



**Cassette Air Handler
Ductless Split System Heat Pumps**
Installation, Operation & Maintenance Manual



ECR international
EST. 1928
A Family of Heating & Cooling Brands.

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- If used as MULTI unit, refer to Installation & operation manuals packed with outdoor unit.

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PRECAUTIONS

- Keep this manual where the operator can easily find them.
 - Read this manual before starting up units.
 - For safety reason the operator must read the following cautions carefully.
 - Installation must be performed in accordance with the requirement of NEC and CEC by authorized personnel only.
-

The safety precautions listed here are divided into two categories.



WARNING

If you do not follow these instructions exactly, the unit may cause property damage, personal injury or loss of life.



CAUTION

If you do not follow these instructions exactly, the unit may cause minor or moderate property damage, personal injury.

After completing the installation, make sure that the unit operates properly during the start-up operation. Please instruct the customer on how to operate the unit and keep it maintained. Also, inform customers that they should store this installation manual for future reference.



WARNING

Be sure only trained and qualified service personnel to install, repair or service the equipment.

Improper installation, repair, and maintenance may result in electric shock, short-circuit, leaks, fire or other damage to the equipment.

Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electrical shock and fire.

When installing the unit in a small room, take measures to prevent refrigerant concentration from exceeding allowable safety limits in the event of refrigerant leakage. Excessive refrigerant in a closed ambient environment can lead to oxygen deficiency.

Use the attached accessories parts and specified parts for installation.

Install at a strong firm location which is able to withstand the unit's weight. If the strength is not enough or installation is not properly done, the unit may drop and cause injury.

The appliance shall be installed 2.5m / 8.2ft above floor.

The appliance shall not be installed in a laundry room.

Before obtaining access to terminals, all supply circuits must be disconnected.

The appliance must be positioned so the plug is accessible.

For electrical work, follow local and national electrical code and this installation instructions. An independent circuit must be used.

If electrical circuit capacity is not enough or defective, it will cause electrical shock or fire.

Use the specified cable and connect tightly and secure cable so no external force will be acted on the terminal. Failure to do so can cause heat-up or fire at the connection.

Wiring routing must be properly arranged so that control board cover is fixed properly. If control board cover is not fixed perfectly, it will cause heat-up at connection point of terminal, fire or electrical shock.

If the supply cord is damaged, it must be replaced by the manufacturer or qualified person in order to avoid a hazard.

An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be used.

When carrying out piping connection, take care not to let air or foreign substances into refrigeration circuit. Otherwise, it will cause lower capacity, abnormal high pressure in the refrigeration cycle, explosion and injury.

Do not share the single service with other electrical appliances. This may cause fire or electrical shock.

If the refrigerant leaks during installation, ventilate the area immediately.
Toxic gas may be produced if the refrigerant comes into contact with fire.

Keep the interconnection cable away from the copper tubing.

After completing the installation work, check that the refrigerant does not leak.

Toxic gas may be produced if the refrigerant leaks into the room and comes into contact with a source of fire, such as a heater, stove or cooker.



CAUTION

Ground the air conditioner.

Do not connect the ground wire to gas or water pipes, lightning rod or a telephone ground wire. Inappropriate grounding may result in electric shock.

Be sure to install a ground fault circuit breaker.
Failure to do so may result in electric shock.

Connect outdoor unit wires, then connect indoor unit wires.
Do not connect the air conditioner with the power supply until the wiring and piping is done.

Install drain piping in order to ensure proper drainage and insulate piping to prevent condensation.
Improper drain piping may result in water leakage and property damage.

Indoor and outdoor units, power supply wiring and connecting wires should be at least 1 meter away from televisions or radios to prevent interference or noise.
Depending on the radio waves, a distance of 1 meter may not be sufficient enough to eliminate the noise.

The appliance is not intended for use by young children or infirm persons without supervision.

Don't install the air conditioner in the following circumstance:

- There is petrolatum existing.
- There is salty air surrounding (near the coast).
- There is caustic gas (the sulfide, for example) existing in the air (near a hot spring).
- The Volt vibrates violently (in the factories).
- In buses or cabinets.
- In kitchen where it is full of oil gas.
- There is strong electromagnetic wave existing.

- There are inflammable materials or gas.
- There is acid or alkaline liquid evaporating.
- Other special conditions.

The appliance shall be installed in accordance with national wiring regulations.

Do not operate your air conditioner in a wet room such as a bathroom or laundry room.

An all-pole disconnection device which has at least 3mm / 0.1in clearances in all poles, and have a leakage current that may exceed 10mA, the residual current device (RCD) having a rated residual operating current not exceeding 30mA, and disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.

INSTALLATION INFORMATION

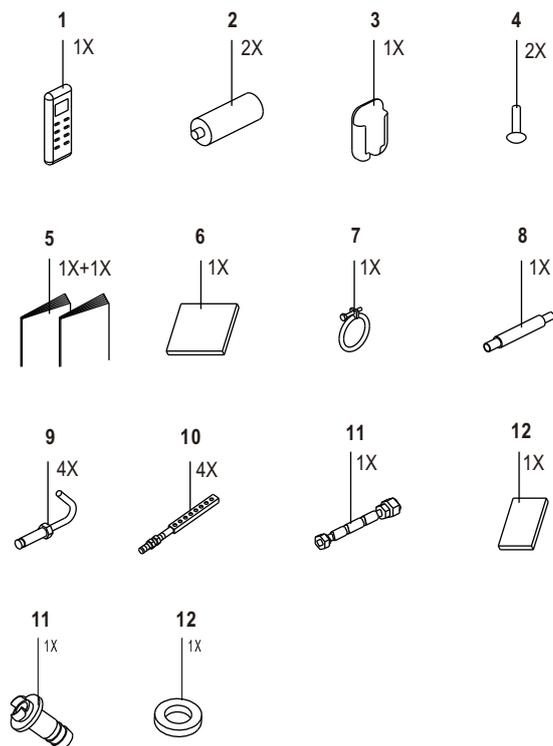
- To install properly, please read this "installation manual" at first.
- The air conditioner must be installed by qualified persons.
- When installing the indoor unit or its tubing, please follow this manual as strictly as possible.
- If the air conditioner is installed on a metal part of the building, it must be electrically insulated according to the relevant standards to electrical appliances.
- When all the installation work is finished, please turn on the power only after a thorough check.
- This product may change without notice.

INSTALLATION ORDER

- Indoor unit installation;
- Outdoor unit installation;
- Install the refrigerant pipe;
- Connect the drain pipe ;
- Electric wiring work;
- Installation of the decoration panel;
- Test operation.

ACCESSORIES

Check if the following accessories are included with your unit.



- 1 Remote controller
- 2 Batteries
- 3 Remote controller holder (on some models)
- 4 Tapping screws (M3×10mm) (on some models)
- 5 Installation and owner's manual
- 6 Paper pattern for installation (on some models)
- 7 Metal champ (on some models)
- 8 Drain hose (on some models)
- 9 Expansable hooks (on some models)
- 10 Installation hooks (on some models)
- 11 Throttle (on some models)
- 12 Anti-shock rubber (on some models)
- 13 Drain plug(only heat pump models)(with the outdoor unit)
- 14 Seal ring(only heat pump models)(with the outdoor unit)

Optional accessories

- This indoor unit requires installation of an optional decoration panel.

For the following items, take special care during construction and check after installation is finished

Tick ✓ when checked	
<input type="checkbox"/>	Is the indoor unit fixed firmly? The unit may drop,vibrate or make noise.
<input type="checkbox"/>	Is the gas leak test finished? It may result in insufficient cooling or heating.
<input type="checkbox"/>	Is the unit fully insulated? Condensate water may drip.
<input type="checkbox"/>	Does drainage flow smoothly? Condensate water may drip.
<input type="checkbox"/>	Does the power supply voltage correspond to that shown on the name plate? The unit may malfunction or components may burn out.
<input type="checkbox"/>	Are wiring and piping correct? The unit may malfunction or components may burn out.
<input type="checkbox"/>	Is the unit safely grounded? Dangerous at electric leakage.
<input type="checkbox"/>	Is the wiring size according to specifications? The unit may malfunction or components may burn out.
<input type="checkbox"/>	Is nothing blocking the air outlet or inlet of either the indoor or outdoor units? It may result in insufficient cooling or heating.
<input type="checkbox"/>	Are refrigerant piping length and additional refrigerant charge recorded? The refrigerant charge in the system might not be clear.



NOTE

All the pictures in this manual are for explanation purpose only. There may be slightly different from the air conditioner you purchased (depend on model). The actual shape shall prevail.

