ComfortStar®

INSTALLATION MANUAL

R32 3D INVERTER CONTROL



INDOOR UNIT

CAC12CD(I)-V(45X)
CAC12CA(I)-V(45V)
CAC18CD(I)-V(45Z)
CAC24CD(I)-V(462)

OUTDOOR UNIT

CAC12CD(O)-V(45Y)
CAC12CA(O)-V(45W)
CAC18CD(O)-V(461)
CAC24CD(O)-V(463)

Table of Contents

Page

1. Introduction 4

1.1 Standard supplied accessories 4

1.2 Optional accessories..... 4

2. Main components and Installation Order 5

2.1 Main components..... 5

2.2 Installation Summary-Indoor Unit 6

3. Selection of location 7

3.1 Unit location selection can refer to installation manual. 7

3.2 DO NOT install the unit in the following locations: 7

3.3 Meets all spatial requirements shown in Installation Space Requirements below. 7

3.4 Rows of series installation 7

4. Inspecting and handling the unit 8

5. Packing and Unpacking the unit..... 8

6. Unit Installation 8

6.1 Installation tools..... 8

6.2 Indoor Unit Installation..... 9

6.3 Outdoor unit installation(Side Discharge Unit) 15

6.4 Refrigerant Pipe Installation..... 16

7. Air Evacuation..... 18

7.1 Preparations and precautions 18

7.2 Selection of vacuum pump..... 18

7.3 Evacuation Instructions 18

8. Charging refrigerant..... 19

Table of Contents

Page

8.1 Precautions when adding R32 19

8.2 Additional Refrigerant Charge 19

8.3 Refrigerant recharge procedure 20

8.4 Checks after refrigerant addition 20

9. Electrical and Gas Leak Checks 20

9.1 Electrical Safety Checks 20

9.2 Gas Leak Checks 20

9.3 After performing gas leak checks 21

10. Before operation 21

10.1 First Time Installation Check 21

10.2 Test Operation 21

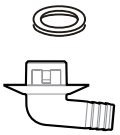
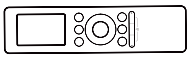
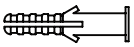
10.3 Engineering Mode Entry and Setting Methods 22

11. Hand-over to the user 28

1. Introduction

1.1 Standard supplied accessories

The air conditioner 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 cause the equipment to fail. The items are not included with the air conditioner must be purchased separately.

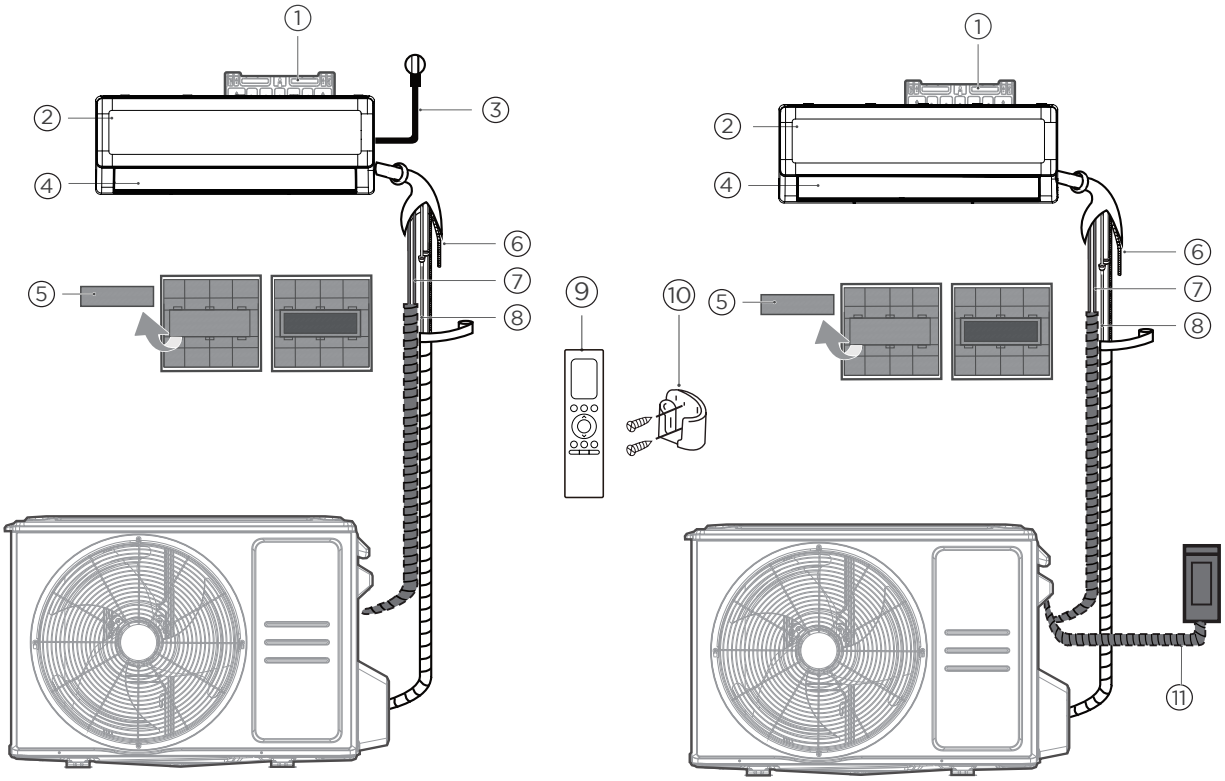
Name	Shape	Quantity	Name	Shape	Quantity
Manual		3	Drain joint & Seal ring		1
Mounting plate		1	Remote controller		1
Clip anchor		5	Battery		2
Mounting plate fixing screw ST3.9 X 25		5	Small Filter(Need to be installed on the back of main air filter by the authorized technician while installing the machine)		1
Copper nut		2			

1.2 Optional accessories

Name	Shape	Name	Shape
Remote controller holder		Fixing screw for remote controller holder	
Connecting pipe		Connecting wire	

2. Main components and Installation Order

2.1 Main components



Indoor power supply models **Outdoor power supply models**

① Wall Mounting Plate

② Front Panel

③ Power Cable(some units)

④ Louver

⑤ Functional Filter (On Back of Main Filter - Some Units)

⑥ Drainage Pipe

⑦ Signal Cable

⑧ Refrigerant Piping

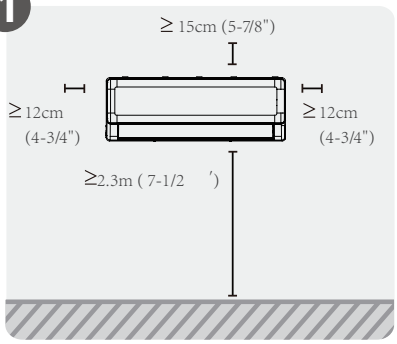
⑨ Remote Controller

⑩ Remote controller Holder (some units)

⑪ Outdoor Unit Power Cable (some units)

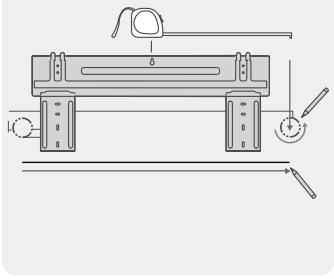
2.2 Installation Summary-Indoor Unit

1



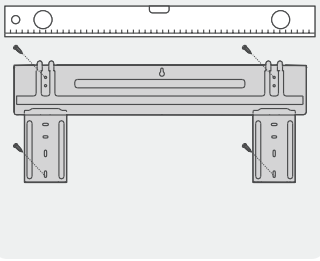
Select Installation Location

2



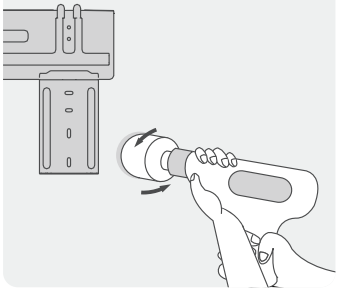
Attach Mounting Plate

3



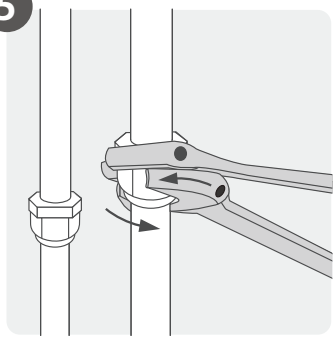
Determine Wall Hole Position

4



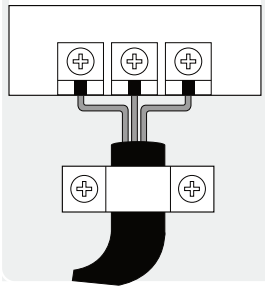
Drill Wall Hole

5



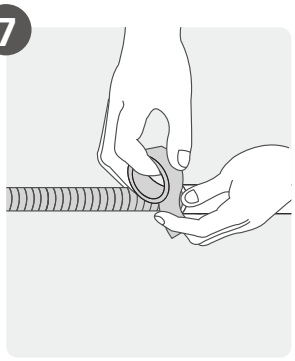
Connect Piping

6



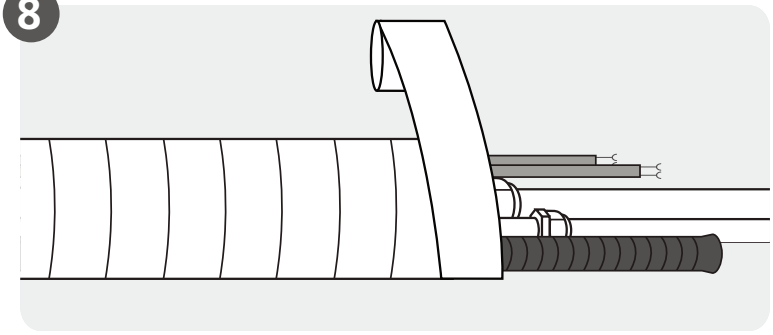
Connect Wiring
(Not applicable for some locations in North America)

