IECS-D Series
Round-Flow Ceiling Cassette
Installation Manual

CONTENTS PAGE

1. PRECAUTIONS

- **Ensure that all Local, National and International regulations are satisfied.**
- **Read this "PRECAUTIONS " carefully before Installation. The precautions described below include the important**
- **items regarding safety. Observe them without fail. After the installation work, perform a trial operation to check**
- **for any problem. Follow the Owner's Manual to explain how to use and**
- **maintain the unit to the customer. Turn off the main power supply switch (or breaker) before**
- **maintenance the unit . Ask the customer that the Installation Manual and the Owner's**
- **Manual should be kept together .**

CAUTION

New Refrigerant Air Conditioner Installation

THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT(R410A)WHICH DOES NOT DESTROY OZONE LAYER.

The characteristics of R410A refrigerant are; Hydrophilic, oxidizing membrane or oil, and its pressure is approx.1.6 times higher than that of refrigerant R22.Accompanied with the new refrigerant, refrigerating oil has also been changed ,Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating oil does not enter the refrigerating cycle.
To prevent charging an incorrect refrigerant and refrigerating oil, the sizes of connecting sections of charging port of the main unit and installation tools are charged from those for the conventional refrigerant.

Accordingly the exclusive tools are required for the new refrigerant (R410A):
For connecting pipes, use new and clean piping designed for R410A,and please care so that water or dust does not enter. Moreover, do not use the existing piping because there are problems with pressure-resistance force and impurity in it.

CAUTION

Do not connect the Appliance from Main Power Supply.

This unit must be connected to the main power supply by means of a switch with a contact separation of at least 3 mm. The installation fuse must be used for the power supply line of this conditioner.

WARNING

If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly 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 connected in fixed wiring.
The appliance shall be installed in accordance with national wiring regulations.
The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.
An all-pole disconnection device which has at least 3mm separation distance in all pole and a residual current device(RCD) with the rating of above 10mA shall be incorporated in the fixed wiring according to the national rule.
The power cord type designation is H05RN-R/H07RN-F or above.
Ask an authorized dealer or qualified installation professional to install/maintain the air conditioner.
Inappropriate installation may result in water leakage,electric shock or fire.
Turn off the main power supply switch or breaker before attempting any electrical work.
Make sure all power switches are off.Failure to do so may cause electric shock.
Connect the connecting cable correctly.
If the connecting cable is connected in a wrong way, electric parts may be damaged.
When moving the air conditioner for the installation into another place, be very careful not to enter any gaseous matter other than the specified refrigerant into the refrigeration cycle.
If air or any other has is mixed in refrigerant, the gas pressure in the refrigeration cycle becomes abnormally high and it may resultingly causes pipe burst and injuries on persons.
Do not modify this unit by removing any of the safety guards or by by-passing any of the safety interlock switches.
Exposure of unit to water or other moisture before installation may cause a short-circuit of electrical parts.
Do not store it in a wet basement or expose to rain or water.
After unpacking the unit, examine it carefully if there are possible damage.
Do not install in a place that might increase the vibration of the unit.
To avoid personal injury (with sharp edges), be careful when handling parts.
Perform installation work properly according to the Installation Manual.
Inappropriate installation may result in water leakage, electric shock or fire.
When the air conditioner is installed in a small room, provide appropriate measures to ensure that the concentration of refrigerant leakage occur in the room does not exceed the critical level.
Install the air conditioner securely in a location where the base can sustain the weight adequately.
Perform the specified installation work to guard against an earthquake.
If the air conditioner is not installed appropriately, accidents may occur due to the falling unit.
If refrigerant gas has leaked during the installation work, ventilate the room immediately.
If the leaked refrigerant gas comes in contact with fire, noxious gas may generate.
After the installation work, confirm that refrigerant gas doer not leak.
If refeigerant gas leaks into the room and flows near a fire source, such as a cooking range, noxious gas might generate.
Electrical work must be performed by a qualified electrician in accordance with the Installation Manual. Make sure the air conditioner uses an exclusive power supply.

An insufficient power supply capacity or inappropriate installation may cause fire.

Use the specified cables for wiring connect the terminals securely fix. To prevent external forces applied to the terminals from affecting the terminals.

Be sure to provide grounding.

Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone cables.

Conform to the regulations of the local electric company when wiring the power supply.

Inappropriate grounding may cause electric shock.

Do not install the air conditioner in a location subject to a risk of exposure to a combustible gas.

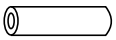
If a combustible gas leaks, and stays around the unit, a fire may occur.

Required tools for installation work

1) Philips screw driver
2) Hole core drill(65mm)
3) Spanner
4) Pipe cutter
5) Knife
6) Reamer
7) Gas leak detector
8) Tape measure
9) Thermometer
10) Mega-tester
11) Electro circuit tester
12) Hexagonal wrench
13) Flare tool
14) Pipe bender
15) Level vial
16) Metal saw
17) Gauge manifold (Charge hose:R410A special requirement)
18) Vacuum pump (Charge hose:R410A special requirement)
19) Torque wrench
    1/4(17mm)16N•m (1.6kgf•m)
    3/8(22mm)42N•m (4.2kgf•m)
    1/2(26mm)55N•m (5.5kgf•m)
    5/8(15.9mm)120N•m (12.0kgf•m)
20) Copper pipe gauge adjusting projection margin
21) Vacuum pump adapter

2. OVERVIEW

2.1 Accessories

NAME	SHAPE	QUANTITY
Installation Manual Installation instructions (Make sure you hand over to the user)		1
User Manual Operating instructions (Make sure you hand over to the user)		1
Brass nut For use in the installation of connecting pipe (the quantity is one for models with a process pipe)		2
Remote controller		1
Insulation piping For insulation of piping connections		2
Ring clamp For use in the installation of connecting pipes		1
Nut		8
Washer		8
Bolt M6		4
Flexible hose tube		1
Tightening band		5
Sponge Ⅰ(250*250*10)		1
Sponge Ⅱ(60*100*5)		1
Soundproof / insulation sheath		2
Out-let pipe sheath		1

2.2 Locally Purchased Accessories

(Unit:mm)

Copper pipe			Water discharge pipe PVC	Insulation casing
Model \ Piping	Liquid side	Gas side		
53	Φ6.4×0.8	Φ12.7×0.8	This is used as the IDU's drain pipe. The length is determined according to actual needs.	The inner diameter should match the corresponding copper tube and rigid polyethylene plastic tube. The thickness is usually 10mm (or above). If the pipe is used in a closed humid area, the thickness should be increased.
71	Φ6.4×0.8	Φ15.9×1.0		
90/105	Φ9.5×0.8	Φ15.9×1.0		
120/140/160	Φ9.5×0.8	Φ15.9×1.0		
Remarks	It is used to connect the IDU and ODU refrigerant systems. A soft copper tube (T2M) is recommended. The length is determined according to actual needs.			

