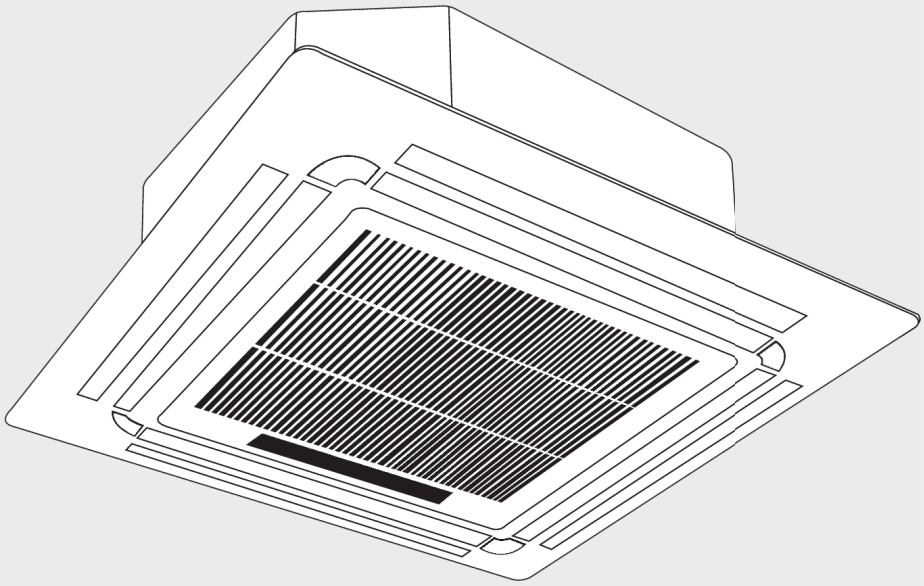


Bosch Four Way Cassette Ductless Single Split Air Conditioner / Heat Pump

Climate 5000 Series

BOSCH

Installation Manual

AHRI CERTIFIED® www.ahridirectory.org
Unitary Small HP
AHRI Standard 210/240
Certification applies only when the complete system is listed with AHRI.

C ETL LISTED US
Intertek

Table of Contents

1 Key to Symbols and Safety Instructions

1.1 Key to Symbols

Warnings

Warnings in this document are identified by a warning triangle printed against a grey background. Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken.

The following keywords are defined and can be used in this document:

- **DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION** indicates a hazardous situation which, if not avoided, could result in minor to moderate injury.
- **NOTICE** is used to address practices not related to personal injury.

Important information

This symbol indicates important information where there is no risk to people or property.

1.2 Safety

Please read safety precautions before installation

Incorrect installation due to ignoring instructions can cause serious damage or injury.

WARNING: ELECTRICAL HAZARD

- Do not modify the length of the power supply cord or use an extension cord to power the unit.
- Do not share the electrical outlet with other appliances. Improper or insufficient power supply can cause fire or electrical shock.

WARNING: INSTALLATION REQUIREMENTS

- Installation must be performed by a licensed contractor, and per the instructions in the installation manual. Improper installation can cause water leakage, electrical shock, or fire.
- In North America, installation must be performed in accordance with the requirement of NEC (National Electric Code) and CEC (Canadian Electric Code) by licensed and qualified personnel only.
- Only contact a licensed contractor for repair or maintenance of this unit.
- 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.
- Install the unit in a solid 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/or damage.

WARNING:

- This product can expose you to chemicals including Lead and Lead components, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

WARNING: ELECTRICAL HAZARD

- For all electrical work, follow all local and national wiring standards, regulations, and the Installation Manual. The power supply to the outdoor unit requires a service disconnect at the unit. Only use a dedicated circuit. Never share a power source connected to this system. Insufficient electrical capacity or defects in electrical work can cause electrical shock or fire.
- For all electrical work, use the specified cables. 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 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.
- In certain functional environments, such as kitchens, server rooms, etc., the use of specially designed air-conditioning units is highly recommended.
- If the power supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons such as a licensed electrician in order to avoid a hazard.
- The product must be properly grounded at the time of installation, or electrical shock may occur.

CAUTION: BURN HAZARD

- For units that have an auxiliary electric heater, do not install the unit within 1 meter (3 feet) of any combustible materials.
- 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.
- Do not operate your air conditioner in a wet room such as a bathroom or laundry room. Too much exposure to water can cause electrical components to short circuit.

NOTICE: PROPERTY DAMAGE

- Install condensate drainage piping according to the instructions in this manual. Improper condensate drainage may cause water damage to your home and property.

CAUTION: CONTAINS REFRIGERANT

- This air-conditioning unit contains fluorinated gases. For specific information on the type of gas and the amount, please refer to the relevant label on the outdoor unit itself.
- Installation, service, maintenance and repair of this unit must be performed by a certified technician.
- Product removal and recycling must be performed by a certified technician.
- If the system has a leak-detection system installed, it must be checked for leaks at least every 12 months.
- When the unit is checked for leaks, proper record-keeping of all checks is strongly recommended.

2 Components

The air conditioning / heat pump system comes with the following components. Use all of the installation parts and components to install the system.

WARNING: ELECTRICAL HAZARD

- Improper installation may result in water leakage, electrical shock and fire, or cause the equipment to fail.

Name	Image	Quanity
Outlet pipe sheath		1
Metal champ		1
Drain joint		1
Seal ring		1
Tapping screws M3×10mm (On some models)		2
Drain Hose		1
Copper nut (Used to make the connective pipes between indoor and outdoor units)		2
Magnetic ring (Wrap the electric wires S1 & S2 (P & Q & E) around the magnetic ring twice) - 36k & 48k models only	 S1&S2(P&Q&E)	1
Magnetic ring (Hitch it on the connective cable between indoor unit and outdoor unit after installation.) - 48k model only		1
Remote controller		1
Fixing screw for remote controller holder ST2.9 x 10		2
Remote controller holder		1
Dry battery AAA		2
Owner's manual	—	1
Installation manual	—	1

Table 1

2.1 Mandatory accessories

This indoor unit requires installation of a decorative panel.

Part #	Description
8733953125	Compact Cassette Grille - 9K ~ 18K
8733953126	Cassette Grille - 24K ~ 48K

Table 2

3 Installation Summary

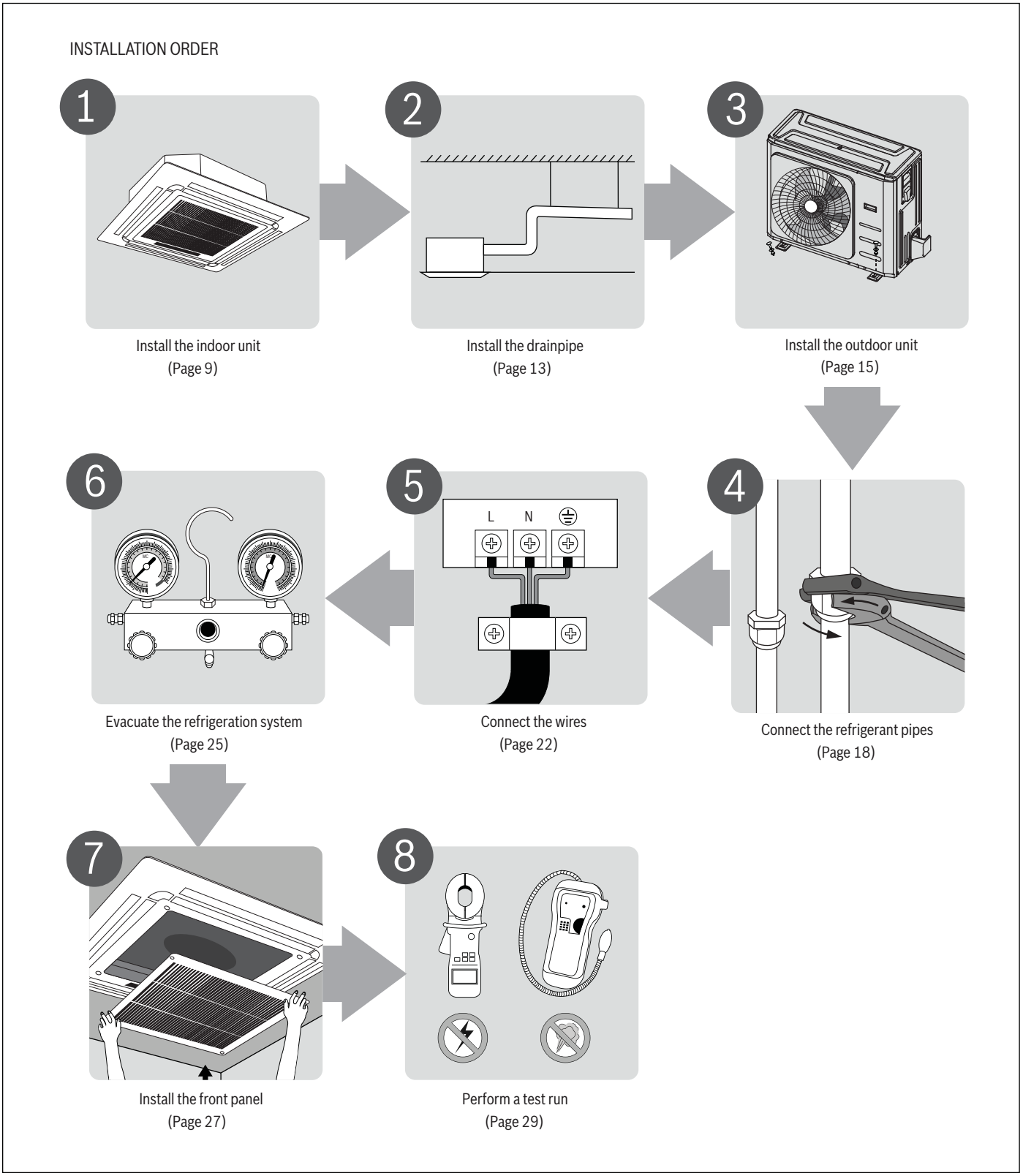


Figure 1

4 Unit parts

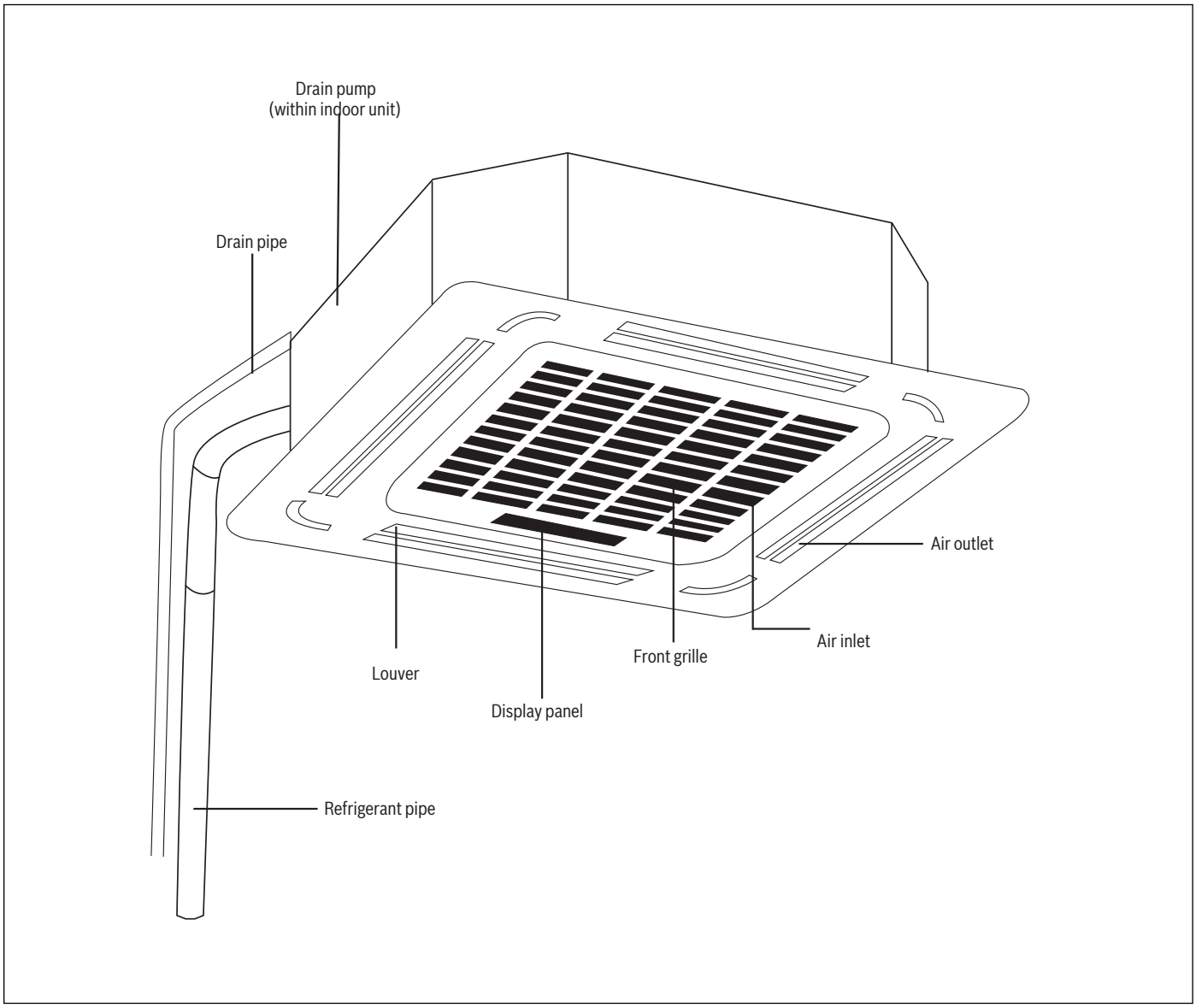


Figure 2

Illustrations in this manual are for explanatory purposes. The actual shape of your indoor unit may be slightly different. The actual shape shall prevail.

