

# INSTALLATION'S MANUAL



VRF AIR CONDITIONING SYSTEM

HI ESP DUCT



Read this manual before installation and operation  
Make sure that it is well kept for later reference



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## Safety considerations

- ◆ Please read this installation manual carefully before installation.
- ◆ The air conditioner must be installed by qualified service person.
- ◆ When installing the indoor unit, please follow this manual as strictly as possible.
- ◆ Check the piping is accomplished perfectly before electrifying the unit.
- ◆ This manual is subject to changes due to technological improvement without further notices

**Note :** The installer should illustrate to users how to correctly use and maintain the appliance and remind the users carefully reading and keeping both installation manual and owner's Manual after the installation.

## Installation place

◆ According to the condensing dew condition to do the test, no abnormal phenomenon happen. But if the unit is running continuously under the following high humidity condition, the water drop may be caused. Especially in the season of plum rains (the dew temp. is above 23 °C).

Install in the tile roof ceiling.

Install in the flagstone roof ceiling.

Install in the ventilated space between the ceiling and floor.

Cooking location.

	Condensing dew test condition
Indoor side	27°C Dry bulb temp.
	24°C Dry bulb temp.
Air volume	Weak air
Running time	4 hours

◆ Please avoid installing in the following places

A place with flammable gas or material.

A saline place such as seashore vicinity.

A place with sulphure gas.

A place with oil gas, such as kitchen.

A place with high humidity air.

An unbearable place.

A place where high-frequency waves are generated.

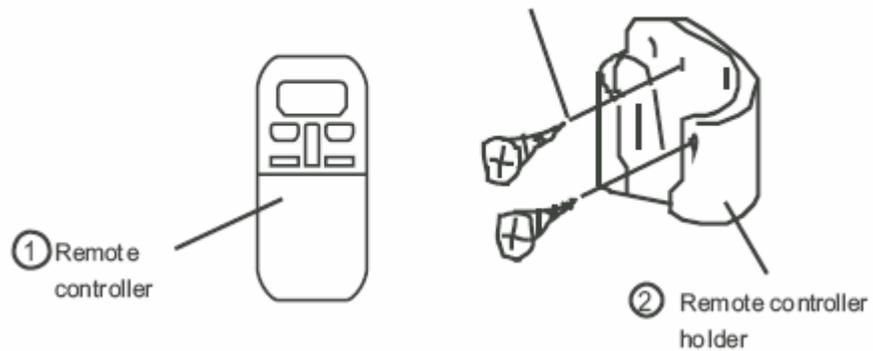
◆ Please comply with the related national electric standard to make electric insulation for construction and metal parts of the air conditioner

◆ Please choose the place where the ventilation is perfect.

## Accessories

Name of Accessories	Q'ty	Outline	Usage
Installation manual	1	(This manual)	_____
Remote controller subassembly	1	_____	Remote controller the air-conditioner
Pipe insulation material	2		Heat insulation
Accessory drain pipe	1		To connect drain pipe
Adhesive tape for seal	1		To connect drain pipe
Remote controller	1		_____

③ Mounting screw



## Test operation

The test operation must be carried out after the entire installation has been completed.

- ◆ Please confirm the following points before the test operation:
- ◆ The indoor unit and outdoor unit are installed properly.
- ◆ Tubing and wiring are correctly completed.
- ◆ The refrigerant pipe system is leakage-checked.
- ◆ The drainage is unimpeded.
- ◆ The heating insulation works well.
- ◆ The ground wiring is connected correctly.
- ◆ The length of the tubing and the added stow capacity of the refrigerant have been recorded.
- ◆ The power voltage fits the rated voltage of the air conditioner.
- ◆ There is no obstacle at the outlet and inlet of the outdoor and indoor and indoor units.
- ◆ The gas-side and liquid-side stop valves are both opened.
- ◆ The air conditioner is pre-heated by turning on the power.

According to the user's requirement, install the remote controller frame where the remote controller's signal can reach the indoor unit smoothly.

### Test operation

Set the air conditioner under the mode of "COOLING" with the remote controller, and check the following points per the "Owner's Manual. If there is any malfunction, please resolve it through chapter "Troubles and Causes " in the "Owner's Manual.

#### The indoor unit

- Whether the switch on the remote controller works well.
- Whether the buttons on the remote controller works well.
- Whether the air flow louver moves normally.
- Whether the room temperature is adjusted well.
- Whether the indicator lights normally.
- Whether the temporary buttons works well.
- Whether the drainage is normal.
- Whether there is vibration or abnormal noise during operation.
- Whether the air conditioner heats well in the case of the HEATING/COOLING type.