CAUTION

Wired controller is standard.

The air conditioner is delivered from the factory without connecting pipes.

All the figures in the manual explain only the general appearance and dimensions of the unit. The air conditioner you purchased may not be completely consistent with the appearance and functions listed in the figures. Please refer to the actual product.

3. INSTALLATION

3.1 Choosing an Installation Site

■ **Selecting an installation site for IDU**

- Enough space for installation and maintenance.
- The ceiling is level, and the structure is strong enough to support the weight of IDU; take reinforcement measures when necessary.
- Airflow in/out of the machine is not obstructed, and the external air exerts minimum impact.
- Easy to supply airflow to every corner in the room.
- Easy to drain fluids from the connected piping and water discharge piping.
- No direct heat radiation.
- Avoid installation in narrow spaces or where there are more stringent noise require-ments.

CAUTION

Installing the unit in the following places may cause it to malfunction (please enquire if it is unavoidable):

Places that contain mineral oil such as machine oil for cutting.

Places with high salt content in the air such as the sea.

Areas like hot springs where there are corrosive gases like sulphur gases.

Factories with major voltage fluctuations in the power supplies.

Places like a car or cabin room.

Areas filled with cooking oil and gas like kitchens.

Places where strong electromagnetic waves are present.

Places where flammable gases or materials are present.

Areas where there is evaporation of acid or alkaline gases.

Other special environmental conditions.

■ **Selection of Installation Site for ODU**

- Enough space for installation and maintenance.
- Unobstructed airflow in/out of the unit; no strong breeze.
- The site should be dry and well-ventilated.
- The supporting surface should be flat and able to bear the weight of the unit. The ODU should be able to be installed horizontally without increasing vibration and noise. Take reinforcement measures when necessary.
- The operating noise and the discharged air should not affect neighbours.
- There should be no leakage of flammable gas nearby.
  It should be easy to install the connecting pipes and complete electrical connections.
- The level difference of connection pipes and the lengths of connection pipes must be within the allowed ranges.

CAUTION

Choose the correct move-in path.

Carry the device in its original package.

Electrical insulation measures can be taken in accordance with relevant technical specifications of electrical equipment if the air conditioner is to be installed onto the metal part of a building.

If the height difference is greater than the allowed level difference, it is recommended to place the ODU above the IDU.

3.2 IDU Installation

WARMING

Install the air conditioner in a location with sufficient strength to support the weight of the unit. Take reinforcement measures when necessary.

The unit may fall and cause personal injury if the location is not strong enough.

Carry out the specified installation works to prevent strong winds or earthquakes.

Improper installation may cause the unit to drop leading to accidents.

Before wiring/pipe layout, make sure that the installation area (walls and floor) is safe and free of water, power, gas, and other hidden dangers.

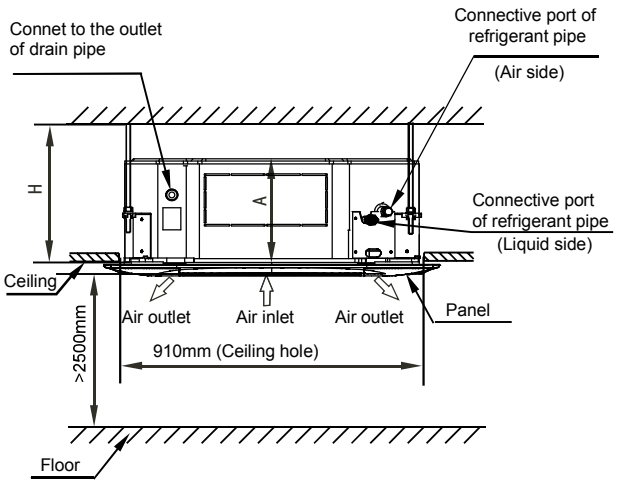
CAUTION

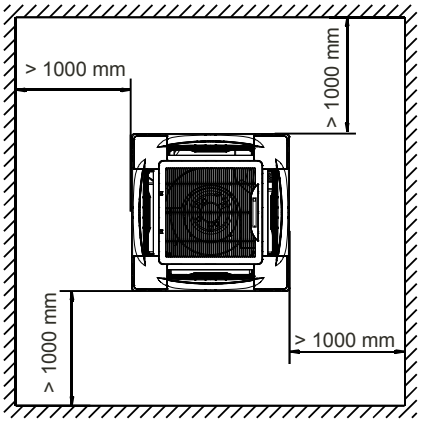
The IDU should be handled with care, and it should not be subjected to heavy pressure.

After the IDU is installed, in case of construction, the IDU should be protected to prevent garbage and dust from falling into the unit.

The fan should be rotated before the test run. Make sure that there is no abnormal friction before powering on the unit.

■ **Space Required for Installation and Maintenance**





Indoor Unit	A（mm）	H（mm）
53/71/90	230	≥260
105/120/140/160	300	≥330

- Enough space for installation and maintenance.
- Unobstructed airflow in/out of the unit; no strong breeze.
- The site should be dry and well-ventilated.
- The supporting surface should be flat and able to bear the weight of the unit. The ODU should be able to be installed horizontally without increasing vibration and noise. Take reinforcement measures when necessary.
- The operating noise and the discharged air should not affect neighbours.
- There should be no leakage of flammable gas nearby.
- It should be easy to install the connecting pipes and complete electrical connections.
- The level difference of connection pipes and the lengths of connection pipes must be within the allowed ranges.

CAUTION

Choose the correct move-in path.
Carry the device in its original package.
Be sure to take electrical insulation measures in accordance with relevant technical specifications of electrical equipment if the air conditioner is to be installed onto the metal part of a building.
If the height difference is greater than the allowed level difference, it is recommended to place the ODU above the IDU.

■ **Installation of the Main Body**

- Existing ceiling (which must be level)

1. Drill a 910 mm × 910 mm square hole into the ceiling based on the layout of the installation board (see Figures 1, 2, and 3).

a. The center of the ceiling opening should match that of the unit.

b. Determine the length and outlets of the connecting pipes, water discharge piping and the electrical wiring.

c. To keep the ceiling level and prevent vibrations, reinforce the strength of the ceiling when necessary.

2. Install the hooks in four corners based on the layout for the hooks outlined in the installation board.

a. Drill four holes with a diameter of 12 mm and a depth of 50–55 mm in the ceiling. Then, insert and fix the expansion hook anchors.

b. During the installation of the hooks, make sure that the concave portion of the hanger corresponds to that of the expansion hook anchors. Determine the appropriate hook length for installation based on the ceiling's height. Remove any excess.

c. Use M10 or W3/8 bolts for the screws of the mounting hooks.

d. Take approximately 1/2 of the screw length for the installed hooks as the excess length L, as shown in Figure 5.

