USERS INFORMATION MANUAL

DOWNFLOW ONLY
SINGLE STAGE GAS FIRED FURNACE
MODELS: G18D SERIES

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

For installation only in HUD manufactured homes per Construction Safety 24 CFR Part 3280

LIST OF SECTIONS - USERS INFORMATION MANUAL

LIST OF SECTIONS -SERVICE AND MAINTENANCE MANUAL

LIST OF FIGURES

LIST OF TABLES

CONTACT INFORMATION

Manufactured and Distributed by:

Mortex Products Inc
501 Terminal Rd
Fort Worth, TX 76106

www.mortx.com

The following list includes important facts and information regarding this gas furnace.

1. Furnace is rated at 115 VAC at 60 Hz.
2. Furnace is available in "Heating Only" or "A/C Ready" configurations.
3. Furnace is designed for use with cooling only or heat pump systems when a cooling coil cabinet and indoor coil is used. A/C ready models are furnished with a cooling coil cabinet. The appropriate indoor coil must be selected and ordered separately.
4. A hold-down strap is furnished with furnace.
5. This furnace is designed for downflow applications only.
6. This furnace must not be operated with the control box cover or front access panels removed.
7. This furnace is certified by ETL for use in the United States only.

SAVE THIS MANUAL FOR FUTURE REFERENCE

⚠ WARNING

FIRE AND ELECRTRICAL HAZARD

Failure to follow the safety warnings in this manual and in the furnace labels could result in a fire or electrical hazard which may cause property damage, personal injury, or death.

- **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 gas appliance.**
- **Do not touch any electrical switch.**
- **Do not use any phone in your building, including cell phones.**
- **Leave 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.**
- **Instruction and service must be performed by aqualified installer, service agency or gas supplier.**

SECTION 1: SAFETY

This is a safety alert symbol. When this symbol is seen on labels or in manuals, be alert to the potential for personal injury. Understand and pay particular attention to the signal words **DANGER, WARNING, or CAUTION.**

DANGER: Indicates an imminently hazardous situation, which if not avoided, **will result in death or serious injury.**
WARNING: Indicates a potentially hazardous situation, which if not avoided, **could result in death or serious injury.**
CAUTION: Indicates a potentially hazardous situation, which if not avoided, **may result in minor or moderate injury.** It is also used to alert against unsafe practices and hazards involving property damage.

Homeowners and furnace users must read all instructions in this manual before performing any maintenance on this furnace. This manual must be saved for future reference.

Safety Requirements

1. The furnace area must be kept clear and free of combustible materials, gasoline and other flammable vapors and liquids.
2. Insulating material may be combustible. The furnace must be kept free and clear of insulating material. The furnace area must be examined when the furnace is installed in an insulated space to make sure that insulation is away from the furnace.
3. Follow the instruction exactly as shown on the operating instructions label, or the startup and shutdown instructions located on page 7 of this manual to properly start the furnace or turn the furnace off.
4. Should the gas supply fail to shut off or if overheating should occur, shut off the manual gas cock located on the gas pipe before turning off the electrical power supply to the furnace.
5. Do not use this furnace if any part has been under water as a flood damaged furnace is extremely dangerous to operate. Attempts to use the furnace could result in a fire or explosion. A qualified service agency should be contacted to inspect the furnace and replace all gas controls, control systems, and electrical parts that have been wet. In some cases, the damage may be so severe that the furnace may need to be replaced.
6. Flammable materials, solvents, or other volatile liquids should be stored only in approved containers outside the home. These materials vaporize easily and are extremely dangerous.
7. Do not store cleaning materials near the furnace. Materials such as bleaches, detergents, powdered cleaners can cause corrosion of the heat exchanger and premature failure.
8. Do not use the area around the furnace as a storage area for items that could block the normal flow of air to the furnace. This flow of air is required for ventilation of the various furnace components.

⚠ WARNING

FIRE OR EXPOLSION HAZARD

This furnace is designed and approved for use with Natural Gas or Propane (LP) only. Do not burn any liquid fuel or solid fuel in this furnace.

Burning any unapproved fuel in this furnace will result in damage to the furnace heat exchanger which could result in a fire, personal injury, property damage, and loss of life.

Burning any unapproved fuel in the furnace will result in termination of the factory warranty.

⚠ WARNING

Any adjustment, service, or maintenance by the homeowner or user may create a condition where the operation of the product could cause property damage, personal injury, and death.

Only qualified service personnel or installer may refer to the service and maintenance section of this manual for serving or repairing this furnace.

⚠ CAUTION

This furnace requires periodic routine maintenance and cleaning of the exterior surfaces by the homeowner or user to remove dust and debris. Any additional service or repair must be performed by qualified personnel. This furnace must be serviced and maintained as specified in these instructions and any applicable local, state, and national codes including, but not limited to building, electrical, and mechanical codes.

⚠ WARNING

FIRE OR ELECTRICAL HAZARD

Failure to follow the safety warnings could result in a fire or electrical hazard which may cause property damage, personal injury, or death.

⚠ DANGER

ELECTRICAL OR EXPLOSION HAZARD

Do not use this furnace if any part has been under water.

A flood damaged furnace is extremely dangerous. Attempts to operate a flood damaged furnace may result in a fire.

A qualified contractor, installer, or service agency must be contacted to inspect the furnace for any water damage and replace components, controls, or electrical parts that have been damaged or replace the furnace.

⚠ DANGER

USE ONLY NATURAL GAS OR HD-5 PROPANE FUEL IN THIS FURNACE.

DO NOT USE "COMMERCIAL GRADE PROPANE" OR ANY PROPANE BLEND OTHER THAN HD-5.

IF A FUEL OTHER THAN NATURAL GAS OR HD-5 PROPANE IS USED IN THIS FURNACE, YOUR WARRANTY WILL BE VOID.

⚠ WARNING

This furnace must not be installed where it may be exposed to potentially explosive or flammable atmosphere.

Installing this furnace in an explosive or flammable atmosphere may result in a fire or explosion causing personnel injury, property damage, or death.

COMBUSTION AIR QUALITY
(LIST OF CONTAMINANTS)

This furnace requires 100% outdoor air for combustion. This furnace must not be installed in the following environments.

- Restricted environments
- Buildings with indoor pools
- Laundry rooms
- Hobby or craft rooms
- Chemical storage areas
- Chemical Exposure

The furnace must not be exposed to the following substances and chemicals.

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

The combustion air intake pipe termination must be located external to the building and in an area where there is no exposure to the substances listed above. Any exposure to the substances listed above will void the furnace warranty.

⚠ WARNING

This furnace must not be installed where it may be exposed to potentially explosive or flammable atmosphere. Installing this furnace in an explosive or flammable atmosphere may result in a fire or explosion causing property damage, personal injury, or death.

⚠ WARNING

Because of the potential of odorant fade, a gas leak may not be detected by smell. It is recommended that black iron pipe be used from the furnace gas valve to outside the home in order to prevent gas leaks inside the home. Copper and brass tubing and fittings (except tin lined) must not be used if the gas contains more than a trace (0.3 grains per 100 cubic ft.) of hydrogen sulfide gas. Check with the gas supplier about gas content and for a gas leak detector.

⚠ WARNING

HAZARD OF ASPHYXIATION: Negative pressure inside a closet with closet door closed and the furnace blower operating must not be more than 0.05" W.C.

⚠ IMPORTANT

To prevent premature heat exchanger failure, do not locate any gas-fired appliances in area where corrosive vapors are present in the atmosphere. Refer to the section on COMBUSTION AIR QUALITY.

⚠ WARNING

Do no wet electronic components or wire connections during the gas leak test. Wetting electronic components may damage circuitry and wire connections and can cause a hazardous situation.

Dry moisture from all leads and terminals if wetting does occur.

Wait at least 12 hours for the electronic components and wire connections to fully dry before energizing the furnace.

⚠ WARNING

This furnace area must never be used as a broom closet, for any other storage purposes or allow the furnace to come in contact with the following substances.

1. **Spray or aerosol cans, rags, brooms, dust mops, vacuum cleaners, or other cleaning tools.**
2. **Soap powders, bleaches, waxes, other cleaning compounds, plastic items or containers**
3. **Gasoline, kerosene, cigarette lighter fluid, dry cleaning fluids, or other volatile fluids.**
4. **Paper bags, boxes, or other paper products.**

⚠ WARNING

FIRE OR ELECTRICAL HAZARD

Servicing the furnace can be hazardous due to exposure to electrical components. Only trained and qualified personnel are allowed to service or repair this furnace. The homeowner or user must never attempt to service or repair this furnace.

The homeowner or user may perform only basic maintenance functions such as cleaning of exterior surfaces and replacing the air filters.

Observe all precautions in the manuals and on the attached labels when performing maintenance on this furnace.

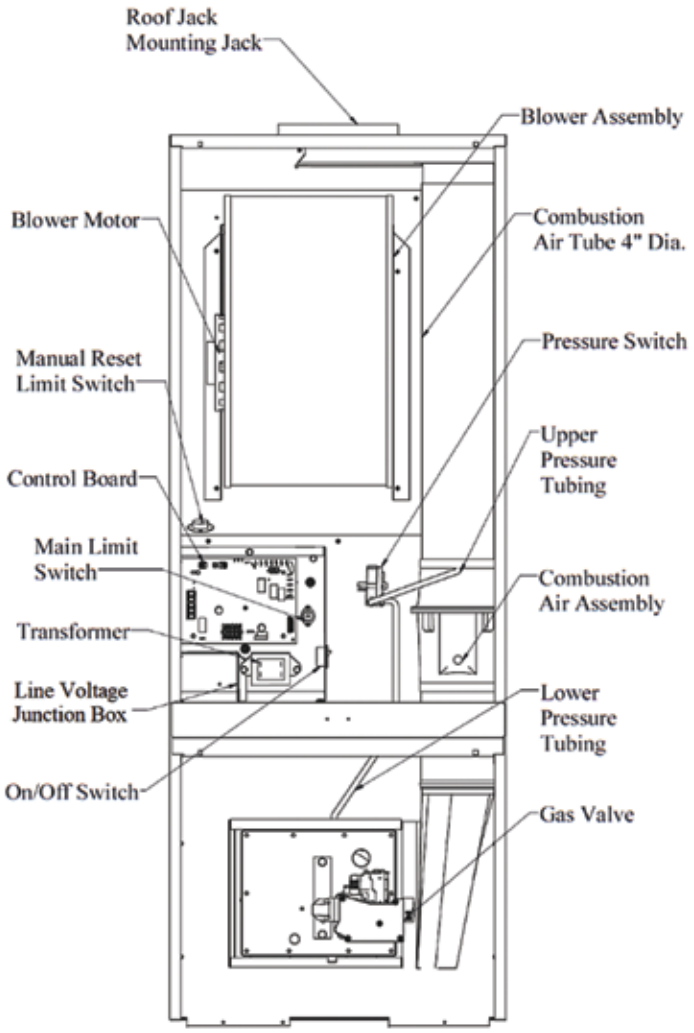


Figure 1: Component Locations

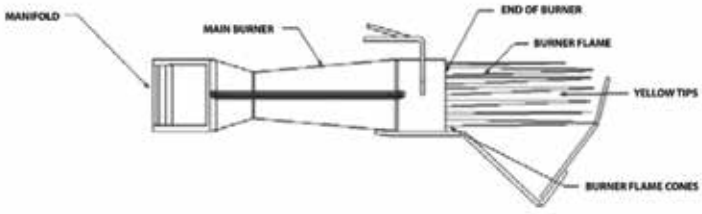


Figure 2: Burner Flame

EXAMINING THE FURNACE

It is the homeowner's or user's responsibility to ensure that an annual inspection of this furnace is made by a qualified service agency. The qualified service agency must examine the furnace as outlined in steps below before each heating season.

1. Examine the heat exchanger, vent pipe, combustion air passages, vent connectors and chimney to be sure they are clear and free of obstructions.
2. Examine the vent pipe making sure it is firmly in place, that it is attached to the top of the furnace and it is physically sound without holes and all of the connections are secure.
3. Examine the return air louvered door to make sure it is physically sound, fastened securely to the furnace casing.
4. Examine the furnace casing making sure the physical support is sound without sagging, cracks, or gaps.
5. Examine the furnace base making sure it is physically sound without cracks, gaps, or sagging and that it has a good seal to the casing.
6. Examine the furnace casing for obvious signs of deterioration.
7. Examine the burner flame to make sure the burner is adjusted properly. The flame should appear long and cylindrical with a blue color. Some yellow streaks may appear, especially near the tip of the flame. The flame on a furnace operating on propane (LP) will appear less blue and has considerably more yellow streaking.

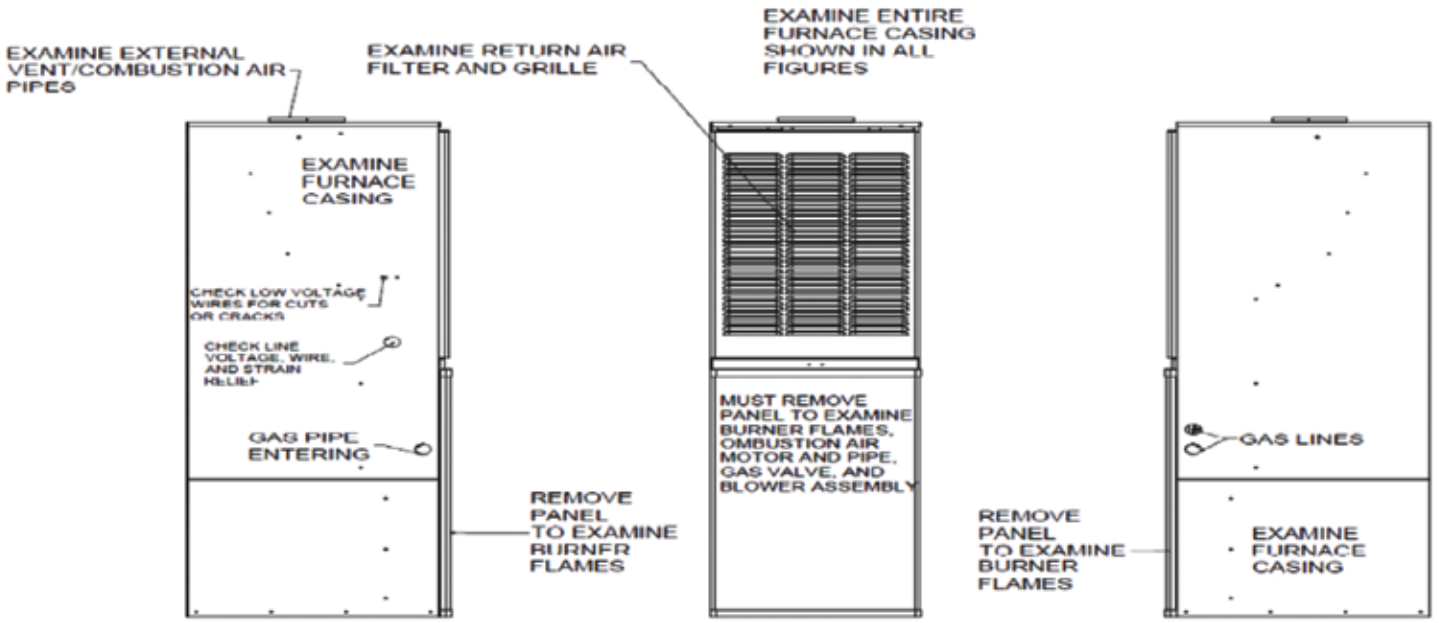


Figure 3: Burner Flame

SECTION 2: HOMEOWNER/USER INFORMATION

How the Furnace Works

Heating Cycle

1. The thermostat calls for heat which energizes furnace control board "W" terminal.
2. The combustion air blower is energized for a pre-purge period to remove any remaining gases from the heat exchanger and will send those gases out the exhaust vent.
3. After the pre-purge period, the combustion air proving pressure switch electrical contacts close if there is no exhaust vent restriction.
4. After the pressure switch contacts closes, the hot surface igniter is energized and will glow.
5. After the igniter has time to become sufficiently hot, the gas valve will open and allow gas to flow to the burner. The gas will ignite as it passes by the igniter and a flame will be established. The flame sensor will sense the presence of flame and send a signal back to the control board that a flame is present. The control board will keep the gas valve open as long as the flame sensor detects the presents of a flame and there is a call for heat by the thermostat unless one of the 2 limit switches senses an over-temperature condition.
6. After ignition has been established long enough for the heat exchanger to heat up, the circulating blower motor will be energized which distributes warm air throughout the home.
7. When the temperature of the home has reached the temperature setting on the thermostat, the 24 VAC signal will be removed from the "W" terminal on the control board which causes the gas valve to de-energize and the burner flame to extinguish. The circulating blower motor will shut down after the heat exchanger has sufficiently cooled down.
8. The furnace will then be in "stand-by" mode until there is another call for heat.

