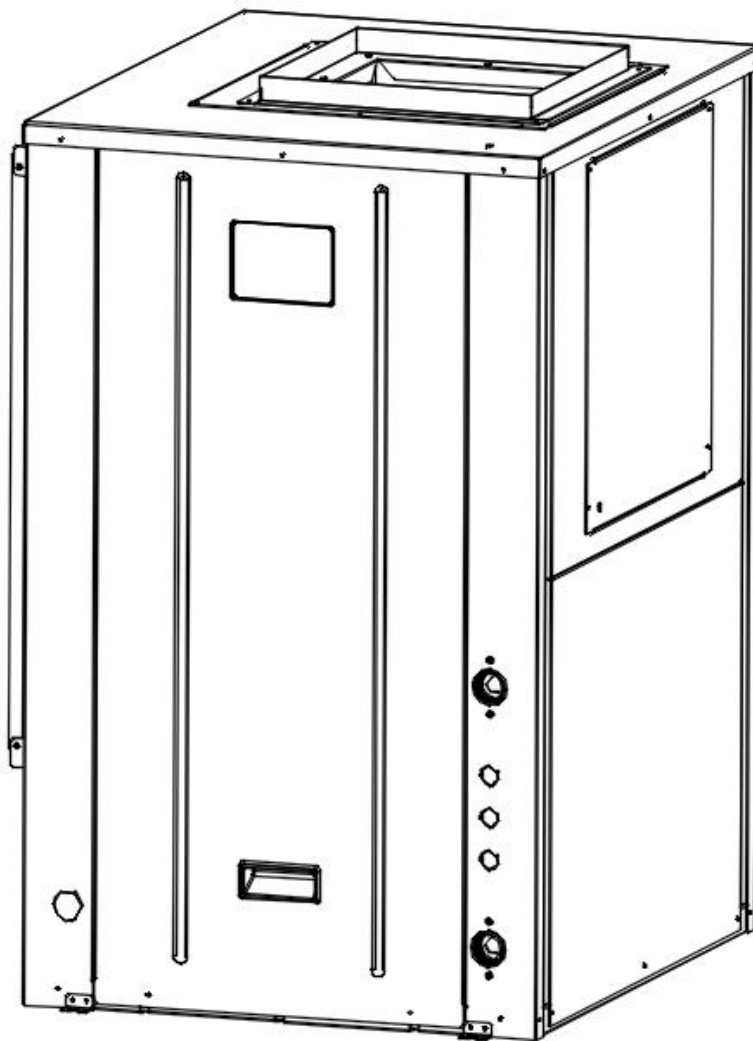


Dandelion AXU

Installation & Operations Manual

Packaged Water Source Heat Pump Model AXU

Revision 1.0



Refer to online documentation for more information (dandelionenergy.com/technology/axu)

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CHAPTER 1: Model Naming

Category	Example	Notes
Brand	AX	
Package orientation	U	Package orientation is configurable
Max Capacity (kBtu/hr)	036	
Return configuration	M	Return side is configurable
Supply configuration	M	Supply side is configurable.
Filter rack / filter	1	Filter and filter rack included
Accessory options	0	
Major HW rev #	1	

CHAPTER 2: Introduction, Operating Precautions, and Unpacking

Section 1: Introduction

Every unit is manufactured to Dandelion's quality and design specifications. Correct application and installation are essential to achieving the unit's rated performance.

This unit provides both heating and cooling and can also operate in a dehumidification mode.

Section 2: Operating Precautions

Description of Notices, Cautions, Warnings, and Hazard Labels

Attention should be paid to the following statements:

- "NOTICE" is a notification of installation, operation, or maintenance information which is important, but is NOT hazard-related.
- "CAUTION" indicates a potentially hazardous situation or an unsafe practice which, if not avoided, COULD result in minor or moderate injury or product or property damage.
- "WARNING" indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.
- "DANGER" specifies an immediately hazardous situation which, if not avoided, WILL result in death or serious injury.
- "NOTE" intends to clarify the unit installation, operation, and maintenance.

Symbol	Meaning
	Service indicator; read technical manual.
	Read operator's manual.
	Operator's manual; operating instructions.
	Warning: flammable materials.

Battery Warning

⚠ WARNING	
• INGESTION HAZARD: This product contains a button cell or coin battery. • DEATH or serious injury can occur if ingested. • A swallowed button cell or coin battery can cause Internal Chemical Burns in as little as 2 hours. • KEEP new and used batteries OUT OF REACH of CHILDREN • Seek immediate medical attention if a battery is suspected to be swallowed or inserted inside any part of the body. Note: This product's wired remote controller contains a replaceable battery. The battery model is CR1225, with a nominal capacity of 50mAh and a nominal voltage of 3V.	
⚠ AVERTISSEMENT	
• IRISQUE D'INGESTION : Ce produit contient une pile bouton ou une pile en forme de pièce de monnaie. • L'ingestion peut entraîner la mort ou des blessures graves. • Une pile bouton ou une pile en forme de pièce de monnaie est avalée et peut provoquer des brûlures chimiques internes dans les 2 heures. • Gardez les piles neuves et usagées hors de portée des enfants. Si vous pensez qu'une batterie a été avalée ou insérée dans une partie de votre corps, consultez immédiatement un médecin. Remarque : Le contrôleur filaire de ce produit contient une batterie remplaçable. Le modèle de batterie est CR1225, avec une capacité nominale de 50 mAh et une tension nominale de 3 V.	

Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children. Do NOT dispose of batteries in household trash or incinerate.

Even used batteries may cause severe injury or death.

Call a local poison control center for treatment information.

This product's wired remote controller contains a replaceable battery. The compatible battery type is CR1225, nominal voltage 3VDC. Non-rechargeable batteries are not to be recharged.

Do not force discharge, recharge, disassemble, heat above the manufacturer's specified temperature rating, or incinerate. Doing so may result in injury due to venting, leakage, or explosion resulting in chemical burns.

The button/coin cell battery is not a non-replaceable battery.

Ductwork

All new ductwork shall be designed as outlined in the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), Air Conditioning Contractors of America (ACCA), or American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) handbooks. Air leakage shall not exceed 2% on any model.

All supply and return plenums shall be isolated from the unit by a flexible connector (canvas) or equivalent to prevent the transfer of vibration and noise to the ductwork. The flexible connector shall not restrict airflow. Turning vanes shall be used on any transition where airflow exceeds 500 CFM. All metal ductwork shall be insulated to prevent heat loss and heat gain and condensation, and to absorb airflow noise. If the unit is being installed with existing ductwork, the ductwork must be designed to handle the air volume required by the unit. When running a cooling or heating load on a building, size the ductwork according to the building design load and heat pump CFM.

WARNING

Auxiliary equipment with potential ignition sources shall not be installed in the air duct system. Examples of such potential ignition sources include hot surfaces with temperatures exceeding 396°C (740°F) and electrical switching equipment.

Only approved auxiliary equipment is allowed to be installed in the connected air duct system.

Consumer Information

Instruct the homeowner in the correct operation and maintenance of the unit, including filter replacement, and explain the use of the thermostat and the indicator lights. Provide the homeowner with the manufacturer's user manual for the installed equipment.

Self-Installation Policy

Installing this heat pump and its system involves electrical, refrigerant, and water connections. Federal, state, and local regulations apply to every aspect of the installation. Improper installation can cause equipment failure and create health and safety hazards. For these reasons, only qualified technicians may install this product.

Because correct installation is important for both performance and safety, Dandelion does not sell heat pumps directly to homeowners. Some internet retailers and HVAC sales outlets may allow homeowners and DIY installers to purchase equipment directly. Dandelion provides no warranty on equipment purchased online or installed by untrained personnel.

Dandelion maintains this policy to ensure this heat pump system is installed safely and in compliance with applicable codes. Installation by well-trained, qualified technicians helps ensure your system operates reliably, efficiently, and comfortably for its intended lifetime.

CAUTION

Failure to observe this warning may result in personal injury. Exercise extreme caution when servicing the equipment and handling components, and ensure you wear appropriate protective clothing, safety spectacles and protective gloves.

NOTE

Prior to commissioning the unit, remove and dispose of the blower motor armature support bracket located at the rear of the blower (where applicable). Additionally, remove and dispose of the blower transport bracket, as failure to do so may result in operational noise and potential damage to the equipment.

Section 3: Unpacking

Unpacking Inspection

When the equipment arrives, check the shipment against the packing list and the carrier's bill of lading (BOL). Confirm that all units and packages have been received and inspect the outer packaging of every package and unit for damage. Ensure the carrier records all damage and shortages on all bill of lading documents.

Report all damage to Dandelion's transportation department within 5 days of delivery. The purchaser is responsible for filing all necessary claims with the carrier.

WARNING

Do not puncture or incinerate!

Before drilling holes in the cabinet or driving any screws, please ensure that the screws will not touch any internal components or refrigerant piping!

CAUTION

Do not operate this equipment during the building construction phase!

Do not use methods other than those recommended by the manufacturer to accelerate the defrosting process or perform cleaning.

This equipment shall be stored in a room without continuously operating ignition sources.

Please note that the refrigerant may be odorless.

Packaging

The unit is secured to a wooden pallet for handling during transit and installation. Cardboard corner posts, a top cap, and coil panels protect the unit in transit, and the unit and pallet are wrapped together in stretch film.

When the equipment arrives, remove the stretch film carefully. Use a utility knife to cut the film at the top of the cardboard and at the corner posts, taking care not to damage the unit finish. Keep all cardboard and other packaging materials to protect the unit during storage and transport to the job site.

Remove the front and back panels to access the technical documents (manuals, bulletins, and instructions) and the accessories.

Equipment Protection

Protect the unit from damage and contamination caused by plaster, spray paint, and any other foreign materials used at the job site. Keep all units covered on the job site with either the original packaging or a protective covering of equivalent effectiveness. Keep all unit connections and piping capped until the unit is installed.

Take precautions against physical damage and contamination. Either can prevent normal startup and can void the unit warranty as misuse or improper operation.

Section 4: Storage and Transportation

Storage

All ground source heat pump units should be stored inside their original packaging in a clean, dry, indoor location. Units should be stored in an upright position at all times. They shall not be stacked, unless specifically noted on the packaging.

CAUTION

This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or those with 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.

Transport of Equipment Containing Flammable Refrigerants

Attention is drawn to the fact that additional transportation regulations may exist with respect to equipment containing flammable gas. The maximum number of pieces of equipment and the permissible configuration of equipment transported together shall be determined by the applicable transport regulations.

Marking of Equipment Using Signs

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 corresponding actions to be taken.

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.

Storage of Equipment/Appliances

The storage of the appliance should be in accordance with the applicable regulations or instructions, whichever is more stringent.

Storage of Packed (Unsold) Equipment

Storage package protection should be constructed in such a way that mechanical damage to the equipment inside the package will not cause a leak of the REFRIGERANT CHARGE.

The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.



Refrigerant
Safety Group
A2L

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 without continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).

Do not pierce or burn.

Section 5: Refrigeration System Maintenance

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, and CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

The minimum test pressure for the low side of the system shall be the low side MAXIMUM ALLOWABLE PRESSURE, and the minimum test pressure for the high side of the system shall be the high side MAXIMUM ALLOWABLE PRESSURE, unless the high side of the system cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side MAXIMUM ALLOWABLE PRESSURE.

Qualification of Workers

The manual contains specific information about the required qualifications of the working personnel for maintenance, service, and repair operations. Every working procedure that affects safety shall only be carried out by competent people according to Annex HH of UL / CSA 60335-2-40.

For example, when operating the equipment, the power supply of the whole unit must be cut off and the operation must be carried out in strict accordance with the equipment safety requirements.

Examples of such working procedures are:

- Working within the refrigeration circuit

- Opening sealed components
- Opening ventilated enclosures

Checks to the Area

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For refrigeration system repairs, the following precautions shall be taken prior to working on the system.

Work Procedure

Work shall be undertaken under a controlled procedure to minimize the risk of flammable gas or vapor 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 gases. 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 refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. A dry powder or CO2 fire extinguisher shall be adjacent to the charging area.

No Ignition Sources

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipework 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, shall be kept sufficiently far away from the site of installation, repair work, removal 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 work area is in the open or 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 Refrigeration Equipment

Where electrical components are being changed, they shall be fit for the purpose and meet 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 actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant-containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigeration 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 or are suitably protected against being so corroded.

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.

Sealed Electrical Components Shall be Replaced

During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during service, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive numbers of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

Service of Intrinsically Safe Components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only ones that can be worked on while live and in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

Cabling

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.

Detection of Flammable Refrigerants

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

The following leak detection methods are deemed acceptable for all refrigerant systems.

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 to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed.

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 pipework.

NOTE. Examples of leak detection fluids/methods 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 performed according to removal and evacuation instructions below.

Removal and Evacuation of Equipment

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 (optional for A2L);
- evacuate (optional for A2L);
- continuously flush or purge with inert gas when using flame to open circuit;
- open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local or 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, refrigerant 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 (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). 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.

Charging Procedures

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment.
- Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATION SYSTEM is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken 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 and prior to commissioning. A follow-up leak test shall be carried out prior to leaving the site.

Equipment Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details. It is recommended good practice 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

recovered refrigerant. It is essential that electrical power is available before the task commences. Before carrying out this procedure:

1. Become familiar with the equipment and its operation.
2. Isolate the system electrically.
3. Before attempting the procedure, ensure that:
 - a. mechanical handling equipment is available, if required, for handling refrigerant cylinders;
 - b. all personal protective equipment is available and being used correctly;
 - c. the recovery process is supervised at all times by a trained person;
 - d. recovery equipment and cylinders conform to the appropriate standards.
4. Pump down refrigerant system, if possible.
5. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
6. Make sure that cylinder is situated on the scales before recovery takes place.
7. Start the recovery machine and operate in accordance with instructions.
8. Do not overfill cylinders (no more than 80% volume liquid charge).
9. Do not exceed the maximum working pressure of the cylinder, even temporarily.
10. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
11. Recovered refrigerant shall not be charged into another REFRIGERATION SYSTEM unless it has been cleaned and checked.

Labelling

NOTE: Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

Refrigerant Recovery

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 are available, and 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 valves and associated shut-off valves in good working order. Empty recovery cylinders shall be evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order, suitable for the recovery of the flammable refrigerant, and accompanied by a set of instructions concerning the equipment at hand. 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 oil. 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.