1. INDOOR UNIT INSTALLATION

1.1 Selecting installation site

When the conditions in the ceiling are exceeding 30°C / 86°F and a relative humidity of 80%, or when fresh air is inducted into the ceiling, an additional insulation is required (minimum 10 mm / 0.4in thickness, polyethylene foam).

1) Select an installation site where the following conditions are fulfilled and that meets your customer's approval.

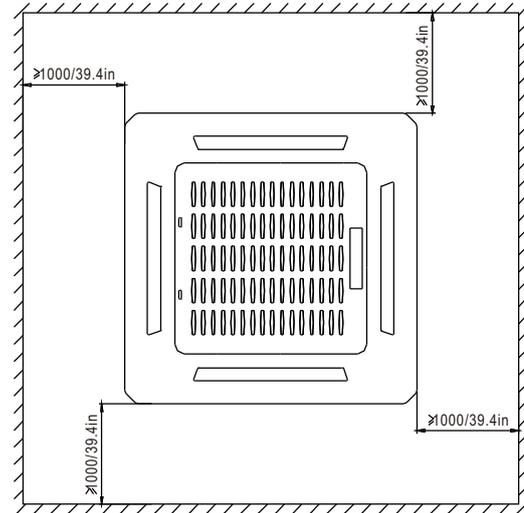
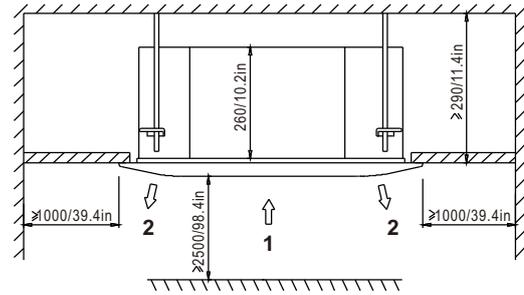
- Where optimum air distribution can be ensured.
- Where nothing blocks air passage.
- Where condensate water can be properly drained.
- Where the false ceiling is not noticeably on an incline.
- Where sufficient clearance for maintenance and service can be ensured.
- Where there is no risk of flammable gas leaking.
- The equipment is not intended for use in a potentially explosive atmosphere.
- Where piping between indoor and outdoor units is possible within the allowable limit.(Refer to the installation manual of the outdoor unit.)
- Keep indoor unit,outdoor unit,inter unit wiring and remote controller wiring at least 1 meter away from televisions and radios.This is to prevent image interference and noise in those electrical appliances.(Noise may be generated depending on the conditions under which the electric wave is generated,even if 1 meter is kept.)
- When installing the wireless remote controller kit,the distance between wireless remote controller and indoor unit might be reduced if there are fluorescent lights that are electrically started in the room. Indoor unit must be installed as far as possible away from fluorescent lights.

2) Ceiling height

Install this unit where the height of bottom panel is more than 2.5m / 8.2ft so that the user cannot easily touch.

3) Use installation hooks for installation.Check whether the ceiling is strong enough to support the weight of the indoor unit.If there is a risk,reinforce the ceiling before installing the unit.

Space required for installation see the figure below (↑ :air flow direction)



1 Air inlet
2 Air outlet
Unit: mm



DANGER

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

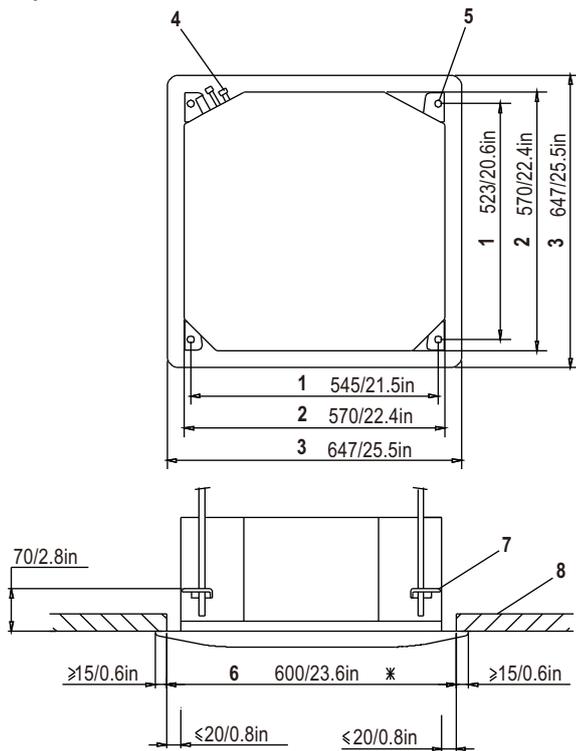


WARNING

If the unit is not properly supported, the unit could be fall out of place and cause serious injury.

1.2 Preparations before installation

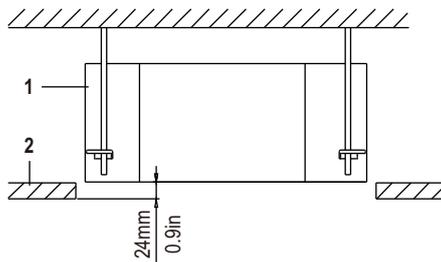
1) Relation of ceiling opening to unit and suspension bolt position.



Unit: mm

- 1 Installation hook pitch dimensions
- 2 Indoor unit dimensions
- 3 decoration panel dimensions
- 4 Refrigerant piping
- 5 Installation hook ($\times 4$)
- 6 Ceiling opening dimensions
- 7 Hanger bracket
- 8 False ceiling

- 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 recess into the false ceiling 24mm / 0.9in.



- 1 Indoor unit
- 2 False ceiling

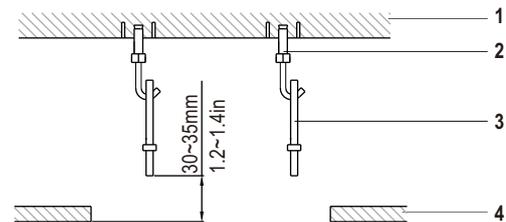
NOTE: Installation is possible with a ceiling dimension of 600 mm / 23.6in(marked with *). However, to achieve a ceiling-panel overlapping dimension of 15 mm / 0.6in, the spacing between the ceiling and the unit should be 20 mm / 0.8in or less. If the spacing between ceiling and the unit is over 20 mm / 0.8in, attach sealing material in the part or recover the ceiling.

2) Make the ceiling opening needed for installation where applicable.(For existing ceilings.)

- Create the ceiling opening required for installation. From the side of the opening to the casing outlet, implement the refrigerant drain piping and wiring for remote controller (unnecessary for wireless type). Refer to each piping or wiring section.
- After making an opening in the ceiling, it may be necessary to reinforce ceiling beams to keep the ceiling level and to prevent it from vibrating. Consult the builder for details.

3) Install the installation hooks. (Use either a M8 or M10 size bolt.)

Use expansible hooks, sunken anchors or other field supplied parts to reinforce the ceiling in order to bear the weight of the unit. Adjust clearance from the ceiling before proceeding further. Installation example see figure below.



- 1 Ceiling slab
- 2 Expansible hook (optional)
- 3 Installation hook (optional)
- 4 False ceiling

NOTE ■ For other installation than standard installation, contact your dealer for details.

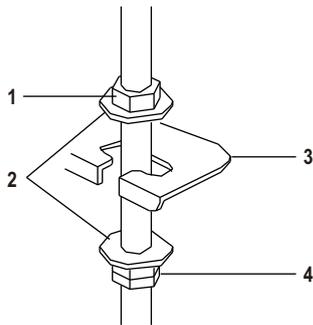
1.3 Install the indoor unit

When installing optional accessories, read also the installation manual of the optional accessories. 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.

Note: Do not install the unit within 4 ft. of any wall or obstruction.

1) Install the indoor unit temporarily.

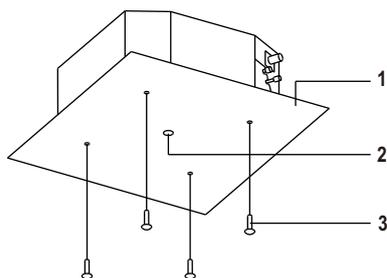
- Attach the hanger bracket to the suspension bolt. Be sure to fix it securely by using a nut and washer from the upper and lower sides of the hanger bracket.
- Securing the hanger bracket see figure below.



- 1 Nut (field supply)
- 2 Washer (field supply)
- 3 Hanger bracket
- 4 Double nuts (field supply,tighten)

2) Fix the paper pattern for installation. (For new ceilings only)

- The paper pattern for installation corresponds with the measurements of the ceiling opening. Consult the builder for details.
- The centre of the ceiling opening is indicated on the paper pattern for installation.
- After removing the packaging material from the paper pattern for installation, attach the paper pattern for installation to the unit with the attached screws as shown in figure below.