The furnace is equipped with the components and controls necessary for proper and safe operation and identified in Figure 1.

General Homeowner/User Information

1. Refer to the furnace rating plate for the furnace model number and specifications for safe operation.
2. Provide clearance for service access to the burner compartment, control box, and the blower compartment.
3. Failure to carefully read and follow all of the instructions in this manual can result in malfunction of the furnace, property damage, personal injury, or death.
4. If the furnace is installed in a residential garage, it must be installed so the burner is located not less than 18 inches above the floor and the furnace must be located or protected to avoid physical damage by vehicles.

The Service Technician

A qualified service technician is required to perform any service or repairs on the furnace. If the furnace gives any indication of improper operation, call the service technician. The service technician is allowed to perform the normal routine care of your furnace as well as service and repairs and can detect potential problems and make corrections before trouble develops. Preventative maintenance of this type will allow the furnace to operate with minimal concerns to the homeowner or users and will add years of reliable comfort.

Warranty and Responsibilities

It is the responsibility of the homeowner to make certain the furnace has been properly installed and adjusted to operate properly.

The manufacturer warrants the furnace to be free from defects in material or workmanship for a stated time in the warranty agreement. The manufacturer will not be responsible for any repair costs to correct problems due to improper setup, improper installation, improper furnace adjustments, adding parts that are not listed by the manufacturer for use with the furnace, and improper operating procedures by the homeowner or users. Specific examples of service calls which will be excluded from warranty reimbursement are:

1. Correcting faulty duct work due to too few ducts or ducts that are too small to provide proper air flow through the furnace.
2. Correcting wiring problems in the electrical circuit to the furnace.
3. Resetting circuit breakers or on/off switches used for servicing.
4. Furnace problems caused by installation and operation of any air conditioning unit, heat pump, or other air quality devise which is not approved for use with this furnace.
5. Adjusting or calibrating the thermostat.
6. Problems caused by construction debris which has fallen into the furnace.
7. Replacement of fuses.
8. Problems caused by dirty air filters.
9. Problems caused by restrictions in the return or supply air flow causing low air flow.

The home owner should establish a thorough understanding of these responsibilities with the installer or service company to prevent misunderstandings at a later time.

While Homeowner or User is Away From Home

The furnace is equipped with safety shutoff devices which will shut off the gas burner in case of a malfunction. For this reason, it is never practical to assume the furnace will operate unattended for a long period of time.

If the homeowner or user is planning to be away from home for a long period of time, someone should be asked to check on the home every day especially when the outside temperature may fall below 35°F to ensure the furnace is operating properly to prevent water pipes from freezing.

When to Call For Service Assistance

Very often time can be saved if the service agency is given information about a furnace problem ahead of time. This will enable the service agency to possibly identify the source of the problem prior to the service call and determine the specific replacement components that may be required so the service agency can arrive with the parts to fix the problem.

SERVICE AGENCY INFORMATION

Fill in Below

MODEL NUMBER: _____

SERIAL NUMBER: _____

SERVICE COMPANY: _____

ADDRESS: _____

TELEPHONE (DAYTIME): _____

TELEPHONE (EMERGENCY) _____

NOTES: _____

SECTION 3: STARTUP AND SHUTDOWN INSTRUCTIONS

⚠ WARNING

Failure to follow these instruction exactly may result in a fire or explosion which can cause property damage, personnel injury, and / or loss of life.

Safety Information

Read the safety instructions below before trying to start the furnace.

1. This furnace does not have a pilot light. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
2. Before starting the furnace, smell around the furnace area for gas. Be sure to smell next to the floor because some gases are heavier than air and will settle on the floor.
3. Only use a finger to push the gas control switch to the "ON" position. Never use tools. If the switch will not operate 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 furnace if any part has been under water. Immediately call a qualified service technician to inspect the furnace and replace parts and controls that have been under water.

Starting the Furnace

1. **STOP!** Read the safety information above.
2. Set the thermostat mode to "OFF".
3. Turn off the electric power to the furnace.
4. Remove the furnace access panel.
5. Move the gas control switch to the "OFF" position. Do not force it. See Figure 4 for the switch location.
6. Wait 5 minutes to clear out any gas. If gas is smelled, follow Step 2 in the safety information above. If there is no gas smell, go to Step 7 below.
7. Move gas control switch to the "ON" position. Do not force it. See Figure 4 for the switch location.
8. Replace the burner access panel.
9. Turn on electrical power to the furnace.
10. Set the thermostat mode to "HEAT" and the temperature setting above the room temperature. Burner will typically light after 30-60 seconds, but it may take multiple tries due to air in the gas line. The furnace will attempt to light the burner 3 times before it will lock out for 1 hour at which time it will try to light again.
11. If the furnace will not light, follow the instructions "Shutting the Furnace Off" below.

Shutting the Furnace Off

1. Set the thermostat mode to "OFF".
2. Turn off the electrical power to the furnace if service is to be performed.
3. Remove furnace access panel.
4. Move gas control switch to the "OFF" position.
5. Replace burner access panel.

The Furnace Fails to Operate Properly

If any abnormalities are observed while the furnace is operating, perform the following checks:

1. Check the setting on the thermostat to make sure the thermostat is set above the room temperature.
2. Check to see if the electrical power is turned on at the circuit breakers at the main electrical panel (circuit breaker box) or check any on/off switches that may be used for service disconnect switches.
3. Make sure the air filters are clean, return grilles are not obstructed, and supply air registers are open.
4. Make sure the control switch on the gas valve is in the "ON" position. Refer to Figure 4 for the gas valve control switch location.
5. Make sure the gas cock or valve shown in Figure 5 is in the "ON" position.

   If the cause of the malfunction is not obvious, do not attempt to repair the furnace. Call a qualified service agency to repair the furnace.

⚠ WARNING

Should overheating occur, turn the gas cock or gas valve in the gas supply line to the "OFF" position. After the furnace has cooled off, turn the circuit breakers in the main electrical panel (circuit breaker box) to the "OFF" position. Call a qualified service personal to troubleshoot and repair the furnace. Do not allow the furnace to continue to cycle on the overtemperature limit switches.

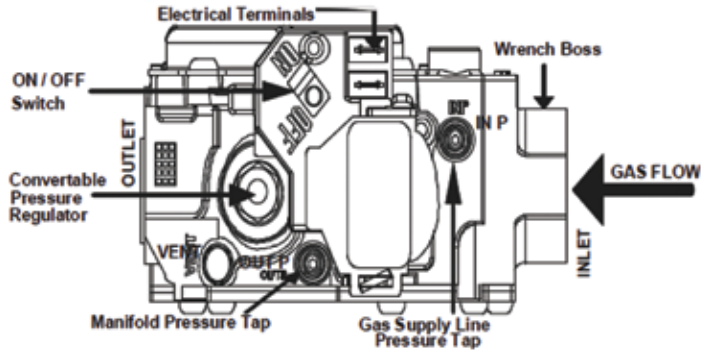


Figure 4: White Rodgers Gas Valve Components

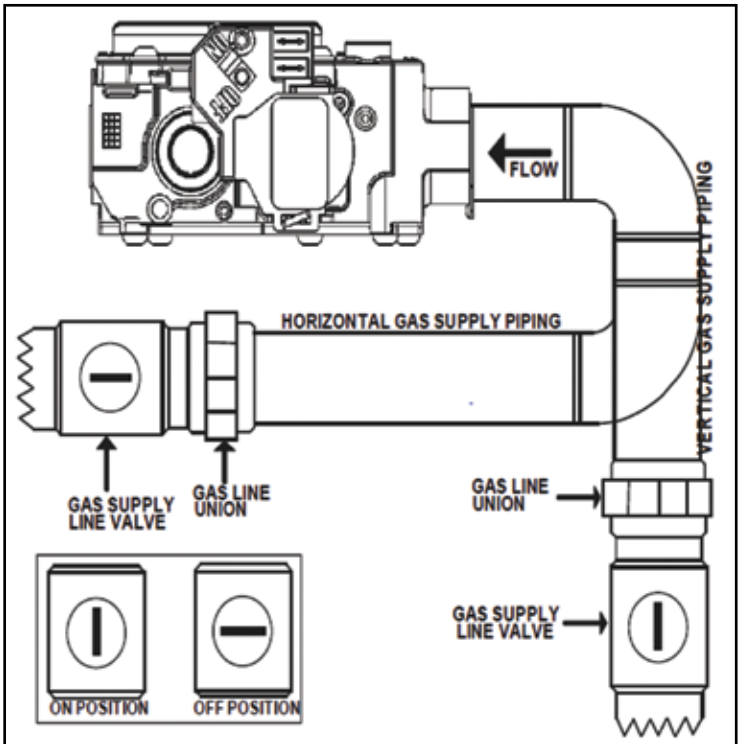


Figure 5: Gas Supply Piping & Shutoff Valve Location

SECTION 4: HOMEOWNER/USER MAINTENANCE

⚠ WARNING

Before proceeding, make sure the area is well ventilated. Turn the thermostat mode to "OFF". If the circulating blower is running, wait until it stops automatically. Follow the "Shutting the Furnace Off" instructions located in Section 3: Startup and Shutdown Instructions on page 7 of this manual. Check all metal parts and surfaces to make sure they have cooled to room temperature before performing maintenance on the furnace.

This furnace requires maintenance at the beginning of each heating season to assure proper operation. The annual service must be performed by qualified service technician. The homeowner/user is expected to perform general cleaning of the exterior surfaces, clean dust from the louvers in the return air door, and replacement of the air filters. Air filters must be checked every month and replaced as needed. Figures 6 and 7 show the location of the air filters in the louvered return air door. If the louvered return air grille does not contain filters, the return air filters may be located in a return air filter grille on the closet wall.

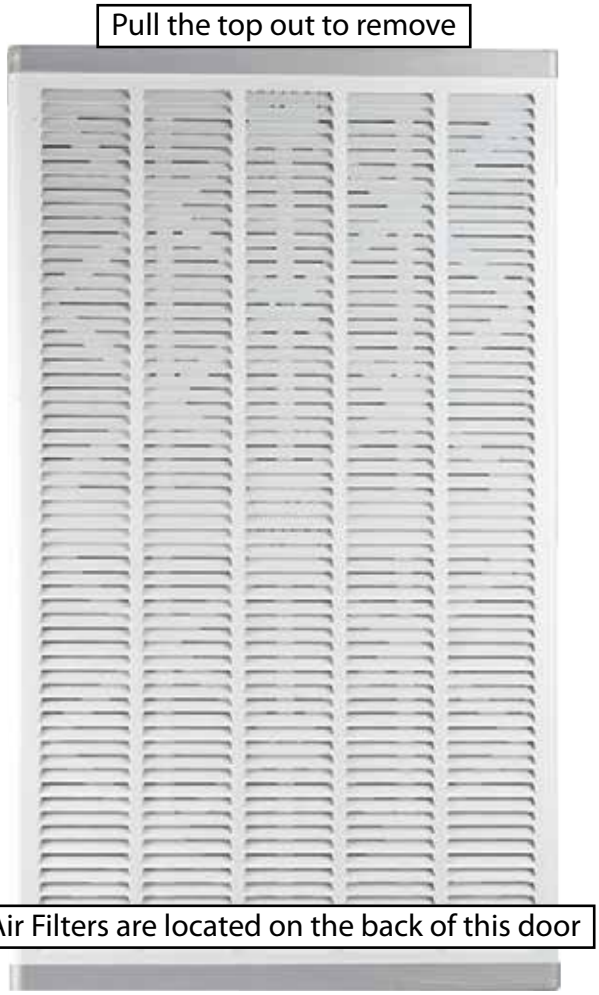


Figure 6: Louvered Return Air Door - Outside

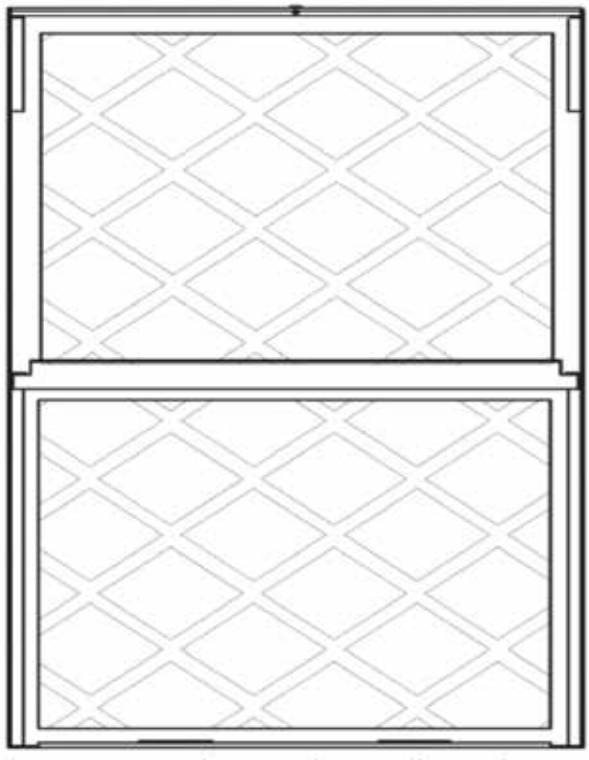


Figure 7: Louvered Return Air Door Filter Rack (Requires Two 16" x 20" x 1" High Velocity Air Filters)

Every time the filters are changed, the following items should be visually inspected.

- Check combustion air and vent pipe for blockage.
- Check for leaks in the vent pipe.
- Check for dirt or lint on any surfaces or on components. Do not try to clean any of the surfaces or components or try to repair or replace any components. Cleaning of the furnace and its components and repairing or replacing components must be done by a qualified service professional.
- Check for excessive amounts of dirt and lint on components.
- Check for obvious damaged or deteriorated components or surfaces.
- Check for water on any surface inside or outside of the furnace.

