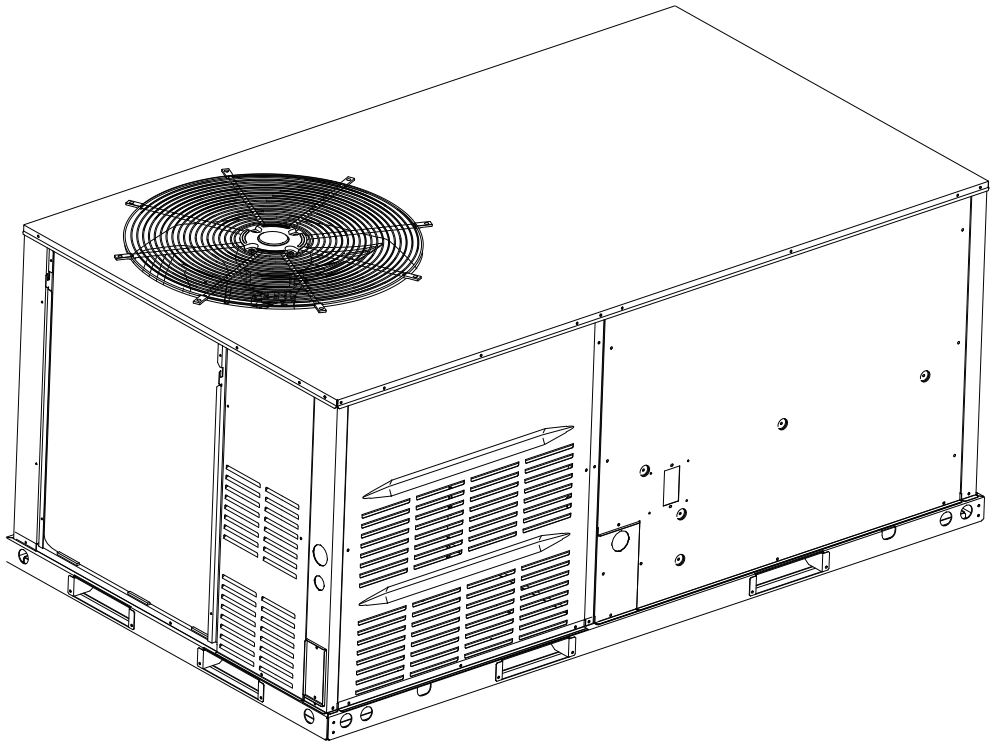
Installation, Operation, and Maintenance

Packaged Rooftop

Cooling and Gas/Electric Heat

5 Tons, 60 Hz



C ETL LISTED US
Intertek
3124627

A2L
R454B

⚠ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

⚠ WARNING



PROPERTY OR PERSONAL INJURY HAZARD

-Risk of fire. Flammable refrigerant used.
-To be repaired only by trained service personnel.
-Do not puncture refrigerant tubing.
-Auxiliary devices which may be ignition sources shall not be installed in the ductwork, other than auxiliary devices listed for use with the specific appliance.
-Dispose of refrigerant properly in accordance with federal or local regulations.
-Failure to follow proper R-454B dissipation system installation instructions can result in property damage, personal injury, or death. If any fault codes are listed, please troubleshoot to resolve system malfunction.

⚠ WARNING

PERSONAL INJURY OR PROPERTY DAMAGE

These instructions are exclusively intended for qualified contractors and authorized installers.
Work on the refrigerant circuit with flammable refrigerant in safety group A2L may only be carried out by authorized contractors.
These contractors must be trained in accordance with UL 60335-2-40, Section HH. The certificate of competence from an industry accredited body is required.
Work on electrical equipment may only be carried out by a qualified electrician.
Before initial commissioning, all safety related points must be checked by the particular certified heating contractors. The system must be commissioned by the system installer or a qualified person authorized by the installer.

⚠ WARNING

Signs for similar appliances used in a work area are generally addressed by local regulations and give the minimum requirements for the provision of safety and/or health signs for a work location.
All required signs are to be maintained and employers should ensure that employees receive suitable and sufficient instruction and training on the meaning of appropriate safety signs and the actions that need to be taken in connection with these signs.
The effectiveness of signs should not be diminished by too many signs being placed together.
Any pictograms used should be as simple as possible and contain only essential details.

⚠ WARNING

Additional transportation regulations may exist with respect to equipment containing flammable gas. The maximum number of pieces of equipment or the configuration of the equipment permitted to be transported together will be determined by the applicable transport regulations.
Storage package protection should be constructed such a way that mechanical damage to the equipment inside the package will not cause leak of the REFRIGERANT CHARGE. The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

Introduction

Read this manual thoroughly before operating or servicing this unit and keep it in a safe place for future reference by a service personnel.

Category I, the combustion system is fan-assisted. A Category I fan-assisted furnace is an appliance equipped with an integral mechanical means to either draw or force products of combustion through the combustion chamber and/or heat exchanger.

Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

⚠WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
NOTICE	Indicates a situation that could result in equipment or property-damage only accidents.

⚠ WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
The appliance shall be stored in a room that does not have continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
Do not pierce or burn.
Be aware that refrigerants may not contain an odour.

⚠ WARNING

LEAK DETECTION SYSTEM installed. Unit must be powered except for service.

Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Midea advocates the responsible handling of all refrigerants-including industry replacements for CFCs and HCFCs such as saturated or unsaturated HFCs and HCFCs.

⚠ CAUTION

ENVIRONMENTAL HAZARD

Failure to follow this caution may result in environmental damage.
Do not vent refrigerant to atmosphere. Recover during system repair or final unit disposal.

Important Responsible Refrigerant Practices

Midea believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to national and local requirements . For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Follow all applicable laws.

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.
All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/ state/national electrical codes.

⚠ WARNING

Follow EHS Policies!

Failure to follow instructions below could result in death or serious injury.

- **All Midea personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/ tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.**
- **Non-Midea personnel should always follow local regulations.**

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury. Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- **Before installing/servicing this unit, technicians MUST put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). ALWAYS refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.**
- **If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

⚠ WARNING

This product can expose you to chemicals including lead, which are known to the state of california to cause cancer and birth defects or other reproductive harm. For more information go to www.p65Warnings.ca.gov

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
Children should be supervised to ensure that they do not play with the appliance.

The appliance is classified as appliance accessible to the general public.

Overview of Manual

One copy of this document ships inside the control panel of each unit and is customer property. It must be retained by the unit's maintenance personnel.

This booklet describes the proper installation, startup, operation, and maintenance procedures for air cooled systems.

By carefully reviewing the information within this manual and following the instructions, the risk of improper operation and/or component damage will be minimized.

It is important that periodic maintenance be performed to help assure trouble free operation. A maintenance schedule is provided at the end of this manual. Should appliance failure occur, contact a qualified service organization with qualified, experienced HVAC technicians to properly diagnose and repair this appliance.

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Revision History

- Add california 65 Warnings

⚠ WARNING

The furnace area must be kept clear and free of combustible materials, gasoline, and other flammable vapors and liquids.
The furnace must be kept free and clear of insulating material, with instructions to examine the furnace area when the furnace is installed or when insulation is added and advising that insulating materials might be combustible.
Should the gas supply fail to shut off or if overheating occurs, shut off the gas valve to the furnace before shutting off the electrical supply.
Do not use this furnace if any part has been under water. A flood-damaged furnace is extremely dangerous. Attempts to use the furnace can result in fire or explosion. A qualified service agency should be contacted to inspect the furnace and to replace all gas controls, control system parts, electrical parts that have been wet or the furnace if deemed necessary.

⚠ WARNING

PERSONAL INJURY HAZARD

Do not, under any circumstances, connect return ductwork to any other heat producing device such as fireplace insert, stove, etc. Unauthorized use of such devices may result in fire, carbon monoxide poisoning, explosion, personal injury or property damage.

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Error Code 45

Explanation of symbols displayed on the unit

	**DANGER**	This symbol shows that this appliance used a mild flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	**CAUTION**	This symbol shows that the operation manual should be read carefully.
	**CAUTION**	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	**CAUTION**	This symbol shows that information is available such as the operating manual orinstallation manual.

General Information

⚠ WARNING

Fiberglass Wool!

Exposure to glass wool fibers without all necessary PPE equipment could result in cancer, respiratory, skin or eye irritation, which could result in death or serious injury. Disturbing the insulation in this product during installation, maintenance or repair will expose you to airborne particles of glass wool fibers and ceramic fibers known to the state of California to cause cancer through inhalation.

You MUST wear all necessary Personal Protective Equipment (PPE) including gloves, eye protection, a NIOSH approved dust/mist respirator, long sleeves and pants when working with products containing fiberglass wool.

Precautionary Measures:

- **Avoid breathing fiberglass dust.**
- **Use a NIOSH approved dust/mist respirator.**
- **Avoid contact with the skin or eyes. Wear long-sleeved, loose-fitting clothing, gloves, and eye protection.**
- **Wash clothes separately from other clothing; rinse washer thoroughly.**
- **Operations such as sawing, blowing, tear-out, and spraying may generate fiber concentrations requiring additional respiratory protection. Use the appropriate NIOSH approved respirator.**

First Aid Measures:

- **Eye Contact - Flush eyes with water to remove dust. If symptoms persist, seek medical attention.**
- **Skin Contact - Wash affected areas gently with soap and warm water after handling.**

Overview of Manual

Note: *One copy of this document ships inside the control panel of each unit and is customer property. It must be retained by the unit's maintenance personnel.*

This booklet describes proper installation, operation, and maintenance procedures for air cooled systems. By carefully reviewing the information within this manual and following the instructions, the risk ofimproper operation and/or component damage will be minimized.

It is important that periodic maintenance be performed to help assure trouble free operation. A maintenance schedule is provided at the end of this manual.

Unit Inspection

To protect against loss due to damage incurred in transit, perform inspection immediately upon receipt of the unit.

Exterior Inspection

If the job site inspection reveals damage or material shortages, file a claim with the carrier immediately. Specify the type and extent of the damage on the bill of lading before signing. Notify the appropriate sales representative.

Important: *Do not proceed with installation of a damaged unit without sales representative's approval.*

- Visually inspect the complete exterior for signs of shipping damages to unit or packing material.
- Verify that the nameplate data matches the sales order and bill of lading.
- Verify that the unit is properly equipped and there are no material shortages.
- Verify that the power supply complies with the unit nameplate specifications.

Inspection for Concealed Damage

Visually inspect the components for concealed damage as soon as possible after delivery and before it is stored.

If concealed damage is discovered:

- Notify the carrier's terminal of the damage immediately by phone and by mail.
- Concealed damage must be reported within 15 days.
- Request an immediate, joint inspection of the damage with the carrier and consignee.
- Stop unpacking the unit.
- Do not remove damaged material from receiving location.
- Take photos of the damage, if possible.
- The owner must provide reasonable evidence that the damage did not occur after delivery.

Unit Storage

Take precautions to prevent condensate from forming inside the unit's electrical compartments and motors if:

- The unit is stored before it is installed; or,
- The unit is set on the roof curb, and temporary heat is provided in the building. Isolate all side panel service entrances and base pan openings (e.g., conduit holes, S/A and R/ A openings, and flue openings) from the ambient air until the unit is ready for start-up.

Note: *Do not use the unit's heater for temporary heat without first completing the start-up.*

The manufacturer will not assume any responsibility for appliance damage resulting from condensate accumulation on the unit's electrical and/or mechanical components.

⚠ WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.
Before installing or servicing the unit, always turn off all power to unit.
There may be more than one disconnect switch. Turn off accessory heater power if applicable. Lock out and tag switch with a suitable warning label.

NOTICE

All parts of the appliance are suitable for outdoor use.

Unit Description

Before shipment, each unit is leak tested, dehydrated, charged with refrigerant and compressor oil, and tested for proper operation.

System Input Devices and Functions

The unit must have a thermostat input in order to operate.

The descriptions of the following basic input devices used within the unit are to acquaint the operator with their function as they interface with the various features. Refer to the unit's electrical schematic for the specific device connections. The following controls are available from the factory for field installation.

Drain Pan Condensate Overflow Switch (Optional)

This input incorporates the Condensate Overflow Switch (COF) mounted on the drain pan. When the condensate level reaches the trip point, the COF relay energizes and opens the 24 Vac control circuit, disabling the unit. A delay timer prevents the unit from starting for within 7 minutes from unit being turned off.

Refrigerant Sensor

The gas heat units come equipped with 1 factory wired R-454B leak detections to ensure safety during a leak. Failure to install this system will result in potentially hazardous conditions and improper equipment appliance, and void all system warranties and liabilities.

Indoor Blower Constant Airflow Control

Traditional fixed speed control cannot maintain the desired indoor airflow in different duct static pressure. A dirty filter would also reduce the airflow in a fixed speed blower system. Under our constant air volume control mode, the indoor blower can automatically adjusts operating speed according to the target operationg power under different static pressures, keeping a constant indoor airflow and maintaining comfortable indoor conditions.

Indoor Blower Taps Automatic Adjustment Function (Optional)

There are four taps of indoor blower motor could be chosed by users to select the indoor blower target output air volume. please refer to the dip switches setting guide for the details. And users also can select the automatic adjustment function. In auto mode, the target output air volume would be adjusted automatically according to the outlet air temperture for a more comfortable performence.

Cooling operating temperature range

The unit is capable of cooling operating within the outdoor temperature range of 0 to 125 ℉ and the indoor temperature range of 63 to 90 ℉.

Dimensional Data

The below figure illustrates the minimum operating and service clearances for either a single or multiple unit installation. These clearances are the minimum distances necessary to assure adequate serviceability, cataloged unit capacity, and peak operating efficiency.