3. Use the hex nuts on the four mounting hooks to evenly adjust and make sure that the unit is level.

a. If the water discharge pipe is slanted, it may cause the water level switch to malfunction, and water may leak.

b. Adjust the position of the unit, and make sure that the gap with the ceiling is evenly spaced on all four sides of the unit, and the base of the unit is 10–12 mm into the base of the ceiling (see Figure 5).

c. Once the position and level of the unit is adjusted, use the nuts on the mounting hooks to secure the air conditioner (see Figure 6).

- New room and ceiling

1. Install the unit according to the above description. Pre-bury the hooks in the new ceiling, and make sure that they are strong enough to bear the weight of the IDU, and that the unit will not become loose when the concrete shrinks.

2. After lifting the unit, use M6×12 screws (accessory) to secure the installation board on the main body of the air conditioner to pre-determine the size and position of the opening in the ceiling (see Figure 1).

a. Before you mount the ceiling, make sure it is level.

b. Operate according to the above description (step 1 in "Existing ceiling").

3. Operate according to the above description (step 3 in "Existing ceiling").

4. Remove the installation board.

- Dimensions (unit: mm)

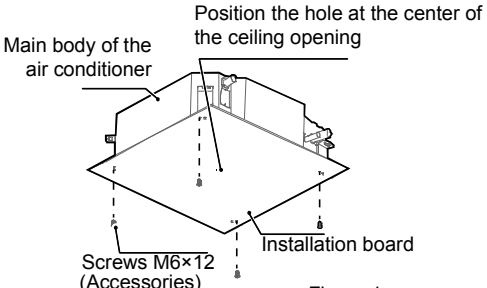


Figure 1

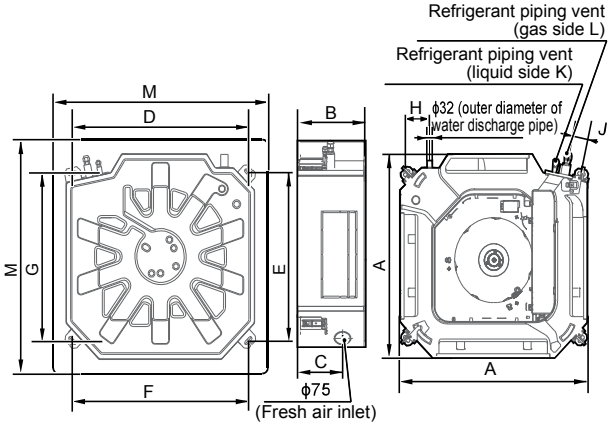


Figure 2

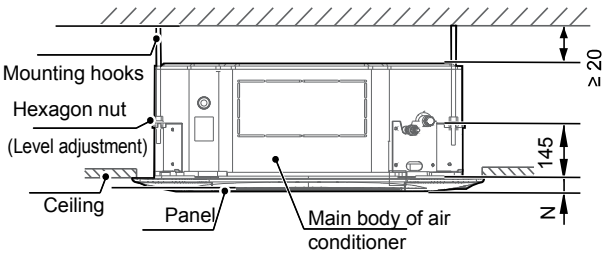


Figure 3

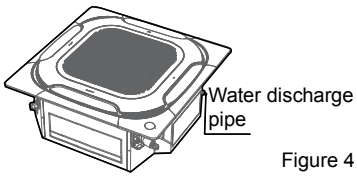


Figure 4

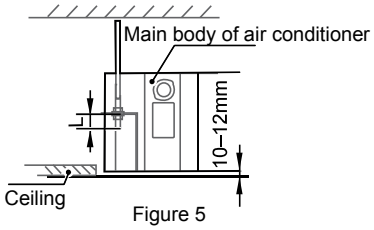


Figure 5

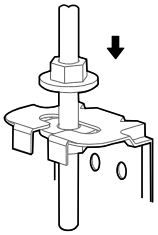


Figure 6

Main IDU body	A	B	C	D	E	F	G
53	840	230	126	780	680	780	680
71	840	230	126	780	680	780	680
90	840	230	126	780	680	780	680
105-160	840	300	197	780	680	780	680

Main IDU body	H	J	K	L	M	N	
53	105	70	Φ6.4	Φ12.7	950	46	
71	105	70	Φ6.4	Φ15.9	950	46	
90	105	70	Φ9.5	Φ15.9	950	46	
105-160	105	70	Φ9.5	Φ15.9	950	46	

NOTE

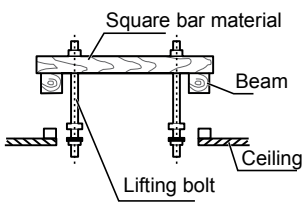
All the figures in the manual explain only the general appearance and dimensions of the unit. The air conditioner you purchased may not be completely consistent with the appearance and functions listed in the figures. Please refer to the actual product.

CAUTION

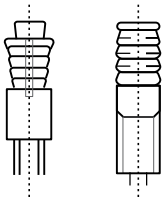
Before IDU installation, make sure that the buffers used for transportation between the fan and the pipe socket are removed. Running the unit without removing the buffers may damage the fan motor.
Make sure that the IDU body is level; otherwise, it may cause water to leak. Calibrate the levelness of the IDU using a spirit level or polyethylene tube filled with water.
The IDU is equipped with a built-in drain pump and float switch. Do not tilt the unit in the reverse direction of the drain pan; otherwise, the float switch may malfunction and cause water leakages.

To match the existing structure, set the screw pitch according to the product dimensions shown below.

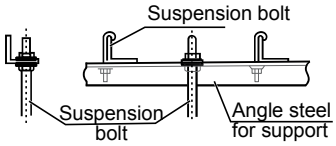
- Wooden Structure
  Place the square bar by crossing the beams and set the lifting bolts.



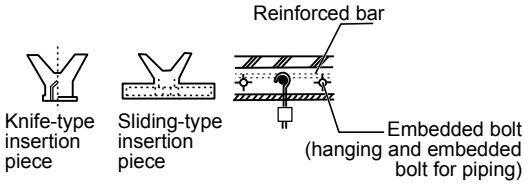
- Original concrete slab Structure
  Use embedded bolts, embedded pull bolts, and embedded plug columns



- Steel framework
  Directly set and use an angle steel for support.



- Newly set concrete slab Structure
  Set using embedded appliances and embedded type of bolts.



