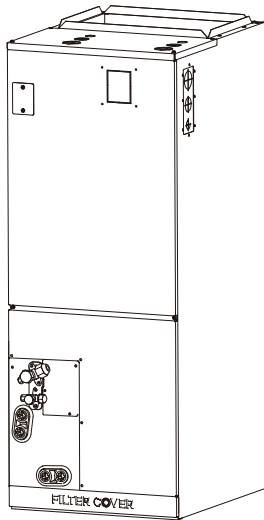


AIR-HANDLER AIR CONDITIONERS

Installation Manual



IMPORTANT NOTE:

Read this manual carefully before installing or operating your new air conditioning unit. Make sure to save this manual for future reference.

Owner's Manual & Installation Manual

SAFETY PRECAUTIONS	3
ACCESSORIES	7
INDOOR UNIT INSTALLATION	8
OUTDOOR UNIT INSTALLATION	30
WIRING	33
SPECIFICATION	48
AIR EVACUATION	51
TEST RUN	53

Read This Manual

Inside you'll find many helpful hints on how to use and maintain your air conditioner properly. Just a little preventive care on your part can save you a great deal of time and money over the life of your air conditioner. These instructions may not cover every possible condition of use, so common sense and attention to safety is required when installing, operating and maintaining this product.



WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer or equivalent service agency.

SAFETY PRECAUTIONS

To prevent injury to the user or other people and property damage, the instructions shown here must be followed. Incorrect operation due to ignoring of instructions may cause harm or damage. The level of risk is shown by the following indications.

WARNING

This symbol indicates the possibility of personnel injury or loss of life.

CAUTION

This symbol indicates the possibility of property damage or serious consequences.

NOTICE

This symbol addresses practices not related to physical injury.

WARNING FOR PRODUCT USE

- If an abnormal situation arises (like a burning smell), immediately turn off the unit and disconnect the power.
Call your dealer for instructions to avoid electric shock, fire or injury.
- **Do not** insert fingers, rods or other objects into the air inlet or outlet.
This may cause injury, since the fan may be rotating at high speeds.
- **Do not** use flammable sprays such as hair spray, lacquer or paint near the unit.
This may cause fire or combustion.
- **Do not** store gasoline or flammable substances near air conditioner.
Emitted gas may collect around the unit and cause explosion.
- **Do not** expose your body directly to cool air for a prolonged period of time.
- If the air conditioner is used together with burners or other heating devices, thoroughly ventilate the room to avoid oxygen deficiency.
- In certain environments, such as kitchens, server rooms, etc., the use of specially designed air-conditioning units is highly recommended.
- This unit is not designed for nonducted (freeblow) applications. Electric heat strips and or blower is easily accessible without duct and presents electrocution or injury hazard.

WARNING FOR CLEANING AND MAINTENANCE

- Turn off the device and disconnect the power before cleaning.
Failure to do so can cause electrical shock.
- **Do not** clean the air conditioner with excessive amounts of water.
- **Do not** clean the air conditioner with combustible cleaning agents.
Combustible cleaning agents can cause fire or deformation.

 **CAUTION**

- Turn off the air conditioner and disconnect the power if you are not going to use it for a long time.
- Make sure that water condensation can drain unhindered from the unit.
- **Do not** operate the air conditioner with wet hands. This may cause electric shock.
- **Do not** use device for any other purpose than its intended use.
- **Do not** climb onto or place objects on top of the outdoor unit.
- As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

 **ELECTRICAL WARNINGS**

- The product must be properly grounded at the time of installation, or electrical shock may occur.
- For all electrical work, follow all local and national wiring standards, regulations, and the Installation Manual. Connect cables tightly, and clamp them securely to prevent external forces from damaging the terminal. Improper electrical connections can overheat and cause fire, and may also cause shock. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
- All wiring must be properly arranged to ensure that the control board cover can close properly. If the control board cover is not closed properly, it can lead to corrosion and cause the connection points on the terminal to heat up, catch fire, or cause electrical shock.

TAKE NOTE OF FUSE SPECIFICATIONS

- The air conditioner's circuit board (PCB) may be designed with a fuse to provide overcurrent protection.
- The specifications of the fuse, if equipped, are printed on the circuit board, examples of such are T5A/250VAC and T10A/250VAC.



WARNINGS FOR PRODUCT INSTALLATION

1. Installation must be performed by an authorized dealer or specialist. Defective installation can cause water leakage, electrical shock, or fire.
2. Installation must be performed according to the installation instructions. Improper installation can cause water leakage, electrical shock, or fire. (In North America, installation must be performed in accordance with the requirement of NEC or CEC by authorized personnel only.)
3. Contact an authorized service provider for repair or maintenance of this unit. This appliance shall be installed in accordance with national wiring regulations.
4. Only use the included accessories, parts, and specified parts for installation. Using non-standard parts can cause water leakage, electrical shock, fire, and can cause the unit to fail.
5. Install the unit in a firm location that can support the unit's weight. If the chosen location cannot support the unit's weight, or the installation is not done properly, the unit may drop and cause serious injury and damage.
6. Install drainage piping according to the instructions in this manual. Improper drainage may cause water damage to your home and property.
7. **Do not** install the unit in a location that may be exposed to combustible gas leaks. If combustible gas accumulates around the unit, it may cause fire.
8. **Do not** turn on the power until all work has been completed.
9. When moving or relocating the air conditioner, consult experienced service provider for disconnection and reinstallation of the unit.
10. Excessive Weight Hazard - Use two or more people when moving and installing the unit. Failure to do so can result in back or other type of injury.

NOTE ABOUT FLUORINATED GASSES (NOT APPLICABLE TO THE UNIT USING R290 REFRIGERANT)

1. This air-conditioning unit contains fluorinated greenhouse gasses. For specific information on the type of gas and the amount, please refer to the relevant label on the unit itself or the "Owner's Manual - Product Fiche" in the packaging of the outdoor unit. (European Union products only).
2. Installation, service, maintenance and repair of this unit must be performed by a certified technician.
3. Product uninstallation and recycling must be performed by a certified technician.
4. When the unit is checked for leaks, proper record-keeping of all checks is strongly recommended.

NOTICE

The functional static pressure range of the air conditioner on site is 0-0.80 in-H₂O (0-200 Pa).

The data below represents the static pressures at full required air flow used for AHRI testing.

Model	18-24K	30-36K	48-60K
Pressure	0.10 in-H ₂ O (25 Pa)	0.15 in-H ₂ O (37 Pa)	0.20 in-H ₂ O (50 Pa)

NOTICE




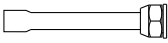




The maximum functional total external static pressure can not exceed 0.80 in WC or 200 Pa. The airflow reduces significantly beyond 0.80 in WC or 200 Pa.

System design should allow for the increased resistance of filters as they become dirty.

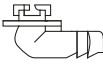

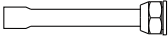
ACCESSORIES

The air conditioning system comes with the following accessories. Use all of the installation parts and accessories to install the air conditioner. Improper installation may result in water leakage, electrical shock and fire, or equipment failure.

Accessories (Packed with the indoor unit)

Name	Shape	Quantity
Owner's Manual & Installation Manual		1
Remote controller		1
Battery		2
Flare-to-braze adapter		2
Wired remote controller		1
Cable ties		2
Foam		4
Flare nut		2

Accessories (Packed with the outdoor unit)

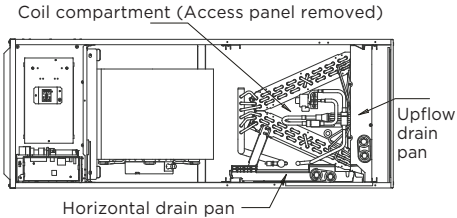
Name	Shape	Quantity
Drain fitting		1
Gasket		1
Flare-to-braze adapter		2

NOTICE

The remote control is only used to adjust the parameters.

INDOOR UNIT INSTALLATION

Indoor Unit Parts



Safety Precautions

! WARNING

- Securely install the indoor unit on a structure that can sustain its weight. If the structure is too weak, the unit may fall and cause personal injury, unit and property damage, or death.
- Do not** install the indoor unit in a moist environment as excessive moisture can short the unit and corrode the wiring.
- Danger of explosion. Keep flammable materials and vapors, such as gasoline, away from air handler. Place air handler so that heating elements are at least 18 inches (46 cm) above the floor for a garage installation. Failure to follow these instructions can result in death, explosion, or fire.

! CAUTION

- Install the indoor and outdoor units, cables and wires at least 1 m (3.2') from televisions or radios to prevent static or image distortion. Depending on the appliances, a 1 m (3.2') distance may not be sufficient.
- If the indoor unit is installed on metal, it must be electrically grounded.

! WARNING

Please apply sealant around the places where the wires, refrigerant pipes and condensate pipes enter the cabinet.

Indoor Unit Installation Instructions

The indoor unit should be installed in a location that meets the following requirements:

- Enough room for installation and maintenance.
- Enough room for the connecting refrigerant tubing and drainpipe.
- The structure that the equipment is suspended from must support the weight of the indoor unit.
- Room for properly sized return and supply duct must be maintained.

! CAUTION

Do not install the unit in the following locations:

- Areas with oil drilling or fracking.
- Areas with caustic gases in the air, such as near laundry vents.
- Areas with strong electromagnetic waves.
- Areas that store flammable materials or gas.
- Rooms with high humidity, such as bathrooms or laundry rooms.

! WARNING

Use duct tape and/or Permagum to seal closed space around the holes where the drain lines exit the cabinet. Warm air must not be allowed to enter through any gaps or holes in the cabinet.

⚠ WARNING

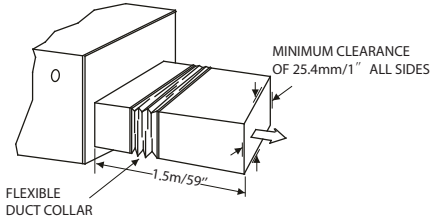
There must be an airtight seal between the bottom of the air handler and the return air plenum. Use fiberglass sealing strips, foil duct tape, caulking, or equivalent sealing method between the plenum and the air handler cabinet to ensure a tight seal. Return air must not be drawn from a room where this air handler or any gas-fueled appliance (i.e., water heater), or carbon monoxide-producing device (i.e., wood fireplace) is installed.

Recommended Distances Between the Indoor Unit

The distance between the mounted indoor unit should meet the specifications illustrated in the following diagram.

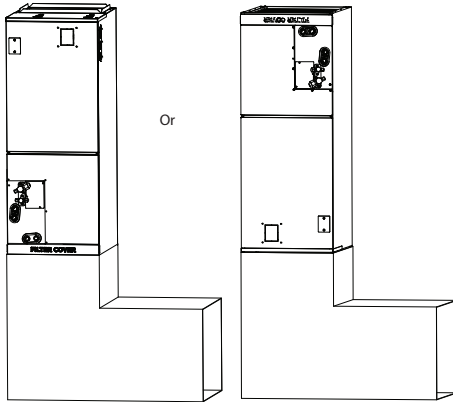
Horizontal Installations

Plenum Clearances



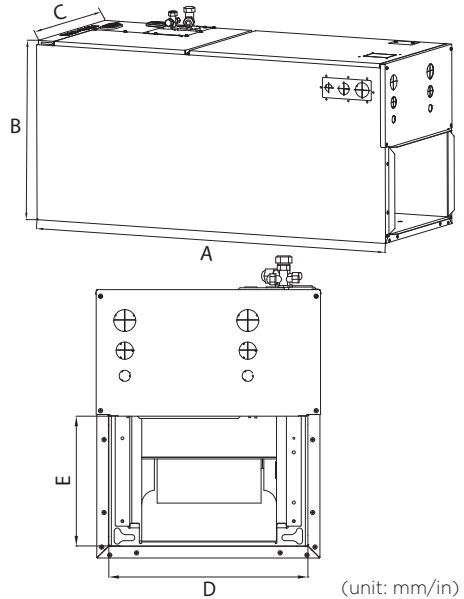
The outlet side pipe length is 1.5m/59”.

Vertical Installations



Fixing instructions: When installed vertically (upward or downward), the lower end of the air outlet needs to be connected to the L-shaped metal air duct and fastened by screws.

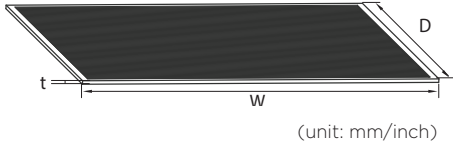
Indoor parts installation size



(unit: mm/in)

Dimensions		MODEL (Btu/h)		
		18K-24K	30K-48K	60K
Length of A	mm	1143	1245	1346
	inch	45	49	53
Length of B	mm	533	533	533
	inch	21	21	21
Length of C	mm	445	534	622
	inch	17-1/2	21-1/50	24-1/2
Length of D	mm	400	490	580
	inch	15-3/4	19-5/16	22-27/32
Length of E	mm	260	260	260
	inch	10-1/4	10-1/4	10-1/4

Recommended size of filter



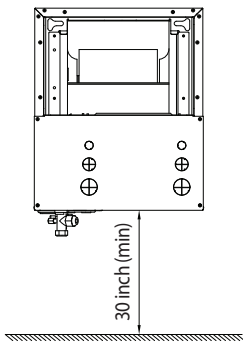
MODEL (Btu/h)		18K-24K	30K-48K	60K
Length of W	mm	406.4	495.3	584.2
	inch	16	20	23
Length of D	mm	508	508	508
	inch	20	20	20
Length of t	mm	25.4	25.4	25.4
	inch	1	1	1

NOTICE

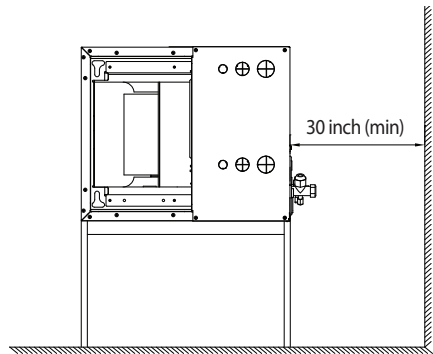
This product filter is only used for energy efficiency sampling test, the user needs to install a filter of their choice.

Installation Place

Vertical Installations



Horizontal Installations



DUCT CONNECTIONS: Air supply and return may be handled in one of several ways best place holder suited to the installation (See table for dimensions for duct inlet and outlet connections). The vast majority of problems encountered with combination cooling systems can be linked to improperly designed or installed duct systems. It is therefore highly important to the success of an installation that the duct system be properly designed and installed.

Use flexible duct collars to minimize the transmission of vibration/noise into the conditioned space. Where return air duct is short, or where sound is could potentially to be a problem, sound absorbing liner should be used inside the duct.

Insulation of duct work is a must where it runs through an unconditioned space during the cooling season. The use of a vapor barrier is recommended to prevent absorption of moisture from the surrounding air into the insulation. The supply air duct should be properly sized by use of a transition to match unit opening. All ducts should be suspended using flexible hangers and never fastened directly to the structure. This unit is not designed for nonducted (freeblow) applications. Duct work should be fabricated and installed in accordance with local and/or national codes.