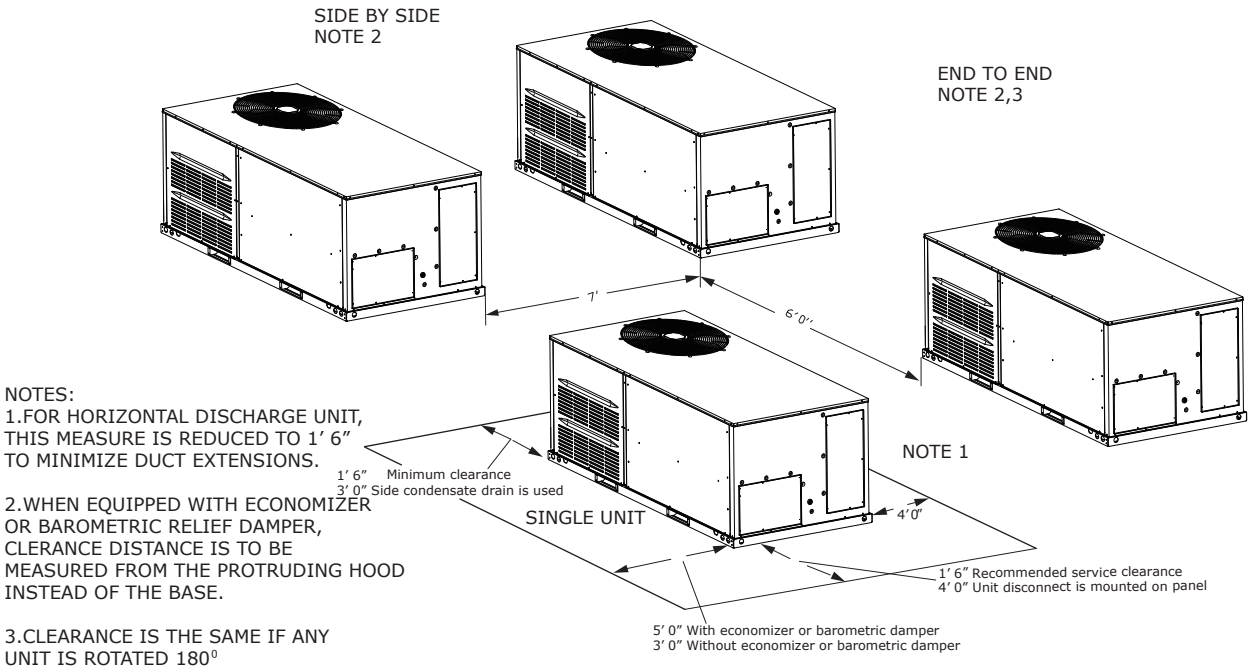
Providing less than the recommended clearances may result in condenser coil starvation, “short-circuiting” of exhaust and economizer airflows, or recirculation of hot condenser air.

⚠ WARNING

PERSONAL INJURY / PROPERTY DAMAGE HAZARD

Only use this unit in well-ventilated spaces and ensure that there are no obstructions that could impede the airflow into and out of the unit.
Do not use this unit in the following locations:
- Locations with mineral oil.
- Locations with saline atmospheres, such as near seaside.
- Locations with sulphurous atmospheres, such as near natural hot springs.
- Where high voltage electricity is present, such as in certain industrial locations.
- On vehicles or vessels, such as trucks or ferry boats.
- Where exposure to oily or very humid air may occur, such as kitchens.
- In proximity to sources of electromagnetic radiation, such as high-frequency transmitters or other high strength radiation devices.

Figure 1. Typical installation clearance for single and multiple unit applications (in inches)



NOTES:
1.FOR HORIZONTAL DISCHARGE UNIT, THIS MEASURE IS REDUCED TO 1’ 6” TO MINIMIZE DUCT EXTENSIONS.

2.WHEN EQUIPPED WITH ECONOMIZER OR BAROMETRIC RELIEF DAMPER, CLERANCE DISTANCE IS TO BE MEASURED FROM THE PROTRUDING HOOD INSTEAD OF THE BASE.

3.CLEARANCE IS THE SAME IF ANY UNIT IS ROTATED 180^0

4.ADDITIONAL CLEARANCE REQUIRED WHEN BAROMETRIC DAMPER OR ECONOMIZER IS INSTALLED.

Figure 2. Gas unit — overview

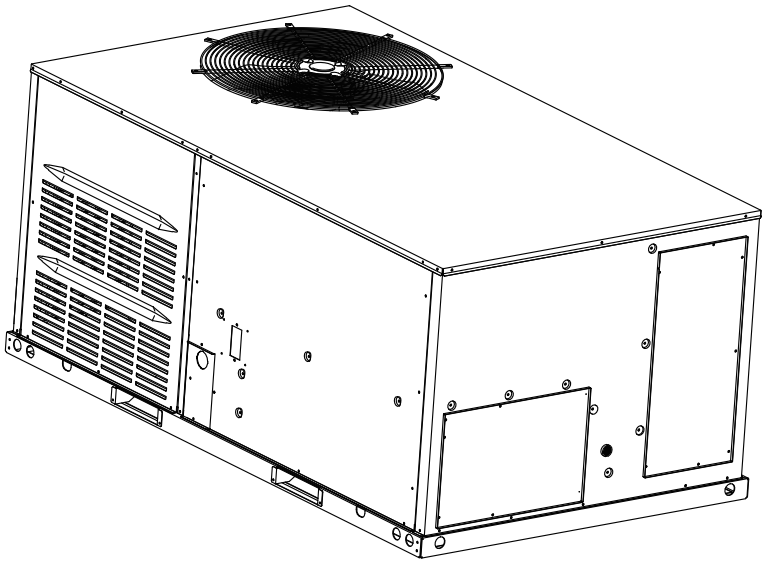


Figure 3. Electric unit — overview

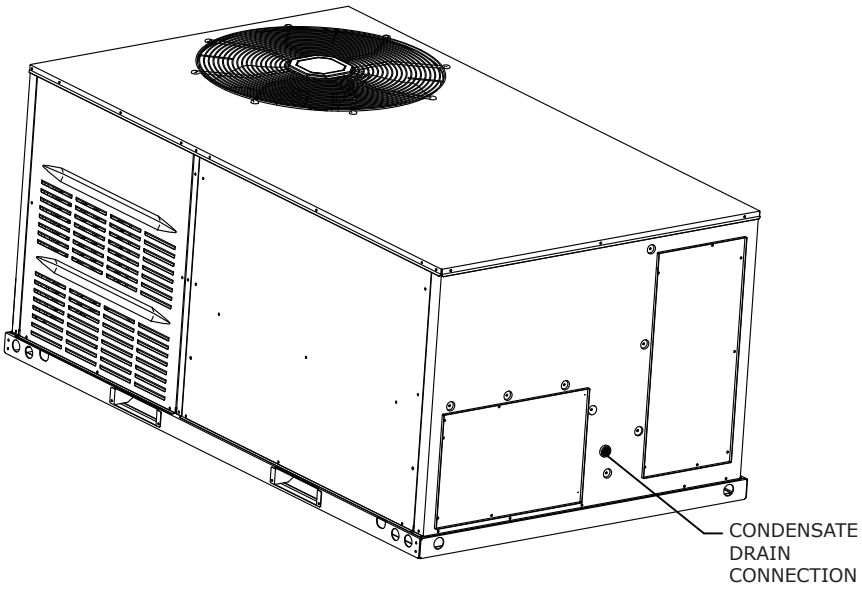


Figure 4. Gas unit — front views (in inches)

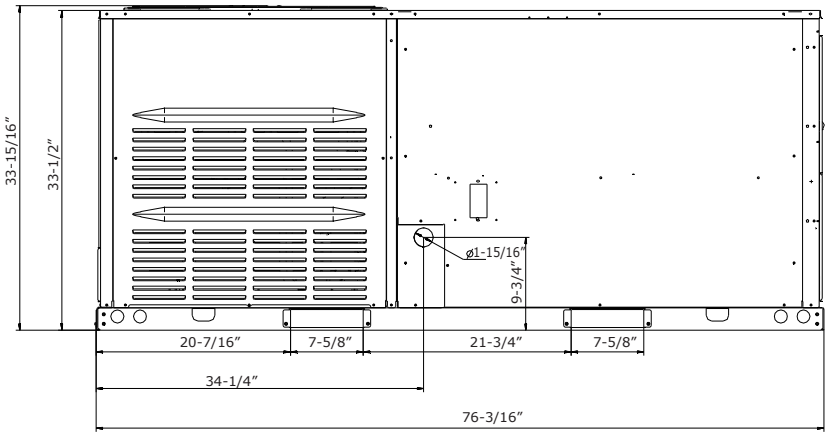


Figure 5. Electric unit — front views（in inches）

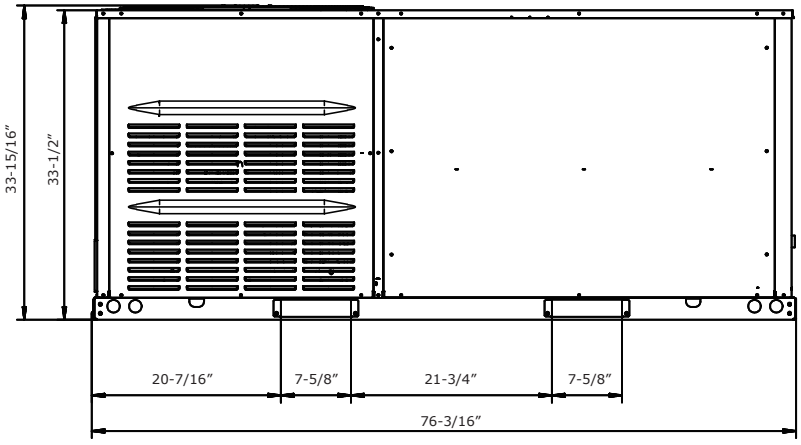


Figure 6. Gas/electric unit — side views（in inches）

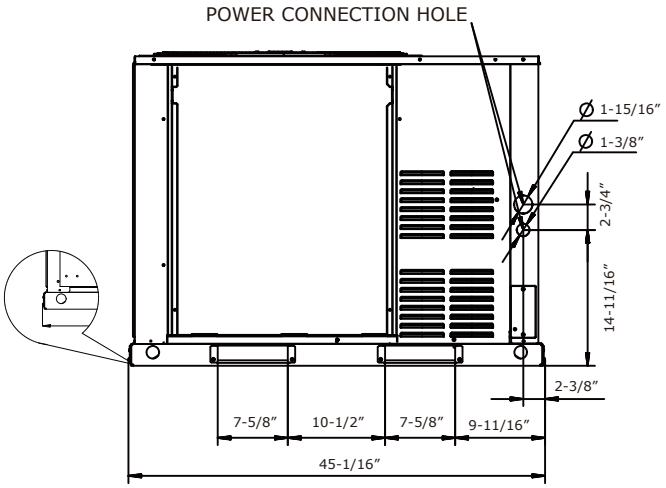


Figure 7. Gas/electric unit — bottom view (in inches)

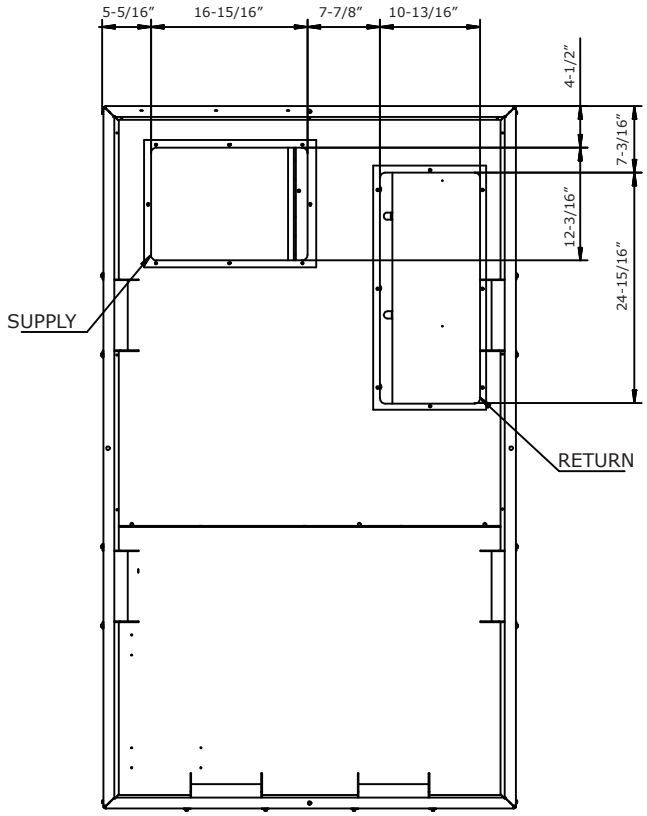


Figure 8. Gas/electric unit — back view (horizontal configuration) (in inches)

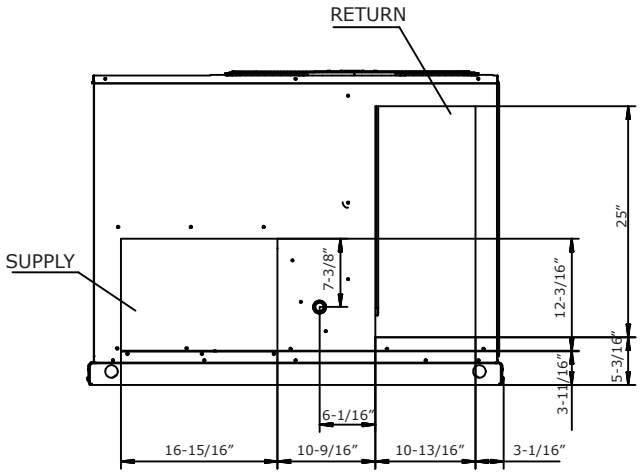
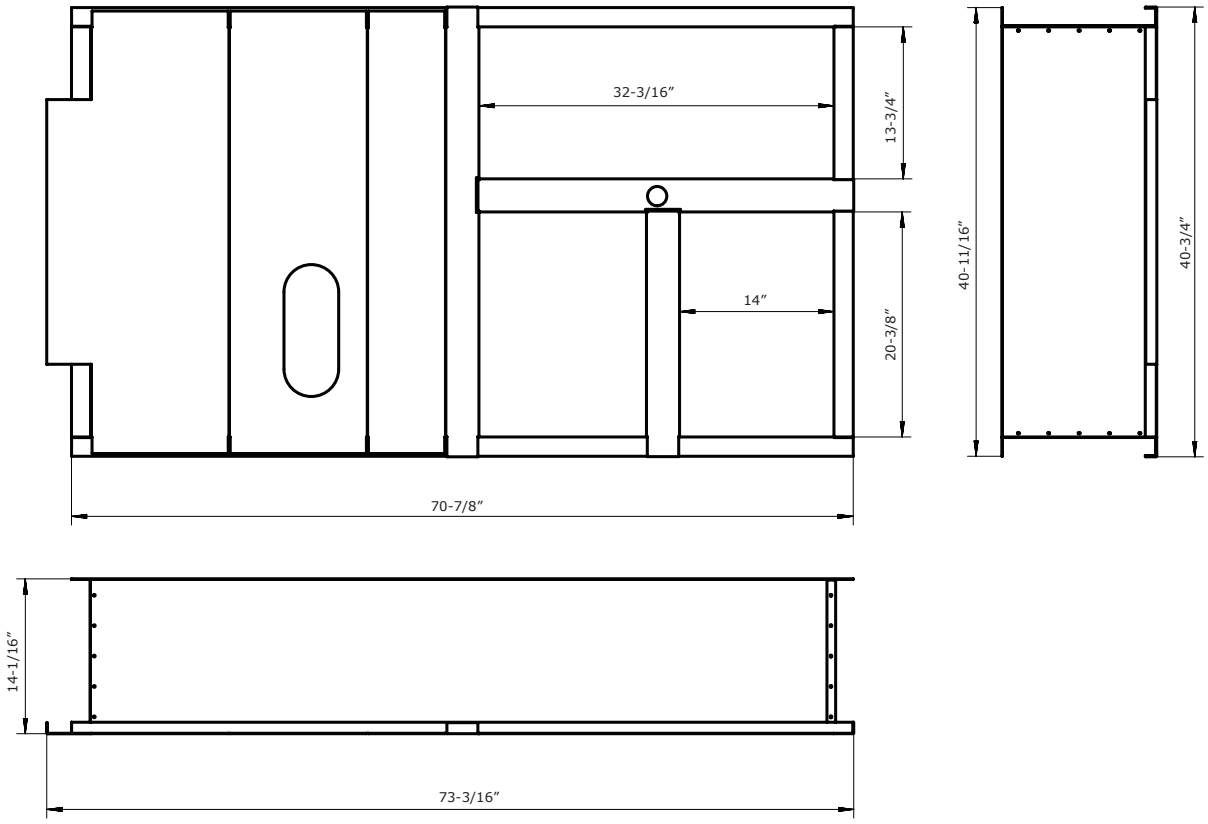


Figure 9. Roof curb (in inches)



Weights

Table 1. Maximum unit and corner weights (lb) and center of gravity dimensions (in.)