CAUTION

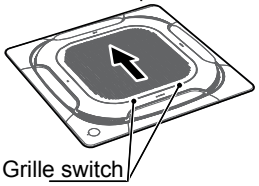
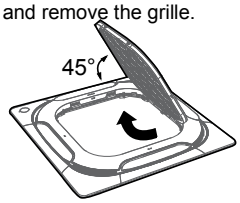
All bolts should be made from high quality carbon steel (with galvanized surfaces or other rust preventive treatment) or stainless steel.
How the ceiling is treated will differ with the type of building. For specific measures, please consult the building and renovation engineers.
How the lifting bolt is secured depends on the specific situation, and it must be secure and reliable.

■ **Panel Installation**

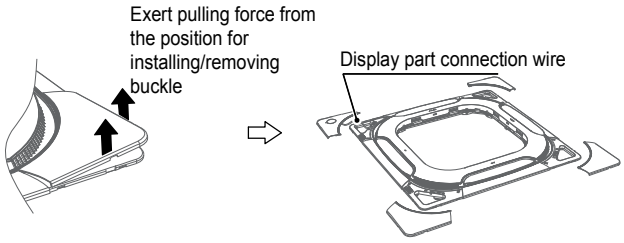
CAUTION

Do not place the panel such that it faces downwards or leans against the wall. Do not place it on a protruding object either. Do not hit or squeeze the air deflector.
There is an air vent shorter than the other three vents in the panel. This air vent must match the shorter air vent of the unit body (see the warning label on the unit body). Otherwise, it will cause air leak and water condensation.!

· Remove the air inlet grille.

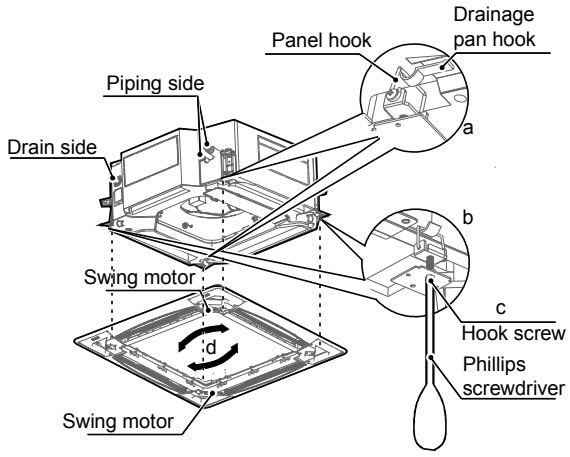
Press the two grille locks at the same time to lift it up.	Raise the air inlet grille to about 45°, and remove the grille.
	

- Remove the screws from all four corners of the installation cover plate to release the cover plate rope, and take out the cover plate, facing outwards.

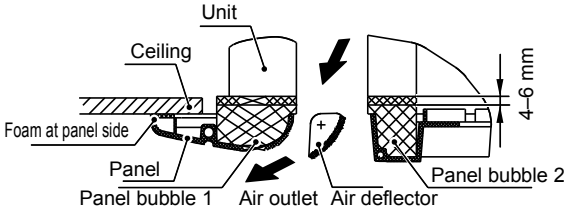


- Installing the panel

1. Align the "PIPING SIDE" and "DRAIN SIDE" sections marked on the panel with the corresponding piping connector and water discharge connector of the unit.
2. When installing the panel, first hang its hooks on the swing motor side and opposite side of the panel to the corresponding drainage pan hooks on the unit (see a in the figure). Then, hang the two remaining panel hooks to the corresponding suspension bracket of the unit (see b in the figure).

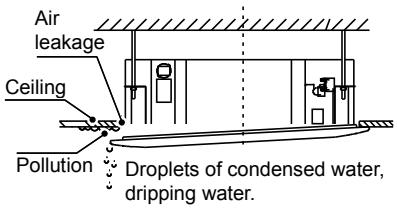


3. Slot the guide wire of the swing motor to the card slot on the panel, and connect the power supply terminal of the swing motor to the corresponding connector of the electric control box.
4. Adjust the four panel hook screws to keep the panel level, and lift it evenly up to the ceiling (see a in the figure).
5. Adjust the panel slightly in the direction indicated by d in the figure, so that the center of the panel aligns with the center of the opening of the ceiling. Verify that the hooks in all four corners are securely in place.
6. Continue to evenly tighten the screws under the hooks of the panel until the foam thickness between the unit and the air outlet on the panel is reduced to about 4–6 mm, and the panel has a steady contact with the ceiling surface.



CAUTION

The plastic cover plate protruding from the swing motor must be embedded within the concave area of the sealing plate.
Make sure the wiring of the swing motor is not caught inside the sealed foam.
Improper screw tightening will result in the fault shown in the right figure.
If there is still a gap between the ceiling and panel after the screws are tightened, re-adjust the IDU height (Figure I).
Without affecting the lifting, lowering, and levelness of the IDU and the water discharge piping, you can use the openings at the four corners of the panel to adjust the IDU height (Figure II).



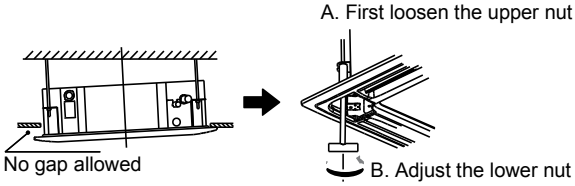
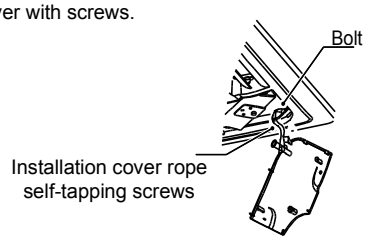


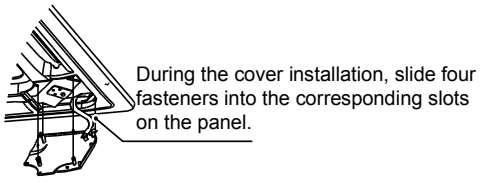
Figure I Figure II

- First hang the air inlet grille on the panel, and then connect the leads of the swing motor and control box to the corresponding connectors on the unit respectively.
- Reinstall the air inlet grille by performing the steps used to remove the air inlet grille in the reverse order.
- Reinstall the installation cover.

