

# Installation, Operation, & Maintenance Manual

IOM 8601

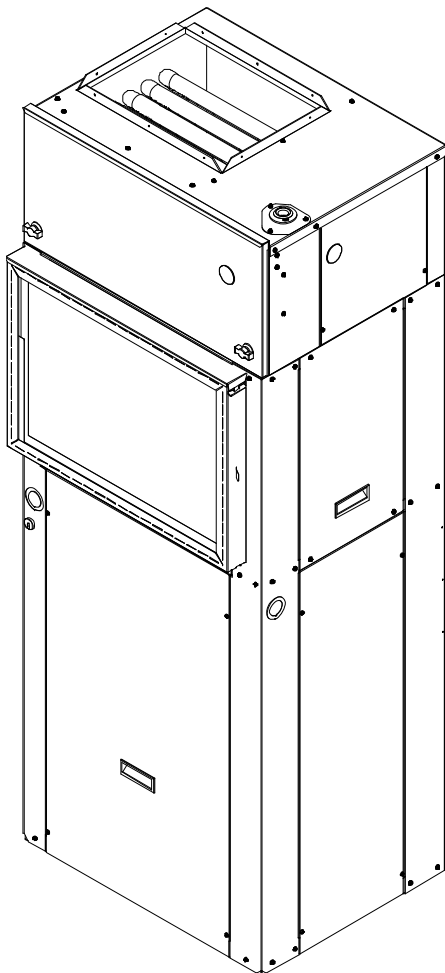
Rev. B 06/2022

## Vertical Packaged Gas Heat / Electric Cooling Unit

CATEGORY III TYPE MSP

11 EER

**eco**series  
THERMA-PAK



### ATTENTION:

#### Installer:

Affix these instructions on or adjacent to the furnace.

#### Consumer:

Read these instructions thoroughly and retain all manuals for future reference.



## WARNING



### FIRE OR EXPLOSION HAZARD

Failure to follow all safety warning exactly may result in property damage, serious 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** attempt to ignite any appliance.
- **DO NOT** touch any electrical switch
- **DO NOT** use a phone
- Leave the building immediately.
- Immediately call gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot contact your gas supplier, call the fire department.

– Installation and service must be performed by either a qualified installer, a service agency, or the gas supplier.



Intertek



## COPYRIGHT

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First Co. / AE-Air works to continually improve its products. It reserves the right to change design and specifications without notice.

The warranty may be void unless the Startup & Performance Checklist is completed and returned to the warrantor. If the Therma-Pak unit is not installed properly, the warranty will be void, as the manufacturer cannot be held accountable for problems that stem from improper installation.

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**\*\*\*WARNING TO INSTALLER, SERVICE PERSONNEL AND OWNER\*\*\***

Altering the product or replacing parts with non-authorized factory parts voids all warranty or implied warranty and may result in adverse operational performance and/or a possible hazardous safety condition to service personnel and occupants. Company employees and/or contractors are not authorized to waive this warning.

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## SAFETY CONSIDERATIONS



1. **READ THE ENTIRE MANUAL BEFORE STARTING THE INSTALLATION.**
2. These instructions are intended as a general guide and **DO NOT** supersede national, state, or local codes in any way.
3. Altering the product, improper installation, or the use of unauthorized parts voids all warranty or implied warranty and may result in adverse operation and/or performance or may result in hazardous conditions to service personnel and occupants. Company employees or contractors are not authorized to waive this warning.
4. This product should only be installed and serviced by a qualified, licensed, and factory authorized installer or service agency.
5. All “kits” and “accessories” used must be factory authorized when modifying this product. Refer and follow instructions packaged with the kits or accessories when installing.

### RECOGNIZE THE FOLLOWING SAFETY NOTATIONS THROUGHOUT THIS MANUAL AND POSTED ON THE EQUIPMENT:

**DANGER**

Indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.

**WARNING**

Indicates a potentially hazardous situation or unsafe practices that could result in severe personal injury or death and/or damage to property.

**WARNING**

**ELECTRIC SHOCK HAZARD**

This warning signifies potential electrical shock hazards that could result in personal injury or death.

**CAUTION**

Indicates a potentially hazardous situation that may result in minor or moderate injury.

**IMPORTANT**

Suggests important procedure steps to insure proper installation, reliability, or operation.

**NOTE**

Used to highlight suggestions, which may result in enhanced installation, reliability or operation.

**WARNING**

**FIRE OR EXPLOSION HAZARD**

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

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

- Before servicing, disconnect all electrical power to furnace.
- When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.



**ALWAYS** verify the unit is operating properly after servicing.

### SAFETY RULES

1. This furnace is approved for use with Natural Gas only. Refer to the furnace rating plate.
2. Install this furnace **ONLY** in a location and position as specified in the **INSTALLATION** section of this manual.
3. Provide adequate combustion and ventilation air to the furnace space as specified in the **COMBUSTION AIR** section of this manual.
4. Products of combustion must be discharged outdoors, refer to the **INSTALLATION** section of this manual.
5. Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections as specified in the **LEAK TESTING** section of this manual.
6. Always install this furnace to operate within the furnace's intended temperature rise range with a duct system which has an external static pressure within the allowable range, as specified on the unit rating plate and in the **HEATING OPERATIONS** section.



## SAFETY CONSIDERATIONS (continued)

7. When this furnace is installed so that the supply air duct supplies air to areas outside the space containing the furnace, the return air duct must be sealed to the furnace casing and terminate outside the space containing the furnace as specified in the **DUCT CONNECTIONS** section of this manual.

 **WARNING** 



For your safety, do not store or use any combustible materials, gasoline, and other flammable vapors and liquids in the vicinity of this or any other appliance as described in the **COMBUSTION AIR** section of this manual. The material may ignite by spontaneous combustion creating a fire hazard resulting in property damage, personal injury, or death.

8. If installed in a residential garage, this furnace must be installed as specified in the **INSTALLATION** section.

 **WARNING** 



For your safety, do not store or use any insulating material in the vicinity of this or any other appliance as specified in the **COMBUSTION AIR** section of this manual. Such actions could result in property damage, personal injury, or death. Inspect the furnace area after installation and after anytime insulation has been added to the structure.

9. For proper and safe operation, the furnace needs air for combustion and ventilation. Do not block or obstruct air openings on the furnace, air openings to the area in which the furnace is installed, and the spacing around the furnace.
10. This furnace is equipped with a blocked vent shut-off system. If the furnace fails to operate, contact a qualified service agency for repair.
11. Should the gas supply fail to shut off or if overheating occurs, shut off the gas valve to the furnace before shutting off the electrical supply. See the **HEATING OPERATIONS** section for more details.

 **WARNING** 

**DO NOT** use this furnace if any part has been submerged under water. A flood-damaged furnace is extremely dangerous. Attempts to use a furnace in this condition can result in fire or explosion.

A qualified service agency must inspect the furnace and to replace all gas controls, control system parts, electrical parts that have been wet or replace the entire furnace if deemed necessary.

 **WARNING** 

**CARBON MONOXIDE POISONING HAZARD**

Failure to follow **ALL** instructions could result in combustion products infiltrating into the building which may cause severe personal injury or death.

Check that all openings in the outside wall around the vent and air intake pipe(s) are sealed to prevent infiltration of combustion products into the building.

Check that furnace vent and air intake terminal(s) are not obstructed in any way during all seasons.

12. The user shall annually inspect the furnace installation to verify the following safety related items:
- All flue-gas carrying areas external to the furnace (i.e., chimney, vent connector) are clear and free of obstructions.
  - The vent connector is in place, slopes upward, and is physically sound without holes or excessive corrosion.
  - The return-air duct connection(s) is physically sound, is sealed to the furnace casing, and terminates outside the space containing the furnace.
  - The physical support of the furnace is sound without sagging, cracks, gaps, etc., around the base to provide a seal between the support and the base.
  - There are no obvious signs of furnace deterioration.
  - The burner flames are in good adjustment, refer to **FIGURE 40- BURNER FLAMES** to illustrate proper flame appearance for comparison.

 **WARNING** 

**DO NOT** operate unit in buildings currently under construction



## SAFETY CONSIDERATIONS (continued)

13. The following items should be inspected annually (minimum) before each heating season by a qualified service agency:
- HEAT EXCHANGER TUBES;** make sure they are free from blockages, signs of carbon buildup or heavy corrosion.
  - GAS BURNERS;** make sure they are free of blockages, signs of carbon buildup or heavy corrosion. The burner carry-over slots should be clean and of uniform size.
  - VENT PIPE;** check for excessive corrosion or perforations.
  - VENT TERMINAL;** check that it is free from blockages and restrictions.
  - COMBUSTION AIR OPENINGS;** check that they are clean & free from debris or blockages of any kind.
  - INDOOR AIR;** the blower wheel and blower housing must be free from debris. Check that supply and return air registers, grilles, and dampers are positioned properly, filters are in place and clean.
  - INSPECT & WASH THE CONDENSER AND EVAPORATOR COILS;** **DO NOT** use high pressure as damage to the finned surfaces may occur.
14. If any of the original wires supplied with the furnace must be replaced, they must be replaced with wiring material having a temperature rating of at least 90°C.
- This furnace must be installed so there are provisions for ventilating air.
  - Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the furnace before shutting off the electrical supply.



16. In regions where snow and ice accumulations are possible, check the outdoor grilled areas, it must be kept free from any obstructions to air flow. The flue vent must be free from snow and ice or any obstruction to assure the products of combustion are safely discharged outdoors.

 **CAUTION** 



Use care when handling compressors. Some surfaces may be hot.

 **CAUTION** 



Compressors must not be used to evacuate the air conditioning system. Vacuums at this level may cause internal electrical arcing which may result in a damaged or failed compressor.

 **WARNING** 

Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury or loss of life. Refer to the user's information manual provided with this furnace. Service must be performed by a qualified installer, service agency or the gas supplier.

 **WARNING** 

Installation and service must be performed by a licensed professional installer (or equivalent), service agency or the gas supplier. Attempting to install or repair this unit without proper proficiency may result in product damage, personal injury or death.

 **WARNING** 

These instructions are intended as an aid to qualified, licensed service personnel for proper installation, adjustment and operation of this unit. Read these instructions thoroughly before attempting installation or operation. Failure to follow these instructions may result in improper installation, adjustment, service or maintenance possibly resulting in fire, electrical shock, property damage, personal injury or death.

 **WARNING** 

**ONLY USE COPPER SUPPLY WIRES**

 **WARNING** 

 **HIGH VOLTAGE** 

Disconnect all power before servicing. Failure disconnect power may result in property damage, personal injury, or death.

15. Do not attempt to light this furnace manually. Refer to the **HEATING OPERATIONS** section for instructions for lighting and shutting down the furnace.

# MODEL NOMENCLATURE

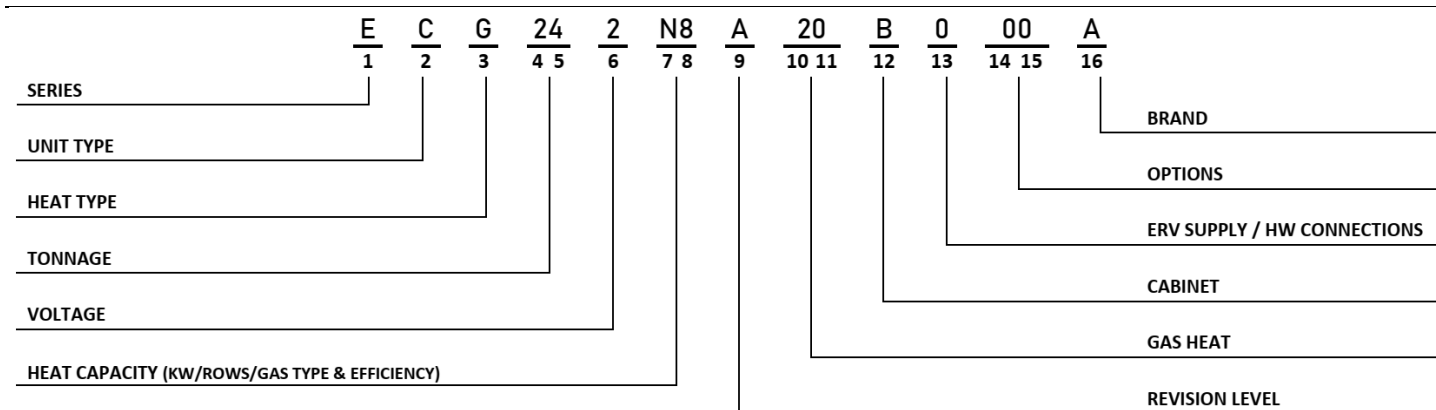


FIGURE 1 - MODEL NOMENCLATURE

## MODEL NUMBER DESCRIPTION

### DIGITS 1-2 – SERIES

E – Eco Series

### DIGIT 2 – HEAT TYPE

C – Cooling Only  
H – Heat Pump  
F – Cooling with ERV  
P – Heat Pump with ERV

### DIGIT 3 – HEAT TYPE

E – Electric Heat  
W – AquaTherm HW Coil  
G – Gas Heat

### DIGITS 4-5 – TONNAGE

09 – 9,000 Btu/Hr  
12 – 12,000 Btu/Hr  
18 – 18,000 Btu/Hr  
24 – 24,000 Btu/Hr  
30 – 30,000 Btu/Hr

### DIGIT 6 – VOLTAGE

2 – 208/230V 1Ph

### DIGITS 7-8 – HEAT CAPACITY

#### (KW/ROWS/GAS TYPE & EFFICIENCY)

00 – No Heat  
E1 – Single Stage Electric Heat  
R2 – 2 Row HW Coil  
R3 – 3 Row HW Coil  
N8 – Nat. Gas 80+%  
N9 – Nat. Gas 90+%

### DIGIT 9 – REVISION LEVEL

A, B, C

### DIGITS 10-11 – GAS HEAT

20 – 20,000 BTUH  
30 – 30,000 BTUH  
40 – 40,000 BTUH  
50 – 50,000 BTUH  
60 – 60,000 BTUH

### DIGIT 12 – CABINET

B – 20 x 26 x (66-74)

### DIGIT 13 – ERV SUPPLY / HW CONNECTIONS

0 – None  
R – Right  
L – Left

### DIGITS 14-15 – OPTIONS

00 – None

### DIGIT 16 – BRAND

F – First Co.  
A – AE Air

## GENERAL INFORMATION

These instructions are provided for the installation of the Therma-Pak gas furnace specifically. For any other related equipment, refer to the appropriate manufacturer's instructions.

Clear surrounding area of all tools, equipment, and debris before operating this unit.

**CAUTION**

**DO NOT** use units during the construction process. Mechanical components and filters may become clogged with dirt and debris, which can cause damage to the system. The manufacturer **DOES NOT** warrant equipment subjected to abuse.

**WARNING**

**ELECTRIC SHOCK HAZARD**

Before servicing equipment, **ALWAYS** turn off all power to the unit. There may be more than one DISCONNECT switch. Electrical shock can cause personal injury or death.

**WARNING**

This furnace is certified for through-the-wall indoor installation only. This furnace is **NOT** approved for mobile homes, recreational vehicles or outdoor applications. Such use could result in property damage, personal injury, or death.

**CAUTION**

**DO NOT** operate furnace without an air filter in place.

**CAUTION**

Extreme caution must be taken to ensure that no damage to the unit occurs as a result of drilling screws into the cabinet.

This furnace is designed for through-the-wall indoor installation only. Installation of this equipment, wiring, ducts, and any related components must conform to current agency codes, state laws, and local codes. Such regulations take precedence over general instructions contained in this manual.

## INTRODUCTION

Therma-Pak ECG series are self-contained units with gas-fired heating and electric cooling. The unit design has been certified by Intertek Testing Services for compliance with the latest edition of the American National Standard – ANSI Z21.47 for direct vent central furnaces. The ECG models are certified to be in compliance with the latest edition of A.H.R.I. Standard 390. All models are design certified for heating operation when fired with natural gas.

These installation instructions are intended as a general guide only, for use by an experienced, qualified contractor.

## STORAGE

Equipment should be stored in a clean dry, conditioned area with maximum temperatures up to 120°F [48.89°C] and minimum temperatures to 32°F [0°C]. Units should be stored upright and in an indoor environment. It is recommended to leave packaging on the unit until the installation is to begin.

**NOTE**

**DO NOT** stack units for any reason. Stacking can damage the units and may cause property damage, personal injury, or death.



## SHIPPING & PACKAGING LIST

### SHIPPING INSTRUCTIONS

ECG units must remain in the upright position throughout the shipping and handling process to maintain the correct compressor oil level.

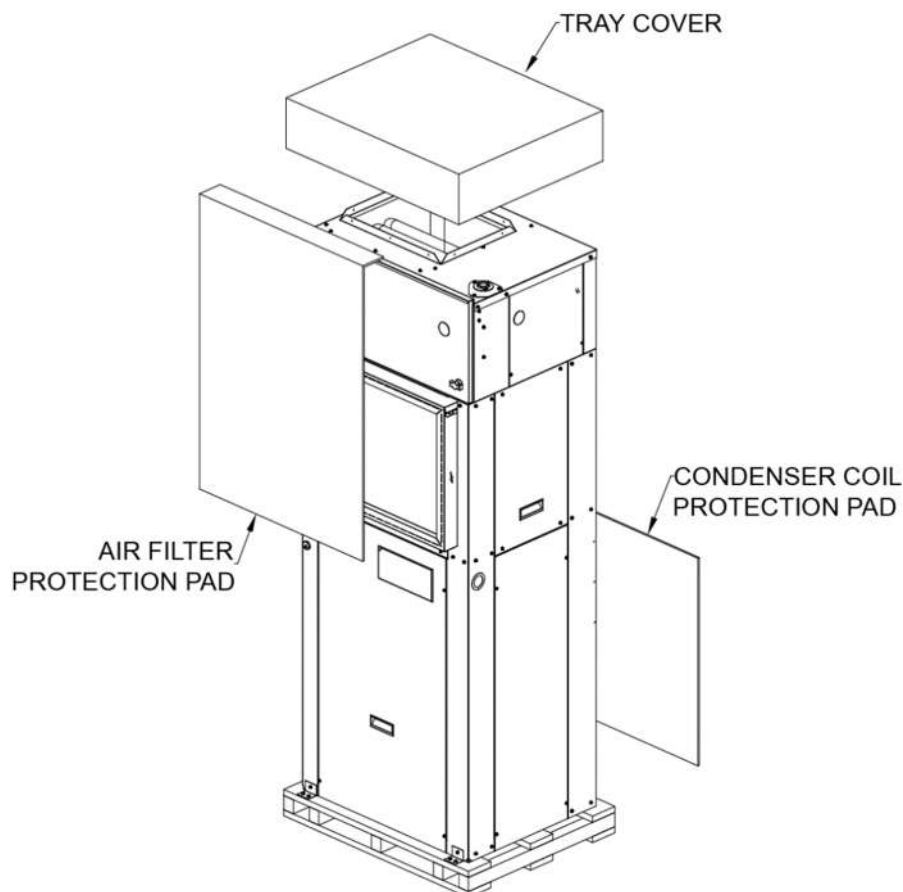


FIGURE 2 - Standard Packaging

### PACKAGING LIST

ECG units are shipped with the following items:

1. Shipping bracket
2. Screws (4)
3. Top mounting bracket
4. Screws (4)
5. Literature package
6. (IOM - Installation & Operations Manual  
Warranty certificate)
7. Vent Kit - (vent pipe, bracket, screws)

Check the unit for shipping damage. If any damage is found, immediately contact the shipping carrier.



### NOTE



All components in this shipment have been inspected at the factory and released to the transportation agency in good condition. When received, a visual inspection of all cartons should be made immediately. Any evidence of rough handling or apparent damage should be noted on the delivery receipt in the presence of the carrier's representative. If damage is found, a claim should be immediately filed against the shipping carrier.

# UNIT INSPECTION CHECKLIST

Complete the inspection procedures below before preparing unit for installation:

- 1) Visually inspect unit for any shipping damage. Damage must be reported immediately to the shipping company to make a claim.
- 2) Ensure that the carrier makes proper notation of any shortages or damage on all copies of the freight bill and completes a common carrier inspection report.
- 3) Verify that unit nameplates on the data label match the sales order or bill of lading (including, unit configuration, size and voltage).
- 4) Immediately before installation, remove unit front panel and verify that all electrical connections are tight.
- 5) Check to make sure that the refrigerant piping is free from any kinks and there is no interference between unit piping and sheet metal or electrical wires.
- 6) Check that the blower spins freely within the housing and that there are no obstructions between the wheel and housing. The wheel can sometimes come loose in shipping.
- 7) Ensure that the evaporator distributor tubes are not touching one in another and that they are over the drain pan.
- 8) Check the air-coil fins for any damage during shipping.
- 9) Ensure that the shipping brackets and screws are removed from the chassis section. Refer to **FIGURE 3 - Standard Packaging with Brackets - Front View** & **FIGURE 4 - Standard Packaging with Brackets - Back View** for more information.
- 10) Inspect the gas heat section:
  - a. Check that the gas manifold is firmly in place on the burner box and secured with the provided screws (4).
  - b. Check that burners are securely in place on each gas orifice and properly aligned with each heat exchanger tube.
  - c. Check that wiring connections are in place on rollout switches, limit switch, pressure switch, gas valve, draft inducer, ignitor, and flame sensor.

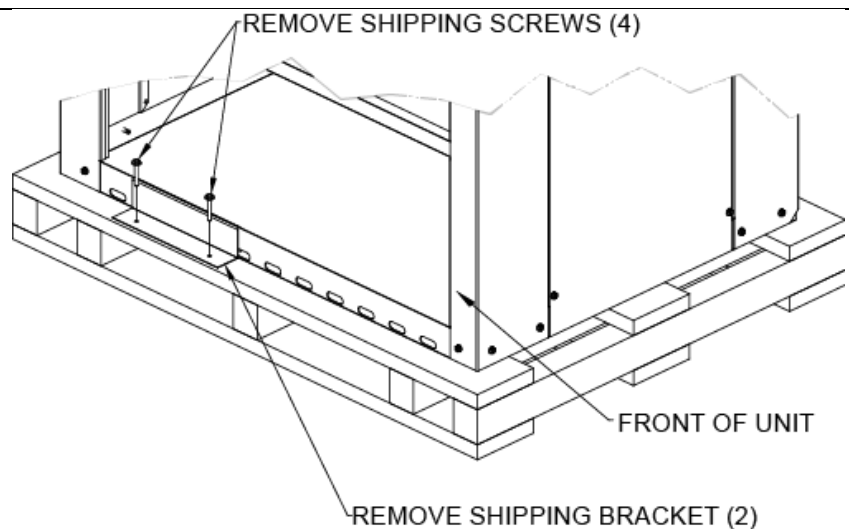


FIGURE 3 - Standard Packaging with Brackets - Front View

<b>i</b>	<b>NOTE</b>	<b>i</b>
Check the unit nameplate for correct voltage before installing the equipment. Ensure that all electrical ground connections are made in accordance with local code.		

