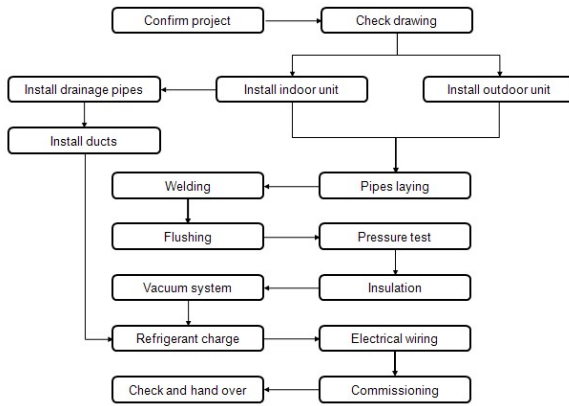


Part 4 Installation

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1.Preparation on installation

1.1 Installation procedure



1.2 Preparation and Tools before Installation

◇ Please buy the following parts from the market before installation

Hanging bolt (4 per unit)
PVC drain pipe
Some cable ties
Connecting copper tube
Branch manifold (choose according to actual installation situation)
Thermal insulation materials for connecting copper tube (PEF foaming materials with thickness above 8mm)
Power cord and power connection line (it's required to wire according to requirement for line diameter in wiring diagram)

Note:

Due to the difference between the characteristics of R410A and R22 refrigerant, it's necessary to use dedicated tools of R410A for some tools during installation.

- ◇ The selected position hanging indoor unit should be able to support the weight of unit without noise and additional vibration. It's necessary to reinforce before installation if reinforcement is required;
- ◇ The space of selected ceiling should be enough for holding indoor unit;
- ◇ The installation location should be easy for drainage;
- ◇ It shouldn't be installed in places (such as kitchen, laundry and mechanical workshop, etc.) of heat source, vapor source and more oil mist to prevent degradation of heat exchanger, electric shock and unit damage caused by plastic parts corrosion;
- ◇ Install in the place at least one meter away from TV and radio to prevent interfering TV and radio,
- ◇ There is no barrier blocking ventilation nearby and cold air should be able to evenly distribute to each indoor corner;
- ◇ There should be certain spacing between the surrounding and barrier of indoor unit to easy maintenance;
- ◇ The unit uses R410A environment-friendly refrigerant that is a kind of nonflammable and nontoxic gas. Since the refrigerant has larger specific gravity than air, it will suffuse on the ground in case of leakage. Therefore, the unit must be well ventilated if installed in closed room to prevent

suffocation. In case of refrigerant leakage, immediately stop unit operation, timely contact maintenance personnel and avoid any open fire on site because refrigerant will decompose hazardous gas when exposed to open fire.

Tool	Application	R410A	Reasons
Flaring tool	cutting tube	○	—
Tube bender	flaring tube and flaring opening when welding	▲	It's required to increase extension allowance of copper tube when using R410A.
Tube bender	bending tube	○	—
Torque wrench	tightening flare nut	▲	The torque of 1/2 and 5/8 is increased and torque reference is changed
welding torch, 2B silver solder	welding Auxiliary tube	○	—
Oxygen, acetylene		○	—
Nitrogen		○	—
vacuum pump with return flow stop valve	vacuumizing	▲	Don't use original vacuum pump. It must be ensured that the oil in vacuum pump can't flow into A/C system.
Refrigerant holder	dosing of refrigerant charge	▲	R410A should be charged in gas state.
Electronic scale		○	—
Pressure gauge	running vacuumizing, charging refrigerant and inspection equipment	▲	The old pressure gauge can't be used due to the need of different pressure, MAX: HP5.3Mpa LP3.5Mpa
Connecting hose		▲	
Leak detector	Checking the leakage of system	▲	Don't use Freon leak detector of CFCs or HCFCs, because there is no chlorine in new refrigerant. It's necessary to use hydrogen leak detector or R134a leak detector.

Note: ○universal ▲special for R410A

2. Installation of Outdoor Unit

2.1 Installation Location and Foundation

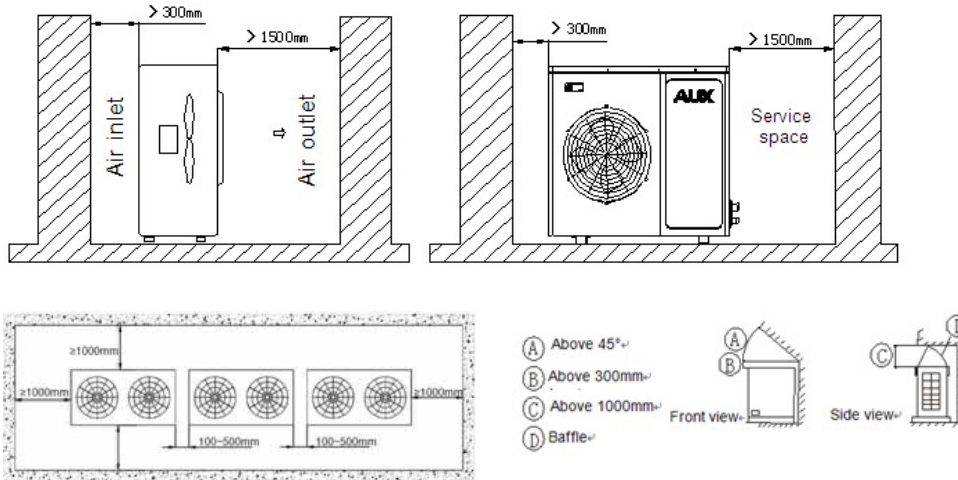
- The installation location should efficiently stand the weight of outdoor unit, isolate noise and vibration;
- The installation location should keep away from direct sunlight. It's preferable to erect a sunshade is necessary;
- The installation location must be able to drain rainwater and water formed by frost;
- The installation location must be able to ensure A/C system can't be buried by snow;
- The installation location must be able to ensure *air* outlet can't face to strong wind;
- The installation location must be able to ensure air discharge and operation noise of unit can't disturb neighbors;
- The installation location must be free from waste and oil mist.

Warning:

Outdoor unit may subject to failure if it runs in the air environment containing oil source (including motor oil), salt (coastal area) and sulfide gas (nearby hot spring and refinery).

1.2 Maintenance and Ventilation Space of modular outdoor unit

- ◇ In case of installation, after reserving maintenance space as shown below, install outdoor unit and install power supply device at side of outdoor unit by referring to installation instruction of power supply device manual.
- ◇ Ensure necessary installation and maintenance space, and modules of the same system must be placed at the same height (see the following diagram).



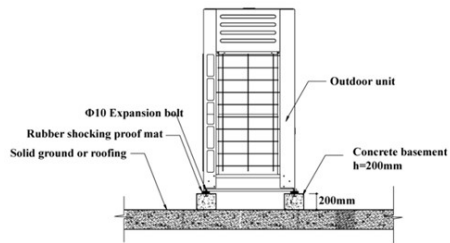
- ◇ If two rows of outdoor units, we suggest face to face, because easy to maintenance; no air short circuit.
- ◇ If there is barrier above outdoor unit, install according to the following diagram:

Note:

If there is stacking objects around outdoor unit, it should be at least 1000mm higher than the top of outdoor unit. If it is lower than the above height, it's required to add mechanical discharge device.

2.3 Installation of Outdoor Unit

- ◇ Tighten outdoor unit on mounting support with M10 bolt and nut, and keep it horizontal. The bolt should have a proper length of 20mm more than base surface.
- ◇ In case of installing on wall or roof, it's necessary to firmly secure A/C system to prevent the attack of earthquake or strong wind;
- ◇ The foundation can be made of channel steel or concrete. Reserve the space for discharging the condensate water from outdoor units.



- ◇ Install drainage channels to ensure condensed water flow out smoothly;
- ◇ Try not to use four-square base to support outdoor unit; rubber anti-vibration pads are necessary to avoid vibration.



2.4 Installation of indoor unit (refer to the part of indoor unit)

3. Installation of refrigerant auxiliary pipe

3.1 Installation notice

◇ Please use seamless phosphorus-killed copper auxiliary pipe.

◇ Ensure to fill nitrogen for protection when welding.

