TRUST
Air Conditioners

INVERTER VRF SYSTEM

(I SERIES-SIDE DISCHARGE)

TRUST AIR CONDITIONING EQUIPMENT CO.
Prepared By: Engineering & R & D Department.

Shiraz- May 2017

Installation

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توجه:

شرکت تراست حق تغییر مشخصات دستگاه ها را در جهت بهبود و ارتقای کیفیت برای خود محفوظ می دارد.

2015-02

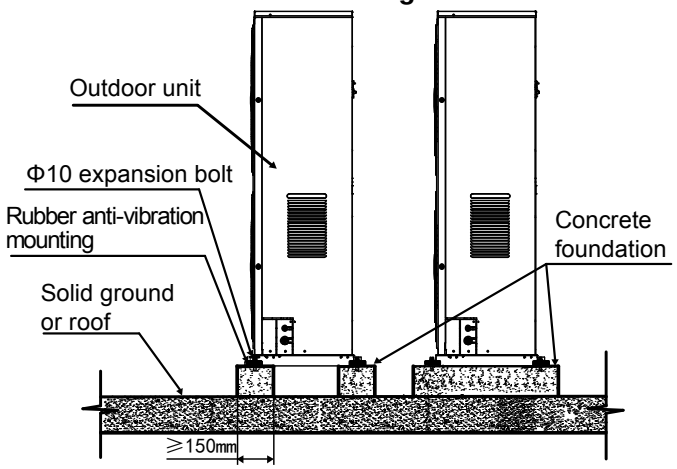
1. Select installation position

- Ensure that the outdoor unit is installed in a dry, well-ventilated place.
- Ensure that the noise and exhaust ventilation of the outdoor unit do not affect the neighbors of the property owner or the surrounding ventilation.
- Ensure that the outdoor unit is installed in a well-ventilated place that is possibly closest to the indoor unit.
- Ensure that the outdoor unit is installed in a cool place without direct sunshine exposure or direct radiation of high-temp heat source.
- Do not install the outdoor unit in a dirty or severely polluted place, so as to avoid blockage of the heat exchanger in the outdoor unit.
- Do not install the outdoor unit in a place with oil pollution or full of harmful gas such as sulfurous gas.
- Do not install the outdoor unit in a place surrounded by salty air. (Except for the models with corrosion-resistant function)

2. Foundation for installation

- A solid, correct base can: Avoid the outdoor unit from sinking and avoid the abnormal noise generated due to base.
- Base types: Steel structure base or concrete base (See the figure below for the general making method)

Side air discharge unit



Note: The key points to make basement:

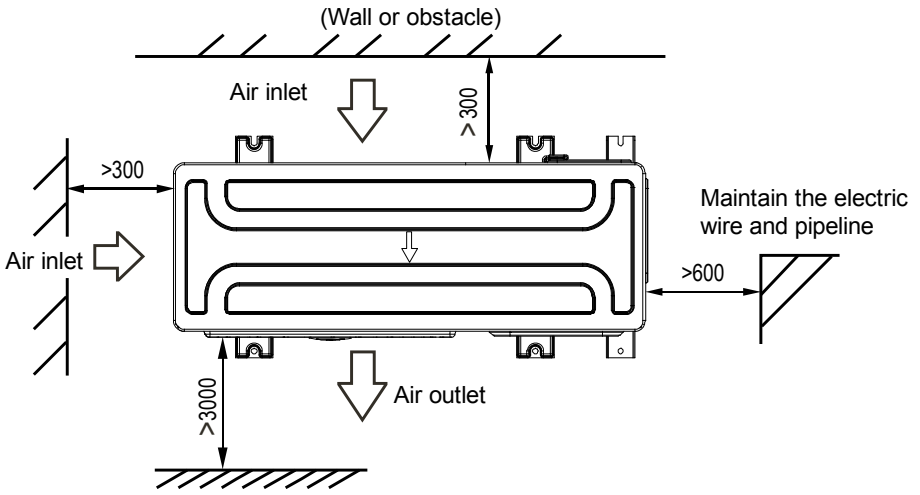
- The master unit's basement must be made on the solid concrete ground . Refer to the structure diagram to make concrete basement in detail, or make after field measurements.
- In order to ensure every point can contact equality, the basement should be on completely level.
- If the basement is placed on the roofing, the detritus layer isn't needed, but the concrete surface must be flat. The standard concrete mixture ratio is cement 1/ sand 2/ carpolite 4, and adds Φ10 strengthen reinforcing steel bar, the surface of the cement and sand plasm must be flat, border of the basement must be chamfer angle.
- Before construct the unit base, please ensure the base is directly supporting the rear and front folding edges of the bottom panel vertically, for the reason of these edges are the actual supported sites to the unit.
- In order to drain off the seeper around the equipment, a discharge ditch must be setup around the basement.
- Please check the affordability of the roofing to ensure the load capacity.

When piping from the bottom of the unit, the base height should be no less than 200mm.

