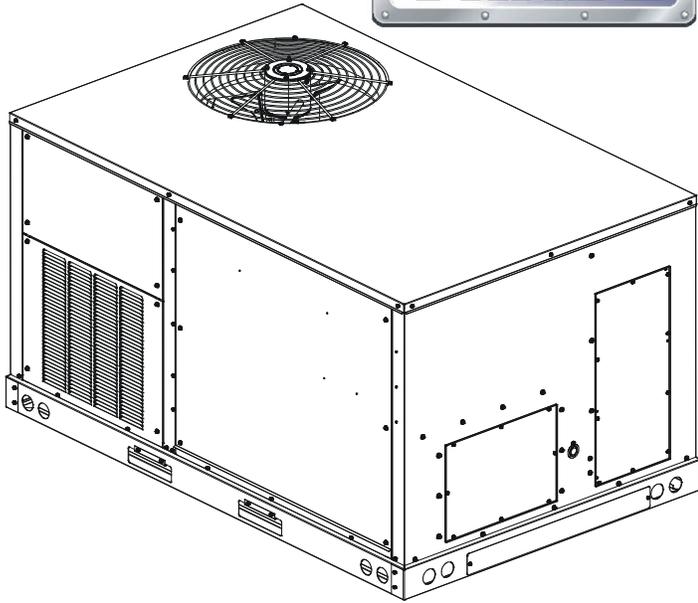


# GPH16 “M” SERIES WITH R-410A SELF-CONTAINED PACKAGE HEAT PUMP UNITS INSTALLATION INSTRUCTIONS



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| <b>PROP 65 WARNING<br/>FOR CALIFORNIA CONSUMERS</b>  |
| <b>⚠ WARNING</b>   |
| Cancer and Reproductive Harm -<br><a href="http://www.P65Warnings.ca.gov">www.P65Warnings.ca.gov</a> |
| 0140M00517-A   |



### WARNING

Only personnel that have been trained to install, adjust, service or repair (hereinafter, “service”) the equipment specified in this manual should service the equipment. The manufacturer will not be responsible for any injury or property damage arising from improper service or service procedures. If you service this unit, you assume responsibility for any injury or property damage which may result. In addition, in jurisdictions that require one or more licenses to service the equipment specified in this manual, only licensed personnel should service the equipment. Improper installation, adjustment, servicing or repair of the equipment specified in this manual, or attempting to install, adjust, service or repair the equipment specified in this manual without proper training may result in product damage, property damage, personal injury or death.

Our continuing commitment to quality products may mean a change in specifications without notice.



## REPLACEMENT PARTS

### ORDERING PARTS

When reporting shortages or damages, or ordering repair parts, give the complete unit model and serial numbers as stamped on the unit's nameplate.

Replacement parts for this appliance are available through your contractor or local distributor. For the location of your nearest distributor, consult the white business pages, the yellow page section of the local telephone book or contact:

HOMEOWNER SUPPORT  
GOODMAN COMPANY, L.P.  
19001 KERMIER ROAD  
WALLER, TEXAS 77484  
877-254-4729

## SAFETY INSTRUCTIONS



**RECOGNIZE THIS SYMBOL AS A SAFETY PRECAUTION.**

These installation instructions cover the **outdoor** installation of single package heating and cooling units. See the Specification Sheet applicable to your model for information regarding accessories.

**\*NOTE: PLEASE CONTACT YOUR DISTRIBUTOR OR OUR WEBSITE FOR THE APPLICABLE SPECIFICATION SHEET REFERRED TO IN THIS MANUAL.**

### TO THE INSTALLER

Before installing this unit, please read this manual to familiarize yourself on the specific items which must be adhered to, including maximum external static pressure to unit, air temperature rise, minimum or maximum CFM and motor speed connections.

**Keep this literature in a safe place for future reference.**



### CAUTION

**SHEET METAL PARTS, SCREWS, CLIPS AND SIMILAR ITEMS INHERENTLY HAVE SHARP EDGES, AND IT IS NECESSARY THAT THE INSTALLER AND SERVICE PERSONNEL EXERCISE CAUTION.**



### WARNING

**DO NOT CONNECT TO OR USE ANY DEVICE THAT IS NOT DESIGN CERTIFIED BY DAIKIN FOR USE WITH THIS UNIT. SERIOUS PROPERTY DAMAGE, PERSONAL INJURY, REDUCED UNIT PERFORMANCE AND/OR HAZARDOUS CONDITIONS MAY RESULT FROM THE USE OF SUCH NON-APPROVED DEVICES.**



### WARNING

**TO AVOID PROPERTY DAMAGE, PERSONAL INJURY OR DEATH, DO NOT USE THIS UNIT IF ANY PART HAS BEEN UNDER WATER. IMMEDIATELY CALL A QUALIFIED SERVICE TECHNICIAN TO INSPECT THE FURNACE AND TO REPLACE ANY PART OF THE CONTROL SYSTEM AND ANY GAS CONTROL HAVING BEEN UNDER WATER.**



### WARNING

**THIS UNIT MUST NOT BE USED AS A "CONSTRUCTION HEATER" DURING THE FINISHING PHASES OF CONSTRUCTION ON A NEW STRUCTURE. THIS TYPE OF USE MAY RESULT IN PREMATURE FAILURE OF THE UNIT DUE TO EXTREMELY LOW RETURN AIR TEMPERATURE AND EXPOSURE TO CORROSIVE OR VERY DIRTY ATMOSPHERES.**



### WARNING

**HIGH VOLTAGE!  
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**



### WARNING

**TO PREVENT THE RISK OF PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH, DO NOT STORE COMBUSTIBLE MATERIALS OR USE GASOLINE OR OTHER FLAMMABLE LIQUIDS OR VAPORS IN THE VICINITY OF THIS APPLIANCE.**

## GENERAL INFORMATION



### WARNING

**TO PREVENT PROPERTY DAMAGE, PERSONAL INJURY OR DEATH, DUE TO FIRE, EXPLOSIONS, SMOKE, SOOT, CONDENSATION, ELECTRIC SHOCK OR CARBON MONOXIDE, THIS UNIT MUST BE PROPERLY INSTALLED, REPAIRED, OPERATED, AND MAINTAINED.**

#### **This unit is approved for outdoor installation ONLY.**

Rated performance is achieved after 20 hours of operation. Rated performance is delivered at the specified airflow. See product specification sheet for packaged models. Specification sheets can be found at [www.goodmanmfg.com](http://www.goodmanmfg.com) for Goodman brand products. Within the website, please select the products menu and then select the submenu for the type of product to be installed, such as air conditioners or heat pumps, to access a list of product pages that each contain links to that model's specification sheet.

To assure that your unit operates safely and efficiently, it must be installed, operated, and maintained in accordance with these installation and operating instructions, all local building codes and ordinances.

#### **EPA REGULATIONS**

**IMPORTANT: THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA) HAS ISSUED VARIOUS REGULATIONS REGARDING THE INTRODUCTION AND DISPOSAL OF REFRIGERANTS IN THIS UNIT. FAILURE TO FOLLOW THESE REGULATIONS MAY HARM THE ENVIRONMENT AND CAN LEAD TO THE IMPOSITION OF SUBSTANTIAL FINES. BECAUSE REGULATIONS MAY VARY DUE TO PASSAGE OF NEW LAWS, WE SUGGEST A CERTIFIED TECHNICIAN PERFORM ANY WORK DONE ON THIS UNIT. SHOULD YOU HAVE ANY QUESTIONS PLEASE CONTACT THE LOCAL OFFICE OF THE EPA.**

#### **NATIONAL CODES**

This product is designed and manufactured to permit installation in accordance with National Codes. It is the installer's responsibility to install the product in accordance with National Codes and/or prevailing local codes and regulations.

The heating and cooling capacities of the unit should be greater than or equal to the design heating and cooling loads of the area to be conditioned. The loads should be calculated by an approved method or in accordance with ASHRAE Guide or Manual J - Load Calculations published by the Air Conditioning Contractors of America.

Obtain from:  
American National Standards Institute  
[www.ansi.org](http://www.ansi.org)

System design and installation should also, where applicable, follow information presented in accepted industry guides such as the ASHRAE Handbooks. The manufacturer assumes no responsibility for equipment installed in violation of any code or regulation. The mechanical installation of the packaged roof top units consists of making final connections between the unit and building services; supply and return duct connections; and drain connections (if required). The internal systems of the unit are completely factory-installed and tested prior to shipment.

Units are generally installed on a steel roof mounting curb assembly which has been shipped to the job site for installation on the roof structure prior to the arrival of the unit. The model number shown on the unit's identification plate identifies the various components of the unit such as refrigeration tonnage, heating output and voltage.

Carefully inspect the unit for damage including damage to the cabinetry. Any bolts or screws which may have loosened in transit must be re-tightened.

In the event of damage, the receiver should:

1. Make notation on delivery receipt of any visible damage to shipment or container.
2. Notify carrier promptly and request an inspection.
3. In case of concealed damage, carrier should be notified as soon as possible-preferably within 5 days.
4. File the claim with the following supporting documents:
  - a. Original Bill of Lading, certified copy, or indemnity bond.
  - b. Original paid freight bill or indemnity in lieu thereof.
  - c. Original invoice or certified copy thereof, showing trade and other discounts or reductions.
  - d. Copy of the inspection report issued by carrier representative at the time damage is reported to the carrier. The carrier is responsible for making prompt inspection of damage and for a thorough investigation of each claim. The distributor or manufacturer will not accept claims from dealers for transportation damage.

**NOTE: WHEN INSPECTING THE UNIT FOR TRANSPORTATION DAMAGE, REMOVE ALL PACKAGING MATERIALS. RECYCLE OR DISPOSE OF THE PACKAGING MATERIAL ACCORDING TO LOCAL CODES.**

#### **PRE-INSTALLATION CHECKS**

Carefully read all instructions for the installation prior to installing unit. Ensure each step or procedure is understood and any special considerations are taken into account before starting installation. Assemble all tools, hardware and supplies needed to complete the installation. Some items may need to be purchased locally.

## UNIT LOCATION



### WARNING

**TO PREVENT POSSIBLE EQUIPMENT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH, THE FOLLOWING BULLET POINTS MUST BE OBSERVED WHEN INSTALLING THE UNIT.**

**IMPORTANT NOTE: REMOVE WOOD SHIPPING RAILS PRIOR TO INSTALLATION OF THE UNIT.**

#### ALL INSTALLATIONS:

**IMPORTANT NOTE: UNIT SHOULD BE ENERGIZED 24 HOURS PRIOR TO COMPRESSOR START UP TO ENSURE CRANKCASE HEATER HAS SUFFICIENTLY WARMED THE COMPRESSORS. COMPRESSOR DAMAGE MAY OCCUR IF THIS STEP IS NOT FOLLOWED.**

**NOTE: APPLIANCE IS SHIPPED FROM FACTORY FOR VERTICAL DUCT APPLICATION.**

Proper installation of the unit ensures trouble-free operation. Improper installation can result in problems ranging from noisy operation to property or equipment damages, dangerous conditions that could result in injury or personal property damage and that are not covered by the warranty. Give this booklet to the user and explain it's provisions. The user should retain these instructions for future reference.

