GeoCool®
DC Inverter
Geothermal Heat Pump

Installation & Owner's Manual

MODELS:

GCSHPM*IN (COMPRESSOR)
GCSBLM* (BLOWER)
GCSAM*GN (A-COIL)
GCSAR* (AIR RETURN)



Read this manual carefully before installation and keep it where the operator can easily find it for future reference.

Due to updates and constantly improving performance, the information and instructions within this manual are subject to change without notice.

Version Date: 07/24/2023
Please visit ***www.mrcool.com/documentation***
to ensure you have the latest version of this manual.

MRCOOL®
COMFORT MADE SIMPLE

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MRCOOL Customers:

Thank you for selecting the MRCOOL DC Inverter Geothermal Heat Pump. Please read this instruction manual carefully before installing and using this system, for the purpose of mastering and using it correctly. In order to guide you in an accurate installation process with ease of use and effective operation, abide by the following:

- This appliance can be used by children aged 8 years and above, persons with reduced physical, sensory, or mental capabilities as well as those with a lack of experience and knowledge if they have been given supervision or instruction in order to use the appliance safely while observing the possible hazards. Only with supervision should children perform cleaning and maintenance of the unit. Children should never play with the unit.
- In order to ensure reliability of the product, the product may consume some power under standby status for maintaining normal communication of the system and preheating refrigerant and lubricant. If the product will not be used for an extended period of time, cut off the power supply. Before reusing it, energize and preheat the unit in advance.
- Ensure you have selected the model that will work best for your designated environment, otherwise it may impact the effectiveness.
- This product cannot be installed in a corrosive, inflammable, or explosive environment or in a place with special requirements, such as a kitchen. Choosing these locations will affect the normal operation, shorten the service life of the unit, or cause a fire hazard or serious injury.
- If the product needs to be installed, moved, or maintained, contact your designated dealer or local service professional for support. Users should not disassemble or maintain the unit themselves, otherwise it may cause relative damage and void the warranty.
- All information and illustrations within this manual are for reference only. This product will continuously undergo improvement and innovation. Please refer to the MRCOOL website for updated documentation.

Exception Clauses:

MRCOOL will bear no responsibilities when personal injury or property loss is caused for the following reasons:

1. Damage to the product due to improper use or misuse of the product.
2. Alter, change, maintain, or use the product along with other equipment without abiding by this instruction manual.
3. After verification, the defect of the product is directly caused by corrosive gas.
4. After verification, defects are due to improper operation during transportation of product.
5. Operation, repairs, or maintenance of the unit is completed without abiding by this manual or regulations.
6. After verification, the problem or dispute is caused by the quality specification or performance of parts and components that were produced by other manufacturers.
7. The damage is caused by natural calamities, poor use environment, or force majeure.

Safety Precautions

⚠ WARNING

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer or service professional for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing. Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements. Recognize safety information. This is the safety-alert symbol:

When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words: **DANGER**, **WARNING**, **CAUTION**, and **NOTICE**. These words are used with the safety-alert symbol.

⚠ **DANGER**	Indicates a hazardous situation that, if not avoided, **will result** in death or serious injury.
⚠ **WARNING**	Indicates a hazardous situation that, if not avoided, **could result** in death or serious injury.
⚠ **CAUTION**	Indicates a hazardous situation that, if not avoided, **may result** in minor or moderate injury.
NOTICE	Indicates important, but not hazard-related information, used to indicate risk of property damage.

⚠ WARNING

Electrical Shock Hazard:

- Failure to follow this warning could result in personal injury or death.
- Before installing, modifying, or servicing the system, the main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.

⚠ WARNING
1. The geothermal heat pump unit should be grounded to avoid electric shock. Do not connect the ground wire to gas pipe, water pipe, lightning rod, or telephone wire.
2. The appliance shall be stored in a well-ventilated area that meets appropriate sizing conditions.
3. The appliance shall be stored in a room without continuously operating open flames (such as an operating gas appliance) and ignition sources (such as an operating electric heater).
4. According to federal/state/local laws and regulations, all packages and transportation materials, including nails, metal or wooden parts, and plastic packing material, must be treated in a safe way.

⚠ WARNING
1. Please install according to this instruction manual. Installation must be performed in accordance with the requirement of NEC and CEC by authorized personnel only.
2. Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment specification.
3. Servicing shall only be performed as recommended by the equipment manufacturer or a professional technician.
4. The appliance shall be installed in accordance with national wiring regulations.
5. The fixed wires connecting to the appliance must be configured with all-pole disconnection device under voltage grade III according to wiring rules.
6. The Geothermal heat pump unit should be stored with protective measures against mechanical damage caused by accident.
7. If the installation space for the Geothermal heat pump unit pipe is too small, utilize a protective measure to prevent the pipe from physical damage.
8. During installation, use the specialized accessories and components. Otherwise, water leakage, electric shock, or fire hazard may occur.
9. Install the unit in a secure place that can withstand the weight of the unit. Insecure installation may cause the unit to fall down which could lead to injury and unit damage.
10. Ensure you're utilizing an independent power circuit. If the power cord is damaged, it must be repaired by the manufacturer or professional technician.
11. The unit can only be cleaned after it is turned off and the power is disconnected in order to prevent electric shock.
12. The unit is not intended to be cleaned or maintained by children without supervision.
13. Do not alter the settings of the pressure sensor or other protective devices. If the protective devices are short-circuited or changed against the rules, a fire hazard or even explosion may occur.
14. Do not operate the geothermal unit with wet hands. Do not wash or allow water on the unit. Malfunction or electric shock will occur.
15. If the unit is to be installed in a small space, use protective measures to prevent the concentration of refrigerant from exceeding the allowable safety limit; excessive refrigerant leakage may lead to explosion.
16. When installing or re-installing the unit, keep the refrigerant circuit away from substances other than the specified refrigerant, such as air. Any presence of foreign substances will cause abnormal pressure change or even explosion, resulting in injury.

NOTICE
1. Do not put fingers or other objects into the air inlet or return air grille.
2. Utilize safety protection measures before touching the refrigerant pipe; otherwise, hand injuries can occur.
3. Position the drain pipe according to the instruction manual.
4. Never stop the heat pump unit by directly cutting off the power.
5. Select the proper copper pipe that matches.
6. Never install the geothermal heat pump unit in the following places: a. Locations with oil, smoke, or volatile liquid; doing so may cause plastic parts to deteriorate and fall off or cause water leakage. b. Locations with corrosive gas; copper pipe or welding parts may be corroded and cause refrigerant leakage.
7. Use proper measures to protect the unit from small animals as they may damage the electrical components and cause malfunction of the geothermal heat pump unit.

NOTICE
1. If a thermostat is to be used, it should be connected first before powering up the unit, or the thermostat may not be usable.
2. Use only a soft dry or damp cloth with neutral detergent to clean the housing of the unit.
3. In order to ensure the reliability of the compressor, the unit will force the compressor to run for at least 6 minutes every time the compressor turns on, regardless of the room temperature. Therefore, it is necessary to select a thermostat having the minimum run time for the compressor, or delaying a few minutes to turn the blower module off after the blower module is shut down or stopped at the temperature point. This is in order to avoid the thermostat turning off the blower while the compressor module is running. This could result in malfunction of the unit.
4. In order to avoid malformation of the unit caused by the high temperature of the pipe, it is forbidden to use gas auxiliary when the compressor module is turned on.

Product Information

This DC Inverter Geothermal Heat Pump features three modules: Compressor Module, A-Coil Module, and Blower Module. These cover Upflow (Bottom or Horizontal Return), Downflow, and Horizontal (Left and Right-Hand Discharge) applications. An optional Return Air Box is available for the Upflow (Horizontal Return) and Horizontal Split application. **(Note: If the unit configuration includes the return air box and is being stored in an unconditioned space, the return air box will need to be insulated.)**

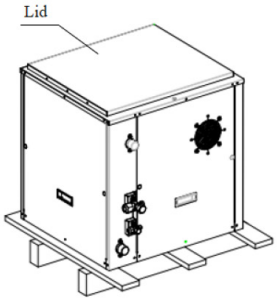
2.1 Operating Range

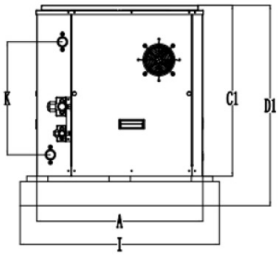
The temperature ranges below show the minimum and maximum temperatures for the units to operate. Make sure the temperatures are in these rangers to prevent the unit from ceasing operation.

	Cooling	Heating
Inlet Water Temperature	**44.6°F (7°C) ~ 107.6°F (42°C)**	**21.2°F (-6°C) ~ 89.6°F (32°C)**
Ambient Temperature	**50°F (10°C) ~ 100.4°F (38°C)**	**39.2°F (4°C) ~ 84.2°F (29°C)**
Return Air Temperature	**60.8°F (16°C) ~ 89.6°F (32°C)**	**50°F (10°C) ~ 80.6°F (27°C)**

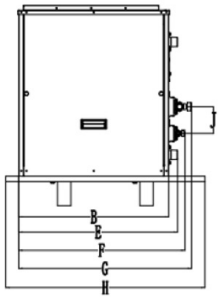
2.2 Dimensions & Diagrams

Compressor Module Dimensions

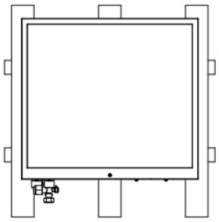




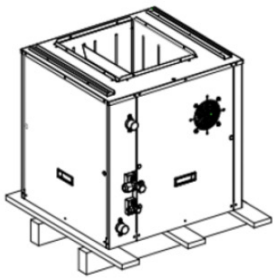
Front Side

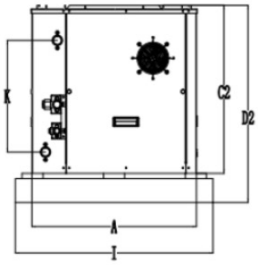


Left Side

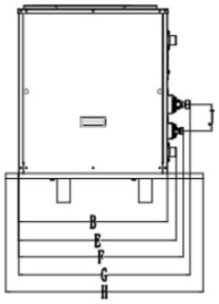


Top Side

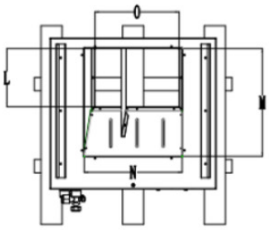




Front Side



Left Side

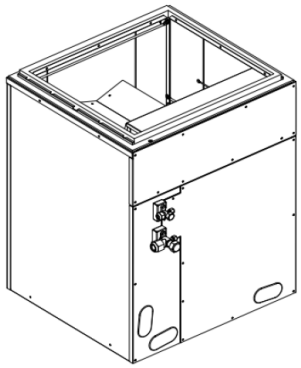


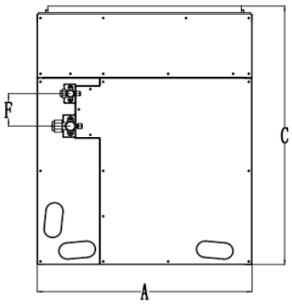
Top Side

Note: The unit is equipped with a lid. The lid is needed for a split installation application, but needs to be removed when during an integral installation application.

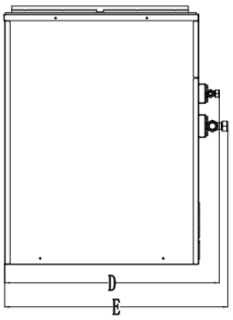
	A	B	C1	C2	D1	D2	E	F	G
Dimensions	24-13/16 (630)	22-7/16 (570)	25-3/16 (639)	25 (635)	29-1/2 (749)	29-5/16 (745)	23-5/8 (600)	24-3/4 (628)	25-11/16 (653)
	H	I	J	K	L	M	N	O	
	28-9/16 (725)	27-9/16 (700)	3-15-16 (100)	16-5/8 (422)	8-11/16 (220)	16 (407)	14-5/8 (372)	12-9/16 (319)	

A-Coil Module Dimensions

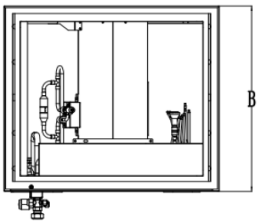




Front Side



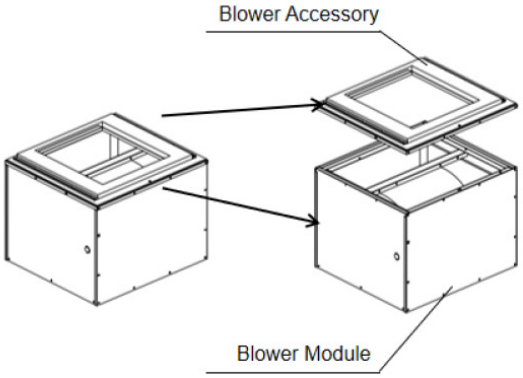
Left Side

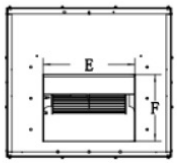


Top Side

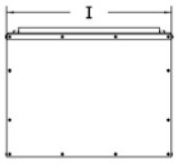
	A	B	C	D	E	F
Dimensions	24-13/16 (630)	22-7/16 (570)	31-5/16 (795)	24-13/16 (630)	25-13/16 (655)	3-15/16 (100)

Blower Module Dimensions

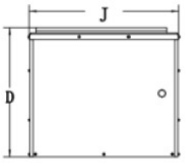




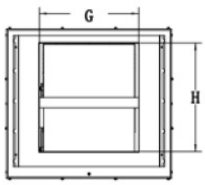
Bottom Side



Front Side

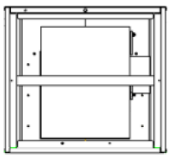


Left Side

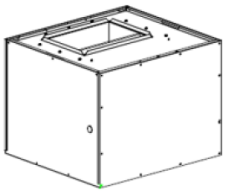


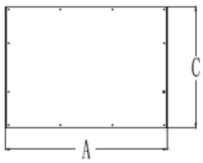
Top Side

(1) Downflow

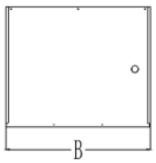


Bottom Side

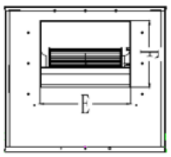




Front Side



Left Side

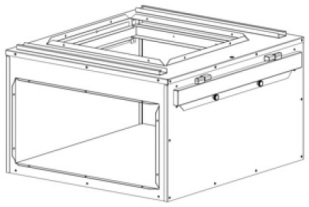


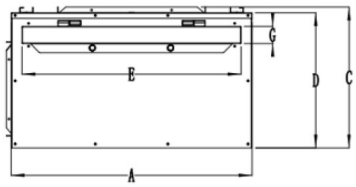
Top Side

(2) upflow

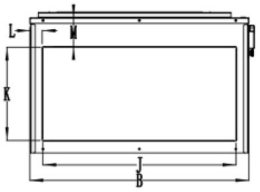
	A	B	C	D	E	F	G	H	I	J
Dimensions	24-7/8 (632)	22-3/8 (568)	18-1/2 (470)	19-9/16 (497)	13-7/8 (353)	10-1/16 (256)	15-1/16 (383)	16-7/16 (418)	25 (635)	22-5/8 (575)

Optional Return Air Box Dimensions

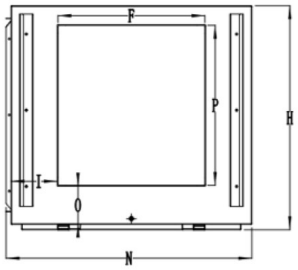




Front Side



Left Side



Top Side

	A	B	C	D	E	F	G	H
Dimensions	24-13/16 (630)	22-7/16 (570)	14-9/16 (370)	14 (355)	22-5/8 (574)	15-3/16 (385)	1-3/4 (45)	23-1/8 (588)
	I	J	K	L	M	N	O	P
	4-3/4 (121)	19-15/16 (506)	9-5/8 (245)	1-1/4 (31)	3 (76)	25-3/8 (644)	4 (101)	16-9/16 (420)

Note: If the unit configuration includes the return air box and is being stored in an unconditioned space, the return air box will need to be insulated. All the insulation must meet the fire prevention requirement.

2.3 Packing List & Optional Accessories

Compressor Module:

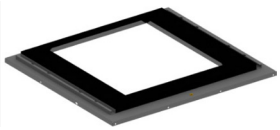
Name	Appearance	Quantity	Usage
M6 Bolt		1	Secures the different modules together
Communication Wire		1	26 feet wire for communication between Compressor Module and A-Coil Module

A-Coil Module:

Name	Appearance	Quantity	Usage
M6 Bolt		2	Secures the different modules together
Horizontal Fixing Bracket		2	Secures the Blower and A-Coil Modules when installed horizontally
Seal Plate		1	For use when changing position of return air temperature sensor for a downflow unit.

The horizontal fixing bracket can also be used in a vertical configuration if additional stability is desired, but is not required.

Blower Module:

Name	Appearance	Quantity	Usage
Blower Accessory		1	Ensures a tight connection to the A-Coil Module for vertical downflow installation (Factory Mounted)

Optional Accessories

Name	Appearance	Quantity	Usage
Return Air Box (Optional)		1	For integral installation in a Vertical Upflow (Side Return Air) configuration (Sold Separately)

Installation Preparation

3.1 Checking Received Products

- After receiving the product, verify that no damage was caused by transportation. Shipping damage is the responsibility of the carrier.
- Verify that the model number, specifications, and accessories are correct prior to installing.
- MRCOOL will not accept claims from dealers for transportation damage or installation of incorrectly shipped units.

3.2 Pre-Installation Requirements

- Carefully read all instructions for the installation prior to installing the product. Make sure each step or procedure is understood and any special considerations are taken into account before beginning installation.
- Gather all tools, hardware, and supplies needed to complete the installation. Some items may need to be purchased locally. Make sure everything needed to install the product is on hand before beginning installation.

3.3 Installation Location Selection

The unit may be installed in a basement, closet, or utility room provided there is adequate service access. The unit is not approved for outdoor installation and therefore must be installed inside the structure being conditioned. **If the unit configuration includes the return air box and is being stored in an unconditioned space, the return air box will need to be insulated.** Do not install in areas subject to freezing in the winter or sweating in the summer. Before setting the unit, consider ease of piping, drain, and electrical connections for the unit. Place the unit on a solid base, preferably concrete, to minimize undesirable noise and vibration.

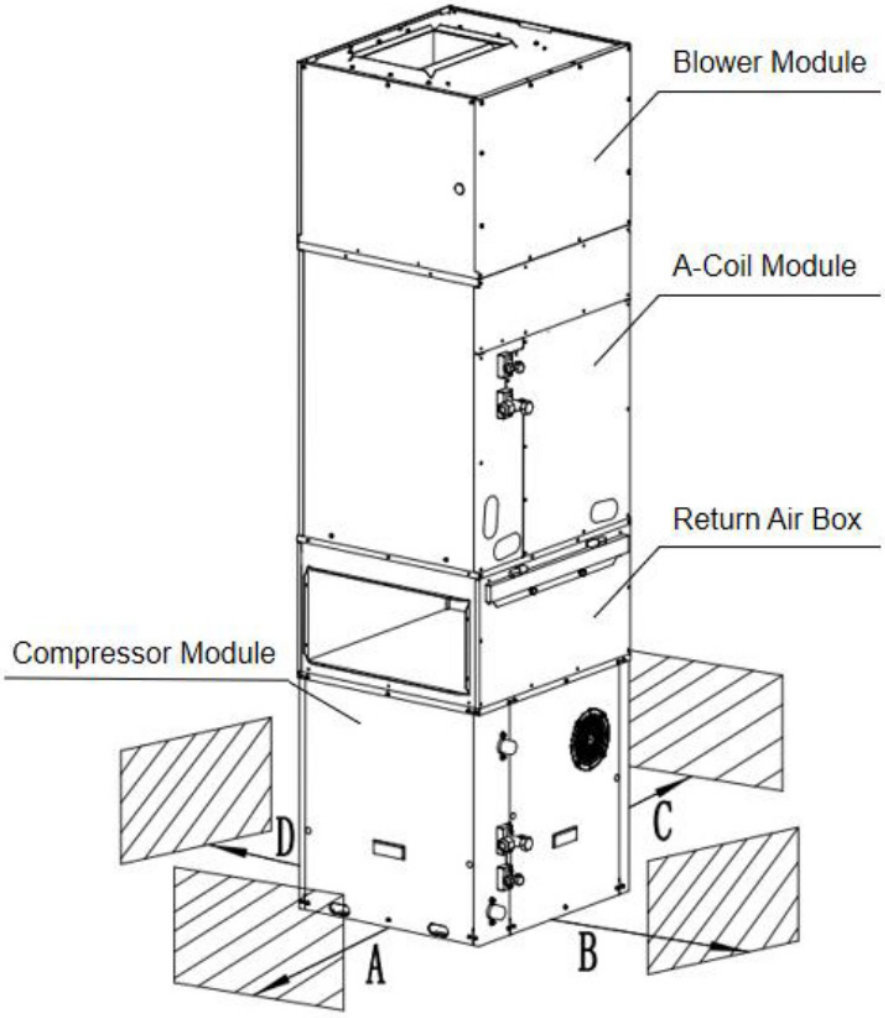
DO NOT install the unit in such a way that a direct path exists between any return grille and the unit. Rather, ensure that the air entering the return grill will make at least one turn before entering the unit or coil. This will reduce possible unwanted compressor and air noise from entering the occupied space.

To minimize vibration and noise, it is recommended to place the unit on top of the vibration absorbing material, the size of the isolation pad should be the same size of the unit base to prevent structural damage to the unit.

- This product is specially designed for indoor installation. Do not install outdoors. The unit should not be installed under external windows or other places where freezing or rain may occur.
- The unit should be installed in an air-conditioned area, such as an air-conditioned basement.
- The unit should be installed in a dry place.
- The unit cannot be used in an area under constrictuon or transformation, so as not to cause the surface of the heat exchanger to be dirty and affect its use.
- If the unit is installed in a closet, consider the space allotted for maintenance.
- The unit must be installed in a place strong enough to bear the weight of the unit when firmly fixed, otherwise the unit could collapse or fall.
- Install the unit at an inclination of less than 5°, but most preferably level at 0°.
- The installation position should withstand the weight and vibration of the unit and allow the installation to be carried out safely.
- Avoid installation in places where flammable gases, soot, or corrosive gases are emitted.
- Install the unit in a place where it is easy to drain condensate. If the water pipe outside the unit leaks, it is necessary to ensure that the leaked water can drain completely to avoid soaking the unit.
- There should be no water spraying around the unit, such as a burst water pipe. If spraying water occurs, it is necessary to power off the unit and have its status checked by a professional to avoid electrical shock.

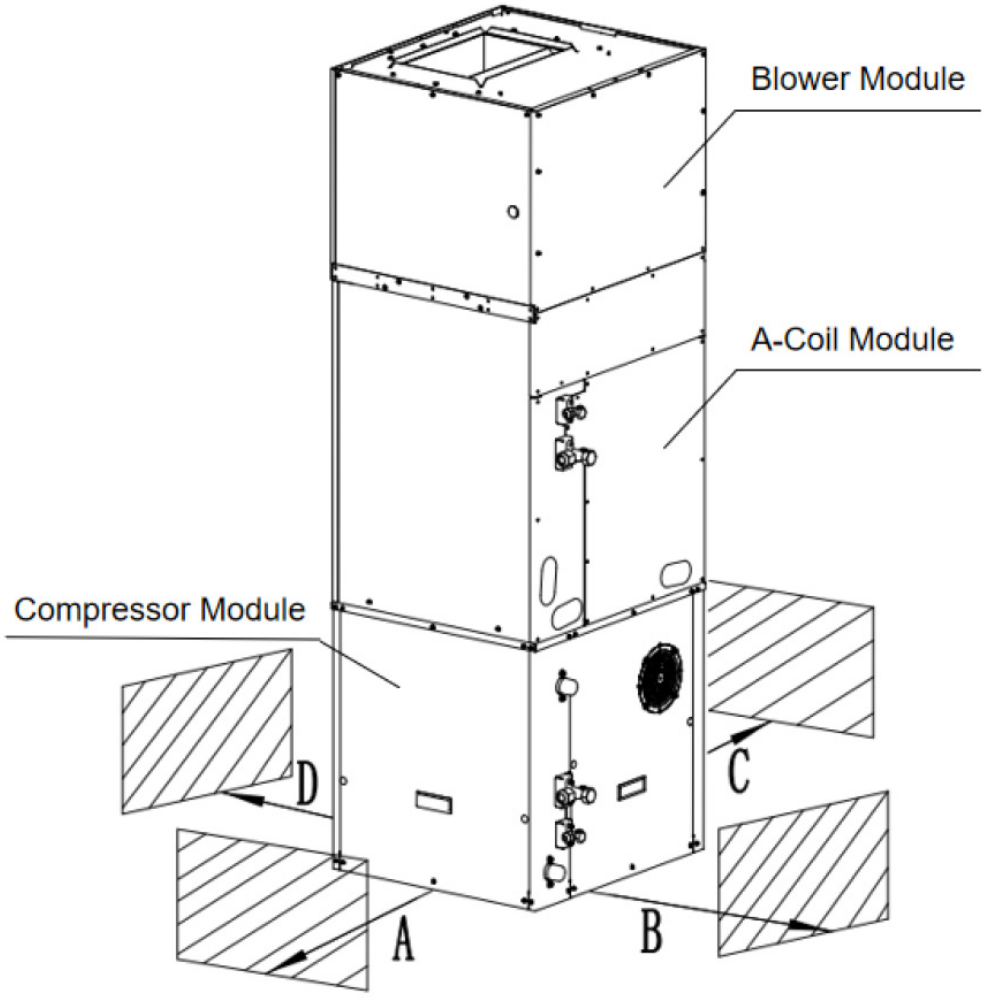
3.4 Location Dimensions & Space Requirements

When the unit is Integral, installed **with** the return air box for the left or right horizontal return air, and vertically upward supply air, at least 23-5/8 inches (600mm) of space should be reserved on the front and right side of the unit for maintenance services. To facilitate the installation of the duct, the left side of the device should have at least 47-1/4 inches (1200mm) reserved. The rear side of the device should have at least 7-7/8 inches (200mm) reserved. If a right hand return air is desired, the left panel with the opening can be switched with the right panel. This will allow for the ductwork to be on the right of the unit. Please follow the dimensions suggested for the left side on the right side for clearance to complete maintenance. **(Note: If the unit configuration includes the return air box and is being stored in an unconditioned space, the return air box will need to be insulated.)**



	A	B	C	D
Dimensions	**47-1/4 (1200)**	**23-5/8 (600)**	**23-5/8 (600)**	**7-7/8 (200)**

When the unit is installed **without** the return air box, it should have at least 23-5/8 inches (600mm) of space reserved on the front, left, and right side of the unit for maintenance services. The rear side of the device should have at least 7-7/8 inches (200mm) reserved. Vertical Upflow is shown in the following figure:



	A	B	C	D
Dimensions	**23-5/8 (600)**	**23-5/8 (600)**	**23-5/8 (600)**	**7-7/8 (200)**

Unit Installation

4.1 Unit Configurations

There are FIVE different installation configurations, distinguished by air flow directions, which include:

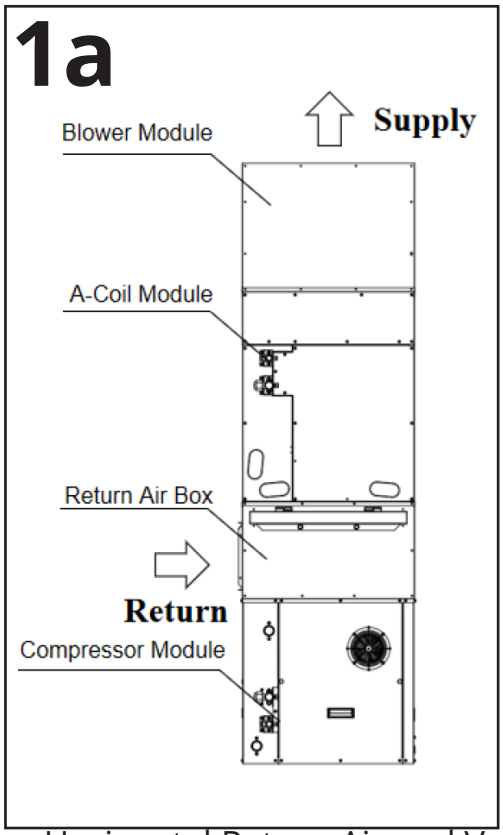
1. Vertical Upflow
   - **1a.** Horizontal Return Air & Vertical Upflow (Integral Unit with Return Air Box)
   - **1b.** Bottom Return Air & Vertical Upflow (Integral Unit without Return Air Box)
   - **1c.** Bottom Return Air & Vertical Upflow (Split Unit without Return Air Box)
2. Vertical Downflow
   - **2a.** Top Return Air and Vertical Downflow (Integral Unit without Return Air Box)
3. Horizontal Split
   - **3a.** Horizontal Return Air & Horizontal Supply Air (Split Unit without Return Air Box)

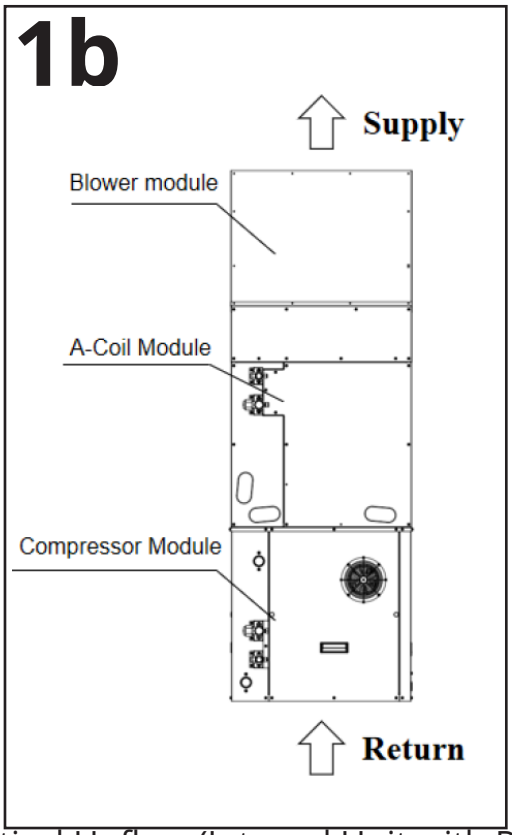
Installation Instructions vary by configuration. Refer to the section of the manual that corresponds to the desired configuration.