If during the visual inspection of the furnace any of the above conditions are found, do not operate the furnace. Call a qualified service technician to check, clean, or repair the furnace. The service technician can provide additional information or answer questions about the operation of the furnace and why the furnace must be checked or cleaned.
If all components appear to be in good operating condition, replace the front panels and follow the **"Starting the Furnace"** instructions in Section 3: **Startup and Shutdown Instructions** on page 7 of this manual.

Replacing Air Filters in the Louvered Return Air Door
All models require two 16" x 20" x 1" high velocity pleated air filters which are located in the louvered return door on the front of the furnace.
Follow the steps below to replace the air filters located in the furnace louvered return air door.
1. Follow the procedure "Shutting the Furnace Off" in Section 3: Startup and Shutdown on page 7 of this manual.

2. Pull back on the top of the return air grille door until it pops out of the retainer clip.
3. Let the top of the door fall outward and then lift up slightly and outward and set the door on the floor.
4. Remove the center retaining bracket by pushing down on the left side of the bracket then use a small flat blade screwdriver to pry it out.
5. Remove both air filters from the door. These filters are disposable filters. Do not attempt to clean the filters and reuse them.
6. Insert the replacement air filters in the door.
7. Place the center retaining bracket between the 2 air filters. Slide the bracket under the flange on the left side of the door. Place a flat blade screwdriver between the bracket and the right side door flange and slide the bracket past the door flange until the bracket is back into place. Use a rubber mallet to straighten the right side door flange if necessary.
8. Lift the door up against the cabinet and align the slots in the bottom of the door with the tabs on the divider panel.
9. Push the door forward lining up the plastic door strike in the top cover with the hinge in the door.
10. Push the top of the door on the left side forward until the door strike snaps into the latch.
11. Push the top of the door on the right side forward until the door strike snaps into the latch.

    Follow the **"Starting the Furnace"** instructions in **Section 3: Startup and Shutdown Instructions** on page 7 of this manual.

Optional Return Air Filter Grille

Some installations may utilize one or more field supplied return air filter grilles that has been installed in the closet or alcove wall above the furnace. If there are no filters in the furnace louvered return air door, look for a return air filter grille or grilles on the wall the closet or alcove. To replace the filters in a return air filter grille, turn the thumbscrews or levers on the face of the grille door and allow the grille door to fall outward providing access to the filter. Replace the air filter in the return air filter grille with the same size and type filter that was removed. Once the new filter is in place, close the grille door and secure it with the thumbscrews or levers.

SERVICE AND MAINTENANCE MANUAL

SECTION 1: SAFETY

THE HOMEOWNERS AND FURNACE USERS MUST STOP HERE!

This section has been designed to assist a qualified service agency in performing service and maintenance on this furnace. Homeowners or furnace users must never attempt to perform maintenance or service on this furnace, especially when furnace components must be replaced or adjusted.

⚠ WARNING

The furnace manufacturer is not responsible for damage to the furnace or furnace malfunctions due to improper parts changes, improper maintenance, improper furnace adjustments, or improper modifications made by the homeowner or furnace user.

The furnace manufacturer is not responsible for damages, repairs, or injury if the homeowner or furnace user uses this section of the instructions in an attempt to perform maintenance or repairs to the furnace. This practice is very dangerous and may result in property damage, personal injury, or death due to a fire, explosion, or electrical shock.

If the homeowner or the furnace user attempts to perform any maintenance or repairs to this furnace, the warranty will be voided and the homeowner will be responsible for all repair costs and/or damages.

The following safety rules must be followed when servicing this furnace.

This is a safety alert symbol. When this symbol is seen on labels or in manuals, be alert to the potential for personal injury. Understand and pay particular attention to the signal words **DANGER, WARNING, or CAUTION.**

DANGER: Indicates an imminently hazardous situation, which if not avoided, **will result in death or serious injury.**
WARNING: Indicates a potentially hazardous situation, which if not avoided, **could result in death or serious injury.**
CAUTION: Indicates a potentially hazardous situation, which if not avoided, **may result in minor or moderate injury.** It is also used to alert against unsafe practices and hazards involving property damage.

⚠ WARNING

Improper adjustment, service or maintenance may create a condition where the operation of the product could cause property damage, personal injury, or death.

⚠ CAUTION

This product must be serviced and maintained as specified in these instructions and to any applicable local, state, and national codes including, but not limited to building, electrical, and mechanical codes.

⚠ WARNING

FIRE OR ELECTRICAL HAZARD
Failure to follow the safety warnings in this manual or on labels affixed to the furnace may result in a fire or electrical hazard which may cause property damage, serious injury, or death.

SAFETY REQUIREMENTS

1. This gas fired furnace is powered by a 115 volt, 60 Hz electrical supply circuit. Check each electrical circuit with a meter to be sure the power has been disconnected before servicing the furnace.
2. Insulating materials may be combustible. This furnace must be kept free and clear of insulating materials.
3. Follow the instructions in **Section 3: Startup and Shutdown Section of the User Information Manual** to properly start or shut the furnace off.
4. Make sure all moving parts have come to a complete stop before the furnace door is removed to perform service or maintenance. Moving parts can cause serious injury or death if clothing or body parts get caught in the moving parts.

⚠ WARNING

ELECTRICAL SHOCK AND FIRE HAZARD

- **Failure to follow the safety warnings in the manual or on the labels affixed to the furnace may result in property damage, serious injury, or death.**
- **Improper servicing could result in property damage, serious injury, or death.**
- **Placing jumper wires between the RED and WHITE thermostat wires at the furnace in order to bypass the thermostat and energize the heater is an extremely dangerous practice that can result in damage to the thermostat, property damage, serious injury, or death.**
- **Before servicing, disconnect all electrical power to the furnace.**
- **When servicing controls, label all wires prior to disconnecting to aid in proper reconnection of wires.**
- **Verify proper operation after servicing by turning the thermostat above the room temperature for a brief period of time to ensure future operation.**

SECTION 2: FURNACE MAINTENANCE

This furnace must be inspected, cleaned, and adjusted by a certified dealer or qualified service technician once a year or before the start of each heating season. The following items must be inspected, cleaned, serviced, or replaced if there are signs of deterioration.

1. The roof jack vent terminal.
2. The furnace roof jack combustion air intake passageways. Should it be necessary to service the vent / combustion air intake system, this service must be conducted by a qualified service agency. The operation of the furnace requires the vent combustion air intake system to be sealed and have adequate passageways for venting and combustion air to the furnace.
3. The burners, igniter, and flame sensor.
4. The circulating blower wheel and motor. Check for dirt, dust, or debris in the blower wheel and motor.
5. The supply air duct system for excessive dust, dirt or debris.
6. The louvered return air door for excessive dust, dirt or debris.
7. All electrical wiring for wear or damage.
8. Check the air-conditioning coil for dust, debris or damage.
9. Check the air-conditioning coil drain pan for proper drainage to prevent water backup into the furnace.
10. The furnace casing and all interior sheet metal panels or dividers.

Furnace Cleaning Procedure

NOTE: The cleaning procedure listed below must be performed by a qualified service agency only!

Burner Removal, Cleaning, and Reinstallation

The main burners should be removed and visually inspected for dirt and debris accumulation during the annual inspection and maintenance call. Follow the procedure below if cleaning of burner is required.

1. Follow the instruction in **Section 3: Startup and Shutdown Instructions of the User Information Manual** to properly shut the furnace off.
2. Remove the burner compartment access panel on the front of the furnace.
3. Turn off the valve in the gas supply line and loosen the ground union joint. Refer to Figure 5 on page 7 of the **User Information Manual.**
4. Remove the gas line from the gas valve. Be sure to use a wrench on the gas valve hub (wrench boss) located on the inlet side of the gas valve to keep the gas valve from rotating when the gas line is being removed.
5. Remove the electrical wires from the terminals on the gas valve.
6. Unplug the wires from the flame sensor and ignitor.
7. Remove the sixteen (16) screws from the burner mounting plate and remove the burner assembly. Refer to Figure 8.
8. Lift the burner assembly up, turning slightly to clear the air baffles and slide the burner assembly back to remove it.
9. Remove dirt or debris using a small soft brush and a vacuum cleaner.
10. Never clean the burners using water. Water will cause the burner to corrode or rust.
11. Re-insert the burner assembly between the air baffles and slide forward until the burner mounting plate screw holes line up with the holes in the burner box.
12. Secure the burner assembly to the burner box with the screws that were removed in step 7.
13. Reconnect the flame sensor and igniter wires that were disconnected in step 6.
14. Reconnect the electrical wires to the terminals on the gas valve.
15. Connect the gas supply line. It is recommended that a new pipe that is properly chamfered, reamed, and free of burrs and chips be used. If the old pipe is reused, be sure it is clean and free of rust, scale, burrs, chips, and old pipe joint compound.
16. Apply pipe joint compound that is approved for all gases only to the male threads of the pipe joints. Do not apply compound to the first two threads nearest the end of the pipe.
17. Use a wrench on the gas valve hub (wrench boss) located on the inlet side of the gas valve to prevent the gas valve from rotating when the gas line is being tightened. Do not over tighten the gas pipe which will damage the gas valve. Use a torque wrench to tighten the inlet gas pipe to a maximum of 375 in-lbs. If a torque wrench is not available, hand tighten the pipe and then turn the pipe an additional ½ – ¾ turn or until connection is snug and not leaking.
18. Connect the union joint and tighten the union.
19. Turn the manual gas valve to the "ON" position. Refer to Figure 5.
20. Reinstall the burner compartment access panel on the front of the furnace.
21. Follow the instructions as shown in **Section 3: Startup and Shutdown Instructions of the User Information Manual** to properly start the furnace.

⚠ WARNING

Do not over-torque the gas supply pipe into the gas valve. If the pipe is over tightened, the valve will be damaged.

The furnace manufacturer recommends hand tightening the gas supply pipe, then tightening an additional ½ - ¾ turn with a wrench or until the connection is snug and not leaking.

After the gas supply pipe has been tightened, check for leaks with a commercially available soap solution made specifically for detection of leaks. Never test for gas leaks with an open flame.

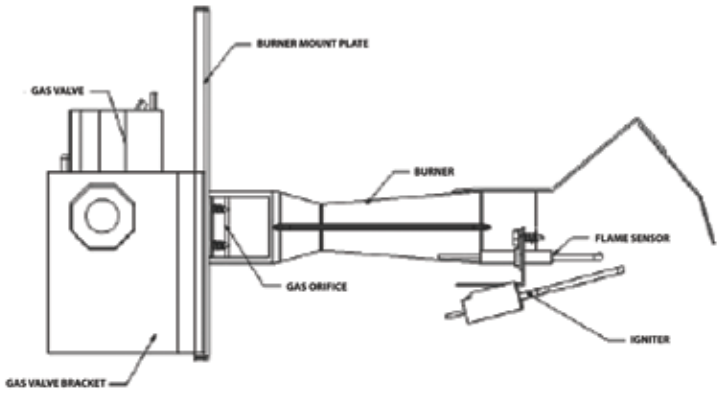


Figure 8: Burner Assembly

Cleaning the Heat Exchanger

1. Remove the burner assembly as described in steps 1-8 in **"Burner Removal and Cleaning"** on the previous page of this manual.
2. Remove the combustion air baffles from the burner box. The combustion air baffles are secured to the vestibule panel with two screws on each baffle located on the top and bottom of the baffle.
3. Use a brush and a vacuum cleaner to remove soot, dust, and debris from the inside of the heat exchanger.
4. Check all of the baffles for cracks or deterioration.
5. Use a mirror to check the baffle inside the drum at the top of the heat exchanger for cracks or deterioration.
6. Check the heat exchanger for any visible signs of cracks or holes.
7. Use a brush and vacuum cleaner to clean soot, dust, and debris from the inside of the burner box.
8. Reinstall the combustion air baffles in the burner box. The combustion air baffles are secured to the vestibule panel with two screws on each baffle located on the top and bottom of the baffle.
9. Reinstall the burner assembly as described in steps 9-16 of **"Burner Removal and Cleaning"** on the previous page of this manual.

⚠ WARNING

CARBON MONOXIDE HAZARD

If the gaskets on the combustion air blower assembly or the flue box cover are damaged or deteriorated, leaks in the combustion system may develop. Leaks in the combustion system will cause incomplete combustion which may allow high levels of carbon monoxide to leak into the living space.

Under no circumstances should the furnace be operated if the combustion air blower or flue box gaskets are damaged or deteriorated. Turn the furnace off and do not operate it until these gaskets have been replaced.

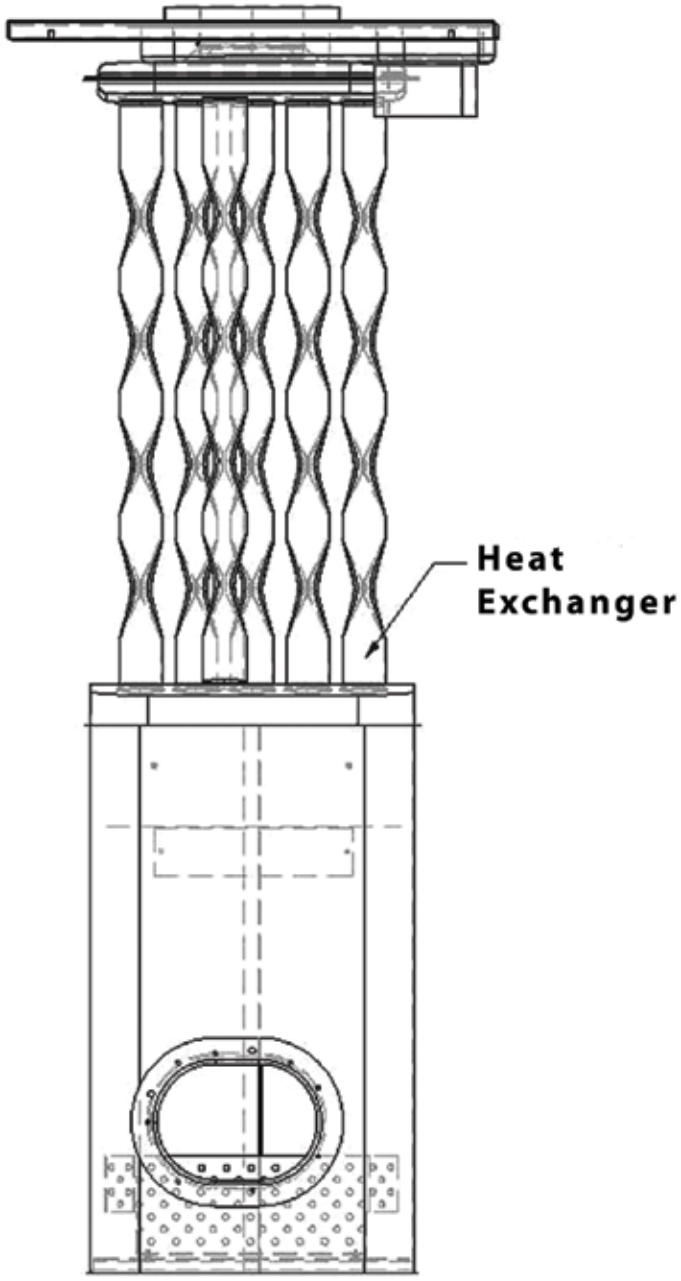


Figure 9: Heat Exchanger Assembly w/ Baffles

Cleaning the Flue Box Assembly

1. Follow the instructions in **Section 3: Startup and Shutdown Instructions of the User Information Manual** to properly shut this furnace down.
2. Remove the louvered return air filter door on the front of the furnace.
3. Slide the roof jack combustion air and vent piping upward as far as possible to remove the pipes from the combustion air and vent flanges at the top of the furnace.
4. Remove the 4 screws that secure the blend air adapter to the top cover if a blend air system is being used.
5. Remove the 11 screws from the furnace top cover.