- To avoid possible illness or death of the building occupants, do NOT locate outside air intake device (economizer, manual fresh air intake, motorized fresh air intake) too close to an exhaust outlet, gas vent termination, or plumbing vent outlet. For specific distances required, consult local codes.
- Allow minimum clearances from the enclosure for fire protection, proper operation, and service access (see unit clearances). These clearances must be permanently maintained.
- When the unit is heating, the temperature of the return air entering the unit must be a minimum of 55° F.

#### GROUND LEVEL INSTALLATIONS ONLY:

- When the unit is installed on the ground adjacent to the building, a level concrete (or equal) base is recommended. Prepare a base that is 3" larger than the package unit footprint and a minimum of 3" thick.
- The base should also be located where no runoff of water from higher ground can collect in the unit.

#### ROOF TOP INSTALLATIONS ONLY:

- To avoid possible property damage or personal injury, the roof must have sufficient structural strength to carry the weight of the unit(s) and snow or water loads as required by local codes. Consult a structural engineer to determine the weight capabilities of the roof.
- The unit may be installed directly on wood floors or on Class A, Class B, or Class C roof covering material.
- To avoid possible personal injury, a safe, flat surface for service personnel should be provided.
- Adequate clearances from the unit to any adjacent public walkways, adjacent buildings, building openings or openable windows must be maintained in accordance with National Codes.

#### UNIT PRECAUTIONS

- Do not stand or walk on the unit.
- Do not drill holes anywhere in panels or in the base frame of the unit except where indicated. Unit access panels provide structural support.
- Do not remove any access panels until unit has been installed on roof curb or field supplied structure.
- Do not roll unit across finished roof without prior approval of owner or architect.
- Do not skid or slide on any surface as this may damage unit base. The unit must be stored on a flat, level surface. Protect the condenser coil because it is easily damaged.

#### ROOF CURB INSTALLATIONS ONLY:

Curb installations must comply with local codes and should be done in accordance with the established guidelines of the National Roofing Contractors Association.

Proper unit installation requires that the roof curb be firmly and permanently attached to the roof structure. Check for adequate fastening method prior to setting the unit on the curb.

Full perimeter roof curbs are available from the factory and are shipped unassembled. Field assembly, squaring, leveling and mounting on the roof structure are the responsibility of the installing contractor. All required hardware necessary for the assembly of the sheet metal curb is included in the curb accessory.

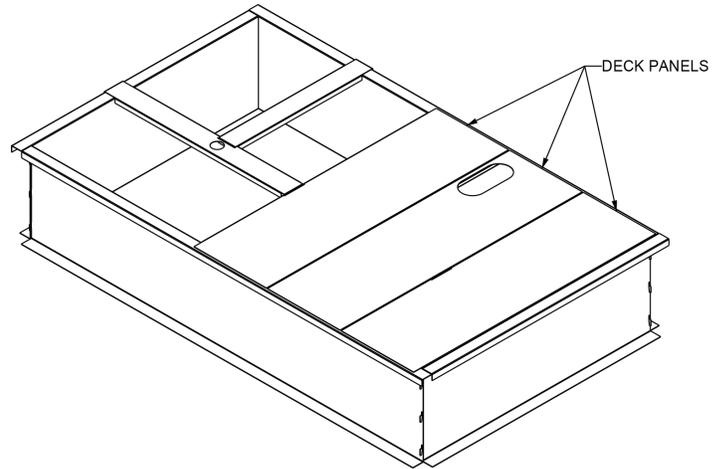


### WARNING

**TO PREVENT POSSIBLE EQUIPMENT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH, THE FOLLOWING BULLET POINTS MUST BE OBSERVED WHEN INSTALLING THE UNIT.**

- Sufficient structural support must be determined prior to locating and mounting the curb and package unit.
- Ductwork must be constructed using industry guidelines. The duct work must be placed into the roof curb before mounting the package unit. Our full perimeter curbs include duct connection frames to be assembled with the curb. Cantilevered type curbs are not available from the factory.
- Curb insulation, cant strips, flashing and general roofing material are furnished by the contractor.
- The curbs must be supported on parallel sides by roof members.
- The roof members must not penetrate supply and return duct opening areas as damage to the unit might occur.

Adequate clearance around the unit should be kept for safety, service, maintenance, and proper unit operation. A clearance of 48" is recommended on all sides of the unit to facilitate possible parts replacement, to allow service access and to insure proper ventilation and condenser airflow. The top of the unit should be completely unobstructed. If units are to be located under an overhang, there should be a minimum of 48" clearance and provisions made to deflect the warm discharge air out from the overhang. The unit should be installed remote from all building exhausts to inhibit ingestion of exhaust air into the unit fresh air intake.



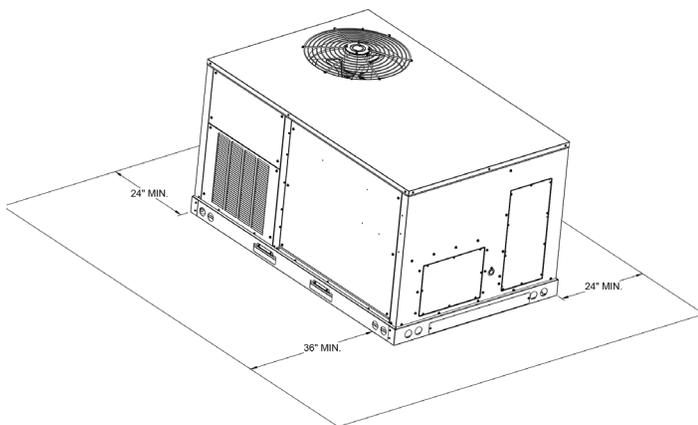
**ROOF CURB INSTALLATION**

**NOTE: THE UNIT AND CURB ACCESSORIES ARE DESIGNED TO ALLOW VERTICAL DUCT INSTALLATION BEFORE UNIT PLACEMENT. DUCT INSTALLATION AFTER UNIT PLACEMENT IS NOT RECOMMENDED.**

|   |
|---|
|  <b>CAUTION</b>  |
| <p><b>ALL CURBS LOOK SIMILAR. TO AVOID INCORRECT CURB POSITIONING, CHECK JOB PLANS CAREFULLY AND VERIFY MARKINGS ON CURB ASSEMBLY. INSTRUCTIONS MAY VARY IN CURB STYLES AND SUPERSEDES INFORMATION SHOWN.</b></p> |

See the manual shipped with the roof curb for assembly and installation instructions.

**CLEARANCES**



**UNIT CLEARANCES**

*\*In situations that have multiple units, a 36" minimum clearance is required between the condenser coils.*

**ROOF CURB POST-INSTALLATION CHECKS**

After installation, check the top of the curb, duct connection frame and duct flanges to make sure gasket has been applied properly. Gasket should be firmly applied to the top of the curb perimeter, duct flanges and any exposed duct connection frame. If gasket is loose, re-apply using strong weather resistant adhesive.

**PROTRUSION**

Inspect curb to ensure that none of the utility services (electric) routed through the curb protrude above the curb.

|  |
|--|
|  <b>CAUTION</b> |
| <p><b>IF PROTRUSIONS EXIST, DO NOT ATTEMPT TO SET UNIT ON CURB.</b></p>                              |

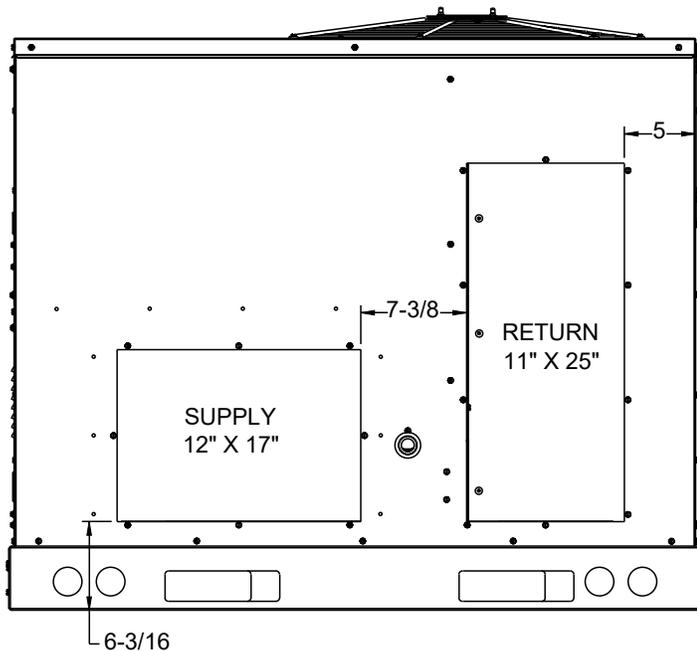
## ROOF TOP DUCT CONNECTIONS

Install all duct connections on the unit before placing the unit on rooftop.

### HORIZONTAL DISCHARGE

Refer to IOD-7082 included in the literature pack for installing horizontal duct covers.

Flexible duct connectors between the unit and ducts are recommended. Insulate and weatherproof all external ductwork and joints as required and in accordance with local codes.



HORIZONTAL DISCHARGE DUCT CONNECTIONS

## RIGGING DETAILS



### WARNING

**TO PREVENT PROPERTY DAMAGE, THE UNIT SHOULD REMAIN IN AN UPRIGHT POSITION DURING ALL RIGGING AND MOVING OPERATIONS. TO FACILITATE LIFTING AND MOVING WHEN A CRANE IS USED, PLACE THE UNIT IN AN ADEQUATE CABLE SLING.**



### CAUTION

**IF UNITS ARE LIFTED TWO AT A TIME, THE FORK HOLES ON THE CONDENSER END OF THE UNIT MUST NOT BE USED. MINIMUM FORK LENGTH IS 42" TO PREVENT DAMAGE TO THE UNIT; HOWEVER, 48" IS RECOMMENDED.**

**PROVISIONS FOR FORKS HAVE BEEN INCLUDED IN THE UNIT BASE FRAME. NO OTHER FORK LOCATIONS ARE APPROVED.**



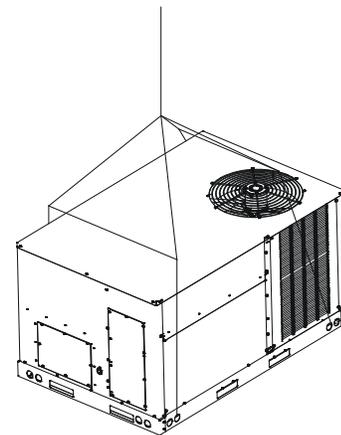
### WARNING

**TO PREVENT POSSIBLE EQUIPMENT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH, THE FOLLOWING BULLET POINTS MUST BE OBSERVED WHEN INSTALLING THE UNIT.**

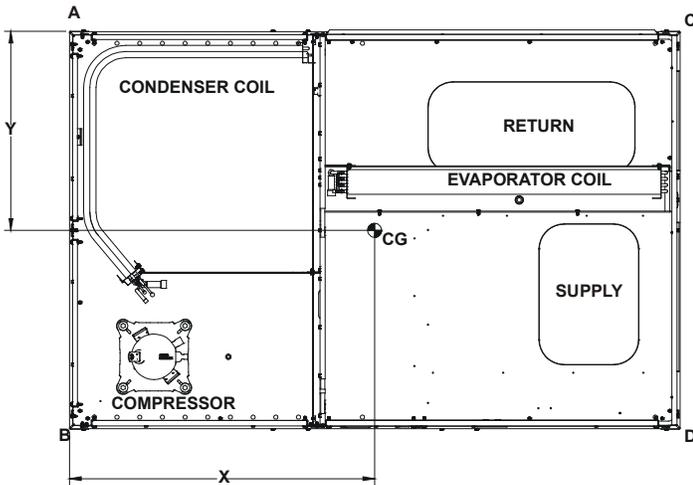
- Unit must be lifted by the four lifting holes located at the base frame corners.
- Lifting cables should be attached to the unit with shackles.
- The distance between the crane hook and the top of the unit must not be less than 60".
- Two spreader bars must span over the unit to prevent damage to the cabinet by the lift cables. Spreader bars must be of sufficient length so that cables do not come in contact with the unit during transport. Remove wood struts mounted beneath unit base frame before setting unit on roof curb. These struts are intended to protect unit base frame from fork lift damage. Removal is accomplished by extracting the sheet metal retainers and pulling the struts through the base of the unit. Refer to rigging label on the unit.