#### The outdoor unit

- Whether there is vibration or abnormal noise during operation.
- Whether the generated wind, noise, or condensed water by the air conditioner have influenced your neighborhood.
- Whether any of the refrigerants is leaked.

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

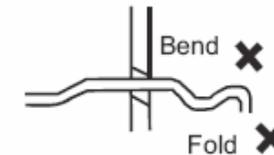
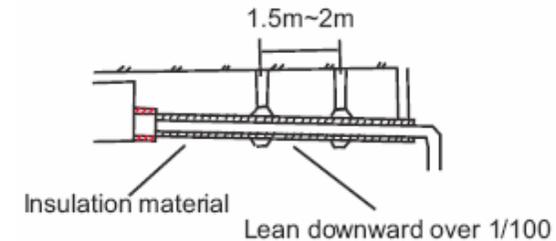
## Drain pipe

When connecting the pipe, please use the sealing material and pipe glove.

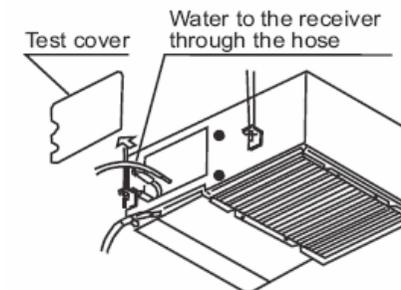
The drain pipe of indoor unit must be heat insulated, or it will condense dew, as well as the connections of the indoor unit. Hard PVC binder must be used for pipe connection, and make sure there is no leakage. With the connection part to the indoor unit, please note not to impose pressure on the side of indoor unit pipes.

The declivity of the drain pipe downwards should not be over 1/100, and no winding and bending.

The total length of the drain pipe when pulled out breadth wise shall not exceed 20m. When the pipe is overlong, a bracket must be installed to prevent winding. Refer to the following figures to install the pipes.



### Drainage test

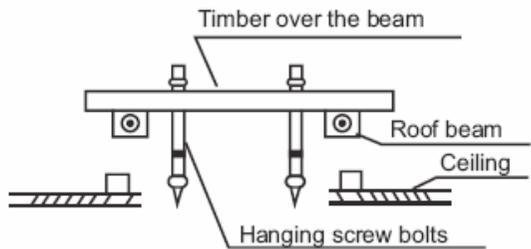


## Install unit

- ◆ Please install with  $\Phi 10$  hanging screw bolts.
- ◆ The handling to the ceiling varies from the constructions; consult the construction person for the specific condition.
  - The size of the ceiling to be handled-- Do keep the ceiling flat. Consolidate the roof beam for possible vibration.
  - Cut off the roof beam.
  - Strengthen the place that has been cut off, and consolidate the roof beam.
  - Connect wires and pipes inside the ceiling after the air conditioner is hanged.
- ◆ After the selection of installation location, position the refrigerant pipes, drain pipes, indoor & outdoor wires to the connection places before hanging up the machine.
- ◆ The installation of hanging screw bolts.

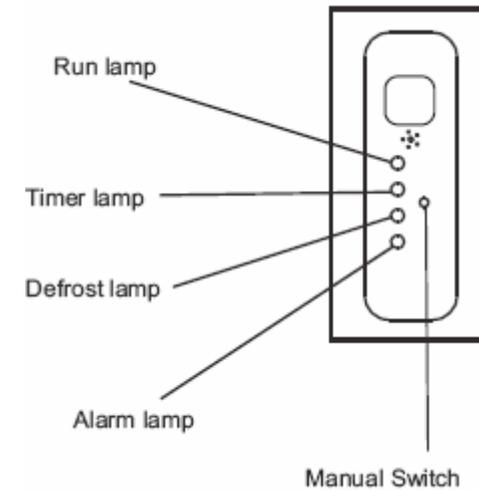
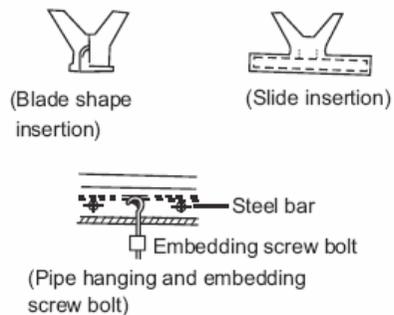
### Wooden construction

Put the square timber over the roof beam, and then install the hanging screw bolts.



