

# FOR SERVICE PERSONNEL ONLY

HITACHI

## HITACHI SPLIT-UNIT AIR CONDITIONER INSTALLATION MANUAL

Indoor Unit

Outdoor Unit

RAS-S10CET

RAC-S10CET

### 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, may cause water leakage or unit collapse, electric shock and fire may occur.
- When installing or removing an air conditioner, only specified refrigerant (R-22) 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 leading to possibility of unit rupture.
- Be sure to ventilate fully if a refrigerant gas leak while operating. If the refrigerant gas comes into contact with fire, 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., poisonous gas may occur.
- Unauthorized modifications to the air conditioner may be dangerous. If breakdown occurs please call qualified air conditioner technician or electrician. Improper repairs may result in water leakage, electric shock, fire, etc.

### CAUTION

- A circuit breaker or fuse (10A) must be installed. Without a circuit breaker or fuse the danger of electric shock exists. A main switch with a contact gap of more than 3mm has to be installed in the power supply line to the outdoor unit.
- Do not install the unit near 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 suitably 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

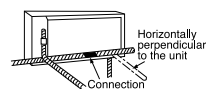
- No nearby heat source and no obstruction near the air outlet is allowed.
- The clearance distances from top, right and left are specified in figure below.
- The location must be convenient for water drainage and pipe connection with the Outdoor unit.
- To avoid interference from noise please place 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.

INDOOR UNIT

### Names of Indoor Components

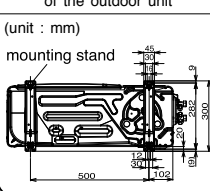
No.	Component's Name	Qty
①	Mounting Plate	1
②	Screw for Mounting Plate (4.1x32)	6
③	Holder for Remote Controller	1
④	AAA Size Battery	2
⑤	Screw for holder of Remote Controller (3.1x16)	2
⑥	Remote Controller	1
⑦	Purifying Filter	2

### Direction of Piping



There are 6 directions allowed, namely, horizontally perpendicular to the unit, vertically down from right, horizontally out from right, horizontally out to left, horizontally out to right, vertically down from left.

### Dimension of Mounting Stand of the outdoor unit



OUTDOOR UNIT

### WARNING

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

### CAUTION

- Do not expose the unit under direct sunshine or rain. Besides, 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 and front are specified in figure below. At least three 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 occur. Request your customer to keep the surrounding of the unit is clean.

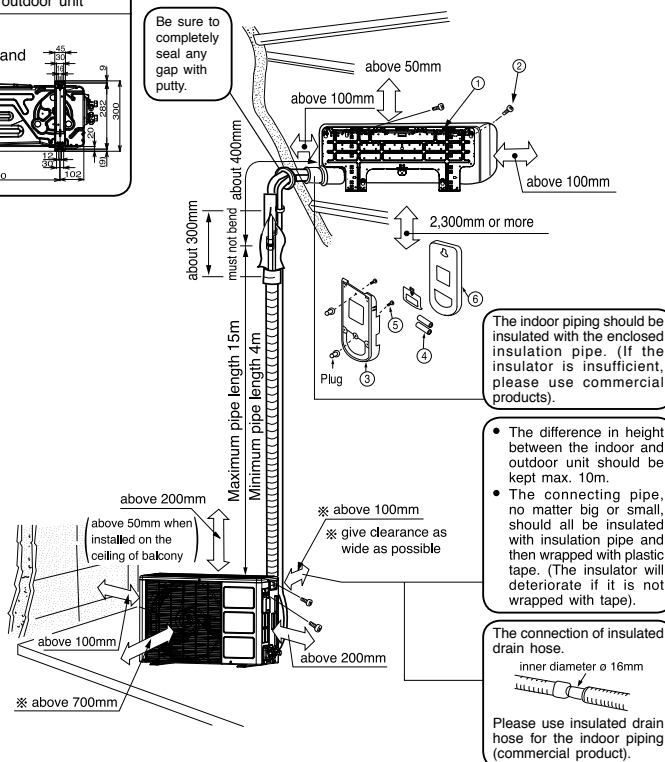
### Figure showing the Installation of Indoor and Outdoor Unit.

### CAUTION

- The installation height of indoor unit must be 2.3m or more.