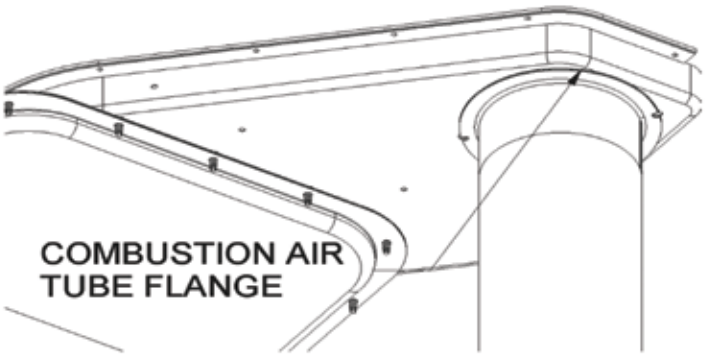


Figure 10: 4" Combustion Air Tube Flange

6. Remove the three 1/4"-20 nuts next to the flue collar.
7. Remove the two 3/16"-16 Phillips head screws from the flange at the top of the 4" combustion air pipe located inside the blower compartment (See Figure 10).

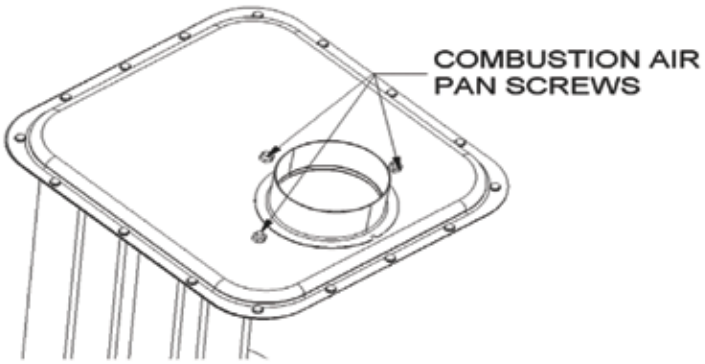


Figure 11: Top Cover Screws and Combustion Air Pan Screws

8. Remove the 3 screws from the combustion pan cover. Refer to Figure 11.
9. Remove the top cover. Be very careful not to damage the insulation and the gaskets. If the insulation or the gaskets are damaged, they must be replaced.
10. Remove the 16 screws from the flue box cover. Do not mix these screws with the other screws as these are stainless steel which is required due to the heat and corrosive flue products. Refer to Figure 12 for screw locations.

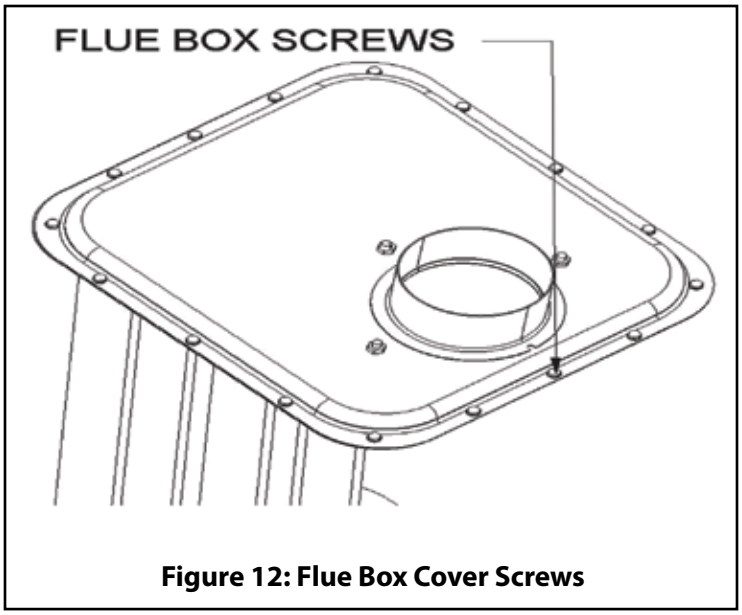


Figure 12: Flue Box Cover Screws

11. Remove the flue box cover. Be very careful not to damage the gasket on the flange. If the gasket is damaged, it must be replaced.
12. Use a brush and vacuum cleaner to clean the tubes and the flue box area.
    NOTE: Debris removed from the wall of the tubes by the brush will fall into the base of the heat exchanger. Be sure to vacuum the base to remove the debris after brushing all of the tubes.
13. Place the flue box cover on top of the flue box base and secure with the stainless steel screws that were removed in step 9.
    NOTE: Inspect the gasket to make sure it is not damaged. A good seal between the flue box cover and the flue box base is required for the furnace to operate properly and to prevent leakage of flue products into the conditioned space. Replace the gasket if it is damaged.
14. Place the top cover on top of the furnace. Make sure the bolt holes in the combustion air pan line up with the 1/4"-20 bolts next to the flue collar.
    NOTE: Inspect the gasket between the combustion air pan and the flue box to make sure it is not damaged. Replace the gasket if it is damaged. A good seal between the combustion air pan and the flue box is required for the furnace for the furnace to operate properly.
15. Install the three 1/4"-20 nuts on the three 3 bolts and tighten until secure.
16. Install the 11 screws in the top cover and tighten until secure. Do not over-tighten and strip these screws.
17. Place the blend air bracket over the 4" hole and align the screw holes. Install the screws to secure it to the top cover. **NOTE:** This step is not required if a blend air system is not used.
18. Install the louvered return air filter door on the front of the furnace.
19. Follow the instructions in **Section 3: Startup and Shutdown Instructions of the User Information Manual** to properly start the furnace.

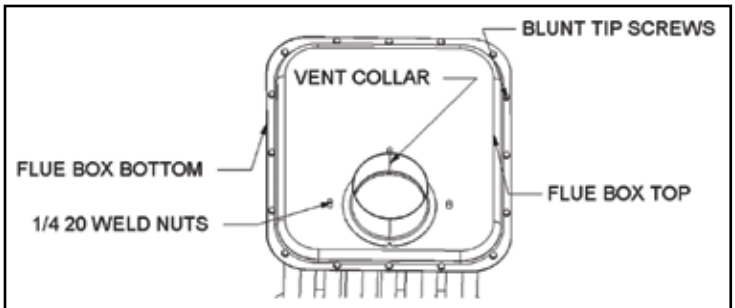


Figure 13: Flue Box Assembly

Cleaning the Combustion Air Assembly

The combustion air assembly should be removed and visually inspected for dust and debris accumulation during the annual inspection. If cleaning is required, follow the steps below.

1. Follow the instructions in **Section 3: Startup and Shutdown Instructions of the User Information Manual** to properly shut the furnace off.
2. Remove the louvered return air filter door on the front of the furnace.
3. Remove the burner compartment access panel on the front of the furnace.
4. Turn the valve in the gas supply line to the "OFF" position and loosen the ground union joint (See Figure 5).
5. Remove the gas line from the gas valve. Use a wrench on the gas valve hub (wrench boss) located on the inlet side of the gas valve to prevent the gas valve from rotating when the gas line is being removed.
6. Remove the wires from the gas valve terminals.
7. Unplug the wires from the flame sensor and igniter.
8. Remove the 10 screws from the burner mounting plate and remove the burner assembly (See Figure 8).
9. Lift the burner assembly and turn it slightly too clear the air baffles and slide the burner assembly back to remove it.
10. Remove the 1/4" tube from the top right side of the burner box.
11. Remove the 4 screws that secure the combustion air baffles to the burner box / vestibule panel (See Figure 14).
12. Remove the 4 remaining screws that secure the burner box to the vestibule panel. Be careful not to damage the gasket on the back side of the burner box. If the gasket is damaged, it must be replaced. A good seal between the burner box and the vestibule panel is required for the furnace to operate properly.
13. Remove the 2 Phillips head screws the secure the bottom of the combustion air assembly to the 4" pipe.
14. Grasp the burner box and twist slightly while pulling down to remove the 4" pipe from the combustion air housing (See Figure 14).
15. Unplug the male and female insulated terminals that go to the combustion air assembly.
16. Remove the 2 screws in the top of the combustion air housing and remove the assembly from the upper 4" pipe (See Figure 14).
17. Use a soft bristle brush and vacuum cleaner to clean the dust and debris from the housing, motor and prop fans. Be careful not to damage the plastic fans. Use the vacuum cleaner when brushing the pipe and fan to prevent the dust and debris from entering the motor windings. Dust and debris will cause the motor to run hotter and will reducing motor's life.
18. Place the round black gasket on the 4" upper pipe so the pipe sits inside the grove in the gasket and slide the combustion air housing into the gasket. Secure the housing to the 4" pipe with 2 screws removed in step 16. Make sure the gasket is properly inserted into the pipe so there is a good seal at the pipe and around the combustion air housing.
19. Place the round black gasket on the 4" lower pipe so that the pipe sits inside the grove in the gasket and slide the combustion air housing into the gasket. Secure the housing to the 4" pipe with the 2 screws removed in step 13. Make sure the gasket is properly inserted into the pipe so there is a good seal at the pipe and around the combustion air housing.
20. Place the gasket on the back side of the burner box so it is between the burner box and the vestibule panel. If the gasket is damaged, it must be replaced. There must be a good seal between the burner box and the vestibule panel for the furnace to operate properly. Install the 4 screws that were removed in step 11 and tighten until secure.
21. Place the combustion air baffles into the burner box and use the 4 screws that were removed in step 10 to secure the baffles to the burner box.
22. Connect the 1/4" tube to the nipple located on the top right side of the burner box (See Figure 14).
23. Install the burner assembly and secure the assembly to the burner box with the 10 screws that were removed in step 8.
24. Connect the 2 white wires to the igniter.
25. Connect the yellow wire to the flame sensor.
26. Connect the brown wires to the gas valve terminals.
27. Connect the gas supply line. It is recommended that a new pipe that is properly chamfered, reamed, and free of burrs and chips be installed. If the old pipe is reused, it must be clean and free of rust, scale, burrs, chips, and old pipe joint compound.
28. Apply pipe joint compound that is approved for all gases only to the male threads of the pipe joints. Do not apply compound to the first two threads nearest the end of the pipe.
29. Use a wrench on the gas valve hub (wrench boss) located on the inlet side of the gas valve to prevent the gas valve from rotating when the gas line is being tightened. Do not] over tighten the gas pipe which will cause damage to the gas valve. Use a torque wrench to tighten the pipe to a maximum of 375 in-lb. If a torque wrench is not available, tighten the gas pipe by hand and then turn the pipe an additional ½ - ¾ turn or until the connection is snug and not leaking.
30. Connect the union joint and tighten the union.
31. Turn the manual gas valve to the "ON" position (See Figure 5).
32. Check the entire gas supply line for leaks.
33. Install the burner compartment access panel on the furnace.
34. Install the louvered return air filter door on the furnace.
35. Follow the instructions in **Section 3: Startup and Shutdown Instructions of the User Information Manual** to properly start this furnace.

Cleaning the Indoor Fan Assembly

1. Follow the instructions in **Section 3: Startup and Shutdown Instructions of the User Information Manual** to properly shut the furnace off.
2. Remove the louvered return air filter door located on the front of the furnace.
3. Remove the burner compartment access panel located on the front of the furnace.
4. Unplug the blower motor wiring harness 6-pin plug located on the right side of the control box.
5. Remove the 2 screws on the right side of the blower mounting bracket.

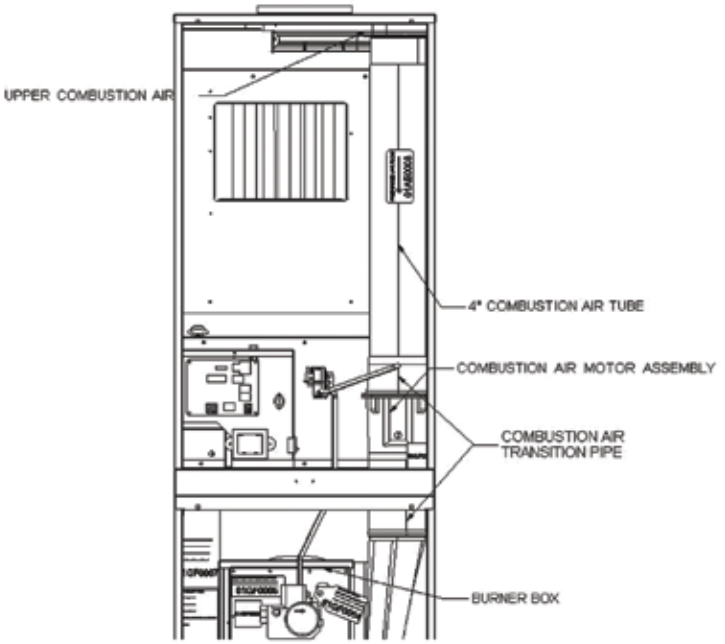


Figure 14: Combustion Air Assembly

6. Remove the 2 screws on the left side of the blower mounting bracket.
7. Lift the blower upward while moving it to the left and pull the blower back to remove it.
8. Use a vacuum cleaner and a small brush to remove any dust and debris from the blower compartment.
9. Check in the area below the blower compartment where the heater exchanger tubes are located and remove any dust and debris from around the heat exchanger tubes. Be careful not to damage the heater exchangers with the vacuum hose or the brush.
10. Place a piece of cardboard on top of the indoor cooling coil to collect the dislodged dust and debris and prevent it from falling on the coil.
11. Check the blower wheel for dust and debris. Use a brush and vacuum cleaner to remove any dust or debris from the blower wheel. Be careful not the move or accidentally remove the balance weight(s) located on the blower wheel blades . If a weight is moved or removed, the blower wheel will vibrate. If the blower wheel is vibrating, it must be replaced.
12. Check the blower motor for dust and debris. Clean the openings in the motor housing as these openings allow air to enter and cool the motor windings. Dust and debris blocking these openings will cause the motor to run hotter than normal and will shorten the life of the motor.
13. Reinstall the blower assembly and secure the assembly using the screws that were removed in steps 5 and 6.
14. Connect the blower motor wiring harness 6-pin plug to the mating plug located on the right side of the control box.
15. Reinstall the burner compartment access panel on the front of the furnace.
16. Reinstall the louvered return air filter door on the front of the furnace.
17. Follow the instructions in **Section 3: Startup and Shutdown Instructions of the User Information Manual** to properly start the furnace.

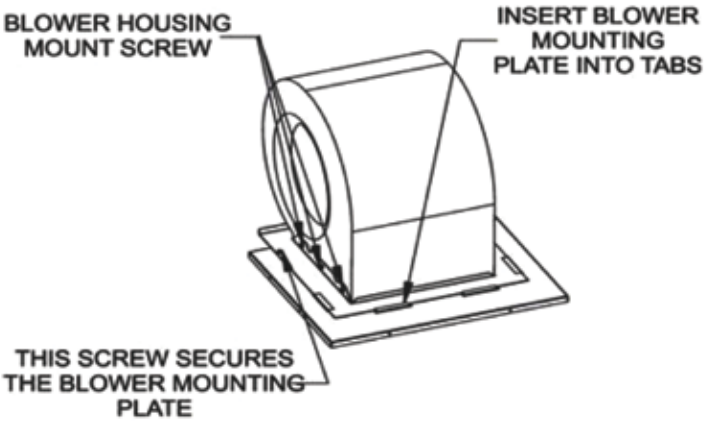


Figure 15: Blower Assembly

SECTION 3: FURNACE CONTROLS

The following describes the furnace controls and how they operate. Refer to Figure 16 for component locations.