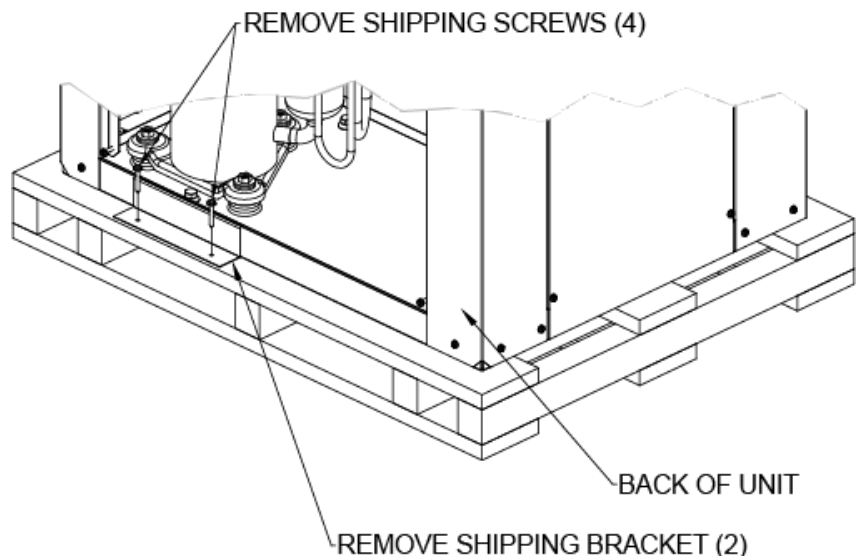


FIGURE 4 - Standard Packaging with Brackets - Back View

# UNIT DIMENSIONAL DATA

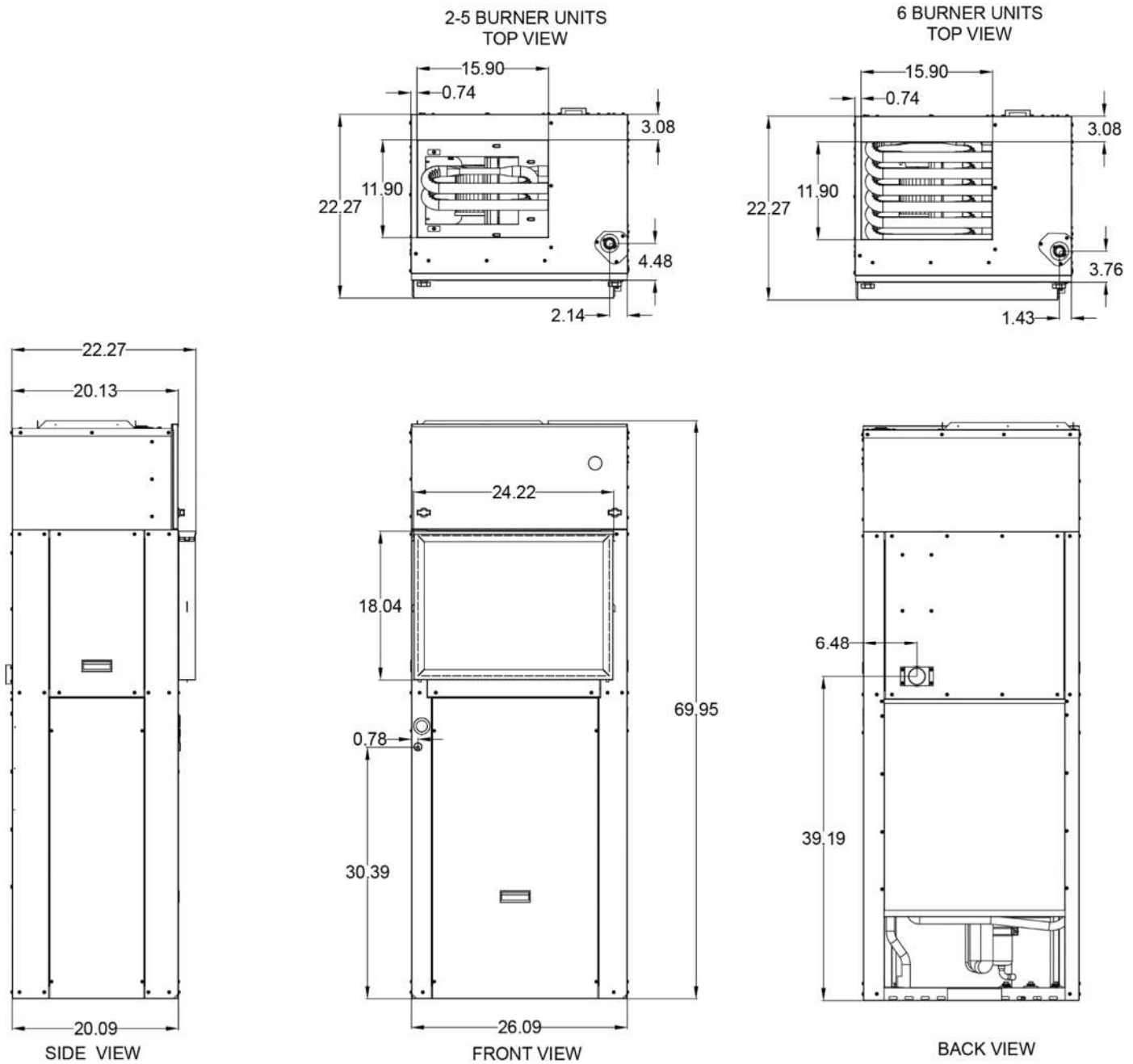


FIGURE 5 - Unit Dimensions

# UNIT PHYSICAL DATA

PHYSICAL DATA								
ECG MODELS	092N8A20B	122N8A20B	122N8A30B	122N8A40B	182N8A30B	182N8A40B	182N8A50B	182N8A60B
UNIT INFORMATION								
Compressor Qty/Type	Rotary (1)	Rotary (1)	Rotary (1)	Rotary (1)	Scroll (1)	Scroll (1)	Scroll (1)	Scroll (1)
Compressor Capacitor	35MFD/370V	40MFD/370V	40MFD/370V	40MFD/370V	30MFD/370V	30MFD/370V	30MFD/370V	30MFD/370V
Condenser Fan HP [kW]	1/4 [0.19]	1/4 [0.19]	1/4 [0.19]	1/4 [0.19]	1/3 [0.25]	1/3 [0.25]	1/3 [0.25]	1/3 [0.25]
Indoor Fan HP [kW]	1/4 [0.19]	1/4 [0.19]	1/4 [0.19]	1/4 [0.19]	1/3 [0.25]	1/3 [0.25]	1/2 [0.25]	1/2 [0.25]
Blower Size (D x W) in. [cm]	10 x 6 [25.4 x 15.24]							
Condenser Dimension (H x W) in. [cm]	26 x 22.5 [66.04 x 57.15]							
Evaporator Dimension (H x W) in. [cm]	18 x 22 [47.72 x 55.88]							
Filter Size (H x W) in. [cm]	18 x 24 [45.72 x 60.96]							
Input BTU/h [kW]	20,000 [5.9]	20,000 [5.9]	30,000 [8.8]	40,000 [11.7]	30,000 [8.8]	40,000 [11.7]	50,000 [14.7]	60,000 [17.6]
Output BTU/h [kW]	16,200 [4.7]	16,200 [4.7]	24,300 [7.1]	32,400 [9.5]	24,400 [7.1]	32,400 [9.5]	40,500 [11.9]	48,600 [14.2]
Thermal Efficiency	81	81	81	81	81	81	81	81
No. of Burners	2	2	3	4	3	4	5	6
Orifice Size in. [mm]	0.061 [1.55]	0.061 [1.55]	0.061 [1.55]	0.061 [1.55]	0.061 [1.55]	0.061 [1.55]	0.061 [1.55]	0.061 [1.55]
Max. Outlet Air Temp. °F [°C]	155 [68]	155 [68]	160 [71]	165 [74]	160 [71]	165 [74]	165 [74]	170 [77]
Max. Static Pressure IWC [pa]	0.5 [125]							
Gas Piping Connection in. [cm]	1/2" [12.7]							
Operating Weight lb. [kg]	283 [129]	283 [129]	285 [130]	287 [130]	347 [158]	350 [159]	364 [165]	367 [167]
Shipping Weight lb. [kg]	303 [138]	303 [138]	305 [139]	307 [140]	367 [167]	370 [168]	384 [175]	387 [176]
Notes:								
<ul style="list-style-type: none"> <li>FPT = Female Pipe Thread</li> </ul>								

Table 1 - Physical Data

PHYSICAL DATA							
ECG MODELS	242N8A30B	242N8A40B	242N8A50B	242N8A60B	302N8A40B	302N8A50B	302N8A60B
UNIT INFORMATION							
Compressor Qty/Type	Scroll (1)	Scroll (1)	Scroll (1)	Scroll (1)	Scroll (1)	Scroll (1)	Scroll (1)
Compressor Capacitor	40MFD/370V	40MFD/370V	40MFD/370V	40MFD/370V	35MFD/370V	35MFD/370V	35MFD/370V
Condenser Fan HP [kW]	1/3 [0.25]	1/3 [0.25]	1/3 [0.25]	1/3 [0.25]	1/3 [0.25]	1/3 [0.25]	1/3 [0.25]
Indoor Fan HP [kW]	1/3 [0.37]	1/3 [0.37]	1/2 [0.37]	1/2 [0.37]	1/2 [0.37]	1/2 [0.37]	1/2 [0.37]
Blower Size (D x W) in. [cm]	10 x 6 [25.4 x 15.24]						
Condenser Dimension (H x W) in. [cm]	26 x 22.5 [66.04 x 57.15]						
Evaporator Dimension (H x W) in. [cm]	18 x 22 [47.72 x 55.88]						
Filter Size (H x W) in. [cm]	18 x 24 [45.72 x 60.96]						
Input BTU/h [kW]	30,000 [8.8]	40,000 [11.7]	50,000 [14.7]	60,000 [17.6]	40,000 [11.7]	50,000 [14.7]	60,000 [17.6]
Output BTU/h [kW]	24,300 [7.1]	32,400 [9.5]	40,500 [11.9]	48,600 [14.2]	32,400 [9.5]	40,500 [11.9]	48,600 [14.2]
Thermal Efficiency	81	81	81	81	81	81	81
No. of Burners	3	4	5	6	4	5	6
Orifice Size in. [mm]	0.061 [1.55]	0.061 [1.55]	0.061 [1.55]	0.061 [1.55]	0.061 [1.55]	0.061 [1.55]	0.061 [1.55]
Max. Outlet Air Temp. °F [°C]	160 [71]	165 [74]	165 [74]	170 [77]	165 [74]	165 [74]	170 [77]
Max. Static Pressure IWC [pa]	0.5 [125]						
Gas Piping Connection in. [cm]	1/2" [12.7]						
Operating Weight lb. [kg]	347 [158]	361 [164]	364 [165]	367 [167]	361 [164]	364 [165]	367 [167]
Shipping Weight lb. [kg]	367 [167]	381 [173]	384 [175]	387 [176]	381 [173]	384 [175]	387 [176]
Notes:							
<ul style="list-style-type: none"> <li>FPT = Female Pipe Thread</li> </ul>							

Table 2 - Physical Data Continued

## ELECTRICAL DATA

ELECTRICAL DATA											
MODEL NUMBER	VOLTAGE-PH-HZ	COMPRESSOR		CONDENSOR MOTOR		INDOOR MOTOR		MIN. CIRCUIT	MAX. CIRCUIT	MIN.	MAX.
		RLA	LRA	FLA	HP	FLA	HP	AMPACITY	PROTECTION	VOLTAGE	VOLTAGE
ECG092N8A20B	208/230-1-60	4.4	20	2.3	1/4	2.3	1/4	11	15	197	253
ECG122N8A20B	208/230-1-60	4.7	26	2.3	1/4	2.3	1/4	11	15	197	253
ECG122N8A30B	208/230-1-60	4.7	26	2.3	1/4	2.3	1/4	11	15	197	253
ECG122N8A40B	208/230-1-60	4.7	26	2.3	1/4	2.3	1/4	11	15	197	253
ECG182N8A30B	208/230-1-60	9	56.3	2.8	1/3	2.8	1/3	17	25	197	253
ECG182N8A40B	208/230-1-60	9	56.3	2.8	1/3	2.8	1/3	17	25	197	253
ECG182N8A50B	208/230-1-60	9	56.3	2.8	1/3	4.1	1/2	19	25	197	253
ECG182N8A60B	208/230-1-60	9	56.3	2.8	1/3	4.1	1/2	19	25	197	253
ECG242N8A30B	208/230-1-60	10.9	61.6	2.8	1/3	2.8	1/3	19	30	197	253
ECG242N8A40B	208/230-1-60	10.9	61.6	2.8	1/3	2.8	1/3	19	30	197	253
ECG242N8A50B	208/230-1-60	10.9	61.6	2.8	1/3	4.1	1/2	20	30	197	253
ECG242N8A60B	208/230-1-60	10.9	61.6	2.8	1/3	4.1	1/2	20	30	197	253
ECG302N8A40B	208/230-1-60	10.8	65	2.8	1/3	4.1	1/2	23	35	197	253
ECG302N8A50B	208/230-1-60	10.8	65	2.8	1/3	4.1	1/2	23	35	197	253
ECG302N8A60B	208/230-1-60	10.8	65	2.8	1/3	4.1	1/2	23	35	197	253

Table 3 - Electrical Data

## INSTALLATION

### REQUIREMENTS

Follow manufacturer's installation instructions, as well as local and municipal building codes. In addition, the installation shall conform to the following Fire Protection Association (NFPA) Standards:

- NFPA No. 90A – Standard for Installation of Air Conditioning and Ventilation Systems.
- NFPA No. 90B – Standard for Installation of Residence Type Warm Air Heating and Air Conditioning Systems.

This unit is approved for installation clearance to combustible material as stated on the unit rating plate. However, stated minimum clearances to combustibles may be inadequate for future accessibility and service needs which must be considered when planning the installation.

### INSTALLATION PRECAUTIONS

Observe the following precautions for typical installation:

- Always use proper tools and equipment.
- No wiring or any work should be attempted without first ensuring the unit is completely disconnected from the power source and locked out. Also, verify that a proper permanent and uninterrupted ground connection exists prior to energizing power to the unit.
- Review unit nameplate and wiring diagram for proper voltage and control configurations. This information may vary from unit to unit.


**CAUTION**


Always wear all appropriate Personal Protection Equipment (PPE) when installing and servicing units.


**WARNING**




Use multiple people when moving and installing units. Failure to do so could result in personal injury or death.


**CAUTION**


Contact with metal edges and corners may result in injury. Protective gloves should be worn when handling. Exercise caution when installing and servicing unit.


**CAUTION**


When the unit is in operation, components are rotating at high speeds.


**NOTE**


When soldering and brazing close to valves or sensitive components, heat shields and/or wet rags are required to prevent damage to the valves or components. It is also recommended to have a fire extinguisher readily available at all times during all soldering/brazing activity.

## INSTALLATION (continued)



### NOTE



Insulation in the unit provides a barrier between varying atmospheres outside and within the unit. If insulation is damaged, condensation can occur and can lead to corrosion, component failure, and possible property damage. Damaged insulation must be repaired prior to the operation of the unit. Insulation will lose its effectiveness and value when wet, torn, separated, and/or damaged.



### CAUTION



When servicing this equipment, because of the high pressures present in the unit, make sure the reversing valve, expansion device, filter drier and other components are specifically designed for R-410A refrigerant.

**ONLY USE** service equipment specifically designed for use with R-410A.



### WARNING



R-410A can become combustible if mixed with air at elevated temperature and/or pressure. Failure to follow this warning could result in property damage, and personal injury or death.

### UNIT LOCATION

This furnace is certified for through-the-wall, indoor, up-flow vertical position installation only. This appliance is not design certified for installation in mobile homes, recreational vehicles, or outdoors. An approved wall sleeve must be used to install the ECG unit.

This is a direct vent appliance which uses outside air for combustion and discharges the products of combustion to the outdoors. Do not install this unit in close proximity to exhaust from clothes dryer vents, kitchen vents, corrosive fumes, or steam vents.

Do not install directly on carpeting, tile, or other combustible material other than wood flooring. Proper distances must be maintained between the appliance vent pipe and operable windows, building openings, public walkways, electric meters, gas meters, gas regulators and gas relief equipment. Flue products must not be permitted to damage building surfaces.

The Installation must conform with local building codes or, in the absence of local codes, to the *National Fuel Gas Code*, ANSI Z223.1/NFPA 54, and/or the *Natural Gas and Propane Installation Code*, CSA B149.1

If unit is installed in a garage, the furnace must be installed so the burner(s) and the ignition source are located not less than 18" [45.72cm] above the floor. The furnace must be protected from physical damage from vehicles.

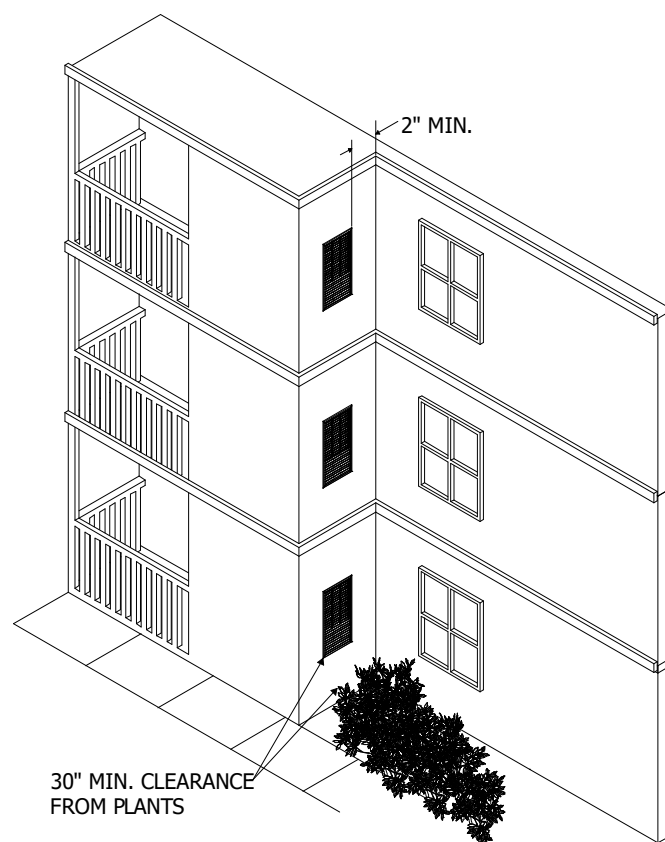


FIGURE 6 - Typical Floorplan with Therma-Pak on Exterior Wall

## INSTALLATION (continued)

### UNIT CLEARANCE REQUIREMENTS

The Therma-Pak unit may be installed with zero clearances to adjacent combustible surfaces. This furnace shall not be installed directly on carpeting, tile, or other combustible material, other than wood flooring. Service clearance must be provided for future maintenance and service. A minimum of 32" [81.28 cm] open area must be left unobstructed in front of the access panels.

The grille side must be kept free from any obstructions to air flow. The unit must be installed at least 4 feet [1.2192m] from electric meters, gas meters, regulators, and relief equipment. Products of combustion are discharged outside from the vent outlet located at the front grille; therefore, all distances from adjacent public walkways, adjacent buildings, openable windows, and building openings must be compliant with those called for in the National Fuel Gas Code ANSI Z223.1 and installation codes, as well as local codes.

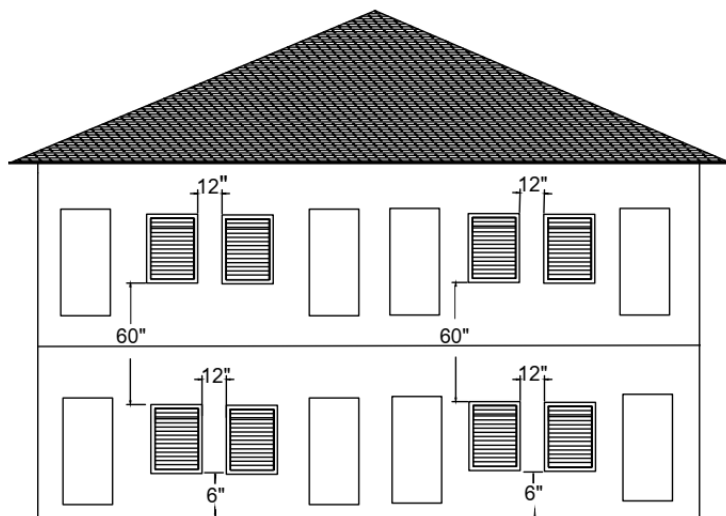


FIGURE 7 - Required Exterior Building Clearance

CLEARANCE REQUIREMENTS	
MINIMUM CLEARANCE	INCHES
Horizontal distance between units	12
Vertical distance between units	60
Distance above ground level	6
Distance above finished floor	6
Distance above a garage floor	18

Table 4 - Dimensional Clearance Requirements

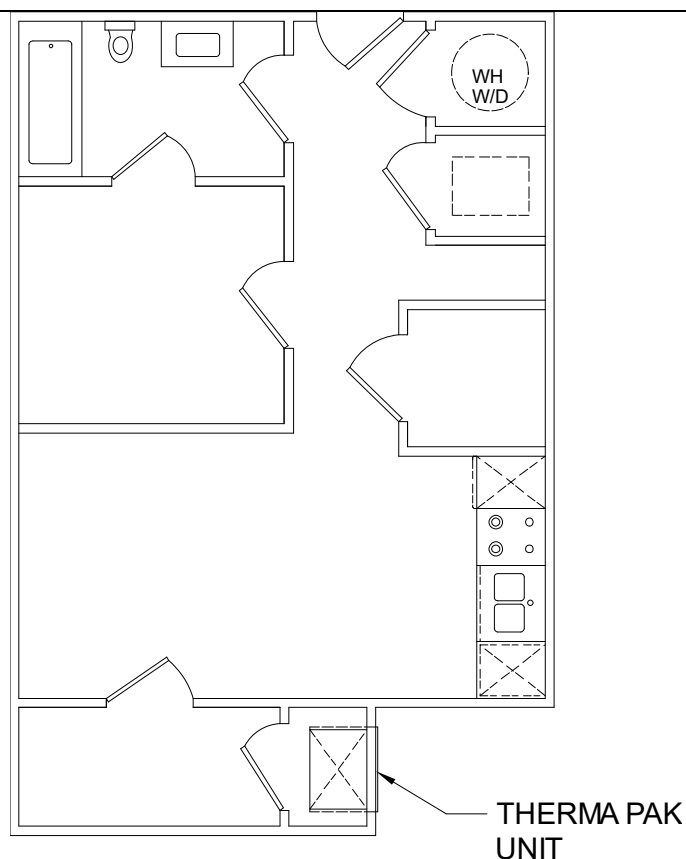


FIGURE 8 - Typical Floor Plan



### WARNING



#### CARBON-MONOXIDE POISONING HAZARD

Failure to follow instructions could result in severe personal injury or death due to carbon-monoxide poisoning, if combustion products infiltrate into the building.