### CAUTION

Installation of pipe length less than minimum pipe length requirement (4meters) may generate an abnormal sound.



- The difference in height between the indoor and outdoor unit should be kept max. 10m.
- The connecting pipe, no matter big or small, should all be insulated with insulation pipe and then wrapped with plastic tape. (The insulator will deteriorate if it is not wrapped with tape).

The connection of insulated drain hose.  
inner diameter  $\phi$  16mm  
Please use insulated drain hose for the indoor piping (commercial product).

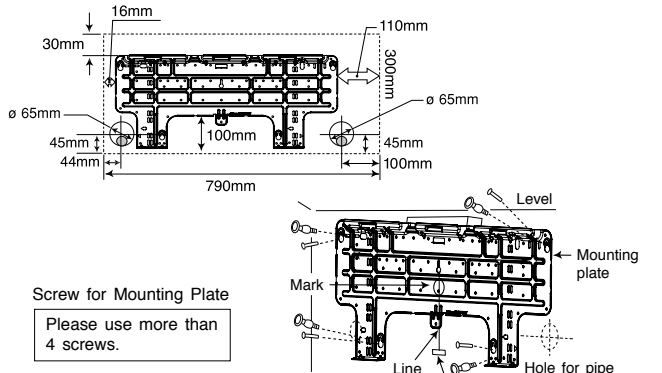
## 1 Installation of Hanger, Wall Penetration and Installation of Protection Pipe

### 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. Condensed water may overflow the water container.

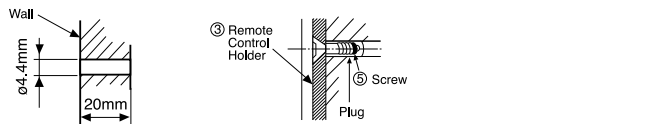
### Direct Mounting On The Wall

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



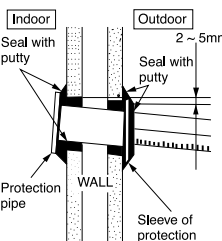
### Procedures of Installation and Precautions

- Procedures to fix the mounting plate.
  - Drill holes on wall. (As shown below)
  - Push plug into the holes. (As shown below)
  - 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.
  - Drill holes on wall. (As shown below)
  - Push plug into the holes. (As shown below)
  - Remote Control Holder (As shown below)



### Wall Penetration and Installation of Protection Pipe

- Drill a  $\phi$  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, Air with high humidity flows from outdoor may cause dew drop.

## 2 Installation of the Indoor Unit

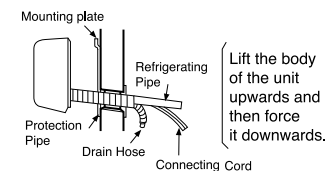
### VERTICALLY DOWNWARD PIPING

#### 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.



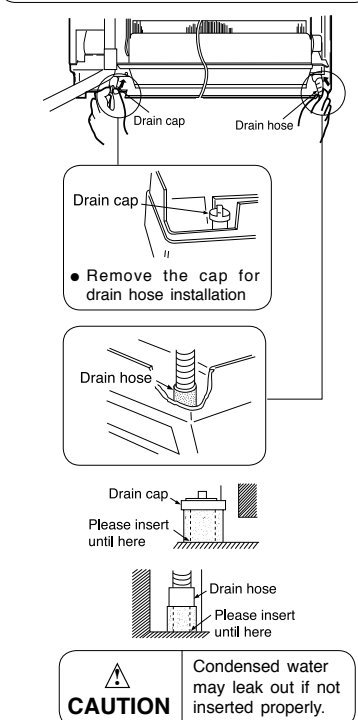
### HORIZONTAL PIPING

#### Preparation

#### Change of Drain Hose and Installation Procedures.

- Exchange 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

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.

### CAUTION

For horizontally out to right piping

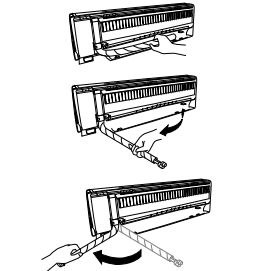
#### GOOD

For right piping, follow the instruction as below:

- Press the upper side of clamp
- Unfold the pipe to downward slowly.
- Bend the pipe to the right side of chassis.