Voltage	Type	Weights (lb)[a], [b]		Corner Weights(lb)[c]				Center of Gravity (in.)	
		Shipping	Net	A	B	C	D	Length	Width
208/230V	Cooling only	540	500	116	116	128	128	38	26
	Gas heat 90K	595	555	130	132	145	142	38	27
	Gas heat 140K	606	566	131	135	150	145	39	28
460V	Cooling only	551	511	121	119	132	134	38	27
	Gas heat 90K	600	560	131	131	146	146	38	28
	Gas heat 140K	611	571	132	134	151	148	39	29

(a) Weights are approximate. Horizontal and downflow unit and corner weights may vary slightly.
(b) Weights do not include additional factory or field installed options/accessories.
(c) Corner weights are given for information only. The units must be supported continuously by a curb or equivalent frame support.

Figure 10. Corner weights

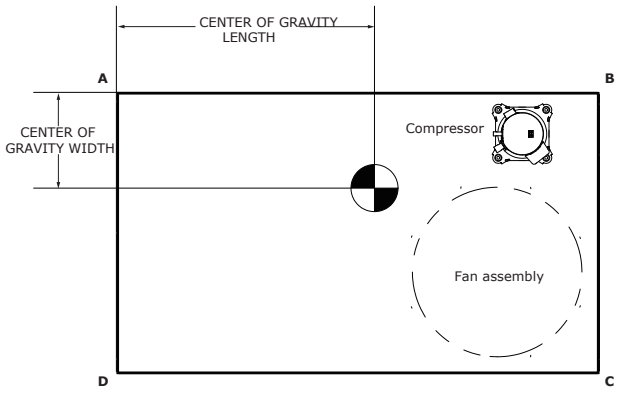
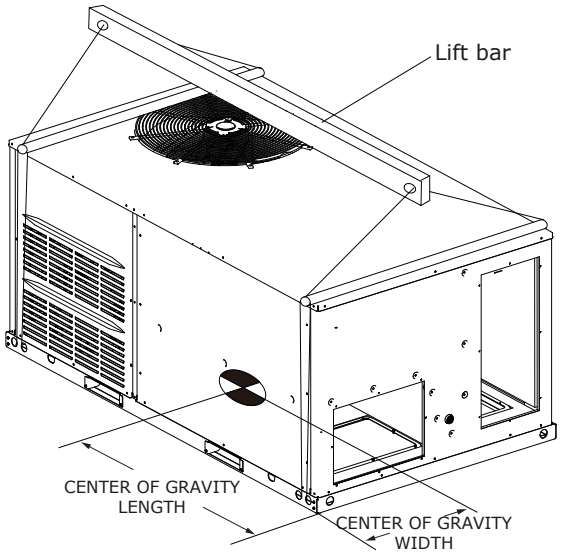


Figure 11. Rigging and center of gravity data



Rigging

⚠ WARNING

Heavy Object!

Failure to follow instructions below could result in unit dropping which could result in death or serious injury, and appliance or property-only damage.

Ensure that all the lifting equipment used is properly rated for the weight of the unit being lifted. Each of the cables (chains or slings), hooks, and shackles used to lift the unit must be capable of supporting the entire weight of the unit. Lifting cables (chains or slings) may not be of the same length. Adjust as necessary for even unit lift.

⚠ WARNING

Improper Unit Lift!

Failure to properly lift unit in a LEVEL position could result in unit dropping and possibly crushing operator/technician which could result in death or serious injury, and appliance or property-only damage.

Test lift unit approximately 24 inches (61 cm) to verify proper center of gravity lift point. To avoid dropping of unit, reposition lifting point if unit is not level.

Refer to Figure 11, p. 13 and for typical unit operating weights rigging before proceeding.

1. Remove the shipping crate from around the unit. Do not remove the crating from the top of the unit.
2. Rig the unit as shown in Figure 11, p. 13 . Attach adequate strength lifting slings to all four lifting brackets in the unit base rail. Do not use cables, chains, or slings except as shown.
3. Install a lifting bar, as shown in Figure 11, p. 13 , to protect the unit and to facilitate a uniform lift. The minimum distance between the lifting hook and the top of the unit should be 7 feet.
4. Perform a test lift of the unit to ensure proper rigging and balance. Adjust rigging as necessary.
5. Lift the unit and position it into place.
6. Downflow units: align the base rial of the appliance with the curb rail while lowering the unit onto the curb. Make sure that the gasket on the curb is not damaged while positioning the unit.

Installation

Unit Foundation

⚠ WARNING

Risk of Roof Collapsing!

Failure to ensure proper structural roof support could cause the roof to collapse, which could result in death or serious injury and property damage.

Confirm with a structural engineer that the roof structure is strong enough to support the combined weight of the roofcurb, the unit, and any accessories.

NOTICE

Water Damage!

Failure to follow instructions below could result in appliance and property damage.

Non-factory penetrations through the base of this unit are not allowed. Any penetration in the base of the unit may affect the watertight integrity of the unit and lead to water leaks into the conditioned space.

Notes:

- *For units with optional Condensate Overflow Switch (COF) accessory kit, the switch will not work properly if unit is not level or slightly sloped toward switch.*
- *To assure proper condensate flow during operation the unit and the curb must be level.*

If the unit is installed at ground level, elevate it above the snow line. Provide concrete footings at each support location with a "full perimeter" support structure or a slab foundation for support. Refer to for the unit's operating and point loading weights when constructing a footing foundation.

If anchoring is required, anchor the unit to the slab using hold down bolts or isolators. Isolators should be installed to minimize the transmission of vibrations into the building.

For rooftop applications, if anchoring is required, anchor the unit to the roof with hold-down bolts or isolators.

Check with a roofing contractor for proper waterproofing procedures.

Refer to the furnace rating plate to ensure gas connection is only the approved gas type.

Provide adequate combustion and ventilation air to the furnace space as specified in page 20 of these instructions.

Ductwork

Elbows with turning vanes or splitters are recommended to minimize air noise due to turbulence and to reduce static pressure.

When attaching the ductwork to the unit, provide a watertight flexible connector at the unit to prevent operating sounds from transmitting through the ductwork if allowed.

All outdoor ductwork between the unit and the structure should be weather proofed after installation is completed.

Note: *For sound consideration, cut only the holes in the roof deck for the ductwork penetrations. Do not cut out the entire roof deck within the curb perimeter.*

If a Curb Accessory Kit is not used:

1. The ductwork can be attached directly to the factory-provided flanges around the unit's supply and return air openings. Be sure to use flexible duct connections at the unit.
2. For "built-up" curbs supplied by others, gaskets must be installed around the curb perimeter flange and the supply and return air opening flanges.

General Unit Requirements

⚠ WARNING

PERSONAL INJURY / PROPERTY DAMAGE HAZARD

Exposing combustible (non-metal) material to the supply opening of a downflow unit can cause a fire resulting in property damage, personal injury or death.

The first 6 inches of supply air plenum and ductwork must be constructed of sheet metal as required by NFPA 90B. The supply air plenum or duct must have a solid sheet metal bottom directly under the unit with no openings, registers or flexible air ducts located in it. If flexible supply air ducts are used, they may be located only in the vertical walls of rectangular plenum, a minimum of 6 inches from the solid bottom. Metal plenum or duct may be connected to the combustible floor base; if not, it must be connected to the unit supply duct exposed to the supply air opening from the downflow unit.

For appliances using A2L REFRIGERANTS, connected via an air duct system to one or more rooms, the supply and return air shall be directly ducted to the space. Open areas such as false ceilings shall not be used as a return air duct. Keep any required ventilation openings clear of obstruction.

That pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

⚠ WARNING

For appliances containing more than for any refrigerating circuit, the manual shall include a statement advising that an unventilated area where the appliance using FLAMMABLE REFRIGERANTS is installed shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard. This shall include:

-a warning that if appliances with A2L REFRIGERANTS connected via an air duct system to one or more rooms are installed in a room with an area less than Amin as determined Clause GG.2, that room shall be without continuously operating open flames (for example an operating gas appliance) or other POTENTIAL IGNITION SOURCES (for example an operating electric heater, hot surfaces). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest;

-for appliances using A2L REFRIGERANTS connected via an air duct system to one or more rooms, a warning with the substance of the following: "Auxiliary devices which may be a POTENTIAL IGNITION SOURCE shall not be installed in the duct work. Examples of such POTENTIAL IGNITION SOURCES are hot surfaces with a temperature exceeding 700° C and electric switching devices" The manufacturer should specify other potential continuously operating sources known to cause ignition of the refrigerant used. The appliance shall be stored so as to prevent mechanical damage from occurring.

-for appliances using A2L refrigerants connected via an air duct system to one or more rooms, a warning that only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork. The manufacturer shall list in the instructions all approved auxiliary devices by manufacturer and model number for use with the specific appliance, if those devices have a potential to become an ignition source.

-a warning that if appliances connected via an air duct system to one or more rooms with A2L REFRIGERANTS are installed in a room with an area less than Amin as determined Clause GG.2. or installed in a room with an EFFECTIVE DISPERSAL VOLUME VED less than the minimum as determined Clause 101.DVN.8, that room shall be without continuously operating open flames (e.g. an operating gas appliance) or other POTENTIAL IGNITION SOURCES (for e.g. an operating electric heater, hot surfaces). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest.

The checklist listed below is a summary of the steps required to successfully install the appliance. This checklist is intended to inform the installing personnel with what is required in the installation process. It does not replace the detailed instructions called out in the applicable sections of this manual.

- ☐ Check the unit for shipping damage and material shortage; file a freight claim and notify appropriate sales representative.
- ☐ Verify correct model, options and voltage from nameplate.
- ☐ Verify that the installation location of the unit will provide the required clearance for proper operation.
- ☐ Assemble and install the roof curb (if applicable). Refer to the latest edition of the curb installers guide that ships with each curb kit.
- ☐ Fabricate and install ductwork; secure ductwork to curb.
- ☐ Rig the unit.
- ☐ Set the unit onto the curb; check for levelness.
- ☐ Ensure unit-to-curb seal is tight and without buckles or cracks.
- ☐ Install and connect a condensate drain line to the evaporator drain connection.

Main Electrical Power Requirements

- ☐ Verify that the power supply complies with the unit nameplate specifications.
- ☐ Inspect all control panel components; tighten any loose connections.
- ☐ Connect properly sized and protected power supply wiring to a field-supplied/ installed disconnect switch and to the main power terminal block in the unit control panel.
- ☐ Install proper grounding wires to an earth ground.

Note: *All field-installed wiring must comply with NEC and applicable local codes.*

⚠ WARNING

ELECTROCUTION HAZARD

Disconnect all power to unit before installing or servicing. More than one disconnect switch may be required to de-energize the appliance.
Hazardous voltage can cause severe personal injury or death.

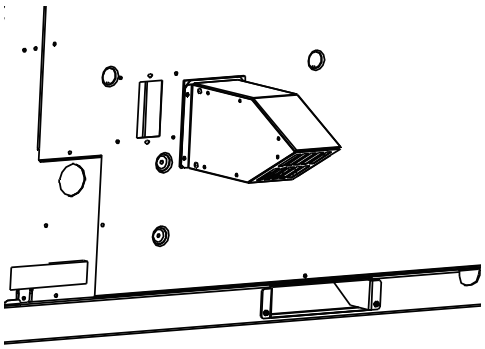
External Vent Hood Installation

1. Remove and discard the cover plate located on the gas heat panel.

   Important:

   - *Make sure you read the label located on the cover plate before you discard it.*
   - *Do not discard the fastening screws! They will be needed to install the vent hood.*

Figure 12. Vent hood installation



Vent hood in the picture is for reference. It functions to prevent rain and foreign objects from entering the appliance, and should not be changed without consultation.

Condensate Drain Configuration

A condensate drain connection is provided on each unit. Refer to "Dimensional Data," p. 8 for the appropriate drain location.

Note: *Use 1 inch PVC pipe to connect to the drain pan outlet provided in the unit. This is a slip fit joint (no threads). Do not use PVC glue to connect condensate drain, thread sealing compound or Teflon tape may be used.*

A condensate trap must be installed at the unit due to the drain connection being on the "negative pressure" side of the fan.

A condensate drain line must be connected to the P-Trap. Pitch the drain lines at least 0.5-inch for every 10 feet of horizontal run to ensure proper condensate flow. Do not allow the horizontal run to sag causing a possible doubletrap condition which could result in condensate backup due to "air lock".