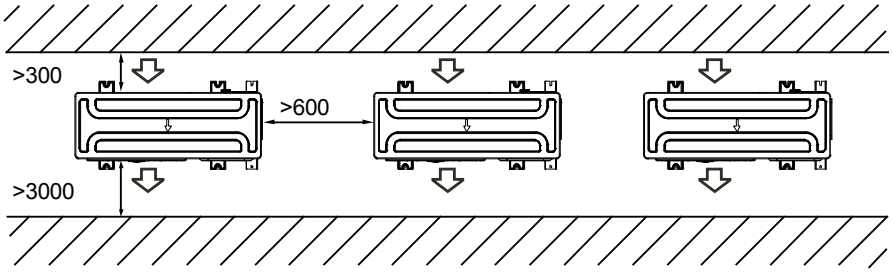
3. Installation space

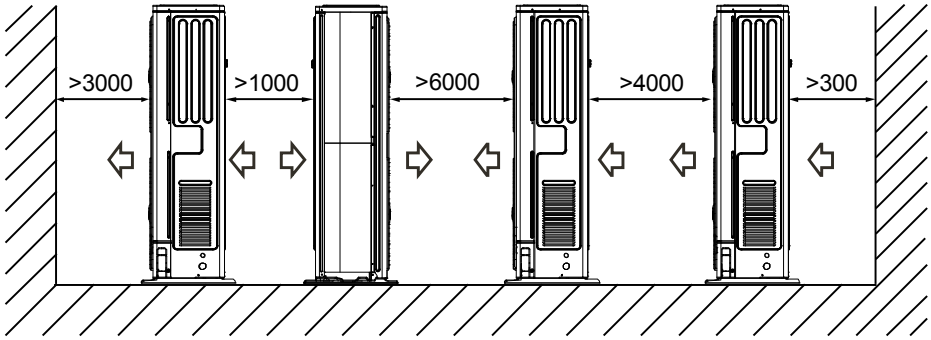
TMVV4I200(7), **TMVV4I224(8)**, **TMVV4I260(9)**

- Single unit installation



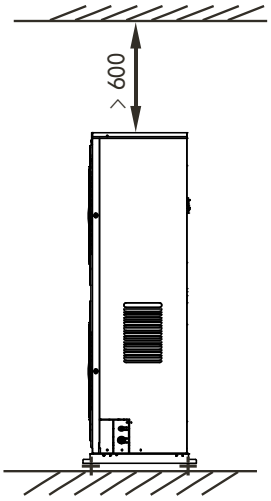
- Multiple unit installation

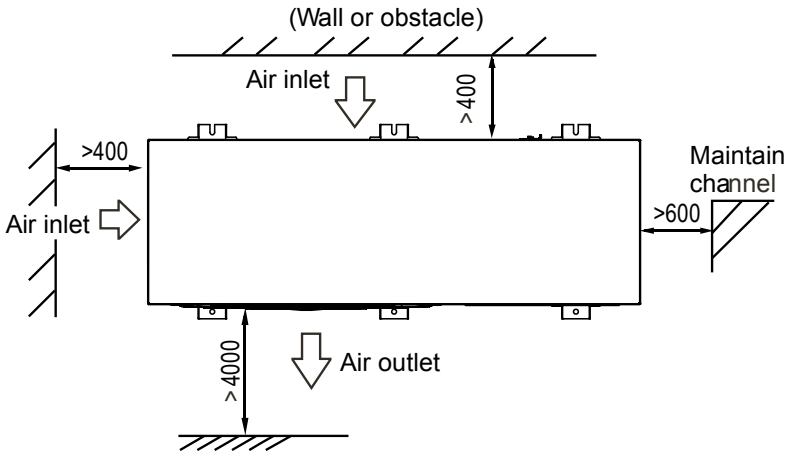




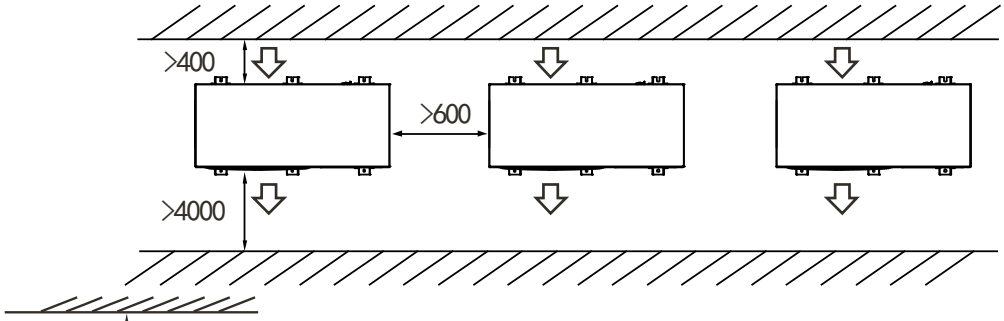
TMVV4I400(14), TMVV4I450(16)

