

# FOR SERVICE PERSONNEL ONLY

# HITACHI

## HITACHI SPLIT-UNIT AIR CONDITIONER INSTALLATION MANUAL

**Indoor Unit**

**RAS-70YHA4  
RAS-80YHA4**



**Outdoor Unit**

**RAC-70YHA4  
RAC-80YHA4**

- Carefully read through the procedures of proper installation before starting installation work.
- The sales agent should inform customers regarding the correct operation of installation.

### Tools Needed For Installation Work

- (⊕ mark is tool exclusive use for R410A)
- ⊕ ⊖ Screwdriver
  - Measuring Tape
  - Knife
  - Saw
  - Pipe Cutter
  - Hexagonal Wrench Key (I/O 4mm)
  - Power Drill (φ 65mm ~ φ 80mm)
  - Vacuum Pump
  - Pliers or Wrench
  - Torque Wrench
  - Vacuum Pump Adaptor
  - Flare Tool
  - Gas Leakage Detector
  - Manifold Valve
  - Charge Hose

### SAFETY PRECAUTION

- Read the safety precautions carefully before operating the unit.
  - The contents of this section are vital to ensure safety. Please pay special attention to the following sign.
    - ⚠ **WARNING** ..... Incorrect methods of installation may cause death or serious injury.
    - ⚠ **CAUTION** ..... Improper installation may result in serious consequence.
- Be sure that the unit operates in proper condition after installation. Explain to customer the proper way of operating the unit as described in the user's guide.

### WARNING

- Please request your sales agent or qualified technician to install your unit. Water leakage, short circuit or fire may occur if you do the installation work yourself.
- Please observe the instructions stated in the installation manual during the process of installation. Improper installation may cause water leakage, electric shock and fire.
- Make sure that the units are mounted at locations which are able to provide full support to the weight of the units. If not, the units may collapse and impose danger.
- Observe the rules and regulations of the electrical installation and the methods described in the installation manual when dealing with the electrical work. Use power cables approved by the authorities of your country.
- Be sure to use the specified wire for connecting the indoor and outdoor units. Please ensure that the connections are tight after the conductors of the wire are inserted into the terminals. Improper insertion and loose contact may cause over-heating and fire.
- Please use the specified components for installation work. Otherwise, the units may collapse or water leakage, electric shock and fire may occur.
- Be sure to use the specified piping set for R410A. Otherwise, this may result in broken copper pipes or faults.
- When installing or removing an air conditioner, only specified refrigerant (R410A) shall be allowed, do not allow air or moisture to remain in the refrigeration cycle. Otherwise, pressure in the refrigeration cycle may become abnormally high that may cause rupture to the refrigeration cycle.
- Be sure to ventilate fully if a refrigerant gas leak while at work. If the refrigerant gas comes into contact with fire, a poisonous gas may occur.
- After completion of installation work, check to make sure that there is no refrigeration gas leakage. If the refrigerant gas leaks into the room, coming into contact with fire in the fan-driven heater, space heater, etc., a poisonous gas may occur.
- Unauthorized modifications to the air conditioner may be dangerous. If a breakdown occurs please call a qualified air conditioner technician or electrician. Improper repairs may result in water leakage, electric shock and fire, etc.

### CAUTION

- A circuit breaker must be installed. Without a circuit breaker or fuse the danger of electric shock exists. The external switch shall be incorporated to completely disconnect from power supply. It should disconnect all poles, and a contact separation of at least 3mm must be present.
- Do not install the unit near a location where there is flammable gas. The outdoor unit may catch fire if flammable gas leaks around it.
- Do not install the indoor unit in a machine shop or kitchen where vapor from oil 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 the worst case, break the plastic parts of the indoor unit.
- Please ensure smooth flow of water when installing the drain hose.
- Piping shall be suitable supported with a maximum spacing of 1m between the supports.

### THE CHOICE OF MOUNTING SITE (Please note the following matters and obtain permission from customer before installation).

#### WARNING

- The unit should be mounted at stable, non-vibratory location which can provide full support to the unit.

#### CAUTION

- No nearby heat source and no obstruction near the air outlet is allowed.
- The clearance distances from top, right and left are specified in figure below.
- The location must be convenient for water drainage and pipe connection with the outdoor unit.
- To avoid interference from noise please place the unit and its remote controller at least 1m from the radio, television and inverter type fluorescent lamp.
- To avoid any error in signal transmission from the remote controller, please put the controller far away from high-frequency machines and high-power wireless systems.
- The installation height of indoor unit must be 2.3m or more.