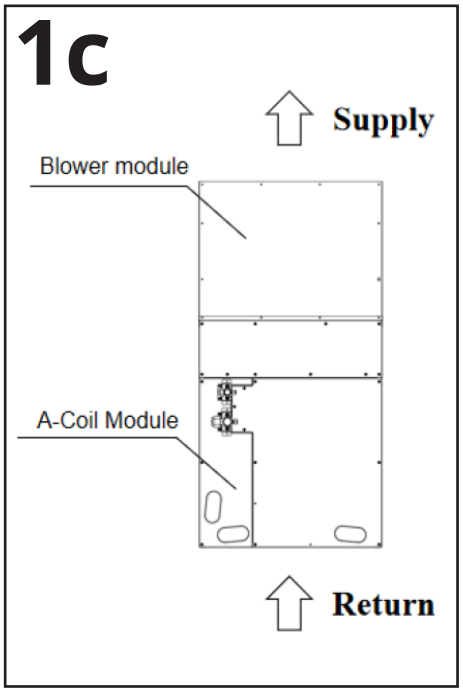
1. Vertical Upflow:

The Vertical Upflow unit can be divided into two forms: Bottom Return Air and Horizontal Return Air. Among them, Bottom Return Air forms include two types: integral unit and split unit. In order to utilize the Horizontal Return Air, it is necessary to use the optional Return Air Box Module. **(IMPORTANT: If a return air box is utilized in an unconditioned space, the box will need to be insulated.)**

There are THREE options for Vertical Upflow.



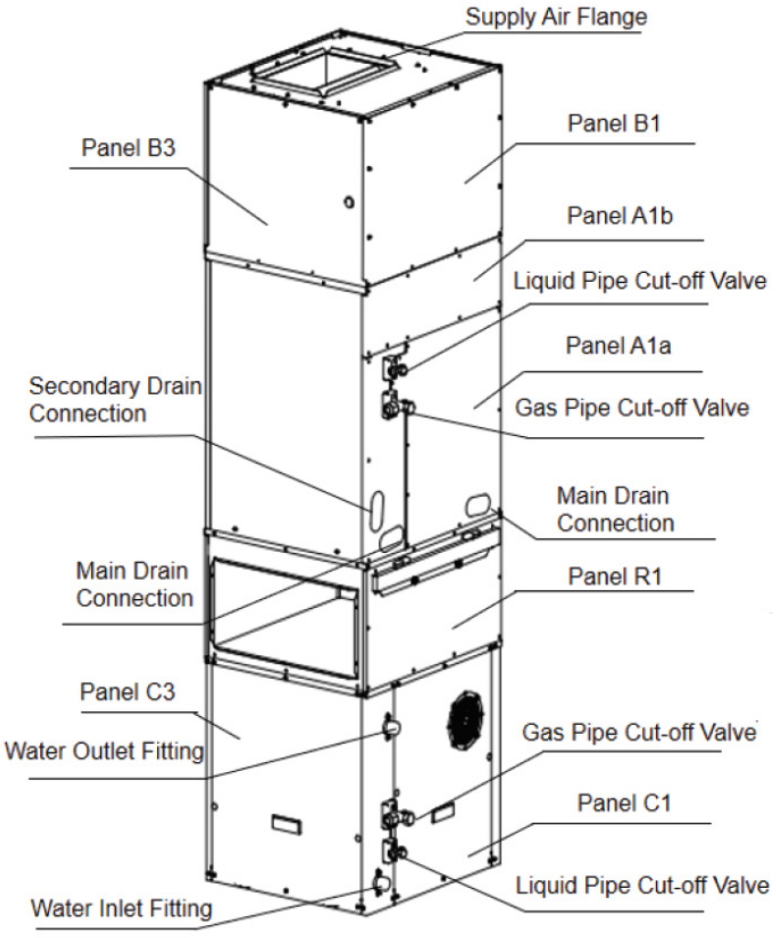




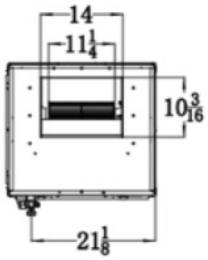
1a: Horizontal Return Air and Vertical Upflow (Integral Unit with Return Air Box)
1b: Bottom Return Air and Vertical Upflow (Integral Unit without Return Air Box)
1c: Bottom Return Air and Vertical Upflow (Split Unit without Return Air Box)
Note: 1a can also be configured as a split unit if desired.

1a. Horizontal Return Air and Vertical Upflow (Integral Unit with Return Air Box)

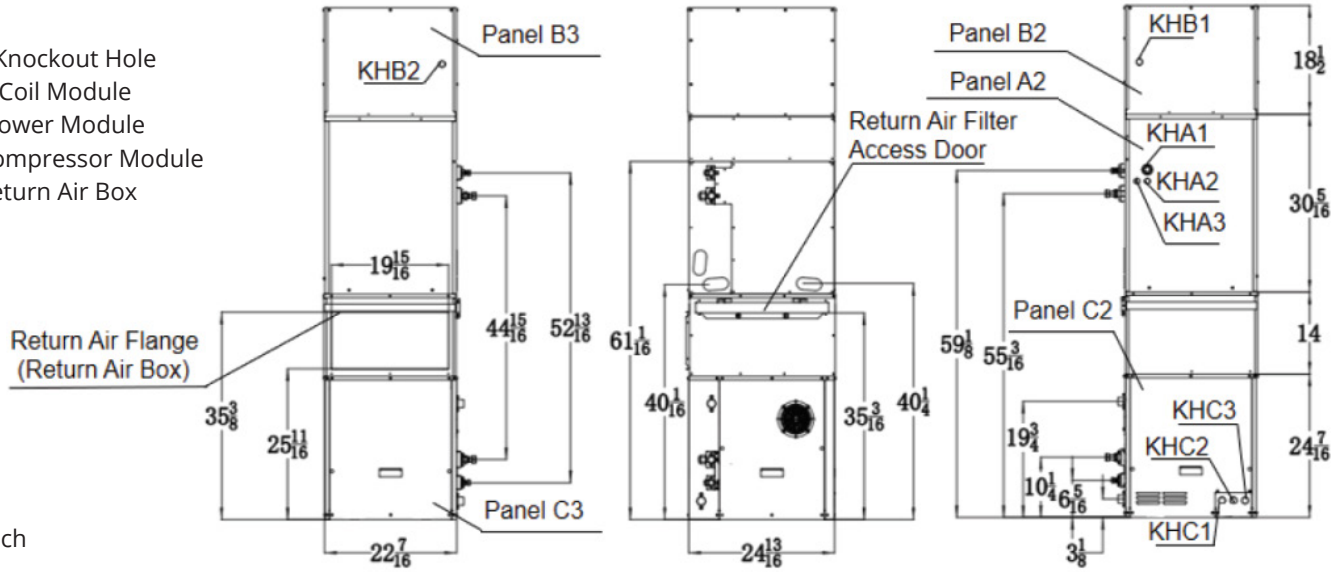
From bottom to top, this configuration is the Compressor Module, the Return Air Box, the A-Coil Module, and the Blower Module.



(Note: If the unit configuration includes the return air box and is being stored in an unconditioned space, the return air box will need to be insulated.)

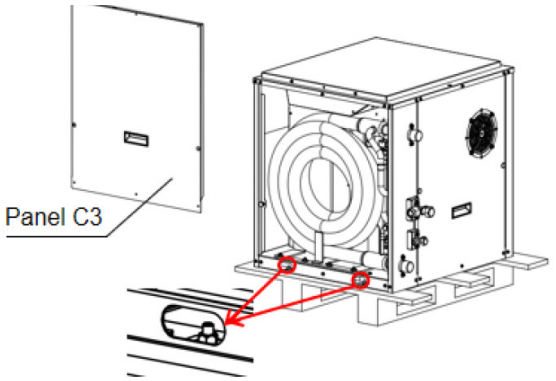


KH: Knockout Hole
A: A-Coil Module
B: Blower Module
C: Compressor Module
R: Return Air Box

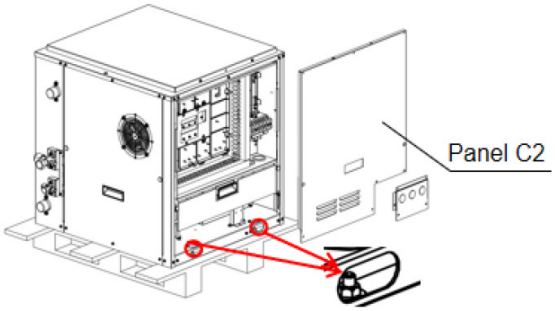


Unit: Inch

Step 1: Remove Panels C2 and C3 from the Compressor Module, remove four screws in the Compressor Module used to secure the unit to the pallet and remove the Compressor Module from the pallet. Install the Compressor Module in a place strong enough to bear the weight of the unit and be firmly attached.

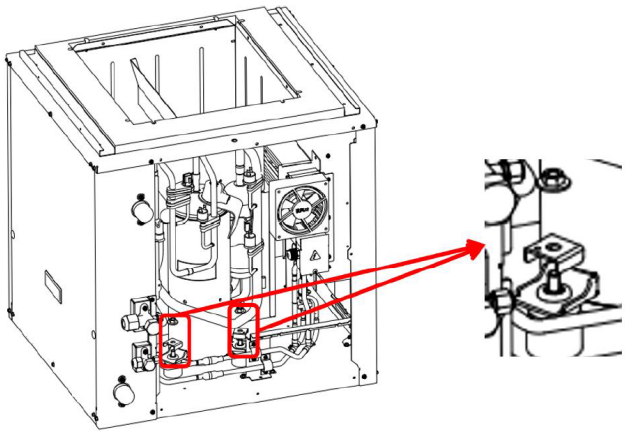


Left Side

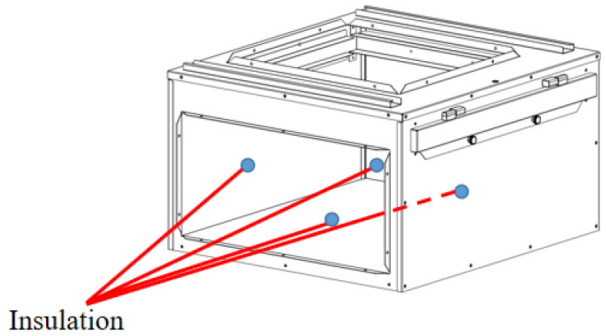


Right Side

Step 2: Remove the cover on the Compressor Module and remove panel C1 from the Compressor Module. Remove two screws located on the front side of the compressor, remove the two compressor gaskets, and then re-secure the screws.

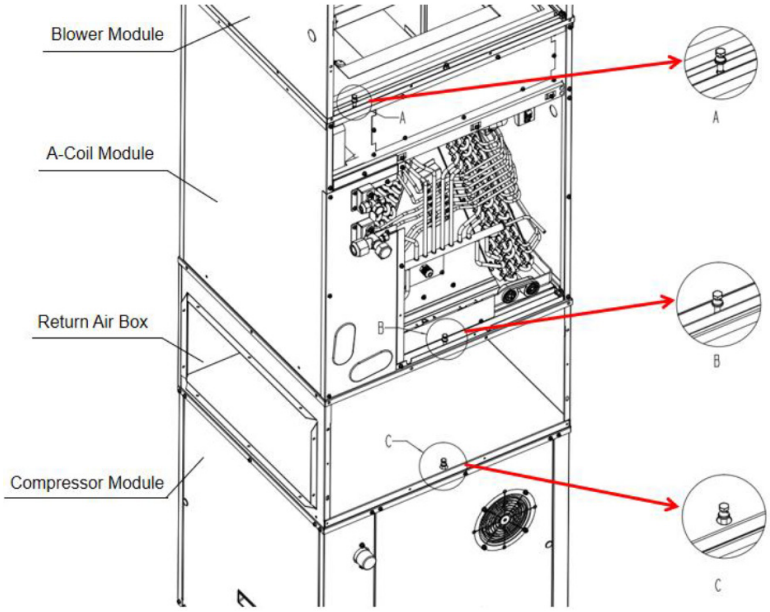


Step 3: If the unit configuration includes the return air box and is being stored in an unconditioned space, the return air box will need to be insulated. All the insulation must meet the fire prevention requrement. The reference positions of hte insulation are shown below.



Step 4: Place the Return Air Box vertically above the Compressor Module, and ensure that the Return Air Box is aligned with the Compressor Module, as well as the two fixing holes.

Step 5: Secure the two parts together using a M6 screw bolt through the fixing holes from air inlet in left side. See figure below.

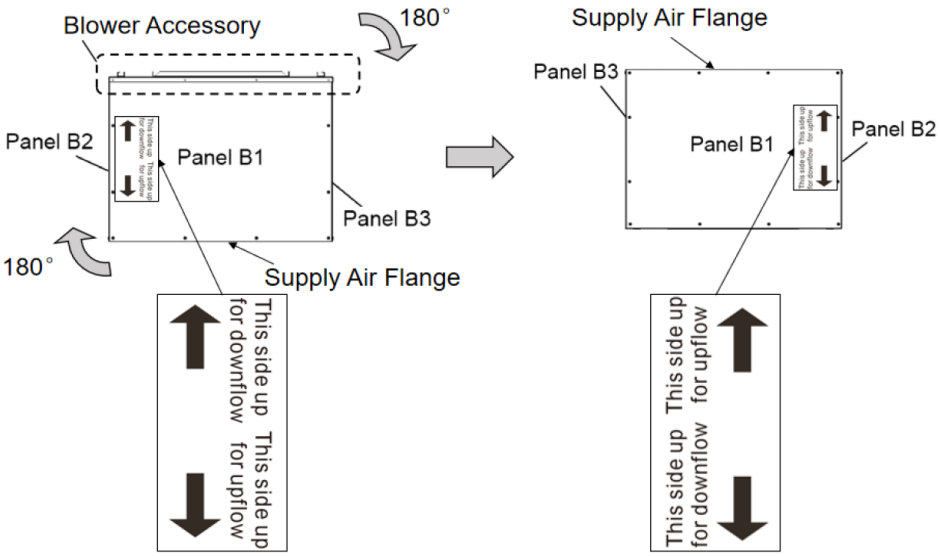


Step 6: Remove Panel A1a and Panel A1b from the A-Coil Module.

Step 7: Place the A-Coil Module vertically above the Return Air Box. Ensure that the A-Coil Module is aligned with the Return Air Box, as well as the two fixing holes.

Step 8: Secure the two parts together using a M6 screw bolt through the fixing holes. Knock off the KHA1, KHA2, and KHA3 on Panel A2.

Step 9: Remove the Blower Accessory from the Blower Module and re-secure the screws. Turn over the Blower Module and ensure the supply air flange is upward. See figure below. **The Blower Accessory is not required in this configuration. Refer to the direction of flow arrows located on the module.**



Step 10: Remove Panel B1 of the Blower Module and knock off the KHB1 on Panel B2. Pull the fan control and power supply wires out of the KHB1.

Step 11: Place the Blower Module vertically above the A-Coil Module, and ensure that the Blower Module is aligned with the A-Coil Module, as well as the two fixing holes.

Step 12: Secure the two parts together using a M6 screw bolt through the fixing holes, then replace Panel B1 of the Blower Module.

Step 13: Duct Installation, see **4.2 Ductwork Installation** on Page 32.

Step 14: Water Pipe & Condensate Installation, see **4.3 Condensate Removal & Water Connection** on Page 36.

Step 15: Refrigerant Pipe Installation, see **4.4 Connection Pipe Installation** on Page 41.

Step 16: Electrical and Thermostat Installation, see **4.5 Electrical Installation** on Page 45.

Step 17: Air Filter Installation, see **5.4 Air Filter Installation** on Page 60.

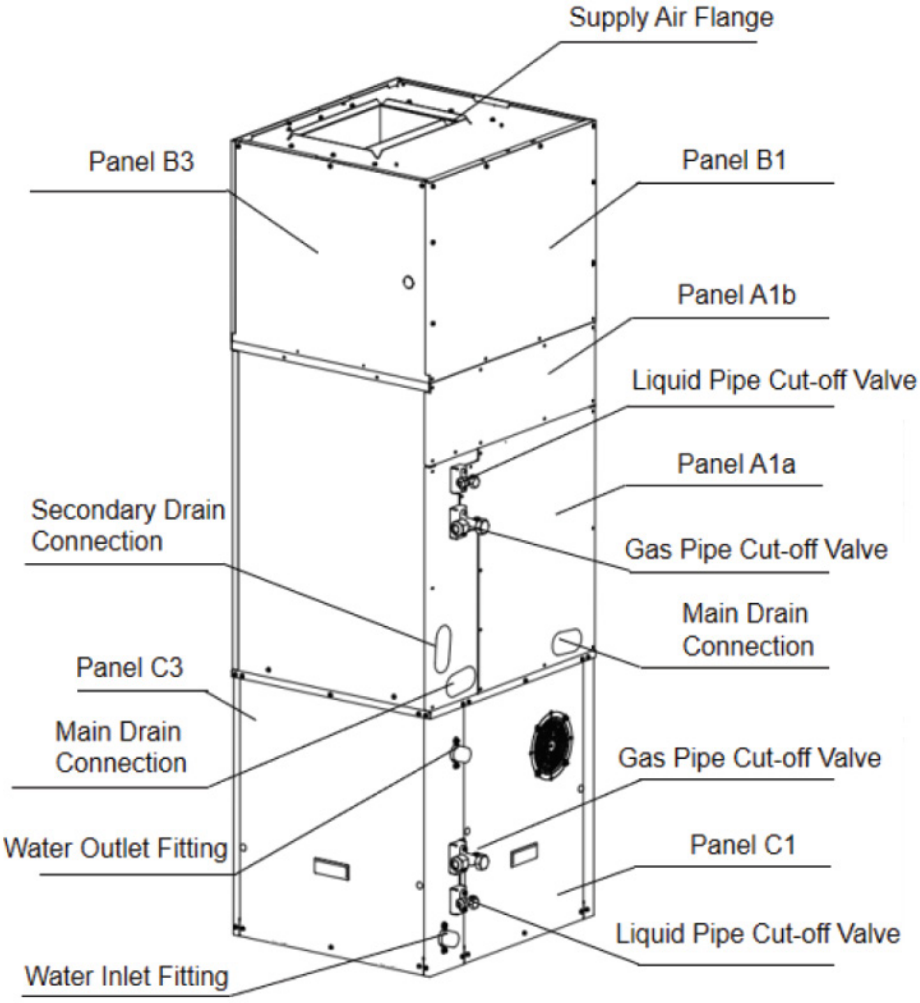
Step 18: Installation Check and Trial Run, see **5.1 Post-Install Item Review** and **5.3 Trial Run** on pages 58 & 59.

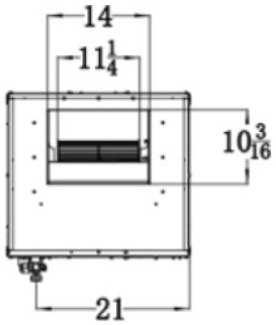
Step 19: Reattach Panel C1, C2, and C3 of the Compressor Module, along with Panel A1a and Panel A1b of the A-Coil Module.

NOTE: It is recommended to seal each joint with insulation with a thickness of at least .39 inches (10mm) and a width of 3.15 inches (80mm) to avoid the risk of condensation due to inadequate installation or other unexpected situation. The insulation used must meet the fire prevention requirements.

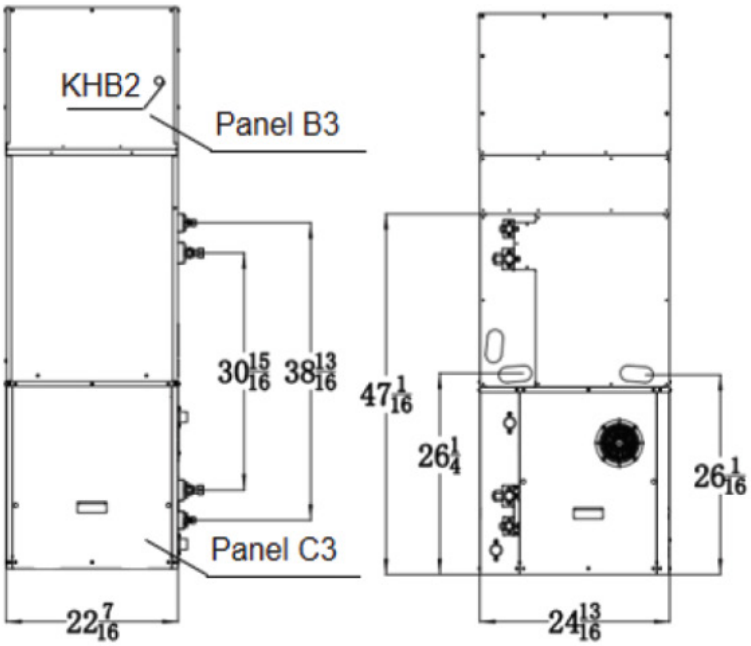
1b. Bottom Return Air and Vertical Upflow (Integral Unit without Return Air Box)

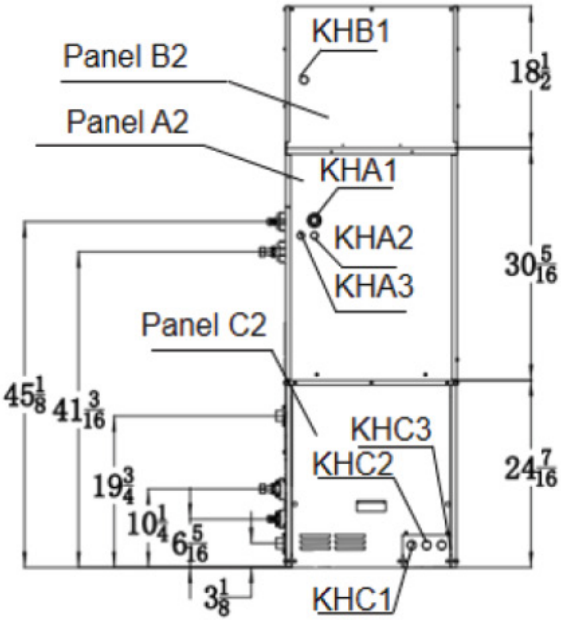
From bottom to top, this configuration is the Compressor Module, the A-Coil Module, and the Blower Module.



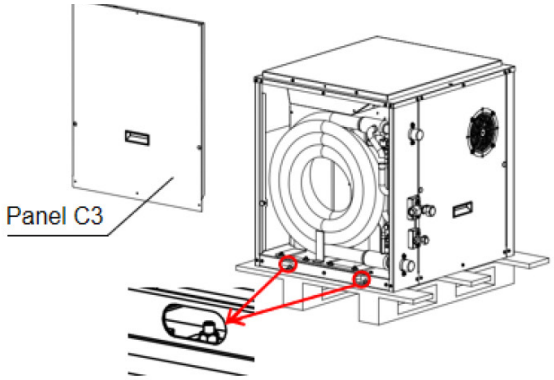


KH: Knockout Hole
A: A-Coil Module
B: Blower Module
C: Compressor Module

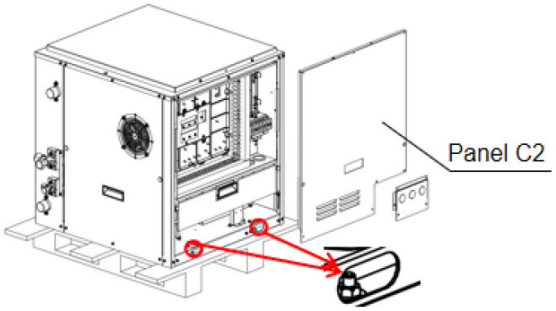




Step 1: Remove Panels C2 and C3 from the Compressor Module, remove four screws in the Compressor Module used to secure the unit to the pallet and remove the Compressor Module from the pallet. Install the Compressor Module in a place strong enough to bear the weight of the unit and be firmly attached.

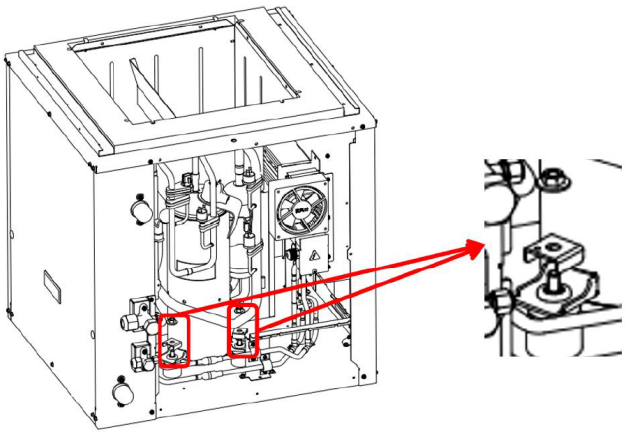


Left Side



Right Side

Step 2: Remove the cover on the Compressor Module and remove panel C1 and C2 from the Compressor Module. Remove two screws located on the front side of the compressor, remove the two compressor gaskets, and then re-secure the screws.