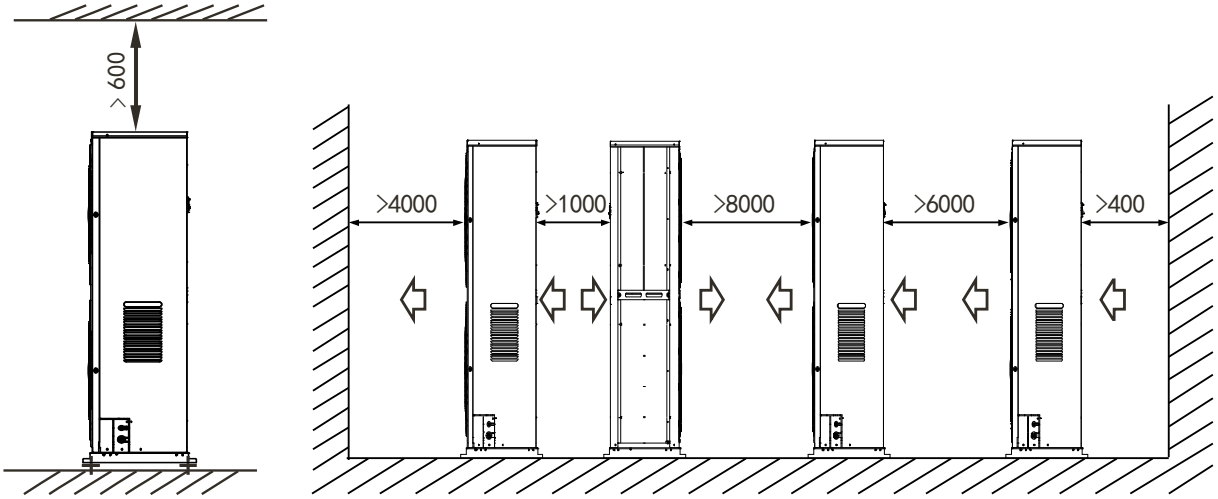
- Single unit installation





- Multiple unit installation

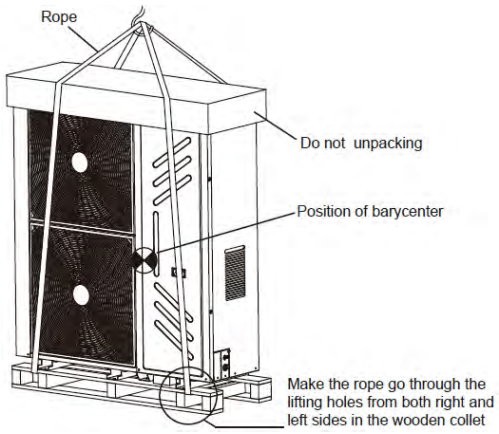




4. Lifting method

- Do not remove any package before the hoisting. Use two ropes to hoist the machine, keep the machine in balance, and then raise it safely and steadily. In case of no package or if the package is damaged, use plates or packing material to protect it.
- When conveying and hoisting the outdoor unit, keep it upright, ensure that the slope does not exceed 30°, and keep safety in mind.
- Steel wire can be used for conveying:
- Use 4 steel wires of the size above Φ6mm to convey the outdoor unit. Pay attention to the gravity center and prevent sliding and tip-over of the outdoor unit.
- In order to prevent scratch and deformity the outdoor unit, apply a guard board to the surface of contact between the steel wire and the air conditioner.
- Remove the cushion for use in the transport after finishing the transport.

Fork lifter can be used for conveying.



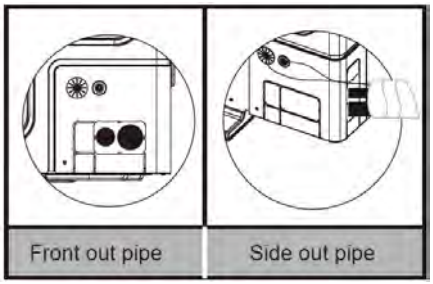
5. Refrigerant piping installation

5.1 Valve instruction

20/22.4/26kW

Unit (mm)

A multi-direction space is available for connecting pipes and wiring in various installation sites.

