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Service Manual

GRV Outdoor Unit

GRV 6 All DC Inverter T1

GRV08/10/12/14/16/18/20/22P3T3/6

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1.1 Cooling Operation

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GRV18P3T3/6, GRV20P3T3/6,GRV22P3T3/6

Cooling

Gas for high temp. & high pressure
Liquid for high temp. & high pressure
Low temp. & low pressure
Sub-cooling / EVI

High-pressure sensor

4-Way Valve

gas stop valve

OS

service valve

High-pressure switch

Condensor

Refrigerant cooling

1# Inverter

2# Inverter

plate heater

liquid stop valve

Low-press sensor

LGS

PMV

Sub-cooling / EVI PMV

storage tank

1.2 Heating Operation

GRV08P3T3/6, GRV10P3T3/6, GRV12P3T3/6 GRV14P3T3/6, GRV16P3T3/6,

GRV18P3T3/6, GRV20P3T3/6, GRV22P3T3/6

Heating

Gas for high temp. & high pressure
Liquid for high temp. & high pressure
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Refrigerant cooling

1#
Inverter

2#
Inverter

Low-press
sensor

LGS

plate heater

liquid stop valve

PMV

Sub-cooling / EVI
PMV

storage tank

1.3 Component introduce

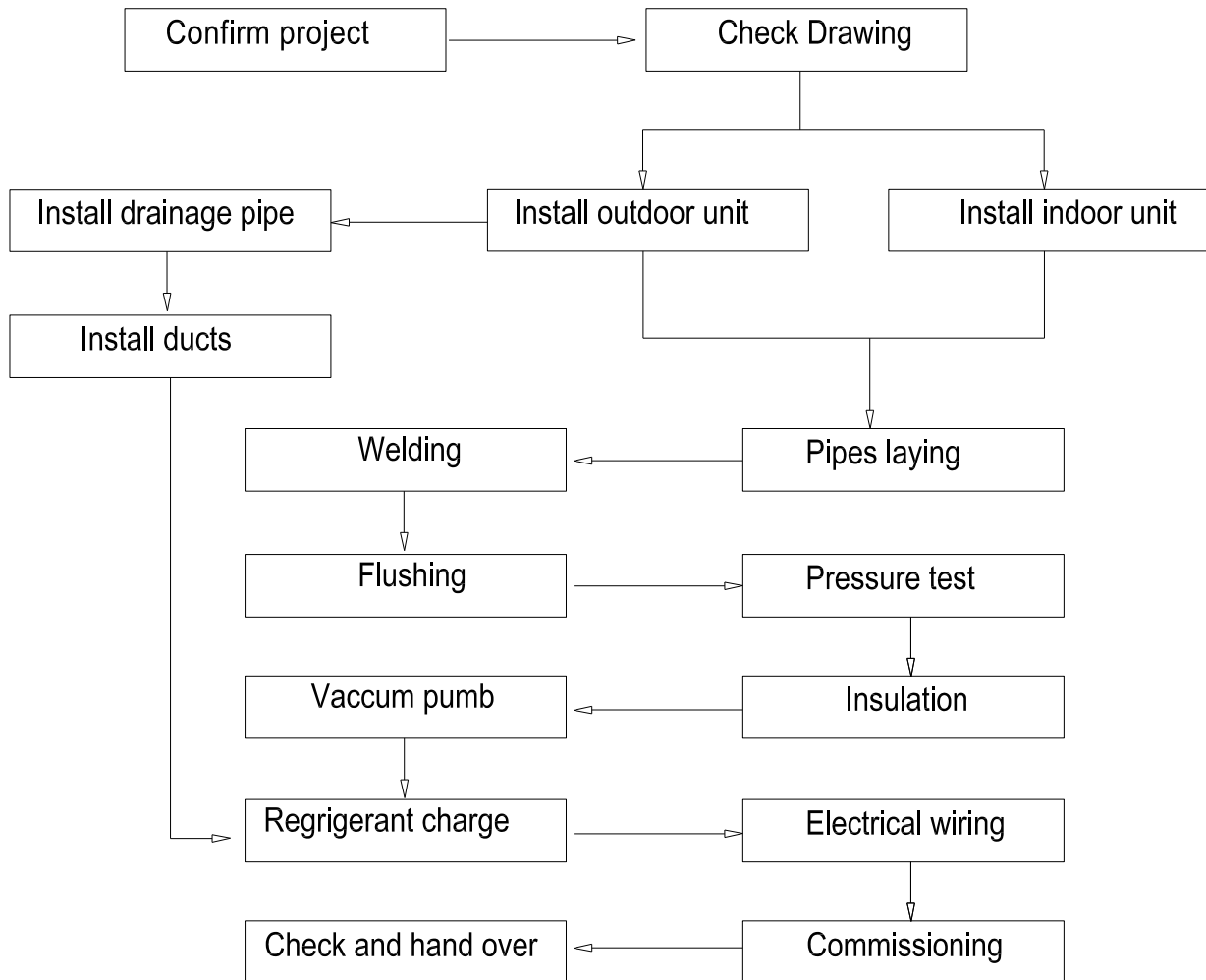| /	Component name	Main function
Inverter	DC inverter compressor	Driving module from unit electrical box will control the DC inverter compressor operation, compressor work frequency range is 20~120Hz.
/	High pressure sensor	Check system high pressure
/	4-way valve	When the heating/cooling mode switch, change the refrigerant flow direction.
/	Condenser	Heat exchange, made the high temperature, pressure refrigerant (gas state) to liquid in cooling mode and the low temperature, pressure refrigerant (gas, liquid complex state)
PMV	Heating mode EXV	Throttling in heating mode
Refrigerant cooling	Refrigerant PCB cooling	PCB is well cooled by refrigerant, ensure the system operate steadily even in tropical area.
/	Storage tank	
/	Plate heater	5.5℃ sub-cooling by special plate heat exchanger further reduce the refrigerant temperature flowing into the indoor unit.
/	Sub-cooling EXV	In order to make the maximum use of the sub-cooling heat exchange

Part2 Installation

1. Preface of installation

The installation procedure is shown below.

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┌─────────────────┐              ┌─────────────────┐
│ Confirm project │ ········>    │  Check Drawing  │
└─────────────────┘              └─────────────────┘
                                          │
        ┌─────────────────────────────────┼──────────────────────────────┐
        ▼                                  ▼                              ▼
┌─────────────────────┐        ┌─────────────────────┐        ┌──────────────────────┐
│ Install drainage pipe│ <──── │ Install outdoor unit │        │  Install indoor unit │
└─────────────────────┘        └─────────────────────┘        └──────────────────────┘
        │                                  │                              │
        ▼                                  └──────────────┬───────────────┘
┌─────────────────────┐                                   ▼
│   Install ducts     │                        ┌─────────────────────┐
└─────────────────────┘                        │    Pipes laying     │
        │              ┌──────────────┐ <───── └─────────────────────┘
        │              │   Welding    │
        │              └──────────────┘
        │                      │
        │                      ▼
        │              ┌──────────────┐        ┌─────────────────────┐
        │              │   Flushing   │ ────>  │    Pressure test    │
        │              └──────────────┘        └─────────────────────┘
        │                                                 │
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        │              ┌──────────────┐        ┌─────────────────────┐
        │              │ Vaccum pumb  │ <───── │      Insulation     │
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        │              ┌──────────────┐        ┌─────────────────────┐
        └────────────> │Regrigerant charge│ ──>│   Electrical wiring │
                       └──────────────┘        └─────────────────────┘
                                                          │
                       ┌──────────────────┐     ┌─────────────────────┐
                       │ Check and hand over│ <──│    Commissioning    │
                       └──────────────────┘     └─────────────────────┘
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⚠Caution

✧ The proper design and installation is a critical element of GRVsystem, installation of piping and electrical works must be carried out by suitably qualified, certified professionals and in accordance with all applicable legislation.

✧ In this Engineering Data Book, the term "applicable legislation" refers to all national, local and other laws, standard, codes, rules, regulations and other legislation that apply in a given situation.
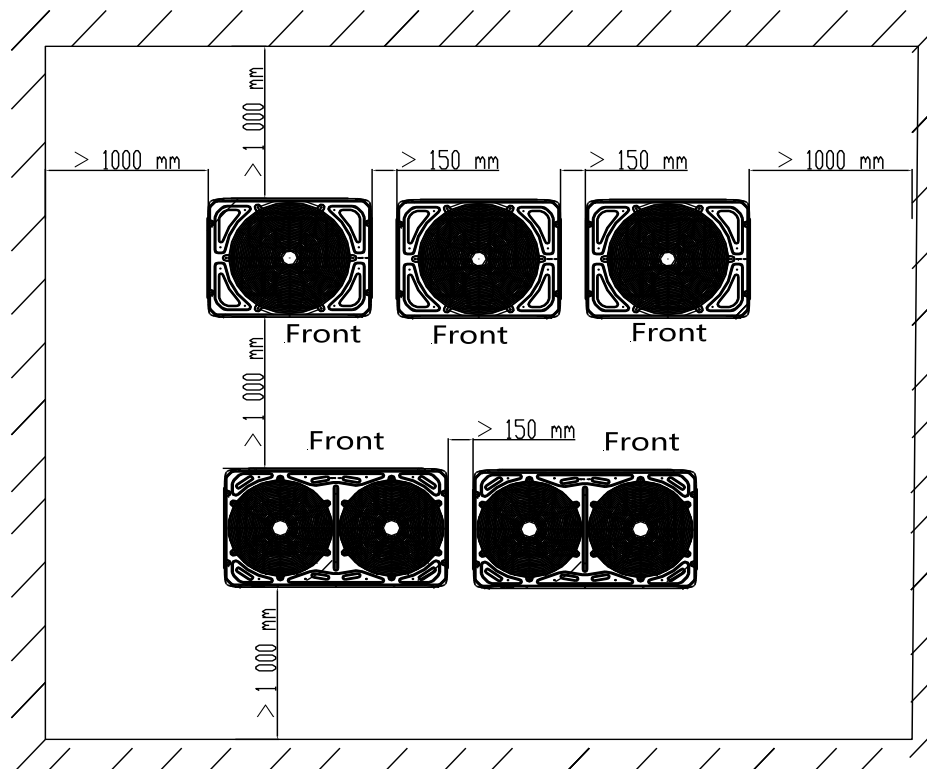
2. Installation of Outdoor Unit

2.1 Installation Location and Foundation

✧ Ensure that the outdoor unit is installed in a dry, well-ventilated place.

✧ Ensure that the noise and exhaust ventilation of the outdoor unit do not affect the neighbors of the property owner or any surrounding ventilation.

✧ Ensure that the outdoor unit is installed in a cool place without direct sunlight exposure or direct radiationof a high-temp heat source.

✧ The outdoor unit should be installed as close as possible to the indoorunit.

✧ 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 free from waste and oil mist.

✧ The foundation should be strong enough to support the outdoor unit.

2.2 Maintenance and Ventilation Space for Outdoor Unit

✧ Install outdoor unit and power supply device at side of outdoor unit by referring to installation instruction of power supply device manual.

✧ Ensure necessary installation and maintenance space.

✧ If there are two rows of outdoor units, we suggest face to face installation for easy maintenance, and avoid air short circuit.

Note:

    If miscellaneous articles are piled around the outdoor unit, it should be at least 1000mm higher than the top of outdoor unit. Otherwise, a mechanical discharge device must be add to improve the ventilation.

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 roof, it is necessary to firmly secure A/C system to prevent the attack of earthquake or strong wind;

✧ If the system has more two outdoor units, the units should be placed in order from the largest capacity unit to the smallest capacity unit. The largest capacity unit must be placed in the first branch, and be set as the master unit, while the others should be set as slave units, as shown in the following example.
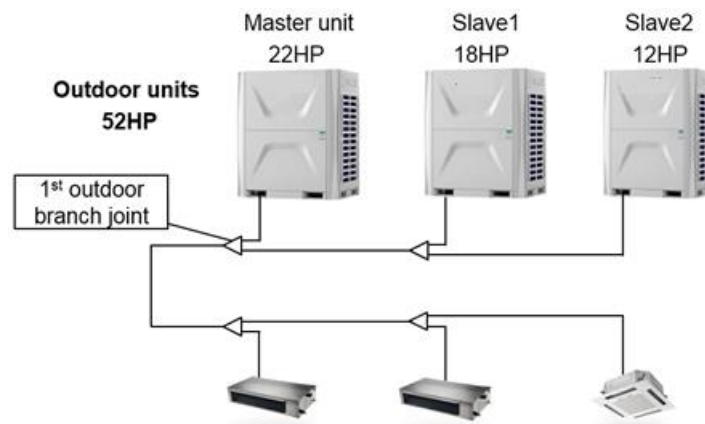

✧ The installation space for anchor bolt please refer to the following drawing.
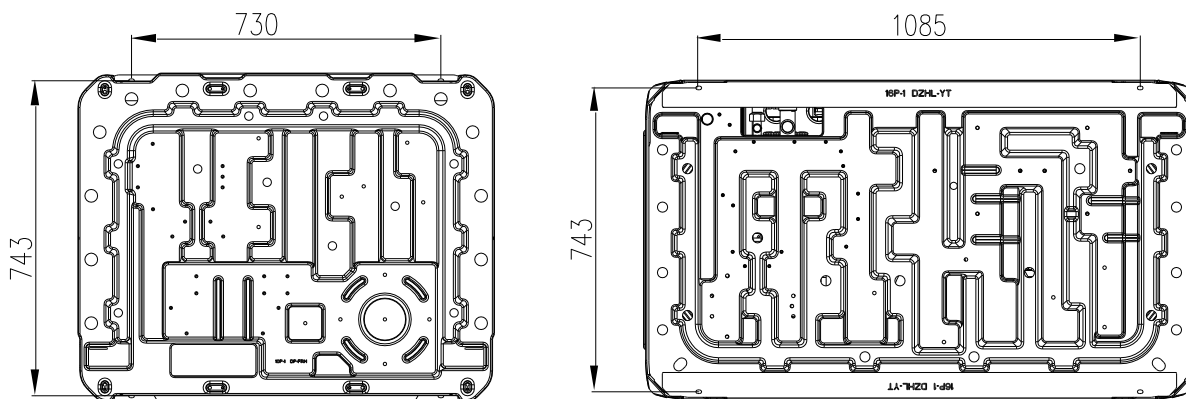
✧ The foundation can be made of channel steel or concrete. Reserve the space for discharging the condensate water from outdoor units.
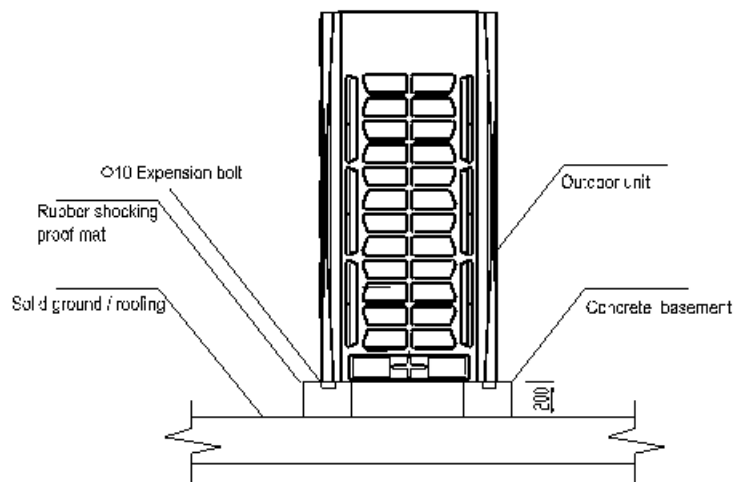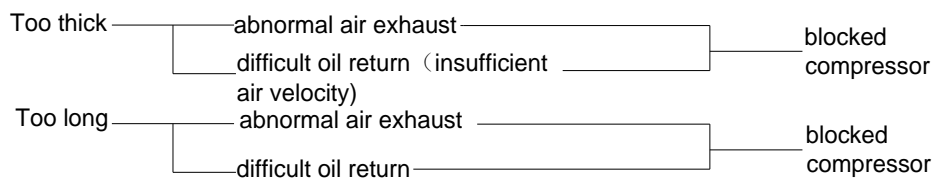
$\diamond$ Install drainage channels to ensure condensed water flow out smoothly.

$\diamond$ Don't use four-square base to support outdoor unit.

$\diamond$ Rubber anti-vibration pads are necessary to avoid vibration.

$\diamond$ If the outdoor unit need side air flow outlet by a duct, it is necessary to remove out the wind grille.
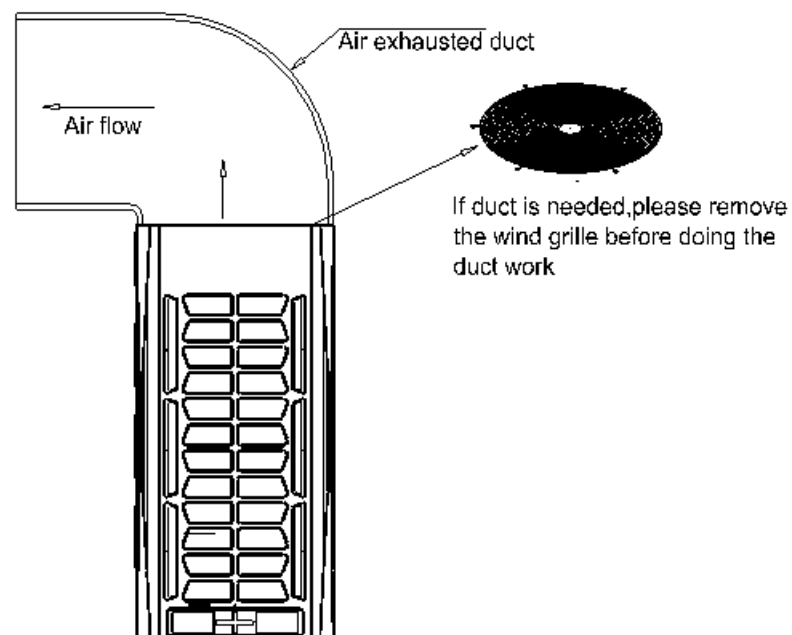
3. Installation of refrigerant pipe

3.1 Installation notice

✧ Please use seamless red copper pipe.

✧ Ensure to fill nitrogen for protection when welding.

It's necessary to fill nitrogen to prevent oxidation layer (Cu_2O) formed in copper pipe when welding, otherwise substantial oxidation layers will cause blockage of capillary tube or expansion valve, abnormal discharge temperature, poor cooling or heating performance.

✧ When welding same diameter pipe, it is required to expand the inside diameter at connection area with flaring tool, then butt and weld two pipes.

✧ Before connection use nitrogen or air to remove dust and moisture inside pipe.

✧ Don't install pipe while raining to prevent water ingression;

Impact of water in 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 pipe should be selected according to unit requirement

```
Too thick ──────  abnormal air exhaust ──────────────        blocked
                  difficult oil return（insufficient _____        compressor
                  air velocity)
Too long ──────   abnormal air exhaust ───────────            blocked
                  difficult oil return ───────────            compressor
```

✧ Refrigerant pipe should be fixed.

When running, refrigerant pipe will sway, expand or shrink, if unfixed, load will concentrate oncertain part, result fracture of refrigerant pipe. The pipe should be fixed every 2~3m.

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

✧ Pipe bender must be used for pipe bending. The curvature can't be too small, otherwise thepipe may be bent and shrunken, affecting refrigerant flow;

3. If permitted, it's recommended to use less indoor units and shorter pipeline

3.2 Connection schematic diagram of pipe
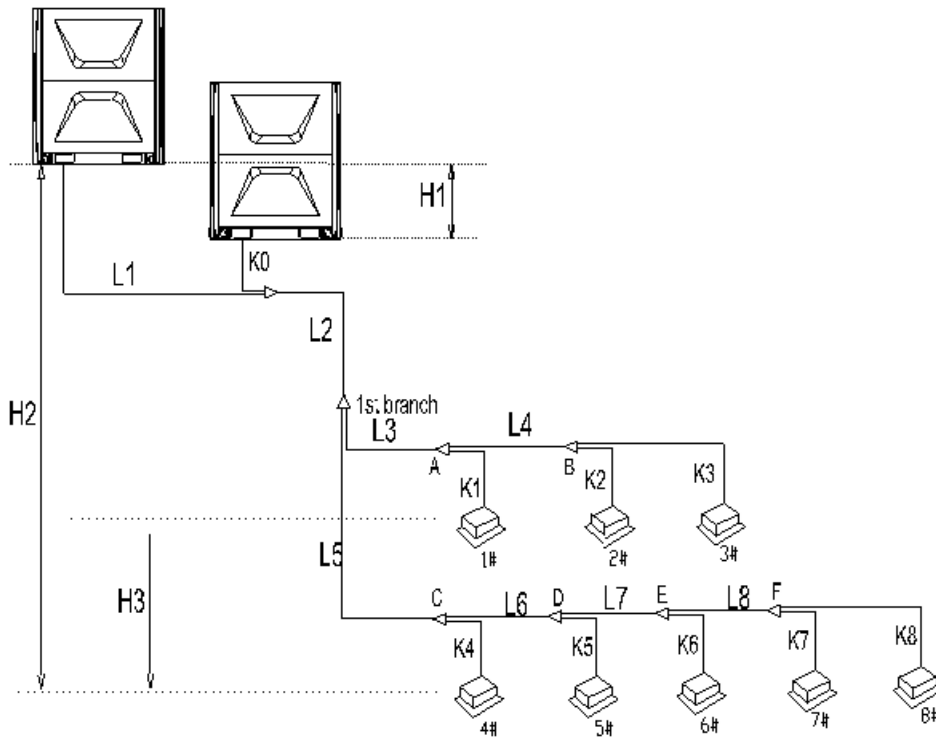
		Allowable value	Part of pipe
Piping Length	Max.Total piping length	1000m	L1+L2+L3+L4+L5+L6+L7+L8+k0+ k1+ k2+ k3+ k4+ k5+ k6+ k7+ k8≤ 1000m
	Max. Equivalent length between outdoor unit and farthest indoor unit	240m	L1+L2+L5+L6+L7+L8+ k8≤240m
	Max. piping length from 1st indoor unit branch to the farthest indoor unit	40	L5+L6+L7+L8+ k8≤40m
		90m*	L5+L6+L7+L8+ k8≤90m & (L5+L6+L7+L8+ k8) - (L3+K1) ≤40m
Level difference	Level difference between ODUs		5m	H1≤5m
	Level difference Between ODU & IDU	ODU is up	110m	H2≤110m
		ODU is down	110m	H2≤110m
	Level difference among indoor units		30m	H3≤30m

Note:

✧ It is necessary to increase the pipes size of the liquid and gas piping if the equivalent length between indoor unit and the first Y branch pipe is over 40m.