#### WARNING

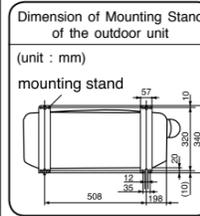
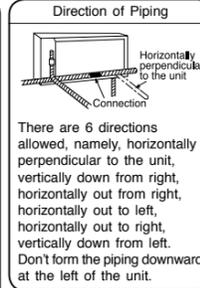
- The outdoor unit must be mounted at a location which can support heavy weight. Otherwise, noise and vibration will increase.

#### CAUTION

- Selecting the installation location: Suitable location that will reduce the impact from rain and direct sun that may affect the unit performance. Besides that, ventilation must be good and clear of obstruction.
- The air blown out of the unit should not point directly to animals or plants.
- The clearances of the unit from top, left, right, front and back are specified in figure below. At least 3 of the above sides must be open air.
- Be sure that the hot air blown out of the unit and noise do not disturb the neighbourhood.
- Do not install at a location where there is flammable gas, steam, oil and smoke.
- The location must be convenient for water drainage.
- Place the outdoor unit and its connection wire at least 1m away from the antenna or signal line of television, radio or telephone. This is to avoid noise interference.
- Do not install outdoor unit facing strong wind direction. It may damage the fan motor.
- Do not install the outdoor unit in a place where small animals may build their nests. If small animal goes inside the unit and touches the electrical parts, failure of the unit, smoke or fire may be caused. Request your customer to keep the surrounding of the unit is clean.

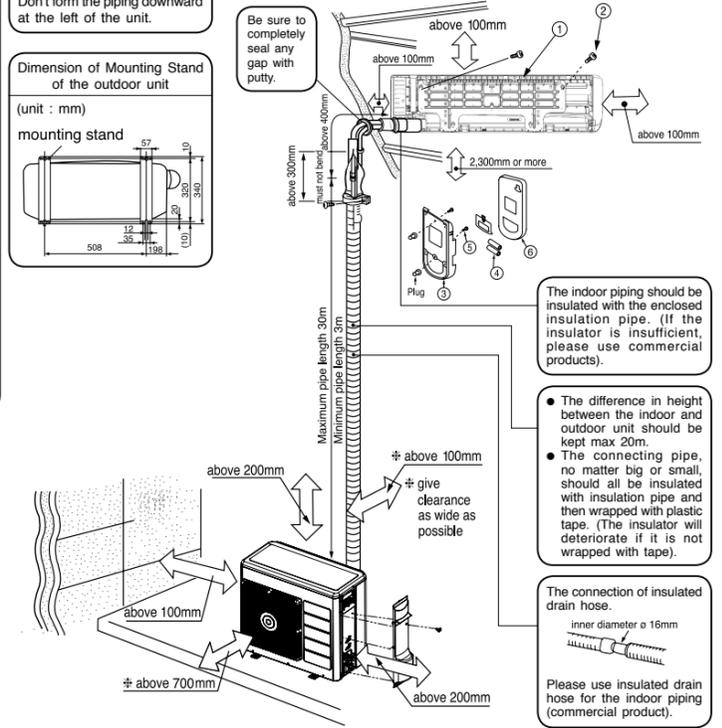
### Names of Indoor Components

No.	Component's Name	Qty
①	Mounting Plate	1
②	Screw for Mounting Plate (4.1x32)	6
③	Holder for Remote Controller	1
④	AAA Size Battery	2
⑤	Screw for holder of Remote Controller (3.1x16)	2
⑥	Remote Controller	1
⑦	Purifying Filter	2



### Names of Outdoor Components

No.	Item	Qty
⑧	Bush	3
⑨	Drain Pipe	1
⑩	Bush	1



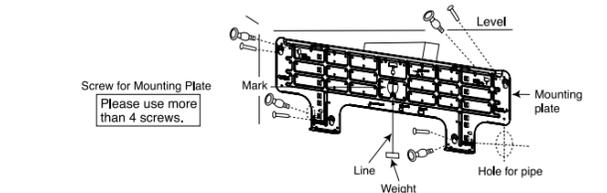
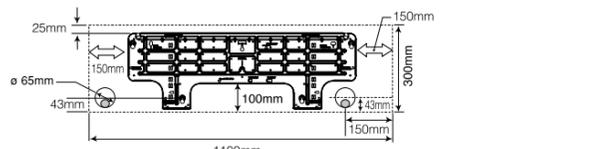
### 1 Installation of Hanger, Wall Penetration and Installation of Protection Pipe

#### CAUTION

- The draining of the water container inside the indoor unit can be done from the left. Therefore the mounting plate must be fixed horizontally or slightly tilted towards the side of drain hose. Otherwise, condensed water may overflow the water container.