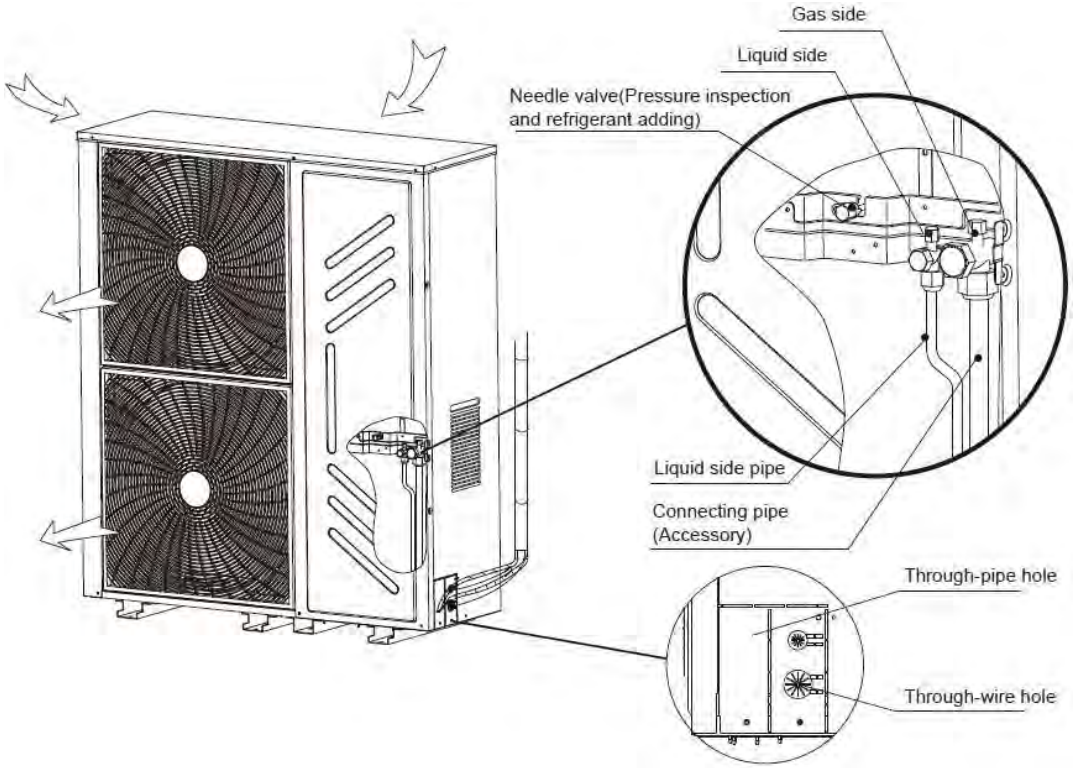


Model	Liquid pipe	Gas pipe
20/22.4kW	Φ9.53	Φ19.1
26kW	Φ9.53	Φ22.2

1. Connecting pipe from right side: cut the side hole of the pipe-outlet plate selectively. It is suggested to cut a piece of metal plate below to avoid the mouse come and destroy the machine wiring body.
2. Connecting pipe from front side: cut the frontal hole of the pipe-outlet plate selectively. It is suggested to cut a piece of metal plate right side to avoid the mouse come and destroy the machine wiring body.
3. Connecting wiring cable: the strong and weak electrical wire should be out through the two plastic holes of the pipe-outlet plate, and binded with gas and liquid pipe together.

40/45kW

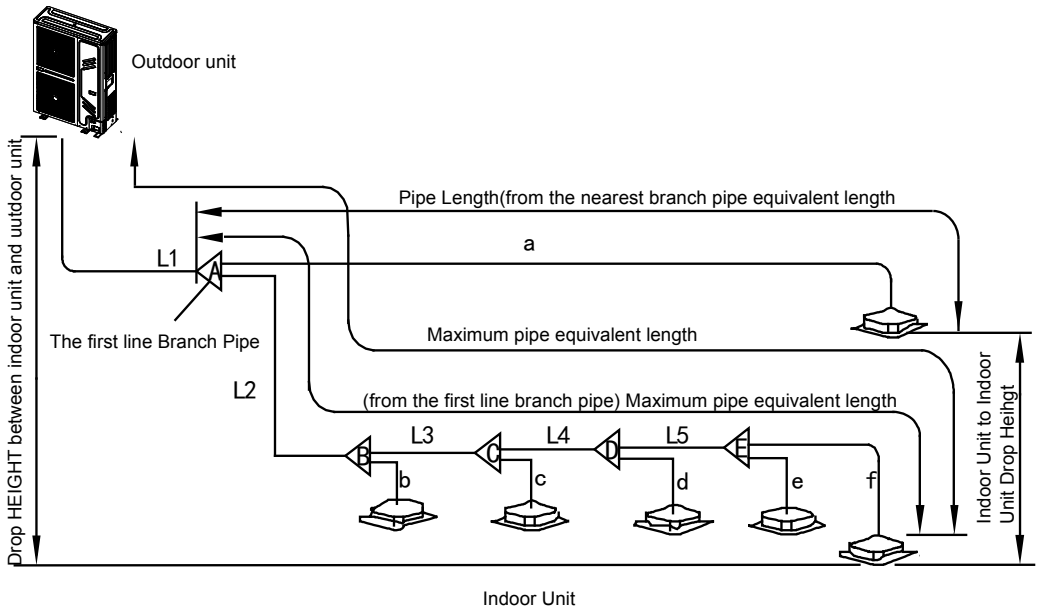
Unit (mm)