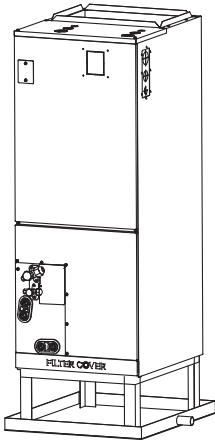
⚠ WARNING

- A field-fabricated secondary drain pan, with a drain pipe to the outside of the building, is required in all installations over a finished living space or in any area that may be damaged by overflow from the main drain pan. In some localities, local codes may require a secondary drain pan for any horizontal installation.
- This unit is not designed for nonducted (freeblow) applications. Electric heat strips and or blower is easily accessible without duct and presents electrocution or injury hazard.

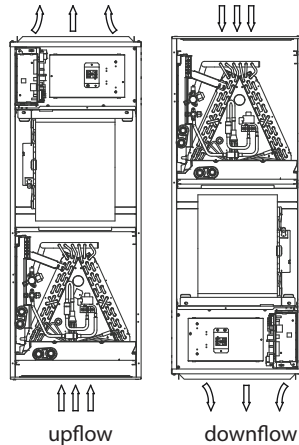
Mount Positions

The units can be installed in a vertical (down and up) and Horizontal (right and left) configuration.

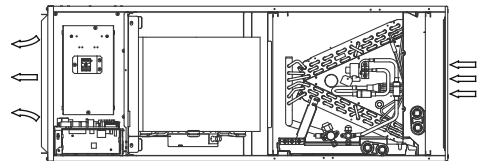
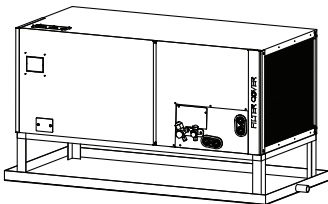
Vertical Up Installations



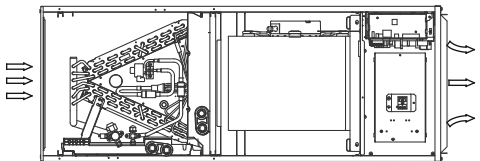
1. Open the upper cover.
2. Open the cover of the electronic control box.
3. Connect the wire according to the wiring diagram.
4. Connect the pipes.
5. Install the drainage pipes.



Horizontal Installations



horizontal left



horizontal right

NOTICE

For horizontal installation, a secondary drain pan (not supplied) must be installed.

Please follow these steps to perform Vertical up installation and Horizontal right installation:

NOTICE

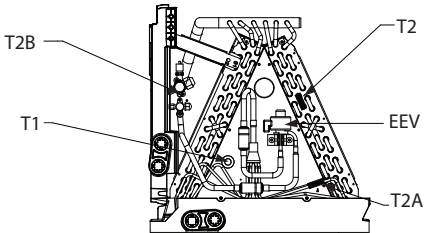
Vertical up and horizontal left installation does not need to change the direction of evaporator.

NOTICE

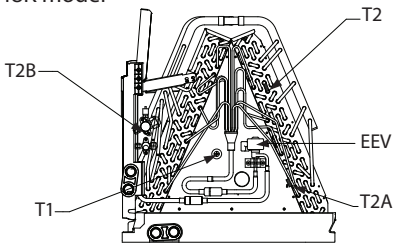
The unit may be installed in one of the upflow, downflow, horizontal left or horizontal right orientations.

Indication of the position of each temperature sensor of the evaporator:

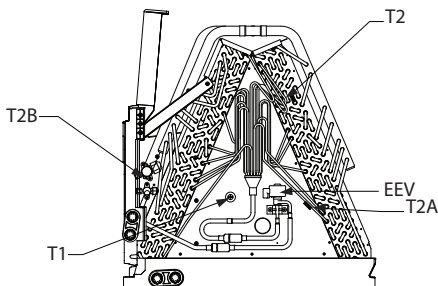
18-24K model



30-48K model

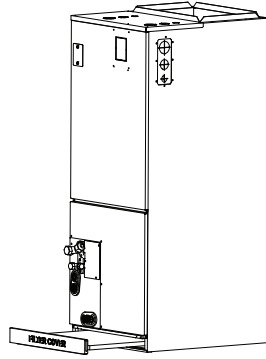


60K model

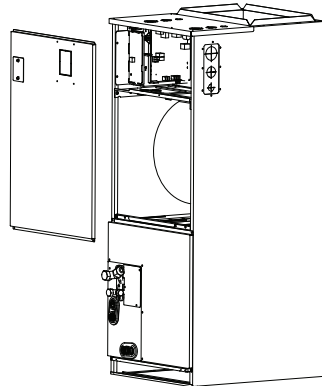


Reversing instructions:

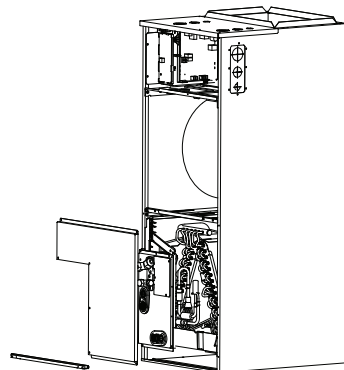
1. Remove the filter door, then take the filter off.



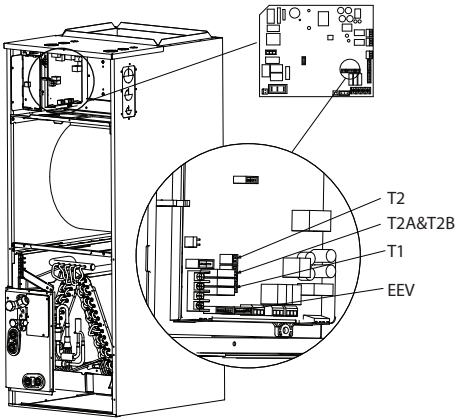
2. Remove the upper cover assembly.



3. Remove evaporator cover plate.



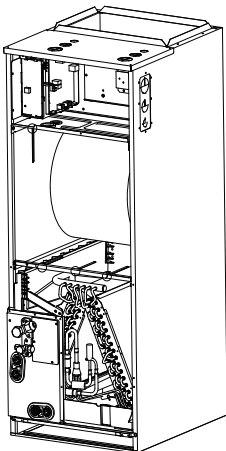
- Unplug temperature sensors T1, T2, T2A, T2B and electronic expansion valve (EEV) from the control board.
 T1: Room temperature sensor
 T2: Evaporator central sensor plug
 T2A: Evaporator input sensor plug
 T2B: Evaporator output sensor plug



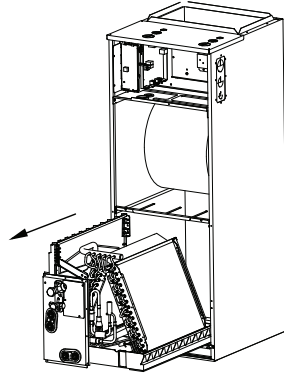
NOTICE

T2A and T2B are only available for some models.

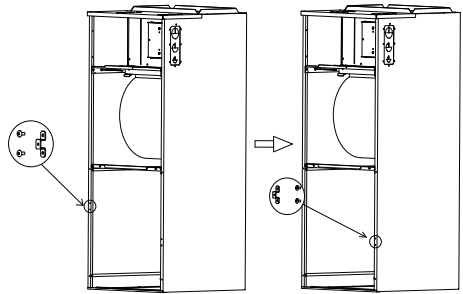
- Remove T1, T2, T2A, T2B, EEV sensor wire ties.



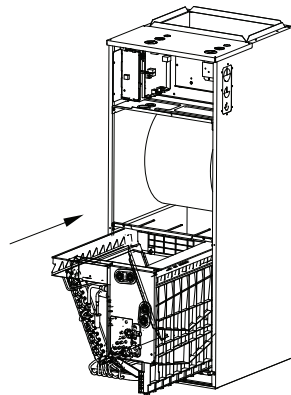
- Take out the evaporator and drain pan and rotate 180°.



- Adjust the position of the mounting parts.



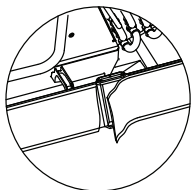
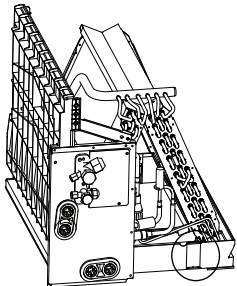
- Reinstall the evaporator and drain pan.



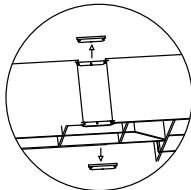
9. Reinstall T1, T2, T2A, T2B sensor plugs and electronic expansion valve (EEV) and tie up the sensor wires.

NOTICE

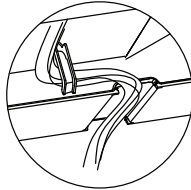
The wire body needs to pass through the wire groove from the drain pan and be stuck on the hook of the drain pan.



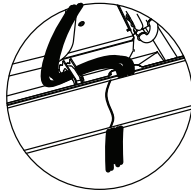
Cut the foam gasket.



Remove knockouts as shown in the figure.

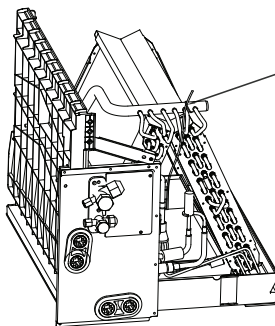
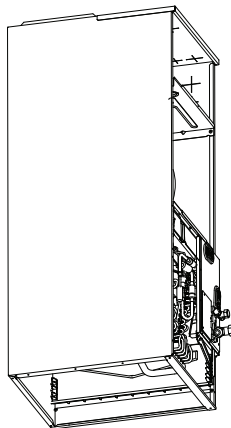


Hook the wire into the buckle and go down from the wire slot.



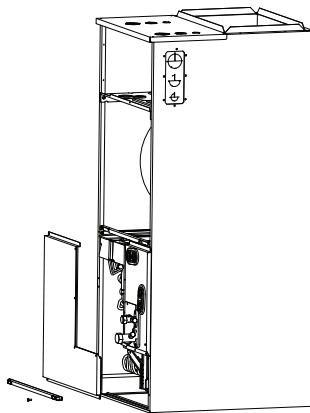
Replace foam gasket.

10. The evaporator is assembled in place.



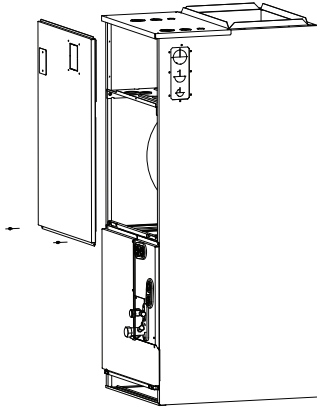
Use cable ties to fix the room temperature sensor as shown in the figure.

11. Reinstal evaporator cover plate.

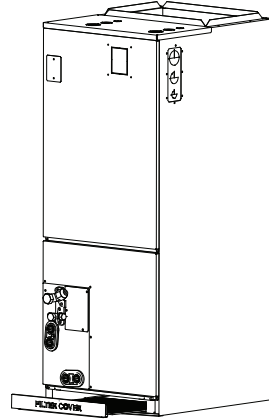


12. Connect the wire according to the wiring diagram.

13. Reassemble the upper cover.



14. Reinstall the filter and filter cover plate.



15. Connect the pipes.

16. Install the drainage pipes.

Drainpipe Installation

The drainpipe is used to drain water away from the unit. Improper installation may cause unit and property damage.

⚠ CAUTION

- Insulate all piping to prevent condensation, which could lead to water damage.
- If the drainpipe is bent or installed incorrectly, water may leak and cause property damage.
- In HEAT mode, the outdoor unit will discharge water. Ensure that the drain hose is placed in an appropriate area to avoid water damage and slippage.
- **Do not** pull the drainpipe forcefully. This could disconnect it.

NOTE ON PURCHASING PIPES

Installation requires pvc pipe or other suitable material per local and national codes, which can be obtained at your local hardware store or dealer.

⚠ WARNING

After removal of drain pan plug(s), check drain hole(s) to verify that drain opening is fully open and free of any debris. Also check to make sure that no debris has fallen into the drain pan during installation that may plug up the drain opening.

Seal around the exiting drain pipe, liquid and suction lines to prevent infiltration of humid air.

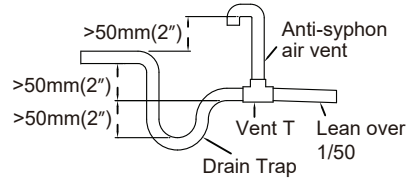
On units of this type, where the blower “draws” rather than “blows” air through the coil, traps must be installed in the condensate drain lines (primary and auxiliary, if used).

Traps prevent the blower from drawing air through the drain lines into the air supply.

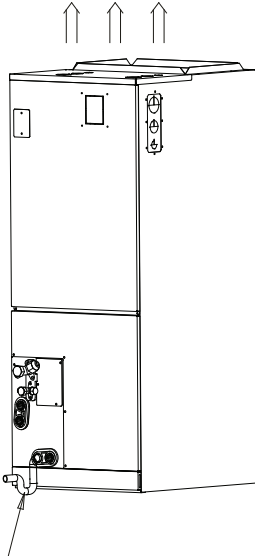
Vertical Installations

These units operate with a negative pressure at the drain connections and a drain trap is required.

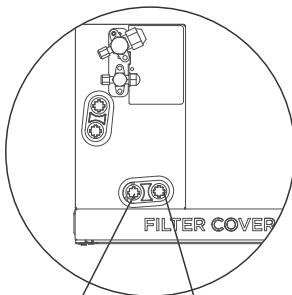
The trap needs to be installed as close to the unit as possible. Make sure the top of the trap is below the connection to the drain pan to allow complete drainage of the pan.



VERTICAL DISCHARGE



PRIMARY DRAIN



Main drain hole

Overflow drain hole |

NOTICE

Horizontal runs must also have an anti-siphon air vent (standpipe) install ahead of the horizontal run to eliminate air trapping.

NOTE ON DRAINPIPE INSTALLATION

- The Figure shows how to trap or plug all drains during vertical discharge.
- The Figure shows how to trap or plug all drains during right-hand discharge.
- The seal plug are supplied as accessories and should be screwed tightly only by hand.
- Incorrect installation could cause water to flow back into the unit and flood.

NOTICE

The drainpipe outlet should be at least 5 cm (1.9 in) above the ground. If it touches the ground, the unit may become blocked and malfunction.

