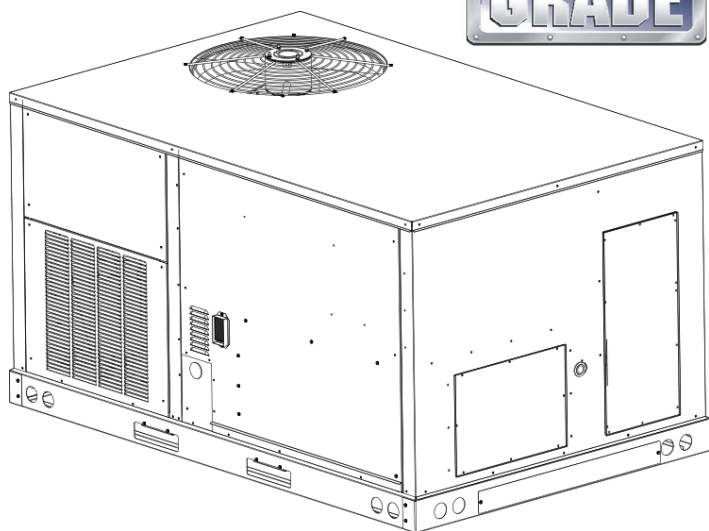




INSTALLATION INSTRUCTIONS

PACKAGED GAS / ELECTRIC UNIT 3-5 TON BELT DRIVE ULTRA LOW NOX LIGHT COMMERCIAL DBG MODELS INSTALLATION INSTRUCTIONS



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.



This forced air central unit design complies with requirements embodied in The American National Standard / National Standard of Canada **ANSI Z21.47-CSA-2.3 Gas-fired central furnaces.**

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

© 2020-2021 **DAIKIN MANUFACTURING COMPANY, L.P.**

19001 Kermier Rd., Waller, TX 77484

www.daikincomfort.com

IOD-1050A
05/2021



INDEX

REPLACEMENT PARTS	2
SAFETY INSTRUCTIONS	2
GENERAL INFORMATION	4
CLEARANCES	6
ROOF CURB POST-INSTALLATION CHECKS	7
ROOF TOP DUCT CONNECTIONS	7
RIGGING DETAILS	7
WEIGHTS AND CENTER OF GRAVITY	8
ELECTRICAL WIRING	8
GAS SUPPLY PIPING	10
CIRCULATING AIR AND FILTERS	12
CONDENSATE DRAIN CONNECTION	12
STARTUP, ADJUSTMENTS, AND CHECKS	13
AIR FLOW ADJUSTMENTS	14
BELT DRIVE MODELS ONLY	14
MOTOR SHEAVE ADJUSTMENTS	15
GAS SYSTEM CHECK	15
NORMAL SEQUENCE OF OPERATION	17
MAINTENANCE	19
TROUBLESHOOTING	20
APPENDIX A BLOWER PERFORMANCES	23
APPENDIX B ELECTRICAL DATA	27
APPENDIX C UNIT DIMENSIONS	28
APPENDIX D MIN-MAX AIRFLOW	29
WIRING DIAGRAMS	30
START-UP CHECKLIST	31

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. Location of your local distributor can be found at www.daikinac.com or contact:

EQUIPMENT SUPPORT
Daikin North America LLC
19001 Kermier Road
Waller, Texas 77484
855-770-5678

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.



WARNING

IF THE INFORMATION IN THESE INSTRUCTIONS IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

- DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

- WHAT TO DO IF YOU SMELL GAS:

- DO NOT TRY TO LIGHT ANY APPLIANCE.

- DO NOT TOUCH ANY ELECTRICAL SWITCH; DO NOT USE ANY PHONE IN YOUR BUILDING.

- IMMEDIATELY CALL YOUR GAS SUPPLIER FROM A NEIGHBOR'S PHONE. FOLLOW THE GAS SUPPLIER'S INSTRUCTIONS. IF YOU CANNOT REACH YOUR GAS SUPPLIER, CALL THE FIRE DEPARTMENT.

- INSTALLATION AND SERVICE MUST BE PERFORMED BY A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.



WARNING

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.



WARNING

SHOULD OVERHEATING OCCUR OR THE GAS SUPPLY FAIL TO SHUT OFF, TURN OFF THE MANUAL GAS SHUTOFF VALVE EXTERNAL TO THE FURNACE BEFORE TURNING OFF THE ELECTRICAL SUPPLY.



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 THE MANUFACTURER 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.



DANGER PELIGRO



CARBON MONOXIDE POISONING HAZARD

Special Warning for Installation of Furnace or Air Handling Units in Enclosed Areas such as Garages, Utility Rooms or Parking Areas

Carbon monoxide producing devices (such as an automobile, space heater, gas water heater, etc.) should not be operated in enclosed areas such as unventilated garages, utility rooms or parking areas because of the danger of carbon monoxide (CO) poisoning resulting from the exhaust emissions. If a furnace or air handler is installed in an enclosed area such as a garage, utility room or parking area and a carbon monoxide producing device is operated therein, there must be adequate, direct outside ventilation.

This ventilation is necessary to avoid the danger of CO poisoning which can occur if a carbon monoxide producing device continues to operate in the enclosed area. Carbon monoxide emissions can be (re)circulated throughout the structure if the furnace or air handler is operating in any mode.

CO can cause serious illness including permanent brain damage or death.

B10259-216

RIESGO DE INTOXICACIÓN POR MONÓXIDO DE CARBONO

Advertencia especial para la instalación de calentadores ó mñajadoras de aire en áreas cerradas como estacionamientos ó cuartos de servicio.

Los equipos ó aparatos que producen monóxido de carbono (tal como automóvil, calentador de gas, calentador de agua por medio de gas, etc) no deben ser operados en áreas cerradas debido al riesgo de envenenamiento por monóxido de carbono (CO) que resulta de las emisiones de gases de combustión. Si el equipo ó aparato se opera en dichas áreas, debe existir una adecuada ventilación directa al exterior.

Esta ventilación es necesaria para evitar el peligro de envenenamiento por CO, que puede ocurrir si un dispositivo que produce monóxido de carbono sigue operando en el lugar cerrado.

Las emisiones de monóxido de carbono pueden circular a través del aparato cuando se opera en cualquier modo.

El monóxido de carbono puede causar enfermedades severas como daño cerebral permanente ó muerte.

B10259-216

RISQUE D'EMPOISONNEMENT AU MONOXYDE DE CARBONE

Avertissement special au sujet de l'installation d'appareils de chauffage ou de traitement d'air dans des endroits clos, tels les garages, les locaux d'entretien et les stationnements.

Evitez de mettre en marche les appareils produisant du monoxyde de carbone (tels que les automobile, les appareils de chauffage autonome, etc.) dans des endroits non ventilés tels que les d'empoisonnement au monoxyde de carbone. Si vous devez faire fonctionner ces appareils dans un endroit clos, assurez-vous qu'il y ait une ventilation directe provenant de l'exterieur.

Cette ventilation est nécessaire pour éviter le danger d'intoxication au CO pouvant survenir si un appareil produisant du monoxyde de carbone continue de fonctionner au sein de la zone confinée.

Les émissions de monoxyde de carbone peuvent être recirculées dans les endroits clos, si l'appareil de chauffage ou de traitement d'air sont en marche.

Le monoxyde de carbone peut causer des maladies graves telles que des dommages permanents au cerveau et même la mort.

B10259-216

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 light commercial models. Specification sheets can be found at www.daikinac.com for Daikin brand products. Within the website, please select the commercial 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, or in their absence, with the latest edition of the National Fuel Gas Code NFPA54/ANSI Z223.1 and National Standard of Canada CAN/CSA B149 Installation Codes.

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
25 West 43rd Street, 4th Floor
New York, NY 10036

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 input 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.



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 its provisions. The user should retain these instructions for future reference.

- For proper flame pattern within the heat exchanger and proper condensate drainage, the unit must be mounted level.
- The flue outlet must be at least 12 inches from any opening through which flue gases could enter a building, and at least three feet above any forced air inlet located within ten feet. The economizer/manual fresh air intake/motorized fresh air intake and combustion air inlet mounted on the unit are not affected by this restriction.
- To avoid possible corrosion of the heat exchanger, do not locate the unit in an area where the outdoor air (i.e. combustion air for the unit) will be frequently contaminated by compounds containing chlorine or fluorine. Common sources of such compounds include swimming pool chemicals and chlorine bleaches, paint stripper, adhesives, paints, varnishes, sealers, waxes (which are not yet dried) and solvents used during construction and remodeling. Various commercial and industrial processes may also be sources of chlorine/fluorine compounds.
- The unit shall not be connected to a chimney flue serving a separate appliance designed to burn solid fuel.
- 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.
- The combustion air inlet and flue outlet on the unit must never be obstructed. If used, do not allow the economizer/manual fresh air damper/ motorized fresh air damper to become blocked by snow or debris. In some climates or locations, it may be necessary to elevate the unit to avoid these problems.
- 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.
- As indicated on the unit data plate, a minimum clearance of 36" to any combustible material is required on the furnace access side of the unit. All combustible materials must be kept out of this area.
- This 36" clearance must also be maintained to insure proper combustion air and flue gas flow. The combustion air intake and furnace flue discharge must not be blocked for any reason, including blockage by snow.
- Adequate clearances from the furnace flue discharge to any adjacent public walkways, adjacent buildings, building openings or openable windows must be maintained in accordance with the latest edition of the National Fuel Gas Code ANSI Z223.1/NFPA 54.
- Minimum horizontal clearance of 48" from the furnace flue discharge to any electric meters, gas meters, regulators and relief equipment is required.

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.

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

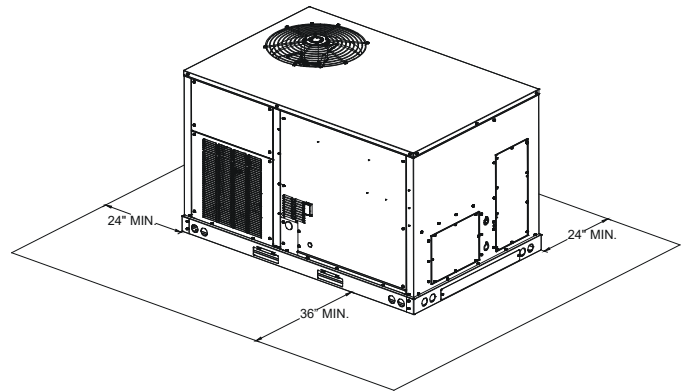


CAUTION

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.

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

CLEARANCES



UNIT CLEARANCES

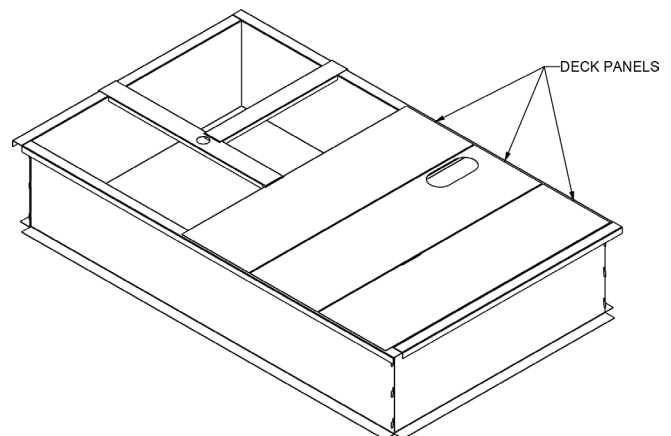
**In situations that have multiple units, a 36" minimum clearance is required between the condenser coils.*

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.

NOTE: IF THE 36" MINIMUM CLEARANCE IS USED ON THE CONTROL PANEL SIDE OF A DBG UNIT, A FLUE EXTENSION KIT NEEDS BE TO INSTALLED TO PREVENT FLUE GAS RECIRCULATION. SEE TABLE BELOW FOR THE KIT SELECTION.

Model size	Kit part number
3,4, and 5 ton	HEFLUE036

FLUE EXTENSION KITS



ROOF CURB INSTALLATION

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.



CAUTION

IF PROTRUSIONS EXIST, DO NOT ATTEMPT TO SET UNIT ON CURB.