CHAPTER 3: Installation & Commissioning

Section 1: Installation

CAUTION

If the SUPPLY CORD is damaged, it must be replaced by the manufacturer, service agent, or qualified persons to avoid a hazard.

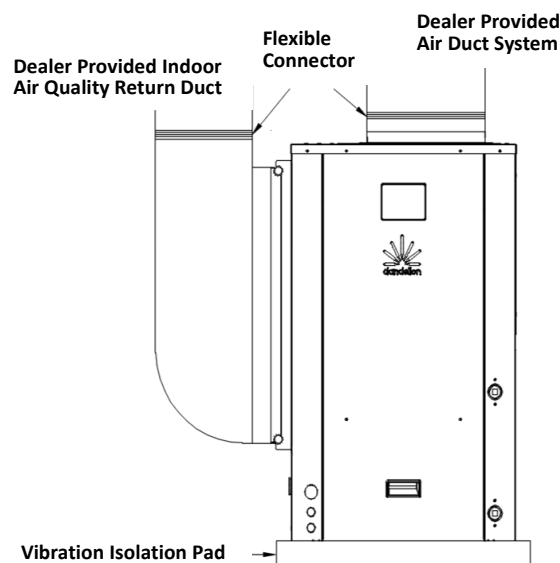
General Work Area

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

Equipment Installation

All units should be located in an indoor area where the ambient temperature will remain above 55°F, and should be located in a way that piping, ductwork, or other permanently installed fixtures do not have to be removed for servicing and filter replacement. Where a unit contains more than 62.4 ounces of slightly flammable refrigerant and is installed in an unventilated area, the room must be constructed or modified so that a refrigerant leak cannot accumulate and create a fire or explosion hazard.

Vertical units should be mounted horizontally on a rubber or high-density polyethylene (HDPE) pad. This helps eliminate vibration and noise that could be transmitted through the floor (the use of corner pads alone is not recommended). The vibration isolation pad should be slightly larger than the unit base, and it is not necessary to secure the unit to the floor.

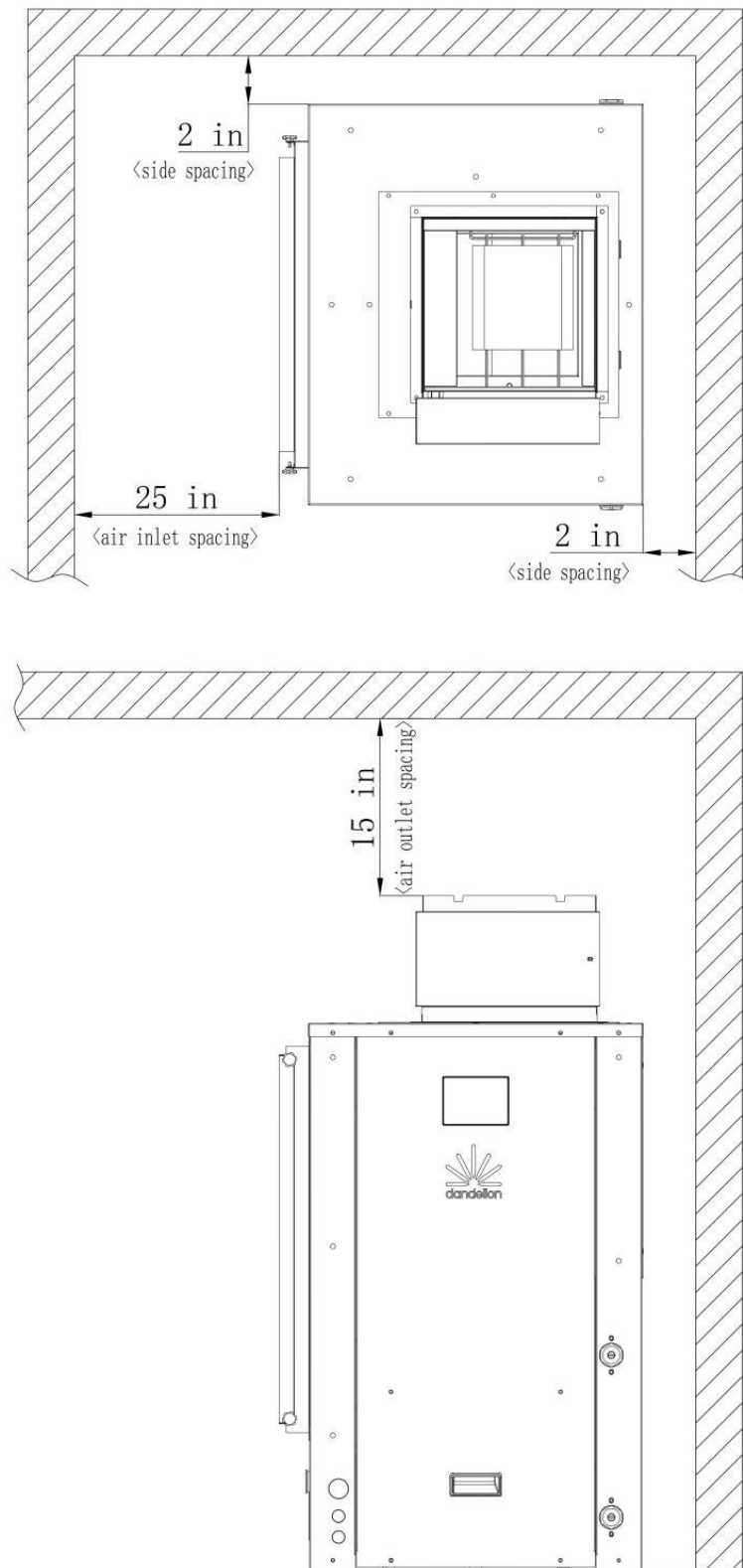


Confirm that all applicable wiring, piping, and accessories are correct and available at the job site.

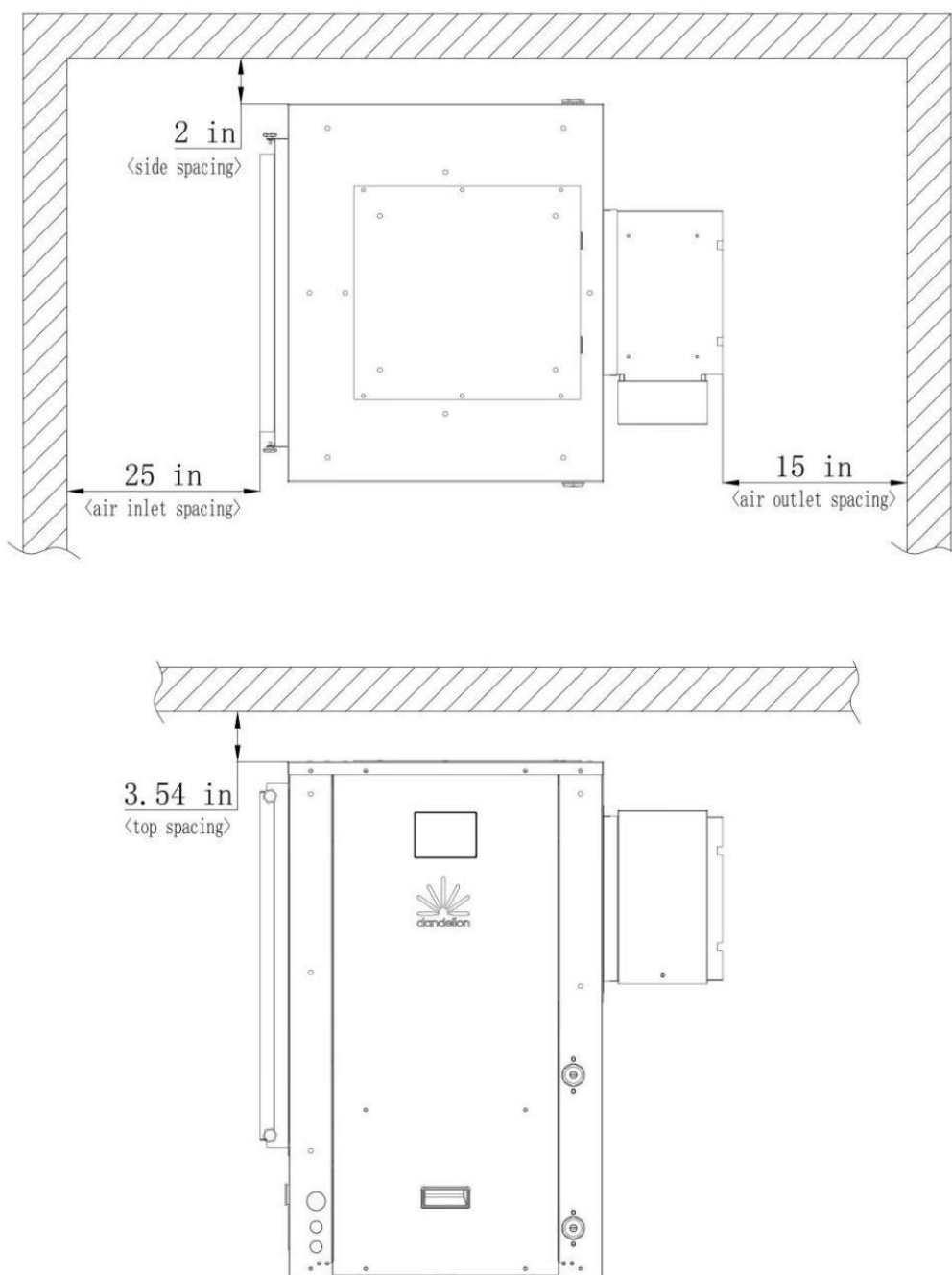
Equipment Installation Space Dimensions

The space required for correct installation of the appliance, including the minimum permissible distances to adjacent structures, is shown below.

Minimum Clearance Requirements for Top Supply Unit Installation



Minimum Clearance Requirements for Side Supply Unit Installation



If an appliance has labels or markings that are to be visible in the installed state, the installer shall not cover the labels or markings:

WARNING – Risk of Fire. Flammable Refrigerant Used. To Be Repaired Only by Trained Service Personnel. Do Not Puncture Refrigerant Tubing.

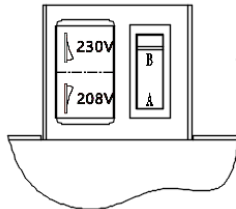
WARNING – Risk of Fire. Dispose Of Properly in Accordance with Federal and Local Regulations. Flammable Refrigerant Used.

WARNING – Risk of Fire – 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. See instructions.

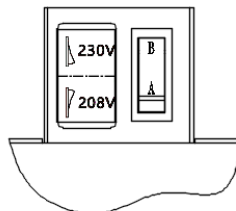
Pre-Installation

Perform the following steps before installation of the geothermal equipment:

1. Inspect the unit thoroughly after unpacking.
2. Compare the electrical data on the unit nameplate against the packing list and the order information to confirm the correct model was shipped.
3. Units rated 208 / 230V are factory-wired for 230V. To convert the unit to 208V, set the changeover switch as shown below.

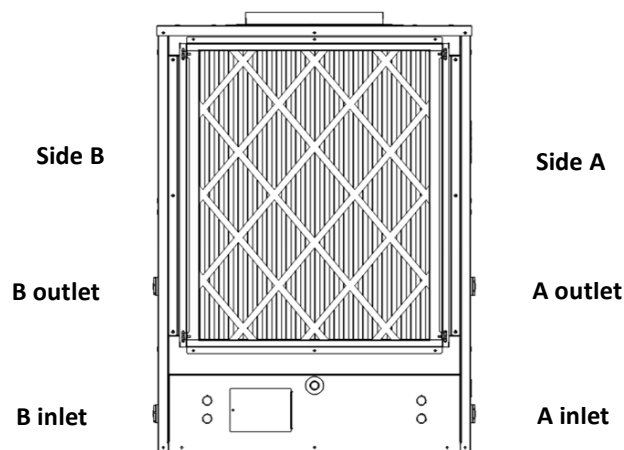


When the input voltage is 208V, please keep the button in this state.

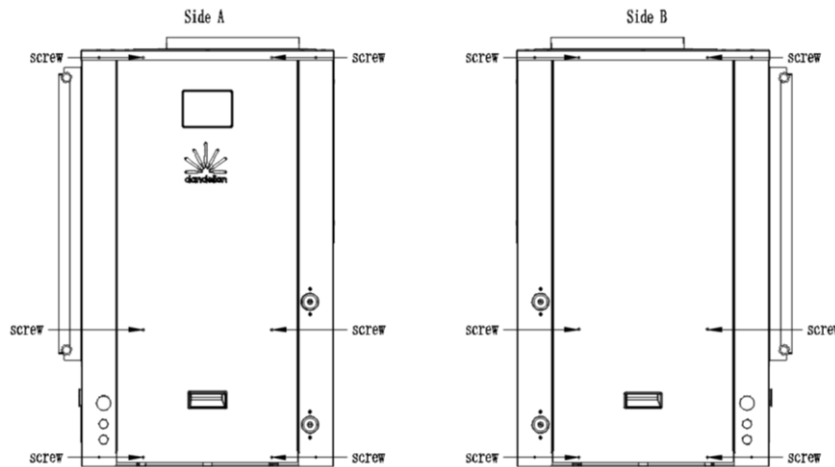


When the input voltage is 230V, please keep the button in this state.