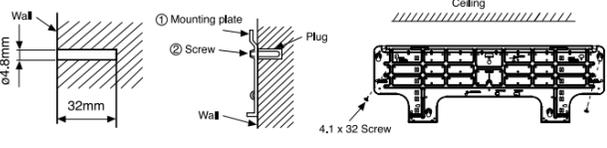
#### Direct Mounting On The Wall

- Please use hidden beams in the wall to hold the mounting plate.

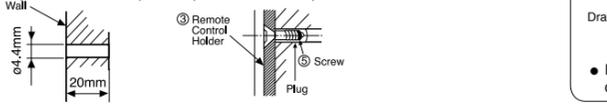


#### Procedures of Installation and Precautions

- Procedures to fix the mounting plate.
  1. Drill holes on wall.
  2. Push plug into the holes. (As shown below)
  3. Fix the mounting plate on wall with 4.1 x 32 screw (As shown in figure below)



- Procedures to fix the holder of remote control.
  1. Drill holes on wall. (As shown below)
  2. Push plug into the holes. (As shown below)
  3. Remote Control Holder (As shown below)



#### Wall Penetration and Installation of Protection Pipe

- Drill a φ 65mm hole on wall which is slightly tilted towards the outdoor side. Drill the wall at a small angle.
- Cut the protection pipe according to the wall thickness.
- Empty gap in the sleeve of protection pipe should be completely sealed with putty to avoid dripping of rain water into the room.

**WARNING**  
Be sure that the wire is not in contact with any metal in the wall. Please use the protection pipe as wire passing through the hollow part of the wall so as to prevent the possibility of damaged by mouse. Unless it seals completely, any air with high humidity flows from outdoor and dew may drop.

### 2 Installation of the Indoor Unit

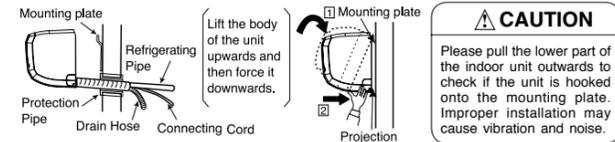
#### VERTICALLY DOWNWARD PIPING

##### Preparation

- Connect connecting cord.
- Pull out the pipe, connecting cord and drain hose.

##### Installation

- The upper part of the indoor unit is hanged on the mounting plate.
- The projection at the lower part of the indoor unit is hooked onto the mounting plate.



**CAUTION**  
Please pull the lower part of the indoor unit outwards to check if the unit is hooked onto the mounting plate. Improper installation may cause vibration and noise.

#### HOW TO REMOVE INDOOR UNIT

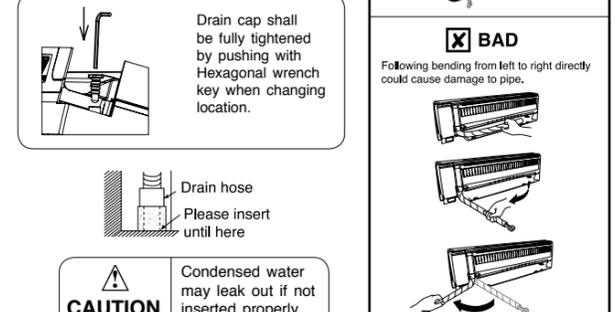
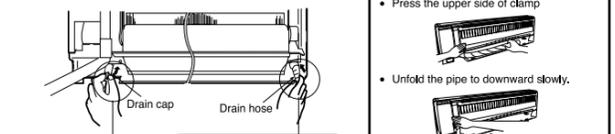
- Push up the (PUSH) sections at the bottom of the indoor unit and pull the bottom plate towards you. Then the claws are released from the stationary plate. (The (PUSH) sections are indicated by 2 arrows in the right figure)

#### HORIZONTAL PIPING

##### Preparation

- Change the location of drain hose and drain cap during horizontal piping as shown in figure below. Be sure to plug in the drain hose until the insulating material folds upon itself.