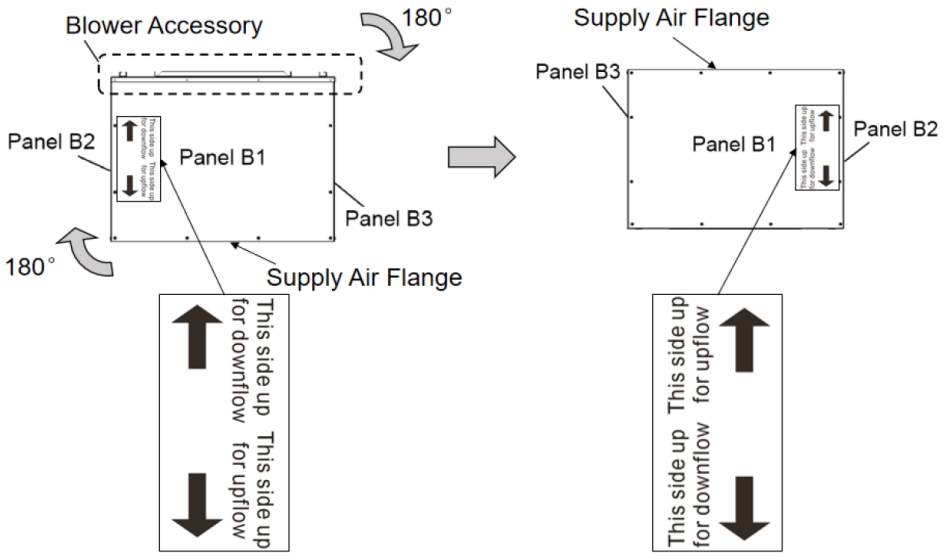


Step 3: Remove Panel A1a and Panel A1b from the A-Coil Module.

Step 4: Place the A-Coil Module vertically above the Compressor Module. Ensure that the A-Coil Module is aligned with the Compressor Module, as well as the two fixing holes.

Step 5: Secure the two parts together using a M6 screw bolt through the fixing holes. Knock off the KHA1, KHA2, and KHA3 on Panel A2.

Step 6: Remove the Blower Accessory from the Blower Module and re-secure the screws. Turn over the Blower Module and ensure the supply air flange is upward. See figure below. **The Blower Accessory is not required in this configuration. Refer to the direction of flow arrows located on the module.**



Step 7: Remove Panel B1 of the Blower Module and knock off the KHB1 on Panel B2. Pull the fan control and power supply wires out of the KHB1.

Step 8: Place the Blower module vertically above the A-Coil module, ensure that the Blower module is aligned with the A-Coil Module, as well as the two fixing holes.

Step 9: Secure the two parts together using a M6 screw bolt through the fixing holes, then replace Panel B1 of the Blower Module.

Step 10: Duct Installation, see **4.2 Ductwork Installation** on Page 32.

Step 11: Water Pipe & Condensate Installation, see **4.3 Condensate Removal & Water Connection** on Page 36.

Step 12: Refrigerant Pipe Installation, see **4.4 Connection Pipe Installation** on Page 41.

Step 13: Electrical and Thermostat Installation, see **4.5 Electrical Installation** on Page 45.

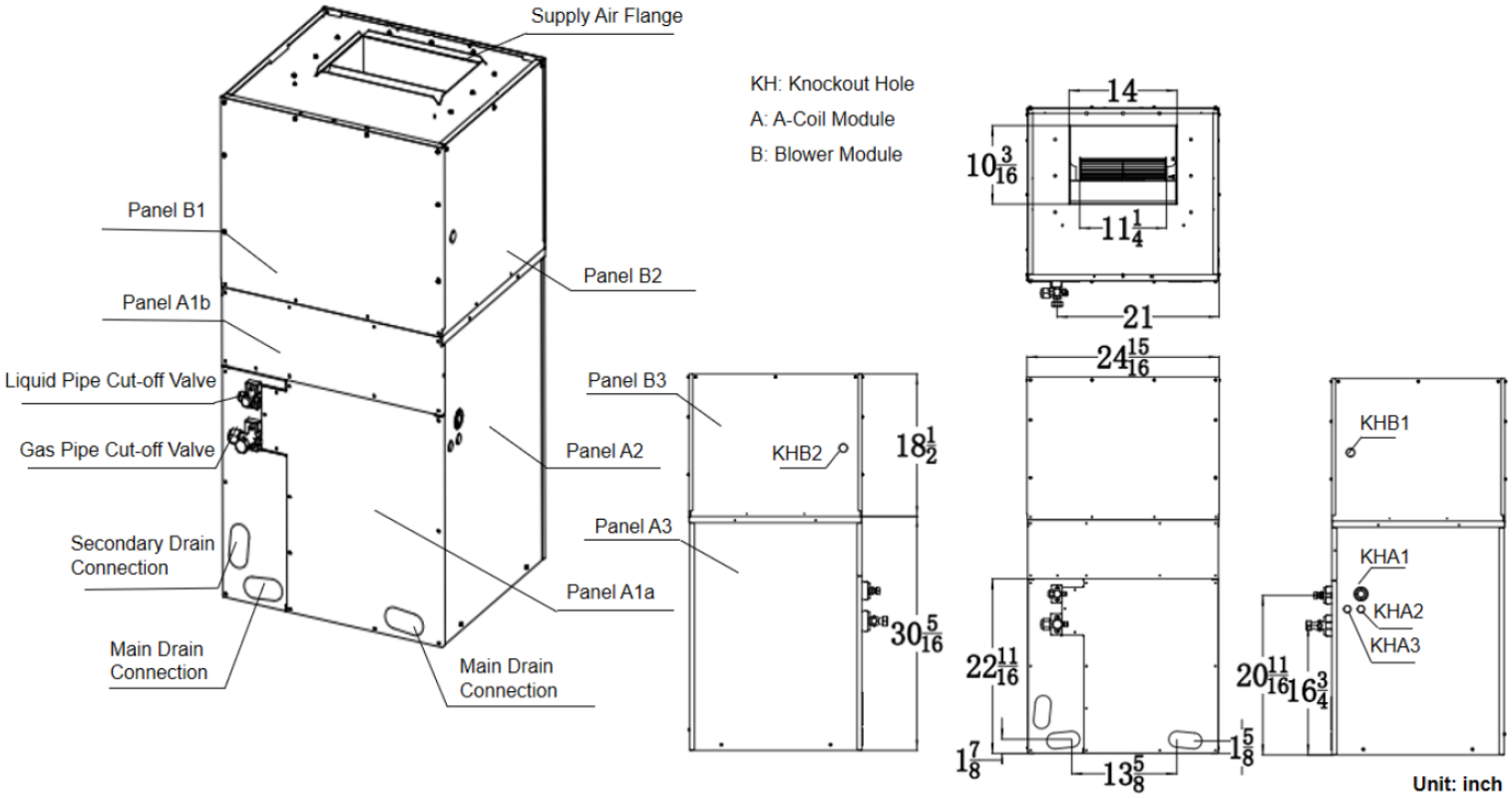
Step 14: Air Filter Installation, see **5.4 Air Filter Installation** on Page 60.

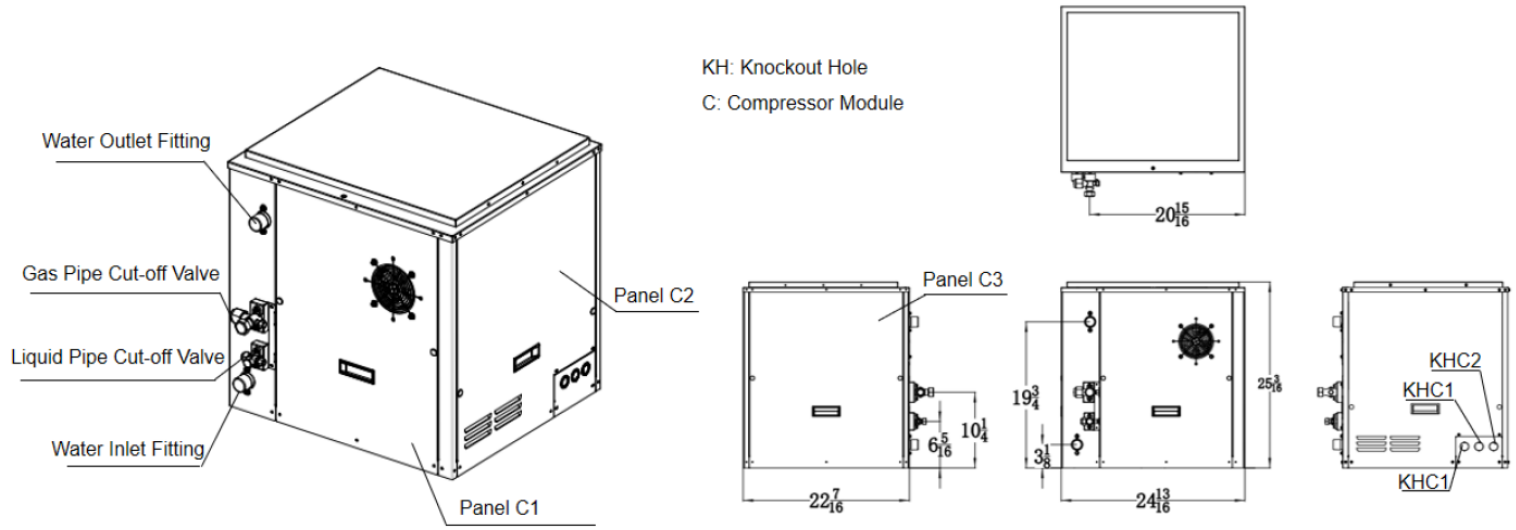
Step 15: Installation Check and Trial Run, see **5.1 Post-Install Item Review** and **5.3 Trial Run** on pages 58 & 59.
Step 16: Reattach Panel C1, C2, C3, Panel A1a and Panel A1b.

NOTE: It is recommended to seal each joint with insulation with a thickness of at least .39 inches (10mm) and a width of 3.15 inches (80mm) to avoid the risk of condensation due to inadequate installation or other unexpected situation. The insulation used must meet the fire prevention requirements.

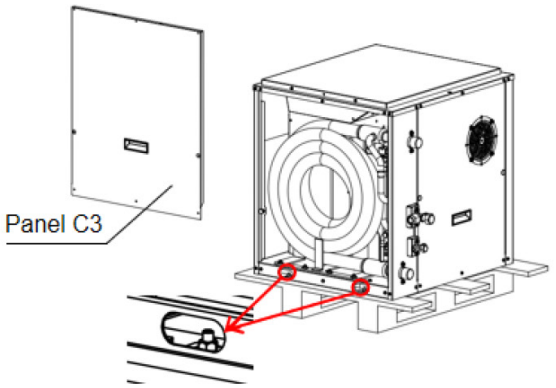
1c. Bottom Return Air and Vertical Upflow (Split Unit without Return Air Box)

From bottom to top, the configuration is the A-Coil Module, and the Blower Module. This configuration can also be used with a Return AIr Box. From bottom to top, the configuration would include the Return AIr Box, the A-Coil Module, and the Blower Module. The configuration would remain split from the compressor.

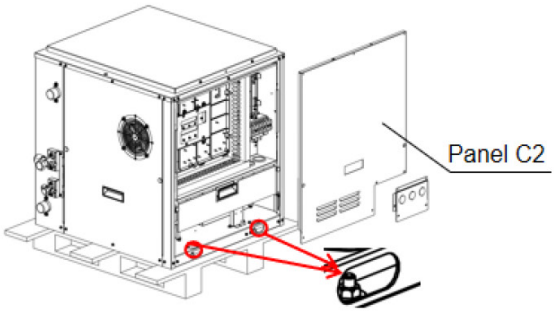




Step 1: Remove Panels C2 and C3 from the Compressor Module, remove four screws in the Compressor Module used to secure the unit to the pallet and remove the Compressor Module from the pallet. Install the Compressor Module in a place strong enough to bear the weight of the unit and be firmly attached.

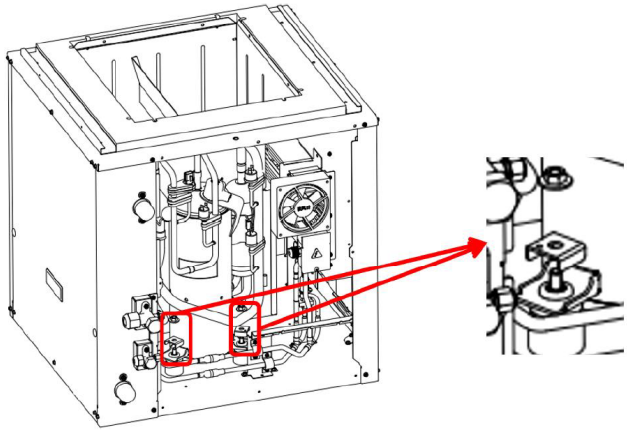


Left Side

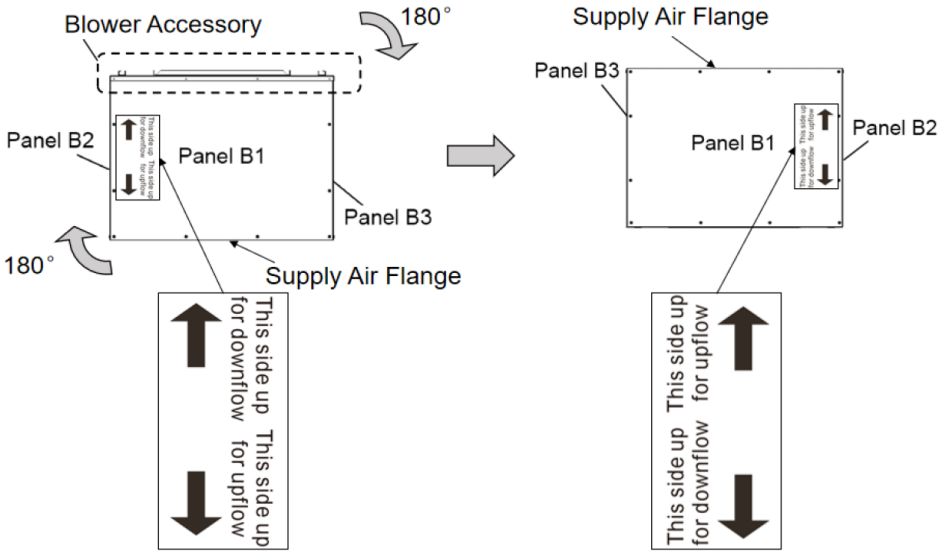


Right Side

Step 2: Remove Panel A1a and Panel A1b from the A-Coil Module. Remove Panel C1 from the Compressor Module and remove two screws located on the front side of the compresor. Remove the two compressor gaskets, and then re-secure the screws.



Step 3: Remove the Blower Accessory from the Blower Module and re-secure the screws. Turn over the Blower Module and ensure the supply air flange is upward. See figure below. **The Blower Accessory is not required in this configuration. Refer to the direction of flow arrows located on the module.**



Step 4: Remove Panel B1 of the Blower Module and knock off the KHB1 on Panel B2. Pull the fan control and power supply wires out of the KHB1.

Step 5: Place the Blower module vertically above the A-Coil module, ensure that the Blower module is aligned with the A-Coil Module, as well as the two fixing holes.

Step 6: Secure the two parts together using a M6 screw bolt through the fixing holes, then replace Panel B1 of the Blower Module.

Step 7: Duct Installation, see **4.2 Ductwork Installation** on Page 32.

Step 8: Water Pipe & Condensate Installation, see **4.3 Condensate Removal & Water Connection** on Page 36.

Step 9: Refrigerant Pipe Installation, see **4.4 Connection Pipe Installation** on Page 41.

Step 10: Electrical and Thermostat Installation, see **4.5 Electrical Installation** on Page 45.

Step 11: Air Filter Installation, see **5.4 Air Filter Installation** on Page 60.

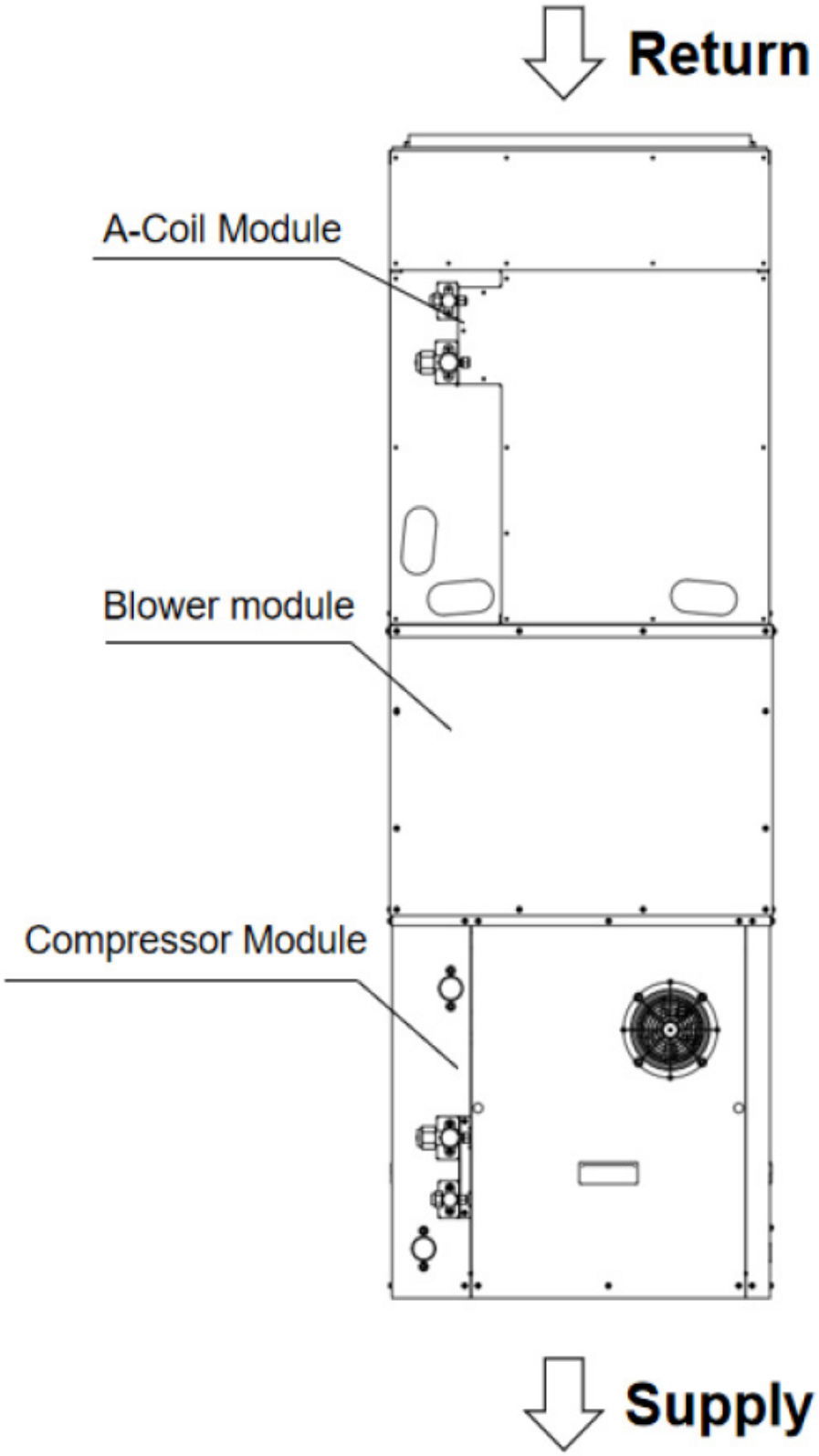
Step 12: Installation Check and Trial Run, see **5.1 Post-Install Item Review** and **5.3 Trial Run** on pages 58 & 59.

Step 13: Reattach Panel C1, C2, C3 of the Compressor Module, and Panel A1a and Panel A1b of the A-Coil Module.

NOTE: It is recommended to seal each joint with insulation with a thickness of at least .39 inches (10mm) and a width of 3.15 inches (80mm) to avoid the risk of condensation due to inadequate installation or other unexpected situation. The insulation used must meet the fire prevention requirements.

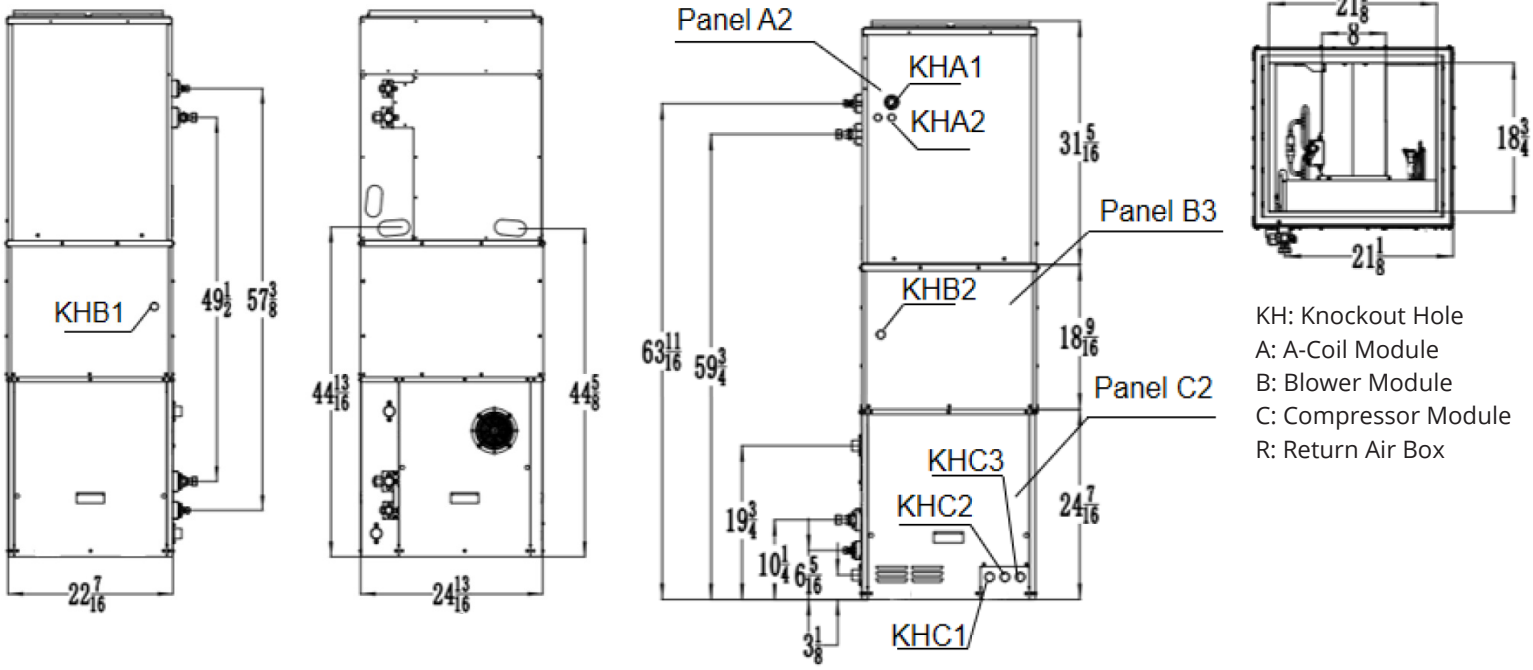
2. Vertical Downflow

There is ONE option for Vertical Downflow.

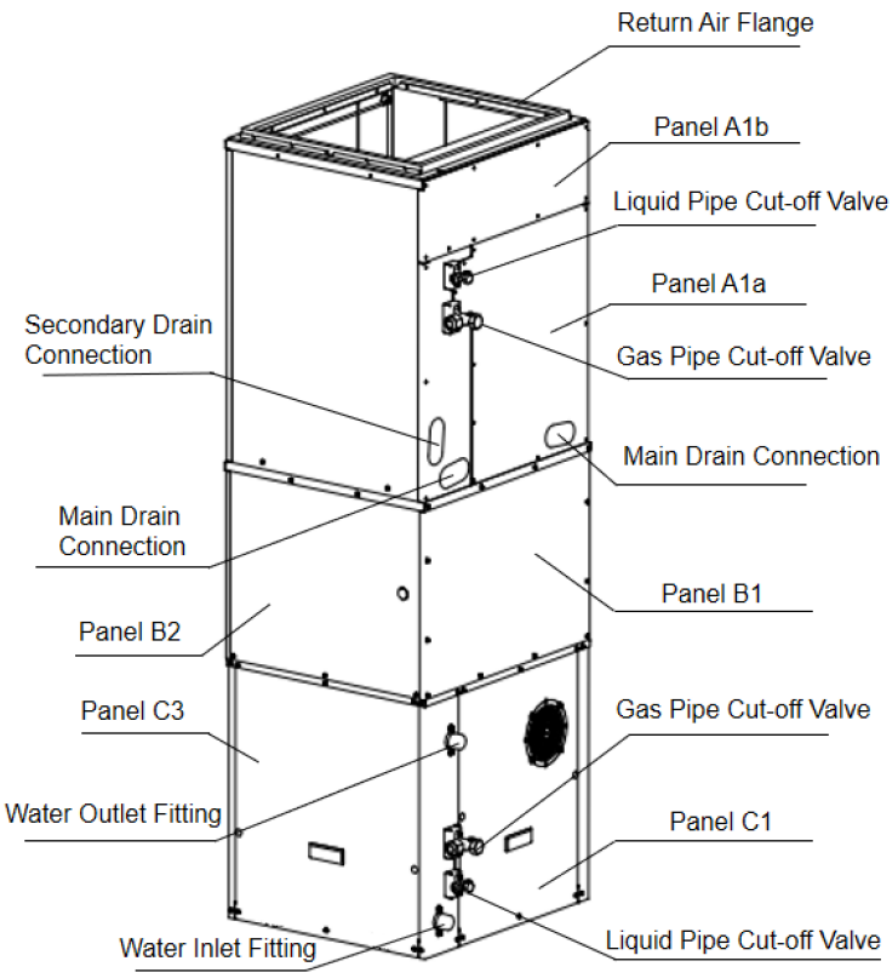


2a. Top Return Air and Vertical Downflow (Integral Unit without Return Air Box)

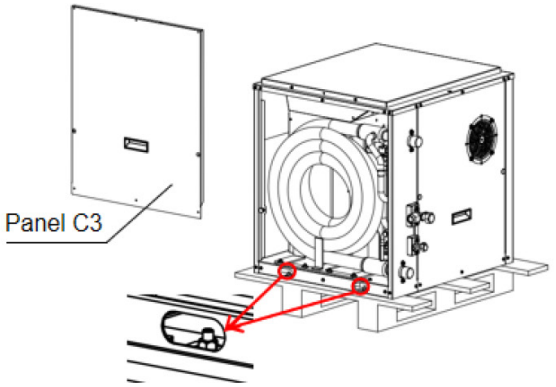
From bottom to top, the configuration is the Compressor Module, the Blower Module, and the A-Coil Module.



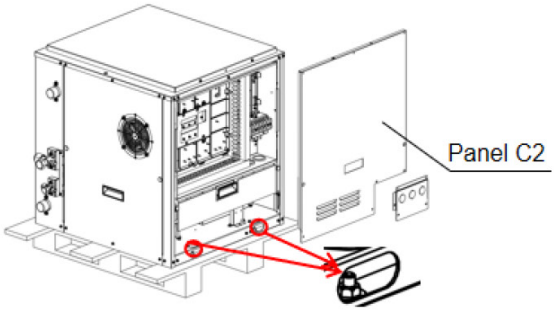
KH: Knockout Hole
A: A-Coil Module
B: Blower Module
C: Compressor Module
R: Return Air Box



Step 1: Remove Panels C2 and C3 from the Compressor Module, remove four screws in the Compressor Module used to secure the unit to the pallet and remove the Compressor Module from the pallet. Install the Compressor Module in a place strong enough to bear the weight of the unit and be firmly attached.



Left Side

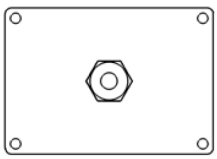


Right Side

Step 2: Remove Panel A1a and Panel A1b from the A-Coil Module.

****For better compressor frequency control for a downflow application, the position of the return air temperature sensor is recommended to be adjusted during installation to better measure the return air temperature. The following steps provide instructions for this adjustment.****

Step 3: Remove the four screws, then remove the seal plate and unscrew the latch nut to remove the return air temperature sensor. Reinstall the seal plate (Downflow Accessory) and secure it with four screws.