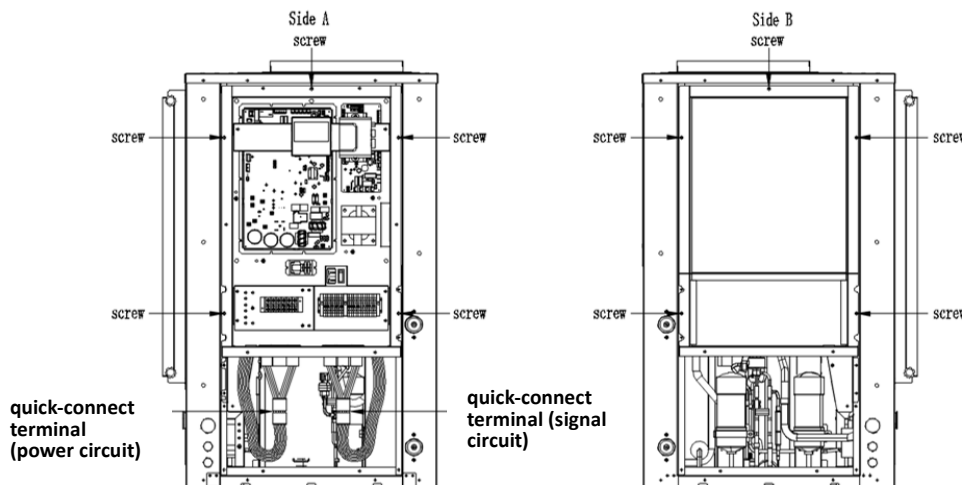
4. Check all electrical connections and wiring. Connections must be clean and tight at the terminals, and wiring must not contact sharp edges or copper tubing.
5. Remove all packaging material used to support or secure the fan/blower in transit, including the foam block in the airbox.
6. Remove and discard the air coil shipping cover, if included.
7. Check all refrigerant piping for dents and kinks. Refrigerant piping must not contact other components of the unit.
8. Read all manuals and familiarize yourself with the unit's components and operation before startup.
9. The unit has two sets of 1" NPT water inlet and outlet connections, mirrored on the left and right sides when facing the return air opening. **Do not remove the factory plugs from the unused ports.** Each set has its own entering and leaving water temperature sensors. Set which side's sensors the unit will use during initial installation. The unit will not start until this is set.



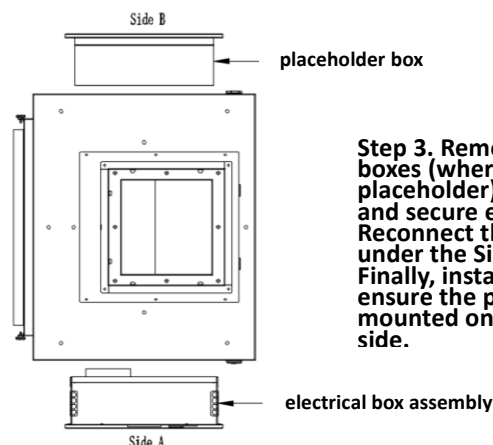
10. Determine if a left-hand or right-hand return air pattern is required before assembling and installing the unit. The factory default is left-hand return, when viewed facing the electrical box. To convert to a right-hand return, move the electrical box to the mirrored position on the opposite side, as shown below. Before moving the electrical box, unplug all 12 connectors at its base. Route the compressor chamber wire harnesses across to the opposite side, reposition the box, and re-attach screws and connectors.



Step 1. Remove the six screws each on Side A and Side B and take out the corresponding side panels.

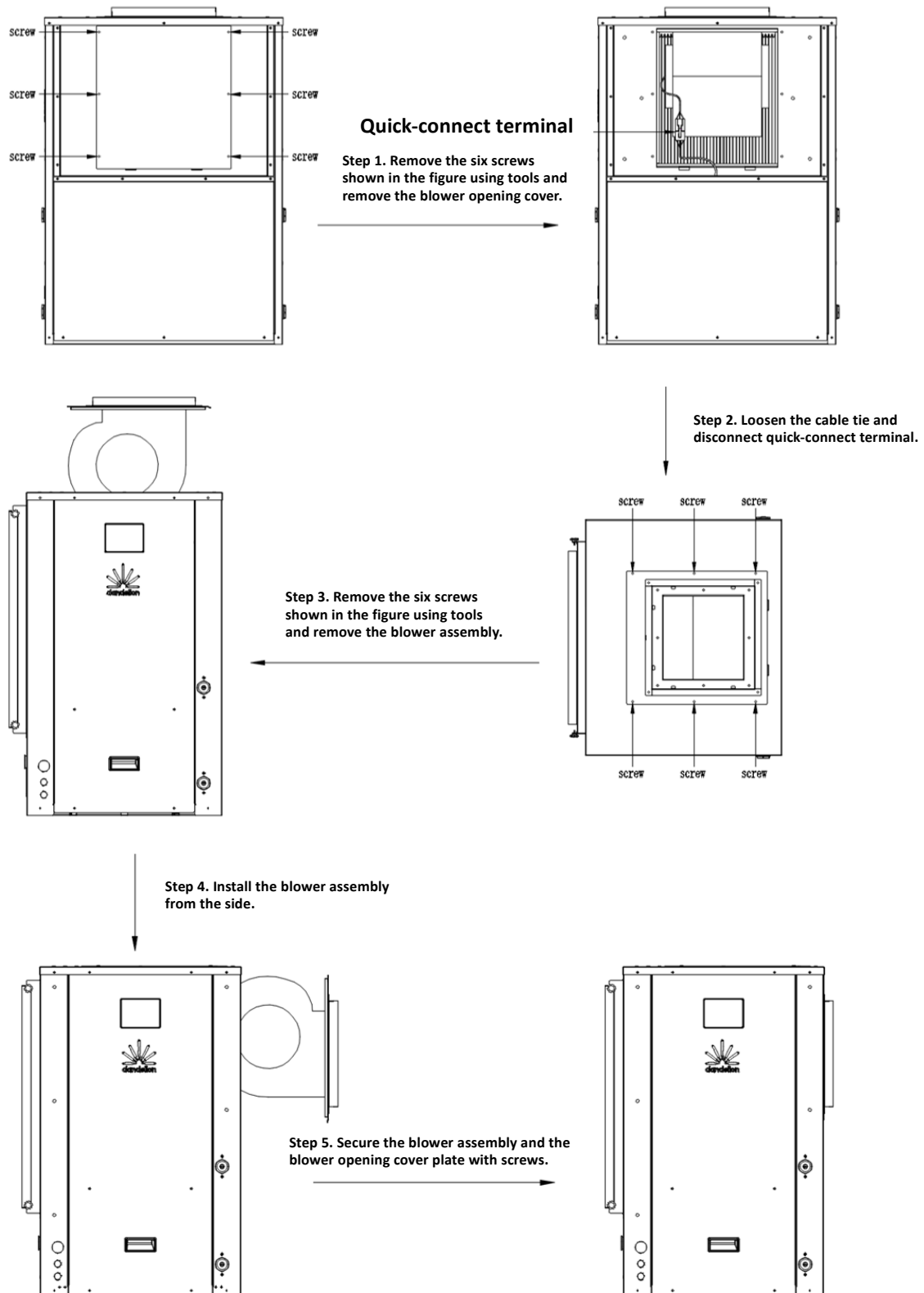


Step 2. First, unplug the 12 quick-connect terminals under the Side A electrical box assembly, and pass the 12 wiring harnesses from the compressor chamber through both sides of the compressor to the opposite side. Then, remove the five screws from the Side A electrical box assembly and the Side B placeholder box respectively.

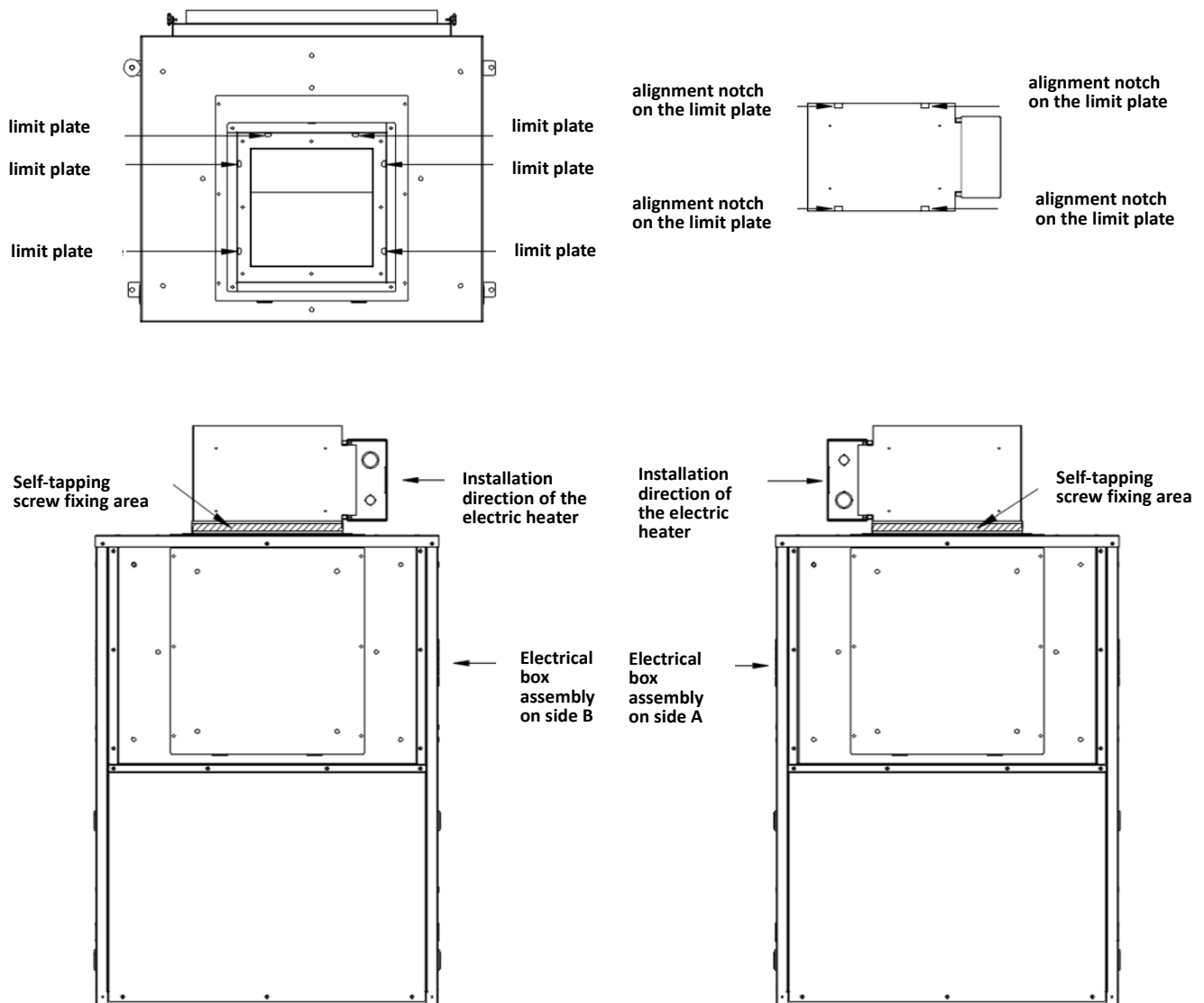


Step 3. Remove both electrical boxes (where one is the placeholder), swap their positions, and secure each with five screws. Reconnect the two harnesses under the Side A electrical box. Finally, install the rear side panel – ensure the panel with the logo is mounted on the electrical box side.

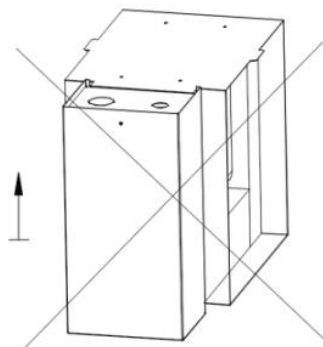
11. Confirm the top supply or side supply configuration before assembling and installing the unit. The factory default is top supply. Side supply can be configured on site by disassembling the blower assembly. Follow the steps below:



12. An electric heater is available as an option. The heater is an external accessory that inserts into the supply air flange and is secured to the flange with self-tapping screws. For ease of service, position the heater's electrical box on the same side as the unit's electrical box. Installation precautions for side supply are the same as those for top supply.



NOTE: When the electric heater is installed on the side of the unit, make sure the power connection faces downward. This prevents water droplets from running into the electrical components (as shown in the diagram below).



Electrical Installation

All wiring, including both line voltage and low voltage circuits, must be connected in accordance with the manufacturer's recommendations, the National Electrical Code, and all local codes and regulations. The main circuit breaker for the unit must be installed in the field wiring in compliance with the National Electrical Code (NEC). See Chapter 5, Section 2 for details on the wiring connections for this unit.

NOTE: The appliance must be installed in accordance with national wiring regulations.

Thermostat

Install the thermostat on an interior wall in the room's return air path, approximately 54 inches above the floor. Do not locate the thermostat where it will be exposed to direct sunlight.

Circulation Pump

The unit does not include a built-in pump. An external pump must be UL listed and cannot exceed the following electrical parameters:

- Power Supply: 208–230V/60Hz
- Rated Power: 0-500W
- Rated Current: 0-2.4A

The external pump may be connected to the pump output terminal on the unit's electrical box. The pump can also be powered externally to the heat pump and controlled by a 24 VAC signal; see the controls section for details.

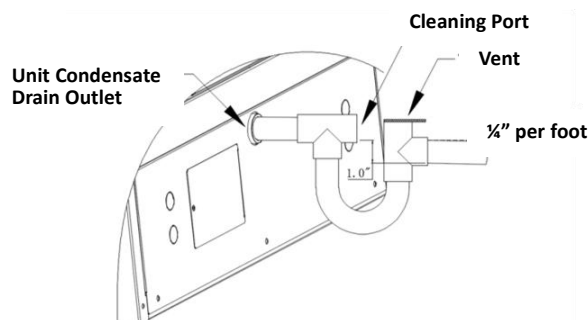
Electric Heater

Connect the electric heater's control input to the unit's electrical box, which provides a 24VAC control output terminal for the heater (Accessory Output "W"). Supply the electric heater's input power on a separate circuit from the heat pump's input power. Do not draw heater power from the unit's power supply. Wire the input leads in accordance with the electric heater's own wiring instructions.

Condensate Drain Pipe Connection

Connect the drain pipe to the unit's 3/4 inch condensate drain connection as shown below. The condensate drain must include a p-trap with a minimum depth of 1.0 inch. Slope the drain pipe away from the unit at a minimum of 1/4 inch per foot. The section between the unit's drain connection and the p-trap must slope downward. Install an air vent downstream of the p-trap.

NOTE: The connection between the drain pipe and the condensate drainage system must comply with local plumbing codes.