5 Indoor Unit Installation

5.1 Selecting Installation Site

When the conditions in the ceiling exceeds 30°C (86°F) with a relative humidity of 80%, or when fresh air needs to be introduced to the space, additional insulation is required (minimum 10 mm (0.4in) thickness, polyethylene foam).

Before installing the indoor unit, refer to the label on the product box to make sure that the model number of the indoor unit pairs with the model number of the outdoor unit.

Step 1: Select installation location

Before installing the indoor 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:
  - Good air circulation
  - Convenient drainage of condensate
  - Noise from the unit will not disturb other people
  - Firm and solid–the location will not vibrate
  - Strong enough to support the weight of the unit
  - A location at least three feet from all other electrical devices (e.g., TV, radio, computer)
  - Flat horizontal ceiling
  - Sufficient clearance for maintenance and service
- DO NOT install unit in the following locations:
  - Near any source of heat, steam, or combustible gas
  - Near flammable items such as curtains or clothing
  - Near any obstacle that might block air circulation
  - Near the doorway
  - In a location subject to direct sunlight

Step 2: Check required space

Install this unit where the height of bottom panel is more than 2.5m (8.2ft) from ground. Please refer to below figure for more information.

Step 3: Install the suspension bolt

(Use either a M8-M10 size bolt or the equivalent). Use a hole-in anchor for existing ceiling, and a sunken insert, sunken anchor or other field supplied parts for new ceilings to reinforce the ceiling to hold the weight of the unit and related parts. All the above parts and field supplied.

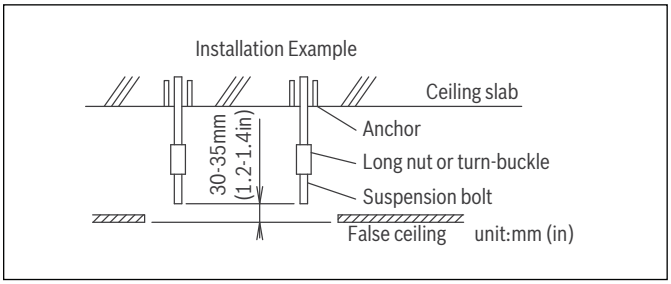


Figure 3

Recommended Distances Between the Indoor Unit and The Ceiling

The distance between the mounted indoor unit and the internal ceiling should meet the following specifications.

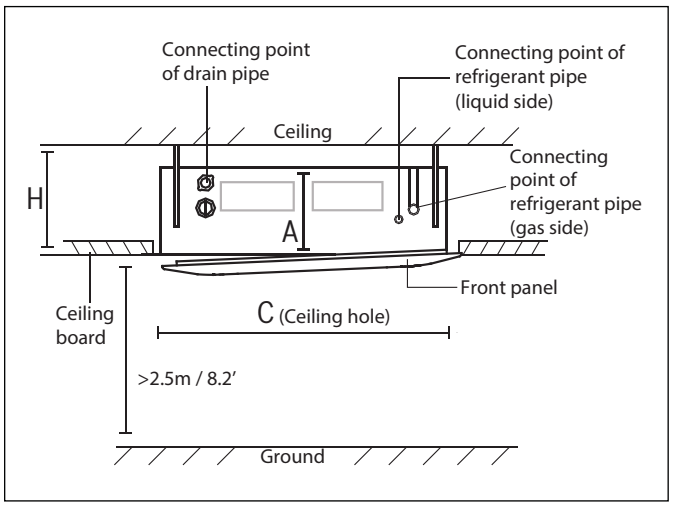


Figure 4

Model	A (mm/in)	H (mm/in)	C (mm/in)
9k - 18k	260/10.2	290/11.4 or more	600/23.6
24k	205/8.0	235/9.3 or more	880/34.5
36k	245/9.6	275/10.8 or more	880/34.5
48k	287/11.3	317/12.5 or more	880/34.5

Table 3

WARNING: CONTAINS REFRIGERANT

- Do not install the unit in an area where flammable materials are present due to risk of explosion resulting in serious injury or death.

WARNING: PROPERTY DAMAGE/SYSTEM FAILURE

- If the base is not strong enough to support the weight of the unit, the unit could fall out of place and cause serious injury.

5.2 Applicable Models : 9k - 18k

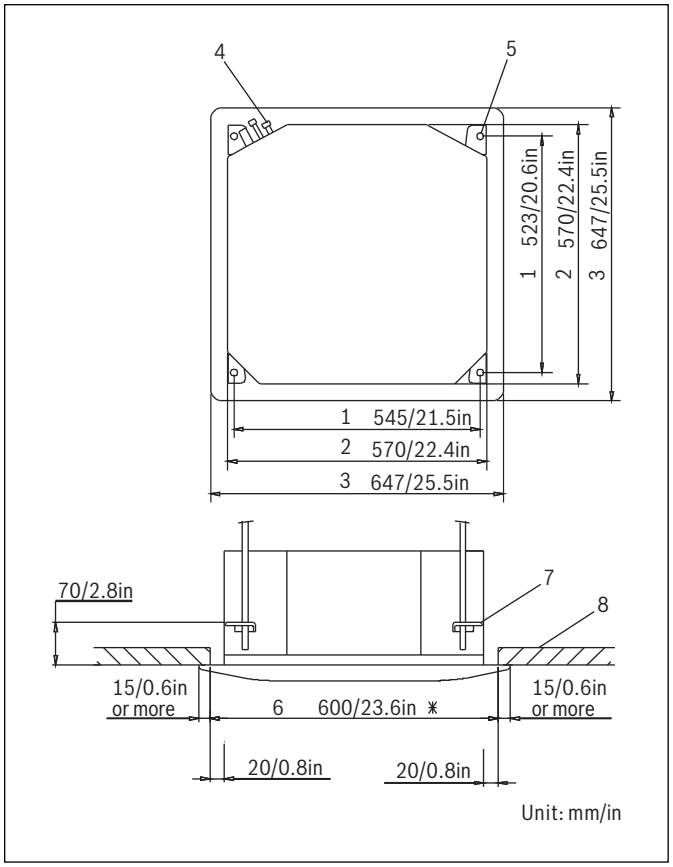


Figure 5

1. Installation hook
2. Indoor unit dimensions
3. Decorative panel dimensions
4. Refrigerant pipe
5. Hanging bolt location (X4)
6. Ceiling opening dimensions
7. Hanger bracket
8. False ceiling

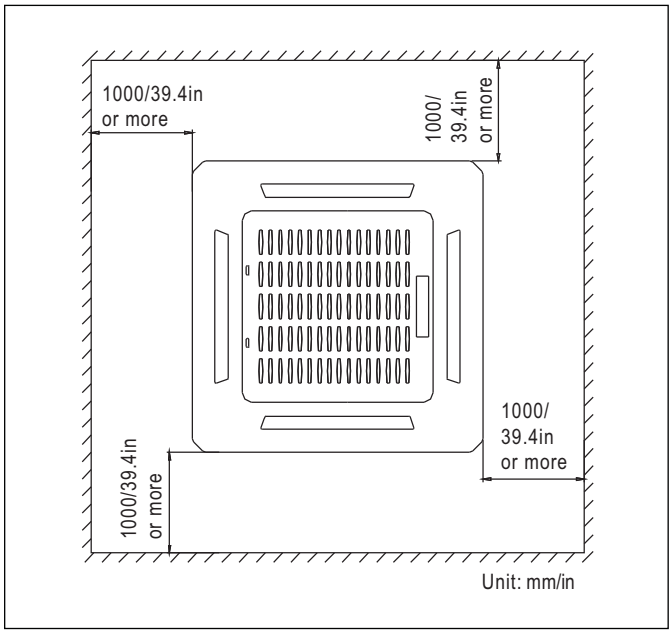


Figure 6

Adjust the position to ensure the gaps between the indoor unit and the four sides of false ceiling are even. The indoor unit's lower part should sink into the false ceiling for 24mm / 0.9in.

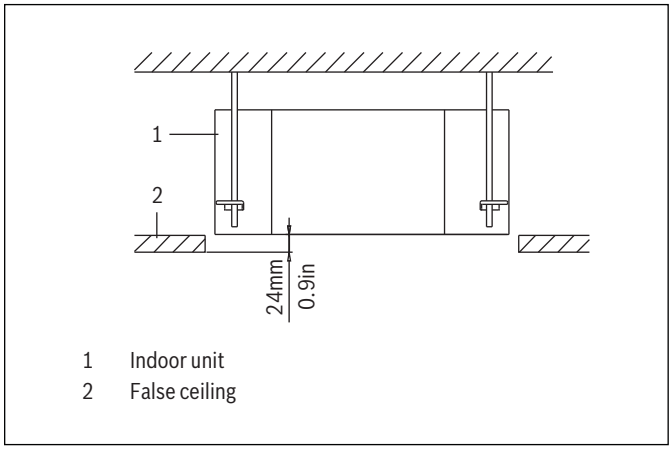


Figure 7

If the spacing between ceiling and the unit is over 20 mm / 0.8in, attach sealing material in the part or recover the ceiling.

5.3 Applicable Models : 24k - 48k

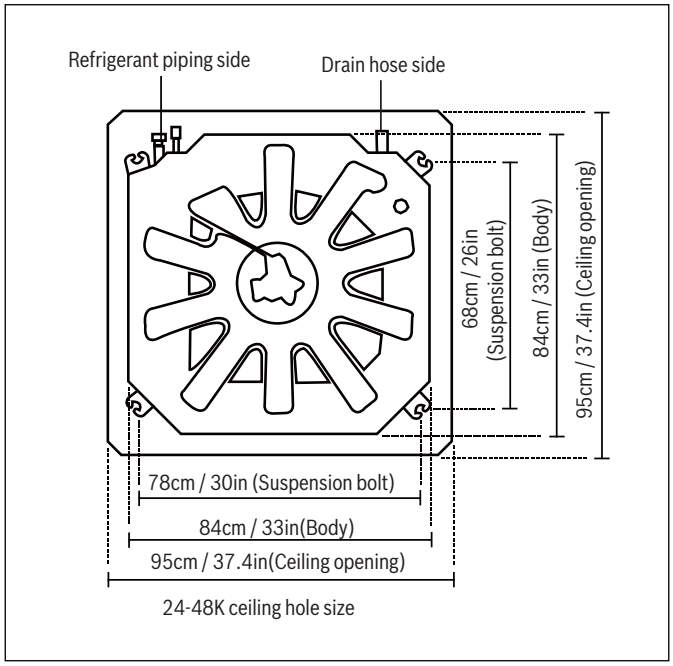


Figure 8

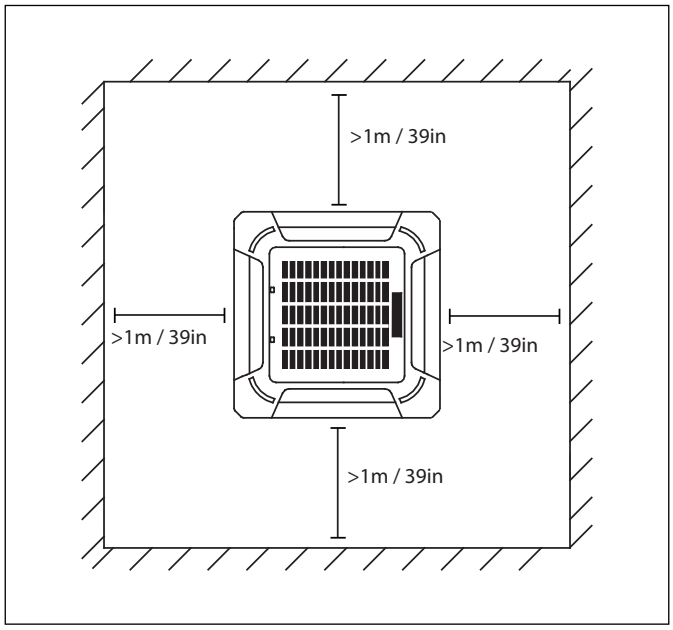


Figure 9

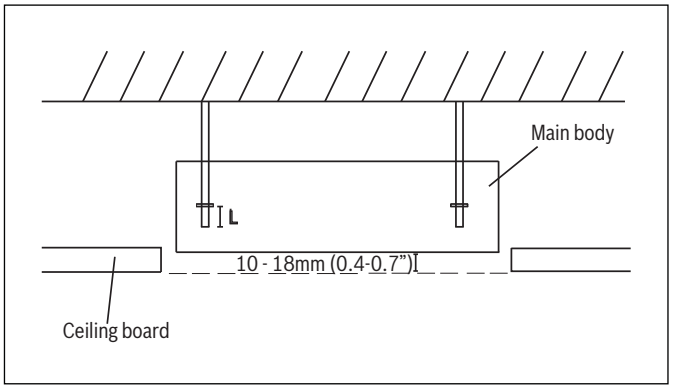


Figure 10

The bottom of the unit should be 10 - 18mm (0.4-0.7in) higher than the ceiling board. Generally, L (indicated in Fig. 10) should be half the length of the suspension bolt or long enough to prevent the nuts from coming off.