Gas Heat Data

Table 2. Gas heat operating data

Heating Input Rate —Btu/h	90,000/67,500	140,000/105,000
Minimum and Maxmum Inlet Supply Gas Pressure Natural	4.5/10.5 in H_2O	4.5/10.5 in H_2O
Minimum and Maxmum Inlet Supply Gas Pressure LP	11.0/14.0 in H_2O	11.0/14.0 in H_2O
Manifold Gas Pressure[a]	3.0/1.7 in H_2O	3.4/1.9 in H_2O
Combustion Blower Suction Pressure (1st Stage)	-1.0 to -1.5 in H_2O	-1.0 to -1.5 in H_2O
Combustion Blower Suction Pressure (2nd Stage)	-1.0 to -1.5 in H_2O	-1.0 to -1.5 in H_2O
Minimum Flame Sensing Current[b]	5.0 Micro Amps DC	
Normal Sensing Current Range	8.0 to 16 Micro Amps DC	
Flue Gas Temperature Rise Above Ambient	150 to 220 °F	170 to 250 °F
Flue Gas Content of CO_2	4.5% to 8.5% (Natural Gas) 5.0% to 9.5% (Propane)	
Minimum Supply Air Temperature Across Heat Exchanger	40 °F	40 °F

[a] Staged gas heat units have a positive pressure gas valve. Never adjust the staged gas pressure valve to a negative pressure.
[b] A voltage reading across pens (V+) and (V-) is equatable to the flame sensing current. One volt equals one micro amp.

Table 3. Piping

Length of Pipe (ft)	Iron Pipe Size (IPS) Inches				
	1/2" Pipe	3/4" Pipe	1" Pipe	1¼" Pipe	1½" Pipe
15	76	176	345	750	1220
30	52	120	241	535	850
45	43	99	199	435	700
60	38	86	173	380	610
75	35	77	155	345	545

Note: Capacity of Pipe of Different Diameters and Lengths in Cu. Ft. Per Hr. with Pressure Drop of 0.3" and Specific Gravity of 0.60.

Table 4. Specific gravity multipliers

Specific Gravity	Multipliers
0.50	1.10
0.55	1.04
0.60	1.00
0.65	0.96

Figure 13. Schematic diagram for field gas piping to units

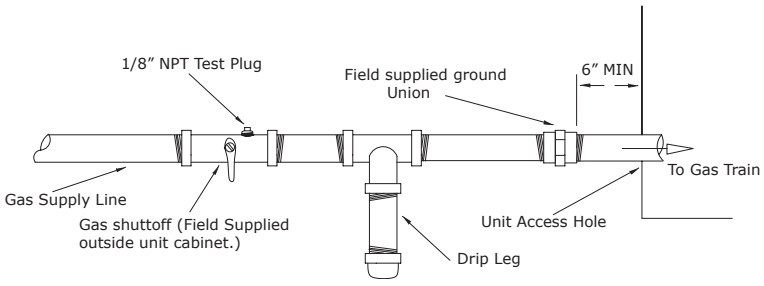
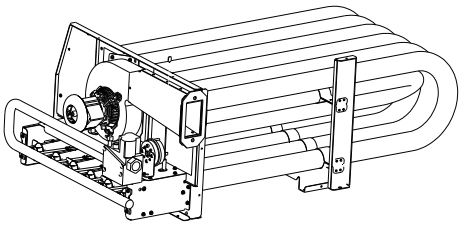


Figure 14. Typical unit gas train configuration



Combustion Airflow Path and Exhaust Path should keep open for heating

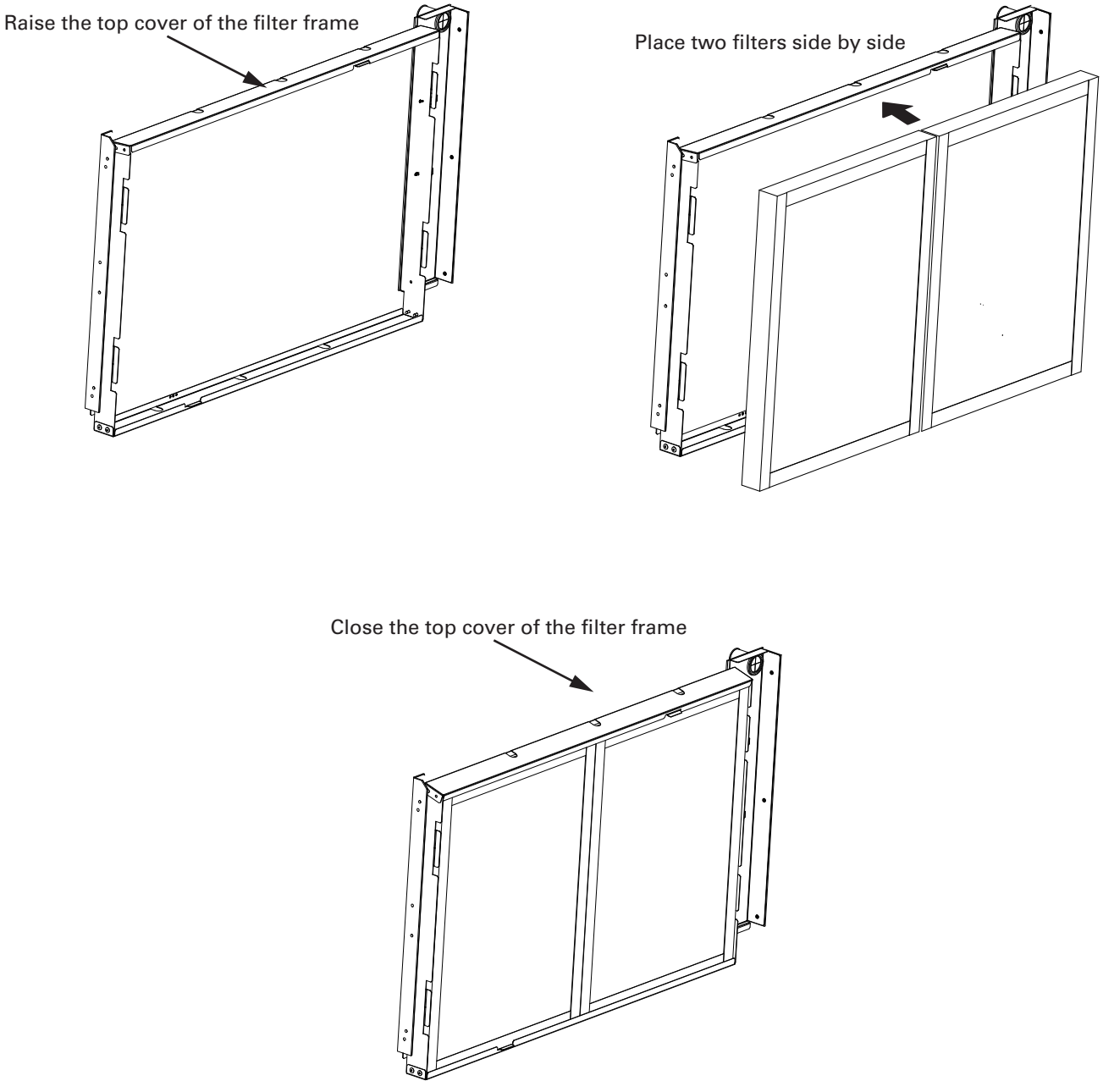
Filter Installation

The unit is equipped with a filter frame and is compatible with 2-inch filter. Access to the filters is obtained by removing the filter access panel.

Note: *Do not operate the unit without filters.*

Steps for Installing the Filter:
Step1: Raise the top cover of the filter frame;
Step2: Place two filters side by side;
Step3: Close the top cover of the filter frame

Figure 15. Filter installation



Field Installed Power Wiring

An overall dimensional layout for the standard field installed wiring entrance into the unit is illustrated in "Dimensional Data," p. 8 . To insure the unit's supply power wiring is properly sized and installed, follow the required codes outlined below.

Note: *All field installed wiring must conform to NEC guidelines as well as state and Local codes.*

Verify that the power supply available is compatible with the unit's nameplate ratings. The available supply power must be within 10 % of the rated voltage stamped on the nameplate. Use only copper conductors to connect the power supply to the unit.

⚠ WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.
Before installing or servicing the unit, always turn off all power to unit.
There may be more than one disconnect switch. Turn off accessory heater power if applicable. Lock out and tag switch with a suitable warning label.

Important: *A field supplied disconnect switch must be installed at or near the unit in accordance with the latest edition of the NEC adopted by the state.*

Main Unit Power

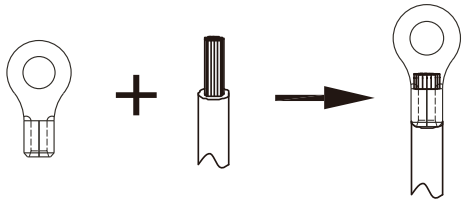
⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.
All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.
If the SUPPLY CORD is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

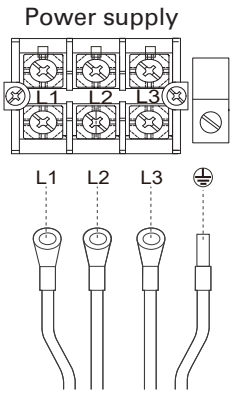
1. Use round-type terminals of the correct specifications to connect the power cable.

Figure 16. Terminal



2. The external power cables are inserted into the wiring holes of the chassis and the electric control box, and the power cables "L1, L2, L3, " and earth wire are connected to the power wiring board marked with "L1, L2, L3 " and the grounding screw next to the power wiring board correspondingly.

Figure 17. Power supply



Standard Wiring

The electrical service must be protected from over current and short circuit conditions in accordance with NEC requirements.

Protection devices must be sized according to the electrical data on the nameplate.

- A field supplied disconnect switch must be installed at or near the unit in accordance with latest edition of the NEC adopted by the state.
- Location of the applicable electrical service entrance is illustrated in "Dimensional Data," p. 8 .
- Complete the unit's power wiring connections onto either; the main terminal block inside the unit control panel, or the electric heat terminal block.
- Refer to the customer connection diagram that shipped with the unit for specific termination points.
- Provide proper grounding for the unit in accordance with local and national codes.

Control Power Transformer

The 24-volt control power transformers are to be used only with the accessories referenced in this manual.

Controls using 24 Vac

Before installing any connecting wiring, refer to "Dimensional Data," p. 8 for the electrical access locations provided on the unit and for AC conductor sizing guidelines.

NOTICE

Use Copper Conductors Only!

Failure to use copper conductors could result in equipment damage as the equipment was not designed or qualified to accept other types of conductors.

This appliance incorporates an earth connection for functional purposes only

1. Use copper conductors unless otherwise specified.
2. Ensure that the AC control wiring between the controls and the unit's termination point does not exceed three (3) ohms/conductor for the length of the run.

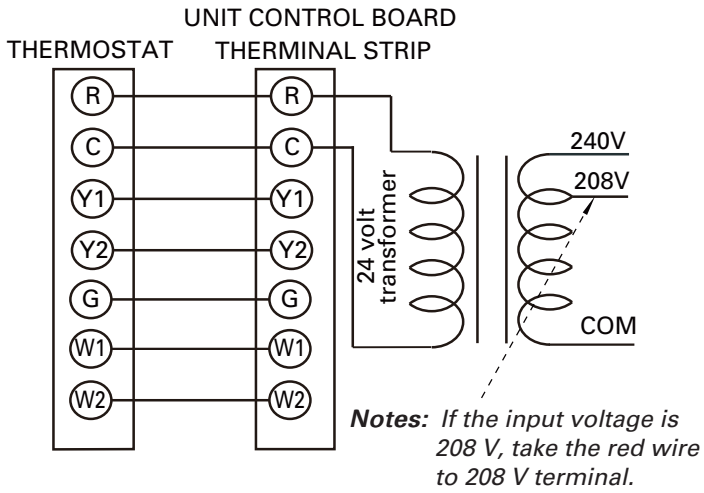
   Note: *Resistance in excess of 3 ohms per conductor could cause component failure due to insufficient AC voltage supply.*

3. Be sure to check all loads and conductors for grounds, shorts, and mis-wiring.
4. Do not run the AC low voltage wiring in the same conduit with the high voltage power wiring.

Table 5. Electromechanical thermostat 24V AC conductors with electromechanical unit

Distance from Unit to Control	Recommended Wire Size
0 - 30 feet (0 - 9.1 m)	22 gauge (0.33 mm²)
31 - 50 feet (9.5 - 15.2 m)	20 gauge (0.50 mm²)
51 - 75 feet (15.5 - 22.9 m)	18 gauge (0.75 mm²)
76 - 125 feet (23.1 - 38.1 m)	16 gauge (1.3 mm²)
126 - 200 feet (38.4 - 60.9 m)	14 gauge (2.0 mm²)

Figure 18. Conventional thermostat field wiring diagram



Voltage Imbalance

Three phase electrical power to the unit must meet stringent requirements for the unit to operate properly. Measure each leg (phase-to-phase) of the power supply.

Each reading must fall within the utilization range indicated on the nameplate. If any of the readings do not fall within the proper tolerances, notify the power company to correct this situation before operating the unit.

Excessive three phase voltage imbalance between phases will cause motors to overheat and eventually fail.

The maximum allowable voltage imbalance is 2 %. Measure and record the voltage between phases 1, 2, and 3 and calculate the amount of imbalance as follows:

% Voltage Imbalance =

$$\frac{100 \text{ X } (AV - VD)}{AV}$$ where;

AV (Average Voltage) =

$$\frac{\text{Volt 1} + \text{Volt 2} + \text{Volt 3}}{3}$$

- V1, V2, V3 = Line Voltage Readings
- VD = Line Voltage reading that deviates the farthest from the average voltage.

Example: If the voltage readings of the supply power measured 221, 230, and 227, the average volt would be:

$$\frac{221 + 230 + 227}{3} = 226$$

- VD (reading farthest from average) = 221
- The percentage of Imbalance equals:

$$\frac{100 \text{ X } 226 - 221}{226} = 2.2\%$$

The 2.2 % imbalance in this example exceeds the maximum allowable imbalance of 2.0 %. This much imbalance between phases can equal as much as a 20 % current imbalance with a resulting increase in motor winding temperatures that will decrease motor life.

If the voltage imbalance is over 2 %, notify the proper agencies to correct the voltage problem before operating this appliance.

Electrical Phasing (Three Phase Motors)

The compressor motor are factory connected for the proper rotation when the incoming power supply is phased as A, B, C.
Proper electrical supply phasing can be quickly determined and corrected before starting the unit by using an instrument such as an Associated Research Model 45 Phase Sequence Indicator and following the steps below:

⚠ WARNING

Hazardous Voltage!

Failure to disconnect power before installing or servicing could result in death or serious injury. Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

1. Turn the field supplied disconnect switch that provides power to the main power terminal block or to the "Line" side of the optional factory mounted disconnect switch to the "Off" position.
2. Connect the phase sequence indicator leads to the terminal block or to the "Line" side of the optional factory mounted disconnect switch as follows:
   - Black (phase A) to L1
   - Brown (phase B) to L2
   - Gray (phase C) to L3
3. Close the field supplied main power disconnect switch or circuit protector switch that provides the supply power to the unit.

⚠ WARNING

Live Electrical Components!

Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.
When it is necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks.