Check that all openings in the outside wall around the vent (and air intake) pipe(s) are sealed to prevent infiltration of combustion products into the building.

Check that furnace vent (and air intake) terminal(s) are not obstructed at during all seasonal weather patterns.



### CAUTION



A masonry wall opening must be properly constructed with a lintel for wall support. Wall openings must be flashed and sealed. The unit must be level, front to back, side to side.

Refer to **VENTING** section and **UNIT CLEARANCE REQUIREMENTS** section of this manual for more information.



# INSTALLATION (continued)

## VENT CLEARANCES

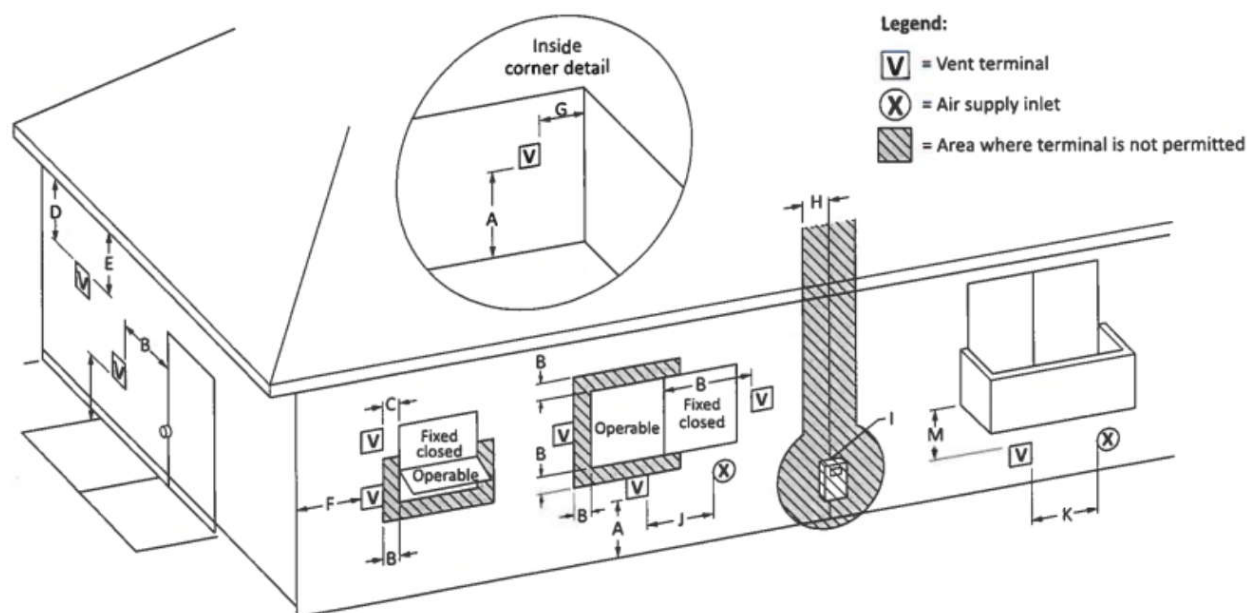


FIGURE 9 - Location of Vent Termination Clearances

VENT TERMINATION CLEARANCES			
	CLEARANCE		US INSTALLATIONS <sup>2</sup>
A =	Clearance above grade, veranda, porch, deck, or balcony (see 1.23.5-i(9)b)		12 in (30 cm)
B =	Clearance to window or door that may be opened		4 ft. (1.2 m) below or to the side of opening 1 foot (0.30 m) above opening
C =	Clearance to permanently closed window		*
D =	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 ft. (61 cm) from the center line of the terminal		*
E =	Clearance to unventilated soffit		*
F =	Clearance to outside corner		*
G =	Clearance to inside corner		*
H =	Clearance to each side of center line		*
I =	Clearance to service regulator vent outlet		*
J =	Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other appliance		4 ft. (1.2 m) below or to the side of opening 1 ft. (0.30 m) above opening
K =	Clearance to a mechanical air supply inlet		3 ft. (91 cm) above if within 10 ft. (3 m) horizontally
L =	Clearance above paved sidewalk or paved driveway located on public property		7 ft. (2.13 m)
M =	Clearance under veranda, porch, deck, or balcony		*

### NOTES:

- 1) In accordance with the current Natural Gas Installation Code.
- 2) In accordance with the current ANSI Z223.1/NFPA 54, National Fuel Gas Code.

\*Clearance in accordance with local installation codes and the requirements of the gas supplier and the manufacturer's installation instructions.

† A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single-family dwellings and serves both dwellings.

‡ Permitted only if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.

Table 5 - Vent Termination Clearances Dimensions



## INSTALLATION (continued)

### REMOVAL OF UNIT FROM COMMON VENTING SYSTEM

When an existing furnace is removed from a common venting system serving other appliances, the venting system is likely to be too large to properly vent the remaining attached appliances. The following test shall be conducted with each appliance while the other appliances connected to the common venting system are not in operation. An improperly sized venting system may cause condensation or flue gas spillage to occur.



### IMPORTANT



**DO NOT** use the Therma-Pak unit within a Common Venting System

1. Seal any unused openings in the common venting system.
2. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion, or other deficiencies which could cause an unsafe condition.
3. Insofar as is practical, close all building doors and windows between the space in which the appliances remaining connected to the common venting system are located and other spaces in the building. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
4. Following the lighting instructions, place the unit being inspected into operation. Adjust the thermostat so the appliance will operate continuously.
5. Test for spillage at the draft control relief opening after 5 minutes of main burner operation. Use the flame of a match or candle.
6. Follow the preceding steps for each appliance connected to the common venting system.
7. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers, and any other fuel burning appliance to their previous condition of use.

If improper venting is observed during any of the above tests, the venting system must be corrected. See National Fuel Gas Code, ANSI Z223.1 (latest edition) to correct improper operation of common venting system.



### WARNING



### ELECTRIC SHOCK HAZARD



Disconnect all power supplies before servicing. Lock out/tag out equipment to prevent electrical shock.

### WALL SLEEVE INSTALLATION

Refer to installation instruction packed with the wall sleeve to assemble and mount into the wall. Before unit installation, make sure sleeve components are not damaged; drain line is not obstructed and is leak free. Check that all seals are in position and free of damage. Securely fasten the Architectural grille to the front of the sleeve using the supplied hardware.

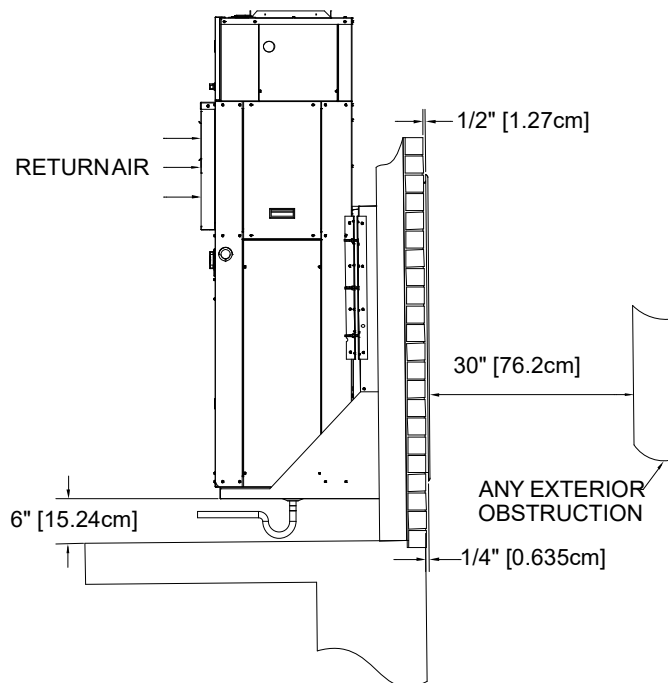


FIGURE 10 - Wall Sleeve Mounting



### IMPORTANT



After sleeve installation, ensure that the gap between the wall and seal is insulated and is in contact with the sleeve sides.



### IMPORTANT



Make sure a high grade non-hardening sealant approved for exterior use has been applied between edge of the sleeve and the structure, on the inside and outside walls, to prevent air and water from migrating inside

## INSTALLATION (continued)

### WALL SLEEVE INSTALLATION

#### REAR INSTALLATION & DIMENSIONS

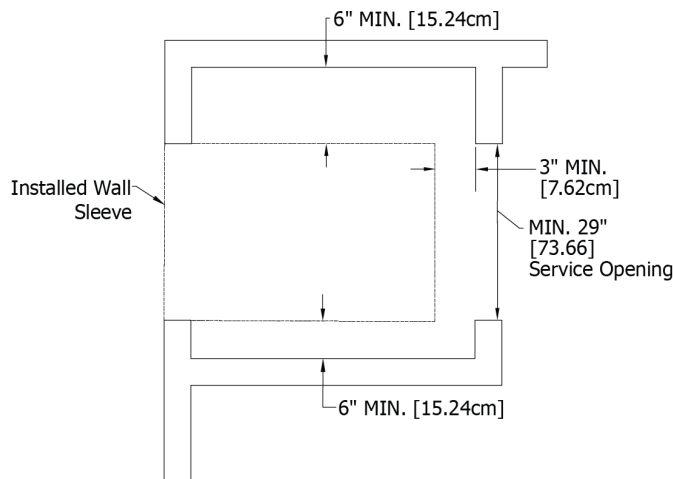


FIGURE 11 - Rear Installation Dimensions

The Therma-Pak unit can be installed in a closet with the following clearances; to combustibles 0" clearance on the sides, 2" [5.08cm] clearance from the top, and 1" [2.54cm] from the front and the plenum. Adequate clearance must be provided to install a gas line and manual shutoff valve while also providing access for installing field wiring. Do not install directly on any combustible material (such as carpet, tile, etc.) other than wood flooring.

#### SIDE INSTALLATION & DIMENSIONS

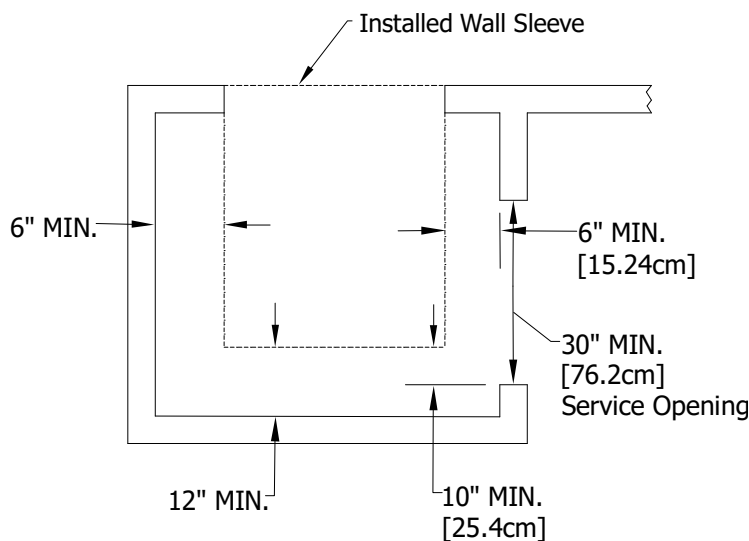


FIGURE 12 - Side Installation Dimensions

<b>i</b>	<b>NOTE</b>	<b>i</b>
Sleeve dimensions differ across models.		

# INSTALLATION (continued)

## PACKAGED UNIT INSTALLATION

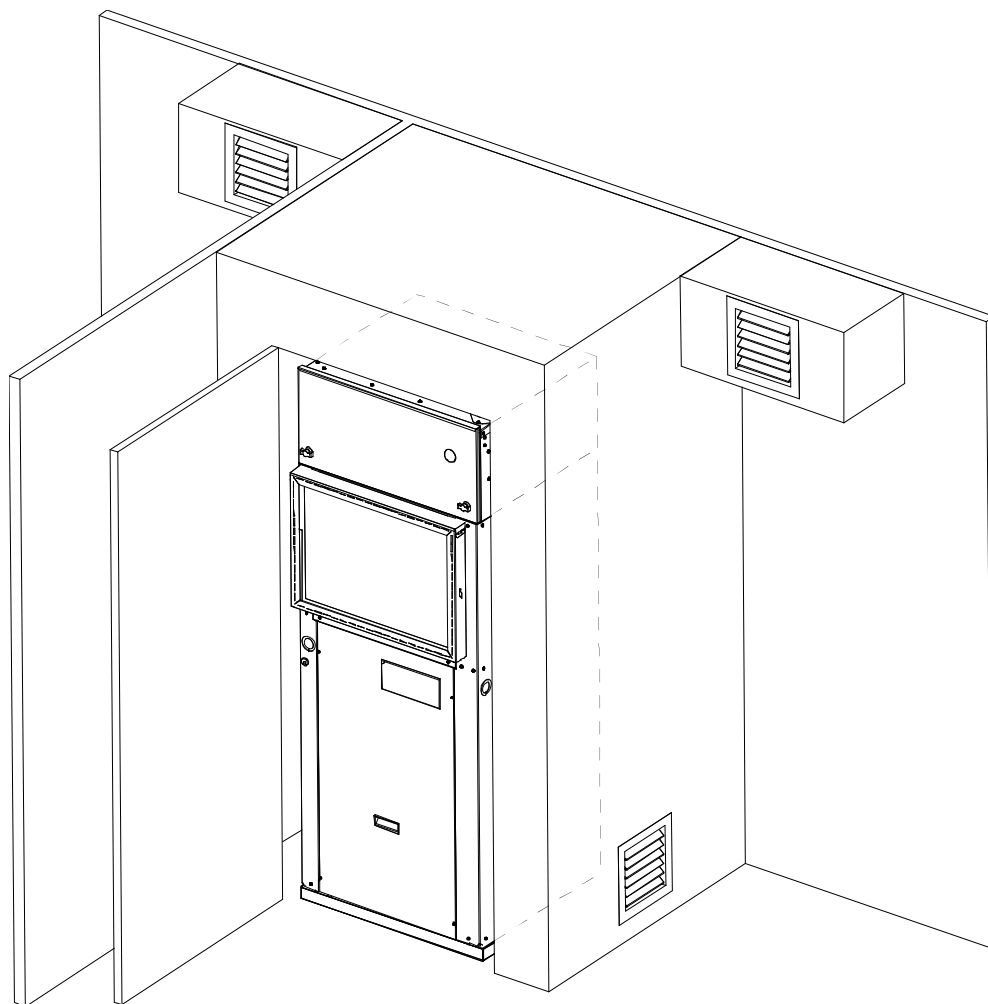


FIGURE 13 – Therma-Pak Unit Installation



### NOTE



Locate unit in an area that provides minimum clearance to all service access panels. Consider all additional clearances needed for water connections, electrical connections, duct connections and sufficient return airflow.



### IMPORTANT



Unit is **ONLY** intended for indoor installation



### NOTE



**DO NOT** locate unit in areas subject to freezing temperatures or with high humidity levels which may cause cabinet condensation. Units should be mounted on the sleeve with a pitch to the outside of the building.

Insulation in the unit provides a barrier between the different atmospheres present outside and within the unit. If the insulating barrier is damaged, the surrounding ambient air will affect the inside surface temperature of the cabinet, this may lead to sheet metal corrosion and subsequently, component failure.



### IMPORTANT



Damaged insulation must be repaired or replaced before the unit can be placed back into operation. Insulation is damaged when wet, perforated, or torn.

The installer must adhere strictly to all local and national code requirements pertaining to the installation of this equipment including the cabinet, discharge plenum and connecting ducts. Therma-Pak units are for indoor use only, and are agency listed for installation with clearances specified in on the furnace rating plate.

# INSTALLATION (continued)

## PACKAGED UNIT INSTALLATION (Continued)



### NOTE



Remove the four shipping brackets holding the unit to the shipping pallet and remove unit from the shipping pallet. Check nameplate voltage, amperage and fuse size for proper power supply.

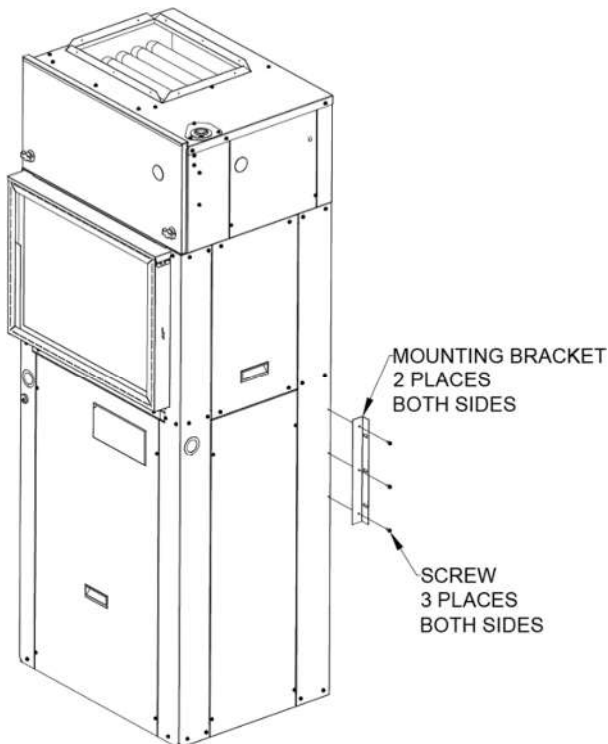


FIGURE 14 - Side Bracket Installation on Sleeve

1. Ensure that properly sized ductwork is in place to mate to the connections on the Therma-Pak.
2. Remove front access panel and verify all electrical connections are secure and check the condenser fan to see it turns freely.
3. If an air filter is to be applied to the unit remove the top flange on the filter rack to replace filter. (FIGURE 21- Air Filter Location). Place the filter into the filter bracket.
4. Ensure that the wall sleeve is installed squarely and is secured before installing the unit.

5. Inspect the sleeve seal, which is supplied with the sleeve, to ensure that it is properly secured and aligned.
6. Slide the Therma-Pak unit toward the sleeve seal until the sleeve and cabinet brackets are nested and almost making contact.
7. Center the Therma-Pak unit in the sleeve.
8. Use screw fasteners to attach the cabinet bracket to wall sleeve.

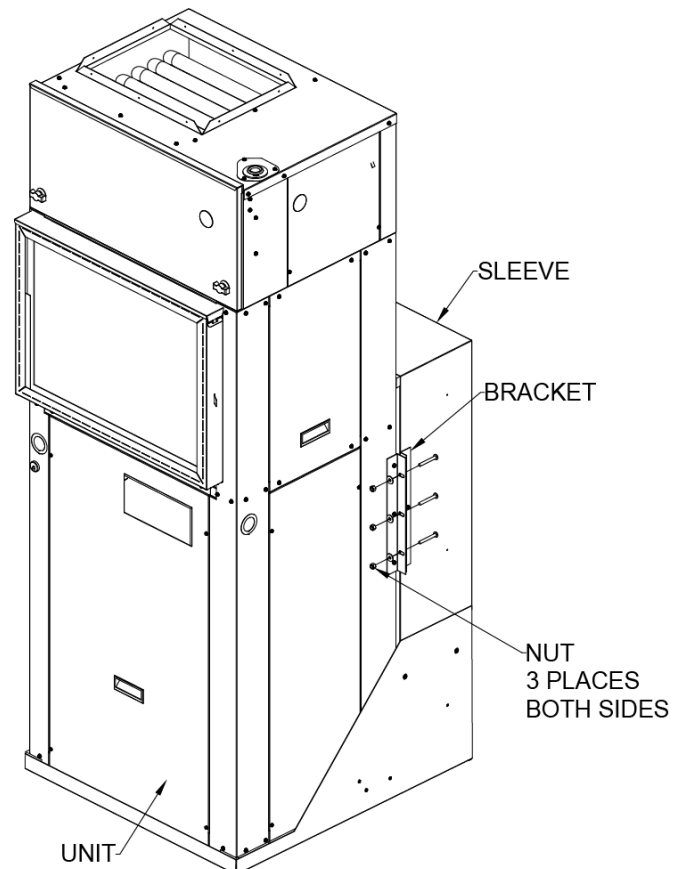


FIGURE 15 - Wall Sleeve Installation

9. Use a high-grade, non-hardening sealant to close any gaps that may exist between the seal and the wall of the sleeve.
10. Check that the unit is completely settled on all four sides against the wall sleeve seals.



### WARNING



If unit is not properly sealed, water, outside air, and/or Products of combustion will infiltrate into the closet. Infiltration of elements to inside air may cause improper unit operation, damage to the unit, or property damage. Infiltration of combustion products may cause personal injury or death.

## INSTALLATION (continued)

### DUCTWORK



#### IMPORTANT



The supply duct connection must be sized to a minimum of the same size as the unit discharge air opening.



#### IMPORTANT



All ductwork must be installed in accordance with National Fire Protection Assoc. Codes 90A and 90B.

### DISCHARGE DUCTING

Discharge (supply) air ductwork must be used and must be adequately sized to provide airflow within the specified total external static pressure of 0.5" w.c. Ductwork should be adequately insulated to prevent condensation and loss of efficiency. Flexible duct connections may be used.

### RETURN AIR DUCTING

If permitted by local codes and the local authority having jurisdiction, Therma-Pak units may use free-air return. For installations using return air ductwork, it must be adequately sized to provide airflow within the specified total external static pressure of 0.5" w.c. Ductwork should be adequately insulated to prevent loss of efficiency. Flexible duct connections may be used.

When this furnace is installed so that the supply air duct supplies air to areas outside the space containing the furnace, the return air duct must be sealed to the furnace casing and terminate outside the space containing the furnace. Installer must ensure that the doors are sealed properly to avoid combustion air recirculation.

Condensate drain lines must be properly installed with adequate slope away from unit to ensure proper drainage. A minimum trap of 1.5 inches [3.81cm] must be installed to isolate the negative pressures of the drain pan from the drain line. Refer to for schematic information on the condensate drain lines.



#### WARNING



Never allow the products of combustion from the flue pipe to enter the supply or return ducts.