### New Concrete Bricks

Inlaying or embedding the screw bolts.

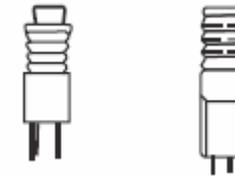


## Trouble shooting

No.	Type	Contents	LED Lamp flash	Remarks
1	Malfunction	The evaporator sensor check point is abnormal or room temp. Sensor is abnormal.	Run lamp flashes at 2.5Hz.	After the malfunctions disappear, it restores automatically.
2	Malfunction	Indoor/outdoor unit communication is abnormal.	The timer lamp flashes at 2.5Hz.	After the malfunctions disappear, it restores automatically.
3	Malfunction	Condenser sensor check point is abnormal or outdoor temp.	All the indoor alarm lamps flash at 0.5Hz.	After the malfunctions disappear, it restores automatically.
4	Malfunction	Water level switch is abnormal	Alarm lamp flashes at 2.5Hz.	If the malfunctions can't be solved in three min. all the indoor alarm lamps flash at 0.5Hz. Turn three min. all the indoor alarm lamps flash at 0.5Hz. Turn off the power to restore.
5	Alarm	Mode conflict	Defrost lamp flashes at 2.5Hz.	When the indoor unit turns to heating mode or is turned off, the alarm will disappear.

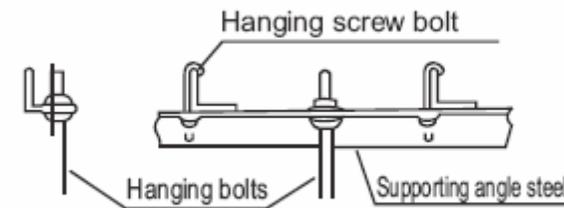
### Finished concrete bricks

Install the hanging hook with expansible bolt into the concrete deep to 45~50mm to prevent loose



### Steel roof beam structure

Install the supporting angle steel.



### Overhanging the indoor unit

Please adopt the pulley to hang the indoor unit to the hanging screw bolt. Use the level gauge to level the indoor unit, if the installation is not level the water leakage will be caused.

Install the filter net and canvas duct

Install the filter net according to the filter net installation manual.

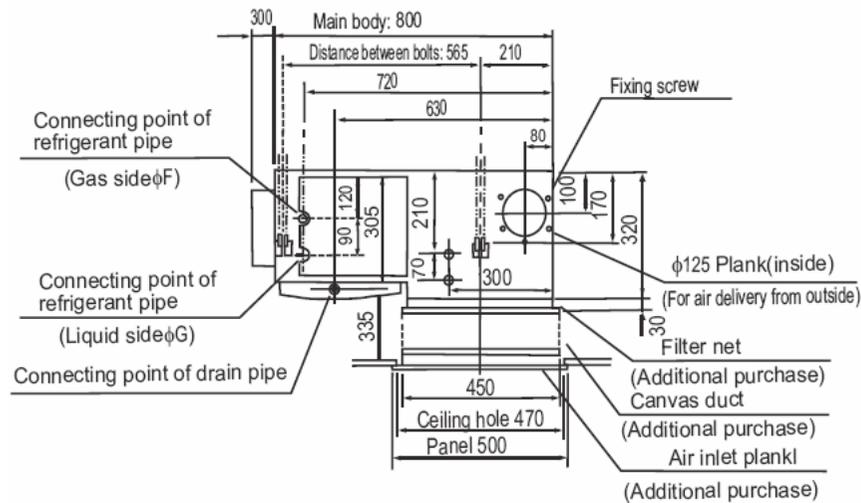
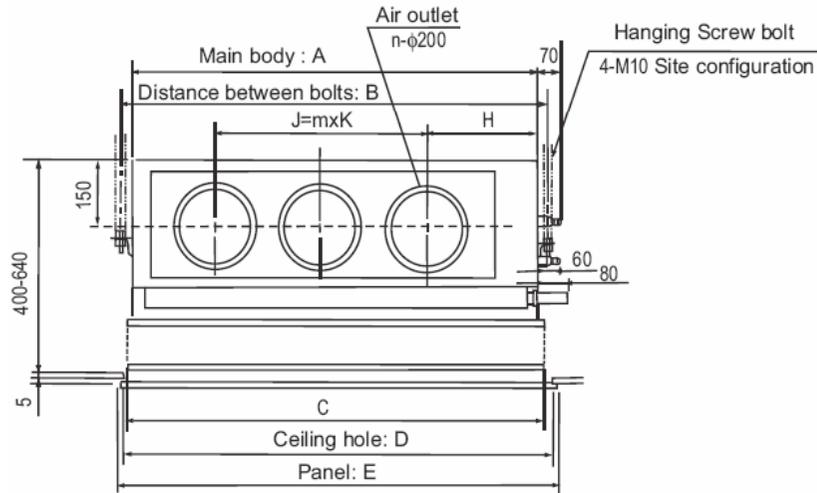
Install the canvas duct under the air filter net.

