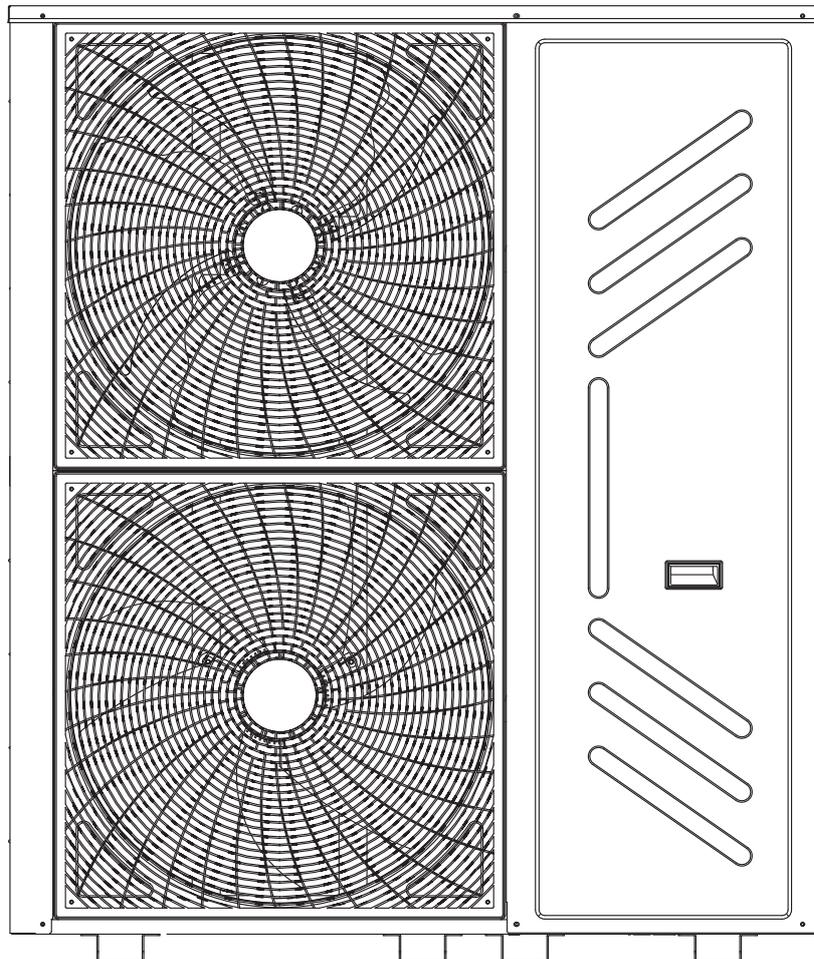




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DC INVERTER FREE | LV-MO400 > 450

Installation and Operation Manual



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1. PRECAUTIONS

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



CAUTION

New Refrigerant Air Conditioner Installation

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

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

Accordingly the exclusive tools are required for the new refrigerant (R410A):

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



CAUTION

Do not connect the Appliance from Main Power Supply.

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

If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid a hazard.

An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring. The appliance shall be installed in accordance with national wiring regulations.

The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.

The power cord type designation is H05RN-R or above/H07RN-F.



WARNING

Ask an authorized dealer or qualified installation professional to install/maintain the air conditioner.

Inappropriate installation may result in water leakage, electric shock or fire.

Turn off the main power supply switch or breaker before attempting any electrical work.

Make sure all power switches are off. Failure to do so may cause electric shock.

Connect the connecting cable correctly.

If the connecting cable is connected in a wrong way, electric parts may be damaged.

When moving the air conditioner for the installation into another place, be very careful not to enter any gaseous matter other than the specified refrigerant into the refrigeration cycle.

If air or any other gas is mixed in refrigerant, the gas pressure in the refrigeration cycle becomes abnormally high and it may resultingly causes pipe burst and injuries on persons.

Do not modify this unit by removing any of the safety guards or by by-passing any of the safety interlock switches.

Exposure of unit to water or other moisture before installation may cause a short-circuit of electrical parts.

Do not store it in a wet basement or expose to rain or water.

After unpacking the unit, examine it carefully if there are possible damage.

Do not install in a place that might increase the vibration of the unit.

To avoid personal injury (with sharp edges), be careful when handling parts.

Perform installation work properly according to the Installation Manual.

Inappropriate installation may result in water leakage, electric shock or fire.

When the air conditioner is installed in a small room, provide appropriate measures to ensure that the concentration of refrigerant leakage occur in the room does not exceed the critical level.

Install the air conditioner securely in a location where the base can sustain the weight adequately.

Perform the specified installation work to guard against an earthquake.

If the air conditioner is not installed appropriately, accidents may occur due to the falling unit.

If refrigerant gas has leaked during the installation work, ventilate the room immediately.

If the leaked refrigerant gas comes in contact with fire, noxious gas may generate.

After the installation work, confirm that refrigerant gas does not leak.

If refrigerant gas leaks into the room and flows near a fire source, such as a cooking range, noxious gas might generate.

Electrical work must be performed by a qualified electrician in accordance with the Installation Manual. Make sure the air conditioner uses an exclusive power supply.

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

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

Be sure to provide grounding.

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

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

Inappropriate grounding may cause electric shock.

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

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

Required tools for installation work

- 1) Phillips screw driver
- 2) Hole core drill(65mm)
- 3) Spanner
- 4) Pipe cutter
- 5) Knife

- 6) Reamer
- 7) Gas leak detector
- 8) Tape measure
- 9) Thermometer
- 10) Mega-tester
- 11) Electro circuit tester
- 12) Hexagonal wrench
- 13) Flare tool
- 14) Pipe bender
- 15) Level vial

- 16) Metal saw
- 17) Gauge manifold (Charge hose:R410A special requirement)
- 18) Vacuum pump (Charge hose:R410A special requirement)
- 19) Torque wrench
 - 1/4(17mm)16N•m (1.6kgf•m)
 - 3/8(22mm)42N•m (4.2kgf•m)
 - 1/2(26mm)55N•m (5.5kgf•m)
 - 5/8(15.9mm)120N•m (12.0kgf•m)
- 20) Copper pipe gauge adjusting projection margin
- 21) Vacuum pump adapter

2. ATTACHED FITTINGS

Please check whether the following fittings are of full scope. If there are some spare fittings , please restore them carefully.

INSTALLATION FITTINGS	NAME	SHAPE	QUANTITY
	1. Outdoor unit installation manual		1
	2. Outdoor unit owner's manual		1
	3. Indoor unit owner's manual		1
	4. Installation Instructions: Indoor Unit Manifold		1
	5.Connection pipe		1
	6.Curved connection pipe		1

3. CONSTRUCTION INSPECTION

3.1 Unpacking installation

- 1.After unpacking, check if there's transportation injuries. Declare to the transportation agent immediately in written form.
- 2.Check if the models, specifications and quantity are conform to the content in the contract.
- 3.Keep the operation manual and check the accessories when unpacking.

3.2 Refrigerant pipe

- 1.Use the central air-conditioner specified refrigerant pipe.
- 2.Refrigerant pipe with specified diameters and thickness should be used.
- 3.Nitrogen blanket protection should be applied when welding copper pipes. Fill nitrogen of 0.2kgf/cm² before welding. Cut off nitrogen when the copper pipe completely cooled after welding.
- 4.Heat preservation process should be applied to refrigerant pipe.
- 5.After installing refrigerant pipe, indoor unit can't be powered on before tightness test and vaccumizing.

3.3 Tightness test

After installing refrigerant pipe, fill 40kgf/cm²(3.9MPa) nitrogen from both gas and liquid sides to process a 24-hour tightness test.

3.4 Vaccumizing

Vaccumizing from both gas and liquid sides after tightness test. (Pressure of vacuum should be -0.1MPa)

3.5 Refrigerant adding

- 1.Calculating refrigerant adding amount according to the diameters and length(actual length) of indoor/outdoor unit liquid side pipes.
- 2.Mark refrigerant adding amount, pipe diameters of pipe, length (actual length) and height difference between indoor and outdoor unit on the usage confirm form of outdoor unit(on electronic control box plate) in advance, in order to further use.

3.6 Electric wiring

- 1.Please choose the power supply capacity, diamters of wires according to the design manual. Power supply cables of air-conditioner should be thicker than cables used in normal electric motor.
- 2.To prevent air-conditioner from malfunctioning, don't entwine power supply wires (380V 3N~)and connecting wires of indoor and outdoor unit(low voltage wires).
- 3.Power on indoor unit after tightness test and vaccumizing.
- 4.For function dial code, please refer to dial code instruction table usage.

3.7 Trial running

Trial running can be processed after 12-hour (or above) preheating of outdoor unit, otherwise it could damage the system.

4. OUTDOOR UNIT INSTALLATION



WARNING

- Ask an authorized dealer or qualified installation professional to install maintain the air conditioner. Inappropriate installation may result in water leakage, electric shock or fire.
- Do not expose the unit directly to sunlight and other sources of heat. Add a cover if necessary to prevent the unit from direct sunlight.
- A place that is even and strong enough to bear the weight of the unit.
- Do not install in a place that might increase the vibration of the unit.
- Install the unit at a place where noise and hot air couldn't bother your neighbour.
- Do not install the air conditioner in a location subject to a risk of exposure to a combustible gas. If a combustible gas leaks, and stays around the unit, a fire may occur.
- Remove obstacles around the unit in order to leave enough space for air circulation.
- Install the unit near to the indoor unit as far as possible under certain installation conditions.
- When installing the outdoor unit in a place that is constantly exposed to a strong wind such as the upper stairs or rooftop of a building, use a baffle when necessary.
- Install the unit so that its discharge port faces to the wall of the building. Keep a distance of 4000mm or more between the unit and the wall surface. Keep strong wind from blowing back inside.
- Do not mount the outdoor unit on a wall.