It's mandatory to purge nitrogen to prevent oxidation layer (Cu₂O) formed in copper Auxiliary pipe when welding, otherwise substantial oxidation layers will cause fatal failure of A/C system;

Foreign matters (oxides) will cause blockage of capillary tube or expansion valve, abnormal discharge temperature, no cooling (no heating), and blocking cylinder of compressor. Mostly, foreign matters cause blocking cylinder of compressor by blocking the oil return hole of gas/liquid separator;

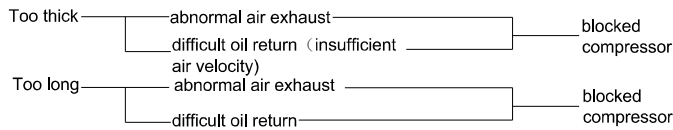
◇ When welding auxiliary pipe of the same diameter, you are required to expand the inside diameter at connection area with flaring tool, then butt and weld two Auxiliary pipes. It's absolutely prohibited butting and welding with flaring opening;

◇ Please purge with nitrogen or air before connection to remove dust and moisture inside auxiliary pipe; Don't install refrigerant Auxiliary pipe when it rains to prevent water ingress; Suspend and fix outdoor Auxiliary pipe to prevent water ingress;

Impact of water on system: blocking capillary or expansion valve, generating acid iron/copper erosion due to refrigerant hydrolysis, generating foreign matter crystal (cage compounds) due to reaction of refrigeration oil;

Don't let dust or foreign matter such as concrete fragment, sand and copper slag ingress into the system;

◇ Specification of refrigerant Auxiliary pipe should be selected according to unit requirement



◇ Refrigerant auxiliary pipe should be fixed.

When running, refrigerant Auxiliary pipe will sway, expand or shrink, if unfixed, load will concentrate on certain part, resulting fracture of refrigerant Auxiliary pipe that should be fixed every 2~3m.

◇ Please lay out the Auxiliary pipe according to its orientation. Don't repeat bending and unbending operation over three times on the same position of Auxiliary pipe (because Auxiliary pipe will be hardened in this way);

◇ Auxiliary pipe bender must be used for auxiliary pipe bending. The curvature can't be too small, otherwise the auxiliary pipe may be bent and shrunken, affecting refrigerant flow;

3.2 Combination Ratio of Capacity

For VRF system, combination ratio of indoor unit and outdoor unit should meet the following requirement:

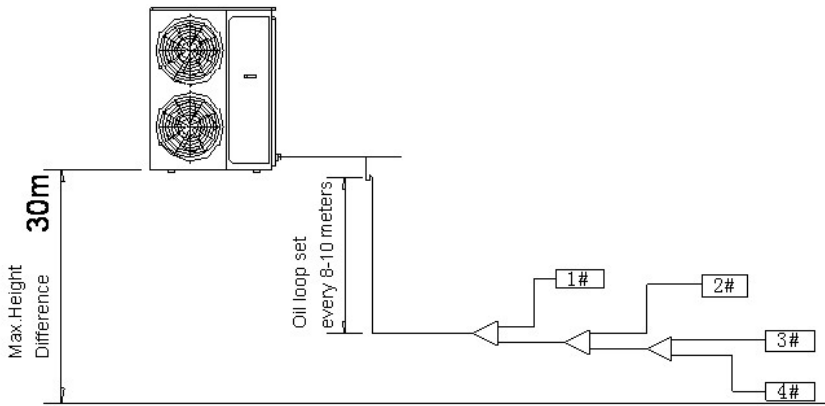
$$N\% = \frac{\sum \text{rated cooling capacity of indoor unit}}{\sum \text{rated cooling capacity of outdoor unit}}$$

Note:

1. Value of N% is 100%. If indoor units not fully opened very often, value of N% can be 130%;
2. Maximum cooling capacity of unit equals to rated cooling capacity of outdoor unit;
3. If permitted, it's recommended to use less indoor units and shorter pipeline

3.3 Connection schematic diagram of auxiliariypipe

Connection Schematic Diagram of system



Note:

Equivalent length refers to conversion length of parts such as elbow after considering pressure loss.
 Equivalent length: actual length of pipe + quantity of elbow × equivalent length of each elbow + quantity of oil trap × equivalent length of each oil trap

Elbow and oil trap recommenddimension list

Type Diameter of pipe(mm)	90° elbow(mm)	Oil trap(mm)
9.52	0.18	1.3
12.7	0.20	1.5
15.88	0.25	2.0
19.05	0.35	2.4
22.2	0.40	3.0
25.4	0.45	3.4
28.6	0.50	3.7
31.8	0.55	4.0
34.93	0.58	4.2
41.3	0.63	4.6
44.5	0.66	5.0

Example:

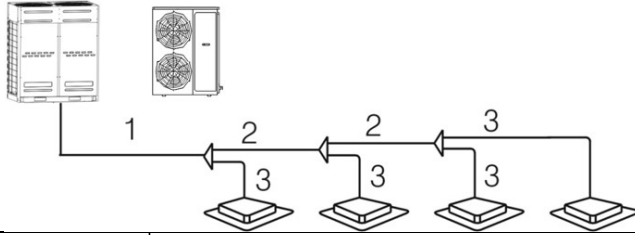
When actual length of 10HP outdoor unit is 80m, diameter of pipe is 25.40mm and 12 elbows & 2 oil traps are used, the equivalent length should be calculated:
 $80 + 0.45 \times 12 + 3.4 \times 2 = 92.2(m)$

Note:

If there is relatively big high head of indoor and outdoor unit, "S"-shaped oil trap must be installed every 8~10m for vertical pipe.

3.4 Determination method of auxiliary pipe and branch pipe

◇ Selecting type of Refrigerant auxiliary pipe



Type of Auxiliary pipe	Connecting parts	No.
Main Auxiliary pipe	between outdoor unit and the 1 st . branch pipe	1
	between branch pipe and branch pipe	2
Branch Auxiliary pipe	between branch pipe and indoor unit	3

◇ Diameter of auxiliary pipe 1 depends on auxiliary pipe specification of outdoor unit.

Model	Gas side(mm)	liquid side(mm)	The 1 st Branch pipe
ARV-H080/4R1A	φ15.88(flared)	φ9.52(flared)	AFG-00A
ARV-H100/4R1A	φ15.88(flared)	φ9.52(flared)	
ARV-H120/4R1A	φ19.05(flared)	φ9.52(flared)	
ARV-H140/4R1A	φ19.05(flared)	φ9.52(flared)	
ARV-H160/4R1A	φ22.2(flared)	φ9.52(flared)	
ARV-H220/5R1A, ARV-H280/5R1	φ22.2(flared)	φ9.52(flared)	

◇ Diameter of auxiliary pipe “2” depends on the total capacity of indoor unit connected to the Branch pipe.

Total capacity of indoor unit (kW)	Gas side(mm)	liquid side(mm)	selection of Branch pipe
0 < B ≤ 5.6	φ12.7	φ6.35	AFG-00A
5.6 < B ≤ 16	φ15.88	φ9.52	AFG-00A
16 < B < 22.4	φ19.05	φ9.52	AFG-12A
22.4 ≤ B ≤ 26	φ22.2	φ9.52	AFG-24A

Note:

The 1st. Branch pipe should be based on total capacity of outdoor unit and other Branch pipes
Shouldn't larger than the 1st Branch pipe.

◇ Diameter of auxiliary pipe “3” depends on indoor unit.

Cooling capacity of indoor unit(kW)	Gas pipe(mm)	Liquid pipe(mm)	Remark
2.2	φ9.52	φ6.35	
2.8	φ9.52	φ6.35	Cassette and Ceiling & Floor unit: the pipe diameter is φ12.7φ6.35
3.6	φ12.7	φ6.35	
4.5	φ12.7	φ6.35	
5.6	φ12.7	φ6.35	
7.1	φ15.88	φ9.52	

8.0	φ15.88	φ9.52	
9.0	φ15.88	φ9.52	
10.0	φ15.88	φ9.52	
11.2	φ19.05	φ9.52	
12.5	φ19.05	φ9.52	
14.0	φ19.05	φ9.52	
15.0	φ19.05	φ9.52	

◇Minimum wall thickness of auxiliary pipe should meet data of the following table.

