propane gas, the pressure is regulated at 10" W.C.

CAUTION

If the gas input to the furnace is too great because of excessive gas pressure, wrong size orifice, high altitude, etc., the burner flame will be sooty and may produce carbon monoxide, which could result in unsafe operation, explosion, and/or fire or asphyxiation.

Never remove or block open the burner observation cover on the furnace. To do so may cause carbon monoxide to be drawn into the living space and may cause asphyxiation.

Observing Burner Operation

1. Observe burner to make sure it ignites. Observe color of flame. On natural gas the flame will burn blue with appreciably yellow tips. On Propane gas a yellow flame may be expected. If flame is not the proper color call a qualified serviceman for service. See Figure 4 and Figure 5.
2. Let furnace heat until blower cycles on.
3. Turn thermostat down.
4. Observe burner to make sure it shuts off.
5. Let the furnace cool and blower cycle off.

WARNING

Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the furnace and allow burner to run until furnace cools down and blower shuts off before shutting off the electrical supply.

If any abnormalities are observed when checking for correct operation, such as burner failing to ignite or to turn off, sooty flame, etc., call your nearest authorized service technician as shown in the Service Center List included in the home owner envelope with the furnace.

Combustion Air

In order for the burner flame to burn efficiently, it must receive adequate combustion air.

The amount of combustion air can be changed by operating the combustion air adjustment rod located beneath the gas valve. See Figure 1.

The adjustment rod is set at an "average" position at the factory and may be properly set for many applications.

However, the amount of combustion air required will vary depending on altitude, actual BTU. content of the gas being used, gas pressure, conversion to another gas, and other variable factors.

Therefore, it is essential that the burner flame be observed and any necessary adjustments are made before the furnace is put into service at the final home site. Adjusting the burner air is considered part of the normal home set–up procedure and is the responsibility of either the home seller or buyer, depending on their agreement. Adjustments of this type are not covered by the warranty.

CAUTION

Combustion air adjustments must be made only by a qualified technician. Improper air adjustment may cause unsafe operation, explosion or asphyxiation.

To adjust the combustion air:

1. To light and operate furnace see label inside lower furnace door.
2. Allow the burner to burn for about 1 MINUTE.
3. Look through the observation window and observe the appearance of the flame.
4. On natural gas, the base of the flame should be blue but the tips of the flame will be yellow. See Figure 4.
5. On Propane gas, almost all of the flame will be yellow although some blue should still be present at the base of the flame next to the end of the burner. See Figure 5.
6. If the flame is too yellow, the combustion air should be increased. If the flame is excessively blue (no yellow) the combustion air should be decreased.
7. To adjust the combustion air, loosen the lock screw holding the combustion air rod in place. Push in on the rod to increase the combustion air. Pull out on the combustion air rod to decrease the combustion air. Tighten lock screw after adjustment is made. Do not completely close air damper at any time. Complete closure of air damper to burner will result in improper operation. See caution above.