**IMPORTANT: IF USING BOTTOM DISCHARGE WITH ROOF CURB, DUCTWORK SHOULD BE ATTACHED TO THE CURB PRIOR TO INSTALLING THE UNIT. DUCTWORK DIMENSIONS ARE SHOWN IN ROOF CURB INSTALLATION INSTRUCTIONS.**

Refer to the Roof Curb Installation Instructions for proper curb installation. Curbing must be installed in compliance with the National Roofing Contractors Association Manual.



To assist in determining rigging requirements, unit weights and center of gravity are shown as follows:



**CORNER AND CENTER OF GRAVITY LOCATIONS**

**NOTE: UNIT SHOULD BE LIFTED AT A POINT ABOVE CENTER OF GRAVITY.**

| Model    | Shipping Weight (lb) | Operating Weight (lb) | Corner Weights (lb) |     |     |     | X (in) | Y (in) |
|----------|----------------------|-----------------------|---------------------|-----|-----|-----|--------|--------|
|          |                      |                       | A                   | B   | C   | D   |        |        |
| GPH1660M | 688                  | 630                   | 150                 | 194 | 165 | 121 | 33.5   | 27.6   |

**CAUTION**

**TO PREVENT DAMAGE TO THE WIRING, PROTECT WIRING FROM SHARP EDGES. FOLLOW NATIONAL ELECTRICAL CODE AND ALL LOCAL CODES AND ORDINANCES. DO NOT ROUTE WIRES THROUGH REMOVABLE ACCESS PANELS.**

**CAUTION**

**TO PREVENT SEVERE DAMAGE TO THE BOTTOM OF THE UNIT, DO NOT FORK LIFT UNIT AFTER WOOD STRUTS HAVE BEEN REMOVED.**

Bring condenser end of unit into alignment with the curb first. Lower unit carefully onto roof mounting curb. When a rectangular cantilever curb is used, care should be taken to center the unit. Check for proper alignment and orientation of supply and return openings with duct.

**RIGGING REMOVAL**

**CAUTION**

**TO PREVENT DAMAGE TO THE UNIT, DO NOT ALLOW CRANE HOOKS AND SPREADER BARS TO REST ON THE ROOF OF THE UNIT.**

Remove spreader bars, lifting cables and other rigging equipment.

**ELECTRICAL WIRING**

**WARNING**

**HIGH VOLTAGE!**  
**DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**



**WARNING**

**HIGH VOLTAGE!**  
**TO AVOID PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, DO NOT TAMPER WITH FACTORY WIRING. THE INTERNAL POWER AND CONTROL WIRING OF THESE UNITS ARE FACTORY-INSTALLED AND HAVE BEEN THOROUGHLY TESTED PRIOR TO SHIPMENT. CONTACT YOUR LOCAL REPRESENTATIVE IF ASSISTANCE IS REQUIRED.**



**CAUTION**

**CONDUIT AND FITTINGS MUST BE WEATHER-TIGHT TO PREVENT WATER ENTRY INTO THE BUILDING.**

For unit protection, use a fuse or HACR circuit breaker that is in excess of the circuit ampacity, but less than or equal to the maximum overcurrent protection device. DO NOT EXCEED THE MAXIMUM OVERCURRENT DEVICE SIZE SHOWN ON UNIT DATA PLATE.

All line voltage connections must be made through weatherproof fittings. All exterior power supply and ground wiring must be in approved weatherproof conduit.

The main power supply wiring to the unit and low voltage wiring to accessory controls must be done in accordance with these instructions, the latest edition of the National Electrical Code (ANSI/NFPA 70), and all local codes and ordinances.

The unit is factory wired for the voltage shown on the unit's data plate. Refer to model nomenclature in Appendix B for voltage requirement for your unit.

**NOTE: IF SUPPLY VOLTAGE IS 208V, LEAD ON PRIMARY OF TRANSFORMER(S) MUST BE MOVED FROM THE 230V TO THE 208V TAP. REFER TO WIRING DIAGRAM ON UNIT FOR DETAILS.**

Main power wiring should be sized for the minimum circuit ampacity shown on the unit's database. Size wires in accordance with the ampacity tables in Article 310 of the National Electrical Code. If long wires are required, it may be necessary to increase the wire size to prevent excessive voltage drop. Wires should be sized for a maximum of 3% voltage drop.

 **CAUTION**

**TO AVOID RISK OF PROPERTY DAMAGE, PERSONAL INJURY OR FIRE, USE ONLY COPPER CONDUCTORS.**

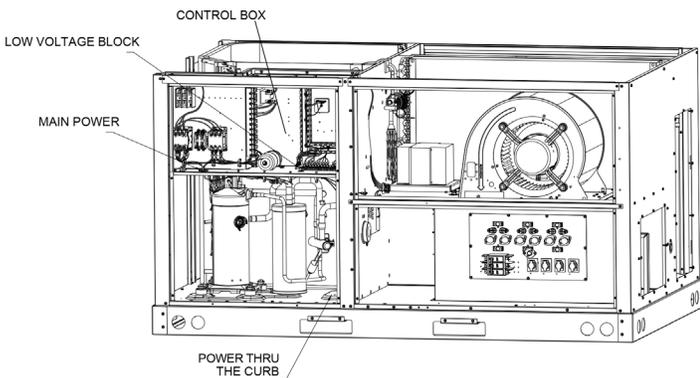
 **CAUTION**

**LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION. VERIFY PROPER OPERATION AFTER SERVICING.**

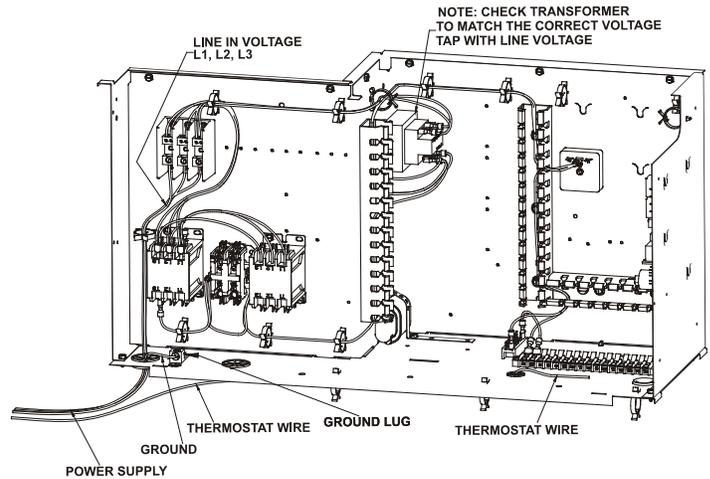
**NOTE: A WEATHER-TIGHT DISCONNECT SWITCH, PROPERLY SIZED FOR THE UNIT TOTAL LOAD, MUST BE FIELD OR FACTORY INSTALLED. AN EXTERNAL FIELD SUPPLIED DISCONNECT MAY BE MOUNTED ON THE EXTERIOR PANEL.**

Ensure the data plate is not covered by the field-supplied disconnect switch.

- Some disconnect switches are not fused. Protect the power leads at the point of distribution in accordance with the unit data plate.
- The unit must be electrically grounded in accordance with local codes or, in the absence of local codes, with the latest edition of the National Electrical Code ANSI/NFPA 70, and/or the Canadian Electrical Code, CSA C22.1, Part 1. A ground lug is provided for this purpose. Do not use the ground lug for connecting a neutral conductor.
- Connect power wiring to the electrical power block located within the main control box.



**CONTROL BOX**



**CONTROL BOX CONNECTIONS**

**NOTE: DEPENDING ON THE OPTIONS INSTALLED, THE LOCATION OF THE COMPONENTS MAY VARY IN SOME MODELS.**

 **WARNING**

**FAILURE OF UNIT DUE TO OPERATION ON IMPROPER LINE VOLTAGE OR WITH EXCESSIVE PHASE UNBALANCE CONSTITUTES PRODUCT ABUSE AND WILL VOID YOUR WARRANTY AND MAY CAUSE SEVERE DAMAGE TO THE UNIT ELECTRICAL COMPONENTS.**

**AREAS WITHOUT CONVENIENCE OUTLET**

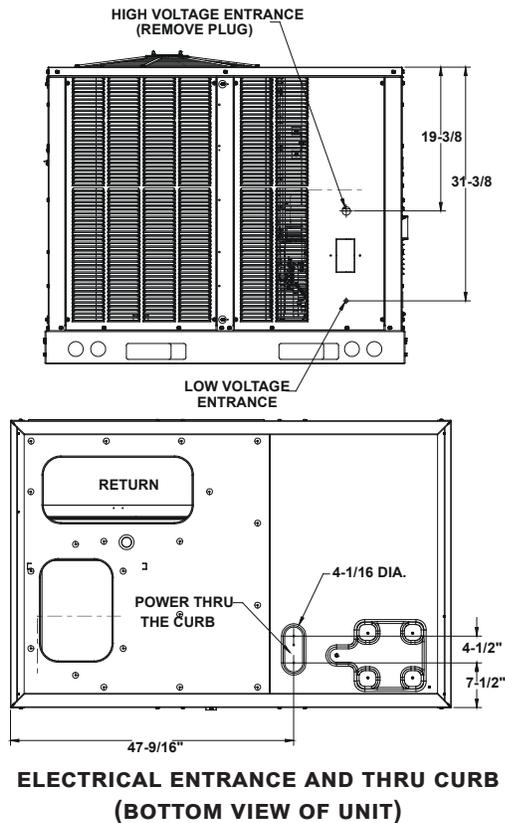
It is recommended that an independent 115V power source be brought to the vicinity of the roof top unit for portable lights and tools used by the service mechanic.