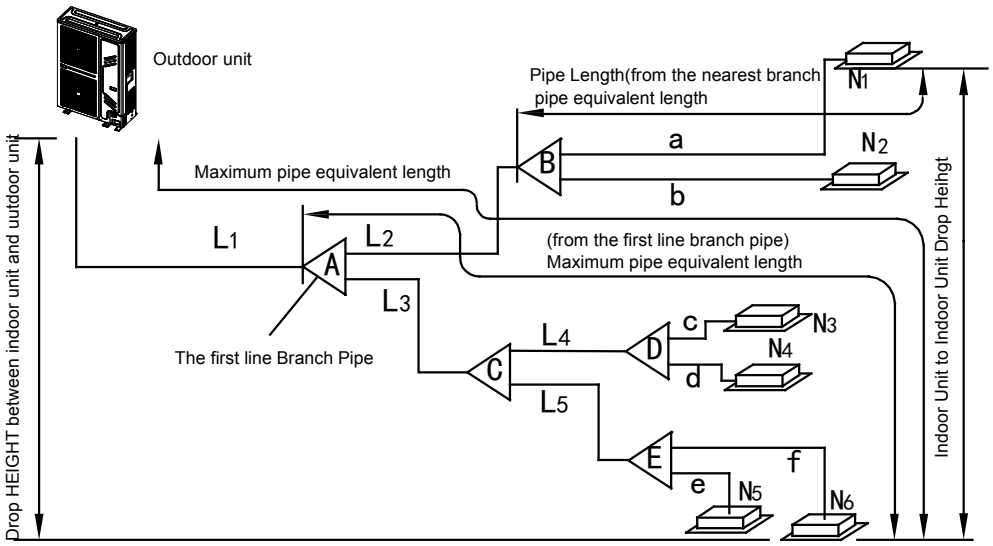
Model	Liquid pipe	Gas pipe
40kW	Φ12.7	Φ22.2
45kW	Φ12.7	Φ25.4

5.2 Refrigerant piping length permitted value

- The first connecting method



- The second connecting method

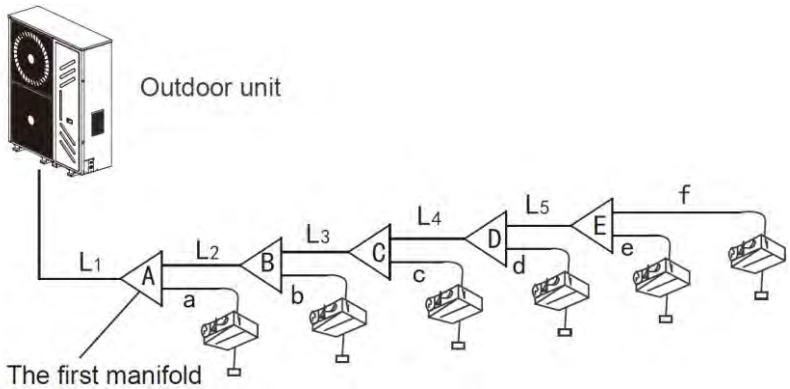


Piping length			Permitted value		Piping
			20-26kW	40-45kW	
Pipe Length	Total Pipe Length(Actual)		≤120m	≤250m	L1+L2+L3+L4+L5+a+b+c+d+e+f
	Maximum Piping	Actual Length	≤60m	≤100m	L1+L2+L3+L4+L5+f(The first connecting method) or L1+L3+L5+f(The second connecting method)
		Equivalent Length	≤70m	≤120m	
	Pipe Length (from the first branch to the furthest IDU)		≤20m	≤40m	L2+L3+L4+L5+f(The first connecting method) or L3+L5+f(The second connecting method)
	Pipe Length(IDU to the nearest branch)		≤15m	≤15m	a,b,c,d,e,f
Level difference	Level difference between IDU~ODU	ODU up	≤30m	≤30m	----
		ODU down	≤20m	≤20m	----
	Level difference between IDU~IDU		≤8m	≤8m	----

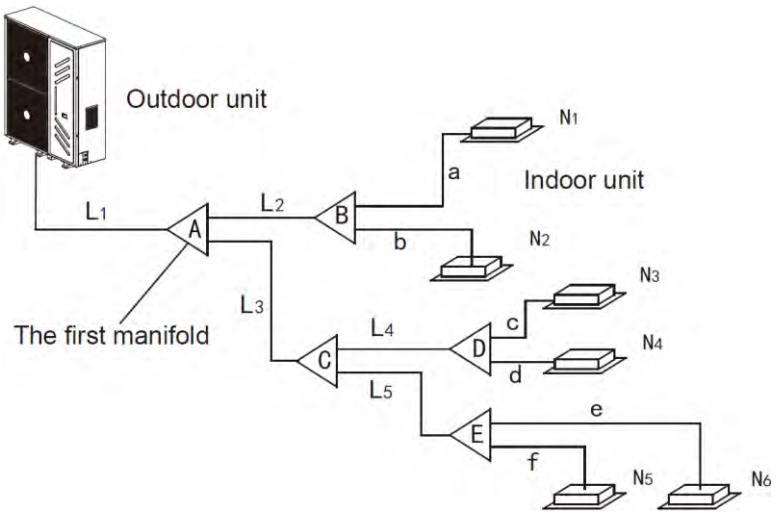
Note: When the total equivalent piping length of liquid + gas side is more than 90m, it must increase the size of air side main pipe. Besides, according to the distance of refrigerant pipe and the over matched state of indoor unit, when the capacity is decreasing it still can increase the gas side main pipe size.

