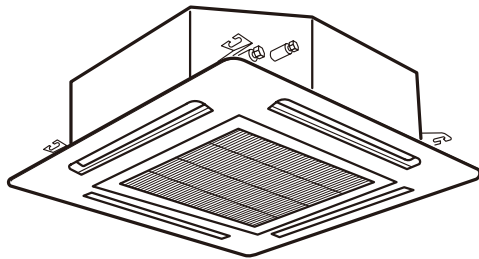


HITACHI SPLIT AIR CONDITIONERS

Installation and Maintenance Manual

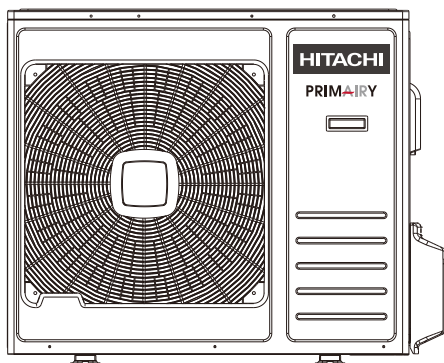
Models



< Indoor Units >

Heat Pump Type
RCI-1.5UNE1NH*
RCI-2.0UNE1NH*
RCI-3.0UNE1NH
RCI-4.0UNE1NH
RCI-5.0UNE1NH
RCI-6.0UNE1NH
RCI-6.5UNE1NH

Cooling Only Type
RCI-1.5TNE1NH*
RCI-2.0TNE1NH*
RCI-3.0TNE1NH*
RCI-4.0TNE1NH*
RCI-5.0TNE1NH*
RCI-6.0TNE1NH*
RCI-6.5TNE1NH*



< Outdoor Units >

Heat Pump Type
RAS-1.5UNESNH1*
RAS-2.0UNESNH1*
RAS-3.0UNESNH1
RAS-4.0UNESNH1
RAS-5.0UNESMH1
RAS-6.0UNESMH1
RAS-6.5UNESMH1

Cooling Only Type
RAS-1.5TNESNH1*
RAS-2.0TNESNH1*
RAS-3.0TNESNH1*
RAS-4.0TNESNH1*
RAS-5.0TNESMH1*
RAS-6.0TNESMH1*
RAS-6.5TNESMH1*

IMPORTANT NOTICE

- We pursue a policy of continuous improvement in design and performance of products. Company reserves the right to vary specifications without prior notice.
- We cannot anticipate every possible circumstance that might involve a potential hazard.
- This air conditioner is designed for standard air conditioning only. Do not use this air conditioner for other purposes such as drying clothes, refrigerating foods or for any other cooling or heating process.
- The installer and system specialist shall secure safety against leakage according to local regulations or standards.
- No part of this manual may be reproduced without written permission.
- Signal words (DANGER, WARNING and CAUTION) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words.

▲ DANGER : Immediate hazards which WILL result in severe personal injury or death.

▲ WARNING : Hazards or unsafe practices which COULD result in severe personal injury or death.

▲ CAUTION : Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

NOTE : Useful information for operation and/or maintenance.

- It is assumed that this air conditioner will be operated and serviced by English speaking people. If this is not the case, the customer should add safety, caution and operating signs in the native language.
- If you have any questions, contact your dealer.
- This manual gives a common description and information for the air conditioner you operate as well as for other models.
- This air conditioner has been designed for the following temperatures. Operate it within this range.

Series	Mode	Outdoor operation temperature range	
		Maximum(°C)	Minimum(°C)
Heat Pump	Cooling Operation	48	-15
	Heating Operation	24	-15
Cooling Only	Cooling Operation	48	-15

- Storage condition: Temperature -25~60°C
Humidity 30%~80%
- The numbers in the model represent the cooling capacity HP. For example, RCI-1.5UNE1NH or RAS-1.5UNESNH1 represent 1.5HP

This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

CHECKING PRODUCT RECEIVED

- Upon receiving this product, inspect it for any shipping damage. Claims for damage, either apparent or concealed, should be filed with the shipping company immediately.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct.

The standard utilization of the unit shall be explained in this manual.

Therefore, the utilization of the unit other than those specified in this manual is not recommended.

Please contact your dealer, as the occasion arises.

- We recommend that this air-conditioner is installed properly by qualified personnel in accordance with the installation instructions provided with the unit.
- Before installation, check if the voltage of the power supply at installation site is the same as the voltage shown on the nameplate.

DANGER

- Do not perform any alterations to this product, otherwise, it may possibly cause water leakage, breakdown, short-circuit, electric shock, fire, and so on.
- Piping and welding work should be carried out far away from the flammable explosive material vessels, including the air-conditioner refrigerant, to guarantee the security of the site.
- To protect the air-conditioner from heavy corrosion, avoid installing the outdoor unit where salt water can splash directly onto it or in sulphurous air near a spa. Do not install the air-conditioner where excessively high heat-generating objects are placed.







WARNING

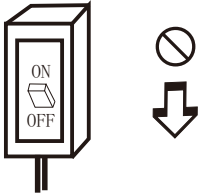
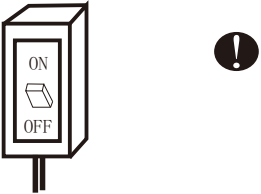




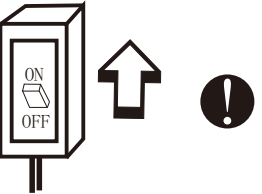
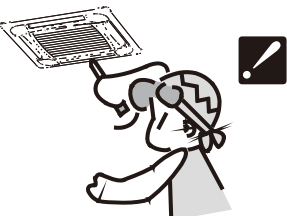
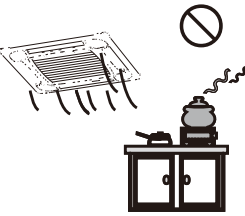
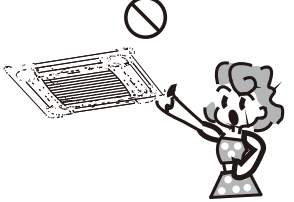
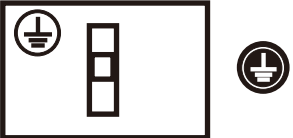
- If the supply cord is damaged, it must be replaced by the factory or its service department to avoid danger.
- The place where this product is installed must have reliable electrical earth facility and protections. Please do not connect the grounding of this product to various kinds of air-feeding ducts, drain piping, lightning protection facility as well as other piping lines to avoid an electric shock and damages caused by other factors.
- Wiring must be done by a qualified electrician. All the wiring must comply with the local electrical codes.
- Consider the capacity of the electric current of your electrical meter and socket before installation.
- The power wire where this product is installed should have independent leakage protective device and the electric current over-load protection device provided for this product.
- This appliance is not intended for use by persons (including children) who lack of experience and knowledge of using air-conditioner, unless they are supervised by adults. Children should be supervised to ensure that they do not play with the appliance.
- Means for disconnection to provide complete disconnection in all poles, must be incorporated in the fixed wiring in accordance with the wiring regulations.
- When abnormalities like burnt smell, deformation, fire, smoke, and so on is observed, stop and so on is observed, stop using the air conditioner, cut off the main power supply immediately and contact the dealer.

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Symbols in this Installation Manual are interpreted as shown below:

-  Be sure not to do.
-  The feature of the appliance, instead of a fault.
-  Pay attention to such a situation.
-  Be sure to follow the instruction.
-  Grounding is necessary.
-  Warning: Incorrect handling could cause a serious hazard, such as death, serious injury, etc.

 <p>Do not use the power supply circuit breaker or pull off the plug to turn it off during operation. This may cause a fire due to spark, etc.</p>	 <p>Avoid dirt accumulation on power supply circuit breaker. Connect the power supply cord to it firmly and correctly, Otherwise it may lead to electric shock or a fire break out due to insufficient contact.</p>	 <p>Provide accurate power supply in accordance with the rating plate requirement. Otherwise, serious faults may occur or a fire may be break out.</p>
 <p>Do not apply excess pressure, pull or press the power supply cord, otherwise, the power supply cord can break leading to electric shock or fire.</p>	 <p>Never insert a stick or similar object to the unit. Since the fan is rotating at high speed, this may cause an injury.</p>	 <p>It is harmful for your health if you are exposed to cold air for prolonged period of time. Hence it is recommended for uniform distribution of airflow in the room.</p>
 <p>Turn off the appliance first and then cut off power supply when appliance malfunctions.</p>	 <p>Do not repair the appliance on your own, this may lead to electric shock and so on.</p>	 <p>Prevent the air flow from reaching the gas burners and stove.</p>
 <p>Do not operate the unit with wet hands.</p>		 <p>It is user's responsibility to make the appliance grounded according to local codes or ordinances by a licensed person.</p>

Operating condition

The protective device may trip and stop the if it is operated outside allowed temperature range.

If the air conditioner runs in "COOLING" or "DRY" mode with door or window open for a long time when relative humidity is above 85%, dew may drip down from the air outlet.

Noise pollution

- Install the air conditioner at a place that can bear its weight to for quiet operation.

Features of protector

The protective device will work at following cases:

- Turning off the appliance and restarting it at once or changing mode during operation, you need to wait at least 3 minutes.

Inspection

After operating for a long time , the air conditioner should be inspected on the following items:

- Overheat of the power supply cord and plug or even a burnt smell.
- Abnormal operating sound or vibration.
- Water leakage from indoor unit.
- Electrification of metal cabinet.

- ☑ Stop the air conditioner if above trouble occurs.

It is advisable to have a detailed inspection after using the appliance for 5 years even if none of the above condition occurs.

Features of HEATING mode

Preheating

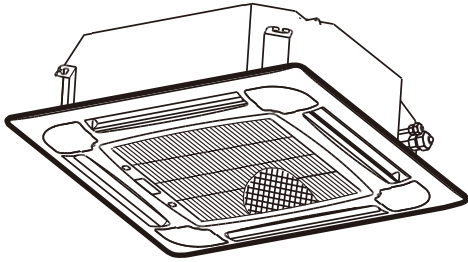
At the beginning of HEATING operation, the airflow from indoor unit is discharged 2-5 minutes later.