Diameter of Auxiliary pipe (mm)	φ6.35	φ9.52	φ12.7	φ15.88	φ19.05
Minimum wall thickness (mm)	0.8	0.8	1.0	1.0	1.0

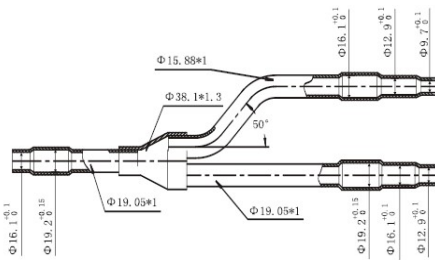
3.5 Type and physical dimension of branch pipe

Notice:

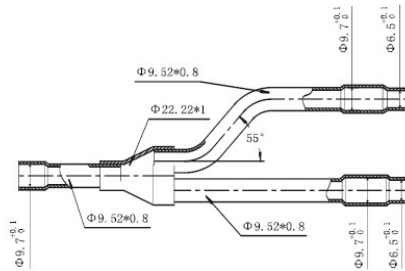
In addition to ensuring compliance with joint of main auxiliary pipe, it's allowable to select Branch pipe with similar specification as long as it meets pressure-proof requirement. It's required that no leaking at gas pressure of 4.5Mpa and no distortion and leaking at hydraulic pressure of 6.3MPa.

AFG-00A Physical Dimension

Gas side joint

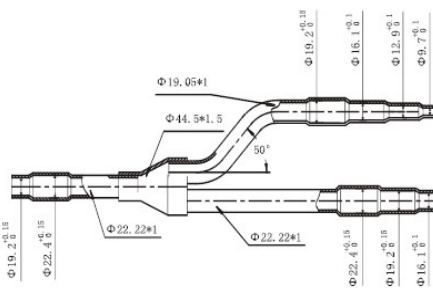


Liquid side joint

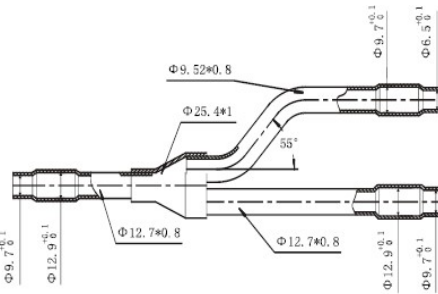


AFG-12A Physical Dimension

Gas side joint



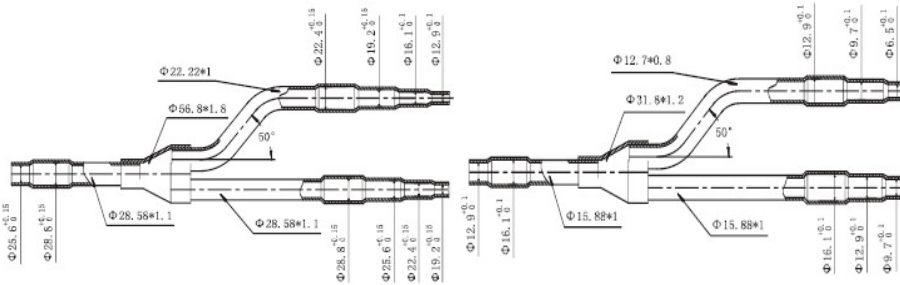
Liquid side joint



AFG-24A Physical Dimension

Gas side joint

Liquid side joint

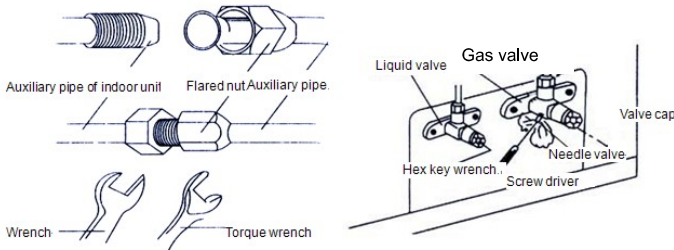


3.6 Connection and Welding of auxiliary pipe

Requirement for flaring opening connection:

- ◇ Debur the auxiliary pipe before flaring, then flare auxiliary pipe with flaring tool as per the dimensions of flaring opening in the following table:
- ◇ Apply a thin layer of refrigeration oil on both inside and outside at the flaring part;
- ◇ Align flaring opening with threaded joint of indoor unit, manually and tightly screw flared nut, then screw with torque wrench as per the tightening torque in the following table.
- ◇ Remove valve cap on liquid valve and air valve of shutoff valve of outdoor unit, align flaring opening with shutoff valve of outdoor unit, sufficiently screw flared nut with hand, and then screw with torque wrench as per the tightening torque in the following table.

Diameter of Auxiliary pipe	Tightening torque	Machining dimension of flared section (A)	Shape of flaring opening	Apply oil
1/4in(φ6.35mm)	15-19(N·m)	8.8-9.1mm		
3/8in(φ9.52mm)	35-40(N·m)	12.8-13.2mm		
1/2in(φ12.7mm)	50-60(N·m)	16.2-16.6mm		
5/8in(φ15.88mm)	68-80(N·m)	19.2-19.6mm		
3/4in(φ19.05mm)	100-120(N·m)	23.6-24mm		

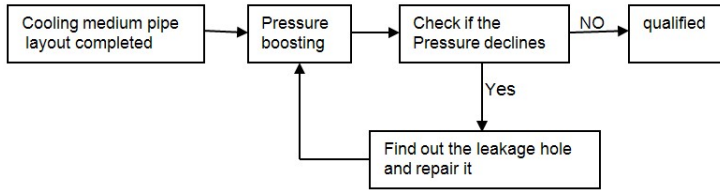


Requirement of welding connection:

- ◇ If welding connection method is used to connect auxiliary pipe and Branch pipe, you are required to weld before system connection and purge with nitrogen to prevent oxidation layer formed inside copper auxiliary pipe when welding.

3.7 Air Tightness Test

It aims to confirm if there is leakage in auxiliary pipe by using nitrogen and the steps are as follows:



Gradual pressurization test

According to each refrigerant system, do gradual pressurization test (nitrogen is required) on gas pipe and liquid pipe.

Phase 1: 3.0 kg / cm²; Pressurize at least 3 minutes; → Large hole may be found.

Phase 2: 15.0 kg / cm²; Pressurize at least 3 minutes; → Large hole may be found.

Phase 3: 43.0 kg / cm²; Retain the pressure for about 24 hours. → Small hole may be found.

Even if pressurize up to 43.0kg / cm², it's impossible to find small hole in very short time. Therefore, in phase 3, it's required to place for 24 hours to observe after pressurization.

Observe pressure drops.

It's necessary to correct if pressurized temperature is different from observed ambient temperature with difference of

0.1 kg / cm² per 1°C. Correction value = (pressurized temperature - observed temperature) x 0.1

Example:

pressure is 43.0 kg/cm² and temperature is 25°C in case of pressurization.

After 24 hours, if pressure is 42.5kg/cm² and temperature is 20°C, it is deemed qualified.

Check leaking hole.

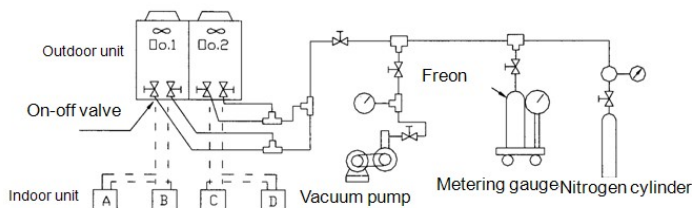
Listening check: larger leaking hole can be found by listening.

Touch check: feel if there is leaking by putting hand at pipe joint.

Soapsuds check: bubble can be found at leaking part.

In order to find small leaking hole or pressure drop is found but leaking hole can't be found in pressurization test

- 1) Discharge nitrogen to the position of 3.0 kg/cm².
- 2) Charge fluorine (R410a) up to the position of 5.0 kg/cm² (namely the mixed state of nitrogen and fluorine)
- 3) Check with halogen lamp, butane gas (petroleum gas) detector and electric detector.
- 4) If leaking hole can't be found, recheck by continuously pressurize up to 28 kg/cm². (maximum pressure is 43 kg/cm²)



Note:

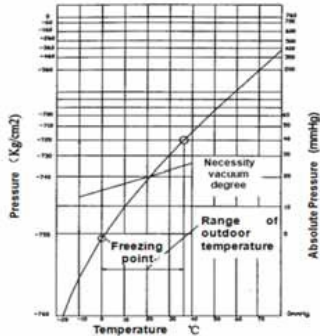
Super-long pipeline should be checked section by section.

1. From each indoor unit to each Auxiliary pipe well;
2. Standpipe inside each Auxiliary pipe well;
3. From each auxiliary pipe well to outdoor unit;
4. From indoor unit to outdoor unit as a whole.
5. After sir tightness test of the system is completed, it's preferable to reduce nitrogen pressure to 5~10 Kg/cm2.