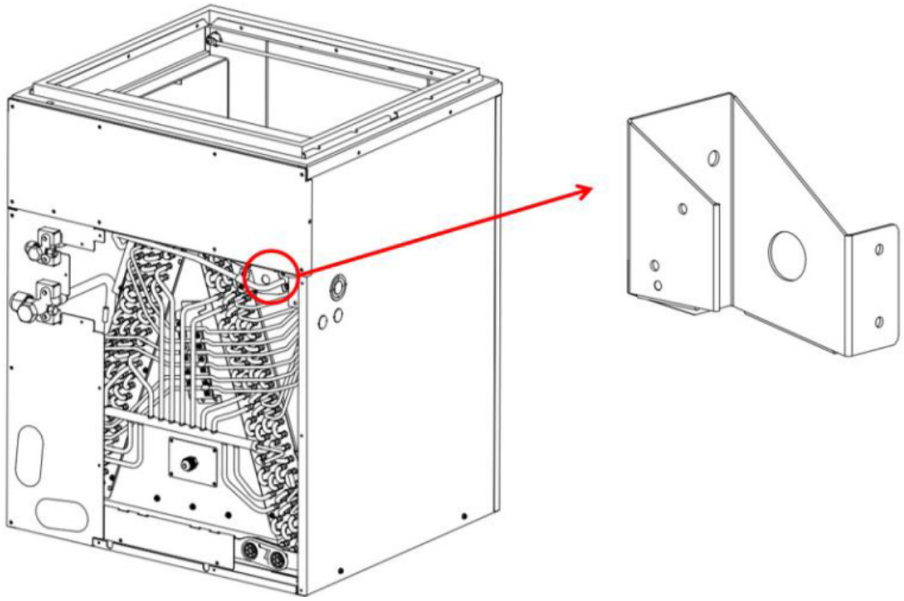


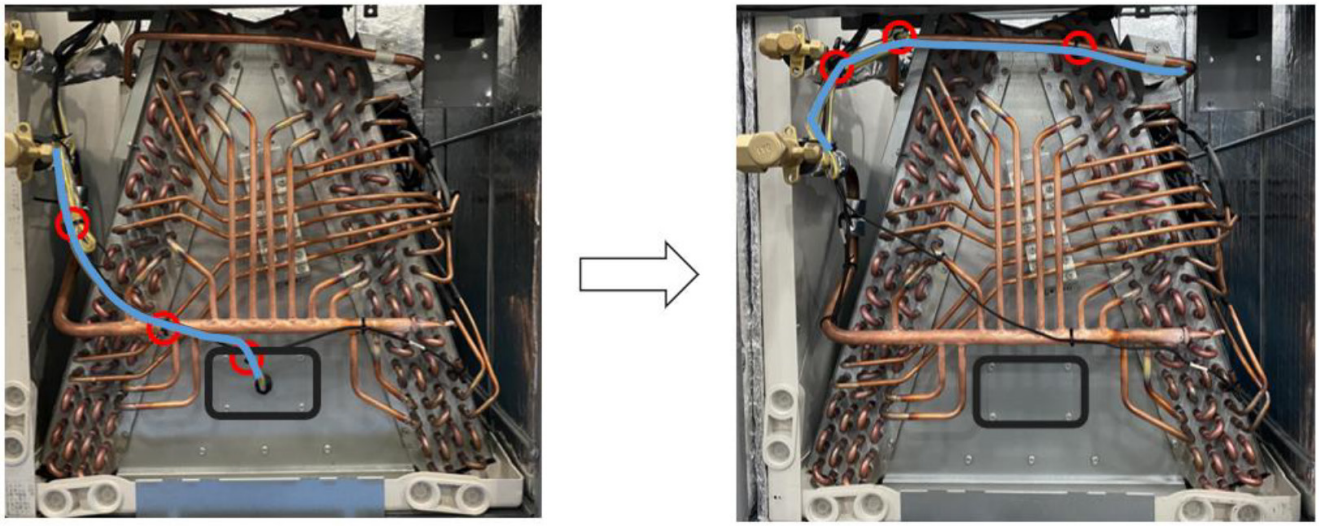
Seal plate (Factory mounted)



Seal plate (Downflow mounted)

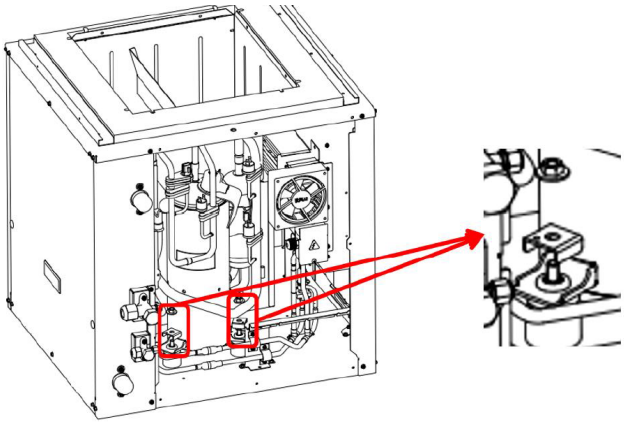
Step 3: Cut off the cable zip ties (shown in figure below). The black wire is in-tub temperature sensor wire, and the other wire is return air temperature sensor wire. Reinstall the in-tub temperature sensor wire with cable zip ties. Run the return air temperature sensor wire along the pipeline and use three cable zip ties to re-secure the wire. Use the removed lock nut and put the temperature sensor through the hole and secure it in the new position.





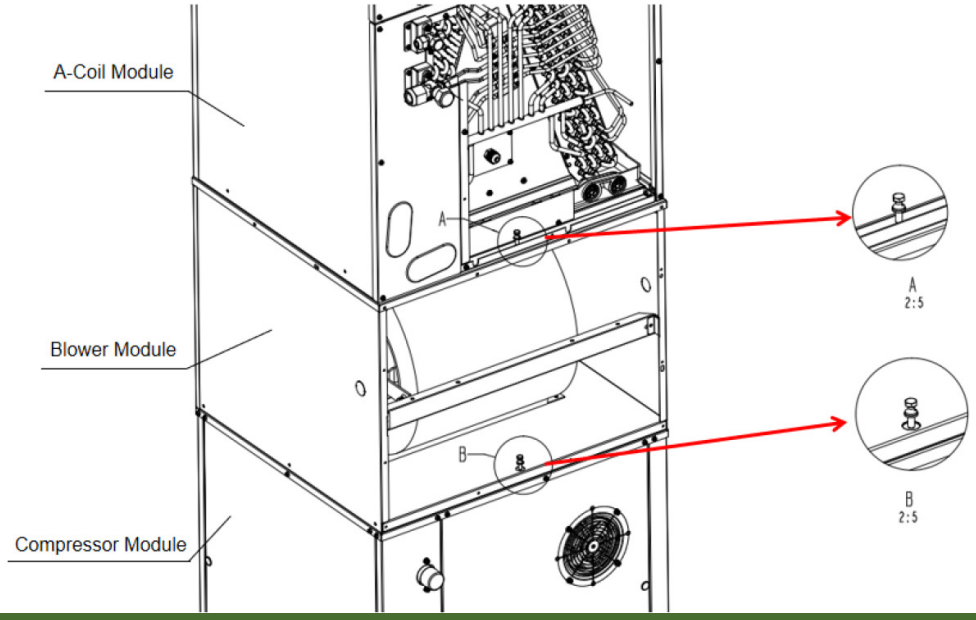
Step 4: Remove the cover above the Blower Module and remove the two screws securing the crossbeam. Remove panel B1 from the Blower Module and reinstall the fan cover.

Step 5: The cover on the compressor should be removed. Remove Panel C1 and C2 from the Compressor Module and remove two screws located on the front side of the compressor. Remove the two compressor foot pads, and then re-secure the screws.



Step 6: Place the Blower Module vertically above the Compressor Module. Ensure that the Blower Module is aligned with the Compressor Module, as well as the two fixing holes.

Step 7: Secure the two parts together using a M6 screw bolt through the fixing holes.



Step 8: Knock off the KHB2 on Panel B3. Pull the fan control and power supply wires out of the KHB2. Replace Panel B1 of the Blower Module.

Step 9: Place the A-Coil Module vertically above the Blower Module. Ensure that the A-Coil Module is aligned with the Blower MOdule, as well as the two fixing holes.

Step 10: Secure the two parts together using a M6 screw bolt through the fixing holes. Knock off the KHA1, KHA2, and KHA3 on Panel A2.

Step 11: Duct Installation, see **4.2 Ductwork Installation** on Page 32.

Step 12: Water Pipe & Condensate Installation, see **4.3 Condensate Removal & Water Connection** on Page 36.

Step 13: Refrigerant Pipe Installation, see **4.4 Connection Pipe Installation** on Page 41.

Step 14: Electrical and Thermostat Installation, see **4.5 Electrical Installation** on Page 45.

Step 15: Air Filter Installation, see **5.4 Air Filter Installation** on Page 60.

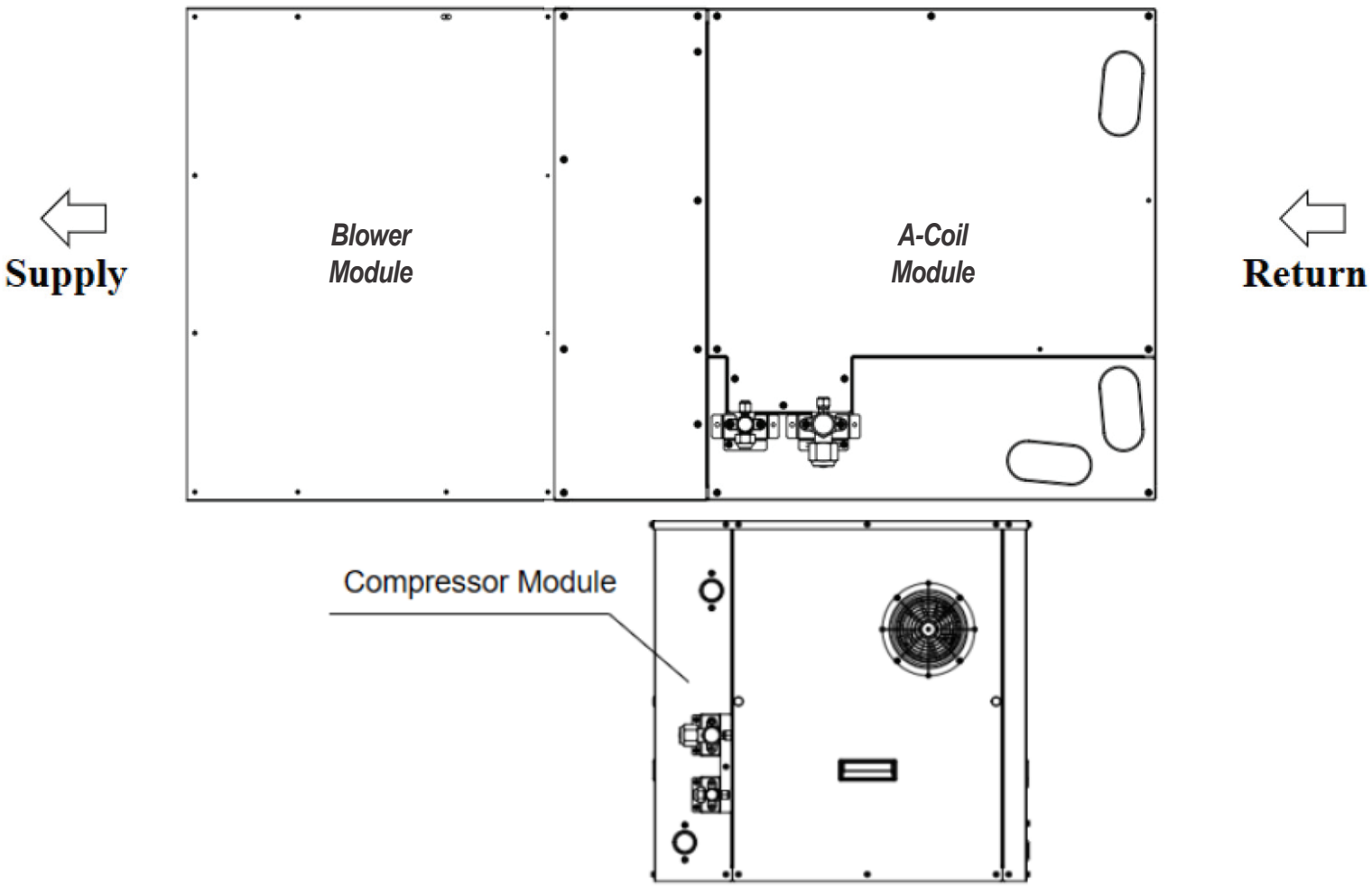
Step 16: Installation Check & Trial Run, see **5.1 Post-Install Item Review** & **5.3 Trial Run** on pages 58 & 59.

Step 17: Replace Panel C1, C2, C3, Panel A1a, and Panel A1b.

NOTE: It is recommended to seal each joint with insulation with a thickness of at least .39 inches (10mm) and a width of 3.15 inches (80mm) to avoid the risk of condensation due to inadequate installation or other unexpected situation. The insulation used must meet the fire prevention requirements.

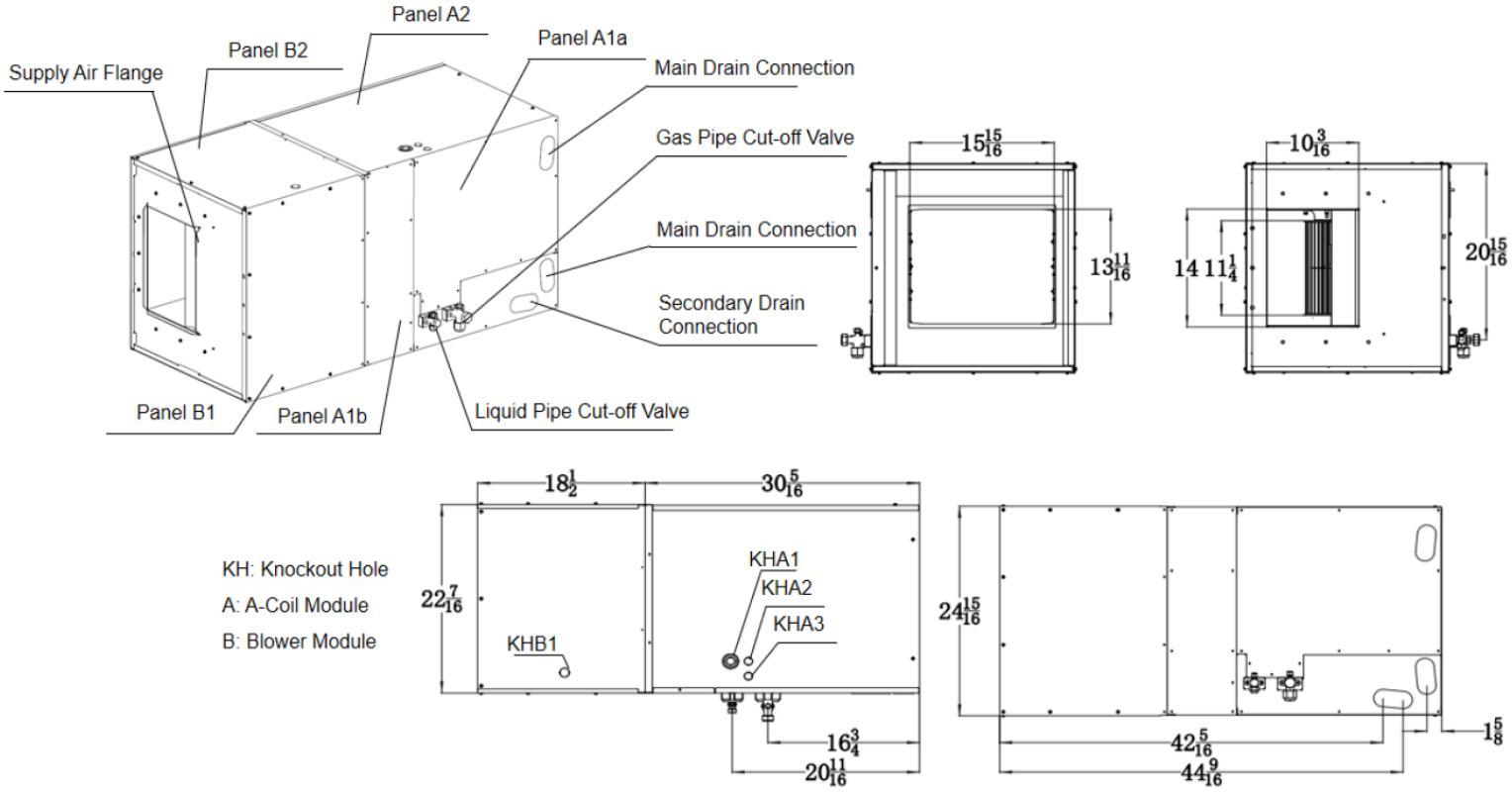
3. Horizontal

There is ONE option for Horizontal installation.

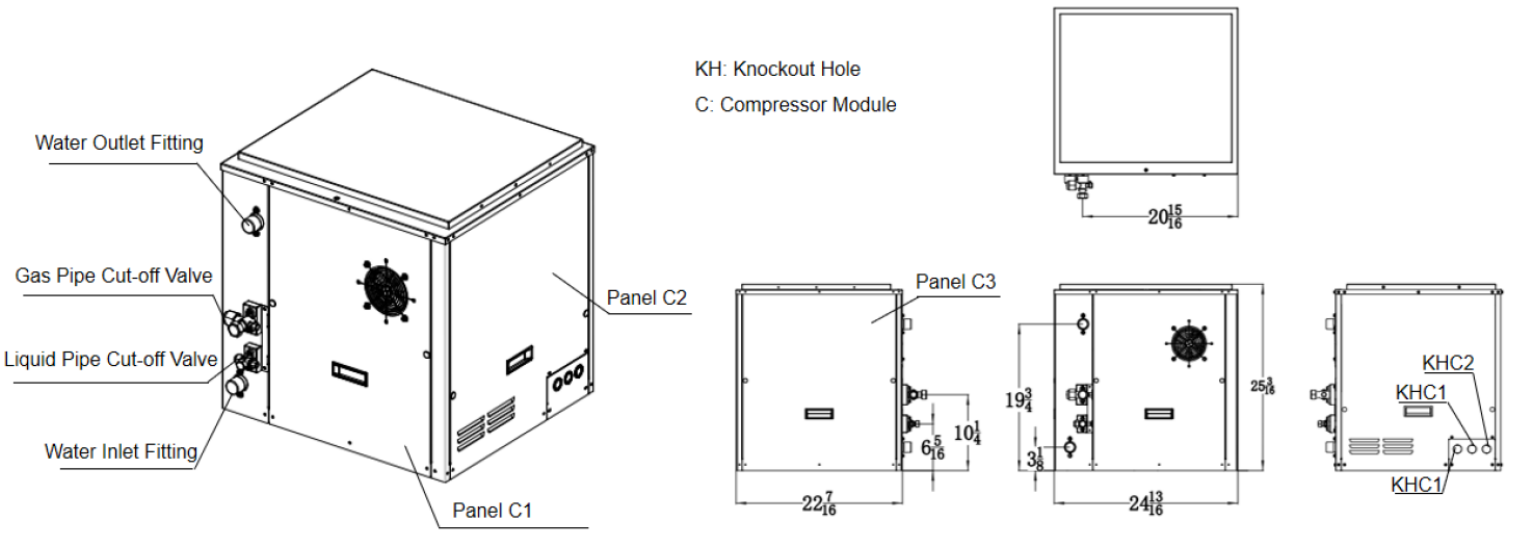


3a. Horizontal Return Air and Horizontal Supply Air (Split Unit without Return Air Box)

Note: This configuration can include the optional Return Air Box if desired with appropriate modifications by the installer.

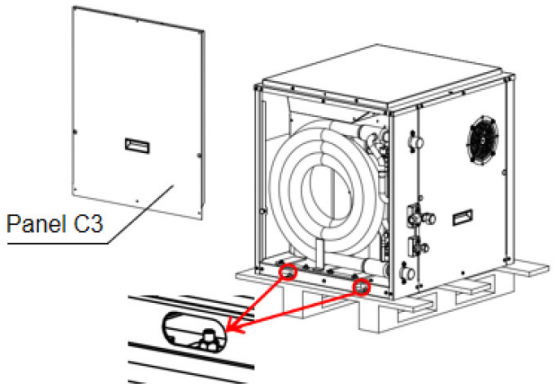


Unit: inch

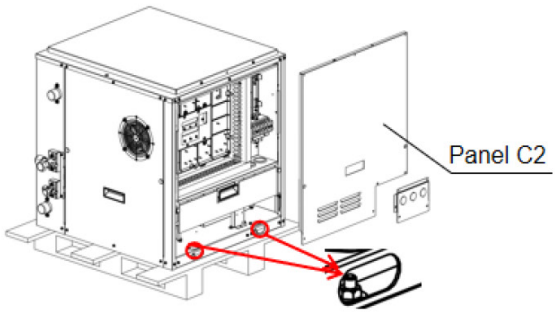


Unit: inch

Step 1: Remove Panels C2 and C3 from the Compressor Module, remove four screws in the Compressor Module used to secure the unit to the pallet and remove the Compressor Module from the pallet. Install the Compressor Module in a place strong enough to bear the weight of the unit and be firmly attached.

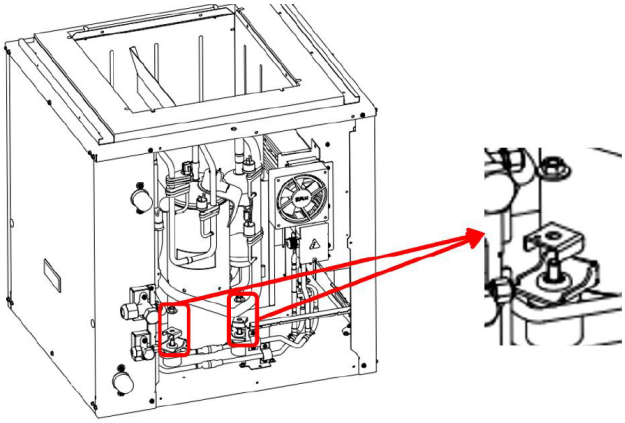


Left Side

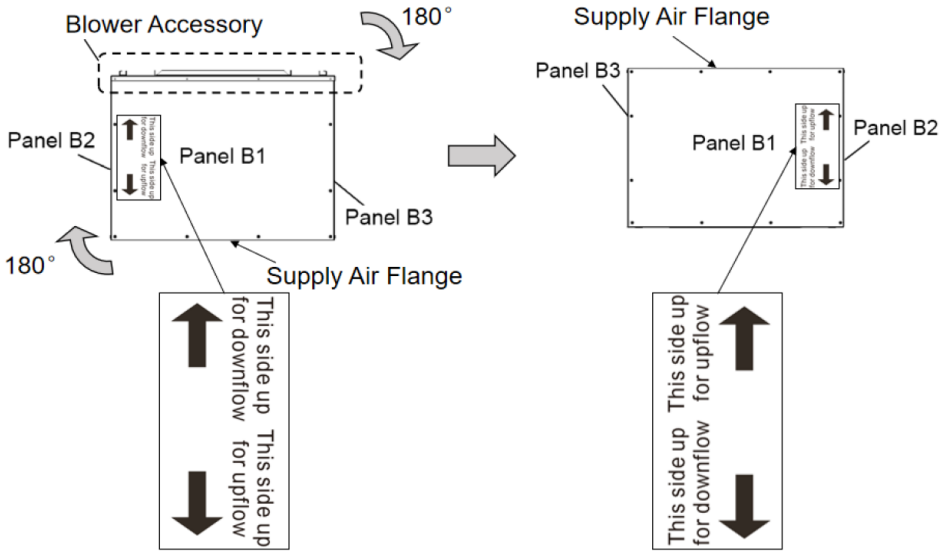


Right Side

Step 2: Remove Panel A1a and Panel A1b from the A-Coil Module. Remove Panel C1 from the Compressor Module and remove the two screws located on the front side of the compressor. Remove the two compressor foot pads, and then re-secure the screws.



Step 3: Remove the Blower Accessory from the Blower Module and re-secure the screws. Turn over the Blower Module and ensure the supply air flange is upward. See figure below. **The Blower Accessory is not required in this configuration. Refer to the direction of flow arrows located on the module.**

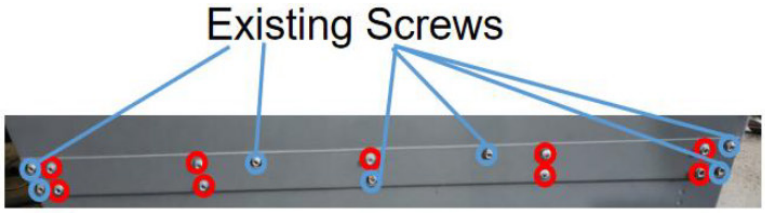


Step 4: Remove Panel B1 of the Blower Module and knock off the KHB1 on Panel B2. Pull the fan control and power supply wires out of the KHB1.

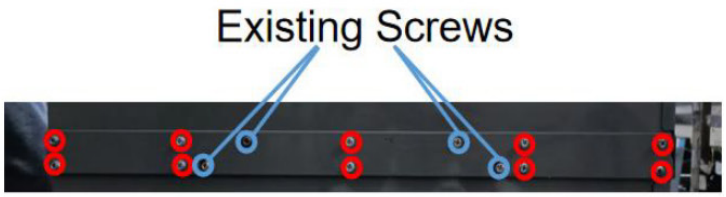
Step 5: Place the Blower module vertically above the A-Coil module, ensure that the Blower module is aligned with the A-Coil Module, as well as the two fixing holes.

Step 6: Secure the two parts together using a M6 screw bolt through the fixing holes, then replace Panel B1 of the Blower Module.

Step 7: Two horizontal fixing brackets are installed at the connection of the Blower Module and the A-Coil Module. The longer fixing bracket is installed on the rear side of the unit, and the shorter fixing bracket is placed on the ride side of the unit. The screw holes on the fixing bracket correspond to the existing screw positions. Attach the fixing bracket to the module with self-tapping screws (as shown below).

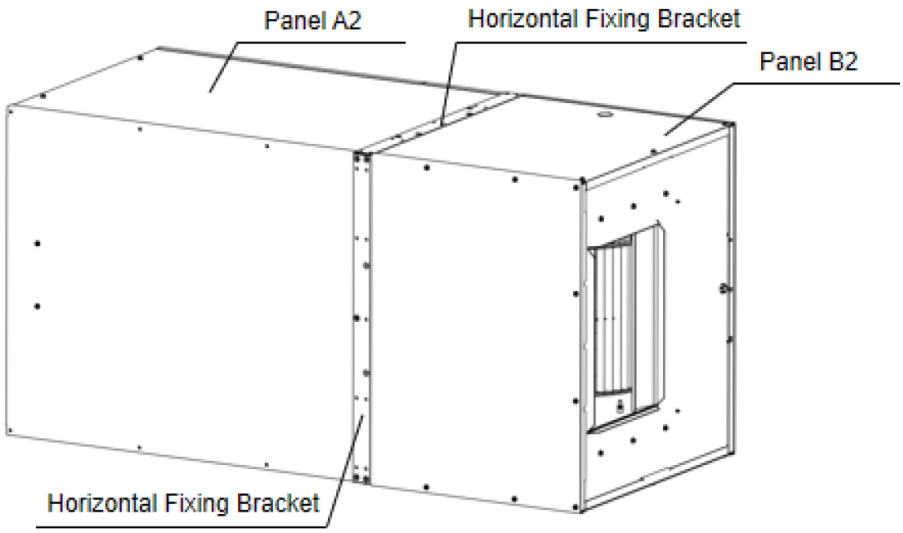


Rear Side



Right Side

Step 8: Turn the unit over 90° and gently lower it down and place it horizontally in the installation position. Make sure the secondary drain is below. See rear side figure below.



Rear Side

Step 9: Duct Installation, see **4.2 Ductwork Installation** on Page 32.

Step 10: Water Pipe & Condensate Installation, see **4.3 Condensate Removal & Water Connection** on Page 36.