✧ 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 recommend dimension list

Type Diameter of pipe(mm)	90° elbow(m)	Oil trap(m)
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 22HP outdoor unit is 80m, diameter of pipe is 34.93mm and 12 elbows & 2 oil traps are used, the equivalent length should be calculated:
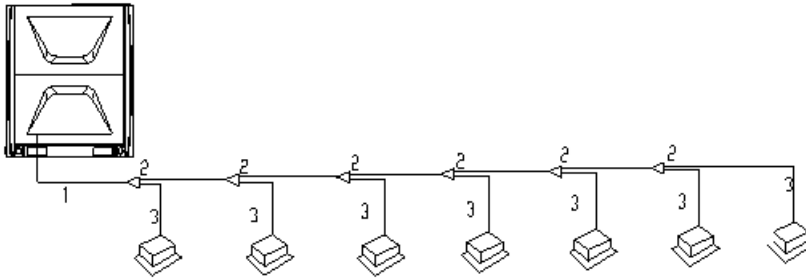
$80+0.58\times12+4.2\times2=95.36m$

Note:

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

3.3 Determination method of pipe and branch pipe

✧ **Selecting type of refrigerant pip**

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

✧ **Diameter of pipe 1 depends on pipe specification of outdoor unit.**

Model	Gas side(mm)	liquid side(mm)	The 1st Branch pipe
8~12HP	φ22.2	φ12.7	RBPK-12B
14~18HP	φ28.6	Φ15.88	RBPK-24B
20~22HP	φ28.6	φ15.88	RBPK-24B
18<A≤24 HP	φ28.6	φ15.88	RBPK-24B
24<A≤34 HP	φ34.93	φ19.05	RBPK-34B
34<A≤50 HP	φ41.3	φ19.05	RBPK-50B
50<A≤88 HP	φ47.6	φ22.2	RBPK-64B

✧ **Diameter of pipe "2" depends on the total capacity of indoor unit connected below.**

Total capacity of indoor unit（kW）	Gas side(mm)	liquid side(mm)	selection of Branch pipe
B≤5.6	φ12.7	φ6.35	RBPK-00B
5.6<B≤16	φ15.88	φ9.52	RBPK-00B
16<B<22.4	φ19.05	φ9.52	RBPK-00B
22.4 < B≤33	φ22.2	Φ9.52	RBPK-12B
33<B≤47	φ28.6	Φ12.7	RBPK-24B
47<B≤68	Φ28.6	Φ15.88	RBPK-24B
68<B≤95	Φ31.8	φ19.05	RBPK-34B
95<B≤140	Φ38.1	φ19.05	RBPK-50B
140<B≤180	Φ41.3	Φ22.2	RBPK-64B
180<B	Φ44.5	Φ25.4	RBPK-64B

Note:

1.   The 1ˢᵗ. Branch pipe should be based on thecapacity of outdoor unit,

2.   Other branch pipes and shouldnot larger than the 1ˢᵗ Branch pipe.

✧ **Diameter of pipe "3" depends on connected indoor unit capacity.**

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: 12.7/6.35
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	
22.0	φ22.2	φ12.7	
28.0	φ22.2	φ12.7	
45.0	φ22.2×2	φ12.7×2	
56.0	φ22.2×2	φ12.7×2	

✧ **Minimum thickness of pipe should meet data of the following table.**

Diameter of pipe (mm)	φ6.35	φ9.52	φ12.7	φ15.88	φ19.05	φ22.2
Minimum wall thickness (mm)	0.8	0.8	1.0	1.0	1.0	1.2
Diameter of pipe (mm)	Φ25.4	Φ28.6	Φ34.93	Φ41.3	Φ44.5	Φ47.6
Minimum wall thickness (mm)	1.2	1.3	1.5	1.5	2	2

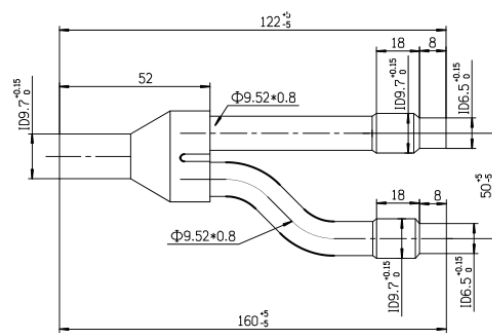## 3.4 Type and physical dimension of branch pipe

It's allowable to select branch pipe with similar specification as long as it meets pressure-proof requirement. It's required that no leakage at gas pressure of 4.5MPa and no distortion and leakage at hydraulic pressure of 6.3MPa.
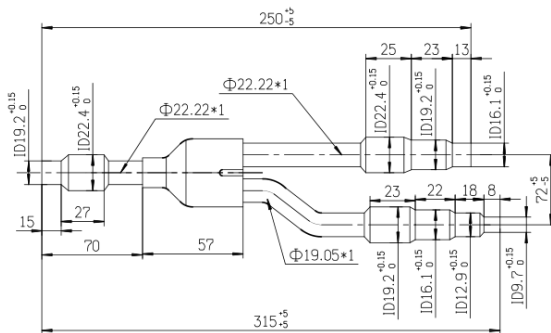
RBPK-00B Physical Dimension
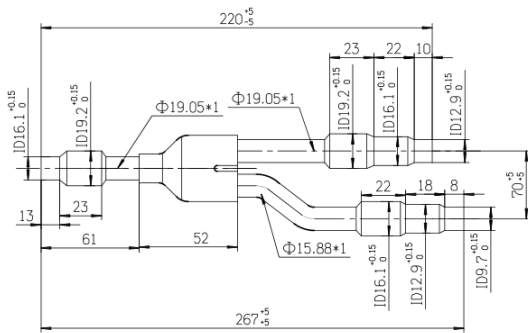
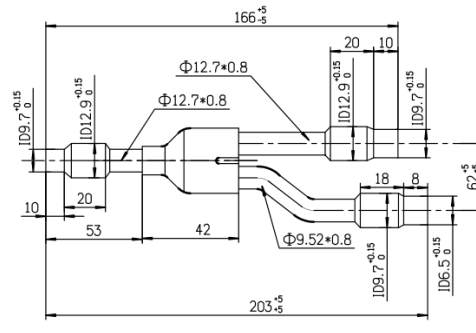**Gas side joint**   **Liquid side join**

RBPK-12B Physical Dimension

Gas side joint   **Liquid side joint**

RBPK-24B Physical Dimension

Gas side joint   **Liquid side joint**

RBPK-34B Physical Dimension

Gas side joint

Liquid side joint

RBPK-50B Physical Dimension

Gas side joint
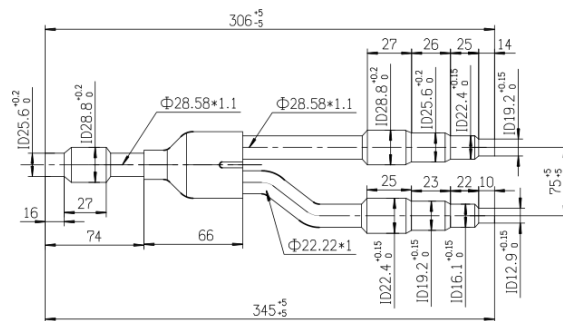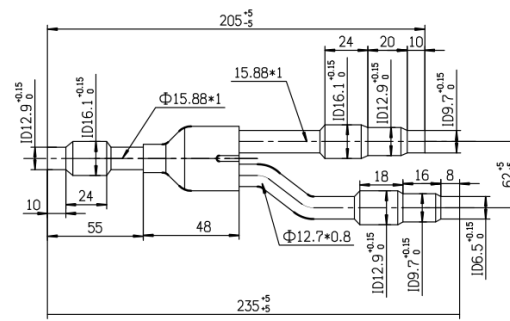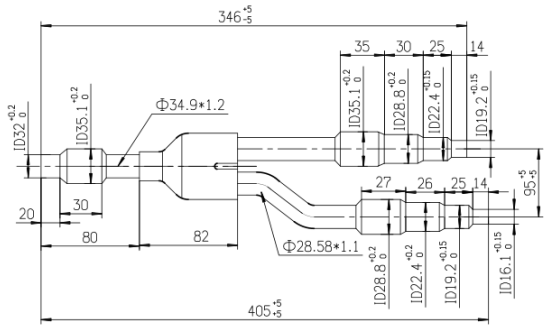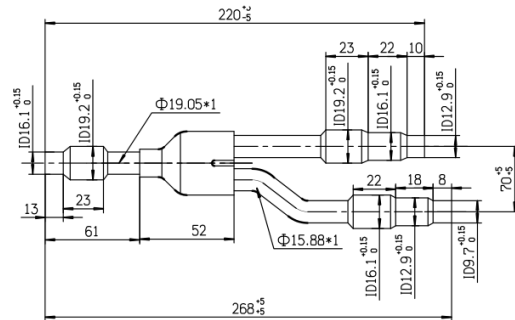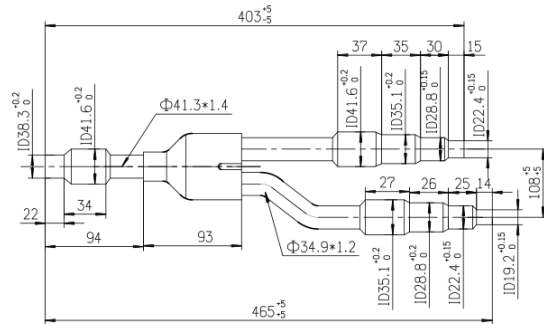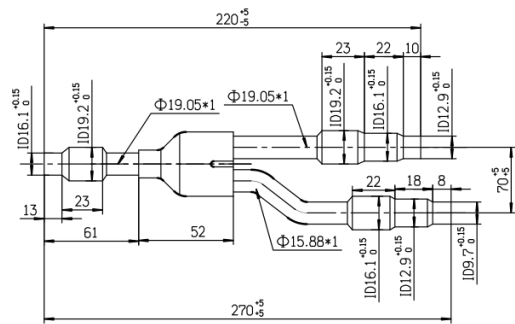
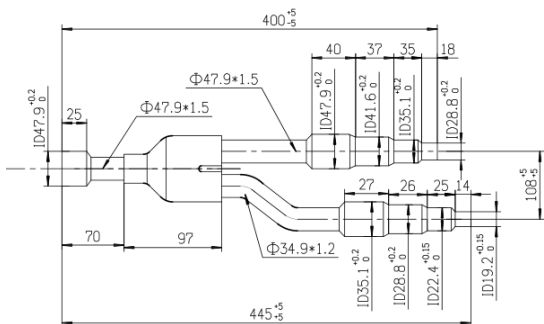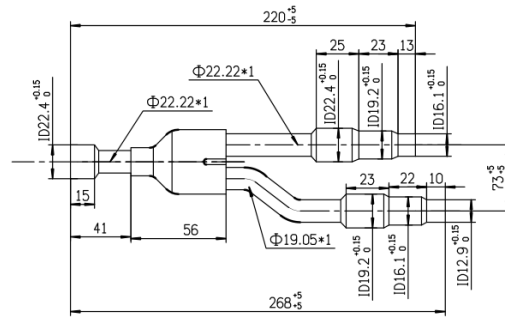### Liquid side joint

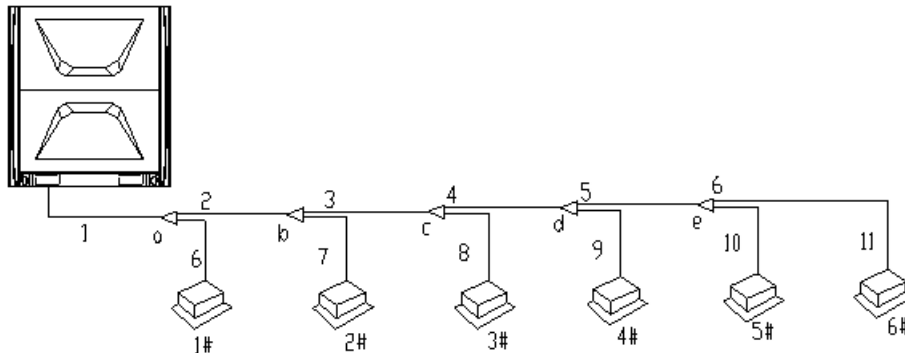## RBPK-64B Physical Dimension

Gas side joint

Liquid side joint

✧ **Example of piping design**

22HP is taken as the example to explain pipe selection.

No. of indoor unit	Indoor Unit Capacity（kW / HP）
1#	10 / 3.57
2#	10 / 3.57
3#	10/ 3.57
4#	10 / 3.57
5#	10/3.57
6#	10 / 3.57

For outdoor unit:

Pipe diameter of "1" depends onoutdoor unit capacity, which is Φ15.88/Φ28.6. Y-type branch pipe should use thetype ofRBPK-24B.

For indoor side:

1. Downstream indoor units of main pipe "5" include 5#、6#. Its HP sum is "10×2=20kW". Dimension of pipe "5" is Φ19.05/Φ9.52. Branch pipe "e" should use RBPK-00B.

2. Downstream indoor units of main pipe "4" include 4#~6#. Its HP sum is "10×3=30 kW". Dimension of pipe "4" is Φ22.2/Φ9.52. Branch pipe "d" should use RBPK-12B.

3. Downstream indoor units of main pipe "3" include 3#~6#. Its HP sum is "10×4=40 kW". Dimension of pipe "3" is Φ28.6/Φ12.7. Branch pipe "c" should use RBPK-24B.

4. Downstream indoor units of main pipe "2" include 2#~6#. Its HP sum is "10×5=50 kW". Dimension of pipe "2" is Φ28.6/Φ15.88. Branch pipe "b" should use RBPK-24B.

5. Downstream indoor units of main pipe "1" include 1#~6#. Its HP sum is "10×6=60 kW". Dimension of pipe "1" is Φ28.6/Φ15.88. Branch pipe "a" should use RBPK-24B.
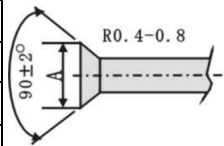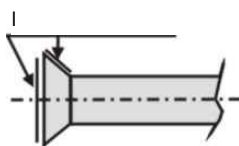
Note:

Branch pipes must be placed horizontally, otherwise there will be distribution of refrigerant will be caused.

3.5 Connection and Welding of pipe

Flaring opening connection.

✧ Deburr the pipe before flaring, then flare pipe with flaring tool as per the dimensions of flaring opening inthe 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 the cap on liquid and gas stop valve, align flaring opening with stop valve of outdoor unit, sufficiently screw fared nut with hand, and then screw with torque wrench as per the tightening torque in the following table.

✧ It is required to weld before system connection and purge with nitrogen to prevent oxidation layer formed inside copper pipe when welding.

Diameter of pipe	Tightening torque	Machining dimension of flared	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		
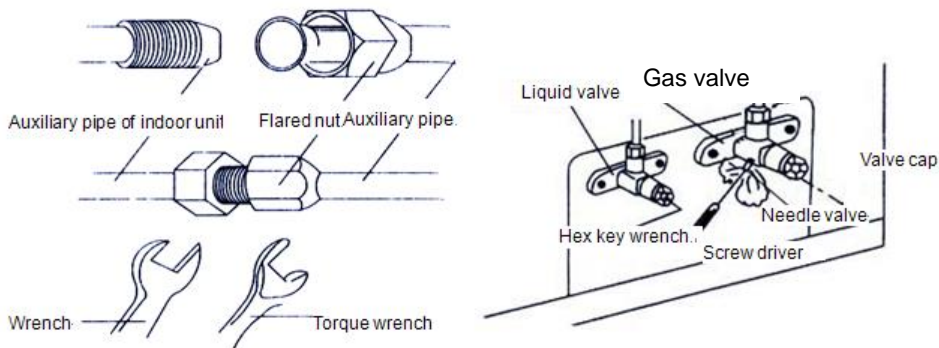
3.6 Gas Tightness Test

✧ **Purpose:** To confirm whether there is leakage in pipe by using nitrogen, and the steps are as follows:
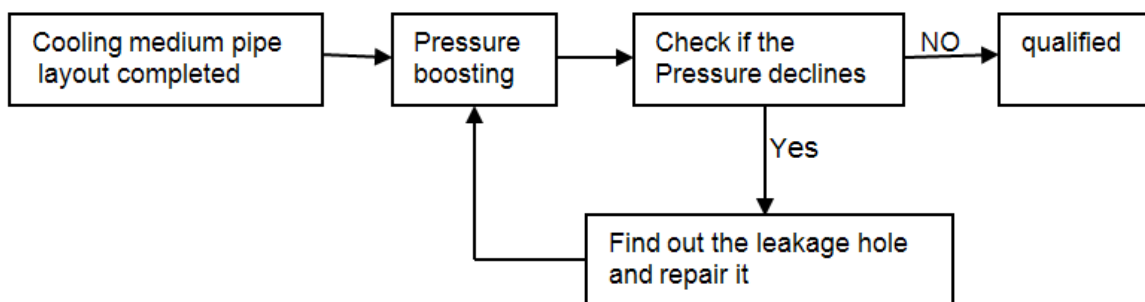
✧ **Gradual pressurization test**

1st stage - Large leakage check: 0.3MPa more 3 minutes.

2nd stage - Big leakage check: 1.5MPa more than 3 minutes.

3rd stage – Small leakage check: 4.3MPa more than 24hours.

✧ **Observe pressure drops.**

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

difference of 0.01MPa/1℃.

Correction value =(pressurized temperature - observed temperature)x0.1

Example:

Pressure is 4.3MPa and temperature is 25℃ in case of pressurization.

After 24 hours, if the pressure is 4.25MPa and temperature is 20℃, it is deemed qualified.

Check leakage point.

If there is pressure drop but leakage point can't be found in pressure test:

1. Discharge nitrogen until the pressure is 0.3MPa.
2. Charge R410a refrigerant to 0.5MPa (namely the mixed state of nitrogen and refrigerant).
3. Check with halogen lamp, butane gas(petroleum gas) detector and electric detector.
4. If leakage point can't be found, recheck by continuously pressurize up to 2.8MPa. (maximum pressure is 4.3MPa.
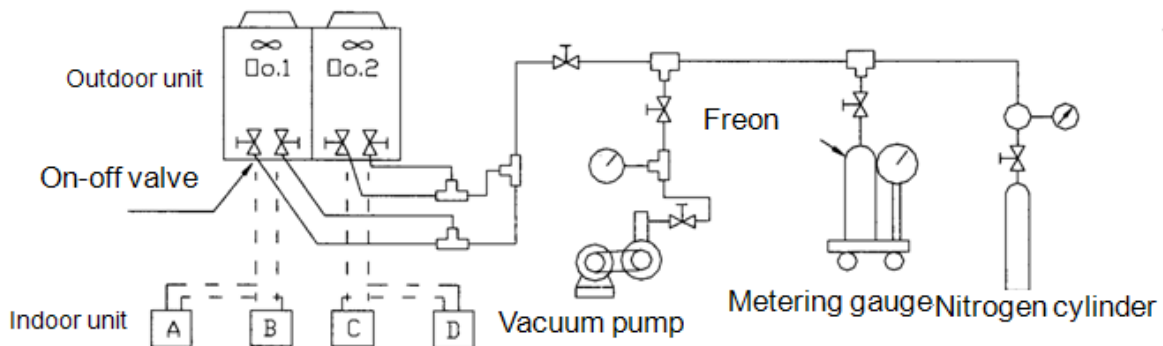
3.7 Vacuum Drying

3.7.1 Purpose of vacuum drying

1. Remove moisture from the system to prevent ice-blockage and coppering. Ice-blockage will cause abnormal operation, while coppering may damage compressor.
2. Eliminating the non-condensable gas of system prevents oxidizing of internal components, system pressurefluctuation, and low heat exchange performance.
3. Detect leakage source from reverse rotate.

3.7.2 Selection of vacuum pump

1. Vacuuming suction must be less than -14.6PSI(756mmHg).
2. The discharge of vacuum pump is over 4L/s.

3. The precision of vacuum pump is over 0.001ft.H_2O(0. 02mmHg)

Note:

1. 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.

2. After the vacuuming process of R410A refrigerant circulation system is complete, vacuum pump will stoprunning. As a result of suction in the in the air conditioning system, vacuum pump lubricant will seep back intothe system. Thissituation will also occur if vacuum pump suddenly stops during operation. It willcause different oils mix, leading to system malfunction, therefore it is recommended to use one-way valve toprevent reverse flow of oil in vacuum pump.

Water's boiling point(℃)	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 ambient temperature is 7.2℃, vacuuming can be carried out under -752mmHg.

3.7.3Operation procedure

There are two vacuum drying methods: common and special.

✧ **Ordinary vacuum drying**

1. Connect the pressure gauge to the infusing mouth of gas and liquid pipe, keep vacuum pump running for atleast 2 hours, ensures vacuum degree o is below -14.6PSI(-755mmHg).

2. If the vacuum degree is not below -14.6PSI(-755mmHg) after 2 hours of drying, system will continue dryingfor 1 hour.

3. If the vacuum degree is not be below -14.6PSI(-755mmHg) after 3 hours of drying, check the system forleaks.

4. Vacuum placement test: when the vacuum degree reaches -14.6PSI(-755mmHg), keep for 1 hour. If thevacuum gauge indicator does not increase, the process is complete. If the vacuum gauge increases, itindicates of moisture or a leak.

5. Vacuum drying shall be conducted from liquid and gas pipe simultaneously. There are a lot of functionparts like valves, which could shut down the gas flow midway.

✧ **Special vacuum drying**

   Special vacuum drying method shall be adopted when:

1. Discovery of moisture during refrigerant piping flush.

2. Conducting construction on rainy day, because rain water might penetrated into pipeline.

3. Construction period is long, and rain water might penetrated into pipeline.

4. Rain water might penetrate into pipeline during construction.

   Procedures of special vacuum drying are as follows:

1. First stage vacuum drying 2 hours.

2. The second vacuum damage, charging nitrogen to 7.1PSI(0.5kgf/cm2).
   Because nitrogen is dry, vacuum damage could achieve the effect of vacuum drying, but this method can'tsufficiently dry the system when there is too much moisture. Therefore, it is crucial to ensure that moisturedoes not enter the system and condensation does not form.

3. Second stage vacuum drying 1 hour.
   Vacuum drying is confirmed complete when vacuum degree is under -14.6PSI(-755mmHg); if the vacuumdegree is still above -14.6PSI(-755mmHg) within 2 hours drying, please repeat the procedures of "vacuumdamage---vacuum drying".

4. Vacuum placement test: when the vacuum degree reaches -14.6PSI(-755mmHg), keep for 1 hour. If thevacuum gauge indicator does not increase, the process is complete. If the vacuum gauge increases, itindicates of moisture or a leak.

4. Additional refrigerant

4.1 Operation procedure

Calculate the required refrigerant volume by the length of liquid pipe → recharge refrigerant.

Pipe size of liquid side (mm)	L1 Φ25.4	L2 Φ22.22	L3 Φ19.05	L4 Φ15.88	L5 Φ12.7	L6 Φ9.52	L7 Φ6.35
Additional refrigerant charge per meter (kg)	0.45	0.34	0.25	0.17	0.11	0.054	0.022

Additional refrigerant charge volume =（L1×0.45）+（L2×0.34）+（L3×0.25）+（L4×0.17）+（L5×0.11）

+（L6×0.054）+（L7×0.022）

4.2 Steps for recharging refrigerant

1.   Make sure vacuum drying is qualified before recharging refrigerant.

2.   Calculate the required refrigerant volume by the diameter and the length of liquid pipe.

3.   Use electronic scale or fluid infusion apparatus to weigh the recharged refrigerant volume.

4.   Use soft pipe to connect refrigerant cylinder, pressure gauge, and examine valve of outdoor unit. And recharge in liquid mode. Before recharging, clear the air in the soft pipe and pressure gauge's pipe.

5.   After recharge is finished, using gas leak detector or soap water, inspect for refrigerant leakage in expansionpart of indoor and outdoor units.

Caution

✧   The recharged refrigerant volume must be calculated according to the formula in the outdoor technicalreference manual. Calculation cannot be made according to running current, pressure and temperature ascurrent and pressure will change depending on the difference of temperature and length of pipeline.

✧   The calculation result must be recorded for reference (Better to make a table);

✧   In cold temperature, use warm water and hot air to warm up refrigerant storage cylinder.

✧   Charge the additional refrigerant from the gas pipe or liquid pipe. After the system is running, if it is neededto charge refrigerant during maintenance, charge at the gauge point.

4.3 Recharging R410A refrigerant

If R410A refrigerant is adopted, confirm the following items before recharging,

1.   R410A refrigerant compatible vacuum pump with one-way valve.

2.   R410A refrigerant compatible pressure gauge.

3.   R410A refrigerant compatible recharging soft pipe and connector.

4.   Charging method: Recharge in liquid phase.

5. Insulation

Thermal insulation wrapping of pipe

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

Note:

✧ Wrap refrigerant pipe with thermal insulation materials of good insulation performance (> 120℃).