7



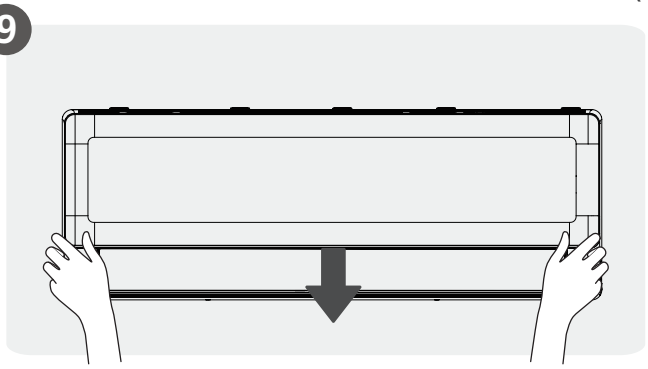
Prepare Drain Hose

8



Wrap Piping and Cable
(Not applicable for some locations in North America)

9



Mount Indoor Unit

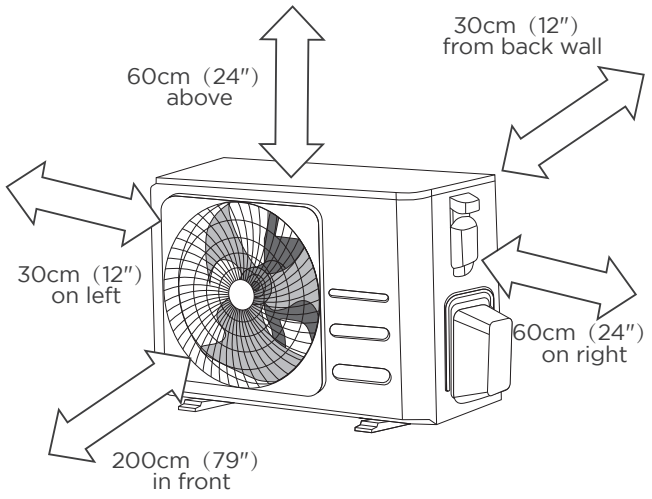
3. Selection of location

3.1 Unit location selection can refer to installation manual.

3.2 DO NOT install the unit in the following locations:

- Where oil drilling or fracking is taking place.
- Coastal areas with high salt content in the air.
- Areas with caustic gases in the air, such as near hot springs.
- Areas with power fluctuations, such as factories.
- Enclosed spaces, such as cabinets.
- Areas with strong electromagnetic waves.
- Areas that store flammable materials or gas.
- Rooms with high humidity, such as bathrooms or laundry rooms.
- If possible, DO NOT install the unit where it is exposed to direct sunlight.

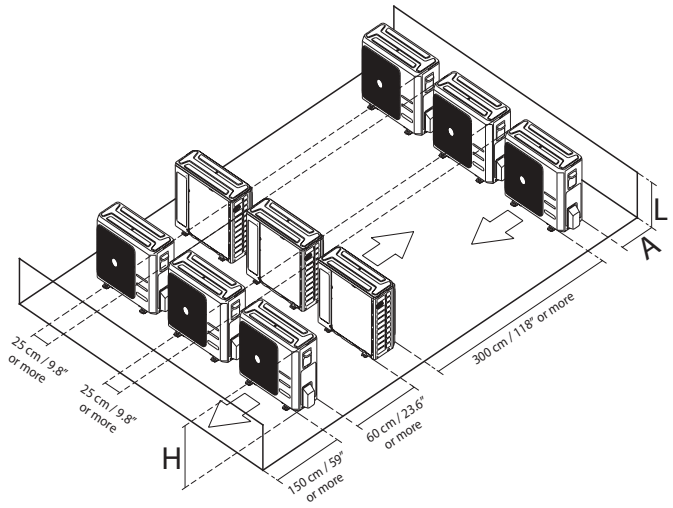
3.3 Meets all spatial requirements shown in Installation Space Requirements below.



3.4 Rows of series installation

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

	L	A
L ≤ H	L ≤ 1/2H	25 cm / 9.8" or more
	1/2H < L ≤ H	30 cm / 11.8" or more
L > H	Can not be installed	



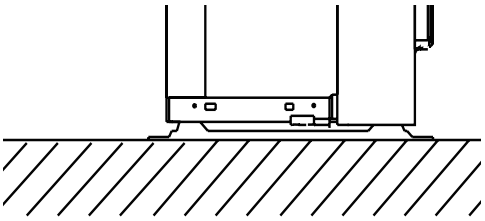
NOTE

H: Unit height

L: Height of the wall behind the unit

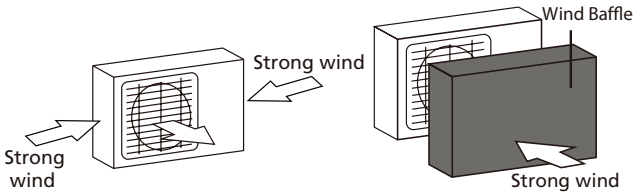
A: Distance between unit and wall

DO NOT install the rows of series like following figure.



2.5 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.



2.6 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.

2.7 If the unit is frequently exposed to salty air (seaside):

Use outdoor unit that is specially designed to resist corrosion.

4. Inspecting and handling the unit

- This section outlines the steps to take once the outdoor unit's box has been delivered to the site. Please consider the following:
- Upon delivery, inspect the packaging and report any damages immediately to the carrier's claims representative.
- Transport the unit in its original packaging as close as possible to its final installation location to avoid damage during transit.
- When managing the unit, consider the following:



The unit is fragile, so handle it with caution.

Keep the unit in an upright position to prevent any damage.

- Plan and clear the path beforehand for moving the unit inside.

5. Packing and Unpacking the unit

Unpacking:

Indoor unit:

1. Cut the sealing tape on the carton with a knife, one cut on the left, one cut in the middle and one cut on the right.

2. Use the vice to take out the sealing nails on the top of the carton.

3. Open the carton.

4. Take out the middle support plate if it is included.

5. Take out the accessory package, and take out the connecting wire if it is included.

6. Lift the machine out of the carton and lay it flat.

7. Remove the left and right package foam or the upper and lower packaging foam, untie the packaging bag.

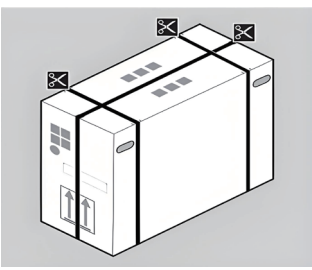
Outdoor Unit

1. Cut the packing belt.

2. Take the unit out of the carton.

3. Remove the foam from the unit.

4. Remove the packaging bag from the unit.



Packing:

Indoor unit:

1. Put the indoor unit into the packing bag.
2. Attach the left and right package foam or the upper and lower packaging foam to the unit.
3. Put the unit into the carton, then put accessory package in.
4. Close the carton and seal it with the tape.
5. Using the packing belt if necessary.

Outdoor unit:

1. Put the outdoor unit into the packing bag.
2. Put the bottom foam into the box.
3. Put the unit into the carton, then put the upper packaging foam on the unit.
4. Close the carton and seal it with the tape.
5. Using the packing belt if necessary.

NOTE: Please keep all packaging items if you may need in the future.

6. Unit Installation

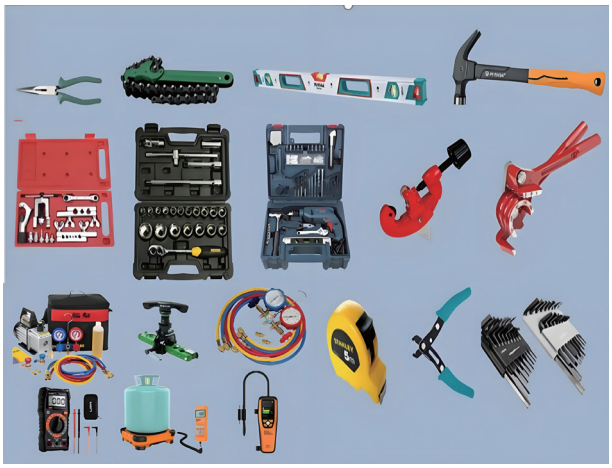
6.1 Installation tools

1. The required tools include: socket wrench, adjustable wrench, screwdriver, test pen, multimeter, hex key wrench, small brazing tool, small vacuum pump, compound refrigerant pressure gauge, pipe cutter, etc.

2. Ensure that you use installation tools (such as gauge manifolds and charge hoses) specifically designed for R32 installations to withstand the pressure and prevent foreign materials (e.g., mineral oils like SUNISO and moisture) from entering the system. (Note that the screw specifications for R32 are different).

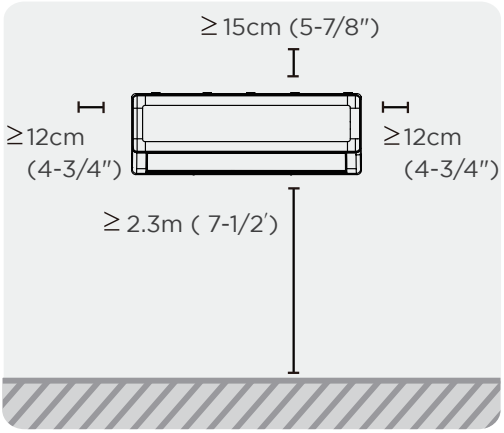
Use a 2-stage vacuum pump with a non-return valve capable of evacuating to -100 kPa (5 Torr, -755 mmHg).

