USERS INFORMATION MANUAL

DOWNFLOW ONLY
SINGLE STAGE GAS FIRED FURNACE
MODELS: G18D SERIES

For Installation In:
1. Manufactured (Mobile) Home 2. Recreational Vehicle
3. Modular Homes & Buildings 4. Residential Homes

LIST OF SECTIONS – USERS INFORMATION MANUAL

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CONTACT INFORMATION

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Fort Worth, TX 76106

WARNING:
FIRE OR EXPLOSION HAZARD
Failure to follow safety warnings exactly could result in serious injury, death, or property damage.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

- **WHAT TO DO IF YOU SMELL GAS:**

- Do not try to light any appliance.
- Do not touch any electrical switch. Do not use any phone in your building, 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 a qualified installer, service agency or gas supplier.

SECTION I: SAFETY

SAFETY SYMBOLS AND SIGNAL WORDS

This is a safety alert symbol. When you see this symbol on labels, or in manuals, be alert to the potential for personnel 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: indicated 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.

Home owners and / or 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 attic or other insulated space or when insulation is added to make sure that insulation has been kept away from the furnace.
3. The furnace needs air for combustion in order to operate properly and safely. Do not block or obstruct air openings on the furnace, air openings to the area where the furnace is installed, or spaces around the furnace.
4. Follow the instruction exactly as shown on the operating instructions label, or the startup and shutdown instructions located on page 3 of this manual, to properly start the furnace or turn the furnace off.
5. Should the gas supply fail to shut off or if overheating should occur shut off the manual gas valve located on the gas pipe before turning off the electrical power supply to the furnace.
6. Do not use this furnace if any part has been under water, a flood damaged furnace is extremely dangerous. 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
7. Flammable materials, solvents or other volatile liquids should be stored only in approved containers outside your home. These materials vaporize easily and are extremely dangerous.
8. Do not store cleaning materials near your furnace. Materials such as bleaches, detergents, powdered cleaners, etc. can cause corrosion of the heat exchangers causing premature failure.
9. 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 and (LP) Propane Gas 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 / or loss of life.

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

⚠WARNING

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

Only qualified service personnel, a contractor, or an installer may refer to the service and maintenance section of this manual for assistance or for additional information on this appliance.

⚠ CAUTION

This product requires periodic routine maintenance and cleaning of the exterior surfaces by the homeowner or user to remove dust and debris. Any additional service must be performed by qualified personnel. This appliance must be serviced and maintained as specified in these instructions and / or 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 exactly could result in serious injury, death, or property damage.
A fire or electrical hazard may result causing property damage, personal injury or loss of life.

⚠ 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 use the furnace can result in a fire.

A qualified contractor, installer, or service agency must be contacted to inspect the furnace for any water damage and replace all components, control system parts, or electrical parts that have been damaged. If enough damage is present, the furnace may need to be replaced

⚠ 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

Appliances must not be installed where they may be exposed to potentially explosive or flammable atmosphere.

Installing this appliance in an explosive or flammable atmosphere will result in a fire or explosion causing personnel injury, property damage and / or death.

COMBUSTION AIR QUALITY (LIST OF CONTAMINANTS)

This furnace will require **outdoor air for combustion.** This furnace cannot be exposed to any of the following environments:

- Restricted Environments.
- Buildings with indoor pools.
- Furnaces installed in laundry rooms.
- Furnaces installed in hobby or craft rooms.
- Furnace installed in chemical storage areas.
- Chemical Exposure.

This furnace will require **outdoor air for combustion.** The furnace cannot be exposed to the following substances and/or 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, ECT.
- ❖ Hydrochloric acid.
- ❖ Cements and glues.
- ❖ Antistatic fabric softeners.
- ❖ Masonry acid washing materials.

When outdoor air is used for combustion, 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 your warranty.

⚠WARNING

Appliances must not be installed where they may be exposed to potentially explosive or flammable atmosphere. Installing this appliance in an explosive or flammable atmosphere will result in a fire or explosion causing personal injury, property damage and/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 gas valve to outside the home in order to prevent gas leaks inside the home. Copper and brass tubing and fittings (except tin lined) shall not be used if the gas contains more than a trace (0.3 grains per 100 cubic ft.) of hydrogen sulfide gas. Check with your gas supplier about gas content and for a gas leak detector.

⚠WARNING

HAZARD OF ASPHYXIATION: Negative pressure inside the closet with closet door closed and the furnace blower operating cannot be more negative than minus 0.05 inwc.

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 Section I COMBUSTION AIR QUALITY.

⚠WARNING

DO NOT wet electronic components or wire connections during the leak test. Wetting electronic components may damage circuitry and to the wire connections and can cause a hazardous situation.
Dry moisture from all leads and terminals if wetting occurs. Wait at least 12 hours for the electronic components and wire connections to fully dry before energizing the system**.**

⚠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 heating / cooling equipment can be hazardous due to electrical components
Only trained and qualified personnel can service or repair heating / cooling equipment. The home owner **must never** try to perform service, repair or maintenance on this appliance.
Untrained service personnel can 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 working on this appliance.

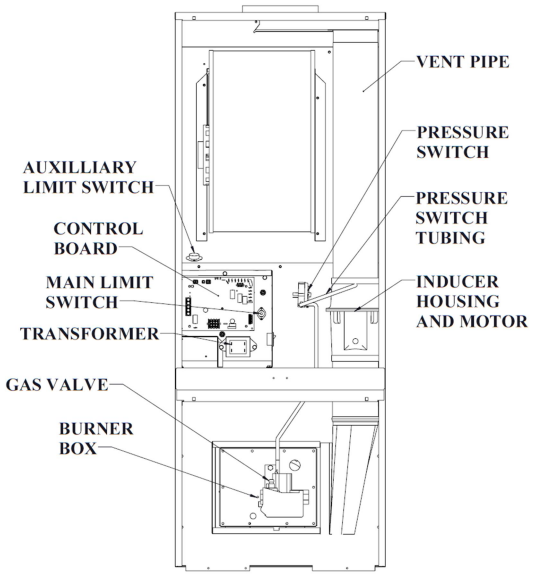

FIGURE 1: Component Locations

INSTRUCTIONS FOR EXAMINING THE FURNACE
It is the owner's responsibility to ensure that an annual inspection of the entire heating portion of the unit is made by a qualified service agency. Examine the furnace as outlined below 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 flames to make sure they are in good adjustment. The flame should appear long and cylindrical (Refer to Figure 2 as comparison to the actual flame.) with a blue color. Some yellow streaks may appear especially near the tip of the flame. (LP) Propane flame appears less blue and has considerably more yellow streaking.

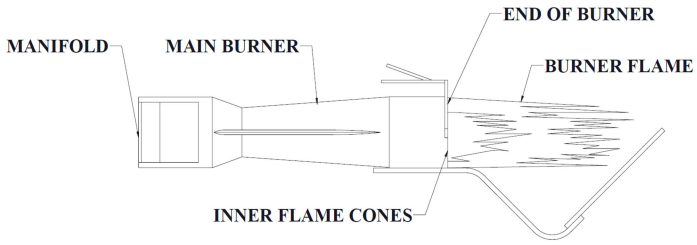

FIGURE 2: Burner Flame Drawing

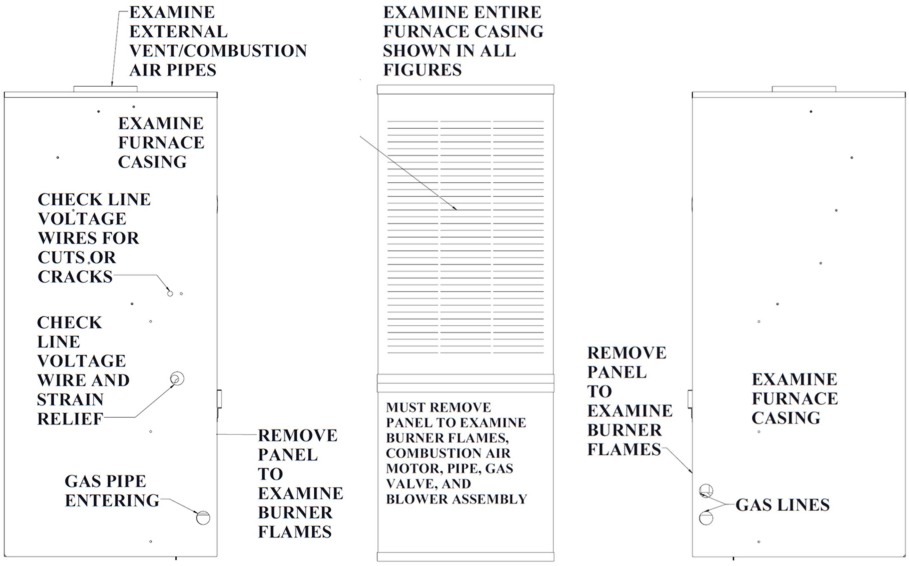

FIGURE 3: Furnace Examination Checkpoints

SECTION II: OWNERS INFORMATION AND SEASONAL INFORMATION

HOW YOU'RE FURNACE WORKS

Your Furnace is a very easy appliance to take for granted. Season after season, it sits there in your home keeping you warm and comfortable. For this reason you may never have given much thought to the way your furnace operates. In order to get the safest and most efficient operation from your furnace you should understand how your furnace does its job.

This furnace may only be installed in the vertical position. Figure 3 shows a typical model in the vertical position. The furnace is equipped with a transformer, pressure switch, integrated control board, burner assembly, combustion air assemble, transformer, and a blower assembly. The transformer provides 24 VAC to the thermostat.

When you set your thermostat to provide more heat in your home, you are starting the heating cycle of the furnace. The heating cycle is as follows:

1. The thermostat calls for heat which places 24 VAC on the "W" terminal on the control board.
2. 24 VAC on the "W" terminal on the control board starts the combustion air blower motor. Operating the combustion air blower motor will purge any remaining gases from the heat exchanger and will send the gases out the vent.
3. Once the combustion air blower motor is running the pressure switch will close providing there is no vent restriction or blockage.
4. After the pressure switch closes the hot surface igniter will be energized and will start to glow.
5. After the igniter gets hot the control will open the gas valve and gas will start to flow of gas. The gas will ignite as it passes by the igniter. The flame sensor will sense the presents of a 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, the 24 VAC signal is present on the control board "W" terminal and no limit switches open.
6. After ignition has been established the indoor blower motor will be energized distributing warm air through the home.
7. When the temperature of the home has reached the setting on the thermostat, the 24 VAC signal will be removed from the "W" terminal on the control board. This causes the gas valve to de-energize removing the flame from the heat exchanger. The control board will start the indoor blower time delay and will turn off the blower once the delay has timed out.
8. This concludes the heating cycle until the thermostat calls for heat again.