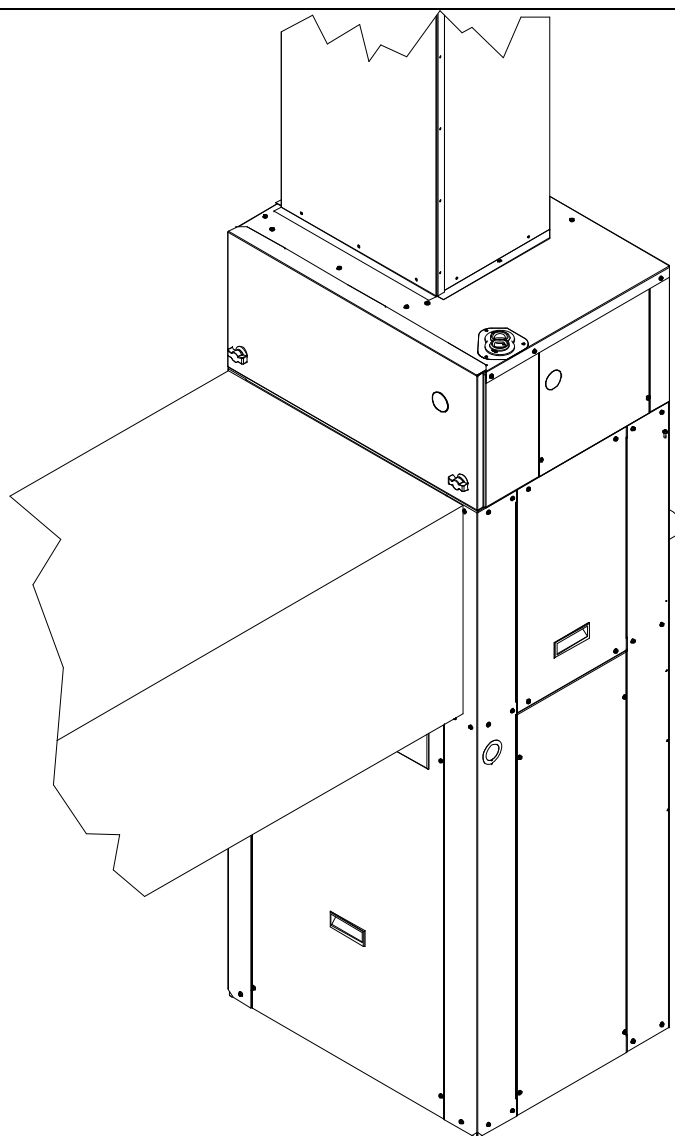


FIGURE 16 - Unit Return Ducting

### CONDENSATE DRAINAGE

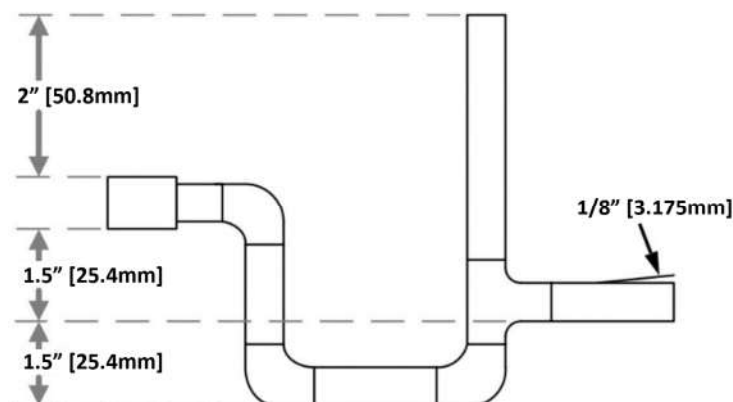


FIGURE 17 - Condensate Drain Layout

## INSTALLATION (continued)

### VENTING

The venting system exhausts the products of combustion to the outdoors. The Therma-Pak unit ships with the vent pipe un-installed. The installer must install the vent pipe before the unit is placed into operation. Follow all local & National codes when selecting an installation location. Observe all clearance requirements pertaining to vent termination. Perform regularly scheduled maintenance checks to assure venting of flue products to the outdoors is unobstructed. The final leg of the flue pipe (25-5-"X") comes with the sleeve and the length of it matches the sleeve's depth. After removing the vent pipe bracket (10-4512), insert the flue pipe (25-5-"X") over the elbow (25-6) shown in figure 19. Later attach the bracket (10-4512) back so it locks the flue pipe (25-5-"X") in place.

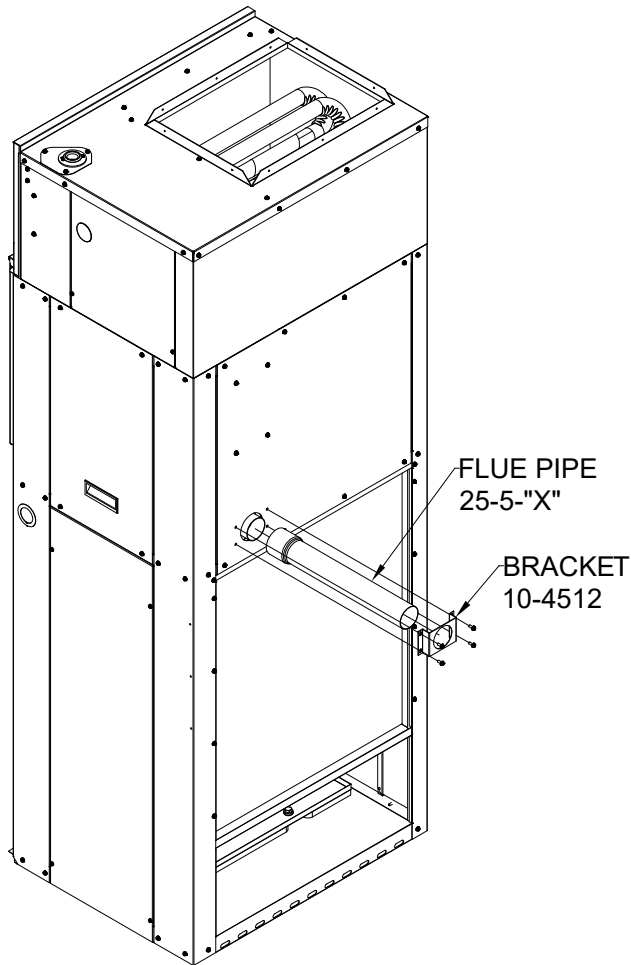


FIGURE 18 - Venting Location

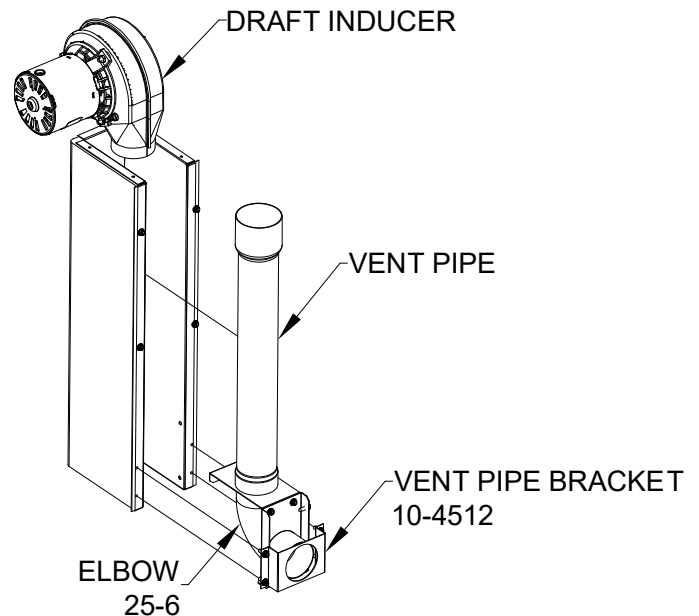


FIGURE 19 - Venting Location (Detail)

!
WARNING
!

**CARBON MONOXIDE POISONING HAZARD**

Failure to follow instructions could result in severe personal injury or death due to carbon monoxide poisoning.

This unit is equipped with safety switches that disable operation if access panels are not in place.

**DO NOT** defeat safety switches.

**DO NOT** operate this unit in any mode without all factory provided access panels secured in place.

The Therma-Pak is equipped with three door switches as shown in the figure to the right. This is to ensure that the appliance does not function, if these key access doors are not replaced back. There are four more access doors on the sides and it is necessary to ensure they are closed or put back on, after any service is performed.

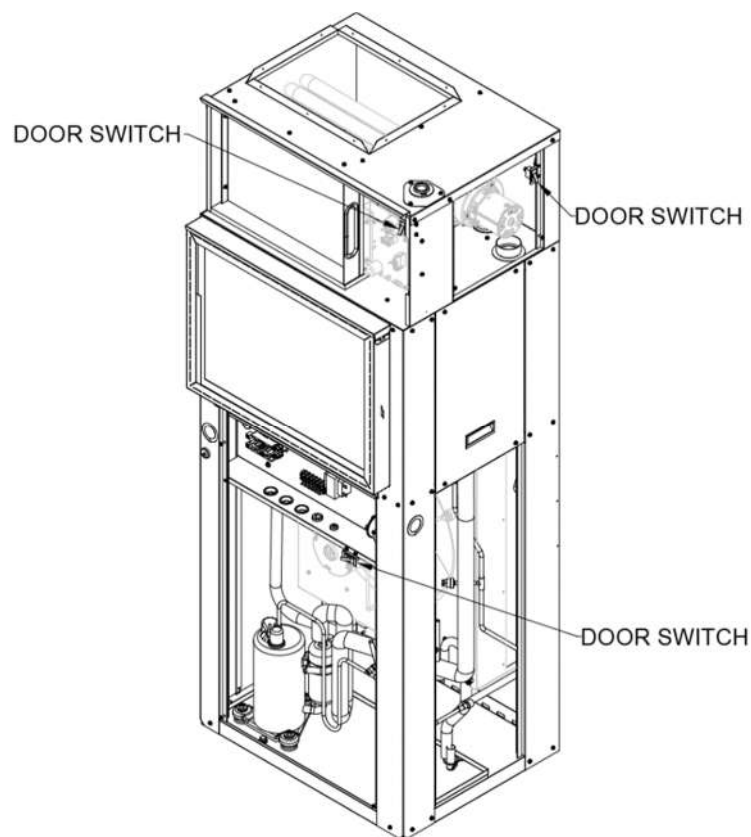


FIGURE 20 – Door Switch Locations

## INSTALLATION (continued)

### AIR FILTER

The Therma-Pak unit must not be operated without an air filter in place. The unit is equipped with a factory installed 2" filter rack and a disposable filter. A permanent washable filter may also be used provided it has the same or greater surface area as the original filter. As an alternative to the factory provided filter location, a filter rack may be field installed elsewhere in the return duct system. Do not use filters which are highly restrictive to air flow. The total external static pressure, including ducts, grilles, registers, and filters must not exceed 0.5" w.c.

AIR FILTER MINIMUM DIMENSIONS	
Model Series	Minimum Area
ECG**2N8*****	432 sq. inches [0.278 sq. meter]

Table 6 - Air Filter Minimum Dimensions

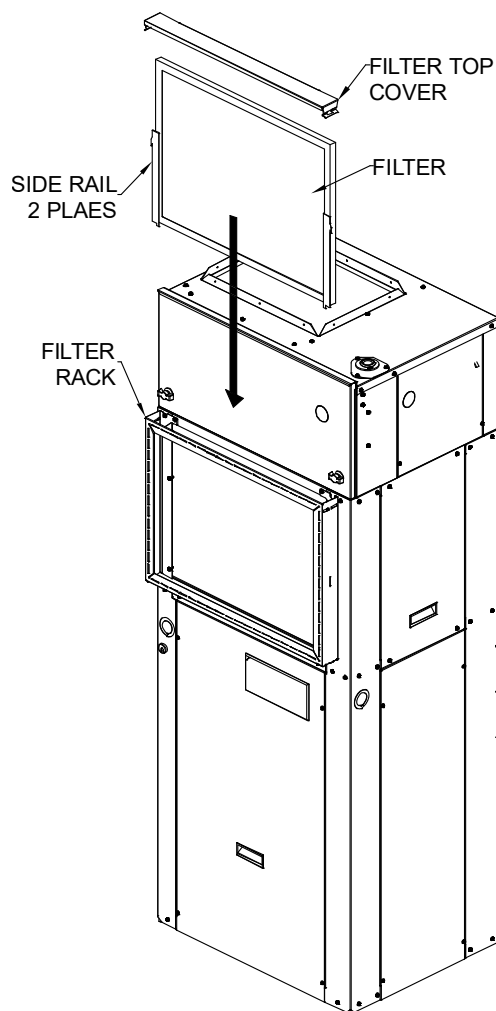


FIGURE 21- Air Filter Location



## INSTALLATION (continued)

### COMBUSTION AIR

This is a direct vent furnace, which receives its combustion air from outside and discharges the products of combustion outside. Do not restrict air openings on the ECG unit or any other appliances. Do not store any insulating material in the vicinity of the ECG unit or any other appliances.

! **WARNING** !

**DO NOT** block any louvered sections of the furnace, inside or outside. Inadequate combustion air will cause improper combustion and lead to the production of carbon monoxide.

! **WARNING** !

The area surrounding the furnace must be kept free of all combustible materials, gasoline, insulating materials and other flammable materials.

Inspect the furnace area after the furnace is installed and after anytime insulation has been added to the structure.

! **CAUTION** !

Avoid contamination of the furnace area and the combustion air supply, exposure to the following substances may cause premature heat exchanger failure:

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

All gas piping and connections to this furnace must be performed by a qualified installer. Installation methods and materials must comply with local building codes or, in the absence of local codes, to the *National Fuel Gas Code*, ANSI Z223.1/NFPA 54, and/or the *Natural Gas and Propane Installation Code*, CSA B149.1.

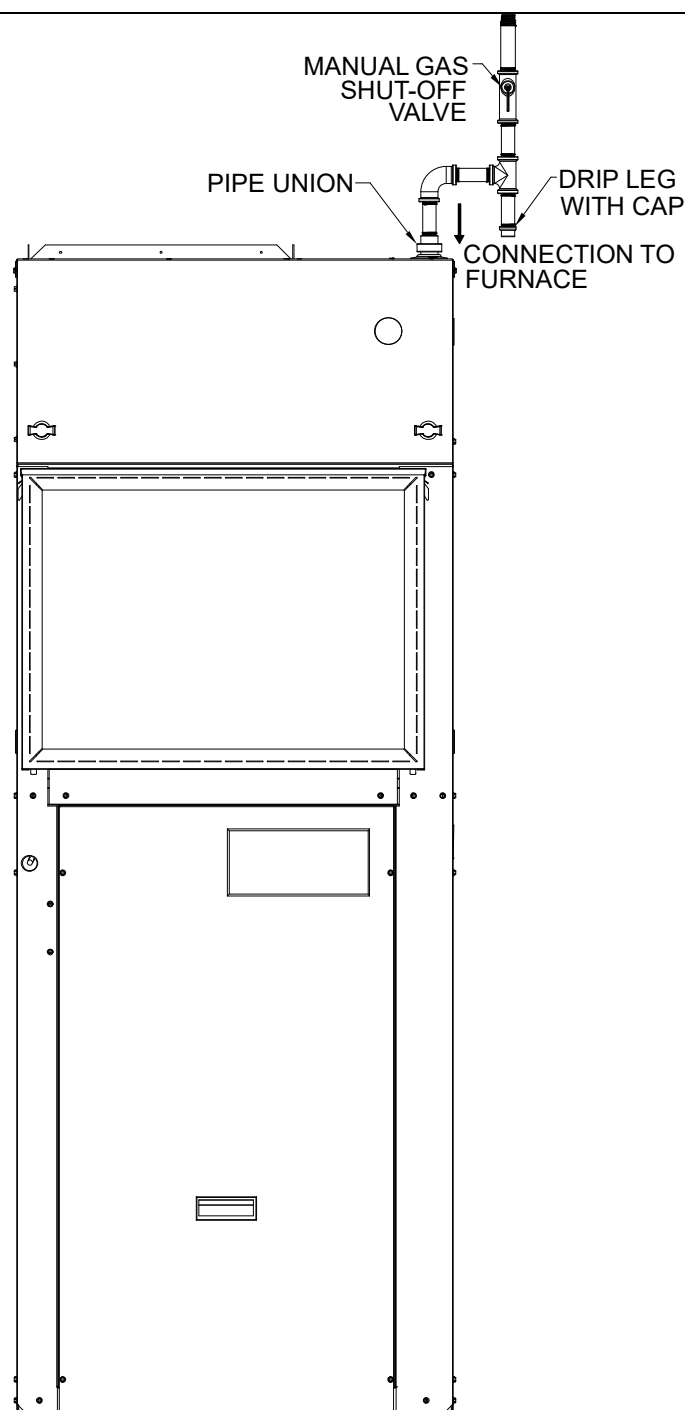




FIGURE 22 - Gas Supply Piping

## INSTALLATION (continued)

### GAS PIPING & CONNECTION


**WARNING**


**In the State of Massachusetts:**

This product must be installed by a licensed Plumber or Gas Fitter. When flexible connectors are used, the maximum length shall not exceed 36" [91.44cm]. When lever-type gas shutoffs are used, they shall be T-handle type.

Use 1/2" N.P.T. gas piping to make field installed connections to the furnace gas valve. A manual gas shut-off valve must be provided and installed external to the furnace casing. A ground joint union and a drip leg must also be provided. A field provided gas supply pressure 1/8" N.P.T. test port must be installed. Use a high quality approved pipe thread compound on all pipe thread joints. A flexible gas connector may be used to connect the furnace if permitted by local codes. If a flexible connector is used, it must be a listed connector in new condition. Do not use a connector that has been previously used to service another appliance. A flexible connector must not pass through the furnace cabinet; Black steel gas piping must be used between the gas valve and a location outside the furnace cabinet to connect the flexible gas connector.

Gas piping must connect to the furnace through the top of the cabinet. Gas piping must be adequately supported external to the furnace cabinet. The furnace gas valve, manifold, and burner assembly are not designed or intended to support the weight of the gas line external to the furnace cabinet. The gas piping connecting the furnace must be properly aligned with the gas valve to prevent binding and distortion of the gas manifold and burner assembly.



The furnace and its external gas shut-off valve must be disconnected from the piping system before any gas line pressure test exceeding ½ PSI (14" [35.56cm] W.C.) is performed. Do not expose the gas valve to any pressure higher than 14" [35.56cm] W.C. or gas valve failure may occur.


The gas valve is equipped with 1/8" N.P.T. pressure test ports for measuring gas supply pressure and gas manifold pressure. Refer **HEATING OPERATIONS** for locations of pressure test ports. Refer to **Table 11 - Gas Pressure Table** for proper gas supply and manifold pressures.

### LEAK TESTING

Gas piping must be thoroughly checked and proven to be leak free before placing the furnace in operation. Follow all local code requirements in place or *National Fuel Gas Code*, ANSI Z223.1/NFPA 54 requirements for leak checking.

Never test for gas leaks using an open flame. Use a commercially available soap solution made specifically for the detection of leaks.


**WARNING**





FIRE OR EXPLOSION HAZARD

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

Use a commercially available solution formulated specifically for the detection of leaks to check all connections.

**NEVER** test for leaks using an open flame.



## ELECTRICAL

### HIGH VOLTAGE

All wiring must comply with local and national code requirements. Units are provided with wiring diagrams and nameplate data to provide information required for necessary field wiring.

Units are provided with a class 2 transformer for 24VAC control circuits. Should any add-on accessory or component also have a class 2 transformer furnished, care must be taken to prevent interconnecting outputs of the two transformers by using a thermostat with isolating contacts.

! **WARNING** !

⚡ **ELECTRIC SHOCK HAZARD** ⚡

Disconnect all power supplies before servicing. Lock out/tag out to prevent accidental electrical shock.

i **NOTE** i

There may be multiple power sources supplying the unit.

! **WARNING** !

Use copper conductors only. Install all parts and panels before operation of unit. Failure to follow these warnings can result in personal injury or death.

! **WARNING** !

Connect ground wire to ground terminal marked "GND". Failure to properly ground the unit may result in personal injury or death.

! **CAUTION** !

Any device that has been furnished by the factory for field installation must be wired in strict accordance with the associated wiring diagram. Failure to properly wire the unit may damage components and void warranties.

### 208-230 VOLT OPERATION

All 208-230 Volt units are factory wired for 230 Volt operation. For 208 Volt operation, rewiring the line voltage tap on the 24 Volt control transformer is required.

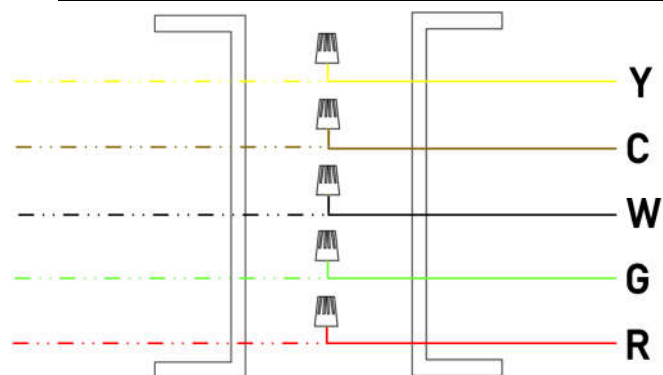
### LOW VOLTAGE

#### THERMOSTAT

A standard 24 VAC single state heating and cooling thermostat is required to control this unit. A thermostat with a "C" common terminal is preferred. Thermostat connections and their functions are below in **FIGURE 23 - Thermostat Connections** as follows.

THERMOSTAT CONNECTIONS KEY			
Abbr.		Color	Function
Y	–	Yellow	Compressor Contactor
C	–	Brown	Transformer 24VAC Common
W	–	White	Call for Heating
R	–	Red	Evaporator Blower
G	–	Green	Transformer 24VAC Hot

**Table 7 - Thermostat Connections Key**



**FIGURE 23 - Thermostat Connections**

### THERMOSTAT INSTALLATION

The Thermostat should be located on an interior wall in a larger room, away from supply duct draft. Position the thermostat back plate against the wall so that it appears level and so the thermostat wires protrude through the middle of the back plate mounting holes and drill holes with a 3/16" [5mm] bit. Install supplied anchors and secure plate to the wall. Thermostat wire must be 18 AWG wire.