5.4 Installing the indoor unit

Depending on the field conditions, it may be easier to install optional accessories before the indoor unit is installed (except for the decoration panel). However, for existing ceiling, install fresh air inlet component kit and branch duct before installing the unit.

Step 1: Install the indoor unit temporarily

- Attach the hanger bracket to the suspension bolt. Be sure to fix it securely by using a nut and washer from the upper and lower sides of the hanger bracket.
- To secure the hanger bracket see figure below.

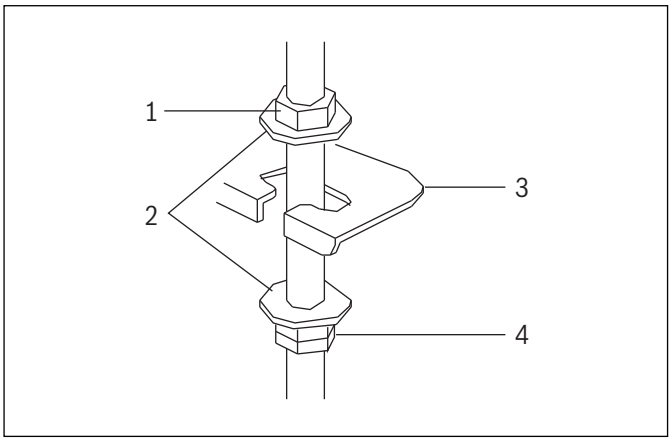


Figure 11

1. Nut (field supplied)
2. Washer (field supplied)
3. Hanger bracket
4. Double nuts (field supplied)

- Adjust the unit to the right position for installation

Step 2: Check that the unit is horizontally level

- Do not install the unit tilted. The indoor unit is equipped with a built-in drain pump and float switch. (If the unit is tilted against the direction of the condensate flow (the drain piping side is raised), the float switch may malfunction and cause water to drip.)
- Check if the unit is levelled at all four corners with a water level or a water-filled vinyl tube as shown in figure 12.

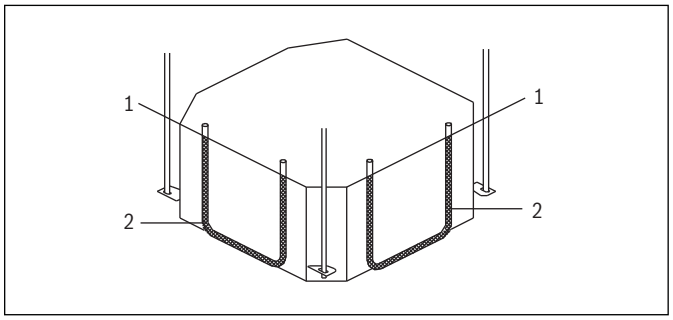


Figure 12

1. Water level
2. Vinyl tube

6 Connecting the Drain Pipe

6.1 Installation of Drain Piping

Install the drain piping as shown in figure below and take measures against condensation. Improperly rigged piping could lead to leaks and damage other products.

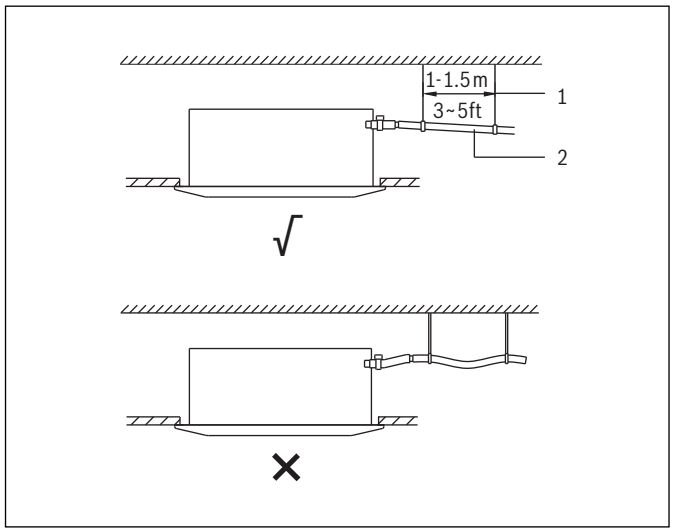


Figure 13

1. Hanging bar
2. ≥1/100 gradient

6.2 Install the Drain Pipes

- Keep piping as short as possible and slope it downwards at a gradient of at least 1/100 so that air may not remain trapped inside the pipe.
- Keep pipe size equal to or greater than that of the connecting pipe (PVC pipe, nominal diameter 20mm/0.8in in, outside diameter 25mm/1in).
- Push the drain hose as far as possible over the drain socket, and tighten the metal clamp securely.

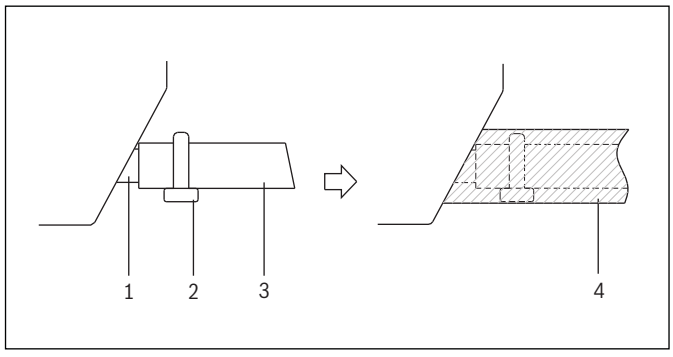


Figure 14

1. Drain socket (attached to the unit)
2. Metal clamp
3. Drain hose
4. Insulation (field supplied)

- Insulate the drain hose inside the building.
- If the drain hose cannot be sufficiently set on a slope, fit the hose with drain raising piping (field supplied).
- Make sure that heat insulation work is executed on the following 2 spots to prevent any possible water leakage due to dew condensation.
  - Indoor drain pipe
  - Drain socket.

6.3 How to Perform Piping

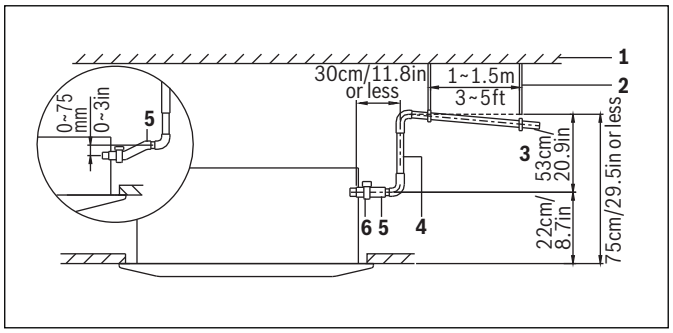


Figure 15

1. Ceiling slab
2. Hanger bracket
3. Adjustable range
4. Drain raising pipe
5. Drain hose
6. Metal clamp

- Connect the drain hose to the drain raising pipes and insulate them.
- Connect the drain hose to the drain outlet on the indoor unit and tighten it with the clamp.

Precautions

- Install the drain raising pipes at a height of less than 530 mm /20.9 in.
- Install the drain raising pipes at a right angle to the indoor unit and no more than 300 mm/11.8 in from the unit.
- To prevent air bubbles, install the drain hose level or slightly tilted up (<75 mm/3 in).
- The incline of drain hose should be 75 mm/3 in or less so that the drain socket does not have to withstand additional force.
- To ensure a downward slope of 1:100, install hanging bars every 1m/3.3ft to 1.5 m/4.9ft.
- When unifying multiple drain pipes, install the pipes as shown in figure 16. Select converging drain pipes whose gauge is suitable for the operating capacity of the unit.

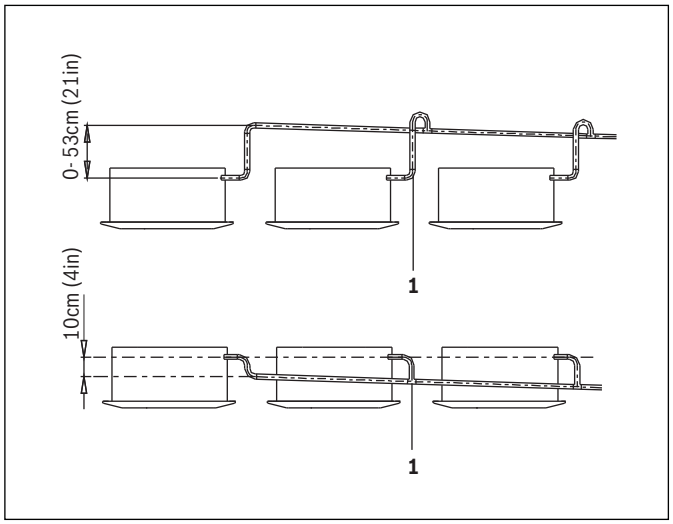


Figure 16

1. T-joint converging drain pipes

NOTICE:

- Drain piping connections. Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.
- The drain hose should not be curved or screwed. The curved or screwed hose may cause water leakage.

6.4 Testing of Drain Piping

After the piping work is finished, check if drainage flows smoothy.

- Add approximately 1L of water gradually through the air discharge outlet. Method of adding water is shown below in figure 17.

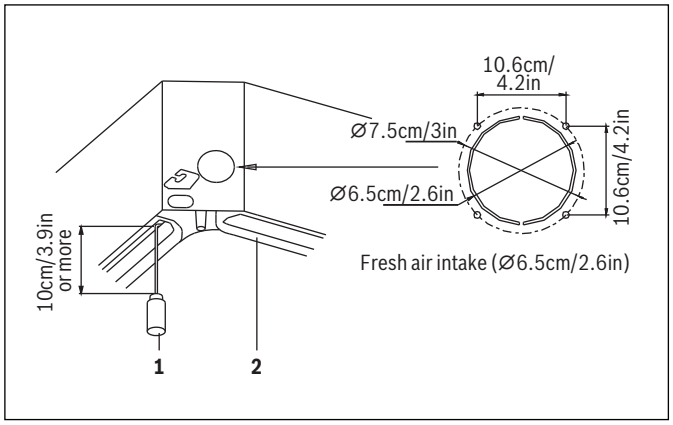


Figure 17

1. Plastic watering can (tube should be about 10cm/3.9in long)
2. Water-receiver

- When electric wiring work is finished, check drainage flow during COOL operation, explained in "Test Operation" in Section 13.