1. Limit Switch – An auto-reset over-temperature limit switch is located on the vestibule panel to sense overheating of the heat exchangers and its contacts will open if the temperature around the switch rises above its set-point, shutting down the burner.
2. Manual Reset Limit Switch – A manual reset over-temperature limit switch is located in the burner compartment to shut the burner down if the switch contacts open due to overheating in the blower compartment due to a failed blower motor.
3. Integrated Furnace Control Board – The integrated furnace control board manages all control functions needed for the operating of the furnace. The control board provides outputs for 3 speed taps for the circulating blower motor (heating, cooling, and continuous fan), the induced draft blower, the main gas valve, and the hot surface igniter. The control board receives inputs from the thermostat, pressure switch, limit switches, and flame sensor.
4. Pressure Switch – The pressure switch senses the negative pressure in the induced draft blower housing and closes its contacts when the negative pressure reaches the set point of the switch.
5. Induced Draft Blower Assembly – The induced draft blower assembly consists of a motor, blower wheel, and = blower housing and draws the combustion air and by-products of combustion through the heat exchanger tubes and forces them up the exhaust vent.
6. 3 Amp Fuse – An automotive type fuse is located on the integrated furnace control and is used for over-current protection of the 24 VAC system control circuit.
7. Transformer – The transformer is used to step down voltage from 115 VAC to 24 VAC and provides the required 24 VAC for the system control circuit.

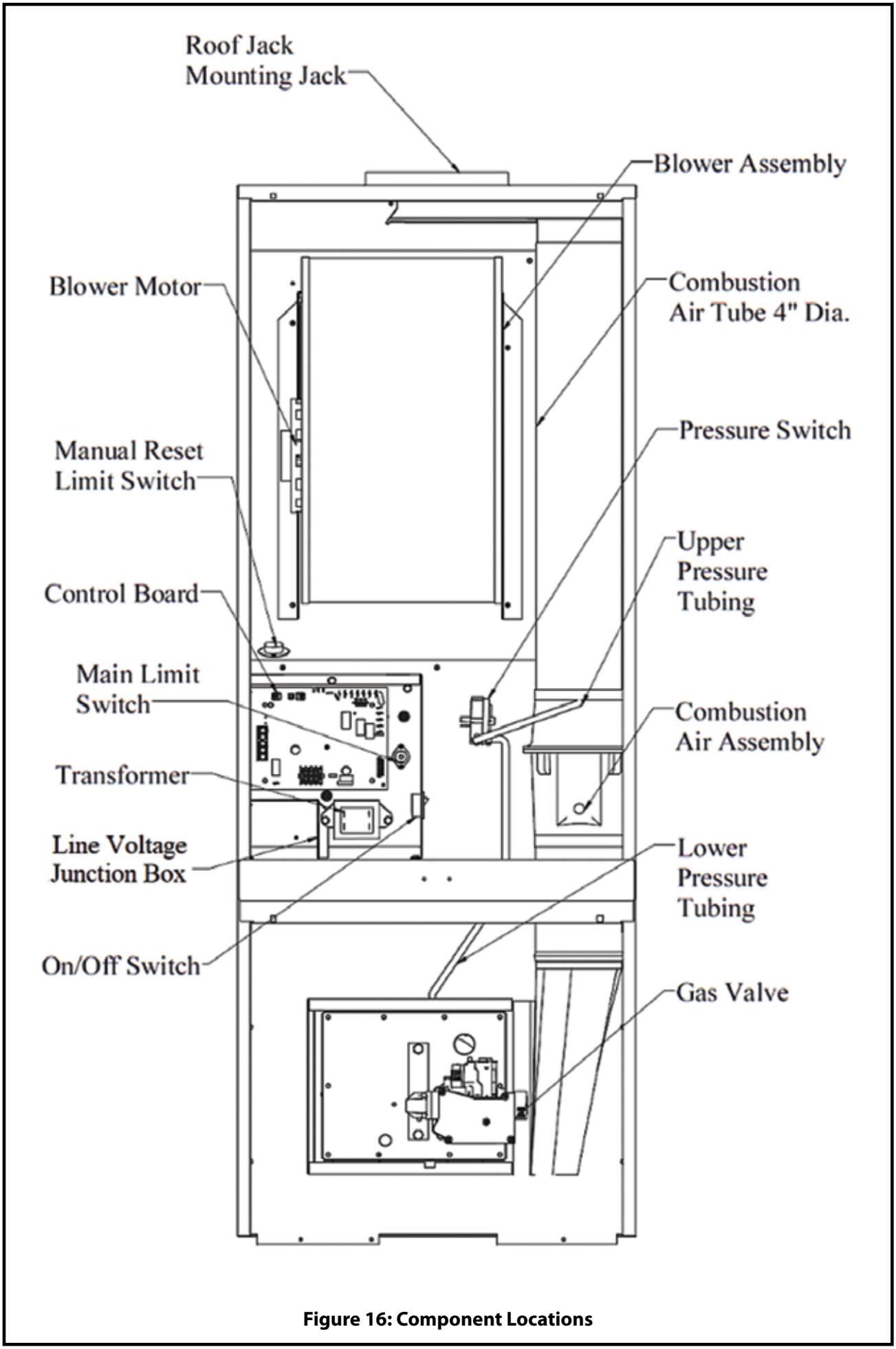


Figure 16: Component Locations

SECTION 4: SEQUENCE OF OPERATION

Normal Heating Mode Sequence of Operation

1. Thermostat Call for Heat: The thermostat calls for heat by energizing the "W" terminal.
2. Pressure Switch Proving: The control board checks to see the pressure switch is open. If the pressure switch is closed when the call for heat occurs, the control will lockout and begin to flash a "2" fault code on the Status LED. If the pressure switch contacts are open, the control board energizes the induced draft blower and waits for the pressure switch contacts to close. If the pressure switch contacts do not close within 60 seconds, the control board will lockout, de-energize the induced draft blower, and will flash a "3" fault code on the Status LED.
3. Pre-Purge: If the pressure switch contacts close, the control board continues to energize the induced draft blower for a 25 second pre-purge period during which the pressure switch contacts must remain closed.
4. Igniter Warm-Up: The control board energizes the hot surface ignitor output for 25 seconds to allow the ignitor to warm up to operating temperature. The induced draft blower remains energized and the pressure switch must remain closed.
5. Ignition Activation Period: The control board energizes the main gas valve for 5 seconds. The induce draft blower and ignitor outputs remain energized.
6. Flame Proving Period and Blower On-Delay: The control board de-energizes the hot surface igniter. The gas valve and induced draft blower outputs remain energized. If flame is sensed at the flame sensor 2 seconds after the igniter is de-energized, the control board energizes the circulating blower motor on the heating speed after a 30 seconds on-delay. The gas valve and inducer outputs remain energized. If flame is not sensed, the control board de-energizes the gas valve and initiates an ignition retry as described in **Ignition Re-Try** below.
7. Steady-State Operation: The heating inputs are continuously monitored by the control board to ensure the limit switch and pressure switch contacts are closed, flame is present, and the thermostat call for heat remains.
8. Post-Purge: When the thermostat call for heat is satisfied, the control board de-energizes the gas valve. The induced draft blower output remains energized for a 15-second post-purge period.
9. Blower Off-Delay: The circulating blower motor is de-energized after the selected heating blower off-delay (100 or 150 seconds) is completed. The blower off-delay timing begins when the thermostat is satisfied.

Interrupted Thermostat Call

If the thermostat demand for heat is removed before the flame recognition period has ended, the control board will continue to energize the induced draft blower for the post-purge period and de-energize all outputs.

If the thermostat demand for heat is removed after the flame recognition period has ended (successful ignition), the induced draft blower will continue to operate through a post-purge period and the circulating blower motor will continue to operate on the heating speed for the heating blower off-delay off period.

Ignition Retry

If flame is not established on the first trial for ignition period, the gas valve is de-energized and the induced draft blower remains energized for an inter-purge period. The ignitor is then re-energized for an ignitor warm up period and the control board initiates another trial for ignition. This sequence repeats for up to 3 trials for ignition.

If flame is not established on the third trial for ignition (initial try + 2 re-tries), the control board de-energizes the gas valve, flashes a "1" fault code on the Status LED, and lockouts out heat operation for 1 hour and will then repeat the trial for ignition process.

Ignition Recycle

If flame is established for 10 seconds or longer and the flame is then lost, the gas valve is de-energized, the induced draft blower continues to operate, and an inter-purge period is initiated. The circulating blower motor will remain energized on the selected heating speed as long as there is a successful ignition and flame is sensed prior to the end of the heating blower off-delay. When the inter-purge period has ended, the ignitor is re-energized and the control board initiates another ignitor warm-up and trial for ignition. The control board will recycle up to 6 flame losses (5 re-cycles) within a single call for heat before entering the lockout mode.

Call for Continuous Fan

When the thermostat calls for continuous fan (G) without a call for heating or cooling, the control board energizes the circulating blower motor on the continuous speed.
If a call for heat (W) occurs during continuous fan operation, the circulating blower motor will be de-energized until after a successful ignition and blower on-delay at which point the circulating blower motor will be energized on the selected heating speed.

When the thermostat FAN switch is moved to the OFF position, the control board de-energizes the circulating blower motor.

Call for Cooling – Intermittent Blower

When the thermostat calls for cooling (Y), the circulating blower motor is energized on the selected cooling speed after a 6 second cooling blower on-delay. When the call for cooling is satisfied, the control board de-energizes the circulating blower motor after the 45 second blower off-delay.

Limit Switch Open

Any time the limit switch contacts open, the gas valve and ignitor will be de-energized, the circulating blower motor will continue to operate on the selected HEAT speed, the induced draft blower will run continuously, and the Status LED will flash a "4" fault code.

Limit Switch Re-Closes

If the limit switch contacts close after being open for less than 6 minutes, the induced draft blower will continue to operate through a post-purge delay and the circulating blower will continue to operate through the selected heating blower off-delay. The control board will then attempt another ignition cycle beginning with the pressure switch check.

Limit Switch Lockout

If the limit switch opens 3 times during the same call for heat and re-closes each time, the control will enter a 1 hour lockout period and will continuing to flash a "4" fault code on the Status LED during the lockout period.

Limit Switch Remains Open

If the limit switch opens and remains open for more than 6 minutes and there is no flame sensed, the control board will enter the fan failure lockout mode. The induced draft blower and

circulating blower motor will be de-energized and the control board will enter the fan failure lockout mode until the thermostat is reset or power to the furnace is cycling off and back on.

Pressure Switch Opens
If the pressure switch opens after flame has been established, the control board de-energized the gas valve and initiates a normal post-purge and blower heating off-delay. When the blower heating off-delay is complete, the circulating blower motor is de-energized. If the pressure switch closes, the control board begins an ignition sequence if the thermostat is still calling for heat.

The control board will ignore a pressure switch opening of less than 2 seconds, but the gas valve will be de-energized momentarily while the pressure switch is open which may cause a loss of flame. If there is a loss of flame, the control board will initiate the **Ignition Recycle** procedure.

If the pressure switch opens for more than 2 seconds during a pre-purge or inter-purge period, the control board will wait for the pressure switch to re-close. The purge time re-starts when the pressure switch closes. If the pressure switch remains open for 60 seconds, the control board will enter the lockout mode, de-energize the induced draft blower, and begin to flash a "2" fault code on the Status LED.

Undesired Flame
If flame is sensed while the gas valve is de-energized, the control board will energize the induced draft blower and circulating blower motor on heating speed. All other outputs will remain off and the Status LED will flash a "5" fault code. When flame is no longer sensed, the induced draft blower will enter a post-purge period and the circulating blower motor will continue to operate until selected heating blower off-delay is completed. The control will not be locked out and continue with normal operation following the blower off-delay.

Lockout
Soft Lockout: The gas valve will be de-energized and the control board will not initiate an ignition attempt. The control board will still respond to an open limit switch and undesired flame by energizing the induced draft blower and circulating blower motor. The control board will automatically exit the lockout mode after 1 hour. The control can be manually forced to exit the lockout mode by cycling the electrical power to the furnace off and then back on or removing the thermostat call for heat for more than 2 seconds.

Hard Lockout: If a gas valve hardware fault, a flame sense hardware fault has occurred or if the limit switch is open for more than 5 minutes, the control board will enter a hard lockout condition. To exit a hard lockout, electrical power to the furnace must be cycled off and then back on or the thermostat call for heat must be removed.

⚠ WARNING

For personnel safety, turn the electrical power "OFF" at the main electrical panel (circuit breaker box) and at the furnace before attempting any service or maintenance operations. Homeowners must never attempt to perform any maintenance on the furnace or remove any furnace access panels except for removing the louvered return air filter door when replacing the filters with the electrical power to the furnace disconnected.

SECTION 5: TROUBLESHOOTING

The following checks should be made before troubleshooting the furnace controls for a no-heat issue. If the integrated furnace control board Status LED is not on, perform the following checks.

1. Check the circuit breakers or fuses that supply line voltage electrical power to the furnace to make sure they are in the "ON" position and have not tripped.
2. Check any "ON/OFF" switches that are external to the furnace to make sure they are turned on.
3. Check to make sure the connections to the line voltage electrical supply pigtails are secure.
4. Check for a loose or missing ground wire to the furnace.
5. Check for loose wiring connections on the 115 VAC power supply control board terminals.
6. Check for loose connections on the integrated furnace control board terminals.
7. Check the control board is connected securely to the chassis ground connection.
8. Check for 24 VAC between the "R" and "COM" terminals on the control board. If 24 VAC is not present, check for a failed transformer.
9. If 24 VAC is present between the "R" and "COM" terminals on the control board, check for 24 VAC between the "W" and "COM" terminals. If 24 VAC is not present between the "W" and "COM" terminals, replace the control board.
10. Check for loose wiring connections on the furnace components.
11. Check all gas line shutoff valves to make sure the valves are in the "ON" position.
12. If the furnace is operating, but not operating correctly, review **Section 4: Sequence of Operation** to determine which component is malfunctioning.

Integrated Furnace Control Board Diagnostics

The control continuously monitors its own operation and the operation of the system. A green LED labeled "STATUS" is provided on control board to indicate system status and faults. Below is a guide to the Status LED codes. If a failure occurs, the STATUS LED will indicate the failure code by the number of flashes. If the LED is on and not flashing, the control is operating normally. If the LED is off, the power to the control is off, the 3 amp fuse on the control board has blown, or the control board is defective. Check the power to the control board and check to see if the fuse is blown. If there is 115 VAC between the control board "L1" and "NEUTRAL" terminals and 24 VAC between the control board "R" and "C" terminals and the STATUS LED is not on, the board is defective and must be replaced.

Integrated Control Board Diagnostic Codes

1 Flash - System Lockout. Ignition Retries Exceeded

Failure to sense flame is often caused by carbon deposits on the flame sensor, a disconnected or shorted flame sensor lead, or a poorly grounded furnace. Carbon deposits can be cleaned with emery cloth or steel wool. Verify the sensor is not contacting the burner and is located in a good position to sense flame.
The ignitor must be positioned to light the gas when the valve opens. If the ignitor has been replaced, verify the position has not changed.
Check sensor lead for shorting and verify the furnace is grounded properly. Verify the gas supply to gas valve, the gas valve is in the "ON" position and is furnace lighting properly. Verify flame engulfs the flame sensor during ignition attempts and gas pressures are correct.