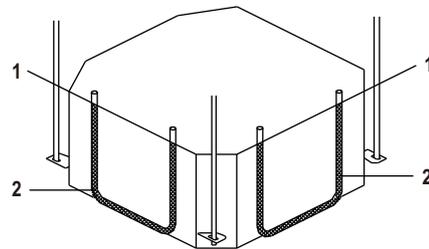
- 1 Paper pattern for installation(on some models)
- 2 Center of the ceiling opening
- 3 Screws(supplied with the decoration panel)

3) Adjust the unit to the right position for installation.

(Refer to the chapter "Preparations before installation" on page 5.)

4) Check if the unit is horizontally levelled.

- 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 below.



- 1 Water level
- 2 Vinyl tube

5) Remove the paper pattern for installation. (For new ceiling only).

2 INSTALL THE REFRIGERANT PIPE

⚠ All field piping must be provided by a licensed refrigeration technician and must comply with the relevant local and national codes.

Precautions

- Execute heat insulation work completely on both sides of the gas piping and liquid piping. Otherwise, this can sometimes result in water leakage.
(When using a heat pump, the temperature of the gas piping can reach up to approximately 120°C/248°F. Use insulation which is sufficiently resistant.)
- Also, in cases where the temperature and humidity of the refrigerant piping sections might exceed 30°C/86°F or Rh80%, reinforce the refrigerant insulation(20mm/0.8in or thicker). Condensation may form on the surface of the insulating material.
- Before rigging tubes, check which type of refrigerant is used.
- Use a pipe cutter and flare suitable for used refrigerant.
- Only use annealed material for flare connections.
- Do not mix anything other than the specified refrigerant, such as air, etc., Inside the refrigerant circuit.
- If the refrigerant gas leaks during the work, ventilate the area. A toxic gas is emitted by the refrigerant gas being exposed to a fire.
- Make sure there is no refrigerant gas leak. A toxic gas may be released by the refrigerant gas leaking indoor and being exposed to flames from an area heater, cooking stove, etc.
- Refer to the table below for the dimensions of flare nuts spaces and the appropriate tightening torque. (Overtightening may damage the flare and cause leaks.)

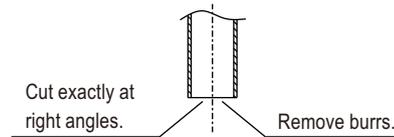
Pipe gauge mm (in)	Tightening torque	Flare dimension A mm (in)	Flare shape
Ø6.35(1/4 in)	15~16 N. m (11-11.8 lbf-ft)	8.3~8.7 0.327~0.343in	
Ø9.52(3/8in)	25~26 N. m 18.4 * 19.2 lbf-ft)	12.0~12.4 0.472~0.488in	
Ø12.7(1/2in)	35~36 N. m (25.8-26.6 lbf-ft)	15.4~15.8 0.606~0.622in	
Ø15.9(5/8in)	45~47 N. m (33.2-34.7 lbf-ft)	18.6~19.0 0.732~0.748in	

- Check whether the height drop between the indoor unit and outdoor unit, and the length of refrigerant pipe meet the following requirements:

The type of models	Capacity (Btu/h)	Max. allowable piping length	Max. allowable piping height
T1 condition Split type air conditioner	9K ~12k	15m/49.2ft	8m/26.2ft
	18k	25m/82ft	15m/49.2ft
R410A inverter Split type air conditioner	9K ~12k	25m/82ft	10m/32.8ft
	18k	30m/98.4ft	20m/65.6ft
T3 condition (outdoor unit down)	9K ~12k	25m/82ft	10m/32.8ft
	18k	30m/98.4ft	15m/49.2ft
T3 condition (outdoor unit up)	9K ~12k	25m/82ft	15m/49.2ft
	18k	30m/98.4ft	20m/65.6ft

2.1 Flaring the pipe end

- Cut the pipe end with a pipe cutter.
- Remove burrs with the cut surface facing downward so that the chips do not enter the pipe.

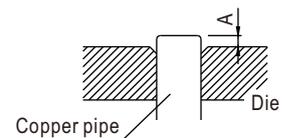


- Put the flare nut on the pipe.
- Flare the pipe.

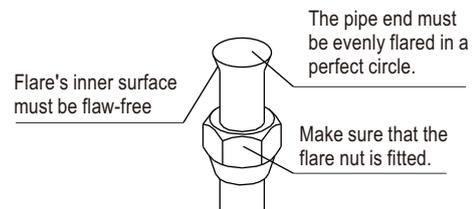
(in=mm/25.4)

Outer diam. mm (in)	A mm (in)	
	Max.	Min.
Ø6.35(1/4 in)	1.3 (.05)	0.7 (.03)
Ø9.52(3/8in)	1.6 (.06)	1.0 (.04)
Ø12.7(1/2in)	1.8 (.07)	1.0 (.04)
Ø15.9(5/8in)	2.2 (.09)	2.0 (.08)

Set exactly at the position shown below.



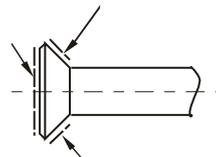
- Check that the flaring is properly made.



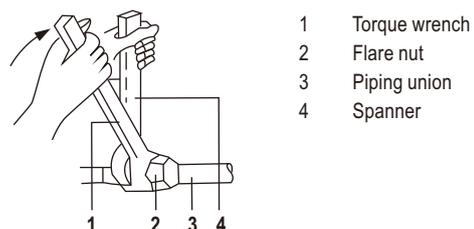
2.2 Refrigerant piping

- Coat the flare both inside and outside with ether oil or ester oil .

Coat here with ether oil or ester oil

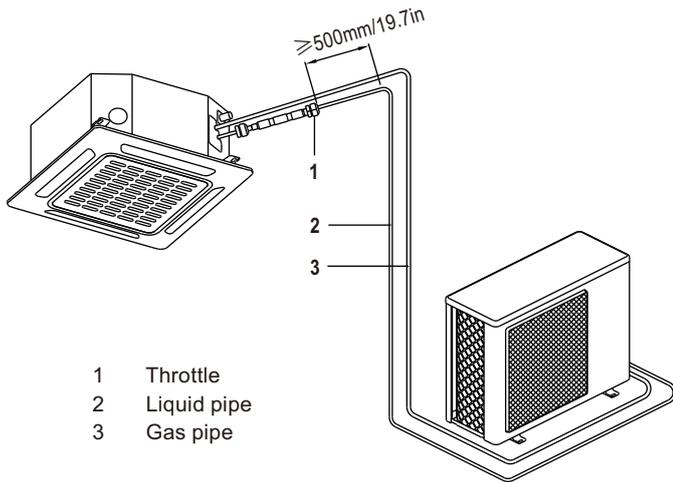


- Align the centres of both flares and tighten the flare nuts 3 or 4 turns by hand. Then tighten them fully with the torque wrenches.



- Torque wrench
- Flare nut
- Piping union
- Spanner

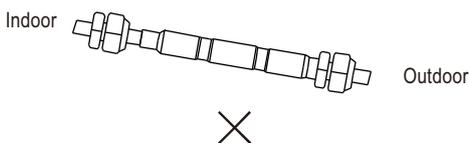
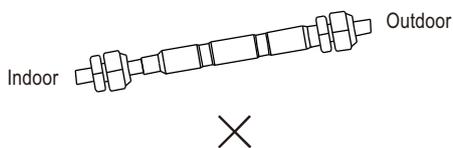
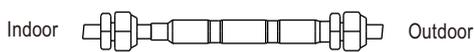
2.3 Installation of the throttle. (For some models)



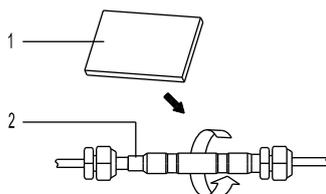
- 1 Throttle
- 2 Liquid pipe
- 3 Gas pipe

■ Precautions

- For ensuring throttled efficiency, please mount the throttle as horizontally as possible.



- Wrap the supplied anti-shock rubber at external of the throttle for denoise.



- 1 Anti-shock rubber
- 2 Throttle

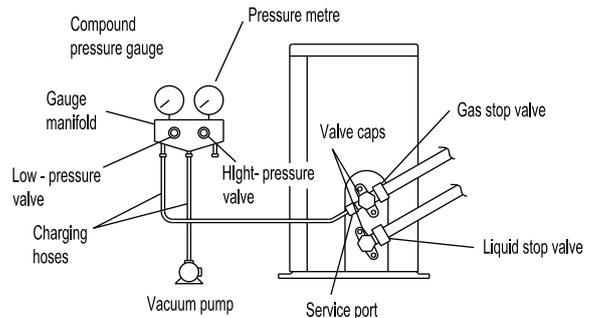
2.4 Purging air and checking gas leakage

- When piping work is completed, it is necessary to purge the air and check for gas leakage.