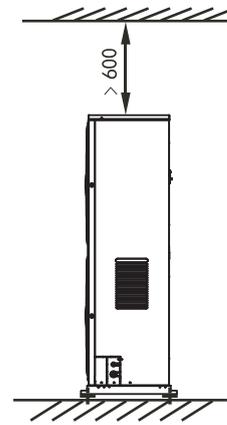
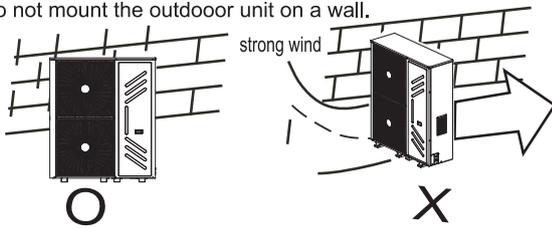


Fig. 4-2

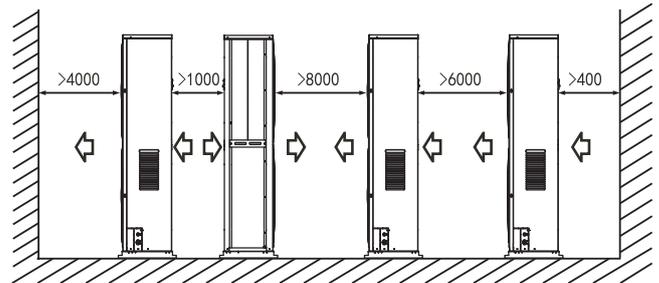


Fig. 4-3

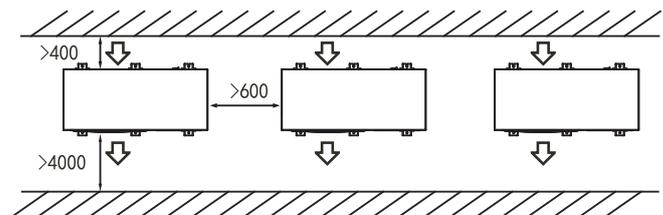


Fig. 4-4

4.1 Installation place

Please keep away from the following place, or malfunction of the machine may be caused:

- There is combustible gas leakage.
- There is much oil (including engine oil) ingredient.
- There is salty air surrounding (near the coast)
- There is caustic gas (the sulfide, for example) existing in the air (near a hot spring)
- A place that the heat air expelled out from the outdoor unit can reach your neighbor's window.
- A place that the noise interferes your neighbors every day life.
- A place that is too weak to bear the weight of the unit
- Uneven place.
- Insufficient ventilation place.
- Near a private power station or high Frequency equipment.
- Install indoor unit, outdoor unit, power cord and connecting wire at least 1m away from TV set or radio to prevent noise or picture interference.

Installation space (Unit:mm), see Fig. 4-1, 4-2, 4-3, 4-4.

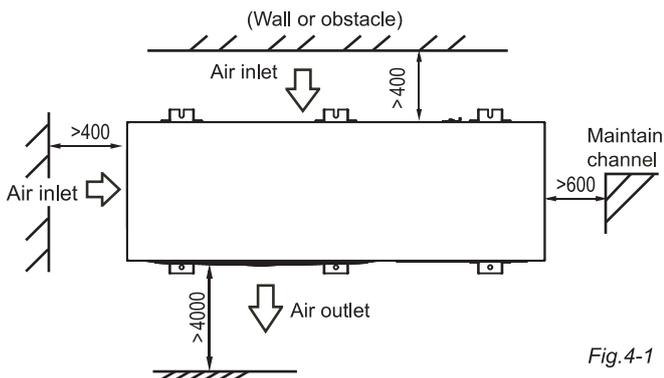


Fig. 4-1

4.2 Handling

- 1) Do not unpacking the unit when handling. Use two ropes whose lengths are more than 8m to handle the unit. Keep balance of the unit, when lifting stably. Use a padding plate or packing materials for protection if the package has been destroyed or no package.
- 2) Keep the unit vertical when moving and handling. If the unit barycenter is not at the center of the unit, do not lean it more than 30°. Refer to Fig. 4-5. Be careful during moving and lifting .
- 3) Never hold the inlet of the outdoor unit to prevent it from deforming.
- 4) Do not touch the fan with hands or other objects.
- 5) Do not lean it more than 45°, and do not lay it sidelong.

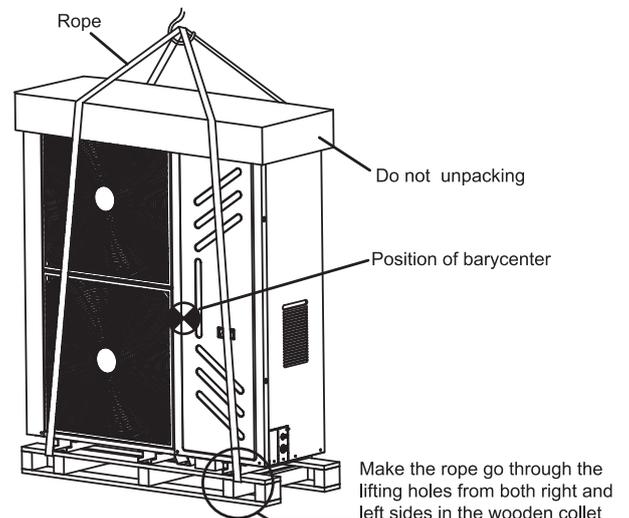


Fig. 4-5

4.3 Outdoor unit basement

1) Advantages of a strong and correct basement :

- ① Outdoor unit won't subside
- ② Outdoor unit won't generate abnormal noise caused by improper basement.

2) Basement types

- ① Steel-frame basement
- ② Concrete basement(See Fig.4-6 for common practice)

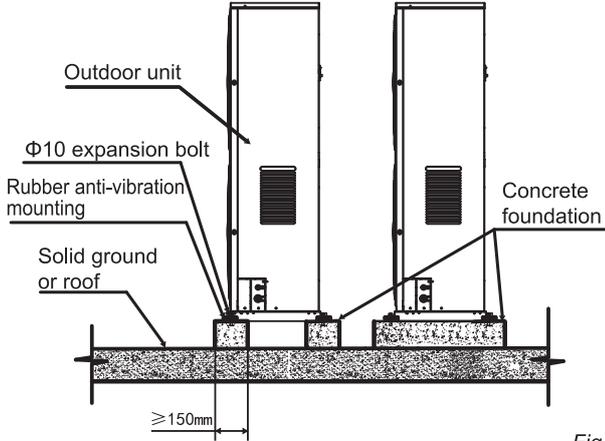


Fig.4-6

Points of making a basement:

- ① Host unit basement should be made in strong concrete ground, See Fig 3.6 for common practice or start after field measurement
- ② The basement should be completely horizontal and make sure all the contactors can contact symmetrically.
- ③ Ensure the the basement supports the vertical foldings of the front and back bottom plates directly, since its the actual bearing place.
- ④ Macadam base is unnecessary. But concrete surface should be roughed. The proportions used in mixing the concrete should be cement 1/sand 2/ pebble 4, including $\Phi 10$ reinforced rebar. Even the surface of concrete. The edge of the basement should be chamfered.
- ⑤ Drainage ditch should be arranged around the basement in order to drainage water around the unit.
- ⑥ Please check endurance of the roof to ensure loading capacity could bear the weight.