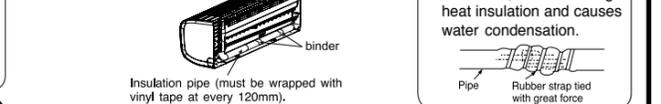
- Please use pliers to pull out the drain cap. (This is an easier way to remove the drain cap.)



**CAUTION**  
Condensed water may leak out if not inserted properly.

### INSTALLATION OF REFRIGERATING PIPES AFTER CONNECTION

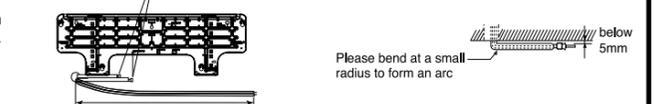
- The refrigerating pipes should be adjusted to fit into the hole on the wall and then ready for further connection.
- The terminals of 2 connected pipes must be covered with insulator used for terminal connection. Then the pipes are wrapped with insulation pipe.
- Connect the connecting cord after removing electrical cover. (Refer to "CONNECTION OF POWER CORD")
- After adjustment, fit the connecting cord and pipes into the space available under the indoor unit.
- When connection is at left side, refrigerating pipe and cabinet shall be tied together. Failing to do so may cause the unit bottom side become warping. Excess binder shall be cut to prevent abnormal sound and water dripping.



### THE CONNECTION OF REFRIGERATING PIPE DURING THE INSTALLATION OF INDOOR UNIT

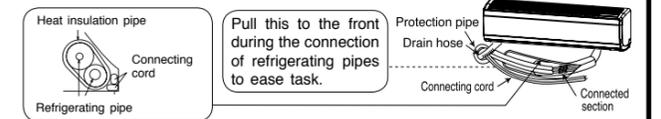
#### Preparation To Install Refrigerating Pipes

- The refrigerating pipes and connecting cord arrangement are attached.
- The end of the refrigerating pipes are at locations marked with "▽" symbol.



#### Installation

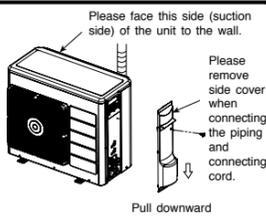
- Hang the Indoor unit onto the mounting plate. Use the temporary stand at the back of the Indoor unit to push its lower part 15cm forwards.
- Place the drain hose through the hole on the wall.
- Wrap the refrigerating pipes with insulation pipe after connecting refrigerating pipe.
- Connect the connecting cord after removing electrical cover. (Refer to "Connection of Power Cord")
- After adjustment, the connecting cord and refrigerating pipes are placed into the space available under the Indoor unit.
- The projection of Indoor unit must hook to the mounting plate.



### 3 Installation of Drain Hose

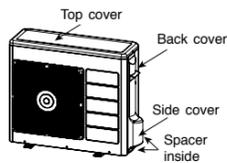
- Bending upwards
  - Condensed water pond
  - Ditch
  - Condensed water pond
- CAUTION**  
Be sure that the drain hose is not loosely connected or bend.
- CAUTION**  
You are free to choose the side (left or right) for the installation of drain hose. Please ensure the smooth flow of condensed water of the Indoor unit during installation. (Carelessness may result in water leakage.)

- Please mount the outdoor unit on stable ground to prevent vibration and increase of noise level.
- Decide the location for piping after sorting out the different types of pipe available.
- Open the side plate by unscrewing the screws as shown beside.



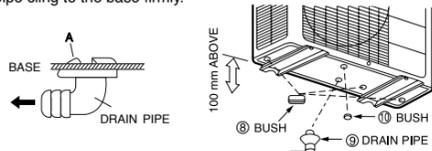
**CAUTION**

- Please make sure to remove all spacers inside the unit.
- Open the Top, Back and Side cover of the unit.
  - Pull out the spacers inside. (Spacers are only for transportation purpose). If not remove, vibration and noise will occur.