Defrosting

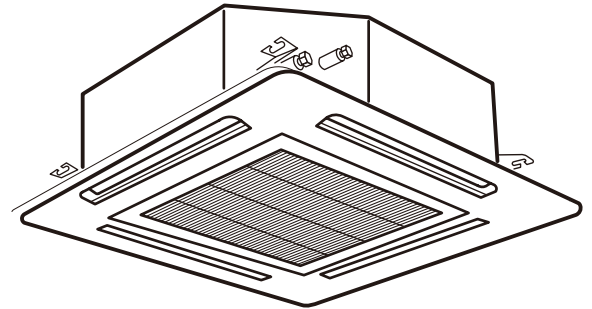
During HEATING operation the appliance will defrost automatically to improve efficiency. This procedure usually lasts for 2-10 minutes. During defrosting, fans stop operation. After defrosting completes, it returns to "HEATING" mode automatically.

- ☑ It is hard to increase the room temperature when outdoor temperature is very low. It might take longer time if the working temperature range not closer to the operation limits.

Indoor unit

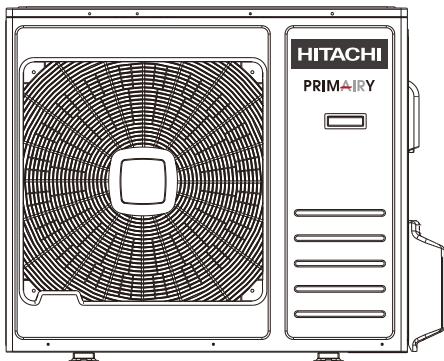


1.5/2.0HP

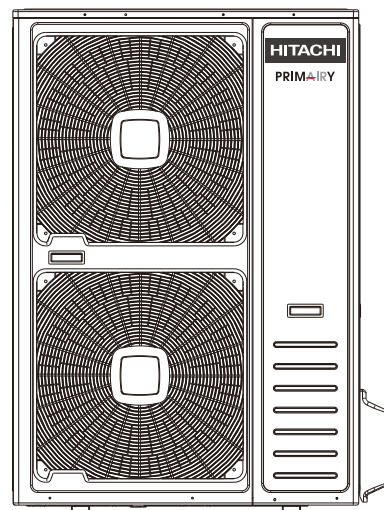


3.0~6.5HP

outdoor unit



1.5~5.0HP



6.0/6.5HP

*Note: The figures are based on the external views of a standard model.
Consequently, the shape may differ from that of the air conditioner you have selected.*

Remote Controller (Optional)

You can control the air-conditioner with the wired controller or remote controller.

It is used for power ON/OFF, setting the operation mode, temperature, fan speed and other functions.

There are different types of remote controllers that can be used.

Operation instructions will be further specified in remote controller's manual .

Please read it carefully before using this appliance and keep it for future reference.

Wire Controller



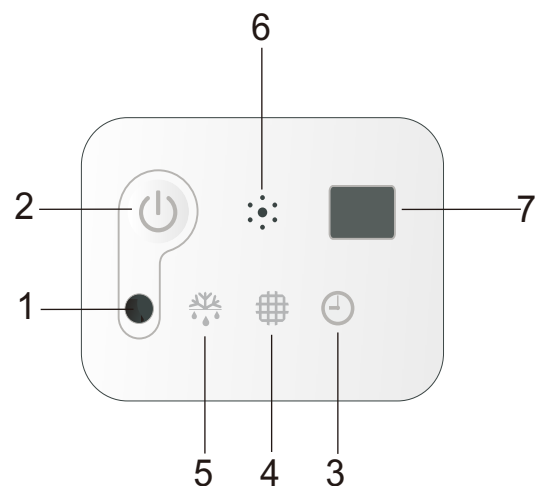
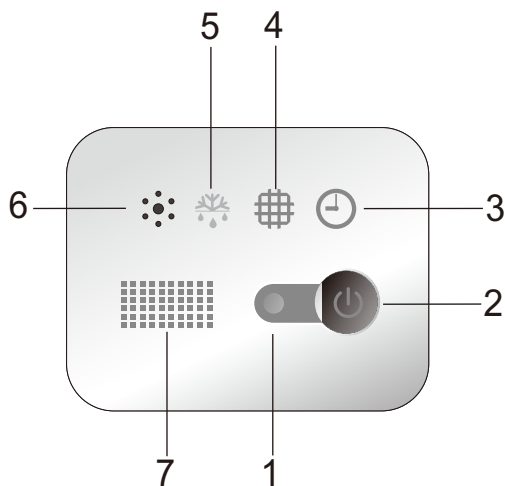
HCWA21NEWH

Remote Controller



HCRA31NEWH

Display Panel



1 Run indicator (Red)

It lights on during operation. It lights off during SLEEP mode.

2 Emergency switch

The filter clean indicator is displayed on the screen when this switch is pressed. The unit will stop operation if you continue to press this button, if pressed for more than 5s, the unit will operate in cooling mode.

3 Timer indicator (Green)

It lights on when timer is in use. It lights off when timer completes.

4 Filter clean (Yellow)

It lights on when the filter should be cleaned.

5 Defrost indicator (Green)

It lights on during defrosting and it lights off when defrosting is complete.

6 Buzzer

It rings when the signal from remote controller is received.

7 Infrared receiver

Receives signal from the remote controller.

☑ • *The figures in this manual are based on the external view of a standard model. Consequently, the shape may differ for the air conditioner model you have selected.*

* *It can be set or canceled by professional after-sale staff.*

Before Operation**⚠ CAUTION**

- Supply electrical power to system for approximately 12 hours before start-up after long time shutdown.
- Do not start the system immediately after power supply, it may cause a compressor failure, because the compressor is not heated well.
- Make sure that the outdoor unit is not covered with snow or ice. If covered, remove it by using hot water (approximately 50°C). If the water temperature is more than 50°C, it will damage the plastic parts.
- When the system is started after a long time shutdown of more than 3 months, it is recommended that the system be checked by your service dealer.
- Turn OFF the main switch when the system is stopped for a long period of time. If the main switch is not turned OFF, electricity is consumed because the oil heater is always energized during compressor stopping.

1. Special Remarks

- 3 minutes protection after compressor stop
To protect compressor, it will be continue to be off for at least 3 minutes once it has stopped.
- 5 minutes protection
Compressor must run at least for 5 minutes once it starts running. In this 5 minutes, compressor will not stop even if the room temperature reaches the setting temperature point unless you use remote controller to turn off the unit (all indoor unit can be turned off by user).
- Cooling operation
The fan of the indoor unit will never stop running during the cooling operation. It remains running even if the compressor stops working.
- Heating operation
Heating capacity depends on external factors like outdoor unit temperature. Heating capacity might decrease if outdoor ambient temperature is too low.
- Anti-freezing function during cooling
When the temperature of the air from the indoor outlet is too low, the unit will run for some time under the fan mode, to avoid frost or ice forming in the indoor heat exchanger.
- Cold air prevention
In several minutes after the heating mode is started, the fan of the indoor unit will not run until the heat exchanger of the indoor unit reaches a certain temperature to prevent cold draft.
- Defrosting
When the outdoor temperature is too low, frost or ice may form on the outdoor heat exchanger, reducing heating performance. When this happens, a defrosting system of the air conditioner will operate. At the same time the fan in the indoor unit stops (or runs at a very low speed in some cases), to prevent cold draft. After defrosting is over, the heating operation and fan speed restarts.
- Blowing out the residual heating air
When air conditioner is stopped during normal operation, the fan motor would run with low speed for a while to blow out residual heating air.
- Auto restart from Power Break
When the power supply is recovered after power break, all presets are still effective and the air-conditioner will run according to the previous setting.

2. Setting of Automatic Swing Louver

For more details, please refer to the Manual of Remote Controller.

⚠ CAUTION

Do not adjust the air louver by hand, to avoid damage to the louver mechanism.

3. Filter Cleaning



Do not operate the system without air filter to protect the indoor unit heat exchanger against being clogged.

Turn OFF the main power switch before taking filter. (The previous operation mode may appear.)

3.1 Setting the Cleaning Period of Filter

Step 1

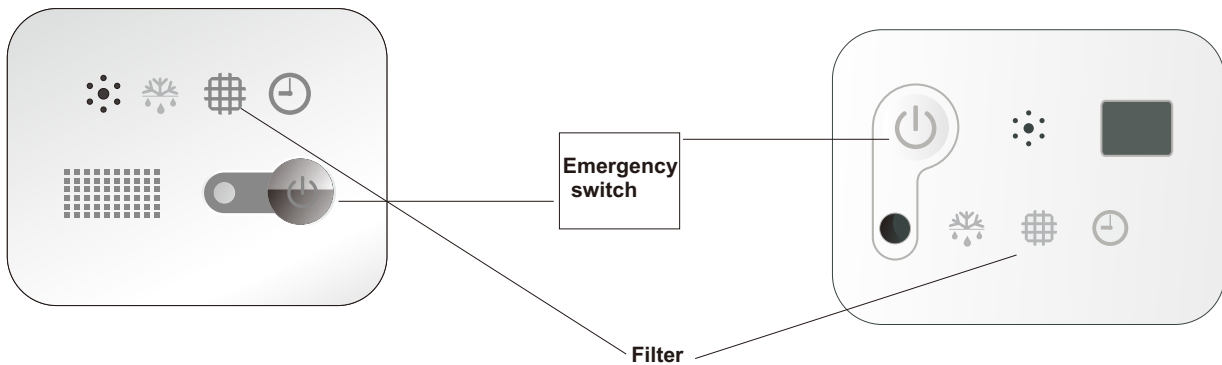
Enter choose and set mode

It is time to clean the filter, when the filter icon (add filter icon) turns on.

Step 2

Cancel the setting

Press Emergency switch to return to the standard state.



3.2 Take Out the Filter

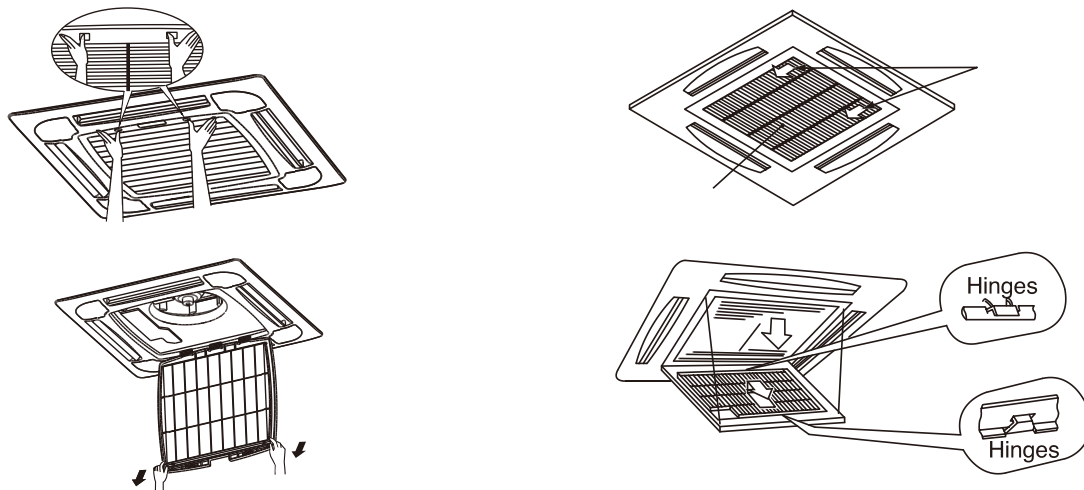
Take out the air filter according to the following steps.