1. Secure the installation cover rope onto the bolt on the installation cover with screws.



2. Gently press the installation cover into the panel.



4 OUTDOOR UNIT INSTALLATION

4.1 Installation Place

■ The outdoor unit should be installed in the location that meets the following requiements:

- There is enough room for installation and maintenance.
- The air outlet and the air inlet are not impeded, and can not be reached by strong wind.
- It must be a dry and well ventilating place.
- The support is flat and horizontal and can stand the weight of the outdoor unit. And will no additional noise or vibration.
- Your neighborhood will not feel uncomfortable with the noise or expelled air.
- It is easy to install the connecting pipes or cables.
- Determine the air outlet direction where the discharged air is not blocked.
- There is no danger of fire due to leakage of inflammable gas.
- The piping length between the outdoor unit and the indoor unit
- may not exceed the allowable piping length.
- In the case that the installation place is exposed to strong wind
- such as a seaside, make sure the fan operating properly by putting the unit lengthwise along the wall or using a dust shield.(Refer to Fig 4.1)
- If possible, do not install the unit where it is exposed to direct sunlight.
- If necessary, install a blind that does not interfere with the air flow.
- Select the position where it will not be subject to snow drifts, accumulation of leaves or other seasonal debris. If unavoidable, please cover it with a shelter.
- Locate the outdoor unit as close to the indoor unit as possible.
- If possible, please remove the obstacles nearby to prevent the performance from being impeded by too little of air circulation.
- The minimum distance between the outdoor unit and obstacles described in the installation chart does not mean that the same is applicable to the situation of an airtight room. Leave open two of the three directions (M,N,P)

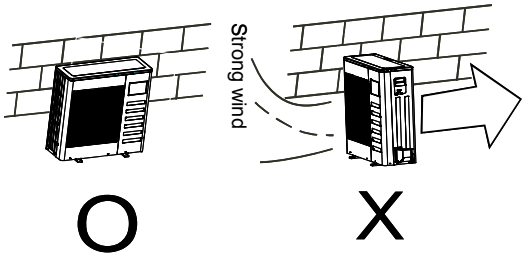


Fig 4.1

NOTE

All the figures in this manual are for explanation purpose only. They may be slightly different from the air conditioner you purchased.The actual uint shall prevail.

4.2 Figure of body size

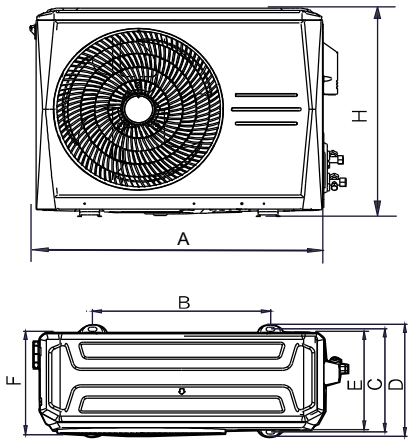


Fig 4.2

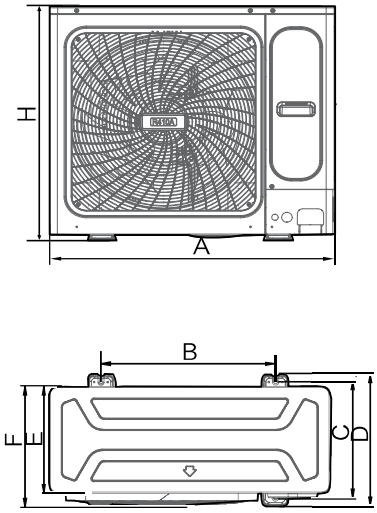


Fig 4.3

Table 2-1 mm

Model	A	B	C	D	E	F	H	Remark
53	795	514	340	365	287	330	555	*Fig.4.2*
71/90	910	663	403	427	345	390	712	*Fig.4.2*
105/140	900	590	390	440	360	406	840	*Fig.4.3*
160	1040	656	463	523	410	452	865	*Fig.4.3*

(in=mm/25.4)

4.3 Space of installation and maintenance

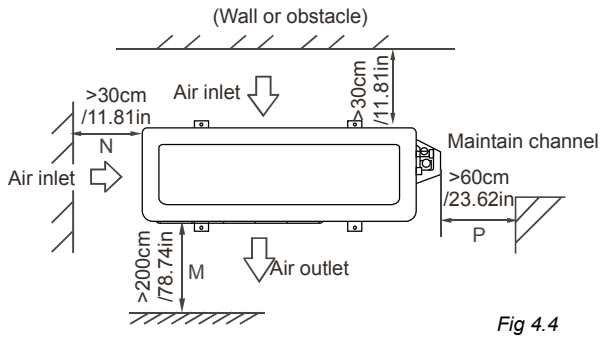


Fig 4.4

4.4 Moving and installation

- Since the gravity center of the unit is not at its physical center, so please be careful when lifting it with a sling.
- Never hold the inlet of the outdoor unit to prevent it from deforming.
- Do not touch the fan with hands or other objects.
- Do not lean it more than 45°, and do not lay it sidelong.
- Make concrete foundation accoding to the sepecif-ications of the outdoor units.*(Refer to Fig.4.5)*
- Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.*(Refer to Fig.4.6)*

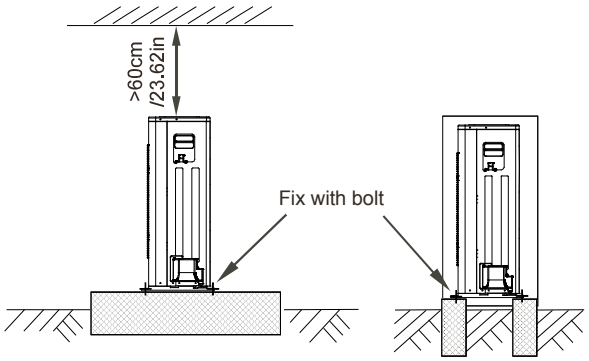


Fig 4.5

5 WATER DISCHARGE PIPING LAYOUT

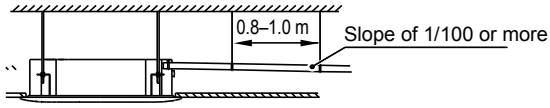
5.1 Installation of water discharge piping for the IDU

- Use PVC pipes for the water discharge pipes (outer diameter: 37–39 mm, inner diameter: 32 mm). Based on the actual installation circumstance, users can purchase pipes with appropriate length from sales agent or local after-sales service center, or purchase directly from the market.
- Insert the water discharge pipe into the end of the water suction connecting pipe of the unit, and use the ring clamp (accessory) to clamp the water discharge pipes with the insulation casing for the water outlet piping securely.

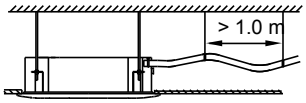
CAUTION

Do not exert too much force in order not to break the pipes. Wrap both the suction piping and water discharge piping evenly with heat insulation casing to prevent water condensation.

- Use insulation casing to evenly wrap the water suction piping connections and water discharge piping of the unit (especially the indoor portion) and bind them firmly to make sure air does not enter and condense to form water.
- In order to prevent the back-flow of water into the interior of the air conditioner when the unit stops operating, the water discharge pipe should slope downwards towards the outside (drainage side) at a slope of more than 1/100. Make sure that the water discharge pipe does not swell or store water, otherwise it will cause abnormal sounds.