4.4 Dimension(Unit: mm)

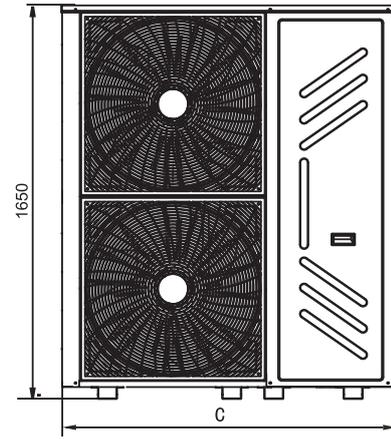


Fig.4-7

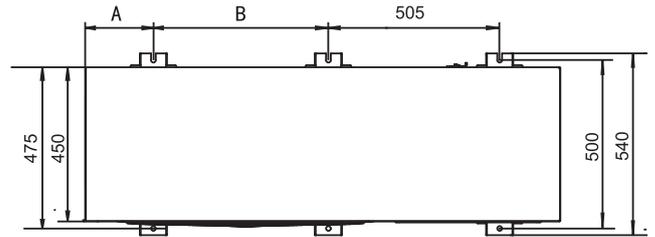


Fig.4-8

Table 4-1

Model \ Size	A	B	C
40kW	175	505	1360
45kW	225	555	1460

4.5 Pipe connection

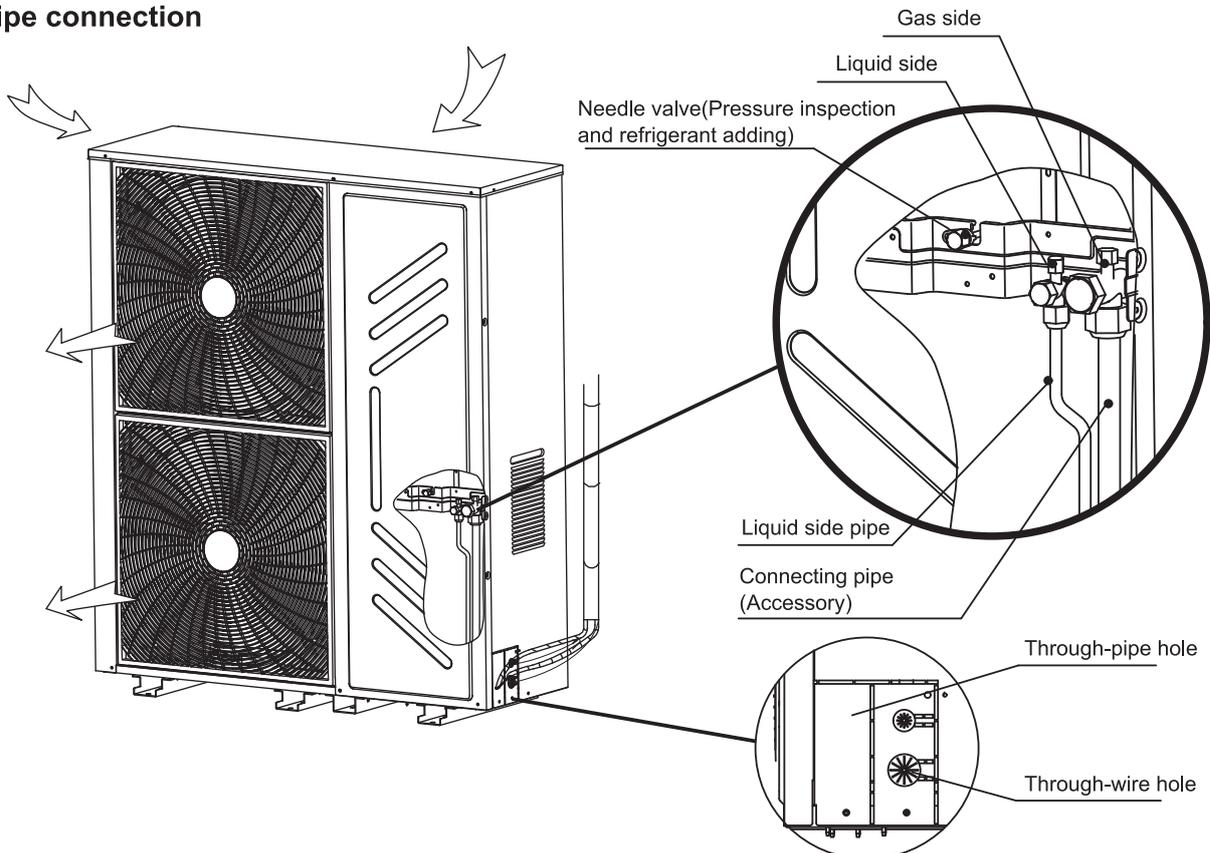


Fig.4-9

5. INSTALL THE CONNECTING PIPE

5.1 Refrigerant pipes

1. Flare

- 1) Cut the pipe with a knife. (See Fig.5-1)
- 2) Fit the pipe to the flare of connecting nut (Table 5-1)

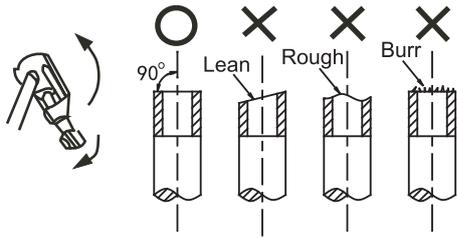


Fig.5-1

Table 5-1

OD (mm)	A (mm)	
	Max.	Min.
φ 6.4	8.7	8.3
φ 9.5	12.4	12.0
φ 12.7	15.8	15.4
φ 15.9	19.0	18.6
φ 19.1	23.3	22.9
φ 22.2	27.3	27.0

2. Fastening the nut

Align the connecting pipe and fastening the nut and then fasten it with a wrench. (See Fig.5-2)

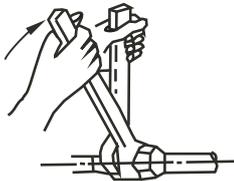


Fig.5-2

Table 5-2

Pipe dimensions	Tightening torque N.m
φ 6.4	14.2~17.2 N.m (144~176 kgf.cm)
φ 9.5	32.7~39.9 N.m (333~407 kgf.cm)
φ 12.7	49.5~60.3 N.m (504~616 kgf.cm)
φ 15.9	61.8~75.4 N.m (630~770 kgf.cm)
φ 19.1	97.2~118.6 N.m (990~1210 kgf.cm)
φ 22.2	109.5~133.7 N.m (1115~1364 kgf.cm)



CAUTION

When welding the refrigerant pipes, nitrogen flushing operation should be applied otherwise the oxidation crumbs will block the cooling system which will result in damage.

Large torque will destroy the flare, small torque will result in gas leakage because of loose. Please refer to Table 5-2 for the tightening torque.

5.2 Pipe types

Refrigerant settings

Table 5-3

Names	Piping position	Code
Main pipe	Pipe between the outdoor unit and indoor-side first manifold	L1
Indoor unit main pipe	Pipe which doesn't connect directly with the indoor unit the indoor-side first manifold	L2~L5
Outdoor unit main pipe	Piping components among main connecting pipe, main piping, and branch piping	a,b,c,d,e,f
Indoor unit manifold components	Pipe which connects directly with the indoor unit behind the manifold	A,B,C,D,E

• Connecting method 1

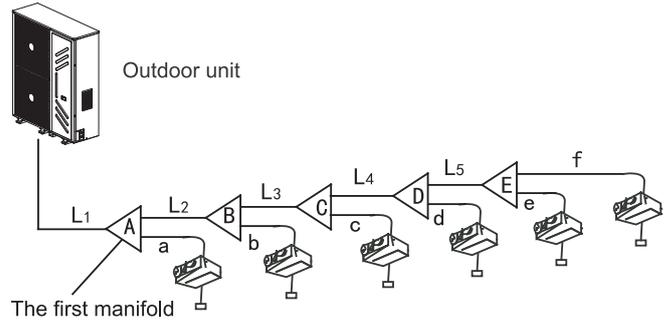


Fig.5-3

• Connecting method 2

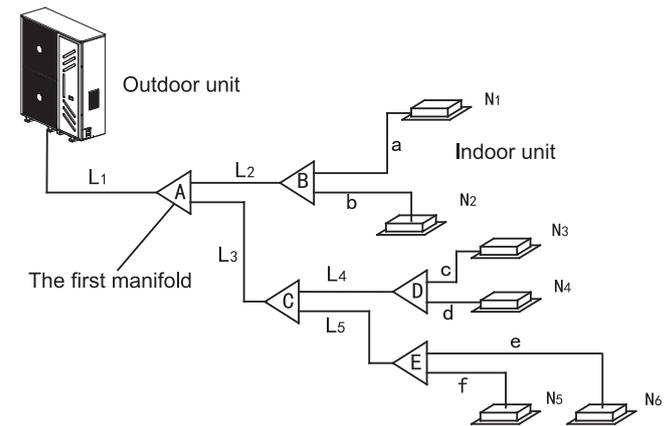


Fig.5-4



CAUTION

All the manifolds used should be specialized ones designated by our company. Fail to follow the requirements could lead to system error.

If the distance between the first manifold and the last one exceeds 15m, please apply the 2nd connecting way.

Distance between the indoor unit and the nearest manifold should be less than 15m.

5.3 Diameters of indoor unit connecting pipe

- 1) Diameter reference table 4-4 of R410A indoor unit connecting pipe.
- 2) E.g. 1: The downstream connecting indoor unit capacity of L2 is $45 \times 2 = 90$, the diameter of gas pipe and liquid pipe will be $\Phi 15.9 / \Phi 9.5$ after checking.

Reference table of R410A indoor unit connecting pipe Table 5-4

Downstream indoor unit capacity	Main pipe dimensions		Applicable manifolds
	Gas pipe	Liquid pipe	
A < 166	Φ15.9	Φ9.5	FQZHN-01C
166 ≤ A < 230	Φ19.1	Φ9.5	FQZHN-01C
230 ≤ A < 330	Φ22.2	Φ9.5	FQZHN-02C
330 ≤ A < 460	Φ25.4	Φ12.7	FQZHN-02C
460 ≤ A	Φ25.4	Φ12.7	FQZHN-02C

5.4 Diameters of outdoor unit connecting pipe

Reference table of R410A outdoor unit connecting pipe Table 5-5

Outdoor unit capacity	Main pipe dimensions when equivalent length of liquid side and gas side pipe is < 90m			Main pipe dimensions when equivalent length of liquid side and gas side pipe is ≥ 90m		
	Gas side (mm)	Liquid side (mm)	Indoor unit first manifold	Gas side (mm)	Liquid side (mm)	Indoor unit first manifold
40kW	Φ22.2	Φ12.7	FQZHN-02C	Φ25.4	Φ12.7	FQZHN-02C
45kW	Φ25.4	Φ12.7	FQZHN-02C	Φ28.6	Φ12.7	FQZHN-03C



CAUTION

The horizontal straight pipe distance between angle branch and its adjacent manifold should be at least 0.5m

The horizontal straight pipe distance between 2 adjacent 2 manifold should be at least 0.5m

The horizontal straight pipe distance that connects to indoor unit behind the manifold should be at least 0.5m

Use the maximum indoor and outdoor connecting pipe diameter.