2 Flashes - Pressure Switch Stuck Closed
Check the pressure switch function and verify the combustion air motor is off.

3 Flashes - Pressure Switch Stuck Open
Check pressure switch function and tubing. Verify the combustion air motor is running and pulling sufficient vacuum to engage pressure switch.

4 Flashes - Open Limit Switch
Verify continuity through the main limit switch located in the control box and the manual reset limit switch located next to the blower.

5 Flashes - Flame Sensed More Than 4.24 seconds After Gas Valve is De-Energized.

Verify the gas valve is opening and shutting down properly. Flame in burner assembly should extinguish promptly at the end of the cycle. Check orifice and gas pressure.

6 Flashes – Flame Rollout Switch Open
The furnace does not have a rollout switch. The 12 pin plug has a purple jumper wire in place of the switch. Check the jumper wire to be sure it is securely inserted into the plug.

7 Flashes - Low Flame Sense Signal
Low flame sense current is often caused by carbon deposits on the flame sensor, a poorly grounded furnace or a mis-aligned flame sense probe. Carbon deposits can be cleaned with emery cloth or steel wool. Check furnace and control board grounding. Verify the flame sensor is located in the flame. The minimum current for proper operation is 0.5 DC micro amps.

8 Flashes - Ignitor Relay Fault
The ignitor relay on the control board has failed. Replace the control board.

9 Flashes - Twinning Fault
If twinning is used, verify field installed wiring is connected correctly. Verify both control boards are the same model.

10 Flashes - Open Fuse
Verify the 3 amp fuse on the control board has opened. Verify there are no shorted circuits and replace the fuse.

11 Flashes - Ignitor Open (External to the Control)
Verify the ignitor is operating correctly and has not failed by checking to see if it glows during the ignition cycle. If it does not glow during the ignition cycle, replace the ignitor.

12 Flashes - Combustion Air Blower Relay Error
The relay built into the control board has failed. Replace the control board.

Rapid Flash - Reverse Polarity
Reverse the incoming power wires connected to the control board "L1" and "Neutral" terminals.

Continuous On - Normal Operation - No Fault

Off - Control Failure / No Power / Internal Fault / IEQ Loss
Verify there is 115 VAC across the control board "L1" and "Neutral" terminals. Replace control if power is at the control and the LED is off.

Fault Code Retrieval: The control will flash the last 5 fault codes that occurred when the push button is pressed to give the service tech more troubleshooting capability. The last fault code is flashed first.

Flame Sense Current
Normal flame sense current is approximately 2.8 micro amps DC. Minimum flame sense current threshold is 0.5 micro amps DC.

Checking and Adjusting the Gas Inlet Pressure

1. Follow the procedure for **"Shutting The Furnace Off"** located in **Section 3: Startup and Shutdown Instructions** in the User Information Manual.
2. Turn the switch on the gas valve to the "OFF" position. Refer to Figure 18 for switch location.
3. Turn off the gas supply at the ball valve or gas cock upstream of the gas valve.
4. Locate the furnace gas control.
5. Find the gas valve pressure ports labeled "IN P" which is the inlet or line pressure tap (See Figure 18) and remove the pressure port cap.
6. Use a 3/32" (2.4 mm) Allen wrench to loosen the "IN P" port set screw by turning it counter clockwise one (1) turn only. **DO NOT REMOVE THE SET SCREW.**
7. Connect the 1/8" (3.175 mm) ID flexible tubing to the positive side of the "U" tube monometer or pressure gauge and the other end of the tubing to the port marked "IN P" on the gas valve as shown in Figure 19.
8. Turn the ON/OFF switch on the gas control to the "ON" position.
9. Follow the **"Starting the Furnace"** instructions located in **Section 3: Startup and Shutdown Instructions** in the User Information Manual to properly start the furnace.
10. Check the line pressure. If the pressure is at the pressure specified in Table 1, go to step 10. If the pressure is not at the correct pressure, adjust the pressure at the regulator upstream of the gas valve while the furnace is operating until the correct pressure is measured at the gas valve pressure port.
11. Follow the procedure to **"Shutting the Furnace Off"** instructions located in **Section 3: Startup and Shutdown Instructions** in the User Information Manual.
12. Turn the switch on the gas valve to the "OFF" position.
13. Turn off the gas supply at the ball valve or gas cock upstream of the gas valve.
14. Remove the "U" tube monometer or pressure gauge from "IN P" and tighten the set screw. Replace the pressure port cap.
15. After the correct inlet pressure has been confirmed, follow the instructions on the next page for checking the manifold pressure.

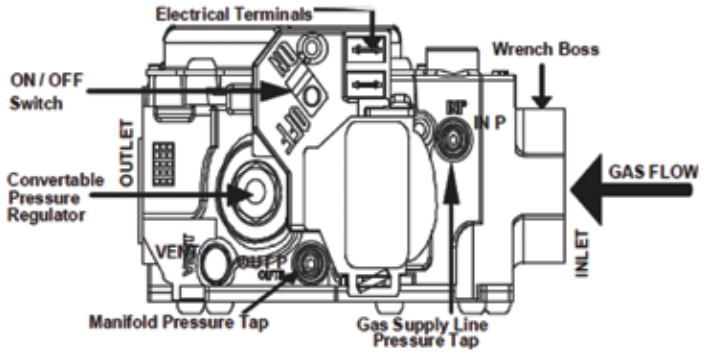


Figure 17: White Rodgers Gas Valve

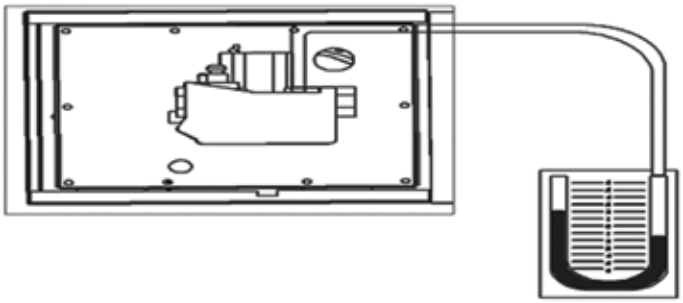


Figure 18: Measuring Inlet (Supply) Gas Pressure (IN P)

INLET GAS PRESSURE RANGE		
	NATURAL GAS	PROPANE (LP)
MINUMUM	4.5" W.C. (1.12 kPa)	11.0" W.C. (2.74 kPa)
MAXIMUM	10.5" W.C. (2.21 kPa)	13.0" W.C. (3.24 kPa)

Table 1: Inlet (Supply) Gas Line Pressure Range

Checking the Manifold Pressure

1. Find the gas valve pressure ports labeled "OUT P" (See Figure 18). OUT P is the manifold pressure tap.
2. Use a 3/32" (2.4 mm) Allen wrench to loosen the set screw by turning it counter clockwise one (1) turn only on the "IN P" port. **DO NOT REMOVE THE SET SCREW.**
3. Connect the 1/8" (3.175 mm) ID flexible tubing to the positive side of the "U" tube monometer or pressure gauge and the other end of the tubing to the port marked "IN P" on the gas valve as shown in Figure 20.
4. Follow the **"Starting the Furnace"** instructions located in **Section 3: Startup and Shutdown Instructions in the User Information Manual** to properly start the furnace.
5. With the furnace operating, read the manifold pressure. The pressure should be between 3.3" W.C. and 3.6" W.C. for natural gas and 9.8" W.C. and 10.2" W.C. for propane (LP). Check the input using the calculations in Table 3 or Table 4. page. If the input is not within 8% of the input listed on the furnace data plate, replace the gas valve.
6. Turn the switch on the gas valve to the "OFF" position.
7. Remove the pressure hose from the pressure port and tighten the set screw.
8. Follow the **"Starting the Furnace"** instructions located in **Section 3: Startup and Shutdown Instructions in the User Information Manual** to properly start the furnace.
9. Proceed to Temperature Rise Check and Adjustment.

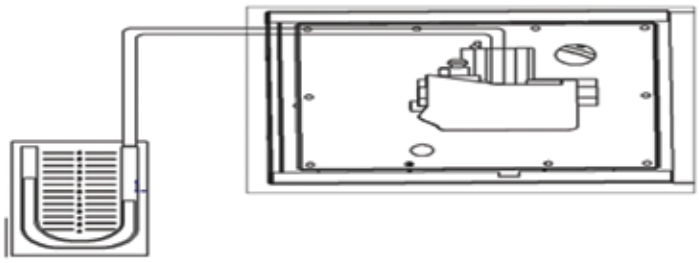


Figure 19: Measuring Outlet (Manifold) Gas Pressure (OUT P)

NOMINAL MANIFOLD PRESSURE	
NATURAL GAS	3.5" W.C. (0.87 kPa)
PROPANE (LP) GAS	10.0" W.C. (2.49 kPa)

Table 2: Nominal Manifold Gas Pressure

Checking the Furnace Input Rate

The gas pressure regulator in the combination gas control is adjusted at the factory for average gas conditions. It is important that gas be supplied to the furnace in accordance with the input rating listed on the furnace data plate. Actual input should be checked and necessary adjustments made after the furnace is installed. Over-firing, a result of excessive gas input, reduces the life of the furnace and increases maintenance. Under no circumstances should the input exceed that shown on the data plate.

Input can be determined by the meter-timing method as long as all other gas burning appliances connected to the meter are off during the test. If this is not possible, use the pressure method.

"IMPORTANT": Inlet pressure and manifold pressure must be checked with the furnace operating when making final adjustments.

Meter Timing Method

1. Shut off all other gas-burning appliances served by the gas meter, including those with pilot lights.
2. Start the furnace and determine the number of seconds it takes to consume 2 cu. ft. or 0.1 cu. meter of natural gas or 1 cu. ft. or 0.05 cu. meter of propane gas. Refer to Table 3 or Table 4 for the procedure for calculating heating input.

The heating value of gas may be obtained from the local utility or gas dealer. If the utility or gas dealer does not know the heating value of the gas you may use the values shown below:

Use 1030 BTU/cu. ft. (38.4 Mj/m^3) for natural gas
Use 2500 BTU/cu. ft. (93.15 Mj/m^3) for propane gas

BTU/cu. ft. or Mj/m^3 = heating value of gas

Input Calculations For Cubic Foot Gas Meters

Formula: BTU/hr = BTU/ft^3 x number of cu. ft. of gas x 3600 ÷ time to consume the number of cu. ft. of gas

Example: Calculating the input for a furnace operating on **natural gas** is as follows:
1030 x 2 x 3600 ÷ 164 = 45,220 BTU/hr

Example: Calculating the input for a furnace operating on **propane (LP)** is as follows:
2500 x 1 x 3600 ÷ 200 = 45,000 BTU/hr

NOTE: Do not use Mj/m^3 number in the above calculations. If the heating value is in Mj/m^3, convert to English units by dividing Mj/m^3 by 0.0372816 to obtain the BTU/ft^3.

Table 3: Input Calculations For Cubic Foot Gas Meters

Input Calculations For Cubic Foot Gas Meters

Formula: Mj/hr = Mj/m^3 x number of m^3 of gas x 3600 ÷ time to consume the number of m^3 of gas

Example: Calculating the input for a furnace operating on **natural gas** is as follows:
38.4 X 0.1 x 3600 ÷ 291 = 47.51 Mj/hr

Then multiply Mj/hr by 0.2778 to get kW as follows:
47.51 x 0.2778 = 13.20 kW/hr

If BTU/hr is desired, multiply kW by 3412 to get BTU/hr as follows:
13.20 x 3412 = 45,038 BTU/hr

Example: Calculating the input for a furnace operating on **propane gas** is as follows:
93.15 X 0.05 x 3600 ÷ 353 = 47.50 Mj/hr

Then multiply Mj/hr by 0.2778 to get kW as follows:
47.50 x 0.2778 = 13.20 kW

If BTU/hr is desired, multiply kW by 3412 to get BTU/hr as follows:
13.20 x 3412 = 45,038 BTU/hr

Table 4: Input Calculations For Cubic Meter Gas Meters

Temperature Rise Measurement and Adjustment

The temperature rise is the supply air temperature minus the return air temperature. The temperature rise must be within the range specified on the furnace data plate. To determine the temperature rise, the furnace must operate continuously for approximately 20 minutes. Measure the temperature of the return air (air entering the furnace) and the supply air (air leaving the furnace). The supply air temperature can be taken either at the plenum or at the closest register to the furnace. The return air temperature can be taken at the furnace return air louvers or in the return air duct. Do not try to read the temperature directly above the heat exchangers because the radiant heat from the heat exchangers will result in incorrect reading. The manufacturer recommends taking the supply air temperature approximately 6 ft (1.83 m) from the furnace. The temperature rise can be changed by increasing the blower speed to reduce the temperature rise or reducing the blower speed to increase the temperature rise.

⚠ DANGER

The limit switch must never be changed to a different temperature setting. The limit switch is designed to protect the heat exchanger from exceeding the maximum allowable outlet temperature and to prevent nuisance tripping of the limit. Changing the temperature of the limit switch can cause either premature heat exchanger failure which can cause personal injury, property damage, a fire, and death.

⚠ DANGER

The temperature rise or the temperature difference between the return air and the supply air temperature must be within the range specified on the furnace data plate.

The supply air temperature must never exceed the Maximum Supply Air Temperature on the furnace data plate. The furnace must never be allowed to operate above the Maximum Supply Air Temperature.
Operating the furnace above the Maximum Supply Air Temperature will cause rapid premature heat exchanger failure that can lead to holes being burnt through the heat exchanger causing high levels of carbon monoxide to enter the living space and/or a fire. This condition can result in carbon monoxide poisoning, personal injury, property damage, and death.

Replacing the Blower Motor

⚠ WARNING

To avoid property damage and personnel injury, make sure the motor leads cannot contact non-insulated metal components of the furnace. Avoid wearing loose clothing or any items that may come in contact with moving parts such as the blower wheel and cause serious personal injury or death.

1. Follow the instructions in **Section 3: Startup and Shutdown Instructions of the User Information Manual** to properly shut this furnace off.
2. Remove the louvered return air filter door located on the front of the furnace.
3. Remove the burner compartment access panel located on the front of the furnace.
4. Unplug the blower motor wiring harness 6-pin plug located on the right side of the control box.
5. Remove the 2 screws on the right side of the blower mounting plate (See Figure 15).
6. Remove the 2 screws on the left side of the blower mounting plate.
7. Lift the blower upward while moving it to the left and pull the blower back to remove it.
8. Label or mark the wires that are connected to the motor terminal block with the terminal they are connected to assure they are connected to the correct terminals on the new motor.