NOTE: Ensure that the pump oil does not flow back into the system when the pump is not operating



6.2 Indoor Unit Installation

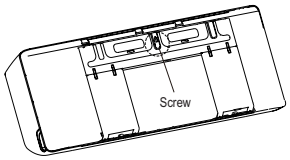
6.2.1 Service space for indoor unit



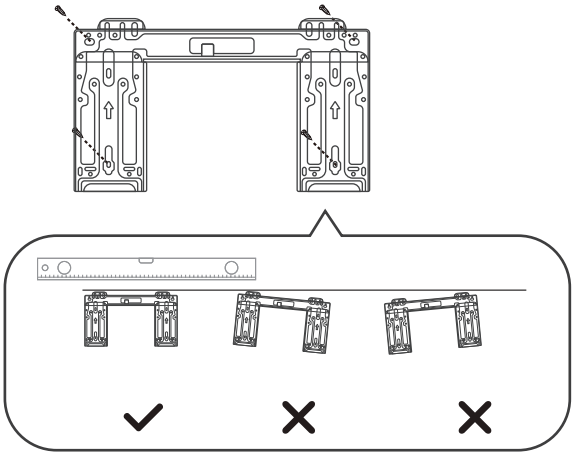
6.2.2 Attach mounting plate to wall

- The mounting plate is the device on which you will mount the indoor unit.

1. Remove the screw that attaches the mounting plate to the back of the indoor unit.



2. Secure the mounting plate to the wall with the screws provided. Make sure that mounting plate is flat against the wall.

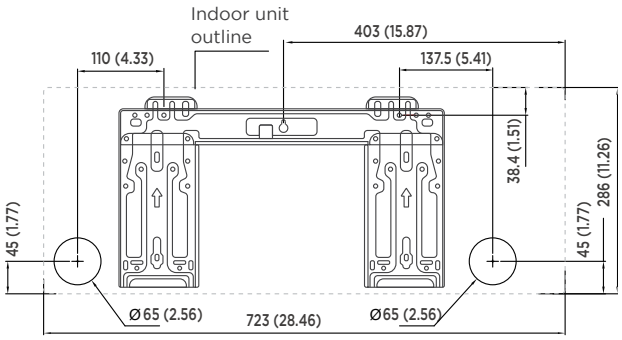


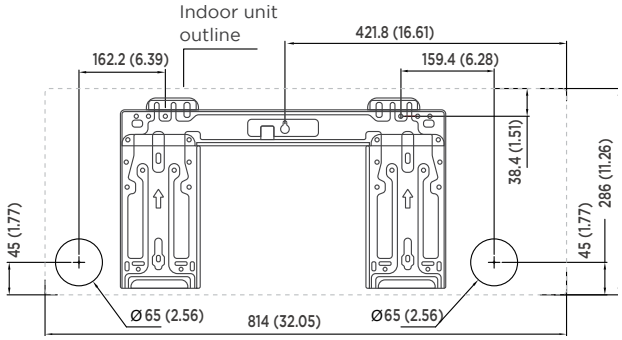
Correct orientation of Mounting Plate

3. Confirm the mounting plate you own.

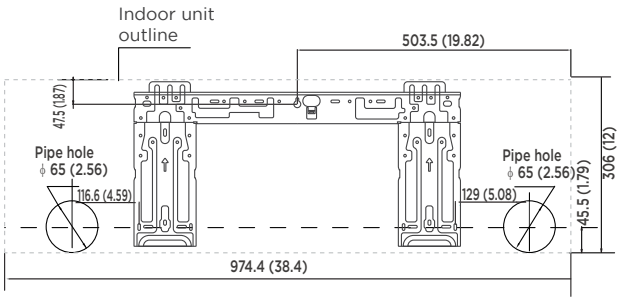
Different models have different mounting plates. Refer to following mounting plate dimensions to help you determine the optimal position. The shape of the mounting plate may be lightly different, but the installation dimensions are the same. (Unit:mm(in))

CAC-12CD(I)-V, CAC-12CA(I)-V

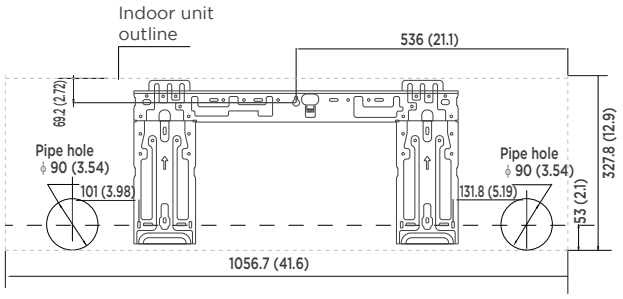




CAC-18CD(I)-V



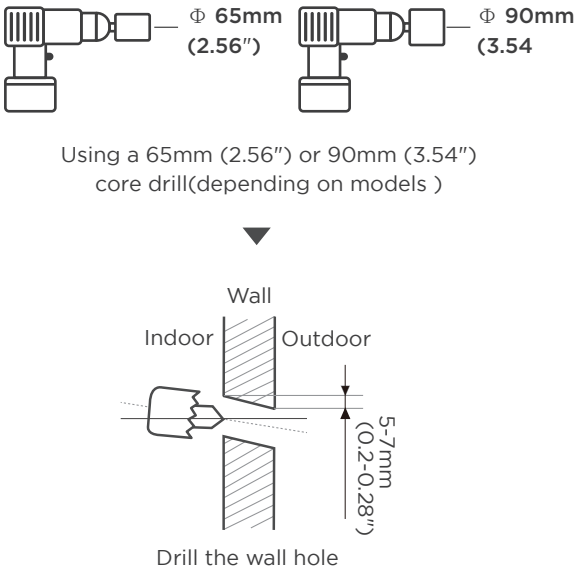
CAC-24CD(I)-V



6.2.3 Drill wall hole for connective piping

You must drill a hole in the wall for refrigerant piping, the drainage pipe, and the signal cable that will connect the indoor and outdoor units.

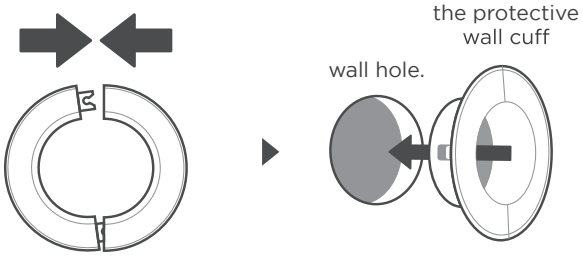
1. Using a 65mm (2.5") or 90mm(3.54") (depending on models)core drill, drill a hole in the wall. Make sure that the hole is drilled at a slight downward angle, so that the outdoor end of the hole is lower than the indoor end by about 5mm to 7mm (3/16-5/16"). This will ensure proper water drainage.



Using a 65mm (2.56") or 90mm (3.54")
core drill(depending on models)

Drill the wall hole

2. Place the protective wall cuff in the hole. This protects the edges of the hole and will help seal it when you finish the installation process.



Place the protective wall cuff in the hole.

NOTE: When drilling the wall hole, make sure to avoid wires, plumbing, and other sensitive components.

NOTE: THE WALL HOLE SIZE

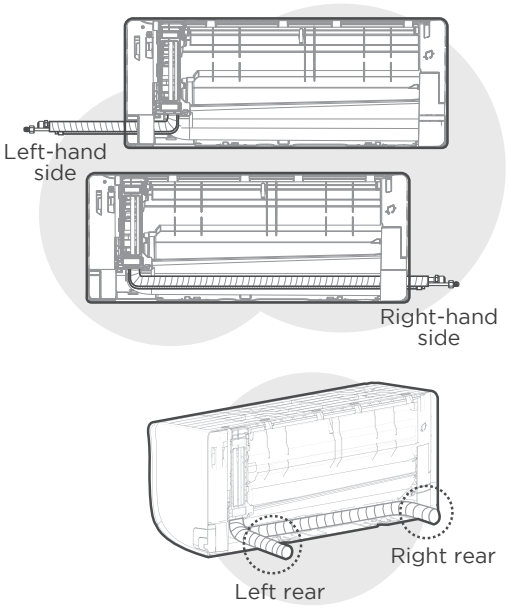
The size of the wall hole is determined by the connective pipes. When the pipe size of the gas side is Φ16mm(5/8") or more, the wall hole should be 90mm(3.54"). When the pipe size of gas side is less than Φ16mm(5/8"), the wall hole should be 65mm(2.56").

6.2.4 Prepare refrigerant piping

NOTE: The refrigerant piping is inside an insulating sleeve attached to the back of the unit. You must prepare the piping before passing it through the hole in the wall. Refer to the Refrigerant Piping connection section of this manual for detailed instructions on pipe flaring and flare torque requirements, technique, etc.

Four sides to exit the piping

Based on the position of the wall hole relative to the mounting plate, choose the side from which the piping will exit the unit. You have four options for the exit direction of the piping.



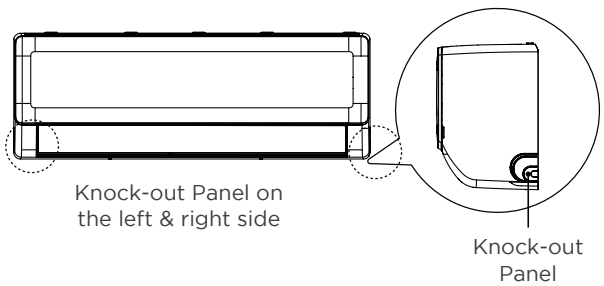
NOTE ON PIPING CONNECTING

In some locations of US, a conduit tube must be used to connect the cable. To ensure an enough space for the pipes running and the machine is against the wall after installation, It is recommended to attach the drain hose to the right-hand side (when you're facing the back of the unit).