Ground Loop Fluid Requirements

This heat pump is designed to operate with a variety of different antifreeze types, including propylene glycol and ethylene glycol. The heat pump is designed with a brazed plate heat exchanger, which is subject to fouling if particulates are present in the ground loop. Refer to IGSHPA guidelines for full water quality requirements. Install the included strainer before the inlet of the heat pump, matching the flow direction arrow to the ground loop flow. Do not install the strainer in a vertical orientation such that the service port is facing upwards – debris will not be properly captured.

The ground loop fluid must meet the following specifications:

1. Chloride ion concentration: 300 ppm maximum, below 140°F
2. pH: 6 to 8
3. Ammonia: none
4. Water-Side Pressure Range: 0 - 0.8 MPa (0 – 116 PSI)

Section 2: Commissioning

System Configuration Settings

The following settings must be configured on the user interface before the unit will operate – there are no factory default settings (besides EFS which is disabled by default and does not need to be configured if not used). **The installer password is 5*****.**

Setting	Full Setting Name	Units	Setting Range
FP	Freeze Point	°F	-6-44
MHC	Max Heat Capacity	Tons	1-3
MCC	Max Cool Capacity	Tons	1-3
AUX-SIZE	AUX (electric heater) size	kW	None, 1.5, 3, 5
EFS	External Fault Switch	/	Disabled, NO, NC
GLS	Ground Loop Side	/	A, B

Record each setting on the designated label inside of the front panel for future reference.

Air Temperature Deltas

During commissioning, when measuring supply and return air temperature deltas, wait at least 10 minutes after engaging heating or cooling on the unit. The air temperature deltas may be higher or lower than expected during startup.

CHAPTER 4: Unit Parameters and Tables

Unit Parameters

Parameter	Model: AXU036MM1001
Input Power Supply	208 / 230 (V) 60Hz 1Ph
MCA	32 A
MOP (Rating of Circuit Breakers)	45 A
Max. Rated Static Pressure	200 Pa (0.8 in. w.c)
Water-Side Pressure Range	0 - 0.8 MPa (0-116 PSI)
Cooling Operation Range (Air Side)	15 - 32 °C (59 – 89 °F)
Cooling Operation Range (Water Side)	4 - 55 °C (39 – 131 °F)
Heating Operation Range (Air Side)	10 - 27 °C (50 – 80 °F)
Heating Operation Range (Water Side)	-15 - 32 °C (5 – 89 °F)
Rated Water Flow	2.0 m³/h (9 GPM)
Compressor Type	Variable Frequency Rotor
Fan Impeller	Outer Diameter 225mm*200mm
Fan Motor	Variable Frequency EC
Refrigerant Charge	1.55 kg (54.6 oz)
Air Heat Exchanger Windward Area	553 in²
Unit Size	27.1" x 22.5" x 37.1"
Factory Weight	132 kg (291lbs)

Please be sure to check the actual refrigerant charge against the unit nameplate.

The minimum clearance to combustible surfaces (curtains, blinds, etc.) from the appliance is 0 clearance.

Blower Performance

Blower Performance Data (Without Filter and Electric Heat)										
Motor Speed		Static Pressure (inches w.c.)								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
1300 RPM	CFM	-	-	-	-	1492	1388	1278	1170	1066
	Watts	-	-	-	-	641	560	508	448	396
1200 RPM	CFM	1594	1533	1479	1421	1294	1176	1069	952	823
	Watts	607	574	531	505	437	388	343	301	255
1100 RPM	CFM	1449	1382	1329	1239	1107	979	845	690	639
	Watts	444	415	401	360	309	267	228	186	174
1000 RPM	CFM	1314	1242	1172	1037	898	753	571	-	-
	Watts	329	304	281	240	202	167	100	-	-
900 RPM	CFM	1116	1047	936	832	677	-	-	-	-
	Watts	241	221	191	157	127	-	-	-	-
800 RPM	CFM	1035	947	782	615	-	-	-	-	-
	Watts	170	155	123	98	-	-	-	-	-
700 RPM	CFM	898	765	581	-	-	-	-	-	-
	Watts	119	100	78	-	-	-	-	-	-
600 RPM	CFM	762	584	-	-	-	-	-	-	-
	Watts	81	63	-	-	-	-	-	-	-

AHRI Performance Data

	Cooling Full Load		Cooling Part Load		Heating Full Load		Heating Part Load	
Model	Btu/hr	EER	Btu/hr	EER	Btu/hr	COP	Btu/hr	COP
AXU036	38800	20.8	27700	33.8	29700	3.8	22200	4.9

Unit Parameter Adjustment Range

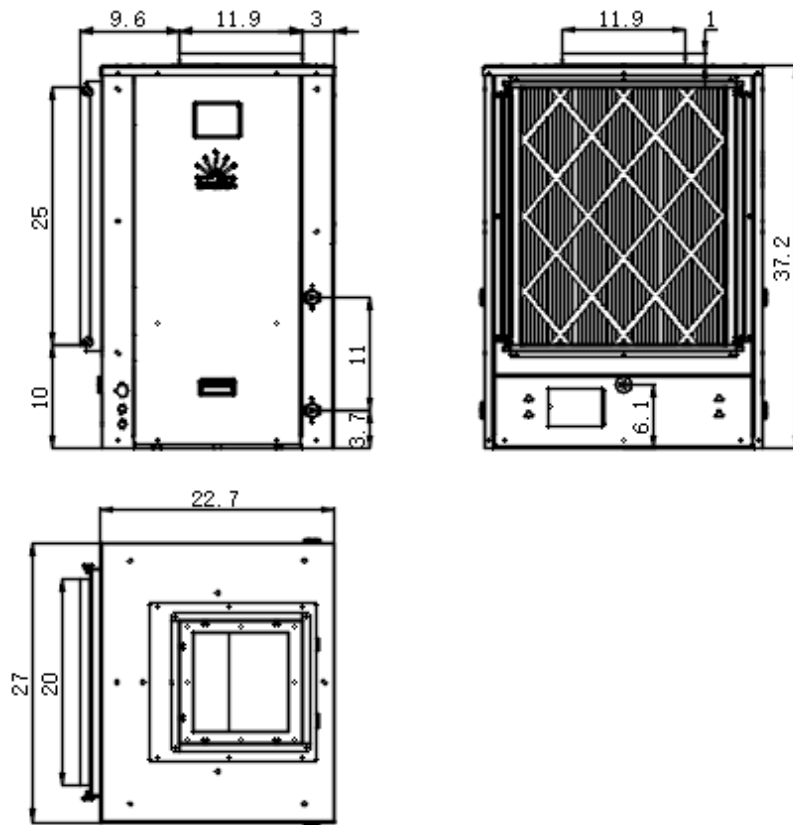
			Model
Parameter			AXU036MM1001
Target Heating/Cooling Capacity (Btu/hr)	Stage 1 Heating		12000
	Stage 1 Cooling		12000
Target Heating/Cooling Capacity (Btu/hr)	Stage 2 Heating	min	12000
	Cooling Level 2	max	36000
	Stage 2 Cooling	min	12000
	Heating Level 2	max	36000
Airflow Setting Range (CFM)*	Cooling Stage 1	min	
		max	
	Cooling Stage 2	min	
		max	
	Heating Stage 1	min	
		max	
	Heating Stage 2	min	
		max	
	Heating & Electric Heating	min	
		max	
	Electric Heating Only	min	
		max	
	Dehumidification	min	
		max	
	Fan Only	min	
		max	
Suitability of Electric Heating	E15S1A01(1.5KW)		YES
	E30S1A01(3.0KW)		YES
	E50S1A01(5.0KW)		YES, only if MHC >= 2

*See online documentation for airflow limits

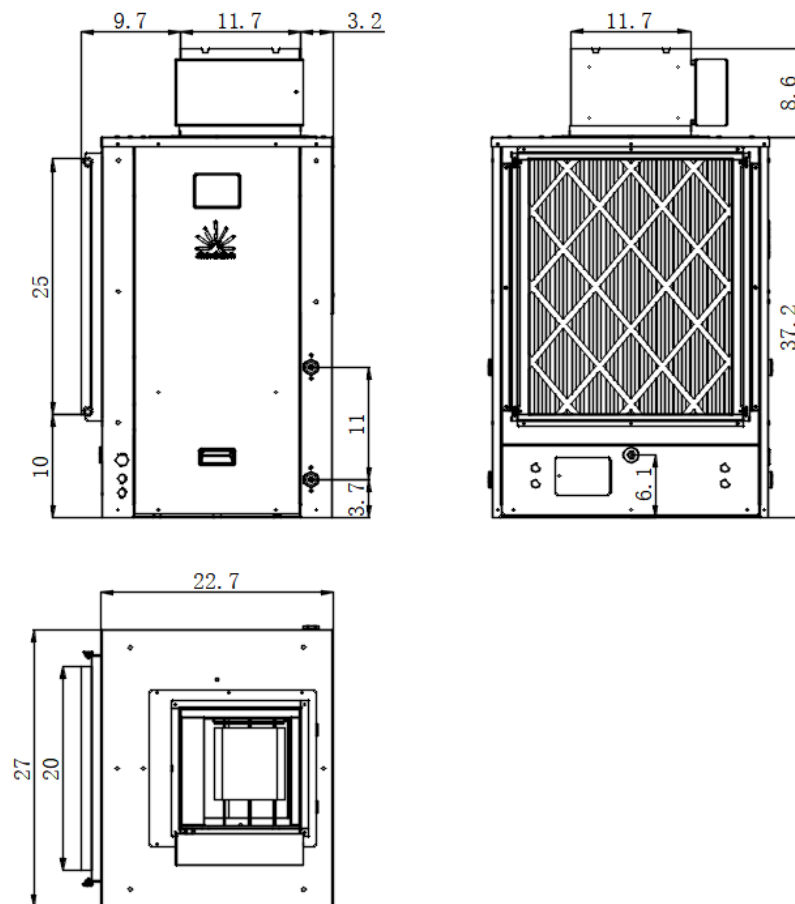
Unit Dimensions and Interfaces

Model	AXU036MM1001
Supply Flange Size	11.9" x 11.9" x 1"
Return Flange Size	25" x 20" x 1"
Ground Loop Inlet and Outlet	1" NPT
Condensate Water Outlet Size	3/4" PVC
Input Power Supply Punchouts, Trade Size	1"
Input Low Voltage Punchouts, Trade Size	1/2"

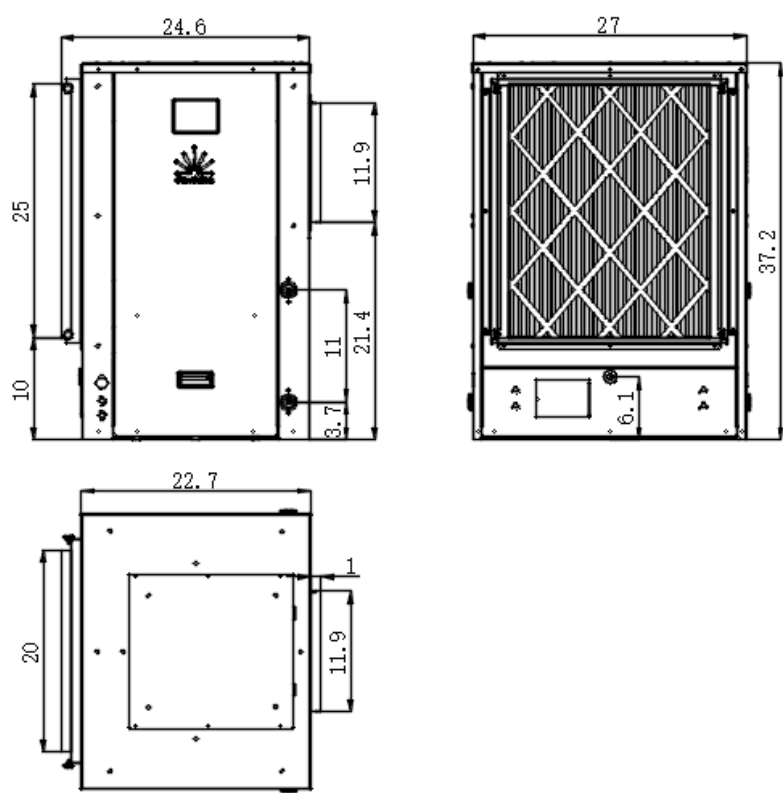
Dimensions, Top Supply Configuration (inches)



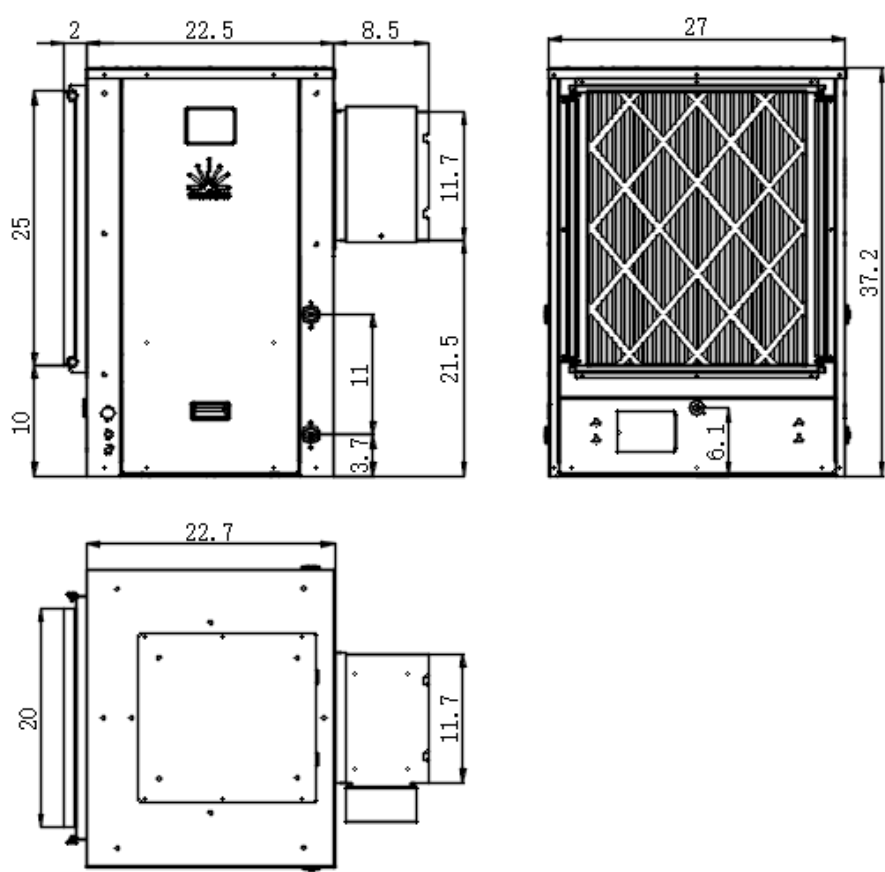
Dimensions, Top Supply Configuration, with Electric Heater (inches)