REFRIGERANT PIPING CONNECTION

Safety Precautions

⚠ WARNING

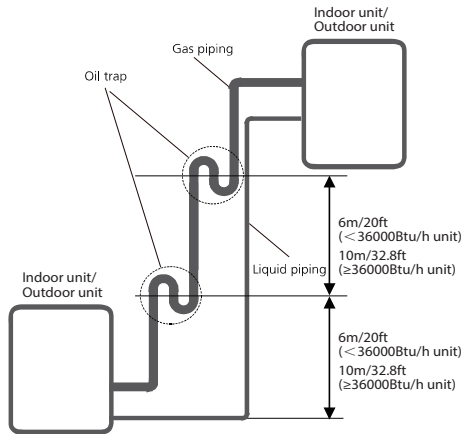
- All field piping must be completed by a licensed technician and must comply with the local and national regulations.
- When the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. If the refrigerant leaks and its concentration exceeds its proper limit, hazards due to lack of oxygen may result.
- When installing the refrigeration system, ensure that air, dust, moisture or foreign substances do not enter the refrigerant circuit. Contamination in the system may cause poor operating capacity, high pressure in the refrigeration cycle, explosion or injury.
- Ventilate the area immediately if there is refrigerant leakage during the installation. Leaked refrigerant gas can be both toxic and flammable. Ensure there is no refrigerant leakage after completing the installation work.

Notes On Pipe Length and Elevation

Ensure that the length of the refrigerant pipe, the number of bends, and the drop height between the indoor and outdoor units meets the requirements shown in the following table:

The Maximum Length And Drop Height Based on Models. (Unit: m/ft.)

Type of model	Capacity (Btu/h)	Length of piping (m/ft)	Maximum drop height (m/ft)
North America, Australia and the EU frequency conversion Split Type	<15K	25/82	10/32.8
	≥15K - <24K	30/98.4	20/65.6
	≥24K - <36K	50/164	25/82
	≥36K - ≤60K	65/213	30/98.4



⚠ CAUTION

Oil traps

If oil flows back into the outdoor unit's compressor, this might cause liquid compression or deterioration of oil return. Oil traps in the rising gas piping can prevent this. An oil trap should be installed every 6m (20ft) of vertical suction line riser (<36000Btu/h unit). An oil trap should be installed every 10m (32.8ft) of vertical suction line riser (≥36000Btu/h unit). See diagram for trap sizing and placement.

Name	Shape		Quantity (PC)
Connecting pipe assembly	Liquid side	Ø9.52mm (3/8in)	Parts you must purchase separately.
	Gas side	Ø19mm (3/4in) ≥ 4 Ton	Consult the dealer about the proper pipe size of the unit you purchased.
		Ø22mm (7/8in) 5 Ton only	

Connection Instructions – Refrigerant Piping

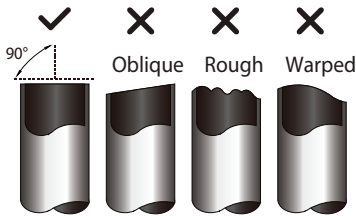
⚠ CAUTION

Insulate both the gas and liquid piping to prevent water leakage.

Step 1: Cut pipes

When preparing refrigerant pipes, take extra care to cut and flare them properly. This will ensure efficient operation and minimize the need for future maintenance.

1. Measure the distance between the indoor and outdoor units.
2. Using a pipe cutter, cut the pipe a little longer than the measured distance.
3. Make sure that the pipe is cut at a perfect 90° angle.



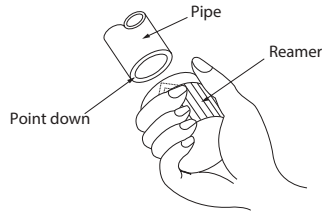
⊘ DO NOT DEFORM PIPE WHILE CUTTING

Be extra careful not to damage, dent, or deform the pipe while cutting. This will drastically reduce the heating efficiency of the unit.

Step 2: Remove burrs

Burrs can affect the air-tight seal of refrigerant piping connection. They must be completely removed.

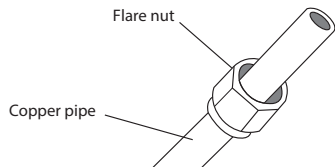
1. Hold the pipe at a downward angle to prevent burrs from falling into the pipe.
2. Using a reamer or deburring tool, remove all burrs from the cut section of the pipe.



Step 3: Flare pipe ends

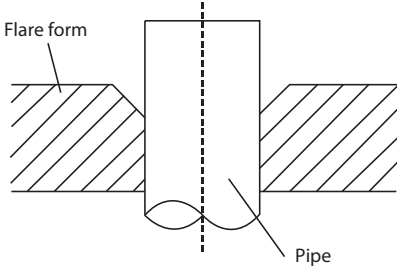
Proper flaring is essential to achieve an airtight seal.

1. After removing burrs from cut pipe, seal the ends with PVC tape to prevent foreign materials from entering the pipe.
2. Sheath the pipe with insulating material.
3. Place flare nuts on both ends of pipe. Make sure they are facing in the right direction, because you can't put them on or change their direction after flaring.



4. Remove PVC tape from ends of pipe when ready to perform flaring work.

- Clamp flare form on the end of the pipe.
The end of the pipe must extend beyond the flare form.



- Place flaring tool onto the form.
- Turn the handle of the flaring tool clockwise until the pipe is fully flared.

PIPING EXTENSION BEYOND FLARE FORM

Pipe gauge (mm)	Tightening torque	Flare dimension (A) (Unit: mm/Inch)		Flare shape
		Min.	Max.	
Ø6.35 (1/4")	18-20 N.m (13-15 ft lb)	8.4/0.33	8.7/0.34	
Ø9.52 (3/8")	25-26 N.m (18.5-19.5 ft lb)	13.2/0.52	13.5/0.53	
Ø12.7 (1/2")	35-36 N.m (25.5-26.5 ft lb)	16.2/0.64	16.5/0.65	
Ø16 (5/8")	45-47 N.m (33-34.5 ft lb)	19.2/0.76	19.7/0.78	
Ø19 (3/4")	65-67 N.m (48-49.5 ft lb)	23.2/0.91	23.7/0.93	
Ø22 (7/8")	75-85 N.m (55.5-62.5 ft lb)	26.4/1.04	26.9/1.06	

- Remove the flaring tool and flare form, then inspect the end of the pipe for cracks and even flaring.

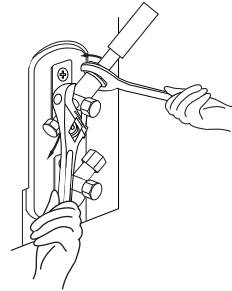
Step 4: Connect pipes

Connect the copper pipes to the indoor unit first, then connect it to the outdoor unit. You should first connect the low-pressure pipe, then the high-pressure pipe.

- When connecting the flare nuts, apply a thin coat of refrigeration oil to the flared ends of the pipes.
- Align the center of the two pipes that you will connect.
- Tighten the flare nut as tightly as possible by hand.
- Using a spanner, grip the nut on the unit tubing.
- While firmly gripping the nut, use a torque wrench to tighten the flare nut according to the torque values in the table.

NOTICE

Use both a spanner and a torque wrench when connecting or disconnecting pipes to/from the unit.



CAUTION

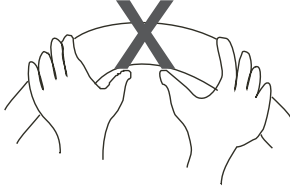
- Ensure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.
- Make sure the pipe is properly connected. Over tightening may damage the bell mouth and under tightening may lead to leakage.

NOTE ON MINIMUM BEND RADIUS

Carefully bend the tubing in the middle according to the diagram below.

DO NOT bend the tubing more than 90° or more than 3 times.

Use appropriate tool



min-radius 10cm (3.9")

NOTICE

DO NOT intertwine signal cable with other wires. While bundling these items together, do not intertwine or cross the signal cable with any other wiring.

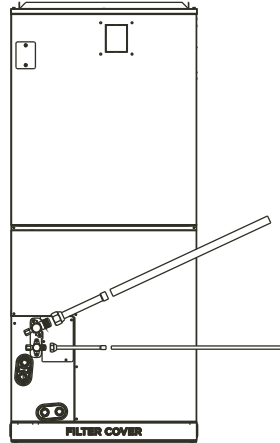
6. Thread this pipeline through the wall and connect it to both the indoor and outdoor units.
7. Evacuate air and moisture from refrigerant lines.
8. Insulate all the piping, including the valves of the outdoor unit.
9. Open the stop valves of the outdoor unit to start the flow of the refrigerant between the indoor and outdoor unit.

CAUTION

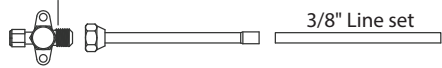
Check to make sure there is no refrigerant leak after completing the installation work. If there is a refrigerant leak, ventilate the area immediately and evacuate the system (refer to the Air Evacuation section of this manual).

60K Air-Handler Air Conditioners Refrigerant Piping Connection

Complete the indoor unit connection pipe assembly as shown below, use flare-to-braze (3/4" to 7/8") and flare-to-braze (3/8" to 3/8") adapters to connect 7/8" Line set. If you connect it in a way other than the one shown in the gure, it will cause the performance of the product to decrease.



3/8" Service valve



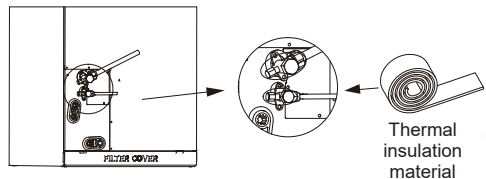
Flare-to-braze (3/8" to 3/8")

3/4" Service valve



Flare-to-braze (3/4" to 7/8")







After the unit is installed, Wrap the valve body with insulation material to prevent condensation.



Thermal insulation material

Installation of Electric Auxiliary Heat Module (for some models) (not supplied)

Accessories

Name	Shape	Quantity
Owner's and Installation manual		1
Foam gasket		1
Screws		7
Silicone breaker cover		1
Electric auxiliary heating wiring diagram		1
Circuit breaker label		1

NOTICE

Installation must be performed by an licensed contractor. Please use necessary protection when installing the unit.

For installations requiring supplemental heating, the optional Electric Auxiliary Heat Module is available in sizes from 3kW to 25kW to accommodate appropriate sizing given the specific heat load and electrical requirements of each installation. Please refer to the table below for selection of available sizes of each model, being sure to avoid improper matching.

NOTICE

Only use matched modules certified for use with model. Please refer to the Electric Auxiliary Heat Model specification for additional details to ensure proper selection and installation.

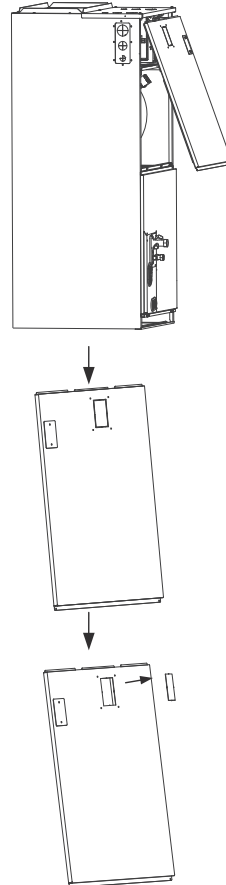
MODEL (Btu/h)	3kW	5kW	8kW	10kW	15kW	20kW	25kW
18K	Y	Y	Y	Y	-	-	-
24K	-	Y	Y	Y	Y	-	-
30K	-	Y	Y	Y	Y	-	-
36K	-	Y	Y	Y	Y	Y	-
48K	-	-	Y	Y	Y	Y	-
60K	-	-	-	Y	Y	Y	Y

Installation Requirements

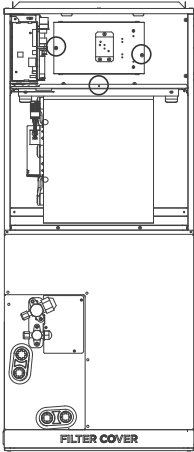
Before installation, please confirm the electric auxiliary heat module and supplied accessories are complete and free of any damage. Do not attempt to install if damage is present.

Electric Auxiliary Heat Module Installation and Wiring Operation

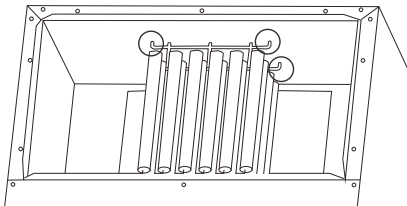
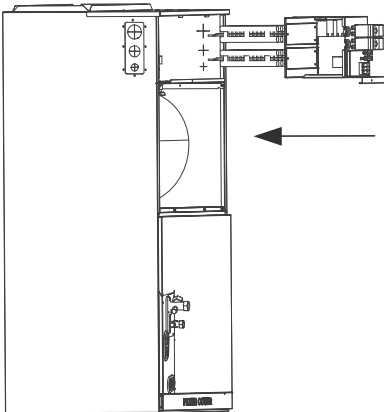
1. Remove the upper cover and use appropriate tools to remove the knock-out holes of the upper cover.



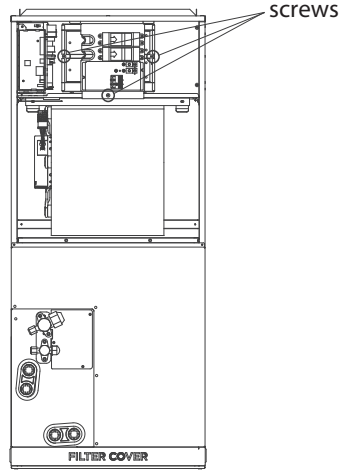
- Remove the terminal block and power wires, loosen the screws, and remove the electric auxiliary heating cover.



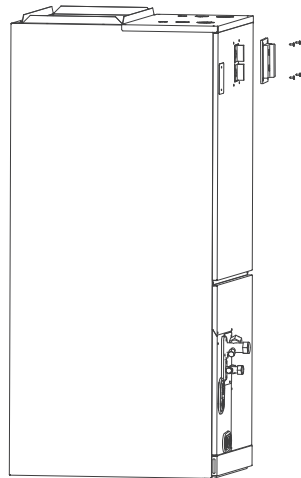
- Install the electric auxiliary heating assembly into the chassis shell from the front, and note that the support assembly must lock into the support holes in the back of the cabinet.



- Tighten the mounting screws.



- Wiring according to the wiring nameplate.
- Apply the wiring diagram to the inside cover when wiring is completed for future reference and maintenance.
- Install the upper cover.
- Install silicone breaker cover.



- After installing the electric auxiliary heat module, apply the circuit breaker label near the silicone breaker cover that was just applied.

After the electric heating wiring is connected, please confirm before power on:

- Check all wiring and ensure secure connection of all wiring.
- Ensure that wire size is properly selected per NEC or local codes.

Specifications	Number of circuit breakers	Number of relays	Number of power cord groups	Number of power cord grounding screws
3kW	1	1	2	2
5kW	1	1	2	2
8kW	1	2	2	2
10kW	1	2	2	2
15kW	2	3	3	3
20kW	2	4	3	3
25kW	3	5	4	4

NOTICE

Electric auxiliary heating wiring diagram packed with the accessories.

NOTICE

If branch circuit wire length exceeds 100 ft (30.5m), consult NEC 210-19a to determine maximum wire length. Use 2% voltage drop.