The position of the ceiling hole and the indoor unit and the hanging screw bolts

If the quantities of the air outlets decrease, please don't run the unit. (Or the malfunction will be caused.)

## Network address setting

Every air-conditioner in network has only one network address to distinguish each other. Address code of air-conditioner in network is set by code switches S1, S2 on the main board, and the set range is 0-63.



Toggle switch set		Network address code
S1	S2	
		00~15
		16~31
		32~47
		48~63

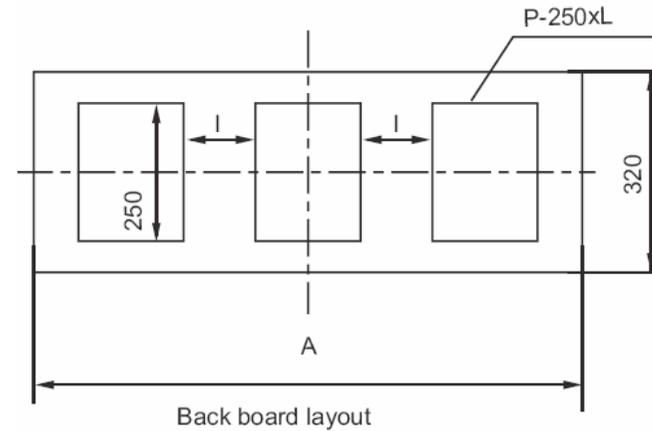
SW1/ENC2	Toggle switch	Address setting
0-F' show the address '0-F' respectively, that is, '0-15' indoor unit (together 16 units), and the others follow the analogy. If two addresses are the same in one system, the abnormal operation will occur.		

ENC1	Toggle switch	For set horsepower
	Code	Capacity(Horsepower)
Note: The horsepower has been set before leaving the factory; anyone can't modify it except the maintenance person.	0	2200W(0.8HP)
	1	2800W(1.0HP)
	2	3600W(1.2HP)
	3	4500W(1.5HP)
	4	5600W(2.0HP)
	5	7100W(2.5HP)
	6	8000W(3.0HP)
	7	9000W(3.2HP)
	8	11200W(4.0HP)
	9	14000W(5.0HP)

### Duct connection

The length of the duct should according to the static pressure outside the unit 39.2Pa (max. 98Pa).

When using the back-air installation, please refer to the following:

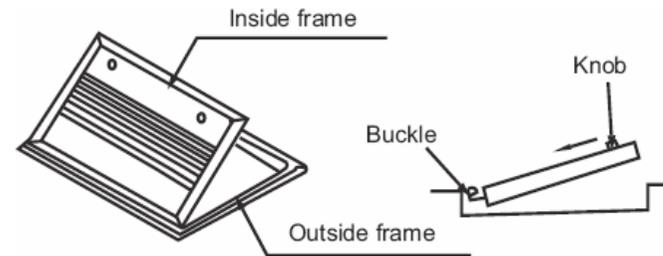


In the above figure, double-point line means the dimensions of air inlet box. Please explain clearly when ordering if customers need air inlet box. And note it is below air inlet or back air-inlet.

### Panel installation

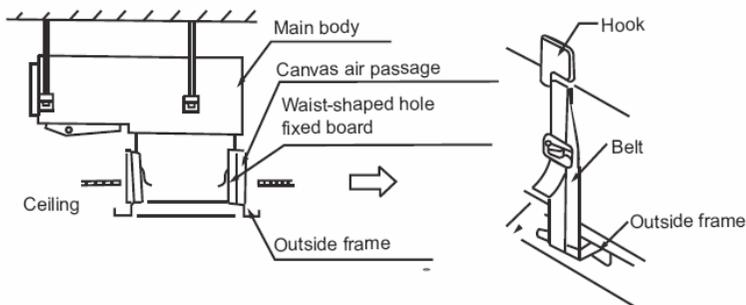
Unload the inner frame.

Slide the knob, release the buckle from the outside frame hole, and then unload the inner frame.