✧ 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℃) 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.
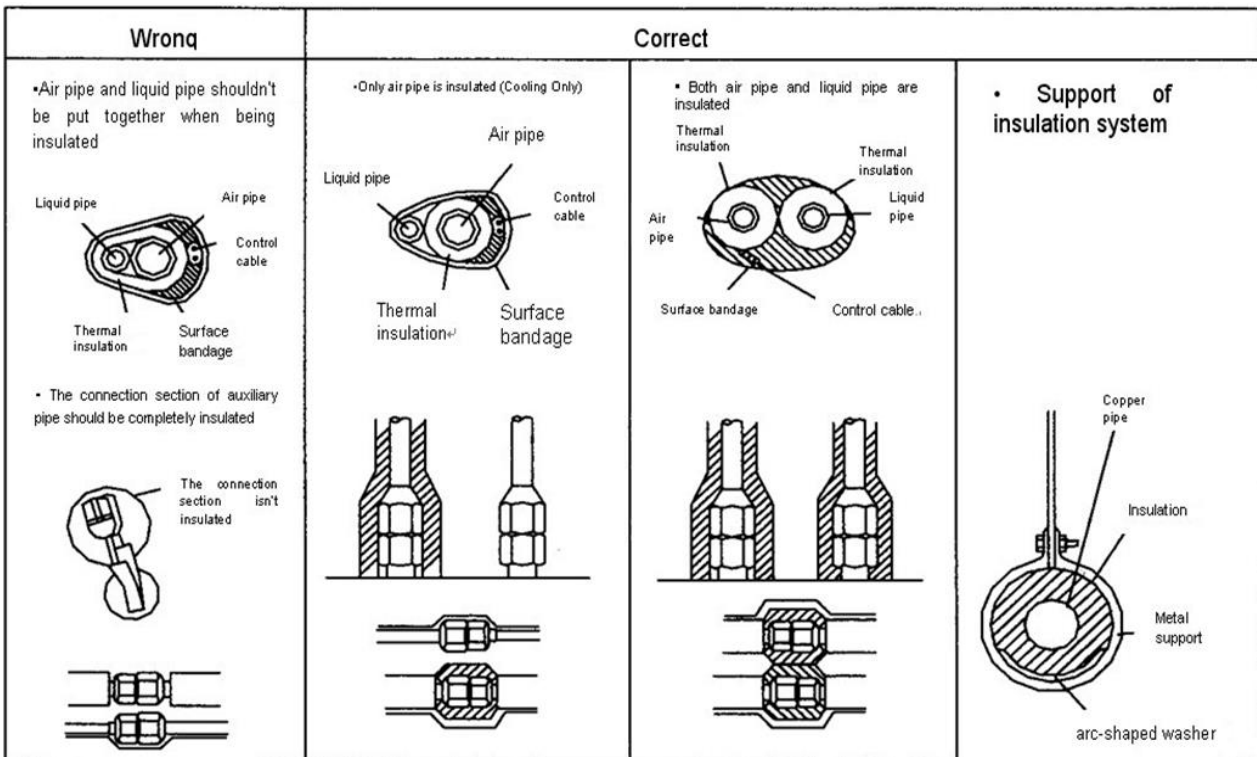
Sealing of Wall Opening

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

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

6. Electrical connection

6.1 Caution and notice

|	
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, 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.
	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 with relevant local and national regulations.
	AC equipment should be grounded according to the relevant local and national electrical regulations.
	Maintenance operation should be conducted after switching off power supply.
	The outdoor unit includes an inverter device. Connect to the earth to eliminate the impact on other devices 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, lightning and other ground wires.
	Leakage protector and power switch 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.
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 between 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 be less than 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.

6.2 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 wire must be thickened when it is overlong.

Wiring Diagram of Modular Outdoor Unit
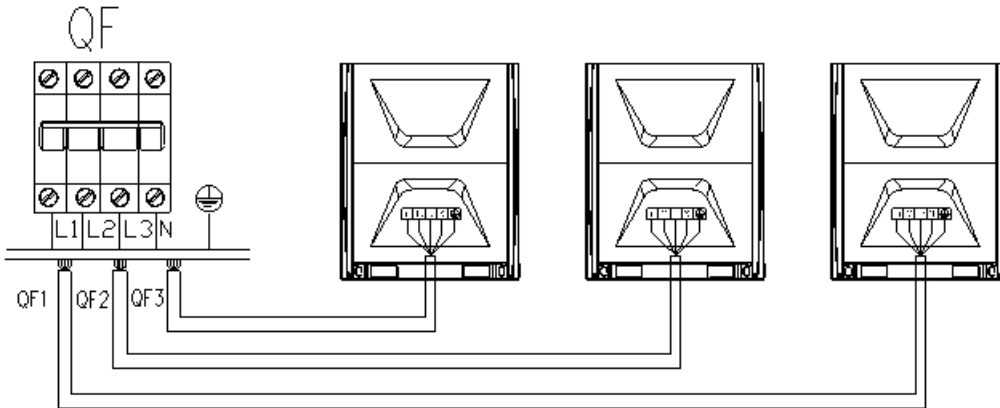
Recommended Specification for Power Line of Outdoor Unit (stand-alone power supply)

Item / Unit Type		Power supply	Sectional area of power line (mm²)	Rated current breaker (A)	Rated current of breaker, leakage currentOperate time	Containing an area of ground wire(mm²)
Separate power	GRV08P3T3/6	380~415V 3Ph ~ 50/60Hz	4	32	30mA, < 0.1 sec.	4
	GRV10P3T3/6		6	32	30mA, < 0.1 sec.	6
	GRV12P3T3/6		6	40	30mA, < 0.1 sec.	6
	GRV14P3T3/6		6	50	30mA, < 0.1 sec.	6
	GRV16P3T3/6		6	50	30mA, < 0.1 sec.	6
	GRV18P3T3/6		10	63	30mA, < 0.1 sec.	10
	GRV20P3T3/6		10	63	30mA, < 0.1 sec.	10
	GRV22P3T3/6		16	63	30mA, < 0.1 sec.	16

6.3 Communication Line Connection
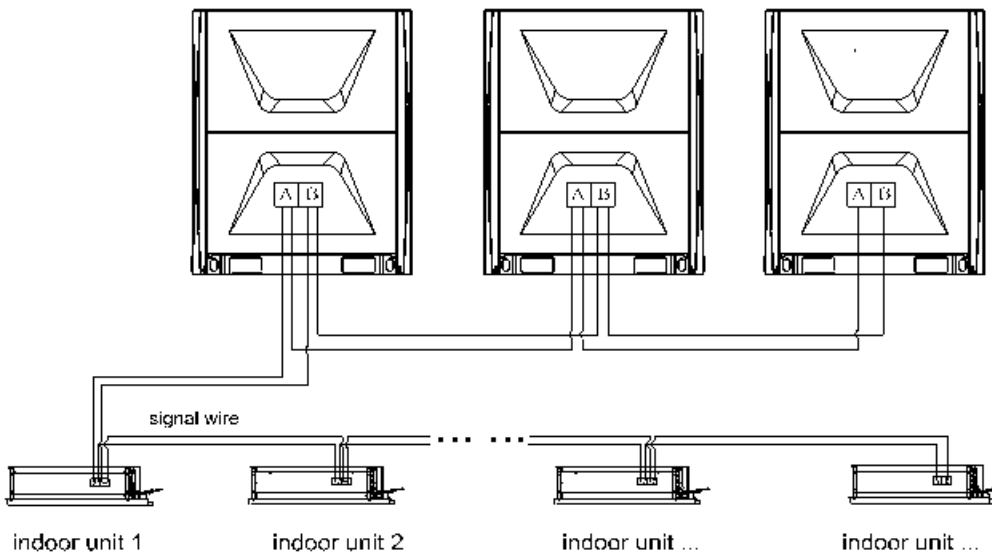
6.4 Wiring

1. Open electric controlled box cover of indoor unit, wire according to electrical schematic diagram on electric controlled box cover, firmly press connecting wire 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. Make sure to thread connecting wire 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 pipe, connecting wire and drainage pipe with bandage as shown below:

Note:

1. Make sure 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.

Part3 Commissioning

1. Preparatory work

1.1 Inspection and confirmation before commissioning

✧ Confirm that refrigeration piping and communication wire of indoor and outdoor units have been connectedto the same refrigeration system in order avoid unnecessary malfunctions.

✧ Confirm power voltage is within ±10% rated voltage.

✧ Confirm that the power wire and control wire are correctly connected, the power phase sequence of outdoor unit is corrected, the outdoor unit can detect each indoor unit.

✧ Confirm wired controller is properly connected.

✧ Confirm all units have passed nitrogen pressure-keeping test for 24 hours.

✧ Confirm the system has been carried out vacuum drying and charged with refrigeration as required.

1.2 Preparation before start up

✧ Turn on power switches of outdoor unit in advance, and keep connected for a minimum of 8 hours toensure refrigerant oil is sufficiently heated.

✧ Turn on all valves. If valves are not fully open unit may be damaged.

✧ All dial switches of indoor / outdoor units have been set according to the technical requirements.

1.3Commissioning

Inspection list of trial run:

1) Confirm the fan impeller is rotating according to its intended route and turns smoothly.

2) Check for abnormal noise during operation of refrigerant system and compressor.

3) Confirm drainage is smooth and its lift pump is operational.

4) Confirm operating current is within the allowed range.

5) Confirm each operating parameter is within the range permitted by the equipment.

Note: Separately test cooling mode and heating mode to judge the stability andreliability of the system.

1.4 Refrigerant leakage caution

This air conditioner adopts R410A as refrigerant, which is safe and noncombustible.

R410A critical thickness: $0.3kg/m^3$ (Critical thickness: the max thickness of Freon without anyharm to person).

Full of leaking refrigerant
All the refrigerant has leaked

Indoor Unit
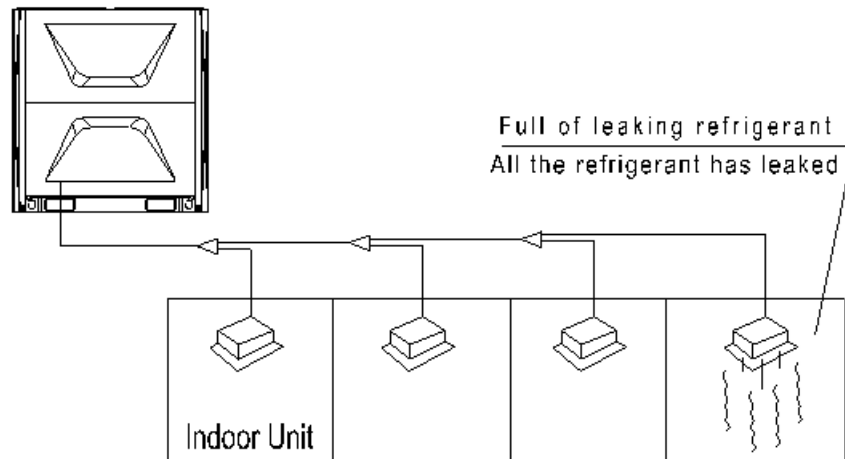
Calculate the critical thickness through following steps, and take necessary actions.

1)   Calculate the refrigerant charge volume A, A= factory charge volume + additional charge volume

2)   Calculate the indoor area volume (B) (as the minimum volume)

3)   Calculate the refrigerant thickness, A/B ≤ critical thickness 0.3kg/m$^{3.}$

Note:

In winter, supply power 6 hours in advance for initial operation so that crankshaft case can be preheated in advance.

In winter, after main power supply is interrupted for 6 hours, conduct trial operation again only after 2.5 hours of power-on.

2. DIP switch

2.1 Outdoor master unit setting- SW1
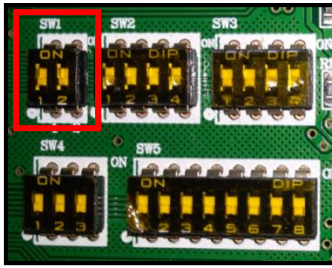
1	2	Definition
OFF	OFF	Master
OFF	ON	Slave 1
ON	OFF	Slave 2
ON	ON	Slave 3

2.2 Check the outdoor unit capacity setting- SW2
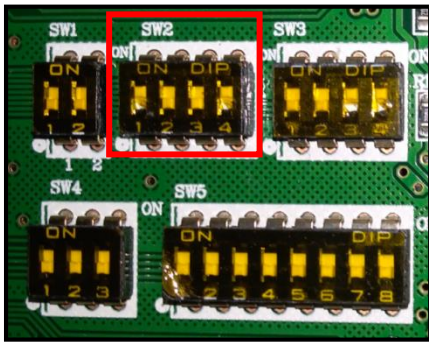
1	2	3	4	Capacity	
OFF	OFF	OFF	OFF	Reserve	
OFF	OFF	OFF	ON	8HP	22.4 kW
OFF	OFF	ON	OFF	9HP	25.2kW
OFF	OFF	ON	ON	10HP	28.0 kW
OFF	ON	OFF	OFF	12HP	33.5 kW
OFF	ON	OFF	ON	14HP	40.0 kW
OFF	ON	ON	OFF	16HP	45.0 kW
OFF	ON	ON	ON	18HP	50.4 kW
ON	OFF	OFF	OFF	20HP	56.0 kW
ON	OFF	OFF	ON	22HP	61.5 kW

2.3 Check the outdoor unit type - SW3
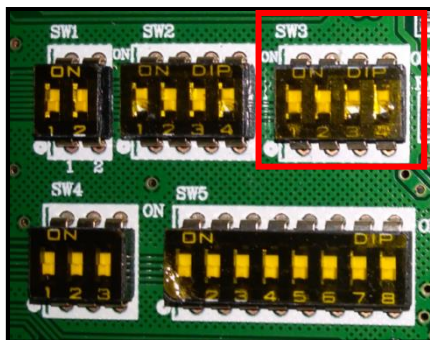
1	2	3	4	Definition
OFF	OFF	OFF	OFF	/
OFF	OFF	OFF	ON	/
OFF	OFF	ON	OFF	/
OFF	OFF	ON	ON	/

3. Commissioning

3.1 Instruction of Keys
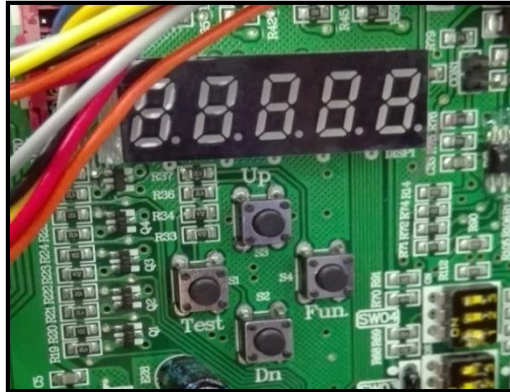
After installation of IDU and ODU, Vacuum pumping, Refrigerantfilling, IDU and ODU power on , then the main PCB digital tube displays"*d*   " , it means the system is waiting for commissioning; if it displays standby " *L . 16*" or locking" *LoC*   ",it means that the system has finished commissioning.

3.2 Basic Operations

●Enter/ Exit

Long press "Fun" button for more than 5 s to enter project commissioning;

Long press "Test" button for more than 5 s to exit.

●Quick finish

After completing Step "3", long press "Fun" + "Test" buttons for more than 5 s to complete project commissioning in advance, the system enters the state of normal standby.

3.3 Steps of Commissioning

3.3.1 ODU address and IDU address setting

The system must set DIP address to make one module as master unit, the rest are slave units.
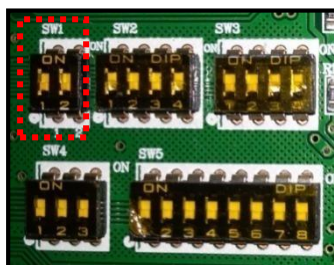
1	2	Definition
OFF	OFF	Master
OFF	ON	Slave 1
ON	OFF	Slave 2
ON	ON	Slave 3

After setting master and slave units correctly, Long press "Fun" button for more than 5 s to enter project commissioning , digital tube will display"*1 . 0*" (the left means 1st step, the

right shows the addressing mode, "0" means manual addressing, "1" means automatic addressing), press "Up" or "Down" buttons to choose, short press "Fun" to confirm; after confirmation, digital tube displays " *1.⠀⠀⠀0* "or" *1.⠀⠀⠀1* ", 2 s later, enter step 2. If manual addressing is chosen, manually set the indoor unit address by remote controller or wired controller.
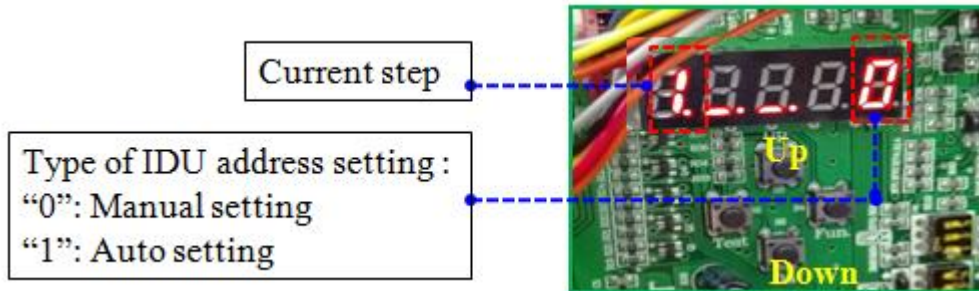
3.3.2 Quantity locking of ODU

Digital tube displays " *2.⠀⠀⠀1* "(the left means 2nd step, the right display the quantity of outdoor units) , if display quantity and actual quantity are inconsistent, need to conduct manual check (DIP address, communication cable and etc.) and commissioning confirmation again. If they are consistent, short press "Fun" button to confirm, digital tube displays like " *2.⠀⠀⠀1* ", 2 s later, enter step 3.
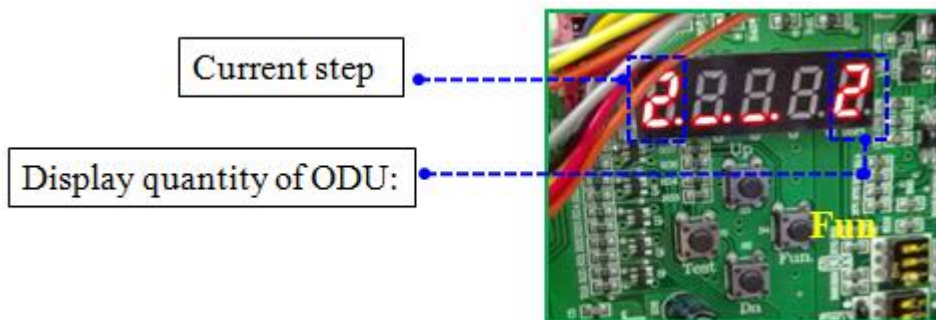
3.3.3 Quantity locking of IDU

Digital tube displays " *3.⠀⠀16* " (the left means 3rd step, the right shows the quantity of indoor units) , if display quantity and actual quantity are inconsistent,need to conduct check (power and communication cable of indoor units, and etc.) commissioning confirmation again. If they are consistent, short press "Fun" button to confirm. digital tube displays like " *3.⠀⠀16* " , 2 s later, enter step 4.
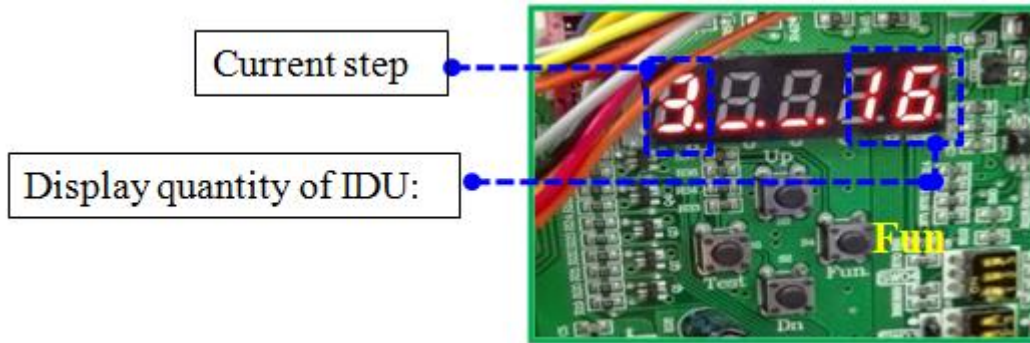
3.3.4 Confirmation of the internal communication of ODUs

Automatically detects the communication between master controller and driver; after 2 s, if the communication with the fan drive is faulty, it displays " 𝟒 𝐽𝟑 ", all buttons are invalid, cannot enter the next judgment; if it is normal, then the module displays " 𝟒 ". If the internal communication of outdoor electronic control box is normal, then conduct system indoor and outdoor units capacity ratio test, if it is out of range, display " 𝟒 𝐽𝐽 ", if ratio is normal, 2 s later, enter the next step.
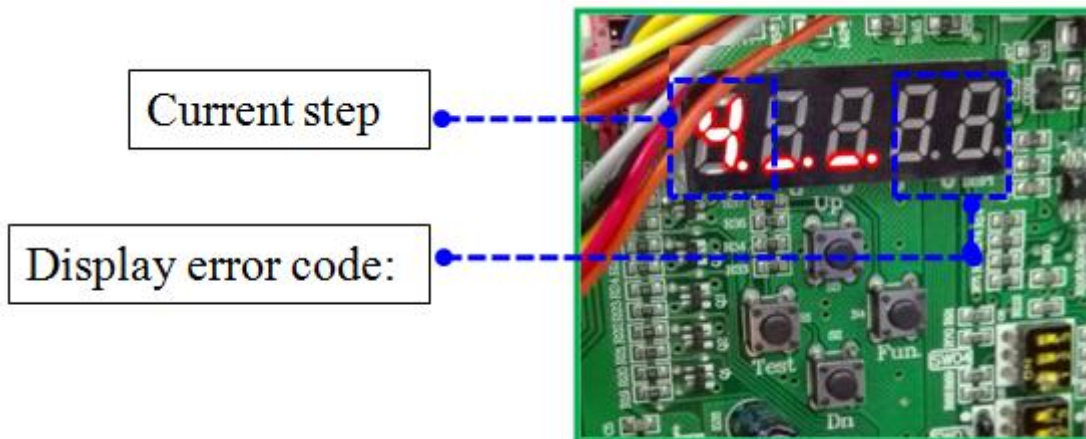
3.3.5 Confirmation of the internal components of ODUs

Automatically check components of outdoor units, being detected, display " 𝟓 ", if it's failure, then corresponding failure displays, for example, " 𝟓 𝐿𝐹𝟒 "; the left means step 5, the middle is the faulty outdoor unit's address, the last two is fault code. only displays the fault with the highest priority. If all failure are solved, display normally; in case that several modules occur faults, displays the fault codes in turn by address order. It cannot enter the next judgment; If all faults are solved, digital tube displays " 𝟓 ", 2 s later, enter step 6.
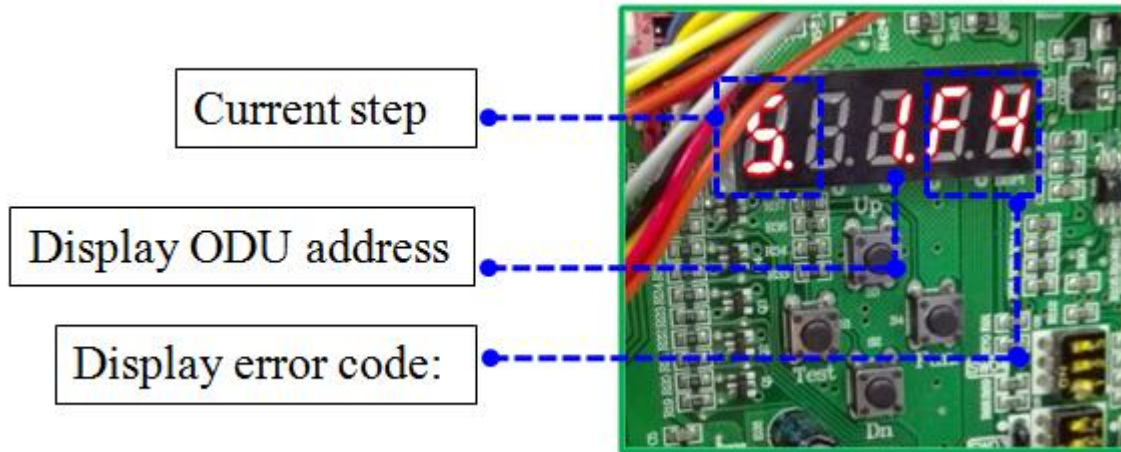
3.3.6 Adjustment on the components of IDUs

Digital tube displays "*6.   *", If one indoor unit occurs a fault, display project number circularly, and the fault code like "*6. 5.A.4*". If several indoor unit occur faults, display the addresses and the fault code circularly. At that moment, all buttons are invalid, cannot enter the next step. If no fault, digital tube displays "*6.   *", 2 s later, enter step 7.
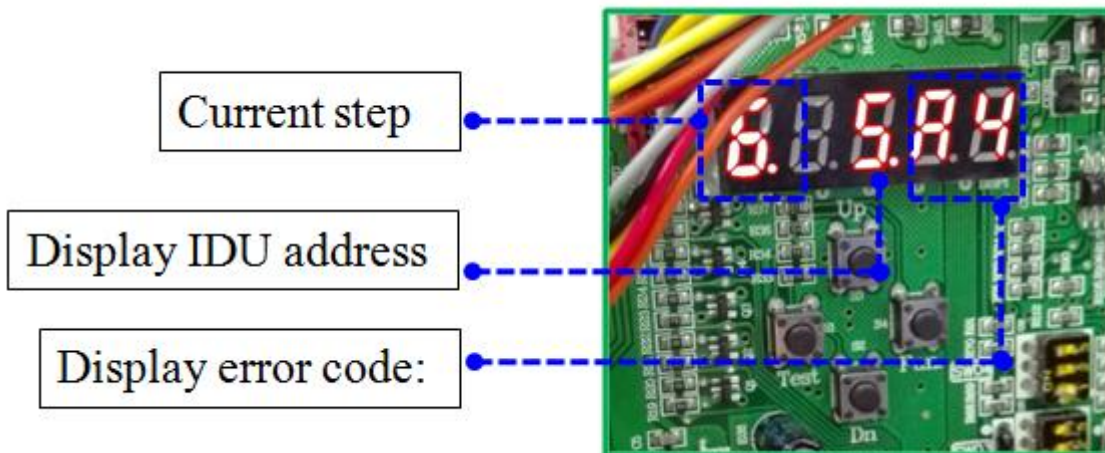
3.3.7 Confirmation and adjustment of compressor preheating

If the outdoor unit has been continuously energized for more than 6 hours, displays "*7.   *", means the completion of preheating, 2 s later, enter step 8. Otherwise display "*7.4:36*", The first digit means step 7, the rest indicates preheating time(hour : min). Short press "Fun" button, can skip waiting and enter step 8.