**NOTE: REFER TO LOCAL CODES FOR REQUIREMENTS. THESE OUTLETS CAN ALSO BE FACTORY INSTALLED.**

**UNITS INSTALLED ON ROOF TOPS**

Main power and low voltage wiring may enter the unit through the condenser end of unit or through the roof curb. Install conduit connectors at the desired entrance locations. External connectors must be weatherproof. All holes in the unit base must be sealed (including those around conduit nuts) to prevent water leakage into building. All required conduit and fittings are to be field supplied.

Supply voltage to roof top unit must not vary by more than 10% of the value indicated on the unit data plate. Phase voltage unbalance must not exceed 2%. Contact your local power company for correction of improper voltage or phase unbalance.



**ELECTRICAL ENTRANCE AND THRU CURB  
(BOTTOM VIEW OF UNIT)**

#### LOW VOLTAGE CONTROL WIRING

1. A 24V thermostat must be installed for unit operation.
2. Locate thermostat or remote sensor in the conditioned space where it will sense average temperature. Do not locate the device where it may be directly exposed to supply air, sunlight or other sources of heat. Follow installation instructions packaged with the thermostat.
3. Use #18 AWG wire for 24V control wiring runs not exceeding 75 feet. Use #16 AWG wire for 24V control wiring runs not exceeding 125 feet. Use #14 AWG wire for 24V control wiring runs not exceeding 200 feet. Low voltage wiring may be National Electrical Code (NEC) Class 2 where permitted by local codes.
4. Route thermostat wires from sub-base terminals to the unit. Control wiring should enter through the condenser panel opening or through curb indicated in "Electrical Entrance" figure. Connect thermostat and any accessory wiring to low voltage terminal block TB1 in the main control box.

**NOTE: FIELD-SUPPLIED CONDUIT MAY NEED TO BE INSTALLED DEPENDING ON UNIT/CURB CONFIGURATION. USE #18 AWG SOLID CONDUCTOR WIRE WHENEVER CONNECTING THERMOSTAT WIRES TO TERMINALS ON SUB-BASE. DO NOT USE LARGER THAN #18 AWG WIRE. A TRANSITION TO #18 AWG WIRE MAY BE REQUIRED BEFORE ENTERING THERMOSTAT SUB-BASE.**

**NOTE: REFER TO UNIT WIRING DIAGRAMS FOR THERMOSTAT OR REMOTE SENSOR CONNECTIONS.**

## CIRCULATING AIR AND FILTERS

### DUCTWORK

The supply duct from the unit through a wall may be installed without clearance. However, minimum unit clearances must be maintained (see "Clearances" section). The supply duct should be provided with an access panel large enough to inspect the air chamber downstream of the heat exchanger. A cover should be tightly attached to prevent air leaks.

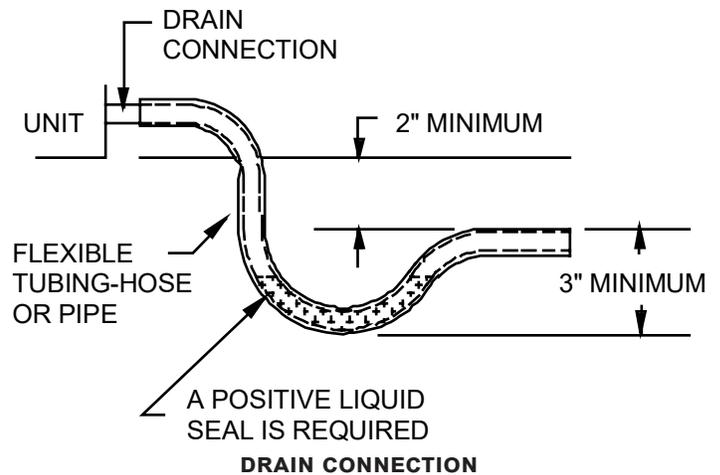
Ductwork dimensions are shown in the roof curb installation manual.

If desired, supply and return duct connections to the unit may be made with flexible connections to reduce possible unit operating sound transmission.

## CONDENSATE DRAIN CONNECTION

### CONDENSATE DRAIN CONNECTION

A 3/4" female NPT drain connection is supplied on the end of the unit and bottom of the drain pan for condensate piping. An external trap must be installed for proper condensate drainage. Hand tighten drain fitting to the drain connection.



Install condensate drain trap as shown. Use 3/4" drain line and fittings or larger. Do not operate without trap.

### HORIZONTAL DRAIN

Drainage of condensate directly onto the roof may be acceptable; refer to local code. It is recommended that a small drip pad of either stone, mortar, wood or metal be provided to prevent any possible damage to the roof.

### VERTICAL DRAIN

To use the bottom drain connection, remove the drain plug from the bottom connection and install it in the horizontal connection.

### CLEANING

Due to the fact that drain pans in any air conditioning unit will have some moisture in them, algae and fungus will grow due to airborne bacteria and spores. Periodic cleaning is necessary to prevent this build-up from plugging the drain.

## STARTUP, ADJUSTMENTS, AND CHECKS



### WARNING

#### HIGH VOLTAGE!

**TO AVOID PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, BOND THE FRAME OF THIS UNIT TO THE BUILDING ELECTRICAL GROUND BY USE OF THE GROUNDING TERMINAL PROVIDED OR OTHER ACCEPTABLE MEANS. DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT.**



### CAUTION

**TO PREVENT PROPERTY DAMAGE OR PERSONAL INJURY, DO NOT START THE UNIT UNTIL ALL NECESSARY PRE-CHECKS AND TESTS HAVE BEEN PERFORMED.**



### WARNING

#### MOVING MACHINERY HAZARD!

**TO PREVENT POSSIBLE PERSONAL INJURY OR DEATH, DISCONNECT POWER TO THE UNIT AND PADLOCK IN THE "OFF" POSITION BEFORE SERVICING FANS.**

### PRE-STARTUP INSTRUCTIONS

On new installations, or if a major component has been replaced, the operation of the unit must be checked.

Check unit operation as outlined in the following instructions. If any sparking, odors, or unusual sounds are encountered, shut off electrical power and recheck for wiring errors, or obstructions in or near the blower motors. **Duct covers must be removed before operating unit.**

The Startup, Adjustments, and Checks procedure provides a step-by-step sequence which, if followed, will assure the proper startup of the equipment in the minimum amount of time. Air balancing of duct system is not considered part of this procedure. However, it is an important phase of any air conditioning system startup and should be performed upon completion of the Startup, Adjustments, and Checks procedure. The Startup, Adjustments, and Checks procedure at outside ambients below 55°F should be limited to a readiness check of the refrigeration system with the required final check and calibration left to be completed when the outside ambient rises above 55°F.

### TEMPORARY HEATING OR COOLING

If the unit is to be used for temporary heating or cooling, a "Startup, Adjustments, and Checks" must first be performed in accordance with this manual. Damage or repairs due to failure to comply with these requirements are not covered under the warranty. **After** the machines are used for temporary heating or cooling, inspect the coils, fans, and motors for unacceptable levels of construction dust and dirt and install new filters.

### CONTRACTOR RESPONSIBILITY

The installing contractor must be certain that:

- All supply and return air ductwork is in place, properly sealed, and corresponds with installation instructions.
- All thermostats are mounted and wired in accordance with installation instructions.
- All electric power, all gas, hot water or steam line connections, and the condensate drain installation have been made to each unit on the job. These main supply lines must be functional and capable of operating all units simultaneously.
- All filters are in place.

### ROOF CURB INSTALLATION CHECK

Inspect the roof curb for correct installation. The unit and curb assembly should be level. Inspect the flashing of the roof mounting curb to the roof, especially at the corners, for good workmanship. Also check for leaks around gaskets. Note any deficiencies in a separate report and forward to the contractor.

### OBSTRUCTIONS, FAN CLEARANCE AND WIRING

Remove any extraneous construction and shipping materials that may be found during this procedure. Rotate all fans manually to check for proper clearances and that they rotate freely. Check for bolts and screws that may have jarred loose during shipment to the job site. Re-tighten if necessary. Re-tighten all electrical connections.

### FIELD DUCT CONNECTIONS

Verify that all duct connections are tight and that there is no air bypass between supply and return.

### PRE-STARTUP PRECAUTIONS

It is important to your safety that the unit has been properly grounded during installation. Check ground lug connection in main control box for tightness prior to closing circuit breaker or disconnect switch. Verify that supply voltage on line side of disconnect agrees with voltage on unit identification plate and is within the utilization voltage range as indicated in Appendix B Electrical Data.

**System Voltage** - That nominal voltage value assigned to a circuit or system for the purpose of designating its voltage class.

**Nameplate Voltage** - That voltage assigned to a piece of equipment for the purpose of designating its voltage class and for the purpose of defining the minimum and maximum voltage at which the equipment will operate.

**Utilization Voltage** - The voltage of the line terminals of the equipment at which the equipment must give fully satisfactory performance. Once it is established that supply voltage will be maintained within the utilization range under all system conditions, check and calculate if an unbalanced condition exists between phases. Calculate percent voltage unbalance as follows:

## AIR FLOW ADJUSTMENTS

When the final adjustments are complete, the current draw of the motor should be checked and compared to the full load current rating of the motor. The amperage must not exceed the service factor stamped on the motor nameplate.

If an economizer is installed, check the unit operating balance with the economizer at full outside air and at minimum outside air.

High stage airflow setting to be between 300 and 500 CFM per ton, see Table below. For models with electric heat the total airflow must not be less than that required for operation of the electric heaters. See Appendix D for minimum airflow for specific electric heaters.

**NOTE: NEVER RUN CFM BELOW 300 CFM PER TON, EVAPORATOR FREEZING OR POOR UNIT PERFORMANCE IS POSSIBLE.**

| Model    | Minimum | Nominal | Maximum |
|----------|---------|---------|---------|
| GPH1660M | 1500    | 1850    | 2500    |

**HIGH STAGE AIRFLOW SETTING, CFM  
(WITHOUT ELECTRIC HEAT)**

### EEM - STANDARD STATIC DRIVE MOTOR

Adjust the CFM for the unit by changing the position of the low voltage leads on the terminal block TB1. Refer to Appendix A for blower performance at each speed tap

**NOTE: IF MORE THAN ONE LEAD IS ENERGIZED SIMULTANEOUSLY, THE MOTOR WILL RUN AT THE HIGHER SPEED.**

Fan speed for G (Fan), Y1 (Low Cool) and W1 (Low Heat) are fixed setting on TB1/T1 and cannot be moved.

Purple wire Y2 (High Cool) and Brown wire W2 (High Heat) are connected to TB1/T2. These wires can be moved together or separately and placed on any unoccupied terminal T3-T5.

Note: for proper operation Y2 and W2 should have a higher speed setting than the G, Y1 and W1 speed setting.

If Electric Heater kit is installed use the red wire provided with the literature kit to jumper terminal TB1/W1 to an unoccupied speed tap that satisfies the minimum airflow required for the heater kit. This must be a different tap than Y2 is connected to. Refer to Appendix D for minimum required airflow for electric heaters.