Step 1

Open the air inlet grille after pushing the two knobs as shown by the arrow mark.

Step 2

Take out the air filter from the air inlet grille by supporting the air grille and lifting the air filter after detaching the filter from the hinges.



3.3 Clean the Filter

Clean the air filter according to the following steps.

Step 1

Use a vacuum cleaner or let water flow onto the air filter for removing the dirt from the air filter.



Do not use hot water with temperature more than 40°C.

Step 2

Dry the air filter in the shade to remove excess moisture.

3.4 Reset of Filter Indication

After cleaning the air filter, press the "Emergency switch" button. The FILTER indication will disappear and the next filter cleaning time will be set.

4. Trouble Shooting



**When drain water overflows from the indoor unit, stop the operation and contact your dealer.
When you smell or see white smoke coming out of the unit, turn OFF the main power supply and contact your dealer.**

4.1 If Trouble Still Persists

If the trouble still persists even after checking the following, contact your dealer and inform them of the following items.

- (1) Unit Model Name
- (2) Content of Trouble

4.2 No Operation

Check whether the SET TEMP is set at the correct temperature.

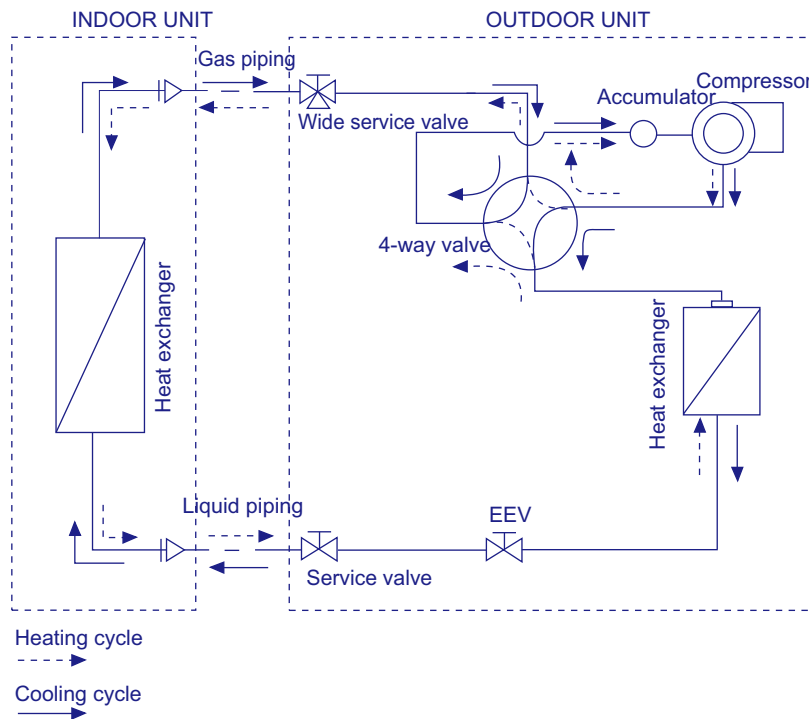
4.3 Not Cooling or Heating Properly

- Check for obstruction of air flow in outdoor or indoor units.
- Check if too many heating sources are located in the room.
- Check if the air filter is clogged with dust.
- Check if the doors or windows are open.
- Check if the temperature condition is within the operation range.

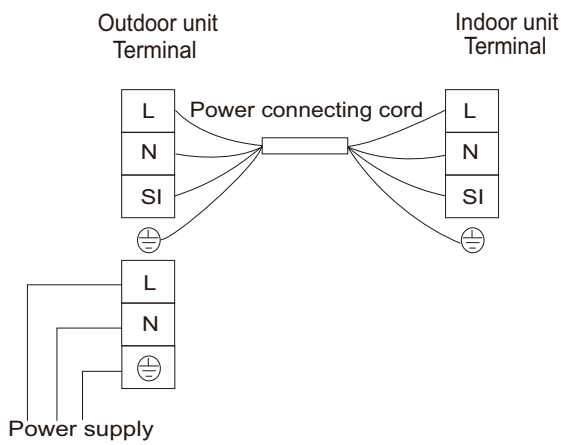
4.4 This is Not Abnormal

- **Smells from indoor unit**
Smell adheres on indoor unit after a long period of time. Clean the air filter and panels or allow a good ventilation.
- **Sound from Deforming Parts**
During system starting or stopping, a sound might be heard. However, this is due to thermal deformation of plastic parts. It is not abnormal.
- **Steam from Outdoor Heat Exchanger**
During defrosting operation, ice on the outdoor heat exchanger is melted, resulting in making steam.
- **Dew on Air Panel**
When the cooling operation continues for a long period of time under high humidity conditions, dew can form on the air panel.
- **Refrigerant Flow Sound**
While the system is being started or stopped, sound from the refrigerant flow may be heard.

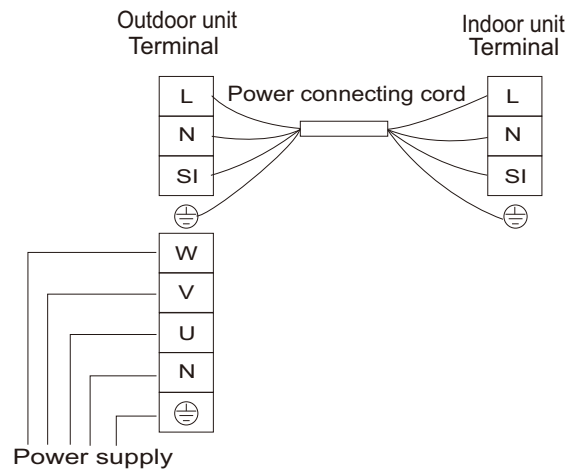
1. Refrigerant Flow Diagram



2. Electrical Wiring Diagram



1.5~4.0HP



5.0~6.5HP

1. Safety Notice

WARNING

- Installation should be performed by a qualified personnel. (Improper installation may cause water leakage, electrical shock or fire.)
- Install the unit according to the instructions given in this manual. (Incomplete installation may cause water leakage, electrical shock or fire).
- Be sure to use the supplied or specified installation parts. (Use of other parts may cause the unit to get loosened, water leakage, electrical shock or fire).
- Install the air conditioner on a solid base that can support the unit weight. (An inadequate base or incomplete installation may cause injury in the unit falls off the base).
- Electrical work should be carried out in accordance with the installation manual and the local national electrical wiring rules or code of practice.
(Insufficient capacity or incomplete electrical work may cause electrical shock or fire).
- Be sure to use a dedicated power circuit. (Never use a power supply shared by another appliance).
- For wiring, use a cable long enough to cover the entire distance. Do not use an extension cord.
- Do not put other loads on the power supply, use a dedicated power circuit.
- Use the specified types of wires for electrical connections between the indoor and outdoor units. (Firmly clamp the interconnecting wires so their terminals receive no external stresses).
- Incomplete connections or clamping may cause terminal overheating or fire.
- After connecting all the wires be sure to fix the cables so that they do not put undue force on the electrical covers or panels. (Install covers over the wires, incomplete cover installation may cause terminal overheating, electrical shock or fire).
- When installing or relocating the system, be sure to keep the refrigerant circuit free from substances other than the specified refrigerant, such as air. (Any presence of air or other foreign substance in the refrigerant circuit causes an abnormal pressure rise or rupture, resulting in injury).
- If any refrigerant has leaked out during the installation work, ventilate the room.
- After all installation is completed, check to make sure that no refrigerant is leaking out. (The refrigerant produces a toxic gas if exposed to flames).
- When carrying out piping connection, take care not to let air substances other than the specified refrigerant get into refrigeration cycle. (Otherwise, it will cause lower performance, abnormal high pressure in the refrigeration cycle, explosion and injury).
- Make sure that the installation is properly grounded. Do not ground the unit to a utility pipe, lightning arrester, or telephone grounding. Incomplete grounding may cause electrical shock. (A high surge current from lightning or other sources may cause damage to the air conditioner).
- An earth leakage circuit breaker may be required depending on the site condition to prevent electrical shock.
- Disconnect the power supply before wiring, piping, or checking the unit.
- When moving the indoor unit and outdoor unit, please be careful, do not make the outdoor unit incline over 45 degree. Pay attention to the sharp edges of the air conditioner to avoid any injury.
- During remote controller installation, ensure that the length of the wire between the indoor unit and remote controller is within 40 meters.

CAUTION

- Do not install the air conditioner in a place where there is danger of exposure to inflammable gas leakage. (If the gas leaks and builds up around the unit, it may catch fire).
- Establish drain piping according to the instructions in this manual. (Inadequate piping may cause flooding).
- Tighten the flare nut according to the specifications with a torque wrench. (If the flare nut is tightened beyond specified torque, the flare nut may crack after a long time and cause refrigerant leakage).

2. The Tools and Instruments for Installation

Number	Tool	Number	Tool
1	Standard screwdriver	8	Knife or wire stripper
2	Vacuum pump	9	Leveller
3	Charge hose	10	Hammer
4	Pipe bender	11	Churn drill
5	Adjustable wrench	12	Pipe expander
6	Pipe cutter	13	Inner hexagon spanner
7	Cross head screw-driver	14	Measuring Tape

3. The Installation of the Indoor Unit**! DANGER**

Do not install the indoor unit in a flammable environment to avoid fire or an explosion.

**! WARNING**

- Check to ensure that the ceiling slab is strong enough. Otherwise the indoor unit may topple, and fall down causing injury.
- Do not install the indoor unit outdoors. If done, an electric hazard or electric leakage will occur.