4. Observe the ABC and CBA phase indicator lights on the face of the sequencer. The ABC indicator light will glow if the phase is ABC. If the CBA indicator light glows, open the disconnect switch or circuit protection switch and reverse any two power wires.
5. Restore the main electrical power and recheck the phasing. If the phasing is correct, open the disconnect switch or circuit protection switch and remove the phase sequence indicator.

Checklist

Use the following checklist in conjunction with the general checklist ("General Unit Requirements," p. 15) to ensure that the unit is properly installed and ready for operation.

⚠ WARNING

Hazardous Voltage!

Failure to disconnect power before installing or servicing could result in death or serious injury. Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

- ☐ Check all electrical connections for tightness and "point of termination" accuracy.
- ☐ Verify that the condenser airflow is unobstructed.
- ☐ Verify that the condenser fan and indoor blower turn freely without rubbing and are properly tightened on the shafts.
- ☐ Check the fan bearings for sufficient lubrication except exhaust gas fan. If the bearings need lubricating, refer to the maintenance section of this manual for instructions.
- ☐ Verify that a condensate trap is installed and the piping is properly sized and pitched.
- ☐ Verify that the correct size and number of filters are in place.
- ☐ Inspect the interior of the unit for tools and debris and install all panels in preparation for starting the unit.

External Unit Power Supply

Unit Disconnect Wiring Plan

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/ state/national electrical codes.

Important: *All phases of this installation must comply with NATIONAL, STATE, and LOCAL CODES. In addition to local codes, the installation must comply with National Electric Code - ANSI/NFPA NO. 70 LATEST REVISION.*

1. Field connections are made by first removing the compressor access panel on the front of the unit.

   Both high and low voltage power can be routed through the front corner post where the disconnect enclosure is mounted. The hole is sized for 1 1/2–in. conduit.
2. If the conduit required for your application is larger than 1 1/2–in., remove the termination plate and connect to the larger hole using field supplied reducing washers.
3. Route the power wires and ground conductor through conduit and into the bottom of a field-installed disconnect switch. Connect the power conductors to the lugs provided. Connect the ground wire to the unit ground lug.

   Note: *Wire size for the length of run should be determined using the circuit ampacity found on the nameplate and the NEC.*
4. Route low voltage (Class II), control wiring through hole the front corner post of unit but not through high voltage conduit. Feed control wiring through bushing provided on side panel. Route wires through loose wire ties provided.
5. Tighten the wire ties. Secure the excess wire bundle under the wire ties in the outdoor section. Do not leave excess wire in the electrical enclosure. Use the unit wiring diagram to make the low voltage connections.

Through the Base Gas Utility Option

This section contains the instructions for making field connections to the Through the Base Gas Utility Option.

Field Installed Connections

⚠ WARNING

Hazardous Voltage w/Capacitors!

Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/ tagout procedures to ensure the power cannot be inadvertently energized. Verify with a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

For additional information regarding the safe discharge of capacitors, see PROD-SVB06*-EN.

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/ state/national electrical codes.

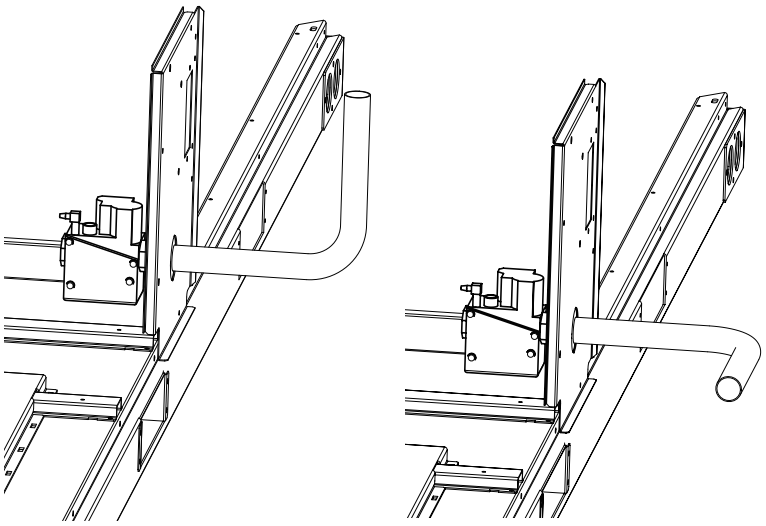
Important: *All phases of this installation must comply with NATIONAL, STATE, and LOCAL CODES. In absence oflocal codes, the installation must conform with ANSI Z223.1 /NFPA 54, and/or the Natural Gas and Propane Installation Code, CSA B149.1.*

1. Field connections are made by first removing the access panel for the heat section on the front of the unit.
2. The gas piping assembly ships inside this section and includes the shut-off valve, a pressure tap for testing, and the necessary unions for field connection.
3. Route field piping through this hole to the dimension shown in Table 6, p. 23.
4. Place the assembly through the cabinet opening as shown in Figure 19, p. 23 and make the union connection to the field piping and to the gas train. Refer to the "Heating Operation (for Gas Units) - Standard Economizer," p. 29 for startup instructions.

Table 6. Through the base gas piping dimension

Model	Dimension
5 Tons	1 3/16–in.

Figure 19. Through the base gas piping installation



Flue gas temperature is high, shall avoid high temperature flue gas directly blowing to the gas pipelines when installing gas pipelines.

Refrigerant Sensor

⚠ WARNING

PERSONAL INJURY OR PROPERTY DAMAGE HAZARD

Failure to follow proper R-454B mitigation system installation instructions can result in property damage, personal injury, or death.
If any fault codes are listed, please troubleshoot to resolve system malfunction.

⚠ CAUTION

When the refrigerant sensor detects a refrigerant leak, the device will shut down the compressor, outdoor fan motor, electric auxiliary heat or gas heating, and run the indoor fan at the highest speed, and the digital tube displays b7.

When the main control cannot communicate with the refrigerant sensor, the device will shut down the compressor, outdoor fan motor, electric auxiliary heat or gas heating, and run the indoor fan at the highest speed, and the digital tube displays b4.

When the main control receives the service life expiration of the refrigerant sensor, the device will shut down the compressor, outdoor fan motor, electric auxiliary heat or gas heating, and run the indoor fan at the highest speed, and the digital tube displays b8. In this case, you need to replace a sensor.

When the main control reads that the refrigerant sensor has other fault information, the device will shut down the compressor, outdoor fan motor, electric auxiliary heat or gas heating, and run the indoor fan at the highest speed, and the digital tube displays b3.

⚠ WARNING

Appliance must be powered except for service. Continuous air circulation required for proper functioning. Appliance must be powered except for service. This appliance is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

⚠ CAUTION

The refrigerant leakage sensor can only use the factory model or the specified model indicated in the corresponding manual.

The R454B refrigerant leakage sensor must be used to activate the refrigerant shut-off device, the alarm device, incorporated circulation airflow or other emergency controls, which shall send signal at a predetermined threshold in response to leaked refrigerant.

The installation of the refrigerant leakage sensor shall allow access for checking, repair or replacement by an authorized person.

The refrigerant leakage sensor shall be installed so its function can be verified easily.

The refrigerant leakage sensor shall be protected to prevent tampering or unauthorized resetting of the pre-set value.

To be effective, the refrigerant leakage sensor must be electrically powered at all times after installation, other than when servicing.

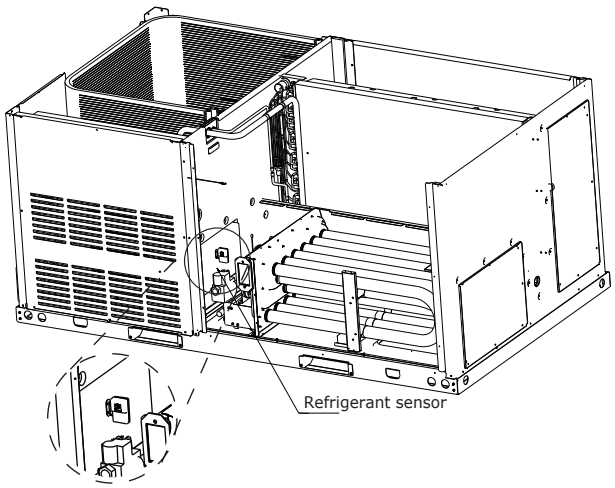
The refrigerant leak sensor has a service life of 15 years and must be replaced at the end of its service life or earlier if a fault is detected.

⚠ CAUTION

If the refrigerant leakage sensor detects a refrigerant leak, tthe appliance will shut off operation of the compressor, outdoor fan motor, electric auxiliary heat or gas heating, and run the indoor fan at the highest speed. You

should immediately leave the leak area and notify a qualified professional for repair.

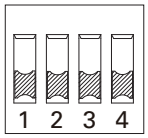
Figure 20. Refrigerant sensor installation position



Pre Start

Dip Switches Setting

After installation, please refer to the guide and check the controler PCB for the dip switches settings before the fist startup.



1. The DIP switches SW1-1, 1-2 are used to set the type of the unit which as follows.

Table 7. Machine's address setting

SW1-1	SW1-2	Unit's type
OFF	OFF	Cool only
OFF	ON	Cool only
ON	OFF	Gas heat(90K)
ON	ON	Gas heat(140K)

2. The DIP switches SW1-3, 1-4 are used to select the indoor blower's taps. The definitions of the DIP switches are as follows. Please refer to the airflow performance table(Table 12) for the target air volume at different taps.

Table 8. Indoor blower taps setting

SW1-3		OFF	OFF	ON	ON
SW1-4		OFF	ON	OFF	ON
Description		LOW	MEDIUM LOW	MEDIUM	HIGH
Taps in air distribution mode		2	3	4	5
Taps in cooling mode	First stage	1	1	2	3
	Second stage	2	3	4	5
Taps in gas heating mode of 90K units		2	4	4	4
Taps in gas heating mode of 140K units		3	5	5	5
Taps in electrical heating mode		5	5	5	5

The Button Function Description



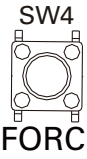
1. The button SW3 (CHECK) is used for checking the unit operating parameters by pressing it one by one. Please refer to the check lists as follows.

The first time you press the "Check" button, it will display the sequence, and after 1 second it will display the value of the parameter. If you press the "Check" button again, it will display the next parameter.

After 20 seconds on same parameter, display will revert back to normal status.

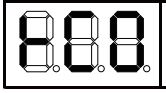
Table 9. Check list

NO.	Description	Unit
0	Unit Model: 208/230V Standard Static Unit: N3L 208/230V High Static Unit: N3H 460V Standard Static Unit: N4L 460V High Static Unit: N4H Undefinition: - - -	-
1	- - -(Reserved)	-
2	Indoor Ambient Temperature(T1)	℉
3	Evaporator Coil Temperature(T2)	℉
4	Condenser Coil Temperature(T3)	℉
5	Outdoor Ambient Temperature(T4)	℉
6	Compressor Discharge Temperature(T5)	℉
7	Electronic Expansion Valve Steps	-
8	Outdoor Fan Speed Taps	-
9	Indoor Fan Speed Taps	-
10	- - -(Reserved)	-
11	The Last Fault Code	-
12	The Second-To-Last Fault Code	-
13	The Third-To-Last Fault Code	-
14	The Fourth-To-Last Fault Code	-
15	The Fifth-To-Last Fault Code	-
16	Mainboard Software Version	-
17	Driver Board Software Version	-
18	AC Voltage	V
19	- -(Check Finish)	-



2. The button SW4 (FORCE) is used to activate the Forced Mode. When the FORCE button is short-pressed, the unit will run the Forceed Mode 1 for 120min. During the 120-minute period, if the FORCE button is short-pressed again, the unit will run the Forced Mode 2 for 120min. Similarly, during these 120 minutes, if the FORCE button is short-pressed again, the unit will run the Forced Mode 3 for 120min. When in Forced Mode 3, a short press of the FORCE button will exit the Forced Mode. In addition, any forced mode will automatically exit after running for 120 minutes without any operation.

Table 10. Force Mode description

Digital Code	Force Mode	description
	Force Mode 1	Run indoor fan only
	Force Mode 2	Run outdoor fan only
	Force Mode 3	Run cooling mode

NOTICE

The Forced Mode can only be activated within the initial 30 minutes following powering on the appliance.

3.The button SW4 (FORCE) is also used to activate the indoor blower taps automatic adjustment function by pressing the FORCE button for 6 seconds. After activating the function, The LED will display the current control mode. Short-pressing the FORCE button again to switch the control mode and staying in the selected mode for 3 seconds to confirm.

Table 11. Indoor blower taps adjustment mode setting

Digital Code	Control Mode
HCT	Manual Control
ACT	Automatic Adjustment

Verifying Proper Air Flow

Much of the systems performance and reliability is closely associated with, and dependent upon having the proper airflow supplied both to the space that is being conditioned and across the evaporator coil.

The air flow is changed by setting the SW1-3,1-4.

Before starting the SERVICE TEST, set the minimum position setpoint for the economizer to 0% using the setpoint potentiometer located on the Economizer Control (ECA), if applicable.

⚠ WARNING

FIRE OR EXPLOSION HAZARD

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

Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections. A fire or explosion may result causing property damage, personal injury or loss of life.

Electromechanical Controls – Test Procedure

Fan Test and Minimum Ventilation. Connect a jumper wire between R and G.

Connect a jumper wire between R and Y1.

Cool 1. Connect a jumper wire between R and Y1.

Cool 2. Connect a jumper wire between R and Y2.

Heat 1. Connect a jumper wire between R and W1.

Heat 2. Connect a jumper wire between R and W2.