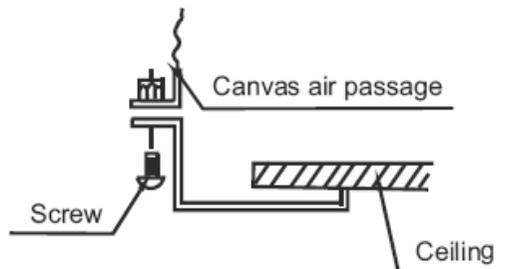


Hang the outside frame on the main body with face down. (4 places at 4 corners). Hang the belt on the hook of the main body.

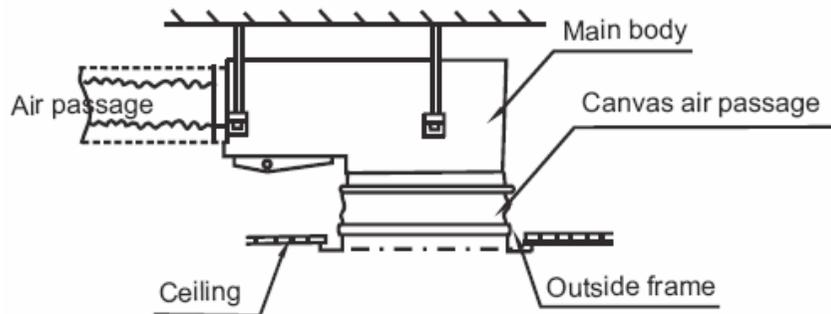
**Note:** The signal wire of the remote control receiver must be drawn out through the canvas



Fix the outside frame and the canvas air passage with screws.  
Screw must be fixed on from the bottom to the top.



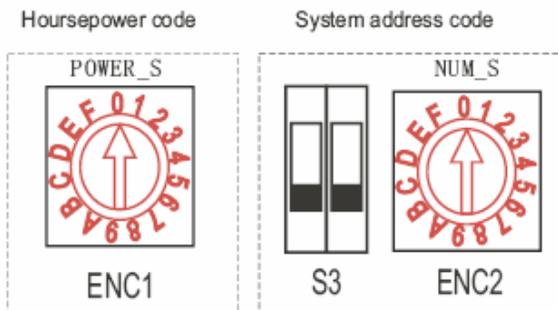
Hang up the outside frame until it sticks to the ceiling tightly.



Fix the main body and the outside frame with the fix board of waist-shape hole (in two places).  
Hang one side of the fix board of the waist-shaped hole on the hook of the main body.  
Tighten the other side of the board with screw to the outside frame.  
Cut off the surplus part of the board with pliers.  
Bend the top of the broken end.

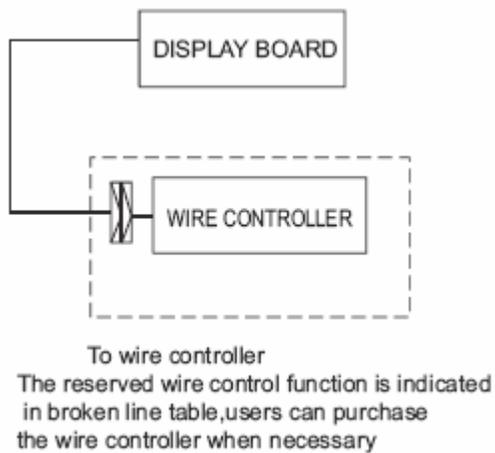
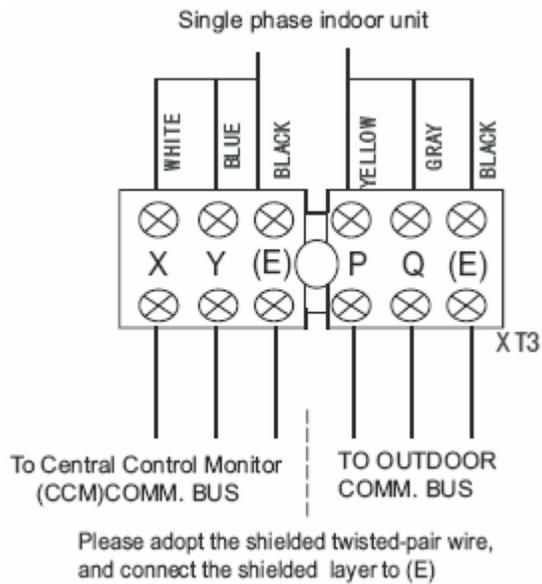
## Control

- ◆ As per the different usages to set the moving switch on the PCB in the electric control box of indoor unit.
- ◆ After the setting, be sure to cut down the main power supply switch, and then turn it on again
- ◆ Setting would be invalid without disconnecting the power.
- ◆ Please number the indoor units during the installation. For example, for the first outdoor unit, the number of the first indoor unit is 1-1, the second indoor unit is 1-2, and the set address is 1 and 2 respectively , the others is analogical.