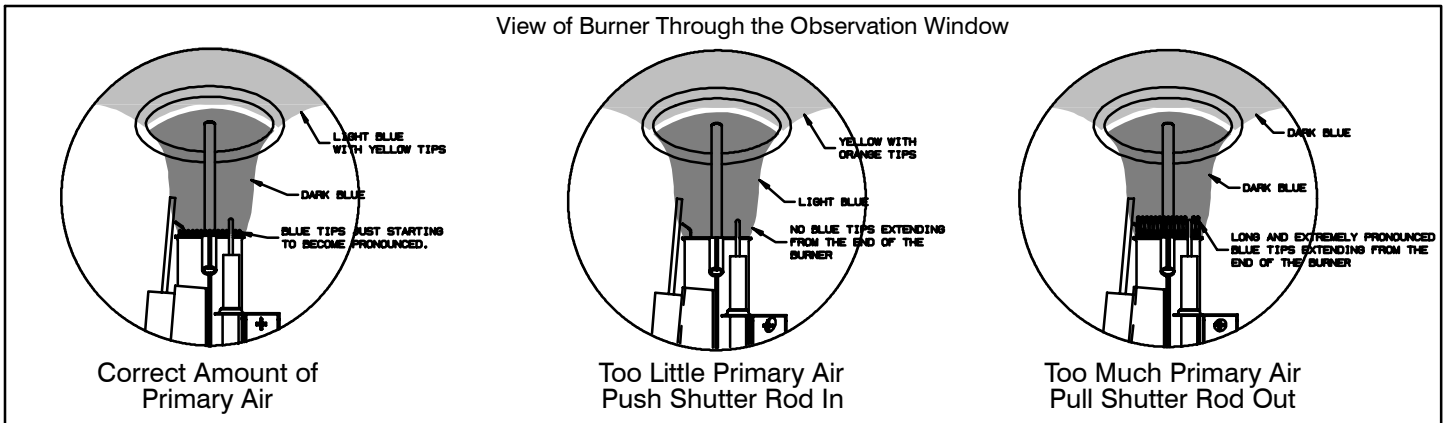


Figure 4 — Natural Gas Flame Appearance

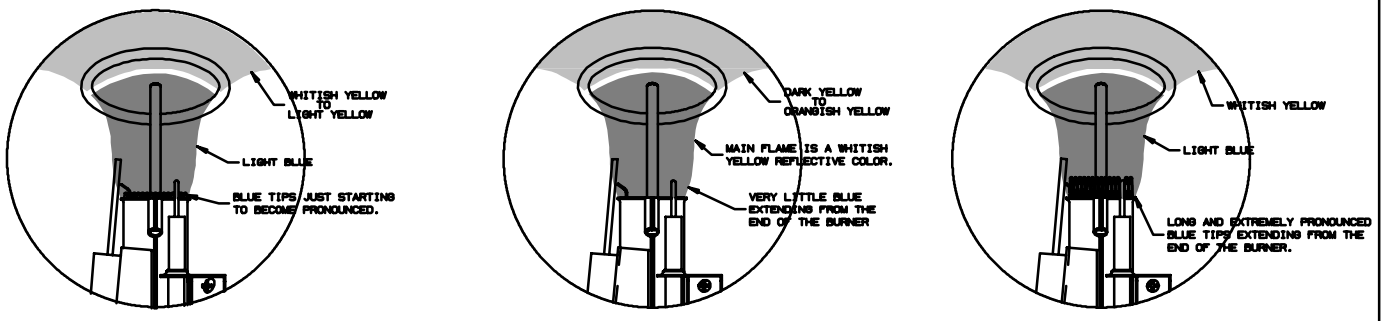


Figure 5 — Propane Gas Flame Appearance

If Furnace Fails to Operate Properly

1. Check setting of thermostat – and position of HEAT/ COOL switch if air conditioning is installed. If a set–back type thermostat is employed be sure that the thermostat is in the correct operating mode.
2. Check to see that electrical power is ON.
3. Check to see that the knob on the gas control valve is in the full ON position.
4. Make sure filters are clean, return grilles are not obstructed, and supply registers are open.
5. Be sure that furnace flue piping is open and unobstructed.

If the cause for the failure to operate is not obvious, do not attempt to service the furnace yourself. Call a qualified service agency or your gas supplier.

PERIODIC INSPECTION AND MAINTENANCE BY HOMEOWNER

It is recommended that the homeowner or user make an inspection of the furnace at least every 90 days, or more often if desired. It is also recommended that a qualified service agency inspect the furnace before each operating season the furnace is used, both heating and air conditioning, and at any time that there is an indication of malfunction. The owner/user should not attempt to disassemble the furnace unless experienced and qualified to do so.

CAUTION

FOR SAFETY -- Turn off electrical power to furnace before performing service such as cleaning filters.

The furnace installation should be examined to determine that:

a. All flue product carrying areas external to the furnace (chimney, vent connector, etc.) are clear and free of obstructions,

b. The physical support of the furnace is sound without sagging and the furnace is level, and

c. There are no obvious signs of deterioration of the furnace.

Filters

It is very important that filters in your furnace or air conditioning system be cleaned frequently or replaced when necessary. Clean filters not only provide added comfort and a more healthful environment, but also allow the system to operate more efficiently. Check filters every two or three weeks. Your furnace is equipped with a permanent type filter which need not be replaced provided it is cleaned frequently. The permanent filter may be washed in a mild solution of detergent and water and then rinsed thoroughly with clear water. If the pores of the filter media become clogged with dirt or lint which cannot be washed out, or if the filter becomes damaged, it must be replaced. A re-

placement filter should be of the permanent type and be of the same size as the old filter.

Flue Piping

Inspect the flue piping connection at the furnace and the connection of the individual sections to ensure that pipe joints have not become disengaged and that there are no openings which could allow leakage of products of combustion. Inspect the termination of the flue outside the structure and look for any indication of carbon or soot streaks. The presence of any soot would indicate a malfunction and the cause must be determined and corrected.

Motor Lubrication

The circulating air blower motor and vent blower are permanently lubricated and do not require periodic lubrication.

Return Air

On some closet installations, the return air opening to the furnace may be on the floor, and/or on the door and/or on the side wall of the closet. The upper grille on the front of the furnace admits return air to the blower. Return air must be provided back to the circulating blower in order to provide air distribution.