Table 12. Air flow

Cooling only unit

Speed Taps	CFM	Blower Performance Under Dry Coil Without Filter										
		ESP(in.H_2O)	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
1	1500	Speed(RPM)	695	769	829	879	930	976	1018	1061	1101	1143	1186
		Power(W)	216	249	284	312	344	374	404	435	468	502	538
2	1650	Speed(RPM)	748	824	883	931	978	1025	1065	1108	1147	1182	1220
		Power(W)	268	312	351	385	420	456	487	526	560	594	628
3	1800	Speed(RPM)	810	887	944	990	1034	1077	1118	1159	1195	1229	1263
		Power(W)	339	393	438	476	513	551	590	629	666	700	743
4	1950	Speed(RPM)	878	952	1007	1048	1088	1128	1166	1206	1243	1281	1318
		Power(W)	429	490	540	578	620	659	700	744	788	832	879
5	2050	Speed(RPM)	918	993	1048	1089	1129	1169	1206	1245	1283	1319	1351
		Power(W)	496	563	618	661	707	751	793	841	888	936	981

Cooling and Gas Heating Unit

Speed Taps	CFM	Blower Performance Under Dry Coil Without Filter										
		ESP(in.H_2O)	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
1	1500	Speed(RPM)	767	829	895	944	992	1037	1082	1125	1165	1203	1242
		Power(W)	253	289	331	364	401	437	474	512	550	586	625
2	1650	Speed(RPM)	836	908	957	1004	1050	1091	1133	1173	1212	1249	1286
		Power(W)	327	377	415	453	492	530	570	612	653	693	734
3	1800	Speed(RPM)	902	969	1018	1062	1105	1146	1185	1223	1260	1296	1331
		Power(W)	411	468	510	551	594	638	682	725	768	814	859
4	1950	Speed(RPM)	990	1041	1083	1126	1167	1206	1243	1281	1316	1350	1384
		Power(W)	531	585	626	674	721	770	815	867	910	964	1015
5	2050	Speed(RPM)	1043	1091	1132	1174	1209	1246	1282	1320	1354	1387	1420
		Power(W)	622	674	722	771	816	865	914	966	1017	1068	1129

Cooling only unit(Oversize Motor)

Speed Taps	CFM	Blower Performance Under Dry Coil Without Filter										
		ESP(in.H_2O)	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2
1	1500	Speed(RPM)	1132	1166	1199	1232	1270	1307	1343	1378	1410	1443	1474
		Power(W)	548.9	579	613.3	646	685	727.2	769.1	813.1	855.3	895.8	937.1
2	1650	Speed(RPM)	1158	1200	1234	1266	1298	1329	1359	1391	1424	1457	1489
		Power(W)	629.4	675.2	713.7	749.6	789.9	823	861.2	904.2	947.6	992.7	1039.5
3	1800	Speed(RPM)	1176	1217	1258	1298	1334	1365	1397	1426	1454	1480	1508
		Power(W)	709.2	752.7	808.6	853.7	906.1	951.8	993.4	1033.8	1076.9	1113.6	1156.7
4	1950	Speed(RPM)	1200	1241	1278	1319	1356	1395	1426	1461	1491	1519	1543
		Power(W)	805.5	859.7	903.1	958.9	1008.4	1071.1	1117.3	1181	1224.5	1274.9	1318.4
5	2050	Speed(RPM)	1218	1259	1296	1337	1375	1408	1445	1482	1514		
		Power(W)	876.3	930.7	982.5	1040.3	1099.6	1148.5	1208.5	1269.4	1324.2		

Cooling and Gas Heating Unit(Oversize Motor)

Speed Taps	CFM	Blower Performance Under Dry Coil Without Filter										
		ESP(in.H_2O)	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2
1	1500	Speed(RPM)	1140	1177	1215	1253	1297	1332	1365	1397	1430	1463	1495
		Power(W)	586	622	664	707	757	801	847	889	935	979	1029
2	1650	Speed(RPM)	1172	1209	1243	1277	1311	1344	1379	1416	1448	1478	1509
		Power(W)	681	722	766	806	852	893	942	1000	1047	1090	1143
3	1800	Speed(RPM)	1209	1243	1276	1308	1340	1371	1403	1434	1465	1497	1529
		Power(W)	791	834	877	922	969	1012	1062	1110	1160	1216	1271
4	1950	Speed(RPM)	1251	1284	1315	1345	1376	1406	1437	1467	1495	1525	1554
		Power(W)	919	964	1010	1055	1102	1158	1209	1260	1315	1367	1425
5	2050	Speed(RPM)	1281	1314	1344	1373	1402	1433	1461	1487			
		Power(W)	1018	1072	1116	1165	1214	1269	1316	1368			

Start Up

Electromechanical Controls - Sequence Of Operation

These units are offered with electromechanical controls.

Cooling without an Economizer

When the thermostat switch is set to the "Cool" position and the zone temperature rises above the cooling setpoint, the thermostat Y contacts close. The compressor contactor (CC) coil is energized provided the low pressure control (LPC), high pressure control (HPC) are closed. When the CC contacts close, compressor (CPR) and both outdoor fan motor (ODM) start.

Evaporator Fan Operation (for Gas Units) - Standard Economizer

Economizer is a field installed accessory. Refer to the following economizer information when the accessory kit is installed.
When the thermostat fan selection switch is set to the "Auto" position, in the cooling mode，the thermostat outputs the G signal simultaneously with the Y signal, when the Y signal disappears, G signal disappears as well. In the heating mode, the thermostat only outputs the W signal, and the ignition module(IGN) outputs the G signal 45 seconds after gas ignition.
When the thermostat fan selection switch is set to the "On" position, the thermostat will always outputs the G signal.
When the control board detects the G signal, it sends a start-up command to the fan driver board. When the G signal disappears, the control board will send a shutdown command to the fan driver board after a 90-second delay. The fan drive board will control the indoor fan motor to turn on and off according to the instructions from the control board.

Evaporator Fan Operation (for Cooling Only Units) - Standard Economizer

Economizer is a field installed accessory. Refer to the following economizer information when the accessory kit is installed.
When the thermostat fan selection switch is set to the "Auto" position, in the cooling mode，the thermostat outputs the G signal simultaneously with the Y signal, when the Y signal disappears, G signal disappears as well. In the heating mode, the thermostat outputs the G signal simultaneously with the W signal，when the Y signal disappears, G signal disappears as well.
When the thermostat fan selection switch is set to the "On" position, the thermostat will always outputs the G signal.
When the control board detects the G signal, it sends a start-up command to the fan driver board. When the G signal disappears, the control board will send a shutdown command to the fan driver board after a 90-second delay. The fan drive board will control the indoor fan motor to turn on and off according to the instructions from the control board.

Cooling with an Economizer - Standard Economizer

The economizer is utilized to control the zone temperature providing the outside air conditions are suitable. Outside air is drawn into the unit through modulating dampers.
When cooling is required and economizing is possible, the unit economizer module (RTEM-EM) opens the economizer damper. The RTEM-EM continues to modulate the economizer damper open/closed to keep the mixed air temperature in the 50°F to 55°F range. The thermostat will close the Y2 contacts to turn on CC if mechanical cooling is required.
If economizing is not possible, the RTEM-EM drives the damper to the minimum position setpoint when the indoor fan is running and allows mechanical cooling operation.

Heating Operation (Units with Electric Heat) - Standard Economizer

When the system switch is set to the "Heat" position and the zone temperature falls below the heating setpoint, the thermostat closesW1 contacts the first stage electric heat contactor (AH or AH and CH) is energized. If the first stage of electric heat cannot satisfy the heating requirement, the thermostat closes W2.

When the W2 contacts close, the second stage electric heat contactor (BH or BH and DH) is energized, if applicable. The thermostat cycles both the first and second stages of heat "On" and "Off" as required to maintain the zone temperature setpoint.

Heating Operation (for Gas Units) - Standard Economizer

When the system switch is set to the "Heat" position and the zone temperature falls below the heating setpoint, the IGN initiates a heat cycle.

Ignition Module Low, Medium and High Heat

Two-stage IGN runs self-check (including verification that the gas valve is de-energized). IGN checks the high-limit switches (TC01 and TC01) for normally closed contacts, the pressure switch (PS) for normally open contacts, and the flame rollout (FR) switch for continuity. IGN energizes inducer blower on high speed to check pressure switch closure. If the pressure switch is closed, the inducer blower starts a 20 second pre-purge (15 seconds on high speed followed by 5 seconds on low speed).

If the PS is still open, the inducer blower will continue to be energized on high speed until pressure switch closure.

After pre-purge completes, the IGN energizes the first stage of the gas valve, initiates spark for 2 seconds minimum, 7 seconds maximum (ignition trial) and detects flame and de-energizes spark. From this point, a fixed 45 second indoor blower delay on timing starts.

After the indoor blower delay on is completed, the IGN energizes the indoor blower. The IGN enters a normal operating loop where all inputs are continuously monitored. If the first stage of gas heat cannot satisfy the heating requirement, the thermostat closes W2. The IGN energizes the second stage of the gas valve and the second stage ofinducer blower.

When the zone thermostat is satisfied, the IGN de-energizes the gas valve. The IGN senses loss of flame. The IGN initiates a 5 second inducer blower post purge and 90 second indoor blower delay off at current speed. The IGN de-energizes the inducer blower at the end of the post purge. The IGN de-energizes the indoor blower at the end of the selected indoor blower delay off.

Table 13. Ignition module diagnostics

Slow flash	Normal, call for heat.
Two blinks	System lockout (failure to detect or sustain flame)
Three blinks	Pressure switch problem detected.
Four blinks	High limit switch protection device open.
Five blinks	Flame sensed and gas valve not energized or flame sensed and no "W" signal.
Six blinks	Flame rollout switch open.
Seven blinks	switch open (W1 and W2 swapped)

Low Pressure Cutout

The low pressure cutout is wired in series to the control board detection circuit.
If this circuit is open before the compressor is started, the compressor will not be allowed to operate.
Anytime this circuit is opened, the compressor is turned off immediately.

High Pressure Cutout and Temperature Discharge Limit

The high pressure cutout is wired in series between the compressor relay and the compressor contactors. If the high pressure cutout opens, the compressor is turned off.
The Discharge temperature sensor is connected to the control board. If the control board detects that the discharge temperature exceeds the limit, the compressor will be turned off.

Emergency Stop

This input can be activated by opening a field supplied device.

Compressor Start-Up

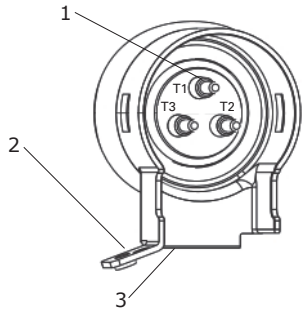
1. Attach a set of service gauges onto the suction and discharge gauge ports.

   Scroll Compressors

   a. Once each compressor has started, verify that the rotation is correct. If wired correctly the suction pressure should drop and the discharge pressure should rise. If a scroll compressor is rotating backwards, it will not pump and a loud rattling sound can be observed.

   b. If the electrical phasing is correct, before condemning a compressor, interchange any two leads (at the compressor Terminal block) to check the internal phasing. Refer to the following illustration for the compressor terminal/phase identification. Do not allow the compressor to operate backwards for more than 5 seconds. Operation for a period of time longer than this will result in compressor damage.

Figure 21. Compressor terminal box



1. Spade connectors 1/4–in.
2. Ground connection
3. Power cable passage

Table 14. Compressor types and POE Oil recharge amount（fl.oz.)

Voltage	Compressor	Oil amount
208/230V	STDC051T1ULB	41.9
460V	STDC051X1ULB	41.9

2. After the compressor and condenser fan have started and operated for approximately 30 minutes, observe the operating pressures. Compare the operating pressures to the operating pressure curve.
3. Check system subcooling.
4. To stop the SERVICE TEST, turn the main power disconnect switch to the "Off" position or proceed to the next component start-up procedure. Remove electromechanical test mode connections (if applicable).

Heating Start-Up

When starting the unit for the first time or servicing the heaters, it is a good practice to start the heater with the main gas supply turned "Off". Once the ignition system and components have been checked, open the main power disconnect switch to reset the unit.

Final System Set Up

After completing all of the pre-start and startup procedures outlined in the previous sections (i.e., operating the unit in each ofits modes through all available stages of cooling and heating), perform these final checks before leaving the appliance:

☐ Inspect the unit for misplaced tools, hardware, and debris.

☐ Verify that all exterior panels including the control panel doors and condenser grilles are secured in place.

☐ Close the main disconnect switch or circuit protector switch that provides the supply power to the appliance's terminal block or the appliance mounted disconnect switch.

Electric Heater Kit

⚠ WARNING

A circuit breaker that meets the requirements must be installed.
No responsibility will be assumed for quality issues caused by the use of third-party Electric heater kits.

Table 15. Electric heater kit breaker information

NO.	Kit	Description	Breaker	FUSE
1	EHK-08C(UL)	240V 7.5kW Heater	Max. 240 V, 60 A, 3 P	/
2	EHK-10C(UL)	240V 10kW Heater	Max. 240 V, 60 A, 3 P	/
3	EHK-15C(UL)	240V 15kW Heater	Max. 240 V, 60 A, 3 P	/
4	EHK-20C(UL)	240V 20kW Heater	Max. 240 V, 60 A, 3 P	/
5	EHK-08F(UL)	460V 7.5kW Heater	/	600V, 30A
6	EHK-10F(UL)	460V 10kW Heater	/	600V, 30A
7	EHK-15F(UL)	460V 15kW Heater	/	600V, 30A
8	EHK-20F(UL)	460V 20kW Heater	/	600V, 30A

NOTE:
1. When the appliance receives W1/W2 signal, electric heater will be energized and indoor blower will be turned on.
2. When W1/W2 signal is off, indoor blower will be turn off after 90 seconds delay.
3. Blower motor runs when G signal is energized, and 90 second off-delay when G signal is de-energized

Electric heater kit installation information

Installation of electric heat sections must conform with standard in National Fire Protection Association (NFPA) Standard for Installation of Air Conditioning and Ventilation Systems NFPA No. 90A, Standard for the Installation of Residence Type Warm Air Heating and Air Conditioning System NFPA No. 90B, manufacturer's installation instructions and local municipal building codes. Heaters are approved for clearance to combustible materials as listed on heater rating plate. Accessibility and service clearances must take precedence over fire protection clearances. All wiring must conform with local codes and the National Electric Code (NEC). ANSI–C1–1978.

⚠ CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

The circuit breaker of electric heater kit in indoor unit cannot be used as air switch for power cables and cannot be operated by users. Maintenance personnel need to disconnect the main switch before servicing.

If install a third-party electric heater kit, ensure that all components used of the electric heater kit meet the A2L class flammable refrigerant regulations.

Installation

⚠ WARNING

Supply circuit power wiring must be 167 ℉ (75 °C) minimum copper conductors only. See nameplate for Electrical Data for ampacity, wire size and circuit protector requirement. Supply circuit protective devices may be either fuses or "HACR" type circuit breakers.

NOTICE

Installing the electric heater before installing the air outlet duct system.
Refer to the unit nameplate for minimum circuit ampacity, and maximum fuse or circuit breaker (HACR TYPE per NEC).
Install power cords and properly sized disconnect switch and breaker.