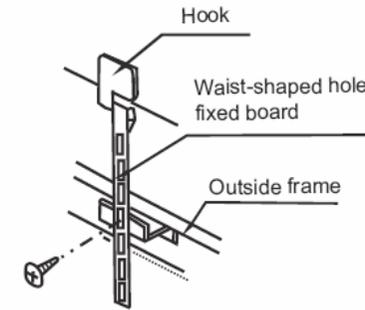
Toggle switch set			System address code	
S3	ENC2			
		~		00~15
		~		16~31
		~		32~47
		~		48~63

**Caution:** The system together have 64 units(0-63),everyone has only system address code, If two addresses are the same in one system, the abnormal operation will occur.

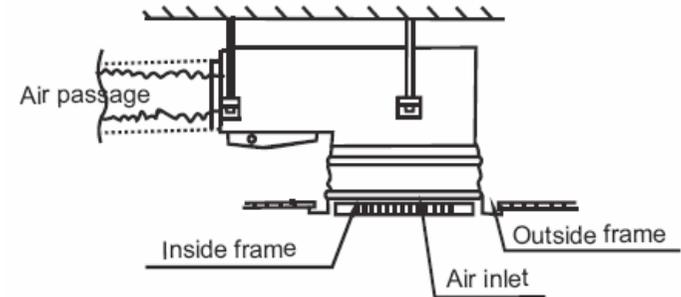


**Note:** The air-conditioners can connect with Central Control Monitor (CCM). Before operation, please wiring correctly and set system address and network address of indoor units.

**Note:** When hanging up the outside frame with the fix board of waist-shaped hole and the belt, stick the outside frame tightly to the ceiling and fix it.



Install the inner frame on the outside frame (the inverse sequence of unloading the inner frame).



The figure is the standard system. (Air-in down)

## Install the connecting pipe

- ◆ Check whether the height drop between the indoor unit and outdoor unit, the length of refrigerant pipe, and the number of the bends meet the following requirements:
- ◆ The max height drop.....10m
- ◆ The length of refrigerant pipe.....less than 30m
- ◆ The number of bends.....Less than 10
- ◆ Do not let air, dust, or other impurities fall in the pipe system during the time of installation.
- ◆ The connecting pipe should not be installed until the indoor and outdoor units have been fixed already.

◆ Keep the connecting pipe dry, and do not let moisture in during installation.

◆ The Procedure of Connecting Pipes

1. Measure the necessary length of the connecting pipe, and make it by the following way.

- Connect the indoor unit at first, then the outdoor unit.
- Bend the tubing in proper way. Don't harm them.
- Daub the surfaces of the flare pipe and the joint nuts with frozen oil, and wrench it for 3~4rounds with hands before fasten the flare nuts.

2. Be sure to use two wrenches simultaneously when you connect or disconnect the pipes. The stop valve of the outdoor unit should be closed absolutely (as original state). Every time you connect it, first loosen the nuts at the part of stop valve, and then connect the flare pipe immediately (in 5 minutes). If the nuts have been loosened for a long time, dusts and other impurities may enter the pipe system and may cause malfunction later. So please expel the air out of the pipe with refrigerant before connection.

3. Expel the air (refer to the "Expel the Air") after connecting the refrigerant pipe with the indoor unit and the outdoor unit. Then fasten the nuts at the repair-points.

◆ Notices for Bendable pipe.

1. The bending angle should not exceed 90
2. Bending position is preferably in the bendable pipe. The larger the better it is.
3. Do not bend the pipe more than three times.

◆ Bend the connecting pipe of small wall thickness.