3.8 Vacuum Drying

Note:

1. The vacuum break shall use nitrogen to carry out. If use other gas mistakenly, it may cause explosion.
2. The vacuum drying adopts the vacuum pump to turn the water (liquid) in pipe to steam (gas) and discharge it to the outside pipe, and dry the pipe. Under the normal air pressure, the boiling point of water (steam temperature) is 100℃, but the pressure in vacuum pump pipe is near vacuum, this makes the boiling point lower to below the outside air temperature, and the water in the pipe is evaporated.



Water's boiling point(°C)	Pressure (mmHg)	Vacuum degree(mmHg)
40	55	-705
30	36	-724
26.7	25	-735
24.4	23	-737
22.2	20	-740
20.6	18	-742
17.8	15	-745
15.0	13	-747
11.7	10	-750
7.2	8	-752
0	5	-755

Example:

when the air temperature is at 7.2℃, the vacuum drying can be carried out under -752mmHg.

Selection of the vacuum pump

The following 2 points shall be noted in selection of the vacuum pump:

- ① Select the vacuum pump with prospected vacuum requirement (vacuum reaches -755mmHg)
- ② require the pumps with large exhaust capacity (around 40L / min or above).

Moreover, before operation, the vacuum meter shall be checked to ensure its measuring range can reach -755mmHg below. Lube oil rotating vacuum pump needs to change the lube oil every one or two month, and check the vacuum state.

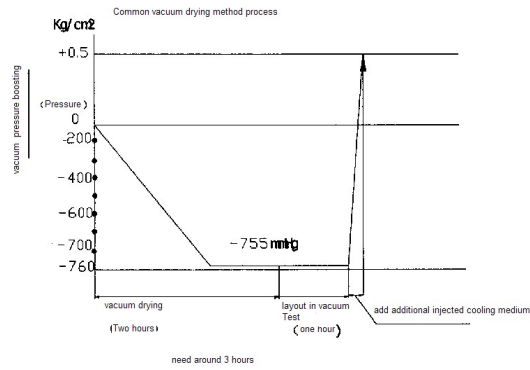
(Reference) The types and vacuum state of vacuum pump

Type	Exhaust volume in maximum vacuum state	Function	
		Vacuum drying	Exhaust
Oil lubrication pump shaft (with oil)	0.02mmHg 100L/min	Suited	Suited
Oil free pump shaft (without oil)	10mmHg 50L/min	Unsuited	Suited
	0.02mmHg 40L/min	Suited	Suited

Vacuum drying

For the methods of the vacuum drying, according to different environments, there are two methods can be selected.

1 common method operation



- ③ Vacuum drying (at the first time)
 Connect the multimeter to the inlets of liquid pipe and air pipe, and operate the vacuum pump for 2 hours or more.(The vacuum state shall be below -755mmHg)
 If the extraction lasts for 2 hours, but the vacuum state cannot reach -755mmHg below, then there exists water or leakage in the system, at this time, extraction will continue for 1 hour.
 If the extraction lasts for 3 hours, and the vacuum state cannot reach -755mmHg, then check whether there exists leakage hole.
- ③ Vacuum layout test
 When the vacuum state reaches -755mmHg, lay out the vacuum dryer, if the vacuum meter value is stable, it means qualified; if the value rises then it means there is water or leakage hole.
- ③ Add additional refrigerant
 Connect the refrigerant tank to the maintenance pipe of the liquid pipe to facilitate adding of the system need refrigerant.
- ④ Open all the open-close valves of the liquid pipes and air pipes
 (Notes) vacuum extraction operation carries out in liquid pipe direction and air pipe direction (because there are all kinds of parts equipped in indoor unit, the process may interrupted).

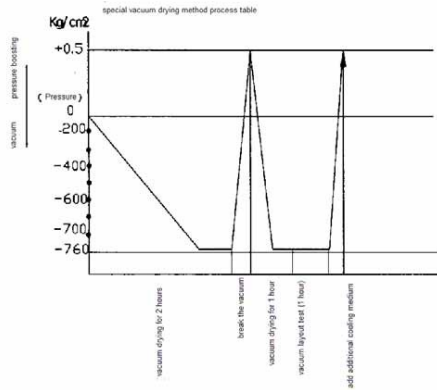
2 Special vacuum drying methods

This kind of vacuum drying method is used in the condition that there is water mixed in the pipe. Such as When flushing refrigerant pipe, water is found.

When the project carried out in raining weather, there may be condensate in the pipe.

If the project last for a long time, there may be water enter the pipe.

In project, the rainwater may enter the pipe.



Method is that insert break the nitrogen vacuum work procedure for more than one time during common vacuum drying process.

Operation procedures:

- ① Vacuum drying (at the first time).....extraction for 2 hours
- ② Break vacuum (at the second time).....add nitrogen to 0.5kg/cm²
Since the nitrogen is a kind of drying gas, when breaking the vacuum, it can accomplish drying effect, but if there is lot of water, the drying effect is not complete. Therefore, in refrigerant project, water penetration and condensate in the pipe shall be specially noted.
- ③ Vacuum drying (at the second time).....extraction for more than 1 hour
Judgment: when reaches -755mmHg or below, it is qualified. If it cannot reach this value within 2 hours, then vacuum break ② and ③ shall be carried out repeatedly.
- ④ Vacuum layout test.....1 hour.
- ⑤ Additional refrigerant injection
- ⑥ Open the open-close valve

4. Additional refrigerant and lubrication oil

4.1 Add refrigerant

Please add refrigerant as the following chart tell us on the basis of total length of connection pipe, the methods of adding refrigerant are as follows:

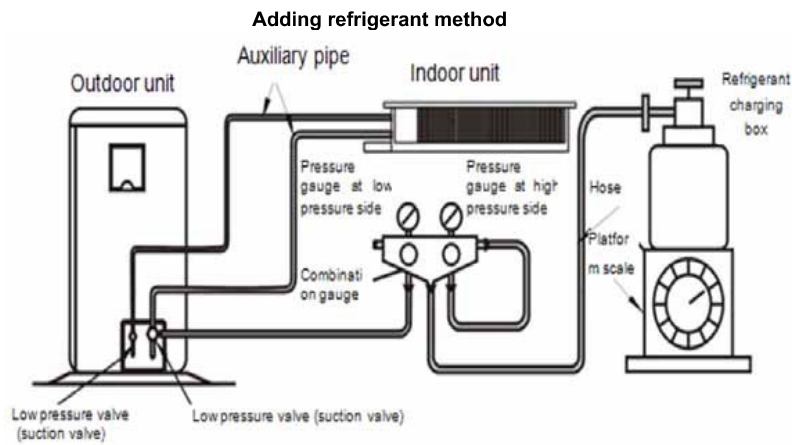
Diameter of liquid duct(mm)	L1(φ19.05)	L2(φ15.88)	L3(φ12.7)	L4(φ9.52)	L5(φ6.35)
Additional amount of refrigerant (kg/m)	0.25	0.17	0.11	0.054	0.022

Additional amount of refrigerant = length of liquid pipe in refrigerant auxiliary pipe × corresponding additional amount of refrigerant for each meter of liquid pipe.

Additional amount of refrigerant= (L1×0.25) + (L2×0.17) + (L3×0.11) + (L4×0.054) + (L5×0.022)

Note:

1. It must record the calculation result(better make a table);
2. To pour the liquid refrigerant into liquid duct from shut-off valve on side of liquid duct when it is completely dried;
3. It may pour the gas refrigerant into liquid duct from air duct through the operation of compressor on trial run, when refrigerant is not completely poured into;
4. It must measure the injection of refrigerant with electronic scale



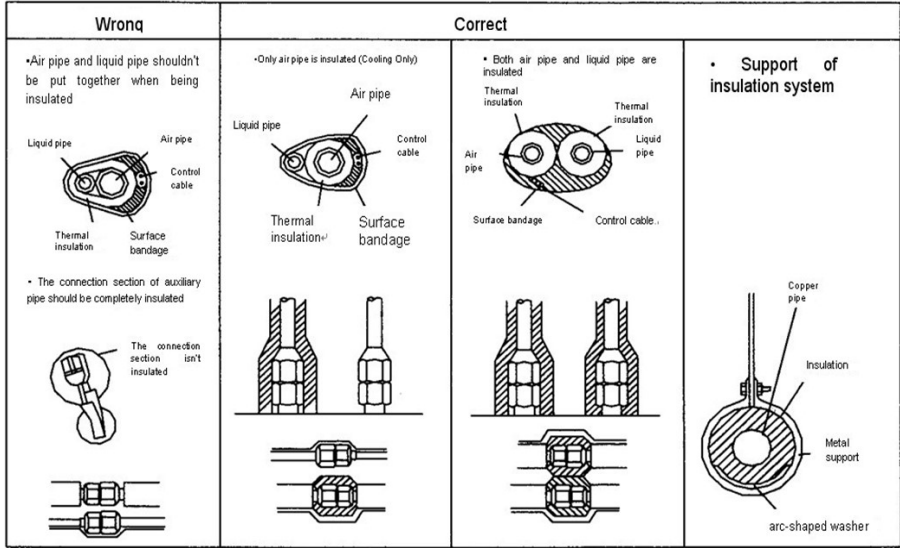
5. Insulation

Thermal insulation wrapping of auxiliary pipe

Thermal insulation materials should be used for drain pipe and auxiliary pipe to prevent condensation or water leakage.