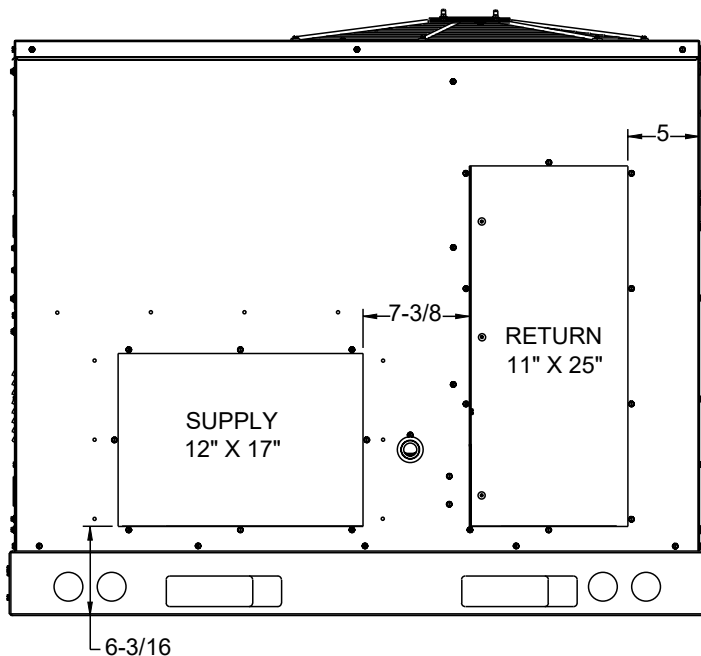
ROOF TOP DUCT CONNECTIONS

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.



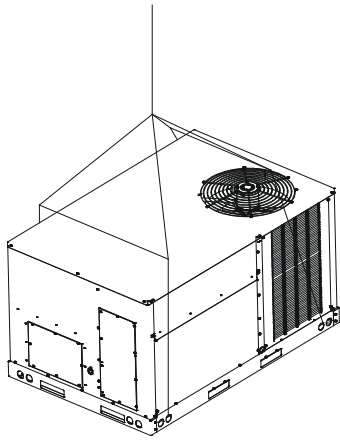
WARNING

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.

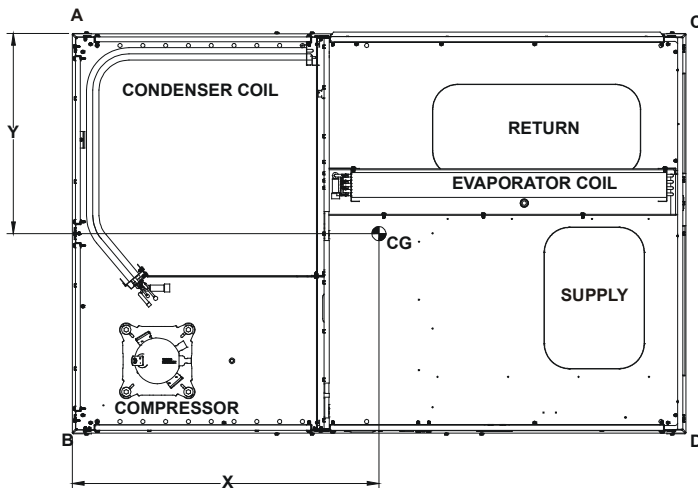
IMPORTANT: IF USING BOTTOM DISCHARGE WITH ROOF CURB, DUCTWORK SHOULD BE ATTACHED TO THE CURB PRIOR TO INSTALLING THE UNIT. DUCTWORK DIMENSIONS ARE SHOWN IN ROOF CURB INSTALLATION INSTRUCTIONS.

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:

WEIGHTS AND CENTER OF GRAVITY



CORNER AND CENTER OF GRAVITY LOCATIONS

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

WEIGHTS FOR DBG BELT DRIVE MODELS								
MODEL	SHIPPING WEIGHT (LBS)	OPERATING WEIGHT (LBS)	CORNER WEIGHTS (LBS)				LENGTH X (IN)	WIDTH Y (IN)
			A	B	C	D		
DBG0363B	654	608	145	162	97	204	36.5	29.3
DBG0483B	690	644	128	208	126	182	35.3	29.2
DBG0603B	716	670	110	241	147	172	35.1	29.8

THE NUMBERS MAY SLIGHTLY VARY DEPENDING ON INSTALLED OPTIONS.



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

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

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.**

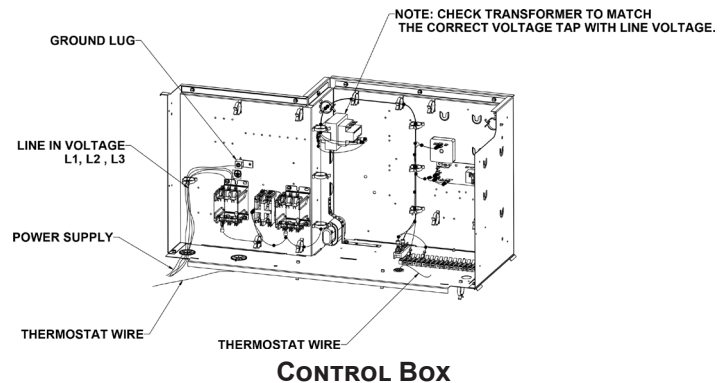
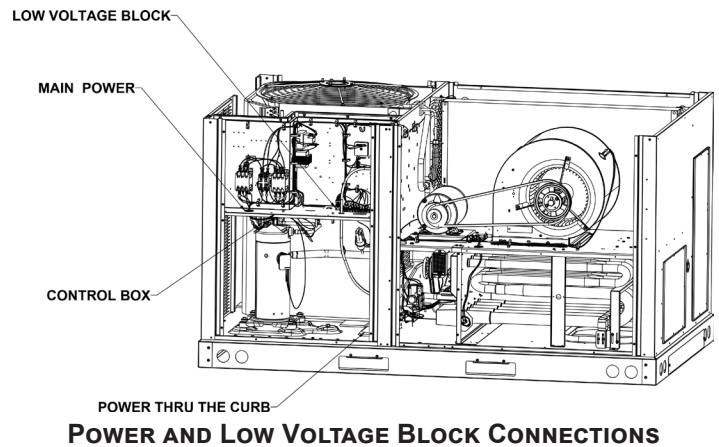
All line voltage connections must be made through weatherproof fittings. All exterior power supply and ground wiring must be in approved weatherproof conduit.

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.

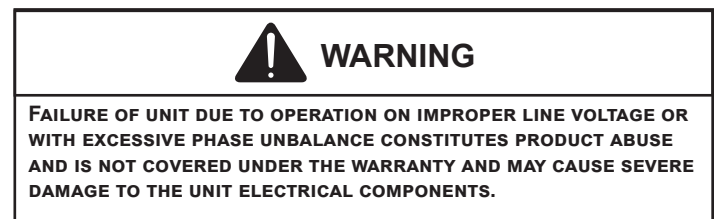
The unit is factory wired for the voltage shown on the unit's data plate.

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.



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



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.

AREAS WITHOUT CONVENIENCE OUTLET

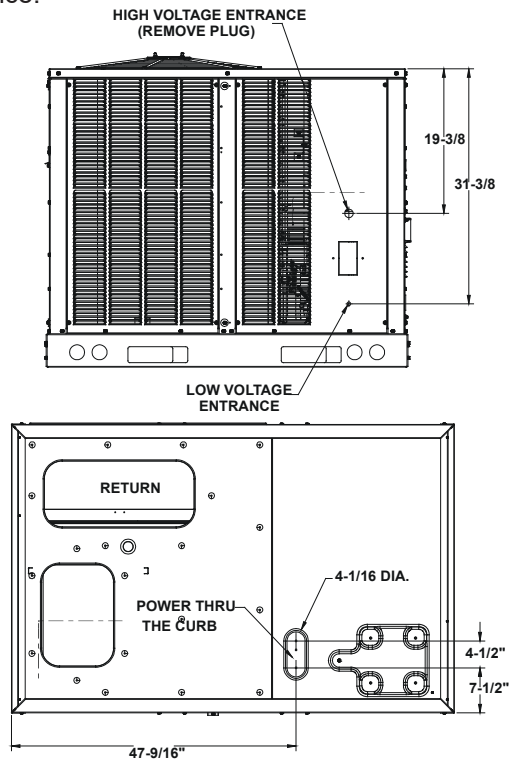
It is recommended that an independent 115V power source be brought to the vicinity of the roof top unit for portable lights and tools used by the service mechanic.

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 unless the DDC controls option has been installed.
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.

GAS SUPPLY PIPING



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.

IMPORTANT NOTE: THIS UNIT IS FACTORY SET TO OPERATE ON NATURAL GAS AT THE ALTITUDES SHOWN ON THE RATING PLATE.

INLET GAS PRESSURE	
NATURAL	Min. 5.0" W.C., Max. 10.0" W.C.

INLET GAS PRESSURE MUST NOT EXCEED MAXIMUM VALUE SHOWN IN TABLE ABOVE.

The minimum supply pressure should not vary from that shown in the table above because this could prevent the unit from having dependable ignition. In addition, gas input to the burners must not exceed the rated input shown on the rating plate. Overfiring of the unit could result in premature heat exchanger failure.

PIPING

IMPORTANT NOTE: TO AVOID POSSIBLE UNSATISFACTORY OPERATION OR EQUIPMENT DAMAGE DUE TO UNDER FIRING OF EQUIPMENT, DO NOT UNDERSIZE THE NATURAL GAS PIPING FROM THE METER TO THE UNIT. WHEN SIZING A TRUNK LINE, INCLUDE ALL APPLIANCES ON THAT LINE THAT COULD BE OPERATED SIMULTANEOUSLY.

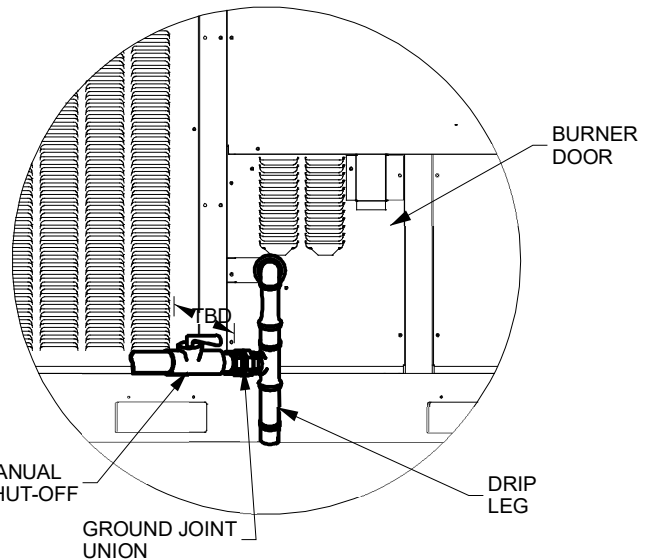
The gas line installation must comply with local codes, or in the absence of local codes, with the latest edition of the National Fuel Gas Code NFPA 54 / ANSI Z223.1.

NATURAL GAS CONNECTION

Natural Gas Capacity of Pipe in Cubic Feet of Gas Per Hour (CFH)					
Length of Pipe in Feet	Nominal Black Pipe Size (inches)				
	1/2	3/4	1	1 1/4	1 1/2
10	132	278	520	1050	1600
20	92	190	350	730	1100
30	73	152	285	590	980
40	63	130	245	500	760
50	56	115	215	440	670
60	50	105	195	400	610
70	46	96	180	370	560
80	43	90	170	350	530
90	40	84	160	320	490
100	38	79	150	305	460

Pressure= .50 PSIG or less and Pressure Drop of 0.3" W.C.
(Based on 0.60 Specific Gravity Gas)

$$\text{CFH} = \frac{\text{BTUH Furnace Input}}{\text{Heating Value of Gas (BTU/Cubic Foot)}}$$



PROPER PIPING PRACTICE

Refer to the Proper Piping Practice drawing for the general layout at the unit. The following rules apply:

1. Use black iron pipe and fittings for the supply piping. The use of a flex connector and/or copper piping is permitted as long as it is in agreement with local codes.
2. Use pipe joint compound on male threads only. Pipe joint compound must be resistant to the action of the fuel used.
3. Use ground joint unions.
4. Install a drip leg to trap dirt and moisture before it can enter the gas valve. The drip leg must be a minimum of three inches long.
5. Use two pipe wrenches when making connection to the gas valve to keep it from turning.
6. Install a manual shut-off valve in a convenient location (within six feet of unit) between the meter and the unit.
7. Tighten all joints securely.
8. The unit must be connected to the building piping by one of the following methods:
 - Rigid metallic pipe and fittings
 - Semirigid metallic tubing and metallic fittings (Aluminum alloy tubing must not be used in exterior locations).
 - Listed gas appliance connectors used in accordance with the terms of their listing that are completely in the same room as the equipment. Always use a new listed connector.
 - In the prior two methods above the connector or tubing must be protected from physical and thermal damage. Aluminum alloy tubing and connectors must be coated to protect against external corrosion when in contact with masonry, plaster or insulation or are subject to repeated wettings by liquids (water - not rain water, detergents or sewage).