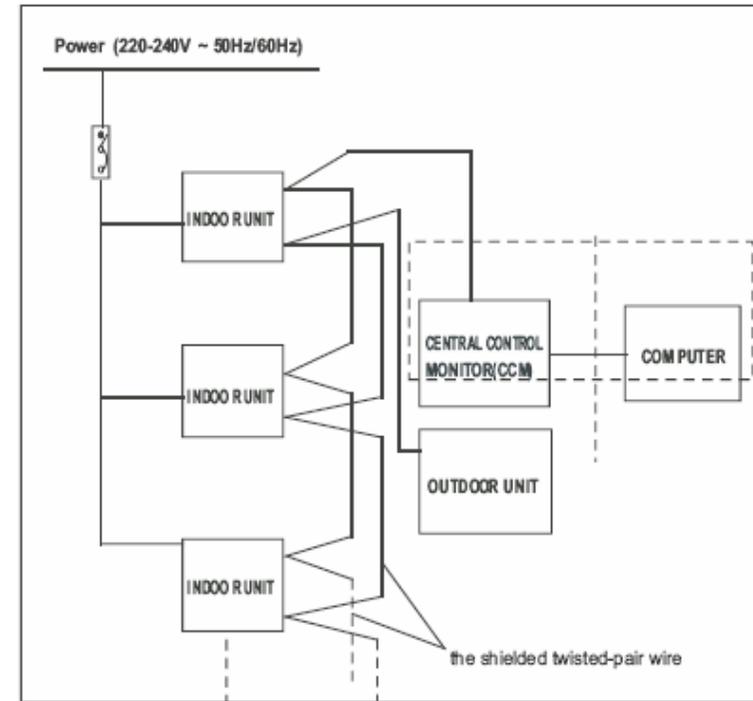
1. Cut out a desired concave at the bending part of the insulating pipe.
2. Then expose the pipe (cover it with tapes after bending).
3. To prevent collapsing of deforming, please bend the pipe at its biggest radius.
4. Use bender to get a small radius pipes.

◆ Use the market brass pipe.

Be sure to use the same insulating materials when you buy the brass pipe. (More than 9mm thick)

**Caution:** A disconnection device having an air gap contact separation in all active conductors should be incorporated in the fixed wiring according to the National Wiring Regulation.

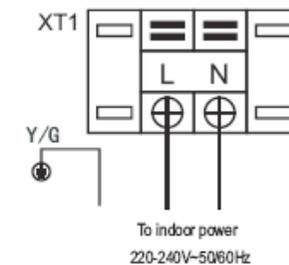
## Wiring chart



**Caution:** The reserved function is indicated in broken line table, users can select it when necessary

## Terminal board diagram

Please refer to the indoor unit wiring diagram for the wiring.



# Wiring

## Attaching wiring

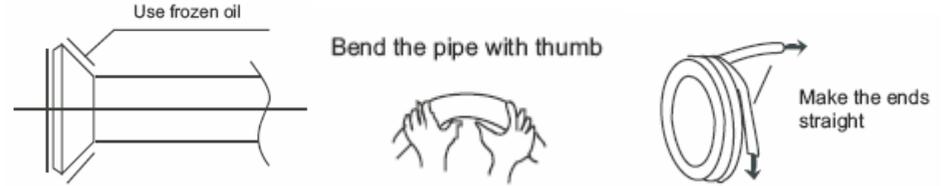
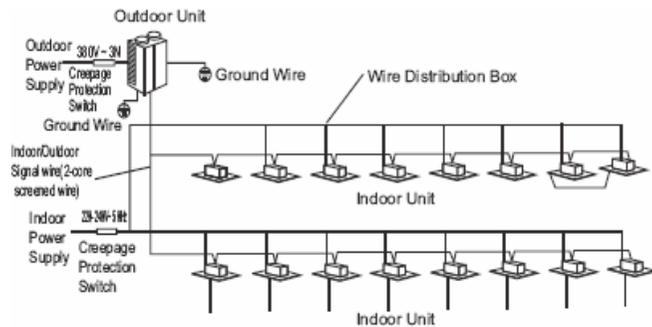
The air conditioner should use separate power supply with rated voltage. The external power supply to the air conditioner should have ground wiring, which is linked to the ground wiring of the indoor and outdoor unit. The wiring work should be done by qualified persons according to circuit drawing. A leakage protector should be installed according to the National Standard concerning electrical appliance. Be sure to locate the power wiring and the signal wiring well to avoid cross-disturbance and their contact with connecting pipe or stop valve body. The wiring attached to this air conditioner is 10m long. Be sure to prolong it with wiring of the same type and proper length if necessary. Generally, do not twist two wiring together unless the joint is soldered well and covered with insulator tape. Do not turn on the power until you have checked carefully after wiring.