Step 11: Refrigerant Pipe Installation, see **4.4 Connection Pipe Installation** on Page 41.

Step 12: Electrical and Thermostat Installation, see **4.5 Electrical Installation** on Page 45.

Step 13: Air Filter Installation, see **5.4 Air Filter Installation** on Page 60.

Step 14: Installation Check & Trial Run, see **5.1 Post-Install Item Review** & **5.3 Trial Run** on pages 58 & 59.

Step 15: Replace Panel A1a and Panel A1b of the A-Coil Module. Replace Panel C1, C2, and C3 of the Compressor Module.

NOTE: It is recommended to seal each joint with insulation with a thickness of at least .39 inches (10mm) and a width of 3.15 inches (80mm) to avoid the risk of condensation due to inadequate installation or other unexpected situation. The insulation used must meet the fire prevention requirements.

4.2 Ductwork Installation

This geothermal unit is designed for a complete supply and return ductwork system.

⚠ WARNING

1. Field ductwork must meet the National Fire Protection Association NFPA 90A, NFPA 90B, and any applicable local ordinance.
2. Sheet metal ductwork run in unconditioned spaces must be insulated and covered with a vapor barrier. Fibrous ductwork may be used if constructed and installed in accordance with SMACNA Construction Standard on Fibrous Glass Ducts. Ductwork must comply with National Fire Protection Association as tested by U/L Standard 181 for Class I Air Ducts. Check local codes for requirements on ductwork and insulation.
3. Duct system must be designed within the range of external static pressure the unit is designed to operate against. It is important that the system airflow be adequate. Make sure supply and return ductwork, grills, special filters, accessories, etc. are accounted for in total resistance. See Fan Performance data in this manual on page 55.
4. Do not operate the unit without all ductwork completed.
5. Do not operate this product without all ductwork attached.
6. Inadequate ductwork that restricts airflow can result in improper performance and compressor or heater failure. Ductwork is to be constructed in a manner that limits restrictions and maintains suitable air velocity. Ductwork is to be sealed to the unit in a manner that will prevent leakage.
7. Return ductwork: Do not terminate the return ductwork in an area that can introduce toxic or objectionable fumes/odors into the ductwork.
8. Return Air Filters: Each installation must include a return air filter. This filtering may be performed at the Return Air Box or externally such as a return air filter grille.
9. Do not install electric heating at the air outlet of the unit.

The duct system should be sized to handle the design airflow quietly. A flexible connector is recommended for both discharge and return air duct connections on metal duct systems to eliminate the transfer of vibration to the duct system. To maximize sound attenuation of the unit blower, the supply and return plenums should include internal fiberglass duct liner or be constructed from duct board for the first few feet. Application of the unit to uninsulated ductwork in an unconditioned space is not recommended, as the unit's performance will be adversely affected.

At least one 90° elbow should be included in the supply duct to reduce air noise. If air noise or excessive air flow is a problem, the blower speed can be changed.

Horizontal units are typically installed in an attic or crawl space. Never install units in areas subject to freezing or where humidity levels could cause cabinet condensation (such as unconditioned spaces subject to 100% outside air). Consideration should be given to access for easy removal of the filter and access panels. Provide sufficient room to make water, electrical, and duct connection(s)

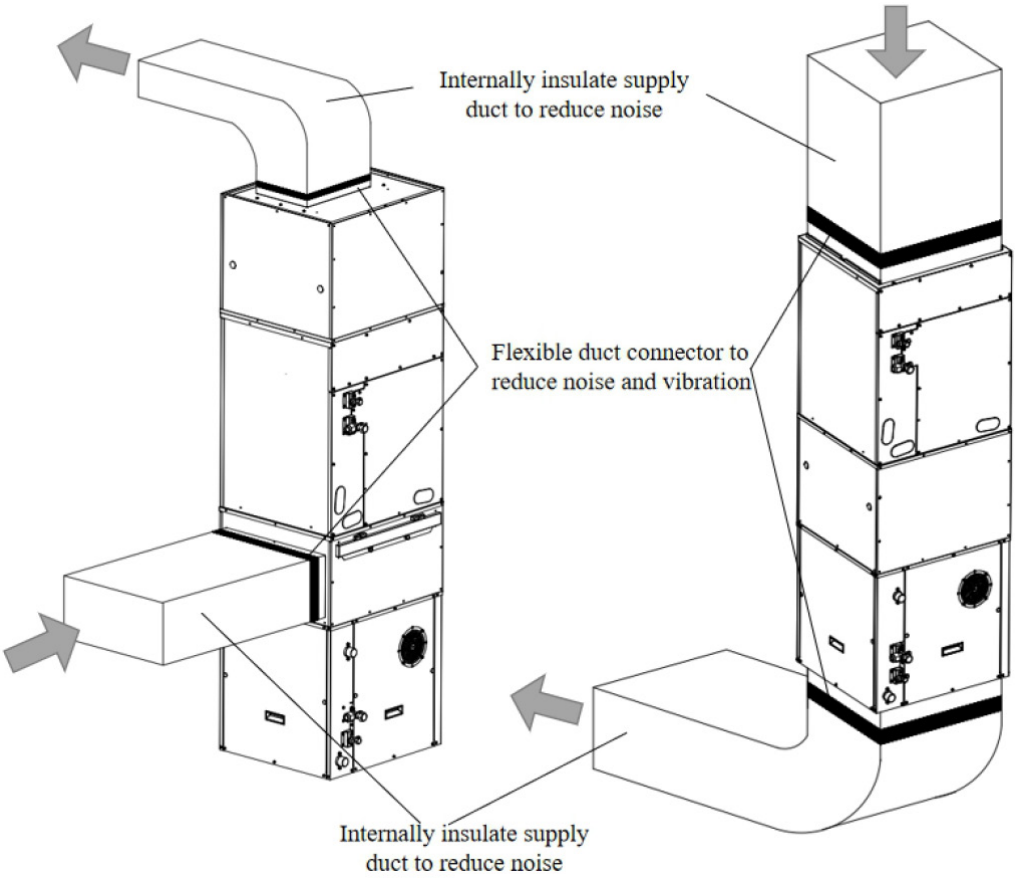
If the unit is located in a confined space, such as a closet, provisions must be made for return air to freely enter the space by means of a louvered door or return duct. Any access panel screws that would be difficult to remove after the unit is installed should be removed prior to setting the unit.

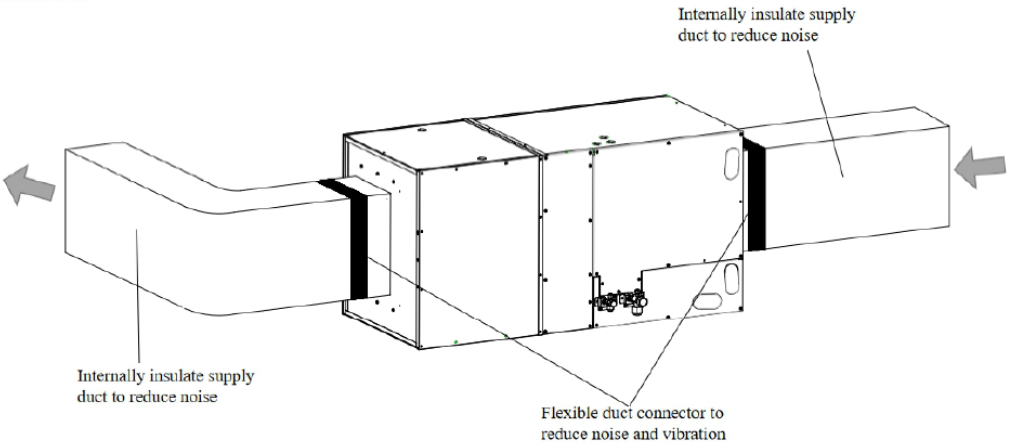
If ductwork is installed in an attic area, after being installed and wrapped in insulation, it is recommended the ductwork be covered with six to eight inches of cellulose. If the attic ductwork is not covered with cellulose, it can lose a significant amount of its heating and cooling capacity into the attic area. Ductwork that is inadequately insulated will cause poor system performance and customer dissatisfaction.

In the USA, ductwork sizing methods should follow ACCA “Manual D” recommendations. Install ductwork within the conditioned space of the building to minimize duct heat loss or gain, wherever possible.

A field supplied discharge duct system will normally consist of:

- a flexible connector at the unit
- a 90-degree elbow without vanes
- a 10 foot length of insulated duct
- a trunk duct teeing into a branch circuit with discharge diffusers

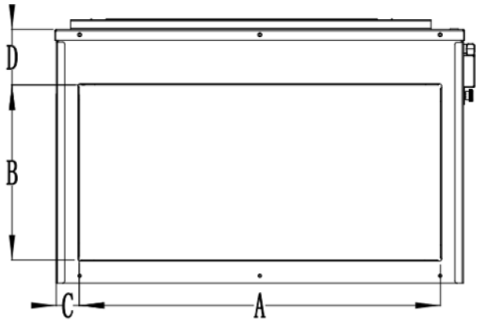




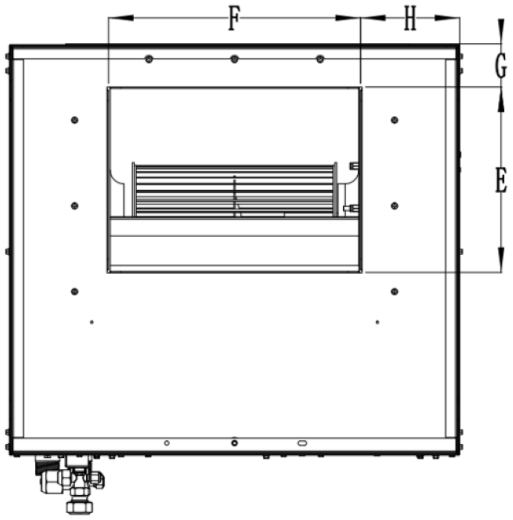
If the unit is connected to existing ductwork, a previous check should have been made to insure that the ductwork has the capacity to handle the airflow required for the unit. All existing ductwork should be checked for leaks and register sizing is crucial for proper air delivery andthrow while maintaining acceptable sound levels.

Ductwork Dimensions

1a. Horizontal Return Air and Vertical Upflow (Integral Unit with Return Air Box) Page 14



Air inlet

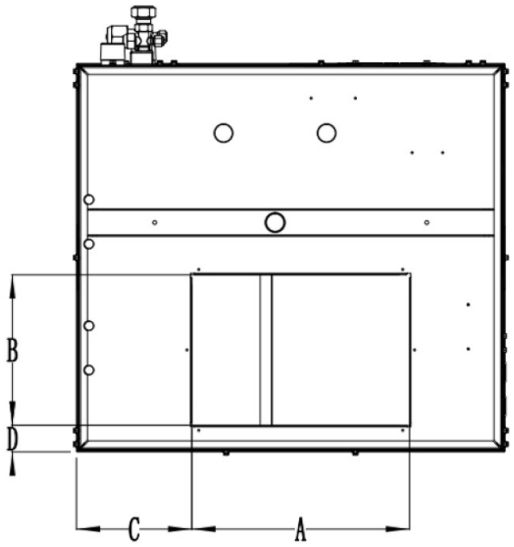


Air outlet

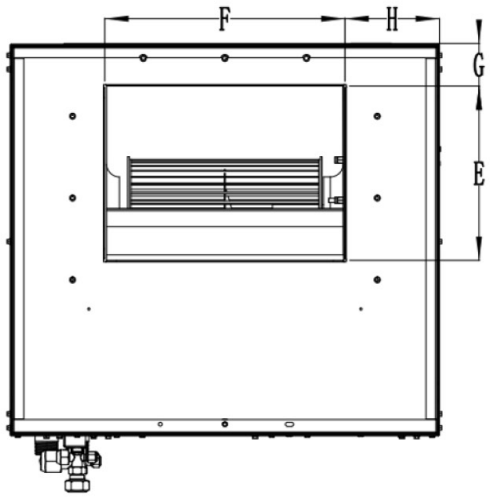
Unit: inch(mm)

	A	B	C	D	E	F	G	H
Dimensions	19-15/16 (506)	9-5/8 (245)	1-1/4 (32)	3-1/16 (78)	10-1/16 (256)	13-7/8 (353)	2-5/16 (59)	5-1/2 (139)

1b. Bottom Return Air and Vertical Upflow (Integral Unit without Return Air Box) Page 16



Air inlet

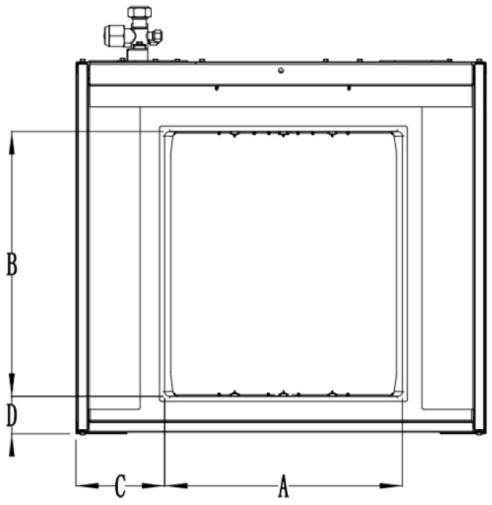


Air outlet

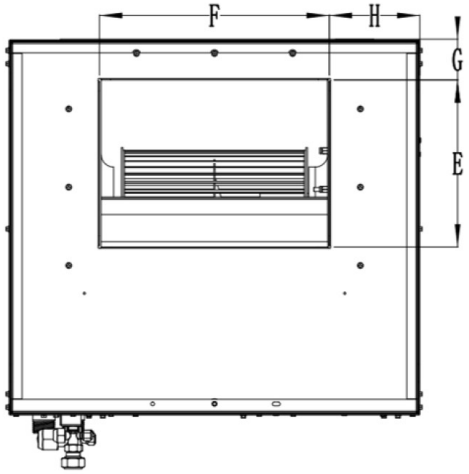
Unit: inch(mm)

	A	B	C	D	E	F	G	H
Dimensions	12-9/16 (319)	8-11/16 (220)	6-5/8 (168)	1-7/16 (37)	10-1/16 (256)	13-7/8 (353)	2-5/16 (59)	5-1/2 (139)

1c. Bottom Return Air and Vertical Upflow (Split Unit without Return Air Box) Page 18



Air inlet

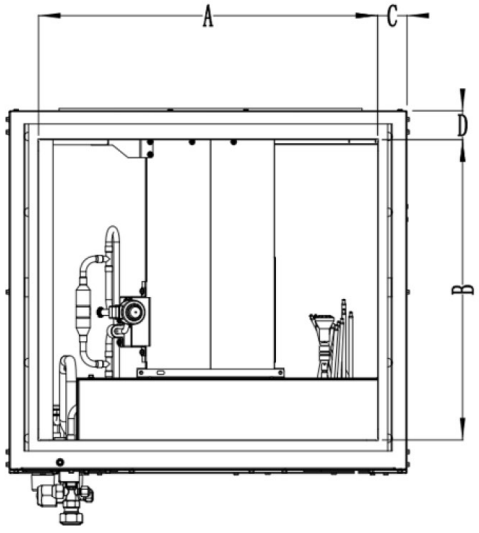


Air outlet

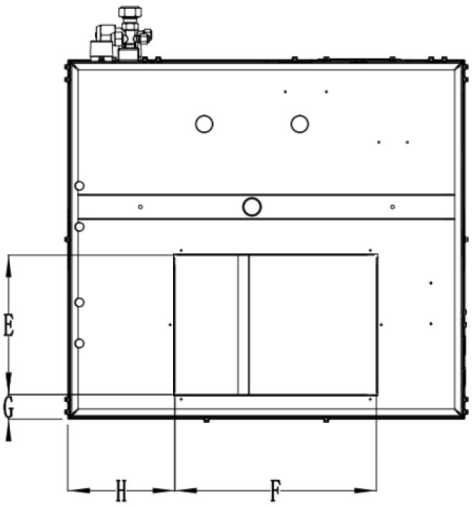
Unit: inch(mm)

	A	B	C	D	E	F	G	H
Dimensions	14-3/8 (365)	16 (406)	5-1/4 (134)	2-3/16 (55)	10-1/16 (256)	13-7/8 (353)	2-5/16 (59)	5-1/2 (139)

2a. Top Return Air and Vertical Downflow (Integral Unit without Return Air Box) Page 21



Air inlet



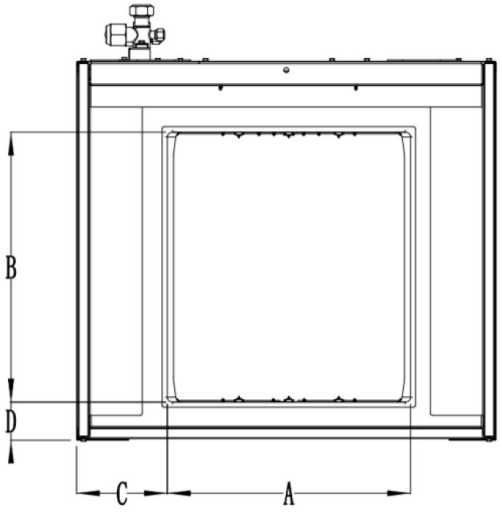
Air outlet

Unit: inch(mm)

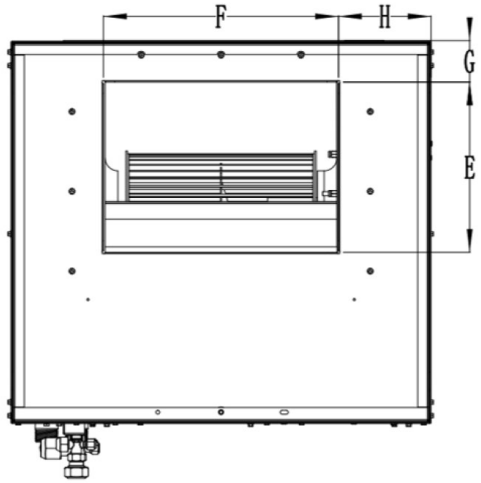
	A	B	C	D	E	F	G	H
Dimensions	21 (534)	18-11/16 (474)	1-7/8 (48)	1-7/8 (48)	8-11/16 (220)	12-9/16 (319)	1-7/16 (37)	6-5/8 (168)

3a. Horizontal Return Air and Horizontal Supply Air (Split Unit without Return Air Box) Page 25

Since the combination of a Horizontal Supply Air split unit and Vertical Upflow split unit is consistent, both the A-coil module and the Blower module are used in combination, so the size of air inlet and air outlet is consistent with that of Horizontal Supply Air split unit, as shown in the figure below.



Air inlet



Air outlet

Unit: inch(mm)

	A	B	C	D	E	F	G	H
Dimensions	**14-3/8 (365)**	**16 (406)**	**5-1/4 (134)**	**2-1/4 (57)**	**10-1/16 (256)**	**13-7/8 (353)**	**2-5/16 (59)**	**5-1/2 (139)**

4.3 Condensate Removal and Water Connection

Water Pump

A water pump is required for the water system and should be equipped on the jobsite. It is recommended to use the pump power supply, control terminals, and the control terminals of the water valve (24VAC) to ensure that the water valve opens first during the starting mode of the unit, followed by the pump and finally the compressor. In addition to ensuring the normal operation of the unit, it is important to avoid water hammer caused when the water valve closes before the pump.

If the pump installed is independently powered, it is necessary to ensure that the water valve and the pump are on before the unit is started, otherwise the unit may fail to turn on due to insufficient water flow.

The water pump should meet the following requirements:

1. The water pump should meet the UL standard.
2. The input power should be less than 600W.
3. The flow rate of the water should be in the range listed on the following chart.

	Units	Dimensions
Minimum Flow Rate	**GPM (m^3 /h)**	**5.3in (1.2mm)**
Maximum Flow Rate	**GPM (m^3 /h)**	**19.8in (4.5mm)**

Water Connection

It is very important that an adequate supply of clean, noncorrosive water at the proper pressure be provided before the installation is completed. Insufficient water, in the heating mode for example, will cause the low pressure switch to trip, shutting down the heat pump. In assessing the capacity of the water system, it is advisable that the complete water system be evaluated to prevent possible lack of water or water pressure at various household fixtures whenever the heat pump turns on.

All plumbing to and from the unit is to be installed in accordance with local plumbing codes. The use of plastic pipe, where permissible, is recommended to prevent electrolytic corrosion of the water pipe. Because of the relatively cold temperatures encountered with well water, it is strongly recommended that the water lines connecting the unit be insulated to prevent water droplets from condensating on the pipe surface. The water inlet dimensions are shown in the chart below.

	Dimensions
Water Inlet Fitting	**1”**
Water Outlet Fitting	**1”**

The operating pressures are recommended in the following chart:

	Minimum Pressure	Maximum Pressure
Open Loop	**25 PSI**	**50 PSI**
Closed Loop	**25 PSI**	**50 PSI**

For an open-loop application, if the minimum inlet temperature is below 50°F (10°C), judge the water flow through a professional assessment, and choose a large water flow to prevent the outlet temperature from becoming too low and causing the outlet pipe to freeze. If this is not possible, choose a closed system.

In an open-loop application, if the geothermal unit will be shut down for a long period of time during the winter, it is recommended to evacuate the water system to avoid the freezing of water.

Units that utilize ground loops must use an antifreeze solution in the unit and ground loop at all times. Use commercial antifreeze designed only for HVAC systems. Do not use automotive grade antifreeze. Once the system is filled with clean water and antifreeze, preventative measures should be taken to protect the system from dirty water conditions. Dirty water can lead to a decrease in the performance of the entire system, and solids may block valves, filters, flow regulators, etc. In addition, the heat exchanger may become clogged, thereby shortening the service life of the compressor or leading to premature failure.

Consult your local sales office to determine the most suitable antifreeze for your area. Propylene glycol coolant with clean water is commonly used as antifreeze. The antifreeze protection should be maintained to 16°F (9°C) below the minimum expected entering loop temperature. For example, if 21°F (-6°C) is the minimum expected entering loop temperature, the leaving loop temperature would be 12°F to 16°F (-11°C--9°C) and freeze protection should be at 5°F (-15°C). Calculation is as follows: 21°F - 16°F = 5°F (-6°C - 9°C = -15°C).

Failure to do so will allow refrigerant temperatures to drop, causing internal freezing of the unit. Severe damage to the unit caused by failure to maintain proper antifreeze levels is not covered under warranty.

For ground water application, if the geothermal unit will be shut down for a long period of time during the winter, the water system must be evacuated to avoid freezing of the water. After evacuating, the water system must be cleaned by referring to the “Cleaning of Water System” instructions on page 63. After cleaning, drying treatment must be carried out to ensure that the heat exchanger is dry and free of any residue. Finally, the water inlet and outlet should be sealed with rubber plugs to avoid corrosion.

For ground loop application, if it is necessary to evacuate the waer system, the water system must also be cleaned with clean water and dried after evacuating, and the water inlet and outlet must be sealed with rubber plugs to avoid corrosion.

The anti-freeze protection measures of the pipeline must be determined according to the geographical location and should be professionally designed.

Forced Pump Function

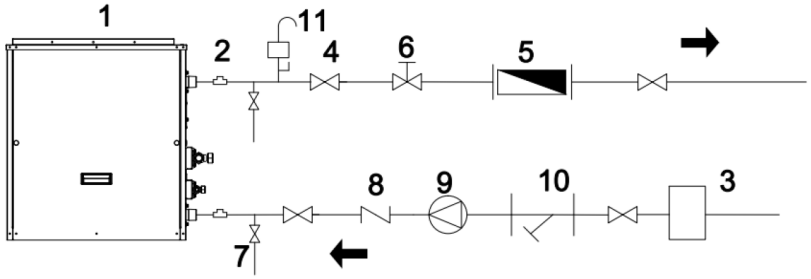
When the unit is turned off, you can turn on the engineering debugging mode through the operation of SW1~3 to enter the forced pump function. Press and hold “SW1” for about 5 seconds to enter the first level menu of the debugging mode. In the first level menu, press and hold “SW1” for about 5 seconds to switch to the number “03”, then press and hold “SW2” or “SW3” for about 5 seconds to enter the control mode. “ON” means open, “OF” means off. Then press and hold “SW1” for about 5 seconds to save. When operating by pressing SW1~3, keep pressing the keys until the display changes. In this mode, the protection of the water flow switch is shielded.

If no air is discharged from the discharge valve, it means that the air in the water system has been completely discharged. The water pump forced start function needs to be operated when the unit is powered on, and must be operated by a professional. During debugging, if no operation is performed within 10s, the debugging mode will be exited. If the forced start of the water pump is on for exceed 30 minutes, it will automatically exit the function of shutting down the water pump.

Ground Water Application

A typical ground water piping is shown in the following figure. For ease of maintenance, shut off valves should be included. Drain valves should be installed in the supply and return lines to evacuate the water system and clean the heat exchanger. The position of the shut off valve should allow water to flow through the drain valve and heat exchanger, rather than allowing flow to enter the piping system. P/T plugs should be used so that pressure drop and temperature can be measured. When installing the water system, it is necessary to use the discharge valve to empty the air in the pipeline, otherwise it may cause the water flow switch protection during operation.

1. Compressor Module
2. P/T Plugs
3. Pressure Tank
4. Shutoff Valve
5. Flow Regulator
6. Water Control Valve
7. Drain Valve
8. Check Valve
9. Water Pump
10. Filter
11. Discharge Valve

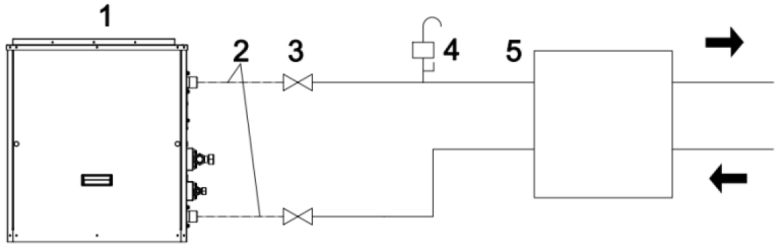


Ground Loop Application

According to the regulations of the International Ground Source Heat Pump Association (IGSHPA), all earth loop piping materials should be limited to polyethylene or equivalent materials.

Galvanized or steel fittings should not be used at any time as they are prone to corrosion. All plastic to metal threaded fittings should be avoided as they may leak in earth coupled applications. The flanged fitting should be substituted. P/T plugs should be used to measure flow using the pressure drop of the unit heat exchanger. Ground loop piping is shown in the figure below.

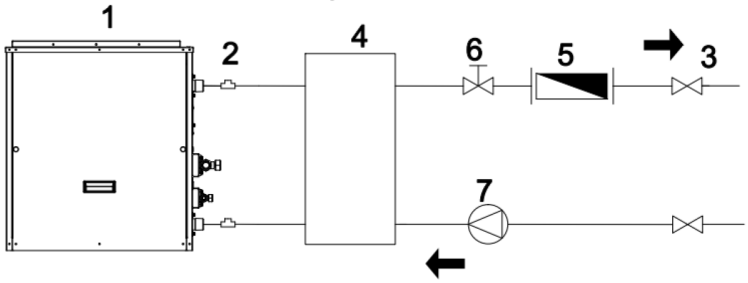
1. Compressor Module
2. Flexible Hoses
3. Shutoff Ball Valve with P/T Ports
4. Discharge Valve
5. Loop Pump Controller



Flushing

Upon completion of system installation and testing, flush the system to remove all foreign objects and purge to remove all air.