When choose Left-hand side or Right-hand side piping, please make sure that the pipes come out horizontally so as not to affect the lower panel installation.

CAUTION: Be extremely careful not to dent or damage the piping while bending them away from the unit. Any dents in the piping will affect the unit's performance.

Connect refrigerant piping



1. If the wall hole is behind the unit, keep the knock-out panel in place. If the wall hole is to the side of the indoor unit, remove the plastic knock-out panel from that side of the unit. Use pliers or scissors if the plastic panel is too difficult to remove by hand.

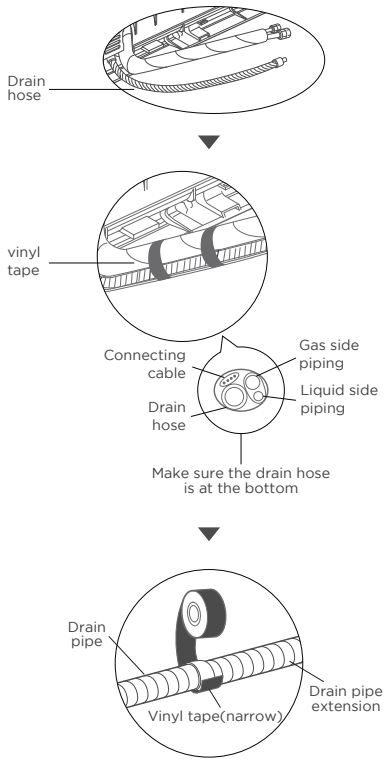
2. Groove has been made in the knock-out panel in order to cut it conveniently. The size of the slot is determined by the diameter of piping.

3. If existing connective piping is already embedded in the wall, proceed directly to the Connect Drain Hose step. If there is no embedded piping, connect the indoor unit's refrigerant piping to the connective piping that will join the indoor and outdoor units. Refer to the Refrigerant Piping Connection section of this manual for detailed instructions.

6.2.5 Connect drain hose

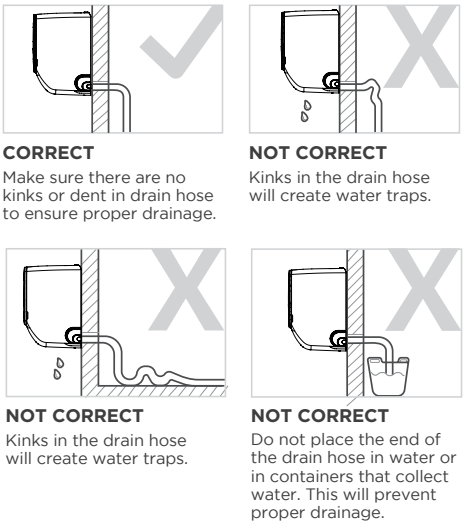
The drain hose can be attached to the left or right side. To ensure proper drainage, attach the drain hose on the same side that your refrigerant piping exits the unit. Attach drain hose extension (purchased separately) to the end of drain hose.

- Wrap the connection point firmly with Teflon tape to ensure a good seal and to prevent leaks.
- For the portion of the drain hose that will remain indoors, wrap it with foam pipe insulation to prevent condensation.
- Remove the air filter and pour a small amount of water into the drain pan to make sure that water flows from the unit smoothly.



NOTE ON DRAIN HOSE PLACEMENT:

- Make sure to arrange the drain hose according to the following figures.



CORRECT
Make sure there are no kinks or dent in drain hose to ensure proper drainage.

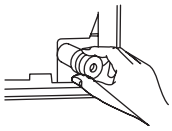
NOT CORRECT
Kinks in the drain hose will create water traps.

NOT CORRECT
Kinks in the drain hose will create water traps.

NOT CORRECT
Do not place the end of the drain hose in water or in containers that collect water. This will prevent proper drainage.

PLUG THE UNUSED DRAIN HOLE

To prevent unwanted leaks you must plug the unused drain hole with the rubber plug provided.



6.2.6 Connect signal and power cable

1. About connecting the electrical wiring

Before connecting the electrical wiring, ensure that:

- The refrigerant piping is connected and inspected.
- The water piping is connected.

Typical Workflow

Connecting the electrical wiring generally involves the following steps:

1. Ensuring the power supply system meets the electrical specifications of the units.
2. Connecting the electrical wiring to the outdoor unit.
3. Connecting the electrical wiring to the indoor unit.
4. Connecting the main power supply.

2. Safety Measures for Electrical Wiring Connection

INFORMATION

Also review the precautions and requirements in the following sections:

- General Safety Precautions
- Preparation

WARNING

Always use multi-core cables for power supply connections.

WARNING

Use an all-pole disconnection type breaker with a minimum contact gap of 3 mm, ensuring complete disconnection under overvoltage category III.

WARNING

- Do not use locally acquired electrical parts within the product.
- Do not branch the power supply for the drain pump or other components from the terminal block, as this could lead to electrical shock or fire.

WARNING

Do not connect the power supply to the indoor unit, as it may cause electrical shock or fire.

WARNING

Keep the interconnection wiring away from copper pipes that lack thermal insulation, as these pipes can become extremely hot.

DANGER: RISK OF ELECTROCUTION

All electrical components (including thermistors) are energized by the power supply. Avoid touching them with bare hands.

DANGER: RISK OF ELECTROCUTION

Disconnect the power supply for at least 10 minutes, and measure the voltage at the terminals of the main circuit capacitors or electrical components before servicing. Ensure the voltage is below 50 V DC before touching any electrical components.

3. 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. If 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.

5. Only connect the unit to an individual branch circuit outlet. Do not connect another appliance to that outlet.

6. Make sure to properly ground the air conditioner.

7. Every wire must be firmly connected. Loose wiring can cause the terminal to overheat, resulting in product malfunction and possible fire.

8. Do not let wires touch or rest against refrigerant tubing, the compressor, or any moving parts within the unit.

9. To avoid getting an electric shock, never touch the electrical components soon after the power supply has been turned of. After turning of the power, always wait 10 minutes or more before you touch the electrical components.

10. Power voltage should be within 90-110% of rated voltage. Insufficient power supply can cause malfunction, electrical shock, or fire.

WARNING: All wiring must be performed strictly in accordance with the wiring diagram located on the back of the Indoor Unit's front panel.

4. Connect signal and power cable

The signal cable enables communication between the indoor and outdoor units. You must first choose the right cable size before preparing it for connection.

Cable Types:

- Indoor Power Cable (if applicable): H05VV-F or H05V2V2-F
- Outdoor Power Cable: H07RN-F
- Signal Cable: H07RN-F

Table: Minimum Cross-Sectional Area able of Power and Signal Cables

Rated Current of Appliance (A)	Nominal Cross-Sectional Area (mm^2)
> 3 and ≤ 6	0.75
> 6 and ≤ 10	1
> 10 and ≤ 16	1.5
> 16 and ≤ 25	2.5
> 25 and ≤ 32	4
> 32 and ≤ 40	6

CHOOSE THE RIGHT CABLE SIZE

The size of the power supply cable, signal cable, fuse, and switch needed is determined by the maximum current of the unit. The maximum current is indicated on the nameplate located on the side panel of the unit. Refer to this nameplate to choose the right cable, fuse, or switch.

1. Open front panel of the indoor unit.

2. Using a screwdriver, open the wire box cover on the right side of the unit. This will reveal the terminal block.

3. Unscrew the cable clamp below the terminal block and place it to the side.

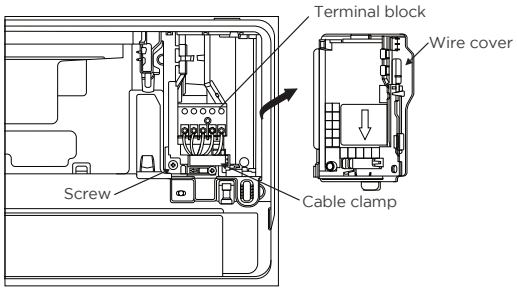
4. Facing the back of the unit, remove the plastic panel on the bottom left-hand side.

5. Feed the signal wire through this slot, from the back of the unit to the front.

6. Facing the front of the unit, connect the wire according to the indoor unit's wiring diagram, connect the u-lug and firmly screw each wire to its corresponding terminal.

7. After checking to make sure every connection is secure, use the cable clamp to fasten the signal cable to the unit. Screw the cable clamp down tightly.

8. Replace the wire cover on the front of the unit, and the plastic panel on the back.



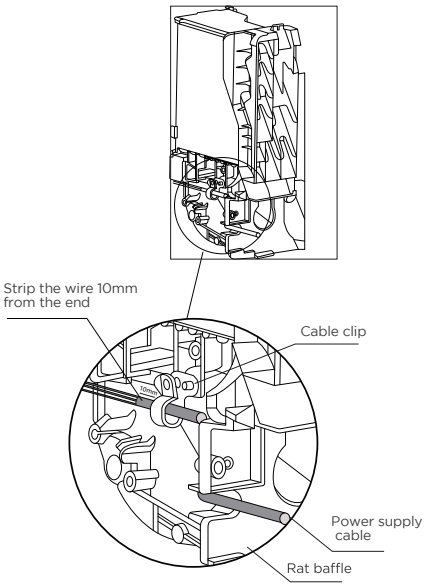
DO NOT MIX UP LIVE AND NULL WIRES

This is dangerous, and can cause the air conditioning unit to malfunction.