Current step

Preheating time
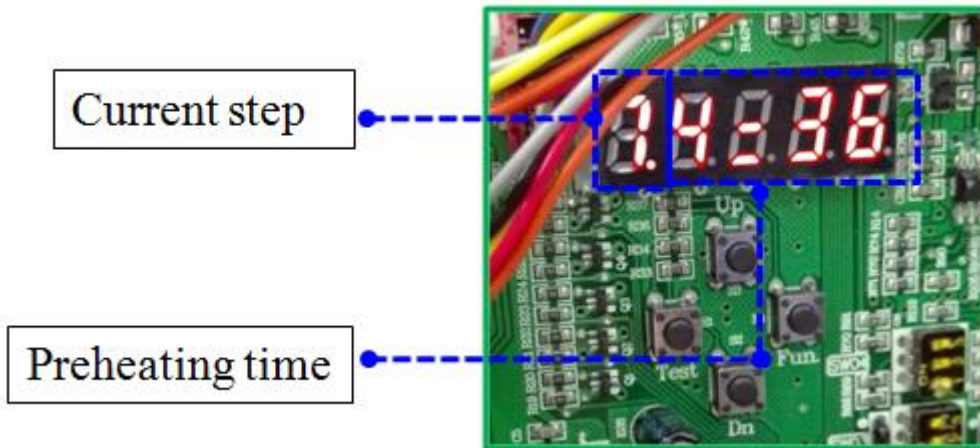
3.3.8 Refrigerant judgment before starting

Refrigerant judgment, display "🔴" . If any [module low pressure P s]≤-25℃, then point out refrigerant lack protection, display "🔴",all buttons are invalid, it required to check if the system refrigerant is normal, or there is any leakage. If it is normal, display "🔴 ", 2 s later, enter step 9.

Current step

Display error code:
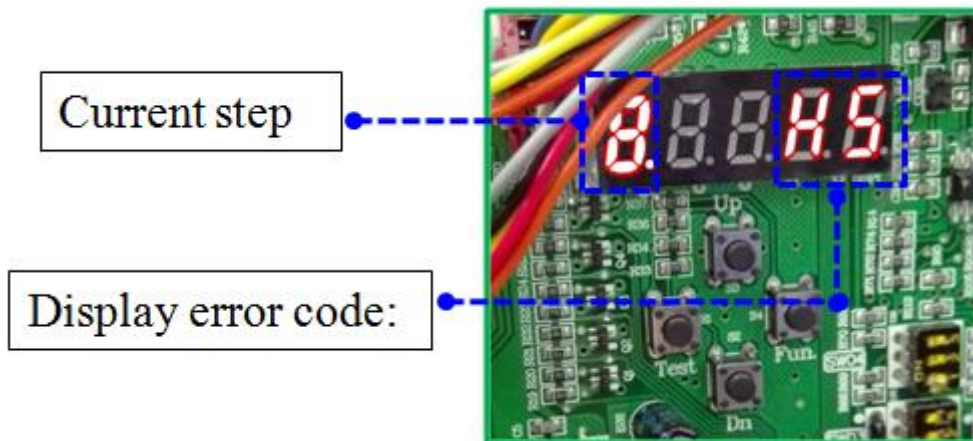
3.3.9 Status judgment on outdoor unit valve before starting

The status judgment of outdoor unit valve "🔴 ", 2sec later, enter the next step.

3.3.10 Confirmation of start commissioning

This step, displays "🔴 ", waiting for start commissioning. Press "Fun" button to start, automatically select operating mode according to outdoor environment temperature: ≥ 20 ℃, running cooling model; <20 ℃, running heating model. 2 s later, automatically enter the next step(step11 or step 12), digital tube displays "🔴".

3.3.11 Cooling operation

Refrigerating operation, all indoor units run in 16℃& high speed, digital tube displays " 11. ". In the operation, if it's failure, displays' Err' and fault code,like " Err.F3 ". 20min later, or accumulated for 25min, if the system is not abnormal, displays " 11. ", after 5s, enters normal standby status " 1. 16 " or locking " LoC ".Project commissioning is finished.

3.3.12 Heating operation
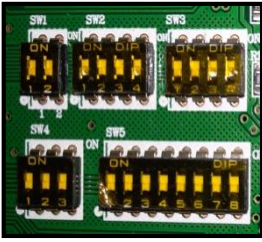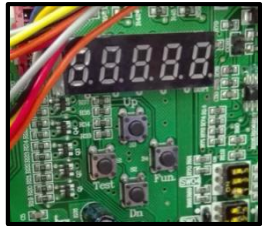
Heating operation, all indoor units run in 30℃& high speed, digital tube displays " 12. ", after 10min, if it is normal, display will not change. 20min later, or accumulated for 25min, if the system is not abnormal, displays " 12. ", after 5s, enters normal standby status " 1. 16 " or locking " LoC ".Project commissioning is finished.

4. Function and Parameter

4.1 Function introduction

List of Functions show in the table, can be set in 2 ways :

（1）、by dial switch（turn off –on the power after you change the Switch）.

（2）、by Key button options.

Function names	setting method	Switch/ Key options
Compressor emergency	switch	SW4-1、2
Modular(ODU)emergency		SW4-3
Silent（Quiet）		SW5-1、2
Model priority（Majority rule）		SW5-3、4
Static pressure		SW5-5、6
IDU/ODU capacity rate	Key button options	1
Clean (Auto dust removal)		2
VER(variable energy-efficiency regulation)		3
Blow off snow(Auto snow-blowing)		4
Vacuumpumping		5
Economic locking (26℃)		6
Refrigerant recycle		7
Refrigerant charging		8

4.1.1 Functions set by switch

Function setting-SW4
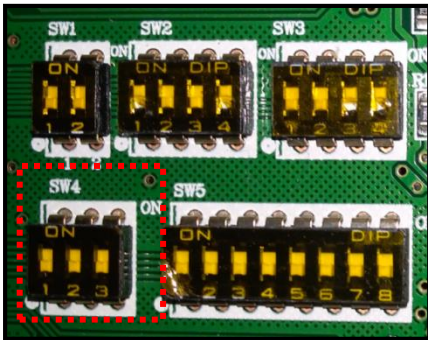
1	2	Function	3	Function
OFF	OFF	Without Compressor emergency(Default)	OFF	Without modular emergency(Default)
OFF	ON	1# Compressor emergency	ON	modular emergency
ON	OFF	2# Compressor emergency		
ON	ON	3# Compressor emergency		

Function setting-SW5
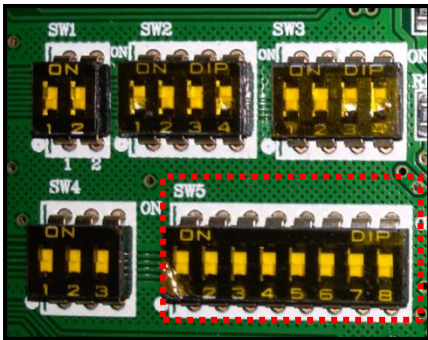
1	2	Function	3	4	Function	5	6	Function	7	8
OFF	OFF	Without quiet mode(Default)	OFF	OFF	First-ON (Default)	OFF	OFF	static pressure 0 Pa(Default)		
OFF	ON	Quiet in night	OFF	ON	Heating priority	OFF	ON	20 Pa		
ON	OFF	Quiet mode	ON	OFF	Cooling priority	ON	OFF	50 Pa	Reserve	
ON	ON	Strong mode	ON	ON	Majority rule	ON	ON	80 Pa		

Notice：

● In the table,**"OFF"** means switch to down , **"ON"** means switch to up .

● When you want tochange any set,please consult our factory first.

● When you set Compressor or modular emergency,please close the Gas/Liquid valve of the ODU,and solve the problem within 24-48h,because the emergency cannot work long time.After solved the problem,please cancel emergency setting,othersthe ODU cannot run.

4.1.2 Functions set by Key button options

Function names	Memory	Instructions
IDU/ODU capacity rate	Y	Set max IDU/ODU rate allowed
Clean (Auto dust removal)	N	Outdoor fan run in special model to clean the condenser
VER(variable energy-efficiency regulation)	Y	3 types of different evaporate temperature：normal、energy saving、comfort
Blow off snow(Auto snow-blowing)	Y	Setting snow-blowing time cycle, Outdoor fan run in special model to snow-blowing
Vacuumpumping	N	Automatic control of each valve component of the system,
Economic locking (26℃)	Y	IDUs set temperature is locked at26℃
Refrigerant recycle	N	The refrigerant is recycled to the outdoor unit
Refrigerant charging	N	Automatically determine whether the refrigerant is filled up(by detecting pressure)

Notice：

● In the table,memory**"Y"** means long-term effective after each setting ,

Memory**"N"** means 1 time effective after each setting .

4.2 ParameterChecking and Setting

4.2.1 Parameter checking and parameter setting interface

After commissioning,the system is standing-by.

1st step--- Press "Fun" key for 2 s, the Main digital tube will displaysparameter checking and parameter setting interface:

1.【Status Checking"*E.□□□□*" (flash) 】 、

2.【Parameter Checking"*P.□□□□*" (flash) 】 、

3.【Parameter Setting"*C.□□□□*" (flash) 】 、

4.【Commissioning "*d.□□□□*" (flash) 】 、

5.【Restore to factory setting"*r.□□□□*" (flash) 】

2st step---Press "Up" or "Down" key to choose the function you want,

3st step---Press "Fun" entre the Parameter checking and parameter setting.

Sketch Map:

Press "Fun" 2 s

Press "up"/"down"

Press "up"/"down"

Press "up"/"down"

Press "up"/"down"

| Press "Fun" | Press "Test" | Press "Fun" | Press "Test" | Press "Fun" | Press "Test" | Press "Fun" | Press "Test" |

Commissioning   **Status Checking**   **Parameter Setting**   **Parameter Checking**
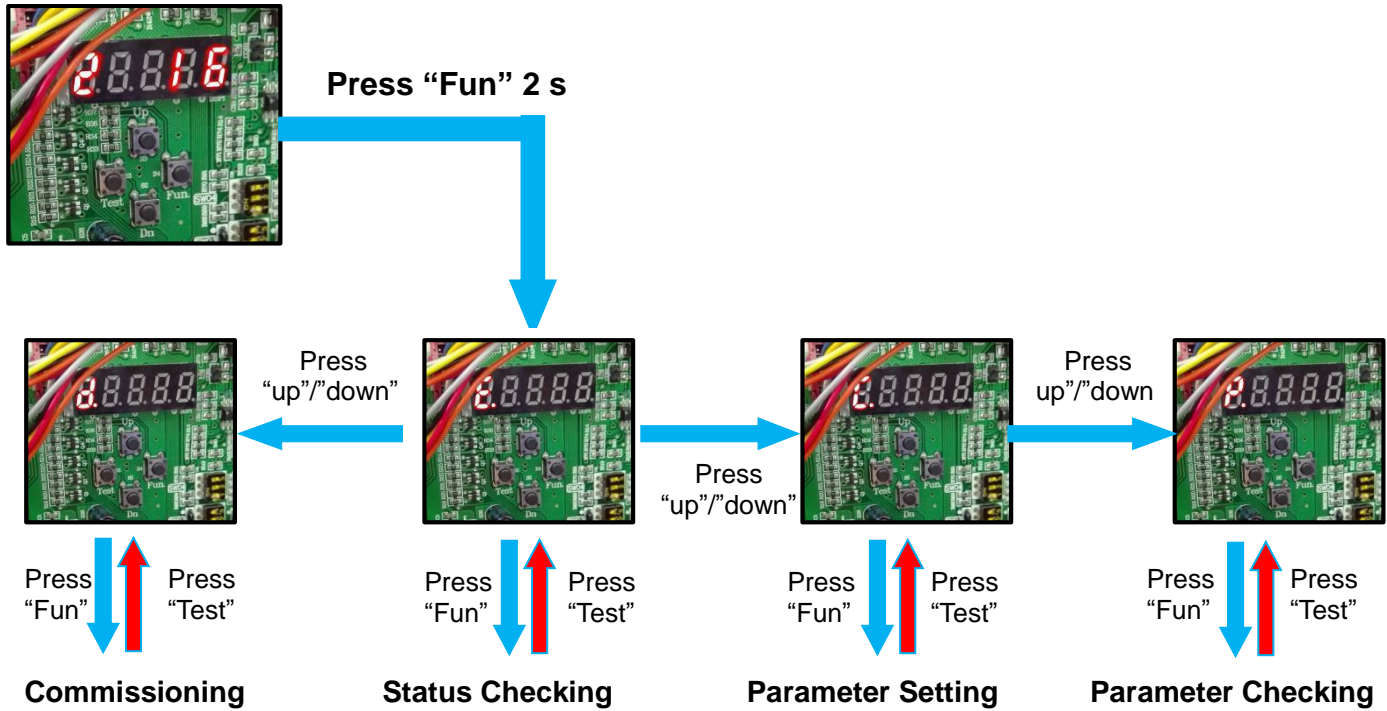
4.2.2 Status Checking

Choose Status Checking"*E*"，press Fun key into the 2nd step，then you can check therunning status of the system,like frequency of compressor and so on.

For example：Digital tube displays like *1 640*,means parameter namecorresponding No.1, 640means the parameter is 64.whole means frequency of comp 1 is 64rps.

Parameter corresponding to serial number:

No	parameter name	units	No	parameter name	units
1	freq of 1# comp	rps	9	ODU environment temp.	0.1℃
2	freq of 2# comp	rps	10	Suction temp.	0.1℃
3	Open degree of PMV1	pls	11	Tci1(outlet of condenser 1)	0.1℃
4	Open degree of PMV2	pls	12	Tci1(outlet of condenser 2)	0.1℃
5	High press sensor-Temp.	0.1℃	13	Tdef1(defrost temperature)	0.1℃
6	Low press sensor-Temp.	0.1℃	14	Tdef2(defrost temperature)	0.1℃
7	Dis-Temp. of 1# comp	0.1℃	15	Edition of procedure	/
8	Dis-Temp. of 1# comp	0.1℃			

Sketch Map:

Press "Test"

Press "Fun"

Serial Number:
Press "up"/"down", from 1~ 15

Parameter Corresponding To Serial Number
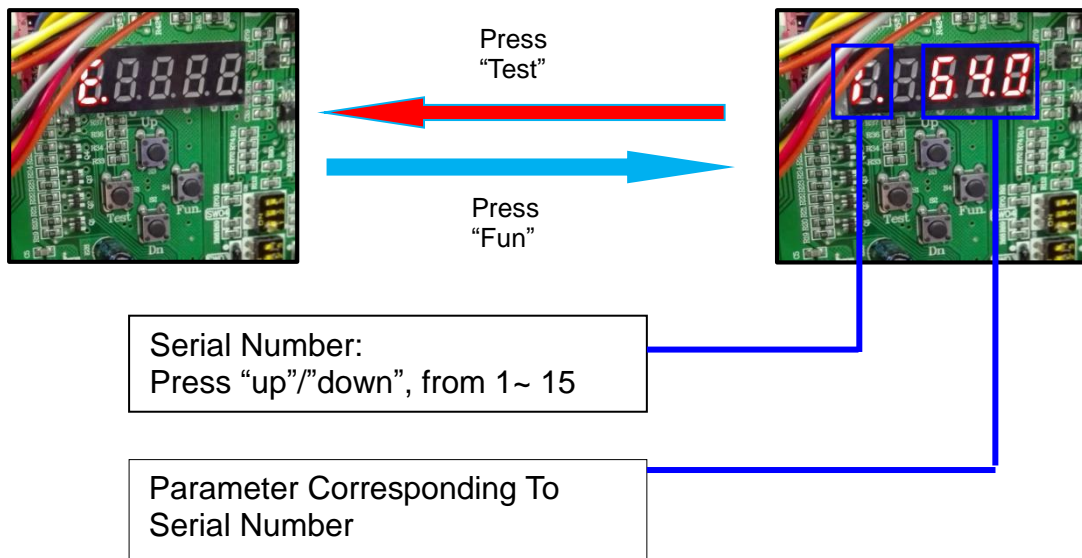
4.2.3 ParameterChecking

In the 1st step---Main menu，choose Parameter Checking" ⌐⍾⍾⍾⍾ "，and press Fun key，then you can check parameter of some functions by choosing the number in the table below.

For example：Digital displays like" ⌐⍾⍾⍾⍾ "(P-light,1-shane)，then press Fun key to the down step,it will show you a parameter like" ⍾⍾⍾135 ",means the max rate of IDU/ODU (No 1) is 135%.

Serial Number	function name	remember
1	IDU/ODU capacity rate	Y
3	VER(variable energy-efficiency regulation)	Y
4	Blow off snow(Auto snow-blowing)	Y
6	Economic locking (26℃)	Y

4.2.4 ParameterSetting

In the 1st step---Main menu，choose Parameter Setting" ⌐⍾⍾⍾⍾ "，press Fun key，then you can set some Function/Parameter you want by choosing the Function Number.

For example：Digital displays " ⌐⍾⍾⍾⍾ " (C-light,1-shane), press Up or Down key to choose the number of function you want,then press Fun key to get into down step to set if it's

need.Change the setting by pressing Up or Down key，then Fun key to confirm.The function

name and number show in the table below.

Function names	1st step	2nd step	3rd step	Notice
	Main menu	**Serial Number**	**Parameter Setting**	
IDU/ODU capacity rate		1	135　　　　　　　： IDU/ODU≤135% 200　　　　　　： IDU/ODU≤200%	135 is default，when you change it，it will influence the comfort，please consult our factory first.
Clean (Auto dust removal)		2	/	Choose the number at 2nd step and confirm，the outdoor fan will run immediately ，only one time.
VER(variable energy-efficiency regulation)		3	Choose number to set model 0：basic mode 1：high efficiency 2：turbo mode	0 is default ,when you change it ,it will influence the comfort or power consumption
Blow off snow(Auto snow-blowing)		4	Choose number to set cycle 0：without this function 1：0.5h 2：1h 3：3h 4：10h	After pressing Fun key to confirm，the outdoor fan will run to blowing off snow automatically and cycle by cycle，if you choose 1、2、3、4
Vacuum pumping		5	/	Choose the number at 2nd step and confirm，the ODU will be ready for Vacuumpumping.If set on the Master unit，the system.
Economic locking (26℃)		6	Choose number to set model 0：without this function 1：lock 20/26℃	If choose 1，the IDU setting temperature will be locked at 20℃ in heating model and 26℃ in cooling model at any time.
Refrigerant recycle		7	/	Recycle refrigerant to ODU
Refrigerant charging		8	/	Automatically determine whether the refrigerant is filled up(by detecting pressure)requires

5. Commissioning Based on Monitoring Software

5.1 Accessory of the monitoring software

Laptop

USB to RS485 converter

5.2 Monitoring software

comdlg32.ocx
mscomctl.ocx
MSCOMM32.OCX
MSHFLXGD.OCX
MSWINSCK.OCX
RICHTX32.OCX
TABCTL32.OCX
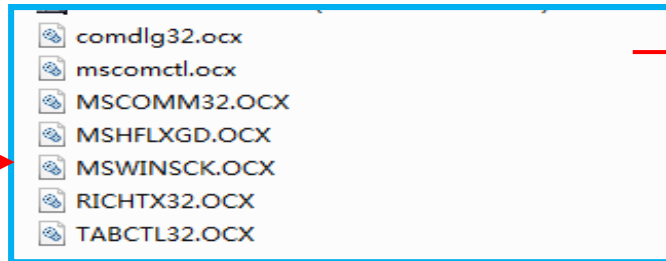
Click here to open the software

5.3 Installation Diagram

5.4 Introduction of the operation interface of GREEN monitoring software

5.4.1 Outdoor Unit List

Display quantity of OUDs, "3/4" means: A system has 4 ODUs, 3 of them are running,1 of them is standby

| ODU List (0/0) | | | | | IDU List (0/0) | | | | | IDU Param Settings | | | | | ODU Param Settings | | |

ODUs Info.

Param(Input)	Master	Slave1	Slave2	Slave3	Unit	Param(OutP)	Master	Slave1	Slave2	Slave3	Unit	Param(SW)	Master	Slave1	Slave2	Slave3	Unit
(1) Pd	-	-	-	-	bar	(1) COMPa	-	-	-	-	rps	(1) Capacity	-	-	-	-	HP
(2) Ps	-	-	-	-	bar	(2) COMPb	-	-	-	-	---	(2) ---	-	-	-	-	---
(3) Pd_t	-	-	-	-	℃	(3) OutputPer	-	-	-	-	%	(3) OperMode	-	-	-	-	---
(4) Ps_t	-	-	-	-	℃	(4) ---	-	-	-	-	---	(4) OperProc	-	-	-	-	---
(5) Tda	-	-	-	-	℃	(5) Fan1Spd	-	-	-	-	rpm	(5) Priority	-	-	-	-	---
(6) Tdb	-	-	-	-	℃	(6) Fan2Spd	-	-	-	-	rpm	(6) ---	-	-	-	-	---
(7) Tdc	-	-	-	-	℃	(7) ---	-	-	-	-	---	(7) CompTim	-	-	-	-	sec
(8) Tcm	-	-	-	-	℃	(8) PMV1	-	-	-	-	pls	(8) FreqRZ	-	-	-	-	---
(9) Ts	-	-	-	-	℃	(9) PMV2	-	-	-	-	pls	(9) PMVRZ	-	-	-	-	---
(10) Tao	-	-	-	-	℃	(10) PMV3	-	-	-	-	---	(10) PMV_SHS	-	-	-	-	---
(11) Tci	-	-	-	-	℃	(11) ---	-	-	-	-	---	(11) ---	-	-	-	-	---
(12) Tdef	-	-	-	-	℃	(12) SV0	-	-	-	-	---	(12) DiagCode	-	-	-	-	---
(13) Tfin	-	-	-	-	℃	(13) SV1	-	-	-	-	---	(13) ---	-	-	-	-	---
(14) Icm	-	-	-	-	A	(14) SVA	-	-	-	-	---	(14) FirmwRev	-	-	-	-	---
(15) CT1	-	-	-	-	A	(15) SVB	-	-	-	-	---	(15) ---	-	-	-	-	---
(16) Ifan	-	-	-	-	A	(16) CHa	-	-	-	-	---	(16) ---	-	-	-	-	---
(17) CR	-	-	-	-	%	(17) CHb	-	-	-	-	---	(17) ---	-	-	-	-	---
(18) DCVolt	-	-	-	-	V	(18) ---	-	-	-	-	---	(18) ---	-	-	-	-	---
(19) HPa	-	-	-	-	---	(19) LP	-	-	-	-	---	(19) ---	-	-	-	-	---
(20) HPb	-	-	-	-	---	(20) PCCtl	-	-	-	-	---	(20) ---	-	-	-	-	---

Outdoor units'operation parameter abbreviation

5.4.1 Indoor Unit List

Display the address of an indoor unit;
Display an indoor unit's operation parameter value

Display quantity of indoor units, "8/10" means: A system has 10 indoor units, 8 of them are running, 2 of them are standby

Indoor units' operation parameter abbreviation

Display indoor units' address, a system's max quantity of indoor units is 64.