NOTE: THE UNIT GAS SUPPLY ENTRANCE IS FACTORY SEALED WITH PLUGS. KEEP PLUGS IN PLACE UNTIL GAS SUPPLY IS READY TO BE INSTALLED. ONCE READY, REPLACE THE PLUGS WITH THE SUPPLIED GROMMETS AND INSTALL GAS SUPPLY LINE.

GAS PIPING CHECKS



CAUTION

TO PREVENT PROPERTY DAMAGE OR PERSONAL INJURY DUE TO FIRE, THE FOLLOWING INSTRUCTIONS MUST BE PERFORMED REGARDING GAS CONNECTIONS AND PRESSURE TESTING:

- THE UNIT AND ITS GAS CONNECTIONS MUST BE LEAK TESTED BEFORE PLACING IN OPERATION. BECAUSE OF THE DANGER OF EXPLOSION OR FIRE, NEVER USE A MATCH OR OPEN FLAME TO TEST FOR LEAKS. NEVER EXCEED SPECIFIED PRESSURES FOR TESTING. HIGHER PRESSURE MAY DAMAGE GAS VALVE AND CAUSE OVERFIRING WHICH MAY RESULT IN PREMATURE HEAT EXCHANGE FAILURE.
- THIS UNIT AND ITS SHUT-OFF VALVE MUST BE DISCONNECTED FROM THE GAS SUPPLY DURING ANY PRESSURE TESTING OF THAT SYSTEM AT TEST PRESSURES IN EXCESS OF ½ PSIG (3.48 kPa).
- THIS UNIT MUST BE ISOLATED FROM THE GAS SUPPLY SYSTEM BY CLOSING ITS MANUAL SHUT-OFF VALVE DURING ANY PRESSURE TESTING OF THE GAS SUPPLY PIPING SYSTEM AT TEST PRESSURES EQUAL TO OR LESS THAN ½ PSIG (3.48 kPa).



WARNING

TO AVOID PROPERTY DAMAGE OR PERSONAL INJURY, BE SURE THERE IS NO OPEN FLAME IN THE VICINITY DURING AIR BLEEDING.

There will be air in the gas supply line after testing for leaks on a new installation. Therefore, the air must be bled from the line by loosening the ground joint union until pure gas is expelled. Tighten union and wait for five minutes until all gas has been dissipated in the air. Be certain there is no open flame in the vicinity during air bleeding procedure. The unit is placed in operation by closing the main electrical disconnect switch for the unit.

ROOF TOP LOCATION AND INSTALLATION

The gas supply piping location and installation for roof top units must be in accordance with local codes or, in the absence of local codes, with ordinances of the latest edition of the National Fuel Gas Code ANSI Z223.1/NFPA 54.

A manual gas shut off valve must be field installed external to the roof top unit. In addition, a drip leg must be installed near the inlet connection. A ground joint union connection is required between the external shut off valve and the unit connection to the gas valve to permit removal of the burner assembly for servicing.

1. Route gas piping to unit so that it does not interfere with the removal of access panels. Support and align piping to prevent strains or misalignment of the manifold assembly.
2. All units are furnished with standard female 1/2" NPT pipe connections. The size of the gas supply piping to the unit must be based on length of run, number of units on the system, gas characteristics, BTU requirement and available supply pressure. All piping must be done in accordance with local codes or, in the absence of local codes, with the latest edition of the National Fuel Gas Code ANSI Z223.1/NFPA 54.

NOTE: THE GAS CONNECTION SIZE AT THE UNIT DOES NOT ESTABLISH THE SIZE OF THE SUPPLY LINE.

3. With all units on a common line operating under full fire, natural gas main supply pressure should be adjusted to approximately 7.0" w.c., measured at the unit gas valve. If the gas pressure at the unit is greater than 10.0" w.c., the contractor must furnish and install an external type positive shut off service pressure regulator. The unit will not function satisfactorily if supply gas pressure is less than 5.0" w.c. or greater than 10.0" w.c.

NOTE: A MINIMUM HORIZONTAL DISTANCE OF 48" BETWEEN THE REGULATOR AND THE FURNACE FLUE DISCHARGE IS REQUIRED.

4. All pipe connections should be sealed with a pipe thread compound, which is resistant to the fuel used with the furnace. A soapy water solution should be used to check all joints for leaks. A tap is located on the entering side of the gas valve for test gauge connection to measure supply (main) gas pressure. Another tap is provided on the manifold side of the gas valve for checking manifold pressure.

5. There must be no obstruction to prevent the flow of combustion and ventilating air. A vent stack is not required and must never be used. The power venter will supply an adequate amount of combustion air as long as the air passageways are kept free of any obstructions and the recommended external unit clearances are maintained.

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.

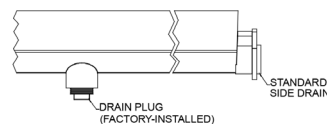
Ductwork dimensions are shown in the roof curb installation manual.

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

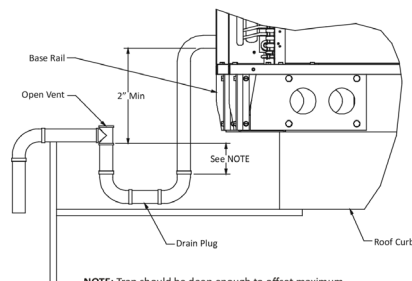
CONDENSATE DRAIN CONNECTION

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.



Drain Pan (Side View)



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.



WARNING

THIS UNIT AND ITS INDIVIDUAL SHUTOFF VALVE MUST BE DISCONNECTED FROM THE GAS SUPPLY SYSTEM DURING ANY PRESSURE TESTING OF THAT SYSTEM AT TEST PRESSURES IN EXCESS OF 1/2 PSIG (13.8" w.c.).



CAUTION

THIS UNIT MUST BE ISOLATED FROM THE GAS SUPPLY PIPING SYSTEM BY CLOSING ITS INDIVIDUAL MANUAL SHUTOFF VALVE DURING ANY PRESSURE TESTING EQUAL TO OR LESS THAN 1/2 PSIG.

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.	
	

PRE-STARTUP INSTRUCTIONS - GENERAL

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

Prior to the beginning of Startup, Adjustments, and Checks procedures, the following steps should be completed in the building.

	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.	

This unit is equipped with an electronic ignition device to automatically light the main burners. It also has a power vent blower to exhaust combustion products.

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 ambient 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.
- Requirements are met for venting and combustion air.
- Air filters are in place.
- Input rate and temperature rise are adjusted per rating plate.

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.

FILTER SECTION CHECK

Remove filter section access panels and check that filters are properly installed. Note airflow arrows on filter frames.

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.

THREE PHASE MODELS ONLY

$$3) \text{ PERCENT VOLTAGE UNBALANCE} = 100 \times \frac{2) \text{ MAXIMUM VOLTAGE DEVIATIONS FROM AVERAGE VOLTAGE}}{1) \text{ AVERAGE VOLTAGE}}$$

HOW TO USE THE FORMULA:

EXAMPLE: Line to Neutral Voltage of 220, 216, and 213

1) Average Voltage = $220 + 216 + 213 = 649 / 3 = 216$

2) Maximum Voltage Deviations from Average Voltage = $220 - 216 = 4$

3) Percent Voltage Unbalance = $100 \times \frac{4}{216} = \frac{400}{216} = 1.8\%$

Percent voltage unbalance MUST NOT exceed 2%.

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. The total airflow must not be less than that required for operation of the furnace.

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

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

BELT DRIVE MODELS ONLY

The drive on the supply fan is typically set in the middle of the RPM range. The drive motor sheave pitch diameter is field adjustable for the required airflow. Refer to "Motor Sheave Adjustments" section.

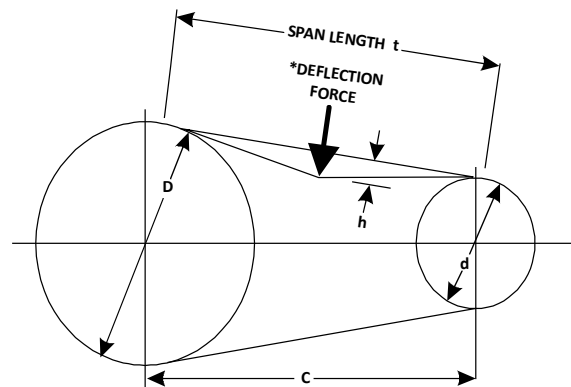
Upon completion of the air flow balancing, we recommend replacing the variable pitched motor sheave with a properly-sized fixed sheave. A matching fixed sheave will provide longer belt and bearing life and vibration free operation. Initially, it is best to have a variable pitched motor sheave for the purpose of airflow balancing, but once the balance has been achieved, fixed sheaves maintain alignment and minimize vibration more effectively. For direct drive units, move fan speed wire.

BEARING CHECK

Prior to energizing any fans, check and make sure that all setscrews are tight so that bearings are properly secured to shafts.

TENSION AND ALIGNMENT ADJUSTMENT

Correct belt tension is very important to the life of your belt. Too loose a belt will shorten its life; too tight, premature motor and bearing failure will occur. Check you belt drive for adequate "run-in" belt tension by measuring the force required to deflect the belt at the midpoint of the span length. Belt tension force can be measured using a belt tension gauge, available through most belt drive manufacturers.



*Apply force to the center of the span.

BELT TENSION ADJUSTMENT

t = Span length, inches

C = Center distance, inches

D = Larger sheave diameter, inches

d = Smaller sheave diameter, inches

h = Deflection height, inches

TYPE		SMALL SHEAVE DIAMETER (in)	DEFLECTION FORCE (lbs)		DEFLECTION (in)
BELT	DRIVE		USED	NEW	
AX	Standard	3.0 to 4.0	4.2 ± 0.5	5.5 ± 0.5	0.313

RECOMMENDED POUNDS OF FORCE PER BELT

New V-belts will drop rapidly during the first few hours of use. Check tension frequently during the first 24 hours of operation. Tension should fall between the minimum and maximum force. To determine the deflection distance from a normal position, measure the distance from sheave to sheave using a straightedge or a cord. This is your reference line. On multiple belt drives, an adjacent undeflected belt can be used as a reference.

MOTOR SHEAVE ADJUSTMENTS

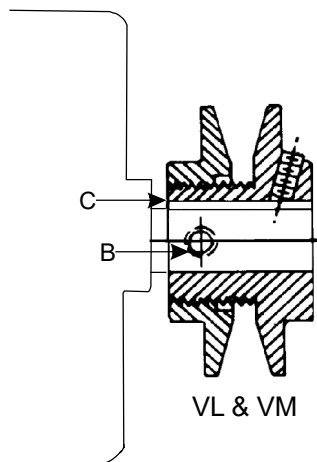
VL, VM, & 2VP VARIABLE PITCH KEY TYPE MOTOR SHEAVES

The driving and driven motor sheaves should be in alignment with each other and the shafts parallel.