Note:

For some units that require on-site connection of power cords, it is necessary to remove the front frame first, thread the power cable through the cable-cross hole in the rat baffle at the back of the indoor unit, and then pull it out from the front side, secure it with a cable clip as shown in the following diagram.

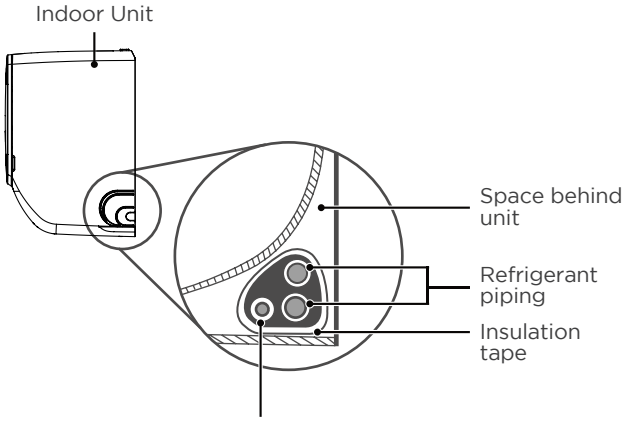
After the power cord passes through the cable clamp, strip the wire 10mm from the end, and then connect the wire to the terminal.

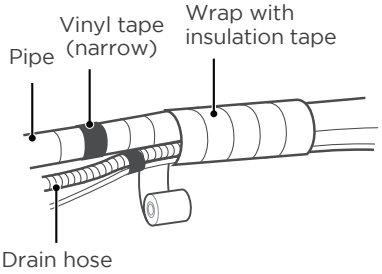


6.2.7 Wrap piping and cables

Before passing the piping, drain hose, and the signal cable through the wall hole, you must bundle them together to save space, protect them, and insulate them.

1. Bundle the drain hose, refrigerant pipes, and signal cable according to the picture below:





2. Using adhesive vinyl tape, attach the drain hose to the underside of the refrigerant pipes.

3. Using insulation tape, wrap the refrigerant pipes, and drain hose tightly together. Double-check that all items are bundled.

4. After completing the wiring and piping connection, reinstall the lower frame.

NOTE:

- Drain hose must be on bottom

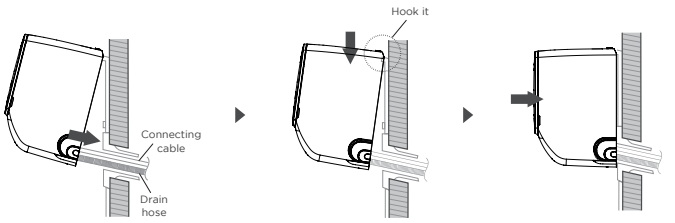
Make sure that the drain hose is at the bottom of the bundle. Putting the drain hose at the top of the bundle can cause the drain pan to overflow, which can lead to fire or water damage.

- Do not wrap ends of piping

When wrapping the bundle, keep the ends of the piping unwrapped. You need to access them to test for leaks at the end of the installation process.

6.2.8 Mount indoor unit

If you installed new connective piping to the outdoor unit, do the following:

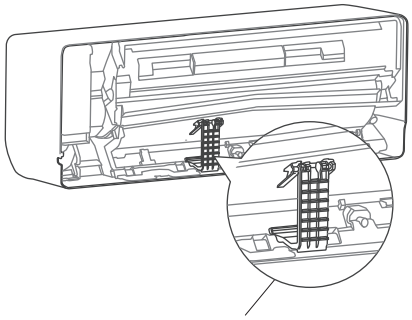


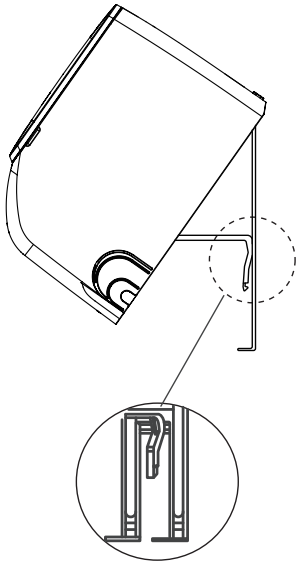
- If you have already passed the refrigerant piping through the hole in the wall, proceed to **Prepare refrigerant piping.**
- Otherwise, double-check that the ends of the refrigerant pipes are sealed to prevent dirt or foreign materials from entering the pipes.
- Slowly pass the wrapped bundle of refrigerant pipes, drain hose, and signal wire through the hole in the wall.
- Hook the top of the indoor unit on the upper hook of the mounting plate.
- Check that unit is hooked firmly on mounting by applying slight pressure to the left and right-hand sides of the unit. The unit should not jiggle or shift.
- Using even pressure, push down on the bottom half of the unit. Keep pushing down until the unit snaps onto the hooks along the bottom of the mounting plate.
- Again, check that the unit is firmly mounted by applying slight pressure to the left and the right-hand sides of the unit.

If refrigerant piping is already embedded in the wall, do the following:

1. Hook the top of the indoor unit on the upper hook of the mounting plate.

2. Use the holder in the mounting plate to prop up the unit, giving you enough room to connect the refrigerant piping, signal cable, and drain hose.





3. Connect drain hose and refrigerant piping (refer to Refrigerant Piping Connection section of this manual for instructions).

4. Keep pipe connection point exposed to perform the leak test (refer to Electrical Checks and Leak Checks section of this manual).

5. After the leak test, wrap the connection point with insulation tape.

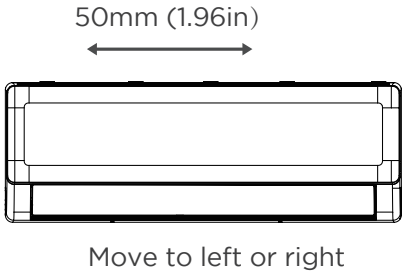
6. Release the holder that is propping up the unit.

7. Using even pressure, push down on the bottom half of the unit. Keep pushing down until the unit snaps onto the hooks along the bottom of the mounting plate.

NOTE:

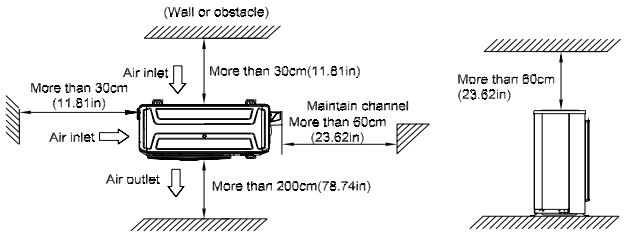
- Unit is adjustable

Keep in mind that the hooks on the mounting plate are smaller than the holes on the back of the unit. If you find that you don't have ample room to connect embedded pipes to the indoor unit, the unit can be adjusted left or right by about 50mm (1.96in), depending on the model.



6.3 Outdoor unit installation(Side Discharge Unit)

6.3.1 Service space for outdoor unit



6.3.2 Install drain joint(Heat pump unit only)

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 Fig. 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.

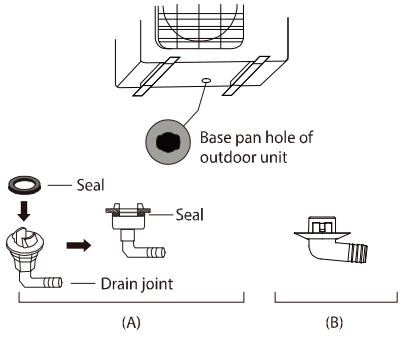
3. Rotate the drain joint 90° until it clicks in place facing the front of the unit. **For some panel plates, you need to use tool.**

4. Connect a drain hose extension (not included) to the drain joint to redirect water from the unit during heating mode.

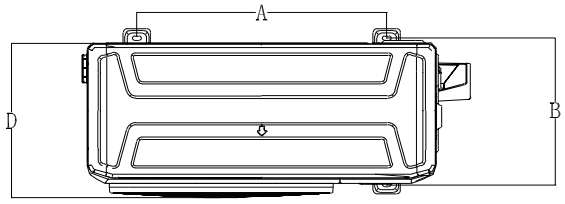
If the drain joint doesn't come with a rubber seal (see Fig. B), do the following:

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 (not included) to the drain joint to redirect water from the unit during heating mode.



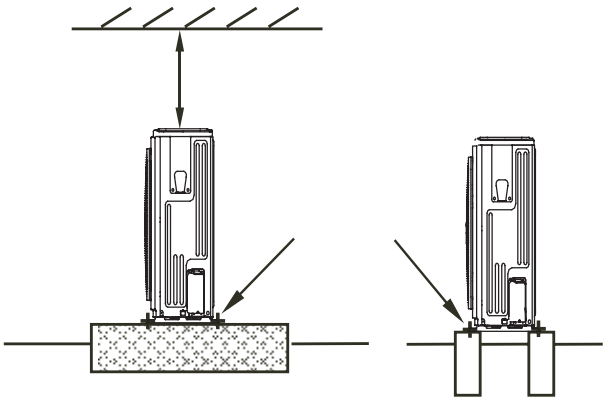
6.3.3 Bolt pitch



Mldels	unit	A	B	D
CAC-12CD(O)-V	mm	452	255	270
CAC-12CA(O)-V				
CAC-18CD(O)-V	mm	452	286	303
CAC-24CD(O)-V	mm	511	317	330

6.3.4 Install Outdoor Unit

Fix the outdoor unit with anchor bolts(M10)



Cation

Since the gravity center of the unit is not at its physical center, so please be careful when lifting it with a sling.

Never hold the inlet of the outdoor unit to prevent it from deforming.

Do not touch the fan with hands or other objects.