Operation Parameter Abbreviation

No.	Operation Parameter Abbreviation	Detailed information
1	Pd	Discharge pressure
2	Ps	Suction pressure
3	Pd_t	Saturation temperature under discharge pressure
4	Ps_t	Saturation temperature under suction pressure
5	Tda	DC inverter compressor a discharge temperature
6	Tdb	DC inverter compressor b discharge temperature
7	Tcm	Temperature of middle point of condenser
8	Ts	Temperature of main suction pipe
9	Tao	Outdoor ambient temperature
10	Tci1	Total gas collecting tube 1 temperature
11	Tci2	Total gas collecting tube 2 temperature
12	Tdef1	Defrosting temperature of condenser 1
13	Tdef2	Defrosting temperature of condenser 2
14	Tfin	DC inverter compressor drive module temperature
15	Icm	DC inverter compressor running current
16	COMPa	DC inverter compressor a rotate speed
17	COMPb	DC inverter compressor b rotate speed
18	Fan1Spd	Fixed speed fan motor rotate speed
19	Fan2Spd	Fixed speed fan motor rotate speed
20	PMV1	Electronic expansion valve 1
21	PMV2	Electronic expansion valve 2
22	LP	Low pressure switch
23	Hpa	DC inverter compressor high pressure switch
24	PC	Manual control
25	CHa	Crankcase heater of DC inverter compressor
26	SV1	Unloading valve
27	SV0	Four-way valve
28	Process Sequence	Process sequence
29	Operation Process	Operation process
30	Operation Mode	Operation mode
31	Operation Priority	Operation priority
32	Outdoor Address	Outdoor address

33	Compressor Operation Time	Compressor operation time
34	Error Grade	Error grade
35	Diagnostic Code	Diagnostic Code
36	Frequency Adjusting Status	Frequency adjusting status
37	Frequency Limited Reason	Frequency limited reason
38	Fan Speed Grade	Fan speed grade
39	Type outdoor unit	Type of outdoor unit
40	Capacity	Capacity
41	Firmware Edition	Firmware edition
42	Firmware Date	Firmware date
43	Output Percentage	Output percentage
44	INV Malfunction	DC inverter drive module malfunction
45	Aimed Output Ratio	Aimed output ratio
46	Mode Command	Mode command
47	Priority	Priority command
48	Process Command	Process Command
49	Sequence Command	Sequence command
50	Output Percentage	Output percentage command
51	Malfunction Command	Malfunction command
52	Compression Ratio	Compression ratio
53	Ics	DC inverter compressor busbar current
54	Vcs	DC inverter compressor busbar voltage
55	Operation Sequence	Operation sequence
56	Operation Process	Operation process
57	Defrosting Ratio	Defrosting ratio
58	Load rate indoor	Load rate of indoor unit
59	TIME oil return	Accumulation time of oil returning
60	Result charging	Refrigerant charging result
61	Judge charging	Refrigerant charging judging
62	Tset	Set Temperature
63	ON/OFF	Operation status
64	Running Mode	Running mode
65	Fan Speed	Fan speed
66	Swing Mode	Swing mode
67	Tai	Temperature of indoor ambient

68	Type of indoor unit	Type of indoor unit
69	Capacity	Capacity
70	Te2	Refrigerant inlet temp. of indoor coil in cooling mode
71	Te1	Refrigerant outlet temp. of indoor coil in cooling mode
72	User Authority	User authority
73	Rmd	Room card
74	Float	Float switch
75	Protection_C	Anti-freezing protection under cooling/
76	Protection_H	overheating protection under heating
77	Qut	Quiet Operation
78	Tem	Temperature of middle point of indoor coil
79	PG Fan Motor	PG fan motor
80	AC Fan Motor	AC fan motor
81	Swg	Swing
82	Pmp	Drainage pump
83	Htr	Electric heater
84	Hlt	Health function
85	PC	Personal control
86	Power wired controller	Power supply for wired controller
87	SHS	Degree of superheat
88	Diagnostic Code	Diagnostic Code
89	Capacity Need	Capacity need
90	SCS	Degree of sub-cooling
91	Pulse EXV	Electronic expansion valve open pulse

5.5 Example

1) After finishing wiring of indoor and outdoor units, connect the monitoring tool to the outdoor unit;

2) Switch on the power supply, start the monitoring software, confirm whether the communication between outdoor and indoor units is normal, as well as address of indoor units.

3) Start up the indoor units one by one in cooling mode, observe the system operation situation according to monitoring software.

4)   Click to choose the right communication port
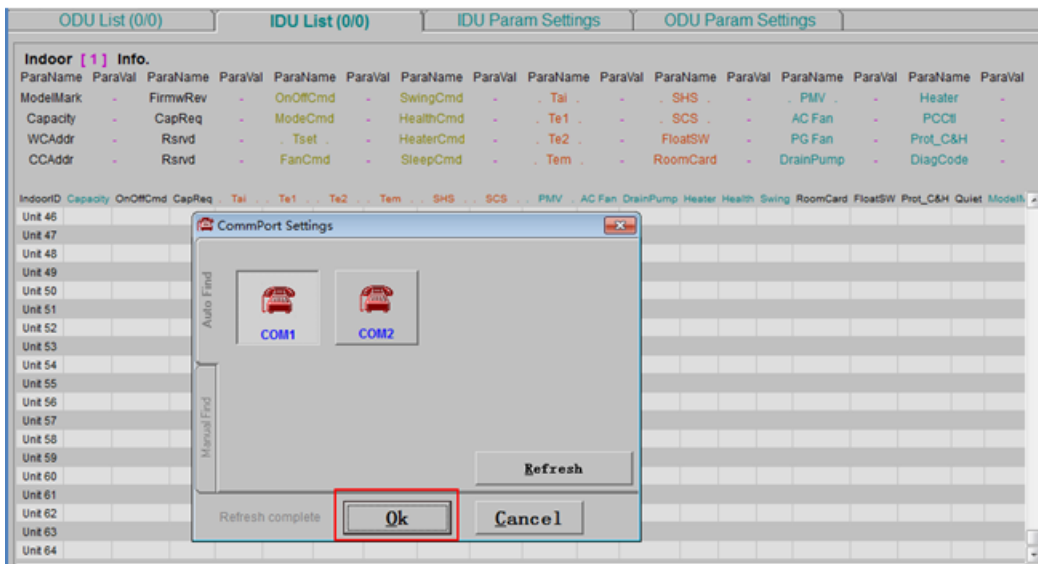
5) Click the start button " ▶ " to monitor the system

Check the parameter of the outdoor units

ODU List (3/3) | IDU List (7/12) | IDU Param Settings | ODU Param Settings

ODUs Info.

Param(Input)	Master	Slave1	Slave2	Slave3	Unit	Param(OutP)	Master	Slave1	Slave2	Slave3	Unit	Param(SW)	Master	Slave1	Slave2	Slave3	Unit
(1) Pd	28.69	28.08	27.75	-	bar	(1) COMPa	55.0	55.0	39.4	-	rps	(1) Capacity	10	8	18	-	HP
(2) Ps	6.67	7.65	7.79	-	bar	(2) COMPb	Off	Off	On	-	---	(2) ---	-	-	-	-	---
(3) Pd_t	48.6	47.7	47.2	-	℃	(3) OutputPer	61.1	61.2	61.1	-	%	(3) OperMode	Cool	Cool	Cool	-	---
(4) Ps_t	-1.3	2.5	3.0	-	℃	(4) ---	-	-	-	-	---	(4) OperProc	Nrml	Nrml	Nrml	-	---
(5) Tda	90.2	83.1	85.9	-	℃	(5) Fan1Spd	840	750	780	-	rpm	(5) Priority	PR1	PR2	PR0	-	---
(6) Tdb	-50.0	-50.0	88.9	-	℃	(6) Fan2Spd	0	0	3	-	rpm	(6) ---	-	-	-	-	---
(7) Tdc	0.0	0.0	0.0	-	℃	(7) ---	-	-	-	-	---	(7) CompTim	04:59:23	24:59:39	04:56:51	-	sec
(8) Tcm	-50.0	-50.0	-50.0	-	℃	(8) PMV1	250	250	250	-	pls	(8) FreqRZ	None	None	None	-	---
(9) Ts	15.5	39.4	16.2	-	℃	(9) PMV2	250	250	250	-	pls	(9) PMVRZ	Fixed	Fixed	Fixed	-	---
(10) Tao	35.8	35.8	34.6	-	℃	(10) PMV3	5	5	32	-	---	(10) PMV_SHS	15.0	15.0	15.0	-	---
(11) Tci	38.3	16.1	38.4	-	℃	(11) ---	-	-	-	-	---	(11) ---	-	-	-	-	---
(12) Tdef	36.2	30.1	36.6	-	℃	(12) SV0	Off	Off	Off	-	---	(12) DiagCode	0H	0H	0H	-	---
(13) Tfin	51.0	54.0	63.0	-	℃	(13) SV1	Off	Off	Off	-	---	(13) ---	-	-	-	-	---
(14) Icm	12.6	11.2	11.0	-	A	(14) SVA	Off	Off	Off	-	---	(14) FirmwRev	V1.1	V1.1	V1.1	-	---
(15) CT1	0.0	0.0	9.8	-	A	(15) SVB	Off	Off	Off	-	---	(15) ---	-	-	-	-	---
(16) Ifan	3.1	2.6	1.3	-	A	(16) CHa	Off	Off	Off	-	---	(16) ---	-	-	-	-	---
(17) CR	3.87	3.36	3.27	-	%	(17) CHb	Off	Off	Off	-	---	(17) ---	-	-	-	-	---
(18) DCVolt	457	467	467	-	V	(18) ---	-	-	-	-	---	(18) ---	-	-	-	-	---
(19) HPa	Off	Off	Off	-	---	(19) LP	Off	Off	Off	-	---	(19) ---	-	-	-	-	---
(20) HPb	On	On	Off	-	---	(20) PCCtl	Off	Off	Off	-	---	(20) ---	-	-	-	-	---

ComPort: COM3   Open   VRF III

Check the parameter of indoor units

ODU List (3/3) | **IDU List (6/12)** | IDU Param Settings | ODU Param Settings

Indoor [1] Info.

ParaName	ParaVal	ParaName	ParaVal	ParaName	ParaVal	ParaName	ParaVal	ParaName	ParaVal	ParaName	ParaVal	ParaName	ParaVal	ParaName	ParaVal
ModelMark	Duct	FirmwRev	V3.7	OnOffCmd	Off	SwingCmd	On	Tai	28.8	SHS	1.0	PMV	0	Heater	Off
Capacity	5.0	CapReq	0	ModeCmd	Cool	HealthCmd	Off	Te1	24.8	SCS	0.0	AC Fan	Off	PCCtl	Off
WCAddr	1	Rsrvd	-	Tset	19.0	HeaterCmd	Off	Te2	21.1	FloatSW	On	PG Fan	0	Prot_C&H	Off
CCAddr	7	Rsrvd	-	FanCmd	Auto	SleepCmd	Off	Tem	21.0	RoomCard	On	DrainPump	Off	DiagCode	0H

IndoorID	Capacity	OnOffCmd	CapReq	Tai	Te1	Te2	Tem	SHS	SCS	PMV	AC Fan	DrainPump	Heater	Health	Swing	RoomCard	FloatSW	Prot_C&H	Quiet	Modelb
Unit 1	5.0	Off	0	28.8	24.8	21.1	21.0	1.0	0.0	0	Off	Off	Off	Off	On	On	Off	Off	Off	Duc
Unit 2	5.0	On	2	25.7	13.5	10.5	10.1	4.0	0.0	149	Low	On	Off	Off	Off	On	On	Off	Off	Duc
Unit 3	2.0	On	12	28.3	26.8	19.7	11.1	4.0	0.0	380	High	On	Off	Off	Off	On	Off	Off	Off	Ca(A
Unit 4	4.0	On	2	24.0	13.5	13.2	4.0	0.0	0.0	141	Mid	On	Off	Off	Off	On	On	Off	Off	Duc
Unit 5	5.0	On	0	25.8	23.7	24.2	24.1	3.0	0.0	5	High	Off	Off	Off	Off	On	On	Off	Off	Duc
Unit 6	2.0	Off	0	28.6	26.5	25.7	25.7	4.0	0.0	0	Off	Off	Off	Off	Off	On	On	Off	Off	Duc
Unit 7	2.0	Off	0	29.9	27.0	25.7	25.9	4.0	0.0	0	Off	Off	Off	Off	Off	On	On	Off	Off	Duc
Unit 8	3.0	On	8	25.8	15.6	12.1	11.9	4.0	0.0	153	High	On	Off	Off	Off	On	On	Off	Off	Duc
Unit 9	3.0	On	6	26.6	15.0	11.4	11.5	4.0	0.0	155	Mid	On	Off	Off	Off	On	On	Off	Off	Duc
Unit 10	5.0	On	0	25.4	14.5	20.5	20.5	3.1	0.0	5	Low	Off	Off	On	Off	On	On	Off	Off	Duc
Unit 11	5.0	On	0	25.4	24.4	25.0	98.9	3.0	0.0	5	Low	Off	Off	Off	Off	On	On	Off	Off	Duc
Unit 12	0.8	On	13	24.6	14.0	10.0	10.1	4.0	0.0	145	Mid	Off	Off	On	Off	On	On	Off	Off	Duc
Unit 13																				
Unit 14																				
Unit 15																				
Unit 16																				
Unit 17																				

Use the central controller to control the indoor units .

No.	observe parameters of indoor and outdoor units	Normal State
1	Is there anything wrong with indoor units	None
2	Whether indoor unit blows air at normal air speed.	It blows out cool air at set air speed.
3	Whether there is abnormal noise in indoor and outdoor units	no abnormal noise
4	Whether 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 allowable range of allowable error
5	Whether the electronic expansion valve of indoor unit is normal	Opening degree is available in case of startup. The EXV can be closed normally.
6	Whether there is anything wrong with outdoor units	None
7	Whether the frequency of compressor is normal	The compressor operates in automatic frequency
8	Whether the outdoor fan motor is normal.	The fan motor operates in automatic speed.
9	Whether temperature sensor of outdoor unit is normal	Within the range of allowable error

6. IDU Parameter setting by Controller

6.1 Parameter Setting Items

No.	Parameter Setting Items	Default value	Min. value	Max. value	Remark
1	communication address of indoor unit	1	1	**64**	
2	centralized address of indoor unit	1	1	**64**	
3	address of wired controller of indoor unit	1	1	**16**	
4	model of indoor unit	1	0	**35**	01 50HZ Low ESP Duct (Drain Pump) ; 01 Mid ESP Duct (Drain Pump) ; 02 High ESP Duct (Within 60K) 02 High ESP Duct (2 Pipe system,22.28.45.54kw) 10 Cassette Unit C7 Type (09-18K) ; 10 DC Cassette Unit E Type (09-18K) ; 11 DC Cassette Unit (24-48K , MB12) ; 12. DC Mid ESP Duct 13 : Ceiling & Floor Unit 22 Fresh Air Processor (2 Pipe system,22.28.45.54kw) 23- AHU 24 Mid ESP Duct (Optional Drain Pump) 24 60HZ Low ESP Duct (Drain Pump) 24 DC E type Low ESP Duct (Drain Pump) 24 E type Low ESP Duct (Optional Drain Pump) 26 DC E type Low ESP Duct 28 One way cassette 30 Two way cassette 32 Wall - Mounted (L Type) 34 Fresh Air Processor (1Pipe system,22.28kw) 35 High ESP Duct (1 Pipe system,22.28kw)
5	capacity of indoor unit	8	1	100	280W/unit
6	priority of indoor unit	0	0	3	0--No priority 1--priority 1 2--priority 2 3--priority 3
7	heating temperature compensation of indoor unit	0	0	10	Unit:°C
8	auto restart function of indoor unit	1	0	1	0—Available 1--not available
9	room card selection	0	0	1	0--invalid room card

					1--valid room card
10	clearing time of filter net	5	1	5	500h/unit
11	operating mode displayed by wired controller	1	0	2	0--[auto][heating] [dehumidification][cooling][ventilation] 1--[heating] [dehumidification][cooling][ventilation] 2--[dehumidification][cooling][ventilation]
12	installation height of indoor unit	0	0	1	0-- installation height is lower than 2.7m 1--installation height is higher than 2.7m
13	switching between Celsius degree and Fahrenheit	0	0	1	0--Celsius degree 1--Fahrenheit
14	display of room temperature	0	0	1	0-- room temperature not to be displayed 1-- room temperature to be displayed
15	selection of room temperature	0	0	1	0-- temperature sensor of return air 1--temperature sensor of wired controller

6.2 Parameter setting by YK – L
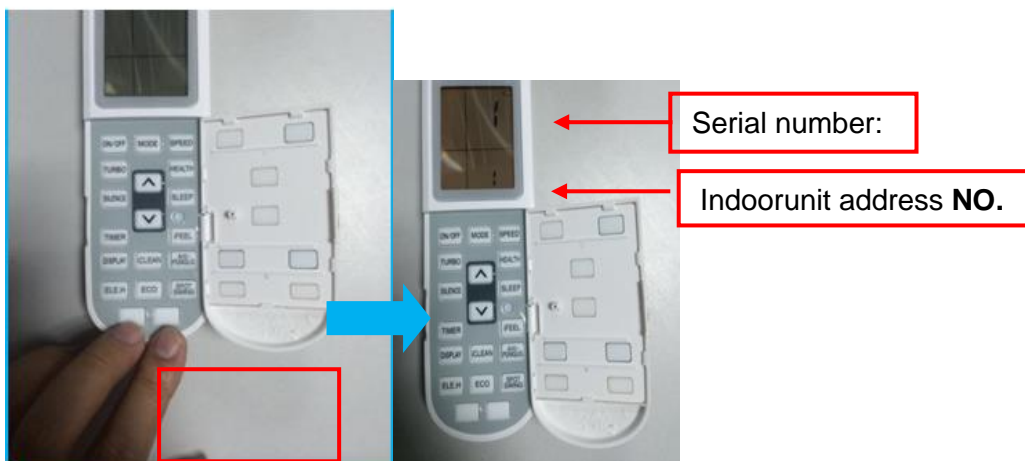
6.2.1 Enter the setting interface

①Make sure the remote controller is off

② Press the two white button at the down side simultaneously more than 10s to enter the address setting mode.

③ First, will display "1", "1",

④ the above number means : series parameter number ,from 1~15

⑤ the below number means：Meaning of parameter correspondence

　For example :

　Check "**6.1 Parameter Setting Items**" for number of parameters and corresponding meaning.

　"1", "1", the indoor unit's address is 1#

　"4", "32", the indoor unit's type is Wall - Mounted (L Type)

Serial number:

Indoorunit address **NO.**

6.2.2Parameter Setting

Press "MODE" button to send order; When hearing buzzer once, it indicates successful setting

Press the "up" or "down" button to change the parameter series number

Press the "Iclean" or "ECO" button to change the parameter correspondence
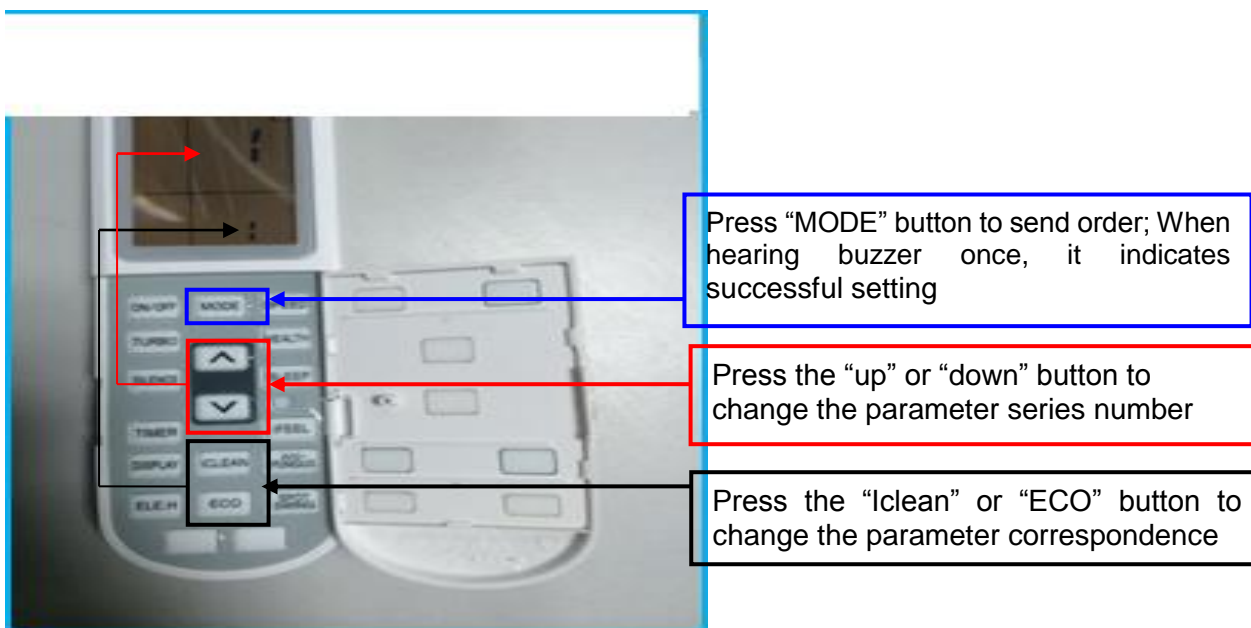
6.3 Parameter setting by XK-02A

6.3.1 Enter the setting interface

① Press [Filter Net Button] for 5 seconds, group number "01" of wired controller will be displayed in temperature zone of LCD screen and "0101" will be displayed in timing setting zone of LCD screen.

② "01" means that group number of wired controller is 1; "0101" means this indoor unit address is No. 1 .

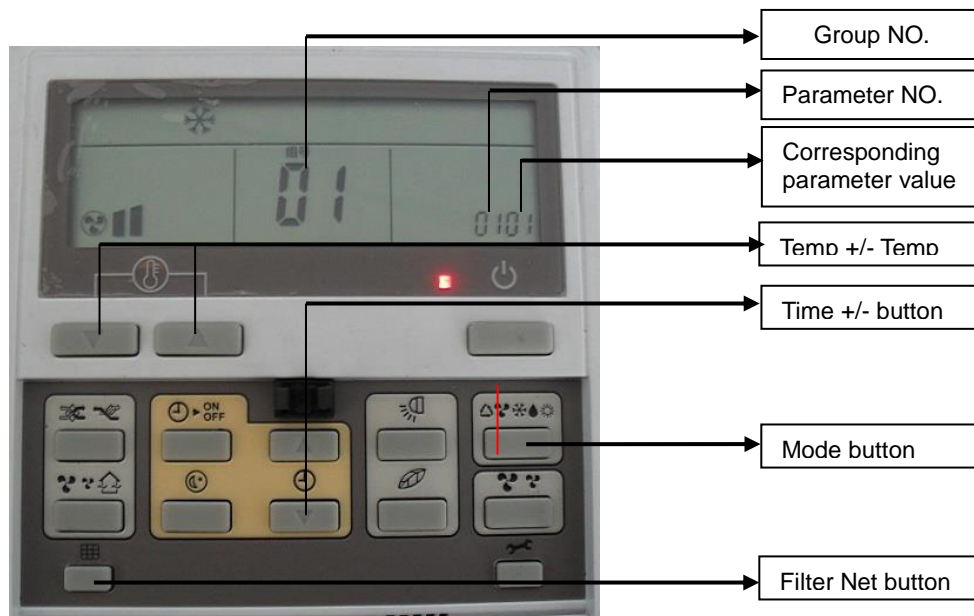③ *Press [+/- Button of Time], "0201", "0301", "0401" "0510" will be displayed successively. Check* "**6.1 Parameter Setting Items**" for number of parameters and corresponding meaning.