7 Outdoor Unit Installation

7.1 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 spatial minimum requirements shown in Installation Space Requirements (Figure 18)

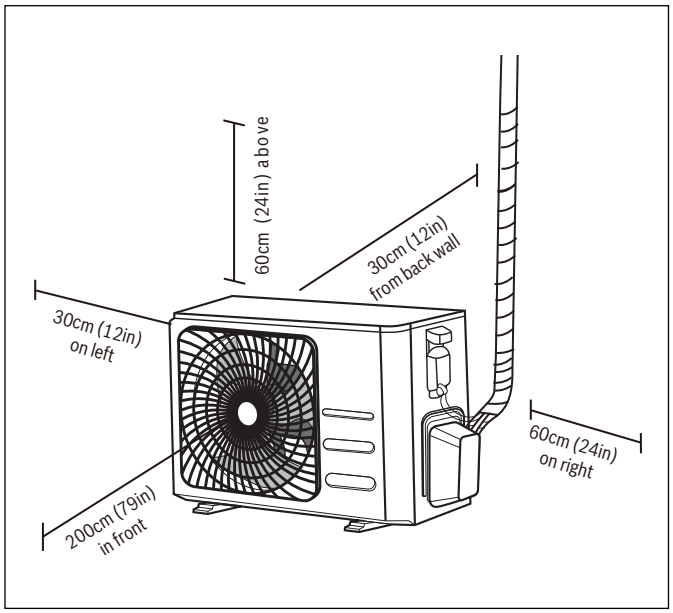


Figure 18

  - Good air circulation and ventilation
  - Firm and solid—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

- 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
  - In a location exposed to excessive amounts of salty air

NOTICE

- 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 19 and 20.

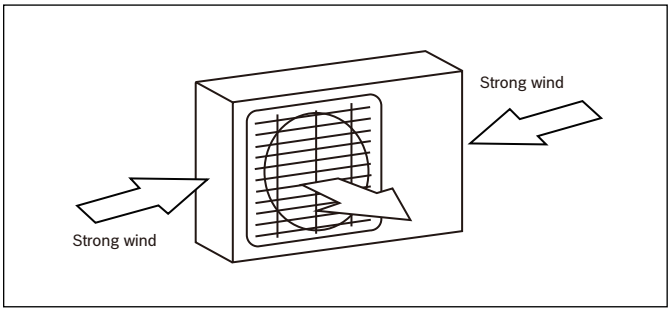


Figure 19

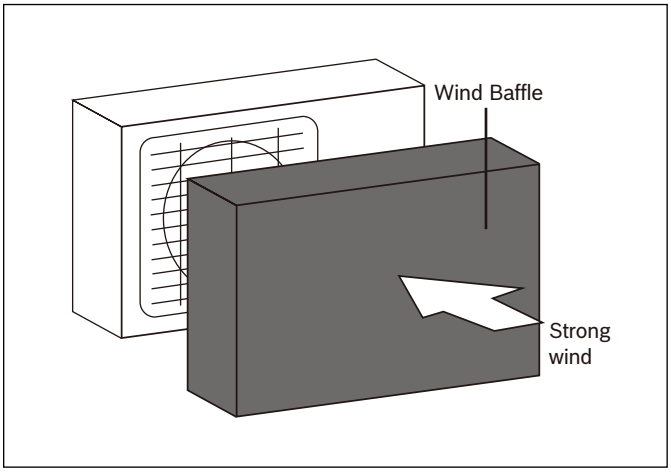


Figure 20

NOTICE

- This unit is not designed for application in areas frequently exposed to salty air (seaside) conditions..

NOTICE

- When operating the air conditioner in a low outdoor ambient temperature, be sure to follow the instructions described below.
  - To prevent exposure to wind, install the outdoor unit with its suction side facing the wall.
  - Never install the outdoor unit at a site where the suction side may be exposed directly to wind.
  - To prevent exposure to wind, it is recommended to install a baffle plate on the air discharge side of the outdoor unit.
  - In heavy snowfall areas, select an

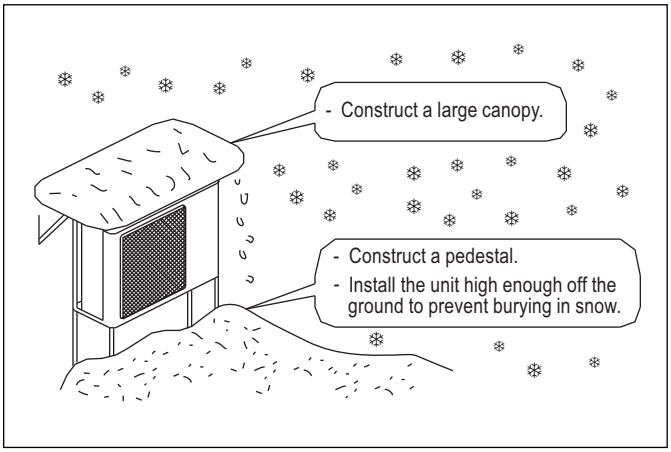


Figure 21

7.2 Install Drain Joint

Heat pump units require a drain joint. Before bolting the outdoor unit in place, you must install the drain joint at the bottom of the unit. Note that there are two different types of drain joints depending on the type of outdoor unit.

If the drain joint comes with a rubber seal (see Figure 22, pos. A), do the following:

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

If the drain joint doesn't come with a rubber seal (see Figure 22, pos. B), do the following:

1. Insert the drain joint into the hole in the base pan of the unit. The drain joint will click in place.
2. Connect a drain hose extension (field supplied) to the drain joint to redirect water from the unit during heating mode.

NOTICE

- 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.

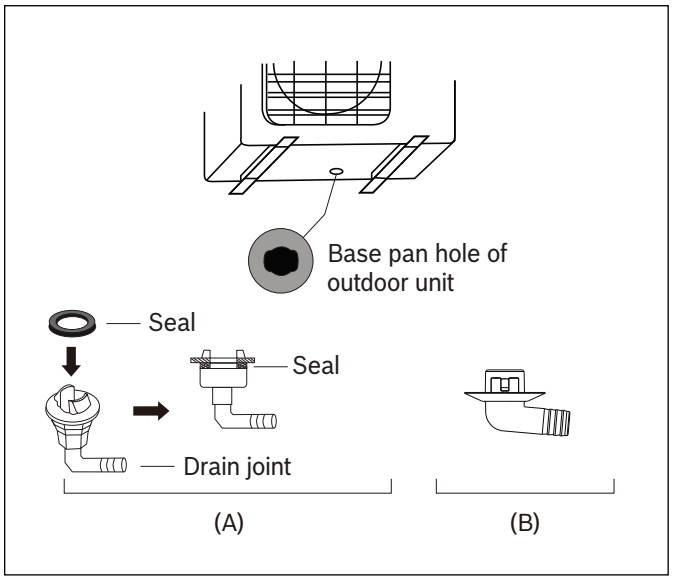


Figure 22

7.3 Anchor Outdoor Unit

The outdoor unit can be anchored to to a commercially available mounting pad on the ground or to a wall-mounted bracket (both sold separately).

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.

NOTICE: PROPERTY DAMAGE/SYSTEM FAILURE

- Never mount this unit directly on the ground. It must be anchored according to the guidance provided in these instructions, and/or local building codes.

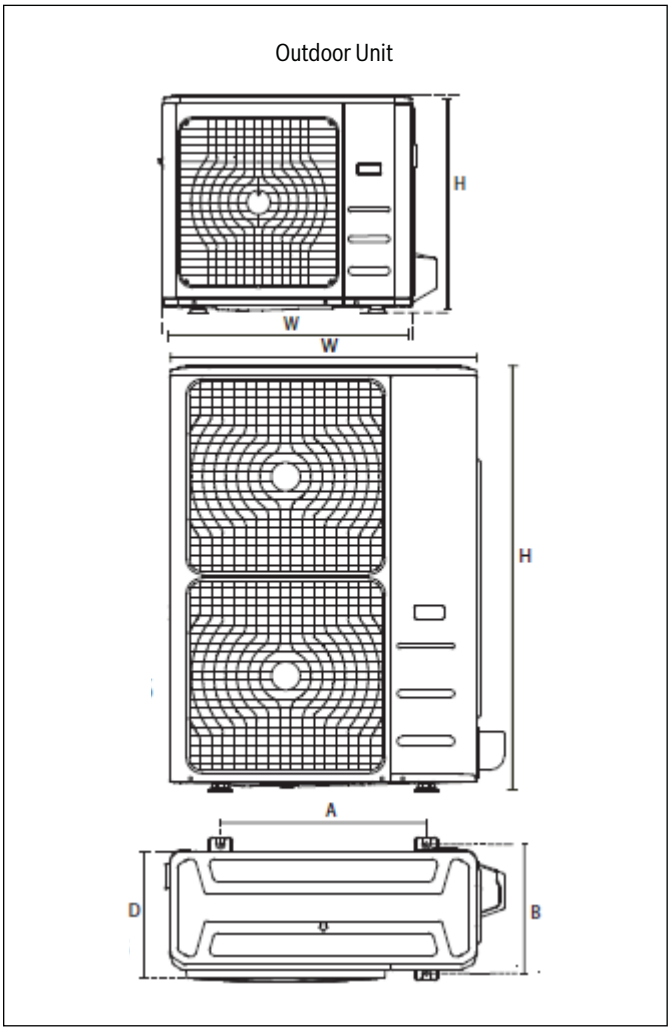


Figure 23

Outdoor Model	Outdoor Unit Dimensions (mm/in)	Mounting Dimensions	
	W x H x D	Distance A (mm/in)	Distance B (mm/in)
BMS500-AAS009-1CSXRA	770x555x300 (30.3x21.85x11.81)	487 (19.2)	298 (11.73)
BMS500-AAS012-0CSXRB, BMS500-AAS012-1CSXRA, BMS500-AAS009-1CSXHB, BMS500-AAS012-1CSXHB	800x554x333 (31.5x21.8x13.1)	514 (20.24)	340 (13.39)
BMS500-AAS018-1CSXRA, BMS500-AAS018-1CSXHB, BMS500-AAM018-1CSXRA	845x702x363 (33.27x27.6x14.3)	540 (21.26)	350 (13.8)
BMS500-AAS024-1CSXRA, BMS500-AAS024-1CSXHB, BMS500-AAS030-1CSXRB,BMS500-AAS036-1CSXRB, BMS500-AAS036-1CSXLB, BMS500-AAM027-1CSXRA BMS500-AAM036-1CSXRA, BMS500-AAM027-1CSXHB, BMS500-AAM036-1CSXHB	946x810x410 (37.24x31.9x16.14)	673 (26.5)	403 (15.87)
BMS500-AAS048-1CSXLB, BMS500-AAS060-1CSXLB, BMS500-AAM048-1CSXRA, BMS500-AAM036-1CSXHB	952x1333x415 (37.5x52.5x16.34)	634 (24.96)	404 (15.9)

Table 4

8 Refrigerant Piping Connection

The length of refrigerant piping will affect the performance and energy efficiency of the unit. Nominal efficiency is tested on units with a pipe length of 5 meters (16.5ft). A minimum pipe run of 3 meters (9.8ft) is required to minimize vibration & excessive noise. Refer to the table below for specifications on the maximum length and drop height of piping.

Maximum length and drop height of refrigerant piping per unit model

Model	Capacity (BTU/h)	Max. Equivalent Length m (ft)	Max. Height Variation m (ft)
R410A Inverter Split Air Conditioner	< 15,000	25 (82ft)	10 (33ft)
	15,000 to < 24,000	30 (98.5ft)	20 (66ft)
	24,000 to < 36,000	50 (164ft)	25 (82ft)
	36,000 to 48,000	65 (213ft)	30 (98.5ft)

Table 5

8.1 Connection Instructions – Refrigerant Piping

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. Refer to Fig.24 for cut examples.

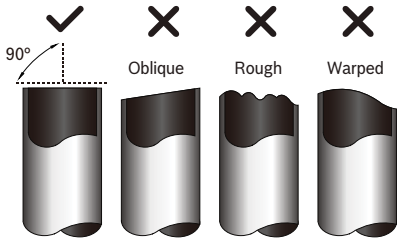


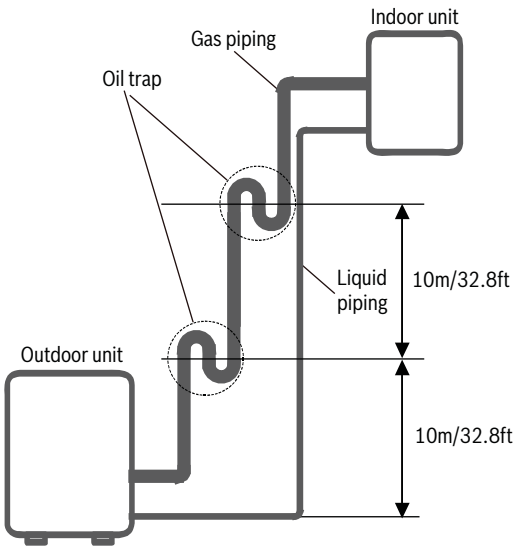
Figure 24

NOTICE:

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

NOTICE: SYSTEM FAILURE

- If the indoor unit is installed higher than the outdoor unit, it may cause liquid compression or deterioration of the oil return. Oil traps in the rising gas piping can prevent this.
- To prevent liquid compression or deterioration of the oil return, an oil trap should be installed every 10m(32.8ft) of vertical suction line riser.