VL & VM SHEAVES ADJUSTMENT

1. Loosen set screw "B" using a 5/32" Allen key.
2. Making half or full turns from closed position, adjust sheave pitch diameter for desired speed. DO NOT OPEN MORE THAN FIVE FULL TURNS.
3. Tighten set screw "B" securely over flat.
4. Carefully put on belts and adjust belt tension. DO NOT FORCE BELTS OVER GROOVES.
5. Ensure all keys are in place and the set screws tight before starting drive. Recheck set screws and belt tension after 24 hours service.

NOTE: FUTURE ADJUSTMENTS SHOULD BE MADE BY LOOSENING THE BELT TENSION AND INCREASING OR DECREASING THE PITCH DIAMETER OF THE SHEAVE BY HALF OR FULL TURNS AS REQUIRED. READJUST BELT TENSION BEFORE STARTING DRIVE.



NOTE: Do NOT OPERATE SHEAVE WITH FLANGE PROJECTING BEYOND THE HUB END.

ELECTRICAL INPUT CHECK

Make preliminary check of evaporator fan ampere draw and verify that motor nameplate amps are not exceeded. A final check of amp draw should be made upon completion of air balancing of the duct system (see Appendix B).

GAS SYSTEM CHECK

PRE-OPERATION CHECKS

1. Close the manual gas valve external to the unit.
2. Turn off the electrical power supply to the unit.
3. Change heating setpoint to its lowest possible setting.
4. Remove the heat exchanger door on the side of the unit by removing screws.
5. This unit is equipped with an ignition device which automatically lights the main burner. DO NOT try to light burner by any other method.
6. Move the gas control valve switch to the OFF position.
7. Wait five minutes to clear out any gas.
8. Smell for gas, including near the ground. This is important because some types of gas are heavier than air. If you have waited five minutes and you do smell gas, immediately follow the warning WHAT TO DO IF YOU SMELL GAS on page 2 of this manual. If having waited for five minutes and no gas smell is noted, move the gas control valve switch to the ON position.
9. Replace the heat exchanger door on the side of the unit.
10. Open the manual gas valve external to the unit.
11. Turn on the electrical power supply to the unit.
12. Change heating setpoint to desired setting.

GAS SUPPLY PRESSURES & REGULATOR ADJUSTMENTS



WARNING

SHOULD OVERHEATING OCCUR OR THE GAS SUPPLY FAIL TO SHUT OFF, TURN OFF THE MANUAL GAS SHUTOFF VALVE EXTERNAL TO THE UNIT BEFORE TURNING OFF THE ELECTRICAL SUPPLY.



WARNING

TO AVOID PROPERTY DAMAGE, PERSONAL INJURY OR DEATH, DO NOT FIRE GAS UNIT WITH FLUE BOX COVER REMOVED.

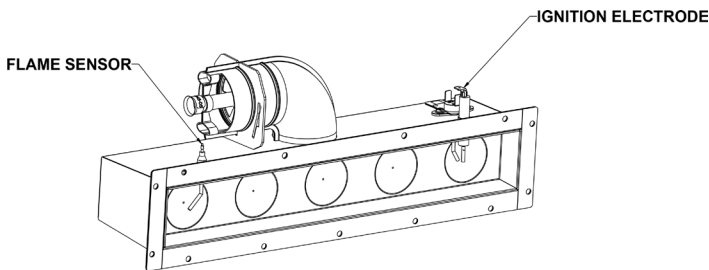
NOTE: EXCEPT DURING BRIEF PERIODS WHEN GAS PRESSURES ARE BEING MEASURED BY QUALIFIED SERVICE PERSONNEL, THE FURNACE ACCESS PANEL MUST ALWAYS BE SECURED IN PLACE WHEN THE FURNACE IS IN OPERATION.

The first step in checking out the gas-fired furnace is to test the gas supply piping to the unit for tightness and purge the system of air using methods outlined in the latest edition of the National Fuel Gas Code ANSI Z223.1 / NFPA 54. Verify that the disconnect switch is in the "OFF" position. A soapy water solution should be used to check for gas leaks.

Since the unit is subject to considerable jarring during shipment, it is extremely important that all gas connections and joints be tested for tightness. Gas piping downstream from the unit inlet should be checked for leaks during the subsequent sequence check.

The supply gas pressure should be adjusted to 7.0" w.c. on natural gas with the gas burners operating. If there is more than one unit on a common gas line, the pressures should be checked with all units under full fire. A supply pressure tap is provided on the upstream side of the gas valve. A manifold pressure tap is provided on the manifold side of the gas valve. The normal manifold pressure for High fire is 3.0" w.c. on natural gas. Minimum gas supply pressure is 5.0" w.c. for natural gas.

Do not attempt adjustment of the built-in pressure regulator unless the supply pressure is at least 5.0" w.c. on natural gas.



FLAME SENSOR AND IGNITION ELECTRODE LOCATION

GAS SUPPLY AND MANIFOLD CHECK

Gas supply pressure and manifold pressure with the burners operating must be as specified on the rating plate.

GAS INLET PRESSURE CHECK

Gas inlet pressure must be checked and adjusted in accordance to the type of fuel being consumed.

WITH POWER AND GAS OFF:

1. Connect a manometer to the inlet pressure tap of the gas valve.

Inlet gas pressure can also be measured by removing the cap from the dripleg and installing a predrilled cap with a hose fitting.

WITH POWER AND GAS ON:

2. Put unit into heating cycle and turn on all other gas consuming appliances.

INLET GAS PRESSURE	
NATURAL	Min. 5.0" W.C., Max. 10.0" W.C.

NOTE: INLET GAS PRESSURE MUST BE WITHIN LIMITS SHOWN ABOVE.

If operating pressures differ from above, make necessary pressure regulator adjustments, check piping size, etc., and/or consult with local utility.

MANIFOLD PRESSURE CHECK AND ADJUSTMENT

The gas valve has a pressure tap to facilitate measurement of the manifold pressure. The manifold pressure must be measured with the burners operating.

1. With disconnect switch open, remove field connected thermostat wire from terminal R, W1 on TB1. Place jumper wire between R, W1 to engage high stage heat.
2. See Figure in gas input check section for gas valve adjustment.

To adjust the pressure regulator, remove the adjustment screw cover on the gas valve. Turn the adjustment screw out (counterclockwise) to decrease pressure, turn in (clockwise) to increase pressure. Only small variations in gas flow should be made by means of the pressure regulator adjustment. Any major changes in flow should be made by changing the size of the burner orifices. The measured input rate to the furnace must not exceed the rating specified on the unit rating plate.

For natural gas, the high stage manifold pressure must be between 2.7" and 3.3" inches water column (3.0 nominal).

GAS INPUT (NATURAL GAS ONLY) CHECK

It is the responsibility of the contractor to adjust the gas input to the unit.

To measure the gas input use a gas meter and proceed as follows:

1. Turn off gas supply to all other appliances except the unit.
2. With the unit operating, time the smallest dial on the meter for one complete revolution. If this is a 2 cubic foot dial, divide the seconds by 2; if it is a 1 cubic foot dial, use the seconds as is. This gives the seconds per cubic foot of gas being delivered to the unit.
3. $INPUT = GAS\ HTG\ VALUE \times 3600 / SEC.\ PER\ CUBIC\ FOOT$

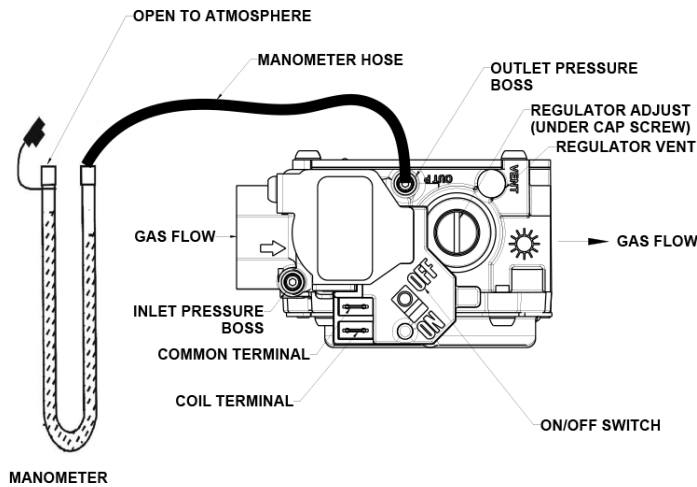
Example: Natural gas with a heating value of 1000 BTU per cubic foot and 34 seconds per cubic foot as determined by Step 2, then:

$$Input = 1000 \times 3600 / 34 = 106,000 \text{ BTU per Hour.}$$

NOTE: BTU CONTENT OF THE GAS SHOULD BE OBTAINED FROM THE GAS SUPPLIER. THIS MEASURED INPUT MUST NOT BE GREATER THAN SHOWN ON THE UNIT RATING PLATE.

Adjust input rate by varying the adjustment of the gas pressure regulator on the gas valve. All adjustments must be made with furnace operating at high fire and at normal operating temperature. A manometer should be connected to the gas valve to verify pressure is within the specified range (see following figures for manometer connections). Clockwise rotation of the pressure regulator screw increases pressure and gas flow rate. Turn screw counterclockwise to decrease pressure and gas flow rate. After adjustment the furnace temperature rise must be within the range specified on the unit data plate.

NOTE: THERMAL EFFICIENCY OF THE FURNACE IS A PRODUCT EFFICIENCY RATING DETERMINED UNDER CONTINUOUS OPERATING CONDITIONS INDEPENDENT OF ANY INSTALLED SYSTEM.



WHITE-RODGERS GAS CONTROL VALVE CONNECTED TO MANOMETER PRESSURE ADJUSTMENTS

To connect manometer to gas valve:

1. Back outlet pressure tap screw (inside inlet pressure boss) out one turn (counterclockwise, not more than one turn).
2. Attach a hose and manometer to the outlet pressure boss of the valve.

To remove manometer from gas valve:

1. Remove manometer hose from outlet pressure boss.
2. Turn outlet pressure tap screw in to seal pressure port (clockwise, 7 in-lb. minimum).
3. Turn on electrical power and gas supply to the system.
4. Turn on system power and energize valve.
5. Using a leak detection solution or soap suds, check for leaks at pressure boss screw. Bubbles forming indicate a leak. SHUT OFF GAS AND FIX ALL LEAKS IMMEDIATELY.



CAUTION

TO PREVENT UNRELIABLE OPERATION OR EQUIPMENT DAMAGE, THE GAS MANIFOLD PRESSURE MUST BE AS SPECIFIED ON THE UNIT RATING PLATE. ONLY MINOR ADJUSTMENTS SHOULD BE MADE BY ADJUSTING THE GAS VALVE PRESSURE REGULATOR.

6. Relight all other appliances turned off in step 1 of gas input check. Be sure all pilot burners are operating.

TEMPERATURE RISE CHECK

Check the temperature rise through the unit by placing thermometers in supply and return air registers as close to the unit as possible. Thermometers must not be able to sample temperature directly from the unit heat exchangers, or false readings could be obtained.

1. All registers must be open; all duct dampers must be in their final (fully or partially open) position and the unit operated for 15 minutes before taking readings
2. The temperature rise must be within the range specified on the rating plate.

NOTE: AIR TEMPERATURE RISE IS THE TEMPERATURE DIFFERENCE BETWEEN SUPPLY AND RETURN AIR.

With a properly designed system, the proper amount of temperature rise will normally be obtained when the unit is operated at rated input with the recommended blower speed.

If the correct amount of temperature rise is not obtained, it may be necessary to change the blower speed. A higher blower speed will lower the temperature rise. A slower blower speed will increase the temperature rise.

NOTE: BLOWER SPEED MUST BE SET TO GIVE THE CORRECT AIR TEMPERATURE RISE THROUGH THE UNIT AS MARKED ON THE RATING PLATE.

NORMAL SEQUENCE OF OPERATION

HEATING

This unit has one (RS) Manual Reset Limit Control Switch. Check the limit to make sure it has not tripped. The limit may arrive at the job site tripped as a result of shipping shock.

If the vent motor comes on, but the unit does not attempt ignition, check if the ALS (Auxiliary High Limit Control Switch) requires resetting.

This unit is equipped with an ignition control that automatically lights the main burner. DO NOT attempt to light the main burners by any other method.