**NOTE: ON HEAT PUMP UNITS, THE YELLOW (YL) WIRE FROM RELAY BR1 TO TB1/T2 MUST ALWAYS BE MOVED TO THE SAME TERMINAL LOCATION AS THE BROWN (BR) WIRE AFTER ADJUSTMENTS ARE MADE, TO ENSURE PROPER BLOWER SPEED DURING DEFROST OPERATION.**

### REFRIGERATION SYSTEM CHECKS

This unit is equipped with thermal expansion valves.

Ensure the hold-down bolts on the compressor are secure and have not vibrated loose during shipment. Check that the vibration grommets have been installed and visually check all piping for damage and leaks and repair if necessary. The entire system has been factory charged and tested, making it unnecessary to field charge. Factory refrigerant charge is shown on the unit's nameplate. To confirm charge levels or, if a leak occurs and charge needs to be added to the system, it is recommended to evacuate the system and recharge refrigerant to the unit's nameplate specifications. This unit has been rated in the cooling mode at the AHRI rated conditions of: indoor (80°F db/67°F wb) and outdoor (95°F db). While operating at this condition, the superheat should range from 9°F to 11°F for each refrigeration circuit measured at the suction service port located near the compressor.

### START-UP PROCEDURE AND CHECKLIST

Begin with power turned off at all disconnects.

### AIR CONDITIONING START-UP PROCEDURE

1. Ensure the thermostat is set to OFF and Fan is set to Auto.
2. Inspect all registers and set them to the normal open position.
3. Turn on the electrical supply at the disconnect.
4. Turn the fan switch to the "ON" position. The blower should operate after a 7 second delay.
5. Turn the fan switch to "Auto" position. The blower should stop after a 60 second delay.
6. Set the thermostat to Cool mode and slowly lower the cooling temperature until the unit starts. The compressor, blower and fan should now be operating. Allow the unit to run 10 minutes, make sure cool air is being supplied by the unit.

7. Check that the compressor is operating correctly. The scroll compressors in these units **MUST** operate in the proper rotation. To ensure the compressors are operating in the correct direction, check the compressor discharge line pressure or temperature after the compressor is started. The discharge pressure and discharge line temperature should increase. If this does not occur and the compressor is producing an exceptional amount of noise, this indicates that there is a phasing issue. Perform the following to correct:

- 7.1 Turn power to the unit OFF.
- 7.2 Switch any two leads of power supply at unit Single Point Power Block.
- 7.3 Turn power to the unit ON.
- 7.4 Perform step 7 again.

8. Turn the temperature setting to the highest position, stopping the unit. The indoor blower will continue to run for 60 seconds.

9. Turn the thermostat system switch to “OFF” and disconnect all power when servicing the unit.

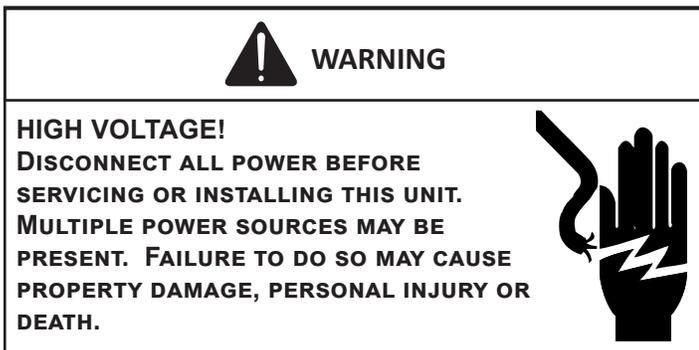
Note: If the outdoor ambient is above 80°F, the unit may trip on its high pressure cut out when on heating. The compressor should stop. The heating cycle must be thoroughly checked, so postpone the test to another day when conditions are more suitable but-**DO NOT FAIL TO TEST**. If the outdoor ambient is low and the unit operates properly on the heating cycle, you may check the pressure cutout operation by blocking off the indoor return air until the unit trips.

- 13. Once the heating has been confirmed, raise the temperature setting until the second stage heating makes contact. Supplemental resistance heat, if installed should now come on. Make sure it operates properly.
- 14. For thermostats with emergency heat switch, set thermostat to Emergency Heat mode. The heat pump will stop, the blower will continue to run, all heaters will come on and the thermostat emergency heat light will come on. Confirm heaters operate normally.

**NOTE: THE COMPRESSOR HAS 180 SECOND RE-START DELAY ON TIMER TO AVOID SHORT CYCLING.**

**FINAL SYSTEM CHECKS**

- 15. Check to see if all supply and return air grilles are adjusted and the air distribution system is balanced for the best compromise between heating and cooling.
- 16. Check for air leaks in the ductwork. See Sections on Air Flow Adjustments.
- 17. Make sure the unit is free of “rattles”, and the tubing in the unit is free from excessive vibration. Also make sure tubes or lines are not rubbing against each other or sheet metal surfaces or edges. If so, correct the trouble.
- 18. Set the thermostat at the appropriate setting for cooling and heating or automatic changeover for normal use.
- 19. Be sure the Owner is instructed on the unit operation, filter, servicing, correct thermostat operation, etc.



**HEAT PUMP START-UP PROCEDURE**

- 10. Check the cooling mode for the heat pump in the same manner as above. The reversing valve is energized when the thermostat is placed in the cooling position. A clicking sound should be noticeable from the reversing valve. By lowering the temperature setting to call for cooling, the solenoid valve is energized. The compressor, blower and fan should then be running. After the cooling mode is checked out, turn the thermostat system switch to “OFF”.
- 11. Turn the thermostat system switch to “HEAT” and fan switch to “AUTO”.
- 12. Slowly raise the heating temperature setting. When the heating first stage makes contact, stop raising the temperature setting. The compressor, blower and fan should now be running with the reversing valve in the deenergized (heating) position. After giving the unit time to settle out, make sure the unit is supplying heated air.

**REFRIGERATION PERFORMANCE CHECK**

Check that compressor RLA corresponds to values shown in Appendix B. RLA draw can be much lower than values listed at low load conditions and low ambient condensing temperatures. Values in Appendix B can slightly exceed at high load conditions and high ambient condensing temperatures.

# HEAT PUMP OPERATION

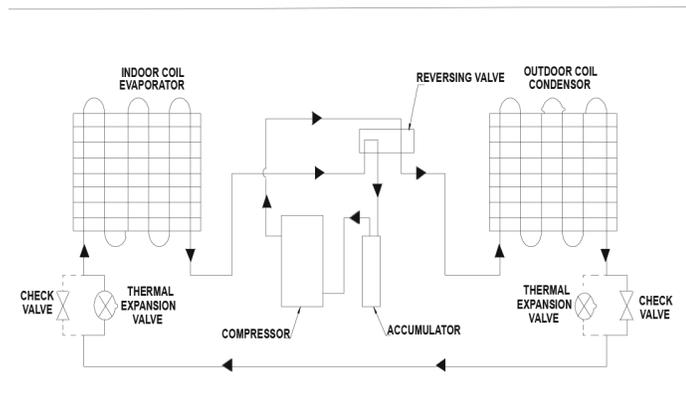
## COOLING CYCLE

When the heat pump is in the cooling cycle, it operates exactly as a Summer Air Conditioner unit. In this mode, all the charts and data for service that apply to summer air conditioning apply to the heat pump. Most apply on the heating cycle except the “condenser” becomes the “evaporator”, “evaporator” becomes “condenser”, “cooling” becomes “heating”.

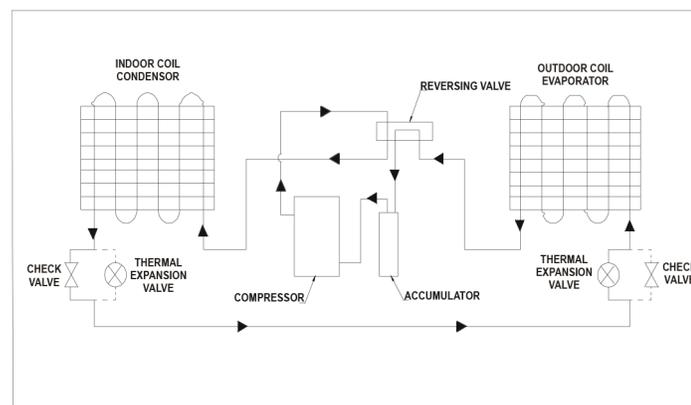
## HEATING CYCLE

The heat pump switches from cooling cycle by redirecting refrigerant flow through the refrigerant circuit external to the compressor. This is accomplished by the reversing valve. Hot discharge vapor from the compressor is directed to the indoor coil (evaporator on the cooling cycle) where the heat is removed, and the vapor condenses to liquid. It then goes through the expansion device to the outdoor coil (condenser on the cooling cycle) where the liquid is evaporated, and the vapor goes to the compressor.

The following figures show a schematic of a heat pump on the cooling cycle and the heating cycle. The heat pump is equipped with thermal expansion valves for the indoor and outdoor coils. It is also provided with a defrost control system.



COOLING



HEATING

## HEATING

When the heat pump is on the heating cycle, the outdoor coil is functioning as an evaporator. The temperature of the refrigerant in the outdoor coil must be below the temperature of the outdoor air in order to extract heat from the air. Thus, the greater the difference in the outdoor temperature and the outdoor coil temperature, the greater the heating capacity of the heat pump. This phenomenon is a characteristic of a heat pump. It is a good practice to provide supplementary heat for all heat pump installations in areas where the temperature drops below 45° F. It is also a good practice to provide sufficient supplementary heat to handle the entire heating requirement should there be a component failure of the heat pump, such as a compressor, or refrigerant leak, etc.

Since the temperature of the refrigerant in the outdoor coil on the heating cycle is generally below freezing point, frost forms on the surfaces of the outdoor coil under certain weather conditions of temperature and relative humidity. Therefore, it is necessary to reverse the flow of the refrigerant to provide hot gas in the outdoor coil to melt the frost accumulation. This is accomplished by reversing the heat pump to the cooling cycle. At the same time, the outdoor fan stops to hasten the temperature rise of the outdoor coil and lessen the time required for defrosting. The indoor blower continues to run and the supplementary heaters are energized.

## DEFROST CONTROL

During operation the Defrost signal to the circuit board is controlled by a temperature sensor, which is clamped to a feeder tube entering the outdoor coil. Defrost timing periods of 30,60 and 90 minutes may be selected by connecting the circuit board jumper to 30, 60 and 90 respectively. Accumulation of time for the timing period selected starts when the sensor contact closes (approximately 31°F), and when the wall thermostat calls for heat. At the end of the timing period, the unit's defrost cycle will be initiated provided the sensor contact remains closed. When the sensor contact opens (approximately 75°F), the defrost cycle is terminated and the timing period is reset. If the defrost cycle is not terminated due to the sensor temperature, a ten minute override interrupts the unit's defrost period.