WARNING

- Do not mix any substance other than the specified refrigerant into the refrigeration cycle.
 - When refrigerant gas leaks occur, ventilate the room as soon as possible.
 - The specified refrigerant should always be recovered and never be released directly into the environment.
 - Use a vacuum pump for the specified refrigerant. Using the same vacuum pump for different refrigerants may damage the vacuum pump or the unit.
-
- If using additional refrigerant, perform air purging from the refrigerant pipes and indoor unit using a vacuum pump, than charge additional refrigerant.
 - Use a hexagonal wrench(4mm / $\frac{5}{32}$ in) to operate the stop valve rod.
 - All refrigerant pipe joints should be tightened with a torque wrench at the specified tightening torque.



- 1) Connect projection side of charging hose (which comes from gauge manifold) to gas stop valve's service port.
- 2) Full open gauge manifold's low-pressure valve (Lo) and completely close its high-pressure valve (Hi) (High-pressure valve subsequently requires no operation.)
- 3) Do vacuum pumping and make sure that the compound pressure gauge reads -0.1MPa (-76cmHg). *1 500 microns Close gauge manifold's low-pressure valve (Lo) and stop vacuum pump.
- 4) (Keep this state for a few minutes to make sure that the compound pressure gauge pointer does not swing back.)*2
- 5) Remove caps from liquid stop valve and gas stop valve.
- 6) Turn the liquid stop valve's rod 90 degrees counterclockwise with a hexagonal wrench to open valve. Close it after 5 seconds, and check for gas leakage. Using soapy water, check for gas leakage from indoor unit's flare and outdoor unit's flare and valve rods. After the check is complete, wipe all soapy water off.
- 7) Disconnect charging hose from gas stop valve's service port then fully open liquid and gas stop valves. (Do not attempt to turn valve rod beyond its stop.)
- 8) Tighten valve caps and service port caps for the liquid and gas stop valves with a torque wrench at the specified torques.

*1. Pipe length vs. Vacuum pump run time

Pipe length	Up to 15m/49.2ft	More than 15m/49.2ft
Run time	Not less than 10 min	Not less than 15min

*2. If the compound pressure gauge pointer swings back, refrigerant may have water content or a loose pipe joint may exist. Check all pipe joints and retighten nuts as needed, then repeat steps 2) through 4).

2.5 Additional refrigerant charge

CAUTION

- Refrigerant may only be charged after performing the leak test and the vacuum pumping.
 - Check the type of refrigerant to be used on the machine nameplate. Charging with an unsuitable refrigerant may cause explosions and accidents, so always ensure that the appropriate refrigerant is charged.
 - Refrigerant containers shall be opened slowly.
-
- The outdoor unit is factory charged with refrigerant. Calculate the added refrigerant according to the diameter and the length of the liquid pipe of the outdoor unit/indoor unit connection.

Pipe length and refrigerant amount:

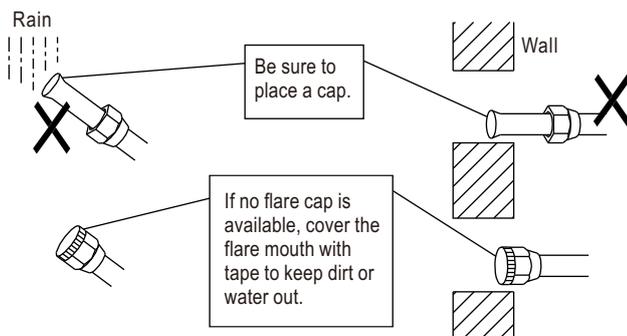
Connective pipe length	Air purging method	Additional amount of refrigerant to be charged
Less than 7.5m (25ft)	Use vacuum pump.	_____
More than 7.5m (25ft)	Use vacuum pump.	Liquid side: $\phi 6.35\text{mm} / 1/4\text{in}$ R410A: (Pipe length-7.5(25)) $\times 15\text{g/m}$ (0.16oz/ft)
		Liquid side: $\phi 9.52\text{mm} / 3/8\text{in}$: R410A: (Pipe length-7.5(25)) $\times 30\text{g/m}$ (0.32oz/ft)

- Be sure to add the proper amount of additional refrigerant. Failure to do so may result in reduced performance.

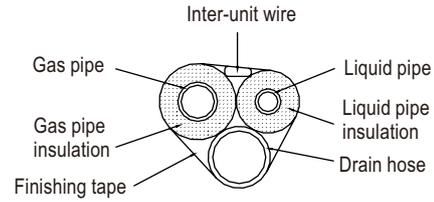
2.6 Refrigerant piping work

1) Caution on the pipe handling

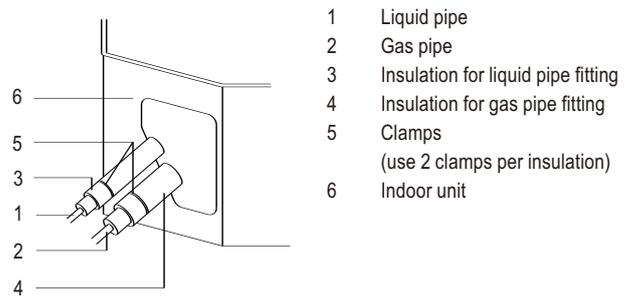
- Protect the open end of the pipe against dust and moisture.
- All pipe bends should be as gentle as possible. Use a pipe bender for bending.



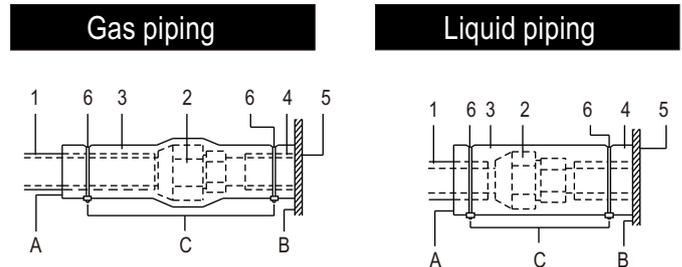
2) Be sure to insulate both the gas and liquid piping. Use separate thermal insulation pipes for gas and liquid refrigerant pipes. See the figure below.



3) Finally, insulate as shown in the figure below.



Piping insulation procedure



- Piping insulation material(field supply)
 - Flare nut connection
 - Insulation for fitting (field supply)
 - Piping insulation material (main unit)
 - Indoor unit
 - Clamp (field supply)
- A Turn seams up
B Attach to base
C Tighten the part other than the piping insulation material

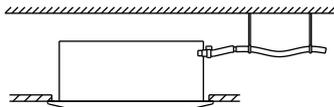
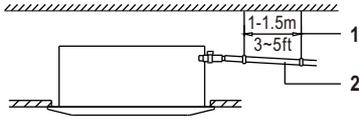


- For local insulation, be sure to insulate local piping all the way into the pipe connections inside the unit. Exposed piping may cause condensation or may cause burns when touched.
- Make sure that no oil remains on plastic parts of the decoration panel (optional equipment). Oil may cause degradation and damage to plastic parts.

3 CONNECT THE DRAIN PIPE

3.1 Installation of drain piping

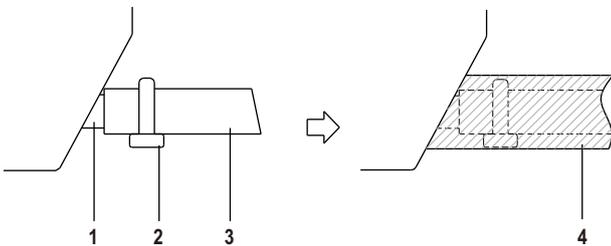
Install the drain piping as shown in figure below and take measures against condensation. Improperly rigged piping could lead to leaks and eventually wet furniture and belongings.