1. R and W thermostat contacts close, initiating a call for heat.
2. Integrated control module performs safety circuit checks.
3. Inducer draft blower is energized for 30 second pre-purge period causing pressure sensor contacts to close.
4. At the end of pre-purge period, integrated control module transitions the induced draft blower to light-off setting.
5. Once the light-off pressure setting is verified by the integrated control module, the spark igniter and gas valve are energized for 4 seconds.

NOTE: THE IGNITER PRODUCES A VERY INTENSE ELECTRICAL SPARK THAT IGNITES THE GAS.

6. Integrated control module monitors flame presence. Gas valve will remain open only if the flame is detected.
7. The 30-second HEAT FAN ON delay time begins after main burner lights.

8. The unit delivers heat to the conditioned space until the thermostat is satisfied; integrated control module monitors safety circuits continuously.
9. R and W thermostat contacts open, completing the call for heat; gas valve de-energizes.
10. Induced draft blower keeps operating for 30-second post purge.
11. Ignition control begins timing the HEAT FAN OFF delay. There is an adjustable HEAT FAN OFF delay of approximately 90/120/150/180 seconds (factory set at 150).

NOTE: THIS DELAY ALLOWS ANY ADDITIONAL HEAT IN THE HEAT EXCHANGER TO BE TRANSFERRED TO THE CONDITIONED SPACE. AFTER THE HEAT FAN OFF DELAY TIME HAS ELAPSED, THE BLOWER WILL DE-ENERGIZE.

UNIT SHUTDOWN

1. Set the room heating setpoint to lowest setting.
2. Turn off the electrical power supply to the unit.
3. Remove the heat exchanger door on the side of the unit by removing screws.
4. Move the gas control valve switch to the OFF position.
5. Close manual gas shut off valve external to the unit.
6. Replace the heat exchanger door on the unit.
7. If cooling and/or air circulation will be desired, turn ON gas control valve switch and the electrical power.

AUTOMATIC RESET HIGH LIMIT CONTROL (LS)

Located in the burner compartment on the heat exchanger, its sensing element projects through the blower section bulkhead and senses the temperature at the rear of the furnace. It will cycle the furnace off if the temperature exceeds 100°F plus maximum rise.

AUXILIARY HIGH LIMIT CONTROL (ALS)

Located in the blower compartment on the blower housing, it senses air temperature within the blower compartment and protects the filters from excessive temperature. It will shut down the furnace if it senses excessive temperatures.

Elevated temperatures at the control are normally caused by blower failure. The reason for the shut down should be determined and repaired prior to resetting.

BLOCKED INLET LIMIT CONTROL

Located in the burner compartment at the top of the burner assembly, it senses high temperature that could occur if the burner inlet is blocked.

The reason for elevated temperatures at the control should be determined and repaired prior to resetting this manual reset control.

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.

1. Turn thermostat system switch to "Cool," and fan switch to "Auto" and turn temperature setting as high as it will go.
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. 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. Turn the temperature setting to the highest position, stopping the unit. The indoor blower will continue to run for 60 seconds.
8. Turn the thermostat system switch to "OFF" and disconnect all power when servicing the unit.

REFRIGERATION SEQUENCE CHECK

1. 24VAC control voltage is provided by the control transformer to terminal XS. The control voltage is passed through any installed safety shutdown devices such as the smoke detector before providing 24VAC to terminals ES and R.
2. To simulate a mechanical call for cooling lower the room cooling setpoint to a value below the current room temperature. The cooling is energized when the room temperature is above the setpoint for cooling.
3. **UNIT WITH ECONOMIZER OPTION:** The compressor circuit is interlocked through of the economizer module. If the outdoor air enthalpy (temperature and humidity) is not suitable for cooling, the economizer will permit the compressor to be energized.



WARNING

TO AVOID PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO FIRE OR EXPLOSION, A QUALIFIED SERVICER MUST INVESTIGATE THE REASON FOR THE ROLLOUT PROTECTION DEVICE TO OPEN BEFORE MANUALLY RESETTING THE ROLLOUT PROTECTION DEVICE.

4. The blower motor is operated to provide cool supply air to the space.
5. Compressor contactor closes its contacts to provide power to the compressor motor. In addition, the condenser fan motor is energized through the compressor contactor.



WARNING

BURN HAZARD!
DO NOT TOUCH! DISCHARGE LINE MAY BE HOT!

6. Check that the compressor is operating correctly. The scroll compressors in these units **MUST** operate in the proper rotation. To ensure the compressor is 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, perform the following checks.

- If the compressor is operating backward, disconnect the unit power supply and lock it in the “OFF” position. Switch two leads of the power supply at the unit Single Point Power Block. Reconnect power and check for compressor and condenser fan motor operation.
7. With all safety devices closed, the system will continue cooling operation until the room temperature is satisfied.
 8. Increasing the room cooling setpoint to a value above the current room temperature will simulate a satisfied thermostat. The compressor and the supply fan will cycle off.
 9. After a time delay of approximately 3 minutes, the compressor control circuits will be ready to respond to a subsequent call for cooling.

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.

FINAL SYSTEM CHECKS

1. 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.
2. Check for air leaks in the ductwork. See Sections on Air Flow Adjustments.
3. 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.
4. Set the thermostat at the appropriate setting for cooling and heating or automatic changeover for normal use.

5. Be sure the Owner is instructed on the unit operation, filter, servicing, correct thermostat operation, etc.

MAINTENANCE



WARNING

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD
FAILURE TO FOLLOW SAFETY WARNINGS EXACTLY COULD RESULT IN DANGEROUS OPERATION, SERIOUS INJURY, DEATH OR PROPERTY DAMAGE.
IMPROPER SERVICING COULD RESULT IN DANGEROUS OPERATION, SERIOUS INJURY, DEATH OR PROPERTY DAMAGE.

- **BEFORE SERVICING, DISCONNECT ALL ELECTRICAL POWER TO FURNACE.**
- **WHEN SERVICING CONTROLS, LABEL ALL WIRES PRIOR TO DISCONNECTING. RECONNECT WIRES CORRECTLY.**
- **VERIFY PROPER OPERATION AFTER SERVICING.**



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.

Preventive maintenance is the best way to avoid unnecessary expense and inconvenience. Have this system inspected at regular intervals by qualified service personnel, at least twice a year. Routine maintenance should cover the following items:

1. Tighten all set screws, and wire connections.
2. Clean evaporator and condenser coils mechanically or with cold water, if necessary. Usually any fouling is only matted on the entering air face of the coil and can be removed by brushing.
3. Replace filters as needed (see below).
4. Check for blockage of condensate drain.
5. Check power and control voltages.
6. Check running amperage.
7. Check operating temperatures and pressures.
8. Check and adjust temperature and pressure controls.
9. Check and adjust damper linkages.

10. Check operation of all safety controls.
11. Examine gas furnaces (see below and the User's Information Manual).
12. Check condenser fans and tighten set screws.

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.

CONDENSER AND INDUCED DRAFT MOTORS

Bearings on the condenser fan motors and the combustion fan motor are permanently lubricated. No additional oiling is required.

FLAME SENSOR (QUALIFIED SERVICER ONLY)

A drop in the flame current can be caused by a nearly invisible coating on the flame sensor. This coating, created by the fuel or combustion air supply, can be removed by carefully cleaning the flame sensor with steel wool.

NOTE: AFTER CLEANING, THE MICROAMP SIGNAL SHOULD BE STABLE AND IN THE RANGE OF 4 - 6 MICROAMPS DC.

FLUE PASSAGES (QUALIFIED SERVICER ONLY)

At the start of each heating season, inspect and, if necessary, clean the unit flue passage.

LUBRICATION

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

INSPECTION & CLEANING

All flue product carrying areas of the furnace, its vent system, and main burners should be examined by a qualified service agency, and cleaned if necessary, before the start of each heating season. This examination is necessary for continued safe operation. Particular attention should be given to deterioration from corrosion or other sources. This examination is accomplished in the following manner:

1. Disconnect power to the unit and remove furnace section access panel.
2. Remove burner assembly:
 - a. Disconnect the wires from the gas valve after noting which wires are connected to each terminal.
 - b. Disconnect wires from the flame rod and ignition electrode.
 - c. Disconnect the gas piping at the union.
 - d. The entire burner assembly can now be removed from the unit.

NOTE: USE ALL SCREWS THAT WERE REMOVED; THEY ARE NECESSARY FOR SAFE AND PROPER OPERATION OF THE UNIT.

3. Inspect and periodically clean the vent outlet (bird screen) on the access panel.

NOTE: PERIODIC CHECK OF OPERATION AND A LOG OF CO₂ MEASUREMENTS ARE RECOMMENDED. THIS WILL AID IN DETERMINING WHETHER THE FURNACE IS OPERATING EFFICIENTLY OR IF THE FURNACE REQUIRES CLEANING.



WARNING

TO AVOID PERSONAL INJURY OR DEATH DUE TO ELECTRIC SHOCK, DO NOT REMOVE ANY INTERNAL COMPARTMENT COVERS OR ATTEMPT ANY ADJUSTMENT. CONTACT A QUALIFIED SERVICER AT ONCE IF AN ABNORMAL OPERATION SHOULD DEVELOP.

NOTE: THIS WILL INVOLVE REMOVING AND REINSTALLING THE HEAT EXCHANGER DOOR ON THE UNIT, WHICH IS HELD BY TWO SCREWS. IF YOU ARE UNCERTAIN ABOUT YOUR ABILITY TO DO THIS, CONTACT A QUALIFIED SERVICER.

FUNCTIONAL PARTS

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

TROUBLESHOOTING

IGNITION CONTROL ERROR CODES

The following presents probable causes of questionable unit operation. Refer to *Diagnostic Indicator Chart* for an interpretation of the signal and to this section for an explanation.

Remove the control box access panel and note the number of diagnostic LED flashes.

FAULT RECALL

The ignition control is equipped with a momentary push-button switch that can be used to display on the diagnostic LED the last five faults detected by the control. Any time the control is powered, the fault code history can be retrieved for display by depressing and releasing the button once (less than 5 seconds); the LED will flash the Fault Code History (up to 5 fault codes from newest to oldest).

The Fault Code History is retained between power cycles until cleared. A fault code is added to the history log as it is encountered if it differs from the most recent history log item. If the history log is already full, then the oldest entry is dropped from the log and the remaining entries are moved down in the Fault Code History so that the new fault can be added to the Fault Code History as the most recent fault.

NOTE: DO NOT HOLD FOR LONGER THAN 5 SECONDS. HOLDING THE BUTTON FOR 5 SECONDS OR HIGHER WILL ERASE THE MEMORY!

ABNORMAL OPERATION - HEATING CODES

RESETTING FROM LOCKOUT

An external lockout occurs if the integrated ignition control determines that a measurable combustion cannot be established within three (3) consecutive ignition attempts. If flame is not established within the four (4) second trial for ignition, the gas valve is de-energized, 30 second inter-purge cycle is completed, and ignition is re-attempted. The control will repeat this routine three times if a measurable combustion is not established. The control will then shut off the induced draft blower and go into a lockout state.

If flame is established but lost, the control will energize the circulator blower at the heat speed and then begin a new ignition sequence. If flame is established then lost on subsequent attempts, the control will recycle the ignition sequence.

The diagnostic fault code is 1 flash for a lockout due to failed ignition attempts. The integrated control will automatically reset after one hour, or it can be reset by removing the thermostat signal or disconnecting the electrical power supply for over five seconds.

IMPORTANT NOTE: IF YOU HAVE TO FREQUENTLY RESET YOUR GAS/ELECTRIC PACKAGE UNIT, IT MEANS THAT A PROBLEM EXISTS THAT SHOULD BE CORRECTED. CONTACT A QUALIFIED SERVICER FOR FURTHER INFORMATION.

PRESSURE SENSOR

The pressure sensor is mounted in the control box and connected to the induced draft blower. Its function is to regulate the induced draft blower's speed in order to maintain proper air-fuel ratio for clean and reliable combustion. The electrical output signal from the sensor

is expected to be proportional to the magnitude of the differential pressure between the inducer inlet negative pressure and the ambient air pressure. The pressure sensor also guards against insufficient airflow (combustion air and flue products) through the heat exchanger.