Note:

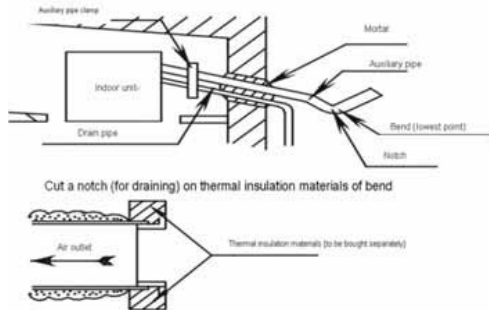
- ◇ Wrap auxiliary pipe with thermal insulation materials of good insulation performance ($> 120^{\circ}\text{C}$).
- ◇ Notice for high-humidity environment: the A/C system is verified by condensation conditions test. However, it may subject to dripping if working in high-humidity (condensation temperature $> 23^{\circ}\text{C}$) environment for a long time. In this case, please add the following thermal insulation materials:
- ◇ The thermal insulation materials should be glass fiber thermal insulation materials with 10~20mm thickness.



Sealing of Wall Opening

After installing auxiliary pipe and drain pipe, it's necessary to seal the gap among wall opening, Auxiliary pipe, drain pipe and electric wire with mortar or putty to prevent capacity degradation or water leakage caused by rainwater or foreign matter from ingressing into room and A/C system.

If outdoor unit is higher than indoor unit, it's necessary to bend auxiliary pipe to ensure the lowest point of auxiliary pipe is lower than wall opening and prevent rainwater flowing into room or A/C system along the tubing.

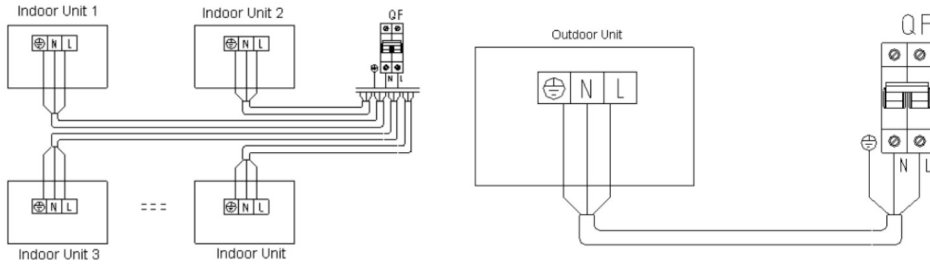


6. Electrical connection

Caution	All field wiring and components must be installed by a licensed electrician.
	Please separately design the special power of indoor units and outdoor units.
	Be sure to use a dedicated power circuit, Never use a power supply shared by another appliance. The connection fixing circuit installs all polar disconnecting device with contact gap above 3mm.
	The indoor units' power, creepage protector and manual switch connecting to the same outdoor unit must be general. All indoor units must be the same circuit, and must simultaneously on or off; otherwise, system life will seriously effect, and appear the situation not to solve.
	The communication line between indoor units and outdoor units please use 2 core shielded wiring, while don't use the multi core wiring without shielded affect, for the interference is reduced each other.
	Purchased wiring, parts and materials should be in compliance must comply with relevant local and national regulations.
	Air conditioning equipment should be grounded according to the relevant local and national electrical regulations.
	Don't switch on power supply before electrical operation. Maintenance operation should be conducted after switching off power supply.
	This is machine includes an inverter device. Connect earth and leave charge to eliminate the impact on other devices by reducing noise generated from the inverter device and to prevent leaked current from being charged in the outer hull of the product.
	Don't connect the ground wire to gas pipe, water pipe, telephone ground wires or lightning rod and other ground wires.
	Leakage protector, power switch and breaker must be installed on power supply to prevent electric shock accident.
	The specification of single-phase control board fuse is F3.15AL 250V,
	The specification of outdoor unit control board fuse is F6.3AL 250V;
	The specification of three-phase outdoor unit control board fuse is F3.15AL 250V,
	The specification of fan unit control board fuse is F10AL 250V.
Reliable grounding is required, because electric shock will be caused by improper grounding.	
Never install a phase advancing capacitor.As this unit is equipped with an inverter ,installing a phase advancing capacitor will not only deteriorate power factor improvement effect,but also may cause capacitor abnormal heating accident due to high-frequency waves.	
Notice	Electrical wiring must be done in accordance with the wiring diagrams and the description herein.
	Signal wire and power wire must be separated, and can't share the same wire. It's strictly prohibited connecting signal wire to heavy current.
	When connecting wiring and wire holder, use cable clamp to fix and make sure no exposure.
	Refrigerant piping system and wiring system of indoor and outdoor unit belongs to the different system.
	When power wire is parallel with signal wire, put wires to their own wire tube and remain proper gap
	Voltage discrepancy of power wire terminal (side of power transformer) and end voltage (side of unit) should be less than 2%. If its length could not be shortened, thicken the power wire. Voltage discrepancy between phases shall not pass 2% rated value and Current discrepancy between highest and lowest phase should be less than 3% rated value.
	Never connect the power supply in reversed phase. The unit can not operate normally in reversed phase. If you connect in inversed phase, replace two of the three phases.

6.2Electrical Wiring of indoor unit and outdoor unit (refer to the part of indoor unit and outdoor unit)

6.3 Wiring Diagram of Indoor Unit and Outdoor Unit



Note:
 Power line must be properly fixed;
 Each outdoor unit must be grounded;
 Each indoor unit must be grounded;
 Power line must be thickened when it is overlong.

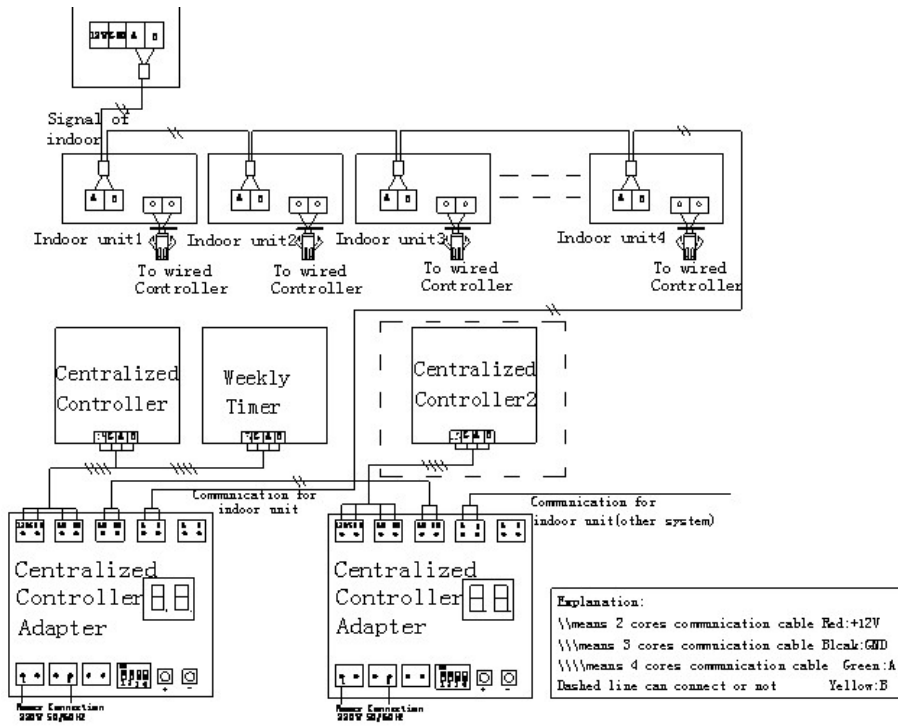
Recommended Specification for Power Line of Outdoor Unit (Separate power)