6.3.2 Parameter Setting

Go on with previous interface and change No. 1 indoor unit into No. 5 indoor unit:

① Press [Filter Net Button] for 5 seconds, group number "01" of wired controller will be displayed in temperature zone of LCD screen and "0101" will be displayed in timing setting zone of LCD screen as shown in previous interface.

②Then press [Mode Button] once, "corresponding parameter value 01" will flicker; press [+/-button of time] again to change the value into "05", press [Mode Button] to confirm. This indoor unit address is changed as No. 5.

6.4 Parameter setting by XK-05A

6.4.1 Enter the setting interface

①Press "Function" button for 10 s to enter the setting interface.

② "0303" means address of wired controller of indoor unit. Check "**6.1 Parameter Setting Items**" for number of parameters and corresponding meaning.
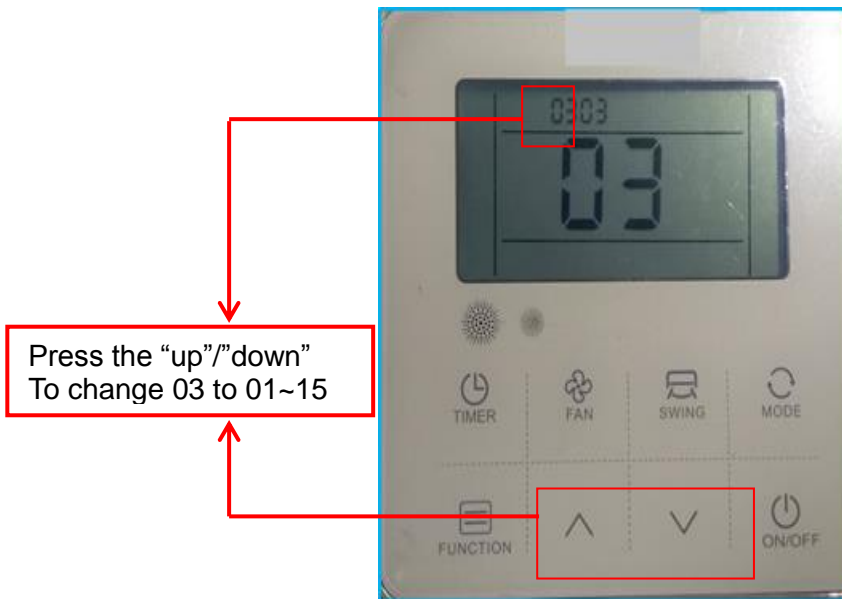

"03" series parameter number ,from 1~15.

"03" parameter correspondence.

Press the "Function" to enter setting interface.
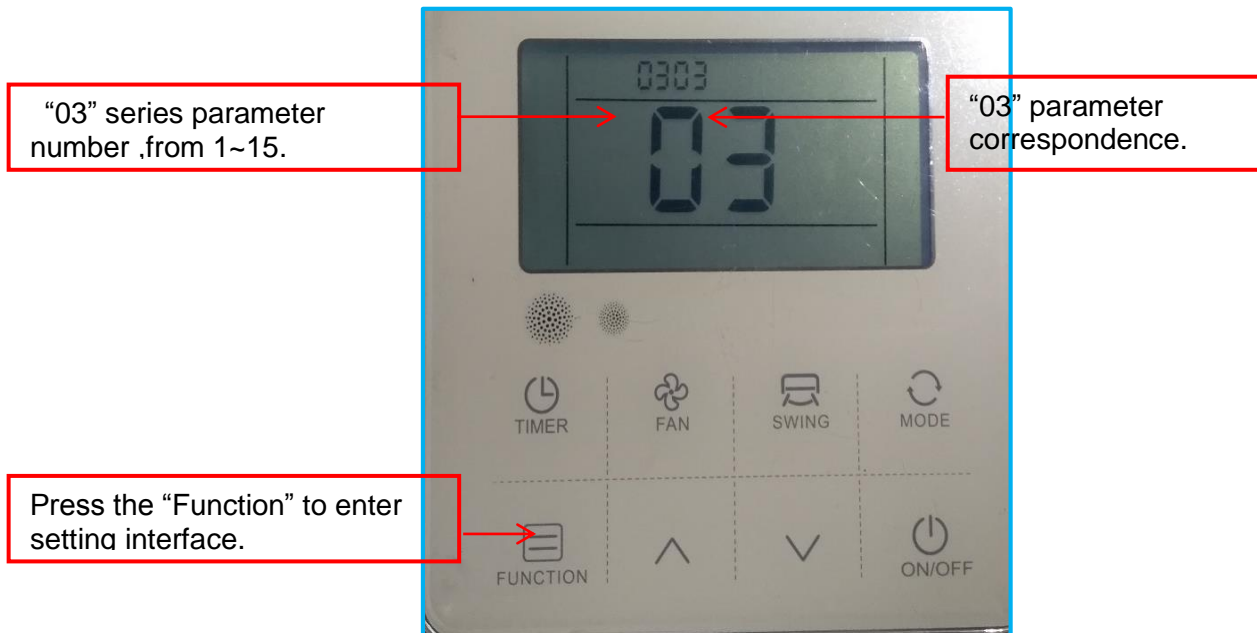
6.4.2 change series parameter number

①Press "up" /"down" button to change the number.

Press the "up"/"down"
To change 03 to 01~15

6.4.3 parameter correspondence setting.

①Press "Function" button , the second "03" will flash.
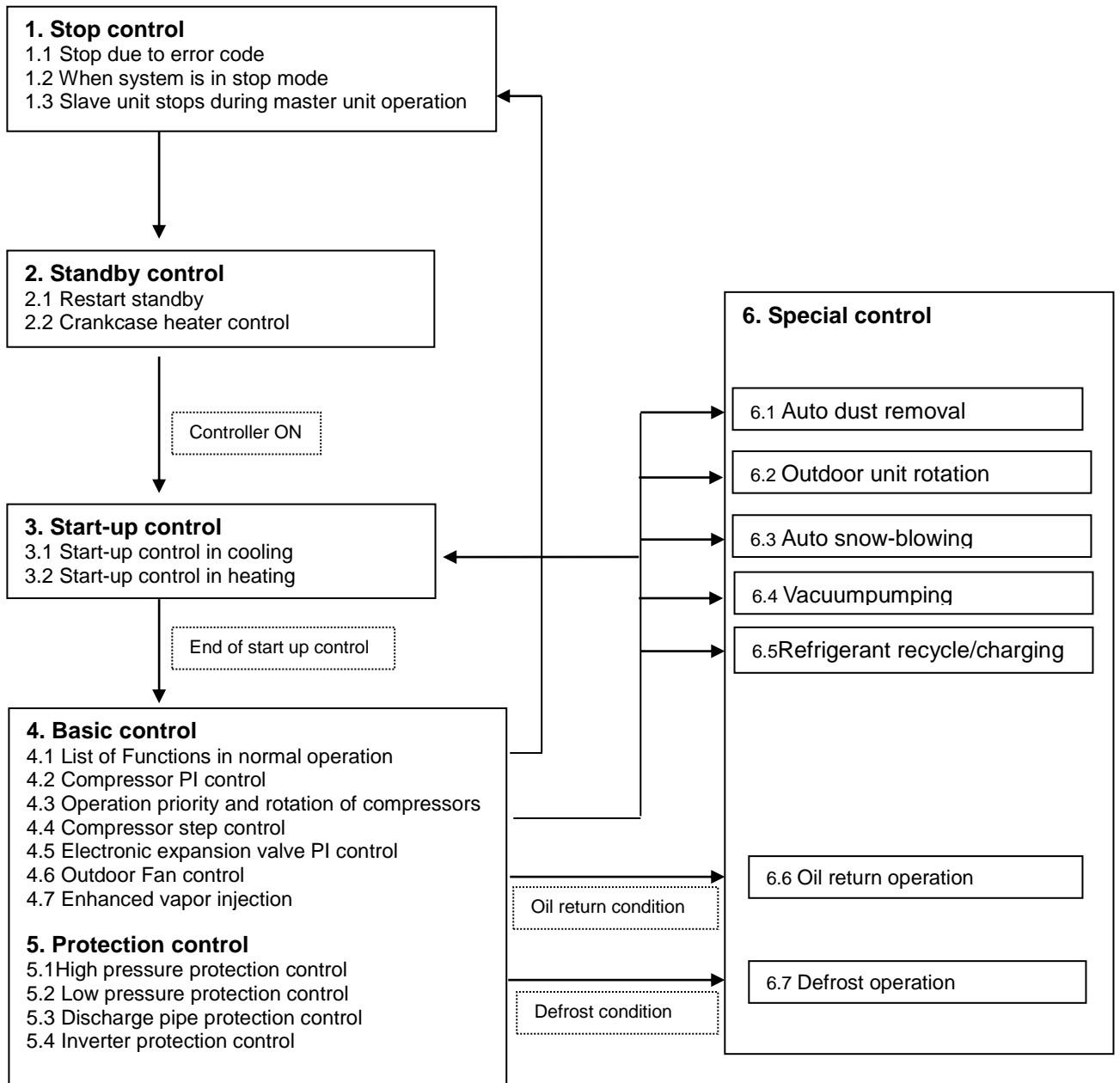
② Press "up" /"down" button to change the number.

1. Press the "Function"

Press the "up"/"down"
To change
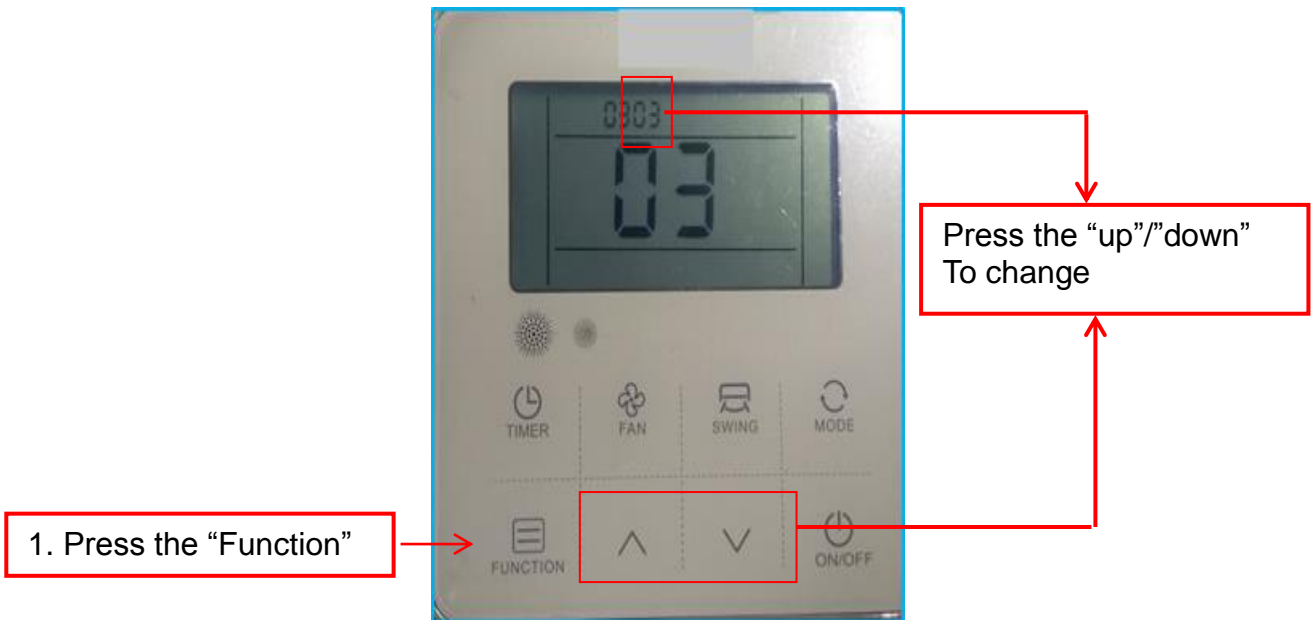
Part4 Function and Control

1. Function General

1.1 Operation Mode

For detailed description of each function in the flow below, refer to the details on related function on the followingpages.

1. Stop control
1.1 Stop due to error code
1.2 When system is in stop mode
1.3 Slave unit stops during master unit operation

2. Standby control
2.1 Restart standby
2.2 Crankcase heater control

Controller ON

3. Start-up control
3.1 Start-up control in cooling
3.2 Start-up control in heating

End of start up control

4. Basic control
4.1 List of Functions in normal operation
4.2 Compressor PI control
4.3 Operation priority and rotation of compressors
4.4 Compressor step control
4.5 Electronic expansion valve PI control
4.6 Outdoor Fan control
4.7 Enhanced vapor injection

5. Protection control
5.1 High pressure protection control
5.2 Low pressure protection control
5.3 Discharge pipe protection control
5.4 Inverter protection control

6. Special control

6.1 Auto dust removal

6.2 Outdoor unit rotation

6.3 Auto snow-blowing

6.4 Vacuumpumping

6.5 Refrigerant recycle/charging

6.6 Oil return operation

6.7 Defrost operation

Oil return condition

Defrost condition

Note:
1. In the event indoor unit stops or the controller turns OFF while in oil return operation ordefrost operation, pump down residual operation is performed on completion of the oil returnoperation or defrosting operation.
2. Not performed during cooling mode.

1.2 Stop Control

1.2.1 Stop due to error

In order to protect compressors, if any of the abnormal state occurs, the system will make "stop with controller OFF" and the error will be determined according to the number of retry times.

1.2.2 When system is in stop mode

The 4- way valves both for heat exchange switch and piping switch retain the condition before they werestopped.

1.2.3 Slave unit stops during master unit operation

When slave unit is stopped (because of low demand), conditions for this unit till this unit is required to operate (increase of load).
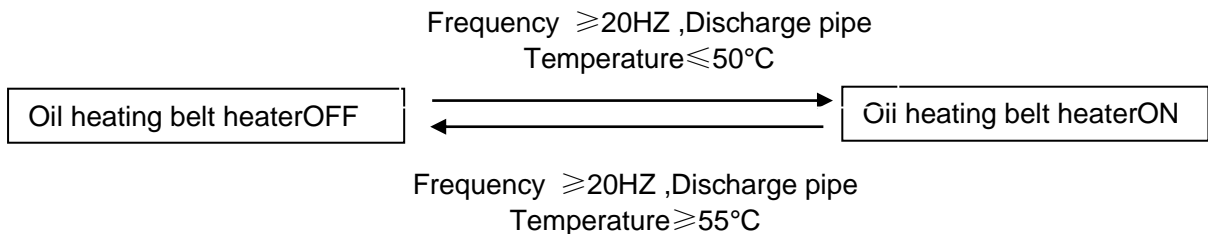
1.3 Standby Control

1.3.1 Restart standby

Used to forced stop the compressor for a period of 3 minutes, in order to prevent the frequent ON/OFF of thecompressor and equalize the pressure within the refrigerant system.

In addition, the outdoor unit fan carry out the residual operation for a while to suppress the acceleration of thepressure equalizing and melting of the refrigerant to the evaporator.

1.3.2 Oil heating belt control

In order to prevent the refrigerant from melting in the compressor oil in the stopped mode, this mode is used tocontrol the Oil heating belt. 50~55℃ keep current state.

Frequency ≥20HZ ,Discharge pipe
Temperature≤50°C

| Oil heating belt heaterOFF | ⟵⟶ | Oii heating belt heaterON |

Frequency ≥20HZ ,Discharge pipe
Temperature≥55°C

1.4 Start-up Control

This control is used to equalize the pressure in the front and back of the compressor prior to the start-up of thecompressor, thus reducing start-up loads. Furthermore, the inverter is turned ON to charge the capacitor.

To avoid stresses to the compressor due to oil return or else after the start-up, the following control is made andthe position of the 4- way valve is also determined. Start both the master and the slave units simultaneously toposition the 4- way valve.

1.4.1 Start-up Control for Cooling Operation

1. Compressor frequency：45/53HZ keep 3 minutes, when the start-up exit condition is satisfied, turned into automatic control

2.Solenoid valve (bypass) open for about 20s

3. ODU and IDU fan automatic control

Component	Wiring diagram label	8-12HP	14-16HP	18-22HP	Control functions and states
Compressor 1	COMP1	○	○	○	Controlled according to load requirement
Compressor 2	COMP2			○	
DC fan motor 1	FAN1	○	○	○	Controlled according to discharge pressure
DC fan motor 2	FAN2		○	○	
EXV 1	EXV1	○	○	○	All EXVs are fully open (480 pls).
EXV 2	EXV2			○	
EXV 3(sub-cooling)	EXV3	○	○	○	OFF
Solenoid valve(bypass)	SV1	○	○	○	Open for about 20s, after only open if pressure > 3.6MPa
Solenoid valve (EVI)	SVA	○	○	○	Controlled according to SH requirement
Solenoid valve (sub-cooling)	SVB	○	○	○	Controlled according to SC requirement

1.42 Start-up Control for Heating Operation

1. Compressor frequency：45/53HZ keep 3 minutes, when the start-up exit condition is satisfied, turned into automatic control

2.Solenoid valve (bypass) open for about 20s

3. ODU and IDU fan automatic control

Component	Wiring diagram label	8-12HP	14-16HP	18-22HP	Control functions and states
Compressor 1	COMP1	○	○	○	Controlled according to load requirement
Compressor 2	COMP2			○	
DC fan motor 1	FAN1	○	○	○	Controlled according to discharge pressure
DC fan motor 2	FAN2		○	○	

EXV 1	EXV1	○	○	○	Controlled according to evaporator super-heat. Opening degree range (65~480 pls)
EXV 2	EXV2			○	
EXV 3(sub-cooling)	EXV3	○	○	○	OFF
Solenoid valve (bypass))	SV1	○	○	○	Open for about 20s ,after only open if pressure > 3.6MPa
Solenoid valve (EVI)	SVA	○	○	○	Controlled according to SH requirement
Solenoid valve (sub-cooling)	SVB	○	○	○	Controlled according to SC requirement

2. Basic Control

2.1 Compressor Output Control

The compressor rotation speed is controlled according to the load requirement. Before compressor start-up, the outdoorunits first estimate the indoor unit load requirementaccording to the nominal capacity of indoor units currently running,and then correct for ambient temperature. The compressors then start up according to the corrected load requirement.

During operation the compressors are controlled according to the nominal capacity of indoor unit currently running andthe indoor unit heat exchanger temperatures. If the actual load requirement can be provided by one unit alone, then onlyone unit starts up. If the actual load requirement requires all outdoor unit modules to operate, the weighted averageactual load requirement is sent to each module and each module operates according to this distributed loadrequirement.

2.2 Compressor Step Control

The running speed of the compressors in rotations per second (rps) is half the frequency (in Hz) of the electrical input tothe compressor motors. The compressor speed can be altered in increments of 1 rps.

2.3 Operating Priority and Rotation of Compressors

In one combination system,any module could run as themaster unit according to the running

2.4 Electronic Expansion Valve (EXV 1/EXV2) Control

The positions of EXVs are controlled in steps from 0 (fully closed) to 480 (fullyopen).
In cooling mode:
When all ODUs are in standby, All EXVs are at position (0 pls)

When some ODUs are running and some ODUs are in standby, EXVs onrunning outdoor units are fully open(480 pls). EXVs of units in standby arefully closed (0 PLS).
When all outdoor units are running. All EXVs are fully open(480 pls).

In heating mode:

When all ODUs are in standby, All EXVs are at position 0 PLS.

⬚⬚When all outdoor units are running, All EXVs are controlled according to evaporator super-heat. Opening degree range (65~480 pls)

2.5 Sub-cooling (EXV3) control

In order to make the maximum use of the sub-cooling heat exchange, this function is used to exertPI control on the electronic expansion valve (Tgo, Tgi,Te).

EXV open degree is controlled according to:

1. SC "plate heat exchange liquid outlet temperature - target temperature"

2. SH " Plate heat exchange gas outlet temperature "Tgo" - Plate heat exchange gas inlet temperature "Tgi""

3. SH "Plate heat exchange gas outlet temperature "Tgo"-low pressure temperature "Te""

2.6 Enhanced vapor injection (EXV3) EVI control

Heating mode: reducing the outlet temperature,increasing the compressor capacity, improving theheating performance.

EXV open degree is controlled according to super-heat "SH" , (SH=Plate heat exchange gas outlet temperature "Tgo" - Plate heat exchange inlet gas temperature "Tgi")

※Enhanced vapor injection function should meet the two conditions (outdoor temperature "Tao"≤ 12℃ and More than 75% capacity load demand) at the same time.

2.7 Outdoor Fan control

When outdoor unit running cooling/heating mode, fan motor start-up, automatic operation controlled according to discharge pressure.

2.8 Oil Return Operation

In order to prevent the compressor from running out of oil, the oil return operation is conducted to recover oil flown out fromthe compressor to the system side.

2.81 Oil Return Operation in Cooling Operation

[Starting conditions]

Referring to the set conditions for the following items, start the oil return operation

• Cumulative oil feed rate

• Timer setting (Make this setting so as to start the oil return operation when the initial cumulative operating time reaches 2hours after power supply is turned ON and then every 8 hours.)Furthermore, the cumulative oil feed rate is computed from Tc, Te, and compressor

loads.

Outdoor unit component control during oil return operation in cooling mode

Component	Wiring diagram label	8-12HP	14-16HP	18-22HP	Control functions and states
Compressor 1	COMP1	○	○	○	Controlled according to high and low pressure , frequency range 50~95HZ
Compressor 2	COMP2			○	
DC fan motor 1	FAN1	○	○	○	Controlled according to discharge pressure
DC fan motor 2	FAN2		○	○	
EXV 1	EXV1	○	○	○	Fully open (480 pls).
EXV 2	EXV2			○	
EXV 3(sub-cooling)	EXV3	○	○	○	OFF
Solenoid valve(bypass)	SV1	○	○	○	OFF
Solenoid valve (EVI)	SVA	○	○	○	OFF
Solenoid valve (sub-cooling)	SVB	○	○	○	OFF

Indoor unit component control during oil return operation in cooling mode

component	unit state	Control functions and states
Fan	ON	Normal control
	Standby	Normal control
	OFF	Off
Electronic expansion valve	ON	Normal control
	Standby	220-480 (steps)
	OFF	220-480 (steps)

2.82 Oil Return Operation in Heating Operation

Outdoor unit component control during oil return operation in heating mode

Component	Wiring diagram label	8-12HP	14-16HP	18-22HP	Control functions and states
Compressor 1	COMP1	○	○	○	Controlled according to high and low pressure , frequency range 50~95HZ
Compressor 2	COMP2			○	

DC fan motor 1	FAN1	○	○	○	Controlled according to discharge pressure
DC fan motor 2	FAN2		○	○	
EXV 1	EXV1	○	○	○	Open degree (120pls).
EXV 2	EXV2			○	According evaporator super-heat
EXV 3(sub-cooling)	EXV3	○	○	○	OFF
Solenoid valve(bypass)	SV1	○	○	○	OFF
Solenoid valve (EVI)	SVA	○	○	○	OFF
Solenoid valve (sub-cooling)	SVB	○	○	○	OFF

Indoor unit component control during oil return operation in heating mode

component	unit	Control functions and states
Fan	Thermo on	Off
	Standby	Off
	Thermo off	Off
Electronic expansion valve	Thermo on	120-480(steps)
	Standby	120-480(steps)
	Thermo off	120-480(steps)

2.9 Defrosting Operation

In order to recover heating capacity, the defrosting operation is conducted when the outdoor unit heat exchanger isperforming as an evaporator. The defrosting operation is controlled according to outdoor ambient temperature, outdoorheat exchanger temperature, indoor heat exchanger temperature and outdoor units running time.