9. Disconnect the wires from the motor terminal block.
10. Loosen the set screw on the blower wheel hub that secures the wheel to the blower motor shaft. Make sure the wheel spins freely with no obstructions. File off any burrs on the motor shaft before trying to remove the wheel.
11. Remove the 3 screws that secure the motor mounting bracket legs to the blower housing and remove the motor from the blower housing.
12. Note or take a photo of the relative position of the belly band and motor mounting bracket legs to the motor and motor terminal block to assure they are positioned correctly on the new motor.
13. Remove the blower motor from the motor mounting bracket by removing the screw and nut that secures the belly band around the blower motor.
14. Insert the new motor into the motor mounting bracket and secure the bellyband to the motor with the screw and nut removed in the previous step. Make sure the belly band and motor mounting bracket legs are positioned in the same place and orientation as they were on the original motor so the motor is not at an angle and the wire terminals are located in the proper position.
15. Secure the motor mounting bracket legs to the blower housing with the 3 screws removed in step 11. Tighten the screws until the mounting bracket arms are securely fastened to the blower housing.
16. Position the blower wheel in the housing until the wheel is centered between the orifices on each side of the housing. Center the setscrew on the center of the shaft flat and tighten the setscrew securely to hold the wheel in place.
17. Connect the blower motor wires to the correct motor terminals. If the wires were not labeled from step 8, refer to the furnace wiring diagram for the correct connections.
18. Reinstall the blower assembly and secure the assembly using the screws that was removed in steps 5 and 6.
19. Connect the blower motor wire harness 9-pin plug to the mating plug located on the top right side of the control box.
20. Install the burner compartment access panel on the front of the furnace.
21. Install the louvered return air filter door on the front of the furnace.
22. Follow the **"Starting the Furnace"** instructions in **Section 3: Startup and Shutdown Instructions of the User Information Manual** to properly start the furnace.
23. Set the thermostat to the desired mode and temperature.

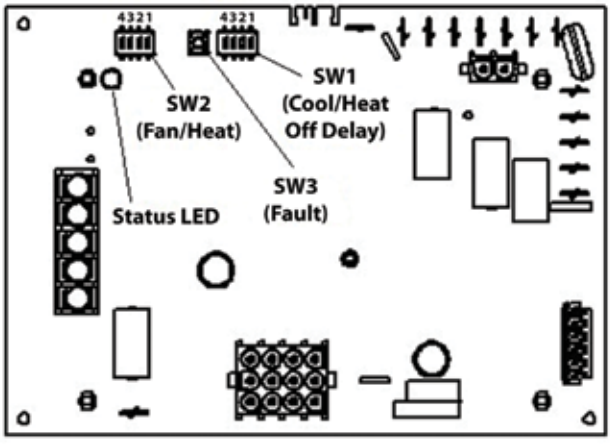


Figure 20: Integrated Furnace Control Board

Circulating Blower Motor Speed Taps and Heating Blower Off Delay - Dip Switch Settings

The circulating blower motor speed tap and heating blower off delay dip switches (SW1 and SW2) are located on the top left side of the control board (Refer to Figure 21). The motor speed taps can be selected for the cooling mode, heating mode, and constant circulation mode by changing the dip switch settings as shown in Table 5. The heating blower off delay can also be selected by changing the dip switch setting as shown in Table 5. The individual dip switches are numbered on each switch body. Push the dip switch in the direction of the "ON" printed on the switch body to select "ON" and away from the "ON" printed on the switch body to select "OFF". The factory and optional settings are shown below.

Factory Cooling Speed: T1 (High)
Optional Cooling Speeds: T2 (Medium High) & T3 (Medium)
Factory Heating Speed: T2 (Medium High)
Optional Heating Speed: T3 (Medium)
Factory Constant Circulation Speed: T1 (High)
Optional Constant Circulation Speeds: T2 – T4
Factory Heating Blower Off Delay Setting: 150 Seconds

Cooling Mode Dip Switch Settings (SW1)												
Motor Speed Tap Number												
T1 Factory Setting			T2			T3			T4			
SW1 Dip Switch Number and Setting			SW1 Dip Switch Number and Setting			SW1 Dip Switch Number and Setting			SW1 Dip Switch Number and Setting		
1	2	3	1	2	3	1	2	3	1	2	3
Off	Off	Off	On	Off	Off	On	On	Off	Off	On	Off

Heating Mode Dip Switch Settings (SW2)							
Motor Speed Tap Number							
T1		T2 Factory Setting		T3		T4	
SW2 Dip Switch Number and Setting		SW2 Dip Switch Number and Setting		SW2 Dip Switch Number and Setting		SW2 Dip Switch Number and Setting	
1	2	1	2	1	2	1	2
Off	Off	On	Off	On	On	Off	On

Constant Circulation Dip Switch Settings (SW2)					
Motor Speed Tap Number					
T1 Factory Setting		T2		T4	
SW2 Dip Switch Number and Setting		SW2 Dip Switch Number and Setting		SW2 Dip Switch Number and Setting	
3	4	3	4	3	4
Off	Off	On	Off	Off	On

Heating Blower Off Delay Dip Switch Setting (SW1)	
150 Seconds (Factory Setting)	100 Seconds
SW1 Dip Switch Number and Setting	SW1 Dip Switch Number and Setting
4	4
On	Off

Table 5: Dip Switch Settings For Circulating Blower Motor Speeds and Heating Blower Off Delay

SECTION 6: BLOWER PERFORMANCE

Furnace Model Number	Mtr HP	Speed Tap	CFM @ 0.10" W.C. E.S.P	CFM @ 0.20" W.C. E.S.P	CFM @ 0.30" W.C. E.S.P	CFM @ 0.40" W.C. E.S.P	CFM @ 0.50" W.C. E.S.P	CFM @ 0.60" W.C. E.S.P	CFM @ 0.70" W.C. E.S.P	CFM @ 0.80" W.C. E.S.P	CFM @ 0.90" W.C. E.S.P	CFM @ 1.00" W.C. E.S.P
G18D---AH3BC G18D---CA3BC	1/3	T4 *	635	463	194	--	--	--	--	--	--	--
		T3	964	901	814	734	630	516	361	109	--	--
		T2	1134	1078	1007	943	857	778	680	566	422	--
		T1	1286	1217	1157	1094	1026	957	880	756	593	299
G18D---CA4BC	3/4	T4 *	884	678	485	360	333	258	136	--	--	--
		T3	1337	1280	1221	1145	1089	1018	955	890	823	629
		T2	1553	1485	1415	1347	1258	1125	979	973	802	535
		T1	1650	1537	1454	1366	1227	1166	1035	1021	853	578

Table 6: Blower Performance Chart – With Filters – Without Cooling Coil
*** Speed tap T4 should only be used for the constant circulation mode.**

SECTION 7: ACCESSORIES AND REPLACEMENT PARTS

PART NUMBER	DESCRIPTION	NOTES
90-RJF1729-AL	ROOF JACK FOR FLAT METAL ROOF	Height: 17" - 29"
90-RJF2551-AL	ROOF JACK FOR FLAT METAL ROOF	Height: 25" - 51"
90-RJS1729-AL	ROOF JACK FOR 3/12 SLOPED ROOF	Height: 17" - 29"
90-RJS2551-AL	ROOF JACK FOR 3/12 SLOPED ROOF	Height: 25" - 51"
90-RJS3868-AL	ROOF JACK FOR 3/12 SLOPED ROOF	Height: 38" - 68"
90-RJS6399-AL**	ROOF JACK FOR 3/12 SLOPED ROOF	Height: 63" - 99"
CROWN ASSEMBLY & FIELD SUPPLIED SEALANT REQUIRED FOR EACH ROOF JACK BODY PURCHASED		
90-RJCRWN-AL	CROWN ASSEMBLY, RJ, GAS	All Roof Jacks
DUCT CONNECTOR WITH FLOOR BASE THAT MAY BE REQUIRED FOR EACH FURNACE (SEE INSTALLATION INSTRUCTIONS)		
90-DCU0-01	1" - 4" DUCT CONNECTOR	
90-DCU0-02	6" - 8" DUCT CONNECTOR	
90-DCU0-03	8" - 12" DUCT CONNECTOR	
FURNACE AND ROOF JACK ACCESSORIES		
90-OUTXT16-AL	RJ 16" EXT OUTDOOR	All Roof Jacks
90-INSXT10-AL	RJ 10" EXT INDOOR	All Roof Jacks
90-RJS56	5-6/12 SLOPE ADAPTER	All Roof Jacks
90-TRM-RNG	CEILING RING	All Roof Jacks
R87JAZ002	DOOR, UPPER, ALL MODELS	All Furnaces
R87JAZ003	DOOR, LOWER, "A" MODEL	G18 Model A
R87JAZ005	DOOR, LOWER, "C" MODEL	G18 Model C

Table 7: Accessories

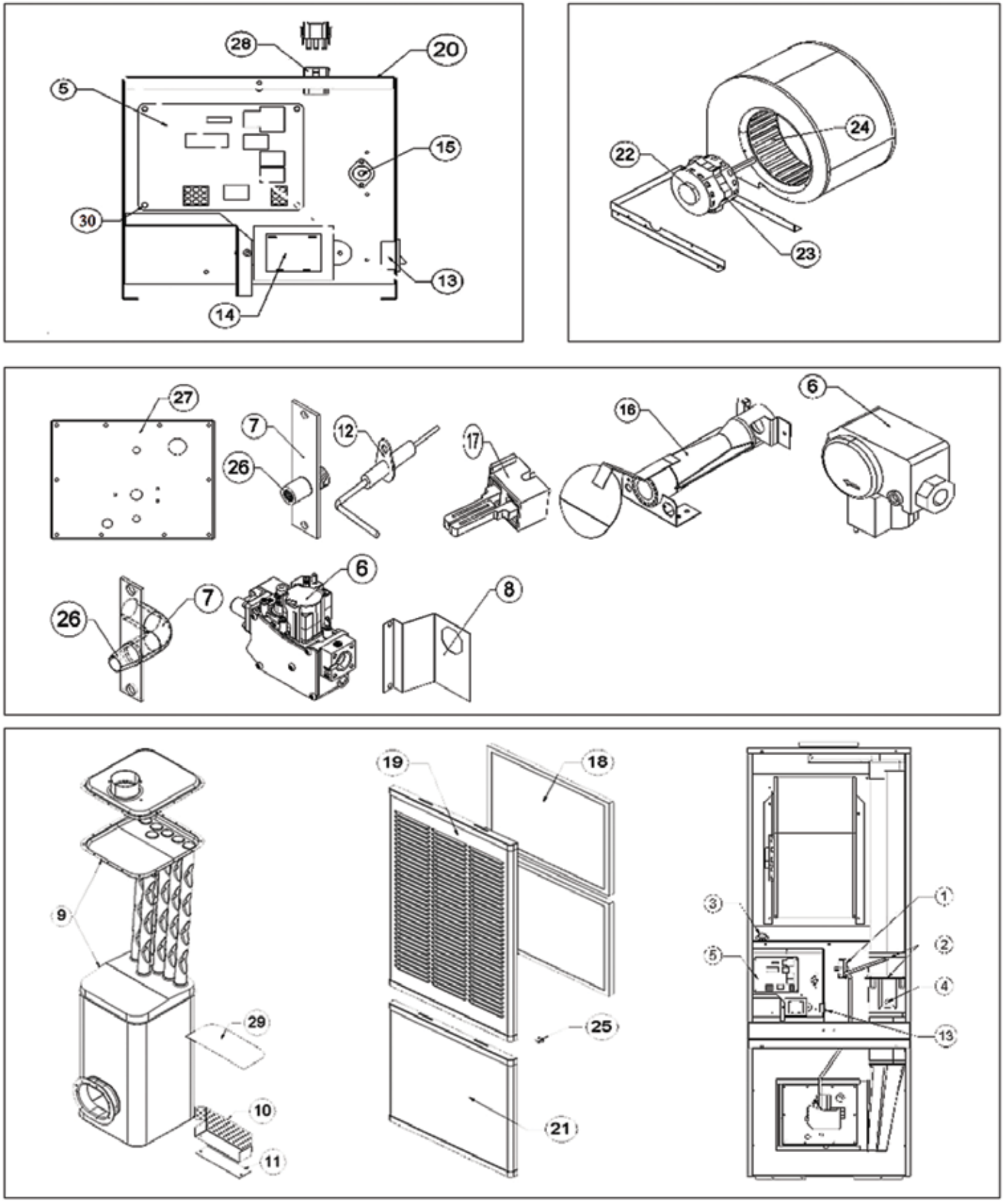


Figure 21: Replacement Parts Identification

G18D Gas Furnace Parts List				
IDENTIFICATION # IN FIGURE 21	**USED ON FURNACE MODEL #**	**PART #**	**QTY**	**DESCRIPTION**
1	G18D060, 070,077, 090	R68DD0014	1	PRES URE SWITCH, N.O, .10
2	G18D060, 070,077, 090	R71CA0006	2 ft.	SILICON TUBING
3	G18D060, 070,077, 090	R68CA0005	1	LIMIT SWITCH, MANUAL RESET, OPEN 180F
4	G18D060, 070,077, 090	R86GF0050	1	COMBUSTION BLOWER AS Y w/AIR ORIFICES
5	G18D060, 070,077, 091	R68GF0021	1	EMERSON INTEGRATED CONTROL BOARD
6	G18D060, 070,077, 090	R68GF0016	1	GAS VALVE -HSI ELECTRIC IGNITION (Supersedes R68GF0012)
7	G18D060, 070,077, 090	R86GF0073	1	GAS MANIFOLD PIPE w/VALVE BRACKET
9	G18D060, 070,077, 090	R86GF0052	1	HEAT EXCHANGER & GASKETS
10	ALL	R87TEU001	1	SINGLE FLAME BAFFLE
12	G18D060, 070,077, 090	R68GF0004	1	FLAME SENSOR
13	G18D060, 070,077, 090	R68DD0009	1	SYSTEM SWITCH - SPST
14	G18D060, 070,077, 090	R68GF0002	1	TRANSFORMER (115V-24V-40VA)
15	G18D060, 070,077, 090	R68CA0004	1	AUTO RESET LIMIT SWITCH, OPEN 140F - CLOSE 110F
16	G18D060	R86GF0096	1	BURNER AS EMBLY 60,000
	G18D070	R86GF0095	1	BURNER AS EMBLY 70,000
	G18D077	R86GF0092	1	BURNER AS EMBLY 77,000
	G18D090	R86GF0094	1	BURNER AS EMBLY 90,000
17	G18D060, 070,077, 090	R68GF0005	1	HOT SURFACE IGNITER
22	G18 w/ H3BB & A3BB BLR	R65BV0021R	1	MOTOR - 1/3 HP ECM 5 SPD
	G18 w/A4BC BLR	R65BV0023R	1	MOTOR - 3/4 HP ECM 5 SPD
23	ALL w/ A4AA BLR	R86GF0056	1	MOTOR MOUNT AS EMBLY
24	G18D060, 070,077, 090	R69AB0001	1	BLOWER WHE L - 10 X 8
25	G18D060, 070,077, 090	R86GF0058	4	DOOR LATCH SET
26	SE ORIFICE CHART (TABLE 8)	R72AG-***	1	MAIN BURNER ORIFICE
27	G18D060, 070,077, 090	R87AF0010	1	BURNER MOUNTING PLATE
28	G18D060, 070,077, 090	R73GF0013	1	12-PIN HARNES FOR EMERSON BOARD
30	G18D060, 070,077, 090	R71FA0006	4	CONTROL BOARD STANDOFFS
	G18D060, 070,077, 090	R87NNE001	1	FILTER RETAINER BRACKET
	ALL	R77GA0003	1	BURNER GASKET
	ALL CA3B(A,B)	R86GF00126-C	1	BLOWER AS EMBLY (1/3 HP ECM 5 SPD)
	ALL CA4B(A,B,C)	R86GF00127-CR	1	BLOWER AS EMBLY (3/4 HP ECM 5 SPD)
	ALL CA(3,4)B(A,B,C)	R73XA0021	1	ECM BLOWER WIRE HARNES
	G18D060	G18HA0601	1	60,000 HIGH ALTITUDE ORIFICE KIT (0-5000 FT)
	G18D060	G18HA0602	1	60,000 HIGH ALTITUDE ORIFICE KIT (6000-10000 FT)
	G18D070	G18HA0701	1	70,000 HIGH ALTITUDE ORIFICE KIT (0-5000 FT)
	G18D070	G18HA0702	1	70,000 HIGH ALTITUDE ORIFICE KIT (6000-10000 FT)
	G18D077	G18HA0771	1	77,000 HIGH ALTITUDE ORIFICE KIT (0-5000 FT)
	G18D077	G18HA0772	1	77,000 HIGH ALTITUDE ORIFICE KIT (6000-10000 FT)
	G18D090	G18HA0901	1	90,000 HIGH ALTITUDE ORIFICE KIT (0-5000 FT)