Do not lean it more than 45, and do not lay it sidelong.

Make concrete foundation according to the specifications of the outdoor units.

Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.

6.4 Refrigerant Pipe Installation

6.4.1 Protection against contamination when installing pipes

Take measures to prevent foreign materials like moisture and contamination from mixing into the system.

Installation period	Protection method
More than a month	Pinch the pipe
Less than a month	Pinch or tape the pipe
Regardless of the period	

Great caution is needed when passing copper tubes through walls.

Block all gaps in the holes for passing out piping and wiring using sealing material (field supply). (The capacity of the unit will drop and small animals may enter the machine.)

6.4.2 Recommended copper pipe thickness

Pipe Diameter	Thickness(mm)
1/4" (6.35)	0.6
3/8" (9.52)	0.7
1/2" (12.7)	0.75
5/8" (15.9)	0.75
3/4" (19)	0.8
7/8" (22)	1

6.4.3 Maximum length and drop height

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.

Capacity(Btu/h)	Max. Length (m/ft)	Max. Elevation (m/ft)
9k~12k	25/82	10/32.8
17~22k	30/98.4	20/65.6

caution:

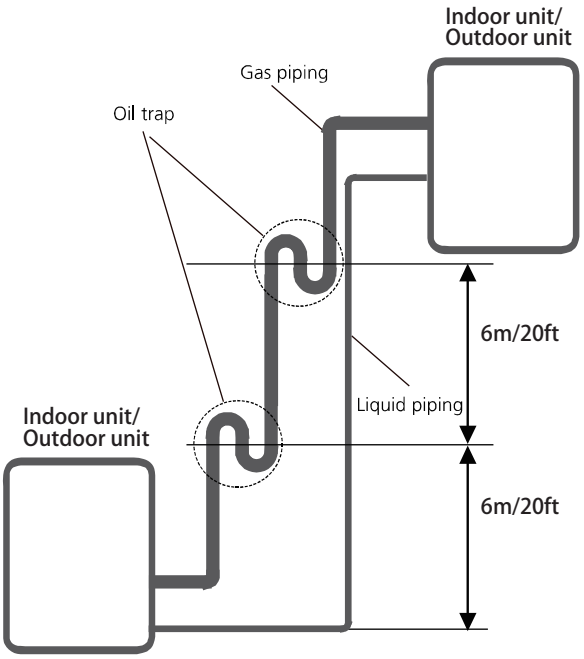
- The capacity test is based on the standard length and

the maximum permissive length is based on the system reliability.

- 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.



6.4.4 The procedure of connecting pipes

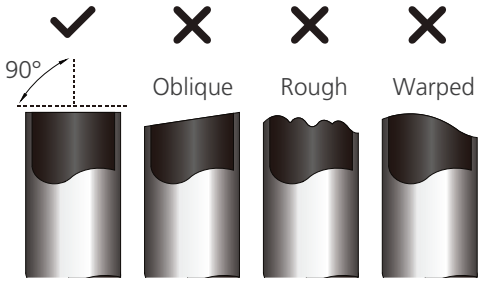
1. Choose the pipe size according to the specification table.

2. Confirm the cross way of the pipes.

3. Measure the necessary pipe length.

4. Cut the selected pipe with pipe cutter

- Make the section flat and smooth.

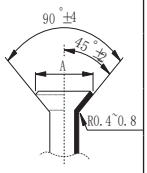


5. Insulate the copper pipe

- Before test operation, the joint parts should not be heat insulated.

6. Flare the pipe

- Insert a flare nut into the pipe before flaring the pipe
- According to the following table to flare the pipe.

Pipe diameter (inch(mm))	Flare dimension A (mm/inch)		Flare shape
	Min	Max	
1/4" (6.35)	8.4/0.33	8.7/0.34	
3/8" (9.52)	13.2/0.52	13.5/0.53	
1/2" (12.7)	16.2/0.64	16.5/0.65	
5/8" (15.9)	19.2/0.76	19.7/0.78	
3/4" (19)	23.2/0.91	23.7/0.93	
7/8" (22)	26.4/1.04	26.9/1.06	

- After flared the pipe, the opening part must be seal by end cover or adhesive tape to avoid duct or exogenous impurity come into the pipe.

7. Drill holes if the pipes need to pass the wall.

8. According to the field condition to bend the pipes so that it can pass the wall smoothly.

9. Bind and wrap the wire together with the insulated pipe if necessary.

10. Set the wall conduit

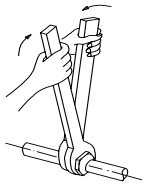
11. Set the supporter for the pipe.

12. Locate the pipe and fix it by supporter

- For horizontal refrigerant pipe, the distance between supporters should not be exceed 1m.
- For vertical refrigerant pipe, the distance between supporters should not be exceed 1.5m.

13. Connect the pipe to indoor unit and outdoor unit by using two spanners.

- Be sure to use two spanners and proper torque to fasten the nut, too large torque will damage the bell mouthing, and too small torque may cause leakage. Refer the following table for different pipe connection.

Pipe Diameter	Torque N.m(lb.ft)	Sketch map
1/4" (6.35)	18~20 (13.3~14.8)	
3/8" (9.52)	32~39 (23.6~28.8)	
1/2" (12.7)	49~59 (36.1~43.5)	
5/8" (15.9)	57~71 (42~52.4)	
3/4" (19)	67~101 (49.4~74.5)	
7/8" (22)	85-110 (62.7-81.1)	

7. Air Evacuation

7.1 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. Ensure to evacuate the air inside the indoor unit and pipes with vacuum pump. 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. Incorrect installation due to ignoring of the Instruction will cause serious problem to the machine.

7.2 Selection of vacuum pump

- The ultimate vacuum degree of vacuum pump shal!be -76cmHg or less.
- Precision of vacuum pump shall reach 0.02mmHg or above.

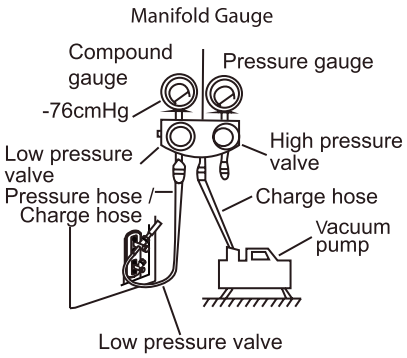
7.3 Evacuation Instructions

Before Performing Evacuation

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

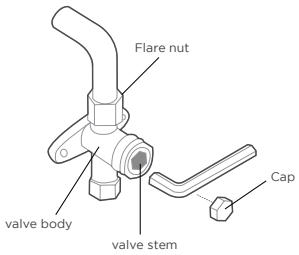
Step 1:

- Connect the charge hose of the manifold gauge to service port on the outdoor unit's low pressure valve.
- Connect another charge hose from the manifold gauge to the vacuum pump.
- Open the Low Pressure side of the manifold gauge. Keep the High Pressure side closed.
- Turn on the vacuum pump to evacuate the system.
- Run the vacuum for at least 15 minutes, or until the Compound Meter reads -76cmHG(-10^5 Pa).
- Close the Low Pressure side of the manifold gauge, and turn of the vacuum pump.
- Wait for 5 minutes, then check that there has been no change in system pressure.



Step 2:

- 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).
- 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

Ensure to open all the valves after evacuation. When opening valve stems, turn the hexagonal wrench until it hits against the stopper. Do not try to force the valve to open further.

8. Charging refrigerant

8.1 Precautions when adding R32

NOTICE

Ensure that the installation of refrigerant piping adheres to relevant regulations. In Europe, the applicable standard is EN378.

NOTICE

Ensure that the field piping and connections are free from stress.

NOTICE

To prevent compressor failure, do not exceed the specified refrigerant charge.

NOTICE

After connecting all the piping, ensure there are no gas leaks. Perform a gas leak detection using nitrogen.

NOTICE

When the refrigerant charging process is complete or paused, immediately close the valve on the refrigerant tank. If the valve is not closed promptly, residual pressure may cause additional refrigerant to be charged. **Possible consequence:** Incorrect refrigerant amount.

WARNING

Refrigerant cannot be charged until all field wiring and piping are completed. It may only be charged after conducting a leak test and vacuum drying.

WARNING

During testing, never pressurize the product beyond the maximum. allowable pressure specified on the unit's nameplate.

8.2 Additional Refrigerant Charge

- After the vacuum drying process is carried out, the additional refrigerant charge process need to be performed.
- The outdoor unit is factory charged with refrigerant. The additional refrigerant charge volume is decided by the diameter and length of the liquid pipe between indoor and outdoor unit. Refer the following formula to calculate the charge volume.

Diameter of liquid pipe (mm)	Formula
6.35	V=12g/m×(L-5)
9.52	V=24g/m×(L-5)

V: Additional refrigerant charge volume (g).

L : The length of the liquid pipe (m).

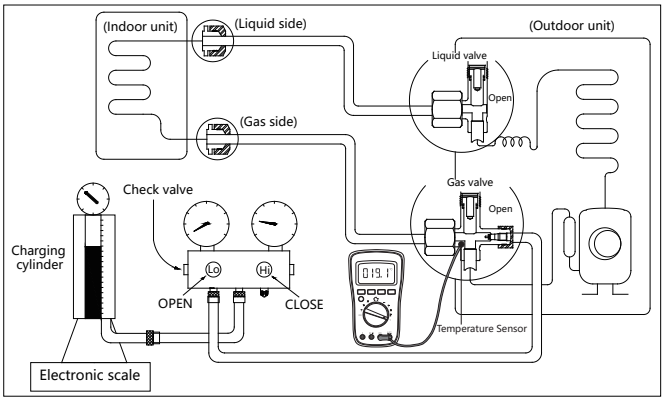
Note:

- Refrigerant may only be charged after performed the vacuum drying process.
- Always use gloves and glasses to protect your hands and eyes during the charge work.
- Use electronic scale or fluid infusion apparatus to weight refrigerant to be recharged. Be sure to avoid

extra refrigerant charged, it may cause liquid hammer of the compressor or protections.