Outdoor unit component control during defrosting operation in heating mode

Component	Wiring diagram label	8-12HP	14-16HP	18-22HP	Control functions and states
Compressor 1	COMP1	○	○	○	95HZ
Compressor 2	COMP2			○	
DC fan motor 1	FAN1	○	○	○	OFF

DC fan motor 2	FAN2		○	○	
EXV 1	EXV1	○	○	○	Open degree (480pls).
EXV 2	EXV2			○	Open degree (480pls).
EXV 3(sub-cooling)	EXV3	○	○	○	OFF
Solenoid valve(bypass)	SV1	○	○	○	OFF
Solenoid valve (EVI)	SVA	○	○	○	OFF
Solenoid valve (sub-cooling)	SVB	○	○	○	OFF

Indoor unit component control during defrosting operation in heating mode

component	unit	Control functions and states
Fan	Thermo on	Off
	Standby	Off
	Thermo off	Off
Electronic expansion valve	Thermo on	120-480(steps)
	Standby	120-480(steps)
	Thermo off	120-480(steps)

3. Protection Control

3.1 High Pressure Protection Control

This high pressure protection control is used to prevent the activation of protection devices due toabnormal increase of high pressure and to protect compressors against the transient increase ofhigh pressure.
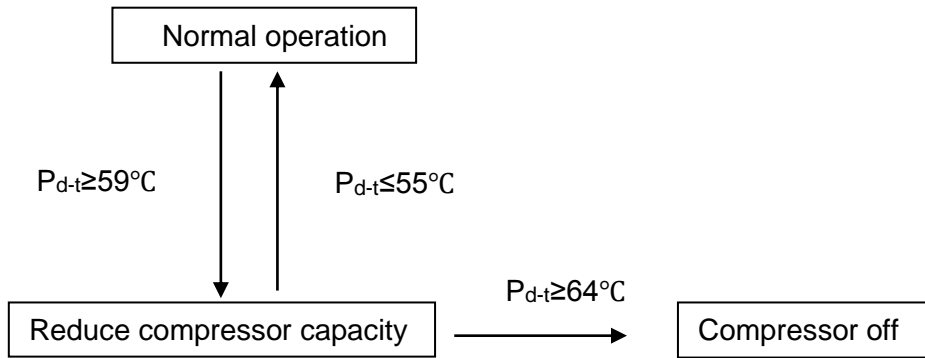
3.2 Low Pressure Protection Control

This low pressure protection control is used to protect compressors against the transient decreaseof low pressure.
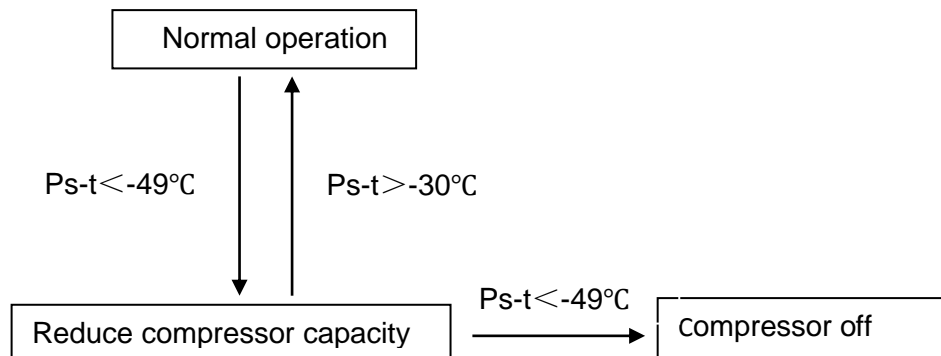
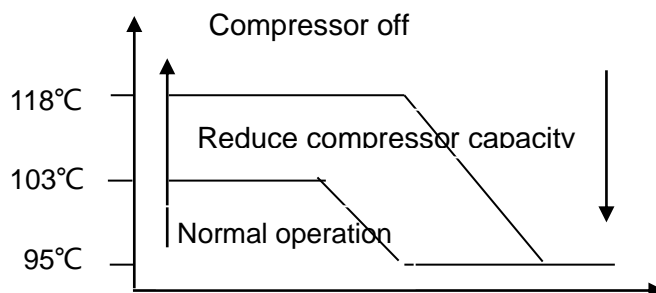## 3.3 Discharge Temperature Protection Control

This control protects the compressors from abnormally high temperatures and transient

spikes in temperature. It isperformed for each compressor.
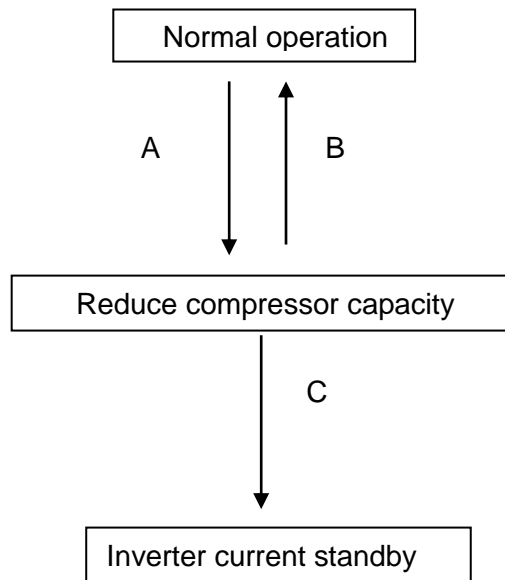
Discharge temperature protection control

3.4 Inverter Protection Control

Inverter current protection control and radiation fin temperature control are performed to preventtripping due to an error, or transient inverter overcurrent, and fin temperature increase.

In the case of multi-outdoor-unit system, each INV compressor performs these controls in thefollowing sequence.

Inverter over current protection control]

Perform the following control of integrated as well as multi units for each INV compressor.

```
              ┌─────────────────────┐
              │  Normal operation   │
              └─────────────────────┘
                  │        ↑
               A  │        │  B
                  ↓        │
        ┌────────────────────────────┐
        │  Reduce compressor capacity │
        └────────────────────────────┘
                     │
                  C  │
                     ↓
          ┌───────────────────────────┐
          │  Inverter current standby  │
          └───────────────────────────┘
```

MODEL	8-12hp	14-16HP	18-22HP
A	35	53	35
B	41	56	41
C	65	95	65

4. Special Control

4.1 Compressor emergency

This function is used in twin compressor models (18-22HP)

When one of these compressors had a fault, will shields all faults of this compressor.

The system run as a single compressor model.

4.2 Modular emergency（ODU）

This function is used in **N**≥2 (N:A system's quantity of outdoor units)

When one of these outdoor units had a fault, will shields all faults of this outdoor unit. Other outdoor units operate preferentially, the outdoor unit which had a fault will not involved in defrosting, oil return function.

4.3 Quiet mode

Cooling: Max frequency of compressor 90HZ,Max frequency of fan motor 49HZ(single fan modular), Max frequency of fan motor 58HZ(twin fan modular) .

Heating: Max frequency of compressor 100HZ,Max frequency of fan motor 49HZ(single fan modular), Max frequency of fan motor 60HZ(twin fan modular) .

4.4 Operation Priority

First-ON: The first "ON" indoor unit determines the running mode of the whole system until shutdown.

Heating priority: When any indoor unit receives the heating command, the outdoor unit runs according to the heating mode until the heating mode is stopped.

Cooling priority: When any indoor unit receives the cooling command, the outdoor unit runs according to the cooling mode until the cooling mode is stopped.

VIP: Manual address set the indoor unit's address to 63, 64, A system can have 2 VIP indoor units, VIP indoor unit determines the running mode of the whole system until.

4.5 ODU static pressure control

Before power on, outdoor unit's static pressure can be set to 0~80Pa according to project demand

4.6 Clean (Auto dust removal)

Outdoor fan motor run as opposite directionfor a period of time to blow away the dust

4.7 Blow off snow (Auto snow-blowing)

Outdoor unit keep stop state until a set cycle, then fan motor run as opposite directionfor a period of time to blow away the snow.

When choose the blow-off snow function, after a set Cycle start judge: If outdoor environment temperature $\leqslant$ -5℃, fan motor run as opposite direction;

4.8 Vacuumpumping

Outdoor units keep OFF state, all PMV valves keep ON state, the sub-cooling solenoid valve alternating switch for 5 minutes.

4.9 Economic locking (26℃)

Through outdoor units to set the Economic locking function, all indoor units will run as energy saving mode state. Indoor unit temperature can be set to 26℃（lowest set temperature）in cooling mode and 20℃ （Highest set temperature）in heating mode.

4.10 Refrigerant recycle

Outdoor units running cooling mode, when display (within 90s detected low pressure Ps ≤ -32 ℃) or (high pressure protect) or (low pressure protect), it means finished refrigerant recycle, outdoor unit stop run at once. After 5 minutes or long press exit button to exit this function.

If outdoor unit environment temperature ≤5℃，do not respond to outdoor unit's refrigerant recycle function.

4.11 Refrigerant charging

4.11.1 Outdoor units running cooling mode

4.11.2 More than 75% capacity load operation

4.11.3 Sub-cooling valve closed

4.11.4 According running parameters, main PCB digital tube will display "F.....1": Refrigerant shortage, " F.....2": Moderate refrigerant, "F.....3"：Excess refrigerant

Note: Outdoor temperature "To" should 15℃≤Tao≤43℃，Indoor temperature "Ti" should 10℃≤Tao ≤32℃，quantity of indoor unit （capacity ≤ 1.2HP）should less than 70% of total indoor units' quantity.

Part5 Trouble shooting

1. Poor effect of cooling and heating

Some phenomenon in using process are similar to failures, which are not failures in fact. Therefore, when cooling performance isn't satisfactory, eliminate the following factors first:

Phenomenon	Cause Description
If there is high ambient temperature outside and more people in room, air conditioner works in full load and cool air is blown from outlet, but room temperature can't be lowered.	In case of high ambient temperature, infiltration heat from outside increases, which increases cooling load of air conditioner; if there are more people (e.g.10 people) in room, each people discharges 120W heat, 10 people discharge 1200W heat altogether, which consume half cooling capacity of air conditioner, therefore, cooling capacity of air conditioner seems not enough and room temperature can't be lowered. It's normal and not the fault of air conditioner.
Air conditioner is hard to start, stops after starting or fuse is blown due to under voltage of power supply.	It is not failure. It's necessary to check the cause of power supply. If it is caused by under voltage of power grid, user should install additional voltage stabilizer for power supply to enable voltage to reach 220V or 380V and use air conditioner normally.
When it operates under high air velocity, room temperature can't cool down and there is no much air flow volume at outlet.	Filth blockage of air filter makes cooling capacity can't be taken out by flowing air timely, causing insufficient cooling capacity that can be solved by removing and cleaning filtering net.
When it operates under high air velocity, unit vibrates and makes loud noise	It is normal that the unit vibrates and makes loud noise when it operates in maximum speed.
Temperature controller isn't properly adjusted and doesn't bring maximum function of cooling, so room temperature can't cool down.	Adjust temperature controller to solve the problem
Heat pump-type air conditioner has unsatisfactory heating effect in cold winter, which is reasonable.	Minimum ambient temperature for starting heating function of air conditioner is $-15℃$.So air conditioner can't effectively heat below this temperature.

Improper installation position of air conditioner can also result in uneven indoor temperature or poor cooling effect.	Readjust the installation position of air conditioner.
mist blown out from indoor unit	It is caused when cool airflow in air conditioner cools down the air in indoor unit.
noise	Air conditioner will make noise when stopping operation, because refrigerant in the unit flows to opposite direction;
	Air conditioner will expand or shrink due to air temperature change, causing harsh sound; sound of water flow is caused by refrigerant flowing in the unit.
odor in room sometimes	Air conditioner won't bring odor by itself, so it must be caused by odor accumulated in environment.
	Solution: clean air filtering net.
In case of heating, air isn't blown out immediately after starting the unit and "Operation" indicator flickers when wired controller is used.	The heating state is used to prevent blowing out cool air. Please wait for a moment.
	The unit has restart function upon power-on after power failure. Air conditioner will automatically start in case of power-on after power failure and operate according to the mode set before power failure.

2. Error code indication

2.1 IDU Fault code table

Error code	Error code definition	Recovery or not	Problem possible reasons
A1	Indoor ambient temperature sensor failure	Yes	Indoor PCB is broken
			The fuse of indoor PCB is broken
			temperature sensor broken , or exceed test limit
A2	Temperature sensor about middle position of evaporator failure	Yes	Indoor PCB is broken
			The fuse of indoor PCB is broken
			temperature sensor broken , or exceed test limit
A3	Indoor coil pipe inlet temperature sensor failure	Yes	Indoor PCB is broken
			The fuse of indoor PCB is broken
			temperature sensor broken , or exceed test limit
A4	Indoor coil pipe outlet temperature sensor failure	Yes	Indoor PCB is broken
			The fuse of indoor PCB is broken
			temperature sensor is broken , or exceed test limit
A5	Indoor water pump failure	Yes	Water pump no power

			Water pump switch short-circuit or unconnected
			Water pump is broken
			Drain pipe block or up lean
			Indoor PCB is broken
A6	Failure of indoor PG fan	No	Fan motor failure
			Fan motor block
			The connection between PCB and fan motor failure.
			Indoor fan block
A7	Failure of reversible synchronous motor	No	Step motor failure
			The connection between PCB and step motor failure.
A8	Indoor unit ERRPROM module failure	No	Indoor unit PCB is broken
			Error module is broken.
A9	The communication between indoor unit and outdoor unit failed	No	The communication wire between indoor unit and outdoor unit is broken.
			Indoor unit power close
			Indoor PCB is broken
AA	The communication between indoor unit and wire controller failed	No	The communication wire between indoor unit and outdoor unit is broken.
			Indoor unit power close
			Indoor PCB is broken
			Wire controller is broken
AC	Two or more indoor unit central control system address repeated	Yes	The central control address setting incorrect
AE	Operation mode conflict	Yes	The operation mode setting incorrect
AH	Two or more indoor unit refrigerant system address repeated	Yes	System address setting incorrect
AJ	Indoor unit total capacity exceeded	Yes	Stop some indoor units
AF	The EXV leakage	Yes	EXV is blocked
			Indoor unit temperature sensor issue.
			Evaporator inlet sensor failure.
A0	The EXV to open failure	No	

2.2 ODU Fault code table

Serial	Error Code	Error code definition	Recovery or not	Possible reason
1	**F3**	High pressure too high protection "Pd"	Yes	Exhaust pipe or condenser pipe block
				Condenser dirty
				Outdoor unit fan stop or low speed
				Refrigerant overcharge
2	**F6**	Low pressure too low protection "Ps"	No	Indoor unit fan stop or low speed
				Evaporator dirty
				Indoor EXV full open in cooling mode (Outdoor EXV full open in heating mode)
				Lack refrigerant
				The pipe between evaporator and suction port block
3	**F8**	Compression ratio too high protection	No	Once confirm the unrecoverable
4	**F9**	Compression ratio too low protection	No	Once confirm the unrecoverable
5	**FH (FB)**	Discharge temperature "Tdi" too low limit frequency protection	No	Once confirm the unrecoverable
6	**H1 (B1)**	High *pressure switch failure* "HPSa"	No	System pressure exceed high pressure switch limit.
				High pressure switch failure
				High pressure sensor failure
				Instantaneous power-off
				Stop valve closed
				Outdoor unit fan stop
				Outdoor unit air outlet block
				In heating mode indoor unit fan stop
				In heating mode indoor unit EXV block
7	**H2 (B2)**	High *pressure switch failure* "HPSb"	No	
8	**H5**	Refrigerant shortage fault	No	System leakage
9	**HF**	Oil shortage fault	No	Once confirm the unrecoverable
10	**HJ**	Main power failure	No	Supply power phase-reversal
				Supply power phase lack
				Outdoor unit PCB failure
11	**E3**	No.1-DC Compressor "Tda" *discharge temperature too high shutdown protection*	No	1.System less refrigerant 2.DC inverter Compressor failure

12	E4	No.2-DC compressor "Tdb" *discharge temperature too high shutdown protection*	No	3.Compressor air return filter block 4.EXV open degree is small 5.EXV block 6.Gas pipe stop valve closed 7.Liquid pipe stop valve closed 8.System exhaust sensor failure 9.Outdoor unit PCB failure
13	J5	Outdoor unit parameter setting incorrect	Yes	Outdoor unit dial switch incorrect
				Mail PCB failure
14	J7	Outdoor unit main control PCB ERROM module failure	No	Mail PCB failure
15	JJ	Indoor unit total capacity exceeding	Yes	Indoor units' total capacity over 130% of the outdoor units' total capcity
16	47	Indoor unit loss failure	Yes	Communication wire between indoor units failure
				Indoor PCB failure
				Power supply of indoor units failure
17	E1	The 4-way valve is fault	NO	/
18	E9	Drive refrigerant cooling pipe low temperature protection	NO	/
19	C1	Ambient "Tao" *temperature sensor failure*	Yes	1.Temperature sensor failure 2.Test temperature exceed limit 3.Sensor connection is incorrect 4.Outdoor unit PCB failure
20	C2	Defrosting "Tdef" *temperature sensor failure*	Yes	
21	C3	Compressor 1# discharge"Tda" *temperature sensor failure*	Yes	
22	C4	Compressor 2# discharge"Tdb" *temperature sensor failure*	Yes	
23	C6	Suction pipe of compressor "Ts" *temperature sensor failure*	Yes	
24	C9	Condenser inlet "Tco" *temperature sensor failure*	Yes	
25	CJ	Oil "Toila" *temperature sensor failure*	Yes	
26	CC	Plate heater liquid outlet *temperature sensor failure*	Yes	
27	CE	Plate heater gas inlet *temperature sensor failure*	Yes	
28	CF	Plate heater gas outlet *temperature sensor failure*	Yes	
29	F1	High pressure sensor failure "Pd"	Yes	High pressure sensor failure
				High pressure sensor connection is incorrect.
				Outdoor unit PCB failure
30	F4	Low pressure sensor failure "Ps"	Yes	Low pressure sensor is broken.
				The connection between sensor and outdoor PCB incorrect
				Outdoor unit PCB failure

31	J1	*Communication failure* between outdoor units	Yes	The communication wire between outdoor units is disconnect, short circuit or connect incorrect.
				Outdoor unit PCB failure
				Outdoor unit main power failed
32	J2	*Communication failure* between outdoor and indoor unit	Yes	The communication wire between indoor unit and outdoor unit disconnect, short circuit or connect incorrect.
				Indoor unit main power failed
				Indoor unit PCB failure
33	J3	*Communication failure* between PCB and INV drive module	Yes	The connection between driving module and main PCB failure
				The communication part of outdoor unit control PCB failure
				Frequency driving board failure
				Compressor failure
34	J4	*Communication failure* between main PCB and DC fan motor drive module	Yes	DC fan motor drive module failure
				DC fan failure
35	31	Compressor 1# drive Module IPM protection (F0)	Yes	1. Supply voltage below level let the current excessive
36	32	Compressor 1# drive Module hardware protection	Yes	2. Supply voltage exceed limit
27	33	Compressor 1# drive Module software protection	Yes	3. Outdoor fan stop or low speed 4. Drive module temperature too high
38	34	Compressor 1# drive module unconnected	Yes	The connect of driving module and DC inverter compressor incorrect
				Driving module failure
				Compressor failure
39	35	Compressor 1# phase current overload protection	Yes	Compressor overload
				Compressor coil disconnect
				Inverter driving board failure
				Compressor failure
40	36	Compressor 1# DC bus voltage over-voltage or under-voltage failure	Yes	Supply voltage below level
				Supply voltage exceed limit
				Driving module failure
41	37	Compressor 1# temperature sensor of drive module heat fins failure	No	Inverter driving board failure
42	38	Compressor 1# drive module high temperature limit frequency failure	Yes	Driving module failure
				Compressor failure
				Outdoor unit fan stop or low speed
43	39	Compressor 1# drive module high temperature shutdown protection	Yes	Driving module failure
				Compressor failure
				Temperature sensor failure
44	3E	Compressor 1# drive module AC Input over current protection	No	Once confirm the unrecoverable

45	3F	Compressor 1# drive Module PFC protection (F0)	Yes	/
46	3A	DC fan 1# motor high temperature shutdown protection	No	Once confirm the unrecoverable
47	3C	DC fan 1# over current protection	No	Once confirm the unrecoverable; DC fan abnormal DC fan drive module abnormal
48	3H	DC fan 1# drive module start failure or Running out of step	No	Once confirm the unrecoverable
49	3J	DC fan 1# drive module over-voltage or under-voltage protection	No	Once confirm the unrecoverable
50	41	DC fan 1# drive module IPM alarm	No	Once confirm the unrecoverable
51	51	Compressor 2# drive Module IPM protection (F0)	Yes	Supply voltage below level let the current excessive Supply voltage exceed limit Outdoor fan stop or low speed
52	52	Compressor 2# drive Module hardware protection	Yes	Supply voltage below level let the current excessive Supply voltage exceed limit Outdoor fan stop or low speed
53	53	Compressor 2# drive Module software protection	Yes	Supply voltage below level let the current excessive Supply voltage exceed limit Outdoor fan stop or low speed
54	54	Compressor 2# and drive module unconnected	Yes	The connect of driving module and DC inverter compressor incorrect Driving module failure Compressor failure
55	55	Compressor 2# phase current overload protection	Yes	Compressor overload Compressor coil disconnect Inverter driving board failure Compressor failure
56	56	Compressor 2# DC bus voltage over-voltage or under-voltage failure	Yes	Supply voltage below level Supply voltage exceed limit Driving module failure
57	57	Compressor 2# temperature sensor of drive module heat fins failure	No	Inverter driving board failure
58	58	Compressor 2# drive module high temperature limit frequency failure	Yes	Driving module failure Compressor failure Outdoor unit fan stop or low speed
59	59	Compressor 2# drive module high temperature shutdown protection	Yes	Driving module failure Compressor failure Temperature sensor failure
60	5E	Compressor 2# drive module Input over current protection	No	Once confirm the unrecoverable
61	5F	Compressor 2# drive Module PFC protection (F0)	Yes	/
62	5A	DC fan 2# drive module high	No	Once confirm the unrecoverable

		temperature shut down protection		
63	**5C**	DC fan 2# over current protection	No	Once confirm the unrecoverable
64	**5H**	DC fan 2# drive module start failure or Running out of step	No	Once confirm the unrecoverable
65	**5J**	DC fan 2# drive module over-voltage or under-voltage protection	No	Once confirm the unrecoverable
66	**49**	DC fan 2# drive module IPM alarm	NO	/

2.3 Indoor unit error code display

2.3.1 Error code display by wired control – YK-02A

After indoor and outdoor units shut down due to failure, failure code will display on wired controller. In case of normal protection, no failure code will display on wired controller. Among others, wired controller doesn't automatically send warning, which requires pressing CHECK button to display corresponding failure codes.
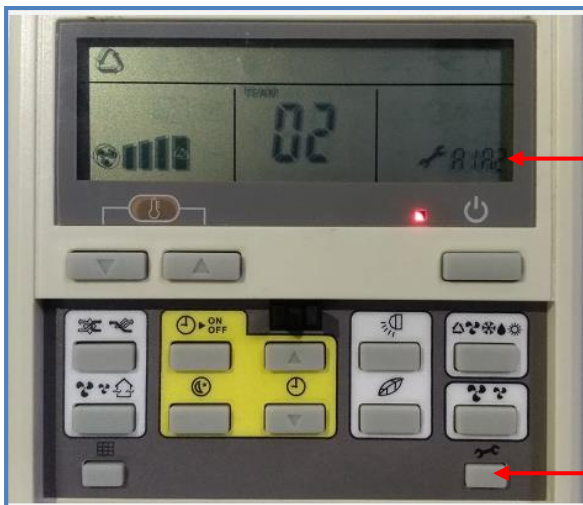
"A1A2" means The last two failures are "A1""A2" ,through the **" 2.1 IDU Fault code table"** to check error code definition,
If there is no error, will display "- - - -"

Press to enter error
Code check

Wired controller uses failure code of two digits, the first digit of which indicates characters in column "B" and the second digit of which indicates "0~F" characters corresponding to each row.