UNITS WITHOUT ELECTRICAL HEAT

Unit	Volts-Phase	Rated Current (A)	Min Ckt Amps	Branch Circuit	
				Min Wire Size AWG*	Fuse/Ckt Bkr Amps
18K	208/230-1	2.0	2.5	16#	15.0
24K	208/230-1	3.0	4.0	16#	15.0
30K	208/230-1	3.5	4.5	16#	15.0
36K	208/230-1	4.0	5.0	16#	15.0
48K	208/230-1	6.0	7.5	16#	15.0
60K	208/230-1	7.0	9.0	16#	15.0

* Use copper wire only to connect unit. If other than uncoated (non-plated) 75°C copper wire (solid wire for 10 AWG and smaller, stranded wire for larger than 10 AWG) is used consult applicable tables of the National Electric Code (ANSI/NFPA 70).

NOTICE

The specification may be different between different models, please refer to indoor unit's nameplate.

Auxiliary Heater Electrical Data

208/230V



Heater Part No.	Heater kW	Internal Circuit Protection	CIRCUIT 1			CIRCUIT 2			CIRCUIT 3		
			Heater Amps	MCA (1)	MOCP (2)	Heater Amps	MCA (1)	MOCP (2)	Heater Amps	MCA (1)	MOCP (2)
EAH-03B(UL)	3	Ckt Bkr	10.8/12.0	14.0/16.0	15.0/20.0	/	/	/	/	/	/
EAH-05B(UL)	5	Ckt Bkr	18.0/20.0	23.0/27.0	25.0/30.0	/	/	/	/	/	/
EAH-08B(UL)	8	Ckt Bkr	28.8/32.0	37.0/42.0	40.0/45.0	/	/	/	/	/	/
EAH-10B(UL)	10	Ckt Bkr	36.0/40.0	46.0/53.0	50.0/60.0	/	/	/	/	/	/
EAH-15B(UL)	15	Ckt Bkr	18.0/20.0	23.0/27.0	25.0/30.0	36.0/40.0	46.0/53.0	50.0/60.0	/	/	/
EAH-20B(UL)	20	Ckt Bkr	36.0/40.0	46.0/53.0	50.0/60.0	36.0/40.0	46.0/53.0	50.0/60.0	/	/	/
EAH-25B(UL)	25	Ckt Bkr	18.0/20.0	23.0/27.0	25.0/30.0	36.0/40.0	46.0/53.0	50.0/60.0	46.0/53.0	50.0/60.0	50.0/60.0

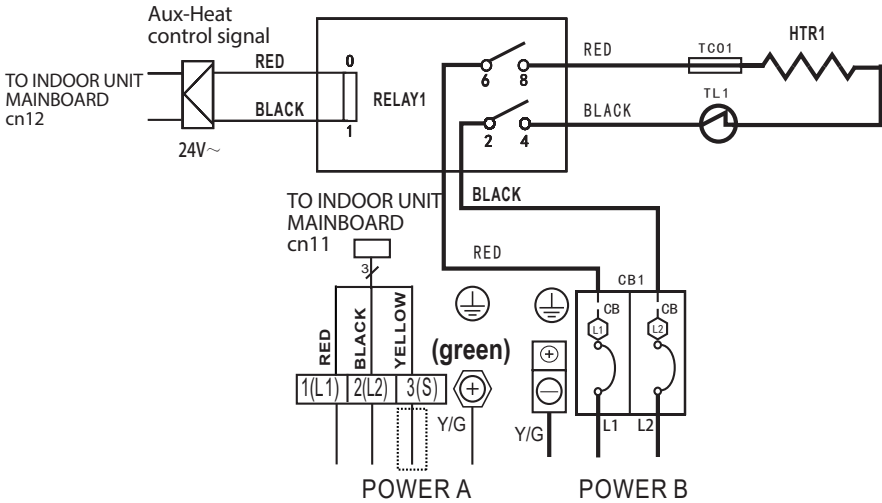
(1) Minimum Circuit Ampacity (Heater Amps + Motor Amps) X 1.25

(2) Maximum Overcurrent Protection = 2.25 X Motor Amps + Heater Amps

Electric auxiliary heating wiring diagram

3KW/5KW HEAT KIT

-  :thermal cut-out
-  :thermal link, self-resetting









NOTE1:

This symbol indicates the element is optional, The wiring type of the actual unit shall prevail.

NOTE2:

Please attach the nameplate to the cover of the electric control box. All the round holes located on the plate represent numbers. Please refer to the Installation Manual for details.

Round hole number	Relay number	Round hole number	Circuit breaker number
	RELAY 1		CB1
			
			
			
			



NOTE3: TO BE WIRED IN ACCORDANCE WITH NEC AND LOCAL CODES.

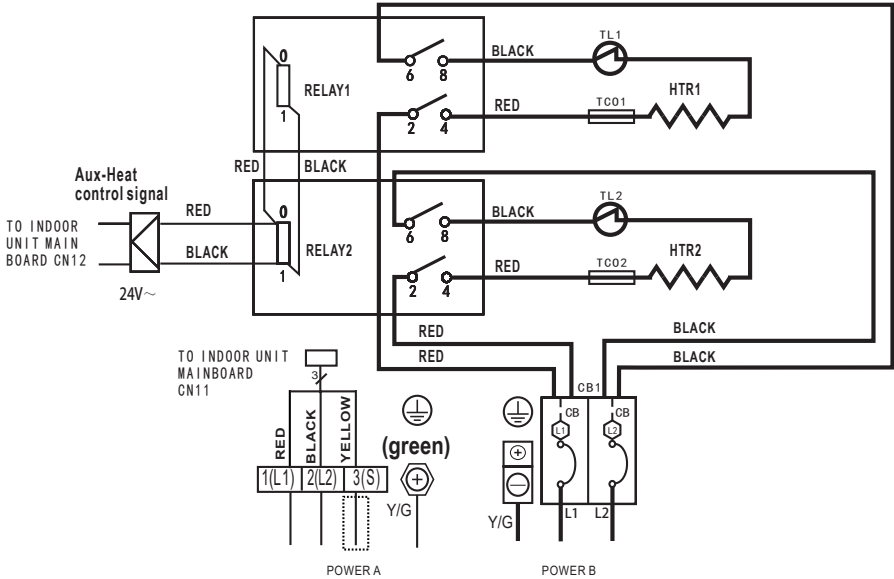
NOTE4: POWER A,B,C,D ARE DIFFERENT POWERS.


The wiring mode of power supply A shall be based on the type of original wiring terminal of AHU; for type A, S position must be connected to the outdoor S; for type B, S position shall not be connected.








8KW/10KW HEAT KIT

-  :thermal cut-out
-  :thermal link, self-resetting



NOTE1:  This symbol indicates the element is optional, The wiring type of the actual unit shall prevail.

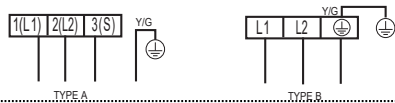
NOTE2: Please attach the nameplate to the cover of the electric control box. All the round holes located on the plate represent numbers. Please refer to the Installation Manual for details.

Round hole number	Relay number	Round hole number	Circuit breaker number
	RELAY 1		CB1
	RELAY 2		
			
			



NOTE3: TO BE WIRED IN ACCORDANCE WITH NEC AND LOCAL CODES.

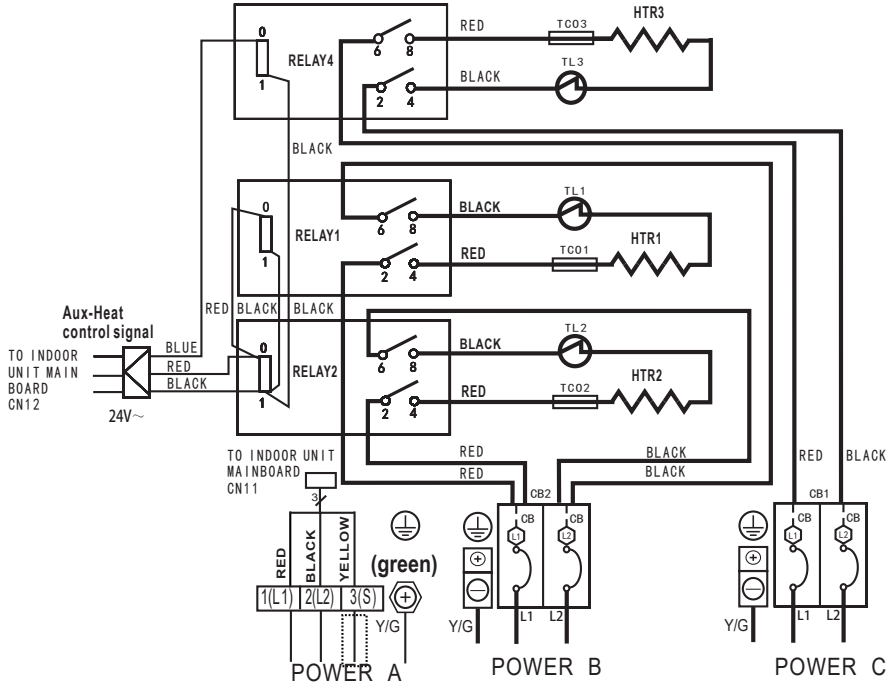
NOTE4: POWER A,B,C,D ARE DIFFERENT POWERS.

The wiring mode of power supply A shall be based on the type of original wiring terminal of AHU; for type A, S position must be connected to the outdoor S; for type B, S position shall not be connected.



15KW HEAT KIT

-  :thermal cut-out
-  :thermal link, self-resetting



NOTE1: 

This symbol indicates the element is optional, The wiring type of the actual unit shall prevail.

NOTE2:

Please attach the nameplate to the cover of the electric control box. All the round holes located on the plate represent numbers. Please refer to the Installation Manual for details.

NOTE3: TO BE WIRED IN ACCORDANCE WITH NEC AND LOCAL CODES.



NOTE4: POWER A,B,C,D ARE DIFFERENT POWERS.

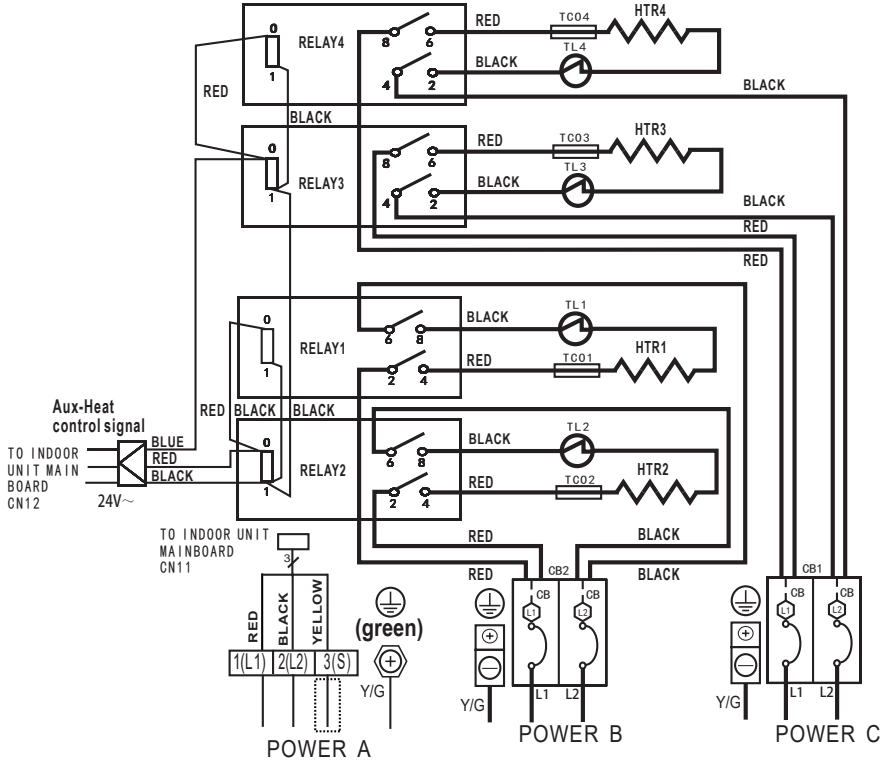
Round hole number	Relay number	Round hole number	Circuit breaker number
①	RELAY 1	①	CB1
②	RELAY 2	②	CB2
③	RELAY 4		
④			
⑤			

The wiring mode of power supply A shall be based on the type of original wiring terminal of AHU; for type A, S position must be connected to the outdoor S; for type B, S position shall not be connected.



20KW HEAT KIT

-  :thermal cut-out
-  :thermal link, self-resetting



NOTE1:

This symbol indicates the element is optional, The wiring type of the actual unit shall prevail.

NOTE2:

Please attach the nameplate to the cover of the electric control box. All the round holes located on the plate represent numbers. Please refer to the Installation Manual for details.

Round hole number	Relay number	Round hole number	Circuit breaker number
⊙	RELAY 1	⊙	CB1
⊙⊙	RELAY 2	⊙⊙	CB2
⊙⊙⊙	RELAY 3		
⊙⊙⊙⊙	RELAY 4		

NOTE3: TO BE WIRED IN ACCORDANCE WITH NEC AND LOCAL CODES.

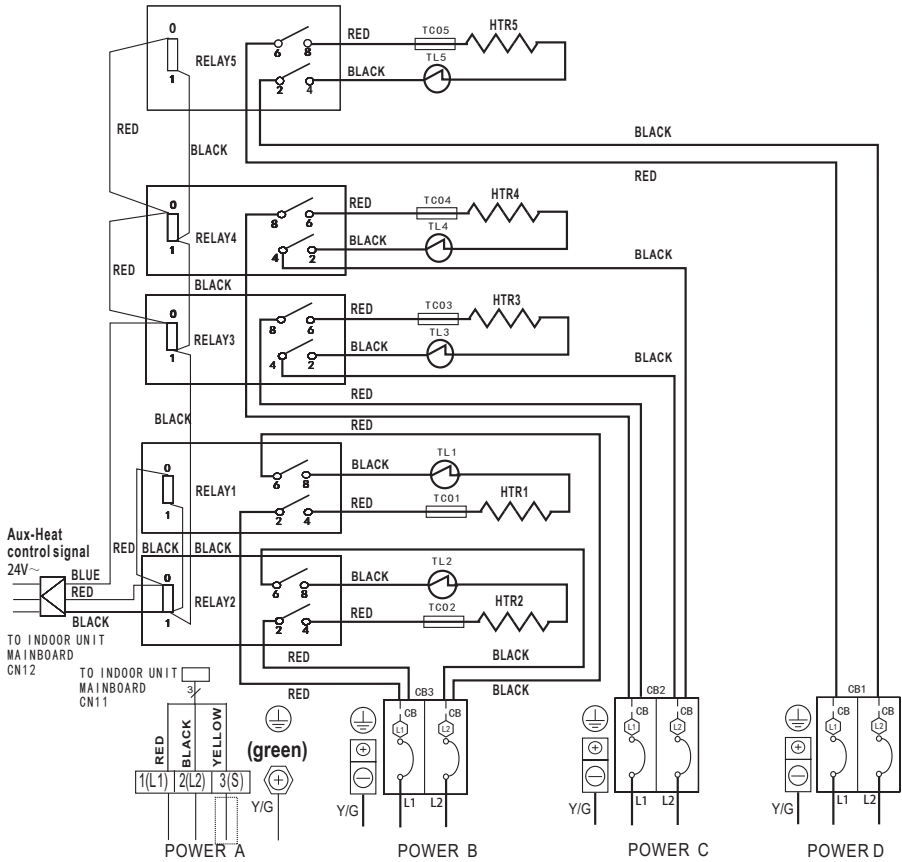
NOTE4: POWER A,B,C,D ARE DIFFERENT POWERS.