- 1 Hanging bar
- 2 $\geq 1/100$ gradient

3.2 Install the drain pipes.

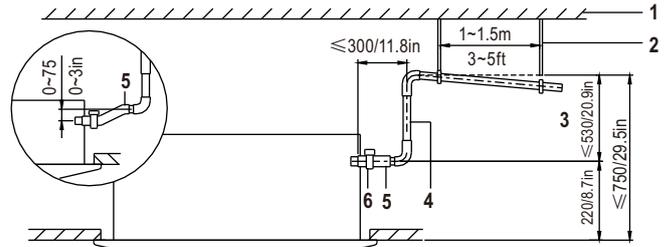
- Keep piping as short as possible and slope it downwards at a gradient of at least 1/100 so that air may not remain trapped inside the pipe.
- Keep pipe size equal to or greater than that of the connecting pipe (PVC pipe, nominal diameter 20mm/0.8in, outside diameter 25mm/1in).
- Push the drain hose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



- 1 Drain socket (attached to the unit)
- 2 metal clamp
- 3 Drain hose
- 4 Insulation (field supply)

- 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 supply).
- Make sure that heat insulation work is executed on the following 2 spots to prevent any possible water leakage due to dew condensation.
 - 1 Indoor drain pipe.
 - 2 Drain socket.

3.3 How to perform piping



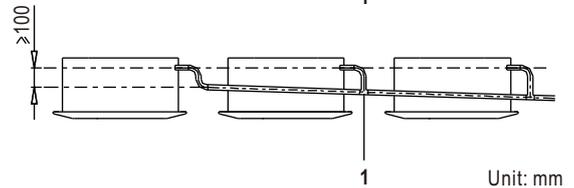
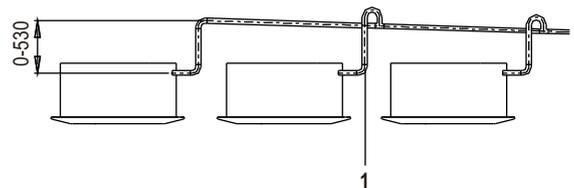
Unit: mm

- 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 below. Select converging drain pipes whose gauge is suitable for the operating capacity of the unit.



- 1 T-joint converging drain pipes

Unit: mm



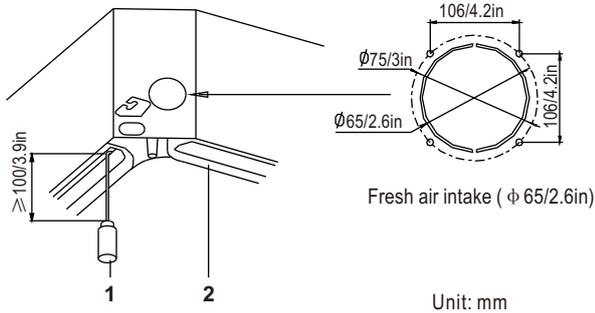
- Drain piping connections
 - Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.
 - Keep in mind that it will become the cause of getting drain pipe blocked if water collects on drain pipe.

3.4 Testing of drain piping

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

- Add approximately 1L of water gradually through the air discharge outlet.

Method of adding water (see the figure below)



- 1 Plastic watering can (tube should be about 100 mm/3.9in long)
- 2 Water-receiver

- When electric wiring work is finished, check drainage flow during COOL running, explained in "Test operation" on page 14.

4 ELECTRIC WIRING WORK

General instructions

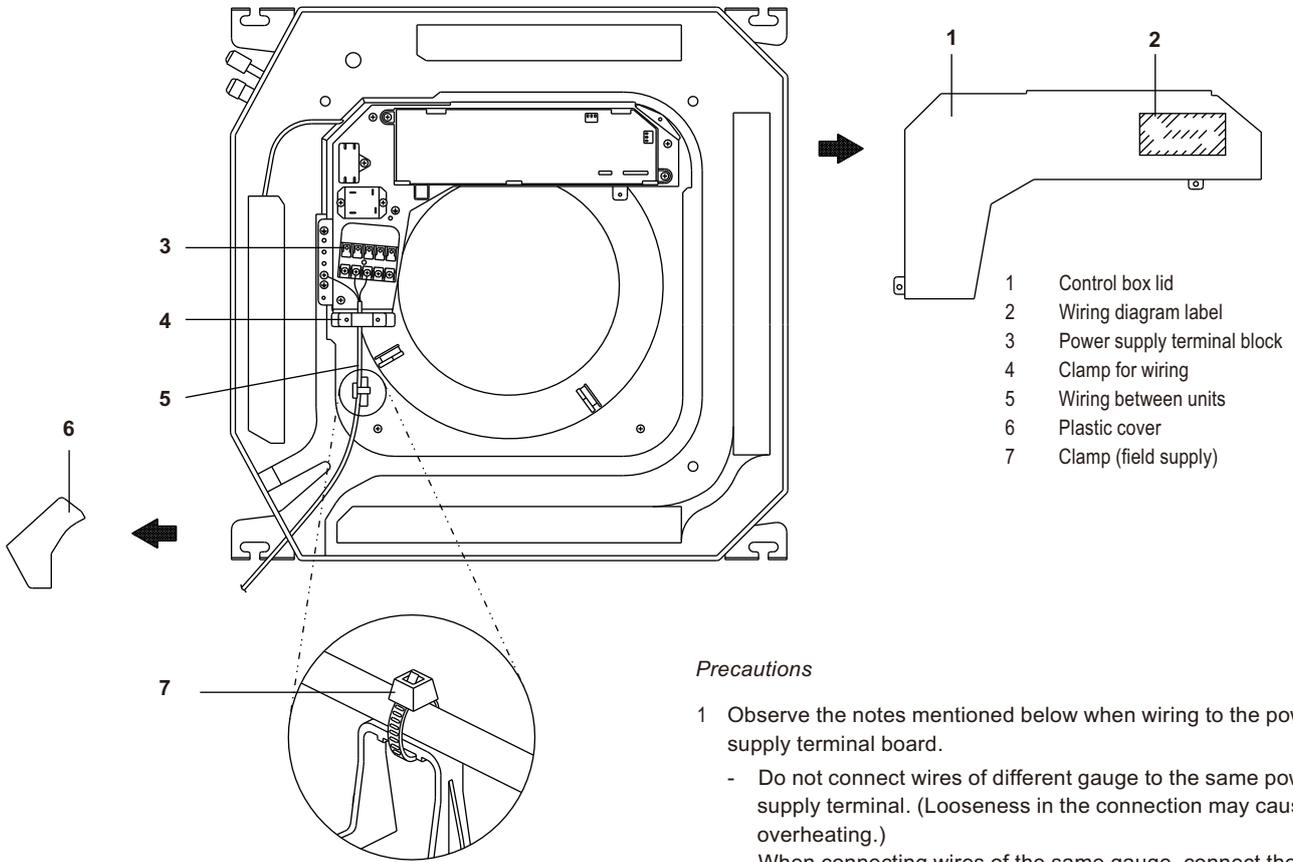
- All field wiring and components must be installed by a licensed electrician and must comply with relevant national regulations.
- Use copper wire only.
- Follow the 'Wiring diagram' attached to the unit body to wire the outdoor unit, indoor units and the remote controller.
- A circuit breaker capable of shutting down power supply to the entire system must be installed.
- Note that the operation will restart automatically if the main power supply is turned off and then turned back on again.
- Be sure to ground the air conditioner.
- Do not connect the ground wire to gas pipes, water pipes, lightning rods, or telephone ground wires.
 - Gas pipes: might cause explosions or fire if gas leaks.
 - Water pipes: no grounding effect if hard vinyl piping is used.
 - Telephone ground wires or lightning rods: might cause abnormally high electric potential in the ground during lightning storms.

The specification of power

Power			
Model	Phase	Frequency and volt	Circuit breaker/Fuse(A)
9K~18K	1Phase	208-240V	20/16

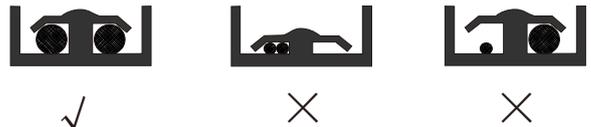
How to connect wiring

- Remove the control box lid of the indoor unit.
Remove the cover of the outdoor unit.
- 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 clamp.
- Attach the cover of the outdoor unit.



Precautions

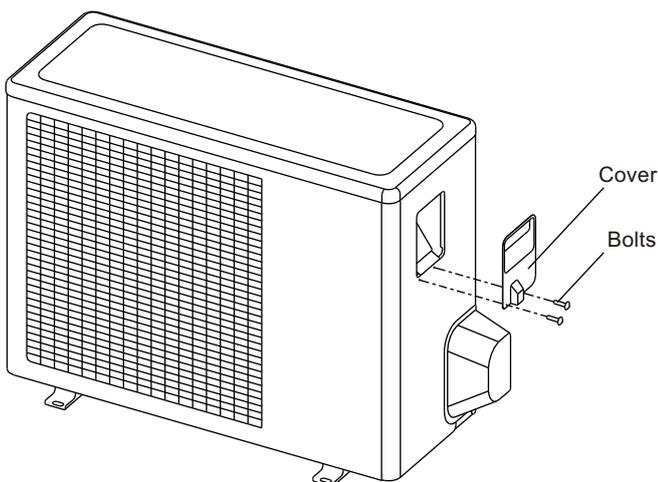
- 1 Observe the notes mentioned below when wiring to the power supply terminal board.
 - Do not connect wires of different gauge to the same power supply terminal. (Looseness in the connection may cause overheating.)
 - When connecting wires of the same gauge, connect them according to the figure.