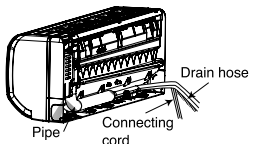
#### BAD

Following bending from left to right directly could cause damage to pipe.



## 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.



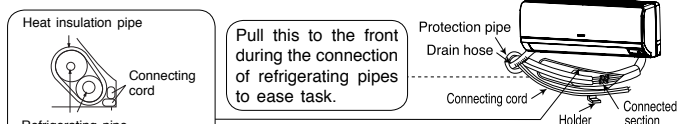
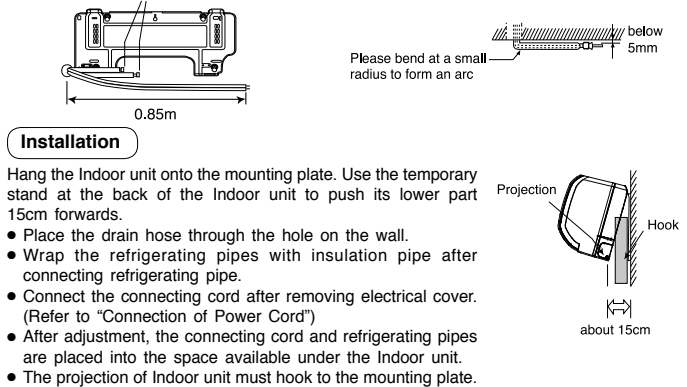
### CAUTION

- The rubber strap used for fixing the insulator should not be tied with great force. Otherwise, this will damage heat insulation and causes water condensation.

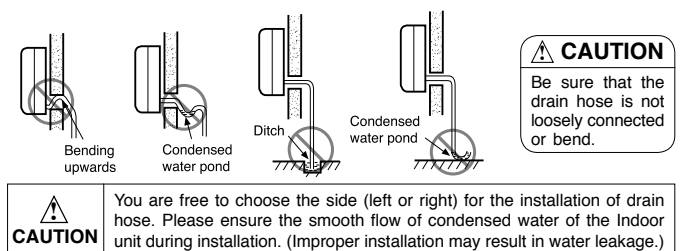
## THE CONNECTION OF REFRIGERATING PIPE DURING THE INSTALLATION OF INDOOR UNIT

### 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.



## 3 Installation of Drain Hose

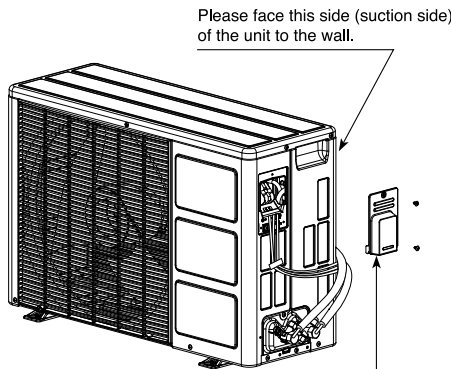


### CAUTION

- Be sure that the drain hose is not loosely connected or bend.

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. (Improper installation 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 below.

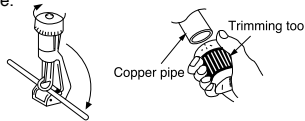


Please remove side cover when connecting the connecting cord.

## INSTALLATION OF REFRIGERATING PIPES AND AIR REMOVAL

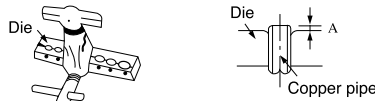
### 1 Preparation of Pipe

- 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.

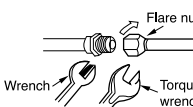


Outer Diameter (ø)	A (mm)	
	Imperial flaring tool	Rigid flaring tool
6.35 (1/4")	0.8 ~ 1.5	0 ~ 0.5
9.52 (3/8")	1.0 ~ 1.8	0 ~ 0.5