# CONTROLS

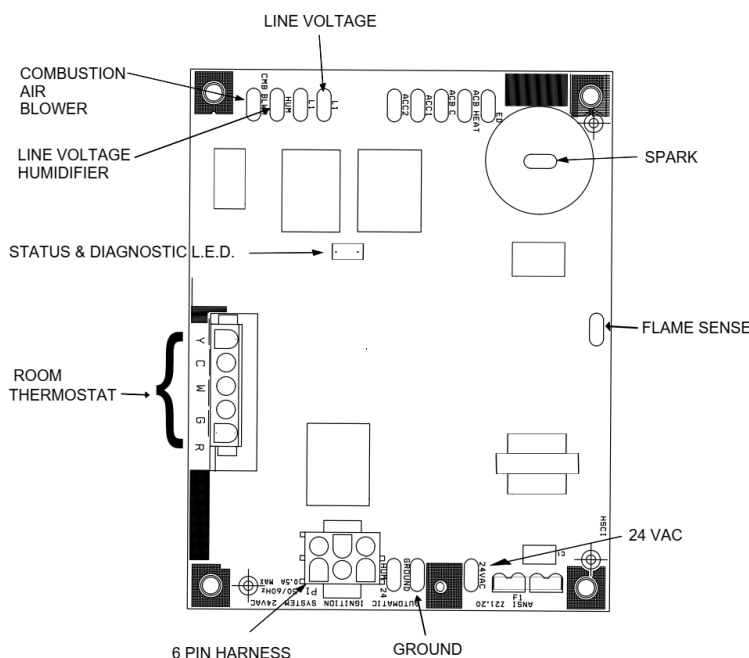


FIGURE 24 - Control Board

CONTROL BOARD L.E.D. TABLE			
SIGNAL	PROBLEM	POSSIBLE CAUSE	CHECKS & CORRECTIONS
Slow Flash	No heat request from room thermostat	Stand-by mode; does not indicate fault condition	
RAPID FLASH	Room thermostat is requesting heat	Thermostat requesting heat; does not indicate condition	
CONSTANT OFF	Internal fault or No power	Main power is off or control has failed	Check circuit breaker / circuit fuse, external power switch
2 FLASHES	Control does not respond	Control does not respond	
3 FLASHES	Unexpected pressure switch condition	Contacts are open with inducer on or closed with inducer off	
4 FLASHES	Limit switch or rollout switch is open		
5 FLASHES	Flame sensed while gas valve is off		
6 FLASHES	On-Board microprocessor conflict		

Table 8 - Control Board L.E.D. Table

## COOLING OPERATION

When the unit is given a "Y" input it will operate in cooling mode. The compressor will immediately come on after a "Y" input. After a 5 second time delay the indoor fan will be energized. The system will remain in cooling mode as long as the "Y" input is present.

When the "Y" input is removed from the system the control immediately de-energizes the compressor contactor. The indoor blower de-energizes after a cooling off delay period of 90 seconds.

## CONTINUOUS FAN OPERATION

When the unit is given a "G" input, without an additional "Y" or "W" call, the unit will operate in continuous fan mode. The fan remains energized as long as the "G" input is present.

## CONTROLS (continued)

### BLOWER CONTROL

ECG gas heat units are equipped with a direct drive indoor blower motor.

- ECG09\* and ECG12\* have 4 speed blower motors:
  - Either T2 or T3 may be used for heating mode providing the speed selection allows the unit to operate within specified temperature rise range.
  - T1 is the constant fan speed.
  - T4 is used for cooling mode.
- All other models have 5 fan speeds:
  - Either T2 or T3 may be used for heating mode providing the speed selection allows the unit to operate within specified temperature rise range.
  - T1 is the constant fan speed.
  - T4 or T5 may be used for cooling mode.

See wiring diagram located on the unit.

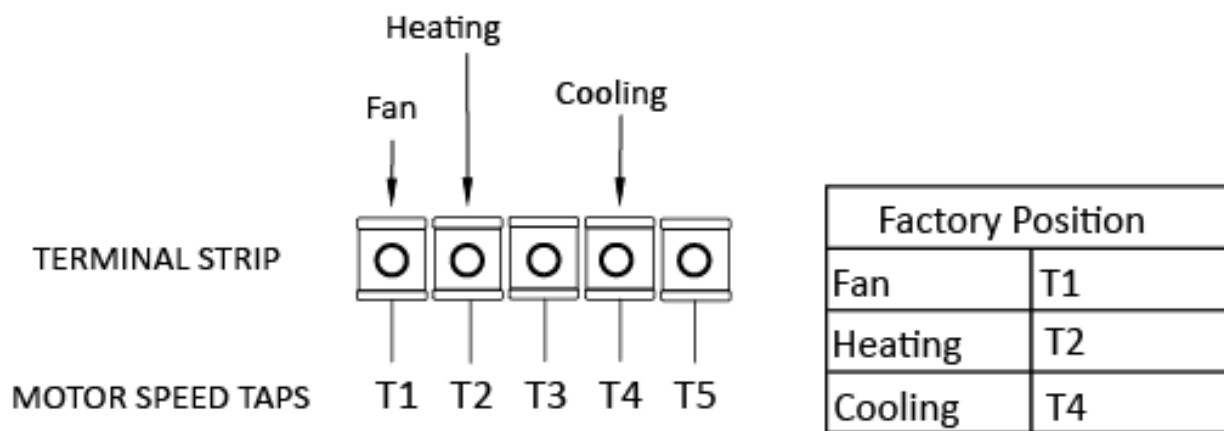


FIGURE 25 - Blower Control Tap



### CAUTION



In heating mode, the unit must operate within its rated temperature rise range and static range.

Refer to **Tables 9 & 10 ECG AIRFLOW PERFORMANCE DATA.**

Failure to operate within the designed temperature rise range will cause unreliable operation and damage the heat exchanger may occur.



### NOTE



High efficiency brushless DC motors are wired with line voltage power applied at all times.

Low voltage thermostat demand and board algorithms will control its use.

# CONTROLS (continued)

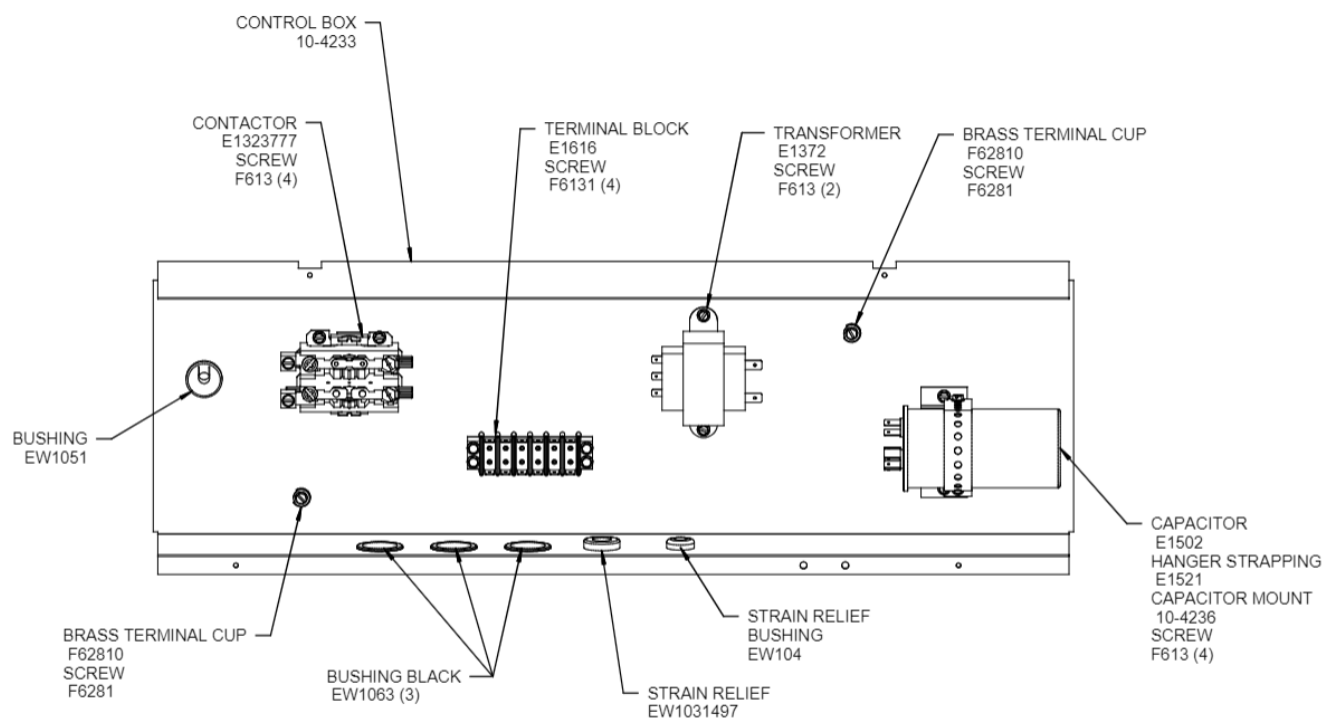


FIGURE 26- Electrical Components

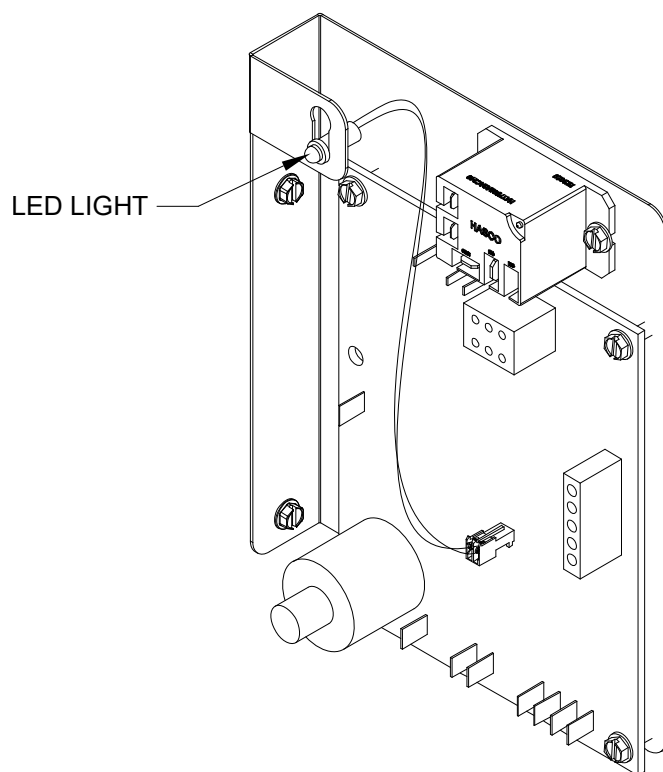


FIGURE 27 - Control Bracket Detail

# AIRFLOW

ECG AIRFLOW PERFORMANCE DATA													
MODEL	MOTOR SPEED	MID RISE °F	RISE RANGE °F	IWC STATIC PRESSURE									
				0.1		0.2		0.3		0.4		0.5	
				SCFM	TEMP RISE °F	SCFM	TEMP RISE °F	SCFM	TEMP RISE °F	SCFM	TEMP RISE °F	SCFM	TEMP RISE °F
ECG092N8A20B	T1	40.0	25-55	300	50	260	-	210	-	170	-	120	-
	T2 <sup>H</sup>		25-55	370	40	330	45	280	53	240	-	190	-
	T3		25-55	450	33	410	36	360	41	320	46	270	54
	T4 <sup>C</sup>		25-55	360	41	320	46	270	55	230	-	180	-
ECG122N8A20B	T1	40.0	25-55	300	50	260	-	210	-	170	-	120	-
	T2 <sup>H</sup>		25-55	370	40	330	45	280	53	240	-	190	-
	T3		25-55	530	28	490	30	440	33	400	37	360	41
	T4 <sup>C</sup>		25-55	460	32	420	35	370	40	330	45	280	52
ECG122N8A30B	T1	45.0	30-60	410	55	370	59	320		290	-	240	-
	T2 <sup>H</sup>		30-60	520	46	490	46	430	51	400	56	350	-
	T3		30-60	620	36	590	38	540	41	500	44	460	48
	T4 <sup>C</sup>		30-60	460	49	420	52	370	-	340	-	290	-
ECG122N8A40B	T1	50.0	35-65	410	-	370	-	320	-	290	-	240	-
	T2 <sup>H</sup>		35-65	620	48	590	50	540	55	500	59	460	-
	T3		35-65	650	46	620	48	560	53	530	56	490	-
	T4 <sup>C</sup>		35-65	460	-	420	-	370	-	340	-	290	-
ECG182N8A30B	T1	45.0	30-60	490	45	470	48	410	54	380	59	330	-
	T2 <sup>H</sup>		30-60	560	39	540	42	480	47	440	50	400	56
	T3		30-60	640	35	610	36	550	40	520	43	470	47
	T4 <sup>C</sup>		30-60	680	33	650	34	600	37	560	39	510	43
	T5		30-60	750	30	720	31	660	34	630	35	580	38
ECG182N8A40B	T1	50.0	35-65	530	56	510	58	450	-	410	-	370	-
	T2 <sup>H</sup>		35-65	620	48	610	49	550	54	510	58	460	-
	T3		35-65	840	35	820	36	760	39	720	41	680	44
	T4 <sup>C</sup>		35-65	690	43	670	44	610	48	580	51	530	56
	T5		35-65	740	40	730	41	670	44	630	47	580	51
ECG182N8A50B	T1	50.0	35-65	650	57	610	61	560	-	530	-	480	-
	T2 <sup>H</sup>		35-65	730	50	700	53	650	57	610	60	560	-
	T3		35-65	920	40	880	42	830	44	800	46	750	50
	T4 <sup>C</sup>		35-65	680	54	650	57	600	62	560		510	-
	T5		35-65	750	50	710	52	660	56	630	59	580	64
ECG182N8A60B	T1	55.0	40-70	580	-	560	-	490	-	450	-	410	-
	T2 <sup>H</sup>		40-70	880	50	860	52	790	56	750	59	710	63
	T3		40-70	1090	41	1070	41	1000	44	960	46	920	48
	T4 <sup>C</sup>		40-70	690	64	670	-	600	-	560	-	520	-
	T5		40-70	750	59	730	61	660		630	-	580	-
NOTES:													
<div><div><ul style="list-style-type: none"><li>Airflow data shown is with a dry coil at 70°DB EAT with Standard 1" filter</li><li>Do not operate unit outside of blower operating range</li></ul></div><div><ul style="list-style-type: none"><li><sup>C</sup> indicates default cooling tap</li><li><sup>H</sup> indicates default heating tap</li></ul></div></div>													
Table 9 - ECG AIRFLOW PERFORMANCE DATA													

## AIRFLOW (continued)

ECG AIRFLOW PERFORMANCE DATA CONTINUED													
MODEL	MOTOR SPEED	MID RISE °F	RISE RANGE °F	IWC STATIC PRESSURE									
				0.1		0.2		0.3		0.4		0.5	
				SCFM	TEMP RISE °F	SCFM	TEMP RISE °F	SCFM	TEMP RISE °F	SCFM	TEMP RISE °F	SCFM	TEMP RISE °F
ECG242N8A30B	T1	45.0	30-60	490	48	470	48	410	54	380	59	330	
	T2 <sup>H</sup>		30-60	560	39	540	42	480	47	440	50	400	56
	T3		30-60	640	35	610	36	550	40	520	43	470	47
	T4 <sup>C</sup>		30-60	770	29	740	30	690	32	650	34	600	37
	T5		30-60	940	24	910	24	850	26	820	27	770	29
ECG242N8A40B	T1	50.0	35-65	530	56	510	58	450	NA	410	NA	370	NA
	T2 <sup>H</sup>		35-65	620	48	610	49	550	54	510	58	460	-
	T3		35-65	840	35	820	36	760	39	720	41	680	44
	T4 <sup>C</sup>		35-65	790	37	780	38	720	41	680	44	630	47
	T5		35-65	920	32	910	33	850	35	810	36	770	39
ECG242N8A50B	T1	50.0	35-65	650	57	610	61	560	-	530	-	480	-
	T2 <sup>H</sup>		35-65	730	50	700	53	650	57	610	60	560	-
	T3		35-65	920	40	880	42	830	44	800	46	750	50
	T4 <sup>C</sup>		35-65	790	47	760	49	710	52	670	55	620	59
	T5		35-65	930	40	890	41	840	44	810	46	760	49
ECG242N8A60B	T1	55.0	40-70	650	-	630	-	560	-	520	-	480	
	T2 <sup>H</sup>		40-70	880	50	860	52	790	56	750	59	710	63
	T3		40-70	1090	41	1070	41	1000	44	960	46	920	48
	T4 <sup>C</sup>		40-70	790	56	770	58	700	64	660	-	620	-
	T5		40-70	930	48	910	49	840	53	800	56	750	59
ECG302N8A40B	T1	50.0	35-65	780	38	740	40	700	43	660	45	620	48
	T2 <sup>H</sup>		35-65	650	45	610	49	560	52	530	56	490	-
	T3		35-65	990	30	950	31	900	33	870	34	820	36
	T4 <sup>C</sup>		35-65	950	31	900	33	860	35	820	36	780	38
	T5		35-65	1030	29	990	30	940	31	900	33	860	34
ECG302N8A50B	T1	50.0	35-65	770	48	740	50	690	54	650	57	600	62
	T2 <sup>H</sup>		35-65	730	50	700	53	650	57	610	60	560	-
	T3		35-65	970	38	940	40	890	42	850	44	800	46
	T4 <sup>C</sup>		35-65	940	39	910	41	860	43	820	45	780	48
	T5		35-65	1010	37	980	38	920	40	890	42	840	44
ECG302N8A60B	T1	55.0	40-70	780	57	760	59	690	65	650	-	610	-
	T2 <sup>H</sup>		40-70	880	50	860	52	790	56	750	59	710	63
	T3		40-70	970	46	940	47	880	51	840	53	790	56
	T4 <sup>C</sup>		40-70	940	47	920	48	850	52	810	55	770	58
	T5		40-70	1000	44	980	45	910	49	870	51	830	54
NOTE:													
<div><div><ul style="list-style-type: none"><li>• Airflow data shown is with a dry coil at 70°DB at dry coil conditions</li><li>• Do not operate unit at static ranges outside of the temperature rise range</li></ul></div><div><ul style="list-style-type: none"><li>• <sup>C</sup> indicates default cooling tap</li><li>• <sup>H</sup> indicates default heating tap</li></ul></div></div>													
Table 10 - ECG AIRFLOW PERFORMANCE DATA CONTINUED													



# HEATING OPERATIONS

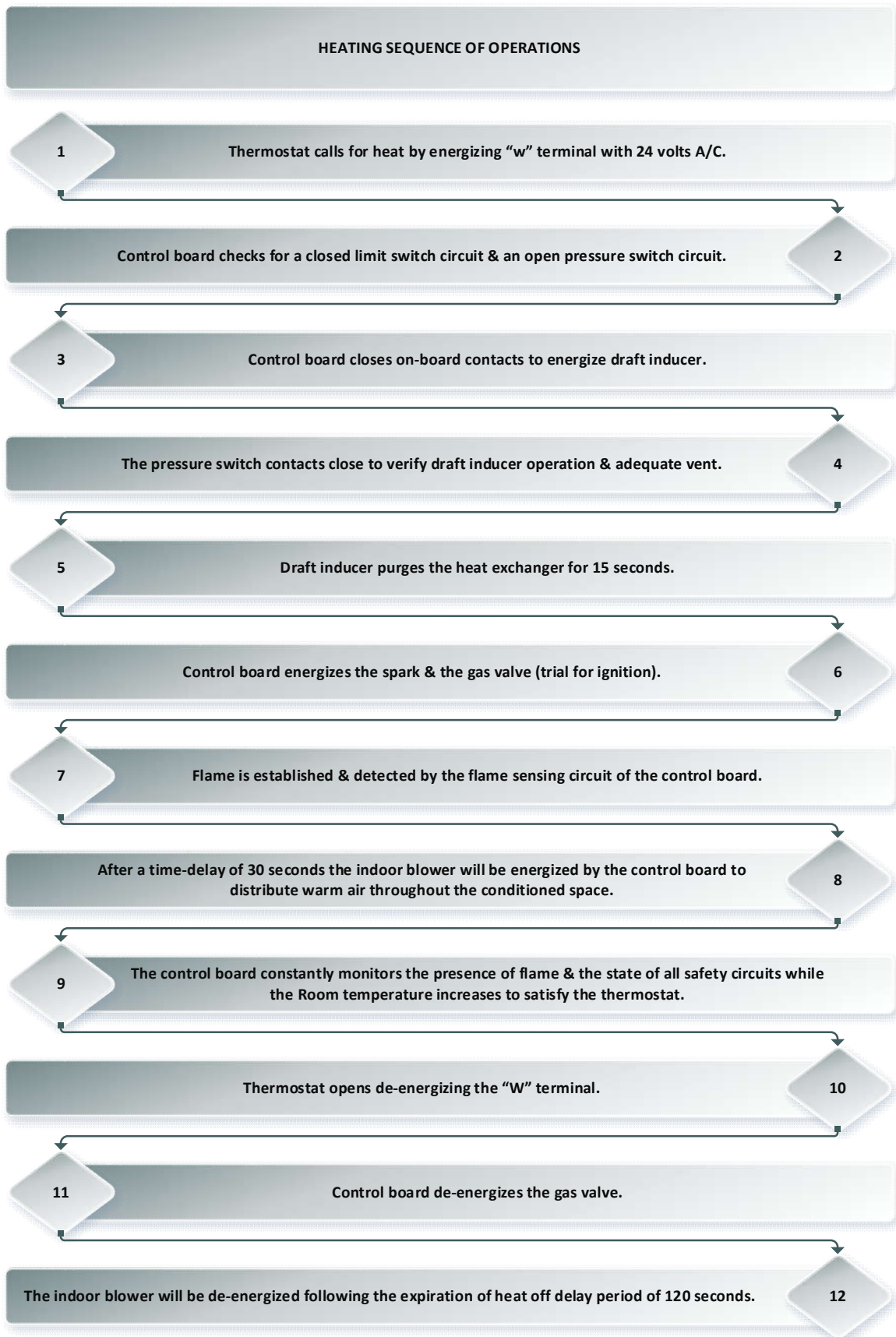


FIGURE 28 - Heating Sequence of Operations

# HEATING OPERATIONS (continued)

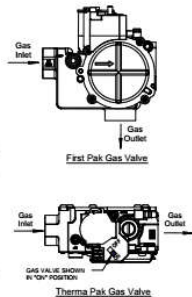
## FOR YOUR SAFETY READ BEFORE OPERATING

**WARNING:** If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury 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.
- WHAT TO DO IF YOU SMELL GAS**
- \* Do not try to light any appliance.
  - \* Do not touch any electric switch; do not use any phone in your building.
  - \* Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - \* If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control switch. Never use tools. If the gas control switch will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

## OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Remove control access panel.
6. Turn the gas control switch "OFF".
7. Wait five(5) minutes to clear out any gas. Then smell for gas, including near the door. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
8. Turn the gas control switch "ON".
9. Replace the control access panel.
10. Turn on all the electric power to the appliance.
11. Set thermostat to desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas to Appliance" and call your service technician or gas supplier.



## TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove control access panel.
4. Turn the gas control switch "OFF". Do not force.
5. Replace control access panel.

L8LLGT01-A

FIGURE 29 - Lighting Instructions Label

## LIGHTING BURNERS

1. Turn off electrical power to the unit.
2. Turn the room thermostat to the lowest setting.
3. Check that the position of the gas valve switch is in the "on" position.
4. Check that the position of the manual gas shut-off valve is in the "on" position (see **FIGURE 31 - Manual Gas Shutoff Valve**).
5. Turn on electrical power to the unit.
6. With the room thermostat to heat mode, set the temperature above the current room temperature.

## SHUTTING DOWN BURNERS

1. Turn off electrical power to the unit.
2. Move the gas valve switch to the "off" position.
3. Turn the manual gas shut-off valve to the "off" position.