5.3 Refrigerant piping selection

- The first connecting method



- The second connecting method



- Pipe name

Main pipe	L1
Indoor unit main pipe	L2, L3, L4, L5
Indoor unit branch pipe	a, b, c, d, e, f
Indoor unit branch pipe assembly	A, B, C, D, E

- Table1: Indoor unit branch pipe selection (a~f)

Capacity of indoor unit (A×100W)	Branching pipe length≤10m	
	Gas side	Liquid side
A≤50	Φ12.7	Φ6.35
A≥56	Φ15.9	Φ9.53

- Table 2: Indoor unit main pipe selection (L1~L5)

Capacity of indoor unit (A×100W)	Indoor unit main pipe (mm)		
	Gas side	Liquid side	Available branching pipe
A<166	Φ15.9	Φ9.53	TFQZHN-01D
166≤A<230	Φ19.1	Φ9.53	TFQZHN-01D
230≤A<330	Φ22.2	Φ9.53	TFQZHN-02D
330≤A	Φ25.4	Φ12.7	TFQZHN-02D

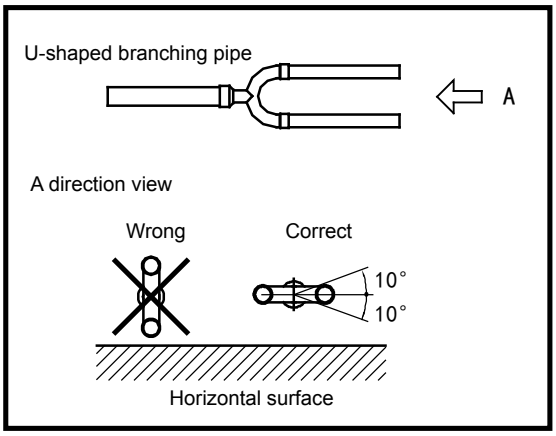
- Table 3: Main pipe selection (L1)

Model	When the equivalent length of all liquid and air pipes < 90m			When the equivalent length of all liquid and air pipes ≥ 90m		
	Gas side (mm)	Liquid side (mm)	The 1st branch pipe	Gas side (mm)	Liquid side (mm)	The 1st branch pipe
20/22.4kW	Φ19.1	Φ9.53	TFQZHN-01D	Φ22.2	Φ9.53	TFQZHN-02D
26kW	Φ22.2	Φ9.53	TFQZHN-02D	Φ25.4	Φ9.53	TFQZHN-02D
40kW	Φ22.2	Φ12.7	TFQZHN-02D	Φ25.4	Φ12.7	TFQZHN-02D
45kW	Φ25.4	Φ12.7	TFQZHN-02D	Φ28.6	Φ12.7	TFQZHN-03D

Note: the main pipe L1 can be selected form table2 or table3, the larger size should be finally selected.

6. Branch pipe installation

The branching pipe must be installed horizontally and error angle of it should not be larger than 10°. Otherwise, refrigerant assignment will be uneven and malfunction will be caused.



7. Remove dirt or water in the piping

- Make sure there is no any dirt or water in the pipe before connecting the piping to the outdoor units.
- Wash the piping with high pressure nitrogen, never use refrigerant of the outdoor unit to do that.

8. Gas tightness test

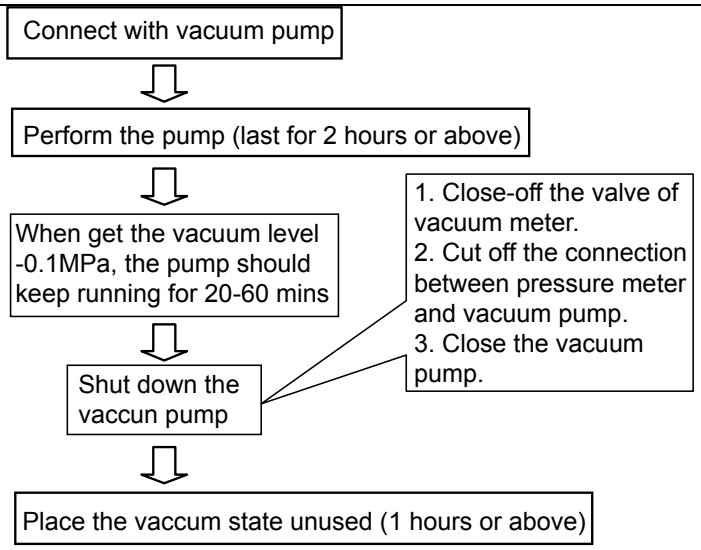
- Upon set up the indoor unit pipeline, please connect the Hi-pressure pipe with liquid side shut-off valve and connect Lo-pressure pipe with gas side shut off valve firstly.
- Use the vacuum pump discharging air inside the pipe from the two pistons (pistons of liquid side shut off valve and gas side shut off valve) simultaneously, until to the -1kgf/cm2.
- Close the vacuum pump, charge 40kgf/cm^2 nitrogen gas from the pistons of the two shut-off valves simultaneously. Pressure inside should be maintained at there no less than 24 hrs.