Unit Type	Item	Power supply	Sectional area of power line (mm ²)	Length of Auxiliary line (m)	Rated current of overcurrent breaker (A)	Rated current of creepage breaker (A) Leakage current (MA) Operate time (Sec.)	Containing an area of ground wire(mm ²)
Separate power	ARV-H080/4R1A	Single-phase 220V-240V ~ 50Hz	6	20	30	30 A,30mA, < 0.1 sec.	2
	ARV-H100/4R1A		6	20	30	30 A,30mA, < 0.1 sec.	2
	ARV-H120/4R1A		10	20	40	40 A,30mA, < 0.1 sec.	2
	ARV-H140/4R1A		10	20	40	40 A,30mA, < 0.1 sec.	2
	ARV-H160/4R1A		10	20	50	50 A,30mA, < 0.1 sec.	2
Separate power	ARV-H220/5R1	3 Phase 380V-415V 50Hz	6	20	30	30A,30mA, < 0.1 sec.	2
	ARV-H280/5R1		6	20	30	30A,30mA, < 0.1 sec.	2

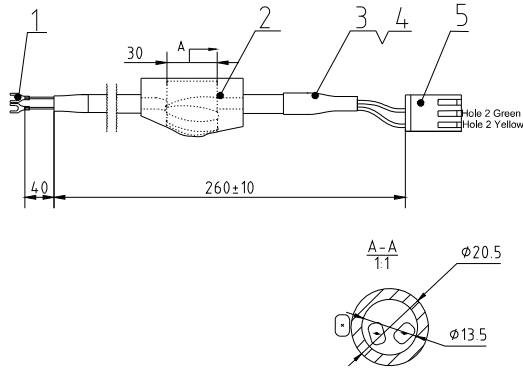
Recommended Specification for Power Line of Indoor Unit (separate power supply from outdoorunit)

Unit Type	Item	Power supply	Sectional area of power line (mm ²)	Length of Auxiliary line (m)	Rated current of over current breaker (A)	Rated current of creepage breaker Leakage current Operate time
Separate power	<10 A	Single-phase 220-240V/ 50Hz	1.5	20	20	20 A,30mA, < 0.1 sec.
	≥10 A and <15 A		2.5	20	30	30 A,30mA, < 0.1 sec.
	≥15 A		4	20	40	40 A,30mA, < 0.1 sec.

6.4 Communication Line Connection



6.5 Specification for Communication Line



Note:

- ◇ Currently, there are two length specifications as shown in the following table for indoor and outdoor communication line: L=10m and L=20m.
- ◇ Communication Line Specification of Indoor Unit and Wired Controller
- ◇ Sectional area of power cord is the minimum value, which should be enlarged to higher specification to prevent voltage drop in case of long power supply connecting line. If single double-layer wire is used, please choose Grade 1 cross-section specification and wrap with dedicated sheaths for electricians;

6.6 Wiring

- 1) Open electric controlled box cover of indoor unit, wire according to electrical schematic diagram on electric controlled box cover, firmly press connecting line on connecting terminal without loosening, ground wire must be connected at designated position.
- 2) Open cover plate of electric appliance on right of outdoor unit and wire according to electrical schematic diagram on backside of electric appliance cover plate.
- 3) Be noted to thread connecting line through tension disc and press firmly, wire end must be firmly pressed on connecting terminal without loosening and ground wire must be connected at designated position.
- 4) After wiring, properly bind connecting auxiliary pipe, connecting line and drain pipe with bandage as shown below:

Note:

1. Be noted that unit connecting line can't be put together with thermal insulation material and should be at least 20cm away from unit connecting pipe.
2. Don't flatten drainpipe when binding

6.7 Parameter setting (refer to the part of control system)

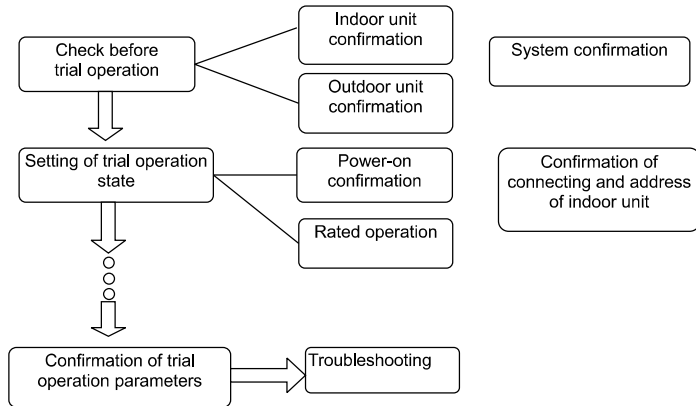
7.Commissioning

Note:

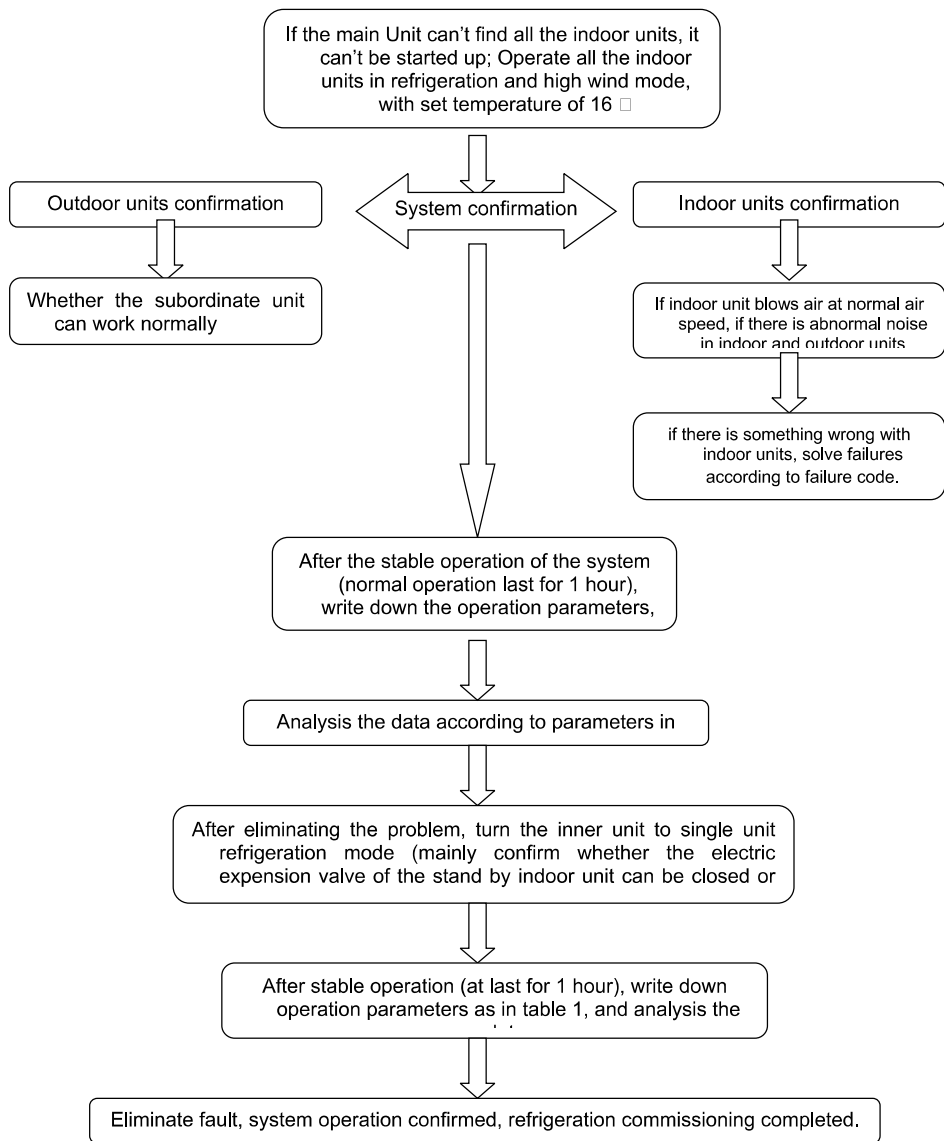
In winter, supply power 8 hours in advance for initial operation so that crankshaft case can be preheated in advance.

In winter, after main power supply is interrupted for 8 hours, conduct trial operation again only after 2.5 hours of power-on.