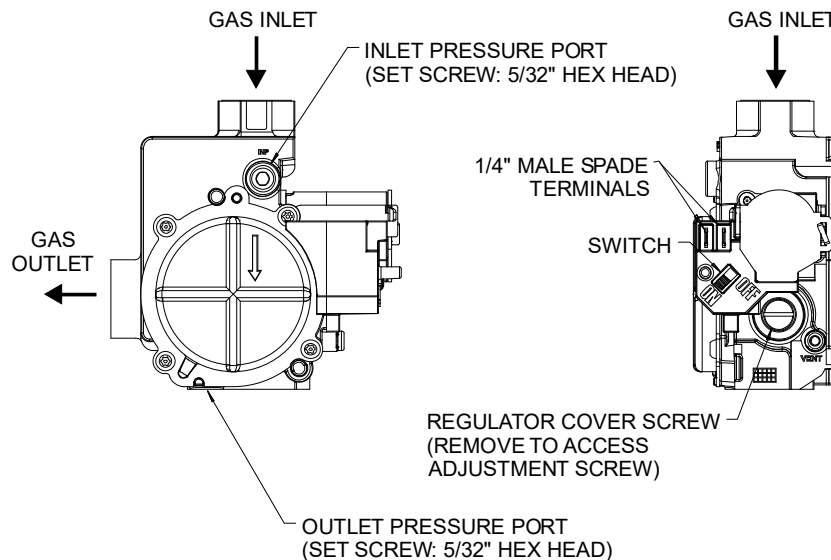


FIGURE 30 - Gas Valve



## NOTE



The White-Rodgers kit ID: F92-1003 is required to measure gas pressure. The kit consists of a 3/32" Allen wrench, 5/16" I.D. tube, and a 5/16" to 1/4" hose barb connector.

## HEATING OPERATIONS (continued)

### GAS SUPPLY PRESSURE

1. Turn "off" the gas supply to the furnace using the 1/4 turn manual gas valve.
2. Turn the pressure test screw (3/32" Hex) in the center of the inlet pressure boss not more than one turn counterclockwise.
3. Attach the 5/16" tube from the kit on the gas valve inlet pressure boss.
4. Insert the 5/16" to 1/4" hose barb connector from the kit into the 5/16" tube attached in step 3.
5. Install manometer tubing with manometer on the 1/4" hose barb connector.
6. Turn "on" the gas supply to the furnace using the 1/4 turn manual gas valve.
7. Leak check the manometer connections using soap solution made specifically for the detection of leaks. If a leak is present, shut off the manual valve and repair the leak. Proceed when no leaks are present.
8. Note the gas supply pressure measured on the manometer. With the burners not operating, the pressure should be 4.5" WC minimum and not exceed 10.5" WC maximum.
9. Set the room thermostat to call for heat.
10. Terminate the call for heat at the thermostat.
11. Turn "off" the manual gas valve.
12. Remove the 5/16" tube, hose barb connector, and manometer tubing from the inlet pressure boss.
13. Turn the inlet pressure test screw (3/32" Hex) clockwise to seal pressure port. Tighten to 7 in\*lb minimum torque.

GAS PRESSURE TABLE			
Natural Gas Pressure (inches W.C.)	Min.	Max.	Nominal
Supply Pressure	4.5	10.5	7
Manifold Pressure	3.2	3.8	3.5

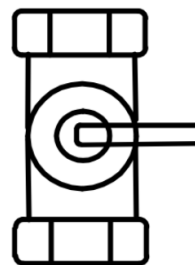
**Table 11 - Gas Pressure Table**

### GAS MANIFOLD PRESSURE

1. Turn "off" the gas supply to the furnace using the 1/4 turn manual gas valve.
2. Turn the pressure test screw (3/32" Hex) in the center of the outlet pressure boss not more than one turn counterclockwise.
3. Attach the 5/16" tube from the kit on the gas valve outlet pressure boss.
4. Insert the 5/16" to 1/4" hose barb connector from the kit into the 5/16" tube attached in step 3.
5. Install manometer tubing with manometer on the 1/4" hose barb connector.



Gas Valve In "ON" Position



Gas Valve In "OFF" Position

**FIGURE 31 - Manual Gas Shutoff Valve**

6. Turn "on" the gas supply to the furnace using the 1/4 turn manual gas valve.
7. Set the room thermostat to call for heat. Check for leaks on the manometer connections using a commercial solution specifically formulated for the detection of leaks. If a leak is present, immediately shut off the manual valve and repair leak. Proceed when no leaks are present.
8. Note the gas manifold pressure measured on the manometer, with the burners operating, the gas pressure must maintain 3.2" WC minimum and not exceed 3.8 WC maximum.
9. To increase gas manifold pressure, remove the regulator cap and turn the adjustment screw clockwise. To decrease the pressure, turn the adjustment screw counter-clockwise.
10. Terminate the call for heat at the thermostat.
11. Turn "off" the manual gas valve.
12. Remove the 5/16" tube, hose barb connector, and manometer tubing from the outlet pressure boss.
13. Turn the outlet pressure test screw (3/32" Hex) clockwise to seal pressure port. Tighten to 7 in\*lb minimum torque.
14. Turn "on" the manual gas valve.
15. Run the furnace in heat mode by setting the room thermostat to call for heat. Check for leaks using soap solution formulated for the detection of leaks.

## HEATING OPERATIONS (continued)

### TEMPERATURE RISE

This gas furnace is designed to operate within a specific range of temperatures while in heating mode. The “Temperature Rise” range is shown on the rating plate. Temperature rise is defined as the temperature difference between the air entering the furnace and the air leaving the furnace. Avoid measuring supply air temperature directly above the heat exchanger as radiant heat will affect the measurement. The actual temperature rise measured must be within the range shown on the rating plate. The volume of air (CFM) moved by the indoor blower may be changed to decrease the actual temperature rise (increase indoor blower CFM) or increase the actual temperature rise (decrease the indoor blower CFM). See blower speed section in controls (**FIGURE 25 - Blower Control Tap**) page 29 of this manual for information on changing indoor blower speed.

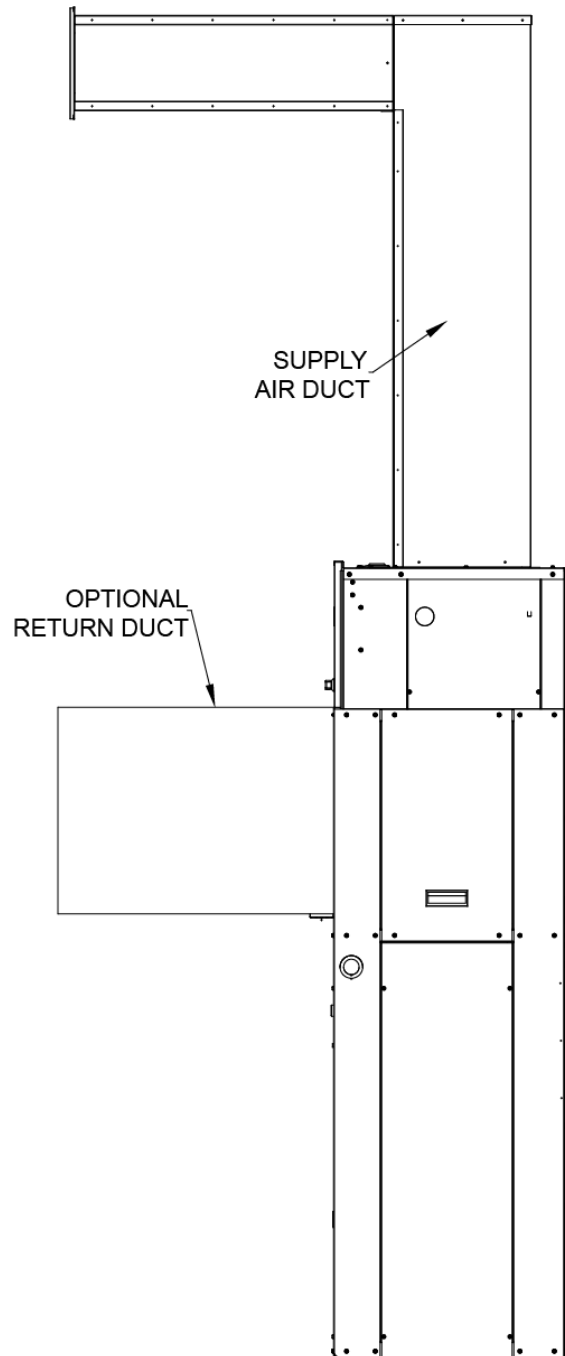


FIGURE 32 - Temperature Rise

## COOLING OPERATIONS

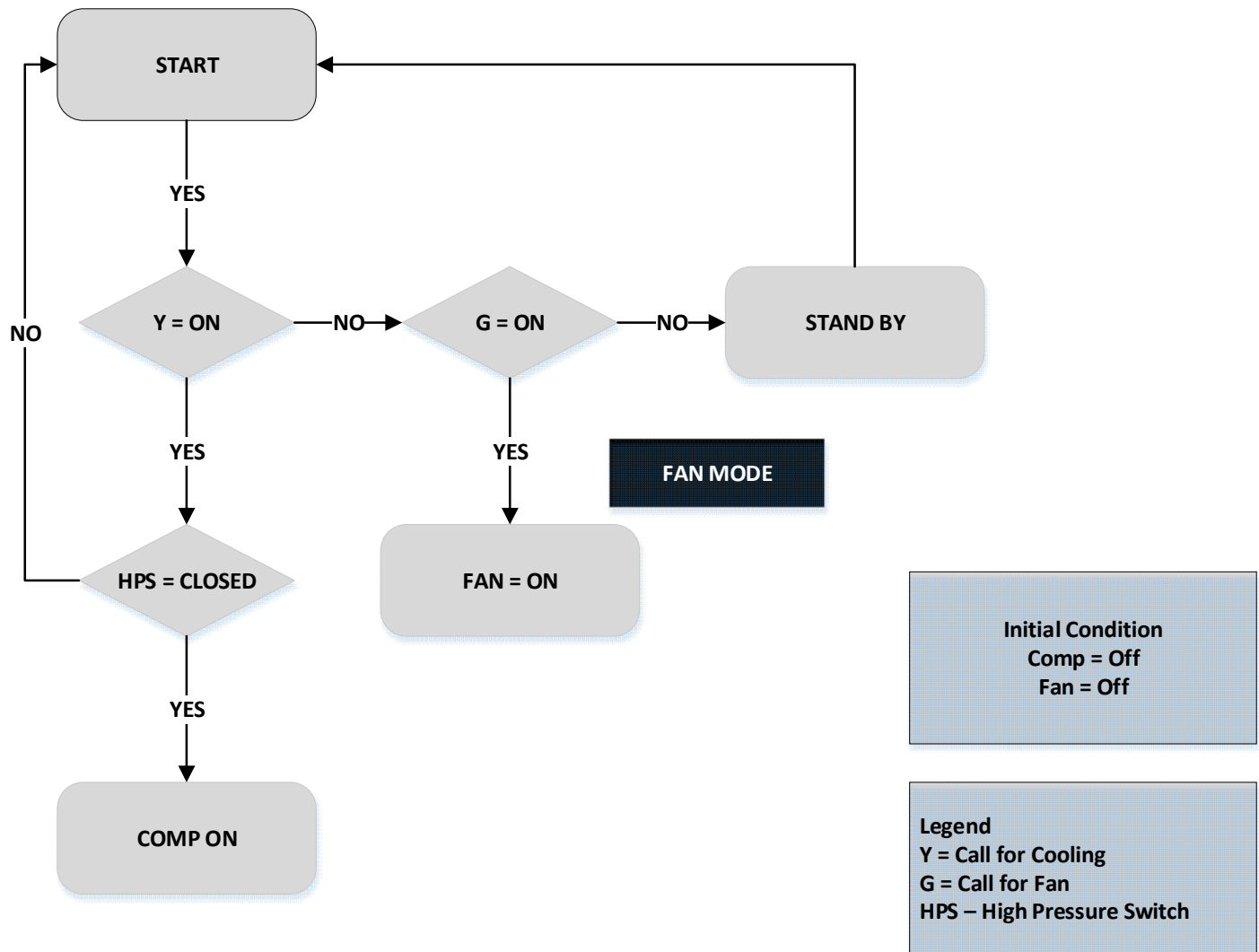


FIGURE 33 - Cooling Sequence of Operations

## LOCATION OF MAJOR COMPONENTS

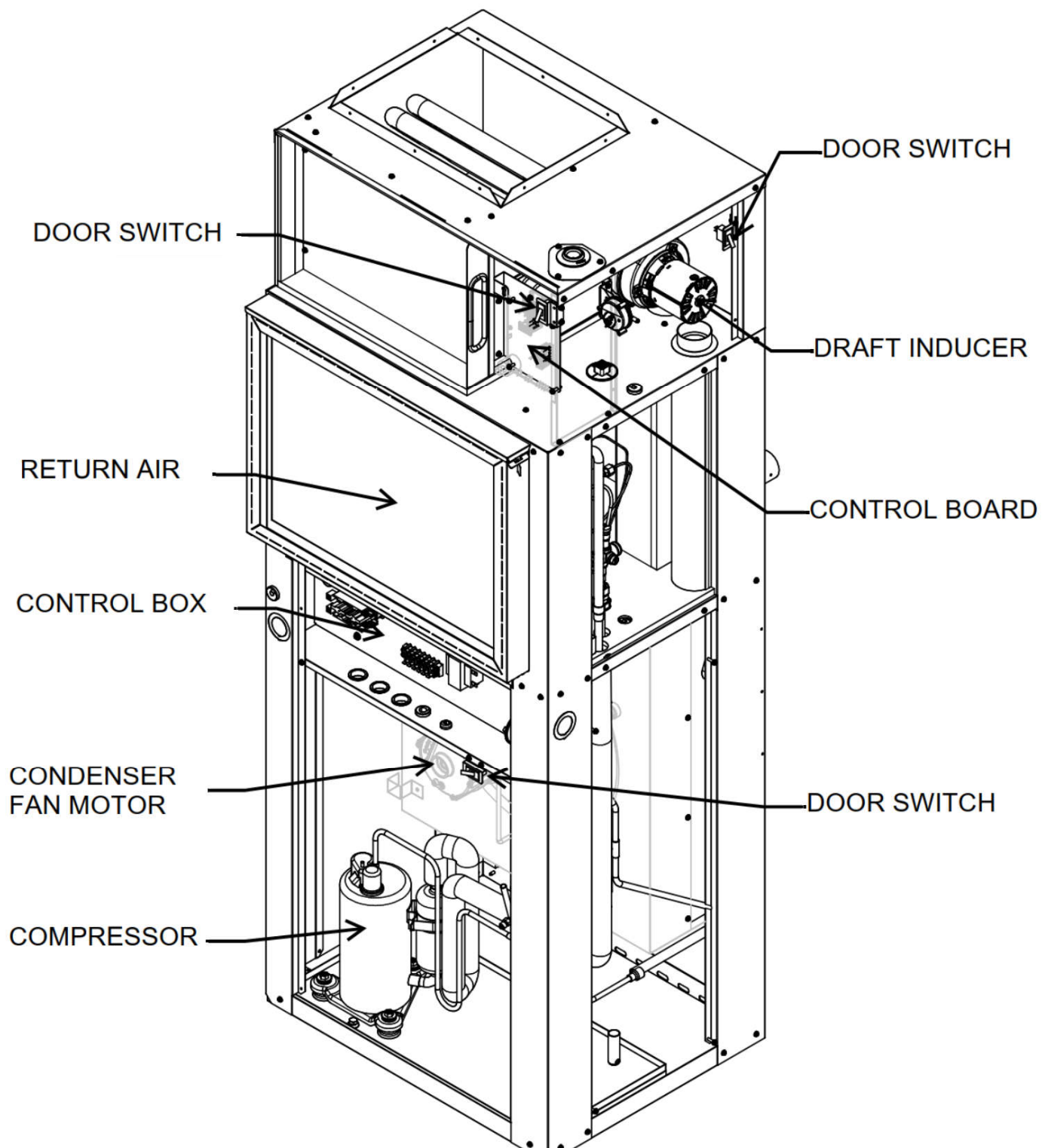


FIGURE 34 - Cabinet Components



## LOCATION OF MAJOR COMPONENTS (continued)

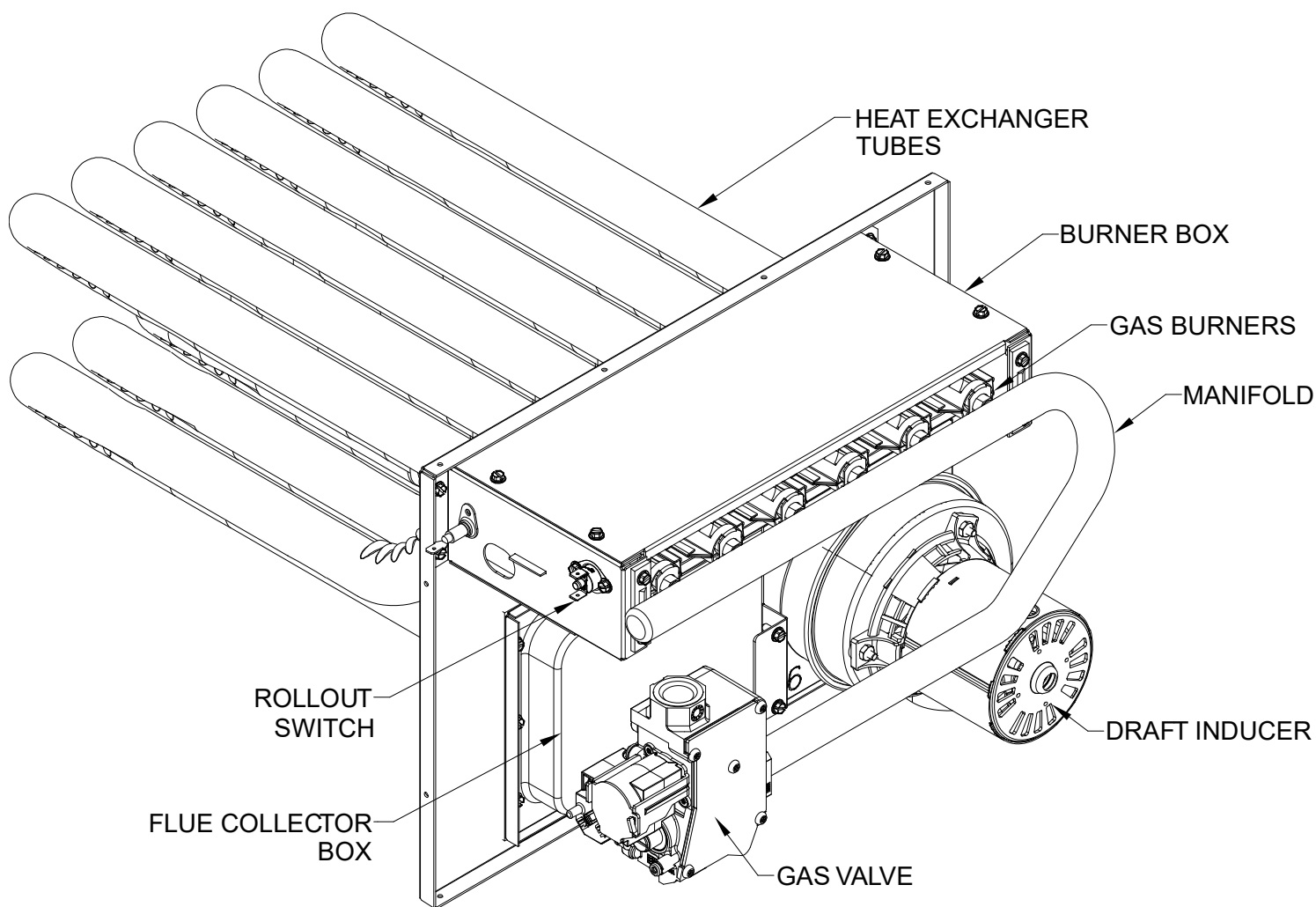


FIGURE 35 - Heating Assembly

# REPLACEMENT PARTS

Part Name	Part Number	Model Use	Part Name	Part Number	Model Use	Part Name	Part Number	Model Use
Igniter	GS-IG-1	All Therma-Pak Models	Condenser Fan	FB1630	All Therma-Pak Models	Compressor	CO086	ECG092N8A20B
Flame Sensor	GS-FS-1	All Therma-Pak Models	Control Board	CB8600	All Therma-Pak Models	Compressor	CO102GKS	ECG122N8A20B ECG122N8A30B ECG122N8A40B
Gas Valve	GS-V-1	All Therma-Pak Models	Contactora	E1323777	All Therma-Pak Models	Compressor	CO166	ECG182N8A30B ECG182N8A40B ECG182N8A50B ECG182N8A60B
Burner	GS-B-1	All Therma-Pak Models	Transformer	E1372	All Therma-Pak Models	Compressor	CO215	ECG242N8A30B ECG242N8A40B ECG242N8A50B ECG242N8A60B
Manifold - 2 Burner	GS-MB-02	ECG092N8A20B ECG122N8A20B	Expansion Valve	CP7323	All Therma-Pak Models	Compressor	CO247	ECG302N8A40B ECG302N8A50B ECG302N8A60B
Manifold - 3 Burner	GS-MB-03	ECG122N8A30B ECG182N8A30B ECG242N8A30B	Remote LED - C Cabinet	SSLED-B	All Therma-Pak Models	Door Switch	E196	All Therma-Pak Models
Manifold - 4 Burner	GS-MB-04	ECG122N8A40B ECG182N8A40B ECG242N8A40B ECG302N8A40B	Gasket - Front Cover	GS-G1	All Therma- Pak Models	Blower Terminal Strip	E1616	All Therma-Pak Models
Manifold - 5 Burner	GS-MB-05	ECG182N8A50B ECG242N8A50B ECG302N8A50B	Gasket - ID Blower	GS-G2	All Therma-Pak Models	Indoor Fan Wheel	W39	All Therma-Pak Models
Manifold - 6 Burner	GS-MB-06	ECG182N8A60B ECG242N8A60B ECG302N8A60B	Gasket Back plate	GS-G3	All Therma-Pak Models	Pressure Switch Hose	CP98PSH1	All Therma-Pak Models
Orifice (Size 1.55 mm)	GS-O-52	All Therma-Pak Models	ID Blower	BLWR-IND80	All Therma-Pak Models	Wire Harness - C Cab	EW971C	All Therma-Pak Models
Foil Face Insulation - 1/2"	I1F	All Therma-Pak Models	X-13 Motor - 1/3 HP	MDX033240	ECG182N8A30B ECG182N8A40B ECG242N8A30B ECG242N8A40B	Limit Switch	E191	ECG122N8A30B ECG182N8A30B ECG242N8A30B
View Port	EW11171500	All Therma-Pak Models	X-13 Motor - 1/4 HP	MDP025115	ECG092N8A20B ECG122N8A20B ECG122N8A30B ECG122N8A40B		E192	ECG092N8A20B ECG122N8A20
Grommet - Gas Inlet	F123	All Therma-Pak Models	Roll Out Switch	GS-ROS-1	ECG092N8A20B ECG122N8A20B ECG122N8A30B ECG182N8A40B ECG242N8A40B ECG302N8A40B		E194	ECG182N8A50B ECG242N8A50B ECG302N8A50B ECG182N8A60B ECG242N8A60B ECG302N8A60B
Pressure Switch	GS-PS-2	ECG122N8A40B ECG182N8A40B ECG242N8A40B ECG302N8A40B ECG182N8A50B ECG242N8A50B ECG302N8A50B	Roll Out Switch	GS-ROS-4	ECG122N8A30B ECG182N8A30B ECG242N8A30B		E195	ECG122N8A40B ECG182N8A40B ECG242N8A40B ECG302N8A40B
	GS-PS-1	ECG092N8A20B ECG122N8A20B ECG122N8A30B ECG182N8A30B ECG242N8A30B ECG182N8A60B ECG242N8A60B ECG302N8A60B	Roll Out Switch	GS-ROS-5	ECG182N8A50B ECG242N8A50B ECG302N8A50B	Condenser Fan Motor	MDR033240A	ECG182N8A30B ECG182N8A40B ECG242N8A30B ECG242N8A40B ECG182N8A50B ECG182N8A60B ECG242N8A50B ECG242N8A60B ECG302N8A40B ECG302N8A50B ECG302N8A60B
X-13 Motor - 1/2 HP	MDX050240	ECG182N8A50B ECG182N8A60B ECG242N8A50B ECG242N8A60B ECG302N8A40B ECG302N8A50B ECG302N8A60B	Roll Out Switch	GS-ROS-6	ECG182N8A60B ECG242N8A60B ECG302N8A60B			
Condenser Fan Motor	MDP025115	ECG092N8A20B ECG122N8A20B ECG122N8A30B ECG122N8A40B						