1. Compressor Module
2. P/T Plugs
3. Flushing Valve
4. Expansion Tank
5. Flow Regulator
6. Water Control Valve
7. Water Pump



Water Quality

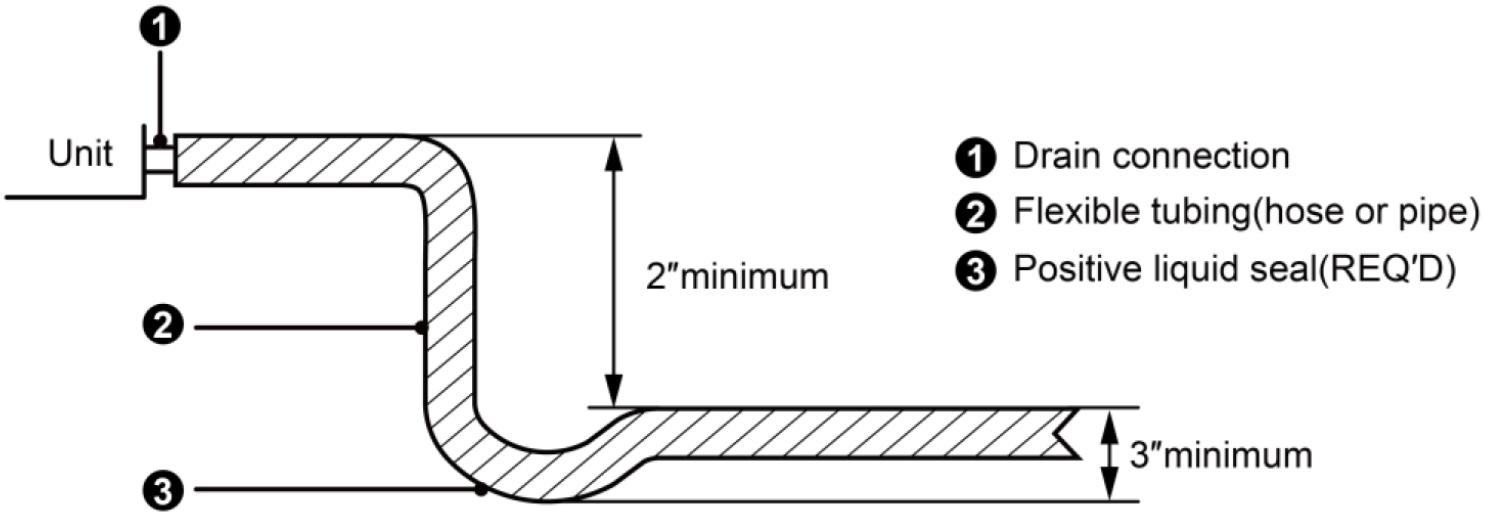
The level of impurities in system water should be evaluated through independent testing laboratories, health departments, or state agencies. Regular sampling, testing, and treatment of water is necessary to ensure that the water quality is maintained at an acceptable level, enabling the heat pump to operate at the optimal level. When water properties exceed these parameters, the water must be treated by a professional water treatment specialist to bring the water quality within the boundaries of this specification.

Failure to do so will void the warranty of the heat pump system and will limit liability for damage caused by leaks or system failure.

Items	Units	Available Range
pH	-	7-9
Suspended Solids	ppm	< 10
Particle Size	micron	< 600
Threshold Velocity	ft/sec	< 3.28
Chlorides	ppm	< 150
Chlorine	ppm	< 0.5
Sulfates	ppm	< 125
Hydrogen Sulfide	ppm	< 50
Ammonia Chloride	ppm	< 0.5
Ammonia Nitrate	ppm	< 0.5
Ammonia Sulfate	ppm	< 0.5
Ammonia Hydroxide	ppm	< 0.8
Iron (Fe3+)	ppm	< 0.2
Magnesium (Mg2+)	ppm	< 75
Nitrate	ppm	< 5
Total Dissolved Solids	ppm	< 1500
Carbon Dioxide	ppm	< 50

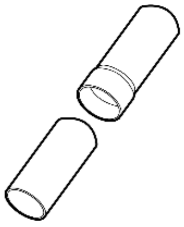
Condensate Removal

1. Do not connect the condensate drain pipe into the waste pipe or other pipelines that are capable of producing corrosive or peculiar smells to prevent the smell from entering indoors or corrupt the unit.
2. Do not connect the condensate drain pipe into a rain pipe. If rain water enters the unit, property loss or personal injury could occur.
3. Condensate drain pipe should be connected into a special drain system for the air conditioner.
4. The drain pan has a primary and secondary drain connection. Condensate removal is performed by attaching a 3/4" PVC pipe to the evaporator coil pan and terminated in accordance with local or state Plumbing/HVAC codes. The installation must include a "P" style trap that is located closely to the evaporator coil. Do not over-tighten the drain connection as it may cause possible damage to the evaporator drain pan. See the following figure for details of a typical condensate line "P" trap.

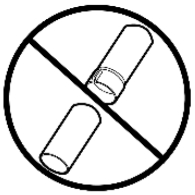


4.4 Connection Pipe Installation

Installation Notice and Requirement on Connection Pipe



Line set size matches service valve connector



Do not crimp service valve connector when pipe is smaller than connector

Installation method: Connect the connection pipes first to the unit. When bending a connection pipe, be careful not to damage the pipe. Do not over-tighten the screw nut, otherwise leakage will occur. The outside of the connection pipe should have a layer of insulating cotton added to protect it from mechanical damage during installation, maintenance, and transportation.

Pipe Bending

1. The pipes should be shaped by hand. Use care not to collapse them. Refer to Figure 4.4a below.

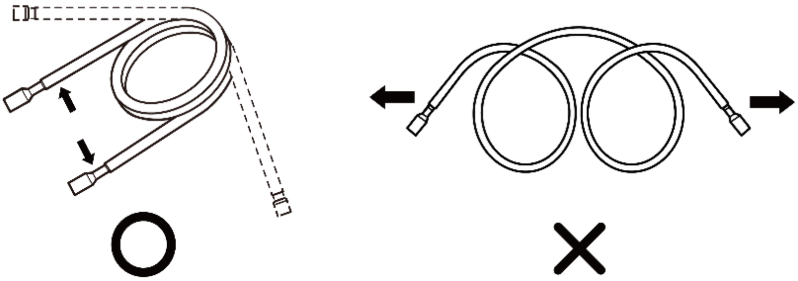


Figure 4.4a

2. Do not bend the pipes in an angle more than 90°

3. If the pipe is repeatedly bent or extended, it will become difficult to bend or extend. Do not bend or extend the pipe more than 3 times.

4. When bending the pipe, excessively bending the pipe will cause it to break. As shown in Figure 4.4b, use a sharp tool to cut the heat insulating layer around the pipe and bend it once the pipe is exposed. After bending, place the heat insulating later back on the pipeline and secure it with adhesive tape.

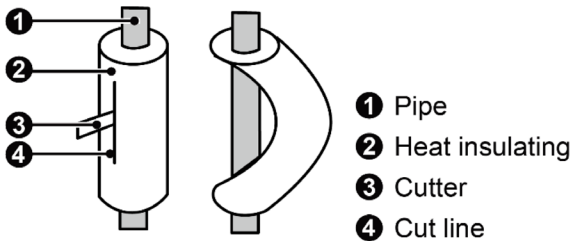


Figure 4.4b

Connection Pipe of the Units

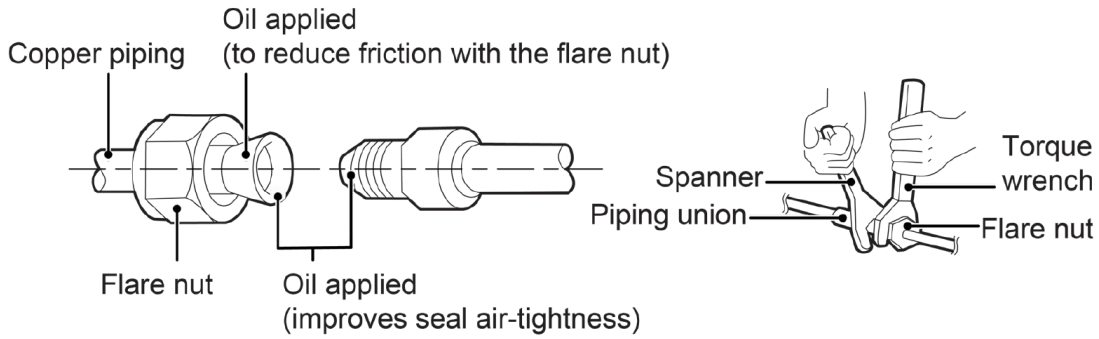
The length of the connection pipe of the unit is 7.5m. Use the corresponding length of connection pipe for installation.

NOTICE
1. Connect the pipe to the unit. Follow the instructions stated in the figures below. Use both the spanner and torque wrench.
2. When connecting the tapered screw nut, first apply chilled machine oil on its inner and outer surface then turn the screw for 3-4 rotations.
3. Confirm the tightening torque by referring to the following table. (If the screw nut is over-twisted, it may become damaged and cause leakage.)
4. Check for a gas leakage in the connection pipe before applying thermal insulation, as shown below.
5. Wrap sponge around the joint of the gas pipe and heat insulation sheath of gas colleting pipe.
6. Be sure to connect gas pipe after liquid pipe is connected.
7. Be sure to have insulation for gas pipe. Insulation for liquid pipe is optional.

Screw Connection

The gas pipe and liquid pipe connection method is a screw connection.

If the No-Vac® Quick Connect® lineset is used, ensure the lineset used matches the unit's configuration and matches up to the cut-off valves.



Pipe Diameter (inch)	Tightening Torque (Nm)
Φ3/8	**35-40**
Φ3/4	**70-75**

INSTRUCTIONS FOR USE WITH Geocool® No-Vac™ Quick Connect® LINE SET* SOLD SEPARATELY
PRECHARGED, SIMPLE SECURE QUICK CONNECT, 100% CONNECTION GUARANTEE

Please read and follow the instructions and diagram below* :
Connections must be made exactly as specified to avoid system leaks and /or damage

1. Take out matching male connectors **M1** and **M2**.

2. **Remove** protective cap with the copper gasket at each stop valve on the **CONDENSER** and ensure the threads are clean and complete.

3. **Tighten** the **M1** connector to the **cutoff valve *1** with a tightening force of 37 ft/lb (50 Nm). **Tighten** the **M2** connector to the **cutoff valve *2** with a tightening force of 52 ft/lb (70 Nm).

4. Repeat step 3 for **A-COIL** at the other end of the **LINE SET**.

5. **Route** the **LINE SET** corresponding to the desired configuration between the **A-COIL** and **CONDENSER**. If the system is being installed as a split system, unroll and route the **LINE SET** between the **A-COIL** and the **CONDENSER**. Bend the line set piping by hand to route the line set to suit your application. Use care when bending the line set.

6. **Remove** the protective caps of the valves at both ends of the **LINE SET**. Verify that all threads are clean and complete.

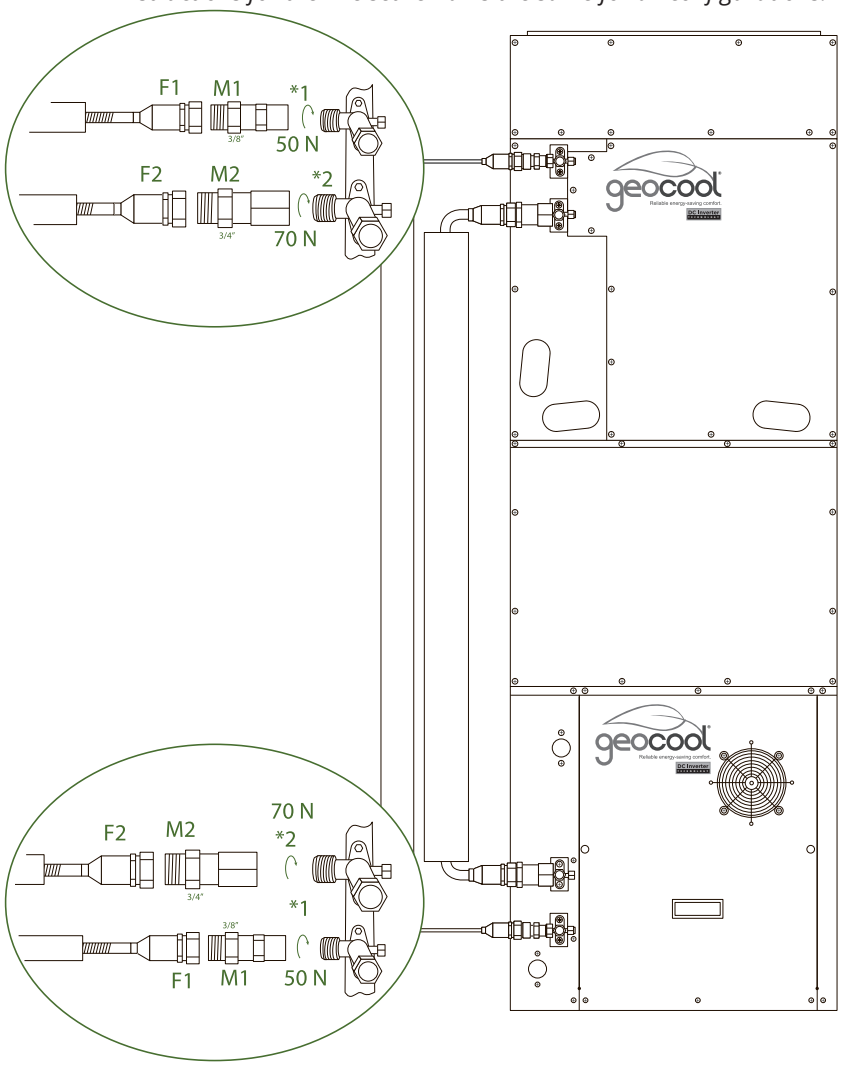
7. **Tighten** the **LINE SET F1** valve to the **M1 Connector** (attached in step 3) with a force of 33 ft/lb (45 Nm). Tighten the **LINE SET F2** valve to the **M2 Connector** (attached in step 3) with a tightening force of 33 ft/lb (45 Nm).

8. **Repeat** this process for the A-COIL at the other end of the **LINE SET.**

9. At the **CONDENSER**, **remove** the **protective cap** at the **cutoff valve switch** and **open** the **stop/cutoff valve** with a hex wrench to release refrigerant into the system. If there is any fizz, grease or other **leakage**, then **close** the valve **immediately** and **check** that **steps 3 and 7** were done properly. **Otherwise**, using a sponge or spray bottle, apply a soapy water solution to the connection points to check for micro leaks. **If any bubbles form** it indicates there is a leak. If this does occur, **close** the valve **immediately** and **check** that **steps 3 and 7** were done properly and and retighten the valves and line set if necessary.

10. **After** the correct connection, retighten the cutoff valve's protection cap and cover the M1, M2 and F1, F2 connections with the gray insulating sleeve to help prevent condensation.

The image below represents a Vertical Upflow configuration without the Return Air Box. This image is for reference and may vary slightly depending on the desired configuration by the user. However, the installation instructions for the line set remains the same for all configurations.



Piping Size (Stamped on Piping)	Wrench Size Required	
	Standard	Metric
3/8"	1"	25 mm
3/4"	1-3/8"	35 mm
Or 2x large crescent (adjustable-type) wrenches		

Allen/Hex Wrench Sizes Needed To Open Stop/Cutoff Valves	
Piping/Valve Size (Stamped on Piping)	Allen Wrench Size
3/8"	5 mm
3/4"	8 mm

Important

The stop/cutoff valves on the unit must be opened AFTER connecting the lines and BEFORE turning on the unit. Otherwise, operation can cause leakage and/or damage to the unit.

Note on Wrenches

The wrench sizes needed for tightening the No-Vac® Quick Connect® Line Set are listed below. However, based on the availability of the wrench sizes needed, it is recommended to use two large crescent (adjustable-type) wrenches. Using one to hold the valve while using the other wrench to tighten the line set connector.

Connection Pipe Vacuum Pumping and Leak Detection

NOTICE
1. Make sure the outlet of the vacuum pump is away from any fire sources and is well-ventilated.
2. Before vacuum pumping, make sure the unit cut-off valves are closed.
3. When vacuum pumping, both the liquid pipe and the gas pipe must be pumped.

1. Remove the caps from the liquid valve, gas valve, and the service port.

2. Connect the hoses at the low pressure and high pressure sides of the manifold valve assembly to the service ports of the unit's gas valve and liquid valve. Meanwhile, the gas and liquid valves should be kept closed in case of refrigerant leak.

3. Connect the hose used for evacuation to the vacuum pump.

4. Open the switch at the lower pressure side of the manifold valve assembly and start the vacuum pump. Meanwhile, the switch at the high pressure side of the manifold valve assembly should be kept closed, otherwise evacuation will fail.

5. The evacuation duration generally depends on the unti's capacity.

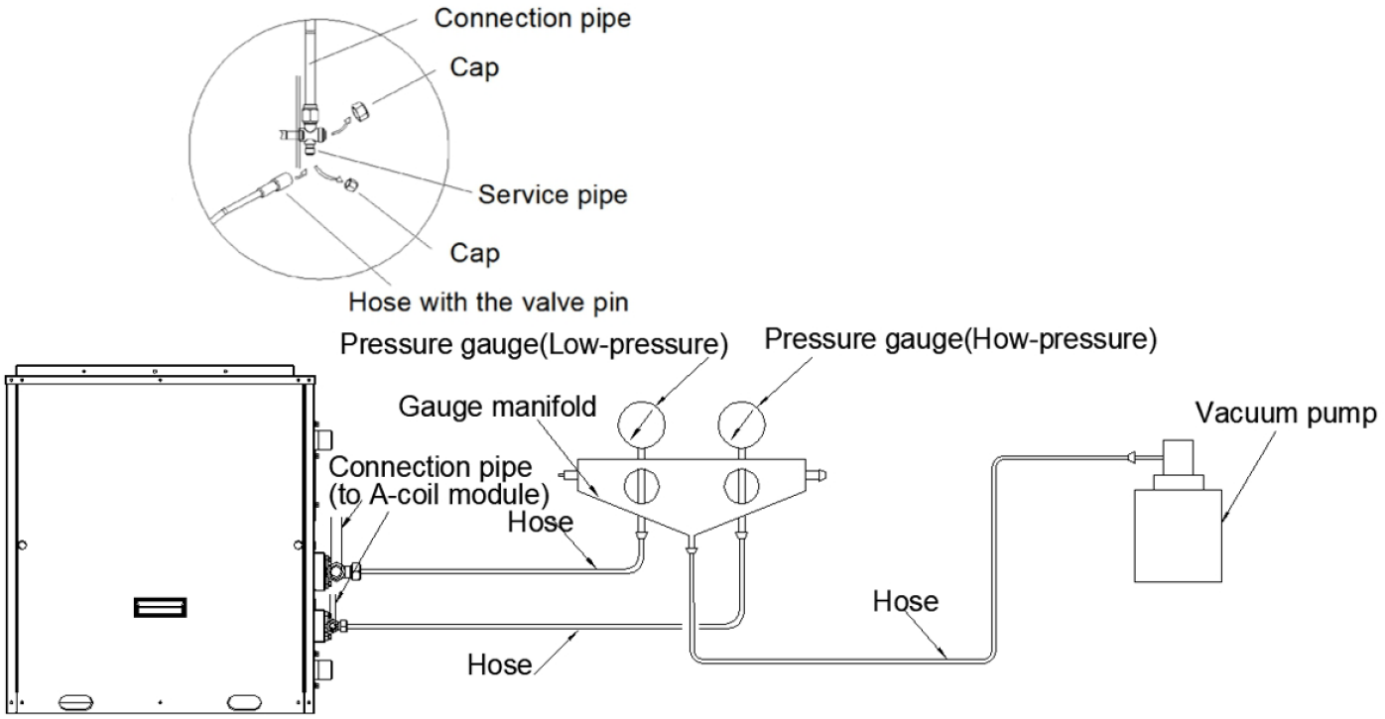
Model	Time (min.)
GCSHPM060IN GCSCAM060GN	**35**

6. Verify if the pressure gauge at the low pressure side of the manifold valve assembly reads -0.1MPa, if not, it indicates there is a leak somewhere. Then, close the switch fully before stopping the vacuum pump.

7. Wait for 10 minutes to see if the system pressure remains unchanged. During this time, the reading of the pressure gauge at the low pressure side cannot be larger than 0.005MPa.

8. Open the liquid valve slightly and let some refrigerant go to the connection pipe to balance the pressure inside and outside of the connection pipe, so that air will not come into the connection pipe when removing the hose. Note that the gas and liquid valve can be opened fully only after the manifold valve assembly is removed.

9. Place the caps back on the liquid valve, gas valve, and also the service port.



NOTICE

For large-size units, there are maintenance ports for the liquid valve and gas valve. During evacuation, you may connect the two hoses of the branch valve assembly to the maintenance ports to speed up the evacuation.

4.5 Electrical Installation

Requirement and Notice on Electrical Installation

⚠ WARNING

The electrical installation for the geothermal unit should observe the following requirements:

1. The electrical installation must be conducted by professionals in compliance with local laws and regulations and the instructions in this manual. Never extend the power cords. The electric circuit must be equipped with a circuit breaker and air switch both with sufficient capacity.

2. The unit's operating power must be within the nominal range stated in the instruction manual. Use a specialized power circuit for the geothermal unit. Do not draw power from another power circuit.

3. The geothermal unit circuit should be at least 1.5m away from any inflammable surface.

4. The external power cords, the thermostat wires and thermostat must be effectively secured.

5. The external power cords, the thermostat wires and thermostat can't directly contact any hot objects. For example: chimney pipes, warm gas pipes, or other hot objects.

6. The external power cords, the thermostat wires and thermostat must not be compressed together. Never pull, stretch or bend the wires.

7. The external power cords, the thermostat wires, and thermostat must not collide with any metal beam or edge on the ceiling, or touch any metal burrs or sharp metal edges.

8. Connect wires correspondingly by referring to the circuit diagram labeled on the unit or electric box. Screws must be tightened. Slipped screws must be replaced by specialized flat-head screws.

9. Only use the power cables that are delivered with the geothermal unit. Do not change the power cables unless necessary. Do not change the length and terminals of the power cables. If you want to change the power cables, please contact a licensed electrician for assistance.

10. Wiring terminals should be connected firmly to the terminal board. Loose connection is prohibited.

11. After the electrical installation is finished, use wire clamps to secure the power cords and the thermostat wires. Make sure the wires are not clamped too tight.

12. The wire gauge of the power cord should be large enough. Damaged power cords or other wires must be replaced by specialized wires. Wiring work must be done according to national wiring rules and regulations.

Electrical Parameters & Leakage Switch

Model	Power Supply	Minimum Circuit Ampacity (A)	Maximum Overcurrent Protection (A)	Air Break Switch (A)	Minimum Section Area of Earth Wire (mm2)	Minimum Section Area of Power Wire (mm2)
GCSHPM048IN GCSHPM060IN	208/230V-1Ph-60Hz	26	35	40	AWG10	2xAWG10
GCSCAM048GN GCSCAM060GN		5	6	15	AWG14	2xAWG14

NOTICE

1. Leakage Switch is necessary for additional installation. If circuit breakers with leakage protection are in use, action response time must be less than 0.1 second. Leakage circuit must be 30mA.

2. Fuse is located on the main board.

3. Install a circuit breaker at every power terminal near the units (A-Coil Module and thermostat) with at least .12 inches (3mm) contact gap. The units must be able to be plugged or unplugged.

4. Circuit breaker and power cord specifications listed in the Electrical Parameters & Leakage Switch table above are determined based on the maximum power input of the units.

5. Specifications of circuit breaker are based on a working condition where the working temperature is 104°F (40°C). If working condition changes, please adjust the specifications according to national standards.

6. Adopt 5 pieces of AWG15 power cords are required to be the communication cords between the A-Coil and thermostat. The maximum length is 30m. Please select a proper length according to local conditions. Communication cords must not be twisted together.

7. The wire gauge of the communication cord should not be less than AWG15. It's recommended to use AWG15 power cords as the communication cords.

High and Low Voltage Wires Connection

The wiring involved in the unit is divided into two types: High Voltage wires and Low Voltage wires.

Among them, the blower power supply wire, the A-coil Module power supply wire and the Compressor Module power supply wire are High Voltage wires.

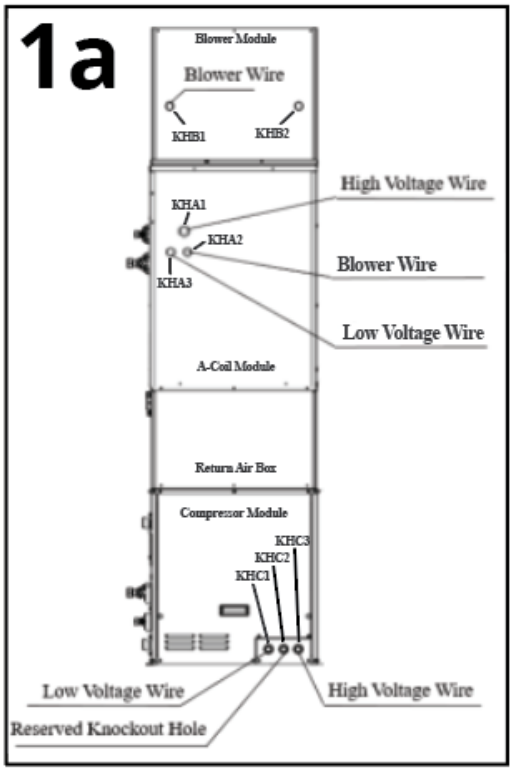
The communication wire, the fan control wire, and thermostat wire belong to Low Voltage wires.

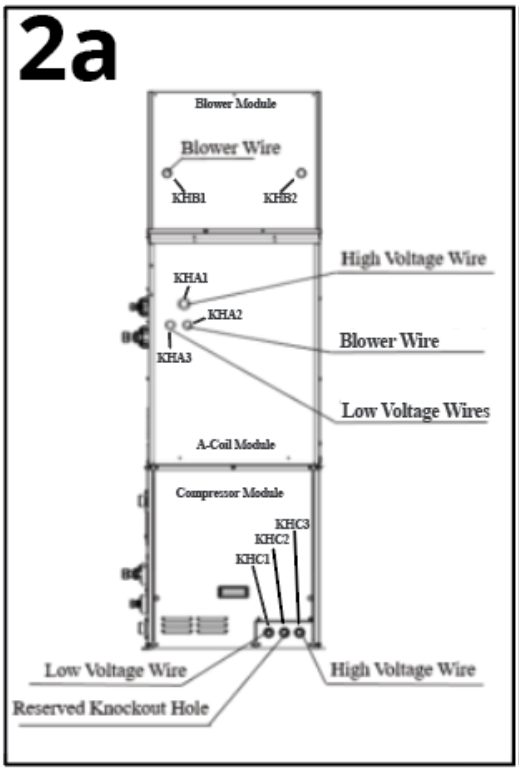
Wiring needs to distinguish High and Low Voltage wires for connection, corresponding to the knock out hole through as shown in the figure on the following page.

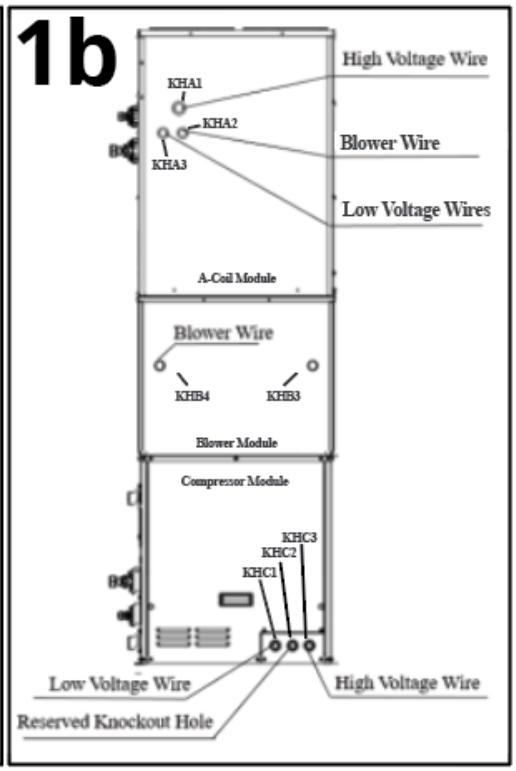
All the high voltage power cords, thermostat wires, and communication wires must be installed through power conduit.