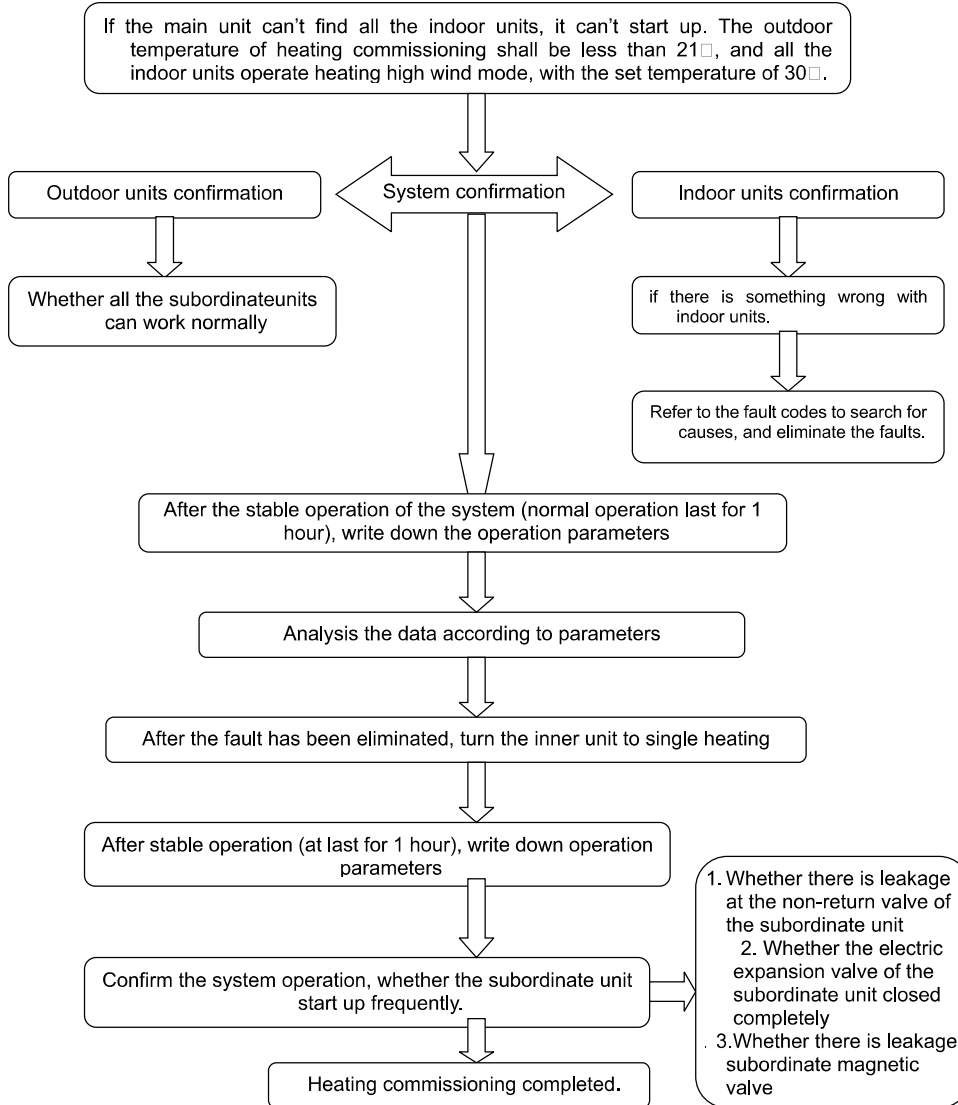
Commissioning procedure



Cooling Commissioning procedure



Heating Commissioning procedure



7.2 Check before Commissioning

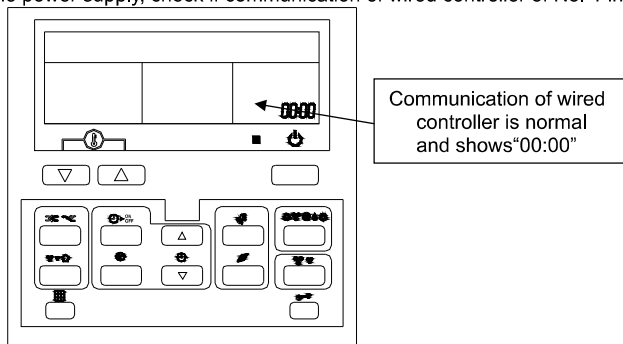
It's required to confirm the state of indoor and outdoor unit before trial operation to prevent failure of trial operation caused by improper installation.

No.	Items
Indoor unit	If indoor unit is integrated, if the position of electric appliance closure complies with factory inspection and if it is firmly fixed.
	Before switching on power supply, test resistance among live wire, naught wire and ground point of power supply terminal block with 500V megohm meter. The resistance must be above 1 megohm.
	Check if ventilation duct, air return duct and air port is smooth and clean.
Outdoor unit	If dial switch of outdoor unit electric controlled panel is correctly set and if capacity dial of outdoor unit is correct.
	Before switching on power supply, test resistance among live wire, naught wire and ground point of power supply terminal block with 500V megohm meter. The resistance must be above 1 megohm.
	If panel of indoor unit is restored.
Wiring	If all power lines of outdoor unit are installed in place and meet the specification required by technical documents.
	If all power lines of indoor unit are installed in place and meet the specification required by technical documents.
	Check power lines of indoor unit to prevent the following case: partial indoor units have experienced power failure, but power supply of other indoor units and outdoor units work normally and outdoor units are still in operation in the same system. Ensure using the same power supply for indoor units of the same system where possible.
	Spacing between heavy current and weak current of power line and communication line must be over 50mm to prevent bad communication.
EXV	if shut off valve of outdoor unit has been completely opened

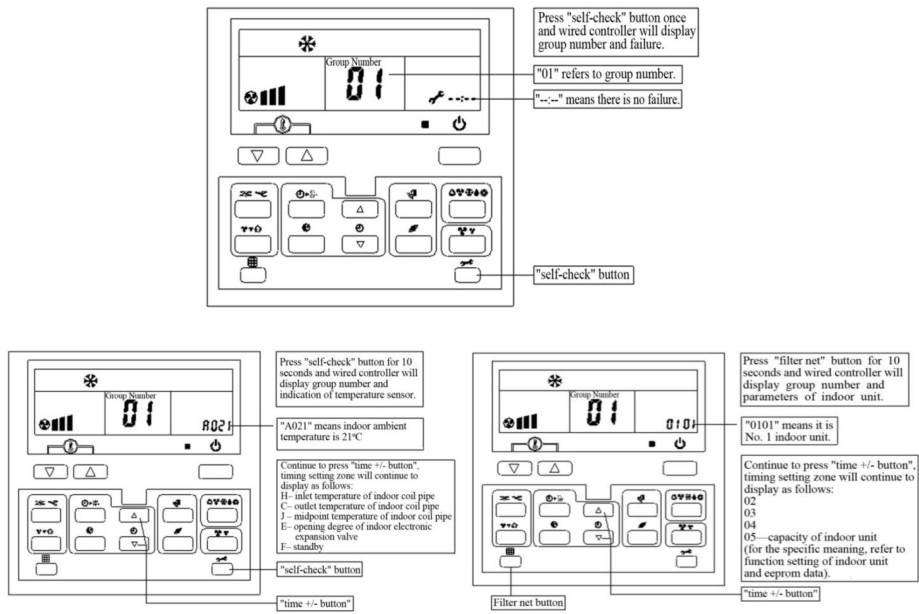
7.3 Example of Commissioning Based on Wired Controller

Connect one outdoor unit to four indoor units

- (1) After finishing wiring of indoor and outdoor units, connect communication line of wired controller and indoor units;
- (2) Switch on the power supply, check if communication of wired controller of No. 1 indoor unit is normal;



- (3) Open "cooling" mode for No. 1 indoor unit; after the unit is started, check if there is something wrong with No. 1 indoor unit by using wired controller, if temperature of indoor unit sensors is normal and if parameters of indoor unit are correct;

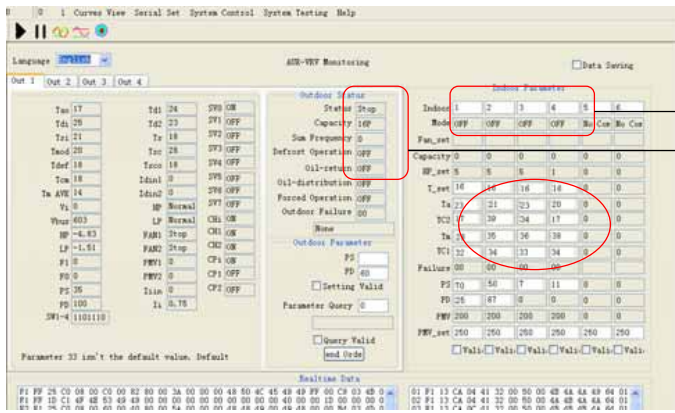


- (4) Switch to "heating" mode and observe in the same way as in step (3) if parameters are normal;
- (5) Set mode as "ventilation" (High fan speed) mode and observe if there is strong wind blown from indoors.
- (6) Open "Swing" button with remote controller and check if air guiding strip of No. 1 indoor unit swings normally;
- (7) Conduct trial operation for the other three indoor units one by one according to the above steps;
- (8) Switch to "cooling" mode and operate for 1h, observe if drainage is normal;
- (9) After confirming unit can operate normally, select "OFF" function to stop trial operation.