⚠ WARNING

Installation and servicing of air conditioning equipment can be hazardous due to internal refrigerant pressure and live electrical components. Only trained and qualified service personnel should install or service this equipment. Installation and service performed by unqualified persons can result in property damage, personal injury, or death.
Risk of electrical shock. Disconnect all remote power supplies before installing or servicing any portion of the system.
Failure to disconnect power supplies can result in property damage, personal injury, or death.
Fire Hazard. Use of aluminum wire with this product may result in a fire, causing property damage, severe injury or death. Use copper wire only with this product.
Can cause injury or death. Unit must be properly ground in accordance with national and local codes. Natural grounding poles embedded in the ground can be used, but do not connect the ground wire to the following locations:
(a) Pipes of flammable or explosive gases, which may otherwise lead to an explosion or fire.
(b) Insulated plastic pipes, otherwise there is no grounding effect.
(c) Telephone line or lightning rod, otherwise it will be dangerous for increasing the ground potential during lightning strikes.

⚠ WARNING

During installation, testing, servicing, and troubleshooting of this product, it may be necessary to work with live electrical components. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.
After installing the unit, cheak all screws of breaker and make sure all screws are properly tight. Failure to do so can result in breaker malfunction, fire, death, personal injure or property damage.

⚠ CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

Avoid sharp metal edges for wires to prevent wear, as it may lead to a short circuit or electric leakage, causing danger.

Wires should be secured well. Otherwise, the connectors may be loose or the terminal may be damaged when they are pulled.

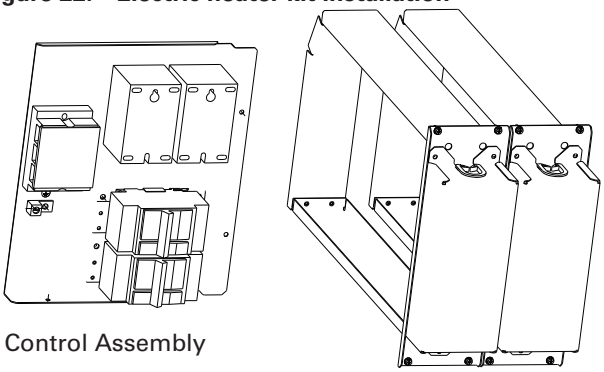
NOTICE

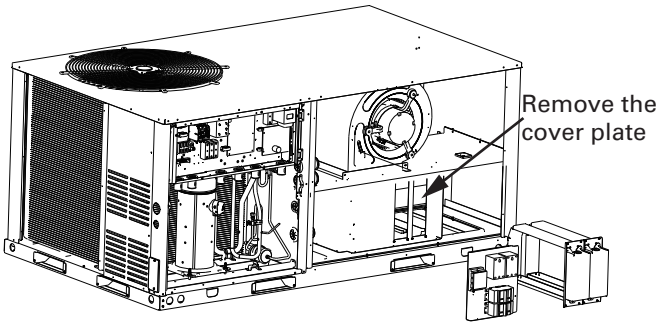
Electrostatic discharge can affect electronic components. Take care during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Touch hand and all tools on an unpainted unit surface before performing any service procedure to neutralize electrostatic charge.

Do not add phase junction capacitors, otherwise it may cause serious damage to the product.

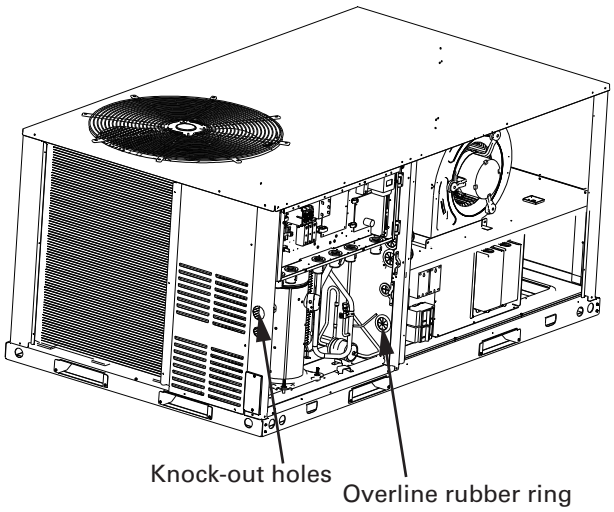
Step 1 : Installation of the Control Assembly and the Electric Heating Assembly
Install the Control Assembly into the unit as shown in the diagram. Tighten the screws in the pre-drilled screw holes on the sheet metal inside the unit (2 screws for the electric heating assembly installation sheet metal, 1 screw for the chassis);
Remove the cover plate on the electric heating assembly installation sheet metal according to the drawing, slide the heating component along the support frame to the end, and then screw it in place on the panel.
Connect the Control Assembly and the Electric Heating Assembly and the electric control box of the unit according to the wiring label.

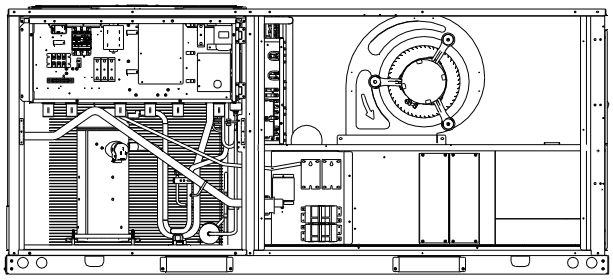
Figure 22. Electric heater kit installation





Step 2 : Power supply wiring
Remove the knock-out holes, use a crimping band to tie the power line to the bottom of the electronic control box to prevent the power line from being scattered randomly. Also, remove the knock-out holes on the partition board. After installing the overline rubber ring, pass the power line through the overline rubber ring. Then, use a crimping band to tightly wrap the protective sleeve of the overline rubber ring and connect the power line to the terminal block according to the wiring label.





NOTICE

Air-conditioning systems require a specified airflow. Each ton of cooling requires between 350 and 450 cubic feet of air per minute(CFM), or 400 CFM nominally.

Maintenance

⚠ WARNING

PERSONAL INJURY / PROPERTY DAMAGE HAZARD

Failure to follow this warning could result in property damage, personal injury, or death.
For continued performance, reliability, and safety, the only approved accessories and replacement parts are those specified by the equipment manufacturer. The use of non-manufacturer approved parts and accessories could invalidate the equipment limited warranty and result in fire risk, equipment malfunction, and failure. Please review manufacturer's instructions and replacement part catalogs available from your equipment supplier. Equipment maintenance and repair can only be carried out according to the methods recommended by the equipment manufacturer.

⚠ 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.**

NOTICE

Servicing shall be performed only as recommended by the manufacturer.

Make sure all personnel are standing clear of the unit before proceeding. The system components will start when the power is applied.

The manual shall contain specific information about the required qualification of the working personnel for maintenance, service and repair operations.
Every working procedure that affects safety means shall only be carried out by competent persons.
Examples for such working procedures are:
- breaking into the refrigerating circuit.
- opening of sealed components.
- opening of ventilated enclosures.

⚠ WARNING

Electrical components that can arc or spark, which are not considered ignition sources due to compliance with IEC 60335-2-40, section 22.116.1 points b), c), d), or f) shall only be replaced with parts specified by the appliance manufacturer. Replacement with other parts can result in the ignition of refrigerant in the event of a leak.

⚠ WARNING

PERSONAL INJURY / PROPERTY DAMAGE HAZARD

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the REFRIGERATING SYSTEM, the following precautions shall be completed prior to conducting work on the system.

- Work procedure

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

- General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

- Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

- Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

⚠ WARNING

- No ignition sources

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

- Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

- Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.
The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS: the ventilation machinery and outlets are operating adequately and are not obstructed; if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant; marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected; refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded.

⚠ WARNING

- Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.
Initial safety checks shall include:
- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- That no live electrical components and wiring are exposed while charging, recovering or purging the system;
- That there is continuity of earth bonding.

⚠ WARNING

Sealed electrical components shall be replaced.

Sealed electrical components shall not be repaired.

Intrinsically safe components must be replaced.

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Under no circumstances shall potential sources of ignition be used while searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)
Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.
Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated for the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

⚠ WARNING

If a leak is suspected, all naked flames shall be removed/extinguished.

If a leakage of refrigerant which requires brazing is found, all of the refrigerant shall be recovered from the system, or isolated(by means of shut off valves) in a part of the system remote from the leak.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

NOTE: Examples of leak detection fluids are
-bubble method,
-fluorescent method agents.

If a leak is suspected, all naked flames shall be removed/extinguished.
If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
Removal of refrigerant shall be according to UL 60335-2-40, Clause DD.9.

⚠ WARNING

When breaking into the refrigerant circuit to make repairs - or for any other purpose-conventional procedures shall be used.
However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:
- safely remove refrigerant following local and national regulations.
- evacuate.
-purge the circuit with inert gas.
- evacuate.
- continuously flush or purge with inert gas when using flame to open circuit; and.
- open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

⚠ WARNING

Ensure that contamination of different refrigerants does not occur when using charging equipment.
Hoses or lines shall be as short as possible to minimise the amount of refrigerant they contain.

Cylinders shall be kept upright. Ensure that the refrigeration system is grounded prior to charging the system with refrigerant.

⚠ WARNING

Label the system when charging is complete (if it is not already labeled).

Charge the refrigerant according to the quantity indicated on the nameplate.

Take extreme care not to overfill the refrigeration system.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant.
It is essential that electrical power is available before the task is commenced.
a) Become familiar with the equipment and its operation.
b) Isolate system electrically.
c) Before attempting the procedure ensure that:
– mechanical handling equipment is available, if required, for handling refrigerant cylinders;
– all personal protective equipment is available and being used correctly;
– the recovery process is supervised at all times by a competent person;
– recovery equipment and cylinders conform to the appropriate standards.
d) Pump down refrigerant system, if possible.
e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
f) Make sure that the cylinder is situated on the scales before recovery takes place.
g) Start the recovery machine and operate it in accordance with the manufacturer's instructions.
h) Do not overfill cylinders. (No more than 80% volume liquid charge).
i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
j) When the cylinders have been filled correctly and the process has been completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

⚠ WARNING

Equipment shall be labeled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed.
Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e.special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.
If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Monthly Maintenance

Before completing the following checks, turn the unit OFF and lock the main power disconnect switch open.

⚠ WARNING

Hazardous Voltage!

Failure to disconnect power before servicing could result in death or serious injury.
Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

Filters

Inspect the return air filters. Clean or replace them if necessary.

Cooling Season

- ☐ Check the unit's drain pans and condensate piping to ensure that there are no blockages.
- ☐ Inspect the evaporator and condenser coils for dirt, bent fins, etc. If the coils appear dirty, clean them according to the instructions described in "Coil Cleaning" later in this section.
- ☐ Manually rotate the condenser fans to ensure free movement and check motor bearings for wear. Verify that all of the fan mounting hardware is tight.
- ☐ Inspect the F/A-R/A damper hinges and pins to ensure that all moving parts are securely mounted. Keep the blades clean as necessary.

⚠ WARNING

Rotating Components!

Failure to disconnect power before servicing could result in rotating components cutting and slashing technician which could result in death or serious injury.
During installation, testing, servicing and troubleshooting of this product it may be necessary to work with live and exposed rotating components. Have a qualified or licensed service individual who has been properly trained in handling exposed rotating components, perform these tasks.

NOTICE

Equipment Damage!

Forcibly turning the motor shaft can damage the gear train and motor beyond repair.
Never turn the motor shaft by hand or with a wrench.

- ☐ Verify that all damper linkages move freely; lubricate with white grease, if necessary.
- ☐ Check supply fan motor bearings; repair or replace the motor as necessary.
- ☐ Check the fan shaft bearings for wear. Replace the bearings as necessary.
- ☐ Verify that all wire terminal connections are tight.
- ☐ Remove any corrosion present on the exterior surfaces of the unit and repaint these areas.
- ☐ Generally inspect the unit for unusual conditions (e. g., loose access panels, leaking piping connections, etc.)
- ☐ Make sure that all retaining screws are reinstalled in the unit access panels once these checks are complete.
- ☐ With the unit running, check and record the following:
  - ambient temperature
  - compressor oil level (each circuit)
  - compressor suction and discharge pressures (each circuit)
  - superheat and subcooling (each circuit)

Record this data on an "operator's maintenance log" like the one shown in Sample maintenance log table in Final Process Section. If the operating pressures indicate a refrigerant shortage, measure the system superheat and system subcooling. For guidelines, refer to "Compressor Start-Up," p. 30.

Important: *Do not release refrigerant to the atmosphere! If adding or removing refrigerant is required, the service technician must comply with all federal, state and local laws.*

Heating Season

The furnace system shall be inspected at least once a year by a qualified service person.

- ☐ Inspect the unit's air filters. If necessary, clean or replace them.
- ☐ Check supply fan motor bearings; repair or replace the motor as necessary.
- ☐ Inspect both the main unit control panel and heat section control box for loose electrical components and terminal connections, as well as damaged wire insulation. Make any necessary repairs.
- ☐ Verify that the electric heat system operates properly.
- ☐ Ensure all burners ignite uniformly. If not, clean gas orifice.

Coil Cleaning

Regular coil maintenance, including annual cleaning enhances the unit's operating efficiency by minimizing the following:

- Compressor head pressure and amperage draw
- Evaporator water carryover
- Fan brake horsepower
- Static pressure losses
- Airflow reduction

At least once each year, or more often if the unit is located in a "dirty" environment, clean the condenser coils using the instructions outlined below. Be sure to follow these instructions as closely as possible to avoid damaging the coils.

⚠ WARNING

Hazardous Chemicals!

Coil cleaning agents can be either acidic or highly alkaline and can burn severely if contact with skin or eyes occurs.

Handle chemical carefully and avoid contact with skin. ALWAYS wear Personal Protective Equipment (PPE) including goggles or face shield, chemical resistant gloves, boots, apron or suit as required. For personal safety refer to the cleaning agent manufacturer's Materials Safety Data Sheet and follow all recommended safe handling practices.

Microchannel (MCHE) Coils

NOTICE

Coil Damage!

Failure to follow instructions below could result in coil damage.

DO NOT use any detergents with microchannel condenser coils.

Use pressurized water or air ONLY, with pressure no greater than 600psi.

For additional information regarding the proper microchannel coil cleaning procedure, refer to RT-SVB83*-EN

Due to the soft material and thin walls of the MCHE coils, the traditional field maintenance method recommended for Round Tube Plate Fin (RTPF) coils does not apply to microchannel coils. Moreover, chemical cleaners are a risk factor to MCHE due to the material of the coil. The manufacturer does not recommend the use of chemical cleaners to clean microchannel coils. Using chemical cleaners could lead to warranty claims being further evaluated for validity and failure analysis.

The recommended cleaning method for microchannel condenser coils is pressurized water or air with a non-pinpoint nozzle and an ECU of at least 180 with pressure no greater than 600 psi. To minimize the risk of coil damage, approach the cleaning of the coil with the pressure washer aimed perpendicular to the face of the coil during cleaning. Optimum clearance between the sprayer nozzle and the microchannel coil is 1"–3".