Dimensions, Side Supply Configuration (inches)

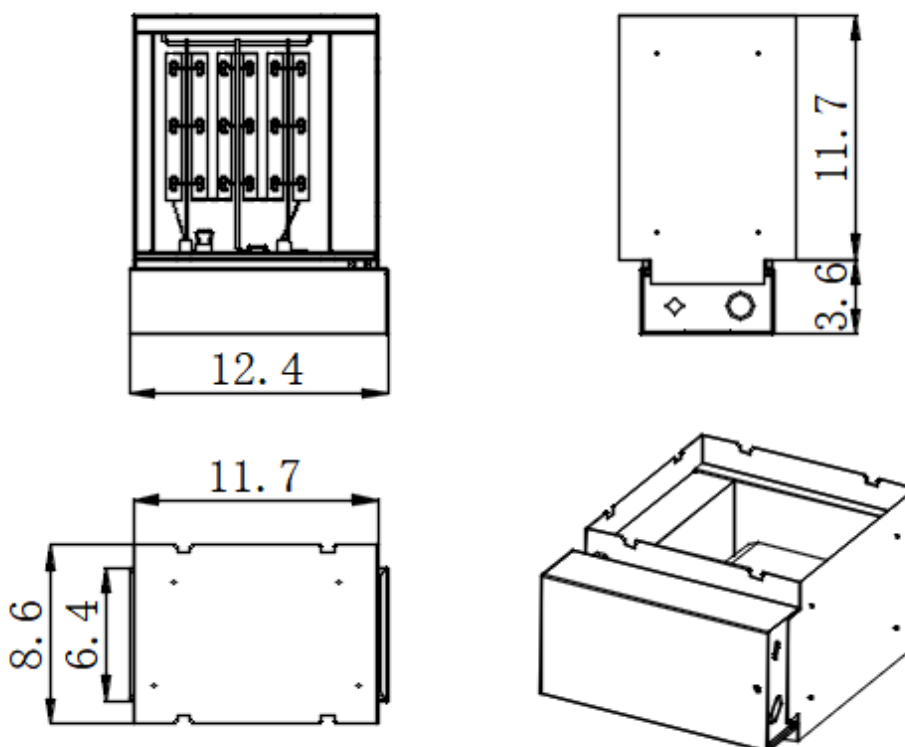


Dimensions, Side Supply Configuration, with Electric Heater (inches)



Electric Heater Parameters

Model	E15S1A01	E30S1A01	E50S1A01
Input Power Supply Voltage (Nominal) [V]	208 / 230		
Input Power Supply Frequency [Hz]	60		
Input Power Supply Phase [Hz]	Single Phase		
Rated Current (208 / 230) [A]	6.1 / 6.7	11.6 / 12.8	19.1 / 20.7
MCA (208 / 230) [A]	7.6 / 8.3	14.5 / 16.0	23.9 / 25.9
MOP (208 / 230) [A]	10 / 15	25 / 25	40 / 45
Dimensions [in]	15.3 x 12.4 x 8.6		
Ventilation Port Connection Size [in]	11.7 x 11.7 x 1		
Input Power Supply Cutout Size [in]	1		
Input control opening size [in]	1/2		



CHAPTER 5: Electrical Components and Controls

Section 1: Critical Components

Inverter Controller Board: Integrated control and drive board providing compressor drive and frequency control, expansion valve control, unit operation, and unit protection.

Unit Controller Board: Low voltage circuit interface for the return air temperature sensor and thermostat, and power supply for the blower relays.

Blower Controller Board: Blower drive, frequency control, and blower protection logic.

Interface Screen: Communicates with the main control board for system parameter setting and fault indication.

Transformer: Converts input line voltage to 24VAC.

Low Voltage Resettable Breaker: Mounted directly on the transformer to protect the transformer and the low voltage circuits. Maximum permissible total current is 0.37A.

Reversing Valve: Controls the refrigerant circuit mode (heating or cooling). Energized in heating mode.

High-Pressure Switch: Locks the unit out when system pressure exceeds the setpoint, protecting the refrigerant circuit from excessive pressure.

High-Pressure Sensor: Senses pressure on the condensing side of the system and calculates condensing saturation temperature.

Low-Pressure Sensor: Senses pressure on the evaporating side of the system and calculates evaporating saturation temperature.

Discharge High Temperature Switch: Locks the unit out when discharge temperature is too high, protecting the refrigerant circuit from excessive temperature: opens at 230°F, closes at 176°F, self-resetting.

Electric Heater: Auxiliary heat in cold weather and backup heat in the event of a unit fault.

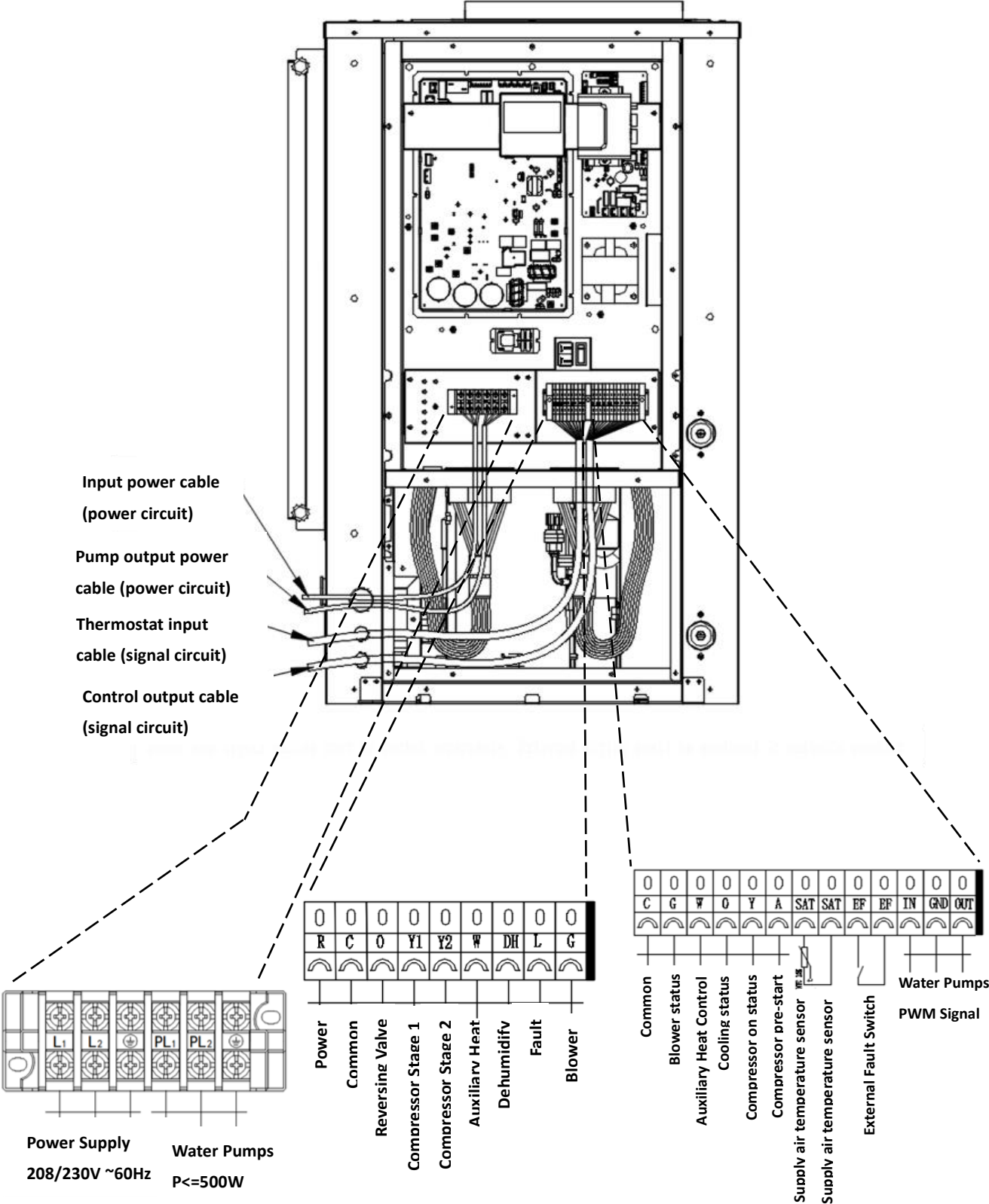
Blower Motor: Variable-speed motor for the blower.

Inverter Compressor: Circulates refrigerant through the heat exchangers and raises refrigerant pressure and temperature. DC inverter-driven, allowing automatic capacity modulation.

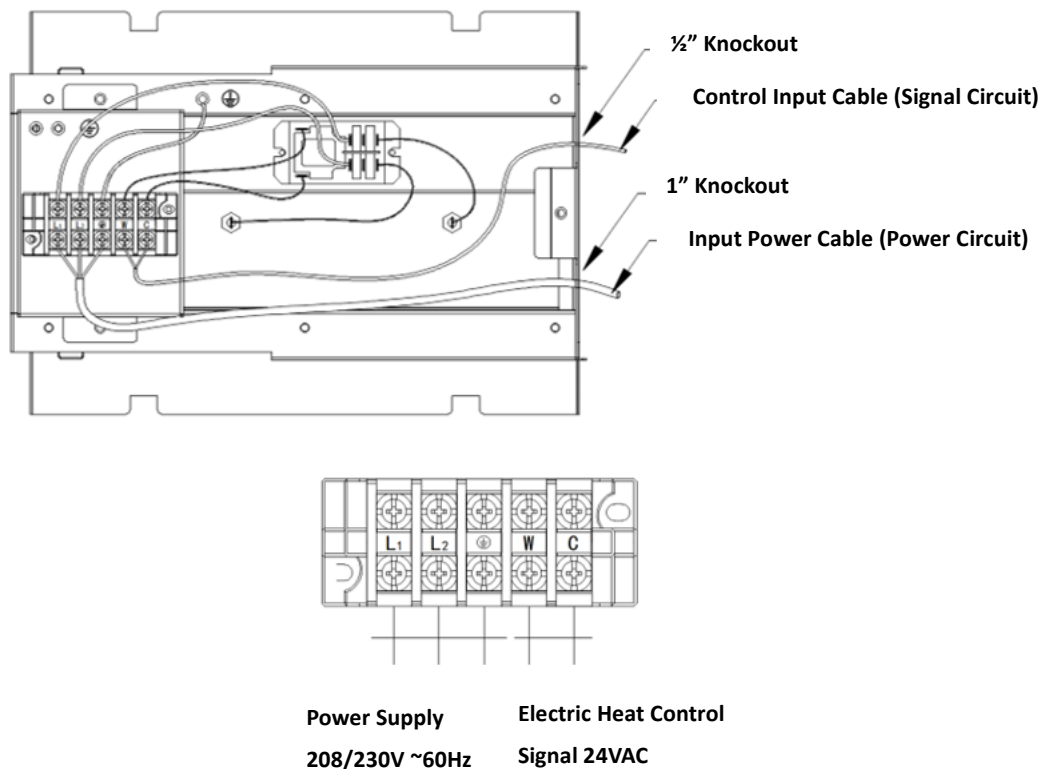
Section 2: Electrical Drawings

Heat Pump

Power and signal cables must be routed separately. External wiring shall be enclosed in suitable conduit.



Electric heater



NOTE: DO NOT draw power from the unit's terminal block or electrical circuit. Wire an independent electrical circuit for the electric heater.

Section 3: Features

Microprocessor Characteristics and Operation

A removable low voltage terminal block provides the terminals for the thermostat connection. A second removable terminal block is provided for wiring auxiliary equipment.

A microprocessor-based circuit board controls the unit's inputs and outputs, including status modes, faults, and diagnostics. The service panel illuminates and displays a fault code when a fault occurs.

Selection of Input Voltage of the Main Control Board

The unit provides several 24VAC output signals used to drive external devices. Because the unit accepts either 208V or 230V input, the selection switch in the electrical box must be set during initial installation to keep the 24VAC outputs within range.

For 208V input, press the upper part of the selection switch so that it points to the 208VAC label. For 230V input, press the lower part of the selection switch so that it points to the 230VAC label.

Control of Circulating Water Pump

Connect terminals “PL1”, “PL2”, and “G” on the electrical box terminal block to the power terminals of the circulating pump. The circuit is normally open. The circuit is closed, and the pumps energized according to the same logic as the “A” VAC24 output.

Control of Electric Heating Component

Wire terminals “W” and “C” in the output section of the electrical box terminal block to the electric heater's control input terminals. The electric heater's power terminals require a separate power feed. Size those conductors according to the rated load of the electric heater.

When the wired service controller enables auxiliary electric heat, terminal “W” outputs 24VAC.

Refer to the electrical schematic on the last page.

Pre-start

Before compressor or electric heat operation, the fan and accessory output “A” are enabled for 30 seconds.

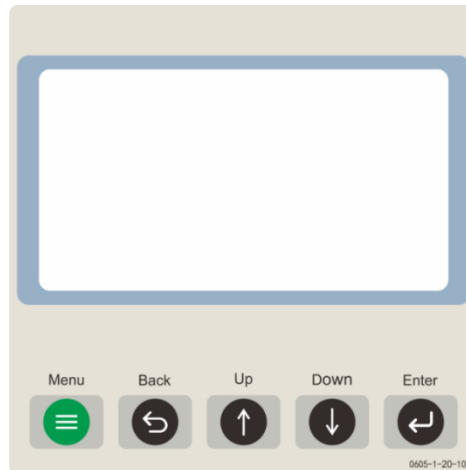
Turn-Down

When shutting down, the compressor will ramp down to the minimum frequency before turning off. Accessory output “A” is turned off 30 seconds after both the compressor and electric heater are turned off.

Chapter 6: User Interface

Section 1: Overview

Interact with the unit using the service panel inside the electrical box.