3.1 The Initial Check

- Install the indoor unit with a proper clearance around it for operation and maintenance space, as shown in Fig. 3. 1.
- Provide a service access door near the unit piping connection area on the ceiling.
- Ensure that the ceiling has sufficient strength to hang the indoor unit.
- Check that the ceiling surface is flat for the air panel installation work.

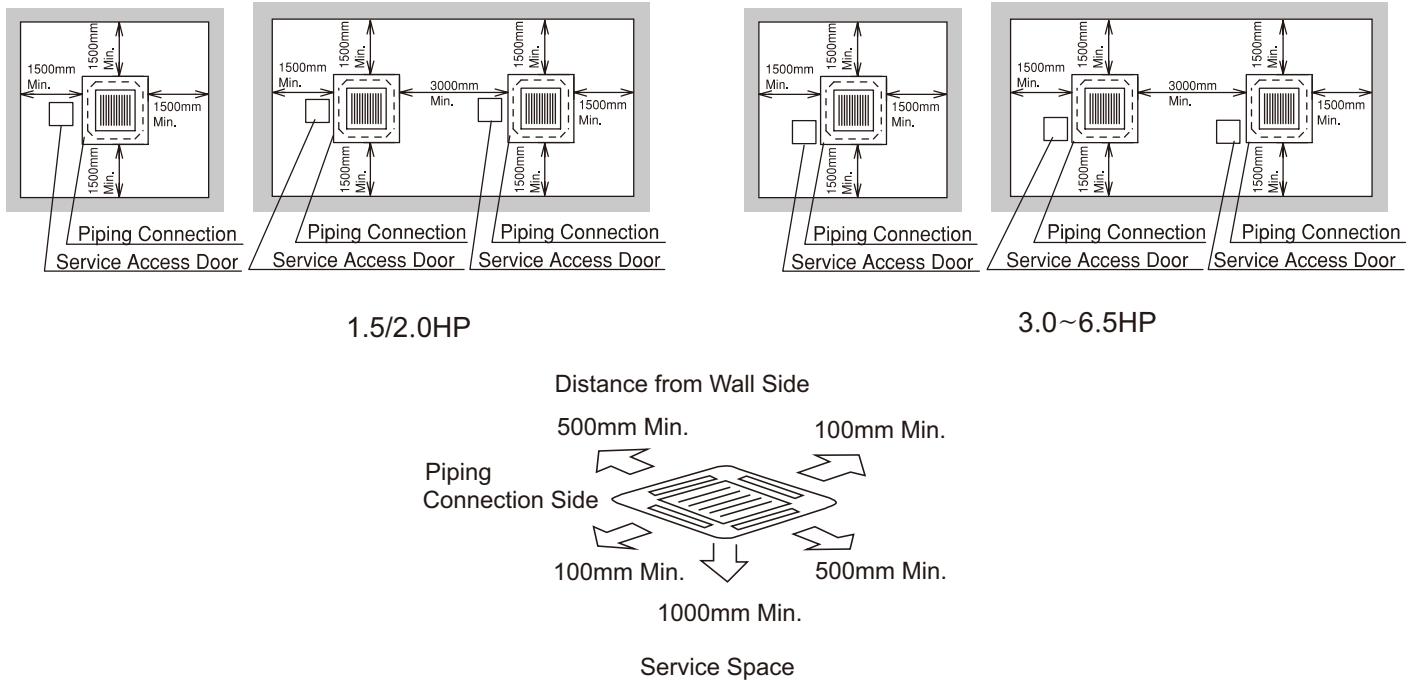


Fig. 3.1 Space around Indoor Unit

- Select the installation location as shown in Fig 3. 2:
(A) Minimum Space
(B) Down Slope Pitch of Drain Piping: 1/25 ~ 1/100

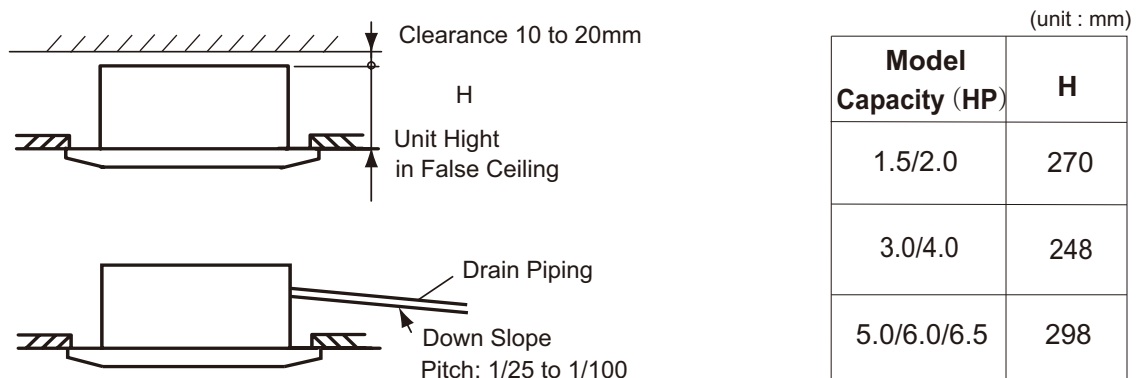


Fig. 3.2 Installation Location of Indoor Unit

- Consider the air distribution from the indoor unit to the space of the room, and select a suitable location so that uniform air temperature distribution can be obtained in the room. It is recommended that the indoor unit is installed 2.5 to 3 meters from the floor level.
- Do not install flammable parts in the service space for the indoor unit.
- Avoid obstacles which may hamper the air intake or the air discharge flow.

Installation and Maintenance

- Do not install the indoor unit in a machinery shop or kitchen where oil vapor or its mist flows to the indoor unit. The oil will deposit on the heat exchanger, thereby reducing the indoor unit performance, and may deform and in severe case, break the plastic parts of the indoor unit.
- Pay attention to the following points when the indoor unit is installed in a hospital or other facilities where there are electromagnetic waves from medical equipment:
 - (A) Do not install the indoor unit where the electromagnetic wave is directly radiated to the electrical box, remote control cable or remote control switch.
 - (B) Install the indoor unit and components at least 3 meters from the electromagnetic wave radiator.
 - (C) Prepare a steel case and install the remote control switch in it. Prepare a steel conduit tube and wire the remote control cable in it. Then, connect the ground wire with the box and the tube.
 - (D) Install a noise filter when the power supply emits harmful noises.
- To avoid any corrosive action to the heat exchanger, do not install the indoor unit in an acid or alkaline environment. If the indoor unit has to be installed in such environments, use corrosion-proof type unit.

WARNING

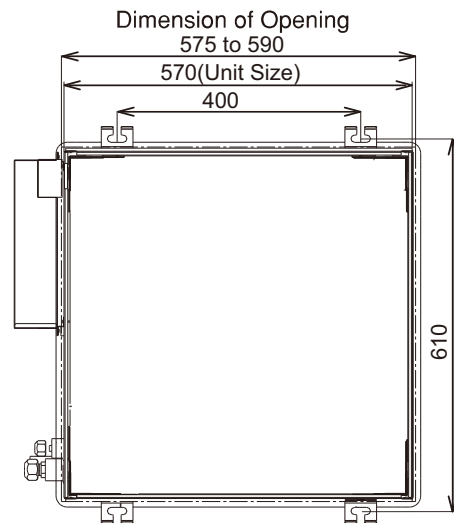
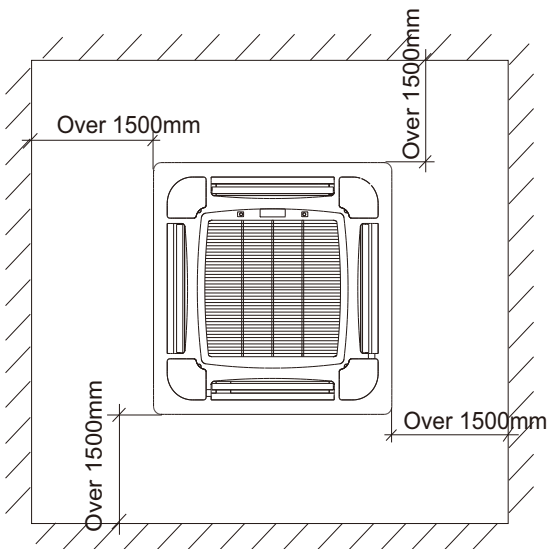
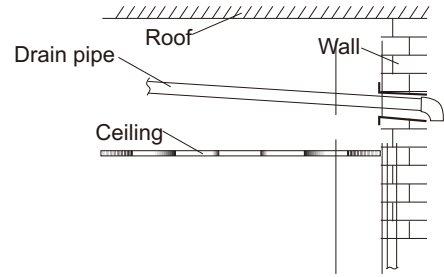
Ensure that the below calculated number is within $0.3\text{kg}/\text{m}^3$. Otherwise it may cause danger situation if the refrigerant in the Outdoor Unit leaks into the room where the Indoor Unit is installed.

$$\frac{\text{(Total Refrigerant Quantity per one Outdoor Unit)}}{\text{(Volume of the room where the Indoor Unit is installed.)}} \leq 0.3\text{kg}/\text{m}^3$$

3.2 Installation (1.5~2.0Hp)

3.2.1 Location for Installing Indoor Unit

- Where there is no obstacle near the air outlet and air can be easily blown to every corner.
- Where drain pipe can extend outside of the wall from the ceiling board.
It is preferable to have a special draining facility.
- Where the roof is strong enough to bear the weight of indoor unit, and does not tend to increasing operation sound and vibration.
- Do not put anything near the air inlet grill to obstruct air absorption.
- Keep the unit and remote controller at least 1m away from television, radio etc.
- To prevent the effects of a fluorescent lamps, keep the indoor unit at least 1.5m away from it.
- Avoid installing the unit at a place with greasy dirt or steam.



3.2.2 Height of Ceiling Board

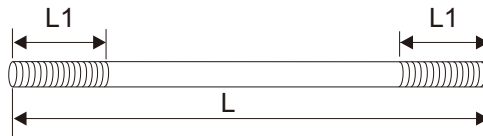
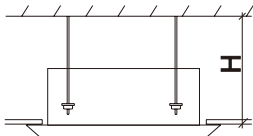
Normally, keep the ceiling board 2.5m-3m above the ground.

3.2.3 Indoor Unit Installation

Pattern board for installation is placed in the packing. Cut off the pattern for opening the false ceiling and for installation of suspension bolts.

(Note: Below reference is only applicable to a house made of concrete.)