## MAINTENANCE



### WARNING

**HIGH VOLTAGE!**  
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



### WARNING

**TO PREVENT PERSONAL INJURY OR DEATH DUE TO IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE, REFER TO THIS MANUAL. FOR ADDITIONAL ASSISTANCE OR INFORMATION, CONSULT A QUALIFIED INSTALLER, SERVICER AGENCY OR THE GAS SUPPLIER.**



### CAUTION

**SHEET METAL PARTS, SCREWS, CLIPS AND SIMILAR ITEMS INHERENTLY HAVE SHARP EDGES, AND IT IS NECESSARY THAT THE INSTALLER AND SERVICE PERSONNEL EXERCISE CAUTION.**

The Self Contained Packaged Air Conditioner and Heat Pump should operate for many years without excessive service calls if the unit is installed properly. However it is recommended that the owner inspect the unit before a seasonal start up. The coils should be free of debris so adequate airflow is achieved. The return and supply registers should be free of any obstructions. The filters should be cleaned or replaced. These few steps will help to keep the product up time to a maximum. The Service section that follows should help in identifying problems if the unit does not operate properly.

## FILTERS



### CAUTION

**TO PREVENT PROPERTY DAMAGE DUE TO FIRE AND LOSS OF EQUIPMENT EFFICIENCY OR EQUIPMENT DAMAGE DUE TO DUST AND LINT BUILD UP ON INTERNAL PARTS, NEVER OPERATE UNIT WITHOUT AN AIR FILTER INSTALLED IN THE RETURN AIR SYSTEM.**

Every application may require a different frequency of replacement of dirty filters. Filters must be replaced at least every three (3) months during operating seasons.

Dirty filters are the most common cause of inadequate heating or cooling performance. Filter inspection should be made at least every two months; more often if necessary because of local conditions and usage.

Dirty throwaway filters should be discarded and replaced with a new, clean filter.

Disposable return air filters are supplied with this unit. See the unit Specification Sheet or Technical Manual for the correct size and part number. To remove the filters, remove the filter access panel on return side of the unit.

### CABINET FINISH MAINTENANCE

Use a fine grade automotive wax on the cabinet finish to maintain the finish's original high luster. This is especially important in installations with extended periods of direct sunlight.

### CLEAN OUTSIDE COIL (QUALIFIED SERVICER ONLY)

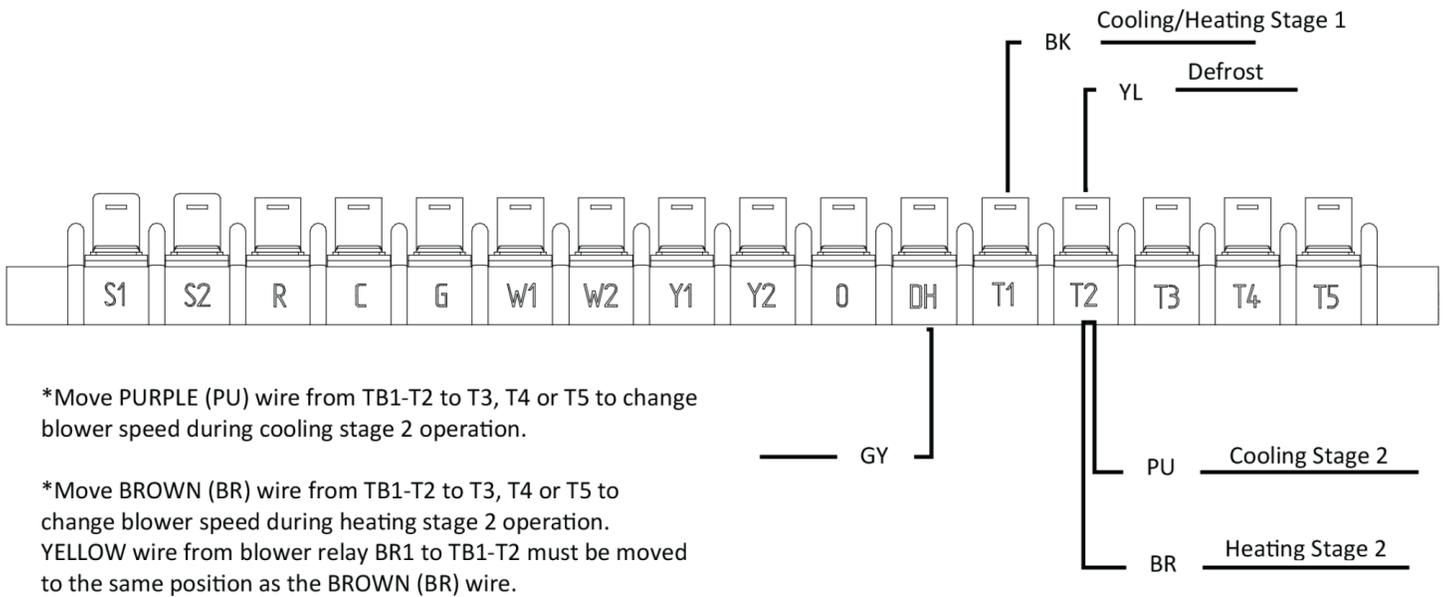
The coil with the outside air flowing over it should be inspected annually and cleaned as frequently as necessary to keep the finned areas free of lint, hair and debris.

### LUBRICATION

The supply fan motors, the condenser fan motors and compressors are permanently lubricated.

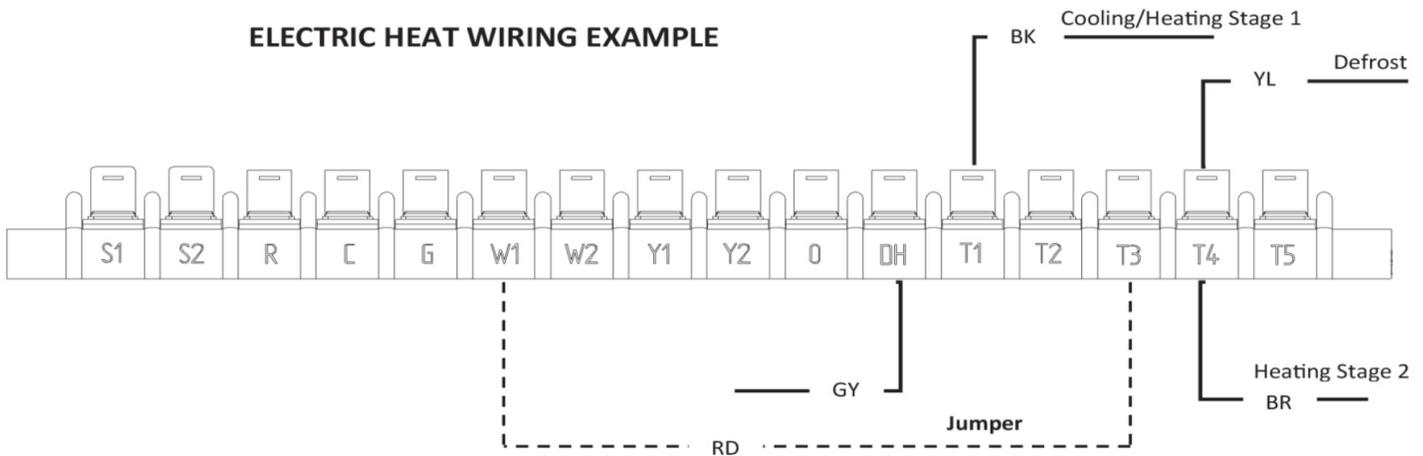
### FUNCTIONAL PARTS

Refer to the unit Parts Catalog for a list of functional parts. Parts are available from your distributor.



**WIRING EXAMPLE**

**ELECTRIC HEAT WIRING EXAMPLE**



\*Move BROWN (BR) wire from TB1-T2 to T3, T4 or T5 to change blower speed during heating stage 2 operation. YELLOW wire from blower relay BR1 to TB1-T2 must be moved to the same position as the BROWN (BR) wire.

\*Install RED jumper to connect TB1-W1 and unoccupied speed tap to change blower speed during heating.

**ELECTRIC HEAT WIRING EXAMPLE**

# APPENDIX A BLOWER PERFORMANCE TABLES - HEAT PUMP

## 5 Ton Heat Pump Standard Static Drive Models: GPH1660M

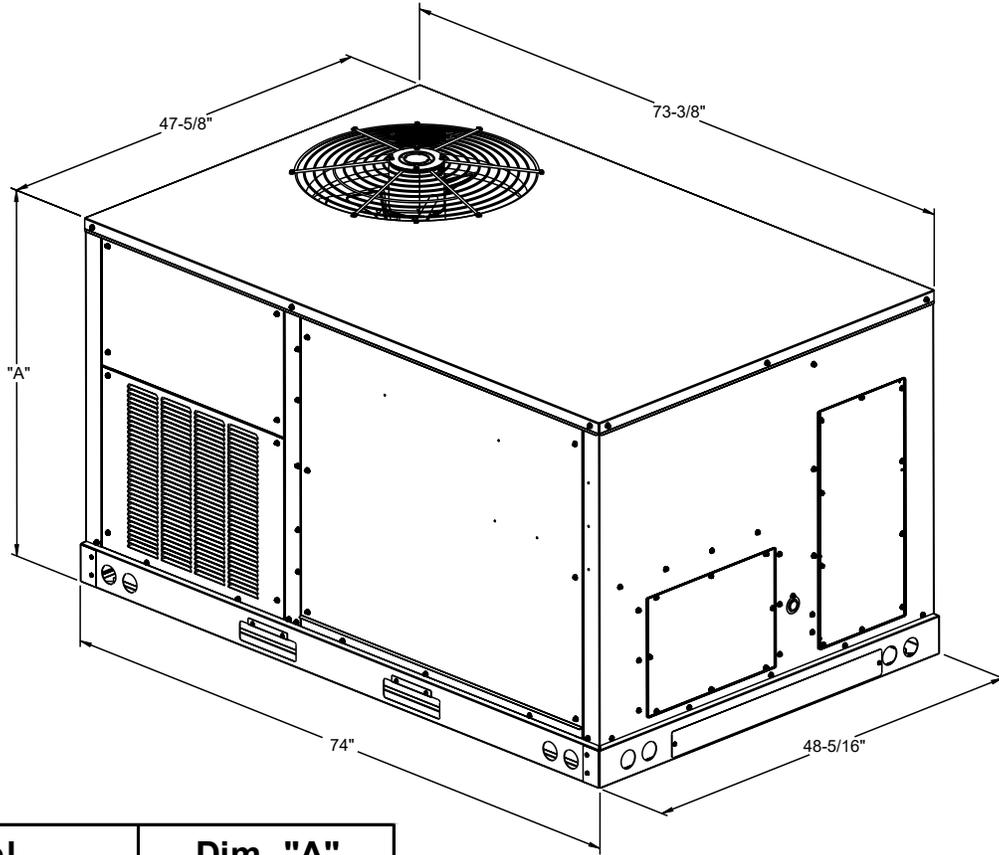
| Down Flow |   |      |      |      | Horizontal Flow |   |      |      |      |
|-----------|---|------|------|------|-----------------|---|------|------|------|
| Speed Tap | External Static Pressure (ESP), in w.c. | SCFM | RPM  | BHP  | Speed Tap       | External Static Pressure (ESP), in w.c. | SCFM | RPM  | BHP  |
| T1        | 0.2                                     | 1299 | 614  | 0.16 | T1              | 0.2                                     | 1326 | 653  | 0.22 |
|           | 0.4                                     | 1209 | 674  | 0.17 |                 | 0.4                                     | 1234 | 717  | 0.24 |
|           | 0.6                                     | 1082 | 755  | 0.19 |                 | 0.6                                     | 1104 | 803  | 0.27 |
|           | 0.8                                     | 933  | 836  | 0.21 |                 | 0.8                                     | 952  | 890  | 0.30 |
| T2        | 0.2                                     | 1967 | 862  | 0.62 | T2              | 0.2                                     | 2007 | 885  | 0.64 |
|           | 0.4                                     | 1896 | 951  | 0.69 |                 | 0.4                                     | 1935 | 931  | 0.67 |
|           | 0.6                                     | 1849 | 1022 | 0.74 |                 | 0.6                                     | 1887 | 969  | 0.70 |
|           | 0.8                                     | 1786 | 948  | 0.69 |                 | 0.8                                     | 1822 | 1009 | 0.73 |
| T3        | 0.2                                     | 2096 | 871  | 0.71 | T3              | 0.2                                     | 2139 | 927  | 0.76 |
|           | 0.4                                     | 2024 | 916  | 0.75 |                 | 0.4                                     | 2065 | 974  | 0.80 |
|           | 0.6                                     | 1972 | 948  | 0.78 |                 | 0.6                                     | 2012 | 1009 | 0.83 |
|           | 0.8                                     | 1921 | 982  | 0.80 |                 | 0.8                                     | 1960 | 1045 | 0.86 |
| T4        | 0.2                                     | 2189 | 902  | 0.81 | T4              | 0.2                                     | 2234 | 960  | 0.86 |
|           | 0.4                                     | 2119 | 943  | 0.84 |                 | 0.4                                     | 2162 | 1003 | 0.90 |
|           | 0.6                                     | 2059 | 979  | 0.88 |                 | 0.6                                     | 2101 | 1042 | 0.93 |
|           | 0.8                                     | 2012 | 1009 | 0.90 |                 | 0.8                                     | 2053 | 1073 | 0.96 |
| T5        | 0.2                                     | 2254 | 923  | 0.88 | T5              | 0.2                                     | 2300 | 982  | 0.93 |
|           | 0.4                                     | 2178 | 964  | 0.92 |                 | 0.4                                     | 2222 | 1025 | 0.98 |
|           | 0.6                                     | 2127 | 997  | 0.95 |                 | 0.6                                     | 2170 | 1061 | 1.01 |
|           | 0.8                                     | 2078 | 1029 | 0.98 |                 | 0.8                                     | 2120 | 1095 | 1.04 |