Final Process

For future reference, record the unit data below in the blanks provided.

Table 16. Unit data log

Complete Unit Model Number	
Unit Serial Number	
Wiring Diagram Numbers (from unit control panel)	
-schematic(s)	
-connections	
Network ID	

Table 17. Sample maintenance log

Date	Current Ambient Temp F/C	Refrigerant Circuit #1				
		Compr. Oil Level	Suct. Press. Psig/kPa	Disch. Press Psig/kPa	Superheat F/C	Sub-cool F/C
		- ok - low				
		- ok - low				
		- ok - low				
		- ok - low				
		- ok - low				
		- ok - low				
		- ok - low				
		- ok - low				
		- ok - low				
		- ok - low				
		- ok - low				
		- ok - low				
		- ok - low				
		- ok - low				
		- ok - low				

Reforming the capacitors

The drive DC link capacitors need to be reformed (re-aged) if the drive has been non-operational for more than one year. Without reforming, capacitors may be damaged when the drive starts to operate.

In order to prevent the capacitors from deteriorating, please energize them for at least 1 hour per year.

If the unit has been without power for more than two years, use an adjustable power supply to slowly increase the voltage from 0 V to the inverter's rated voltage over 2 to 3 minutes. Then, activate the main circuit electrolytic capacitor by powering on with no load for at least 1 hour. In the subsequent operation, please perform normal wiring and confirm that there is no abnormality of the inverter, overcurrent, motor vibration, speed change, etc. during operation.

Replacing the fuse

When replacing the fuses, please use the original fuses. To purchase the original fuses as shown in Table 18, please contact the agent where you purchased the product or the sales department of our company. The replacement of fuses must undergo strict testing before being put into use after replacement. It is not recommended that users replace fuses by themselves. If you really need to replace it, please contact the agent where you purchased the product or the sales department of our company.

Table 18. Relevant parameters of fuse

Voltage	Diameter	Length	Rated Working Voltage	Rated Working Current	Model
460 V	38 mm	10.3 mm	500 VDC	30 A + 15 A + 2A	Fast-Acting or Time-Delay

Figure 23. Fuse



Troubleshooting

⚠ WARNING

Hazardous Service Procedures!

Failure to follow all precautions in this manual and on the tags, stickers, and labels could result in death or serious injury.

Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the following instructions: Unless specified otherwise, disconnect all electrical power including remote disconnect and discharge all energy storing devices such as capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. When necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been trained in handling live electrical components perform these tasks.

Standard Troubleshooting

The IGN has the ability to provide the service personnel with some unit diagnostics and system status information.

Before turning the main power disconnect switch "Off", follow the steps below to check the IGN.

To prevent injury or death from electrocution, it is the responsibility of the technician to recognize this hazard and use extreme care when performing service procedures with the electrical power energized.

1. Verify LED on face of the phase monitor is green. If LED is red, correct supply power fault.
2. Verify that the LED on the IGN is burning continuously. If the LED is lit, go to Step 5.
3. Verify that the Digital Display on the mainboard is displaying "–". If the Digital Display is right, go to Step 5.
4. If the LED is not lit, verify that 24 Vac is present between R and C. If the LED is not lit and 24 Vac is present replace the IGN. If the Digital Display is not lit and 24 Vac is present replace the mainboard. If 24 Vac is not present, check fuse 2 on the mainboard and check TNS1. Proceed to Step 5 if necessary.
5. If no failures are indicated, use the TEST mode procedures described in the "Unit Start-Up" section or thermostat to start the unit. This procedure will allow you to check all of the external controls (relays, contactors, etc) and the IGN.
6. Test the system through all of the available modes, and verify operation of all outputs, controls, and modes. Refer to the sequence of operations for each mode, to assist in verifying proper operation. Make the necessary repairs and proceed to Step 6 and Step 7.
7. If no abnormal operating conditions appear in the test mode, exit the test mode by turning the power "Off" at the main power disconnect switch and removing the test mode connections.

Failures

Heating Failure

Verify Heat Failure by IGN LED indicator:

Slow Flash: Normal, Call for heat

2 Flash: System Lockout (failed to detect or sustain flame)

3 Flash: Pressure Switch Problem Detected

4 Flash: High limit switch protection device open

5 Flash: Flame sensed and gas valve not energized or flame sensed and no "W" signal

6 Flash: Flame rollout switch open

7 Flash: Thermostat miswired (W1 and W2 swapped)

Simultaneous Heat and Cool Failure

Emergency Stop is activated.

To Clear an Alarm

Once the alarm has been identified and the cause has been removed (for example, replaced faulty sensor), the alarm can be cleared from the display.

Resetting Cooling and Heating Lockouts

Cooling Failures and Heating Lockouts are reset in an identical manner.

To reset the system at the unit, cycle the unit power by turning the disconnect switch "Off" and then "On".

Note: *Before resetting Cooling Failures and Heating Lockouts check the Failure Status Diagnostics by the methods described earlier. Diagnostics will be lost when the power to the unit is disconnected.*

Table 19. Troubleshooting chart

Symptom	Possible Cause	Remedy
Unit not running	Power off or loose electrical connection	Check for correct voltage at compressor contactor in control box
	Thermostat out of range-set too high	Adjust the setpoint
	Failed contactor	Check for 24 volts at contactor coil - replace if contacts are open
	Blown fuses	Replace fuses
	Transformer defective	Check wiring - replace transformer
	Interconnecting low voltage wiring damaged	Replace thermostat wiring
Condenser fan runs, compressor doesn't	Loose connection on compressor wiring	Check for correct voltage at compressor - check and tighten all connection
	Compressor stuck, grounded or open motor winding or internal overload	Wait at least 2 hours for overload to reset. If still open, replace the compressor
	Low voltage condition	Determine cause and correct. At compressor terminals, voltages must be within 10% of rating plate volts when unit is operating
Insufficient cooling	Improperly sized unit	Recalculate the load and size the unit properly
	Improper airflow	Check - should be approximately 400 CFM per ton
	Incorrect refrigerant charge	Charge per procedure attached to unit service panel
	Air, non-condensible or moisture in system	Recover refrigerant, evacuate & recharge, add filter drier
	Incorrect voltage	Determine cause and correct. At compressor terminals, voltages must be within 10% of rating plate volts when unit is operating
Compressor short cycles	Incorrect voltage	At compressor terminals, voltage must be ±10% or nameplate marking when unit is operating.
	Defective overload protector	Replace compressor - check for correct voltage
	Refrigerant undercharge	Add refrigerant
Compressor operates continuously	Dirty air filter	Replace filter
	Unit undersized for load	Decrease load or increase unit size
	Thermostat temperature set too low	Adjust thermostat setpoint
	Low refrigerant charge	Locate leak, repair, and recharge
	Air in system	Recover refrigerant, evacuate system, and recharge
	Outdoor coil dirty or restricted	Clean coil or remove restriction
Registers sweat	Low evaporator airflow	Increase speed of blower or reduce restriction - replace air filter
High head-low vapor pressure	Restriction in liquid line, expansion device or filter drier	Remove or replace defective component
	Flow check piston size too small	Change to correct size piston
	Incorrect capillary tubes	Change coil assembly
	EEV does not open	Check the control wiring and valve body, replace the coil or valve body

Table 20. Troubleshooting chart (continued)

Symptom	Possible Cause	Remedy
High head-high or normal vapor pressure - Cooling mode	Dirty condenser coil	Clean coil
	Refrigerant overcharge	Correct system charge
	Condenser fan not running	Repair or replace condenser fan motor
	Air or non-condensible in system	Recover refrigerant, evacuate & recharge
Low head-high vapor pressures	Defective compressor valves	Replace compressor
	Incorrect capillary tubes	Replace coil assembly
Low vapor - cool compressor - iced evaporator coil	Low evaporator airflow	Increase speed of blower or reduce restriction - replace air filter
	Moisture in system	Recover refrigerant - evacuate & recharge - add filter drier
High vapor pressure	Excessive load	Recheck load calculation, reduce the load, or increase unit size
	Defective compressor	Replace compressor
Fluctuating head and vapor pressure	Air or non-condensible in system	Recover refrigerant - evacuate and recharge
Gurgle or pulsing noise at expansion device or liquid line	Air or non-condensible in system	Recover refrigerant - evacuate and recharge
Indoor blower run continuously but the compressor does not start	Manual reset overtemperature control tripped	Reset or replace
	Wire loose in limit circuit	Check wiring
Burners will not ignite	Water in gas line	Drain. Install drip leg.
	No power to furnace	Clean or replace filter as necesary
	No 24 volts power supply to control circuit	Check transformer.
	Miswired or loose connections	Check all wiring and wire nut connections
	Misaligned spark electrodes	Check flame ignition and sense electrode positioning. Adjust as necessary.
	No gas at main burners	Check gas line for air. Purge as necessary. NOTE: After purging gas line of air, wait at least 5 minutes for any gas to dissipate before attempting to light unit.
		Check gas valve
Inadequate heating	Dirty air filter Clean or replace filter as necessary	Check power supply fuses, wiring or circuit breaker.
	Gas input to furnace too low	Check gas pressure at manifold with that on unit nameplate
	Unit undersized for application	Replace with proper unit or add additional unit
	Restricted airflow	Clean or replace filter, remove any restriction
	Limit switch cycles main burners	Check rotation of blower, temperature rise of unit. Adjust as
Poor flame characteristics	Incomplete combustion results in: Aldehyde odors, carbon monoxide, sooting flame, floating flame	Tighten all screws around burner compartment
		Cracked heat exchanger. Replace as necessary.
		Unit over-fired. Reduce input (change orifices or adjust gas line or manifold pressure).
		Check burner alignment
		Inspect heat exchanger for blockage. Clean as necessary.
Both condenser fan and compressor startup and shutdown frequently (about three minutes per cycle)	Abnormal high discharge pressure caused the high pressure switch tripping	Reference to the remedy of 'High head-high or normal vapor pressure-cooling mode'.

Error Code

Table 21. Error code

Error Code	Error Description	Possible Reason
--	Standby	No operation signal received
10.	Running	/
E01	Power Phase Loss/Reverse Fault	Incorrect wiring or damaged cables
E02	Power Overvoltage Protection	The supply voltage exceeds 270V （for 230V units） or 528V （for 460V units）
E03	Power Undervoltage Protection	The supply voltage lower than 170V (for 230V units) or 393V (for 460V units)
b7	Refrigerant Leak Protection	Refrigerant leakage
b8	Refrigerant Sensor Lifetime Fault	Lifetime of the refrigerant sensor has been exhausted
b3	Refrigerant Sensor Fault	The refrigerant sensor is faulty
b4	Refrigerant Sensor Communication Fault	Incorrect wiring/Incorrect sensor model/Mainboard damaged
E1	Condenser Coil Temperature Sensor Fault (T3)	T3 temperature sensor is short circuit or open circuit
E3	Electronic Expansion Valve Loose attachment Fault	Electronic Expansion Valve Inserted Loosely or wiring damaged
E5	Evaporator Coil Temperature Sensor Fault (T2)	T2 temperature sensor is short circuit or open circuit
E7	Discharge line Temperature Sensor Fault (T5)	T5 temperature sensor is short circuit or open circuit
E9	Indoor Ambient Temperature Sensor Fault (T1)	T1 temperature sensor is short circuit or open circuit
EA	Outdoor Ambient Temperature Sensor Fault (T4)	T4 temperature sensor is short circuit or open circuit
Eb	Thermostat Output Signal Fault	Incorrect thermostat output signal wiring
EF	External Device Protection	External protection/ Remote OFF state/ Emergency Stop
HE	PE Protection occur 3 Times Within 60 minutes	PE Protection occur 3 Times Within 60 minutes
H4	P4 Protection occur 3 Times Within 60 minutes	P4 Protection occur 3 Times Within 60 minutes
H6	P6 Protection Occur 3 Times Within 60 minutes	P6 Protection occur 3 Times Within 60 minutes
P4	Low Pressure Switch Protection	Ambient temperature overrange/ indoor blower broken/ Electronic Expansion Valve blocked/ indoor coils blocked
P5	T3 Overtemperature Protection	Ambient temperature overrange/ outdoor fan broken/ Electronic Expansion Valve blocked/ outdoor coils blocked
P6	Discharge line Temperature Protection	Leakage of refrigerant/ Ambient temperature overrange /Electronic Expansion Valve blocked
Pb	Fan Module Communication Fault	Incorrec wiring/ damaged wiring
Pc	Evaporator Freezing Protection	Leakage of refrigerant/ Ambient temperature overrange /Electronic Expansion Valve blocked
PE	High Pressure Switch Protection	Ambient temperature overrange/ outdoor fan broken/ Electronic Expansion Valve blocked/ outdoor coils blocked
Ph	Outdoor Temperature Overrange Protection	Ambient temperature lower than 0 °F
PH	Low Discharge Superheat Protection	Electronic Expansion Valve failure
dL	Compressor Operating Over 10h Notice	Compressor Operating Over 10h
L.1X	Indoor Fan Motor Overcurrent Protection	Static pressure over range/ Indoor blower blocked/ Indoor coils blocked/ Indoor fan motor shortcircuit
L.2X	Indoor Fan Motor Overtemperature Protection	Static pressure over range/ Indoor blower blocked/ Indoor coils blocked
L.3X	Indoor Fan Motor Power Supply Protection	Incorrect indoor blower motor power
L.4X	Indoor Fan Motor Hardware Protection	Driver board damaged/ Incorrect wiring
L.5X	Indoor Fan Motor Control Protection	Driver board damaged/ incorrect wiring/ Incorrect software
L.6X/L.7X	Indoor Fan Motor Diagnostic Protection	Indoor fan motor blocked/ Incorrect software
n.1X	Outdoor Fan Motor Overcurrent Protection	Outdoor blower blocked/ outdoor coils blocked/ outdoor fan motor wiring short circuit
n.2X	Outdoor Fan Motor Overtemperature Protection	Outdoor blower blocked/ outdoor coils blocked
n.3X	Outdoor Fan Motor Power Supply Protection	Outdoor fan motor power supply Incorrect

Error Code	Error Description	Possible Reason
n.4X	Outdoor Fan Motor Hardware Protection	Driver board damaged/ Incorrect wiring
n.5X	Outdoor Fan Motor Control Protection	Driver board damaged/ Incorrect wiring/ Incorrect software
n.6X/n.7X	Outdoor Fan Motor Diagnostic Protection	Outdoor fan motor blocked/ Incorrect software
L.45	Fan Motor Code Mismatch	Incorrect motor model/ Incorrect software

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双胶纸80 g
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A-B 认证要求修改和其他结构参数修改
B-C 业务要求修改P10机器图 图6