At the beginning of a call for heat, the control ensures the inducer is in an off state, then checks the pressure sensor output for the proper null offset value. If the pressure sensor output is outside the acceptable range for the null value, the control enters a five minute lockout. After the lockout timer has expired, the control resumes normal operation.

During inducer operation, including all operating modes except for the null test, the control monitors the pressure sensor output for expected values. The control limits during normal operation are expected to be within certain tolerances of the target pressures. In response to a pressure sensor span error, the control enters a five minute lockout. After the lockout timer has expired, the control resumes normal operation.

PRIMARY LIMIT

A primary limit will open due to excessive supply air temperatures. This can be caused by a dirty filter, excessive duct static, insufficient air flow, or a faulty limit. Check filters, total external duct static, blower motor, blower motor speed tap (see wiring diagram), and limit. This limit will automatically reset once the temperature falls below a preset level.

If a limit switch opens, the gas valve is immediately de-energized, the induced draft and air circulating blowers are energized. The induced draft and air circulator blowers remain energized for 5 minutes or until the limit switch re-closes, whichever happens first.

NOTE: IF THE PRIMARY LIMIT OPENS THREE (3) TIMES WITHIN THE SAME CALL FOR HEAT, THE IGNITION CONTROL WILL LOCK OUT FOR ONE (1) HOUR WITH THE AIR CIRCULATING BLOWER ENERGIZED AT HEATING SPEED.

FLAME DETECTED WITH GAS VALVE CLOSED

If flame is detected with the gas valve de-energized, the combustion and air circulator blowers are energized. The control can be reset by removing the power supply to the unit or it will automatically reset after one hour. Miswiring is the probable cause for this fault. The initial lockout period is 5 minutes. After that time, the control continues to monitor the flame sense input and resumes normal operation when flame is no longer sensed.

LOW FLAME SIGNAL

Under some conditions, the fuel or air supply can create a nearly invisible coating on the flame sensor. This coating acts as an insulator causing a drop in the flame signal. If the flame signal drops below a predetermined value, the ignition control will display an error code of (1) flash on the amber diagnostic LED. The unit will continue to operate until the control can no longer detect flame.

BURNER SWITCH

The burner temperature switch is mounted on the burner assembly to monitor the burner box temperature. It is normally closed (electrically), auto-reset sensor. This switch guards against the burner flames not being properly drawn into the heat exchanger.

The control senses an open blocked burner switch, indicating that the burner temperature/pressure has exceeded its set point. The control de-energizes the gas valve, energizes the inducer to the pre-purge setting and energizes the indoor blower. The initial lockout period is five minutes. After this time elapses, the control evaluates the state of the blocked burner switch. If the switch is closed, the control resumes normal operation. The control will enter a one hour lockout state if the blocked burner switch fails to reset before the recovery timer has expired.

ID Plug

The control operational parameters are stored in ID Plug which connects on the circuit board. The control requires a valid ID plug present to operate in heating mode. If a valid ID plug is not present the control will not respond to a call

for heat. However, the control will respond to thermostat inputs "Y" or "G", operating the appropriate fan output. The cooling delays are ignored in this operating mode. The control puts the burner into hard lockout and will not respond to heating requests until the power is cycled with a valid ID plug installed.

NOTE: SOME ELECTRONIC THERMOSTATS ALSO HAVE A BUILT-IN COMPRESSOR SHORT CYCLE TIMER THAT MAY BE LONGER THAN THE THREE MINUTE DELAY GIVEN ABOVE. IF YOU ARE USING AN ELECTRONIC THERMOSTAT AND THE COMPRESSOR HAS NOT STARTED AFTER THREE MINUTES, WAIT AN ADDITIONAL FIVE MINUTES TO ALLOW THE THERMOSTAT TO COMPLETE ITS SHORT CYCLE DELAY TIME.

The status light on the furnace control may be used as a guide to troubleshooting this appliance. Some more useful status light codes are below:

¹The fault condition must be cleared for 30 seconds before normal operation can resume. A power cycle will also reset any lockout.

PCBBL216 ULN CONTROL ERROR CODES

LED ACTIVITY	DESCRIPTION	COLOR	MINIMUM LOCKOUT PERIOD ¹	LED ACTIVITY	DESCRIPTION	COLOR	MINIMUM LOCKOUT PERIOD ¹	LED ACTIVITY	DESCRIPTION	COLOR	MINIMUM LOCKOUT PERIOD ¹
LED OFF	NO 24 VAC POWER TO CONTROL	-	N/A	6 FLASHES	NORMALLY CLOSED BLOCKED BURNER SWITCH/AUXILIARY SWITCH OPEN	RED	MAXIMUM RECOVERY PERIOD - 1 HOUR IF TIME EXCEEDED	2 FLASHES	ID PLUG FAILURE	AMBER	HARD LOCKOUT HEATING MODE
RED, AMBER, GREEN	POWER-UP VERIFICATION OF LED	-	N/A	7 FLASHES	GAS VALVE CIRCUIT SHORTED	RED	1 HOUR	3 FLASHES	CONTROL FUSE OPEN	AMBER	5 MINUTES
STEADY ON	CONTROL FAULT DETECTED	RED	1 HOUR OR HARD LOCKOUT	8 FLASHES	RESERVED	RED	-	STEADY ON	STANDBY NORMAL OPERATION NO THERMOSTAT REQUESTS	GREEN	N/A
1 FLASH	RETRIES EXCEEDED	RED	1 HOUR FIXED	10 FLASHES	HIGH LIMIT SWITCH RECOVERY TIMER EXPIRED	RED	1 HOUR OR HARD LOCKOUT	RAPID FLASH	CLEAR ERROR HISTORY	GREEN	N/A
2 FLASHES	PRESSURE SENSOR NULL ERROR	RED	5 MINUTES	STEADY ON	OEM FACTORY TEST MODE	AMBER	N/A	1 FLASH	CALL FOR HEATING	GREEN	N/A
3 FLASHES	PRESSURE SENSOR SPAN ERROR	RED	5 MINUTES	RAPID FLASH	FIELD TEST MODE	AMBER	N/A	2 FLASHES	CALL FOR COOLING	GREEN	N/A
4 FLASHES	HIGH LIMIT SWITCH OPEN	RED	MAXIMUM RECOVERY TIME - 1 HOUR AFTER MAX TRIPS EXCEEDED	1 FLASH	LOW FLAME SENSE	AMBER	N/A	3 FLASHES	CONTINUOUS FAN OPERATION	GREEN	N/A
5 FLASHES	FLAME PRESENT WITH GAS VALVE OFF	RED	5 MINUTES	-	-	-	-	-	-	-	-

APPENDIX A BLOWER PERFORMANCE TABLES

BELT DRIVE STANDARD DOWN SHOT

DBG036*B STANDARD STATIC DOWNSHOT

ESP, In H ₂ O	TURNS OPEN																	
	0			1			2			3			4			5		
	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP
0.1	-	-	-	-	-	-	1330	775	0.29	1170	715	0.21	1010	655	0.15	860	600	0.10
0.2	-	-	-	-	-	-	1211	775	0.26	1038	715	0.19	861	655	0.13	-	-	-
0.3	-	-	-	1278	840	0.33	1080	775	0.24	889	715	0.17	-	-	-	-	-	-
0.4	1341	900	0.40	1151	840	0.30	933	775	0.21	-	-	-	-	-	-	-	-	-
0.5	1218	900	0.37	1009	840	0.27	-	-	-	-	-	-	-	-	-	-	-	-
0.6	1081	900	0.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.7	926	900	0.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DBG048*B STANDARD STATIC DOWNSHOT

ESP, In H ₂ O	TURNS OPEN																	
	0			1			2			3			4			5		
	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP
0.1	-	-	-	1739	930	0.55	1580	870	0.44	1423	810	0.34	1280	755	0.26	-	-	-
0.2	-	-	-	1643	930	0.52	1477	870	0.41	1310	810	0.31	-	-	-	-	-	-
0.3	1707	990	0.61	1542	930	0.49	1366	870	0.38	-	-	-	-	-	-	-	-	-
0.4	1609	990	0.58	1433	930	0.46	1246	870	0.35	-	-	-	-	-	-	-	-	-
0.5	1504	990	0.54	1317	930	0.42	-	-	-	-	-	-	-	-	-	-	-	-
0.6	1391	990	0.51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.7	1269	990	0.47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DBG060*B STANDARD STATIC DOWNSHOT

ESP, In H ₂ O	TURNS OPEN																	
	0			1			2			3			4			5		
	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP
0.1	-	-	-	2112	1075	0.90	1934	1005	0.72	1764	940	0.57	1595	875	0.45	-	-	-
0.2	-	-	-	2031	1075	0.86	1847	1005	0.69	1670	940	0.54	-	-	-	-	-	-
0.3	-	-	-	1947	1075	0.83	1755	1005	0.65	1570	940	0.51	-	-	-	-	-	-
0.4	2042	1140	0.97	1860	1075	0.79	1659	1005	0.62	-	-	-	-	-	-	-	-	-
0.5	1957	1140	0.93	1767	1075	0.75	1557	1005	0.58	-	-	-	-	-	-	-	-	-
0.6	1869	1140	0.89	1670	1075	0.71	-	-	-	-	-	-	-	-	-	-	-	-
0.7	1775	1140	0.85	1567	1075	0.67	-	-	-	-	-	-	-	-	-	-	-	-
0.8	1677	1140	0.81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A BLOWER PERFORMANCE TABLES

BELT DRIVE HIGH STATIC DOWN SHOT

DBG036°C HIGH STATIC DOWNSHOT¹

ESP, In H ₂ O	TURNS OPEN																	
	0			1			2			3			4			5		
	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP
0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1314	935	0.43
0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1165	935	0.39
0.8	-	-	-	-	-	-	-	-	-	-	-	-	1235	990	0.43	995	935	0.32
0.9	-	-	-	-	-	-	-	-	-	1345	1050	0.53	1072	990	0.39	-	-	-
1.0	-	-	-	-	-	-	-	-	-	1193	1050	0.48	881	990	0.35	-	-	-
1.1	-	-	-	-	-	-	1291	1105	0.58	1019	1050	0.44	-	-	-	-	-	-
1.2	-	-	-	-	-	-	1129	1105	0.53	-	-	-	-	-	-	-	-	-
1.3	-	-	-	1259	1160	0.63	937	1105	0.48	-	-	-	-	-	-	-	-	-
1.4	-	-	-	1088	1160	0.58	-	-	-	-	-	-	-	-	-	-	-	-
1.5	1225	1215	0.70	882	1160	0.52	-	-	-	-	-	-	-	-	-	-	-	-
1.6	1043	1215	0.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

¹ To operate below 0.6" H₂O external static pressure, motor and blower sheave must be changed to VL34 and AK59 respectively, or equivalents.

DBG048°C HIGH STATIC DOWNSHOT¹

ESP, In H ₂ O	TURNS OPEN																	
	0			1			2			3			4			5		
	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP
0.6	-	-	-	-	-	-	-	-	-	1761	1140	0.84	1588	1080	0.69	1403	1020	0.55
0.7	-	-	-	-	-	-	-	-	-	1672	1140	0.80	1491	1080	0.65	1294	1020	0.51
0.8	-	-	-	-	-	-	1764	1200	0.94	1578	1140	0.76	1387	1080	0.61	-	-	-
0.9	-	-	-	-	-	-	1675	1200	0.90	1479	1140	0.72	1275	1080	0.57	-	-	-
1.0	-	-	-	1775	1260	1.04	1580	1200	0.85	1372	1140	0.68	-	-	-	-	-	-
1.1	-	-	-	1685	1260	1.00	1478	1200	0.81	1256	1140	0.64	-	-	-	-	-	-
1.2	1796	1320	1.16	1589	1260	0.95	1369	1200	0.76	-	-	-	-	-	-	-	-	-
1.3	1705	1320	1.11	1487	1260	0.90	1251	1200	0.71	-	-	-	-	-	-	-	-	-
1.4	1609	1320	1.06	1377	1260	0.85	-	-	-	-	-	-	-	-	-	-	-	-
1.5	1506	1320	1.01	1256	1260	0.80	-	-	-	-	-	-	-	-	-	-	-	-
1.6	1396	1320	0.96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.7	1275	1320	0.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.8	1141	1320	0.84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

¹ To operate below 0.6" H₂O external static pressure, motor and blower sheave must be changed to VL40 and AK66 respectively, or equivalents.