The wiring mode of power supply A shall be based on the type of original wiring terminal of AHU; for type A, S position must be connected to the outdoor S; for type B, S position shall not be connected.



25KW HEAT KIT

- : thermal cut-out
- : thermal link, self-resetting



NOTE1: This symbol indicates the element is optional. The wiring type of the actual unit shall prevail.

NOTE2: Please attach the nameplate to the cover of the electric control box. All the round holes located on the plate represent numbers. Please refer to the Installation Manual for details.

NOTE3: TO BE WIRED IN ACCORDANCE WITH NEC AND LOCAL CODES.

NOTE4: POWER A,B,C,D ARE DIFFERENT POWERS.

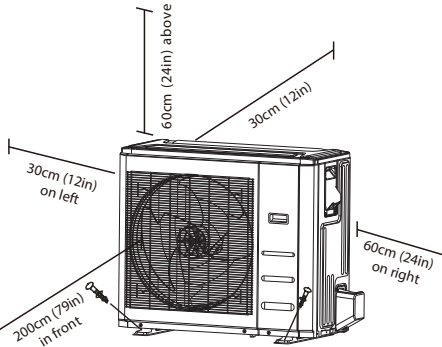
Round hole number	Relay number	Round hole number	Circuit breaker number
○	RELAY 1	○	CB1
○○	RELAY 2	○○	CB2
○○○	RELAY 3	○○○	CB3
○○○○	RELAY 4		
○○○○○	RELAY 5		

The wiring mode of power supply A shall be based on the type of original wiring terminal of AHU; for type A, S position must be connected to the outdoor S; for type B, S position shall not be connected.



OUTDOOR UNIT INSTALLATION

Install the unit by following local codes and regulations, they may differ slightly between different regions.



Installation Instructions

STEP 1: SELECT INSTALLATION LOCATION

Before installing the outdoor unit, you must choose an appropriate location. The following are standards that will help you choose an appropriate location for the unit.

Proper installation locations meet the following standards:

- ✓ Meets all clearance requirements shown in Installation Space Requirements above.
- ✓ Good air circulation and ventilation.
- ✓ Firm and solid foundation — the location can support the unit and will not vibrate.
- ✓ Noise from the unit will not disturb others.
- ✓ Protected from prolonged periods of direct sunlight or rain.
- ✓ Where snowfall is anticipated, take appropriate measures to prevent ice buildup and coil damage.
- ✓ The outdoor unit must be installed on risers of at least 15cm (6") in height or per local code to get unit above local mean snow fall.

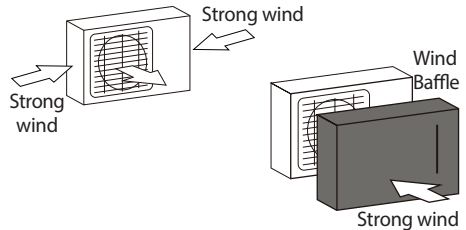
DO NOT install unit in the following locations:

- ⊘ Near an obstacle that will block air inlets and outlets.
- ⊘ Near a public street, crowded areas, or where noise from the unit will disturb others.
- ⊘ Near animals or plants that will be harmed by hot air discharge.
- ⊘ Near any source of combustible gas.
- ⊘ In a location that is exposed to large amounts of dust.

SPECIAL CONSIDERATIONS FOR EXTREME WEATHER

If the unit is exposed to heavy wind:

Install unit so that air outlet fan is at a 90° angle to the direction of the wind. If needed, build a barrier in front of the unit to protect it from extremely heavy winds. See Figures below.



If the unit is frequently exposed to heavy rain or snow:

Build a shelter above the unit to protect it from the rain or snow. Be careful not to obstruct air flow around the unit.

STEP 2: INSTALL DRAIN FITTING

Before bolting the outdoor unit in place, you must install the drain fitting at the bottom of the unit.

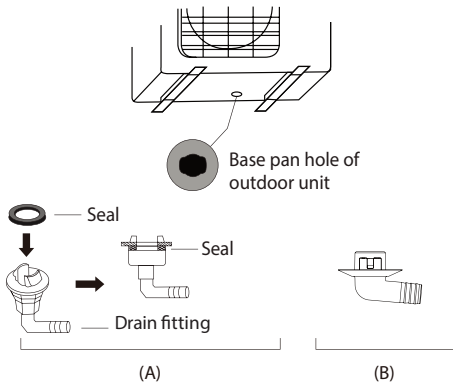
NOTE: There are two different types of drain fittings depending on the type of outdoor unit.

If the drain fitting comes with a rubber seal (see Fig. A), do the following:

1. Fit the rubber gasket on the end of the drain fitting that will connect to the outdoor unit.
2. Insert the drain fitting into the hole in the base pan of the unit.
3. Rotate the drain fitting 90° until it clicks in place facing the front of the unit.
4. Connect a drain fitting extension (not included) to the drain fitting to redirect water from the unit during heating mode.

If the drain fitting doesn't come with a rubber seal (see Fig. B), do the following:

1. Insert the drain fitting into the hole in the base pan of the unit. The drain fitting will click in place.
2. Connect a drain hose extension (not included) to the drain fitting to redirect water from the unit during heating mode.



⚠ IN COLD CLIMATES

In cold climates, make sure that the drain hose is as vertical as possible to ensure swift water drainage. If water drains too slowly, it can freeze in the hose and flood the unit.

STEP 3: ANCHOR OUTDOOR UNIT

The outdoor unit can be anchored to the ground or to a wall-mounted bracket with bolts. Prepare the installation base of the unit according to the dimensions in next section.

⚠ WARNING

WHEN DRILLING INTO CONCRETE, EYE PROTECTION IS RECOMMENDED AT ALL TIMES.

⚠ CAUTION

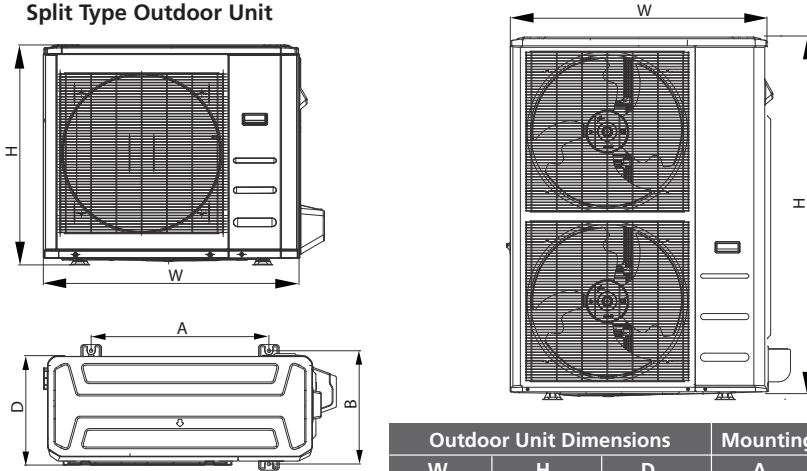
Make sure that the wall is made of solid brick, concrete, or of similarly strong material. **The wall must be able to support at least four times the weight of the unit.**

Unit Mounting Dimensions

The following is a list of different outdoor unit sizes and the distance between their mounting feet. Prepare the installation base of the unit according to the dimensions below.

Outdoor Unit Types and Specifications

Split Type Outdoor Unit



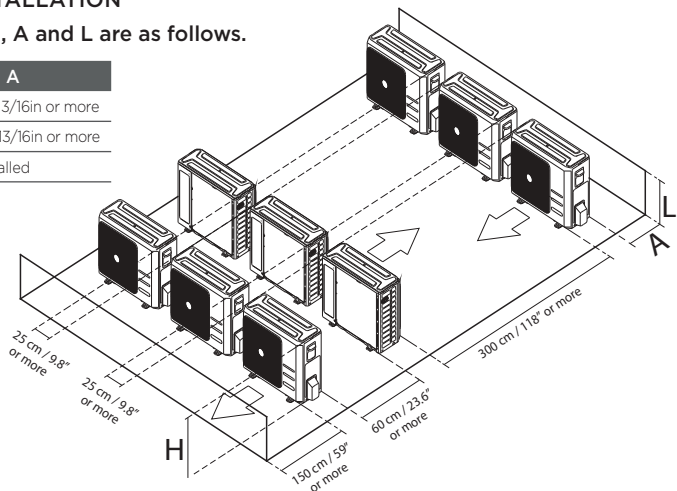
(unit: mm/inch)

Outdoor Unit Dimensions						Mounting Dimensions			
W		H		D		A		B	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
805	31-11/16	554	21-13/16	330	13	511	20-1/8	317	12-1/2
890	35	673	26-1/2	342	13-15/32	663	26-1/8	354	13-15/16
946	37-1/4	810	31-29/32	410	16-5/32	673	26-1/2	403	15-7/8
952	37-1/2	1333	52-1/2	415	16-11/32	634	24-35/36	404	15-29/32

ROWS OF SERIES INSTALLATION

The relations between H, A and L are as follows.

	L	A
$L \leq H$	$L \leq 1/2H$	25 cm / 9-13/16in or more
	$1/2H < L \leq H$	30 cm / 11-13/16in or more
$L > H$	Can not be installed	



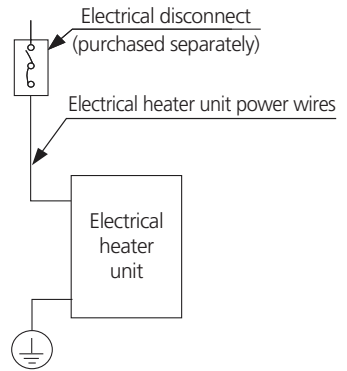
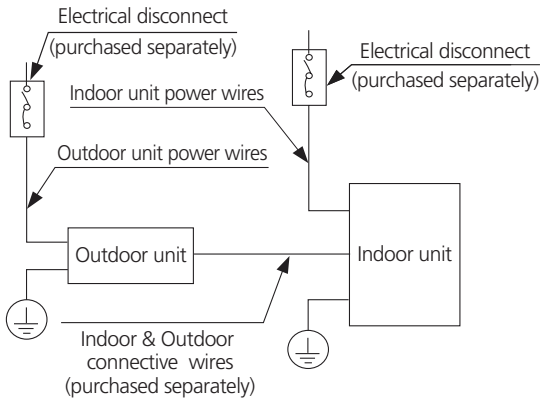
WIRING

WARNING

BEFORE PERFORMING ANY ELECTRICAL OR WIRING WORK, TURN OFF THE MAIN POWER TO THE SYSTEM.

BEFORE PERFORMING ANY ELECTRICAL WORK, READ THESE CAUTIONS.

1. All wiring must comply with local and national electrical Codes and Regulations and must be installed by a licensed electrician.
2. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
3. If there is a serious safety issue with the power supply, stop work immediately. Explain your reasoning to the client, and refuse to install the unit until the safety issue is properly resolved.
4. Power voltage should be within 90-110% of rated voltage. Improper power supply can cause malfunction, electrical shock, or fire.
5. Installation of an external surge suppressor at the outdoor disconnect is recommended.
6. If connecting power to fixed wiring, a switch or circuit breaker that disconnects all poles and has a contact separation of at least 1/8in (3mm) must be incorporated in the fixed wiring. The qualified technician must use an approved circuit breaker or switch.
7. Only connect the unit to an individual branch circuit. Do not connect another appliance to that circuit.
8. Make sure to properly ground the air conditioner.
9. Every wire must be firmly connected. Loose wiring can cause the terminal to overheat, resulting in product malfunction and possible fire.
10. Do not let wires touch or rest against refrigerant tubing, the compressor, or any moving parts within the unit.
11. To avoid getting an electric shock, never touch the electrical components soon after the power supply has been turned off. After turning off the power, always wait 10 minutes or more before you touch the electrical components.
12. Make sure that you do not cross your electrical wiring with your signal wiring. This may cause distortion, interference or possibly damage to circuit boards.
13. No other equipment should be connected to the same power circuit.
14. Connect the outdoor wires before connecting the indoor wires.



NOTICE

The diagrams are for explanation purpose only. Your machine may be slightly different. The actual shape shall prevail.

Outdoor Unit Wiring

⚠ WARNING

Before performing any electrical or wiring work, turn off the main power to the system.

1. Prepare the cable for connection.
 - a. You must first choose the right cable size.

NOTICE

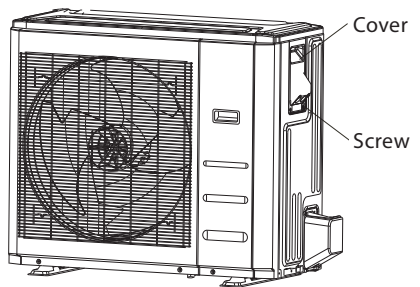
In North America, choose the cable type according to the local electrical codes and regulations. In North America, please choose the right cable size according to the Minimum Circuit Ampacity indicated on the nameplate of the unit.

- b. Using wire strippers, strip the jacket from both ends of the cable to reveal approximately 15cm (6") of wire.
- c. Strip the insulation from the ends.
- d. Stranded wire requires u-lugs or ring terminals to be crimped onto the ends of the wire.

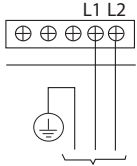
NOTICE

When connecting the wires, strictly follow the wiring diagram found inside the electrical box cover.

2. Remove the electric cover of the outdoor unit. If there is no cover on the outdoor unit, take off the bolts from the maintenance board and remove the protection board.

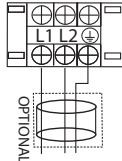


3. Connect the u-lugs to the terminals. Match the wire colors/ labels with the labels on the terminal block. Firmly screw the u-lug of each wire to its corresponding terminal.



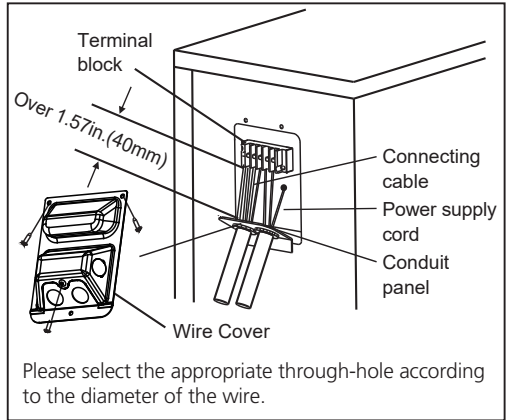
TO POWER SOURCE

Outdoor Unit A



TO POWER SOURCE

Outdoor Unit B



Please select the appropriate through-hole according to the diameter of the wire.