The furnace is equipped with the controls necessary for proper and safe operation. The various components referred to in this manual are identified in Figure 1.

The following list includes important facts and information regarding the gas furnace and its inclusions.

1. Furnace is rated at 115 volts AC at 60 Hertz
2. Furnace is available in two (2) cabinet sizes.
3. All furnaces are equipped with a blower
4. This furnace is designed for downflow application only.
5. This furnace must not be operated without furnace door installed.

GENERAL OWNER INFORMATION

1. Refer to the furnace rating plate for the furnace model number and the operating specifications for safe operation.
2. Provide clearances for servicing ensuring service access is allowed for the burner compartment, control box and the blower compartment.
3. Failure to carefully read and follow all instructions in this manual can result in malfunction of the furnace, personal injury, property damage and / or loss of life.
4. If the furnace is installed in a residential garage it must be installed so that the electric heaters are located not less than 18 inches above the floor and the furnace must be located or protected to avoid physical damage by vehicles.
5. These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances these instructions exceed certain local codes and ordinances, especially those who have not kept up with up with changing construction practices. These instructions are to be followed and are the minimum requirement to perform service or repairs on this appliance.

The Service Technician

The furnaces best friend is a qualified service technician. If the unit gives any indication of improper operation, call the service technician. The service technician is allowed to perform the normal routine care of your furnace. He 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 home owner and will add years of comfort.

Warranty and Responsibilities

It is the sole responsibility of the home owner 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 for use with this furnace, improper operating procedures by the user, ECT.

Some specific examples of service calls which will be excluded from warranty reimbursement are:

1. Correcting faulty duct work in the home. This can be due to not enough ducts or ducts 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 firm understanding of these responsibilities with the installer or service company so there no misunderstanding at a later time.

While you are away
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 you are planning to be away from home for a long period of time have someone check on your home everyday epically when the outside temperatures will be below 35°F to ensure the furnace is operating properly. This may prevent water pipes from freezing.

When to Call For Service Assistance
Very often time can be saved if you give a service agency the information about the furnace ahead of time. This will enable the service agency to determine the specific components used and possibly indentify the problem, thus arriving with the parts to fix the problem.

SERVICE AGENCY INFORMATION
Fill in Below
COMPANY:_____
ADDRESS:_____
TELEPHONE (DAYTIME):_____
TELEPHONE (EMERGENCY)_____

SECTION III: STARTUP AND SHUTDOWN INSTRUCTIONS

STARTUP AND SHUTDOWN INSTRUCTIONS
Read the instructions below before trying to start the furnace.

⚠WARNING

If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personnel injury, and / or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
B. BEFORE OPERATING; smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
C. Use only your hand 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.
D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and replace any part of the control system and any gas control which has been under water.

Operating Instructions
1. STOP! Read the safety information above.
2. Set the thermostat to the lowest setting.
3. Turn off all electric power to the appliance.
4. Remove furnace door.
5. Move gas control switch to the "OFF" position. Do not force. See Figure 4 for switch location.
6. Wait (5) five minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above. If you do not smell gas, go on the next step.
7. Move gas control switch to the "ON" position. Do not force. See Figure 4 for switch location.
8. Replace the burner access panel.
9. Turn on all electrical power to the appliance.
10. Set thermostat to the desired setting. Burner will light, which may take 30-60 seconds.
11. After three (3) trials for ignition, if the appliance will not operate follow the instructions "TO TURN OFF THE APPLIANCE" and call your service technician or gas supplier.

TO TURN OFF THE APPLIANCE
1. Set the thermostat to the lowest setting.
2. Turn off all electrical power to the appliance if service is to be preformed.
3. Remove burner 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 normally, 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 service circuit breaker box or check any on/off switches that may be used for service disconnect switches.
3. Check the 3 amp fuse on the left side of the control board to determine if it has blown. A replacement fuse can be purchased at your local automotive, electronics or retail store that has an automotive department.
4. Make sure the air filters are clean, return grilles are not obstructed, and supply air registers are open.
5. Make sure the control switch on the gas valve is in the "ON" position. Refer to Figure 4 for control switch location.
6. 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 service the furnace yourself. Call a qualified service agency to repair the furnace.
If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personnel injury, and / or loss of life.

⚠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 on the main electrical service entrance (Circuit Breaker Box) to the off position. Call a qualified service personal to trouble shoot and repair the furnace. DO NOT allow the furnace to continue to cycle on the limit controls.

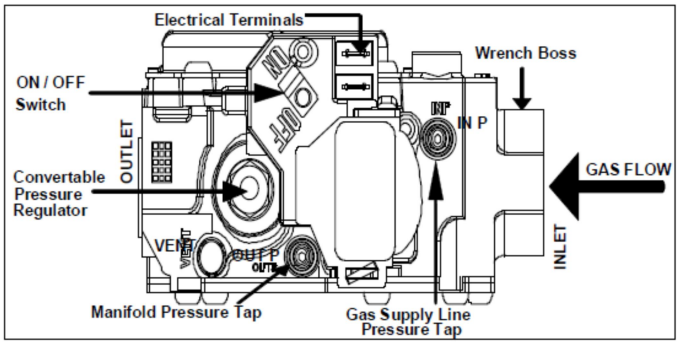

Figure 4: White Rodgers 36J Gas Valve Components

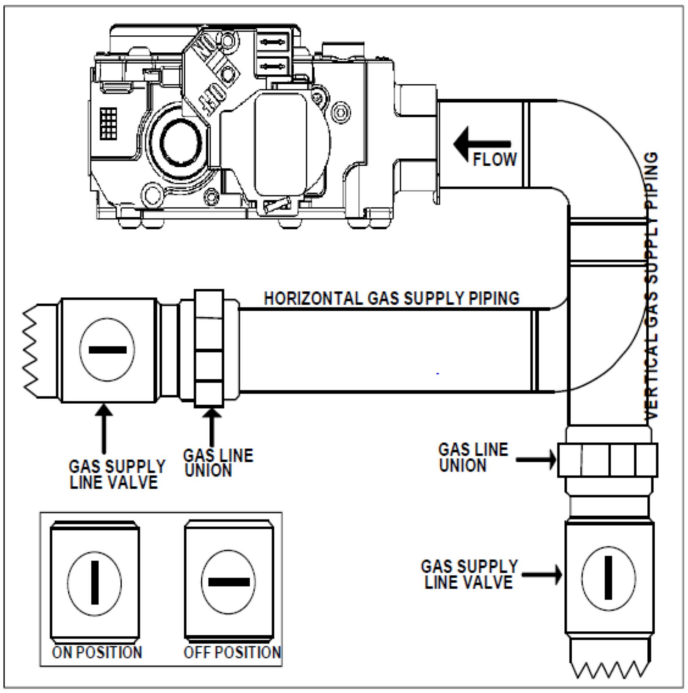

Figure 5: Gas Supply Pipe Shutoff Valve Locations

NOTE: As a safety precaution all electrical power and gas supply valves must be shut off before servicing.

SECTION IV: OWNER MAINTENANCE

⚠WARNING

Before proceeding make sure the area is well ventilated. Turn the thermostat "OFF". If the blower is running, wait until it stops automatically. Follow the shutdown instructions located on page 6. Check all metal parts and surfaces to be sure they have cooled to room temperature before you begin.

AIR FILTERS

All appliances need maintenance at the beginning of each heating season in order to operate properly. The annual service must be performed by a qualified service personal. The home owner 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 indicate the location of the air filters in the louvered return air door.

Figure 6: Return Air Louvered Door Air Filter Location

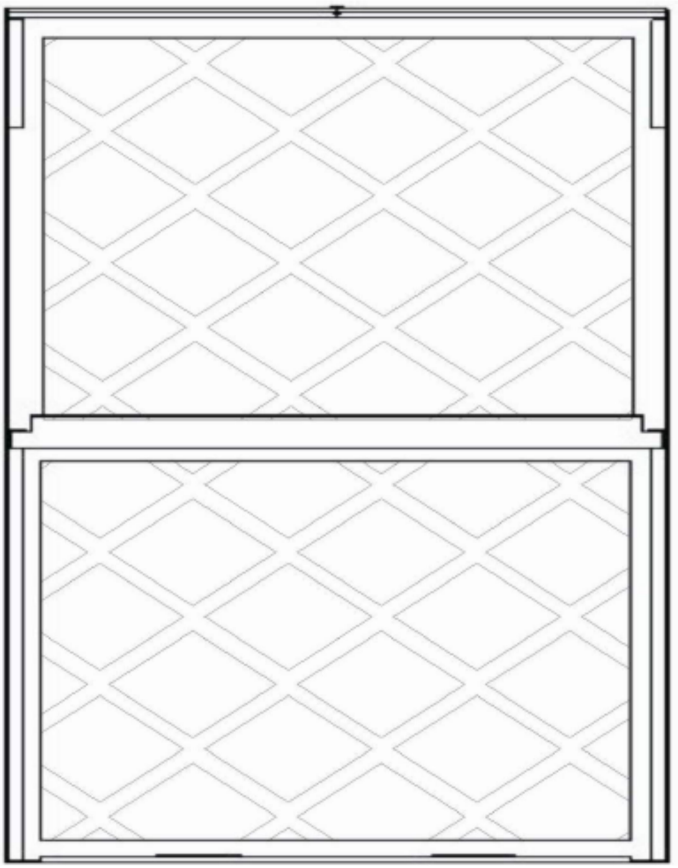

Figure 7: Return Air Louvered Door – w/ Two (2) 16" x 20" x 1" Air Filters

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

- Check combustion air and vent pipe for blockage.

- Check all components to be sure they are in good condition and that there are no obvious signs of deterioration.
- Check for dirt or lint on any surfaces or on components. Do not try to clean any of the surfaces or components, cleaning of the furnace and its components must be done by a qualified service professional.

If during the visual inspection of your furnace you find any of the following conditions

- Excessive amounts of dirt and lint on components.
- Damaged or deteriorated components or surfaces.
- Leaks or blockage in the vent pipe passages.
- Water on any surface inside or outside of the furnace.

Do not operate the furnace. Call a certified dealer or service contractor to check, and / or clean your furnace. The dealer or service contractor can provide you with additional information or simply answer your questions about the operation of your furnace and why the furnace must be checked and / or cleaned. If all components appear to be in good operating condition, replace the front panels. Follow the startup instructions on page 6.