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: $1.31\text{N}\cdot\text{m} \pm 10\%$ (12in·ft).

- 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 supply) thus to prevent small animals or dirt from entering the unit from outside and causing short circuits in the control box.

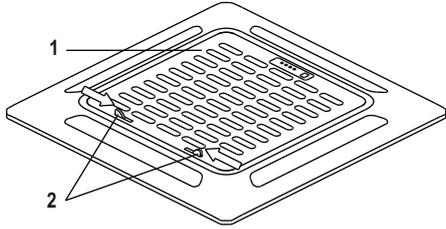
- 2 Do not connect wires of different gauge to the same grounding terminal. Looseness in the connection may deteriorate the protection.
- 3 Use only specified wires and tightly connect wires to the terminals. Be careful that wires do not place external stress on the terminals. Keep wiring in neat order so that they do not obstruct other equipment such as popping open the service cover. Make sure the cover closes tight. Incomplete connections could result in overheating, and in the worst case, electric shock or fire.



5 INSTALLATION OF THE DECORATIVE PANEL

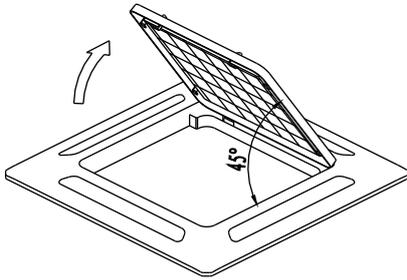
■ Detach the intake grille.

- Slide the 2 grille hooks toward the middle of the decorative panel.



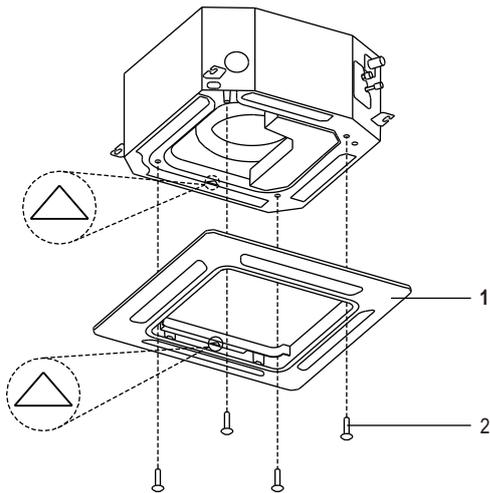
- 1 Intake grille
- 2 Grille hook

- Open the intake grille and remove.



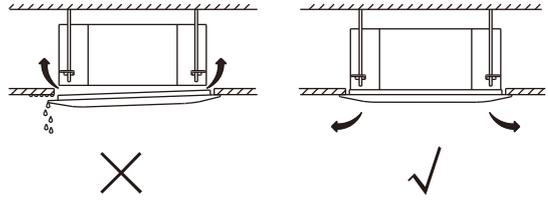
■ Install the decoration panel

- Align the indicate "△" on the decoration panel to the indicate "△" on the unit .
- Attach the decoration panel to the unit with the supplied screws as shown in figure below.



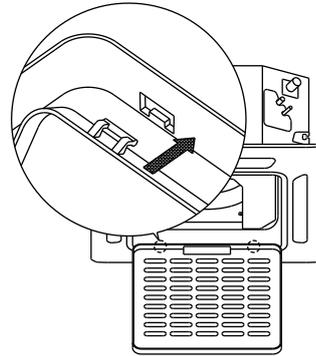
- 1 Decoration panel
- 2 Screws (M5)(supplied with the panel)

- 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 below)

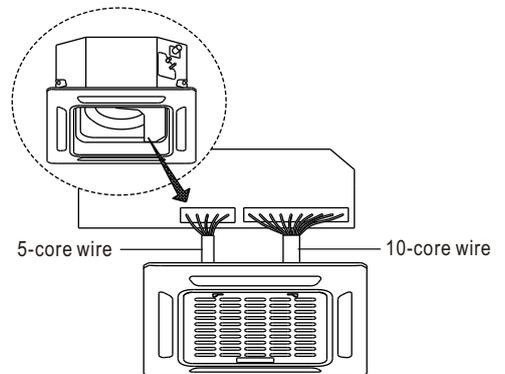


■ Mount the intake grille.

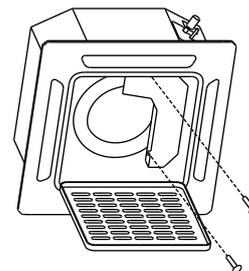
- Ensure that the buckles at the back of the grille be properly seated in the groove of the panel.



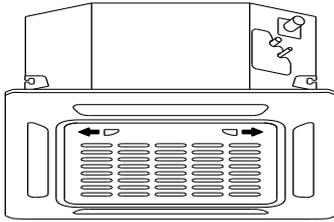
- Connect the 2 wires of the decoration panel to the mainboard of the unit.



- Fasten the control box lid with 2 screws .



- Close the intake grille, and close the 2 grille hooks.



6 TEST OPERATION

Make sure the control box lids are closed on the indoor and outdoor units.

Refer to "For the following items, take special care during construction and check after installation is finished" on page 2.

After finishing the construction of refrigerant piping, drain piping, and electric wiring, conduct test operation accordingly to protect the unit.

Test operation after installing decoration panel

- 1 Open the gas side stop valve.
- 2 Open the liquid side stop valve.
- 3 Electrify crank case heater for 6 hours.
- 4 Set to cooling operation with the remote controller and start operation by pushing ON/OFF button.
- 5 Check the following points. If there is any malfunction, please resolve it according to the chapter "Troubleshooting" in the "Owner's Manual".
 - The indoor unit
 - Whether the switch on the remote controller works well.
 - Whether the buttons on the remote controller works well.
 - Whether the air flow louver moves normally.
 - Whether the room temperature is adjusted well.
 - Whether the indicator lights normally.
 - Whether the temporary buttons works well.
 - Whether there is vibration or abnormal noise during operation.
 - Whether the drainage flows smoothly.
 - The outdoor unit
 - Whether there is vibration or abnormal noise during operation.
 - Whether the generated wind, noise, or condensed of by the air conditioner have influenced your neighborhood.
 - Whether any of the refrigerant is leaked.
- 6 Turn off the main power supply after operation.



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

MANUAL OPERATION

■ Ceiling & Floor

This function is used to operate the unit temporarily in case you misplace the remote controller or its batteries are exhausted. Two modes including AUTO and FORCED COOL can be selected through the TEMPORARY BUTTON on the air-in grill control box of the indoor unit. Once you push this button, the air conditioner will run in such order: AUTO, FORCED COOL, OFF, and back to AUTO.

1 AUTO

The OPERATION lamp is lit, and the air conditioner will run under AUTO mode. The remote controller operation is enabled to operate according to the received signal.

2 FORCED COOL

The OPERATION lamp flashes, the air conditioner will turn to AUTO after it is forced to cool with a fan speed of HIGH for 30 minutes. The remote controller operation is disabled.

3 OFF

The OPERATION lamp goes off. The air conditioner is OFF while the remote controller operation is enabled.

■ Four-way Cassette

This function is used to operate the unit temporarily in case you misplace the remote controller or its batteries are exhausted. Two modes including AUTO and mandatory COOL can be selected through the TEMPORARY BUTTON on the air inlet grill control box of the indoor unit. Once you push this button, the air conditioner will run in such order: AUTO, mandatory COOL, OFF, and back to AUTO.

1 AUTO

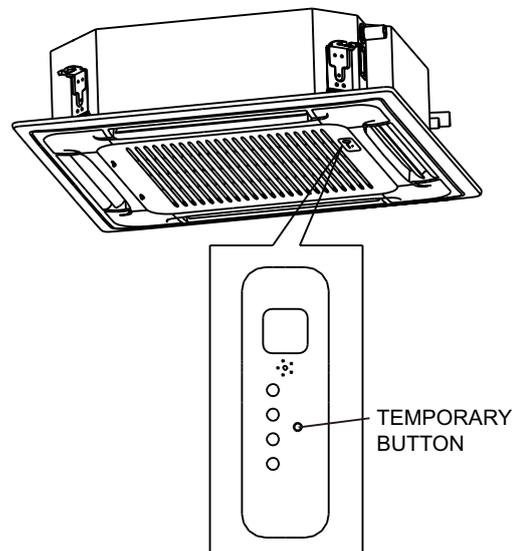
The OPERATION lamp is lit, and the air conditioner will run under AUTO mode. The remote controller operation is enabled to operate according to the received signal.