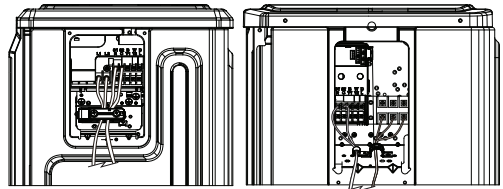
4. Clamp down the cable with the cable clamp.
5. Insulate unused wires with electrical tape. Keep them away from any electrical or metal parts.
6. Reinstall the cover of the electric control box.

⚠ WARNING

RISK OF ELECTRIC SHOCK CAN CAUSE INJURY OR DEATH. DISCONNECT ALL REMOTE ELECTRIC POWER SUPPLIES BEFORE SERVICING.

In North America

1. Remove the wire cover from the unit by loosening the 3 screws.
2. Remove caps on the conduit panel.
3. Mount the conduit tubes (not included) on the conduit panel.
4. Properly connect both the power supply and low voltage lines to the corresponding terminals on the terminal block.
5. Ground the unit in accordance with local codes.
6. Be sure to size each wire allowing several inches longer than the required length for wiring.



Outdoor Unit A

Outdoor Unit B

⚠ WARNING

ISOLATE THE POWER SUPPLY LEADS AND COMMUNICATION LEADS BY THE STRAIN RELIF AND KEEP POWER SUPPLY LEADS AWAY FROM COMMUNICATION LEADS.

Indoor Unit Wiring

1. Prepare the cable for connection.
 - a. Using wire strippers, strip the rubber jacket from both ends of the signal cable to reveal about 15cm (6") of the wire.
 - b. Strip the insulation from the ends of the wires.
2. Open the front panel of the indoor unit. Using a screwdriver, remove the cover of the electric control box on your indoor unit.
3. Thread the power cable and the signal cable through the wire outlet.
4. Connect the wires to the terminals. Match the wire colors/labels with the labels on the terminal block. Firmly screw the wires of each wire to its corresponding terminal.
5. Refer to the Serial Number and Wiring Diagram located on the cover of the electric control box.

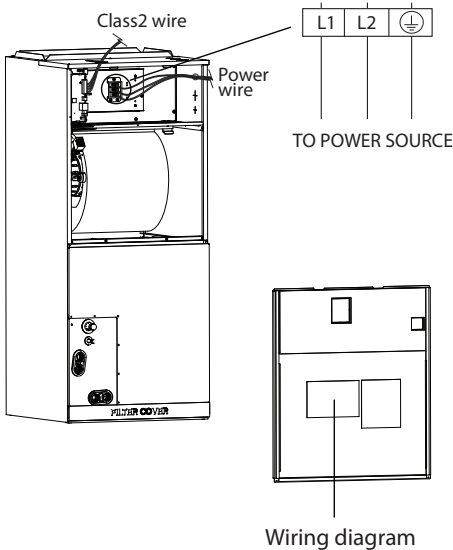
⚠ CAUTION

- While connecting the wires, please strictly follow the wiring diagram.
- The refrigerant circuit can become very hot. Keep the interconnection cable away from the copper tube.

⚠ WARNING

ISOLATE THE POWER SUPPLY AND COMMUNICATION LEADS AS SHOW IN THE DIAGRAM, KEEP POWER SUPPLY LEADS AWAY FROM COMMUNICATION LEADS.

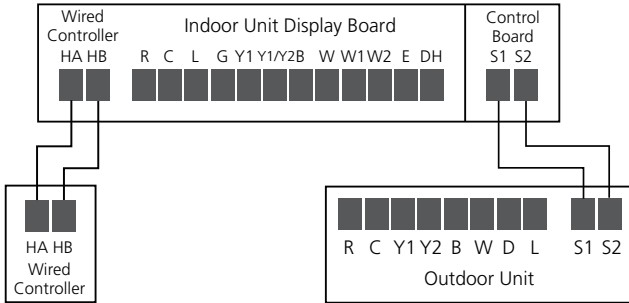
6. Clamp down the cable with the cable clamp. The cable must not be loose or pull on the u-lugs.
7. Reattach the electric box cover.



Specific Wiring Method

Connection method A:

This is the preferred method of control with the communicating control, Midea indoor and outdoor unit. Refer to the wiring method of internal and external machine communication and wired controller as follows:

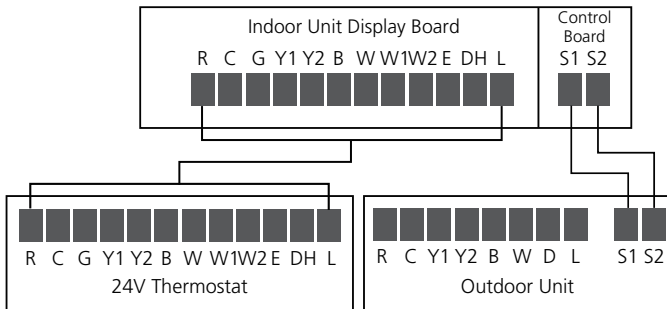


WARNING

Please refer to the wiring nameplate for the wiring method. Do not connect 24V AC to S1 - S2, as this will damage the system.

Connection method B:

This is the preferred method when using a 24V thermostat with Midea indoor and outdoor unit. To use a 24V thermostat, you need to refer to the following wiring:



NOTICE

The use of shielded communication or thermostat wire is not required, but is recommended where separation from high voltage conductors can not be maintained, or in areas with high electrical noise.

The shield and drain conductor must be grounded at the outdoor unit and stripped back and taped at the indoor unit. Grounding at both ends results in an increase of noise transmitted onto the signal wires.

When using a 24V thermostat, please refer to the non-communicating wiring diagrams that follow:

Connection method C:

NOTICE

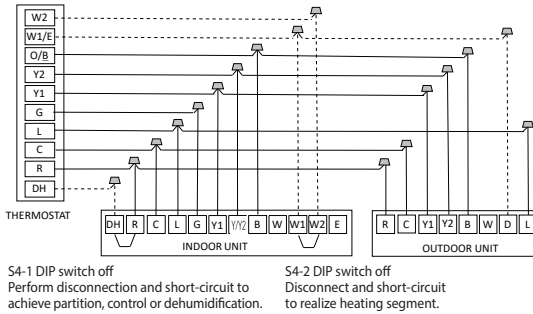
This equipment uses B functionality. This terminal is energized for heating functionality. Please ensure that thermostat configuration is set up for B functionality.

Non-communication scheme wiring reference

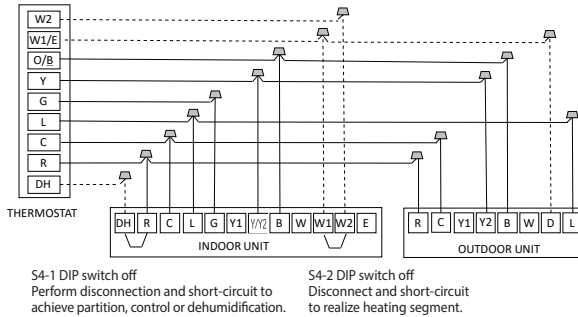
Note: These methods are for use with a Midea outdoor unit and a third party indoor unit or Cased coil and gas furnace.

The following wiring diagram are suitable for the AHU and ODU with 24V thermostat.

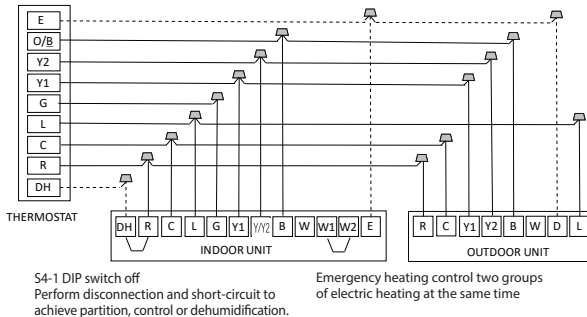
- Wiring for 4H and 2C thermostat:



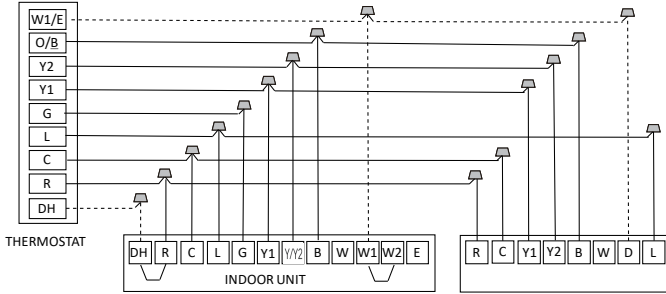
- Wiring for 3H and 1C thermostat:



- Wiring for 3H and 2C thermostat:



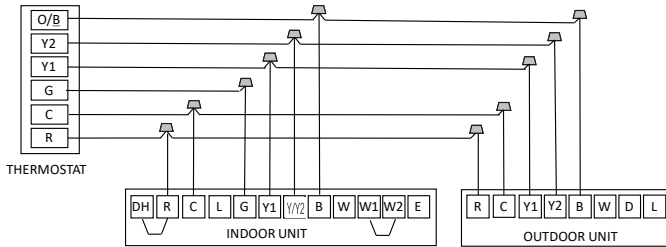
- Wiring for 3H and 2C thermostat:



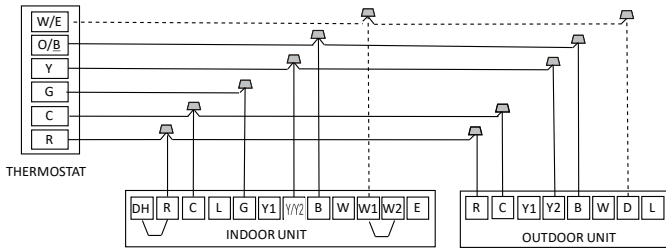
S4-1 DIP switch off
Perform disconnection and short-circuit to achieve partition, control or dehumidification

S4-2 DIP switch off
Disconnect and short circuit to realize heating segment

- Wiring for 2H and 2C thermostat:

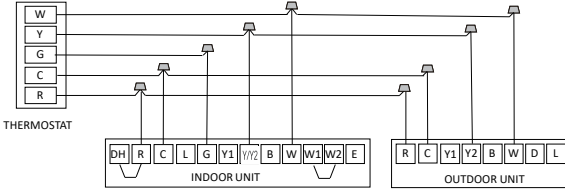


- Wiring for 2H and 1C thermostat:



S4-2 DIP switch off
Disconnect and short circuit to realize heating segment

- Wiring for 1H and 1C thermostat:

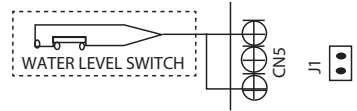


Note:

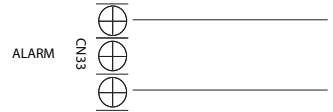
This is the least preferred method of control wiring and should only be used for emergency situations. Full comfort capacity may not be achieved using this method.

- **Condensate overflow switch:**

The unit will accommodate a remote condensate overflow switch. To enable, remove jumper J1, and connect the installer provided condensate overflow device to CN5 per below. When an overflow condition is present, the device should open connection signaling the unit to turn off the system.



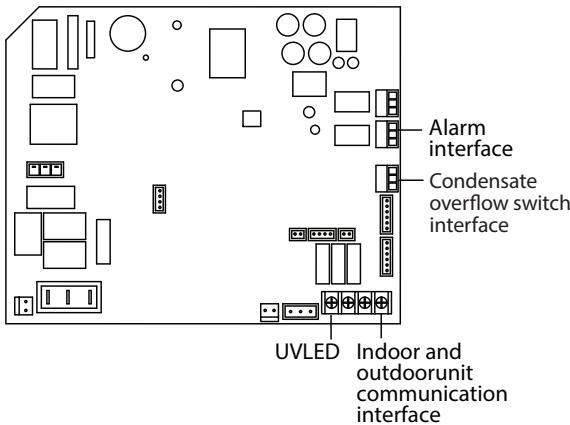
- **The fault warning**



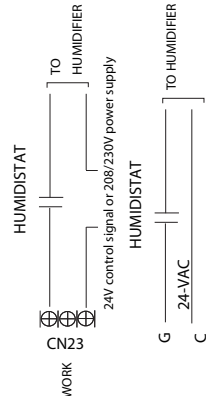
Alarm output:

An alarm output (CN33) can be utilized if actions are required when a fault is present. This is a passive outlet port, so you will need to input a voltage signal. The relay is normally-open for normal operation, and closed when a fault condition is active.

Optional function wiring:

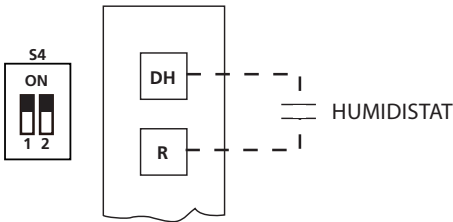


- **Humidifier control:**



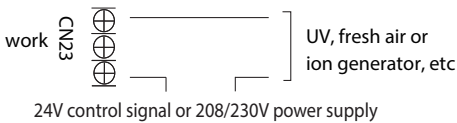
To connect a humidifier, utilize the passive signal "WORK" output (CN23) port as well as the G and C wires on the controller, and wire the humidistat and humidifier per above wiring diagram. When the fan is running, the CN23 relay will be closed, which will allow power to the humidifier when the humidistat is below humidity setpoint. If the thermostat or zone controller has an HUM interface, connect the humidifier directly to the HUM and C ports.

• **Dehumidification control wiring**



Dehumidification control requires external Humidistat at DH and R. Set S4-2 as OFF. When the humidity rises and exceeds the set value of the Humidistat, the 24V signal of DH changes to OV, the cooling system starts the dehumidification operation, and the air volume drops to 80% of the nominal cooling air volume.

• **UV, fresh air or ion generator wiring**



The WORK port is linked with the fan. When the fan is running, the relay is closed; if an active 24V signal is required, it can be directly connected to the G and C ports.

Control Logic

Indoor Unit Connector

Connector	Purpose
R	24V Power Connection
C	Common
G	Fan Control
Y1	Low Cooling
Y/Y2	High Cooling
B	Heating Reversing Valve
W	Heating control
W1	Stage 1 Electric Heating
W2	Stage 2 Electric Heating
E/AUX	Emergency Heating
DH/DS/BK	Dehumidification/Zoning control
L	System Fault Signal

Outdoor Unit Connector

Connector	Purpose
R	24V Power Connection
C	Common
Y1	Low Cooling
Y2	High Cooling
B	Heating Reversing Valve
W	Heating control
D	Defrost heat
L	System Fault Signal

LED Display

The control displays unit status as well as any active fault codes on the LED display. If the unit is functioning normally, the LED will display current temperature setpoint or if a 24V thermostat is used, a functional display code from the table below will be shown. When a fault code is active, the display will flash the active fault code.