- Use supplementing flexible pipe to connect refrigerant cylinder, pressure gauge and outdoor unit. And The refrigerant should be charged in liquid state. Before recharging, The air in the flexible pipe and manifold gauge should be exhausted.
- After finished refrigerant recharge process, check whether there is refrigerant leakage at the connection joint part.(Using gas leakage detector or soap water to detect).

8.3 Refrigerant recharge procedure



Procedure:

1. Close both liquid and gas way valves.
2. Slightly connect the Handle Lo charge hose to the gas way service port.
3. Connect the charge hose to the valve at the bottom of the cylinder.
4. If the refrigerant is R410A/R32, invert the cylinder to ensure a complete liquid charge.
5. Open the valve at the bottom of the cylinder for 5 seconds to purge the air in the charge hose, then fully tighten the charge hose with push pin Handle Lo to the service port of gas way valve..
6. Place the charging cylinder onto an electronic scale and record the starting weight.
7. Fully open the Handle Lo manifold valve, liquid and gas way valves.
8. Operate the air conditioner in cooling mode to charge the system with liquid refrigerant.
9. When the electronic scale displays the correct weight (refer to the gauge and the pressure of the low side to confirm, the value of pressure refers to chapter Appendix), turn off the air conditioner, then disconnect the charge hose from the gas way service port immediately..
10. Mount the caps of service port and liquid and gas way valves.
11. Use a torque wrench to tighten the caps to a torque of 18 N.m.
12. Check for gas leakage.

8.4 Checks after refrigerant addition

- Are the stop valves for both liquid and gas open?
- Has the amount of added refrigerant been recorded for future reference?

⚠Ensure the stop valves are open after charging the refrigerant.

Running the system with the stop valves closed will cause compressor damage.

9. Electrical and Gas Leak Checks

9.1 Electrical Safety Checks

After installation, confirm that all electrical wiring is installed in accordance with local and national regulations, and according to the Installation Manual.

9.1.1 Before test run

- Check Grounding Work

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

Note: This may not be required for some locations in the US.

9.1.2 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.

Note: This may not be required for some locations in North America.

9.2 Gas Leak Checks

There are two different methods to check for gas leaks.

- Soap and Water Method

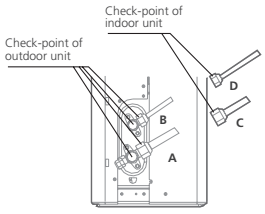
Using a soft brush, apply soapy water or liquid detergent to all pipe connection points on the indoor unit and outdoor unit. The presence of bubbles indicates a leak.

- Leak Detector Method

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

9.3 After performing gas leak checks

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



A: Low pressure stop valve
B: High pressure stop valve

10. Before operation

10.1 First Time Installation Check

Air and moisture trapped in the refrigerant system affects the performance of the air conditioner by:

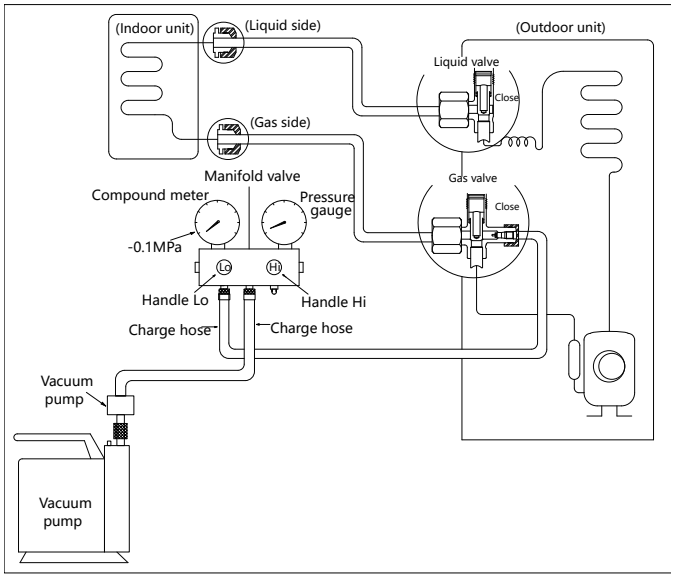
- Increasing pressure in the system.
- Increasing the operating current.
- Decreasing the cooling or heating efficiency.
- Congesting the capillary tubing due to ice build-up in the refrigerant circuit.
- Corroding the refrigerant system.

To prevent air and moisture from affecting the air conditioner's performance, the indoor unit, as well as the pipes between the indoor and outdoor unit, must be be leak tested and evacuated.

Leak test (soap water method)

Use a soft brush to apply soapy water or a neutral liquid detergent onto the indoor unit connections and outdoor unit connections. If there is gas leakage, bubbles will form on the connection.

Air purging with vacuum pump



Procedure:

1. Tighten the flare nuts of the indoor and outdoor units, and confirm that both the liquid and gas way valves are closed.
2. Connect the charge hose with the push pin of Handle Lo to the gas service port of the gas way valve.
3. Connect another charge hose to the vacuum pump.
4. Fully open the Handle Lo manifold valve.
5. Using the vacuum pump, evacuate the system for 30 minutes.
   a. Check whether the compound meter indicates -0.1 MPa (14.5 Psi).
      - If the meter does not indicate -0.1 MPa (14.5 Psi) after 30 minutes, continue evacuating for an additional 20 minutes.
      - If the pressure does not achieve -0.1 MPa (14.5 Psi) after 50 minutes, check for leakage.
      - If the pressure successfully reaches -0.1 MPa (14.5 Psi), fully close the Handle Lo valve, then cease vacuum pump operations.
   b. Wait for 5 minutes then check whether the gauge needle moves after turning off the vacuum pump. If the gauge needle moves backward, check wether there is gas leakage.
6. Loosen the flare nut of the gas way valve for 6 or 7 seconds and then tighten the flare nut again.
   a. Confirm the pressure display in the pressure indicator is slightly higher than the atmospheric pressure.
   b. Remove the charge hose from the gas way valve.
7. Fully open the liquid and gas way valves and tighten the cap of the liquid and gas way valves.

10.2 Test Operation

10.2.1 Before test run:

Only perform test run after you have completed the following steps:

- Electrical Safety Checks – Confirm that the unit's electrical system is safe and operating properly
- Gas Leak Checks – Check all flare nut connections and confirm that the system is not leaking
- Confirm that gas and liquid (high and low pressure) valves are fully open

10.2.2 Test Run Instructions

You should perform the Test Run for at least 30 minutes.

1. Connect power to the unit.

2. Press the ON/OFF button on the remote controller to turn it on.

3. Press the MODE button to scroll through the following functions, one at a time:

- COOL – Select lowest possible temperature
- HEAT – Select highest possible temperature

4. Let each function run for 5 minutes, and perform the following checks:

List of Checks to Perform	PASS/FALL	
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	Outdoor(2)	Outdoor(2)
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		

5. After the Test Run is successfully completed, and you confirm that all checks points in List of Checks to Perform have PASSED, do the following:

- Using remote control, return unit to normal operating temperature.
- Using insulation tape, wrap the indoor refrigerant pipe connections that you left uncovered during the indoor unit installation process.

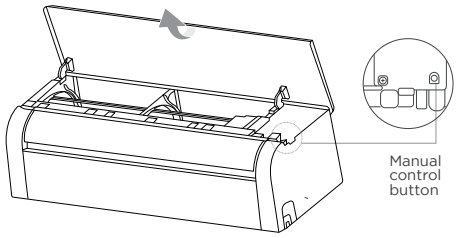
10.2.3 If ambient temperature is below 16°C (60°F)

You can't use the remote controller to turn on the COOL function when the ambient temperature is below 16°C./ 17°C In this instance, you can use the MANUAL CONTROL button to test the COOL function.

1. Lift the front panel of the indoor unit, and raise it until it clicks in place.

2. The MANUAL CONTROL button is located on the right-hand side of the display box. Press it two times to select the COOL function.

3. Perform Test Run as normal.



10.3 Engineering Mode Entry and Setting Methods

10.3.1 Information Inquiry

In order to enter to the engineering mode, and check the data of the system (data checking mode), Please make the following steps:

- Make sure that the AC is on the standby status, or working normally in a non-locked conditions.
- Press "Power" + "Fan" buttons together for 7s until the remote controller screen shows "0", and also "Auto, Cool, Dry, Heat, Battery " icons will be displayed at the same time.
- Press "Up" or "Down" button to choose different channel number that you want to check (from 0-30) on the remote controller, and then the display will show the parameter value

Channel	Code	Meaning	Remark
0		Error code	Refer to next list of error code Empty means no error
1	T1	Room temperature	Actual data, °C
2	T2	Indoor coil temperature	Actual data,°C
3	T3	Outdoor coil temperature	Actual data, °C
4	T4	Ambient temperature	Actual data, °C
5	TP	Discharge temperature	Actual data,°C
6	FT	Targeted frequency	Actual data
7	Fr	Actual frequency	Actual data
8	dL	Running current	3.2A=3
9	Uo	AC voltage	220V=22*
10	Sn	Reserved	
11	nA	Reserved	
12	Pr	Outdoor fan speed	Actual data/8
13	Lr	EXV opening steps	Actual data/8
14	ir	Indoor fan speed	Actual data/8
15	Hu	Humidity (if a sensor there)	Actual data, %
16	TT	Set temperature including compensation	Actual data, °C
17	DT	Reserved	
18	iF	Reserved	
19	nA	Reserved	
20	oT	Target Frequency calculated by indoor	Without limitation
21~30	nA	Reserved	

Please note that:

1-The Channel number indicates a certain parameter value (Check the below table).