2 MANDATORY COOL

The OPERATION lamp flashes, the air conditioner will turn to AUTO after it is forced to cool with a fan speed of HIGH for 30 minutes. The remote controller operation is disabled.

3 OFF

The OPERATION lamp goes off. The air conditioner is OFF while the remote controller operation is enabled.



ADJUSTING AIR FLOW DIRECTION

■ Cassette Type

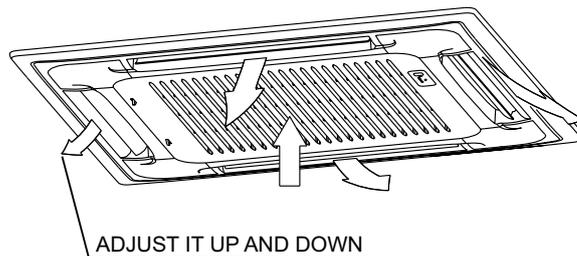
While the unit is in operation, you can adjust the air flow louver to change the flow direction and naturalize the room temperature evenly. Thus you can enjoy it more comfortably.

1. Set the desired air flow direction.

Push the **SWING** button to adjust the louver to the desired position and push this button again to maintain the louver at this position.

2. Adjust the air flow direction automatically.

Push the **SWING** button, the louver will swing automatically.



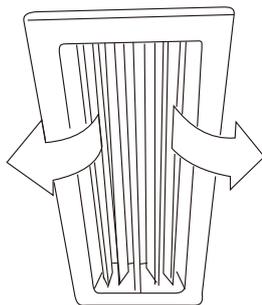
While this function is set, the swing fan of indoor unit runs; otherwise, the swing fan doesn't run. The swing scale of every side is 30°. When the air conditioner isn't in operation (including when "TIMER ON" is set), the **SWING** button will be disabled.

Duct and Ceiling Type

The following is how to adjust air flow direction when air outlet part (sold separately) is used with the indoor unit.

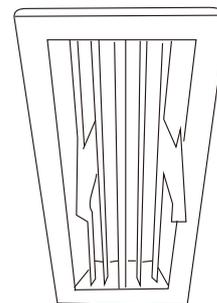
Cooling

To effectively cool the whole room, please set the louver so that the air can come out horizontally.



Heating

To effectively heat the bottom of the room, please set the louver so that the air can come out downwards.



MAINTENANCE

WARNING

WARNING

Before you clean the air conditioner, be sure to disconnect the power supply plug.

Cleaning the indoor unit and remote controller

CAUTIONS

- Use a dry cloth to wipe the indoor unit and remote controller.
- A cloth dampened with cold water may be used on the indoor unit if it is very dirty.
- Never use a damp cloth on the remote controller.
- Do not use a chemically-treated duster for wiping or leave such material on the unit for long, because it may damage or fade the surface of the unit.
- Do not use benzine, thinner, polishing powder, or similar solvents for cleaning. These may cause the plastic surface to crack or deform.

If you do not plan to use the unit for at least 1 month.

- (1) Operate the fan for about half a day to dry the inside of the unit.
- (2) Stop the air conditioner and disconnect power.
- (3) Remove the batteries from the remote controller.

Checks before operation

CAUTIONS

- Check that the wiring is not broken off or disconnected.
- Check that the air filter is installed. (Some air-conditioners do not have air filters.)
- Check that the outdoor unit air outlet or inlet is not blocked.

Before you clean the air conditioner, be sure to disconnect the power supply plug.

Cleaning the air filter

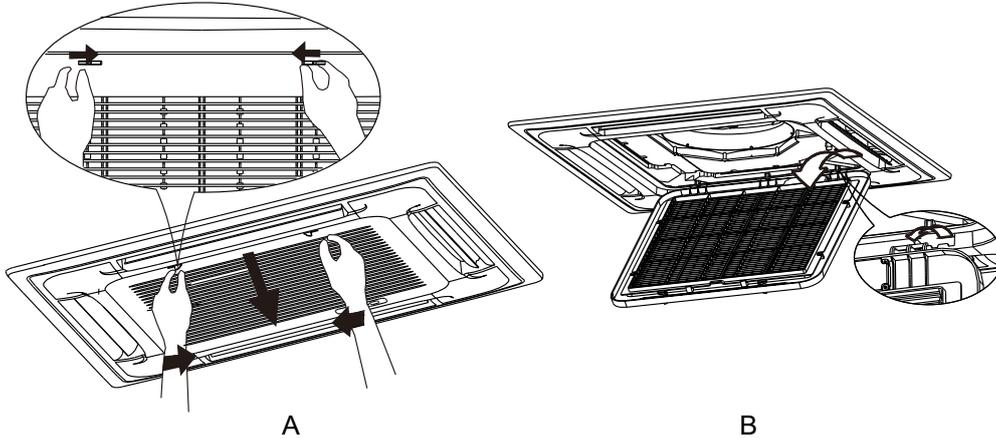
- The air filter can prevent the dust or other particulate from going inside. In case of blockage, the working efficiency of the air conditioner may greatly decrease. Therefore, the filter must be cleaned once even two weeks during usage.
- If the air conditioner is positioned in a dusty place, the cleaning frequency of the air filter must be increased.
- If the accumulated dust is too heavy to be cleaned, please replace the filter with a new one (replaceable air filter is optional).
- The filter cleaning should be performed by a suitable service provider.

■ Cassette Type

1. Open the air-in grill

Push the grill switches towards the middle simultaneously as indicated in sketch A. Then pull down the air-in grill.

Cautions: The control box cables ,which are originally connected with the main body electrical terminators must be pulled off before doing as indicated above.



2. Take out the air-in grill (together with the air filter shown in Sketch B)

Pull the air-in grill down at 45 ° and lift it up to take out the grill.

3. Dismantle the air filter

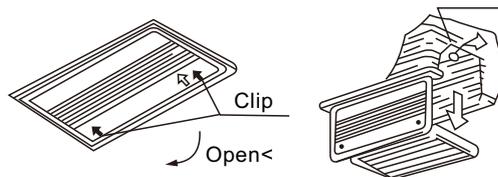
4. Clean the air filter(Vacuum cleaner or pure water may be used to clean the air filter. If the dust accumulation is too heavy , please use soft brush and mild detergent to clean it and dry out in cool place) .

■ Duct and Ceiling Type

1. Open the air-in grill

Push the grill switches towards the middle simultaneously as indicated in follow figure sketch. Then pull down the air-in grill.

Cautions: The control box cables ,which are originally connected with the main body electrical terminators must be pulled off before doing as indicated above.



2. Take out the air-in grill.

3. Dismantle the air filter

4. Clean the air filter (Vacuum cleaner or pure water may be used to clean the air filter. If the dust accumulation is too heavy , please use soft brush and mild detergent to clean it and dry out in cool place) .

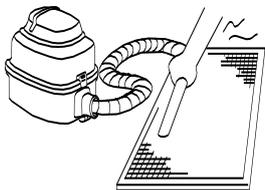


Fig. 1

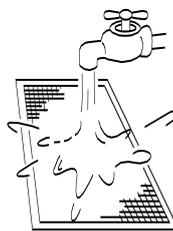


Fig. 2

- The air-in side should face up when using vacuum cleaner. (See Fig. 1)
- The air-in side should face down when using water. (See Fig. 2)

Cautions : Do not dry out the air filter under direct sunshine or with fire.

5. Re-install the air filter

6. Install and close the air-in grill in the reverse order of step 1 and 2 and connect the control box cables to the corresponding terminators of the main body .

Note: High-static Pressure Parvis Split Type has no air filter.

AIR CONDITIONER OPERATIONS AND PERFORMANCE

Three-minute protection feature

A protection feature prevents the air conditioner from being activated for approximately 3 minutes when it restarts immediately after operation.

Power failure

Power failure during operation will stop the unit completely.

- The OPERATION lamp on the indoor unit will start flashing when power is restored.
- To restart operation, push the ON/OFF button on the remote controller.
- Lightning or a car wireless telephone operating nearby may cause the unit to malfunction.

Disconnect the unit with the power and then connect the unit with the power again. Push the ON/OFF button on the remote controller to restart operation.