**CONDENSED WATER DISPOSAL OF OUTDOOR UNIT**

- There are holes on the base of Outdoor unit for condensed water to exhaust.
- In order to flow condensed water to the drain, the unit is installed on a stand or a block so that the unit is 100mm above the ground as shown figure. Join the drain pipe to one hole.
- At first insert one portion of the hook to the base (Portion A), then pull the drain pipe in the direction shown by the arrow while inserting the hook into the base. After installation, check whether the drain pipe cling to the base firmly.



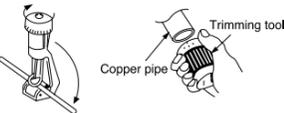
**When Using and Installing In Cold Areas**

When the air conditioner is used in low temperature and in snowy conditions, water from the heat exchanger may freeze on the base surface to cause poor drainage. When using the air conditioner in such areas, do not install the bushings. Keep a minimum of 250mm between the drain hole and the ground. When using the drain pipe, consult your sales agent.

※ For more details, refer to the installation Manual for Cold Areas.

**1 Preparation of Pipe**

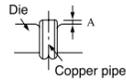
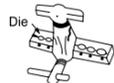
- Use a pipe cutter to cut the copper pipe.



**CAUTION**

- Jagged edge will cause leakage.
- Point the side to be trimmed downwards during trimming to prevent copper chips from entering the pipe.

- Before flaring, please put on the flare nut.



- Recommend to use R410A flaring tool

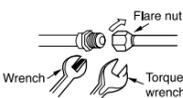
Outer Diameter (mm)	Thickness (mm)	A (mm)		
		Flare tool for R410A		Conventional flare tool
		Clutch type	Clutch type	Wing nut type
6.35 (1/4)	0.8	0.0 ~ 0.5	1.0 ~ 1.5	1.5 ~ 2.0
9.52 (3/8)	0.8	0.0 ~ 0.5	1.0 ~ 1.5	1.5 ~ 2.0
12.70 (1/2)	0.8	0.0 ~ 0.5	1.0 ~ 1.5	1.5 ~ 2.5
15.88 (5/8)	1.0	0.0 ~ 0.5	1.0 ~ 1.5	1.5 ~ 2.5

**2 Pipe Connection**

**CAUTION**

In case of removing flare nut of an Indoor unit, first remove a nut of small diameter side, or a seal cap of big diameter side will fly out. Prevent water from entering into the piping when working.

	Outer diameter of pipe	Torque N.m (kgf • cm)
Small dia. side	6.35 (1/4")	13.7 ~ 18.6 (140 ~ 190)
	9.52 (3/8")	34.3 ~ 44.1 (350 ~ 450)
Large dia. side	12.7 (1/2")	44.1 ~ 53.9 (450 ~ 550)
	15.88 (5/8")	49 ~ 58.8 (500 ~ 600)
Valve head cap	Small dia. side	6.35 (1/4") 19.6 ~ 24.5 (200 ~ 250)
	Large dia. side	9.52 (3/8") 29.4 ~ 34.3 (300 ~ 350)
	12.7 (1/2") 29.0 ~ 31.0 (296 ~ 316)	
Valve core cap		12.3 ~ 15.7 (125 ~ 160)

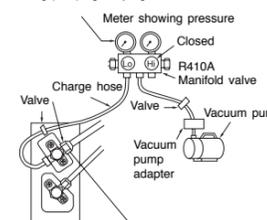


**3 Removal Of Air From The Pipe And Gas Leakage Inspection**

**Procedures of using Vacuum Pump for Air Removal**

- As shown in right figure, remove the cap of valve core. Then, connect the charge hose. Remove the cap of valve head. Connect the vacuum pump adapter to the vacuum pump and connect the charge hose to the adapter.

When the meter reaches - 101KPa (-76cmHg) during pumping, fully tighten the shuttle.

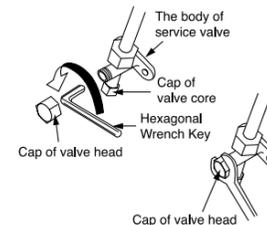


- Fully tighten the "Hi" knob of the manifold valve and completely unscrew the "Lo" knob. Run the vacuum pump for about 10~15 minutes, then completely tighten the "Lo" knob and switch off the vacuum pump.

When pumping starts, slightly loosen the flare nut to check of air sucked in. Then tighten the flare nut.

- Remove the charge hose and tighten the cap of valve core. Check the cap's periphery if there is any gas leakage.