Replacement Air Filter Sizes

All models require two 16" x 20" x 1" high velocity air filters. Replace the air filters with the same size and type that was removed.

Replacing Return Grille Air Filters

Follow these easy steps to replace the filters located in the return air grille:

1. Follow the procedure "**To Turn Off the Appliance"** in the Startup and Shutdown Instructions section of these instructions.
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 towards you then lift up slightly pulling towards you 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 straight edge screw driver 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. Remove the filter material from the plastic wrap they come in.
7. Place the air filters in the door.
8. Place the center retaining bracket between the two air filters. Slide the bracket under the flange on the left side of the door. Place a straight edge screw driver between the bracket and the right side door flange, then, 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.
9. Lift the door up against the cabinet and align the slots in the bottom of the door with the tabs on the divider panel.
10. Push the door forward lining up the plastic door strike in the top cover with the hinge in the door.
11. Push the top of the door, on the left side forward until the door strike snaps into the latch.
12. Push the top of the door, on the right side, forward until the door strike snaps into the latch.
13. Follow the instructions to "**Turn On / Start the Appliance"** in the Startup and Shutdown section of these instructions.

SERVICE AND MAINTENANCE MANUAL

Section I SAFETY

THE HOME OWNERS AND / OR APPLIANCE USERS MUST STOP HERE!

This section has been designed to assist a **qualified service agency** in performing service and maintenance on this appliance.

The home owners and / or the appliance user must never attempt to perform any service or maintenance on the appliance especially when it involves the removal or adjustment of any parts and / or components.

⚠WARNING

The manufacturer will not be responsible for any damage to the appliance or for any repairs due to improper parts changes, improper maintenance, improper furnace adjustments or improper modifications made by the homeowner and/or the appliance user.

The manufacturer will not be responsible for any damages or repairs if the home owner and/or appliance user use 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 a fire causing property damage, personal injury, and / or loss of life.

If the homeowner or the appliance user attempts to perform any maintenance or repairs to this appliance, the appliance warranty will be void and the home owner 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 you see this symbol on labels or in manuals, be alert to the potential for personnel 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: indicated 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 personal injury or property damage.

Refer to this manual for assistance or for additional information consult a qualified contractor, installer, or service agency.

⚠ CAUTION

This product must be serviced and maintained as specified in these instructions and/or 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 exactly could result in serious injury, death, or property damage.

A fire or electrical hazard may result causing property damage, personal injury or loss of life.

SAFETY REQUIREMENTS

1. This gas fired furnace has a 115 volt 60 HZ electrical supply circuit. Make sure you check each electrical circuit with a meter to be sure the power has been disconnected.
2. Insulating materials may be combustible. The furnace must be kept free and clear of insulating materials.
3. Follow the instructions exactly as shown in Startup and Shutdown Section in this manual to properly Startup or Shutdown this appliance.
4. Make sure all moving parts have come to a complete stop before attempting to perform any work once the furnace door has been removed. Moving parts can cause serious injury if clothing or body parts get caught in the moving part.

⚠WARNING

ELECTRICAL SHOCK, FIRE HAZARD

Failure to follow the safety warnings exactly could result in dangerous operation, serious injury, death, or property damage.

Improper servicing could result in dangerous operation, serious injury, death, and /or property damage.

- 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.
- 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, dangerous operation, serious injury, death, and/or property damage.

Section II: FURNACE MAINTENANCE

This furnace must be cleaned and adjusted by a certified dealer or qualified service contractor once a year or before the start of each heating season. The following items must be cleaned and serviced or replaced if there 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 /air intake system, the manufacturer recommends this service be conducted by a qualified service agency. The operation of the appliance requires the reassembly of the vent/combustion air intake system to be sealed and have adequate passageways for venting and combustion air to the appliance.
3. The burners, igniter, and flame sensor.
4. The blower wheel and the motor Also check for dirt, dust or debris in the blower wheel and the motor.
5. The supply air duct system for excessive dust, dirt or debris
6. The return air louvered door for excessive dust, dirt or debris
7. All electrical wiring for wear and / or damage.
8. Check the air conditioning evaporator coil for dust, debris or damage.
9. Check the evaporator 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! **The home owner or appliance user MUST STOP HERE! If you continue you do so at your OWN RISK AND EXPENSE!**

Burner Removal and Cleaning

The main burners should be removed and visually inspected for dirt and debris accumulation every time the annual maintenance. Follow the procedure below if cleaning is required.

1. Follow the instructions exactly as shown in the "Startup and Shutdown Instructions" in this manual to properly shutdown this appliance.
2. Remove the burner access door 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.
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 moving when the gas line is being removed.
5. Remove the electrical wires from the terminals on the gas valve.
6. Unplug the flame sensor and igniter wires from the insulated spade plugs.
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 too clear the air baffles and slides the burner assembly back to remove.

Empty any dirt or debris using a small soft brush and a vacuum cleaner.

NEVER clean the burners using water. Water will cause the burner to corrode and / or rust.

⚠WARNING

DO NOT OVER TORQUE the gas supply pipe into the gas valve. If the pipe is over tightened into the gas valve it will damage the valve.
The manufacturer recommends the hand tightening gas pipe to the gas valve, then giving the pipe ½ turn with a wrench.

Check for leaks.
Never test for gas leaks with an open flame.
Check all gas piping connections with a commercially available soap solution made specifically for detection of leaks.

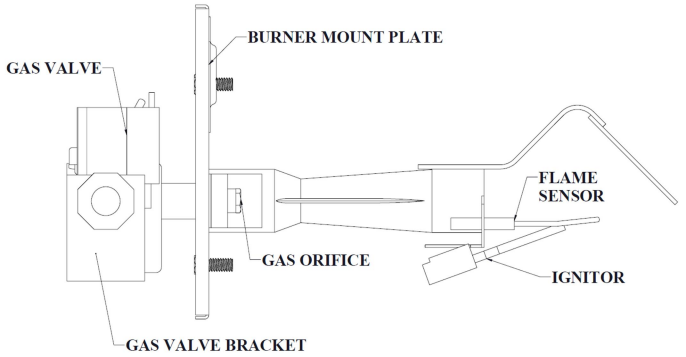

Figure 8: Burner Assembly

9. 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.
10. Secure the burner assembly to the burner box with the screws that were removed in step 7.
11. Connect the flame sensor and igniter wire spade terminals to the insulated spade plugs that were unplugged in step 6.
12. Reconnect the electrical wires to the terminals on the gas valve
13. Connect the gas supply line. You should use new pipe that is properly chamfered, reamed, and free of burrs and chips. If you are using old pipe, be sure it is clean and free of rust, scale, burrs, chips, and old pipe joint compound.

Apply pipe joint compound (pipe dope) **that is approved for all gases, only to the male threads of the pipe joints. DO NOT** apply compound to the first two threads.

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 moving when the gas line is being tightened. Do not over tighten the gas pipe. This will cause damage to the gas valve. If you have a torque wrench **torque: 375 in-lb maximum**. If you do not have a torque wrench then tighten by hand the tighten pipe then, turn the pipe an additional ¾ of a turn or until **connection is snug and not leaking.**

14. Connect the union joint and tighten the union and turn the manual gas valve back to the "ON" position. Refer to Figure 5.
15. Reinstall the burner access door on the front of the furnace.
16. Follow the instructions exactly as shown in the "Startup and Shutdown Instructions" in this manual to properly startup this appliance.

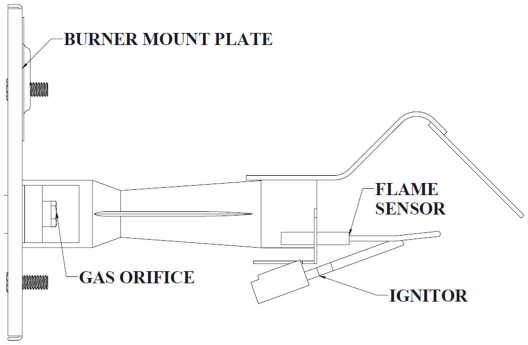

Figure 9: Burner Assembly, Burner Support Plate, Retaining Screws and Gas Orifices

Cleaning the Heat Exchanger

1. Remove the burner assembly as described in **"Burner Removal and Cleaning"** steps 1-8.
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 clean any areas of the inside portions of the heat exchanger that may need cleaning.
4. Check all of the baffles for cracks and/or deterioration.
5. Use a mirror to check the baffle, inside the drum, at the top of the heat exchanger for cracks and/or deterioration.
6. Check the heat exchanger for any visible signs of cracks or holes.
7. Use a brush and vacuum to clean the inside portion burner box.
8. Reinstall 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.
9. Reinstall the burner assembly as described in **"Burner Removal and Cleaning"** steps 9-16.

⚠WARNING

CARBON MONOXIDE HAZARD

If the gaskets on the combustion air blower assembly or the flue box cover have been damaged, but have not been replace there is a potential of these parts to develop leaks in the combustion system. These leaks will cause incomplete combustion to occur causing high levels of carbon monoxide to leak into the living space.

Under no circumstances should this equipment be operated if these gaskets have been damaged.

TURN THE FURNACE OFF UNTIL THE GASKETS HAVE BEEN REPLACED!!

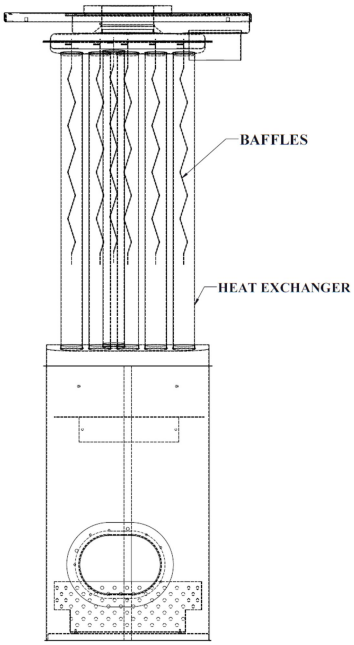

Figure 10: Heat Exchanger Assembly w/ Baffles

Cleaning the Flue Box Assembly

1. Follow the instructions exactly as shown in the "Startup and Shutdown Instructions" in this manual to properly shutdown this appliance.
2. Remove the louvered filter door on the blower compartment.
3. Slide the Roof Jack combustion air and vent piping upward as far as it will go to remove the pipes from the combustion air and vent flanges at the top of the furnace.
4. Remove the four screws that secure the blend air adapter to the top cover. (If a blend air system is being used)
5. Remove the eleven (11) screws from the furnace top cover. Refer to Figure 11.