● Joint dimension

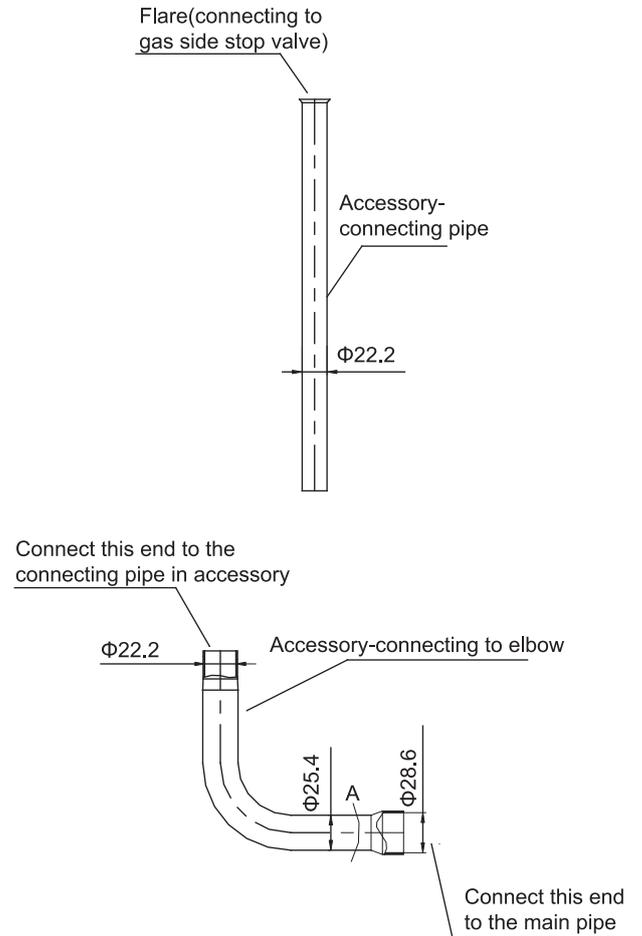
Pipe diameters of the indoor unit joint Table 5-6

Refrigerant	Model	Gas side	Liquid side
R410A	Wall mounting 22~45	Φ12.7(Flare)	Φ6.4(Flare)
	Wall mounting 56	Φ15.9(Flare)	Φ9.5(Flare)
	Four-side air outlet 28~45	Φ12.7(Flare)	Φ6.4(Flare)
	Four-side air outlet 56~80	Φ15.9(Flare)	Φ9.5(Flare)
	Single-side air outlet 18~45	Φ12.7(Flare)	Φ6.4(Flare)
	Single-side air outlet 56	Φ15.9(Flare)	Φ9.5(Flare)
	Low static pressure 18~45	Φ12.7(Flare)	Φ6.4(Flare)
	Low static pressure 56	Φ15.9(Flare)	Φ9.5(Flare)
	Thin duct 71	Φ15.9(Flare)	Φ9.5(Flare)
	A5 Duct 22~45	Φ12.7(Flare)	Φ6.4(Flare)
	A5 Duct 56~80	Φ15.9(Flare)	Φ9.5(Flare)
	A5 Duct 90~140	Φ15.9(Flare)	Φ9.5(Flare)

Pipe diameters of the outdoor unit joint Table 5-7

Model	To pipe side	Pipe diameters of the outdoor unit joint	
		Gas side	Liquid side
40kW		Φ22.2	Φ12.7
45kW		Φ25.4	

Dimensions of connecting pipe diameters in accessory



Elbow connecting instruction	
Main pipe diameters of connecting pipes	Connecting pipe bending process
Φ22.2	Cut the pipe at A, insert the main pipe and weld
Φ25.4	Cut the pipe at A, flare and weld
Φ28.6	Insert main pipe directly and weld

Table 4-8

Outdoor Unit (kW)	Capacity of Outdoor unit (kW)	Maximum Quantity of Indoor unit	Sum Capacity of Indoor unit
40kW	40	14	20000~52000
45kW	45	15	22000~58000



CAUTION

Capacity of indoor unit shouldn't be greater than the sum of 130% of outdoor unit loading.

When running with oversized bearings, attenuation will happen correspondingly.

Table 5-9

Classification of power	22	28	36	45	56	71
HP	0.8	1	1.2	1.7	2	2.5
Classification of power	80	90	100	112	125	140
HP	3	3.2	3.7	4	4.5	5

5.5 Examples

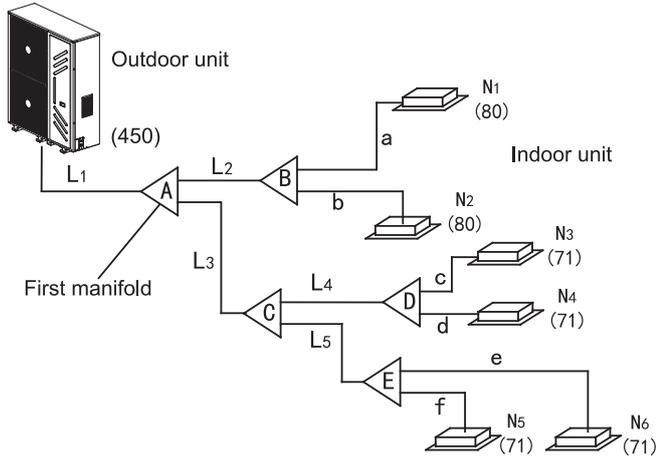


Fig.5-5

- The downstream inner units of the main pipe L2 are N1, N2, and its total capacity is $80 \times 2 = 160$, the size of pipe L2 is $\Phi 15.9/\Phi 9.5$, and the branch pipe B should be FQZHN-01C.
- The downstream inner units of the main pipe L4 are N3, N4, and its total capacity is $71 \times 2 = 142$, the size of pipe L4 is $\Phi 15.9/\Phi 9.5$, and the branch pipe D should be FQZHN-01C.
- The downstream inner units of the main pipe L5 are N5, N6, and its total capacity is $71 \times 2 = 142$, the size of pipe L5 is $\Phi 15.9/\Phi 9.5$, and the branch pipe E should be FQZHN-02C.
- The indoor unit below the main pipe L3 are N3~N6, and its total capacity is $71 \times 4 = 284$, the size of pipe L3 is $\Phi 15.9/\Phi 9.5$, and he branch pipe C should be FQZHN-02C.
- The indoor unit below to the main pipe A are N1~N6, and its total capacity is $71 \times 4 + 80 \times 2 = 444$, and the branch pipe should be FQZHN-03C, and because the total piping length of liquid + air side is $\geq 90\text{m}$, check Table.4-4, and the first branch pipe should apply FQZHN-03C, and according to the principle of maximum value, it should apply FQZHN-03C.

3. Main pipe (please refer to Table 5-5 and Table 5-7)

In Fig. 5-5, main pipe L1, its outdoor unit capacity is 45kW. Its gas/liquid pipe diameter is $\Phi 25.4/\Phi 12.7$ according to Table 5-7. Because total piping length of liquid + air side is $\geq 90\text{m}$, according to Table 5-5, its gas/liquid side is $\Phi 28.6/\Phi 12.7$. By maximum principle, adopt $\Phi 28.6/\Phi 12.7$.



CAUTION

Suppose in the displayed piping system, the total equivalent piping length of air side + liquid side is longer than 90m.

1. Indoor unit branch pipe

Inner branch pipes are a~f, the size selection please refers to Table 5-6. Note: The max. length of the branch pipe should not longer than 15m.

2. The main pipes of indoor unit and the indoor unit branch pipe components

● Connecting method

Table 5-10

	Gas side	Liquid side
Outdoor unit 40kW	Flare/welding	Flare/welding
Outdoor unit 45kW	Flare/welding	Flare/welding
Indoor unit	Flare	Flare
Manifold	Flare/welding	Flare/welding

● Allowable length and altitude difference of refrigerant pipe

Table 5-11(Liquid side pipe only)

		Pimitted value	Piping	
40kW 45kW	Pipe Length	Total Pipe Length(Actual)	$\leq 250\text{m}$ L1+L2+L3+L4+L5+a+b+c+d+e+f	
		Maximum Piping(L)	Actual Length	$\leq 100\text{m}$ L1+L2+L3+L4+L5+f (The first connect method) or L1+L3+L5+f (The second connect method)
			Equivalent Length	$\leq 120\text{m}$
		Pipe Length(from the first line branch pipe to the furthest indoor unit)(m)	$\leq 40\text{m}$	L2+L3+L4+L5+f (The first connect method) or L3+L5+f (The second connect method)
	Pipe Length(from the nearest branch pipe equivalent length)(m)	$\leq 15\text{m}$	a,b,c,d,e,f	
Drop Height	Indoor Unit-Outdoor Unit Drop Height(H)	Outdoor Unit up	$\leq 30\text{m}$	
		Indoor Unit Down	$\leq 20\text{m}$	
	Indoor Unit to Indoor Unit Drop Height(H)	$\leq 8\text{m}$		



CAUTION

When the total equivalent piping length of liquid + gas side is $\geq 90\text{m}$, it must increase the size of air side main pipe. Besides, according to the distance of refrigerant pipe and the over matched state of inner unit, when the capacity is decreasing it still can increase the gas side main pipe size.