## The specification of power

Model(W)		2200~14000
Phase		1-Phase
Power	Frequency and volt	220-240~50/60Hz
	Circuit breaker/fuse (A)	5/3
Indoor unit power wiring (mm <sup>2</sup> )		2×2.0
Indoor/outdoor connecting wiring (mm <sup>2</sup> )	Ground wiring(mm <sup>2</sup> )	1×2.0
	Strong electric signal	3×0.75(3×0.75)

## Indoor unit power supply

The indoor unit power source should not be shared with the outdoor unit. The indoor units that connect to the same outdoor unit should use the same power source, creep age protector and main switch.

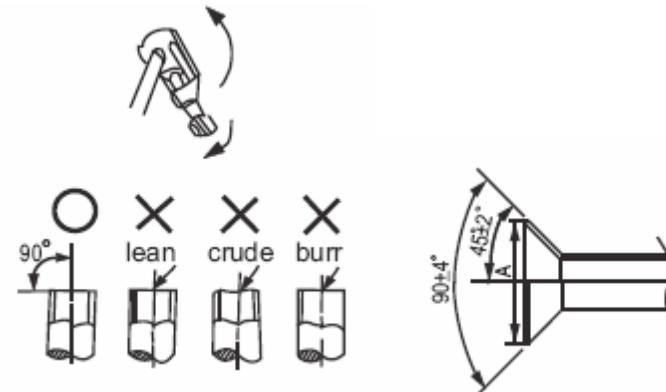


- ◆ Locate the Pipe
  1. Drill a hole in the wall (suitable just for the size of the wall conduit, 90mm in general), then set on the fittings such as the wall conduit and its cover.
  2. Bind the connecting pipe and the cables together tightly with binding tapes. Do not let air in, which will cause water leakage by condensation.
  3. Pass the bound connecting pipe through the wall conduit from outside. Be careful of the pipe all location to do no damage to the tubing.
- ◆ Connect the pipes.
- ◆ Then, open the stem of stop valves of the outdoor unit to make the refrigerant pipe connecting the indoor unit with the outdoor unit fluently flows.
- ◆ Be sure of no leakage by checking it with leak detector or soap water.
- ◆ Cover the joint of the connecting pipe to the indoor unit with the sound proof/insulating sheath (fittings), and bind it well with the tapes to prevent leakage.

# Refrigerant pipe connection

## Flaring

Cut a pipe with a pipe cutter. Insert a flare nut into a pipe and flare the pipe.

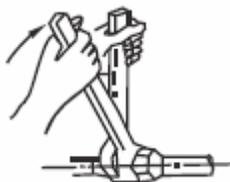


Outside diameter	A(mm)	
	Max	Min
φ6.4mm	8.7	8.3
φ9.5mm	12.4	12.0
φ12.7mm	15.8	15.4
φ15.9mm	19.0	18.6
φ19.1mm	23.3	22.9

### Fasten the nut

Put the connecting tubing at the proper position, wrench the nuts with hands then fasten it with a wrench.

Too large torque will harm the bell mouting and too small will cause leakage. Please determine the torque according to table.



Tubing size	Torque
φ9.5mm	32.7~39.9N.m
φ19.1mm	92.7~118.6N.m

### Material and size of the Pipes

Three lengths (3m, 5m, and 10m) of pipes are available to purchase.

Pipe Material	Copper Pipe for Air Conditioner	
Size(mm)	Gas side	φ19.1
	Liquid side	φ9.5

### The necessary filling amount of refrigerant

When the length of the one-way pipe is less than 5m, the quantity of filling fluorine will be subject to the nameplate.

When the length of the one-way pipe is over 5m, the quantity to be added is as follows:

Capacity≤8000W:  $0.03 \times (L-5)$  (Unit: kg)

Capacity≥9000W:  $0.065 \times (L-5)$  (Unit: kg)

L: The length of the pipe

Please record the quantity added and store it carefully for future maintenance.

### Air Purging

Use a vacuum pump, to vacuum from the gas side refrigerant adding mouth of the outdoor unit.

Don't use the refrigerant of the outdoor unit to do the vacuum. (A certain volume of refrigerant had been added into the outdoor unit in factory.)

### Open/Close the valves

Open/Close the spools or the valves of outdoor unit with a φ 5mm hexagon spanner.

### Leakage Test

Test if there is any leakage on the connections of the piping with soap water.

### Heat Insulation

Heat insulation for the gas and liquid pipe separately.

Heat insulation should be fully and carefully done, because the liquid side pipe and gas side pipe are easy to condense water due to low temperature when cooling.

Heat proof above 120 material should be used at the gas side pipe.

The indoor unit connection parts should be no-gap heat-insulated with the attached heat insulation materials.