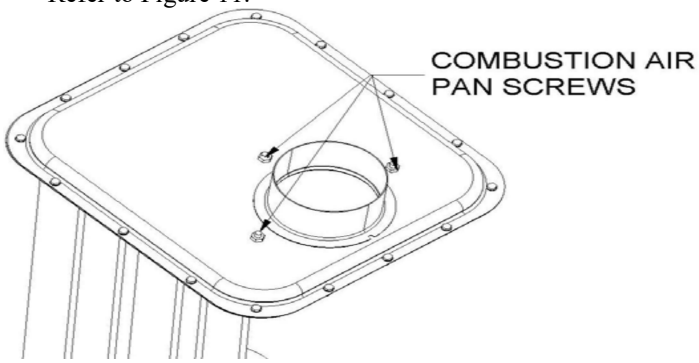

Figure 11: Top Cover Screws and Combustion Air Pan Screws

6. Remove the three ¼-20 nuts next to the flue collar.
7. Remove the two 3/16-16 Phillips screws from the flange at the top of the four (4) inch combustion air pipe located inside the blower compartment. Refer to Figure 11.

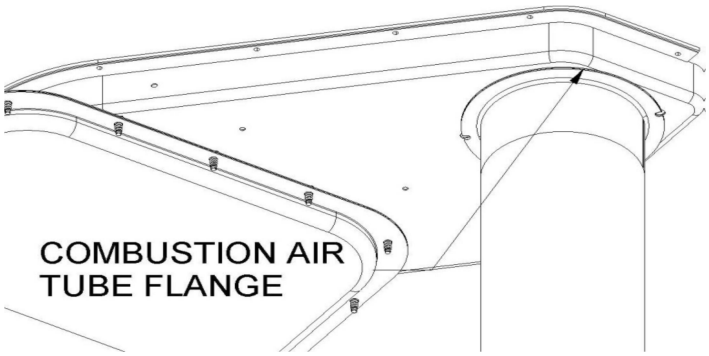

Figure 12: Four (4) Inch Combustion Air Tube Flange

8. Remove the three screws from the combustion pan cover. Refer to Figure 12.
9. Remove the top cover. Be very careful not to damage the insulation and the gaskets. If the insulation or the gaskets get damaged they must be replaced.
10. Remove the sixteen (16) screws from the flue box cover. Do not mix these screws with the other screws as these are stainless because of the heat. Refer to Figure 13 for screw locations.

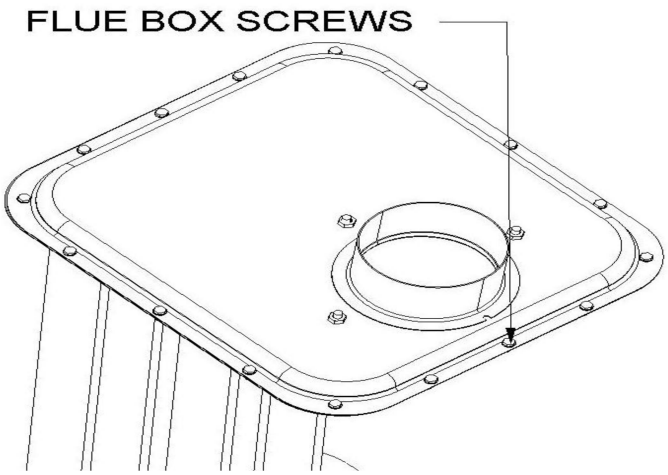

Figure 13: Flue Box Cover Screws

11. Remove the flue box cover. Be very careful not to damage the gasket on the flange. If the gasket get damaged it must be replaced.
12. Remove the flue baffles from inside the tubes. Refer to Figure 14.
13. Now you can take a brush and vacuum and clean the tubes and the flue box area. Remember, the debris removed from the wall of the tubes by the brush will fall into the base of the heat exchanger. You must vacuum the base to remove the debris when you have finished brushing the tubes.
14. Place the flue baffles back inside the tubes.
15. Place the flue box cover back on top of the flue box base and secure with the stainless screws that were removed in step 9. Make sure the gasket is not damaged because you must have a good seal for the furnace to operate properly.
16. Place the top cover back on top of the furnace. Make sure the bolt holes in the combustion air pan line up with the ¼-20 bolts next to the flue collar. Make sure the gasket is between the combustion air pan and the flue box is not damaged. If the gasket is damaged, replace it. You must have a good seal between the combustion air pan and the flue box to prevent leaking.

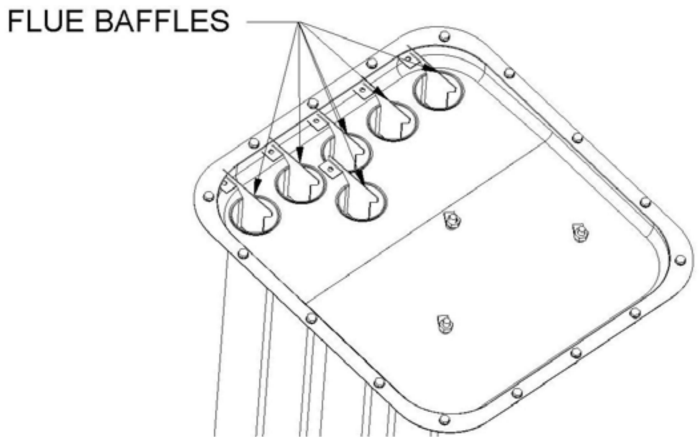

Figure 14: Flue Baffle Location and Removal

17. Install the three (3) - ¼-20 nuts on the three (3) bolt and tighten until secure.
18. Install the eleven (11) screws back in the top cover and tighten until they are secure. Do not over tighten as they will strip.
19. Place the blend air bracket over the four inch hole and align the screw holes, then install the screws to secure it to the top cover. (Bypass this step if you do not have a blend air system).
20. Place the louvered filter door back on the blower compartment.
21. Follow the instructions exactly as shown in the "Startup and Shutdown Instructions" in this manual to properly startup this appliance.

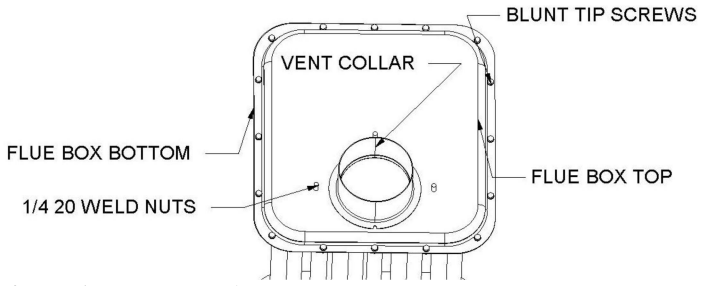

Figure 15: Flue Box Assembly

Cleaning the Combustion Air Assembly

The combustion air assembly should be removed and visually inspected for dirt and debris accumulation every time you find excessive dirt and debris in the burner box while performing the annual maintenance. Follow the procedure below if cleaning is required.

1. Follow the instructions exactly as shown in the "Startup and Shutdown Instructions" in this manual to properly shutdown this appliance.
2. Remove the louvered filter door on the front of the furnace.
3. Remove the burner compartment door on the front of the furnace.
4. Turn off the valve in the gas supply line and loosen the ground union joint. Refer to Figure 5.
5. 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 moving when the gas line is being removed.
6. Remove the electrical wires from the terminals on the gas valve.
7. Unplug the flame sensor and igniter wires from the insulated spade plugs.

8. Remove the ten (10) screws from the burner mounting plate and remove the burner assembly. Refer to Figure 8.
9. Lift the burner assembly up, turning slightly too clear the air baffles and slides the burner assembly back to remove.
10. Remove the ¼" tube from the top right side of the burner box.
11. Remove the four (4) screws that secure the combustion air baffles to the burner box / vestibule panel. Refer to Figure 16.
12. Remove the four (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, replace it. There must be a good seal between the burner box and the vestibule panel for the furnace to operate properly. Refer to Figure 16.
13. Remove the two (2) Phillips screws the secure the bottom of the combustion air assembly to the 4" pipe.
14. Grab the burner box and twist slightly while pulling down to remove the four inch (4") pipe from the combustion air housing. Refer to Figure 16.
15. Unplug the male and female insulated spade terminals that go to the combustion air assembly.
16. Remove the two (2) screws in the top of the combustion air housing, then, remove the assembly from the upper four inch (4") pipe. Refer to Figure 16.
17. Use a soft bristle brush and a vacuum to clean the dirt and debris from the housing, motor and prop fans. Be careful not to damage the plastic fans. Use the vacuum when brushing the pipe and fan in a manor to prevent the dirt or debris to entering the motor windings. Dirt or debris will cause the motor to run hotter reducing motor life.
18. Place the round black gasket on the four inch (4") upper pipe so that the pipe sits inside the grove in the gasket, then, slide the combustion air housing into the gasket and secure the housing to the four inch (4") pipe with the two (2) screws. 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. Refer to Figure 16.
19. Place the round black gasket on the four inch (4") lower pipe so that the pipe sits inside the grove in the gasket, then, slide the combustion air housing into the gasket and secure the housing to the four inch (4") pipe with the two (2) screws. 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. Refer to Figure 16.
20. Place the gasket on the back side of the burner box so it is in between the burner box and the vestibule panel. If the gasket is damaged, replace it. There must be a good seal between the burner box and the vestibule panel for the furnace to operate properly. Install the four (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 four (4) screws that were removed in step 10 to secure the baffles to the burner box.
22. Connect the ¼" tube to the nipple located on the top right side of the burner box. Refer to Figure 16.
23. Install the burner assembly and secure the assembly to the burner box with the ten (10) screws that were removed in step 8.
24. Connect the two (2) ¼" male and female spade terminals for the igniter. The igniter has the two (2) white wires with the high temperature insulation.
25. Connect the ¼" male and female spade terminal for the flame sensor. The flame sensor has one (1) yellow wire.
26. Connect the brown wires to the electrical spade terminals on the gas valve.
27. Connect the gas supply line. You should use new pipe that is properly chamfered, reamed, and free of burrs and chips. If you are using old pipe, be sure it is clean and free of rust, scale, burrs, chips, and old pipe joint compound. Apply pipe joint compound (pipe dope) **that is approved for all gases, only to the male threads of the pipe joints. DO NOT** apply compound to the first two threads.
    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 moving when the gas line is being tightened. Do not over tighten the gas pipe. This will cause damage to the gas valve. If you have a torque wrench **torque: 375 in-lb maximum**. If you do not have a torque wrench then tighten by hand the tighten pipe then, turn the pipe an additional ¾ of a turn or until **connection is snug and not leaking.**
28. Connect the union joint and tighten the union and turn the manual gas valve back to the "ON" position. Refer to Figure 5. You should check the entire gas supply line for leaks again to be sure nothing is leaking.
29. Place the lower burner door back on the furnace.
30. Place the louvered filter door back on the furnace.
31. Follow the instructions exactly as shown in the "Startup and Shutdown Instructions" in this manual to properly startup this appliance.