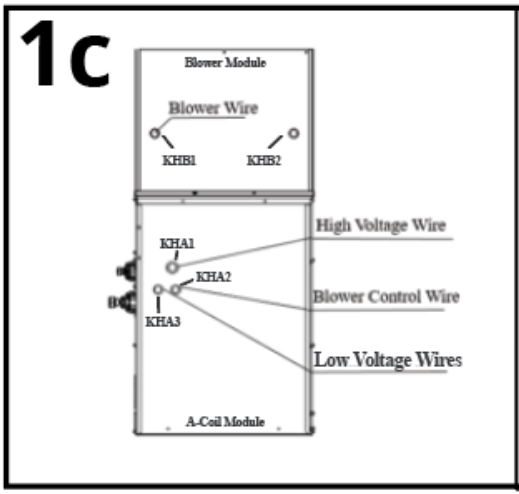
A-Coil Module Wiring	
High Voltage Wires	**Low Voltage Wires**
• Blower Power Supply Wire • A-Coil Module Power Supply Wire	• Thermostat Wire • Communication Wire • Blower Control Wire

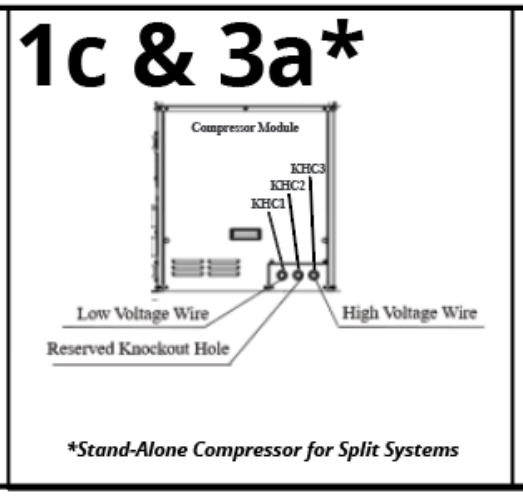
Compressor Module Wiring	
High Voltage Wires	**Low Voltage Wires**
• Compressor Module Power Supply Wire	• Thermostat Wire • Communication Wire

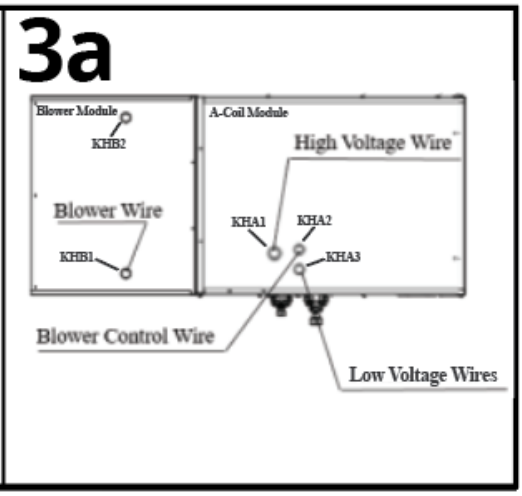












1a. Horizontal Return Air and Vertical Upflow (Integral Unit)

2a. Top Return Air and Vertical Downflow (Integral Unit)

1b. Bottom Return Air and Vertical Upflow (Integral Unit)

1c. Bottom Return Air and Vertical Upflow (Split Unit)

3a. Horizontal Return Air and Horizontal Supply Air (Split Unit) **Note: This configuration can include the optional Return Air Box if desired with appropriate modifications by the installer.**

Connection of Power Cords and Thermostat Wires

1. For Solid Wires (As Shown in Figure 4.5a Below):

1. Use wire cutters to cut off the wire end, then peel away about 25mm of the insulation layer.
2. Use a screwdriver to unscrew the terminal screw on the terminal board.
3. Use needle nose pliers to bend the solid wire into a ring that fits the terminal screw.
4. Form a proper ring then put it on the terminal board. Use a screwdriver to tighten the terminal screw.

2. For Strand Wires (As Shown in Figure 4.5a Below):

1. Use wire cutters to cut off the wire end then peel away about 10mm of the insulation layer.
2. Use a screwdriver to unscrew the terminal screw on the terminal board.
3. Use a round terminal fastener or clamp to fix the round terminal firmly on the peeled wire end.
4. Locate the round terminal conduit. Use a screwdriver to replace it and tighten the terminal screw.

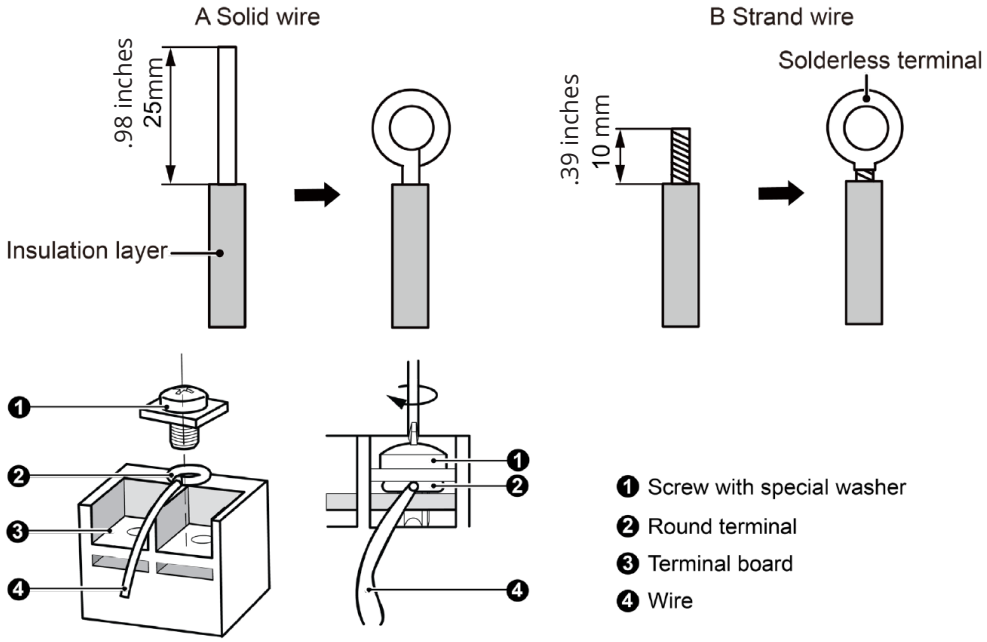


Figure 4.5a

3. How to Connect the Thermostat Wires and Power Cords

Lead the thermostat wires and power cords through the insulation tube. Then, attach the wires with wire clamps. (As shown in Figure 4.5b below.)

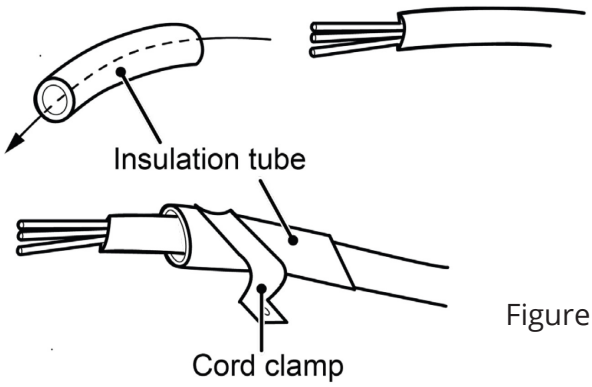


Figure 4.5b

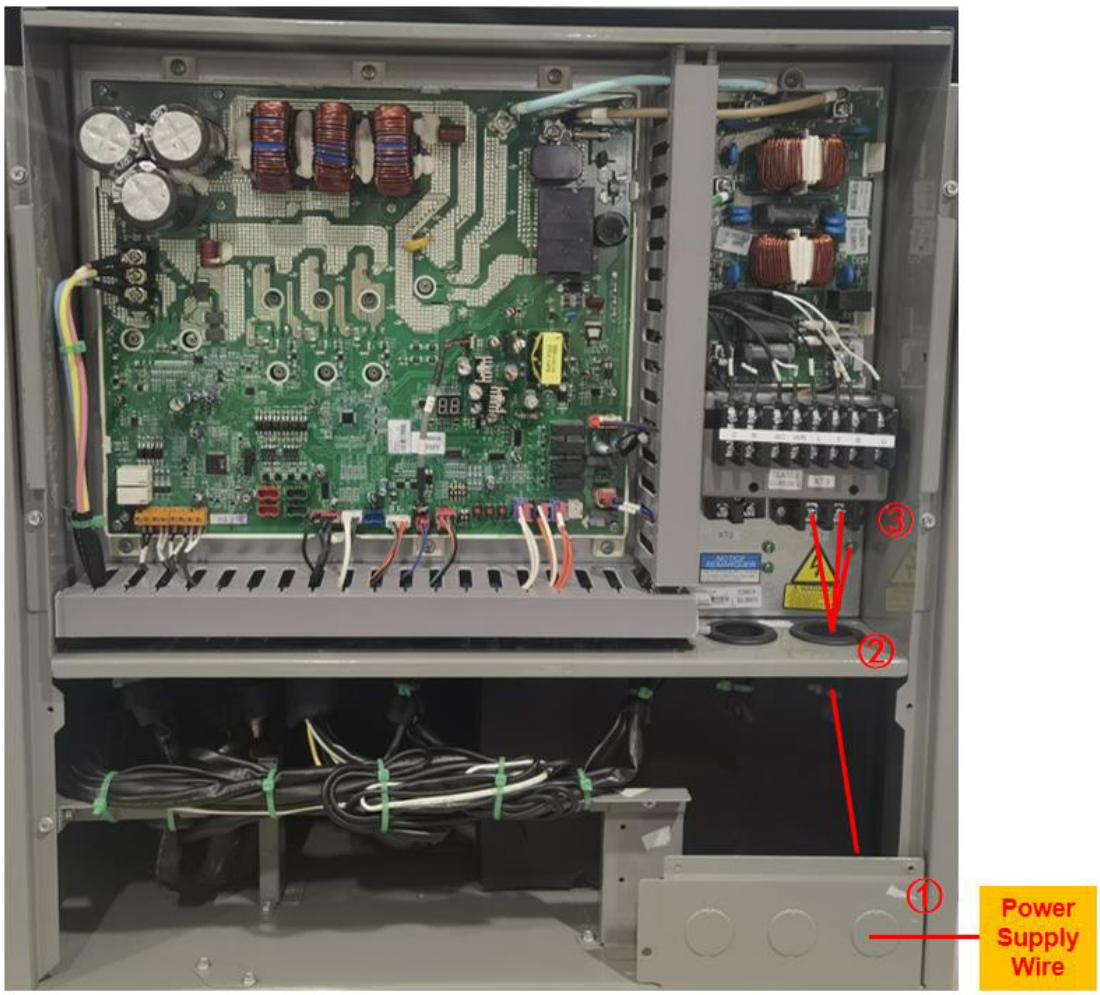
WARNING

1. Before working, check whether the geothermal unit and thermostat are powered on.
2. Match the terminal numbers and wire colors with the colors indicated in the A-Coil module.
3. A wrong wire connection may burn the electrical components.
4. Connect the wires firmly to the wiring box. Incomplete installation may lead to fire hazard.
5. Use wire clamps to secure the external covers of connecting wires. (Insulators must be clamped securely; otherwise, electric leakage may occur.)
6. Ground wire should be connected.

Power Supply Wires

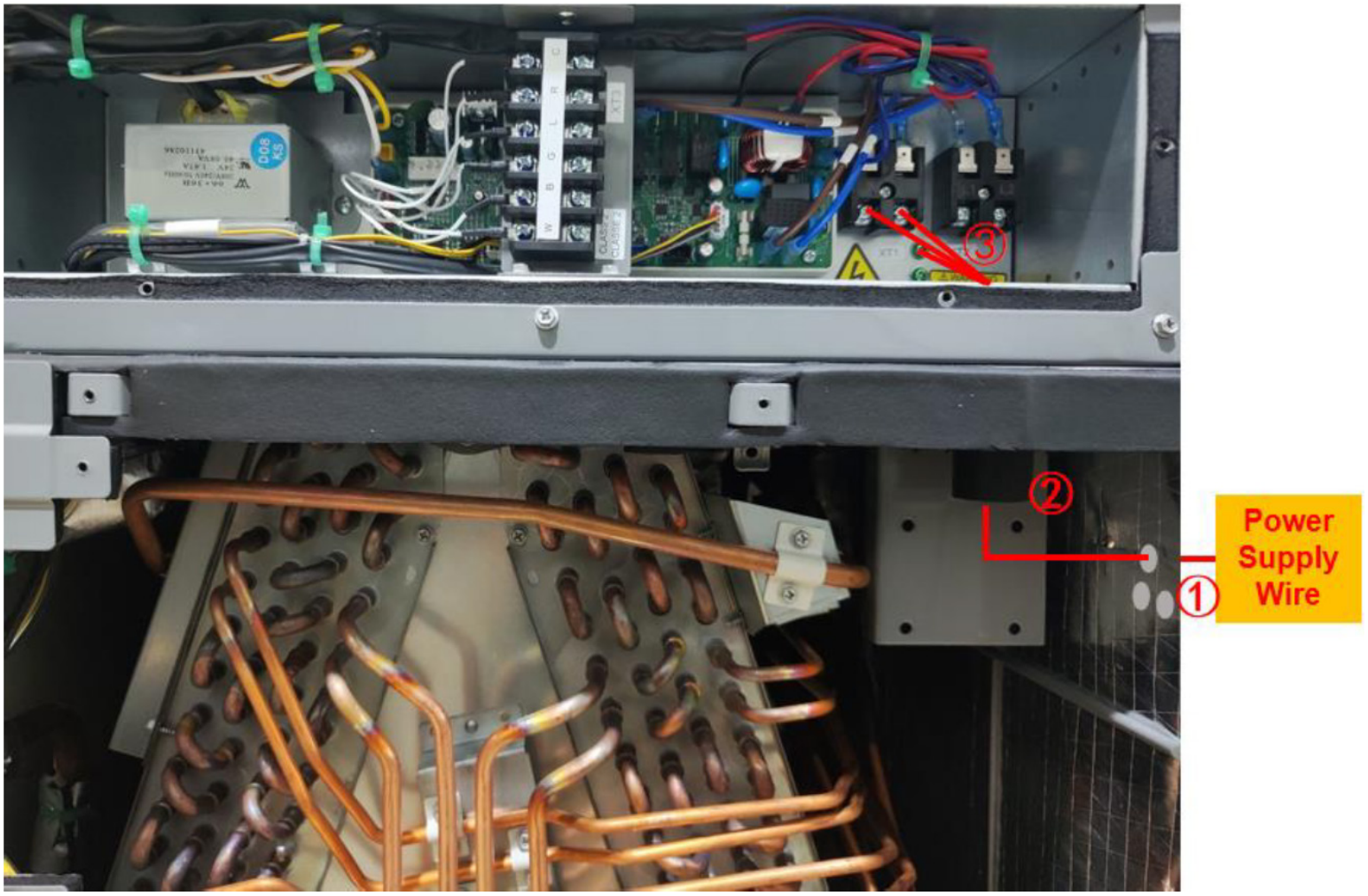
Compressor Module:

1. Remove Knockout Hole KHC3 from Panel C2. (#1 on Figure below.)
2. Thread Power Supply Wires through Knockout Hole KHC3. (#1 on Figure below.)
3. Pass wires through rubber ring on right side under electrical box. (#2 on Figure below.)
4. Connect live wire to the L1 terminal on the terminal block XT1. (#3 on Figure below.)
5. Connect neutral wire to the L2 terminal on the terminal block XT1. (#3 on Figure below.)
6. Connect the ground wire to the grounding terminal. (#3 on Figure below.)



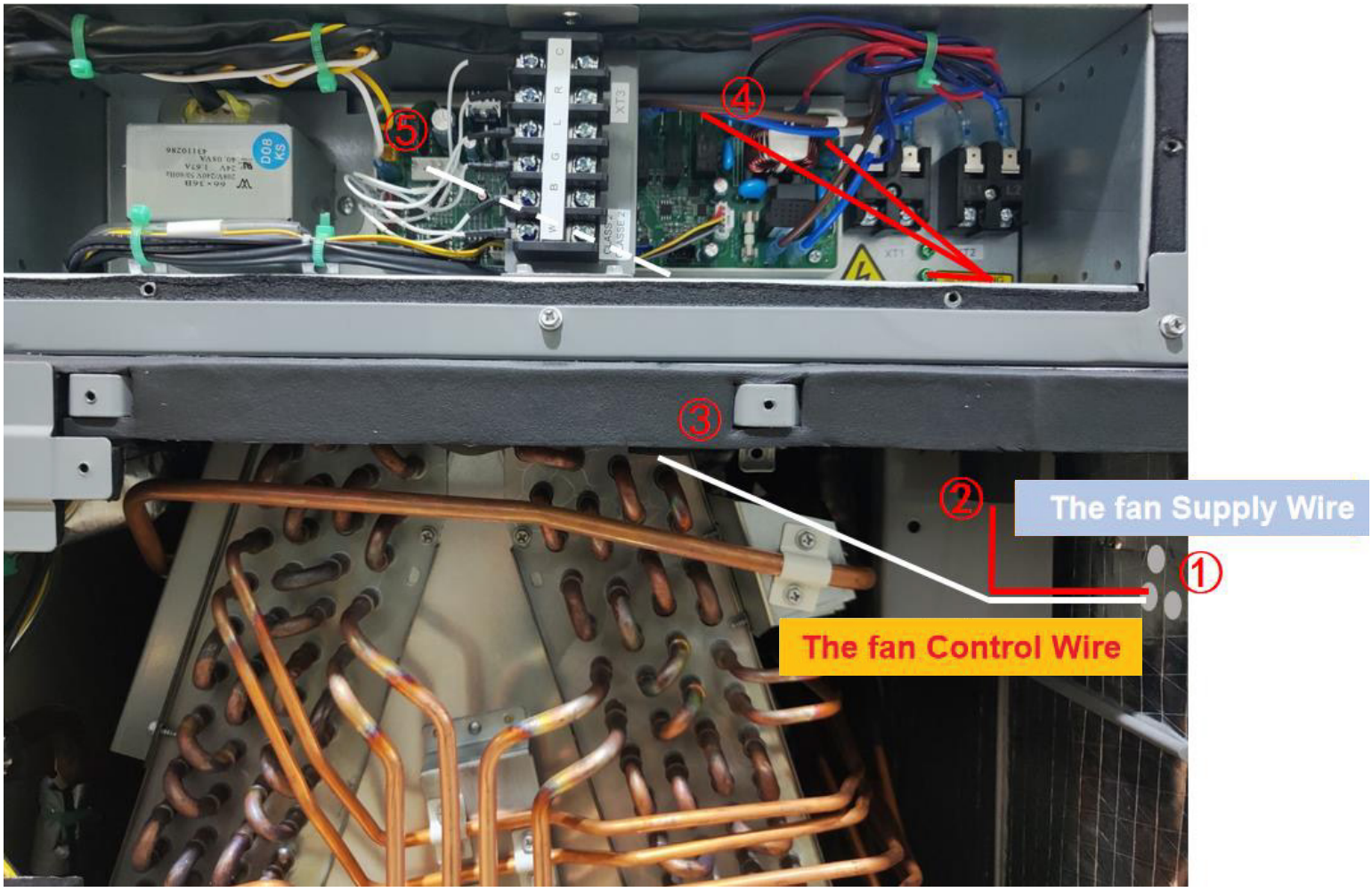
A-Coil Module:

1. Remove Knockout Hole KHA1 from Panel A2.
2. Thread the Power Supply Wires through the Knockout Hole KHA1.
3. Pass wires through the rubber ring on the right side under the electrical box.
4. Connect the live wire to the L1 terminal on the terminal block XT1.
5. Connect the neutral wire to the L2 terminal on the terminal block XT1.
6. Connect the ground wire to the grounding terminal.



Blower Control and Power Wires Connection

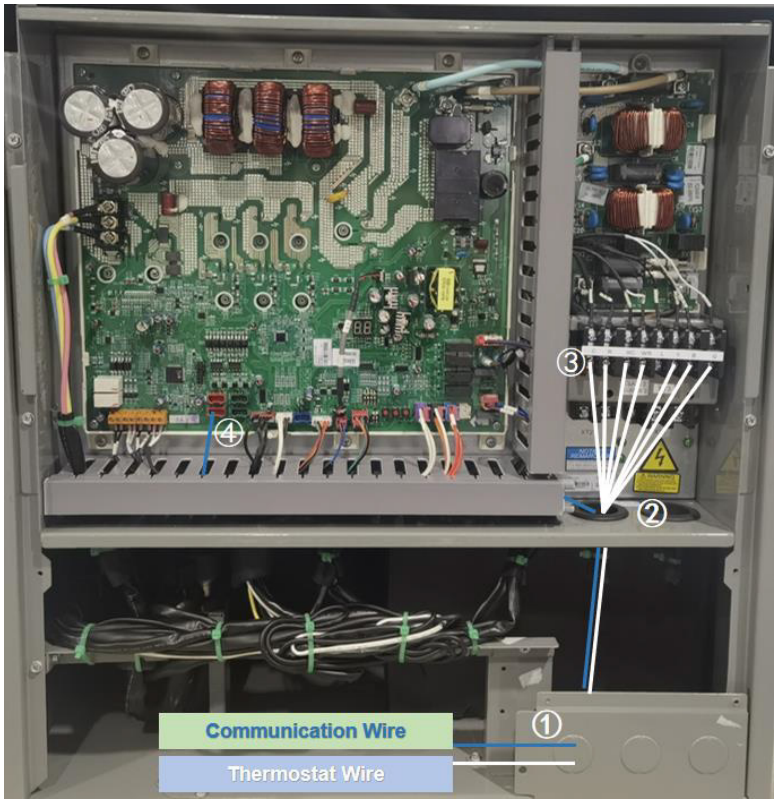
1. After the unit splicing installation is completed, thread the combined blower control wire and power wire that have protruded from the Knockout Hole KHA2 on the panel A2 of the A-Coil Module, as shown below.
2. Pass the fan power wire through the rubber ring on the right side under the Electrical Box.
3. Pass the fan control wire through the rubber ring on the left side under the Electrical Box.
4. Insert the combined power cord into the corresponding terminals according to the wiring diagram.
5. Insert the fan control wire into the corresponding terminals according to the wiring diagram.



Thermostat Wires & Communication Wires Connection

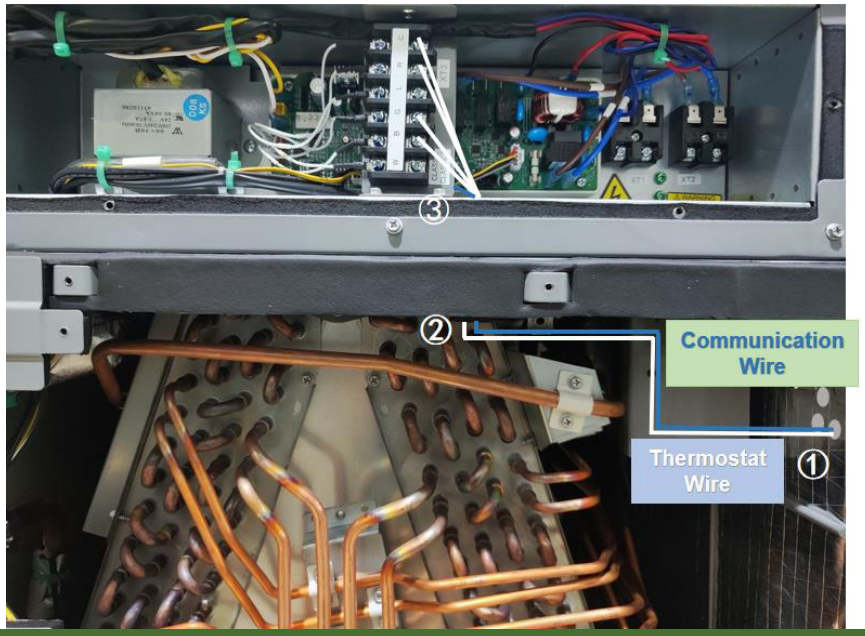
The Compressor Module:

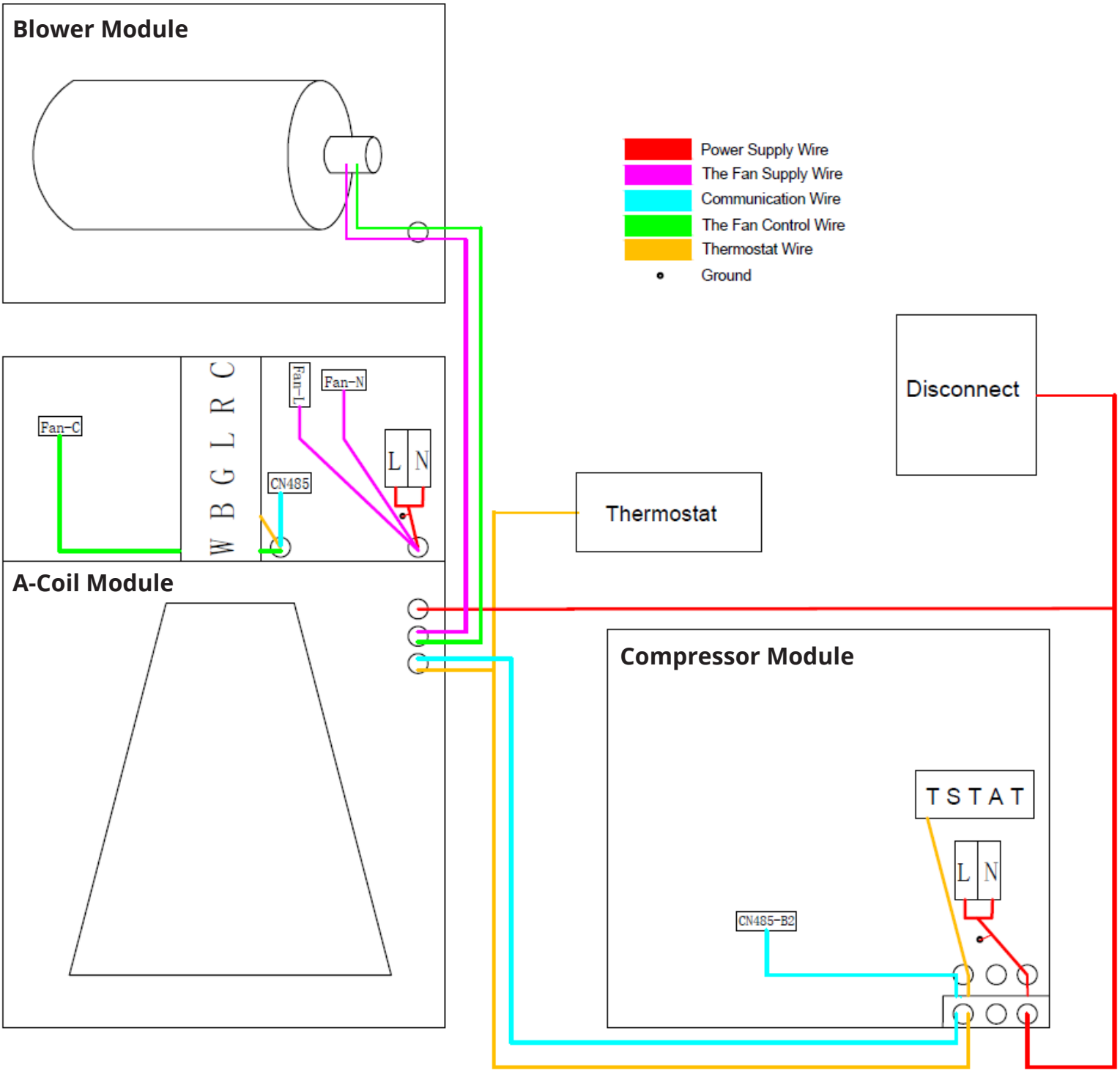
1. Remove Knockout Hole KHC1 on Panel C2.
2. Thread the thermostat wires through the Knockout Hole KHC1.
3. Pass wires through the rubber ring on the left side under the Electrical Box.
4. Connect the thermostat wires to the terminal block XT3 and the communication wire to the mainboard terminal according to the wiring diagram.