Note:

- Pressurized nitrogen (3.9MPa; 44kgf/cm^2) is used for airtightness test.
- It is not allowed to use oxygen, combustible gas or toxic gas to conduct the airtightness test.
- When welding, please use wet cloth insulating the low pressure valve for protection.
- To avoid the equipment be damaged, the pressure maintained time should not last too long.

9. Vacuum

- Use the vacuum pump which vacuum level lower than -0.1MPa and the air discharge capacity above 40L/min.
- The outdoor unit is not necessary to vacuum, don't open the outdoor unit gas and liquid pipe shut-off valves.
- Make sure the vacuum pump could result as -0.1MPa or below after 2 hours or above operation. If the pump operated 3 hours or above could not achieve to -0.1MPa or below, please check whether water mix or gas leak inside of the pipe.



Caution:

- Don't mix up the different refrigerants or abuse the tools and measurements which directly contact with refrigerants.
- Don't adopt refrigerant gas for air vacuuming.
- If vacuum level could not get to -0.1MPa, please check whether resulted by leakage and confirm the leakage site. If no leakage, please operate the vacuum pump again 1 or 2 hrs.

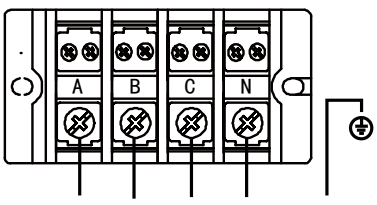
10. Additional refrigerant charge

Calculate the additional refrigerant charge according to the diameter and the length of the liquid side pipe of the outdoor/indoor unit connection. The refrigerant is R410A.

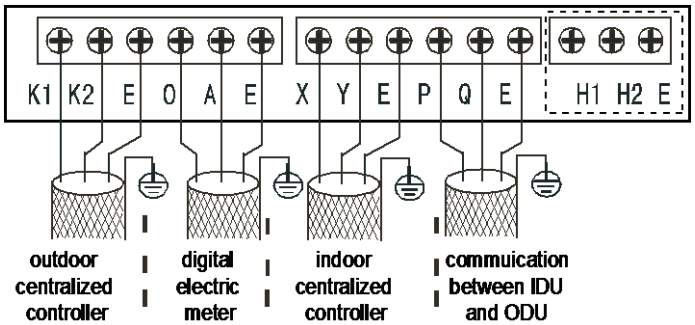
Pipe size of liquid side	Additional refrigerant charge per meter (kg)
Φ6.35	0.022
Φ9.53	0.054 (≤22.4kW)
	0.057 (＞22.4kW)
Φ12.7	0.11
Φ15.9	0.17
Φ19.1	0.26
Φ22.2	0.36

11. Electric wiring installation

11.1 Wiring terminals instruction



Three-phase power supply



11.2 Electric wiring installation

Note:

Please select power supply for indoor unit and outdoor unit separately.

The power supply should have specified branch circuit with leakage protector and manual switch.

The power supply, leakage protector and manual of all the indoor units connecting to the same outdoor unit should be universal.

(Please set all the indoor unit power supply of one system into the same circuit. It should turn on or shut down the unit at the

same time, otherwise, the service life would affect seriously, even the unit may not turn on.)

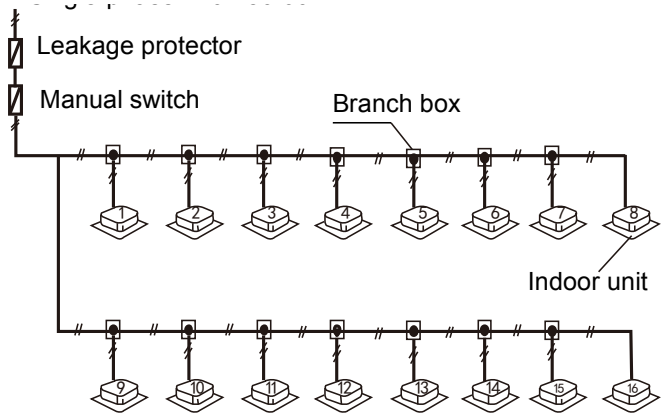
Please put the connective wiring system between indoor unit and outdoor unit with refrigerant piping system together.

It is suggested to use 3-core shielded wire as signal wire between indoor and outdoor units, multi-core wire is unavailable.

Please comply with relevant National Electric Standard.

Power wiring should be done by professional electrician.

Indoor unit powering supply wiring



Note:

- Set refrigerant piping system, signal wires between indoor units and signal wires between outdoor units into one system.
- Power must unified supply to all indoor units in the one system.
- Please do not put the signal wires and power wires in the same wire tube; keep distance between the two tubes. (Keep distance above 300mm, when current capacity of power supply less than 10A, and Keep distance above 500mm, when current capacity of power supply less than 50A)

11.3 Signal wiring installation

The signal wire should be shielded wire. Using other wiring shall create signal interference, thus leading to error operation.

The shielded nets at the two sides of shielded wires are either grounded to the earth, or connected with each other and jointed to the sheet metal along to the earth.

Signal wire could not be bound together with refrigerant pipeline and power wire. When power wire and signal wire is distributed in parallel form, keep gap between them above 300mm so as to preventing signal interference.