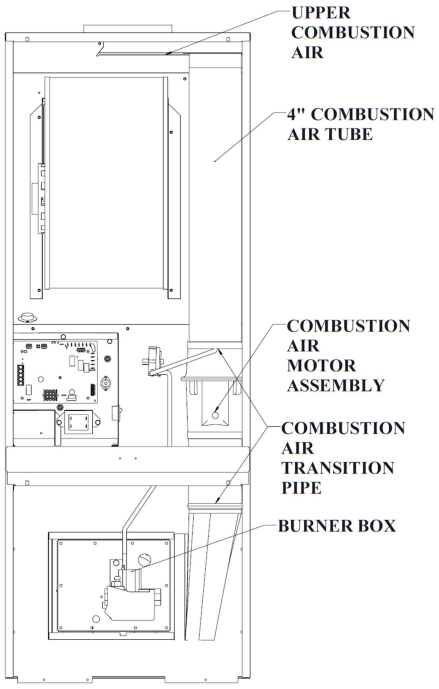

Figure 16: Combustion Air Assembly

Cleaning the Indoor Fan Assembly

1. Follow the instructions exactly as shown in Startup and Shutdown Section in this manual to properly shutdown this appliance.
2. Remove the louvered blower compartment access door located on the front of the furnace.

3. Remove the louvered burner compartment access door located on the front of the furnace.

4. Unplug the blower motor wire harness six (6) pin plug located on the right side of the control box.
5. Remove the two screws on the right side of the blower mounting bracket.
6. Remove the two (2) screws on the left side of the blower mounting bracket.
7. Lift the blower upward while moving to the left, then, pull the blower back to remove.
8. Use a vacuum cleaner and a small brush to remove any dirt 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, dirt or debris from around the heater elements. Be careful not to damage the heater exchangers with the vacuum hose or the brush**. Make sure you place a piece of cardboard on top of the "A" coil to collect the dirt and debris so it does not go into the coil.**
10. Check the blower wheel for dust and debris. Use the brush and the vacuum cleaner to remove any dust or debris from the wheel. Be careful not the move or accidentally remove the blower wheel balance weight located on the wheel fins. If it is moved or removed it will cause the blower wheel to vibrate. If the wheel is vibrating, you must replace it.
11. Check the blower motor for dust and debris. Be sure to clean the openings on the motor housing as these openings are used to cool the motor. If dust, dirt or debris has not been removed it from these openings will cause the motor to run hotter than normal and will shorten the life of the motor.
12. Reinstall the blower assembly and secure the assembly using the screw that was removed in steps 3 and 4.
13. Connect the blower motor wire harness six male pin plug to the six pin female plug located on the right side of the control box.
14. Reinstall the burner compartment access door on the front of the furnace.
15. Reinstall the louvered blower compartment access door on the front of the furnace.
16. Follow the instructions exactly as shown in the "Startup and Shutdown Instructions" in this manual to properly startup this appliance.

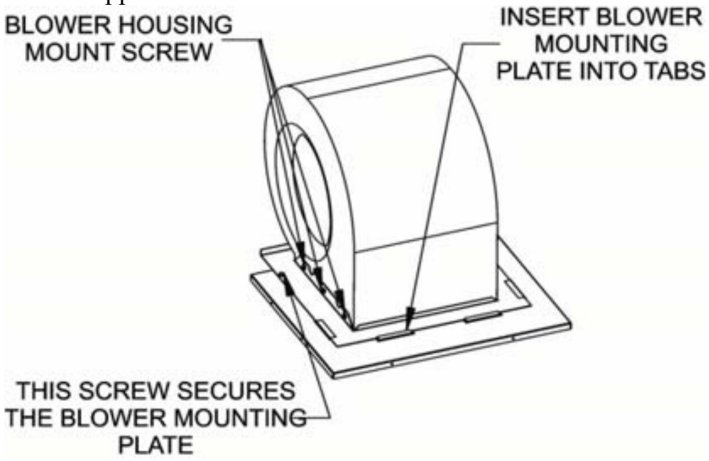

Figure 17: Blower Mounting Screw

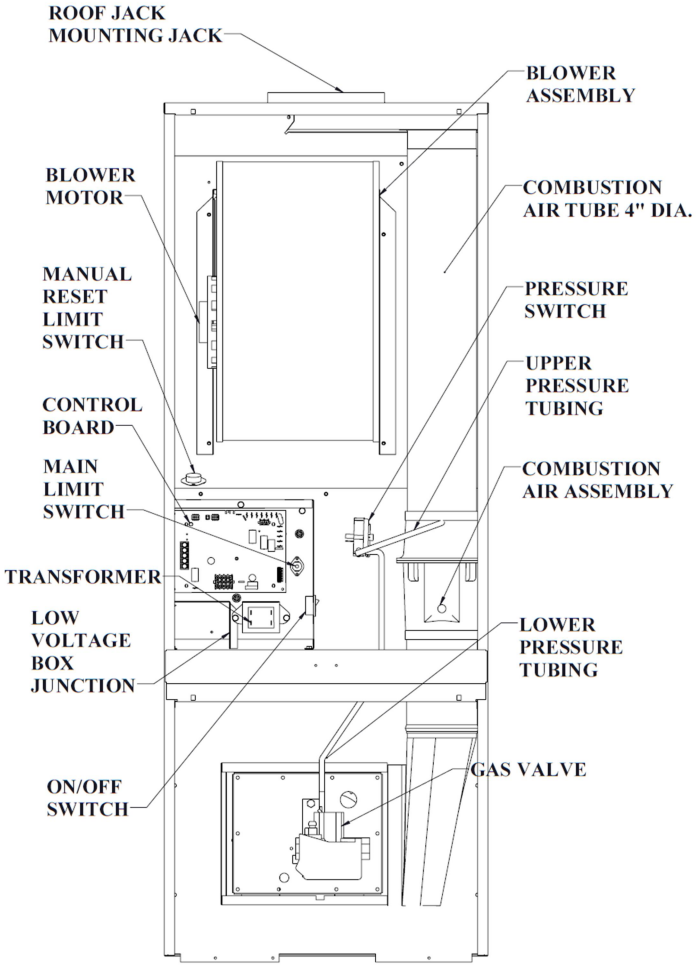

Figure 18: Component Locations

Section III: FURNACE OPERATION

FURNACE CONTROLS

This section discusses the furnace controls and how they operate. Refer to Figure 18 for component locations.

1. **The Limit Controls** – The furnace has a limit control located on the vestibule panel to sense overheating of the heat exchangers and open if the temperature gets above the set point of the limit control.
2. **The Rollout Limit Controls** – The burner assembly has two (2) limit controls to shutdown the burner operation if either of the limits open.
3. **The Furnace Integrated Control** – The integrated Hot Surface Ignition control combines all control functions needed for an induced draft mobile home furnace into a single printed circuit board package.
   The control provides outputs for a 2 speed taps for the indoor blower motor speed tap leads, single speed inducer motor, main gas valve, and hot surface igniter element. The control receives inputs from the thermostat (W and G), pressure switch, high temperature limit switches, and senses flame
4. **Pressure Switches –** The pressure switches sense the pressure in the induced draft housing and closes the contacts when the negative pressure is above the set point.
5. **Induced Draft Assembly –** This consists of a motor, blower wheel and scroll. This assembly draws the combustion air and the by-products of combustion through the heat exchanger tubes and pushes them up the vent.
6. **3 Amp Fuse** – This is an automotive type fuse that is used for over-current protection of the 24 VAC circuit.
7. **Transformer** – The transformer is used to step down voltage from 240 VAC to 24 VAC. The transformer provides the required 24 VAC for the system control circuit

SECTION IV: SEQUENCE OF OPERATION

Normal Heating Mode Sequence

The thermostat calls for heat by energizing the "W" terminal. The control 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 "3" on the Status LED after 60 seconds.

The control energizes the induced draft motor and waits for the pressure switch to close. If the pressure switch does not close within 60 seconds of the inducer energizing, the control will lockout, de-energize the inducer, and begin to flash "2" on the Status LED.

The control runs the inducer for a 25 second pre-purge time, during which the pressure switch must remain closed.

The control energizes the HSI output for 25 seconds. The inducer remains energized, and the pressure switch must remain closed.

The control energizes the main gas valve for 5 seconds. The inducer and igniter outputs remain energized.

The control de-energizes the hot surface igniter. The gas valve and inducer outputs remain energized. If flame is present 2 seconds after the igniter de-energizes, the control goes to blower on delay. If flame is not present, the control de-energizes the gas valve and proceeds with the ignition re-try.

If flame is present, the control energizes the blower on HEAT speed after the selected blower on delay following flame being proven. The gas valve and inducer outputs remain energized.

The Control inputs are continuously monitored to ensure limit and pressure switches are closed, flame is established, and the thermostat call for heat remains.

When the thermostat demand for heat is satisfied, the control de-energizes the gas valve. The inducer output remains on for a 15 second post-purge period.

The indoor blower motor is de-energized after the selected blower off delay. Blower off delay timing begins when the thermostat is satisfied.

Interrupted Thermostat

If the thermostat demand for heat is removed before the flame recognition period, the control will run the inducer for the post purge period and de-energize all outputs.

If the thermostat demand for heat is removed after the flame recognition period (successful ignition), the induced draft motor will run through a post purge and the indoor blower motor will run on heat speed for the selected delay off time.

Ignition Re-try

If flame is not established on the first trial for ignition period, the gas valve is de-energized and the inducer remains energized for an inter-purge period of 25 seconds. The igniter is then re-energized for a warm up period, and the control initiates another trial for ignition. This sequence repeats for up to 4 trials for ignition.

If flame is not established on the fourth trial for ignition (initial try + 3 re-tries), the control de-energizes the gas valve, flashes "1" on the Status LED, and lockouts out heat operation for 1 hour.

Ignition Re-cycle

Flame must not be sensed for 2 seconds before the control responds to a loss of flame. If flame is established and maintained during the trial for ignition period and then flame is lost, the gas valve is de-energized within 0.8 seconds, the induced draft motor continues to run, and the control begins timing the 25 second inter-purge delay. The indoor blower motor will be energized and/or remain energized on heat speed for the selected delay off time.