IMPORTANT NOTICE

Do not obstruct these openings including the grille on the furnace. To do so will cause the furnace to activate the high limit and shut down or it may cause asphyxiation.

This equipment must be serviced only by qualified individuals specially trained and experienced in servicing of this type equipment and related system components, such as duct systems, air conditioning, etc. Installation and service personnel are required to be licensed in some areas. Persons not qualified should not attempt to service this equipment.

Your Serviceman

Your furnace's best friend is your qualified serviceman. If the unit gives any indication of improper operation, call your serviceman. If the serviceman is allowed to perform the normal routine care of your furnace, he can many times detect potential difficulties and make corrections before trouble develops. Preventative maintenance of this type will allow you to operate the unit with a minimum of concern, and at the same time will pay for itself in added years of comfort.

When You Call For Service Assistance

Very often time can be saved if you will give the service agency the MODEL and SERIAL NUMBER of your furnace. This will enable him to determine the specific components used, and perhaps to better identify the possible problem and be better prepared if a service call is required.

To Contact Your Serviceman
(fill in)
COMPANY:_____

ADDRESS:_____

TELEPHONE:_____

While you are away

Your furnace is equipped with a safety device which will shut off the supply of gas to the burner in case of malfunction. For this reason it is never practical to assume that the furnace will operate unattended for a long period of time, especially if there is a possibility of damage to your property because of freezing. So, if you plan to be away from home, arrange for someone to check your house every day.

SEASONAL SERVICE INFORMATION

During extreme cold weather, ice may form on the furnace roof jack crown. Small amounts of ice forming on the roof jack will present no problem to proper furnace operation. However, excessive ice formation could restrict the combustion air supply to the burner causing inefficient burner operation and pilot outage.

When the temperature is very cold, near zero or below, it is recommended that the roof jack be inspected every day or more frequently if required. If ice has started to collect on the roof jack crown, it should be carefully broken off.

All appliances need maintenance by serviceman at the beginning of each heating season. Call your nearest authorized service technician to:

1. Clean filters. Clean all lint and dust from around furnace.
2. Remove fan and clean all dust and lint from unit with stiff bristle brush.
3. Inspect combustion chamber, the transition into the blower compartment, flue collar, and roof jack.
4. Check the gas valve and line connections for leaks.
5. Make any adjustments necessary for good operation.

NOTE

The coil panel provides a good removable access for inspecting inside the furnace casing. Smoke or reflected light inside the casing indicates the presence of leaks in the heat exchanger.

WARNING

Use of furnace or air conditioning components that are not included in the Underwriter's Laboratories certification of this appliance may create a hazard, will invalidate the certification, and will in many states make installation illegal. UL listed air conditioning components are specified on the furnace label.

IMPORTANT

☞ As an owner of a new furnace you need to know the following information:

If your home is located at an elevation above 2,000 feet, the burner orifice in your furnace will need to be derated. Please contact the nearest authorized Service Center to have this procedure performed properly.

Your dealer or gas company may have already applied the proper deration for your unit. If so, they should be able to advise you as such. If not, you need to have the deration made to insure continued use of your furnace. Not having the unit derated properly will eventually render the furnace inoperable.

Deration of the orifice for furnaces installed in homes at elevations above 2,000 feet is not covered by the warranty. This procedure is considered a part of the installation process and is required to make the furnace operate properly.

These furnaces are shipped from the factory with a natural gas orifice. If you will be operating this furnace on LP (liquid propane gas), it will also be necessary to have the furnace converted. The correct LP orifice is supplied with the furnace to allow operation at elevations below 2,000 feet. If the furnace will be operating on LP gas at elevations above 2,000 feet, the orifice supplied will be too large to allow proper operation. You should contact your LP supplier for assistance in getting the derated orifice installed.

We hope you follow these instructions and enjoy many years of trouble free service. If you have any questions, please feel free to contact the technical assistance hot line at 316/832–6450.