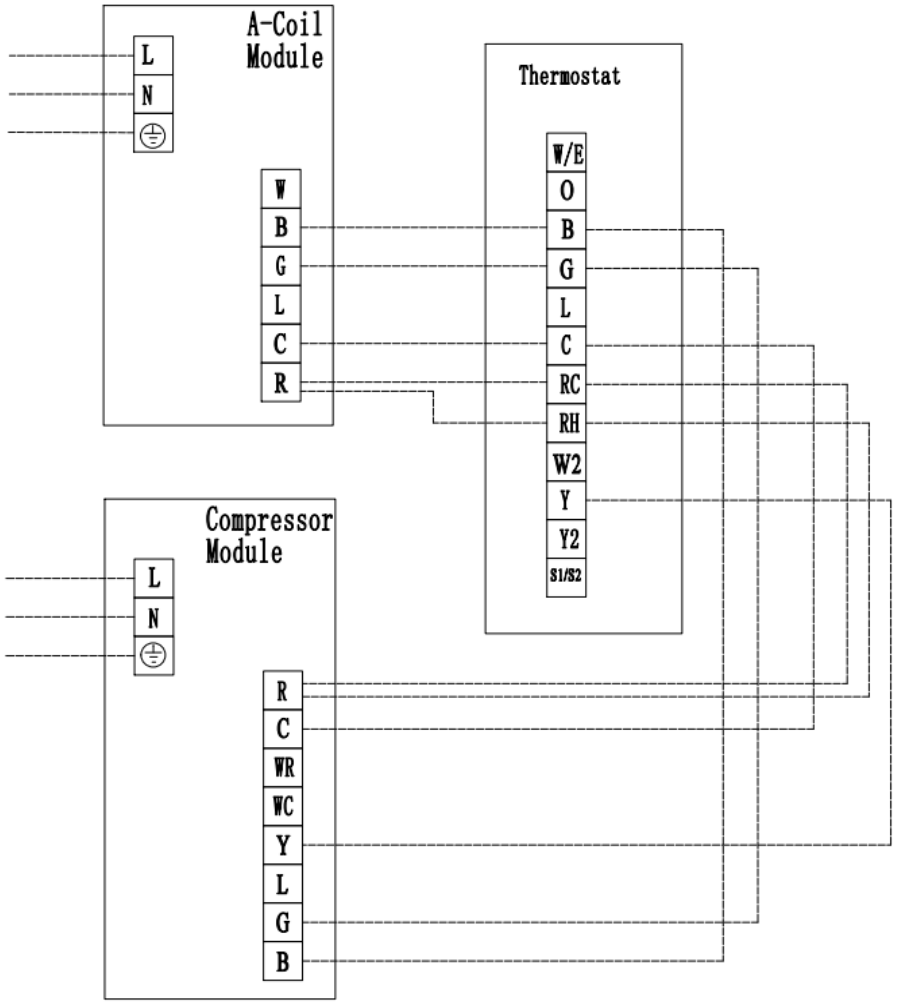
The A-Coil Module:

1. Remove the Knockout Hole KHA3 on Panel A2.
2. Thread the thermostat wires and communication wire through the Knockout Hole KHA3.
3. Pass wires through the rubber ring on the left side under the Electrical Box.
4. Connect the thermostat wires to the terminal block XT3 and communication wire to the motherboard terminal according to the wiring diagram on page 55.




Blower Module
Power Supply Wire
The Fan Supply Wire
Communication Wire
The Fan Control Wire
Thermostat Wire
Ground
Disconnect
Fan-C
W B G L R C
Fan-L
Fan-N
CN485
L N
Thermostat
A-Coil Module
Compressor Module
TSTAT
L N
CN485-B2

Thermostat Wiring Diagram:



Note:

R means 24V AC Power Supply

C means 24V Common

WR means 24V AC Power Supply for Water Valve

WC means 24V Common for Water Valve

Y means Compressor Control Signal

B which is energized under the Heating Mode means 4-way Valve Control Signal

W (Reserved)

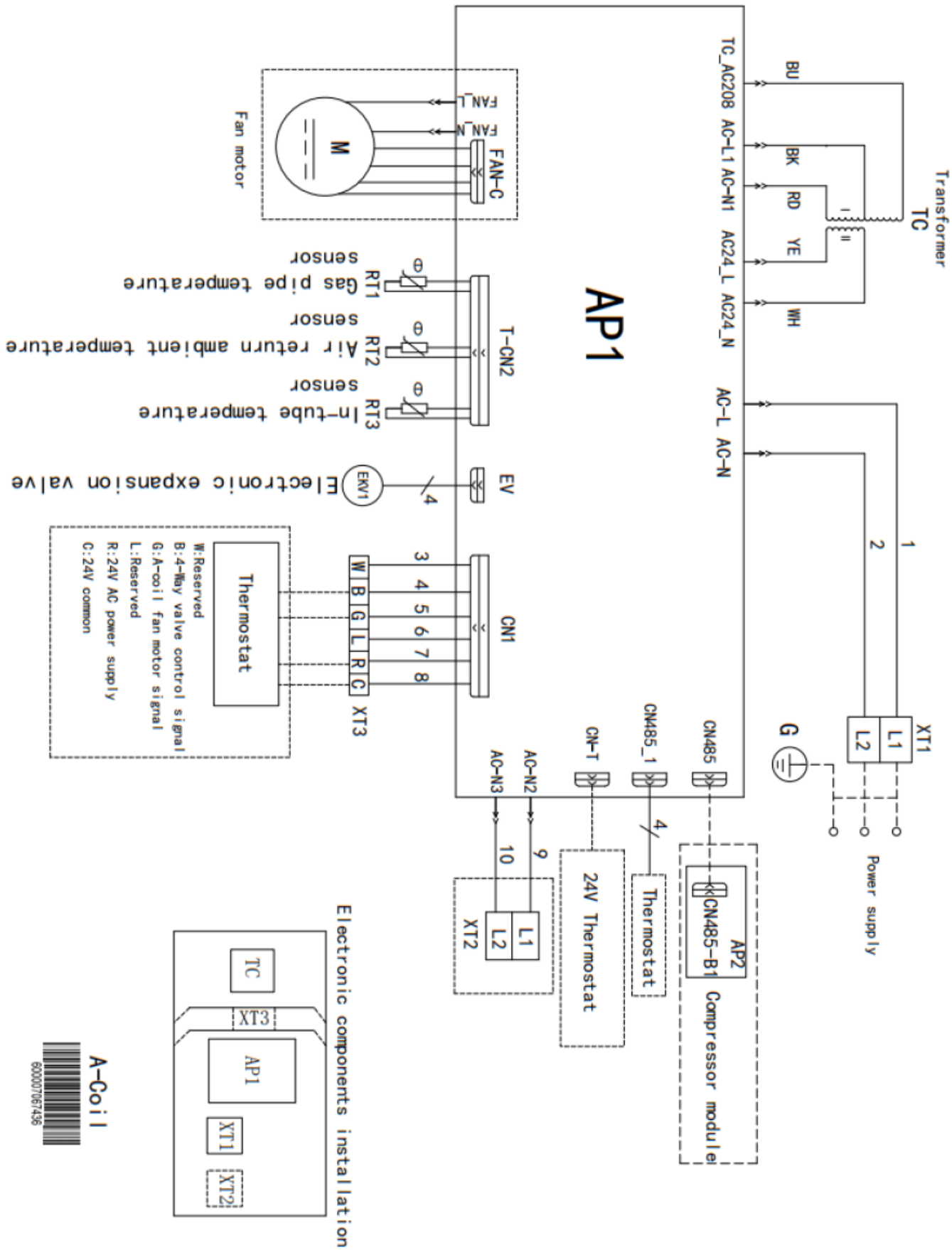
L (Reserved)

G means Fan Signal for the Blower Module

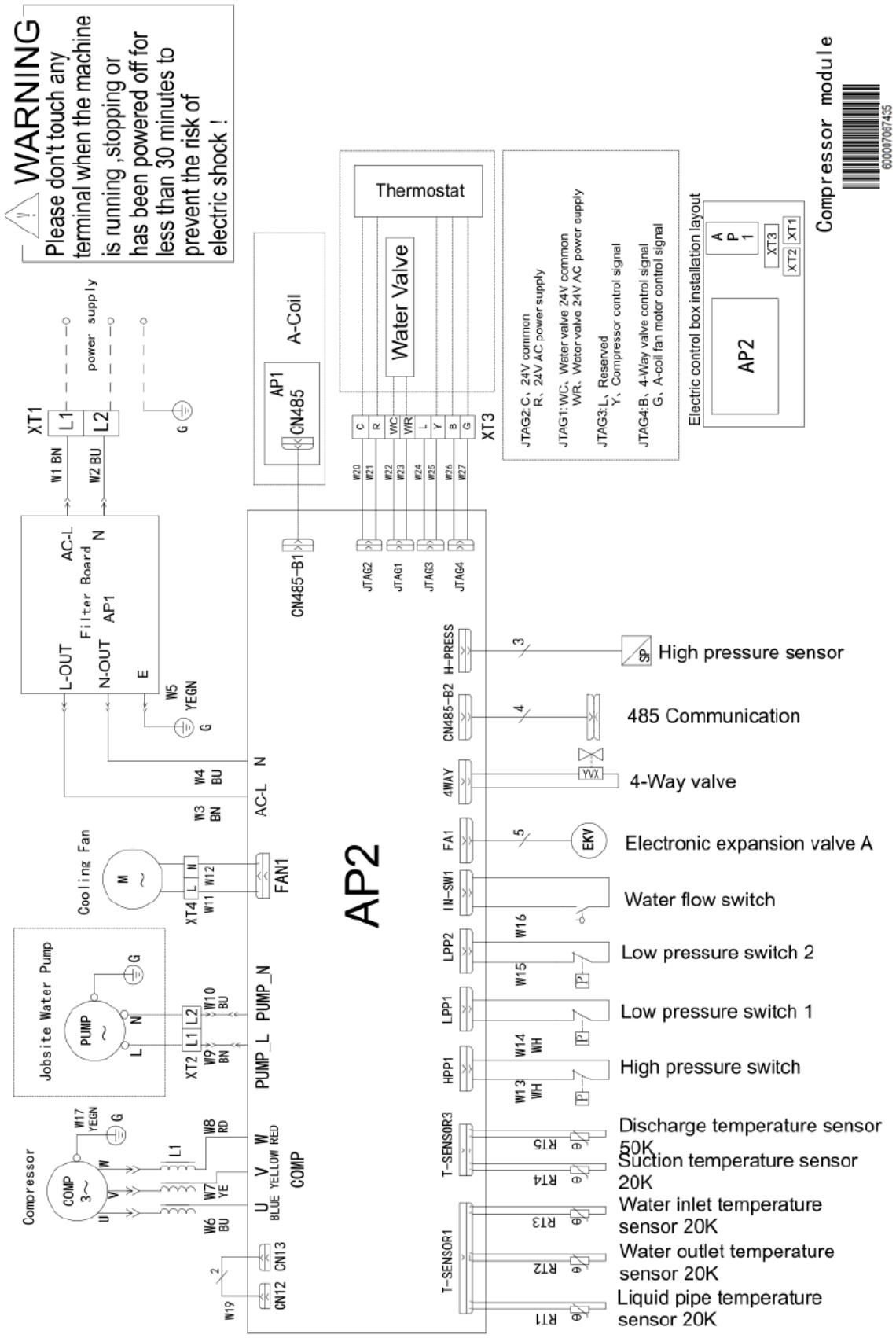
WARNING

1. High and low voltage wires should be led through different rubber rings of the electric box cover.
2. Do not bundle up the thermostat wires or lay them side by side, otherwise errors will occur.
3. High and low voltage wires should be secured separately. Secure the former ones with big clamps and the latter ones with small clamps.
4. Use screws to tighten up the thermostat wires and power cords of unit on the terminal board. Wrong connection may lead to fire hazard.
5. If the thermostat wires of the unit and the power cords are not correctly connected, the geothermal unit may be damaged.
6. Ground the unit through connecting the ground wire.
7. The units should comply with applicable local and national rules and regulations on power consumption.
8. When connecting the power cords, make sure the phase sequence of the power supply matches with the corresponding terminals, otherwise the compressor will get reversed and operate abnormally.

A-Coil Wiring Diagram:



Compressor Module Wiring Diagram:



Dip Switch Settings

Set the fan speed through the four dip switches of the A-coil Module main control board. The higher level, the higher speed of the fan. If the air outlet direction of the unit changes, you need to change the air outlet direction setting of the unit by dialing code SA2. SA3 indicates the combined status of the unit.

Operation Instruction is below.

Dip switch settings must be completed before powering on the unit.

During installation and debugging, ensure the temperature controller has set the fan delay and shutdown time. If the thermostat has been set, the actual delay and shutdown time of the fan depends on the thermostat setting time and the fan delay time of the A-Coil Module.

DIP Switch	Fan Speed Level				
SA1	Level 1	1	1	0	0
	Level 2	1	0	1	1
	Level 3	1	0	1	0
	Level 4	1	0	0	1
	Level 5	1	0	0	0
DIP Switch	**Air Flow Directions**				
SA2	Vertical Upflow/Horizontal Return Air	0	0	0	1
	Vertical Downflow	0	0	1	1

Module		SA1		SA2			
GCSHPM024036IN GCSHPM048060IN	Ground Water Open Loop	0	0	0	0	0	0
	Ground Loop Closed Loop	0	0	1	0	0	0

Note: 0 means dip switch to "on", 1 means dip switch to number.

Post-Installation

5.1 Post-Install Item Review

Items to be Checked	Problems that might occur from Improper Installation	Check
Check if each part of the unit has been installed correctly.	The unit might fall, vibrate, or emit noise.	
Check if the unit has passed through leakage test.	It may cause deficiency of cooling or heating capacity.	
Check if the unit has been insulated properly.	It may cause condensation and dripping water.	
Check if the water can be drained fluently.	It may cause condensation and dripping water.	
Check if the power voltage corresponds with that on the nameplate.	Malfunction might occur and parts might be burned.	
Check if the wiring and pipeline has been installed correctly.	Malfunction might happen and parts might be burned.	
Check if the unit has been earthed soundly.	Hazard of electricity leakage.	
Check if the wiring conforms to the wire gauge.	Malfunction might happen and parts might be burned.	
Check if there is obstruction blocking the air inlet/outlet.	It may cause deficiency of cooling or heating capacity.	
Check if the piping connection and valves have been set properly.	It may cause unit abnormality and damage to the unit.	
Check for cracks among the air return and supply pipe.	It may cause air leakage, vibration, and noise.	
Check if the panel is mounted firmly.	It may cause air leakage, vibration, and condensation.	

5.2 Fan Performance Data

External static pressure (ESP) should stay within the minimum and maximum limits shown in the table below in order to ensure proper operation of both cooling and heating. Inappropriate speed and ESP may cause condensate water to be blown into the ductwork.

Upflow & Horizontal Application:

Model	GCSHPM060IN / GCSCAM060GN								
Level	Static Pressure (Inches W.C)								
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Speed 1 (CFM)	**1241**	1139							
Speed 2 (CFM)	**1447**	**1298**	1162						
Speed 3 (CFM)	1659	1560	**1349**	**1252**	1169				
Speed 4 (CFM)	1842	1787	1510	1531	**1449**	**1251**	1198	976	
Speed 5 (CFM)	1948	1862	1578	1656	1538	1410	**1308**	**1151**	987

Downflow Application:

Model	GCSHPM060IN / GCSCAM060GN								
Level	Static Pressure (Inches W.C)								
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Speed 1 (CFM)	**995**	**889**	**756**	**576**	**419**				
Speed 2 (CFM)	**1142**	**1052**	**958**	**835**	**683**	**510**			
Speed 3 (CFM)	**1325**	**1232**	**1151**	**1021**	**939**	**821**	**663**	**476**	
Speed 4 (CFM)	**1477**	**1399**	**1326**	**1240**	**1146**	**1042**	**918**		
Speed 5 (CFM)	**1640**	**1569**	**1500**	**1433**	**1355**	**1266**	**1169**	**1063**	**953**

Note: The ESP and the speed selections shown with BOLD font are recommended for upflow and horizontal application. For downflow application, it is recommended to keep the speed within 1300 CFM and 1500 CFM.

5.3 Trial Run

Prepare for Trial Run

a. Never power on the unit until all of the installation work has been done.

b. Ensure the control circuit and wiring has been connected correctly and soundly. Valves on the gas and liquid line should be completely open.

c. All scattered objects should be removed from the area.

d. Check if the unit appearance and piping system has been damaged during transportation or handling.

e. Check if the terminals are tightened and the phases are correct.

Trial Run

a. Trial run can be operated by professional personnel only after above items have been checked.

b. Power on the unit and press ON/OFF button to activate.

c. After compressor starts up, immediately stop the unit if an abnormal sound is emitted.

d. Perform trial runs under several modes and check if the unit operates normally.

5.4 Air Filter Installation

For the unit with the return air box, the air filter installed in the return air box can be selected by the user, and the corresponding installed air filter size of the unit is 22-1/4”×22-1/4”×1-3/16”(565mm× 565mm×30mm).

Do not power on the system if the filter is not installed on the inlet or return side of the system. If the pipe size is too small, the filter size is insufficient, or the filter is dirty, it can lead to insufficient airflow and the high-pressure or low-pressure control device can be accidentally tripped. Therefore, the filter should be kept clean, and the pipe and filter size must be guided by the size requirements in this manual.

The installation steps are as follows:

1. Unscrew the two screws on the return air box Panel R1 to attach the access door .
2. Rotate the access door open, push the air filter in through the installation port, and after completely placing it, close the access door and retighten the fixing screw. Complete the installation.

For units without the return air box, the filter location will need to be installed at the air return location in the duct work.

6.1 Troubleshooting

If the geothermal unit fails to function normally, check the following items before performing maintenance:

Problem	Cause	Corrective Measure
The geothermal unit can’t run.	When the unit is turned off and immediately turned on, the compressor will delay running for 3 minutes to protect the compressor and avoid system overload.	Wait for a while.
	Wire connection is wrong.	Connect wires according to the wiring diagram.
	Fuse or circuit breaker is broken.	Replace the fuse or switch on the circuit breaker.
	Power failure has occurred.	Restart the unit after power is restored.
	Power plug is loose.	Re-insert the power plug securely.
Bad cooling or heating effect.	Air inlet and outlet of the units have been blocked.	Clear the obstacles and keep the room for the units well-ventilated.
	The unit is set to an improper temperature.	Reset a proper temperature.
	Fan speed is too low.	Reset a proper fan speed.
	Air flow direction is not correct.	Change the direction of air louvers.
	Doors or windows are open.	Close doors and windows.
	Unit is exposed under direct sunshine.	Put curtains or louvers in front of the windows.
	There are too many heat sources in the room.	Remove unnecessary heat sources.
	Filter is blocked or dirty.	Request a professional to clean the filter.

The following situations are not operation failures:

Problem	Time of Occurrence	Cause
Mist is emitted from the unit.	During operation	If the unit is running under high humidity, the wet air in the room will quickly cool down.
The unit generates noise.	There is a purring noise when the unit is turned on.	When the system first starts, the refrigerant is not stable. The purr sound lowers after about 30 seconds.
	About 40 seconds after heating mode is enabled.	This is the sound of the 4-way valve switching direction. The sound will disappear after the valve changes direction.
	There is a hissing sound when the unit starts or stops and a slight hissing sound during and after operation.	This is the sound of gaseous refrigerant that stops flowing and the sound of the drainage system.
	There is a crunching sound during and after operation.	Because of temperature change, the front panel and other components may swell and cause an abraision sound.
	There is a hissing sound when the unit is turned on or suddenly stopped during operation or after defrosting.	Because refrigerant suddenly stops flowing or changes the flow direction.
Dust is emitted from the unit.	The unit starts operation after being unused for a long time.	Dust inside the unit emits together with the air.
The unit generates a smell.	During operation	Smells within the room such as from cigarettes comes out through the unit.

NOTICE

Check the above items and adopt the corresponding corrective measures. If the unit continues to function poorly, stop the unit immediately and contact MRCOOL® technical support, at (270) 366-0457.

6.2 Error Codes

⚠ WARNING

1. If there are abnormal occurrences (awful smell, etc.), stop the unit immediately and disconnect the power. Then, contact MRCOOL® technical support at (270) 366-0457. If the unit continues to run during these abnormal situations, it may become damaged and cause electric shock or fire hazard.
2. Do not attempt to repair the unit by yourself. Improper maintenance can cause electric shock or fire hazard. Contact MRCOOL® technical support at (270) 366-0457 and request repair by a professional technician.

If the LED display on the mainboard of the outdoor unit shows an error code, refer to the error code meaning in the following table.

Number	Error Code	Error
1	E1	High-pressure protection
2	E2	Anti-freeze protection
3	E3	Low-pressue protection
4	E4	High Discharge Temperature Protection
5	EC	Water Flow Switch Protection
6	C6	Dischare temperature sensor error
7	dc	Suction temperature sensor error
8	FB	Water inlet temperature sensor error
9	FM	Water outlet temperature sensor error
10	A7	Liquid pipe temperature sensor error
11	E0	Fan Error
12	C2	In-Tube Temperature Sensor Error
13	Cb	Gas Pipe Temperature Sensor Error
14	C1	Return Air Temperature Sensor Error
15	E6	Communication error
16	LF	Power protection
17	E5	Current protection
18	H5	IPM protection
19	HC	PFC protection
20	P8	High Driver Module Temperature Protection
21	PL	DC Bus Under-Voltage Protection or DC Bus Voltage Drop Error
22	PH	DC Bus Over-Voltage Protection
23	PU	Charging Circuit Error
24	C9	Chip error
25	H3	High-pressure sensor error
26	LP	Capacity DIP Switch Setting Error

6.3 Daily Maintenance

Daily Water Quality Inspection

After the local source heat pump water system has been cleaned, drained and debugged for 10 days, the water should be drained for several minutes before sampling at the inlet and outlet drain valves of the unit. When the test results exceed the water quality requirements, the test should be repeated immediately and the testing frequency should be increased. When the water quality inspection results exceed the standard continuously, find out the reasons and take effective measures to prevent the system from operating abnormally. It is recommended to test the water system once every season.

Maintenance of Water System

Maintenance of the water system can be achieved by taking the following measures:

(1) Put insulation material on the water pipe connecting the equipment, because the temperature of well water is lower than the air temperature in summer, and putting insulation material on it can prevent water droplets from condensing on the surface of the pipe; In winter, the temperature of well water is higher than the air temperature, so the heat loss of water during transportation can be reduced by putting on thermal insulation materials.

(2) Control the flow rate.

(3) When using ground loop system, the airbag expansion tank can be considered to buffer the pressure fluctuation in the system and eliminate the water hammer.

(4) When the concentration of calcium and magnesium ions in water is too high, a water softening device can be added to the water inlet pipeline.

(5) When the water quality is hard or there are iron bacteria, the ground loop system can be selected.

(6) Wash the casing heat exchanger regularly.

(7) When there is a lot of fine sand in the water, Y type filter and quartz sand filter can be added to the water inlet pipeline to filter out impurities and fine sand in the water.

Cleaning of Water System

After long term use, the waterway system may scale, which may lead to poor heat exchange and heating effect, and even block the waterway system, causing damage to the unit. Therefore, it is necessary to clean the waterway system regularly, and it is recommended to clean it every 2 months. Organic acids or inorganic acids such as oxalic acid, acetic acid and formic acid can be used for cleaning, but nitric acid cannot be used because the sleeve heat exchanger of this product is made of nickel copper alloy. When using hydrochloric acid as cleaning solution, in order to avoid corrosion and shorten the service life of the heat exchanger, the concentration of hydrochloric acid should be limited to 3% ~ 5%, and 0.2% ~ 0.3% corrosion inhibitor should be added, plus a small storage tank and pump. Closed loop, detect the change of pH value, stop immediately when it approaches pH=8, and then replace it with clean water.

When cleaning, please refer to the following methods (taking oxalic acid as an example):

Backwashing: backwashing the heat exchanger before pickling, which can not only improve the effect of pickling, but also reduce the acid consumption of pickling (the inlet and outlet are reversed, so that the water flow direction is opposite to the original).

Pour the cleaning solution into the cleaning equipment then inject it into the heat exchanger.

Pickling: Pickling solution should be prepared according to the concentration of oxalic acid 5%, buffer 1.2% and surfactant 0.8%, and the pickling temperature should be controlled at 140°F (60°C) so the cleaning effect is better. Soak the heat exchanger filled with acid solution for 2 hours. And then continuously and dynamically circulate for 3-4 hours. In the meantime, alternate positive and negative cleaning every 0.5 hour. During the pickling process, samples should be taken frequently to test the pickling concentration. When the difference between two adjacent tests is less than 0.2%, the pickling reaction can be considered to be over.

Neutralization: After pickling, NaOH, Na3PO4 and softened water are prepared according to a certain proportion, and the heat exchanger is washed with alkali by dynamic circulation to achieve acid-base neutralization.

Passivation treatment: Exposure to air for 3-4h, or purging for 2 hours. Forming an oxidation passivation layer on the surface of the tube.

Water washing: After alkali washing, use clean softened water. Rinse the heat exchanger repeatedly for 0.5 hour, and thoroughly rinse the residue in the heat exchanger.

6.4 Unit Maintenance

WARNING
1. Only professionals are allowed to carry on daily maintenance.
2. Before contacting any wire, make sure power is disconnected.
3. Do not let any inflammable objects near the unit.
4. Do not use organic solvent to clean the unit.
5. If you need to replace a component, ask a professional to repair with a manufacturer-supplied component to ensure quality.
6. Improper operation may get the unit broken, hit by electric shock, or cause fire.
7. Do not allow the unit to become wet or it may lead to electric shock. Ensure that the unit is not rinsed with water during cleaning under any circumstance.

NOTICE
1. Before cleaning, make sure the unit is stopped. Cut the circuit breaker and remove the power socket. Otherwise, electric shock may occur.
2. Do not wash the unit with water, otherwise fire or electric shock may occur.
3. When cleaning the filter, be careful if located high above the ground.

Co-Axial Heat Exchanger Maintenance

Generally speaking, ground loop systems do not require maintenance of the co-axial heat exchanger. However, if the piping is known to contain high levels of dirt or debris, it is best to establish a regular maintenance schedule to regularly check the co-axial heat exchanger. If regular cleaning of the co-axial heat exchanger is required, use a standard coil cleaning procedure compatible with the heat exchanger material and copper water pipeline. Generally, the more water that flows through the unit, the less chance for scaling.

Drainage Pipe

Regularly check if the drainage pipe is blocked to ensure that the condensate is unobstructed. In areas where airborne bacteria may produce " slimy" substances in the drain pan, it may be necessary to chemically treat the drain pan with algaecide approximately every three months to minimize the problem. The condensate pan may also require regular cleaning to ensure indoor air quality. The condensate discharge port will collect lint and dirt, especially in the presence of water. The condensate drain may collect lint and dirt, especially when the filter is dirty. Check the drain twice a year to avoid possibility of plugging and eventual overflow.

A-Coil

The air coil must be cleaned to achieve maximum performance. Under normal operating conditions, check once a year and if dirty, clean with a brush or vacuum. Care must be taken not to damage the aluminum fins during cleaning. ATTENTION: The edges of the fins are sharp.

Refrigerant System

To maintain sealed circuit integrity, do not install service gauges unless unit operation appears abnormal. Verify that air and water flow rates are at proper levels before servicing the refrigerant circuit.

Before Beginning Use:

1. Check if the air inlet/outlet of the units are blocked.
2. Check if the ground connection is reliable.
3. Check if the air filter screen is properly installed.
4. Check if the installation of the unit is firm.

After Use:

1. Cut off the main power of the unit.
2. Clean the dust and sundries in the unit.
3. If the unit is rusty, coat the rusty location with paint to prevent expansion.

MRCOOL®

COMFORT MADE SIMPLE

GeoCool DC Inverter Geothermal Heat Pump

MODELS:

GCSHPM*IN (COMPRESSOR)

GCSBLM* (BLOWER)

GCSAM*GN (A-COIL)

GCSAR* (AIR RETURN)

The design and specifications of this product and/or manual are subject to change without prior notice.
Consult with the sales agency or manufacturer for details.