When the inter-purge delay is over, the igniter is re-energized, and the control initiates another igniter warm-up and ignition activation period. The control will re-cycle up to 6 flame losses (5 re-cycles) within a single call for heat before going to lockout.

Continuous Fan

Cooling / heating thermostats have a fan switch that has an “ON” and: AUTO” position. In the “ON” position the thermostat calls for continuous fan (G) without a call for heat, the indoor fan is energized on the COOL speed after a 0.25 second delay.

If a call for heat (W) occurs during continuous fan, the blower will de-energize.

When the thermostat removes the call for fan ("G"), the control de-energizes the cooling speed fan after a fan off delay period of 20 seconds.

Intermittent Blower - Cooling

Cooling / heating thermostats have a fan switch that has an “ON” and “AUTO” position. In the “AUTO” position the thermostat calls for continuous fan (G) without a call for heat, the indoor fan is energized on the COOL speed after a 0.25 second delay.

When the thermostat removes the call for fan ("G"), the control de-energizes the cooling speed fan after a fan off delay period of 20 seconds.

Limit Switch Operation
Any time the limit switch opens, the gas valve and igniter will be de-energized, the indoor blower motor will run on heat speed, the induced draft motor will run continuously, and the Status LED will flash a fault code of “4”.
If the switch re-closes after being open for less than 6 minutes, the induced draft motor will run through a post-purge delay, and the indoor blower will run through the selected blower off delay. The control will then attempt another ignition cycle, beginning with the pressure switch check.
If the limit switch opens 3 times during the same call for heat, and closes in less than 6 minutes each time, the control will enter a 1 hour lockout period, and, continuing to flash "4" on the Status LED during the lockout period.

Limit Switch Lockout
If the limit switch opens, and remains open for more than 6 minutes, the control will enter a fan failure mode routine. The inducer and indoor blower will be de-energized after the limit switch has been open for 6 minutes, and the control will be locked out, until the thermostat is reset, or power is removed. When the control has entered this lockout mode, after the limit switch has reclosed, all outputs remain off for 15 minutes. Following the 21 minute delay, the control attempts an ignition trial. After flame is established, the control will operate for 25 seconds, and then de-energize the gas valve and the inducer after a post purge period. All outputs will then remain off for another 15 minute period. The sequence is then continually repeated, with the LED flashing a fault code of “4”, until the lockout condition is reset.

Pressure Switch
If the pressure switch opens for more than 2 seconds after flame has been established, the control shall de-energize the gas valve, run through a normal post-purge and selected heat blower off delay. When the blower off delay is complete, the control shall start an ignition sequence if the thermostat is still calling for heat. The control shall ignore pressure switch openings of less than 2 seconds (the gas valve will momentarily de-energize while the pressure switch is open, this may cause a loss of flame and the control will respond to the lost flame).
If the pressure switch opens for more than 2 seconds during a pre-purge or inter-purge, the control shall 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 will lockout, de-energize the inducer, and begin to flash "2" on the Status LED.

Undesired Flame
If flame is sensed longer than 4 seconds while the gas valve is de-energized, the control shall energize the induced draft motor and indoor blower motor on heat speed, keep the other outputs off, and flash an LED fault code of “5”.
When flame is no longer sensed, the induced draft motor will run through post-purge and the indoor heat speed blower motor will run through the selected blower off delay time.
The control will not be locked out, and continue with normal operation following the blower off delay.

Lockout
The control shall not initiate an ignition attempt or continuous fan operation while in lockout. The control will still respond to an open limit and undesired flame. Lockout shall automatically reset after 1 hour. Lockout may be manually reset by removing power from the control for more than 1 seconds or removing the thermostat call for heat for more than 2 seconds.
If a gas valve hardware fault, a flame sense hardware fault, or the limit switch open for more than 5 minutes has occurred, the control will be in a hard lockout condition. To reset the lockout, power must be removed from the control for more than 1 second, or the thermostat call must be removed for more than 2 seconds.

Diagnostic Codes

1 Flash - System lockout Retries Exceeded (External to the Control)
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. Verify sensor is not contacting the burner and is located in a good position to sense flame.

Ignitor must be positioned to light the gas immediately when the valve opens. If the ignitor has been replaced, verify hot spot position has not changed.

Check sensor lead for shorting and verify furnace is grounded properly. Verify gas supply to valve, gas valve in “ON” position and appliance lighting properly. Verify flame reaches flame sensor during ignition attempts and gas pressures are correct.

2 Flashes - Pressure Switch Stuck Closed. (External to the Control)
Pressure switch stuck closed. Check switch function, verify combustion air motor id turning off. Refer to wiring diagram.

3 Flashes - Pressure Switch Stuck Open (External to the Control)
Check pressure switch function and tubing. Verify combustion air motor is turning on and pulling sufficient vacuum to engage pressure switch.. Refer to wiring diagram.

4 Flashes - Open Limit Switch. (External to the Control)
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 with Gas Valve De-energized. (Internal to the Control)
Verify the gas valve is opening and shutting down properly. Flame in burner assembly should extinguish promptly at the end of the cycle. Check orifices and gas pressure.

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

7 Flashes - Low Flame Sense Signal (External to the Control)
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. Check or improve furnace and module ground. Verify sensor is located in or very near flame. Minimum current for proper operation is 0.5 DC micro amps. Refer to the wiring diagram.

8 Flashes - Ignitor Relay Fault (External to the Control)
Ignitor relay contacts on the control board are not functioning properly. Replace the Control Board.

9 Flashes - Twinning Fault (External to the Control)
If twinning is used, verify field installed wiring is connected correctly. Verify both controls are the same model.

10 Flashes - Open Fuse (External to the Control)
Verify the 3 amp ATC Fuse has opened. Verify there are no shorted circuits, then, replace the fuse.

11 Flashes - Ignitor Open (External to the Control)
Verify ignitor is operating correctly and has not failed by checking to see if it is glowing on startup. If it is not glowing replace the ignitor.

12 Flashes - Combustion Air Blower Relay Error (Internal to the Control)
The relay built into the control is not operating properly. Replace the control

Rapid Flash - Reverse Polarity (External to the Control)
Reverse the L1 and the Neutral wires

Continuous On - Normal Operation
No Fault

Off - Gas Heating Lockout (Gas Valve energized when it should be de-energized.) Verify power to the control. Replace control if power is at the control and Red LED is off.

Off - Gas Valve De-energized when it should be energized
Verify power to the control. Replace control if power is at the control and Red LED is off.

Off - Control Failure / No Power / Internal Fault / IEQ Loss
Verify power to the control. Replace control if power is at the control and Red LED is off.

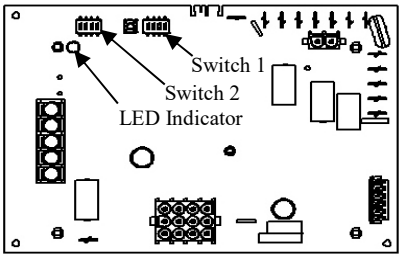

Figure 19: Integrated Control Board

Speed Tap Changes – Dip Switch Settings

The dip switches are located on the top left side of the control board as seen on Figure 19. You can change the blower motor speed tap setting by changing the dip switch settings. The default settings are shown below.
Cooling default setting is T1 (High Speed)
Optional Heating or Cooling Speed is T2 (Medium High Speed)
Heating Default setting is T3 (Medium Speed)
Constant Circulation default setting is T4 (Low Speed)

Cooling dip switch choices are: (Y Terminal)

Dip Switch Settings (S1-1, S1-2, S1-3)											
T1			T2			T3			T4		
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 dip switch choices are: (W Terminal)

Dip Switch Settings (S2-1, S2-2)							
T1		T2		T3		T4	
1	2	1	2	1	2	1	2
Off	Off	On	Off	On	On	Off	On

Constant Circulation dip switch choices are: (G Terminal)

Dip Switch Settings (S2-3, S2-4)					
T1		T2		T4	
3	4	3	4	3	4
Off	Off	On	Off	Off	On

Table 1: Board Dip Switch Settings

⚠WARNING

For personnel safety be sure to turn the electrical power "OFF" at the main entrance (Circuit Breaker Box) and at the furnace before attempting any service or maintenance operations. Home owners must never attempt to perform any maintenance on the furnace or do anything that required opening or removing any furnace doors or panels.

Section V: TROUBLE SHOOTING

The following checks should be made before trouble shooting the furnace controls for a no heat issue. If the integrated control board led is not lit check the following

1. Check the all of the circuit breakers. Make sure they are turned to the "ON" position and have not tripped.
2. Check all fuses, especially the 3 amp fuse on the left side of the integrated control. If the fuse is blown, check the wiring with an OHM meter for a short to ground. Repair the short, and then replace the fuse.
3. Check any switches that are external to the furnace to make sure they are turned on.
4. Make sure all wiring connections especially on any of the components are ensure and are securely fastened.
5. Check electrical power on both the 115 VAC terminals and the 24 VAC terminals. If both have power, check the thermostat terminals for 24 VAC. If 24 VAC is present on "W" and "COM", check the ground connection. If the ground connection is good but integrated control will not operate then replace the integrated control.
6. Check all gas line shutoff valves. Make sure the valves are in the "ON" position.
7. If the furnace is operating but not correctly, review the sequence of operation and observe the furnace operation to determine what component is malfunctioning. If this does not help then check the Trouble Shooting Guide in the back of this manual.

⚠WARNING

To avoid personnel injury or property damage, make certain that the motor leads cannot come into contact with non-insulated metal components of the unit.

Replacing the Blower

1. Follow the instructions exactly as shown in Startup and Shutdown Section in this manual to properly shutdown this appliance.
2. Remove the louvered blower compartment access door located on the front of the furnace.
3. Remove the louvered burner compartment access door located on the front of the furnace.
4. Unplug the blower motor wire harness six (9) pin plug located on the right side of the control box.
5. Remove the two screws on the right side of the blower mounting bracket.
6. Remove the two (2) screws on the left side of the blower mounting bracket.
7. Lift the blower upward while moving to the left, then, pull the blower back to remove.
8. Remove the blower motor and replace with a new motor.
9. Reinstall the blower assembly and secure the assembly using the screw that was removed in steps 3 and 4.
10. Connect the blower motor wire harness (9) pin plug to the (9) pin female plug located on the right side of the control box.
11. Reinstall the burner compartment access door on the front of the furnace.
12. Reinstall the louvered blower compartment access door on the front of the furnace.
13. Follow the instructions exactly as shown in the "Startup and Shutdown Instructions" in this manual to properly startup this appliance.
14. Set the thermostat to the desired temperature

⚠WARNING

To avoid personal injury take precautions not to come into contact with non-insulated electrical components.