2-The indoor unit display will show the code for 2s, and then the parameter value.

3-In the engineering mode, the other keys or operations are invalid except for the following buttons “Power”, “Up”, “Down” and “Ok”.

4-In order to exit from the engineering mode, press “Power” + “Fan” buttons together for 2s to quit Checking and back to the home screen.

5-The engineering mode will be exited if there is no valid input data for 60s.

Error code of engineer mode

Display	Error Information
A	No fault or protection
EH00	IDU EEPROM malfunction
EH0A	IDU EEPROM parameter error
EL01	IDU & ODU communication error
EH6A	Communication error between indoor unit and indoor external fan module
EH30	Parameters error of indoor external fan
EH35	Phase failure of indoor external fan
EH36	Indoor external fan current sampling bias fault
EH37	Indoor external fan zero speed failure
EH38	Indoor external fan stall failure
EH39	Out of step failure of indoor external fan
EH3A	Low voltage protection of indoor external fan DC bus
EH3b	Indoor external fan DC bus voltage is too high fault
EH3E	Indoor external fan overcurrent fault
EH3F	Indoor external fan module protection/hardware overcurrent protection
EH03	IDU fan speed out of control
EC51	ODU EEPROM parameter error
EC52	ODU coil temp. sensor (T3) error
EC53	ODU ambient temp. sensor (T4) error
EC54	COMP. discharge temp. sensor (TP) error
EC55	ODU IPM module temp.sensor(TH) error
EC0d	Outdoor unit malfunction
EH60	IDU room temp. sensor (T1) error
EH61	Evaporator coil temperature sensor T2 is in open circuit or short circuit
EC71	Outdoor external fan overcurrent fault
EC75	Outdoor external fan module protection/hardware overcurrent protection
EC72	Outdoor external fan phase failure
EC74	Outdoor external fan current sampling bias fault
EC73	Zero speed failure of outdoor unit DC fan
EC07	ODU fan speed out of control(

ELOC	System lacks refrigerant
PC00	ODU IPM module protection
PC10	ODU AC voltage too low protection
PC11	ODU DC bus voltage too high protection
PC12	ODU DC bus voltage too low protection
PC02	Compressor top (or IPM) temp. protection
PC40	Communication failure between outdoor unit main control chip and driver chip
PC41	Compressor current sampling circuit failure
PC42	Compressor starting failure
PC43	Compressor lost phrase protection
PC44	Compressor zero speed protection
PC45	Voltage drop
PC46	Compressor speed out of control
PC49	Compressor over current error
PC06	Compressor Discharge pipe high temp. protection
PC08	ODU Current protection
PH09	Anti-cold air in heating mode
PC0F	PFC failure
PC30	System overpressure protection
PC31	System pressure is too low protection
PC03	Pressure protection(low or high pressure)
PC0L	Outdoor low temp. protection
PH90	Evaporator high temp. protection
PH91	Evaporator low temp. protection
PC0R	Condenser high temp. protection
PH0C	Indoor unit humidity sensor malfunction
LH00	Evaporator temp. freq. limited(L0)
LH30	Indoor external fan current freq. limited
LH31	Indoor external fan voltage freq. limited
LC01	Condenser coil temp. (T3) freq. limited
LC02	ODU exhaust temp. (TP) freq. limited
LC05	Voltage freq. limited
LC03	Current freq. limited
LC06	IPM module temp. freq. limited
LC30	High pressure freq. limited
LC31	Low pressure freq. limited

LH07	Remote control frequency limitation in effect
----	IDUs mode conflict(Multi-zone)

10.3.2 Advanced Function Setting

In order to enter to the engineering mode, and check the advanced function settings, Please make the following steps:

If you want to check the current functions set value (Presetting Page):

1- Firstly, you need to disconnect the power supply from the unit, and wait for 1 minute.

2- Then connect the power supply again to the unit (the unit should be under the standby state).

3- Press "Power" + "Fan" buttons together for 7s until the remote controller screen shows "0", and also "Auto, Cool, Dry, Heat, Battery " icons will be displayed at the same time.

4- Press "Up" or "Down" button to choose different channel number that you want to check (from 0-30) on the remote controller.

5- Then Press "Power" button for 2s until the remote controller screen shows "Ch" .

6- Press "OK" button to query the current function set value while the remote controller shows "Ch", and the function set value will be shown on the indoor unit display.

If you want to change the current functions set value:

1- Firstly, you need to disconnect the power supply from the unit, and wait for 1 minute.

2- Then connect the power supply again to the unit (the unit should be under the standby state).

3- Press "Power" + "Fan" buttons together for 7s until the remote controller screen shows "0", and also "Auto, Cool, Dry, Heat, Battery " icons will be displayed at the same time.

4- Press "Up" or "Down" button to choose different channel number that you want to change (from 0-30) on the remote controller.

5- Then Press "Power" button for 2s until the remote controller screen shows "Ch".

6- Press "Up" or "Down" button to choose the desired set value from the screen of the remote control.

7- Then Press "OK" to send the new set value to the indoor unit, and the indoor unit will display "CS", which means that the new set value is uploaded successfully.

8- Finally, disconnect the power supply again from the unit, and wait for 10 minutes, then connect it again.

Please note that:

1- The Channel number indicates a certain function, and each number will be showed on the indoor unit screen indicates the current function set value (Check the below table).

2- In the engineering mode, the other keys or operations are invalid except for the following buttons "Power", "Up", "Down" , and "Ok".

3- In order to set a new set value successfully, you need to finish the steps (from 2 to 7) within 1 minute only.

4- The engineering mode will be exited if there is no valid input data for 60s.

5- In order to exit from the engineering mode, Pleas follow the following steps:

- Press "Power" button for 2s press until the remote controller screen shows "0".
- Then Press "Power" + "Fan" buttons together for 2s to quit the engineering mode and back to the home screen.

Channel	Function	Parameter Value Meaning	Remark
0	/	Nothing to set	
1	Auto-restart function	0 – Inactive 1 – Active	
2	Fan control when Ts reached	1- Fan stop 2 - Fan runs at lowest RPM 3 - Fan runs at setting RPM 4 - Fan stops for 4 mins and runs for 1min 5 - Fan stops for 8 mins and runs for 1min 6 - Fan stops for 16 mins and runs for 1min 7 - Fan stops for 24 mins and runs for 1min 8 - Fan stops for 48 mins and runs for 1min 9 - Fan stops for 15 mins and runs for 2.5min 10 - Fan stops for 30 mins and runs for 2.5min 11 - Fan stops for 60 mins and runs for 2.5min 12 - Fan runs at setting RPM, but stop if choose Automatic speed 13 - Fan runs at the lowest speed, but stop if choose Automatic speed	
3	Mode lock	CH–Cooling and heating (all modes) HH–Heating only (Heating + Fan only) CC–Cooling only (Cooling + Drying + Fan only) nU–Cooling and heating without Auto	Remote controller will change as well.
4	Lowest setting temperature	16-24	Remote controller will change as well.
5	Highest setting temperature	25-30	Remote controller will change as well.
6	Mode priority selection for multi units	H – Heating first C – Cooling first	
7	/	Nothing to set	
8	/	Nothing to set	
9	/	Nothing to set	
10	/	Nothing to set	
11	Min. frequency limitation in cooling mode	10, 11, 12, …, 49, 50, -- (Cancel)	
12	Min. frequency limitation in heating mode	10, 11, 12, …, 49, 50, -- (Cancel)	
13	Max frequency selection in T4 limitation of Zone6	20, 21, 22, …, 149, 150, -- (Cancel)	

14	/	Nothing to set	
15	Frequency selection of outdoor forced-operation	10, 11, 12, …, 249, 250, -- (Cancel)	
16	One button reset	rS – Reset	
17	nA	Nothing to set	
18	nA	Nothing to set	
19	Max. frequency selection in cooling mode	40, 41, 42, …, 83, 84, -- (Cancel)	
20	Max. frequency selection in heating mode	40, 41, 42, …, 83, 84, -- (Cancel)	Without limitation
21	Cooling temperature compensation	-3.0, -2.5, -2.0, …, 3.0, 3.5, -- (Cancel)	
22	Heating temperature compensation	-6.5, -6.0, -5.5, …, 0.5, 1.0, 1.5, …, 7.0, 7.5, -- (Cancel)	
23	Max. fan speed selection in cooling	-41, -40, -39, …, 19, 20, -- (Cancel)	
24	Min. fan speed selection in cooling	-41, -40, -39, …, 19, 20, -- (Cancel)	
25	Max. fan selection in heating	-41, -40, -39, …, 19, 20, -- (Cancel)	
26	Min. fan speed selection in heating	-41, -40, -39, …, 19, 20, -- (Cancel)	
27	Reserved	Nothing to set	
28	Anti-cold air Stop Fan Temperature	16~28	
29	Reserved	Nothing to set	
30	Reserved	Nothing to set	

11. Hand-over to the user

Once the test run is complete and the unit is operating correctly, please ensure the following information is communicated to the user:

- Ensure the user has the printed documentation and advise them to keep it for future reference. Inform the user that the complete documentation can be found at the URL mentioned earlier in this manual.
- Explain to the user how to properly operate the system and what steps to take in case of any issues.
- Demonstrate to the user how to perform maintenance on the unit.
- Provide the user with energy-saving tips as described in the operation manual.