### 2 Pipe Connection

#### CAUTION

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



		Outer dia. of pipe	Torque N·m (kgf·cm)
Small dia. side	Large dia. side	6.35 (1/4")	13.7 ~ 18.6 (140 ~ 190)
	Valve head cap	9.52 (3/8")	34.3 ~ 44.1 (350 ~ 450)
	Valve core cap	12.7 (1/2")	44.1 ~ 53.9 (450 ~ 550)
Large dia. side	Small dia. side	6.35 (1/4")	19.6 ~ 24.5 (200 ~ 250)
	Valve head cap	9.52 (3/8")	19.6 ~ 24.5 (200 ~ 250)
	Valve core cap	12.7 (1/2")	29.4 ~ 34.3 (300 ~ 350)

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

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

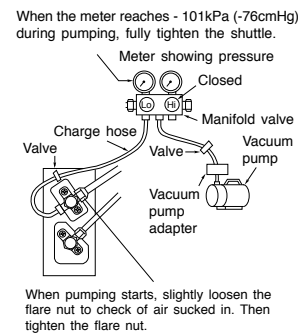
As shown in right figure, remove the cap of valve core. Then, connect the charge hose. Remove the cap of valve head. Connect the vacuum pump adapter to the vacuum pump and connect the charge hose to the adapter.

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.

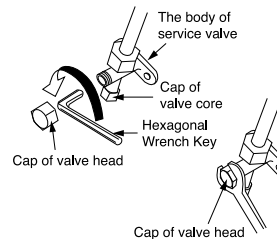
Remove the charge hose and tighten the cap of valve core. Check the cap's periphery if there is any gas leakage.

Completely unscrew the spindle of the service valve (at 2 places) 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.



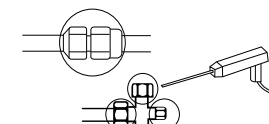
When pumping starts, slightly loosen the flare nut to check if air sucked in. Then tighten the flare nut.



#### Gas Leakage Inspection

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

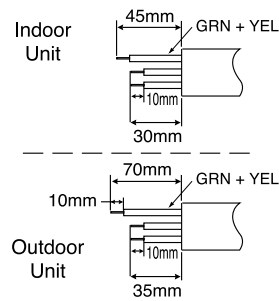
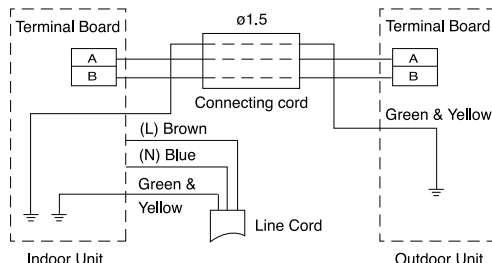
If gas leakage occurs, further tighten the connection to stop leakage.



#### WARNING • THIS APPLIANCE MUST BE EARTHED.

Power supply shall be connected at the rated voltage, otherwise the unit will be broken or could not reach the specified capacity.

#### Procedures of Wiring



Detail of cutting the connecting cord

When removing the connecting wires for the Indoor unit, please remove the low cover panel in front of the unit.

#### WARNING

- The naked part of the wire core should be 10 mm and fixed to the terminal tightly. Then try to pull the individual wire to check if the contact is tight. Improper insertion may burn the terminal.
- Be sure to use only power cables approved from the authorities in your country. For example in Germany: Cable type: NYM 3x1.5mm<sup>2</sup>, (fuse = 16A time delay)
- Please refer to the installation manual for wire connection to the terminals of the units. The cabling must meet the standards of electrical installation.
- There is a AC voltage of 220~230V between the L and N terminals. Therefore, before servicing, be sure to remove the plug from the AC outlet or switch off the main switch.
- Do not make any connection in the middle of the connecting cable. It may cause the wire over heated, emit smoke and fire.

#### Wiring Of The Indoor Unit

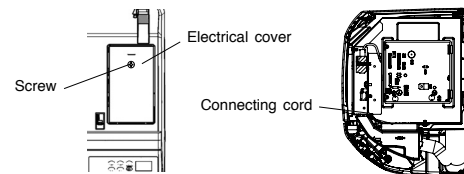
- For wire connection of the Indoor unit, you need to open or remove front panel and electrical cover.

Method to remove front panel

- Please refer to Instruction Manual – "Removing the Front Panel" under "Cleaning of Front Panel".

#### Method to remove electrical cover

- Remove the screw and electrical cover.
- Insert the connecting cord (A, B) from the back of unit.
- Fixed the wire to terminal wires firmly as shown in figure at right side.