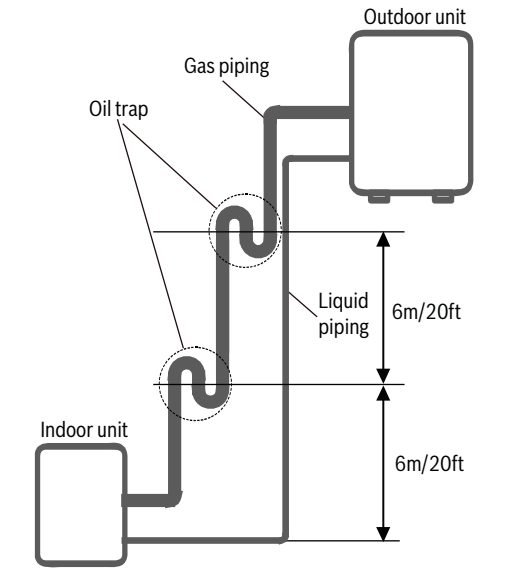


The indoor unit is installed higher than the outdoor unit

Figure 25

NOTICE: SYSTEM FAILURE

- If the outdoor unit is installed higher than the indoor unit, it is recommended that vertical suction risers not be up sized.
- Proper oil return to the compressor should be maintained with suction gas velocity. If velocities drop below7.62m/s (1500 ft/min), oil return will be decreased.
- An oil trap should be installed every 6m(20ft) of vertical suction line riser.



The outdoor unit is installed higher than the indoor unit

Figure 26

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.

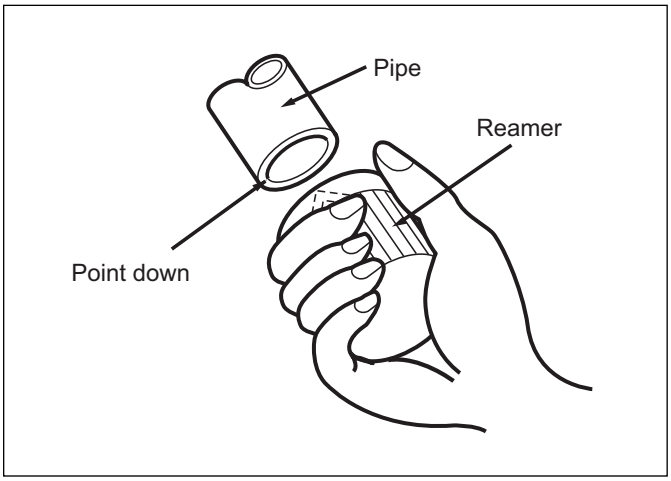


Figure 27

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 a piece of 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 proper direction, because you can't put them on or change their direction after flaring. See Figure 28.

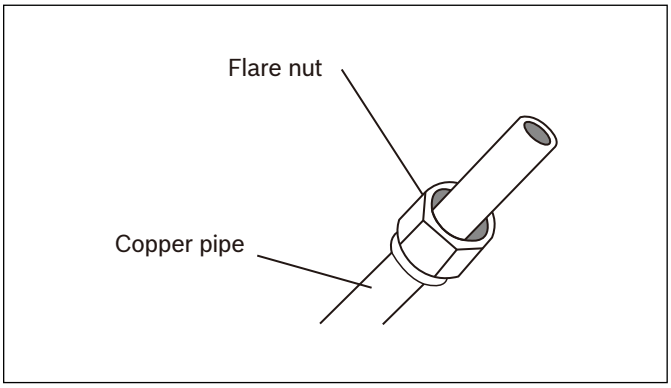


Figure 28

4. Remove tape from ends of pipe when ready to perform flaring work.
5. Clamp flaring block on the end of the pipe. The end of the pipe must extend beyond the edge of the flare form in accordance with the dimensions shown in the Table 6.

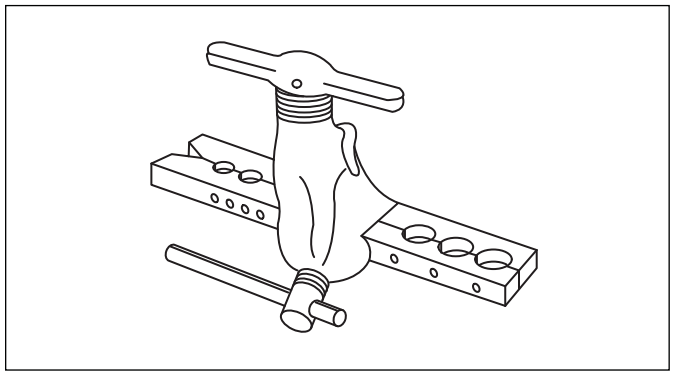


Figure 29

Piping extension beyond flare form

Outer diameter of tube mm (in.)	A mm (in.)	
	Min.	Max.
Ø 6.4 (Ø 0.25")	0.7 (0.0275")	1.3 (0.05")
Ø 9.5 (Ø 0.375")	1.0 (0.04")	1.6 (0.063")
Ø 12.7 (Ø 0.5")	1.0 (0.04")	1.8 (0.07")
Ø 15.9 (Ø 0.63")	2.0 (0.078")	2.2 (0.086")

Table 6

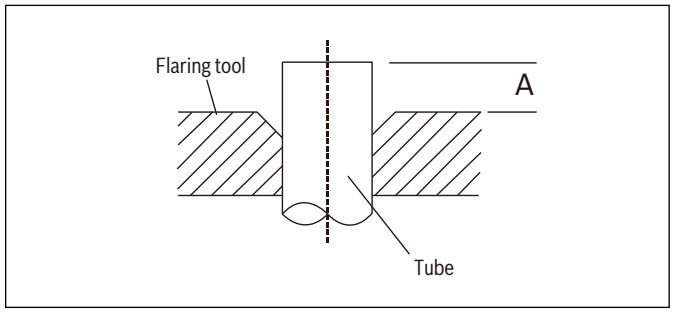


Figure 30

6. Place flaring tool onto the flaring block.
7. Turn the handle of the flaring tool clockwise until the pipe is fully flared.
8. Remove the flaring tool and flaring block, then inspect the end of the pipe for cracks and even flaring. Slide the nut up to see if the flare is of proper diameter and does not interfere with the threads in the flare nut.

Step 4: Connect pipes

When connecting refrigerant pipes, be careful not to use excessive torque or to deform the piping in any way. You should first connect the low-pressure (suction) pipe, then the high-pressure pipe (liquid line).

Minimum Bend Radius
When bending connective refrigerant piping, the minimum bending radius is 10cm (4in). See Figure 31.

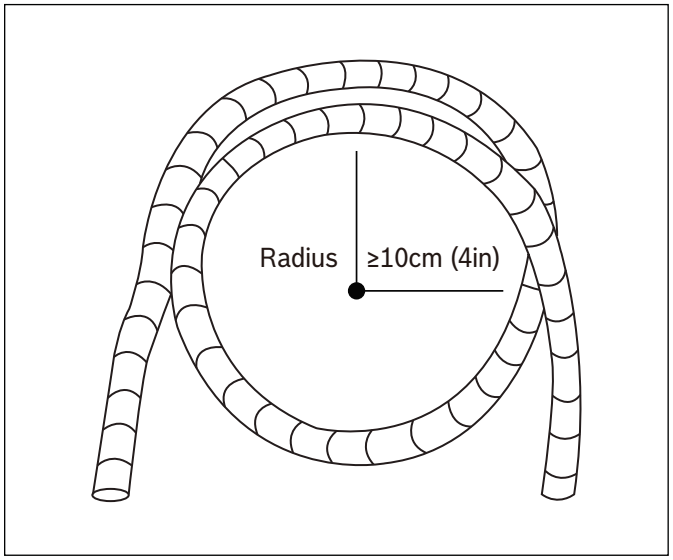


Figure 31

NOTICE: EQUIPMENT DAMAGE

- Make sure that no oil remains on plastic parts of the decoration panel (accessories sold separately). Oil may cause degradation and damage to plastic parts.

8.2 Connecting Piping to Indoor Unit

1. Align the center of the two pipes that you will connect. See Figure 32.

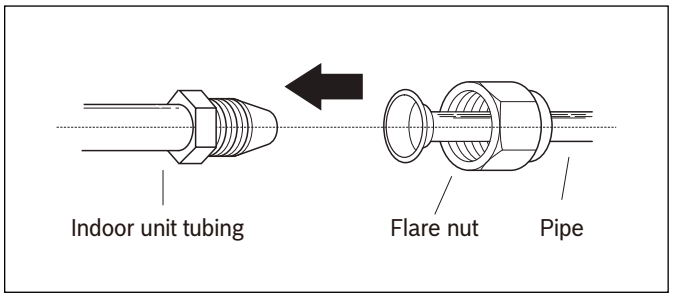


Figure 32

2. Tighten the flare nut as tightly as possible by hand.
3. Using a wrench, grip the nut on the unit tubing.
4. While firmly gripping the nut on the unit tubing, use a torque wrench to tighten the flare nut according to the torque values in the Torque Requirements Table 7. Loosen the flaring nut slightly, then tighten again.

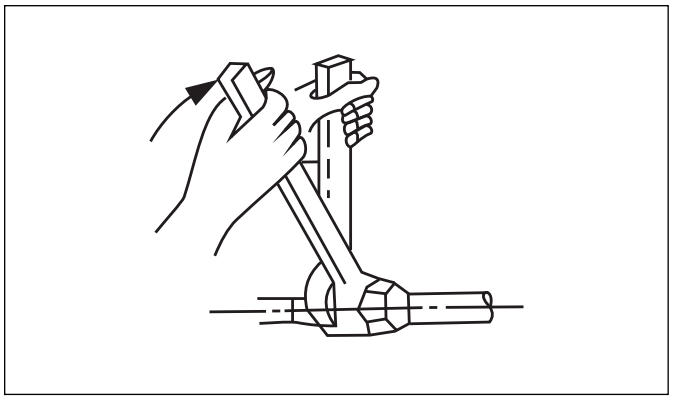


Figure 33

Torque requirements

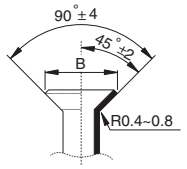
Pipe Gauge	Tightening torque	Flare dimension (B) (mm/inch)		Flare shape
		Min.	Max.	
Ø 6.4	18-20N.m (183-204kgf.cm)	8.4/0.33	8.7/0.34	
Ø 9.5	25-26 N.m (255-265 kgf.cm)	13.2/0.52	13.5/0.53	
Ø 12.7	35-36 N.m (357-367 kgf.cm)	16.2/0.64	16.5/0.65	
Ø 15.9	45-47 N.m (459-480 kgf.cm)	19.2/0.76	19.7/0.78	

Table 7

NOTICE: DO NOT USE EXCESSIVE TORQUE

- Excessive force can break the nut or damage the refrigerant piping. You must not exceed torque requirements shown in the table above.

8.3 Connecting Tubing to Outdoor Unit

1. Unscrew and remove the cover on the side of the outdoor unit. See Figure 34.

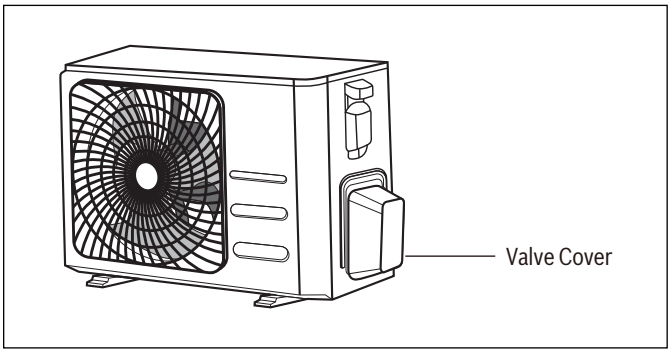


Figure 34

2. Remove protective caps from ends of valves.
3. Align flared pipe end with each valve and tighten the flare nut as tightly as possible by hand.
4. Using a wrench, grip the body of the valve. Do not grip the nut that seals the service valve. See Figure 35.

NOTICE: USE WRENCH TO GRIP MAIN BODY OF VALVE

- Torque from tightening the flare nut can snap off other parts of valve.