- The first connecting method

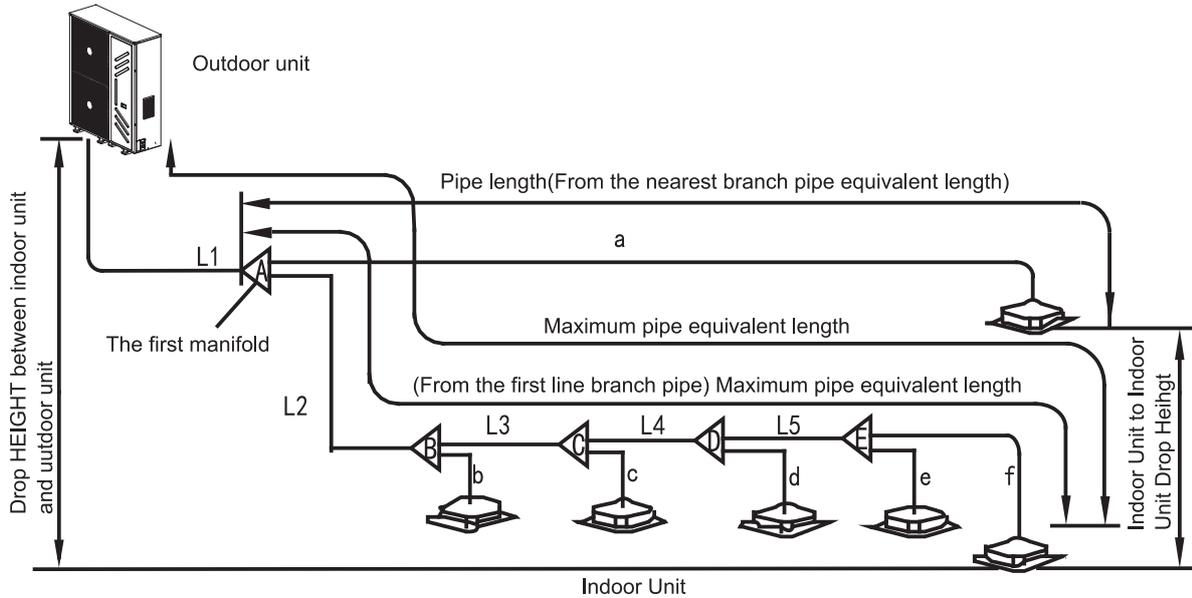


Fig.5-6

- The second connecting method

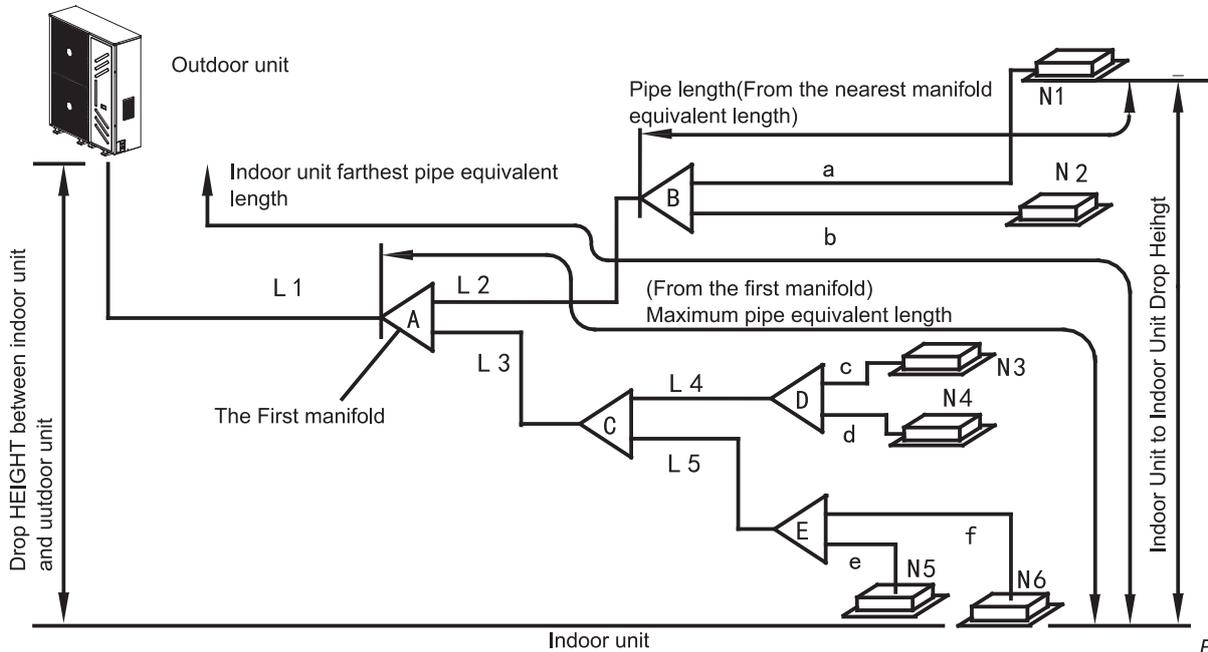


Fig.5-7

5.6 Remove Dirt or Water in the Pipe

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

5.7 Airtight Test

1. Connect the high pressure side pipe and liquid side stop valve after connecting indoor unit pipes.
2. Weld low pressure side pipe and meter connector.
3. Use vacuum pump to discharge air from valve core of liquid side stop valve and meter connector until the pressure reaches to -1kgf/cm^2 .
4. Close the vacuum pump and fill nitrogen 40kgf/cm^2 .
5. At the end of air tightness test, the gas side stop valve and the low pressure side piping should be welded.

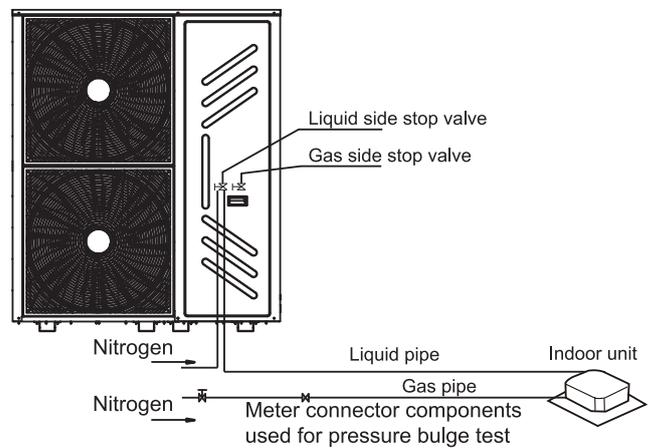


Fig.5-8



CAUTION

- Pressured nitrogen (3.9MPa (44kgf/cm²) for R410A] should be used in the airtight test.
- DO NOT pressure to the stop valve directly.(See Fig.5-8)
- The airtight test should never use any oxygen,flammable gas or poisonous gas.
- Wrap the low pressure valve with a wet cloth for protection when welding.
- In case of damage, the holdup time shouldn't be too long.

5.8 Air Purge with Vacuum Pump

1. Use the vacuum pump with the relative vacuum degree of -0.1MPa, vacuum-pump efficiency of 40L/min
2. Outdoor unit needn't to be vacuumized. Do not open liquid/gas side stop valves of the outdoor unit.
3. Be sure when vacuum pump works for more than 2 hours, the relative vacuum degree is under -0.1MPa. If the degree is still under -0.1MPa for more than 3 hours, it demonstrate there's moistureor leakage. Check the pump.

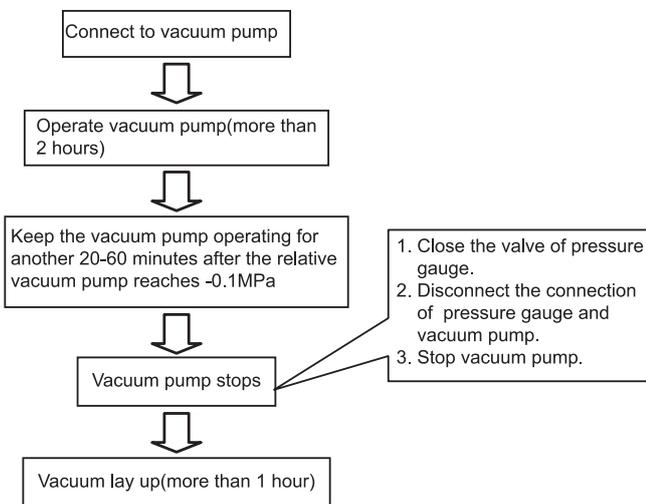


Fig.5-9



CAUTION

- Do not mixedly use tools used for different refriferant, tools and measuring instrument that directly contact refriferant. DO NOT use refriferant gas to air discharge.
- When vacuum degree can't reach -0.1MPa, consider if it leaks. If no leakage, please keep the vacuum pump working for another 1 to 2 hours.

5.9 Outdoor unit stop valve

- **Outdoor unit stop valve**
 1. Before using stop valve, get familiar with every part of the valve, as shown in Fig.4-10. The stop valve is closed when leaving the factory.
 2. Please use a proper tool. Because the stop valve in this unit is not a flare-seal type, if dismantling forcibly, it may cause valve damage. Please use hosepipe to fill in when maintenance.
 3. When cooling in the outside in a low temperature, operation pressure will be low. Use silicone encapsulant to seal in case of freezing of flare nut of stop valve gas side.
 4. Make sure if there is refrigerant leakage after fastening the bonnet.
- **Operational approach of closing the valve**
Prepare a hexagonal wrench(specification 6mm)

Open approach:

1. Insert a hexagonal wrench into the valve rod and spin anticlockwise.
2. When the valve rod can't be spinned any more, the valve is open

Close approach:

Insert a hexagonal wrench into the valve rod and spin clockwise.

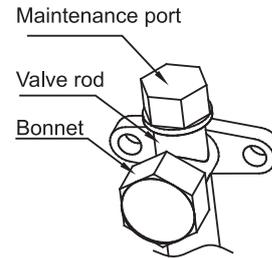


Fig.5-10

- **Bonnet caution**
Tightening the bonnet after valve operation.
- **Main tenance port caution**
Please operate with a filling hosepipe with a compression bar. Tightening the valve after operating.

Stop valve specification

Table 5-12

Model	40kW	45kW
Liquid side stop valve	Φ12.7	Φ12.7
Gas side stop valve	Φ22.2	Φ25.4

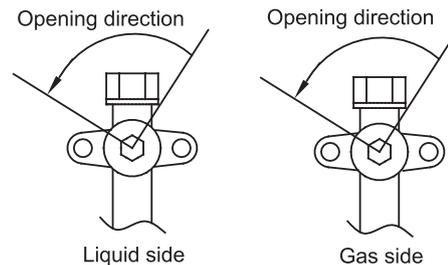


Fig.5-11

5.10 Leakage inspection

Inspect each joint to check if it leaks by using a leak detector or suds.(Fig.5-12)

NOTE: A liquid side stop valve

B gas side stop valve

C and D are the joint of the indoor unit connecting pipe.