Avoid wearing loose clothing or any items that can come in contact with moving parts such as the blower wheel. This can cause serious personal injury.

CONTROL BOARD FLAME SENSE

Normal flame sense current is approximately 2.5 micro amps DC.

Minimum flame sense current threshold is 0.5 micro amps DC.

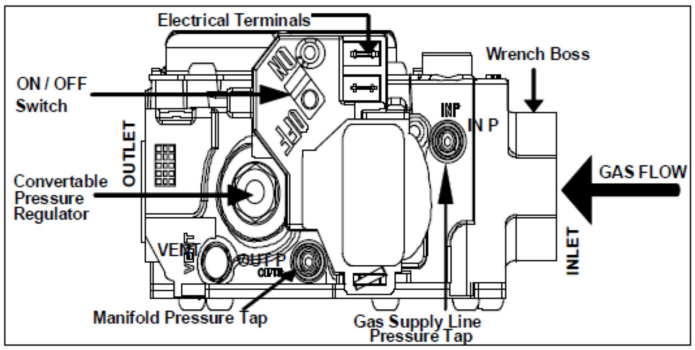

Figure 20: White Rodgers 36J Gas Valve

INLET GAS PRESSURE RANGE		
	NATURAL GAS	PROPANE (LP) GAS
MINIMUM	4.5" W.C. (1.12 kPa)	8.0" W.C. (1.99 kPa)
MAXIMUM	10.5" W.C. (2.61 kPa)	13.0" W.C. (3.24 kPa)

Table 2: Inlet Gas Line Pressure

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

Table 3: Manifold Gas Pressure

SECTION VI: BLOWER PERFORMANCE

G18DxxxAH3BB - 10 x 8 WHEEL 1/3 HP 5 SPD CONSTANT TORQUE MOTOR						
Configuration	SPD Tap	0.1	0.2	0.3	0.4	0.5
CFM - NO COIL	1	635	463	194		
	2	754	671	549	400	204
	3	964	901	814	734	630
	4	1134	1078	1007	943	857
	5	1286	1217	1157	1094	1026

G18DxxxCA3BB - 10 x 8 WHEEL 1/3 HP 5 SPD CONSTANT TORQUE MOTOR						
Configuration	SPD Tap	0.1	0.2	0.3	0.4	0.5
CFM - NO COIL	1	635	463	194		
	2	754	671	549	400	204
	3	964	901	814	734	630
	4	1134	1078	1007	943	857
	5	1286	1217	1157	1094	1026

G18DxxxCA4BB - 10 x 8 WHEEL 3/4 HP 5 SPD CONSTANT TORQUE MOTOR						
Configuration	SPD Tap	0.1	0.2	0.3	0.4	0.5
CFM - NO COIL	1	694	517	137		
	2	1114	986	839	642	289
	3	1405	1308	1201	1087	949
	4	1697	1599	1486	1378	1255
	5	1829	1739	1648	1552	1467

Table 4: Blower Performance -10 X 8 Blower.

SECTION VII: ACCESSORY AND REPLACEMENT PARTS LISTS

Part No	Description	Notes
90-RJF1729-AL	Body, Roof Jack - FLAT	Height - 94 1/2" x 106 1/2"
90-RJF2551-AL	Body, Roof Jack - FLAT	Height - 102 1/2" x 128 1/2"
90-RJS1729-AL	Body, Roof Jack - SLOPE 3/12	Height - 94 1/2" x 106 1/2"
90-RJS2551-AL	Body, Roof Jack - SLOPE 3/12	Height - 102 1/2" x 128 1/2"
90-RJS3868-AL	Body, Roof Jack - SLOPE 3/12	Height - 115 1/2" x 145 1/2"
90-RJS6399-AL	Body, Roof Jack - SLOPE 3/12	Height - 140 1/2" x 176 1/2"
90-RJCRWN-AL	Crown - Roof Jack	Use w/ roof jack body
90-TRN-RNG	Ceiling Trim Ring - Roof Jack	Trim out to inside RJ - pipe
RJTRC	Kit - Transit Roof Jack Cap & Label	Used for transport. Remove on site
90-OUTXT16-AL	Roof Jack Outdoor Extension - 16"	Extends roof jack crown 16"
90-INXST10-AL	Roof jack Indoor Extension - 10"	Extends indoor roof jack 10"
90-RJS56	5 - 6/12 Slope Adapter	Used to adapt to 3/12 pitch roof
90-DCU0-01	Floor Base	Transition to duct for 1" to 4" deep floor
90-DCU0-02	Floor Base	Transition to duct for 6" to 8" deep floor
90-DCU0-03	Floor Base	Transition to duct for 8" to 12" deep floor
90-DCU0-04	Combustible Floor Base	Placed on top of floor base for combustible floors
90-CABEXT4	White Top cabinet Extender Plate	Fill alcove 76" top opening

Table 5: Accessory Parts List

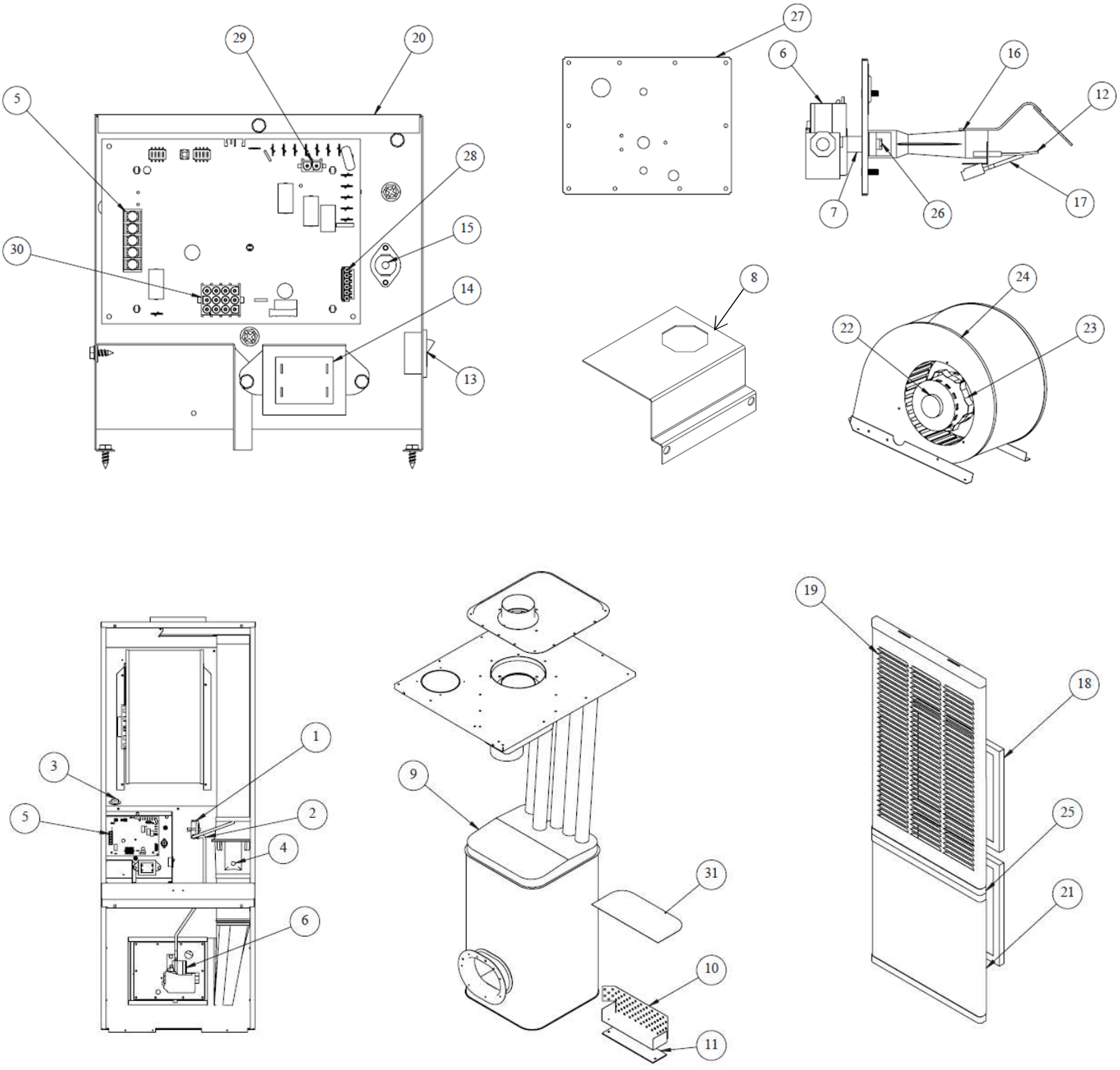

Figure 21: Replacement Parts Item Identification

G18D Gas Furnace Parts List

ITEM NO.	USED ON FURNACE MODEL	PART NO.	QTY	DESCRIPTION
1	All	R68DD0010	1	Pressure Switch, -0.20 N.O.
2	All	71CA0008	2 ft.	Silicon Tubing - 9"
	All	71CA0009		Silicon Tubing - 13"
3	All	68CA0005	1	Limit Switch, Manual, Upper-180F
4	All	R86GF0050	1	Combustion Air Blower Assembly (No Orifices)
5	All	R68GF0021	1	Emerson Integrated Control Board, HSI
6	All	R68GF0012	1	WR 36J Gas Valve for HSI Electric Ignition
7	All	86GF0073	1	Gas Manifold Pipe w/ Mounting Bracket
8	All	87BBG006	1	Gas Valve Support Bracket
9	All	86GF0106	1	Heat Exchanger & Gaskets
10	All	87TEU001	1	Stainless Perforated Diffuser Baffle
11	All	77GC0001	1`	Stainless Perforated Diffuser Baffle Gasket
12	All	R68GF0004	1	Flame Sensor
13	All	68DD0009	1	System Switch - SPST
14	All	R68GF0002	1	Transformer (115V-24V, 40VA)
15	All	68CA0004	1	Limit Switch - Open 140 F - Close 110 F
16	All	R86GF0054	1	Burner Assembly
17	All	R68GF0005	1	Hot Surface Igniter
18	All	76AA0012	2	Filter (16" X 20" X 1") Pleated
19	All	R86GF0082	1	Louvered Door - Upper
20	All	86GF0118	1	Control Box Assembly
21	All	86GF0112	1	Door Panel - Lower 56" Tall Furnace
	All	86GF0115	1	Door Panel - Lower 77.5" Tall Furnace
22	All	65BV0021	1	Motor - 1/3 HP Genteq
	All	65BV0021B	1	Motor - 1/3 HP Nidec
	All	65BV0021C	1	Motor - 1/3 HP Broad Ocean
	All	65BV0023	1	Motor - 3/4 HP Genteq
	All	65BV0023B	1	Motor - 3/4 HP Nidec
	All	65BV0023C	1	Motor - 3/4 HP Broad Ocean
23	All	66AB0009	1	Motor Mount Band
	All	66AB0066	3	Motor Mount Arms with Grommets
	All	66CA0002	3	Screw 1/4-20 x 1 1/4 hex bolt
	All	66CC0006	3	5/16" Flat Washer
24	All	69AB0001	1	Blower Wheel - 10 x 8
25	All	66AB0031	4	Door Latch, Set
26	60,000 Input (Natural Gas)	72AG-144	1	Main Burner Orifice - #27
	70,000 Input (Natural Gas)	72AG-157	1	Main Burner Orifice - #22
	77,000 Input (Natural Gas)	72AG-166	1	Main Burner Orifice - #19
	90,000 Input (Natural Gas)	72AG-173	1	Main Burner Orifice - #17
	60,000 Input (Propane)	72AG-086	1	Main Burner Orifice - #44
	70,000 Input (Propane)	72AG-0935	1	Main Burner Orifice - #42