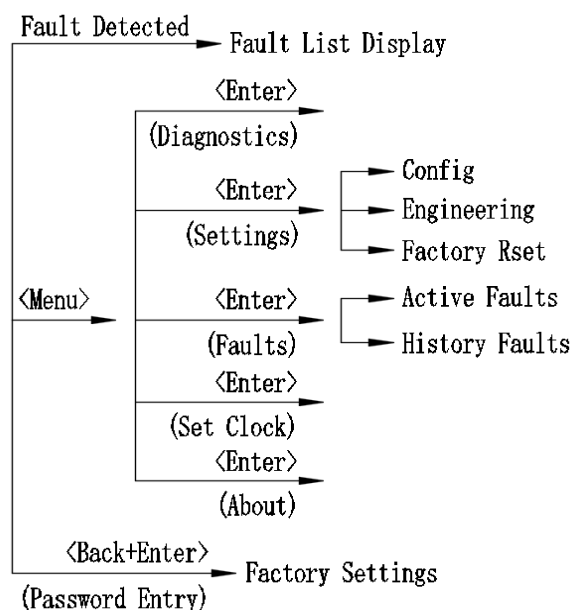
Button Functions and Operation Hierarchy Overview

There are 5 physical buttons in total, with the following functions respectively: <Menu>、<Back>、<Up>、<Down>、<Enter>.

Description:

<XX> indicates the XX button.
<XX+YY> indicates the combination of the XX button and the YY button.

Power-on → Countdown Interface → Main Interface →



Notes:

1. If no button is pressed for 30 minutes while in a sub-interface, the display returns to the Main Interface. The Countdown Interface is an exception and does not time out.
2. A ▲ on the right side of the display indicates that the Up button scrolls up in that interface.

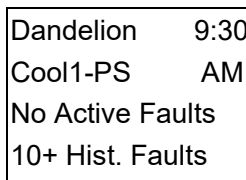
3. A ▼ on the right side of the display indicates that the Down button scrolls down in that interface.
4. Press the Menu button from any sub-interface to return to the Main Interface.

Interface Overview

Startup Interface



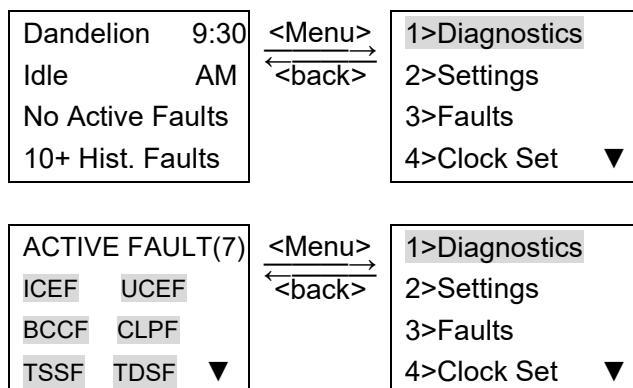
Main Interface



Notes:

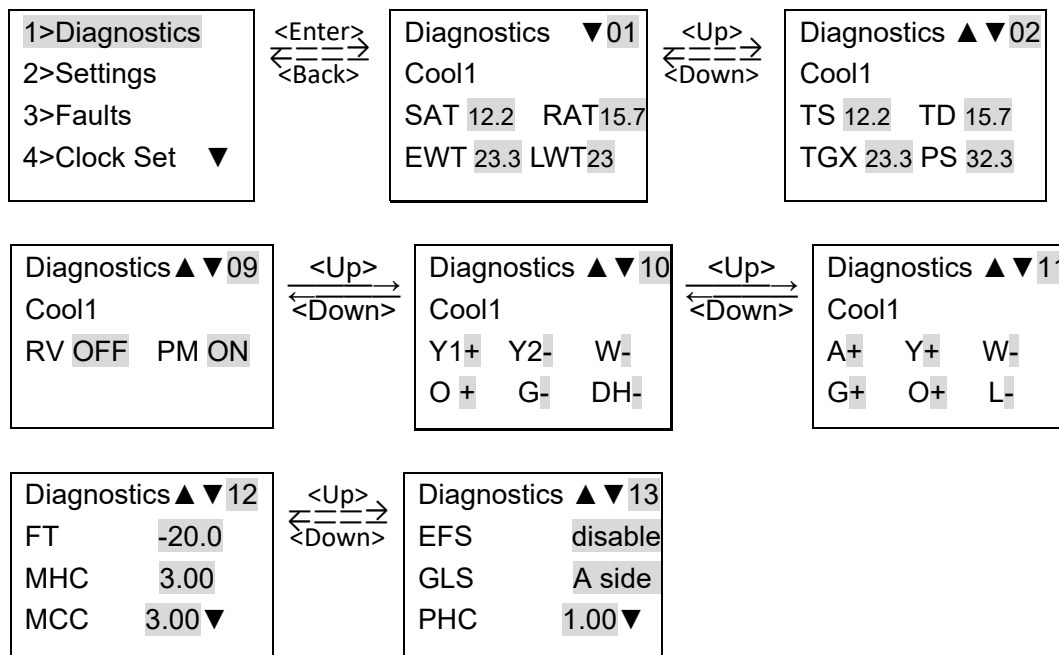
1. The Main Interface displays the thermostat mode and the unit status together, separated by a hyphen. For example, "Cool1-PS".
2. When a fault occurs, the Main Interface displays the active fault code, and the screen backlight turns on. See the Fault Code Table for fault code definitions.
3. The clock uses a 12-hour format, for example "9:30 AM".
4. "10+ Hist. Faults" indicates that 10 or more historical fault records are stored.

Fault Interface

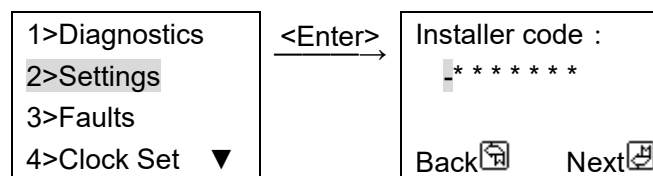


Note: From the Main Interface, or from the fault list displayed on the Main Interface, press the Menu button to enter Menu Settings. Press the Back button to return to the Main Interface.

Status Inquiry Interface

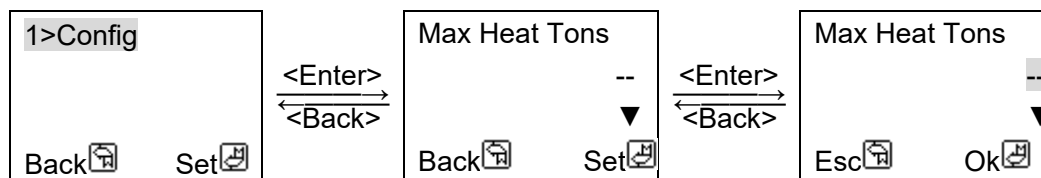


Parameter Settings Interface

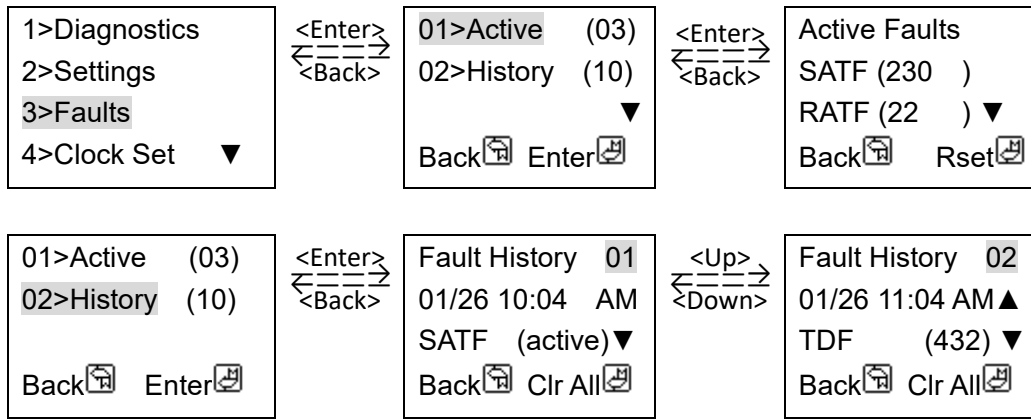


1) Enter the installer password (5*****) to display the installer parameters.

Note: The installer parameters must be configured during startup. The unit will not start until they are configured.



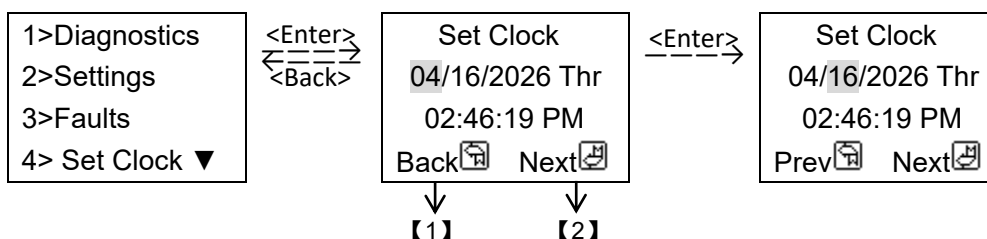
Fault Inquiry Interface



Notes:

1. The Fault Inquiry Interface provides both Active Faults and Fault History, each with its fault count.
2. Active Faults interface:
 - a. Two faults are displayed per page. If more than two faults are active, press the Up or Down button to page through the remaining faults.
 - b. For each fault that has not been reset, the elapsed duration in seconds appears in parentheses. For example, "SATF (230)" means the supply air temperature sensor fault has been active for 230 seconds.
 - c. Once the fault condition has cleared, press the Enter button to reset the fault.
3. Fault History interface:
 - a. One historical fault is displayed per page. Press the Up or Down button to page through the remaining records.
 - b. The second line shows the time the fault occurred, for example "01/26 10:04 AM".
 - c. The third line shows the fault itself. A fault that has not been reset is marked "(Active)", for example "SATF (Active)". A fault that has been reset shows its duration instead, for example "TDF (432)". If the unit is powered off while a fault is still not reset, that fault's duration displays as 0 after the next power-up.
 - d. In the Fault History interface, press the Enter button to clear all historical faults.

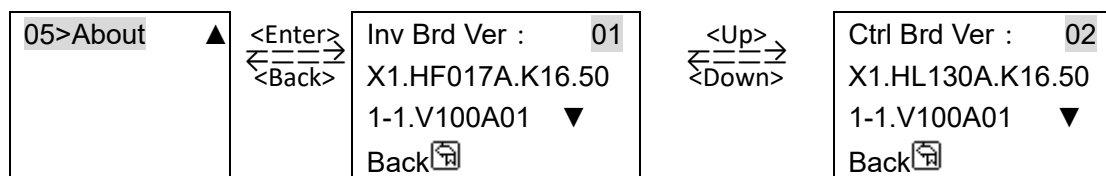
Clock Settings Interface



Notes:

1. The clock setting is used to timestamp historical fault records.
2. Button operation:
 - a. Press the Enter button to step through Year, Month, Day, Hour, Minute, and Second. Press the Up or Down button to adjust the selected value.
 - b. Press the Back button to return to the previous interface and save the setting.
3. Set the system time zone with the "Clock Time Zone Setting" parameter.

About Interface



Note: This interface displays the unit software version, the display software version, the inverter version, the main board serial number, the blower controller software version, the hardware serial number, and other identifying information.

Section 2: Operating Tables

Thermostat Mode – Unit Status			
Code	Description	Code	Description
Idle	Standby	Cool2-PS	Cooling 2 - Pre-start
Idle-FLT	Standby - Fault	Cool2-TD	Cooling 2 - Shutdown
Heat1	Heating 1	Cool2-FLT	Cooling 2 - Fault
Heat1-PS	Heating 1 - Pre-start	DH	Dehumidify
Heat1-TD	Heating 1 - Shutdown	DH-PS	Dehumidify - Pre-start
Heat1-FLT	Heating 1 - Fault	DH-TD	Dehumidify - Shutdown
Heat2	Heating 2	DH-FLT	Dehumidify - Fault
Heat2-PS	Heating2 - Pre-start	Fan	Fan
Heat2-TD	Heating 2 - Shutdown	Fan-FLT	Fan - Fault
Heat2-FLT	Heating 2 - Fault	Invalid	Invalid (Y1, O, and W triggered simultaneously)
Heat1+AUX	Heating 1 + Aux	Heat1 - CSCD	Heat 1 signal present, but compressor is in anti-short-cycle protection.
Heat1+AUX-PS	Heating 1 + Aux - Pre-start	Heat2 - CSCD	Heat 2 signal present, but compressor is in anti-short-cycle protection.
Heat1+AUX-TD	Heating 1 + Aux - Shutdown	Cool1 - CSCD	Cool 1 signal present, but compressor is in anti-short-cycle protection.
Heat1+AUX-FLT	Heating 1 + Aux - Fault	Cool2 - CSCD	Cool 2 signal present, but compressor is in anti-short-cycle protection.
Heat2+AUX	Heating 2 + Aux	DH - CSCD	Dehumidify signal present, but compressor is in anti-short-cycle protection.
Heat2+AUX-PS	Heating 2 + Aux - Pre-start	Heat1 - NF	Heat 1 - Unit is in water freeze protection.
Heat2+AUX-TD	Heating 2 + Aux - Shutdown	Heat2 - NF	Heat 2 - Unit is in water freeze protection.
Heat2+AUX-FLT	Heating 2 + Aux - Fault	Heat1 + AUX - NF	Heat 1 + Aux Heat - Unit is in water freeze protection.
AUX only-PS	Aux Heat - Pre-start	Heat2 + AUX - NF	Heat 2 + Aux Heat - Unit is in water freeze protection.
AUX only-TD	Aux Heat - Shutdown		
AUX only	Aux Heat		
AUX only-FLT	Aux Heat - Fault		
Cool	Cooling 1		
Cool1-PS	Cooling 1 - Pre-start		
Cool1-TD	Cooling 1 - Shutdown		
Cool1-FLT	Cooling 1 - Fault		
Cool2	Cooling 2		

Sensor Data

Code	Description	Unit
SAT	Supply air temperature	°F
RAT	Return air temperature	°F
EWT	Entering water temperature	°F
LWT	Leaving water temperature	°F
TS	Suction temperature	°F
TD	Discharge temperature	°F
TGX	Ground heat exchanger liquid line temperature	°F
PS	Suction pressure	PSIG
PD	Discharge pressure	PSIG
TE	Evaporator saturation temperature	°F
TC	Condenser saturation temperature	°F

Other Unit Data

Code	Description	Unit
CC	Estimated cooling capacity	kBtu/hr
HC	Estimated heating capacity	kBtu/hr
TET	Target evaporation temperature	°F
TCT	Target condensation temperature	°F
CTS	Compressor target speed	Hz
CCS	Compressor current speed	Hz
BTS	Blower target speed	rpm
BCS	Blower current speed	rpm
EVS	EEV steps	step
TSH	Target superheat	°F
CSH	Current superheat	°F
IOV	Inverter output voltage	V
IOC	Inverter output current	A
IIV	Inverter input voltage	V
IIC	Inverter input current	A
IOP	Inverter output power	kW
IBT	Inverter board temperature	°F
IFL	Inverter frequency limit	/
BBT	Blower board temperature	°F
BP	Blower power	kW
RV	Reversal valve status	/
PM	Water pump output status	/

Thermostat Input Status

Terminal	Description
Y1	"+" indicates detected; "-" indicates not detected.
Y2	"+" indicates detected; "-" indicates not detected.
W	"+" indicates detected; "-" indicates not detected.
O	"+" indicates detected; "-" indicates not detected.
G	"+" indicates detected; "-" indicates not detected.
DH	"+" indicates detected; "-" indicates not detected.