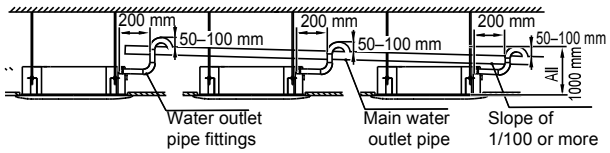


- When connecting the water discharge piping, do not use force to pull the pipes to prevent the water suction pipe connections from coming loose. At the same time, set a supporting point at every 0.8–1.0 m to prevent the water discharge pipes from bending.



- When pipe bending is required, use water outlet connecting fittings in the junction box for pipe layout.

  When a long water discharge pipe is connected, the indoor portion must be covered with insulation casing to prevent the long pipe from becoming loose.
- When the outlet of the water discharge pipe is higher than the pipe connection for water suction, try to keep the water discharge pipe as vertical as possible, and the water outlet connecting fittings will bend so that the height of the water discharge pipe should be within 1000 mm away from the base of the drainage pan. Otherwise there will be excessive water flow when the operation stops.



Water discharge pipes from multiple units are connected to the main water discharge pipe to be discharged through the sewage pipe.

CAUTION

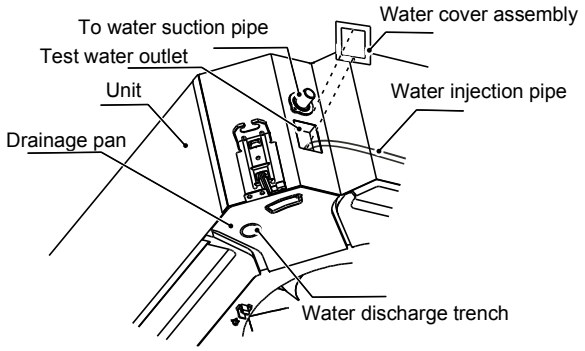
Make sure all the connections in the piping system are properly sealed to prevent water leakages.

The end of the water discharge pipe must be more than 50 mm above the ground or from the base of the water discharge slot. In addition, do not submerge it in water. To discharge the condensed water directly into a ditch, the water discharge pipe must bend upwards to form a U-shaped water plug to stop the odour from entering the room via the water discharge pipe.

5.2 Water Discharge Test

- Before the test, make sure that the water discharge pipeline is smooth, and check that each connection is sealed properly.
- Conduct the water discharge test in a new room before the ceiling is paved.

1. Remove the water cover assembly to connect to the test water outlet, and use the water injection pipe to inject 2000 ml of water into the drainage pan.



2. Connect the power supply, and set the air conditioner to operate in cooling mode. Check the sound of the drain pump, and check whether the drainage outlet is discharging water properly (based on the length of the pipe, the discharge may occur 1 minute), and check for water leakage at each joint.

CAUTION

Faults, if any, need to be rectified in time.

3. Stop the air conditioner. Wait for three minutes, and then check if there is anything unusual. If the water discharge piping layout is not correct, the excessive water flow will cause the alarm indicator on the control box to flicker. There may even be water overflowing from the drainage pan.

4. Continue to add water until the alarm for excessive water levels is triggered. Check if the drain pump drains water immediately. After three minutes, if the water level does not fall below the warning level, the unit will shut down. At this time, you need to turn off the power supply, and drain away the accumulated water before you can start up the unit normally.

5. Turn off the power supply, remove the water, and put the water cover assembly back to the original place.

CAUTION

The drainage plug at the bottom of the unit is used to discharge accumulated water from the drainage pan when the air conditioner malfunctions. When the air conditioner is operating normally, make sure the drainage plug is properly plugged to prevent water leakage.

5.3 Connection of Connecting Pipe

■ Length and level difference requirements for the pipe connections of IDU and ODU

Product Model	Maximum length (m)	Maximum level difference (m)	Maximum number of bends
53/71	20	15	15
90/105/120	30	20	15
140/160	50	25	15

Notes: If the height difference is greater than the allowed level difference, it is recommended to place ODU above the IDU.

CAUTION

Do not let air, dust, or other particles invade the pipeline system during installation of the connecting pipes.

Install the connecting pipes only when the indoor and outdoor units are secured.

Make sure to keep the connecting pipes dry during installation so that no water will enter the piping system.

Connecting copper pipes must be wrapped with insulation materials (thicker than 10mm, the thickness should be increased if the unit is installed in a closed humid place).

■ Steps of pipe connection

Measure the required length of the connecting pipe. Make the connecting pipe using the following method (see the column Pipe Connection for details).

1. Connect the IDUs before the ODU.

- Bend and arrange pipes carefully without damaging the pipes and their insulating layers.

  Before tightening the flare nut, apply refrigerant oil on the outer surface at the pipe flaring position and the conical surface of the connecting nut (the refrigerant oil used must be compatible with the refrigerant of this model), and screw it 3 to 4 turns with your hand to tighten it as shown in the Fig 3-9.
- When connecting or removing a pipe, use two wrenches at the same time.
- Do not put the weight of the connecting pipe on the connector of the IDU. Otherwise, the heavy weight will deform the connector and affect the cooling (heating) effect.

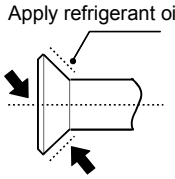


Fig 3-9

2. The check valve of the ODU should be completely closed (e.g. the ex-factory condition).

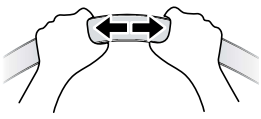
Unscrew nuts from the check valve in each connection, and connect the flared tube immediately (within 5 minutes). When the nut at the check valve is removed and placed for too long, dust and other sundries may enter the pipeline system and cause failures at a later time.

3. After the refrigerant pipe is connected to the IDU and ODU, discharge the air according to the column Air Discharge. After the air is discharged, tighten the service nut.

Precautions for flexible pipes:

- Do not bend a pipe more than 90 degrees (see the figure on the right).
- The bend should be as close as possible to the center of the tube and the bend radius should not be less than 3.5D (pipe diameter).
- Do not bend the flexible tube back and forth more than 3 times.

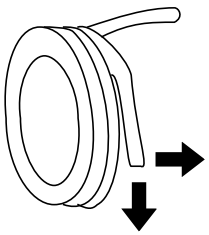
Bend the pipe with your thumbs



Bend a thin-walled connecting pipe (see the right figure):

- When bending a pipe, cut off the required recess in the insulation pipe at the bend and expose the pipe (wrap the bend with a binding tie after bending).
- Keep the elbow radius as much as possible to prevent flattening or crushing. Use a pipe bender to make tight elbows.