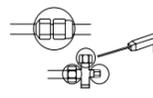
- Completely unscrew the spindle of the service valve in anti-clockwise direction to allow the flow of refrigerant (using Hexagonal Wrench key).



- Re-cap the service valve and tighten using wrench. Check the cap's periphery if there is any gas leakage. The task is then completed.

**Gas Leakage Inspection**

Please use gas leakage detector to check if leakage occurs at the connection of Flare nut as shown on the right.



If gas leakage occurs, further tighten the connection to stop leakage. (Use the detector provided for R410A)

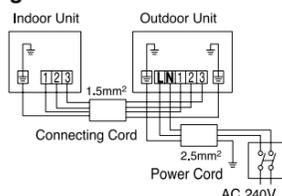
**WARNING**

**BURST HAZARD**  
Do not allow air, etc. to get into refrigerant cycle (piping)  
**RISK OF EXPLOSION**  
Compressor must be stopped before removing refrigerant pipes.  
All service valve must be fully closed after pumping down operation.

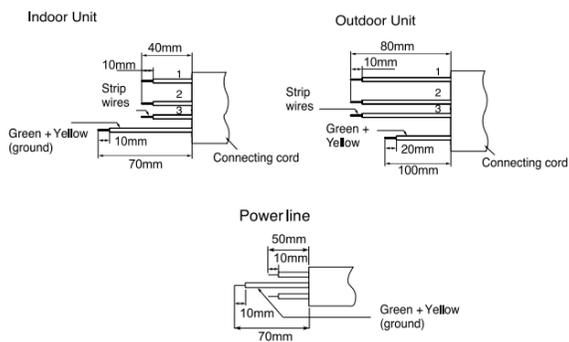
**WARNING**

- THIS APPLIANCE MUST BE EARTHED.

**Procedures of Wiring**

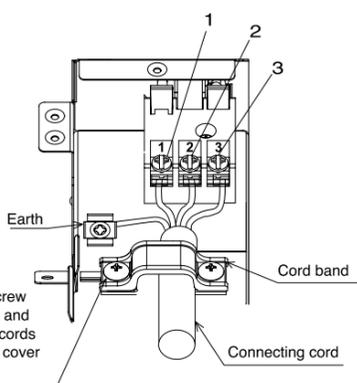


**Detail of Cutting the Connecting Cord**



**Wiring of The Indoor Unit**

- For wire connection of the Indoor unit, you need to remove the front cover, the low cover under the body of the unit and terminal cover.
- Remove the cover from the terminal base and screw the cable.



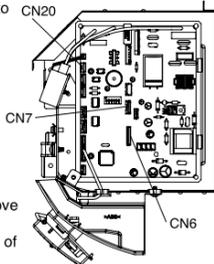
After remove the screw and terminal cover, and put the connecting cords and fix the terminal cover with screw.

**How to connect the optional parts**

(RAC Adapter, Dry contact, Wired Remote Controller)

- For cable connection to control P.W.B., you need to remove front cover and electrical box cover.

- Each connecting location is as below.
- ① Drycontact: CN6
  - ② H-LINK: CN7
  - ③ Wired Remote Controller: CN20



- Please check and confirm manuals attached to each optional parts for more connection details.
- You can refer to this installation manual how to remove and re-attach the front cover.
- Please be careful not to damage lead wires by edge of plate when connecting the optional parts.

**Wiring of the Outdoor Unit**

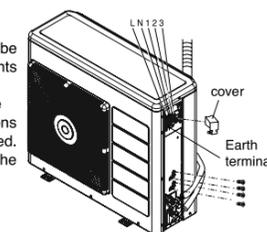
- Please remove the side cover for wire connection.

**WARNING**

- If you cannot attach the side plate due to the connection cord, please press the connecting cord in the direction to the front panel to fix it.
- Be sure that the hooks of the side cover fixed in certainly. Otherwise water leakage may occur and this causes short circuit or faults.
- The connecting cord should not touch to service valve and pipes. (it becomes high temperature in heating operation.)

**Checking for the electric source and the voltage range**

- Before installation, the power source must be checked and necessary wiring work must be completed. To make the wiring capacity proper, use the wire gauge list below for the wiring from house distribution fuse box to the outdoor unit in consideration of the locked rotor current.
- Investigate the power supply capacity and other electrical conditions at the installing location. Depending on the model of room air conditioner to be installed, request the customer to make arrangements for the necessary electrical work etc. The electrical work includes the wiring work up the outdoor unit. In localities where electrical conditions are poor, use of a voltage regulation is recommended.
- Install outdoor for the room air conditioner within the reaching range of the line cord.