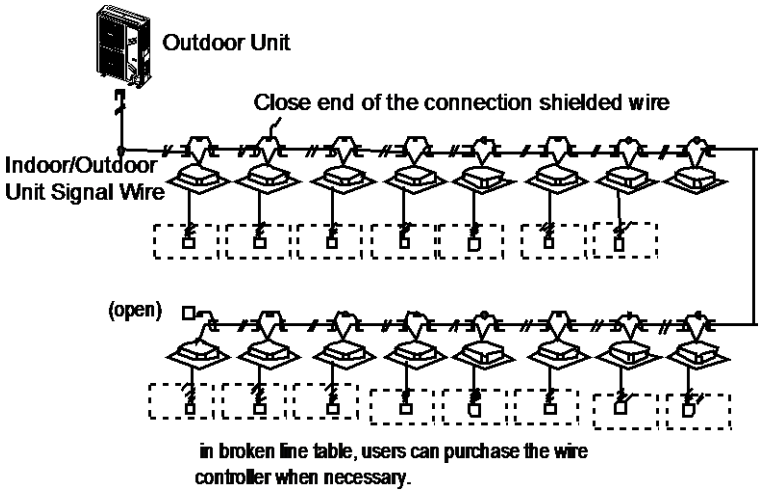
Signal wire could not form closed loop.

Signal wire has polarity, so be careful when connecting.

The shield net should be grounded at the wiring terminal of outdoor unit. The inlet and outlet wire net of indoor communication wire should be connected directly and could not be grounded, and form open circuit at the shield net of final indoor unit.

Signal wire between outdoor unit and indoor unit

Signal wire of indoor/outdoor unit adopts 3-core shielded wire ($\geqslant$0.75mm^2) which has polarity, please connect it correctly.



12. Running test

Operate according to “key points for test running” on the electric control box cover.

CAUTION

- Test running cannot start until the outdoor unit has been connected to the power for 12hours.
- Test running cannot start until all the valves are affirmed open.
- Never make the test running if the machine has malfunction.
- Make sure the communication between the indoor unit and outdoor unit is normal before test running.

13. Caution on refrigerant leakage

- This air conditioner adopts R410A as refrigerant, which is safe and noncombustible.
- The room for air conditioner should be big enough that refrigerant leakage cannot reach the critical thickness. Besides this, you can take some action on time.

Refrigerant critical thickness: 0.44[kg/m^3] for R410A.

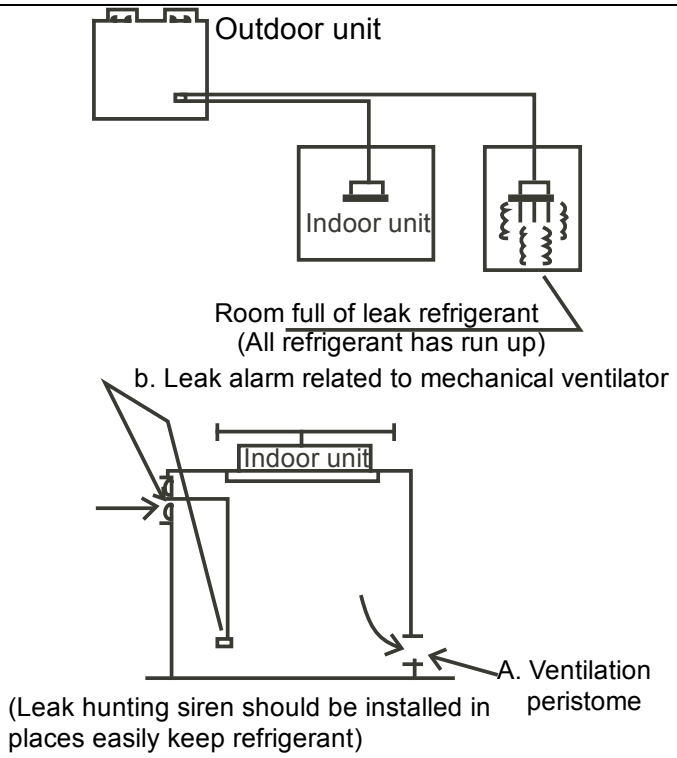
Confirm the critical thickness through follow steps, and take necessary actions.

1. Calculate the sum of the charge volume (A[kg]) Total Refrigerant volume of 10HP=factory refrigerant volume + super addition
2. Calculate the indoor cubage (B[m^3]) (as the minimum cubage.
3. Calculate the refrigerant thickness

$$\frac{A[kg]}{B[m^3]} \leqslant \text{critical thickness}$$

Counter measure against over high thickness

1. Install mechanical ventilator to reduce the refrigerant thickness under critical level. (ventilate regularly)
2. Install leak alarm facility related to mechanical ventilator if you cannot regularly ventilate.



NOTE

Please press “Force Cool” button to carry out refrigerant recycling process. Keep the low pressure above 0.2MPa; otherwise compressor may be burnt out.

TRUST

Air Conditioning Systems

Cooling & Heating

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