- Measure the distance H between the roof surface and the ceiling board ;
- Make four suspending poles with M10 screw thread on both ends (metric system) as shown in the below figure. (processed with $\Phi 10$ pole)



Value of L and L1 are calculated as below:

$$L1=50\text{mm (when } H<255\text{mm, } L1=40\text{mm)}$$

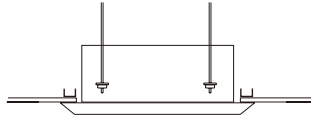
$$L=1.5L1+H-230 \text{ (unit: mm)}$$

- Turn 4 attached nuts onto the thread ends on the suspending poles as shown below:



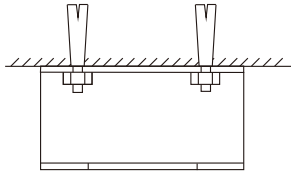
Installation and Maintenance

- Take out the moulding board from the packing carton of indoor unit, do not fold it, just use it to decide an installation location and direction of the unit on the roof and ceiling. Press the moulding board tightly onto the surface of the roof, draw out the hole position for suspension bolts with a pencil, then take off the moulding board, drill 8 holes for the suspension bolts. It is preferable if the depth of holes just reveal the thread of the poles.
- Cut an opening (A x B) on the ceiling board with assistance of the pattern board, make sure to follow the same direction of the holes for roof bolts. Fix the edges of the opening with the “L”-shaped aluminum bars.

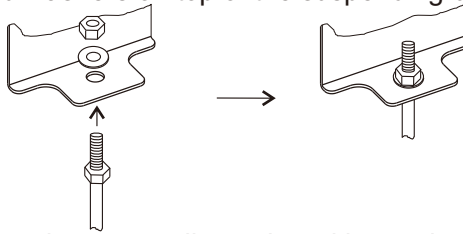


Model	A(mm)	B(mm)
1.5/2.0HP	575~590	575~590

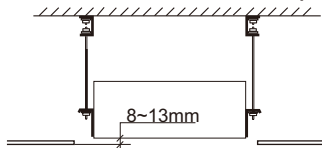
- Mount the attached suspending brackets with suspension bolts M8X50 on the roof surface. Make sure to tighten the suspension bolts and nuts well. The opening of suspension brackets should face outward as shown below.



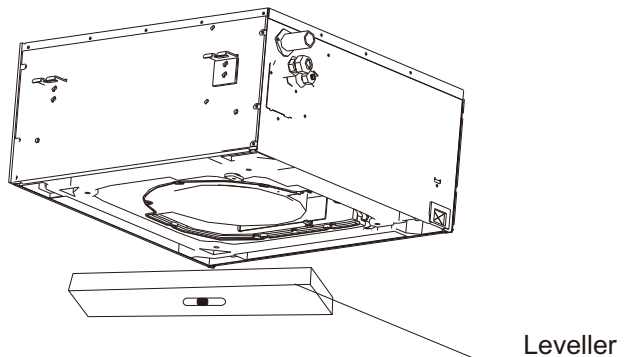
- Take out the suspending poles with nut on one end, mount them on the fixed suspending bracket, then tighten the nuts and washers on top of the suspending brackets.



- Fix the main unit onto the suspending poles with attached nuts and washer. The nuts on the bottom should turn to about half of the thread length. (Note: This task needs at least two people).



- Adjust the nuts on the bottom of the suspending poles, allow the bottom of the unit 8-13mm higher than that of the ceiling board. (as shown in the above figure)
Then adjust each corner of the bottom horizontally with a leveller. (Levelness should be within the scope of 1/100).



3.3 Installation(3.0~6.5HP)

3.3.1 Opening of False Ceiling and Suspension Bolts

- (1) Determine the final location and direction of installation of the indoor unit paying careful attention to the space for the piping, wiring and maintenance.
Pattern board for installation is printed on the packing. Cut off the pattern for opening the false ceiling and installation suspension bolts.
- (2) Cut out the area for the indoor unit in the false ceiling and install suspension bolts, as shown in Fig. 3.3.

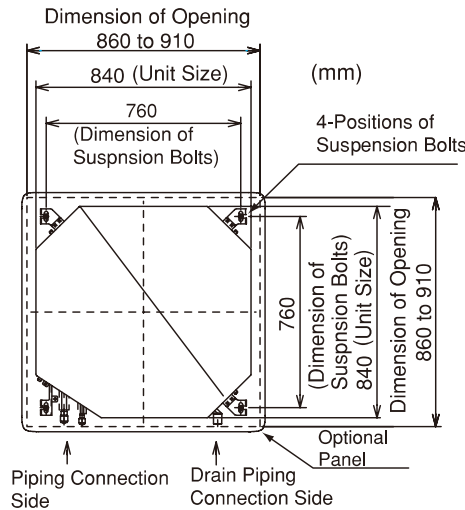
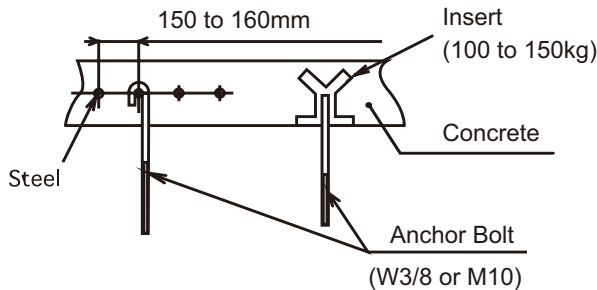


Fig. 3.3 Opening of False Ceiling and Suspension Bolts

- (3) Check to ensure that the ceiling is horizontally level, otherwise drainage can not flow.
- (4) Strengthen the opening parts of the false ceiling.
- (5) Mount suspension bolts, as shown in Fig. 3.4.

- For Concrete Slab



- For steel Beam

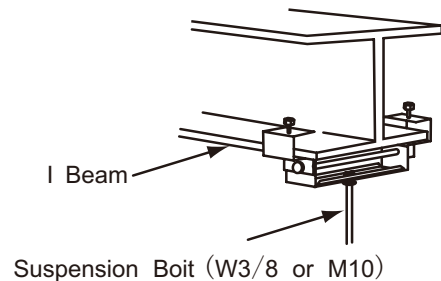
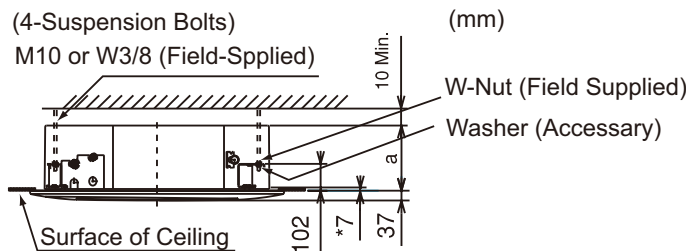


Fig. 3.4 Mounting Suspension Bolts

3.3.2 Mounting Position of the Indoor Unit



* indicates the dimension between lower face of indoor unit and surface of ceiling.

Model	a
3.0/4.0	248
5.0/6.0/6.5	298

Fig. 3.5 Mounting Position

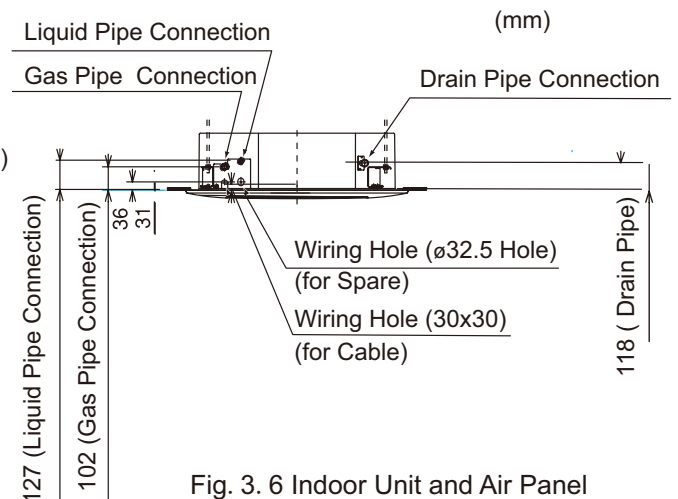


Fig. 3.6 Indoor Unit and Air Panel

3.3.3 Mounting the Indoor Unit

(1) Mount the nuts and washers into the suspension bolts.

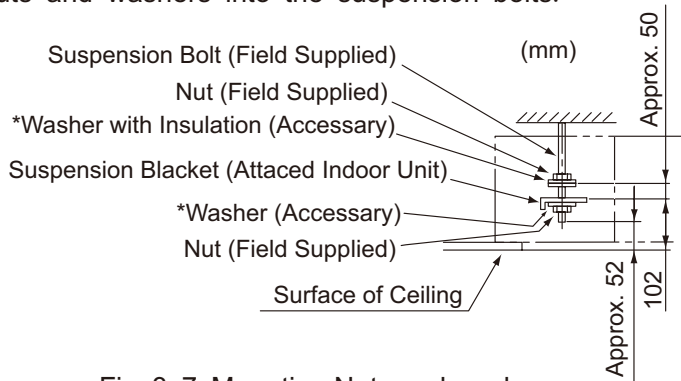


Fig. 3.7 Mounting Nuts and washer

*Place the washer so that the surface with insulation faces downwards.

- (2) Lift the Indoor Unit by hoist, and do not apply any force on the drain pan.
 (3) Secure the indoor unit using the nuts and washer.

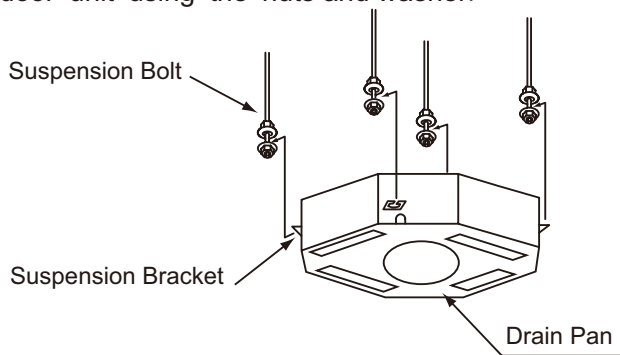


Fig. 3.8 Mounting the Indoor Unit

NOTE: If a false ceiling is already constructed, complete all piping and wiring work inside the ceiling before fixing the indoor unit.