DBG060°C HIGH STATIC DOWNSHOT¹

ESP, In H ₂ O	TURNS OPEN																	
	0			1			2			3			4			5		
	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP
0.8	-	-	-	-	-	-	2180	1340	1.43	1993	1275	1.19	1794	1210	0.97	1578	1140	0.76
0.9	-	-	-	-	-	-	2106	1340	1.38	1913	1275	1.14	1705	1210	0.93	-	-	-
1.0	-	-	-	2239	1410	1.62	2030	1340	1.33	1829	1275	1.10	1612	1210	0.88	-	-	-
1.1	-	-	-	2166	1410	1.57	1950	1340	1.28	1741	1275	1.05	1513	1210	0.84	-	-	-
1.2	-	-	-	2090	1410	1.52	1867	1340	1.24	1648	1275	1.00	-	-	-	-	-	-
1.3	2219	1475	1.76	2012	1410	1.47	1779	1340	1.19	1549	1275	0.96	-	-	-	-	-	-
1.4	2144	1475	1.71	1930	1410	1.42	1687	1340	1.14	-	-	-	-	-	-	-	-	-
1.5	2067	1475	1.65	1844	1410	1.37	1589	1340	1.08	-	-	-	-	-	-	-	-	-
1.6	1986	1475	1.60	1754	1410	1.31	-	-	-	-	-	-	-	-	-	-	-	-
1.7	1902	1475	1.54	1658	1410	1.26	-	-	-	-	-	-	-	-	-	-	-	-
1.8	1813	1475	1.48	1556	1410	1.20	-	-	-	-	-	-	-	-	-	-	-	-

¹ To operate below 0.8" H₂O external static pressure, motor and blower sheave must be changed to VL40 and AK59 respectively, or equivalents.

APPENDIX A BLOWER PERFORMANCE TABLES

BELT DRIVE STANDARD HORIZONTAL

DBG036*B STANDARD STATIC HORIZONTAL

ESP, In H ₂ O	TURNS OPEN																	
	0			1			2			3			4			5		
	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP
0.1	-	-	-	-	-	-	-	-	-	-	-	-	1205	655	0.19	1066	600	0.14
0.2	-	-	-	-	-	-	-	-	-	1231	715	0.23	1067	655	0.17	908	600	0.12
0.3	-	-	-	-	-	-	1270	775	0.28	1093	715	0.20	905	655	0.14	-	-	-
0.4	-	-	-	1336	840	0.34	1134	775	0.25	931	715	0.18	-	-	-	-	-	-
0.5	-	-	-	1204	840	0.31	976	775	0.22	-	-	-	-	-	-	-	-	-
0.6	1271	900	0.38	1053	840	0.28	-	-	-	-	-	-	-	-	-	-	-	-
0.7	1128	900	0.34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DBG048*B STANDARD STATIC HORIZONTAL

ESP, In H ₂ O	TURNS OPEN																	
	0			1			2			3			4			5		
	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP
0.1	-	-	-	1792	930	0.58	1651	870	0.47	1512	810	0.37	1386	755	0.29	1244	695	0.22
0.2	-	-	-	1707	930	0.55	1560	870	0.44	1412	810	0.34	1277	755	0.27	-	-	-
0.3	1764	990	0.64	1617	930	0.51	1462	870	0.41	1304	810	0.31	-	-	-	-	-	-
0.4	1677	990	0.60	1522	930	0.48	1356	870	0.38	-	-	-	-	-	-	-	-	-
0.5	1584	990	0.57	1419	930	0.45	1240	870	0.34	-	-	-	-	-	-	-	-	-
0.6	1485	990	0.53	1307	930	0.41	-	-	-	-	-	-	-	-	-	-	-	-
0.7	1377	990	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DBG060*B STANDARD STATIC HORIZONTAL

ESP, In H ₂ O	TURNS OPEN																	
	0			1			2			3			4			5		
	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP
0.1	-	-	-	2122	1075	0.92	1964	1005	0.74	1814	940	0.60	1665	875	0.47	1502	805	0.36
0.2	-	-	-	2050	1075	0.88	1887	1005	0.71	1731	940	0.57	1574	875	0.45	-	-	-
0.3	-	-	-	1976	1075	0.85	1807	1005	0.67	1642	940	0.53	-	-	-	-	-	-
0.4	2060	1140	0.99	1898	1075	0.81	1721	1005	0.64	1548	940	0.50	-	-	-	-	-	-
0.5	1985	1140	0.95	1817	1075	0.77	1631	1005	0.60	-	-	-	-	-	-	-	-	-
0.6	1906	1140	0.91	1731	1075	0.73	1535	1005	0.57	-	-	-	-	-	-	-	-	-
0.7	1824	1140	0.87	1640	1075	0.69	-	-	-	-	-	-	-	-	-	-	-	-
0.8	1737	1140	0.83	1542	1075	0.65	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A BLOWER PERFORMANCE TABLES

BELT DRIVE HIGH STATIC HORIZONTAL

DBG036*C HIGH STATIC HORIZONTAL¹

ESP, In H ₂ O	TURNS OPEN																	
	0			1			2			3			4			5		
	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP
0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1285	935	0.42
0.8	-	-	-	-	-	-	-	-	-	-	-	-	1346	990	0.46	1134	935	0.35
0.9	-	-	-	-	-	-	-	-	-	-	-	-	1203	990	0.42	954	935	0.31
1.0	-	-	-	-	-	-	-	-	-	1310	1050	0.51	1034	990	0.38	-	-	-
1.1	-	-	-	-	-	-	-	-	-	1156	1050	0.46	-	-	-	-	-	-
1.2	-	-	-	-	-	-	1253	1105	0.55	970	1050	0.41	-	-	-	-	-	-
1.3	-	-	-	-	-	-	1083	1105	0.50	-	-	-	-	-	-	-	-	-
1.4	-	-	-	1217	1160	0.61	868	1105	0.47	-	-	-	-	-	-	-	-	-
1.5	1338	1215	0.72	1034	1160	0.55	-	-	-	-	-	-	-	-	-	-	-	-
1.6	1177	1215	0.66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

¹ To operate below 0.7" H₂O external static pressure, motor and blower sheave must be changed to VL34 and AK59 respectively, or equivalents.

DBG048*C HIGH STATIC HORIZONTAL¹

ESP, In H ₂ O	TURNS OPEN																	
	0			1			2			3			4			5		
	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP
0.6	-	-	-	-	-	-	-	-	-	-	-	-	1659	1080	0.71	1495	1020	0.57
0.7	-	-	-	-	-	-	-	-	-	1733	1140	0.83	1573	1080	0.67	1398	1020	0.53
0.8	-	-	-	-	-	-	-	-	-	1650	1140	0.79	1481	1080	0.63	1293	1020	0.50
0.9	-	-	-	-	-	-	1735	1200	0.92	1562	1140	0.75	1381	1080	0.59	-	-	-
1.0	-	-	-	-	-	-	1651	1200	0.87	1468	1140	0.70	1273	1080	0.55	-	-	-
1.1	-	-	-	1744	1260	1.01	1562	1200	0.83	1365	1140	0.66	-	-	-	-	-	-
1.2	-	-	-	1659	1260	0.97	1465	1200	0.78	1252	1140	0.62	-	-	-	-	-	-
1.3	1762	1320	1.13	1569	1260	0.92	1361	1200	0.74	-	-	-	-	-	-	-	-	-
1.4	1677	1320	1.08	1472	1260	0.87	1245	1200	0.69	-	-	-	-	-	-	-	-	-
1.5	1586	1320	1.03	1366	1260	0.82	-	-	-	-	-	-	-	-	-	-	-	-
1.6	1488	1320	0.98	1248	1260	0.77	-	-	-	-	-	-	-	-	-	-	-	-
1.7	1382	1320	0.92	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.8	1263	1320	0.86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

¹ To operate below 0.6" H₂O external static pressure, motor and blower sheave must be changed to VL40 and AK66 respectively, or equivalents.

DBG060*C HIGH STATIC HORIZONTAL¹

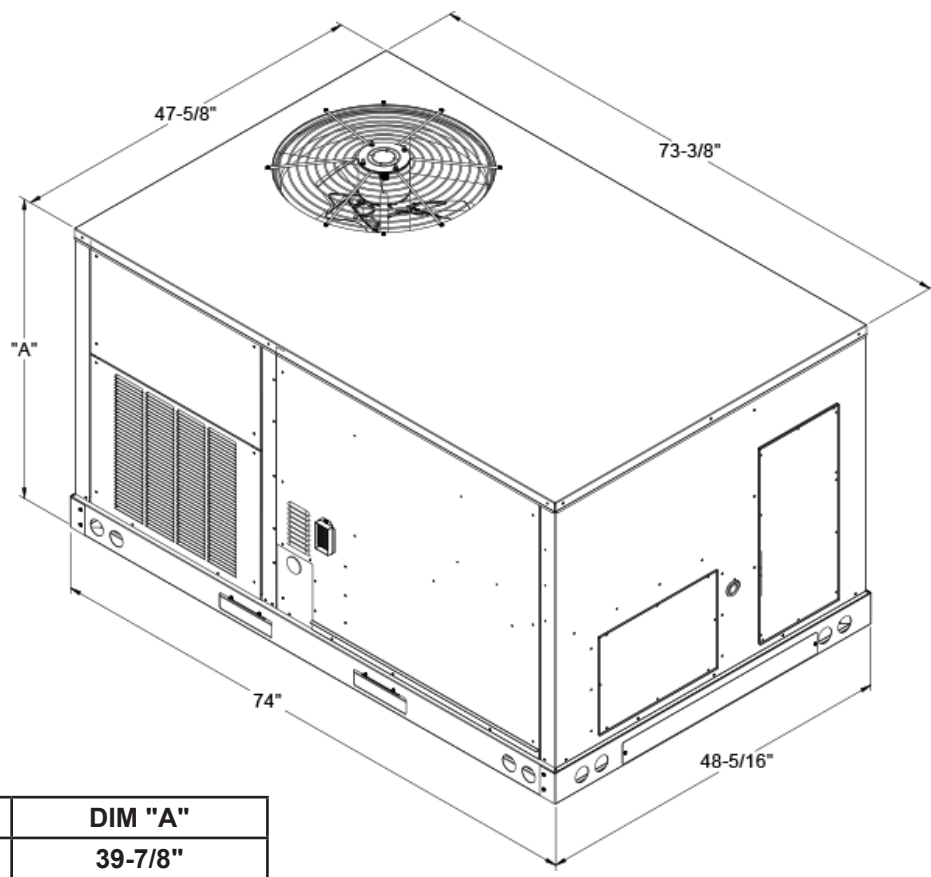
ESP, In H ₂ O	TURNS OPEN																	
	0			1			2			3			4			5		
	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP	CFM	RPM	BHP
0.8	-	-	-	-	-	-	2182	1340	1.44	2017	1275	1.20	1840	1210	0.99	1650	1140	0.79
0.9	-	-	-	-	-	-	2117	1340	1.39	1946	1275	1.16	1762	1210	0.95	1562	1140	0.75
1.0	-	-	-	2233	1410	1.63	2049	1340	1.35	1872	1275	1.12	1680	1210	0.90	-	-	-
1.1	-	-	-	2169	1410	1.58	1978	1340	1.30	1794	1275	1.07	1592	1210	0.86	-	-	-
1.2	-	-	-	2102	1410	1.53	1905	1340	1.25	1712	1275	1.02	-	-	-	-	-	-
1.3	2216	1475	1.77	2033	1410	1.48	1827	1340	1.20	1624	1275	0.98	-	-	-	-	-	-
1.4	2150	1475	1.71	1961	1410	1.43	1746	1340	1.15	1531	1275	0.93	-	-	-	-	-	-
1.5	2081	1475	1.66	1885	1410	1.38	1660	1340	1.10	-	-	-	-	-	-	-	-	-
1.6	2010	1475	1.61	1805	1410	1.33	1567	1340	1.05	-	-	-	-	-	-	-	-	-
1.7	1936	1475	1.55	1721	1410	1.27	-	-	-	-	-	-	-	-	-	-	-	-
1.8	1857	1475	1.49	1631	1410	1.21	-	-	-	-	-	-	-	-	-	-	-	-

¹ To operate below 0.8" H₂O external static pressure, motor and blower sheave must be changed to VL40 and AK59 respectively, or equivalents.