G18D Gas Furnace Parts List (cont.)				
ITEM NO.	**USED ON FURNACE MODEL**	**PART NO.**	**QTY**	**DESCRIPTION**
26	**77,000 Input (Propane)**	**72AG-096**	**1**	**Main Burner Orifice - #41**
	90,000 Input (Propane)	**72AG-104**	**1**	**Main Burner Orifice - #37**
27	**All**	**87AF0010**	**1**	**Burner Mount Plate**
28	**All**	**73XA0020**	**1**	**9 Pin Blower Wire Harness**
29	**All**	**73GF0012**	**1**	**2 Pin Wire Harness**
30	**All**	**73GF0013**	**1**	**12 Pin Blower Wire Harness**
31	**All**	**87TE1001**	**1**	**Top Heat Exchanger Restriction Baffle**

Table 6: Replacement Parts List

SECTION VIII: WIRING DIAGRAM

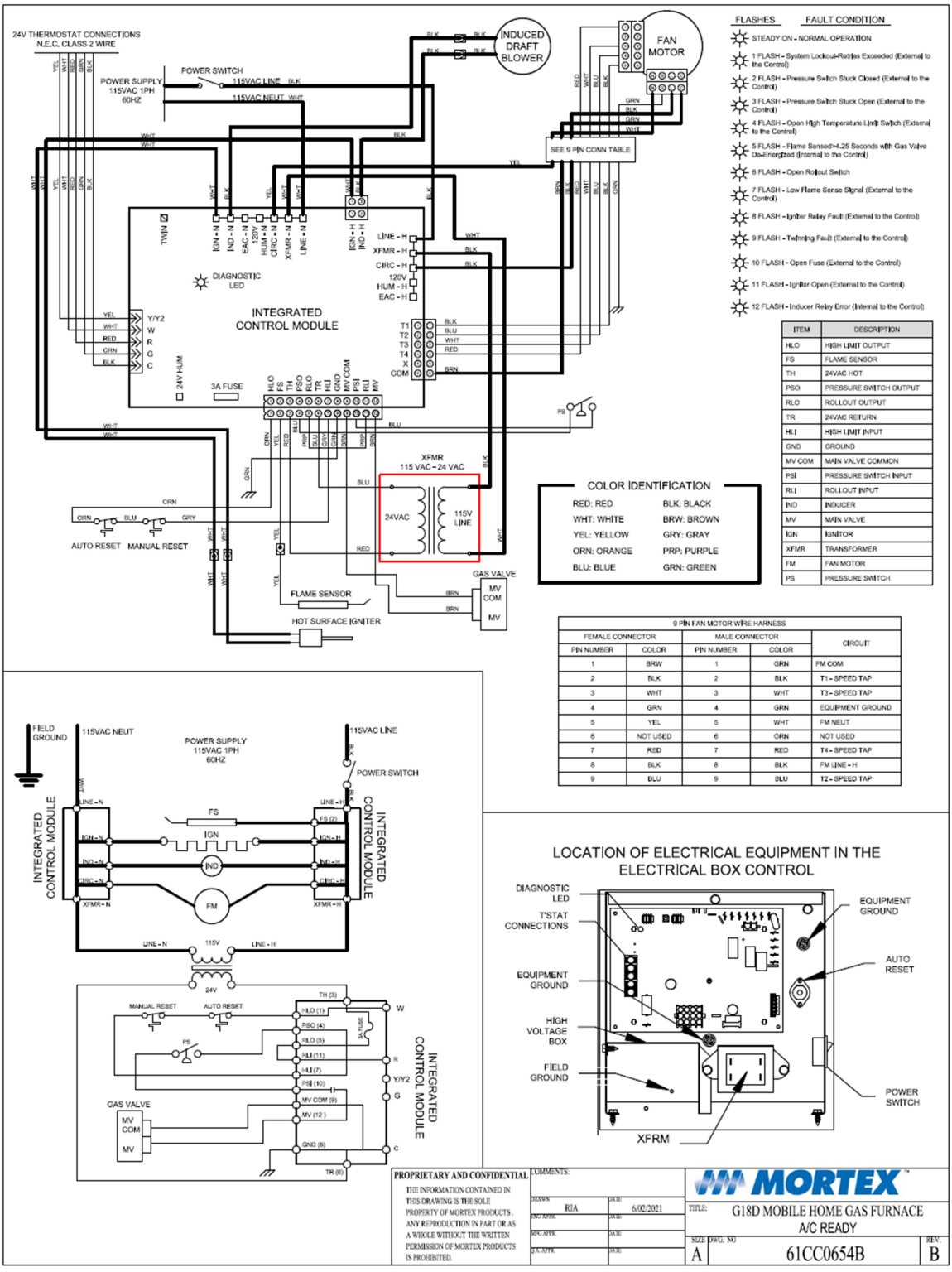

Figure 22: Wiring Diagram – Heat Only Models.
NOTE: IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THIS UNIT MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 105°C THERMOPLASTIC OR its EQUIVALENT

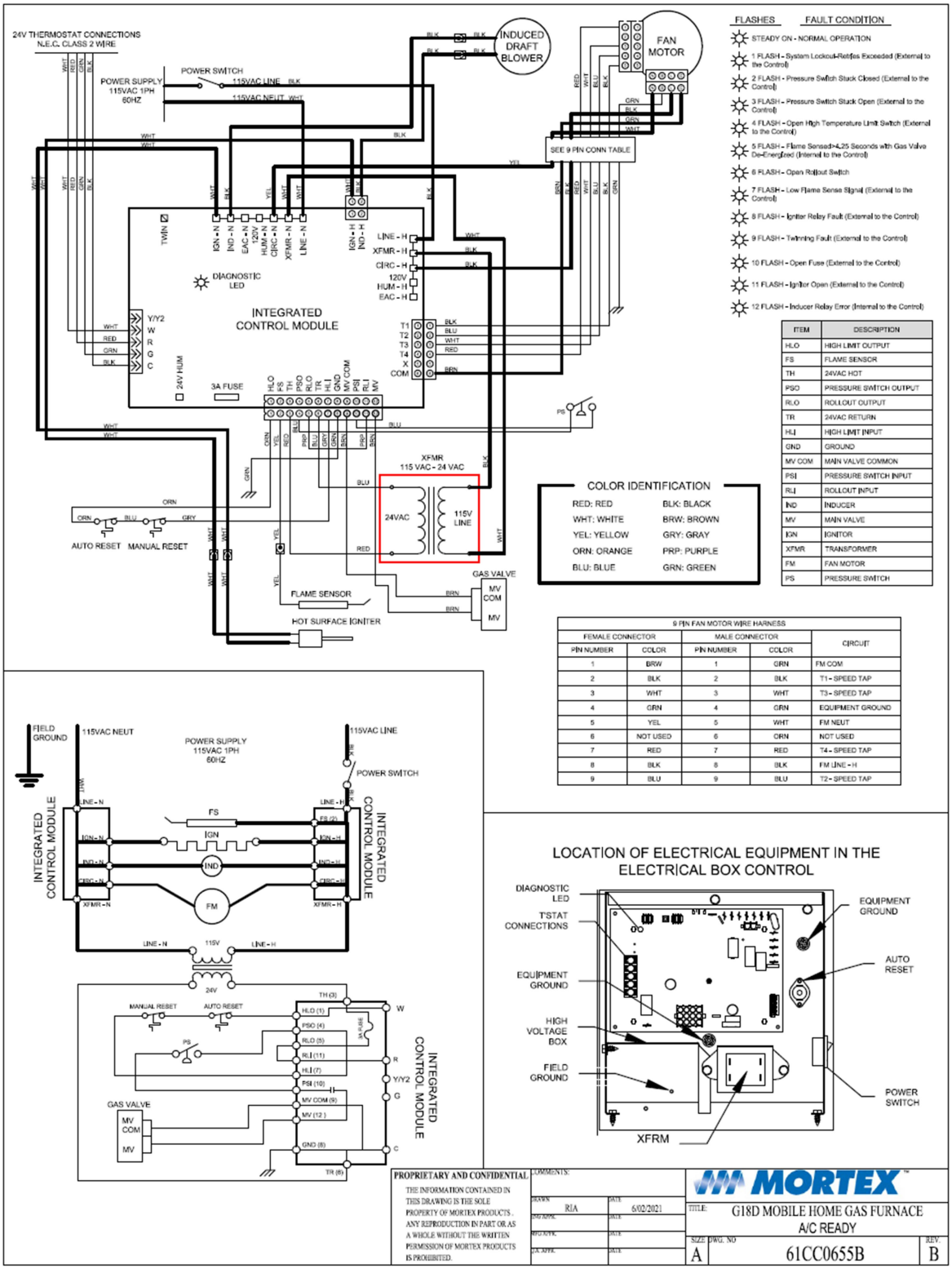

Figure 23: Wiring Diagram – A/C Ready Models.

NOTE: IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THIS UNIT MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 105°C THERMOPLASTIC OR its EQUIVALENT

Subject to change without notice **61GF0101C**

 Supersedes: 61GF0077