**Table 12: Replacement Parts**

For service part inquiries, please contact:

First Co. / AE-Air  
8273 Moberly Lane  
Dallas, TX 75227  
214-388-5751



## WIRING DIAGRAMS

## ECG(09-12)2N8A\*\*B ROTARY 208-230V ECM

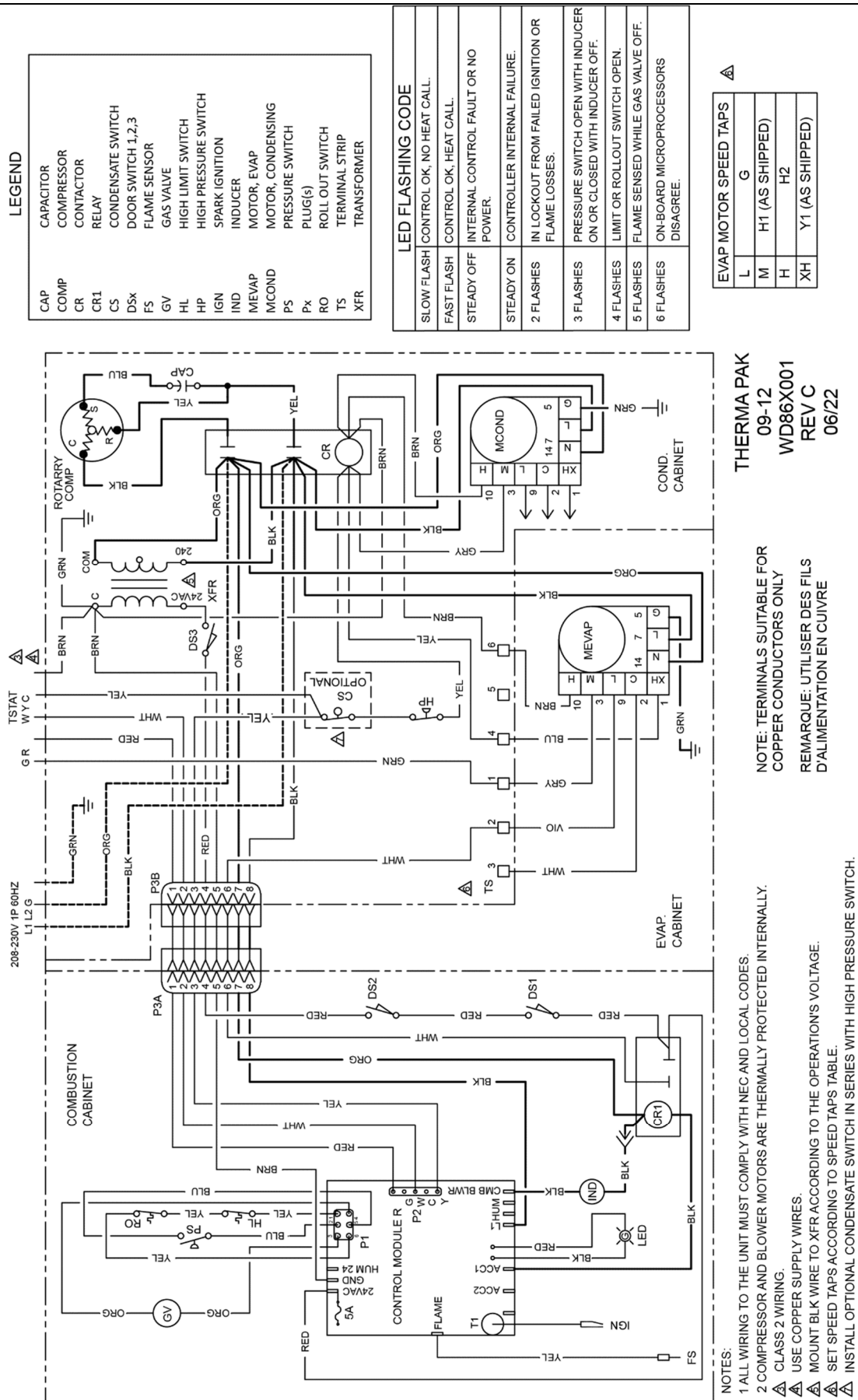


FIGURE 36 -ECG(09-12)2N8A\*\*B 208-230 Volt ECM Wiring Diagram

FIGURE 37 - ECG(18-30)2N8A\*\* Scroll 208-230 Volt ECM Wiring Diagram

ECG(18-30)2N8A\*\*B SCROLL 208-230V ECM

CAP	CAPACITOR
COMP	COMPRESSOR
CR	CONTACTOR
CR1	RELAY
CS	CONDENSATE SWITCH
DSx	DOOR SWITCH 1,2,3
F5	FLAME SENSOR
GV	GAS VALVE
HL	HIGH LIMIT SWITCH
HP	HIGH PRESSURE SWITCH
IGN	SPARK IGNITION
IND	INDUCER
MEVAP	MOTOR, EVAP
MCOND	MOTOR, CONDENSING
P5	PRESSURE SWITCH
Px	PLUG(s)
RO	ROLL OUT SWITCH
TS	TERMINAL STRIP
XFR	TRANSFORMER

	LED FLASHING CODE
SLOW FLASH	CONTROL OK, NO HEAT CALL.
FAST FLASH	CONTROL OK, HEAT CALL.
STEADY OFF	INTERNAL CONTROL FAULT OR NO POWER.
STEADY ON	CONTROLLER INTERNAL FAILURE.
2 FLASHES	IN LOCKOUT FROM FAILED IGNITION OR FLAME LOSSES.
3 FLASHES	PRESSURE SWITCH OPEN WITH INDUCER ON OR CLOSED WITH INDUCER OFF.
4 FLASHES	LIMIT OR ROLLOUT SWITCH OPEN.
5 FLASHES	FLAME SENSED WHILE GAS VALVE OFF.
6 FLASHES	ON BOARD MICROPROCESSORS DISAGREE.

EVAP MOTOR SPEED TAPS	
T1	G
T2	H1 (AS SHIPPED)
T3	H2
T4	Y1 (AS SHIPPED)
T5	Y2

## CIRCUIT SCHEMATIC

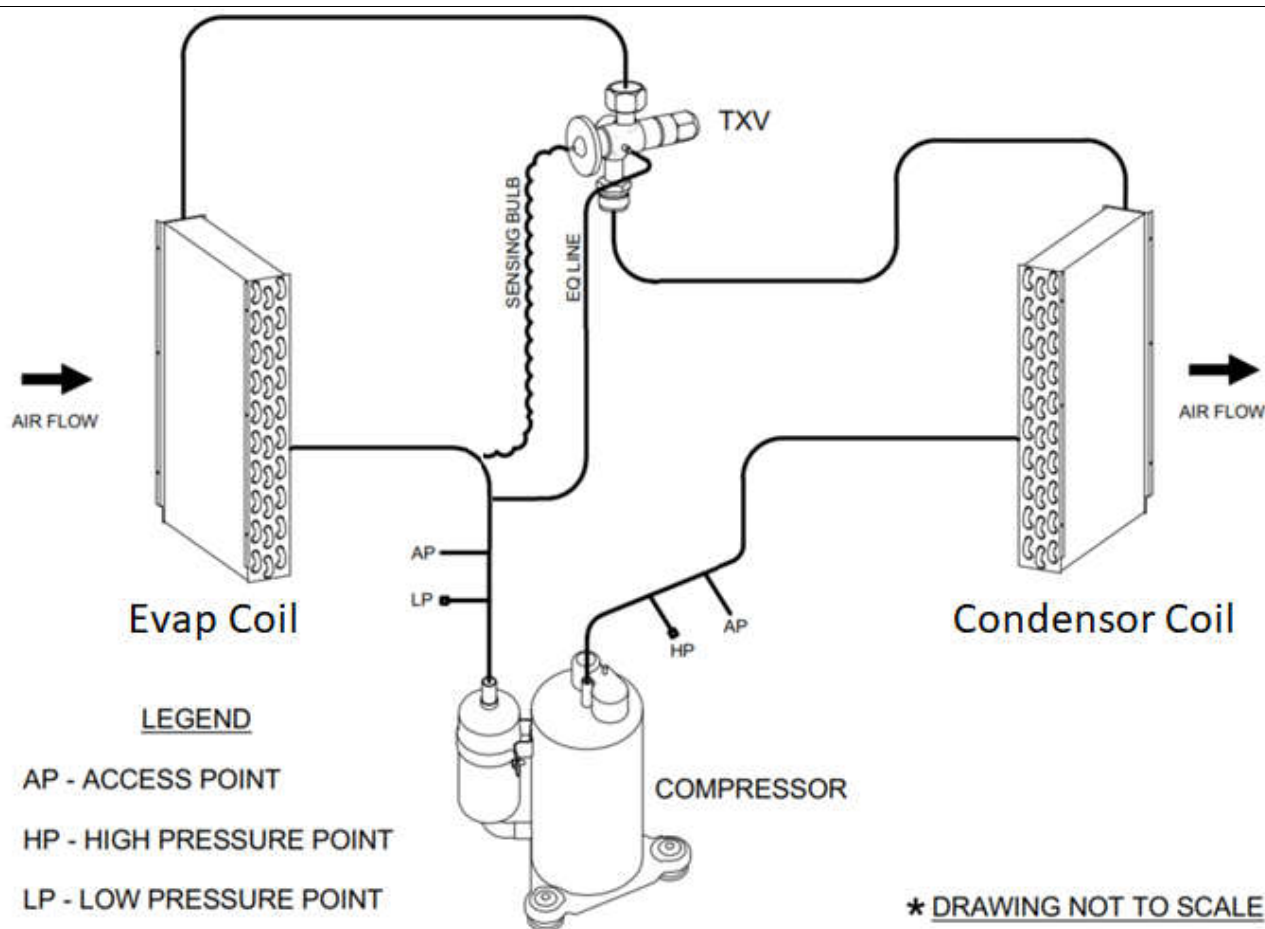


FIGURE 38 - Circuit Diagram

## STARTUP INSTRUCTIONS

### PRE-STARTUP CHECKS

!

CAUTION

!

Wire all field installed device such as a fan switch or thermostat furnished by the factory in strict accordance with the wiring diagram supplied with the unit. Failure to do so could result in damage to components and will void all warranties.

Before start-up, thoroughly check all the components. Optimal operation of equipment requires cleanliness. Often after installation of the equipment, additional construction activities occur. Protect the equipment from debris during these construction phases.

### PRIOR TO THE STARTUP OF THE UNIT

1. Ensure supply voltage matches nameplate data.
2. Ensure the unit is properly grounded.
3. With the power off, check blower wheel set screws for proper tightness and that the blower wheel rotates freely.
4. Ensure unit will be accessible for servicing.
5. Ensure condensate line is properly sized, run, trapped, pitched and tested.
6. Ensure all cabinet grommets and electrical insulating grommets are in place.
7. Ensure clean filters are in place.
8. Ensure all access panels are in place and secured.
9. Make sure that all electrical connections are tight and secure.
10. Check the electrical overcurrent protection and wiring for the correct size.
11. Verify that the low voltage wiring between the thermostat and the unit matches the wiring diagram.

## STARTUP INSTRUCTIONS (continued)

### UNIT STARTUP

1. Ensure that power is connected to the unit and the local disconnect is switched to "ON" position.
2. Check that there is 24V from the control transformer. The controller module LED should light up.
3. Set the thermostat to the lowest position. Turn the thermostat system switch to "COOL" and the fan switch to "AUTO" position. The compressor, outdoor fan should come on within 5 seconds.

### CHECKING GAS INPUT RATE

The gas input rate of a furnace is expressed in BTU per hour (BTUH). Upon installation and startup, the gas input rate of each ECG unit must be measured and must not exceed the input rate listed on the furnace rating plate.

To measure the natural gas input rate:

1. The ECG unit must be the only appliance consuming gas during this measurement, other gas consuming appliances must be turned OFF.
2. Set the room thermostat to call for heat. When the burners are operating, use a stopwatch and record the number of seconds it takes to complete one revolution of the 0.5 cu/ft., 1.0 cu/ft or the 2.0 cu/ft. dial at the gas meter.
3. The heating value may be obtained from the utility company, if unknown use the typical heating value of 1,000 BTU per cu/ft.

Refer to **Table 13 - Gas Meter Clocking Table** or see example calculation below.

GAS METER CLOCKING TABLE			
MODEL	SECONDS FOR ONE REVOLUTION		
	0.5 CU/FT	1.0 CU/FT	2.0 CU/FT
ECG**2N8A20	90	180	360
ECG**2N8A30	60	120	240
ECG**2N8A40	45	90	180
ECG**2N8A50	36	72	144
ECG**2N8A60	30	60	120

**Table 13 - Gas Meter Clocking Table**

Example of input rate calculation using the typical heating valve of Natural Gas of 1,000 BTU cu/ft, and 90 seconds time to complete one revolution of the 1 cu/ft dial on the gas meter.

- **Heating value** = 1,000 BTU per cu/ft.
- **Convert hours to seconds** (60 minutes per hour x 60 seconds per minute) = 3600 seconds in one hour.
- **Example time for one revolution of the 1 cu/ft dial** = 90 seconds.
- **Input** = Heating Value (1,000) x seconds per hour (3,600) divided by the time to consume 1 cu/ft of gas (90 secs) = 40,000 BTUH.



### NOTE



In the calculation example above, If the 0.5 cu/ft dial was used, you must multiply the number of seconds recorded for one revolution by two before using the formula.  
If the 2 cu/ft dial was used, you must divide the number of seconds recorded for one revolution by two before using the formula.

## STARTUP & PERFORMANCE CHECKLIST INSTRUCTIONS

The warranty may be void unless the **FIGURE 43 - Startup and Performance Checklist** & **FIGURE 44 - Startup and Performance Checklist** is completed and returned to the warrantor. If the ECG unit is not installed properly the warranty will be void as the manufacturer can't be held accountable for problems that stem from improper installation.

## TROUBLESHOOTING

## HEATING

PROBLEM	POSSIBLE CAUSE	CHECKS & CORRECTIONS
NO OPERATION	Open Circuit Fuse (Electrical Panel)	Replace fuse
	Open Circuit Breaker (Electrical Panel)	Re-set circuit breaker / fuse
	Open Unit Power Switch (External disconnect, adjacent to unit)	Check position / electrical state of switch
NO HEAT	Active fault locking out heat operation	Refer to LED & legend for state of unit / fault code. Correct condition & re-set power
	Open Unit Door Switch (Internal)	Furnace design does not permit heat operation with blower door removed
	No power to room thermostat (24 vac between P1 terminals 2 & 5)	Improper field wiring
		Faulty Transformer
		No transformer ground
	No request from room thermostat (24 vac between P1 terminals 2 & 3)	Improper field wiring
		Faulty thermostat / thermostat wiring
		Control board relay not closing contact to energize draft inducer
	No draft inducer operation	Remove obstruction preventing inducer wheel from turning
		Electrically open inducer motor winding or thermal protector - replace inducer
	Weak Spark / No spark	Correct poor chassis to earth ground / transformer to chassis ground / control board to chassis ground
		Correct Improper gap on spark electrode
		Clean Insulating carbon buildup from spark electrode & determine cause of poor combustion
		Replace spark electrode assembly for faulty - leaking insulator
		Faulty ignition wire leaking voltage - replace ignition wire
		Ignition wire not connected / poorly connected to control or spark electrode
	Open limit from no indoor blower operation	Remove obstruction preventing indoor blower wheel from turning
		Control board relay contact not energizing line voltage to blower motor - replace control
		Speed tap not energized at low voltage terminal strip by thermostat wire, repair connection to thermostat wire or motor speed terminal
		Over-heated blower motor with open winding or open thermal protection, correct restriction causing over-heating condition, replace motor if winding is open
	Furnace cycling on pressure switch	Correct inadequate venting, plugged inducer pressure switch port
	Gas valve not opening	Check wiring connections to gas valve & control board (P2 terminals 3 & 4)
		Check control board output 24 VAC to gas valve (P2 terminals 3 & 4) - control must energize gas valve and spark electrode for 4 seconds minimum at trial for ignition
	No or inadequate flame signal	Correct low gas pressure, clean or replace flame rod
INADEQUATE HEAT	Furnace cycling on limit switch	Restricted air flow caused by plugged filter, closed registers / grilles
	Gas pressure too low	Correct gas supply line pressure to 4.5" - 10" range while furnace operating in heat mode
		Correct gas manifold pressure to 3.2" to 3.8" range

Table 14 - Gas Heat Troubleshooting Table



## TROUBLESHOOTING (continued)

### HEATING

Refer to the LED code definitions in **Table 8 - Control Board L.E.D. Table** for definitions used in this section.

<b>Step 1 Thermostat calls for heat by energizing “W” terminal with 24 volts a/c</b>	
<b>Description of Normal Operation</b>	The room thermostat R terminal is constantly powered with 24 volts a/c by its connection to the control board R terminal and the unit transformer. A request for heat will energize the “W” terminal of the thermostat and the control board.

**Possible Causes of Failure:**

1. Thermostat mode switch is not set to heat
2. Broken wire between control board & thermostat
3. Broken wire at thermostat terminal
4. Improperly connected thermostat wire (W at control is not connected to W at thermostat)
5. Defective thermostat
  - a. The control board LED will display a slow flash – no call for heat

<b>Step 2 Control board checks for a closed limit switch circuit &amp; an open pressure switch circuit</b>	
<b>Description of Normal Operation</b>	Upon receiving a request for heat, the control board must verify a safe condition exists before attempting ignition. The high temperature limit & rollout switches must be electrically closed. The pressure switch must be electrically open.

**Possible Causes of Failure:**

1. Draft inducer relay on control board stuck closed keeping the draft inducer running & the pressure switch closed
  - a. The control board L.E.D. will flash 3 times
2. The high limit switch or rollout switch is electrically open. A wire or connector is broken or improperly connected
  - a. The control Board L.E.D. will flash 4 times
  - b. The room thermostat will lose power as an open limit or rollout switch breaks 24 volts a/c to the R terminal

<b>Step 3 Control board closes on-board contacts to energize draft inducer</b>	
<b>Description of Normal Operation</b>	The control board relay coil is energized & relay contacts close to power the draft inducer. The draft inducer must function to draw the gas flames into the heat exchanger tubes & expel the products of combustion outdoors.

**Possible Causes of Failure:**

1. No power to draft inducer due to control board inducer relay contracts failing open
  - a. The control board L.E.D. will flash 3 times
2. The draft inducer motor is powered but not operating due to an open winding or thermal protector
  - a. The control board L.E.D. will flash 3 times

<b>Step 4 Draft inducer runs causing pressure switch contacts to close</b>	
<b>Description of Normal Operation</b>	The pressure switch must prove that the draft inducer is running & that adequate negative pressure is present in the heat exchanger.

**Possible Causes of Failure**

1. The draft inducer motor is running but the pressure switch is not closing due to lack of negative pressure caused by
  - a. Blocked flue
  - b. Tubing disconnected from the draft inducer or pressure switch
  - c. Tubing leaking
  - d. Blocked pressure switch port on draft inducer housing
    - i. The control board L.E.D. will flash 3 times

<b>Step 5 Draft inducer purges the heat exchanger for 15 seconds</b>	
<b>Description of Normal Operation</b>	Before trial for ignition, the draft inducer runs to purge the heat exchanger of any combustible mixture of gas & air which may be present.