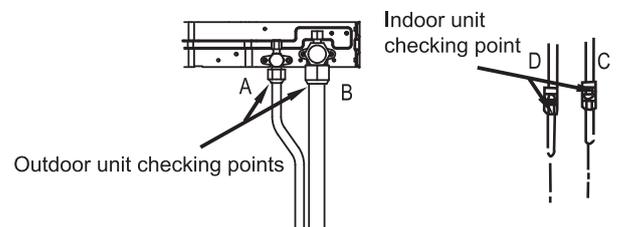


Fig.5-12

5.11 Heat Insulation

Do the heat insulation to the pipes of air side and liquid side separately. The temperature of the pipes of air side and liquid side when cooling, for avoiding condensation please do the heat insulation fully.(Fig.5-13)

1. The air side pipe should use closed cell foamed insulation material, which the fire-retardant is B1 grade and the heat resistance over 120°C.
2. When the external diameter of copper pipe≤Φ12.7mm, the thickness of the insulating layer at least more than 15mm;
When the external diameter of copper pipe≥Φ15.9mm, the thickness of the insulating layer at least more than 20mm.

3. Please use attached heat-insulating materials do the heat insulation without clearance for the connecting parts of the indoor unit pipes.

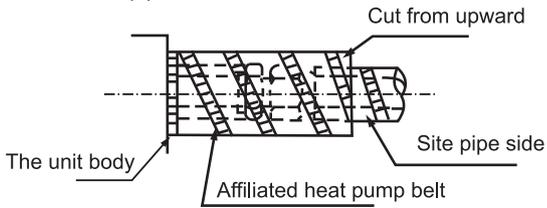


Fig.5-13

5.12 Refrigerant Amount to be Added

Calculate the added refrigerant according to the diameter and the length of the liquid side pipe of the outdoor unit/indoor unit connection. Calculate the refrigerant adding amount, adding refrigerant R410A.

Table 5-13

Liquid Side Piping Diameter	Refrigerant to be Added Permeter Piping
Φ6.4	0.022kg
Φ9.5	0.057kg
Φ12.7	0.110kg
Φ15.9	0.170kg

NOTE: R410A refrigerant should be added in liquid quantifiedly by electronic scale.

5-13 Manifold installation key points

Install it in a horizontal level, error angle should less than 10°. It may result in damage if installing in a wrong way

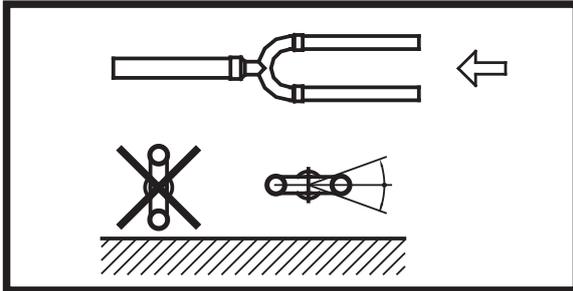


Fig.5-14

6. ELECTRICAL WIRING



CAUTION

- Please select power source for indoor unit and outdoor unit respectively.
- The power supply has specified branch circuit with leakage protector and manual switch.
- The outdoor unit model which corresponding to different outdoor unit power supply should refer to the nameplate.(Please set all the indoor unit power of one system into the same branch circuit.)
- Please put the connective wire system between indoor unit and outdoor unit with the refrigerant system together.
- Use 3-core shielded wire as indoor unit and outdoor unit signal wire.
- The installation should comply with local electric standard.
- Power wiring should be engaged by specialized electrician.

6.1 Outdoor unit wiring terminal instructions

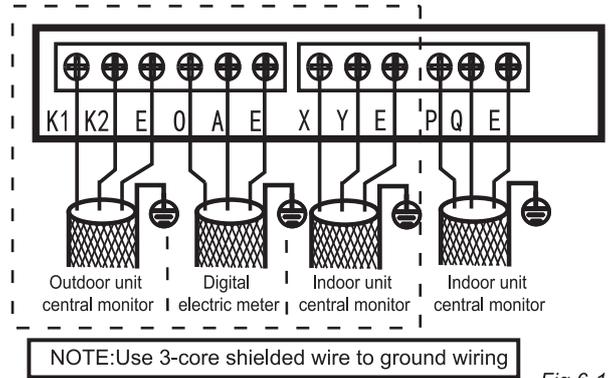


Fig.6-1

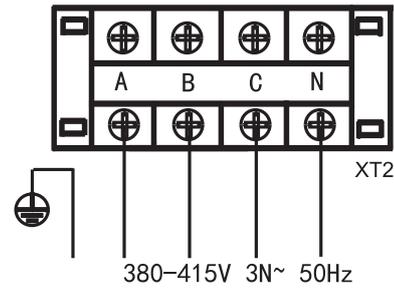


Fig.6-2

NOTE: Outdoor unit central monitor, digital electric meter, indoor unit central monitor are all optional components in the dotted box, if necessary, please contact to the local dealer to buy those.

6.1.1 The specification of power

Power Source		380-415V 3Ph~ 50Hz	
Model	Capacity(kW)	40	45
Power Supply	Hz	50	50
	Voltage	380-415	380-415
	Min.(V)	342	342
	Max.(V)	456	456
	MCA	42.5	52.5
	TOCA	39.84	49.84
Compressor	MFA	60	60
	MSC	/	/
OFM	RLA	12×2	15.4×2
	kW	0.56+0.32	0.56+0.32
	FLA	2.65+3.84	2.65+3.84

6.2 Indoor unit system wiring

1. Individual power supply (without power supply device)
(See the table below)

Table 6-1

Item	Power Source	Thinnest electric wire diameter(mm ²) (Metal tube synthetic resin wiring)			Hand switch		Leakage protector
		Under 20m	Under 50m	Ground wire	Capacity	Fuse	
Model							
40kW	380-415V 3N~ 50Hz	4×16mm ²	4×25mm ²	16mm ²	100	70	Under 100mA 0.1 sec
45kW	380-415V 3N~ 50Hz	4×25mm ²	4×35mm ²	16mm ²	100	90	Under 100mA 0.1 sec



CAUTION

Wiring diameters and continuous lengths in the table are the situation that voltage decrease degree is within 2%, when the wiring continuous length exceeds the values in the table, choose the wire diameter according to regulations

6.3 Outdoor unit spot checking instruction

SW2 Query instructions

Table 6-2

NO.		Display content	Note
	Normal display	Operation frequency	
1	0. --	Outdoor unit address	0
2	1. --	Outdoor unit itself capacity	8, 10, 12, 14, 16, 18
3	2. --	Module outdoor unit quatity	Reserved
4	3. --	Qty.setting of indoor units	Actual value
5	4. --	Total capacity of outdoor unit	Reserved
6	5. --	Total requirement of indoor unit capacity	Actual value
7	6. --	Total requirement of main unit corrected capacity	Actual value
8	7. --	Operation mode	0, 2, 3, 4
9	8. --	This outdoor unit actual operation capacity	Capacity requirements
10	9. --	Speed of fan A	0, 1,, 9, 10
11	10. --	Speed of fan B	0, 1,, 9, 10
12	11. --	T2B/T2 average Temp.	Actual value
13	12. --	T3/T3A pipe temp.	Actual value
14	13. --	T4 ambient temp	Actual value
15	14. --	Discharge Temp.of Inverter compressor A	Actual value
16	15. --	Discharge Temp.of Inverter compressor B	Actual value
17	16. --	Reserved	
18	17. --	Current of inverter compressor A	Actual value
19	18. --	Current of inverter compressor B	Actual value
20	19. --	Opening angle of EXV A	
21	20. --	Opening angle of EXV B	
22	21. --	High pressure	Reserved
23	22. --	T3B	
24	23. --	Qty. of Indoor units	That can communicate with indoor units
25	24. --	Qty. of the working Indoor units	Actual value
26	25. --	Priority mode	0, 1, 2, 3, 4
27	26. --	Night noise control mode	0, 1, 2, 3
28	27. --	Static pressure mode	Reserved
29	28. --	DC voltage A	Actual value+10
30	29. --	DC voltage B	Actual value+10
31	30. --	Reserved	
32	--	Reserved	Display code 8.8.8
33	---	---	Check end

NOTE:

Normal display:When standby, the high position displays the address of the outdoor unit,and the low position displays the Qty.of indoor units that can communicate with outdoor unit .When it is operating, it will display the rotation frequency of the compressor.

- 1)Operation mode:0—OFF; 2—Cooling; 3—Heating; 4—Constraint cooling;
- 2)Fan speed:0-stop; 1~10: speed increase sequentially, 10 is the max. fan speed.
- 3)EXV opening angle: Pulse count=display value*8;
- 4)Priority mode: 0-heating priority mode ; 1-cooling priority mode ; 2-open the priority mode first ; 3-respond the heating mode only ; 4-respond the cooling mode only.
- 5)Night noise control mode:0-Night noise control mode ; 1-silent mode ; 2-reserve; 3-no priority.