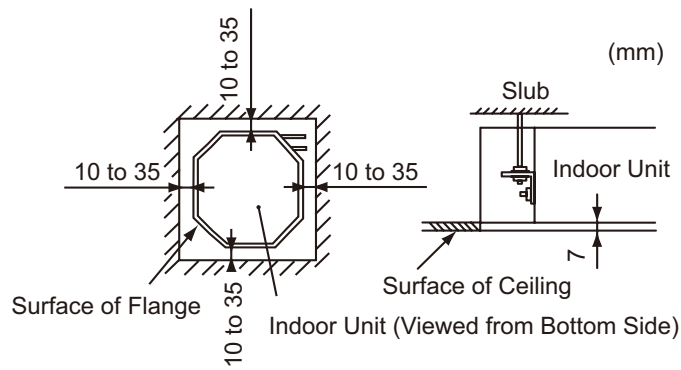
3.3.4 Adjusting the Space between Indoor Unit and False Ceiling Opening

CAUTION

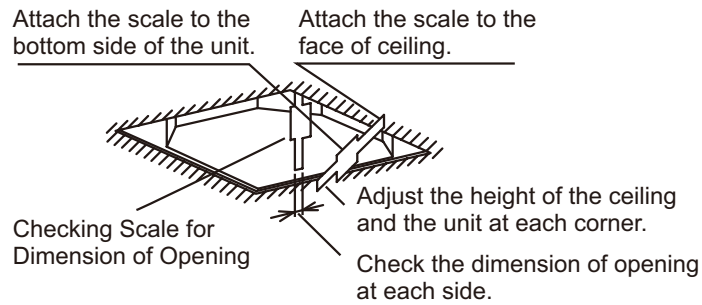
- Check the level of the drain pan using a leveller to avoid incorrect operation of the drain discharge mechanism in the indoor unit. The drain piping side of the indoor unit must be approximately 5mm lower than the other part.
- Tighten the nuts of the suspension brackets after the adjustment is completed. Apply **LOCK-TIGHT paint*** to the bolts and nuts to prevent them from loosening. Otherwise, abnormal noises or sounds may occur and the indoor unit may fall down.

LOCK-TIGHT paint*: Paint the lock bolts and nuts. Adjust the indoor unit to the correct position while checking with the scale (factory-supplied).

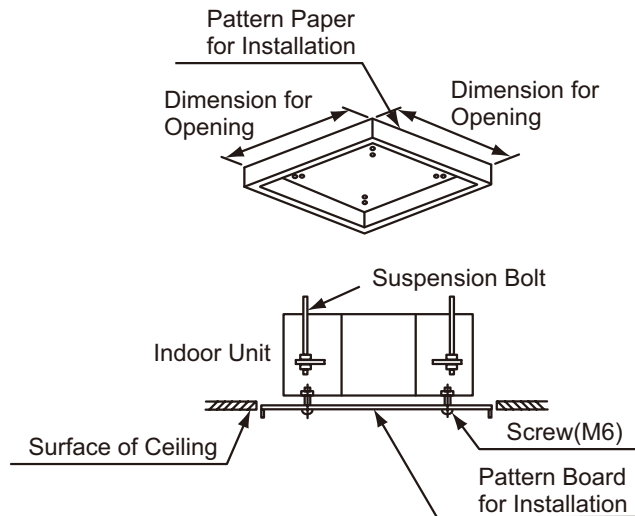
- (1) Pattern Board for installation is attached with the packing.
 (2) Adjust the position of indoor unit, using scale as shown below:



a .For Ceiling already Completed with Panels



b . Ceiling not Completed with Panels yet



3.4 Installation Details for Air Panels

- Installation work for air panel should be done according to the Installation Manual for Air Panel.
- Ensure that the connector between indoor unit and the air panel is properly connected.

4. The Installation of Outdoor Unit

4.1 The Initial Check

- The outdoor unit should be kept in well ventilated and dry place.
- Make sure that the noise and exhaust does not disturb your neighbors.
- Never install the outdoor unit at the place with high oil fog, acidic or alkaline environment, salt mist or harmful gas such as sulfur steam.
- Ensure that the unit is installed far away from radiation source at least 3 meters.
- Install snow hood before the inlet and outlet of the outdoor unit, when it is installed in ice covered area.
- Install the outdoor unit in shaded place to avoid the direct sunshine and high temperature heat radiation.
- Do not install the unit at places with dust and pollution to avoid the heat exchanger getting blocked.
- Do not install the unit at a place where the indoor/outdoor unit is easily reachable.
- Do not install the unit at a place where the rain or wind between building can blow the fan directly.

NOTE:

- The fan could be destroyed by strong wind when it blows the exchanger of the outdoor unit directly.
- Be cautious of the sharp aluminum foil fins, it can injure your hands if touched.
- Only the service engineer can touch the outdoor unit.

4.2 Installation

- (1) Use the washers provided as accessories to fasten the appliance at the foundation bolts.
 - (2) When fastening the outdoor unit with the foundation bolts, the fasten holes position should be as shown in Fig 4.2.
 - (3) Fasten the outdoor unit as shown in Fig 4.3.
 - (4) Ensure to fasten the outdoor unit tightly in an horizontal position to avoid noise generation when it gets inclined by strong earthquake or breeze.
 - (5) Do not drain off water into public places to avoid slippery path.
 - (6) Make a strong base (made of concrete or similar construction). The appliance should be placed at least 10 cm above the ground level to avoid getting wet or corroded. Otherwise, it may cause damage to the appliance or reduce its life time. (Fig 4.4)
- Fix the unit with wire ropes to prevent overturning in case a strong seasonal wind blows against the unit (Fig 4.5).

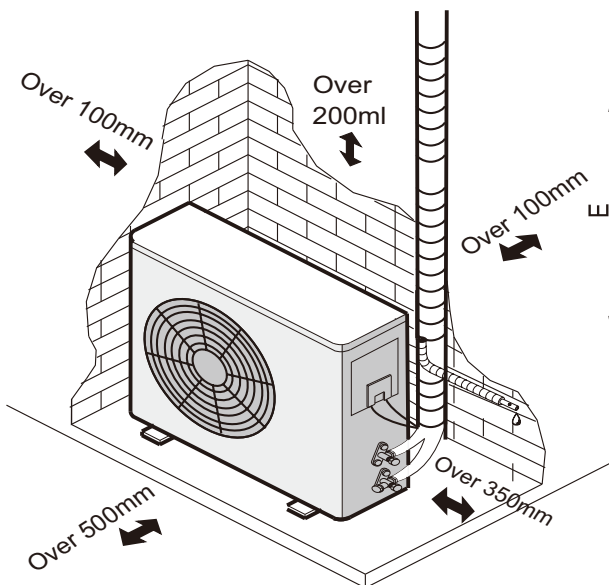
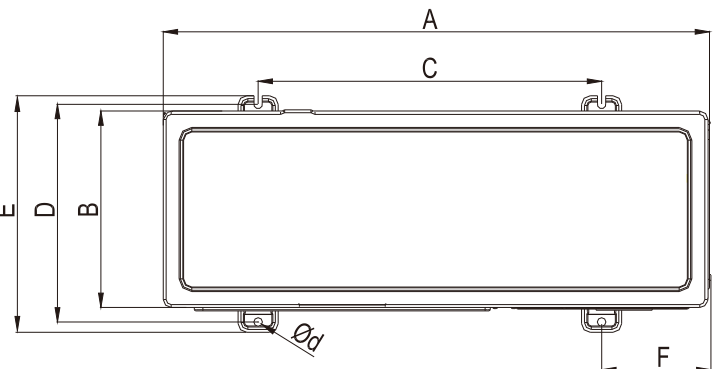


Fig.4.1



DC-Inverter Unitary Air Conditioner

(Unit: mm)

Model Capacity(HP)	A	B	C	D	E	F	d
1.5	810	281	510	310	338	150	10×17
2.0/3.0	860	310	542	341	368	168	11×17
4.0/5.0/6.0/6.5	950	340	580	378	410	185	15

Fig.4.2 The position of anchor bolts

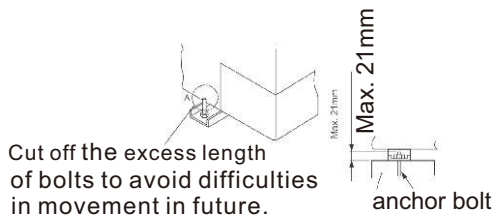


Fig. 4.3 The installation of anchor bolts

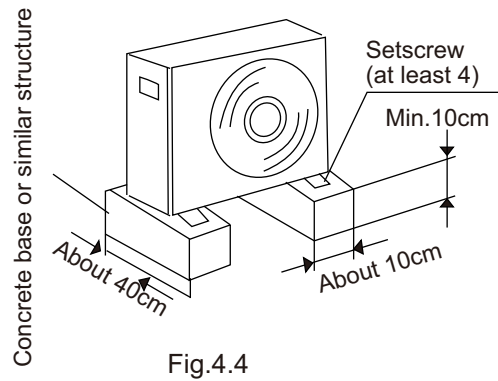


Fig.4.4

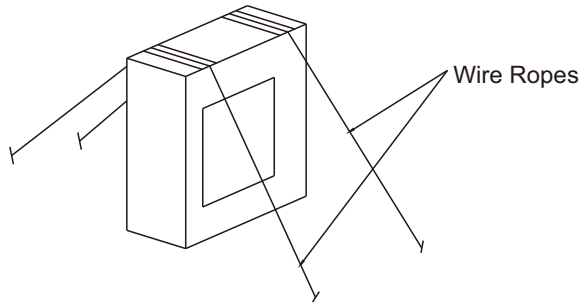


Fig.4.5

4.3 Refrigerant Length between Indoor and Outdoor

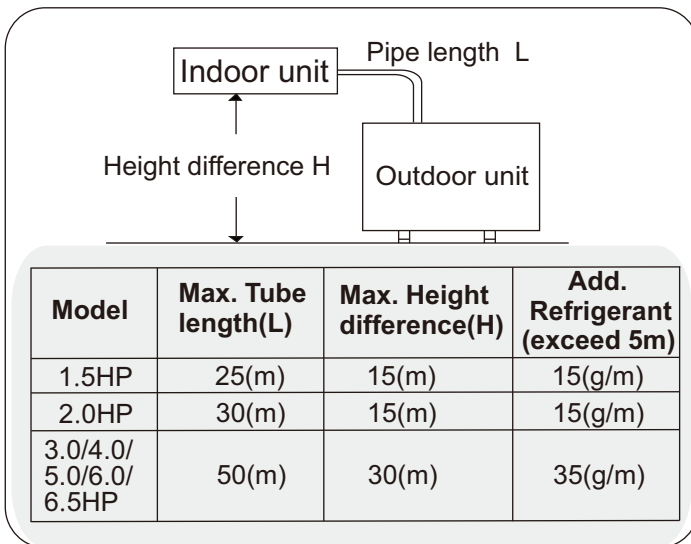


Fig.4.6

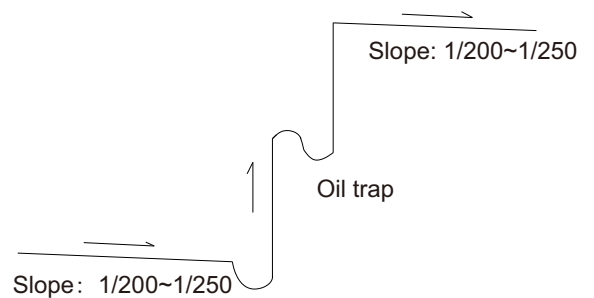


Fig.4.7

If the total pipe length is between 5m to 50m (Max. length), an additional refrigerant can be added. It is not necessary to add compressor oil. (Figure 4.6) Pay attention to the Max. pipe length and Max. height difference allowed while performing this work.