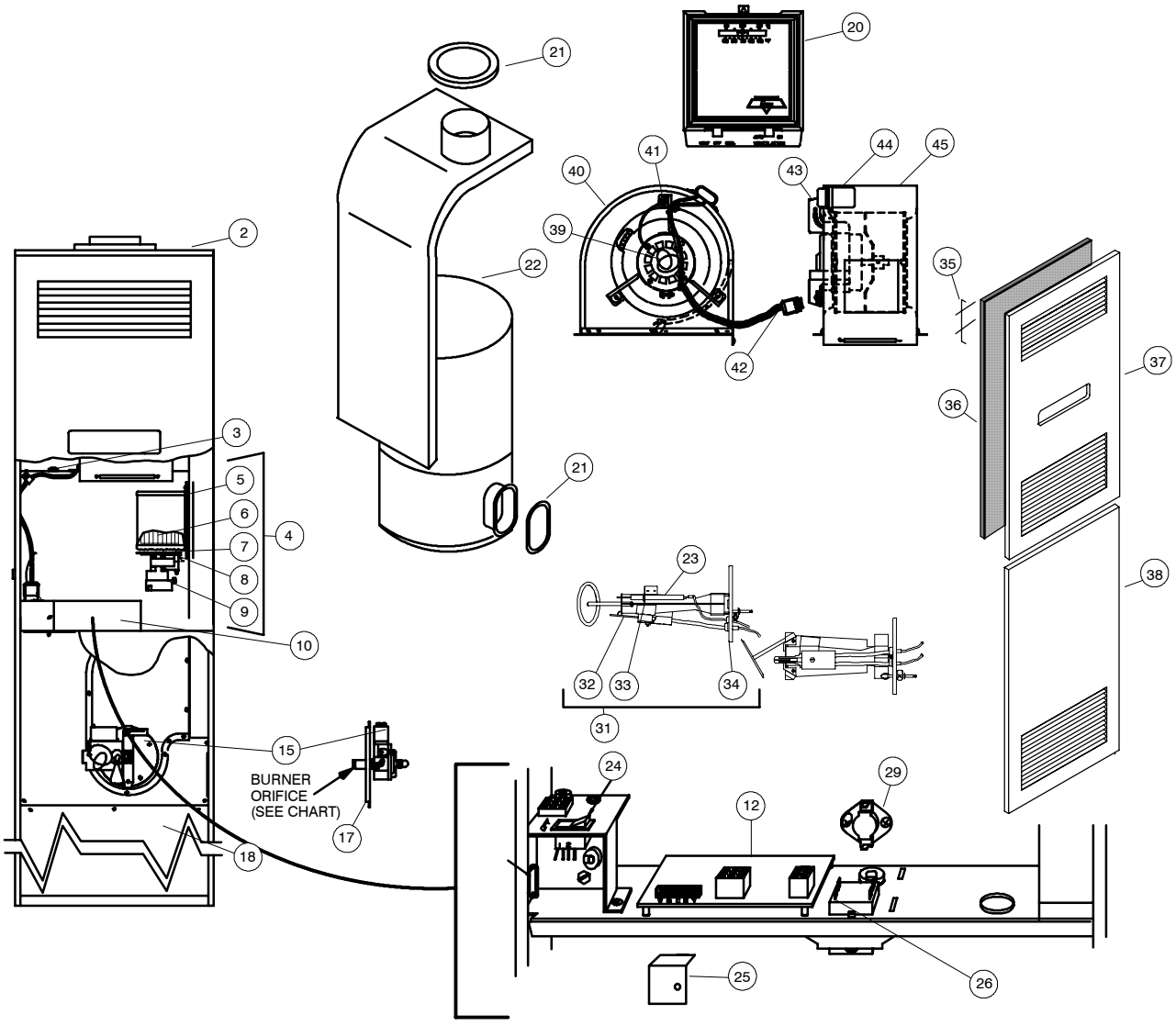
Evcon Industries, Inc.

3110 North Mead
P.O. Box 19014
Wichita, KS 67204–9014

1973–105/A Rev.1 (6/95) P.I.
Evcon

LITHO IN U.S.A.

Repair Parts List for:							
DGAM056BDD	DGAT056BDD	DLAS056BDD	DGAT070BDD	DGAM075BDD	DGAT075BDD	DLAS075BDD	DGAT090BDD



	CODE	USED ON MODEL	NO. REQ.	PART NUMBER	DESCRIPTION	VENDOR	
	—	ALL	X	8B246P 8B2471	Enamel (Spray 15 oz. Almond) Enamel (Spray 15 oz. White)		
	2	ALL	1	7945A5721	Casing Top		
*	3	ALL	1	7990–3591▼	Limit Switch (Upper) (180˚ Automatic Reset)		
	4	ALL	1	7990–6451	Booster Assembly (Includes Code 5 – 9)		
	5	ALL	1	7995A386	Booster Gasket		
	6	ALL	1	2900–3601	Impellor ($3\ ^{13}/_{16}$ x $1\ ^{7}/_{8}$ x $^{1}/_{4}$)		
	7	ALL	1	2900–147	Mount Plate (Booster Motor)		
	8	ALL	1	7990–300	Motor Mount Plate Gasket		
*	9	ALL	1	7990–317P	Booster Motor – 3000 RPM	Fasco	#7102–2187
	10	ALL	1	7945–1351/B	Cover (Control Box)		
*	12	056,070 075,090	1 1	7956–319P 7990–319P	Integrated Control Integrated Control		
*	15	ALL	1	7990–326P▼▼	Gas Valve (24V .5 Amp $^{1}/_{2}$" x $^{3}/_{8}$")	RS	#7C5–C7F–026
	16	––	–	–––––––	–––––––––––		

▼ **NOTE:** The 7624A3591 (180˚ Manual Reset) is a designed approved alternate for this limit switch.