6.4 Outdoor unit main control board

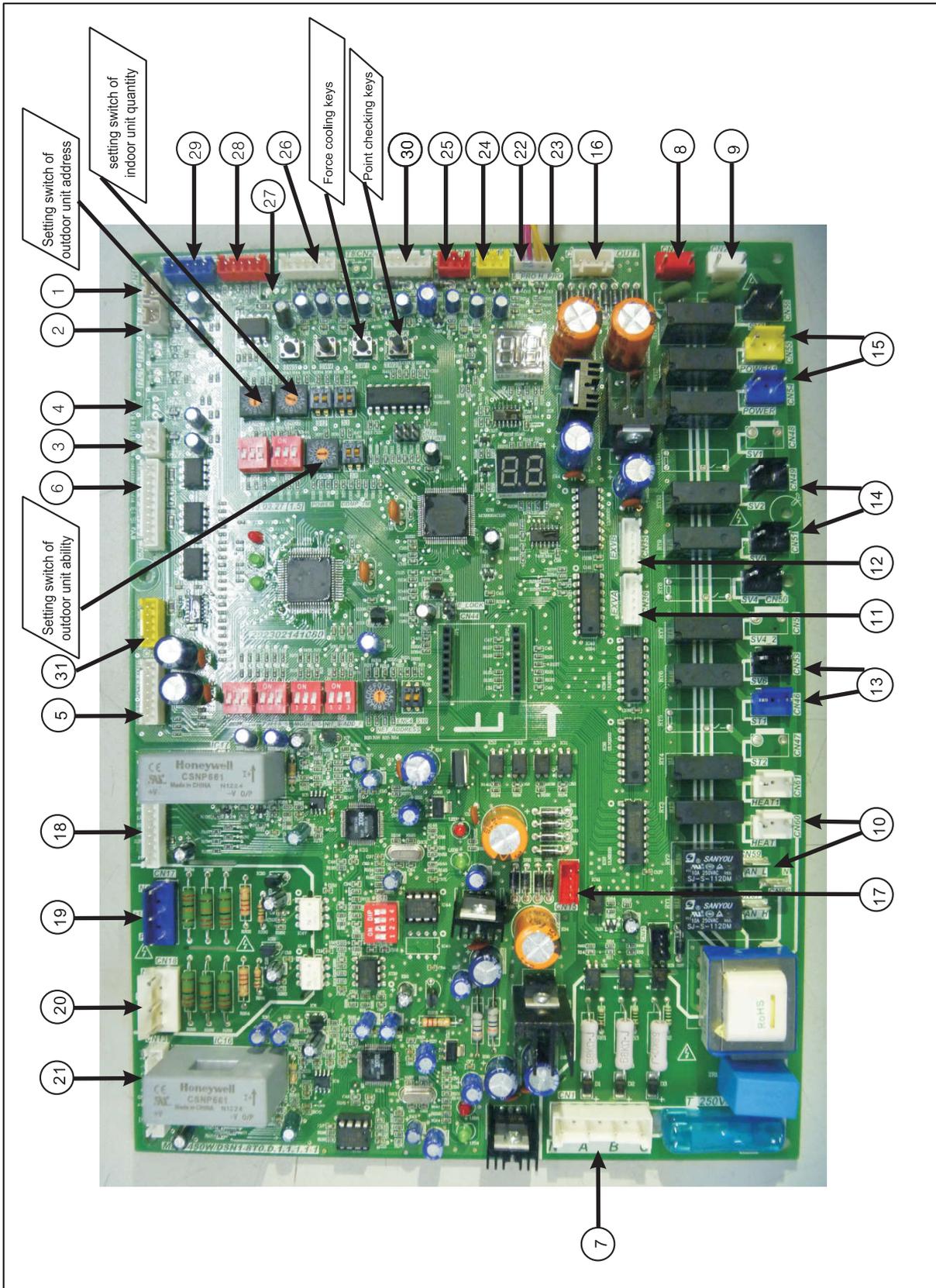


Fig.6-3

6.5 Outdoor main control board instructions

Table 6-3

NO.	Contents	NO.	Contents
1	Discharge temp. sensed port of the inverter compressor A	17	Power output of the No.2 transformer
2	Discharge temp. sensed port of the inverter compressor A or B	18	Activation port of inverter module B
3	Ttemp. sensed port of the inverter module radiator	19	Port for inverter module B voltage inspection
4	Reserved	20	Port for inverter module A voltage inspection
5	Reserved	21	Activation port of inverter module A
6	Wiring port for communication between indoor and outdoor units, indoor unit network and network accounting	22	ON/OFF signal input port for system low pressure inspection
7	Phase inspection port	23	ON/OFF signal input port for system high pressure inspection
8	Power input of the No.1 transformer	24	Reserved
9	Power input of the No.2 transformer	25	Reserved
10	Loading output terminal	26	Inspection port for outdoor ambient temp. and condensator coil
11	EXV A driving port	27	Reserved
12	EXV B driving port	28	Control port of DC fan A
13	Loading output terminal	29	Control port of DC fan B
14	Loading output terminal	30	Current inspection port of the inverter compressor A and B
15	Loading output terminal	31	Power supply connected port of the main control panel
16	Power output of the No.1 transformer		--

6.6 Dial indication sign instructions

ENC3 and S12 function definition:

		Set the number of indoor units to 0-15
		Set the number of indoor units to 16-31
		Set the number of indoor units to 32-47
		Set the number of indoor units to 48-63

ENC1 function definition:

	Reserved
--	----------

ENC2 function definition:

	Outdoor unit capacity dial code 0-6 valid represents 6HP-18HP
--	---------------------------------------------------------------

ENC4 function definition:

	Outdoor unit net address dial code 0-F valid represents 0-15
--	--------------------------------------------------------------

S1 function definition:

	Starting time is set about 5 minutes
	Starting time is set about 12 minutes (Default the Factory Set)

S2 function definition:

	Night time selection is 6h/10h (Default the Factory Set)
	Night time selection is 6h/12h
	Night time selection is 8h/10h
	Night time selection is 8h/12h

S3 function definition:

	Non-silence mode (Factory default)
	Silence mode
	Reserved
	Non-silence mode

S4 function definition:

	0 static mode (Factory default)
	Low static mode (Reserved, used in customized unit)
	Middle static mode (Reserved, used in customized unit)
	High static mode (Reserved, used in customized unit)

NOTE:

S1,S2 function definition only for 14HP,S3 function definition only for 16HP.

S5 function definition:

ON	Heating priority mode (Factory default)
ON	Cooling priority mode
ON	Firt-start priority mode
ON	Heating mode response only
ON	Cooling mode response only

S8 function definition:

ON	(Factory default)
----	-------------------

S10 function definition:

ON	Reserved
----	----------

S11 function definition:

ON	6-10HP Outdoor unit settings
ON	12-18HP Outdoor unit settings



CAUTION

Code dialing must be operated after the power supply is cut off.

S6 function definition:

ON	Auto address searching
ON	Non-auto address searching (Factory default) (communication method with old indoor unit)
ON	Indoor unit address reset (Auto search for new valid indoor unit)

S7 function definition:

ON	Quantity settings of shield indoor unit
ON	Start quantity settings of indoor unit

6.7 Electric system and installation

Electric wiring Notes

1. Please use private indoor and outdoor unit power supplies.
2. Power supply should apply specialized duplexure and should install RCCB and manual switch.
3. Power supply, RCCB and manual switch used for a same indoor unit should have universality.(Indoor unit power supply for the same unit should use the same circuit and ON/OFF simultaneously, or it could seriously affect the system service life and the unit may fail to power on).
4. Consider the indoor and outdoor unit connecting wiring system and refrigerant piping as a same system.
5. Suggest to use 3-core shield cable for outdoor unit signal wire to decrease noise disturb, don't use multi-core cable without shield.
6. Operate according to the relative electric national regulations.
7. Power supply wiring must be operated with a specialized person.