Notes:

1) Contact factory if furnace heat exchanger needs replacing. 80044464
2) G18D Gas Furnace has 5 Year Limited Warranty on parts from Furnace Manufactured Date
3) All Products Shipped FOB From Ft Worth, TX Factory

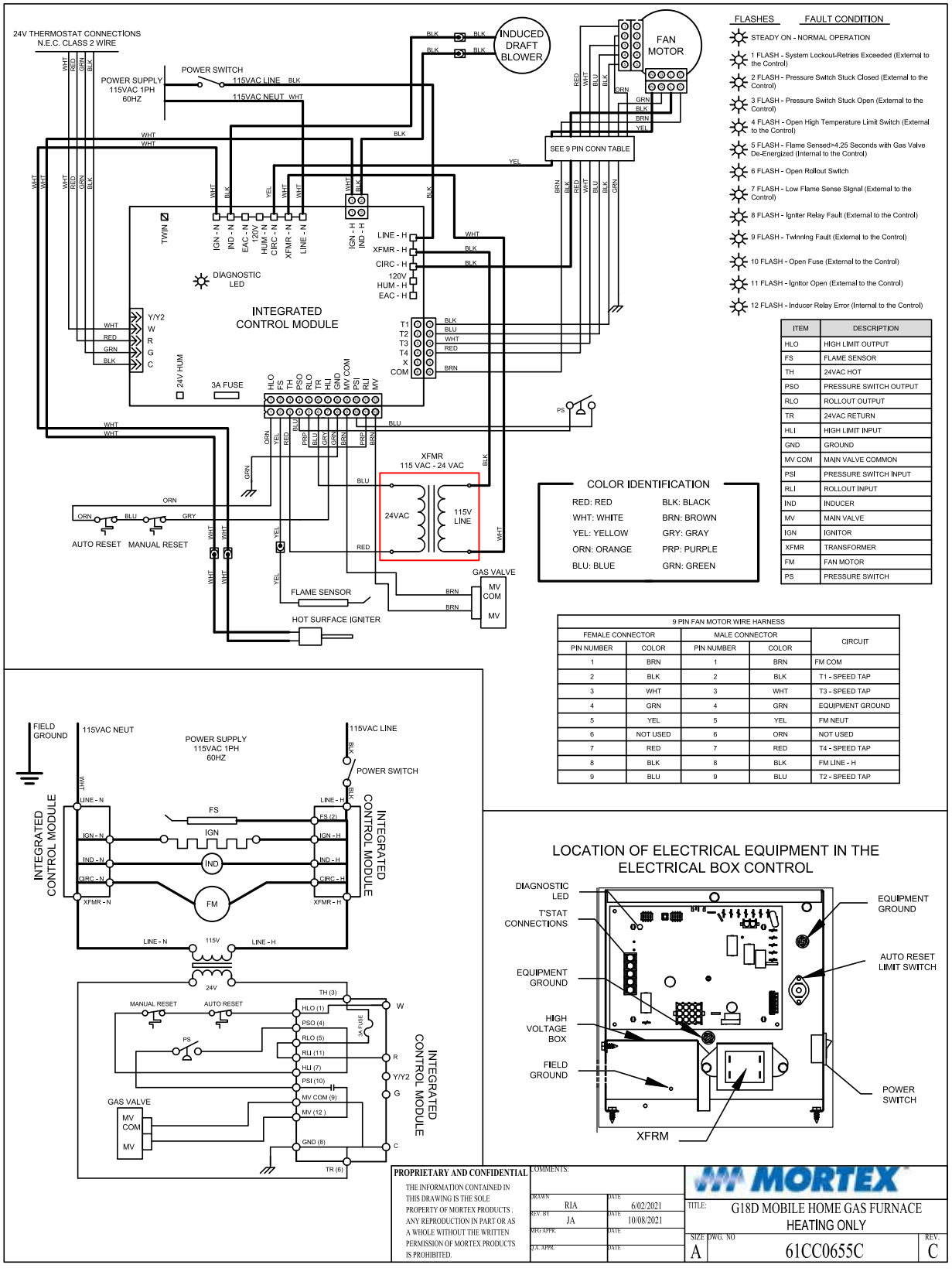
Table 8: Replacement Parts List

HIGH ALTITUDE DERATE CHART - MAIN BURNER ORIFICE SIZE

NATURAL GAS												
ELAVATION	60,000 BTU FURNACE			70,000 BTU FURNACE			77,000 BTU FURNACE			90,000 BTU FURNACE		
	PART NO	ORIF DIA	DRILL SIZE	PART NO	ORIF DIA	DRILL SIZE	PART NO	ORIF DIA	DRILL SIZE	PART NO	ORIF DIA	DRILL SIZE
SEA LEVEL	72AG-144	0.144	27	72AG-157	0.157	22	72AG-166	0.166	19	72AG-173	0.173	17
2000	72AG-1405	0.1405	28	72AG-154	0.154	23	72AG-161	0.161	20	72AG-1695	0.1695	18
2000	72AG-1405	0.1405	28	72AG-152	0.152	24	72AG-161	0.161	20	72AG-166	0.166	19
4000	72AG-136	0.136	29	72AG-1495	0.1495	25	72AG-159	0.159	21	72AG-166	0.166	19
5000	72AG-136	0.136	29	72AG-147	0.147	26	72AG-157	0.157	22	72AG-161	0.161	20
6000	72AG-136	0.136	29	72AG-144	0.144	27	72AG-154	0.154	23	72AG-159	0.159	21
7000	72AG-1285	0.1285	30	72AG-144	0.144	27	72AG-1494	0.1494	25	72AG-157	0.157	22
8000	72AG-1285	0.1285	30	72AG-1405	0.1405	28	72AG-147	70.147	26	72AG-154	0.154	23
9000	72AG-1285	0.1285	30	72AG-136	0.136	29	72AG-144	0.144	27	72AG-152	0.152	24
10000	72AG-120	0.120	31	72AG-136	0.136	29	72AG-1405	0.1405	28	72AG-147	0.147	26

PROPANE (LP) GAS												
ELAVATION	60,000 BTU FURNACE			70,000 BTU FURNACE			77,000 BTU FURNACE			90,000 BTU FURNACE		
	PART NO	ORIF DIA	DRILL SIZE	PART NO	ORIF DIA	DRILL SIZE	PART NO	ORIF DIA	DRILL SIZE	PART NO	ORIF DIA	DRILL SIZE
SEA LEVEL	72AG-086	0.086	44	72AG-0935	0.0935	42	72AG-096	0.096	41	72AG-104	0.104	37
2000	72AG-082	0.082	45	72AG-0935	0.0935	42	72AG-0935	0.0935	42	72AG-1015	0.1015	38
2000	72AG-082	0.082	45	72AG-089	0.089	43	72AG-0935	0.0935	42	72AG-0995	0.0995	39
4000	72AG-082	0.082	45	72AG-089	0.089	43	72AG-0935	0.0935	42	72AG-0995	0.0995	39
5000	72AG-081	0.081	46	72AG-089	0.089	43	72AG-089	0.089	43	72AG-098	0.098	40
6000	72AG-078	0.078	47	72AG-086	0.086	44	72AG-089	0.089	43	72AG-096	0.096	41
7000	72AG-078	0.078	47	72AG-086	0.086	44	72AG-086	0.086	44	72AG-0935	0.0935	42
8000	72AG-076	0.076	48	72AG-082	0.082	45	72AG-086	0.086	44	72AG-0935	0.0935	42
9000	72AG-076	0.076	48	72AG-081	0.081	46	72AG-082	0.082	45	72AG-089	0.089	43
10000	72AG-073	0.073	49	72AG-078	0.078	47	72AG-081	0.081	46	72AG-089	0.089	43

Table 9: High Altitude Gas Orifice Size Chart

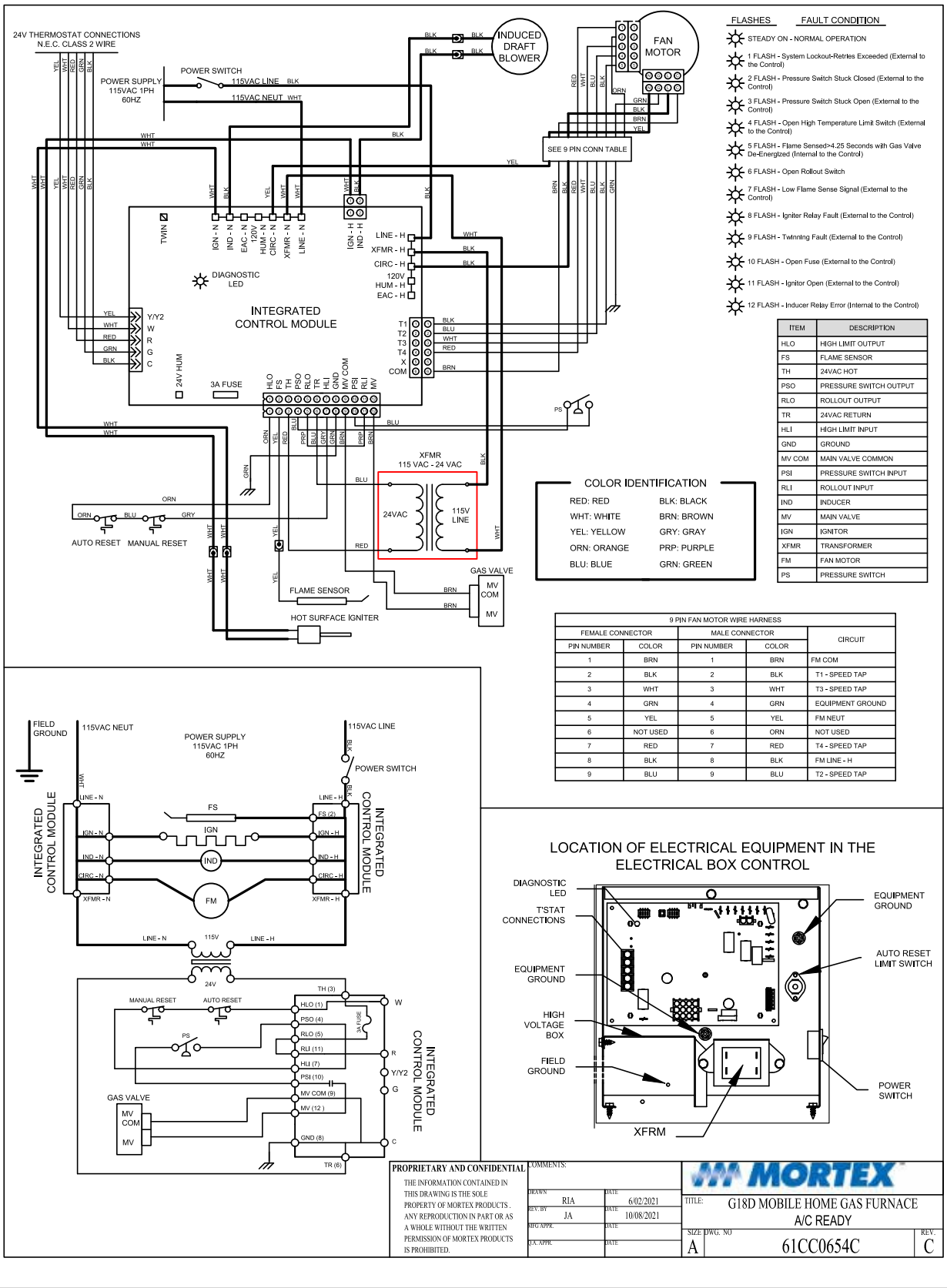


ITEM	DESCRIPTION
HLO	HIGH LIMIT OUTPUT
FS	FLAME SENSOR
TH	24VAC HOT
PSO	PRESSURE SWITCH OUTPUT
RLO	ROLLOUT OUTPUT
TR	24VAC RETURN
HLI	HIGH LIMIT INPUT
GND	GROUND
MV COM	MAIN VALVE COMMON
PSI	PRESSURE SWITCH INPUT
RLI	ROLLOUT INPUT
IND	INDUCER
MV	MAIN VALVE
IGN	IGNITOR
XFMR	TRANSFORMER
FM	FAN MOTOR
PS	PRESSURE SWITCH

9 PIN FAN MOTOR WIRE HARNESS				
FEMALE CONNECTOR		MALE CONNECTOR		CIRCUIT
PIN NUMBER	COLOR	PIN NUMBER	COLOR	
1	BRN	1	BRN	FM COM
2	BLK	2	BLK	T1 - SPEED TAP
3	WHT	3	WHT	T3 - SPEED TAP
4	GRN	4	GRN	EQUIPMENT GROUND
5	YEL	5	YEL	FM NEUT
6	NOT USED	6	ORN	NOT USED
7	RED	7	RED	T4 - SPEED TAP
8	BLK	8	BLK	FM LINE - H
9	BLU	9	BLU	T2 - SPEED TAP

Figure 22: Wiring Diagram – Heating Only Models

NOTE: If any of the original wires supplied with this furnace must be replaced, replace with Type 105°C thermoplastic or equivalent wire.



ITEM	DESCRIPTION
HLO	HIGH LIMIT OUTPUT
FS	FLAME SENSOR
TH	24VAC HOT
PSO	PRESSURE SWITCH OUTPUT
RLO	ROLLOUT OUTPUT
TR	24VAC RETURN
HLI	HIGH LIMIT INPUT
GND	GROUND
MV COM	MAIN VALVE COMMON
PSI	PRESSURE SWITCH INPUT
RLI	ROLLOUT INPUT
IND	INDUCER
MV	MAIN VALVE
IGN	IGNITOR
XFMR	TRANSFORMER
FM	FAN MOTOR
PS	PRESSURE SWITCH

9 PIN FAN MOTOR WIRE HARNESS				
FEMALE CONNECTOR		MALE CONNECTOR		CIRCUIT
PIN NUMBER	COLOR	PIN NUMBER	COLOR	
1	BRN	1	BRN	FM COM
2	BLK	2	BLK	T1 - SPEED TAP
3	WHT	3	WHT	T3 - SPEED TAP
4	GRN	4	GRN	EQUIPMENT GROUND
5	YEL	5	YEL	FM NEUT
6	NOT USED	6	ORN	NOT USED
7	RED	7	RED	T4 - SPEED TAP
8	BLK	8	BLK	FM LINE - H
9	BLU	9	BLU	T2 - SPEED TAP

Figure 23: Wiring Diagram – A/C Ready Models

NOTE: If any of the original wires supplied with this furnace must be replaced, replace with Type 105°C thermoplastic or equivalent wire.