Oil trap

When the indoor unit is lower than outdoor unit and height is larger than 5m, install an oil trap every 5m (height difference) on suction piping. (Figure 4.7)

NOTE:

1. To avoid storing too much oil in the oil trap, the oil trap should be as short as possible.
2. The horizontal piping should be slope down along the refrigerant flow direction, to bring the oil back to compressor, the slope is about 1/200 to 1/250.
3. In order to ensure cooling/heating performance better, the refrigerant piping should be as short and straight as possible.

5. Refrigerant Piping



Use refrigerant R410A in the refrigerant cycle (refer to outdoor nameplate). Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These type of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for these type of tests.

5.1 The Piping Materials

- (1) Prepare locally-supplied copper pipes.

Model	Gas pipe (mm)	Liquid pipe (mm)
1.5HP	ø9.52	ø6.35
2.0HP	ø12.7	ø6.35
3.0HP	ø15.88	ø9.52
4.0/5.0/6.0/6.5	ø19.05	ø9.52

- (3) Select clean copper pipes. Make sure there is no dust and moisture inside. Blow the pipes with nitrogen or dry air to remove dust and foreign materials before connecting pipes.

5.2 The Piping Connection

- (1) Position of piping connection is shown in Fig. 5. 1. (Indoor Unit)

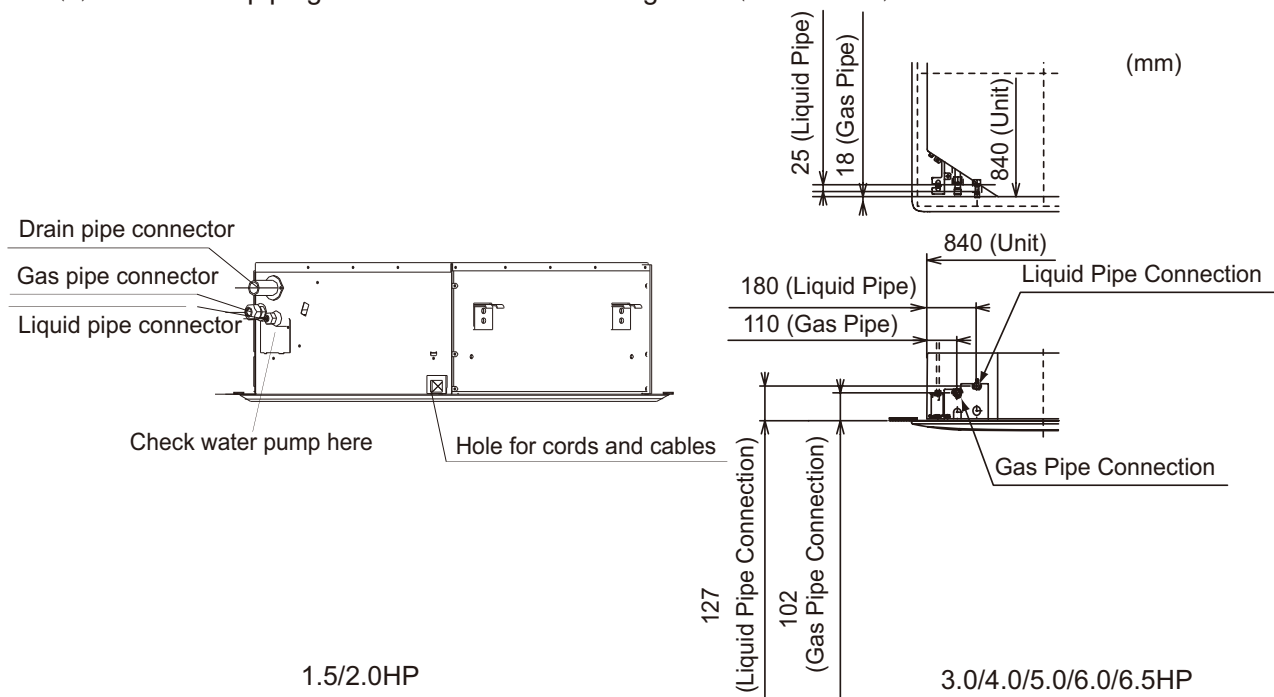
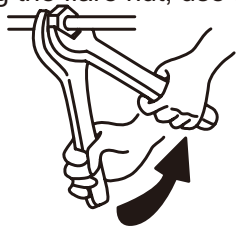


Fig. 5. 1 Position of Piping Connection

- (2) When tightening the flare nut, use two spanners as shown in Fig.5.2.



Pipe Size(mm)	Tightening Torque N.m
φ 6.35	20
φ 9.52	40
φ 12.7	60
φ 15.88	80
φ 19.05	100

Fig. 5. 2 Tightening work of Flare Nut

- (3) After connecting the refrigerant piping, seal the refrigerant pipes by using the factory-supplied insulation material as shown in Fig 5.3.

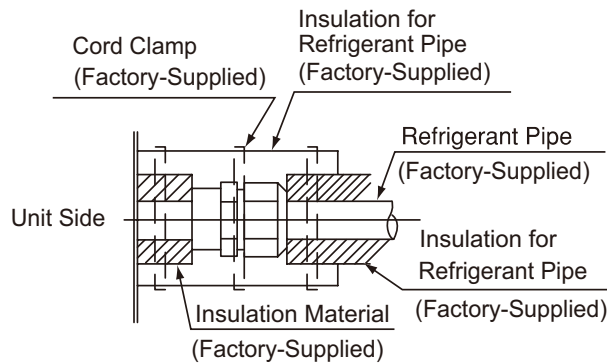


Fig. 5.3 Insulation on Pipes

⚠ CAUTION

- Cover the end of the pipe with a cap while inserting the pipe through a hole.
- Do not place pipes on the ground directly without a cap or vinyl tape at the end of the pipe.

5.3 Air Exhaust

Air and moisture remaining in the refrigerant system cause undesirable effects.

Therefore, they must be removed completely with the following steps.

Air Purging with a Vacuum Pump

- (1) Check that each pipe (both narrow and wide pipes between the indoor and outdoor units) is properly connected. Note that both narrow and wide pipe valves on the outdoor unit are kept closed at this stage.
- (2) Using an adjustable wrench or box wrench, remove the bonnet from the service valve.
- (3) Connect a vacuum pump and service valve together tightly.
- (4) Turn on the vacuum pump with the pressure lower than -755mm Hg for 5 minutes.
- (5) With the vacuum pump still running, demount the pipe of vacuum pump from the service valve. Then stop the vacuum pump.
- (6) Replace the bonnet on the service valve and fasten it securely with an adjustable wrench or box wrench.
- (7) Using an adjustable wrench or box wrench, remove the bonnet of both narrow and wide valve.
- (8) With the hex wrench, turn the stem of wide and narrow pipe valves counter clockwise to fully open the valves.
- (9) Replace the bonnets on the wide and narrow valves and fasten it securely with an adjustable wrench or box wrench.

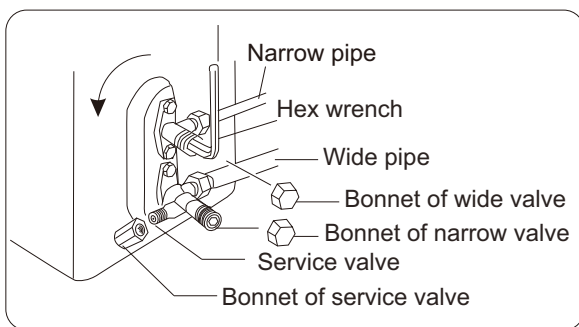
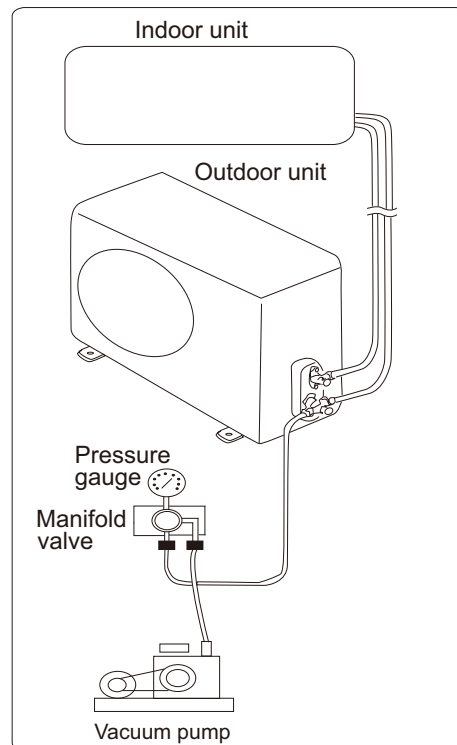