Please refer to the fault code table located in the troubleshooting section of the Service Manual for detailed fault code information.

Functional Display

Mode	Priority	G	Y1	Y/Y2	B	W	W1	W2	E/AUX	DH/DS/BK	Display
Shut down	/	0	0	0	0	0	0	0	0	*	00
Fan	7	1	0	0	0	0	0	0	0	1	01
Fan		1	0	0	0	0	0	0	0	0	
Cooling	6	*	1	0	0	0	0	0	0	1	02
Cooling 2		*	*	1	0	0	0	0	0	1	03
Dehumidification 1		*	1	0	0	0	0	0	0	0	04
Dehumidification 2		*	*	1	0	0	0	0	0	0	05
Heating 1	5	*	1	0	1	0	0	0	0	1	06
Heating 2		*	*	1	1	0	0	0	0	1	
Heating 2		*	*	*	*	1	0	0	0	1	07
Electric heating 1	3	*	0	0	0	0	1	0	0	*	08
Electric heating 1		*	0	0	0	0	0	1	0	*	
Electric heating 2		*	0	0	0	0	0	1	1	0	*
Heating 1 + electric heating 1	4	*	1	0	1	0	1	0	0	1	10
Heating 1 + electric heating 1		*	1	0	1	0	0	1	0	1	
Heating 2 + electric heating 1		*	*	1	1	0	1	0	0	1	
Heating 2 + electric heating 1		*	*	*	*	1	1	0	0	1	
Heating 2 + electric heating 1		*	*	1	1	0	0	1	0	1	
Heating 2 + electric heating 1		*	*	*	*	1	0	1	0	1	
Heating 1 + electric heating 2		*	1	0	1	0	1	1	0	1	11
Heating 2 + electric heating 2		*	*	1	1	0	1	1	0	1	
Heating 2 + electric heating 2	*	*	*	*	1	1	1	0	1		
Emergency heating	1	*	*	*	*	*	*	*	1	*	12
Heating zone control	2	*	1	0	1	0	*	*	0	0	13
Heating zone control		*	*	1	1	0	*	*	0	0	
Heating zone control		*	*	*	*	1	*	*	0	0	

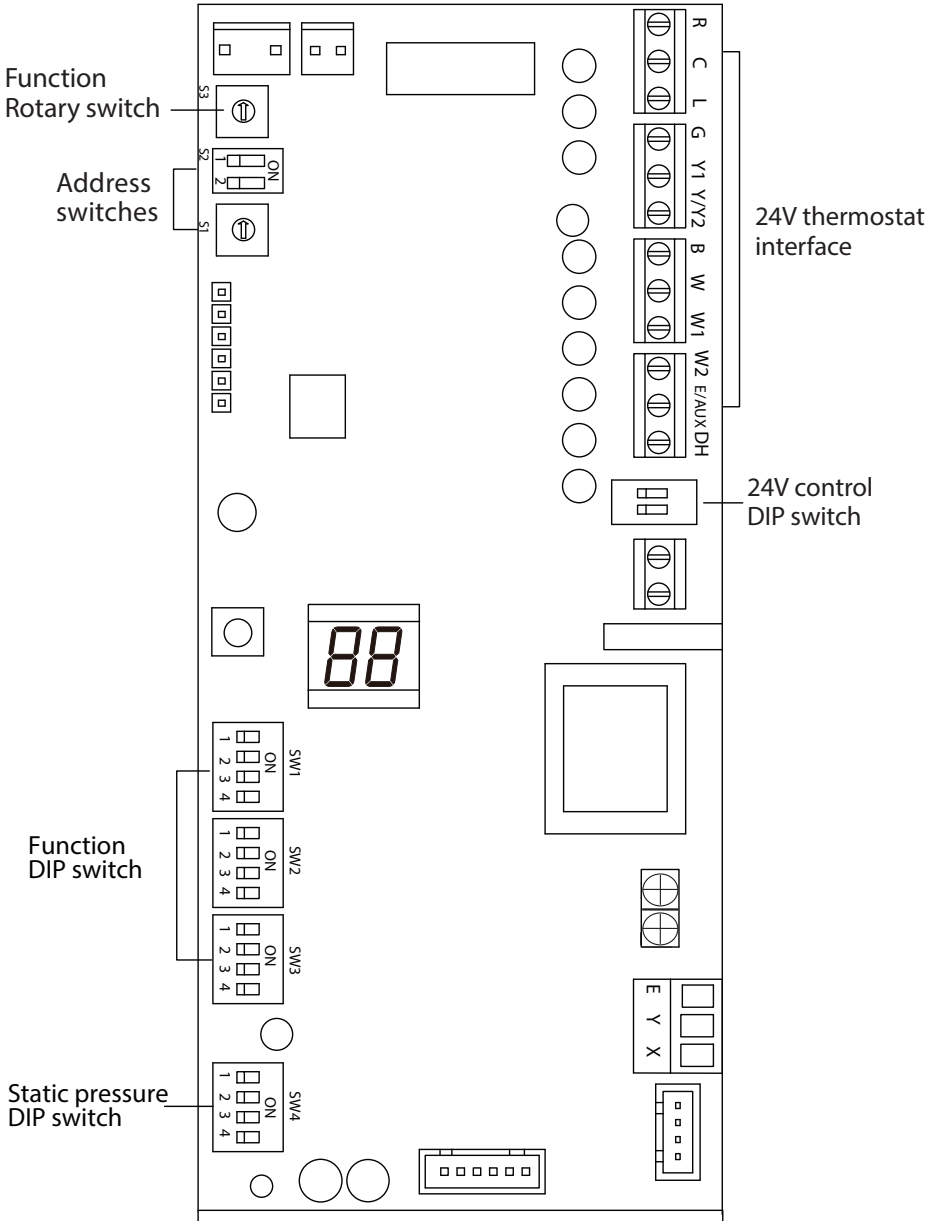
NOTICE

1 : signal

0 : no signal

The terminal input signal is stable for 1 second before confirmation.

DIP Switch Definitions



Wiring

Function DIP Switch Settings:

The 24V thermostat mode needs to refer to the following settings.



SW4-1	000 is the default
SW4-2	000/001/010/011/100/101/110/111, internal machines with different abilities, electric heating and PSC classification for use
SW4-3	

Indoor unit dial code

NO.	Dial code	Features	ON	OFF
1	SW1-1	Whether 24V thermostat is used or not.	YES	NO
2	SW1-2	Anti-cold blow protection option.	NO	YES
3	SW1-3	Single cooling/heating and cooling options.	Cooling.	Cooling & Heating.
4	SW1-4	Stand alone indoor unit or full system.	Indoor unit only.	Full system.
5	SW2-1	First stage auxiliary heating.	1°C (1.8°F)	2°C (3.6°F)
6	SW2-2	Electric heat on delay.	30 minutes.	15 minutes.
7	SW2-3	Electric auxiliary heating delay to start time.	YES	NO
8	SW2-4	Compressor / Auxiliary heat outdoor ambient lockout.	The heater will not operate if the outdoor temperature is greater than the temperature set by S3.	The compressor will not operate if the outdoor temperature is lower than the temperature set by S3.
9	SW3-1	Maximum continuous runtime allowed before system automatically stages up capacity to satisfy set point. This adds 0.5 to 3.0°C to the user set point in the calculated control point to increase capacity and satisfy user set point.	30 minutes.	90 minutes.
10	SW3-2	Cooling and heating Y2 temperature differential adjustment.	1°C (1.8°F)	2°C (3.6°F)
11	SW3-3	Temperature differential to activate second stage auxiliary heating.	2°C (3.6°F)	3°C (5.4°F)
12	Rotary Switch S3	Set outdoor temperature limitation (for auxiliary heat or compressor).	0 means that the temperature protection is not turned on, 1-F is -20-8°C (-4-46°F) respectively, and each scale represents 2°C (3.6°F).	
13	S4-1	Default ON.	Short circuit W1 and W2.	W1, W2 separate.
14	S4-2	DH function selection.	DH is off by default.	DH on.

NOTICE

The SW4 DIP switch is only for Certified service technicians to debug and use, please do not touch it.

Outdoor unit DIP Switch setting

NO.	Dial code	Features	ON	OFF
1	SW-1	Metering device location	Outdoor throttling (normally closed single-way solenoid valve is not powered on).	Indoor throttling (normally closed single-way solenoid valve store).
2	SW-2	Communication setting	24V communication scheme	485 communication scheme
3	SW-3	Strong cold and strong heat function	The cooling/heating target pressure compensation value is valid.	The cooling/heating target pressure compensation value is invalid.
4	SW-4	Function to be defined	_____	_____





Address DIP switch:

Address dialing S1+S2: When the user uses the centralized controller, the address dialing is required.

Network address: The address silkscreen is NET address, which is composed of a 16-bit address rotary code S2 plus a two-digit DIP switch S1 [Set during engineering installation, no network function does not need to be set].

- When S2 is 00 (the dialing code is not connected), the network address value is the value of S2.
- When S2 is 01 (corresponding to the dial code of the 5.1K resistor connected to the hardware is turned on), the network address value is the value of S2 plus 16.
- When S2 is 10 (corresponding to the switch of the hardware connected to the 10K resistor), the network address value is S2 plus 32.
- When S2 is 11 (all dialing codes are on), the network address value is the value of S2 plus 48.

Determined by dial code S2 1-10K 2-5.1K

S2 dip switch setting	Website address
	S2 + 48
	S2 + 32
	S2 + 16
	S2

Air volume table

<i>Model</i>	<i>SW4-1, 2, 3 setting (default) air volume (CFM)</i>	<i>001 air volume (CFM)</i>	<i>010 air volume (CFM)</i>	<i>011 air volume (CFM)</i>
18K	660	630	600	570
	10KW	10KW, 8KW	8KW	5KW, 3KW
24K	880	850	830	800
	15KW	15KW, 8KW	10KW, 8KW	5KW, 3KW
30K	1100	1040	990	930
	15KW	15KW, 10KW	10KW, 8KW	8KW, 5KW
36K	1320	1255	1190	1125
	20KW	15KW	10KW, 8KW	8KW, 5KW
48K	1760	1675	1580	1490
	20KW	15KW, 10KW	10KW, 8KW	8KW
60K	2195	2055	1920	1775
	25KW	20KW, 15KW	15KW, 10KW	10KW

NOTICE

The air flow DIP switch can only change the air volume when the electric heating is turned on, and the air conditioner cooling and heating air volume remains unchanged. If the DIP switch is wrong, the default air flow will be run.

High, medium and low air volume parameters

18K			24K			30K			36K			48K			60K		
Fan speed	Static pressure (Pa/m W.C)	Air volume (CFM)	Fan speed	Static pressure (Pa/m W.C)	Air volume (CFM)	Fan speed	Static pressure (Pa/m W.C)	Air volume (CFM)	Fan speed	Static pressure (Pa/m W.C)	Air volume (CFM)	Fan speed	Static pressure (Pa/m W.C)	Air volume (CFM)	Fan speed	Static pressure (Pa/m W.C)	Air volume (CFM)
Low	0/0	489	0/0	598	422	0/0	879	946	0/0	946	1151	0/0	946	1151	0/0	946	1151
	25/0.1	493	25/0.1	613	705	25/0.1	883	943	25/0.1	943	1136	25/0.1	943	1136	25/0.1	943	1136
	37/0.15	490	37/0.15	625	713	37/0.15	888	942	37/0.15	942	1133	37/0.15	942	1133	37/0.15	942	1133
	50/0.2	488	50/0.2	630	705	50/0.2	892	948	50/0.2	948	1132	50/0.2	948	1132	50/0.2	948	1132
	75/0.3	501	75/0.3	632	708	75/0.3	893	947	75/0.3	947	1128	75/0.3	947	1128	75/0.3	947	1128
	100/0.4	497	100/0.4	635	711	100/0.4	893	940	100/0.4	940	1134	100/0.4	940	1134	100/0.4	940	1134
	125/0.5	495	125/0.5	631	707	125/0.5	892	940	125/0.5	940	1130	125/0.5	940	1130	125/0.5	940	1130
	150/0.6	492	150/0.6	624	704	150/0.6	890	933	150/0.6	933	1133	150/0.6	933	1133	150/0.6	933	1133
	200/0.8	489	200/0.8	614	702	200/0.8	873	925	200/0.8	925	1126	200/0.8	925	1126	200/0.8	925	1126
	250/1.0	488	250/1.0	624	698	250/1.0	826	925	250/1.0	925	1118	250/1.0	925	1118	250/1.0	925	1118
Mid	0/0	524	0/0	692	813	0/0	1010	1155	0/0	1155	1367	0/0	1155	1367	0/0	1155	1367
	25/0.1	528	25/0.1	690	811	25/0.1	1001	1156	25/0.1	1156	1358	25/0.1	1156	1358	25/0.1	1156	1358
	37/0.15	532	37/0.15	685	813	37/0.15	1001	1154	37/0.15	1154	1362	37/0.15	1154	1362	37/0.15	1154	1362
	50/0.2	542	50/0.2	695	816	50/0.2	1000	1154	50/0.2	1154	1361	50/0.2	1154	1361	50/0.2	1154	1361
	75/0.3	523	75/0.3	693	815	75/0.3	995	1143	75/0.3	1143	1360	75/0.3	1143	1360	75/0.3	1143	1360
	100/0.4	524	100/0.4	692	811	100/0.4	995	1147	100/0.4	1147	1352	100/0.4	1147	1352	100/0.4	1147	1352
	125/0.5	533	125/0.5	688	809	125/0.5	996	1149	125/0.5	1149	1353	125/0.5	1149	1353	125/0.5	1149	1353
	150/0.6	523	150/0.6	684	801	150/0.6	983	1143	150/0.6	1143	1348	150/0.6	1143	1348	150/0.6	1143	1348
	200/0.8	521	200/0.8	670	807	200/0.8	996	1140	200/0.8	1140	1340	200/0.8	1140	1340	200/0.8	1140	1340
	250/1.0	519	250/1.0	654	801	250/1.0	969	1113	250/1.0	1113	1316	250/1.0	1113	1316	250/1.0	1113	1316
High	0/0	573	0/0	752	899	0/0	1137	1325	0/0	1325	1608	0/0	1325	1608	0/0	1325	1608
	25/0.1	577	25/0.1	746	895	25/0.1	1123	1328	25/0.1	1328	1590	25/0.1	1328	1590	25/0.1	1328	1590
	37/0.15	580	37/0.15	750	902	37/0.15	1119	1337	37/0.15	1337	1586	37/0.15	1337	1586	37/0.15	1337	1586
	50/0.2	576	50/0.2	756	898	50/0.2	1120	1337	50/0.2	1337	1560	50/0.2	1337	1560	50/0.2	1337	1560
	75/0.3	579	75/0.3	750	900	75/0.3	1112	1330	75/0.3	1330	1561	75/0.3	1330	1561	75/0.3	1330	1561
	100/0.4	574	100/0.4	746	909	100/0.4	1111	1333	100/0.4	1333	1554	100/0.4	1333	1554	100/0.4	1333	1554
	125/0.5	573	125/0.5	741	901	125/0.5	1113	1338	125/0.5	1338	1549	125/0.5	1338	1549	125/0.5	1338	1549
	150/0.6	576	150/0.6	745	908	150/0.6	1101	1335	150/0.6	1335	1545	150/0.6	1335	1545	150/0.6	1335	1545
	200/0.8	577	200/0.8	735	905	200/0.8	1094	1321	200/0.8	1321	1543	200/0.8	1321	1543	200/0.8	1321	1543
	250/1.0	574	250/1.0	714	899	250/1.0	1088	1321	250/1.0	1321	1548	250/1.0	1321	1548	250/1.0	1321	1548