▼▼ **NOTE:** The 7707–326P is a designed approved alternate for this valve.

DGAM, DGAT, & DLAS SERIES
HSI GAS DOWN FLOW FURNACE

	CODE	USED ON MODEL	NO. REQ.	PART NUMBER	DESCRIPTION	VENDOR	
	17	ALL	1	7945–5151/C	Valve Bracket		
	18	DGAM,DGAT	1	7956A5201	Panel (Coil Cavity 19 $^{13}/_{16}$"		
	19	––	–	–––––––	–––––––––––––––		
*	20	ALL	1	7670–368P/A	Thermostat (Adj. Ant.)	RS	#65A–943–462
	21	ALL	1	7945–3011	Gasket Pkg. (Heat Exchanger)		
	22	ALL	1	7995–5751	Heat Exchanger (with Gaskets)		
*	23	ALL	1	7975–3881	Remote Sensor		
	24	ALL	1	7681–3301	System Switch	Carling	#RC901–RB
	25	ALL	1	7956–1121	Junction Box Cover		
*	26	ALL	1	2940A3541	Transformer (115–24V 40VA)		
*	29	056 070,075 090	1	7945–3281 7970–3281 7995–3381	Limit Switch (OPEN–140° CLOSE–110°) Limit Switch (OPEN–145° CLOSE–115°) Limit Switch (OPEN–150° CLOSE–120°)		
	31	ALL	1	7970–5851/A	Burner Assembly (Less Gas Valve – Includes Codes 32, 33, 34)		
*	32	ALL	1	1474–0521	Hot Surface Ignitor	Norton	#201N(W)
	33	ALL	1	7970–179	Ignitor Shield		
	34	ALL	1	7945–1631/A	Mounting Plate (Burner)		
	35	ALL		7670–3451	Filter Retainer (Pk'd. 2) – S/N 960623003 & Below		
*	36	ALL ALL	1 1	7660–3401 1214–2511	Filter (19 $^{3}/_{8}$ x 35 $^{3}/_{4}$ x $^{1}/_{4}$) – S/N 960623003 & Below Filter (16 x 20 x 1) (2 Required) – S/N 960623004 & Above		
	37	DGAM DGAM DLAS, DGAT DLAS, DGAT	1 1 1 1	7975–1561/A 7975–1561/B 7990–1561 7990–1561/A	Panel (Upper)(Almond) Panel (Upper)(White) – S/N 960623004 & Above Panel (Upper)(Almond) Panel (Upper)(White) – S/N 960623004 & Above		
	38	DGAM,DGAT DGAM,DGAT DLAS DLAS	1 1 1 1	7956–1571 7956–1571/A 7956–1631 7956–1631/A	Panel (Lower)(Almond) Panel (Lower)(White) – S/N 960623004 & Above Panel (Lower)(Almond) Panel (Lower)(White) – S/N 960623004 & Above		

BLOWER PARTS

*	39	DGAM	1	1468–220P	Motor		
		DGAT, DLAS (057, 070, 075)	1	7966–311P	Motor		
		090	1	1468–212P	Motor		
	40	All	1	7966A530	Scroll		
	41	All	1	2702–4091	Motor Mount(3/Pkg.)		
	42	All	1	7680–348	Connector Plug		
	43	All	1	7670–6391	Motor Clamp		
*	44	090 DGAM	1 1	1499–4461 1499–4471	Run Capacitor Run Capacitor		
	45	All	1	1472–2751	Blower Wheel (10 5/8 Dia. x 7 1/8 x 1/2)	TORIN LAU MORR	#CM1020–704–5 #027855–10 #03–42001–0

BURNER ORIFICE CHART

MODEL	056	070	075	090
Nat.	9951–1281	9951–1491	9951–1541	9951–1771
LP	9951–0821	9951–0931	9951–0961	9951–1041

NOTE: All parts with three digit suffix numbers are "Special Order" Parts. These parts are subject to factory availability and require extra time for delivery.

***** Suggested Parts Inventory (2% of Units Installed–Minimum 1 each)