Fig. 5.4 Air Purging

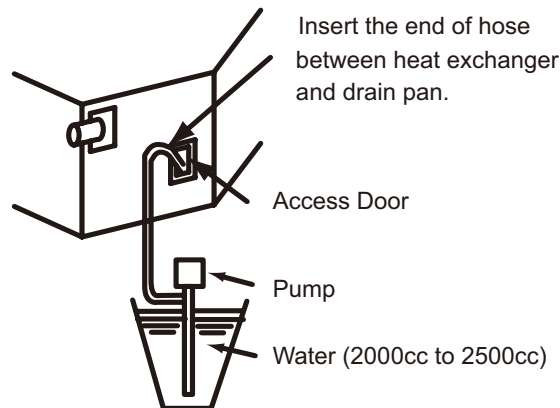


6. Drain Piping

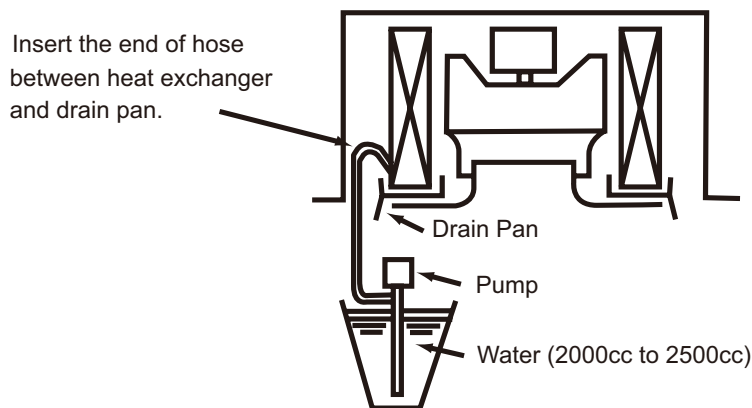


- Do not create an upper-slope or rise for the drain piping, since drain water can flow back to the indoor unit causing leakage into the room when the system operation is stopped.
- Do not connect the drain pipe with sanitary or sewage piping or any other drainage piping.
- When the common drain piping is connected with other indoor units, the connected position of each indoor unit must be higher than the common drain pipe, also the pipes must be large enough according to the unit size and number of units.
- After performing drain piping work and electrical wiring, check to ensure that water flows smoothly as in the following procedure.
- Checking with the Float Switch:
 - (A) Switch ON the power supply.
 - (B) Pour 1.8 liters of water into the drain pan.
 - (C) Check to ensure that the water flows smoothly or whether no water leakage occurs.
When water cannot be found at the end of the drain piping, pour another 1.8 liters of water into the drain.
 - (D) Switch ON the power supply and press the RUN/STOP button.

- In case of pouring water through the access door.

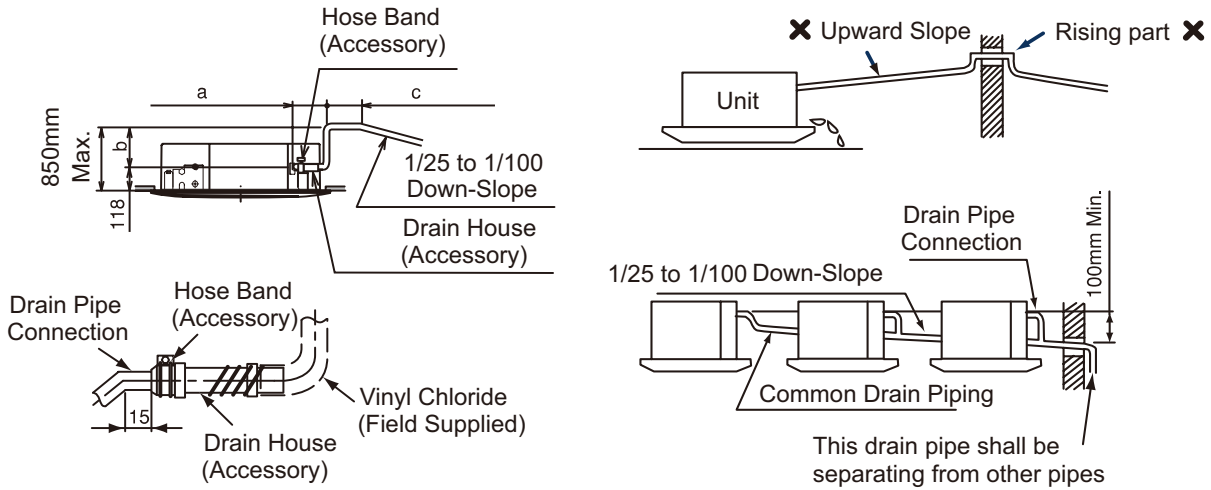


- In case of pouring water through the air outlet.



Installation and Maintenance

- Prepare a polyvinyl chloride pipe with a 21mm inside diameter (1.5/2.0).
Prepare a polyvinyl chloride pipe with a 32mm outer diameter (3.0~6.5).
- Fasten the tubing to drain hose with the adhesive agent and factory-supplied clamp. The drain piping must be performed with a down-slope pitch of 1/25 to 1/100.



* The total length of $a+b+c$:

For Model 1.5/2.0 : $a \leq 300$, $b \leq 500$, $c \leq 50$

For Model 3.0~6.5: $a \leq 300$, $b \leq 850$, $c \leq 50$, $a+b+c \leq 1100$

* In case of lifting the drain pipe at outlet part, perform the drain piping work as shown in the above figure.

- Insulate the drain pipe after connecting the drain hose.



7. Electrical Wiring

WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit before electrical wiring work or a periodical check is performed.
- Check to ensure that the indoor fan and the outdoor fan have stopped before electrical wiring work or a periodical check is performed.
- Protect the wires, drain pipe, electrical parts, etc. from rats or other small animals. If not protected, rats may gnaw at unprotected parts and at the worst, a fire will occur.
- Check the item below before turning ON the main switch.
- Tighten screws according to the following torque.
M3.5: 1.2N.m
M5: 2.0~2.4N.m

CAUTION

- Wrap the accessory packing around the wires, and plug the wiring connection hole with the seal material to protect the product from any condensate water or insects.
- Tightly secure the wires with the cord clamp inside the indoor unit.
- Secure the cable of the remote control switch using the cord clamp inside the electrical box.

7.1 General Check

- (1) Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data given in "9. Electrical installation". Make sure that the components comply with National Electrical Code(NEC).
- (2) Check to ensure that the power supply voltage is within $\pm 10\%$ of the rated voltage.
- (3) Check the capacity of the electrical wires. If the power source capacity is too low, the system cannot be started due to the voltage drop.
- (4) Check to ensure that the ground wire is connected.
- (5) Power Source Main Switch Install a multi-pole main switch with a space of 3.5mm or more between each phase.

7.2 Electrical Wiring Connection

The intermediate connection between the indoor unit and the air panel should be referred to in the Installation Manual for Air Panel.

- (1) Connect the power supply and earth wires to the terminals in the electrical box.
- (2) Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box.

8. Test Run**⚠ WARNING**

- Only after all the checking points have been checked the unit can be operated.
 - (A) Check and make sure that the resistance of the terminal to ground is more than $2M\Omega$, otherwise, you cannot operate the unit before the electricity leakage point is found and repaired.
 - (B) Check and make sure that the stop valve has been opened before operating the unit.
 - (C) Make sure that turn on electric power 6 hours before operating the unit.
- Make sure the power and unit run well then plug in.
- Turn on the appliance and adjust it to Cooling or Heating mode according to the room temperature. Set at lowest temperature when cooling mode and highest temperature when heating mode. Check if the appliance can run well.
- Installation of the appliance is generally finished after the above operations are done. If you still have any trouble, please contact local technical service center of our company for further information.
- Pay attention to the following items while the system is running.
 - (A) Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are heated higher than 90°C .
 - (B) Use remote controller to operate, and check whether room temperature and function well. After test, turn off the electric power.

9. Electrical Installation



- Use an ELB (Electric Leakage Breaker). If not used, it may cause an electric shock or a fire.
- Do not operate the system until all the check points have been cleared.
 - (A) Check to ensure that the insulation resistance is more than 2MΩ, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.
 - (B) Check to ensure that the stop valves of the outdoor unit are fully opened and then start the system.

Model Capacity(HP)	Power Supply	ELB		Power Source Cable Size	Transmitting Cable Size
		Nominal Current(A)	Nominal Sensitive Current (mA)	EN60335-1	EN60335-1
1.5	220-240V~, 50Hz	20	30	3×1.5mm ²	4×1.5mm ²
2.0	220-240V~, 50Hz	20	30	3×2.5mm ²	4×1.5mm ²
3.0	220-240V~, 50Hz	32	30	3×2.5mm ²	4×1.5mm ²
4.0	220-240V~, 50Hz	40	30	3×4.0mm ²	4×1.5mm ²
5.0/6.0/6.5	380-415V 3N~, 50Hz	32	30	5×2.5mm ²	4×1.5mm ²

Max. Running Current(A): REFER TO NAMEPLATE

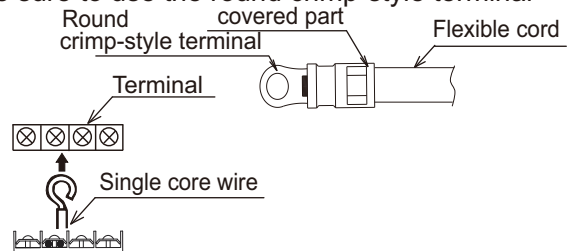
NOTES:

- 1) Follow local codes and regulations when selecting field wires, and all the above are the minimum size.
- 2) The wire sizes marked in the table are selected at the maximum current of the unit according to the European Standard, EN60335-1. Use the wires which are not lighter than the ordinary polychloroprene sheathed flexible cord (code designation H07RN-F).

When connecting the terminal block using flexible cord, make sure to use the round crimp-style terminal for connection to the power supply terminal block.

Place the round crimp-style terminals on the wires up to the covered part and secure in place.

When connecting the terminal block using a single core wire, be sure to perform curing.



- 3) When transmitting cable length is more than 15 meters, a larger wire size should be selected.
- 4) Use a shielded cable for the transmitting circuit and connect it to ground.
- 5) In the case that power cables are connected in series, add each unit maximum current and select wires below.

Selection According to EN60335-1

Current i(A)	Wire Size(mm ²)
i ≤ 6	0.75
6 < i ≤ 10	1
10 < i ≤ 16	1.5
16 < i ≤ 25	2.5
25 < i ≤ 32	4
32 < i ≤ 40	6
40 < i ≤ 63	10
63 < i	*

* In the case that current exceeds 63A, do not connect cables in series.



Johnson Controls Hitachi participates in the Eurovent Certified Performance programme for AC.
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The restriction note: * models so marked are not Eurovent certified.



Correct Disposal of this product

This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

Specifications in this document are subject to change without notice, in order that Hitachi-Johnson Controls Air Conditioning, Inc. may bring the latest innovations to their customers.

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