Shaded area indicates air flow below 1500 SCFM (300 SCFM/ton) that is not recommended for High Stage cooling or heating

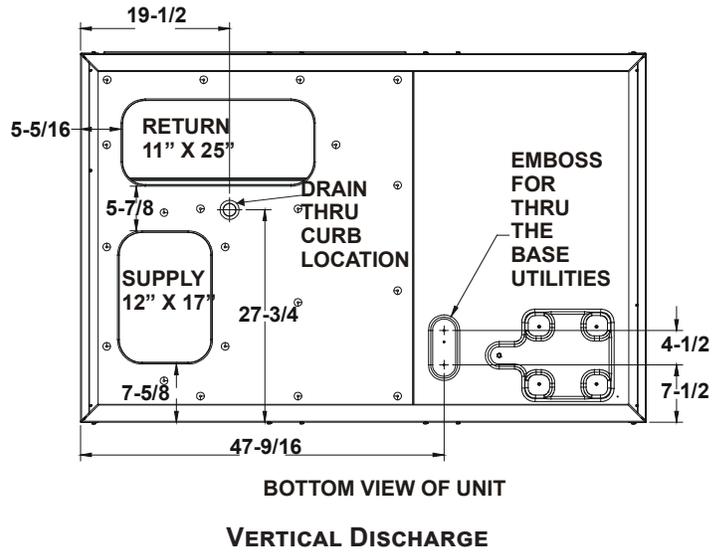
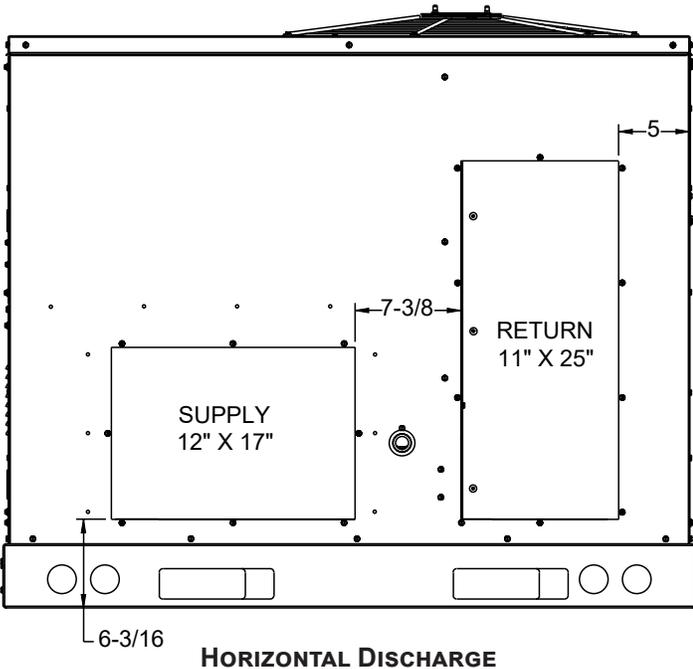
## APPENDIX B ELECTRICAL DATA

| Model Number | Electrical Rating | Compressor |         |       | Outdoor Fan Motor |         |         | Indoor Fan Motor               |    |     | Optional Electric Heat |           |           | Optional Powered Convenience | Optional Power | Power Supply |           |
|--------------|-------------------|------------|---------|-------|-------------------|---------|---------|--------------------------------|----|-----|------------------------|-----------|-----------|------------------------------|----------------|--------------|-----------|
|              |                   | QTY        | RLA     | LRA   | QTY               | HP      | FLA     | Type                           | HP | FLA | Part #                 | KW*       | FLA       | Outlet FLA                   | Exhaust FLA    | MCA          | MOP       |
| GPH1660M     | 208-230/1/60      | 1          | 26.9    | 152.9 | 1                 | 0.3     | 3.5     | Direct Drive - Standard Static | 1  | 6.9 | -                      | -         | -         | -                            | -              | 44.1/44.1    | 70.0/70.0 |
|              |                   |            |         |       |                   |         |         |                                |    |     | -                      | -         | -         | 7.2/6.5                      | -              | 51.3/50.6    | 70.0/70.0 |
|              |                   |            |         |       |                   |         |         |                                |    |     | EH*-1S05               | 3.76/5.00 | 18.1/20.8 | -                            | -              | 66.6/70.1    | 70.0/80.0 |
|              |                   |            |         |       |                   |         |         |                                |    |     | -                      | -         | -         | 7.2/6.5                      | -              | 73.8/76.6    | 80.0/80.0 |
|              |                   |            |         |       |                   |         |         |                                |    |     | EH*-1S10               | 7.51/10.0 | 36.1/41.7 | -                            | -              | 89.2/96.1    | 90.0/100  |
|              |                   |            |         |       |                   |         |         |                                |    |     | -                      | -         | -         | 7.2/6.5                      | -              | 96.4/103     | 100/110   |
|              |                   |            |         |       |                   |         |         |                                |    |     | EH*-1S15               | 11.3/15.0 | 54.2/62.5 | -                            | -              | 112/122      | 125/125   |
| -            | -                 | -          | 7.2/6.5 | -     | 119/129           | 125/150 |         |                                |    |     |                        |           |           |                              |                |              |           |
| -            | -                 | -          | -       | -     | -                 | -       | 134/148 | 150/150                        |    |     |                        |           |           |                              |                |              |           |
| -            | -                 | -          | 7.2/6.5 | -     | 142/155           | 150/175 |         |                                |    |     |                        |           |           |                              |                |              |           |

# APPENDIX C UNIT DIMENSIONS



| Model           | Dim. "A" |
|-----------------|----------|
| 5 Ton Heat Pump | 43-1/2"  |

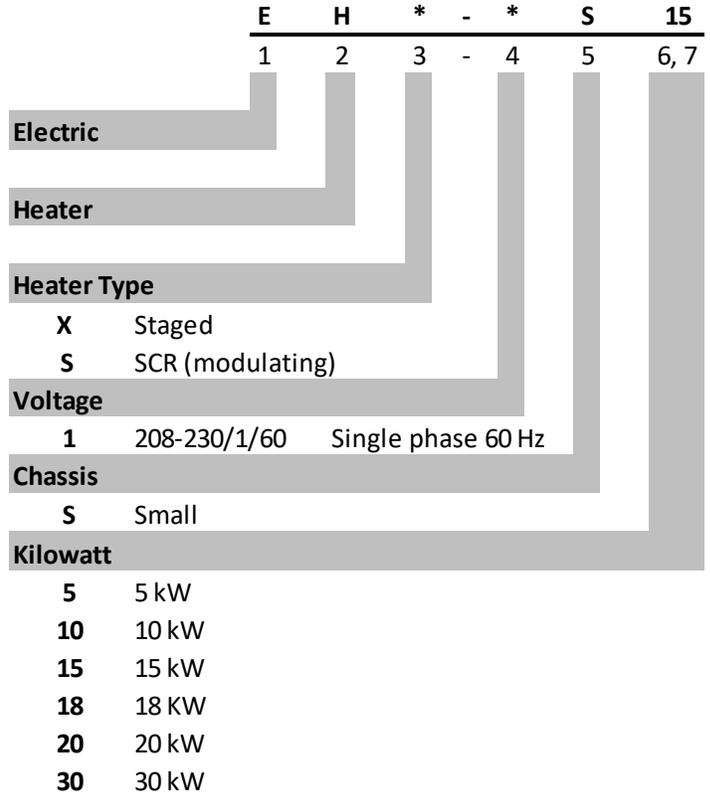


NOTE: REFER TO IOD-7082 INCLUDED IN THE LITERATURE PACK FOR INSTALLING HORIZONTAL DUCT COVERS.