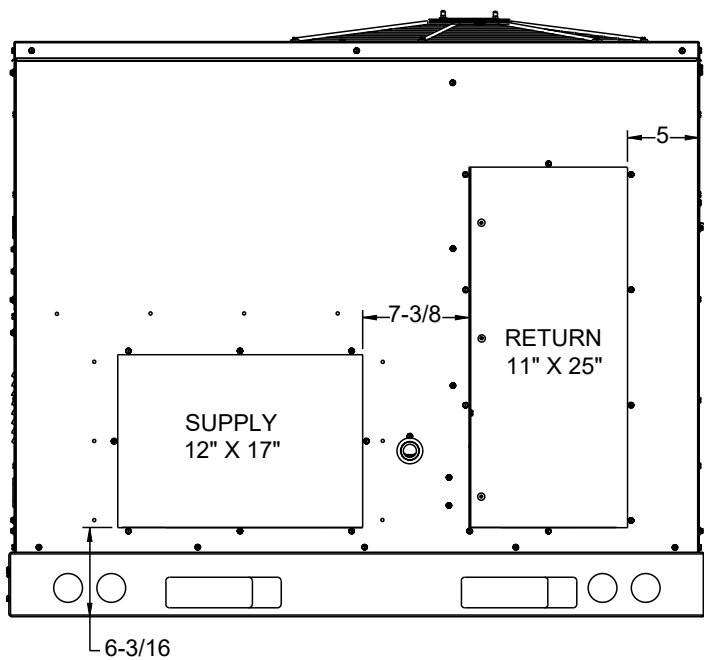
APPENDIX B ELECTRICAL DATA

Model Number	Electrical Rating	Compressor			Outdoor Fan Motor			Indoor Fan Motor			Optional Powered Convenience Outlet	Optional Power Exhaust	Power Supply	
		QTY	RLA	LRA	QTY	HP	FLA	Type	HP	FLA	FLA	FLA	MCA	MOP
DBG0363B	208/230/3/60	1	10.5	73	1	0.2	1	Belt Drive Standard Static	1	3.4	-	-	17.4/17.4	25/25
											9.6/8.7	-	27.0/26.1	35/35
											-	1.7/1.5	19.1/18.9	25/25
											9.6/8.7	1.7/1.5	28.7/27.6	35/35
DBG0363C	208/230/3/60	1	10.5	73	1	0.2	1	Belt Drive High Static	1	3.4	-	-	17.4/17.4	25/25
											9.6/8.7	-	27.0/26.1	35/35
											-	1.7/1.5	19.1/18.9	25/25
											9.6/8.7	1.7/1.5	28.7/27.6	35/35
DBG0364B	460/3/60	1	5.77	38	1	0.2	0.5	Belt Drive Standard Static	1	1.7	-	-	9.39	15
											4.3	-	13.7	15
											-	0.5	9.89	15
											4.3	0.5	14.2	15
DBG0364C	460/3/60	1	5.77	38	1	0.2	0.5	Belt Drive High Static	1	1.7	-	-	9.39	15
											4.3	-	13.7	15
											-	0.5	9.89	15
											4.3	0.5	14.2	15
DBG0367B	575/3/60	1	3.78	37	1	0.2	0.4	Belt Drive Standard Static	2	2.3	-	-	7.42	15
											3.5	-	10.9	15
											-	0.6	8.02	15
											3.5	0.6	11.5	15
DBG0483C	208/230/3/60	1	13.1	83	1	0.3	1.4	Belt Drive High Static	2	4.8	-	-	22.6/22.6	35/35
											9.6/8.7	-	32.2/31.3	45/40
											-	1.7/1.5	24.3/24.1	35/35
											9.6/8.7	1.7/1.5	33.9/32.8	45/40
DBG0484B	460/3/60	1	6.09	41	1	0.3	0.7	Belt Drive Standard Static	1	1.7	-	-	10	15
											4.3	-	14.3	20
											-	0.5	10.5	15
											4.3	0.5	14.8	20
DBG0484C	460/3/60	1	6.09	41	1	0.3	0.7	Belt Drive High Static	2	2.4	-	-	10.7	15
											4.3	-	15	20
											-	0.5	11.2	15
											4.3	0.5	15.5	20
DBG0603B	208/230/3/60	1	15.9	110	1	0.3	2	Belt Drive Standard Static	1	3.2	-	-	25.1/25.1	40/40
											9.6/8.7	-	34.7/33.8	50/45
											-	1.7/1.5	26.8/26.6	40/40
											9.6/8.7	1.7/1.5	36.4/35.3	50/45
DBG0603C	208/230/3/60	1	15.9	110	1	0.3	2	Belt Drive High Static	2	7.8	-	-	29.7/29.7	45/45
											9.6/8.7	-	39.3/38.4	50/50
											-	1.7/1.5	31.4/31.2	45/45
											9.6/8.7	1.7/1.5	41.0/39.9	50/50
DBG0604B	460/3/60	1	7.05	52	1	0.3	0.9	Belt Drive Standard Static	1	1.5	-	-	11.2	15
											4.3	-	15.5	20
											-	0.5	11.7	15
											4.3	0.5	16	20
DBG0604C	460/3/60	1	7.05	52	1	0.3	0.9	Belt Drive High Static	2	3.9	-	-	13.6	20
											4.3	-	17.9	20
											-	0.5	14.1	20
											4.3	0.5	18.4	20

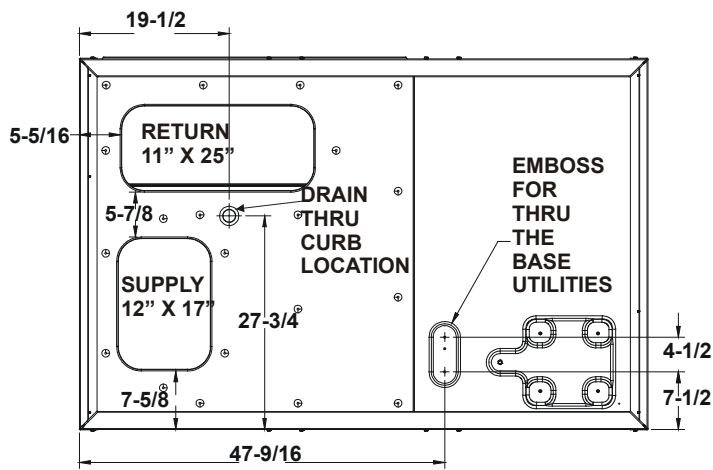
APPENDIX C UNIT DIMENSIONS



MODEL SIZE	DIM "A"
3,4, & 5 TON	39-7/8"



HORIZONTAL DISCHARGE



BOTTOM VIEW OF UNIT
VERTICAL DISCHARGE

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

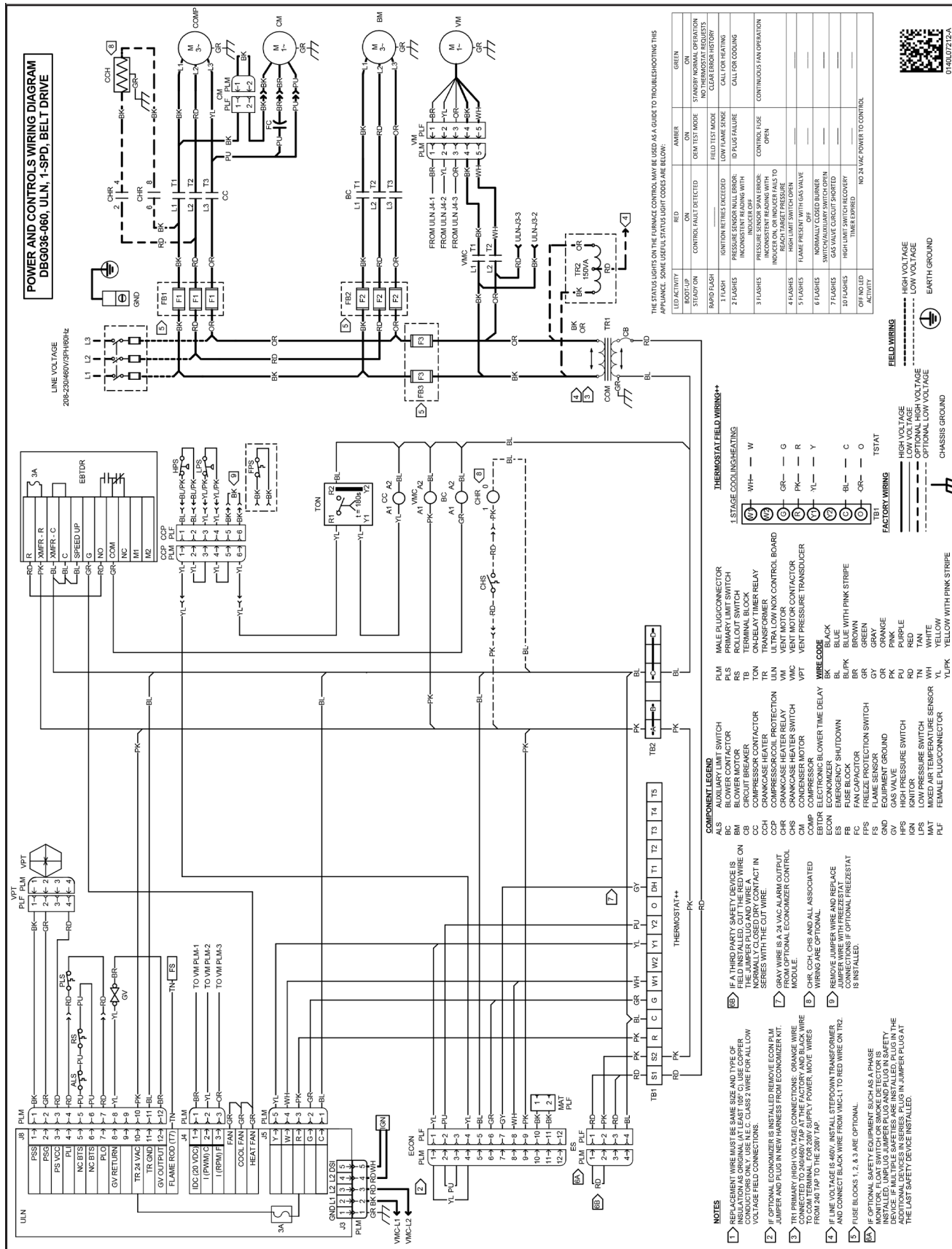
APPENDIX D MIN-MAX AIRFLOW

RECOMMENDED MIN-MAX AIRFLOW RANGE				
UNIT	FIRE RATE BTU/HR	<u>HEATING</u> MINIMUM SCFM	<u>COOLING</u> MINIMUM SCFM	MAXIMUM SCFM
DBG036	100,000	1100	900	1350
DBG048	100,000	1200	1200	1800
DBG060	100,000	1300	1500	2250
DBG036	80,000	1100	900	1350
DBG048	80,000	1200	1200	1800
DBG060	80,000	1300	1500	2250

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.



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



Start-up Checklist

**Store in job file*

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.

9/2014



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

THIS PAGE IS INTENTIONALLY LEFT BLANK

THIS PAGE IS INTENTIONALLY LEFT BLANK

THIS PAGE IS INTENTIONALLY LEFT BLANK

CUSTOMER FEEDBACK

We are very interested in all product comments.

Please fill out the feedback form on one of the following links:

Daikin Products: (<https://daikincomfort.com/contact-us>)

You can also scan the QR code on the right for the product brand you purchased to be directed to the feedback page.



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

© 2020-2021 **DAIKIN MANUFACTURING COMPANY, L.P.**

19001 Kermier Rd., Waller, TX 77484

www.daikincomfort.com