24VAC Relay Output Status

Terminal	Description
A	"+" indicates output energized; "-" indicates output off
Y	"+" indicates output energized; "-" indicates output off
W	"+" indicates output energized; "-" indicates output off
G	"+" indicates output energized; "-" indicates output off
O	"+" indicates output energized; "-" indicates output off
L	"+" indicates output energized; "-" indicates output off

User Settings Parameter Display

Code	Description	Units
FP	Freeze Point	°F
MHC	Max Heat Capacity	Ton
MCC	Max Cool Capacity	Ton
AUX-SIZE	AUX size	kW
EFS	External Fault Switch	/
GLS	Ground Loop Side	/
PHC	Part load heat capacity	Ton
PCC	Part load cool capacity	Ton
ATM	AHRI test mode	/
TTU	TET/TCT update	/
AF-CTRL	Airflow Control (CFM vs RPM)	/
NC	Nominal capacity	Ton
NAF	Nominal airflow	CFM
MAF	Maximum airflow	CFM
AF-AUX	AUX airflow	CFM
AF-HEAT1	Heat1 Airflow	CFM
AF-HEAT2	Heat2 Airflow	CFM
AF-COOL1	Cool1 Airflow	CFM
AF-COOL2	Cool2 Airflow	CFM
AF-DH	DH Airflow	CFM
AF-FAN	FAN Airflow	CFM

Indoor Unit Board 24VAC Signal Logic Table

24VAC Thermostat Signals	
Input Signals	Output Signals
Y1 - Stage 1 Cooling/Heating Request Signal	L - Fault Output Signal; Activated when a fault occurs in the indoor unit or outdoor unit.
Y2 - Stage 2 Cooling/Heating Request Signal	
O/B - Cooling Request Signal.	
G - Fan Request Signal	
W - Electric Auxiliary Heat Request Signal	
DH - Dehumidification Request Signal	
Accessory 24VAC Output Signals	
A - Compressor Pre-start Signal: Activated during the "Pre-start" phase (30 seconds before the compressor or electric heater is about to start) and remains on while the compressor is running. Deactivated 30 seconds after both the compressor and electric heater are turned off.	
Y - Compressor Running Status: Activated when the compressor is running.	
W - Electric Heat Status: Activated when electric heater is on.	
G - Supply Blower Running Status: Activated when the indoor blower is running.	
O - Cooling Status: Activated when the unit is in cooling mode. Note: the reversing valve itself is opposite polarity.	

Thermostat Input Control Table

Thermostat Inputs*									
G	Y1	Y2	O	W	DH	Operating Mode	Compressor	Indoor Fan	AUX
0	0	x	x	0	0	Idle	Off	Off	Off
1	0	x	x	0	0	Fan	Off	On	Off
x	0	0	x	0	1	DH	On	On	Off
x	1	0	0	0	x	Heat1	On	On	Off
x	1	1	0	0	x	Heat2		On	Off
x	1	0	0	1	x	Heat1+AUX		On	On
x	1	1	0	1	x	Heat2+AUX		On	On
x	1	0	1	0	x	Cool1	On	On	Off
x	1	1	1	0	x	Cool2		On	Off
x	0	x	x	1	x	AUX only	Off	On	On
x	1	x	1	1	x	Invalid	Off	Off	Off

*"1" indicates the presence of the 24VAC signal, "0" indicates the absence of the 24VAC signal, and "x" indicates that the 24VAC signal may be either present or absent.

Accessory Outputs

24VAC Output Signal*					
Unit Status	A	Y	W	G	O
Idle	0	0	0	0	0
FAN	0	0	0	1	0
Dehumidify	1	1	0	1	1
Heat1	1	1	0	1	0
Heat2	1	1	0	1	0
Heat1+AUX	1	1	1	1	0
Heat2+AUX	1	1	1	1	0
AUX	1	0	1	1	0
Cool1	1	1	0	1	1
Cool2	1	1	0	1	1
Pre-Start	1	0	0	1	x
Shutdown	1	0	0	1	x

*"1" indicates the 24VAC signal is present; "0" indicates the 24VAC signal is absent; "x" indicates ON or OFF is determined by the mode.

Fault Code Table

There are four different reset methods for faults, depending on the specific fault.

1. Power-on Reset
 - These faults can only be reset by power cycling the unit after the fault has been cleared.
2. A/M: Limited Automatic Reset
 - After a fault alarm, once the fault is cleared there will be a default three-minute delay. If the same fault does not occur again within this period, the system will automatically reset.
 - Within 60 minutes, it can be automatically reset twice; when the third alarm occurs, the fault enters a lock state, and the default reset delay will be increased by the "extended delay time" before the system can automatically reset.
 - The "Extended delay time" starts at 30 minutes. Each time the lock is triggered, it accumulates an additional 30 minutes, until it reaches the upper limit of 4 hours.
 - After a manual fault reset, the alarm counts will be reset, and the "extended delay time" will start accumulating from 30 minutes again.
3. A: Automatic Reset
 - The alarm automatically resets after the fault is cleared, with no limit on the number of resets.
 - Manual reset via the service panel will also clear these faults.
4. M: Manual Reset
 - After the fault is cleared, the alarm can only be manually reset through the controller.

Fault Code	Fault Name	Reset Mode	Detection Condition	Troubleshooting Method
Main Control Board Fault				
ICEF	Outdoor EEPROM Data Error	Power-on Reset	Alarm detected after power-on when abnormal	Initialize all parameters. If the fault persists after initialization, contact technical support
UCEF	Indoor EEPROM Data Error	Power-on Reset	Alarm detected after power-on when abnormal	Initialize all parameters. If the fault persists after initialization, contact technical support
ICCF	Inverter Communication Fault	A	Alarm detected after power-on when abnormal	Check if communication wires are properly connected with good contact
UCCF	Indoor Communication Fault	A	Alarm triggered when communication is disconnected after power-on	Check if communication wires are properly connected with good contact
BCCF	Indoor Blower Communication Fault	A	Alarm triggered after communication disconnection lasts for 180 seconds post power-on	Check if communication wires are properly connected with good contact
BF	Indoor Blower Fault	A/M	Alarm triggered when indoor blower is abnormal after power-on	Refer to indoor blower drive fault descriptions for detailed definitions
IF	Inverter Fault	A/M	Alarm triggered when inverter is abnormal after power-on	Refer to inverter fault descriptions for detailed definitions
ICS	Inverter Model Under Configuration	A	Alarm detected after power-on when abnormal	Initialize all parameters. If the fault persists after initialization, contact technical support

Unit Fault				
CLPF	Low Pressure Switch Fault	M	Alarm triggered by abnormal low-pressure switch signal	Check the input status of low-pressure switch
LPF	Low Pressure Sensor Low Reading	A/M	Alarm triggered by abnormal low-pressure sensor signal	Check system low pressure value
CHPF	High Pressure Switch Fault	M	Alarm triggered by abnormal high-pressure switch signal	Check the input status of high-pressure switch
HPF	High Pressure Sensor High Reading	A/M	Alarm triggered by abnormal high-pressure sensor signal	Check system high pressure value
RLF	Refrigerant Leakage	M	Alarm triggered when both high and low system pressures are too low	Check for refrigerant leakage. Verify normal operation of high/low pressure sensors
TDF	Excessive Discharge Temperature	A/M	Alarm triggered by excessive discharge temperature	Inspect temperature probe integrity. Check for insufficient refrigerant
TSF	Excessively Low Suction Temperature	A/M	Alarm triggered by excessively low suction temperature in cooling mode	Check blower operating status. Check for insufficient refrigerant
ASDF	Abnormal Suction-Discharge Temperature Difference	M	Alarm triggered by abnormal temperature difference between suction and discharge	Verify normal readings of suction and discharge temperature sensors
WTF	Excessively Low Water Source Outlet Temperature	A/M	Fault triggered by excessively low water source side temperature under water heating mode	Check water pump operation. Check for insufficient refrigerant
HETF	Excessively Low Heating Evaporation Temperature	A/M	Fault triggered by excessively low saturated evaporation temperature under heating mode	Check water pump operation. Check for insufficient refrigerant
CETF	Excessively Low Cooling Evaporation Temperature	A/M	Alarm triggered by excessively low saturated evaporation temperature under cooling mode	Check blower operating status. Check for insufficient refrigerant
COF	Condensate Overflow Fault	A/M	Alarm triggered when water level switch opens under cooling mode	Check normal condensate drainage
USCF	User Configuration Incomplete	A	Alarm triggered when Y1/W/DH thermostat signals received before startup parameters are fully configured	Confirm completion of parameter configuration
TSI	Thermostat Signal Fault	A	Alarm triggered when Y1, W and O signals are connected simultaneously	Verify correct thermostat wiring
ASF	Incorrect Auxiliary Electric Heater Model Selection	A	Alarm triggered when nominal capacity (NC) < 2ton with AUX size set to 5kw	Verify correct model selection of auxiliary electric heater
EF	External Switch Fault	A/M	Alarm triggered by abnormal external switch signal	Inspect abnormal input from external switches

Sensor Fault				
SATF	Supply Air Temperature Probe Fault	A	Alarm detected after power-on for abnormal sensor	Check if main board sensor wiring is connected and for sensor integrity
RATF	Return Air Temperature Probe Fault	M		
TGSF	Outdoor Coil Temperature Probe Fault	M		
TDSF	Discharge Temperature Probe Fault	M		
TSSF	Suction Temperature Probe Fault	M		
LPTF	Low Pressure Transducer Fault	M		
HPTF	High Pressure Transducer Fault	M		
LASF	Right Water Source Outlet Temperature Fault	M		
LBSF	Left Water Source Outlet Temperature Fault	M		
EASF	Right Water Source Return Temperature Fault	A		
EBSF	Left Water Source Return Temperature Fault	A		

Inverter Fault List

Fault Code	Fault Name	Possible Causes	Troubleshooting Method
IF01	Overcurrent at start	Mismatch between compressor model parameters and actual compressor compressor	Check compressor model and matching parameters
		Restarting compressor while it is still rotating	Wait until compressor fully stops before restarting
		Short circuit between UVW output wires or short to ground	Check UVW output wires for short circuits
		Damaged inverter power module	Contact service personnel
IF02	Overcurrent during acceleration	Mismatch between compressor model parameters and actual compressor	Check compressor model and matching parameters
		Undervoltage grid supply	Check input power supply
		Inverter power rating insufficient	Replace with higher power inverter
		Acceleration time set too short	Lengthen acceleration time
IF03	Overcurrent during deceleration	Mismatch between compressor model parameters and actual compressor	Check compressor model and matching parameters
		Inverter power rating insufficient	Replace with higher power inverter
		Deceleration time set too short	Lengthen deceleration time
IF04	Overcurrent during constant-speed operation	Mismatch between compressor model parameters and actual compressor	Check compressor model and matching parameters
		Low grid voltage	Check input power supply
		Abnormal load condition	Perform load inspection
		Inverter power rating insufficient	Replace with higher power inverter
IF05	Overvoltage during acceleration	Excessively high input voltage	Check input power supply
		Restarting compressor while it is still rotating	Wait until compressor fully stops before restarting
		Mismatch between compressor model parameters and actual compressor	Check compressor model and matching parameters
IF06	Overvoltage during deceleration	Excessively high input voltage	Check input power supply
		Mismatch between compressor model parameters and actual compressor	Check compressor model and matching parameters
		Deceleration time set too short	Lengthen deceleration time
IF07	Overvoltage during constant-speed operation	Excessively high input voltage	Check input power supply
		Mismatch between compressor model parameters and actual compressor	Check compressor model and matching parameters
		The acceleration and deceleration times are set too short.	Extend acceleration and deceleration time appropriately
IF08	Overvoltage in	Excessively high input voltage	Check input power supply

	standby state	Faulty DC bus voltage detection circuit	Contact service personnel
IF09	Undervoltage during running	Abnormal input voltage or power cut during operation	Check input power supply and wiring
		Missing input phase	Check input power supply and wiring
		Damaged charging contactor	Inspect and replace contactor
IF10	Input phase loss (3-phase input only)	Missing phase in 3-phase input	Check installation wiring
		Unbalanced 3-phase input voltage	Measure input voltage balance
		Severe output oscillation	Adjust parameters to eliminate oscillation
IF11	Output phase loss	Missing phase on U/V/W output terminals	Inspect output wiring, motor, and connecting cables
IF12	Power device protection	Mismatch between compressor model parameters and actual compressor	Check compressor model and matching parameters
		Short circuit between UVW output wires or short to ground	Rewire output cables
		Excessively long wiring between compressor and inverter	Install output reactor or filter
		Severe electromagnetic interference or damaged inverter	Contact service personnel
IF13	Inverter overheating	Excessively high ambient temperature	Lower ambient operating temperature
		Temperature probe damage or open circuit if fault occurs immediately after power-on	Contact service personnel
		Blocked air duct or broken cooling fan	Clean air duct or replace cooling fan
		Excessive load	Inspect load or upgrade to higher power inverter
IF14	Inverter Overload (PFC Overheat)	Excessively high inverter temperature	Inspect cooling fan, air duct and ambient temperature
		Acceleration time set too short	Lengthen acceleration time
		Undervoltage input supply	Check input voltage
		Mismatch between compressor model parameters and actual compressor	Check compressor model and matching parameters
IF15	Motor overload	Mismatch between compressor model parameters and actual compressor	Check compressor model and matching parameters
		Compressor locked rotor or sudden heavy load fluctuation	Check compressor model and matching parameters
		Undervoltage input supply	Check input voltage
IF16	PFC Startup Failure	Grid voltage remains low for several seconds after startup, preventing PFC activation	Check input voltage