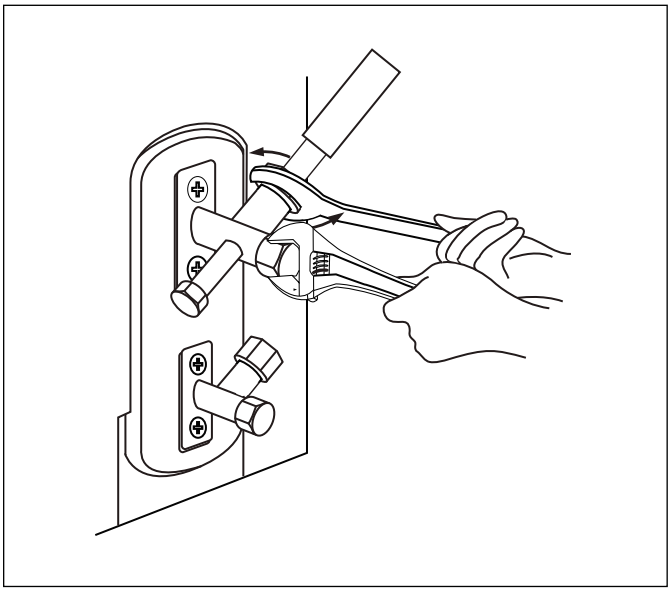


Figure 35

5. While firmly gripping the body of the valve, use a torque wrench to tighten the flare nut according to the correct torque values.
6. Loosen the flaring nut slightly, then tighten again.
7. Repeat Steps 3 to 6 for the remaining tube.

8.4 Pipe Insulation

1. Be sure to insulate both the gas and liquid piping. Use separate thermal insulation pipes for gas and liquid refrigerant pipes. See the figure below.

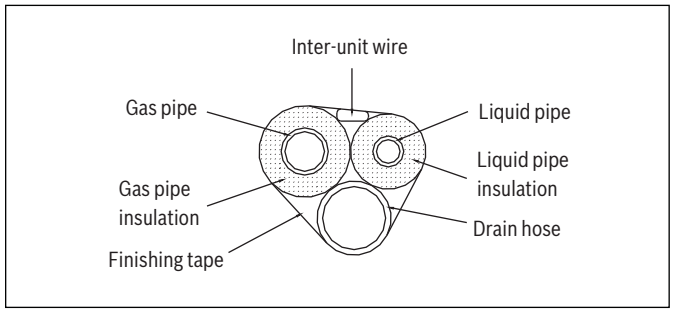


Figure 36

2. Finally, insulate as shown in the figure below.

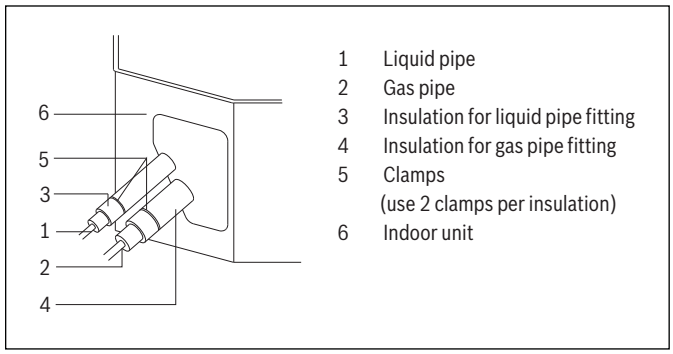


Figure 37

Piping insulation procedure

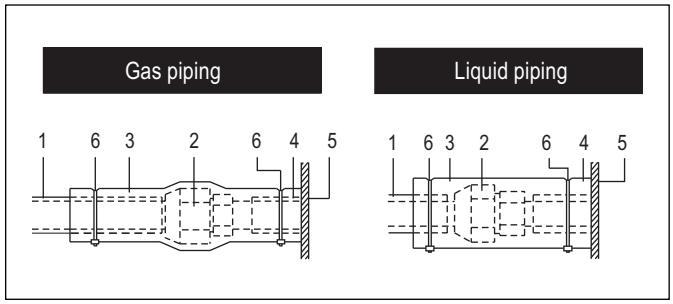


Figure 38

1. Pipe insulation material (field supplied)
2. Flare nut connection
3. Insulation for fitting (field supplied)
4. Piping insulation material (main unit)
5. Indoor unit
6. Clamp (field supplied)

CAUTION: PERSONAL INJURY

- For local insulation, be sure to insulate local piping all the way into the pipe connections inside the unit. Exposed piping may cause condensation or may cause burns when touched.

9 Connecting Signal and Power Cables

The outside unit's terminal block is protected by an electrical wiring cover on the side of the unit. A comprehensive wiring diagram is printed on the inside of the wiring cover.

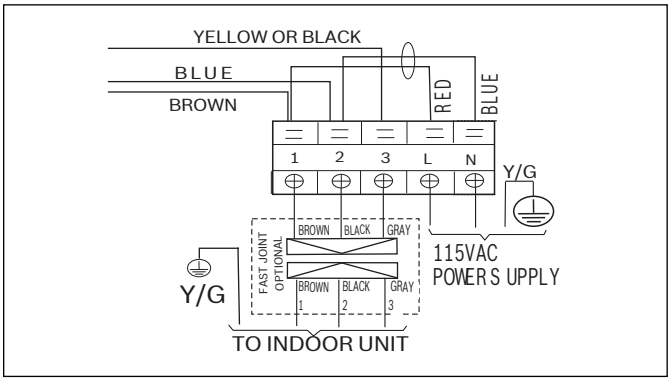


Figure 39 Wiring Schematic Example (refer to unit for actual schematic)

WARNING: ELECTRICAL HAZARD

- Before performing electrical work, read these regulations:

1. All wiring must comply with local and national electrical codes, 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. Insufficient power supply can cause malfunction, electrical shock, or fire.
5. When connecting power to fixed wiring, install a surge protector and main power switch with a capacity of 1.5 times the maximum current of the unit.
6. When 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 licensed electrician must use an approved/listed circuit breaker.
7. Only connect the unit to an individual branch / dedicated circuit. Do not connect another appliance to that circuit.
8. Make sure to properly ground the outdoor unit.
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.

WARNING: ELECTRICAL HAZARD

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

1. Prepare the cable for connection:

Cable Types

- Outdoor Power Cable: SOOW type
- Signal/Power Cable: SOOW type

Minimum Cross-Sectional Area of Power Cables

Appliance Amps (A)	AWG
10	18
13	16
18	14
25	12
30	10

Table 8

- Using wire strippers, strip the rubber jacket from both ends of signal/ power cable to reveal about 40mm (1.57in) of the wires inside.
- Strip the insulation from the ends of the wires.
- Using wire crimper, crimp u-type lugs on the ends of the wires.

WARNING: ELECTRICAL HAZARD

- While crimping wires, make sure you clearly distinguish the Live ("L") Wire from other wires.

WARNING: ELECTRICAL HAZARD

- All wiring must be performed strictly in accordance with the wiring diagram located on the inside of the indoor unit's wire cover.

2. Unscrew the electrical wiring cover and remove it.
3. Unscrew the cable clamp below the terminal block and place it to the side.
4. Match the wire colors/labels with the labels on the terminal block, and firmly screw the u-lug of each wire to its corresponding terminal.
5. After checking to make sure every connection is secure, loop the wires around to prevent rain water from flowing into the terminal.
6. Using the cable clamp, fasten the cable to the unit. Screw the cable clamp down tightly.
7. Insulate unused wires with PVC electrical tape. Arrange them so that they do not touch any electrical or metal parts.
8. Replace the wire cover on the side of the unit, and screw it in place.

9.1 How to Connect Wiring

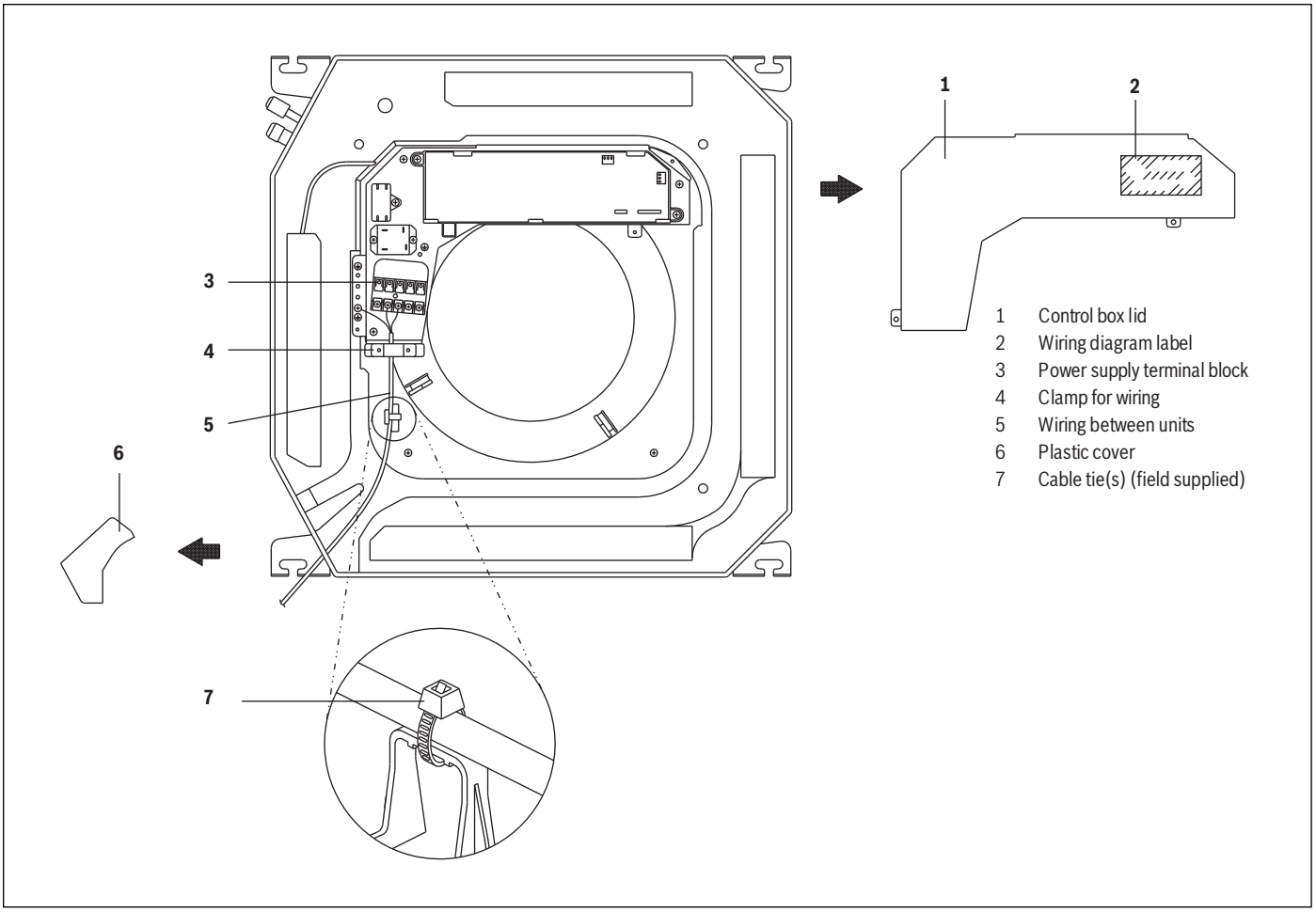


Figure 40

1. Remove the control box lid of the indoor unit.
2. Remove the cover of the outdoor unit.
3. Follow the "Wiring diagram label" attached to the indoor unit's control box lid to wire the outdoor unit, indoor unit and the remote controller. Securely fix the wires with a field supplied cable tie(s).
4. Use Magnetic ring for 36k and 48k models.

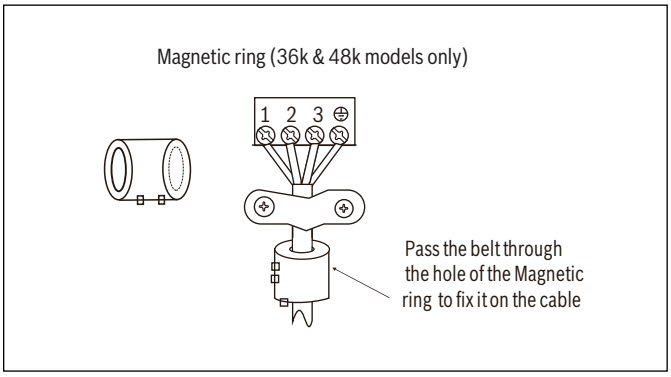


Figure 41

5. Attach the cover of the outdoor unit.

Precautions

Observe the notes mentioned below when wiring to the power supply terminal board.