#### Wiring of The Outdoor Unit

- Please remove the side plate for wire connection.

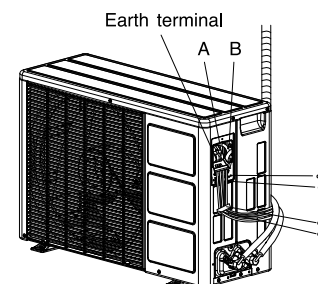
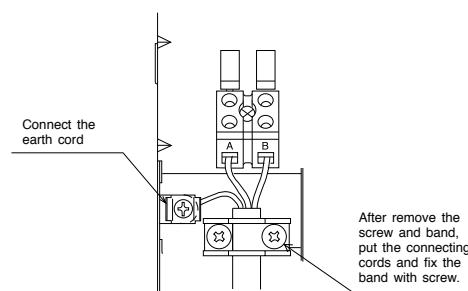
#### WARNING

- If you cannot attach the side plate due to the connecting cord, please press the connecting cord in direction to the front panel to fix it.
- Be sure that the hooks of the side plate is fixed in certainly. Otherwise water leakage may occur and this causes short circuit or faults.

#### CAUTION

Note:

- Outdoor supply cords shall not be lighter than polychloroprene sheathed flexible cord, 60245 IEC 57.



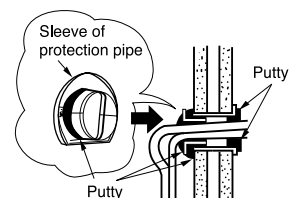
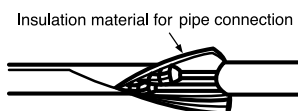
- Investigate the power supply capacity and other electrical conditions at the installation location. Depending on the model of room air conditioner to be installed, request the customer to make arrangements for the necessary electrical work etc. The electrical work includes the wiring work up the outdoor. In localities where electrical conditions are poor, use of a voltage regulator is recommended.
- Install outlet for the room air conditioner within the reaching range of the line cord.

#### IMPORTANT

Circuit Breaker
10A

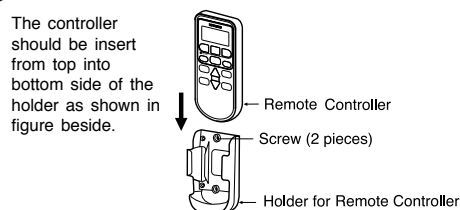
### 1 Insulation And Maintenance Of Pipe Connection

- The connected terminals should be completely 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.

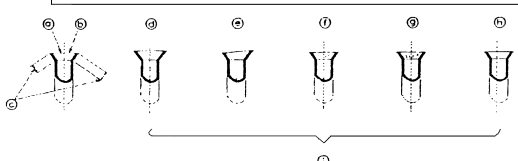


### 2 Installation Of Remote Controller

- 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.



- 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.
- ④ all areas are smooth, no notching area
- ⑤ no scratch or mark inside
- ⑥ all have the same length
- ⑦ phase of bending is too long
- ⑧ slanting
- ⑨ there are scratches around bending area
- ⑩ crack
- ⑪ different length
- ⑫ sample of bending pipe cannot be used



### 3 Power Source And Operation Test

#### Power Source

#### CAUTION

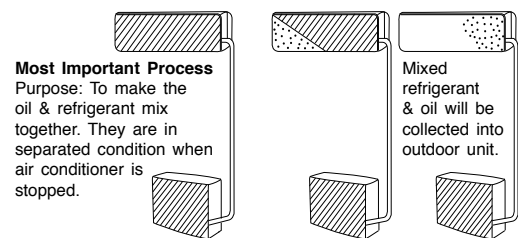
- Please use a new socket. Accident may occur due to the use of old socket because of poor contact.
- Please plug in and then remove the plug for 2 ~ 3 times. This is to ensure that the plug is completely plugged into the socket.
- Keep additional length for the power cord and do not render the plug 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.

#### Proper Pump Down Method

- ① Operate air conditioner at cooling mode for 10~15 minutes
- ② After 10~15 minutes of pre operation, close 2s valve. After 3 minutes, close 3s valve.



- ③ Take out air conditioner unit.
- ④ Install New Refrigerant air conditioner