For (Power cord - L, N, Earth)

Wire cross-section
2.5 mm <sup>2</sup>

For (Connecting cord - 1, 2, 3, Earth)

Wire length	Wire cross-section
up to 30m	1.5 mm <sup>2</sup>

**IMPORTANT**

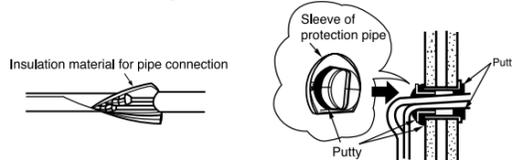
Circuit Breaker 20A

**CAUTION**

Outdoor supply cords shall not be lighter than polychloroprene sheathed flexible cord with code designation 60245 IEC 57

**1 Insulation And Maintenance Of Pipe Connection**

- The connected terminals should be completed sealed with heat insulator and then tied up with rubber strap.
- Please tie the pipe and power line together with vinyl tape as shown in the figure showing the installation of indoor and outdoor units. Then fix their position with holders.
- To enhance the heat insulation and to prevent water condensation, please cover the outdoor part of the drain hose and pipe with insulation pipe.
- Completely seal any gap with putty.



**3 Power Source And Operation Test**

**Power Source**

**CAUTION**

- Please use a new socket. Accident may occur due to the use of old socket because of poor contact.
- Please plug in and then remove the plug for 2 - 3 times. This is to ensure that the plug is completely plugged into the socket.
- Keep additional length for the power cord and do not render the plug under external force as this may cause poor contact.
- Do not fix the power cord with U-shape nail.

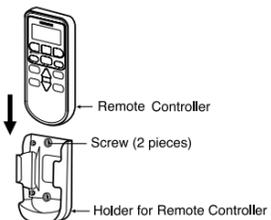
**Operation Test**

- Please ensure that the air conditioner is in normal operating condition during the operation test.
- Explain to your customer the proper operation procedures as described in the user's manual.

**2 Installation Of Remote Controller**

- The remote controller can be placed in its holder which is fixed on wall or beam.
- To operate the remote controller at its holder, please ensure that the unit can receive signal transmitted from the controller at the place where the holder is to be fixed. The unit will beep when signal is received from the remote controller. The signal transmission is weakened by the fluorescent light. Therefore, during the installation of the remote control holder, please switch on the light, even during day time, to determine the mounting location of the holder.

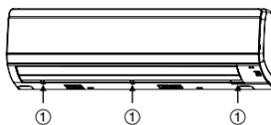
The controller should be insert from top into bottom side of the holder as shown in figure below.



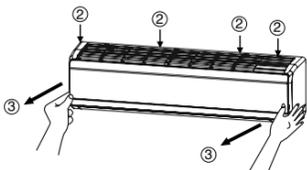
- How to check pipe bending.
- Compare bended pipe with the picture below.
- If bended pipe is not good enough, cut bended area and bend it again.

- |  |   |
|--|---|
| Ⓐ all areas are smooth, no notching area | Ⓘ there are scratches around bending area |
| Ⓑ no scratch or mark inside              | Ⓚ crack                                   |
| Ⓒ all have the same length               | Ⓛ different length                        |
| Ⓓ phase of bending is too long           | Ⓜ sample of bending pipe cannot be used   |
| Ⓝ slanting                               |   |

**How to remove the front cover**

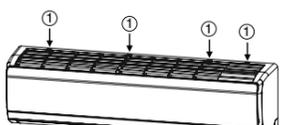


- Remove the caps and uncrew at lower portion of the front cover.

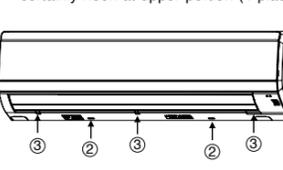


- Firmly press 4 hooks at top of front cover by tools until the hook release from slot
- Pull the front cover to front side.

**How to attach the front cover**



- To assemble front cover back to the unit, certainly hook at upper portion (4 places).



- Insert the bottom of front cover into the slot at "PUSH" marking and ensure bottom area is align from left to right.
- Tighten the screw and cover by caps (3 places)