**Possible Causes of Failure:**

1. Power Failure
2. Draft Inducer Failure
3. Control Board Relay Failure

# TROUBLESHOOTING (continued)

## HEATING

### Step 6 Control board energizes the spark ignitor & the gas valve (trial for ignition)

<b>Description of Normal Operation</b>	During trial for ignition, the draft inducer, & gas valve are energized. After 10 seconds, the spark ignitor is de-energized & the control checks for the presence of flame. If flame is not present, the control will de-energize the gas valve.
--	---

#### Possible Causes of Failure:

1. Internal or external gas valve in off position
2. Inadequate ground causing no spark or poor spark
3. Inadequate gas supply to furnace
4. Manifold gas pressure too high or too low causing improper gas / air mixture
5. Improper spark electrode gap
  - a. The control board L.E.D. will display 2 flashes if locked out from failed ignition or flame loss

### Step 7 Control board senses flame within 10 seconds of trial for ignition

<b>Description of Normal Operation</b>	Flame must be sensed by the control board flame rectification system to maintain gas valve operations.
--	--

#### Possible Causes of Failure:

1. Inadequate flame
2. Inadequate control ground
3. Flame sensor dirty / coated with non-conductive buildup
4. Flame sensor insulator is cracked
  - a. The control board L.E.D. will display 2 flashes if locked out from failed ignition or flame loss

### Step 8 Control board energizes indoor blower motor after 30 seconds

<b>Description of Normal Operation</b>	After 30 seconds of burner operation the control board energizes the indoor blower motor.
--	---

#### Possible Causes of Failure:

1. Control board relay fails to energize blower
2. Indoor blower not connected to line voltage 240-volt supply
3. Indoor blower speed tap not connected to low voltage 24-volt supply
4. Indoor blower fan wheel blocked or restricted
  - a. The control board L.E.D. will display 4 flashes due to open limit switch if indoor airflow is inadequate

### Step 9 Room temperature increases to satisfy the thermostat

<b>Description of Normal Operation</b>	Heat cycle continues until the room thermostat temperature set point is met.
--	--

#### Possible Causes of Failure:

1. Room thermostat request for heat interrupted ending call for heat
2. Furnace burners cycling on / off due to
  - a. Open limit switch
  - b. Restricted airflow
  - c. Dirty filter
    - i. The control board L.E.D. will display 4 flashes due to open limit switch if indoor airflow is inadequate

# TROUBLESHOOTING (continued)

## HEATING

### Step 10 Thermostat opens de-energizing the “W” terminal

<b>Description of Normal Operation</b>	The room thermostat will end the request for heat & de-energize the “W” terminal of the control board.
--	--

#### Possible Causes of Failure:

1. Room thermostat contacts staying closed not ending the request for heat
2. Thermostat wires shorted together keeping “W” terminal energized

### Step 11 Control board de-energizes the gas valve

<b>Description of Normal Operation</b>	Control board opens the 24 Volt signal to the gas valve main solenoid shutting off the flow of gas to the burners.
--	--

#### Possible Causes of Failure:

1. Electrical short in the gas valve circuit keeping the gas valve energized. The control board L.E.D. will display 5 flashes if gas flame is detected when it is not expected. Draft inducer will continue to run

### Step 12 Control board continues to energize the indoor blower motor for 2 minutes

<b>Description of Normal Operation</b>	Control boards continues to energize the indoor blower motor to distribute heat from the heat exchanger to the conditioned space.
--	---

#### Possible Causes of Failure:

1. The control board time delay blower relay is stuck closed causing blower to stay on to cool down heat exchanger runs in excess of 2 minutes



# TROUBLESHOOTING (continued)

## COOLING

PROBLEM	POSSIBLE CAUSE	CHECKS & CORRECTIONS
ENTIRE UNIT DOES NOT RUN	Power supply off	Apply power; close disconnect.
	Blown Fuse	Replace fuse or reset circuit breaker. Check for correct fuses.
	Voltage supply low	If voltage is below minimum voltage specified on unit data plate, contact lower power company. (Fault Code – Ou & 17).
	Thermostat	Set the fan to “ON”, the fan should run. Set thermostat to “COOL” and lowest temperature setting, the unit should run in the cooling mode. If neither the blower nor compressor run with the thermostat set to “COOL”, check that the unit is wired correctly.
BLOWER OPERATES BUT COMPRESSOR DOES NOT RUN	Thermostat	Check setting, calibration and wiring.
	Wiring	Check for loose or broken wires at compressor, capacitor or contractor.
	Safety Controls	Check control board fault LED for fault code.
	Compressor overload open	If the compressor is cool and the overload will not reset, replace the compressor.
	Compressor motor grounded	Internal wiring grounded to the compressor shell. Replace compressor. If compressor burnout, install new filter dryer.
	Compressor windings open	After compressor has cooled, check continually of compressor windings. If the windings are open, replace the compressor.
UNIT OFF ON HIGH PRESSURE CONTROL FAULT CODE 12	Discharge pressure too high	In “COOLING” mode: Lack of adequate airflow rate. Air temperature too warm. Scaled or restricted condenser coil.
	Refrigerant charge	The unit is overcharged with refrigerant. Reclaim refrigerant, evacuate and recharge with factory recommended charge.
	High pressure switch	Check for defective or improperly calibrated high-pressure switch.

Table 15 - Cooling Troubleshooting Table

## MAINTENANCE & SERVICE- HEATING

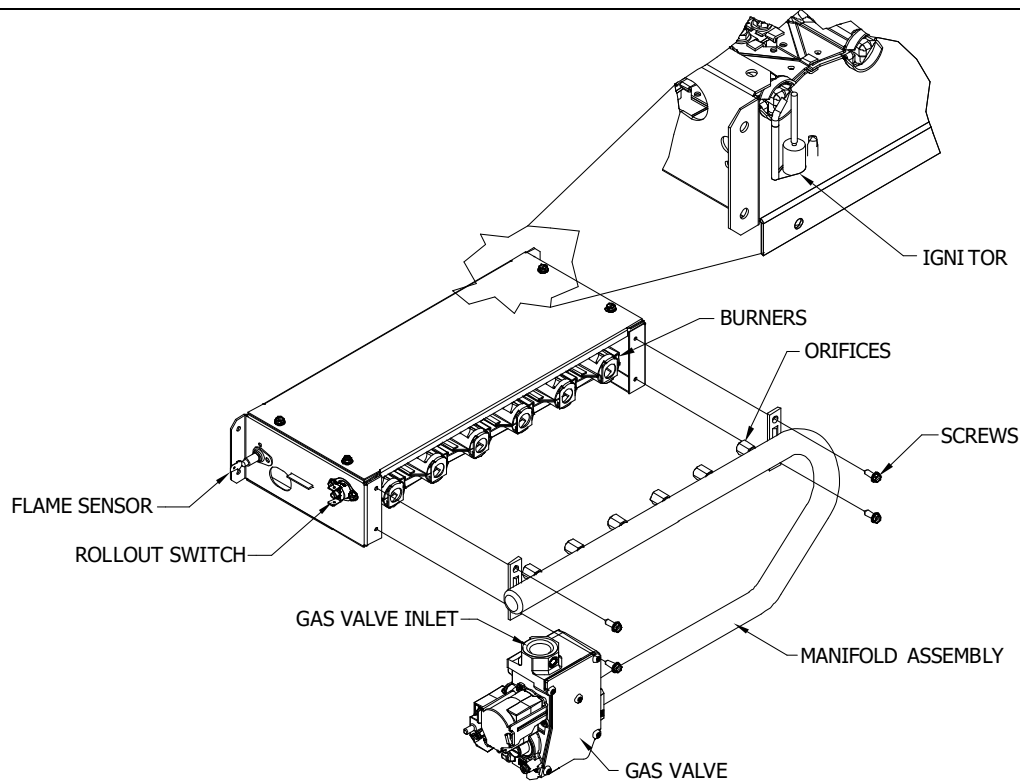


FIGURE 39 - Burner Components

### PREVENTATIVE MAINTENANCE

Examine the furnace after installation and periodically thereafter to determine that:

1. The furnace flue is clear and free of obstructions.
2. The furnace flue is in place and is physically sound without holes or excessive corrosion.
3. The return-air duct connection(s) is physically sound, is sealed to the furnace casing, and terminates outside the space containing the furnace.
4. The physical support of the furnace is sound without sagging, cracks, gaps.
5. There are no obvious signs of deterioration of the furnace.
6. The burner flames are proper (see **FIGURE 39 - Burner Flames**) being drawn into the heat exchanger tubes, not lifting, blue in color, not being distorted by fan operation.

### BLUE FLAMES

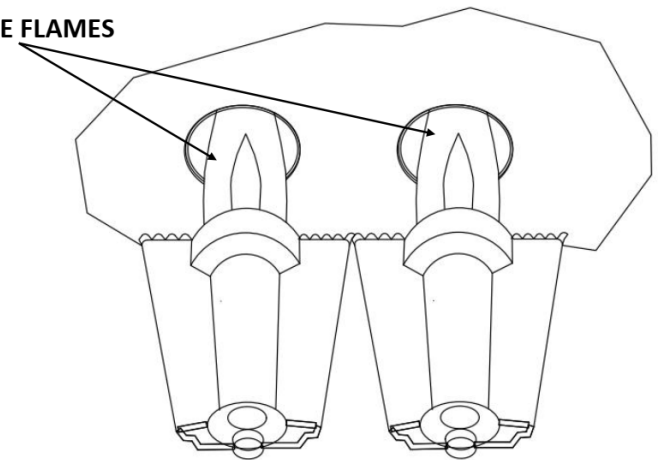


FIGURE 40 - Burner Flames

### AIR FILTER(S)

Furnace filters should be checked monthly and replaced as necessary. Do not operate the furnace without filters in place. The interval of filter replacement will vary with environmental factors and the size and type of filters used. It is extremely important to replace filters before they become a restriction to air flow.

### DRAFT INDUCER

The draft inducer creates a negative pressure condition in the gas heat exchanger and discharges the products of combustion to the outdoors. Check the ventilation openings on the end of the inducer draft motor to make sure they are not blocked and free from debris. The draft inducer motor contains permanently sealed ball bearings and requires no lubrication.

### COMBUSTION AIR PROVING SWITCH

The combustion air-proving switch is a safety device which verifies operation of the draft inducer.

## MAINTENANCE & SERVICE- HEATING (continued)

### FLAME ROLL OUT SWITCHES

Flame roll-out switches are electrically normally closed safety switches that assure burner flames are drawn properly into the heat exchanger tubes. In the event of improper burner flames or overheating of the burner section, the flame roll-out switch opens the electrical circuit shutting off the flow of gas to the burners. Flame roll-out switches require manual reset if tripped.

### FLAME SENSOR ASSEMBLY

The flame sensor assembly consists of a conductive rod surrounded by an insulator attached to a mounting plate. The flame sensor may be cleaned as needed with steel wool. A slight coating developing on the flame sensor over time is normal and to be expected, however; the presence of heavy black carbon is an indication of improper combustion and requires immediate attention to determine the cause and to correct. Exercise care when handling to protect the insulator from damage.

### GAS BURNERS

The gas burners allow combustion air to mix with the natural gas and direct the gas / air mixture to each heat exchanger tube.

### GAS ORIFICES

The gas orifices are precisely sized to deliver the proper amount of natural gas to each burner. Exercise caution when handling orifices to prevent the creation of burrs.

### GAS VALVE

The gas valve is an integral part of unit safety. Never use a gas valve that has been under water. The gas valve is energized by the control board to establish the flow of natural gas to the burners when heat is requested by the thermostat and all safety devices are in their proper state.

### HIGH TEMPERATURE LIMIT SWITCH

The high temperature limit switch is an electrically normally closed safety that limits temperature within the furnace. If heating mode airflow through the furnace becomes inadequate, the high temperature limit switch will open, shutting off the flow of gas to the burners. The high temperature limit switch is auto reset.

### INDOOR BLOWER MOTOR





Check the openings on the end of the indoor blower motor to make sure they are not blocked and free from debris. The indoor blower motor contains permanently sealed ball bearings and requires no lubrication.

### INTEGRATED CONTROL

The integrated control handles inputs from the room thermostat, spark ignition & flame sensing functions, controlling power to the gas valve, fan timing functions, and monitors all safety circuits of the furnace. There are no serviceable parts in the integrated control module other than a 5A fuse. Do not handle the integrated control module unless necessary, before touching the integrated control module, touch the unit frame to discharge any static electricity which could damage the integrated control.

### SPARK IGNITOR ASSEMBLY

The spark igniter assembly consists of a spark electrode with insulator and a ground electrode attached to a mounting plate. Take care not to damage the insulator. The spark and ground electrodes may be cleaned as needed with steel wool.

	<b>WARNING</b>	
	<b>ELECTRIC SHOCK, FIRE, OR EXPLOSION HAZARD</b>	
<p>Failure to follow safety warnings may cause property damage, personal injury, or death.</p> <p>Improper servicing could result in dangerous operation death or property damage.</p> <ul style="list-style-type: none"> <li>• Before servicing, disconnect all electrical power to furnace.</li> <li>• When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.</li> <li>• Verify proper operation after servicing.</li> </ul>		

## MAINTENANCE & SERVICE- HEATING (continued)

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### PERIODIC INSPECTIONS

The following additional items should be inspected annually (minimum) before each heating season by a qualified service agency:

#### HEAT EXCHANGER TUBES

Make sure they are free from blockages, signs of carbon buildup, heavy corrosion or cracks.

#### GAS BURNERS

Make sure they are free of blockages, signs of carbon buildup or heavy corrosion. The burner carry-over slots should be clean and of uniform size.

#### VENT PIPE

Check for excessive corrosion or perforations.

#### VENT TERMINAL

Check that it is free from blockages and restrictions.

#### COMBUSTION AIR OPENINGS

Check that they are clean & free from debris or blockages of any kind.

#### INDOOR AIR

The blower wheel and blower housing must be free from debris. Check that supply and return air registers, grilles, and dampers are positioned properly, filters are in place and clean.

#### CONDENSER AND EVAPORATOR COILS

Inspect and wash the condenser and evaporator coils.

**DO NOT** use high pressure as damage to the finned surfaces may occur.

### HIGH ALTITUDE OPERATIONS

ECG\*\*2N8\* units are certified for installation at altitudes of 0 - 4,500 ft.

### SPECIAL NOTES FOR EXTREMELY COLD WEATHER AREAS

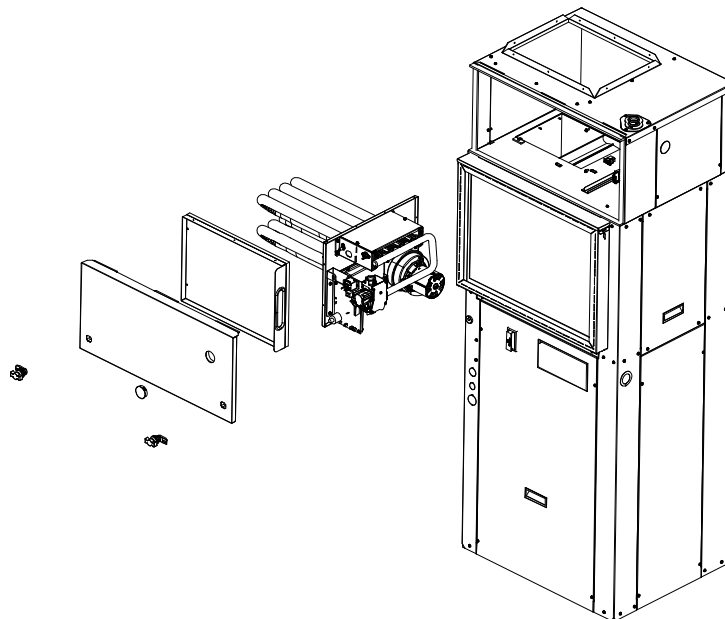
Periodically check the outside louvered grill for ice that may form and obstruct the flue and combustion air inlet.

## MAINTENANCE & SERVICE- HEATING (continued)

### HEATING MODULE REMOVAL

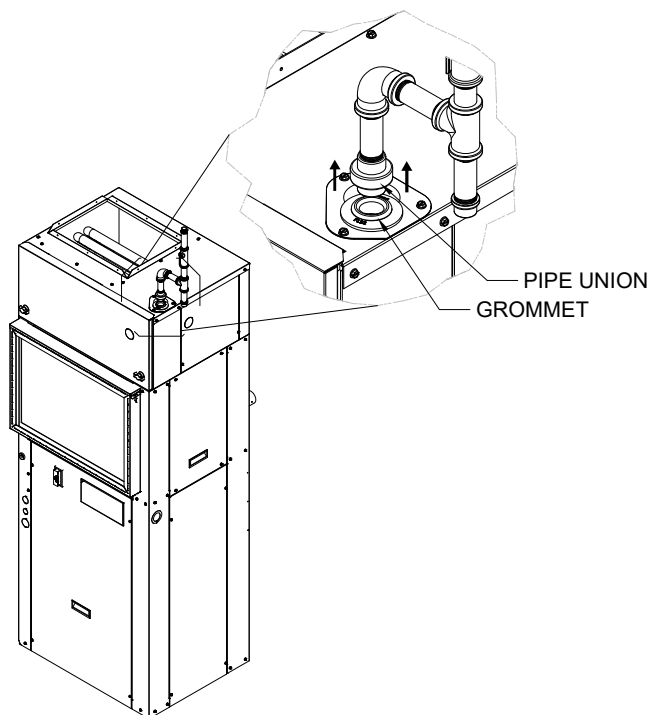
The entire gas heat section may be removed as a unit for service if required. Turn off electrical power to furnace before removing.

- 1) Turn off electrical power to furnace.
- 2) Remove heating section access panels shown in **FIGURE 39- Heating Access Panel Removal**.



**FIGURE 41 - Heating Access Panel Removal**

- 3) Disconnect gas union and necessary piping to allow heat section module to slide out of cabinet, see **FIGURE 42 - Disconnection of Gas Union & Piping**.





**FIGURE 42 - Disconnection of Gas Union & Piping**

## MAINTENANCE & SERVICE- COOLING

### PREVENTIVE MAINTENANCE

To achieve maximum performance and service life of equipment, a formal schedule of regular maintenance should be established and followed.




**WARNING**




It is a violation of federal law to discharge refrigerant into the atmosphere. Use proper reclaiming methods and equipment when installing or servicing this unit. Service should be performed by a **QUALIFIED** service agency.

The refrigerant system contained in the unit normally requires no maintenance since it is a closed, self-contained system.


**CAUTION**


All appropriate personal protection equipment should be worn when servicing or maintaining this unit. Personal injury can result from sharp metal edges, moving parts, and hot/cold surfaces.


**WARNING**



**ELECTRIC SHOCK HAZARD**


Check motor connections to ensure they are secure and in accordance with the unit wiring diagram.

ECM motors have line voltage power applied at all times.  
**ALWAYS VERIFY THAT POWER IS DISCONNECTED BEFORE SERVICING.**

### AIR FILTER

The air filter should be cleaned or replaced every 30 days or more frequently if severe operating conditions exist. Always replace the filter with the same type and size as originally furnished.

### COIL

Clean all heat transfer surfaces and remove all dirt, dust, and contaminants that potentially impairs air flow using industry accepted practices. Care should be taken not to bend coil fin material.

### CONDENSATE DRAIN PAN AND PIPE

Check and clean all dirt and debris from pan. Ensure drain line is free flowing and unobstructed.

### UNIT PERFORMANCE

Record performance measurements of volts, amps, and air temperature differences. A comparison of logged data with start-up and other annual data is useful as an indicator of general equipment condition.

# STARTUP & PERFORMANCE CHECKLIST



**CUSTOMER** \_\_\_\_\_ **STARTUP DATE** \_\_\_\_\_ **JOB #** \_\_\_\_\_  
**ADDRESS** \_\_\_\_\_ **SERVICE COMPANY** \_\_\_\_\_  
 \_\_\_\_\_ **TECHNICIAN** \_\_\_\_\_  
**MODEL #** \_\_\_\_\_ **SERIAL #** \_\_\_\_\_ **PHONE #** \_\_\_\_\_

## INSTALLATION CHECK LIST

- ☐ Inspect the unit for transit damage and report any damage on the carrier's freight bill.
- ☐ Check model number of ensure it matches the job requirements.
- ☐ Install field accessories and unit adapter panels as required. Follow accessory and unit installation manuals.
- ☐ Verify field wiring, including the wiring to any accessories.
- ☐ Check all multi-tap transformers, to ensure they are set to the proper incoming voltage.
- ☐ Prior to energizing the unit, inspect all the electrical connections.
- ☐ Power the unit. Bump the motor contractor to check rotation. Three phase motors are synchronized at the factory. If the blower fans are running backward, de-energize power to the unit, then swap two of the three incoming electrical lines to obtain proper phasing. Re-check.
- ☐ Perform all start up procedures outlined in the installation manual shipped with the unit.
- ☐ Fill in the Start Up Information as outlined below and on the following page.
- ☐ Provide owner with information packet. Explain the thermostat and unit operation.

## START UP INFORMATION SHEET

### ELECTRICAL

Supply Voltage L1-L2 \_\_\_\_\_

Running Voltage L1-L2 \_\_\_\_\_

Secondary Voltage \_\_\_\_\_

C (black) to G (green) Volts\* \_\_\_\_\_

C (black) to W (white) Volts\* \_\_\_\_\_

Compressor Amps \_\_\_\_\_

Blower Amps \_\_\_\_\_

Condenser Fan Amps \_\_\_\_\_

\*with thermostat calling.

### AMPERAGE – ERV MOTORS

#### Intake Motor: Nominal HP

Rated Amps \_\_\_\_\_

Running Amps \_\_\_\_\_

#### Exhaust Motor: Nominal HP

Rated Amps \_\_\_\_\_

Running Amps \_\_\_\_\_

#### Intake Design CFM

Pressure Drop \_\_\_\_\_

Calculated CFM \_\_\_\_\_

Amb db Temp \_\_\_\_\_

Return Air db Temp\* \_\_\_\_\_

Tempered Air db Temp\* \_\_\_\_\_

### AIRFLOW

#### Exhaust Design CFM

Pressure Drop \_\_\_\_\_

Calculated CFM \_\_\_\_\_

Amb db Temp \_\_\_\_\_

Return Air db Temp\* \_\_\_\_\_

Tempered Air db Temp\* \_\_\_\_\_

## TEMPERATURES

### Outdoor Air Temperature

\_\_\_\_\_ DB \_\_\_\_\_ WB

### Return Air Temperature

\_\_\_\_\_ DB \_\_\_\_\_ WB

### Cooling Supply Air Temperature

\_\_\_\_\_ DB \_\_\_\_\_ WB

### Heating Supply Air Temperature

\_\_\_\_\_ DB \_\_\_\_\_ WB

The warranty may be void unless the Startup & Performance Checklist is completed and returned to the warrantor. If the HVAC Unit is not installed properly the warranty will be void as the manufacturer cannot be held accountable for problems that stem from improper installation.

FIGURE 43 - Startup and Performance Checklist (1 of 2)

# STARTUP & PERFORMANCE CHECKLIST (continued)



## UNIT OPERATION

### HEATING MODE

- 1 GAS INLET PRESSURE \_\_\_\_\_ IN. W.C.
- 2 GAS MANIFOLD PRESSURE \_\_\_\_\_ IN. W.C.
- 3 INDOOR BLOWER AMPS \_\_\_\_\_
- 4 TEMPERATURE RISE  
 Supply Duct Temperature \_\_\_\_\_  
 Return Duct Temperature - \_\_\_\_\_  
 Temperature Rise = \_\_\_\_\_
- 5 TOTAL EXTERNAL STATIC  
 Supply External Static \_\_\_\_\_  
 Return External Static + \_\_\_\_\_  
 Total External Static = \_\_\_\_\_
- 6 CONDENSATE LINE  
☐ Leak Free

### COOLING MODE

- 3 INDOOR BLOWER AMPS \_\_\_\_\_
- 4 TEMPERATURE DROP  
 Return Duct Temperature \_\_\_\_\_  
 Supply Duct Temperature - \_\_\_\_\_  
 Temperature Drop = \_\_\_\_\_
- 5 TOTAL EXTERNAL STATIC (dry coil)  
 Supply External Static \_\_\_\_\_  
 Return External Static + \_\_\_\_\_  
 Total External Static = \_\_\_\_\_
- 8 DRAIN LINE  
☐ Leak Free
- 9 THERMOSTAT  
☐ Adjusted & Programmed  
☐ Explained Operation to Owner

FIGURE 44 - Startup and Performance Checklist (2 of 2)



## NOTES

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