Air conditioner operating conditions

For proper performance, run the air conditioner under the following temperature conditions:

Mode	Cooling operation	Heating operation	Drying operation
Room temperature	17°C~32°C (62°F~90°F)	0°C~30°C (32°F~86°F)	17°C~ 32°C/ 62°F~ 90°F
Outdoor temperature	18°C~43°C (64°F~109°F)	-7°C~24°C (20°F~76°F)	18°C~ 43°C/64°F~109°F
	(-7°C~43°C/20°F~109°F: For the models with low temperature cooling system)		
	18°C~52°C/64°F~126°F: For special tropical models		18°C~52°C/64°F~126°F (For special tropical models)

NOTE:

1. If air conditioner is used outside of the above conditions, certain safety protection features may come into operation and cause the unit to function abnormally.
2. Room relative humidity less than 80%. If the air conditioner operates in excess of this figure, the surface of the air conditioner may attract condensation. Please sets the vertical air flow louver to its maximum angle (vertically to the floor), and set HIGH fan mode.
3. Optimum performance will be achieved within these operating temperature.

Special functions

Refrigerant Leakage Detection(optional):

With this new technology, the display area will appear EC (if applicable) and the LED indication lamps continue flashing when the outdoor unit detects refrigerant leakage.

Louver Angle Memory Function(optional):

For some models, the machine is special designed with louver angle memory function. Power failure during operation or pressing the ON/OFF button on the remote controller will stop the unit completely. When the power restores or pressing the ON/OFF button on the remote controller again, the unit restarts automatically with the previous open angle of the horizontal louver by the memory function. So we strongly recommend that the open angle of the horizontal louver should not be set too small, in case the condensed water forms and drops from the horizontal louver. Press the Manual control button and the open angle of the horizontal louver will be restored to the standard angle.

INSTALLATION

Location:

- During cooling operation, the air conditioner will dry the room air, so please fix a pipe to drain all the water away from the air conditioner.
- Please install indoor unit more than one meter away from the TV set and the radio in order to avoid the picture and noise interference.
- Powerful radio transmitters or any other devices radiating high frequency radio waves can cause the air conditioner to malfunction. Please consult the dealer where you purchased the air conditioner before installing it.
- Don't fix the unit in the dangerous region with combustible gas or volatile matter.
- If the air conditioner operates in an atmosphere containing oils (machine oil, salt (near a coastal area, sulfide gas (near a hot spring, etc., such substances may lead to failure of the air conditioner.

Be careful of noise or vibrations

- Please fix the unit in the stable place to avoid the noise or vibrations.
- The noise near the air outlet of the outdoor unit may enter the air exit.
- Locate the outdoor unit where noise emitted by it or hot air from its air outlet will cause no nuisance to your neighbours.
- If the air conditioner sounds abnormal during operation, contact the dealer where you purchased the air conditioner.

Wire

- To avoid the electric shock, ground the air conditioner with the ground. The plug in the air conditioner has ground wire.
- The power socket is used as the air conditioner specially.
- Don't pull the power wiring hard.
- When linking the air conditioner with the ground, observe the local and national electrical code.
- If necessary, use the power fuse or the circuit, breaker or the corresponding scale ampere.
If you want to change the power wiring, please contact the center service of the local MD electric appliance.

Relocation

If you move out or if it is desired to relocate the air conditioner, consult your dealer, because special skills to withdraw Freon, purge air and perform other operations are required.

TROUBLES AND CAUSES

Before you ask for servicing or repairs, check the following points.

Recheck

Inoperative

- The power fuse is blown or the circuit breaker has been tripped.
- The batteries in the remote controller are exhausted.
- The timer is set.

Does not cool or heat well.

- The air inlet or outlet of the outdoor unit is blocked.
- Doors or windows are open.
- The air filter is clogged with dust.
- The louver is not at the correct position.
- The fan speed is set to low.
- The temperature setting is too high or too low.

These are not failures

Room air is smelly.

A bad odor comes from the air conditioner.

- Smells impregnated in the wall, carpet, furniture, clothing, or furs, are coming out. A white mist of chilled air or water is generated from the outdoor unit.

CAUTION

If any of the following conditions occur, stop the air conditioner immediately, set to off the power switch, and contact the dealer:

- The indicator lamps flash rapidly (five times per second), you disconnect the unit with the power and then connect the unit with the power again after two or three minutes but the lamps still flash.
- Switch operations are erratic.
- The fuse is blown frequently or the circuit breaker is tripped frequently.
- Foreign matter or water has fallen inside the air conditioner.
- Any other unusual condition is observed.

TROUBLES AND CAUSES (CONCERNING REMOTE CONTROLLER)

Before you ask for servicing or repairs, check the following points.

Setting Change is Impossible		
Symptoms	Causes	Reason and Disposal
The fan speed can not be changed.	<ul style="list-style-type: none"> • Check whether the MODE indicated on the display is "AUTO" 	When the automatic mode is selected, the air conditioner automatically selects the fan speed.
	<ul style="list-style-type: none"> • Check whether the MODE indicated on the display is "DRY" 	When dry operation is selected, the air conditioner automatically select the fan speed. The fan speed can be selected during "COOL" and "FAN ONLY", and "HEAT"

The Transmission Indicator "▲" Never Comes On		
Symptoms	Causes	Reason and Disposal
The remote control signal is not transmitted even when the ON/OFF button is pushed.	<ul style="list-style-type: none"> • Check whether the batteries in the remote controller are exhausted. 	The remote control signal is not transmitted, because the power supply is off.

The Display Never Comes On		
Symptoms	Causes	Reason
The TEMP. indicator does not come on.	<ul style="list-style-type: none"> • Check whether the MODE indicated on the display is "FAN ONLY". FAN ONLY 	The temperature cannot be set during fan only operation.

The Display Goes Off		
Symptoms	Causes	Reason
The indication on the display disappears after a lapse of time.	<ul style="list-style-type: none"> • Check whether the timer operation has come to an end when the OFF TIMER is indicated on the display. 	The air conditioner operation stops since the set time elapsed.
The ON TIMER indicators go off after a lapse of certain time.	<ul style="list-style-type: none"> • Check whether the timer operation is started when the ON TIMER is indicated on the display. 	When the time set to start the air conditioner is reached, the air conditioner will automatically start and the appropriate indicator will go off.

The Signal Receiving Tone does Not Sound		
Symptoms	Causes	Disposal
No receiving tone sounds from the indoor unit even when the ON/OFF button is pushed.	<ul style="list-style-type: none"> • Check whether the signal transmitter of the remote controller is properly directed to the receiver of the indoor unit when the ON/OFF button is pushed. 	Direct the signal transmitter of the remote controller to the receiver of the indoor unit, and then repeatedly push the ON/OFF button twice.
Buttons on the remote controller don't work.		Press Reset button.

The following displays indicate an error or problem:

NO	Malfunction	Display (nixie tube)	timer lamp	running lamp (flashes per second)
1	Indoor EEPROM error	E0.	OFF	1
2	Communication malfunction between indoor and outdoor units	E1.	OFF	2
3	Indoor fan speed malfunction	E3.	OFF	4
4	Indoor room temperature sensor open circuit or short circuit	E4.	OFF	5
5	Evaporator coil temperature sensor open circuit or short circuit	E5.	OFF	6
6	Refrigerant leakage detection malfunction	EC.	OFF	7
7	Water-level alarm malfunction	EE.	OFF	8
8	Communication malfunction between two indoor units (for twins model)	E8.	OFF	9
9	Other malfunction of twins model	E9.	OFF	10
10	Current overload protection	F0.	ON.	1
11	Outdoor room temperature sensor open circuit or short circuit	F1.	ON.	2
12	Outdoor condenser pipe temperature sensor error	F2.	ON.	3
13	Discharging air temperature sensor error	F3.	ON.	4
14	Outdoor EEPROM error	F4.	ON.	5
15	Outdoor fan speed malfunction (Only for DC fan motor)	F5.	ON.	6
16	T2b sensor error	F6.	ON.	7
17	Lifting panel communication checking channel is abnormal	F7.	ON.	8
18	Lifting panel malfunction	F8.	ON.	9
19	Lifting panel is not closed	F9.	ON.	10
20	Inverter module IPM protection	P0.	Flash.	1
21	High/Low voltage protection	P1.	Flash.	2
22	High temperature protection of compressor top	P2.	Flash.	3
23	Outdoor low temp. Protection	P3.	Flash.	4
24	Compressor drive error	P4.	Flash.	5
25	Mode conflict	P5.	Flash.	6

The displayed error code differs from appliance to appliance. The actual display of the indoor unit shall prevail.

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

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