SPECIFICATIONS

COOLING AND HEATING SPECIFICATIONS

• Air Handler

Series		18K	24K	30K	36K	48K	60K
Midea Indoor Unit Model: MVC-		18HWFNI-M	24HWFNI-M	30HWFNI-M	36HWFNI-M	48HWFNI-M	60HWFNI-M
Power supply	Rated	208/230V, 1, 60					
	V, Ph, Hz						
MCA/MOCP ¹	A	2.5 / 15.0	4.0 / 15.0	4.5 / 15.0	5.0 / 15.0	7.5 / 15.0	9.0 / 15.0
Indoor air flow (Hi/Mi/Lo)	CFM	576.47/529.41/488.24	758.82/694.12/629.41	894.12/805.88/711.76	1082.35/970.59/864.71	1282.35/1094.12/905.88	1582.35/1358.82/1135.29
Indoor noise level (Hi/Mi/Lo)	dBA	36/34/32	43/40.5/35	43/40/30.5	46.8/44/41.3	53/50/46	52.5/49/44
ESP ²	Range	0-0.8	0-0.8	0-0.8	0-0.8	0-0.8	0-0.8
Throttle type							
EEV for cooling							
Dimension (WxDXH)	in	21.02x17.52x45.00	21.02x17.52x45.00	21.02x21.02x49.02	21.02x21.02x49.02	21.02x21.02x49.02	21.02x24.49x52.99
Packing (WDXH)	in	25.20x20.87x50.39	25.20x20.87x50.39	25.20x24.41x54.33	25.20x24.41x54.33	25.20x24.41x54.33	25.20x27.76x58.27
Net/gross weight	lbs	105.82/129.41	105.60/127.43	129.19/155.64	129.19/155.64	130.51/156.31	162.70/190.70
Refrigerant piping	Liquid side/gas side	3/8 / 3/4	3/8 / 3/4	3/8 / 3/4	3/8 / 3/4	3/8 / 3/4	3/8 / 7/8
Drainage water pipe diameter	in	3/4	3/4	3/4	3/4	3/4	3/4
Communication protocol between IDU and ODU							
RS485+24V							
Thermostat type	Wireless remote controller	Standard					
	Programmable wired controller	Standard					
	Wi-Fi	Optional					
Qty per 20'x40'x40' HQ	Indoor unit	39/82/154	39/82/154	27/57/57	27/57/57	27/57/57	27/57/57

¹ MCA: Minimum Circuit Ampacity / MOCP: Maximum Over Current Protection

² External Static Pressure

NOTICE

Values do not include optional electric heat. See instructions for selected Heat Kit for specifications.

• Standard

Series		Regular					
Midea Outdoor Unit Model:		MOX330U-18HFN1-MRO	MOX430U-24HFN1-MRO	MOD30U-30HFN1-MRO	MOD30U-36HFN1-MRO	MOE30U-48HFN1-MRO	MOE30U-60HFN1-MRO
Power supply	Rated	208/230V, 1.60					
	V, Ph, Hz						
Cooling	MCA/MOCP ¹	16.0 / 20.0	19.0 / 30.0	20.0 / 35.0	24.0 / 40.0	34.0 / 50.0	34.0 / 60.0
	Rated capacity (range)	18000 (5350-18700)	24000 (7500-26000)	30000 (9482-33000)	36000 (7700-38900)	47000 (10500-48000)	57000 (4395-60200)
	EER	11.1	11.3	10.9	10.4	9.3	10.3
	SEER	19.0	19.4	19.5	18.0	17.3	18.0
	Rated capacity (range)	18000 (5600-18700)	26000 (5600-30000)	31000 (12200-32000)	36000 (6000-36400)	55000 (11700-57000)	60000 (11400-63100)
Heating at 47°F (8.3°C)	HSPF4	10.8	11.3	10.3	9.1	10.0	9.2
	HSPF5	8.8	9.2	8.6	7.1	8.2	7.6
Heating at 5°F (-15°C)	Capacity	9550	17000	20000	18600	27000	29000
	COP	1.85	1.75	1.95	1.80	1.75	1.80
Outdoor noise level (Sound pressure)		54.0	56.5	61.5	61.0	59.0	61.0
Throttle type		EEV for Heating					
Outdoor unit	Dimension (WxDxH)	31.69x12.99x21.81	35.04x13.46x26.50	37.24x16.14x31.89	37.24x16.14x31.89	37.48x16.34x52.48	37.48x16.34x52.48
	Packing (WxDxH)	36.02x14.57x24.21	39.17x15.67x29.13	42.91x19.69x34.84	42.91x19.69x34.84	43.11x19.49x58.27	43.11x19.49x58.27
	Net/gross weight	75.84/81.35	102.29/109.13	141.76/151.46	151.68/161.16	217.59/248.68	217.15/248.46
	Liquid side/gas side	3/8 / 3/4	3/8 / 3/4	3/8 / 3/4	3/8 / 3/4	3/8 / 3/4	3/8 / 7/8
Refrigerant piping	Max. pipe length	98	164	213	213	213	213
	Max. difference in level	66	82	98	98	98	98
Ambient temperature	Cooling	°F (°C)					
	Heating	°F (°C)					
Qty per 20'/40'/40" HQ	Outdoor unit	114/234/312	99/198/198	44/96/144	44/96/144	22/48/48	22/48/48
	Performance	AHRI	Yes				
Certification	E*Star	-					
	NEEP	Yes					
	UL	Yes					
	ETL	-					
	Safety	-					
	CSA	-					

¹ MCA: Minimum Circuit Ampacity / MOCP: Maximum Over Current Protection

• Cold Climate Heat Pump

Series		Cold Climate Heat Pump				
Midea Outdoor Unit Model:		MOX430U-18HFN1-M	MOD30U-24HFN1-MW	MOD30U-30HFN1-MRO(X)	MOE31U-36HFN1-M	MOE30U-48HFN1-M-(X)
Power supply	Rated	208/230V, 1.60				
		V, Ph, Hz				
	MCA/MOCP ¹	A	20.5 / 35.0	23.0 / 35.0	41.0 / 50.0	42.0 / 50.0
Cooling	Rated capacity (range)	Btu/h	24000 (6400-27000)	30000 (10400-33600)	36000 (12000-47400)	47000 (18000-48000)
	EER	Btu/W	12.5	11.0	10.5	8.5
	SEER	Btu/W	20.0	18.0	18.0	16.0
Heating at 47°F (8.3°C)	Rated capacity (range)	Btu/h	24000 (10100-31000)	33000 (12000-37000)	40000 (9000-57200)	50000 (20000-55000)
	H-SPF4	Btu/W	12.0	10.5	10.5	10.0
	H-SPF5	Btu/W	10.0	8.4	8.5	8.5
Heating at 5°F (-15°C)	Capacity	Btu/h	24000	28500	43500	47000
	COP	W/W	1.80	1.95	1.80	1.88
Outdoor noise level (Sound pressure)		dB(A)	64.0	61.5	64.0	64.0
Throttle type		EEV for Heating				
Outdoor unit	Dimension (WxDxH)	in	35.0x41.3x46x26.50	37.24x46.14x31.89	37.48x46.34x52.48	37.48x46.34x52.48
	Packing (WxDxH)	in	39.17x45.67x29.13	42.91x49.69x34.84	43.11x49.49x58.27	43.11x49.49x58.27
	Net/gross weight	lbs	102.95/109.79	136.69/145.50	159.83/169.75	227.07/255.73
Refrigerant piping	Liquid side/gas side	in	3/8 / 3/4	3/8 / 3/4	3/8 / 3/4	3/8 / 3/4
	Max. pipe length	ft	98	164	213	213
	Max. difference in level	ft	66	82	98	98
Ambient temperature	Cooling	°F (°C)	-22 - 122 (-30 - 50)			
	Heating	°F (°C)	-22 - 75 (-30 - 24)			
Qty per 20'/40'/40' HQ	Outdoor unit		99/198/198	44/96/144	22/48/48	22/48/48
			Yes			
Certification	Performance	AHRI	Yes			
		E*Star	Yes	Yes	-	-
	Safety	NEEP	Yes			
		UL	Yes			
		ETL	-			
CSA	-					

¹ MCA: Minimum Circuit Ampacity / MOCP: Maximum Over Current Protection

AIR EVACUATION

Preparations and Precautions

Air and foreign matter in the refrigerant circuit can cause abnormal rises in pressure, which can damage the Heat Pump, reduce its efficiency, and cause injury. Use a vacuum pump and manifold gauge to evacuate the refrigerant circuit, removing any non-condensable gas and moisture from the system.

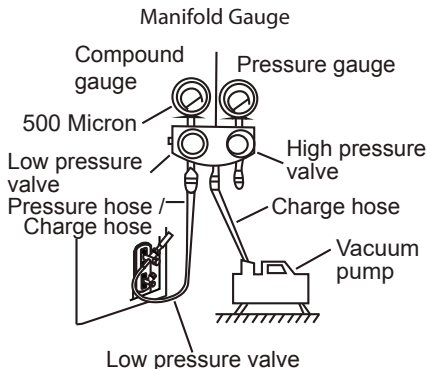
Evacuation should be performed upon initial installation and when refrigerant is removed for any reason.

BEFORE PERFORMING EVACUATION

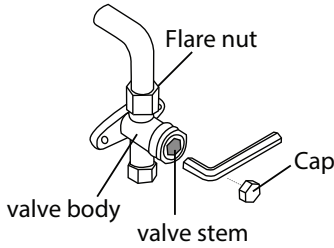
- Check to make sure the refrigerant pipes between the indoor and outdoor units are connected properly.
- Check to make sure all wiring is connected properly.

Evacuation Instructions

1. Connect the charge hose of the manifold gauge to service port on the outdoor unit's low pressure valve.
2. Connect another charge hose from the manifold gauge to the vacuum pump.
3. Open the Low Pressure side of the manifold gauge. Keep the High Pressure side closed.
4. Turn on the vacuum pump to evacuate the system.
5. Run the vacuum for at least 15 minutes, or until the Micron Gauge reads 500 Micron.
6. Close the Low Pressure side of the manifold gauge, and turn off the vacuum pump.
7. Wait for 5 minutes, then check that there has been no change in system pressure.
8. If there is a significant change in system pressure, check for leaks. If there is no change in system pressure, unscrew the cap from the packed valve (high pressure valve). Pressure rises but becomes stable below 1000 Microns, ok to open valves. Pressure becomes stable above 1000 but below 2000 Microns there is moisture in system, further evacuation and dehydration required. Pressure rises above 2000 Microns or does not become stable, there is a leak.
9. Insert hexagonal wrench into the packed valve (high pressure valve) and open the valve by turning the wrench in a 1/4 counterclockwise turn. Listen for gas to exit the system, then close the valve after 5 seconds.



- Watch the Pressure Gauge for one minute to make sure that there is no change in pressure. The Pressure Gauge should read slightly higher than atmospheric pressure.
- Remove the charge hose from the service port.



- Using hexagonal wrench, fully open both the high pressure and low pressure valves.
- Tighten valve caps on all three valves (service port, high pressure, low pressure) by hand. You may tighten it further using a torque wrench if needed.

⚠ OPEN VALVE STEMS GENTLY

- When opening valve stems, turn the hexagonal wrench until it hits against the stopper. Do not try to force the valve to open further.
- Ensure hexagonal wrench is inserted to full depth of socket. Failure to do so or use of stepped service valve tool may result in stripped and unusable socket.

Note on Adding Refrigerant

Some systems require additional charging depending on pipe lengths. The standard length is 25 ft (7.6m), add refrigerant for lengths beyond 25 ft (7.6m). The system MUST be operating in cooling mode to add charge. The refrigerant should be charged as liquid from the service port on the outdoor unit's low pressure valve. The additional refrigerant to be charged can be calculated using the following formula:

Liquid Side Diameter

	Ø9.52mm (3/8in)
R-410A: (Metering device in the indoor unit):	(Total pipe length - standard pipe length) x65g (0.69oz)/m(ft)
R-410A: (Metering device in the outdoor unit):	(Total pipe length - standard pipe length) x30g (0.32oz)/m(ft)

⚠ CAUTION

DO NOT mix refrigerant types.

TEST RUN

Before Test Run

A test run must be performed after the entire system has been completely installed. Confirm the following points before performing the test:

- a. Indoor and outdoor units are properly installed.
- b. Piping and wiring are properly connected.
- c. No obstacles near the inlet and outlet of the unit that might cause poor performance or product malfunction.
- d. Refrigeration system does not leak.
- e. Drainage system is unimpeded and draining to a safe location.
- f. Heating insulation is properly installed.
- g. Grounding wires are properly connected.
- h. Length of the piping and additional refrigerant charge have been recorded.
- i. Power voltage is the correct voltage for the air conditioner.

CAUTION

Failure to perform the test run may result in unit damage, property damage, or personal injury.

Test Run Instructions

1. Open both the liquid and gas service valves.
2. Turn on the main power switch and allow the unit to warm up.
3. Set the air conditioner to COOL mode.
4. For the Indoor Unit:
 - a. Double check to see if the room temperature is being registered correctly.

- b. Check to see that the drainage system is unimpeded and draining smoothly.
 - c. Ensure there is no vibration or abnormal noise during operation.
5. For the Outdoor Unit:
 - a. Check to see if the refrigeration system is leaking.
 - b. Make sure there is no vibration or abnormal noise during operation.
 - c. Ensure the exhausted air, noise, and water generated by the unit do not disturb your neighbors or pose a safety hazard.
 6. Drainage Test:
 - a. Ensure the drainpipe flows smoothly. New buildings should perform this test before finishing the ceiling.
 - b. Turn on the main power switch and run the air conditioner in COOL mode.
 - c. Check to see that the water is discharged. It may take up to one minute before the unit begins to drain depending on the drainpipe.
 - d. Make sure that there are no leaks in any of the piping.
 - e. Stop the air conditioner. Turn off the main power switch and reinstall the test cover.

NOTICE

If the unit malfunctions or does not operate according to your expectations, please refer to the Troubleshooting section of Service Manual before calling customer service.



make yourself at home