7.4 Example of Commissioning Based on Monitoring Software

Connect one outdoor unit to four indoor units

- (1) After finishing wiring of indoor and outdoor units, connect communication line of monitoring tool and outdoor units;
- (2) Switch on the power supply, open monitoring software, confirm if communication of all outdoor units and indoor units as well as address of indoor units are correct;

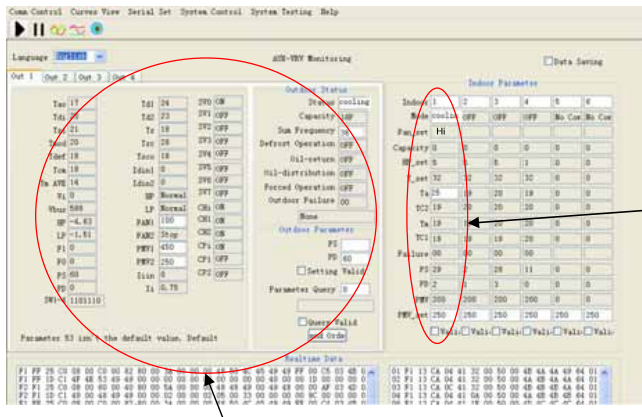


1. Indoor and outdoor units communication is normal;
2. Addresses of four

Confirm indoor unit temperature sensor : if ambient temperature is 16°C , temperature of indoor unit coil pipesensor should be

(3) Start cooling mode of indoor unit one by one. After units are started, observe indoor units according to monitoring software and actual situation.

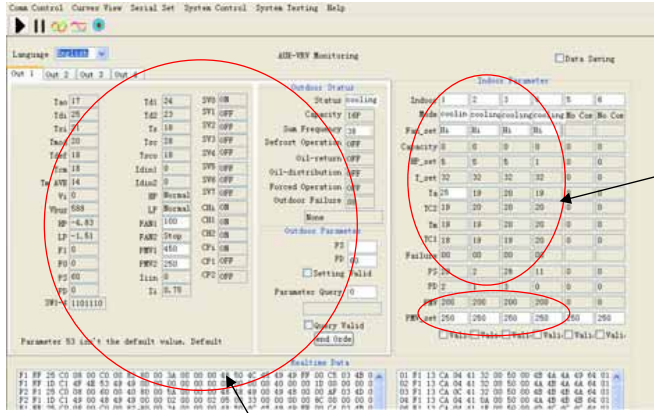
No.	observe parameters of indoor and outdoor units	NormalState
1	if there is something wrong with indoor units	None
2	If indoor unit blows air at normal air speed.	It blows out cool air at set air speed.
3	if there is abnormal noise in indoor and outdoor units	no abnormal noise
4	if ambient temperature, inlet temperature of coil pipe, midpoint temperature of coil pipe and outlet temperature of coil pipe of indoor units are normal	Within the range of allowable error
5	if electronic expansion valve of indoor units is normal	Opening degree is available in case of startup. Expansion valve is normal and can be closed when the unit is closed.
6	if there is something wrong with outdoor units	None
7	if frequency and fan of outdoor unit are normal	it operates at automatic frequency and fan blows air.
8	if temperature sensor of outdoor unit is normal	Within the range of allowable error
9	if electronic expansion valve of outdoor units is opened	Opened, with opening degree



- Open cooling mode of No. 1 indoor unit and observe the state:
- ① There are cooling mode, high fan speed, available capacity demand, correct HP matching of indoor unit;
 - ② Ambient temperature is 25°C, so temperature of coil pipe sensor should be less than 25°C ;
 - ③ there is nothing wrong with indoor unit;
 - ④ electronic expansion valve

State of outdoor unit

- ① There are cooling state, available capacity demand, correct HP matching of outdoor unit and automatic frequency operation;
- ② Outdoor fan blows air and fan speed is available;
- ③ Temperature of outdoor sensors is within the allowable range;
- ④ there is nothing wrong with outdoor unit;



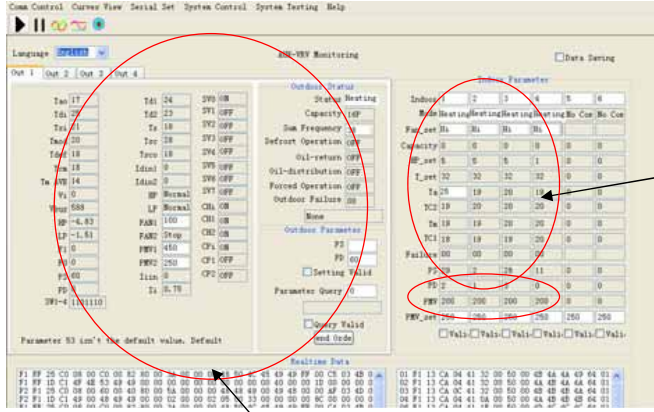
Open cooling mode of the other three indoor units and observe the state:

- ① There are cooling mode, high fan speed, available capacity demand, correct HP matching of indoor unit;
- ② Ambient temperature, inlet temperature, midpoint temperature and outlet temperature of coil pipe are within the allowable range;
- ③ there is nothing wrong with indoor unit;
- ④ electronic expansion valve

State of outdoor unit

- ① There are cooling state, available capacity demand, correct HP matching of outdoor unit and automatic frequency operation;
- ② Outdoor fan blows air and fan speed is available;
- ③ Temperature of outdoor sensors is within the allowable range;
- ④ there is nothing wrong with outdoor unit;

(4) Switch to "heating" mode and observe if parameters in table 1 are normal;

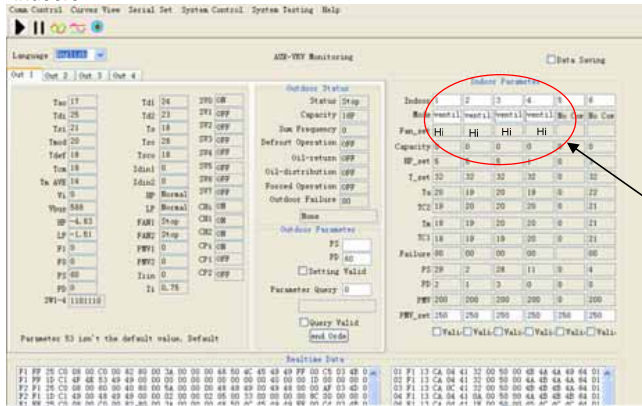


State of indoor unit

- ① There are heating state, high fan speed, available capacity demand, correct HP matching of indoor unit;
- ② Ambient temperature, inlet temperature, midpoint temperature and outlet temperature of coil pipe are higher than ambient temperature and within the allowable range;
- ③ there is nothing wrong with indoor unit;
- ④ electronic expansion valve of indoor unit is opened with

- State of outdoor unit
- ① There are heating state, available capacity demand, correct HP of outdoor unit and automatic frequency operation;
 - ② Outdoor fan blows air;
 - ③ Temperature of outdoor sensors is within the allowable range;
 - ④ there is nothing wrong with outdoor unit;

(5) Set mode as “ventilation” (High fan speed) mode and observe if there is strong wind blown from indoors.



State of four indoor units:
Set the four indoor units at ventilation mode and high fan speed;

- (6) Open “Swing” button with remote controller and check if air guiding strip of No. 1 indoor unit swings normally;
- (7) Switch to “cooling” mode and operate for 1h, observe if drainage is normal;
- (8) After confirming unit can operate normally, select “OFF” function to stop trial operation.