Method of unwinding the coil:
Straighten the pipe end



If a copper pipe purchased from the market is used, the heat insulation material of the copper pipe must be the same (thicker than 10mm, the thickness should be increased if the unit is installed in a closed humid place).

■ **Pipe Layout**

1. Bend the pipe or drill a hole in the wall as needed. The cross-sectional area of the pipe bending deformation must not exceed 1/3 of the original pipe section. A protective casing should be provided at the wall or floor hole. The weld joint must not be inside the casing. The drill hole on the external wall must be sealed and tightly wrapped with a binding tie to prevent impurities from entering the pipe. The pipe must be insulated with an insulation pipe of suitable size.

2. Insert the bundled piping and wiring from outside the room through the wall opening into the room. Be careful when laying out the pipes. Do not damage them.

■ **Vacuum the connecting pipe.**

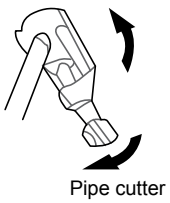
After completing the above steps, the check valve stem of the ODU should be fully opened to ensure that the refrigerant pipeline of the IDU and ODU is unobstructed.

Use a leak detector or soapy water to carefully check for leakage and ensure that there is no leakage. Cover the joint of the IDU with a sound/heat insulation sleeve (accessory) and wrap it tightly with a binding tie to prevent condensation and water leakage.

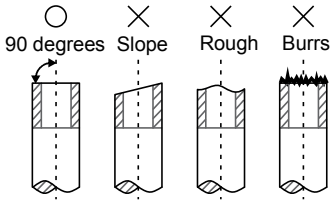
■ **Pipe Connection**

1. Flaring

Use a pipe cutter to cut off the pipe, and rotate the pipe cutter repeatedly to cut off the pipe.

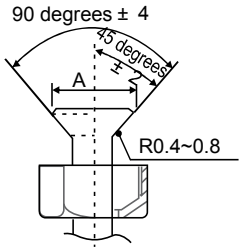


Pipe cutter



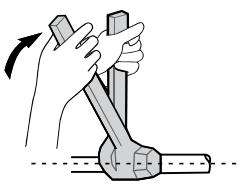
2. Insert the pipe into the connection nut flare.

Outer diameter (mm)	A (mm)	
	Max.	Min.
Φ6.4	8.7	8.3
Φ9.5	12.4	12.0
Φ12.7	15.8	15.4
Φ15.9	19.0	18.6
Φ19.1	23.3	22.9



■ **Fasten the nut**

Align the connection pipe, tighten the connecting nut with a hand, and tighten them with a wrench as shown in the right figure.



NOTE

Depending on the installation conditions, excessive torque will damage the pipe socket, while inadequate torque will cause air leakage. Refer to the following table to determine the tightening torque.

Pipe size	Tightening torque N.m
Φ6.4	14.2～17.2 N.m (144～176 kgf.cm)
Φ9.5	32.7～39.9 N.m (333～407 kgf.cm)
Φ12.7	49.5～60.3 N.m (504～616 kgf.cm)
Φ15.9	61.8～75.4 N.m (630～770 kgf.cm)
Φ19.1	97.2～118.6 N.m (990～1210 kgf.cm)

CAUTION

Do not let air, dust, or other particles invade the pipeline system during installation of the connecting pipes.
Install the connecting pipes only when the indoor and outdoor units are secured.
Make sure to keep the connecting pipes dry during installation so that no water will enter the piping system.
Connecting copper pipes must be wrapped with insulation materials (thicker than 10 mm, the thickness should be increased if the unit is installed in a closed humid place).

■ **Air tightness test**

After the refrigerant pipe is installed and before the refrigerant pipe is connected to an ODU, inject nitrogen at a certain pressure and at the same time from both gas and liquid sides (for the R410A refrigerant model, inject 40 kgf/cm2 nitrogen (at 3.9 MPa)) for a 24-hour air tightness test.

Connect the refrigerant pipe to the gas side and liquid side of the ODU. Use a vacuum pump to vacuumize the gas side and liquid side of the ODU.

CAUTION

The refrigerant sealed into the ODU must not be used for vacuumizing.

■ **Valve switch**

Turn on/off the valve core of the ODU by using a 5 mm hex wrench.

■ **Adding refrigerant**

- If the one-way pipe length is less than 5 m (including 5 m), the refrigerant charging amount is determined according to the nameplate.
- If the one-way pipe length exceeds 5 m, the supplementary refrigerant charging amount should be calculated according to the pipe diameter and length of the liquid-side pipes of the IDU and ODU. See the table below for details.
- Record the amount of refrigerant charged and retain the record for use during future maintenance.

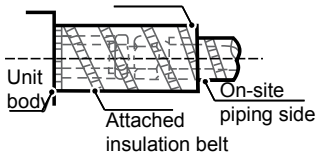
Model	Diameter of Liquid-side Pipe	Supplementary Refrigerant Amount	Remarks
53/71	Φ6.4	0.0115 kg (L-5)	L is the one-way pipe length
90/105/120 /140/160	Φ9.5	0.027 kg (L-5)	L is the one-way pipe length

■ **Leak detection**

Check leakage at the valve connector in the piping connection part by using soap bubbles.

■ **Heat insulation treatment**

Carry out heat insulation treatment for the pipes at the gas and liquid sides respectively. Pipes on the liquid and air sides have a low temperature during cooling. Take sufficient insulation measures to prevent condensation (see the figure on the right).



1. The pipes at the gas side must use heat insulation material that can withstand high temperature up to at least 120°C.
2. The attached insulation material for the part of the IDU where the pipe connects must undergo heat insulation treatment that leaves no gaps.

6 ELECTRIC CONNECTION

CAUTION

Use special power supply for the air conditioner. Design power supplies specific to the indoor unit and outdoor unit. The supply voltage must comply with the nominal voltage.

The external supply circuit of the air conditioner must have a ground wire, and the power supply ground wire of the indoor unit must be connected with the external ground wire firmly.

The wiring must be performed by professional technicians according to the circuit diagram labels.

Distribute the wires according to the relevant electric technical standards promulgated by the State, and set the Residual Current-operated Circuit Breaker (RCCB) properly.

The power wire and the signal wire shall be laid out neatly and properly, without mutual interference or contacting the connection pipe or valve.

No power cable is attached to this equipment. The user can select the power cable by reference to the stipulated power supply specifications. No joint of wires is allowed.

Upon completion of wire connection, double check it and then connect the power supply.

An all-pole disconnection device which has at least 3mm separation distance in all pole and a residual current device(RCD)with the rating of above 10mA shall be incorporated in the fixed wiring according to the national rule.