- Do not connect wires of different gauge to the same power supply terminal. (Looseness in the connection may cause overheating.)
- When connecting wires of the same gauge, connect them according to the figure below.

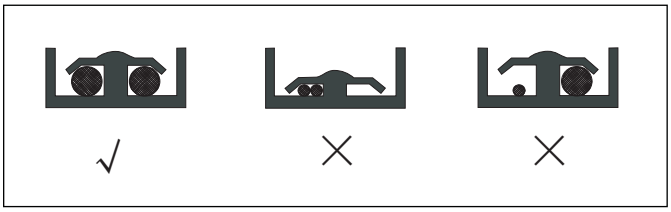


Figure 42

- Use the specified electric wire. Connect the wire securely to the terminal. Lock the wire down without applying excessive force to the terminal. (Tightening torque: 1.31N.m±10%).
- When attaching the control box lid, make sure not to pinch any wires.

- After all wiring connections are done, fill in any gaps in the casing wiring holes with putty or insulation material (field supplied) to prevent small animals or dirt from entering the unit from outside and causing short circuits in the control box.
- Do not connect wires of different gauge to the same grounding terminal.
- Use only specified wires and tightly connect wires to the terminals. Make sure the cover closes tight. Incomplete connections could result in overheating, and in the worst case, electric shock or fire.

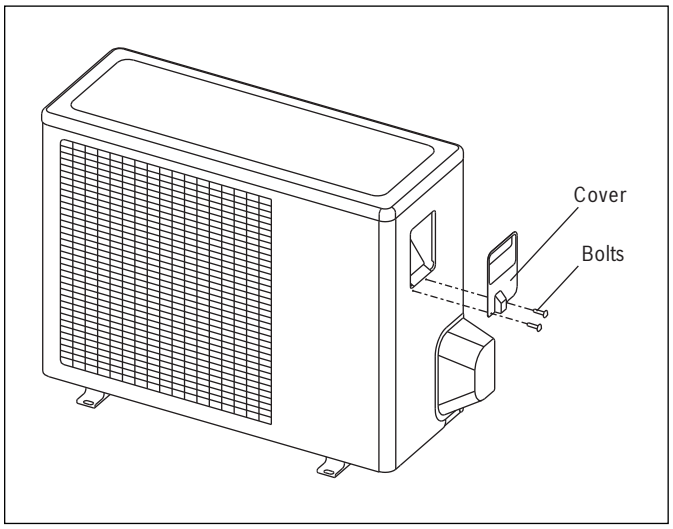


Figure 43

10 Air Evacuation

10.1 Preparations and Precautions

Air and foreign matter in the refrigerant circuit can cause abnormal rises in pressure, which can damage the air conditioner, 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 unit is relocated.

Before performing evacuation

- Check to make sure that both high-pressure and low-pressure pipes between the indoor and outdoor units are connected properly in accordance with the Refrigerant Piping Connection section of this manual.
- Check to make sure all wiring is connected properly.

10.2 Evacuation Instructions

Before using the manifold gauge and vacuum pump, read their operation manuals to familiarize yourself with how to use them properly.

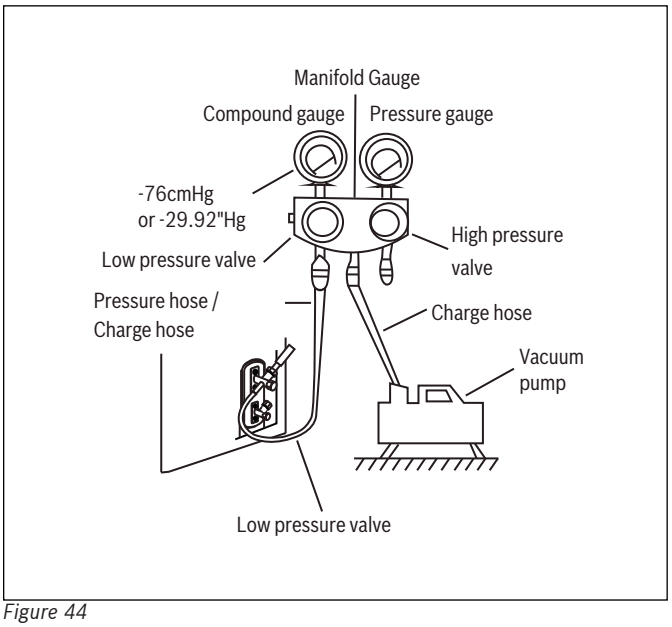


Figure 44

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 until the Compound Meter reads -76cmHg / -29.92"Hg (-101 kPa). It is recommended to use a micron gauge; run the vacuum until the micron gauge reads 350 to 500 microns or less.
6. Close the Low Pressure side of the manifold gauge, and turn off the vacuum pump.
7. Wait for approximately 10 to 15 minutes, then check that there has been no change in system pressure. It is recommended to use a micron gauge; check to make sure the system is still below 500 microns.
8. If there is a change in system pressure, refer to Gas Leak Check section for information on how to check for leaks. If there is no change in system pressure, unscrew the cap from the packed valve (high pressure valve).
9. Insert a 5mm allen 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.
10. 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.

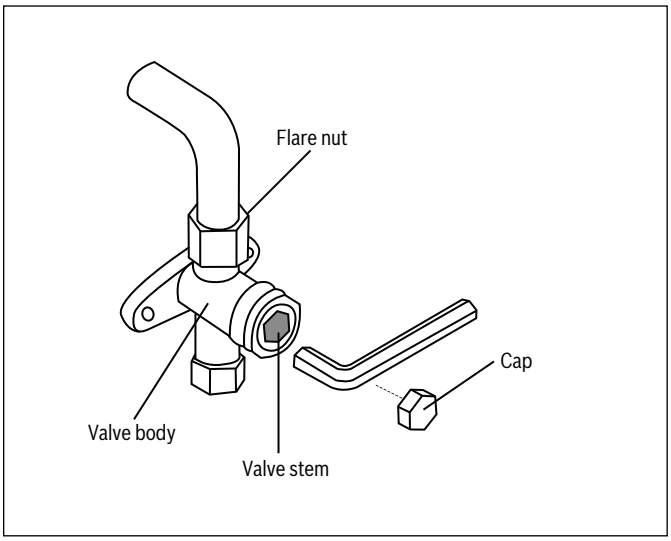


Figure 45

11. Remove the charge hose from the service port.
12. Using hexagonal wrench, fully open both the high pressure and low pressure valves.
13. 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.

NOTICE: OPEN VALVE STEMS GENTLY

- When opening valve stems, turn the hexagonal allen wrench until it hits against the stopper. Do not try to force the valve to open further.

10.3 Adding Refrigerant

In North America, the standard pipe length is 7.5m (25'). The additional refrigerant to be charged can be calculated using the following formula:

Additional refrigerant per pipe length

Connective Pipe	Air Purging	Additional Refrigerant	
< Standard pipe length	Vacuum Pump	N/A	
> Standard pipe length	Vacuum Pump	Liquid Side: Ø 6.35 (ø 0.25") Inverter R410A: (Pipe length – standard length) x 15g/m (Pipe length – standard length) x 0.16oz/ft	Liquid Side: Ø 9.52 (ø 0.375") Inverter R410A: (Pipe length – standard length) x 30g/m (Pipe length – standard length) x 0.32oz/ft

Table 9

CAUTION: CONTAINS REFRIGERANT

- ▶ NEVER mix refrigerant types.

11 Installation of the Decorative Panel

11.1 Remove Front Grille

- ▶ Slide the 2 grille hooks in the middle of the decorative panel.

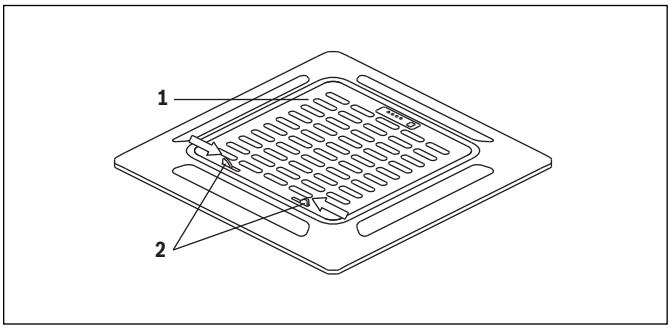


Figure 46

1. Intake grille
2. Grille hook

- ▶ Open the intake grille and detach from decorative panel.

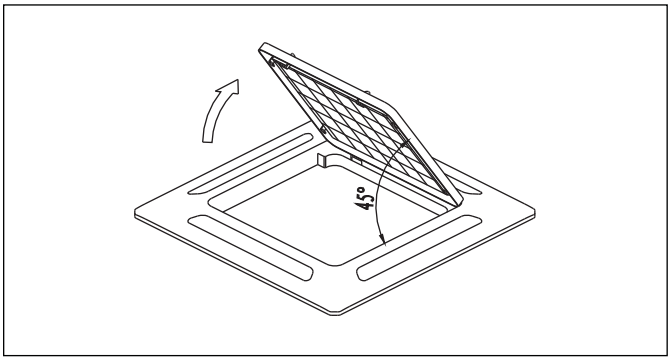


Figure 47

11.2 Remove Corner Covers of the Panel

(24k and 48k models only)

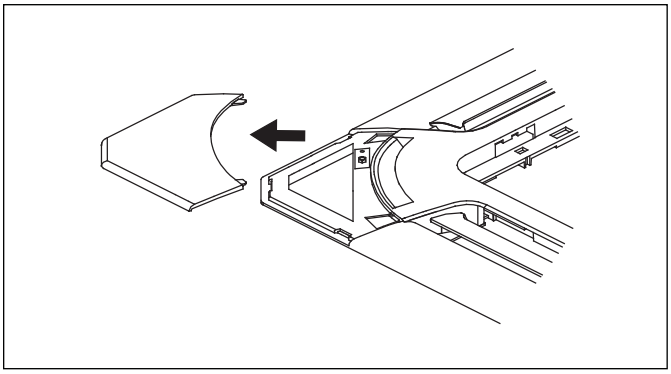


Figure 48

11.3 Install the Decorative Panel

Instruction for 9k ~ 18k models only

- ▶ Align the "△" symbol on the decorative panel to the "△" symbol on the unit.
- ▶ Attach the decorative panel to the unit with the supplied screws as shown in figure below.

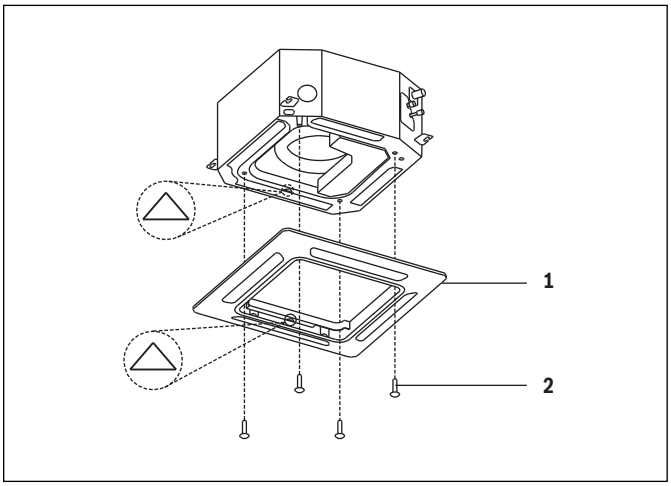


Figure 49

1. Decorative panel
2. Screws (M5)(supplied with the panel)

Instruction for 24k and 48k models only

- ▶ Align the front panel to the main body, taking into account the position of the piping and drain sides. Hang the four latches of the decorative panel to the hooks of the indoor unit. Tighten the panel hook screws evenly at the four corners.

Tighten the screws until the thickness of the sponge between the main body and the panel reduces to 4-6mm (0.2-0.3in). The edge of the panel should be in contact with the ceiling tightly.