		PFC module self-protection or circuit abnormality	Power off for several minutes then restart. Contact service personnel if fault persists
IF17	Motor overload	Current exceeds overload threshold for specified duration	Check compressor model and matching parameters
IF18	Motor overspeed	Compressor running speed exceeds 1.1*maximum rated speed	Compressor phase sequence reversed or motor disconnected; check compressor model and matching parameters
IF19	Motor D-axis overcurrent	Mismatch between compressor model parameters and actual compressor	Check compressor model and matching parameters
		Restart compressor too soon after shutdown	Wait several minutes before restarting
		Faulty current detection circuit	Contact service personnel
		Permanent magnet synchronous motor demagnetization	Replace motor
		Open circuit in compressor stator winding	Measure stator resistance and replace motor
IF20	Motor Q-axis overcurrent	Mismatch between compressor model parameters and actual compressor	Check compressor model and matching parameters
		Restart compressor too soon after shutdown	Wait several minutes before restarting
		Faulty current detection circuit	Contact service personnel
		Permanent magnet synchronous motor demagnetization	Replace motor
		Open circuit in compressor stator winding	Measure stator resistance and replace motor
IF21	Parameter saving failed	Error during parameter write operation	Power off, then restart. Contact service personnel if fault persists
IF22	Communication error	Incorrect or disconnected communication wiring between main control board and inverter drive board	Inspect wiring between main control board and inverter drive
		Improper communication parameter settings	Verify communication parameter configuration
		Severe communication interference	Check communication wiring and grounding
IF23	Current test error	Damaged current sensor or abnormal detection circuit	Power off, then restart. Contact service personnel if fault persists
IF24	Heat temperature test error for PFC	Temperature probe damage, open circuit or circuit abnormality if fault triggers immediately after power-on	Power off, then restart. Contact service personnel if fault persists
IF25	Motor Lock at start	Excessive rotor rotation fluctuation, causing motor loss of synchronism	Check compressor model and matching parameters
		Restart compressor too soon after shutdown	Wait several minutes before restarting
		Inappropriate motor startup and stall detection parameters	Check compressor model and matching parameters

		Permanent magnet synchronous motor demagnetization	Replace motor
		Open circuit in motor stator winding	Measure stator resistance and replace motor
		Excessive operating load	Inspect motor load condition
IF26	Motor lock during running	Excessive rotor rotation fluctuation causing motor loss of synchronism	Check compressor model and matching parameters
		Restart compressor too soon after shutdown	Wait several minutes before restarting
		Inappropriate motor startup and stall detection parameters	Check compressor model and matching parameters
		Permanent magnet synchronous motor demagnetization	Replace motor
		Open circuit in motor stator winding	Measure stator resistance and replace motor
		Excessive operating load	Inspect motor load condition
IF27	Heat temperature test error	Fault triggers immediately after power-on; temperature probe may be damaged, open circuit, or circuit abnormality.	Power off then restart. Contact service personnel if fault persists
IF28	Stall error	Motor fails to start as commanded.	Check compressor model and matching parameters
IF29	Interrupt overflow 1	Internal fault	Contact service personnel
IF30	Interrupt overflow 2	Internal fault	Contact service personnel
IF31	Rotor shakes at start	Motor restarted too soon after shutdown	Wait several minutes before restarting
		Motor startup and stall detection parameters improperly set	Check compressor model and matching parameters
		PMSM motor demagnetization	Replace motor
		Motor stator winding open circuit	Measure stator resistance and replace motor
		Excessive operating load	Inspect motor load condition
IF32	Rotor shakes while running	Motor restarted too soon after shutdown	Wait several minutes before restarting
		Motor startup and stall detection parameters improperly set	Check compressor model and matching parameters
		PMSM motor demagnetization	Replace motor
		Motor stator winding open circuit	Measure stator resistance and replace motor
		Excessive operating load	Inspect motor load condition
IF33	PFC Overcurrent	Low grid voltage and overload operation	Check input power supply
		PFC inductor short circuit between phases or to ground, or PFC circuit fault	Check PFC inductor leads and coils for short circuits, or contact service personnel
IF34	PFC peak current over	Low grid voltage and overload operation	Check input power supply
		PFC inductor short circuit between phases or to ground, or PFC circuit fault	Check PFC inductor leads and coils for short circuits, or contact service personnel

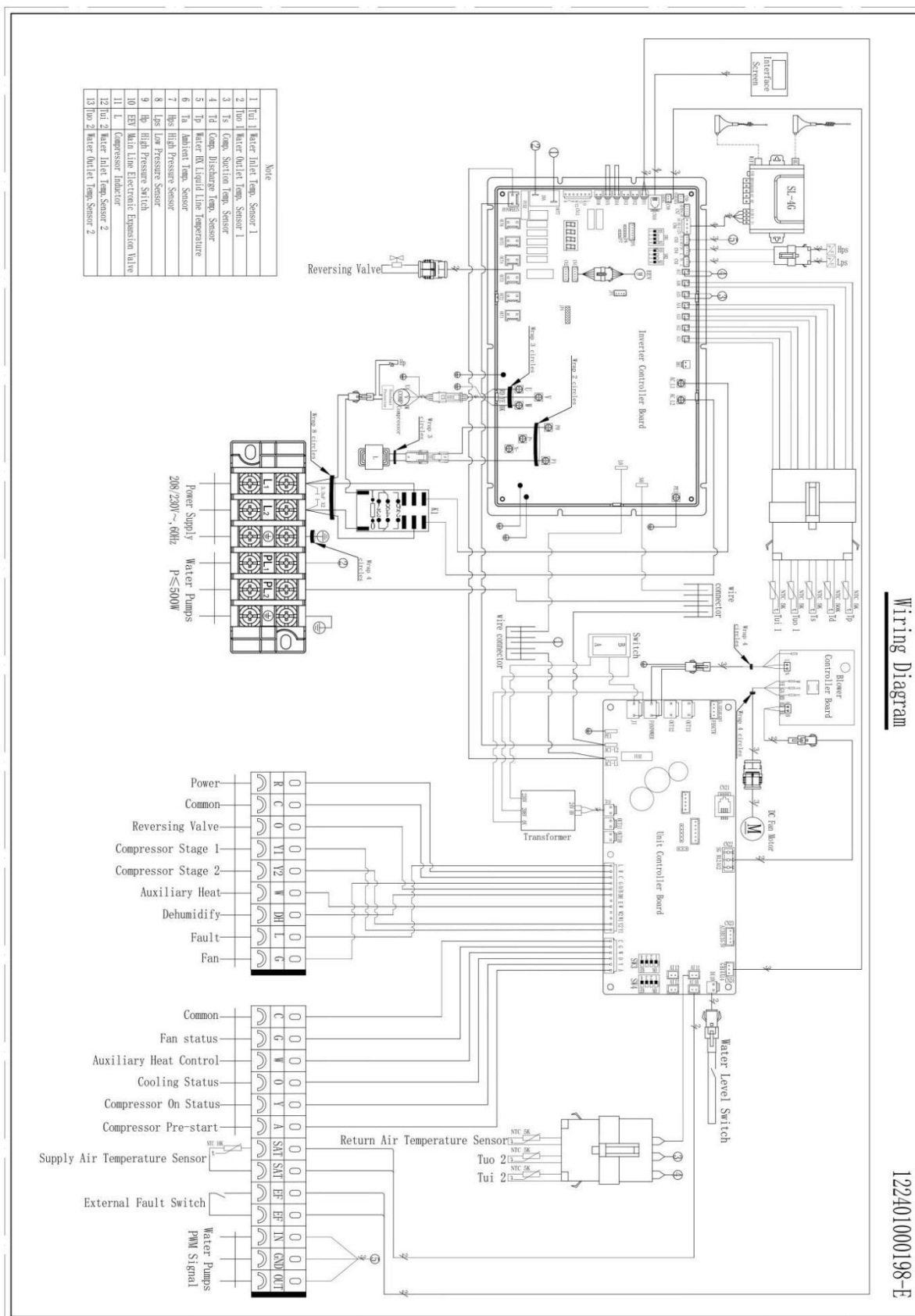
IF35	PFC rms current over	Low grid voltage and overload operation	Check input power supply
		Compressor overload or abnormal compressor refrigerant	Inspect mechanical system, compressor refrigerant, etc., or contact service personnel
IF36	Input phase reverse	Input power supply abnormal	Check input power supply
IF37	Input frequency high	Input power supply abnormal	Check input power supply
IF38	Input frequency low	Input power supply abnormal	Check input power supply
IF39	Input Overvoltage	Input power supply abnormal	Check input power supply
IF40	Input Undervoltage	Input power supply abnormal	Check input power supply
IF41	Input phase voltage distortion	Input power supply abnormal	Check input power supply
IF42	Output Overvoltage	Input power supply abnormal	Check input power supply
IF43	Charging circuit anomaly	/	Contact service personnel
IF44	TASK2 overflow error	/	Contact service personnel
IF45	TASK2 run error	/	Contact service personnel

Blower Fault List

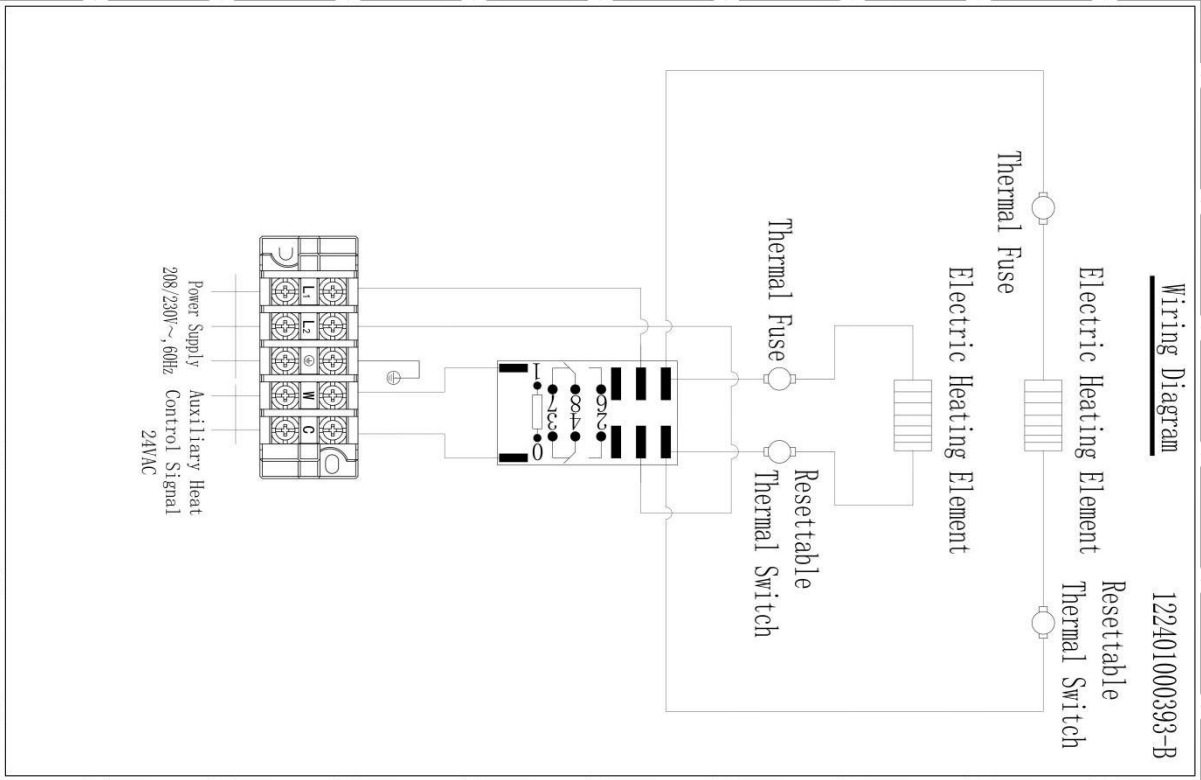
Fault Code	Fault Name	Possible Causes	Troubleshooting Method
BF01	Hardware Overcurrent	Blower phase wire short circuit	Check blower
		Drive and fan mismatch	Verify drive and fan matching
		Foreign object on drive surface	Inspect drive
BF02	Software Overcurrent	Blower phase wire short circuit	Check blower
		Drive and fan mismatch	Verify drive and fan matching
		Foreign object on drive surface	Inspect drive
BF03	DC Bus Overvoltage	Input voltage too high	Check input voltage
BF04	DC Bus Undervoltage	Input voltage too low	Check input voltage
BF06	Startup Failure	Blower locked rotor or excessive load	Check blower and air duct
BF07	Drive Overheating	Drive and blower mismatch	Verify drive and blower matching
		Excessive blower load	Check blower and air duct
BF08	Motor Overheating	Drive and blower mismatch	Verify drive and blower matching
		Excessive blower load	Check blower and air duct
BF09	Op-Amp Offset Error	Foreign object on drive surface	Inspect drive
BF0A	Motor Phase Loss	Phase wire disconnected	Check drive-to-blower connecting wires
BF0B	Communication Fault	Poor communication wire connection	Check drive-to-main-control connecting wires
BF0C	Follower Address Error	Foreign object on drive surface	Inspect drive
BF14	Software Configuration Error	Foreign object on drive surface	Inspect drive

Chapter 7: Electrical Schematics

Applicable Models : AXU036MM1001



Applicable Models : E50S1A01



Applicable Models : E30S1A01, E15S1A01