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

■ **Specifications of power supply**

Table 6-1

Model	Power	Switch capacity of the main power suppliy (A)	power cable includes grounded wire (mm2)	Indoor/Outdoor unit power cable includes grounded wire (mm2)
53	220-240V~ 50Hz	20	2X2.5+1X2.5	4X2.5
71	220-240V~ 50Hz	25	2X4.0+1X4.0	4X2.5

Model		Power	Switch capacity of the main power suppliy (A)	power cable includes grounded wire (mm2)	Connective wire (mm2)
90	indoor unit	220-240V ~ 50Hz	6	2X1.0+1X1.0	3X0.75
	outdoor unit		25	2X2.5+1X2.5	
105	indoor unit	220-240V ~ 50Hz	6	2X1.0+1X1.0	3X0.75
	outdoor unit		32	2X4.0+1X4.0	
120	indoor unit	220-240V ~ 50Hz	6	2X1.0+1X1.0	3X0.75
	outdoor unit		32	2X4.0+1X4.0	
140	indoor unit	220-240V ~ 50Hz	6	2X1.0+1X1.0	3X0.75
	outdoor unit		40	2X6.0+1X6.0	
160	indoor unit	220-240V ~ 50Hz	6	2X1.0+1X1.0	3X0.75
	outdoor unit		40	2X6.0+1X6.0	

■ **Safety precautions**

- The electric circuit must be installed RCCB and manual switch.
- Ground the air conditioner properly in case to affect its anti-interference function

NOTE

Please identify outdoor main unit and auxilary unit. Only main unit connects with signal wire of indoor unit. Users should adjust the dial on electric control board of outdoor unit as follows, otherwise incorrect adjustment may cause malfunction.

7 ELECTRIC WIRE DIAGRAM

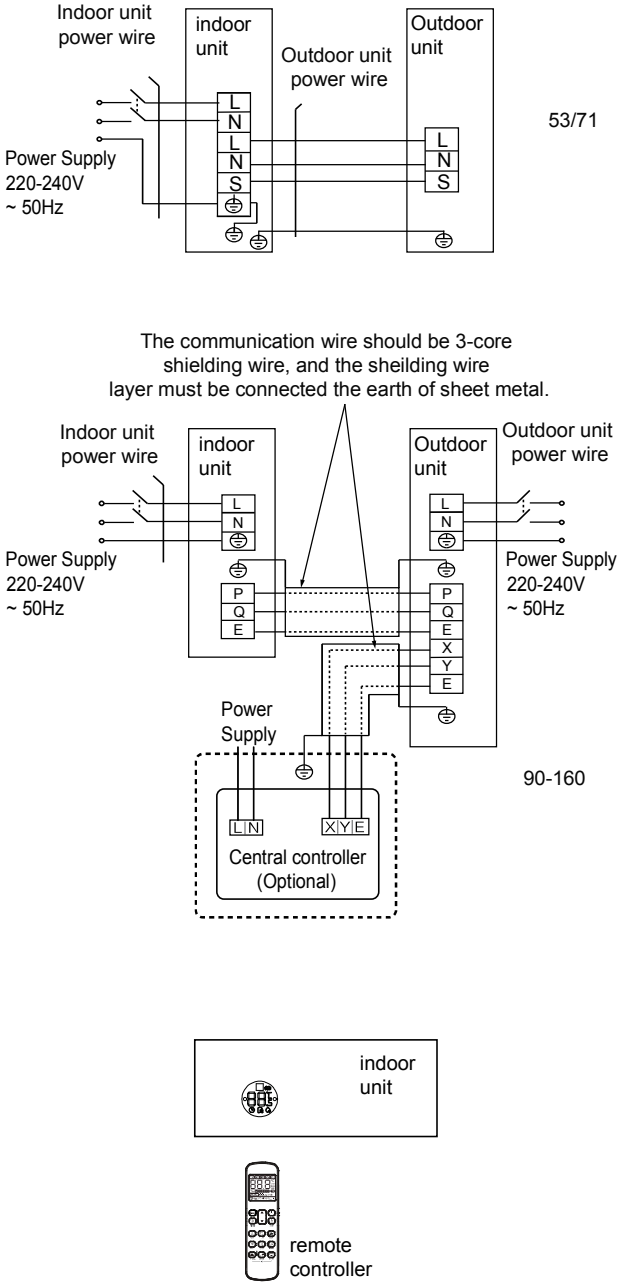


Fig 7.1

NOTE

Pay attention to the phase sequence of the power supply. If the phase sequence is reversed, the compressor will not start. Meanwhile, the fault indicator of the outdoor electric control board will light up. For details, see outdoor unit wring diagram on the cover plate of the electric control box .

After shifting the phase sequence, power on the unit until the fault indicator goes out and the compressor starts up normally.

For the model 32, 53 and =, it is neccessary to install a Time-delay relay on the electric wire to prevent the compressor with frequent start-stop, refer to Fig 7.1. It is recommended to set about 10~15 minute delay on the Time-delay relay.

8 TRIAL RUN

Please conduct in accordance with “Trial Run Tenor Nameplate” on the electric control box.

CAUTION

- Perform the trial run only after the outdoor unit has been powered on for over 12 hours.
- Check that all valves are opened before trial run.
- Check the electric safety before trial run.
- Do not perform compulsory operation in any way.(It is very dangerous if the protection device is not active)

- Perform trial run only after all installations are finished.
- Confirm the following issues before trial operation, and ✓ the box for the confirmed items.

- Check whether the indoor unit and the outdoor are installed properly. ☐
- Check whether the piping and wiring are correct. ☐
- Check whether the refrigerant pipeline system is inspected for leakage. ☐
- Check whether the drain is smooth. ☐
- Check whether the heat insulation is perfect. ☐
- Check whether the ground cables are connected correctly. ☐
- Check whether the pipe length and the refrigerant amount are recorded. ☐
- Check whether the supply voltage is equal to the rated voltage of the air conditioner. ☐
- Check whether any obstacles exist at the air inlet/outlet of the indoor or outdoor unit. ☐
- Open the gas valve and the liquid valve. ☐
- Connect the power supply to preheat the air conditioner. ☐

ENVIRONMENTAL
TECHNOLOGIES LLC.

17702 Mitchell North, #101
Irvine, CA. 92614 .USA
Tel: 714 795 2830
Fax: 714 966 1646
info@omegavrf.com
www.omegavrf.com

Showroom & Technology Center
11380 Interchange Circle North
Miramar,FL 33025 .USA
Tel: 305 901 1270
Fax: 954 212 8280
info@otecvrf.com
www.otecvrf.com

IECSJ3A-IM1D0622