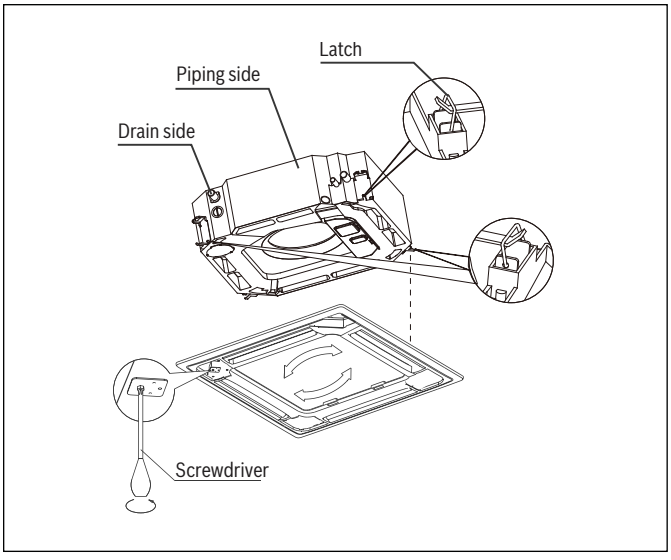


Figure 50

- After installing the decorative panel, ensure that there is no space between the unit body and decorative panel. Otherwise air may leak through the gap and cause dewdrop. (See figure 51 below)

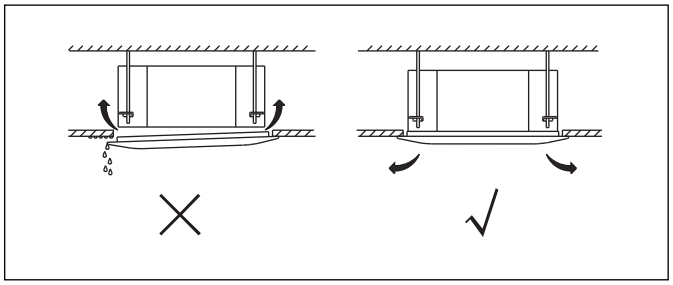


Figure 51

11.4 Mount the Intake Grille

- Ensure that the buckles at the back of the grille be properly seated in the groove of the panel.

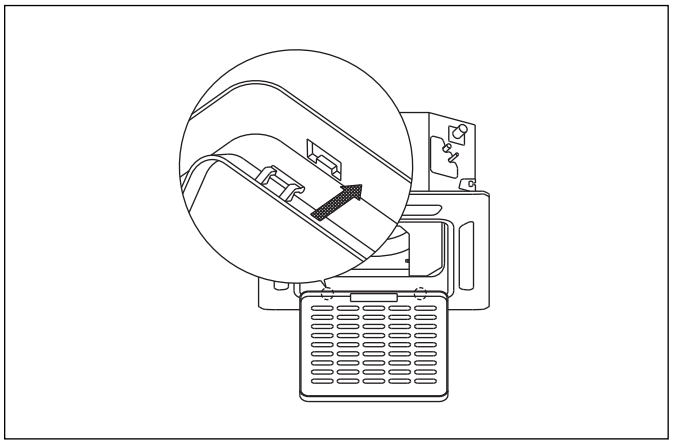


Figure 52

11.5 Connect 2 wires of decorative panel to main board of the unit

Diagram shown for 9k ~ 24k models

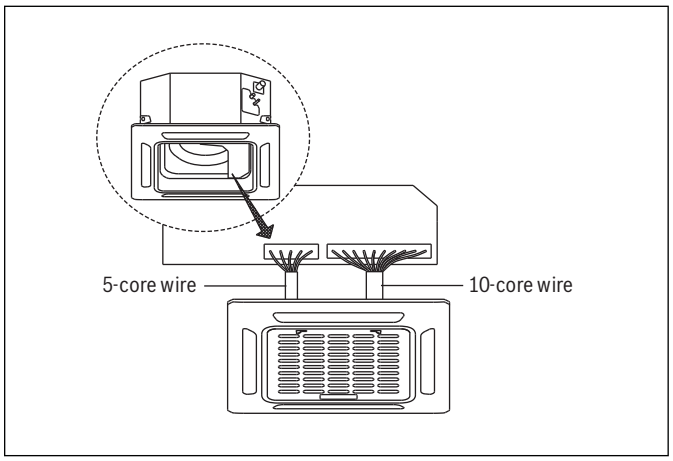


Figure 53

Diagram shown for 36k & 48k models

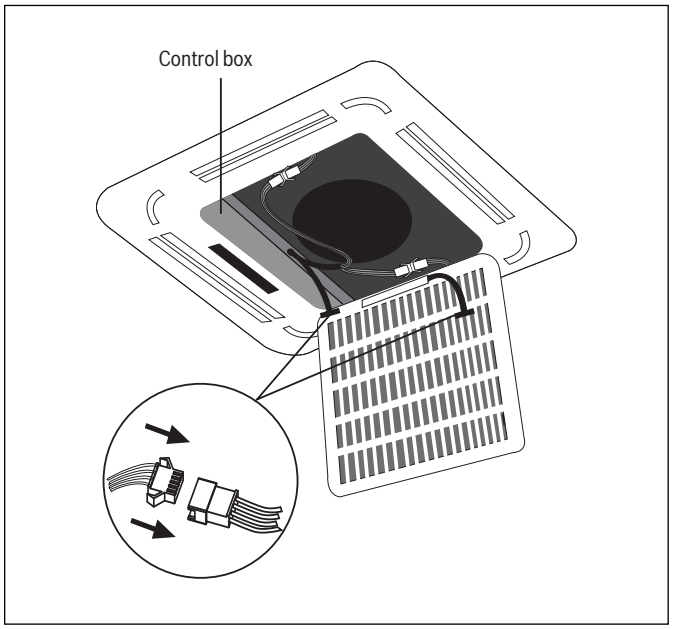


Figure 54

11.6 Fasten the Control Box Lid with 2 Screws

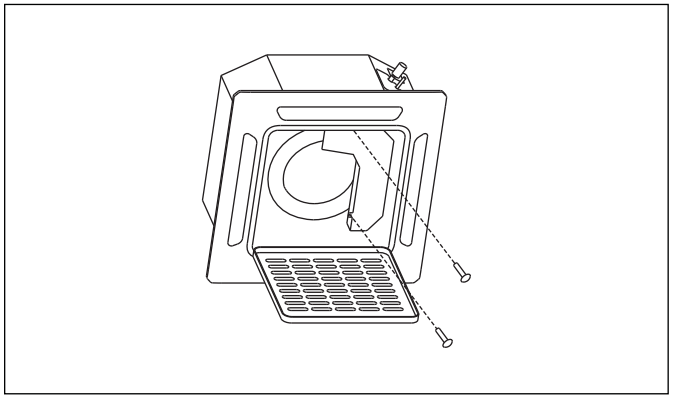


Figure 55

11.7 Close the Intake Grille and Close the 2 Grille Hooks

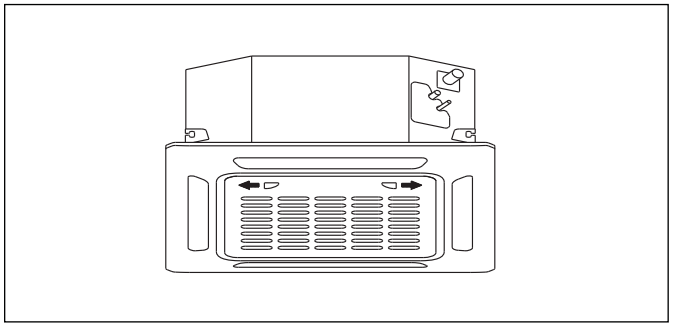


Figure 56

11.8 Attach Four Corner Covers by Pushing Them Inwards

(24k & 48k models only).

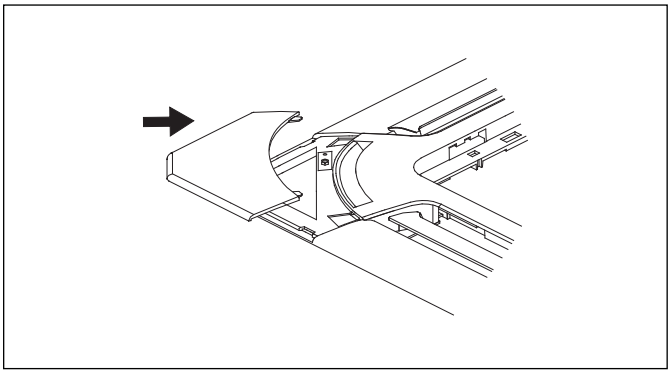


Figure 57

If the height of the indoor unit needs to be adjusted, you can do so through the openings at the panel's four corners. Make sure that the internal wiring and drainpipe are not affected by this adjustment.

12 Electrical and Gas Leak Checks

12.1 Electrical Safety Checks

After installation, confirm that all electrical wiring is installed in accordance with local and national codes / regulations, and according to the Installation Manual. All testing must be performed by a licensed electrician.

Before test run

- Check grounding work
- Measure grounding resistance by visual detection and with grounding resistance tester. Grounding resistance must be less than 0.1Ω.

This may not be required for some locations. Refer to local code requirements.

During test run

- Check for electrical leakage
- During the Test Run , use an electroprobe and multimeter to perform a comprehensive electrical leakage test. If electrical leakage is detected, turn off the unit immediately and call a licensed electrician to find and resolve the cause of the leakage.

WARNING: ELECTRICAL HAZARD

- All wiring must comply with local and national electrical codes and must be installed by a licensed electrician.

12.2 Gas Leak Checks

There are two different methods to check for gas leaks.

Soap and Water Method

Using a soft brush, apply soapy water or liquid detergent to all pipe connection points on the indoor unit and outdoor unit. The presence of bubbles indicates a leak.

Leak Detector Method

If using leak detector, refer to the device's operation manual for proper usage instructions.

After confirming that all pipe connection points DO NOT leak, replace the valve cover on the outside unit.

12.3 Error Codes

Number	Cause	Operation indicator flashes	Timer indicator	Error Code
1	Indoor EEPROM (Electrically Erasable Programmable Read-Only Memory) error	1	Off	E0
2	Indoor and outdoor unit communication malfunction	2	Off	E1
3	Indoor fan speed malfunction	4	Off	E3
4	Indoor room temperature sensor error	5	Off	E4
5	Evaporator coil temperature sensor error	6	Off	E5
6	Refrigerant leak detection system malfunction	7	Off	EC
7	Water level alarm malfunction	8	Off	EE
8	Dual indoor unit (twin model only) communication malfunction	9	Off	E8
9	Other twin model malfunction	10	Off	E9
10	Overload protection	1	On	F0
11	Outdoor temperature sensor error	2	On	F1
12	Outdoor condenser pipe sensor error	3	On	F2
13	Discharge air temperature sensor error	4	On	F3
14	Outdoor EEPROM (Electrically Erasable Programmable Read-Only Memory) error	5	On	F4
15	Outdoor fan speed (DC fan motor only) malfunction	6	On	F5
16	Auto-lifting panel communication error	8	On	F7
17	Auto-lifting panel malfunction	9	On	F8
18	Auto-lifting panel is open	10	On	F9
19	Inverter module IPM protection	1	Flash	P0
20	High/Low voltage protection	2	Flash	P1
21	Compressor top overheating protection	3	Flash	P2
22	Outdoor low temperature protection	4	Flash	P3
23	Compressor drive error	5	Flash	P4
24	Mode conflict	6	Flash	P5
25	Compressor low-pressure protection	7	Flash	P6
26	Outdoor IGBT sensor error	8	Flash	P7

Table 10

9k~18k models do not have display to show error codes and Operation and Timer Indicator will turn on / off and or flash according to above table to show system malfunction.

13 Test Operation

Perform test operation after installing decoration panel

1. Open the gas side stop valve.
2. Open the liquid side stop valve.
3. Turn on the main power switch and allow the system to warm up.
4. Set to cooling operation with the remote controller and start operation by pushing ON/OFF button.
5. Turn off the main power supply after operation.
6. Check the following points (Table 11). If there is any malfunction, please resolve it according to the chapter "Troubleshooting" in the "Owner's Manual".

List of Checks to Perform	Pass	Fail
No electrical leakage		
Unit is properly grounded		
All electrical terminals properly covered		
Indoor and outdoor units are solidly installed		
All pipe connection points do not leak		
Water drains properly from drain hose		
All piping is properly insulated		
Unit performs COOL function properly		
Unit performs HEAT function properly		
Indoor unit louvers rotate properly		
Indoor unit responds to remote controller		

Table 11

A protection feature prevents the air conditioner from being activated for approximately 3 minutes when it is restarted immediately after shut off.

14 Disposal guidelines

Components
Many parts in the Air Conditioner can be fully recycled in the end of the product life. Contact your city authorities for information about the disposal of recyclable products.

Refrigerant
At the end of the service life of this appliance and prior to its environmental disposal, a person qualified to work with refrigerant circuits must recover the refrigerant from within the sealed system.

CAUTION: CONTAINS REFRIGERANT

- Improper disposal of this appliance endangers your health and is bad for the environment. Hazardous substances may leak into the ground water and enter the food chain.
- Disposing of this product correctly will help ensure that the waste undergoes the necessary treatment, recovery and recycling.

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