6.8 Electric control system wiring diagram

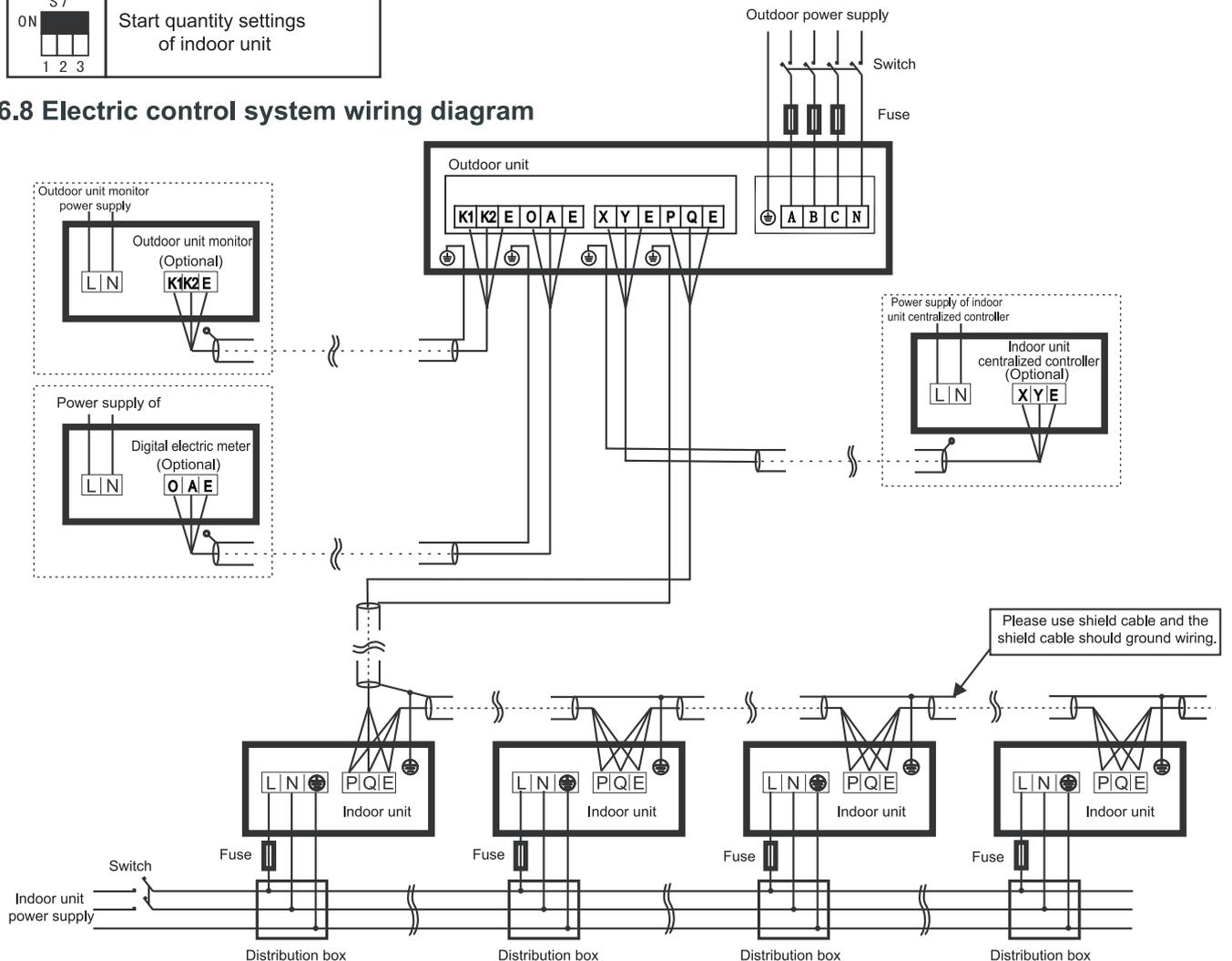


Fig.6-4





CAUTION

- Wrong wiring may damage compressor and other components.
- PQE connects to weak current signal wire, don't connect it to strong current.
- All the connecting terminal should be fastened reliably, ground wire should be grounded correctly.
- Use wiring terminal power supply wire with a torus. After power supply wire has been connected to the wiring base, it needs to be reliably fastened.
- Power on after a careful inspection and make sure there's no mistakes.

6.9 Indoor and outdoor unit control wiring

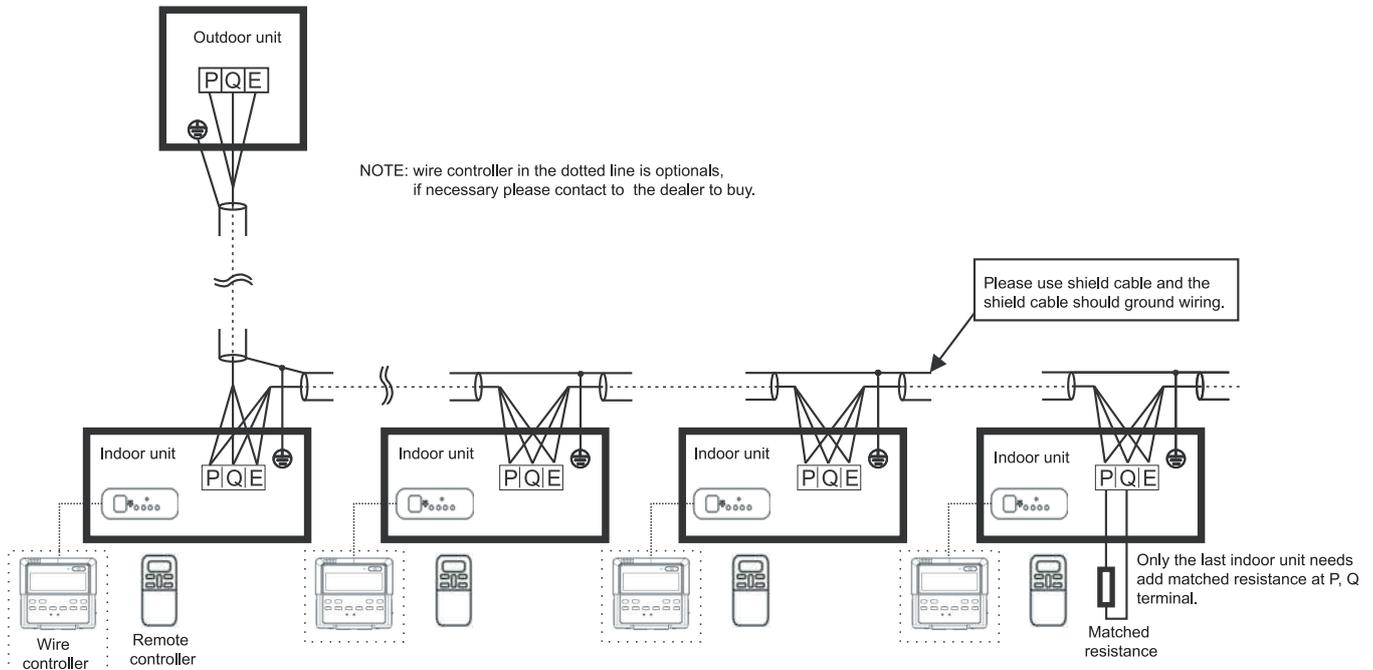


Fig. 6-5



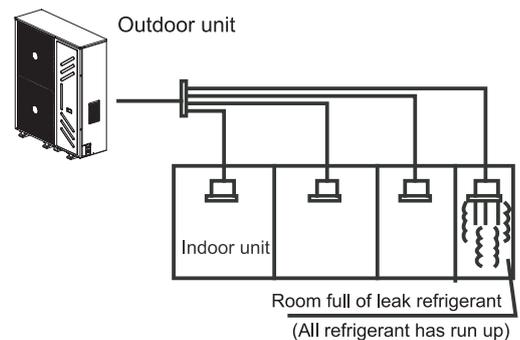
CAUTION

- Signal wire is 3-core, polarized wire. Use 3-core shield wire to prevent interference. The grounding method now is grounding the closed end of the shield wire and opening (insulating) at the end. Shield is to be grounded. (Reference distance: It is 300mm when current capacity of power cord is less than 10A, or 500mm when 50A).
- When power cord is parallel with signal wire, please put them into separate wire distribution pipes, and leave a proper distance.
- Display box, remote controller, and matched resistance are the accessories of indoor unit; wire controller is optional, if necessary please contact to the dealer to buy.

7. PRECAUTIONS ON REFRIGERANT LEAKAGE

This air conditioner(A/C) adopts innocuous and nonflammable refrigerant of R22,R410A,407C. The locating room of the A/C should big enough that any refrigerant leakage is unable to reach critical thickness. So certain essential action can be taken on time. Critical thickness-----the Max. thickness of Freon without any harm to person.

Refrigerant critical thickness: 0.3[kg/m³] for R22
 Refrigerant critical thickness: 0.35[kg/m³] for R470C
 Refrigerant critical thickness: 0.44[kg/m³] for R410A.



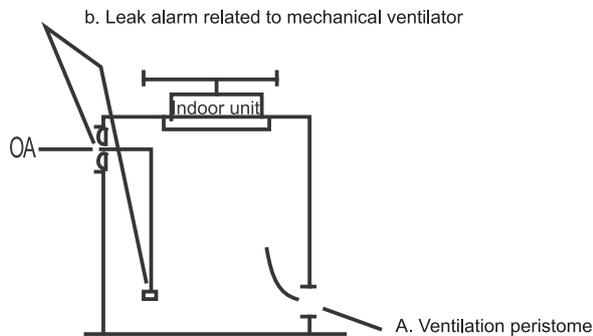
Confirm the critical thickness through follow steps, and take necessary actions.

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[m³]) (as the minimum cubage).
3. Calculate the refrigerant thickness.

$$\frac{A \text{ [kg]}}{B \text{ [m}^3\text{]}} \leq \text{Critical thickness}$$

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 can not regularly ventilate.



(Leak hunting siren should be installed in places easily keep refrigerant)

9. TURN OVER TO CUSTOMER

1. The owner's manual of indoor unit and owner's manual of outdoor or unit must be turned over to the customer.
2. Explain the contents in the owner's manual to the customers in details.

8. TEST RUNNING

8.1 Check points before test running

1. If indoor and outdoor units have been installed properly.
2. Whether piping and wiring is correct.
3. Whether has taken leakage inspection to the refrigerant pipe system.
4. Whether heat insulation has been properly applied.
5. If ground wire has been correctly connected.
6. Whether take a record of the piping length or refrigerant adding amount.
7. Whether the power supply voltage is equal with the rated voltage.
8. If there's barriers around air inlet/outlet.
9. Open gas side and liquid side stop valve.
10. Connect to power supply and pre-heat the AC.

8.2 Testing running

Control A/C to process cooling operation with remote controller, check the following points respectively, if it fails, please debug according to operation manual.

1. Indoor unit

- If the remote controller is normal.
- Whether each function keys is normal in the remote controller.
- If the air deflector operates normally .
- Whether room temp. adjustment is normal.
- Whether indicator lights up normally.
- If manual keys are normal.
- If water drainage is normal.
- If there's vibration and abnormal noise when operating.
- Test if heating function works normally for heating and cooling A/C.

2. Outdoor unit

- If there's vibration and abnormal noise when operating.
- Whether the wind and noise and condenser water could influence your neighbour.
- If there's refrigerant leakage.



CAUTION

When electrified, start the unit immediately or reboot after shutdown, A/C has protection fuction, compressor will start 5min delay.

Thank you very much for purchasing our product.
Before using your air conditioner, please read this manual carefully and keep it for future reference.

Due to LENNOX EMEA ongoing commitment to quality, the specifications, ratings and dimensions are subject to change without notice and without incurring liability.
Improper installation, adjustment, alteration, service or maintenance can cause property damage or personal injury.
Installation and service must be performed by a qualified installer and servicing agency.



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