## APPENDIX D AIR FLOW FOR ELECTRIC HEAT

| UNIT     | HEATER KIT MODEL NUMBER | kW | MINIMUM SCFM | MAXIMUM SCFM |
|----------|-------------------------|----|--------------|--------------|
| GPH1660M | EH*-*S05                | 5  | 1500         | 2500         |
|          | EH*-*S10                | 10 | 1500         |              |
|          | EH*-*S15                | 15 | 1500         |              |
|          | EH*-*S20                | 20 | 1550         |              |

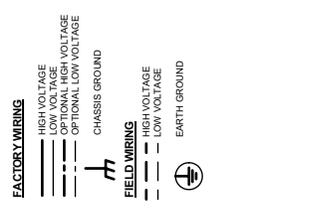
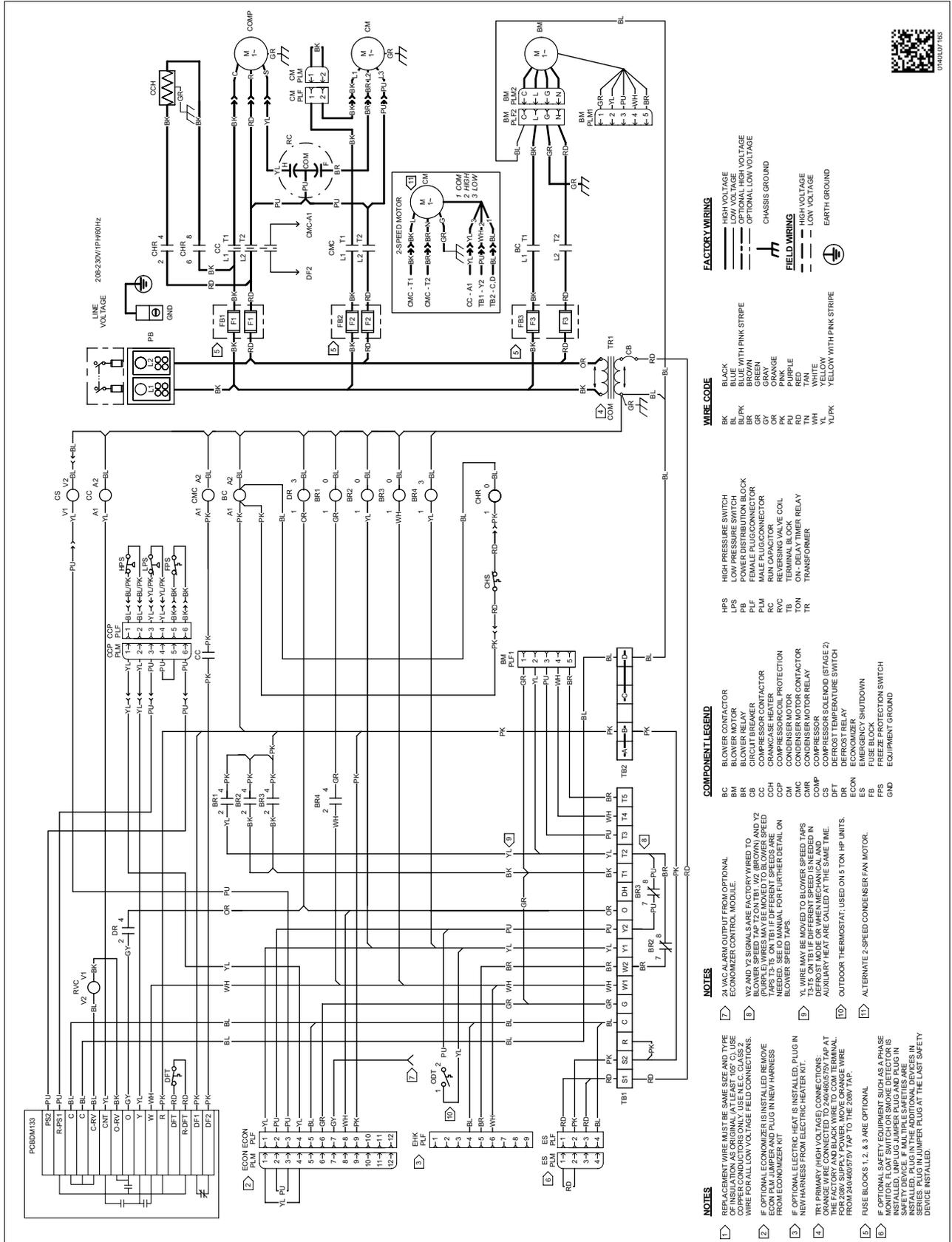
### HEATER KIT MODEL NUMBER NOMENCLATURE



# WIRING DIAGRAMS



**WARNING**  
 HIGH VOLTAGE!  
 DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



**WIRE CODE**

|       |                         |
|-------|-------------------------|
| BK    | BLACK                   |
| BL    | BLUE                    |
| BL/PK | BLUE WITH PINK STRIPE   |
| BR    | BROWN                   |
| GR    | GREEN                   |
| GY    | GRAY                    |
| OR    | ORANGE                  |
| PK    | PINK                    |
| PU    | PURPLE                  |
| RD    | RED                     |
| TR    | TRANSFORMER             |
| WH    | WHITE                   |
| YL    | YELLOW                  |
| YL/PK | YELLOW WITH PINK STRIPE |

**COMPONENT LEGEND**

|      |                               |
|------|-------------------------------|
| BC   | BLOWER CONTACTOR              |
| BM   | BLOWER MOTOR                  |
| BR   | CIRCUIT BREAKER               |
| CC   | CONDENSER CONTACTOR           |
| CCP  | COMPRESSOR COIL PROTECTION    |
| CM   | CONDENSER MOTOR CONTACTOR     |
| CMC  | COMPRESSOR MOTOR RELAY        |
| COMP | COMPRESSOR SOLENOID (STAGE 2) |
| DFT  | DEFROST TEMPERATURE SWITCH    |
| ES   | EMERGENCY SHUTDOWN            |
| FB   | FUSE BLOCK                    |
| GND  | EQUIPMENT GROUND              |

**NOTES**

- REPLACEMENT WIRE MUST BE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL AT LEAST 100°C USE COPPER CONDUCTORS ONLY USE N.E.C. CLASS 2 WIRE FOR ALL LOW VOLTAGE FIELD CONNECTIONS.
- OPTIONAL ECONOMIZER IS INSTALLED REMOVE FROM ECONOMIZER KIT
- IF OPTIONAL ELECTRIC HEAT IS INSTALLED, PLUG IN NEW HARNESS FROM ELECTRIC HEATER KIT.
- OPTIONAL THERMOSTAT IS INSTALLED, PLUG IN THE FACTORY AND BLACK WIRE TO COM TERMINAL FROM 240/460/575V TAP TO THE 230V TAP.
- FUSE BLOCKS 1, 2, & 3 ARE OPTIONAL.
- OPTIONAL SAFETY EQUIPMENT SUCH AS PHASE SEQUENCE RELAY, SAFETY SWITCH, SAFETY DEVICES, SAFETY DEVICE, MULTIPLE SAFETIES ARE IN SERIES. PLUG IN JUMPER PLUG AT THE LAST SAFETY DEVICE INSTALLED.

**NOTES**

- 24VAC ALARM OUTPUT FROM OPTIONAL ECONOMIZER CONTROL MODULE
- W2 AND Y2 SIGNALS ARE FACTORY WIRING TO BLOWER SPEED TAP T2 ON TB1. W2 (BROWN) AND Y2 (PURPLE) WIRES MAY BE MOVED TO BLOWER SPEED TAP T2 ON TB1. SEE MANUAL FOR FURTHER DETAIL ON BLOWER SPEED TAPS.
- YL WIRE MAY BE MOVED TO BLOWER SPEED TAPS T3-T5 ON TB1 IF DIFFERENT SPEED IS NEEDED IN AUXILIARY HEAT ARE CALLED AT THE SAME TIME.
- OUTDOOR THERMOSTAT IS USED ON 5 TON HP UNITS.
- ALTERNATE 2-SPEED CONDENSER FAN MOTOR.



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

Date: \_\_\_\_\_ Location: \_\_\_\_\_  
Model Number: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Technician: \_\_\_\_\_ Unit #: \_\_\_\_\_

## Pre Start-Up

*(Check each item as completed)*

- Verify all packaging material has been removed.
- Remove all shipping brackets per installation instructions.
- Verify the job site voltage agrees with the unit serial plate.
- Verify condensate connection is installed per installation instructions.
- Verify proper clearance around the unit for safety, service, maintenance and proper unit operation.
- Verify proper weatherproofing of all ductwork, roof curbs and electrical connections.
- Check that the flue screen is in place.
- Check gas piping for leaks.
- Verify gas pressure to the unit is within the range specified on the serial plate.
- Check to ensure that all fans, pulleys and wheels are secure.
- Check for proper belt tension and alignment per installation instructions.
- Check refrigerant piping for rubbing and leaks. *Repair if necessary.*
- Check unit wiring to ensure it is not in contact with refrigerant piping or sharp metal edges.
- Check all electrical connections and terminals. *Tighten as needed.*
- Verify that the crankcase heaters have been energized for 24 hours.
- Verify the scroll compressor(s) are rotating in the right direction.
- Verify all accessories are installed and operating correctly.
- Check filters and replace if necessary.
- Verify the installation of the thermostat.



Air Conditioning & Heating

# Start-up Checklist

**Start-Up**  
*(Insert the values as each item is completed.)*

**ELECTRICAL**

|                           |         |       |         |       |         |       |
|---------------------------|---------|-------|---------|-------|---------|-------|
| Supply Voltage            | L1 - L2 | _____ | L2 - L3 | _____ | L3 - L1 | _____ |
| Circuit 1 Compressor Amps | L1      | _____ | L2      | _____ | L3      | _____ |
| Circuit 2 Compressor Amps | L1      | _____ | L2      | _____ | L3      | _____ |
| Blower Amps               | L1      | _____ | L2      | _____ | L3      | _____ |
| Condenser Fan Amps        | Fan 1   | _____ | Fan 2   | _____ | Fan 3   | _____ |

**BLOWER EXTERNAL STATIC PRESSURE**

|                                |       |          |
|--------------------------------|-------|----------|
| Return Air Static Pressure     | _____ | IN. W.C. |
| Supply Air Static Pressure     | _____ | IN. W.C. |
| Total External Static Pressure | _____ | IN. W.C. |
| Blower Wheel RPM               | _____ | RPM      |

**TEMPERATURES**

|                                |       |    |       |    |
|--------------------------------|-------|----|-------|----|
| Outdoor Air Temperature        | _____ | DB | _____ | WB |
| Return Air Temperature         | _____ | DB | _____ | WB |
| Cooling Supply Air Temperature | _____ | DB | _____ | WB |
| Heating Supply Air Temperature | _____ | DB | _____ |    |

**PRESSURES**

|                            |       |                     |       |                      |
|----------------------------|-------|---------------------|-------|----------------------|
| Gas Inlet Pressure         | _____ | IN. W.C.            |       |                      |
| Gas Manifold Pressure      | _____ | IN. W.C. (Low Fire) | _____ | IN. W.C. (High Fire) |
| Suction Circuit 1          | _____ | PSIG                | _____ | °F                   |
| Superheat (Orifice System) |       |                     | _____ | °F                   |
| Suction Circuit 2          | _____ | PSIG                | _____ | °F                   |
| Superheat (Orifice System) |       |                     | _____ | °F                   |
| Discharge Circuit 1        | _____ | PSIG                | _____ | °F                   |
| Subcooling (TXV System)    |       |                     | _____ | °F                   |
| Discharge Circuit 2        | _____ | PSIG                | _____ | °F                   |
| Subcooling (TXV System)    |       |                     | _____ | °F                   |

**(HEAT PUMP ONLY)**

|                     |       |      |       |    |
|---------------------|-------|------|-------|----|
| Suction Circuit 1   | _____ | PSIG | _____ | °F |
| Suction Circuit 2   | _____ | PSIG | _____ | °F |
| Discharge Circuit 1 | _____ | PSIG | _____ | °F |
| Discharge Circuit 2 | _____ | PSIG | _____ | °F |

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