2.3.2 Error code display by wired control – YK-05A

"E0A1" means the first error code "A1" ,through the **"2.1 IDU Fault code table"** to check error code definition, "E2A3" means the second error code

Press "Function" "Up" button at the Same time to enter the error code check

2.3.3 Error code display by digital tube – panel

"E0" error code

2.4 Outdoor unit error code display

For outdoor units, the error code displays on the main PCB (Master unit).

Outdoor unit control box Outdoor unit main PCB
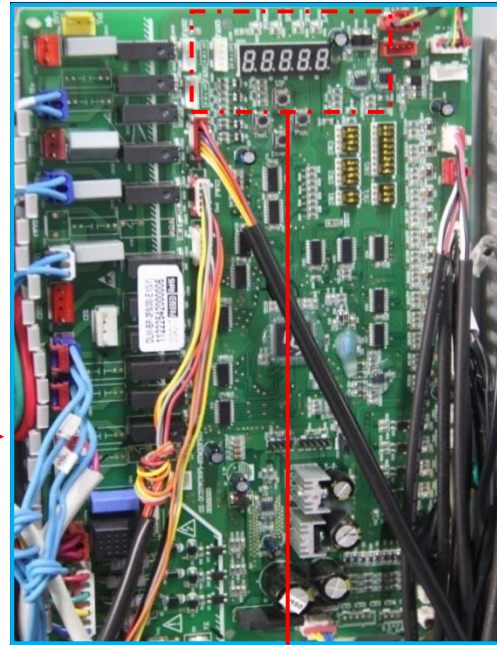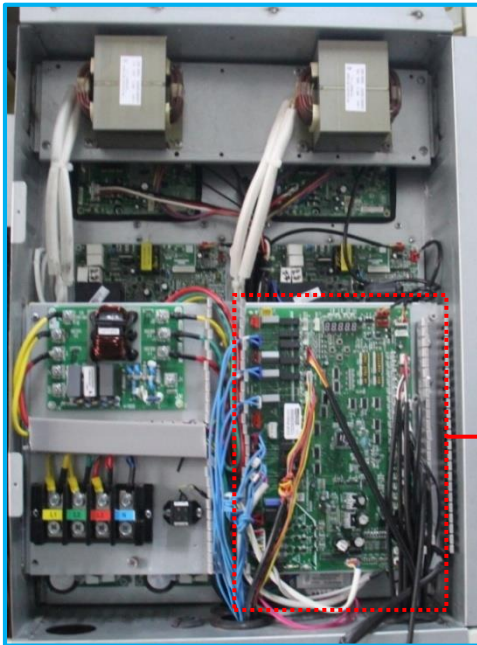
Error code " H5 " , through the **"2.2 ODU Fault code table"** to check the definition: system leakage

Symbol Description
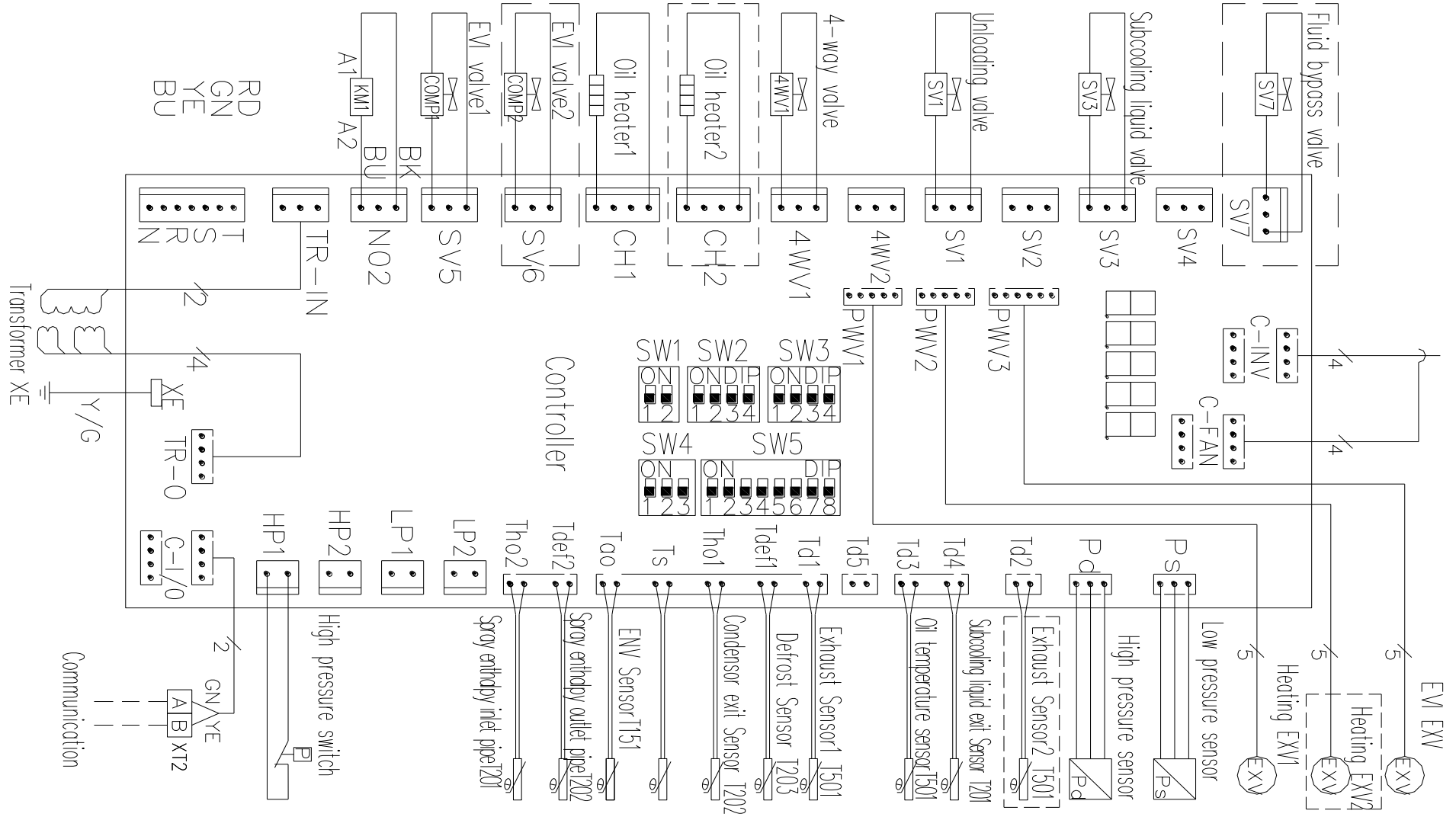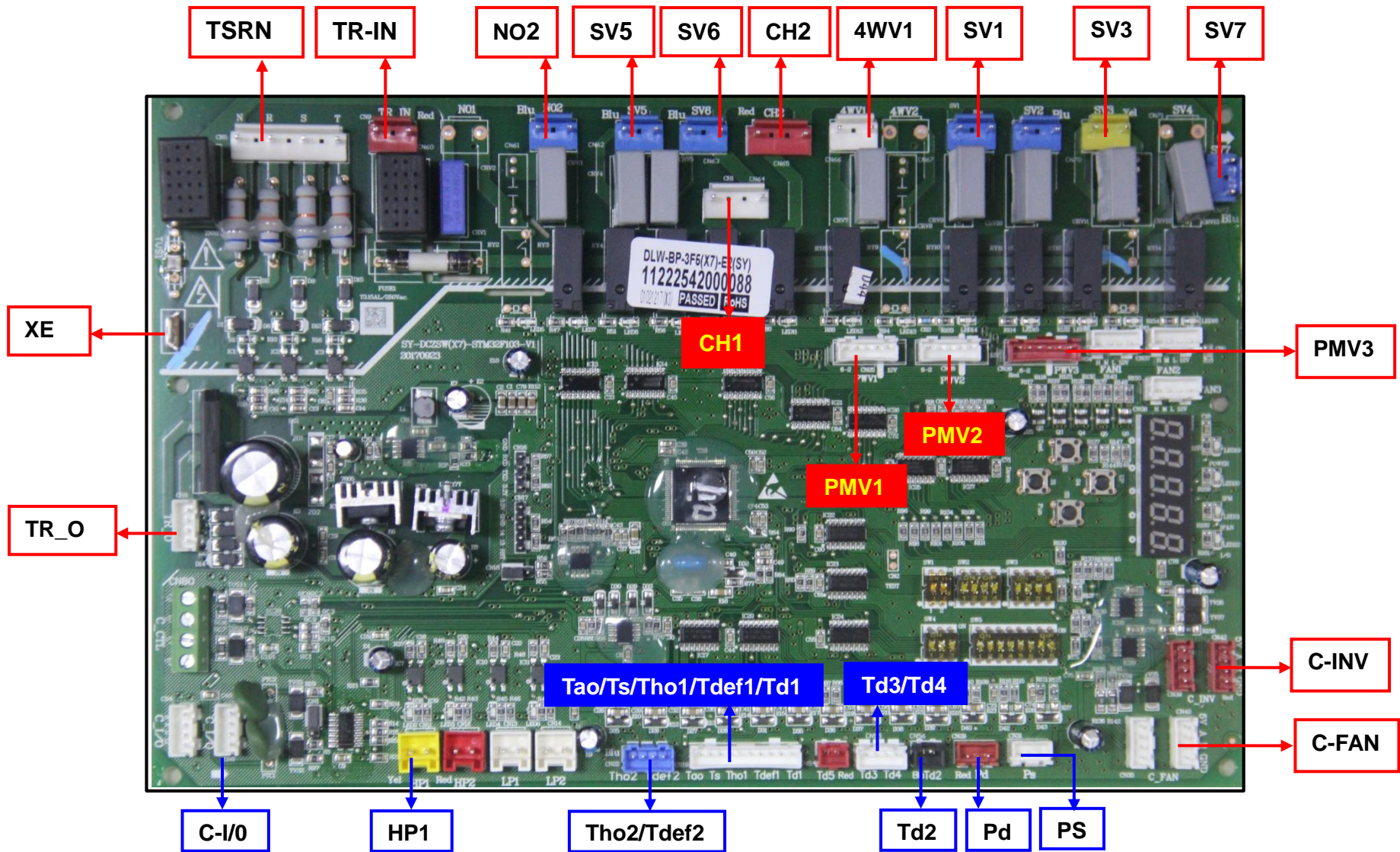
Definition of ports

Symbol Abbreviation	Detailed information
N R S T	Power input
TR_IN	Transform input
N02	AC contact
SV5	1# Vapor injection valve
SV6	2# Vapor injection valve
CH1	1# Compressor preheating
CH2	2# Compressor preheating
4WV1	4-way valve
SV1	Unloading valve
SV3	Sub-cooling valve
SV7	Bypass valve
PWV1	1# Heating EXV
PWV2	2# Heating EXV
PWV3	Electronic expansion valve of Vapor injection
C_INV	Drive modular of compressor
C_FAN	Drive modular of fan motor
C_I/O	Communication Ports
HP1	High pressure switch
Tho2	Inlet temperature of PMV3
Tdef2	Outlet temperature of PMV3
Tao	Environment temperature
Ts	Gas-liquid separator outlet
Tho1	Condenser outlet
Tdef1	Defrost
Td1	Discharge of compressor 1#
Td3	Oil temperature
Td4	Sub-cooling outlet
Td2	Discharge of compressor 2#
Pd	High pressure sensor
Ps	Low pressure sensor
TR_O	Transform output
XE	Ground wire

2.5 Outdoor unit trouble shooting

2.5.1 E3 E4 Error Code

E3 / E4 : Discharge temperature "Tda""Tdb" too high

Compressor discharge temperature sensor detected Td ≥120℃ and Lasts for 10s, whole system will stop running, after 4 minutes later will restart, but if stop running more than 3 times within an hour, ODU PCB will display E3 or E4 error code. Stop running until power up again.

Check whether Lack of refrigerant
1. Whether additional refrigerant?
2. Check if the low pressure is too low?

Yes → Add refrigerant

NO ↓

Check whether Lack of frozen oil
1. Through monitoring software to check is the system frequent to run the oil return mode

Yes → Add oil

NO ↓

Check whether high pressure too high
1. Chcek wether ODU fan running abnormal
2. Check wether condensor is dirty block

Yes → 1. Check fan motor and driver modular, if abnormal, replace
2. Clean the condensor

NO ↓

Check whether less gas return to compressor
1. Check wether IDU's coil of EXV is abnormal
2. Check wether IDU's EXV is abnormal, through monitoring software to dectect the EXV's open degree
3. Check wether IDU's EXV is dirty block

Yes → 1. Replace coil of EXV
2. Replace EXV

NO ↓

Contact the manufacturer's Technician

2.5.2 F8 Error code

F8 : Compression ratio too high protection

When detect the pd/ps > 8 ,then system begin to slow down the compressor running frequency .

After the frequency was down to the lowest value and   detected the pd/ps > 8 all the time within 400s. Then will appear F8 Error code, whole system stop running.

※ **pd:** High pressure value

ps: Low pressure value

Check wether stop valve is OFF —Yes→ Open

NO

Check wether condensor and evaporator dirty block —Yes→ Clean

NO

Check whether the pipe is flattened —Yes→ Re welding

NO

Check whether the heating EXV is abnormal, through check the temperature is same or not which between inlet and outlet piping of the EXV. —Yes→ Replace EXV

NO

Check whether pressure sensor is abnormal —Yes→ Replace sensor

NO

Check whether the system lack of refrigerants: through dectect the discharge temperature 、high pressure value and so on to judge. —Yes→ Add refrigerant

NO

Contact the manufacturer's Technician

2.5.3 F9 Error code

F9 : Compression ratio too low protection

When detect the pd/ps < 1.8，then system begin to increase the compressor running frequency .

every 40s later detect again , After 45 cycles and the pd/ps < 1.8 remain the same . Then will appear F9 Error code, whole system stop running.

※ **pd:** High pressure value

ps: Low pressure value

Check wether 4-way valve is abnormal, through dectect the inlet temperature of the condensor

→ Yes → Adjust or replace 4-way valve

Check wether condensor dirty block

→ Yes → Clean

NO

Check whether pressure sensor is abnormal

→ Yes → Replace sensor

NO

Check whether discharge temperature and Driver modular temperature is too high

Yes

Check whether Lack of refrigerant

→ Yes → Add refrigerant

NO

Check wether Lack of frozen oil

→ Yes → Add frozen oil

NO

Contact the manufacturer's Technician

2.5.4 HF Error code

HF : Oil shortage fault

When detect the oil temperature is abnormal, low temperature near the enviroment temperature. In addition, discharge superheat is normal. Then will appear HF Error code, whole system will stop running. Once confirm the unrecoverable

Check wether the oil temperature sensor is abnormal → Yes → Replace sensor

NO

Check whether the oil return capillary is blocked → Yes → Replace capillary

NO

Through monitoring software to check is the system frequent to run the oil return mode → Yes → Add oil

NO

Contact the manufacturer's Technician

2.5.5 HJ Error code

HJ : Main power failure

When dectect three phase single reverse phase, Then will appear HJ Error code, whole system stop running.

Check wether the power terminal board wiring loosening

Yes → Tighten the wiring

NO

Check wether the wrong phase sequence

Yes → Change phase sequnence

NO

Check wether main PCB is abnormal

Yes → Change PCB

NO

Contact the manufacturer's Technician

2.5.6 H5 Error code

H5 : Refrigerant shortage fault

Long time power off or standby (over 4 hours), through detect high pressure value and compare with pressure value which under normal environment temperature, then judge wether lack of refrigerant and appear H5 Error code

Through below steps to check wether the system lack of the refrigerant:

1. Check wether discharge temperature too high than normal situation (Normal discharge temperature about 80℃)

NO

Yes

2. Check wether poor effect in cooling or heating. (poor effect: indoor unit air outlet temperature too high in cooling or too low in heating)

NO

Yes

Lack of refrigerant: add refrigerant

Check wether pressure sensor abnormal

Yes

Replace sensor

NO

Analysis indoor and outdoor running paremeter though monitoring software

Contact with the manufacturer's Technician

2.5.7 FH Error code

FH : Discharge temperature "Tdi" too low limit frequency protection

System detect discharge superheat temperature less than 10℃ within 20 minutes , then will appear FH error code to protect

Check wether the system excess refrigerant:

1. Wether add excess refrigerant

NO

Yes

1. Wether indoor unit's EXV less open degree Through monitoring software detect

Yes

Blow off some refrigerant

Check wether outside condensor dirty block effect heating mode → Yes → Clean

NO

Check wether indoor evaporator dirty block effect cooling mode → Yes → Clean

NO

Check wether discharge temperature sensor abnormal → Yes → Replace

NO

Contact with the manufacturer's Technician

3. Appendix

Relation between temperature sensor of compressor and resistance

T [°C]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]
R25=50KΩ±1%			
B25/50=3950K ±1%			
-20	449.9	464.7	479.9
-19	425.7	439.5	453.6
-18	402.9	415.7	428.8
-17	381.5	393.4	405.6
-16	361.3	372.3	383.6
-15	342.2	352.5	363.0
-14	324.3	333.9	343.7
-13	307.5	316.4	325.5
-12	291.5	299.8	308.3
-11	276.6	284.3	292.2
-10	262.4	269.6	276.9
-9	249.0	255.7	262.5
-8	236.5	242.7	249.0
-7	224.5	230.3	236.2
-6	213.3	218.7	224.2
-5	202.7	207.7	212.8
-4	192.7	197.3	202.0
-3	183.2	187.5	191.9
-2	174.3	178.3	182.4
-1	165.8	169.5	173.3
0	157.7	161.2	164.7
1	150.2	153.4	156.7
2	142.9	145.9	148.9
3	136.1	138.9	141.7
4	129.7	132.3	134.93
5	123.6	126.0	128.4
6	117.8	120.0	122.3
7	112.2	114.3	116.4
8	107.1	109.0	111.0
9	102.1	103.9	105.7
10	97.42	99.08	100.8
11	92.97	94.51	96.06
12	88.74	90.17	91.61
13	84.73	86.05	87.38
14	80.92	82.14	83.37
15	77.29	78.42	79.56
16	73.84	74.89	75.95
17	70.57	71.54	72.51
18	67.46	68.35	69.25
19	64.49	65.32	66.15

20	61.68	62.44	63.20
21	59.00	59.70	60.40
22	56.44	57.09	57.74
23	54.02	54.61	55.20
24	51.70	52.25	52.80
25	49.50	50.00	50.50
26	47.37	47.87	48.37
27	45.34	45.84	46.34
28	43.41	43.91	44.41
29	41.59	42.08	42.57
30	39.84	40.33	40.82
31	38.18	38.66	39.15
32	36.59	37.07	37.55
33	35.07	35.55	36.03
34	33.64	34.11	34.58
35	32.27	32.73	33.20
36	30.95	31.41	31.87
37	29.70	30.15	30.61
38	28.50	28.95	29.40
39	27.37	27.81	28.25
40	26.29	26.72	27.16
41	25.24	25.67	26.10
42	24.25	24.67	25.09
43	23.31	23.72	24.14
44	22.41	22.81	23.22
45	21.53	21.93	22.33
46	20.71	21.10	21.50
47	19.92	20.30	20.69
48	19.16	19.54	19.92
49	18.44	18.81	19.18
50	17.75	18.11	18.48
51	17.08	17.44	17.80
52	16.44	16.79	17.14
53	15.84	16.18	16.53
54	15.26	15.59	15.93
55	14.69	15.02	15.35
56	14.16	14.48	14.81
57	13.65	13.96	14.28
58	13.15	13.46	13.77
59	12.69	12.99	13.30
60	12.23	12.53	12.83
61	11.80	12.09	12.39
62	11.39	11.67	11.96
63	10.98	11.26	11.54
64	10.60	10.87	11.15
65	10.23	10.50	10.77
66	9.880	10.14	10.41

67	9.537	9.792	10.05
68	9.211	9.460	9.715
69	8.897	9.141	9.391
70	8.595	8.834	9.078
71	8.306	8.539	8.778
72	8.028	8.256	8.490
73	7.759	7.983	8.212
74	7.501	7.720	7.944
75	7.254	7.468	7.687
76	7.016	7.225	7.440
77	6.786	6.991	7.201
78	6.565	6.765	6.971
79	6.352	6.548	6.749
80	6.147	6.339	6.536
81	5.950	6.138	6.331
82	5.761	5.944	6.133
83	5.578	5.757	5.942
84	5.401	5.577	5.758
85	5.231	5.403	5.580
86	5.069	5.237	5.410
87	4.912	5.076	5.245
88	4.760	4.921	5.087
89	4.615	4.772	4.934
90	4.474	4.628	4.787
91	4.338	4.489	4.645
92	4.207	4.354	4.506
93	4.081	4.225	4.374
94	3.958	4.099	4.245
95	3.840	3.978	4.121
96	3.726	3.861	4.001
97	3.616	3.748	3.885
98	3.509	3.639	3.773
99	3.407	3.534	3.665
100	3.308	3.432	3.560
101	3.212	3.333	3.459
102	3.119	3.238	3.361
103	3.030	3.146	3.267
104	2.942	3.056	3.174
105	2.858	2.970	3.086
106	2.778	2.887	3.000
107	2.699	2.806	2.917
108	2.623	2.728	2.837
109	2.549	2.652	2.758
110	2.479	2.579	2.683
111	2.410	2.508	2.610
112	2.343	2.439	2.539
113	2.279	2.373	2.471

114	2.216	2.308	2.404
115	2.156	2.246	2.340
116	2.097	2.186	2.278
117	2.040	2.127	2.217
118	1.985	2.070	2.158
119	1.932	2.015	2.102
120	1.880	1.962	2.047

Part6 Control System

1. Controller Introduction

Remote Controller		Wired Controller	
YK-L	YK-k	XK-02A	XK-05A

Centralized controller system		
CC-01	CC-02	Adapter

Centralized control software system				
RS-232 to RS485	RS-485/422 Repeater	Adapter	USB to RS485	software

BMS system			Wireless Network Control	
MODBUS Gateway	BACNET Gateway		WIFI Modular	Software

1.1 Control Component List

Type	Model	Function description
Remote controller	YK-K	General wireless remote controller, none address setting function
	YK-L	Background light , address setting function
Wired controller	XK-02A	With a directly connecting 10m display board wire,add setting address function. For the display board of indoor unit with wiredcontrol port.Control Max. 16 indoor units.
	XK-05A	Touch screw wired controller, address setting function, Control Max. 16 indoor units.
Centralized controller	CC-01 DCZCCXK02(COG)SY-E1	With weekly timer.Control Max. 64 indoor units.Can control multiple refrigeration systems,but each refrigeration system must connect centralized controller adaptor.
	CC-02	Touch screw.Control Max. 256 indoor units.Can control multiple refrigeration systems,but each refrigeration system must connect centralized controller adaptor.
Centralized controller adaptor	Adaptor DCZ-ZJB-SYE2	Centralized controller adaptor and switch-mode power supply.Accessories equipment of centralized controller.
Centralized Control Software	/	Control Max. 256 outdoor units and 4096 indoor units. Can control 64 refrigeration systems.but each refrigeration system must connect gateway.Whole control system must connect a 232-485 converter and a special computer.
Centralized Control Software Adaptor	RS-485/422 Repeater	Accessories equipment of centralized controller software.
Monitoring Software	GREEN-GRV-monitoring	The central control monitor of outdoor unit. Can only control a refrigeration system.Monitor Max. 4 outdoor unit.Must connect USB-485 communication
Selection Software	GREEN Project Express (GREENselectionV2.7.0)	Without password.Select branch pipe and copper pipe faster and more accurate.
BMS system	MODBUS	Each system connect with a MODBUS gateway, at most 32 systems
	BACNET	Each system connect with a MODBUS gateway, at most 32 systems

2. Remote controller

2.1 YK-L
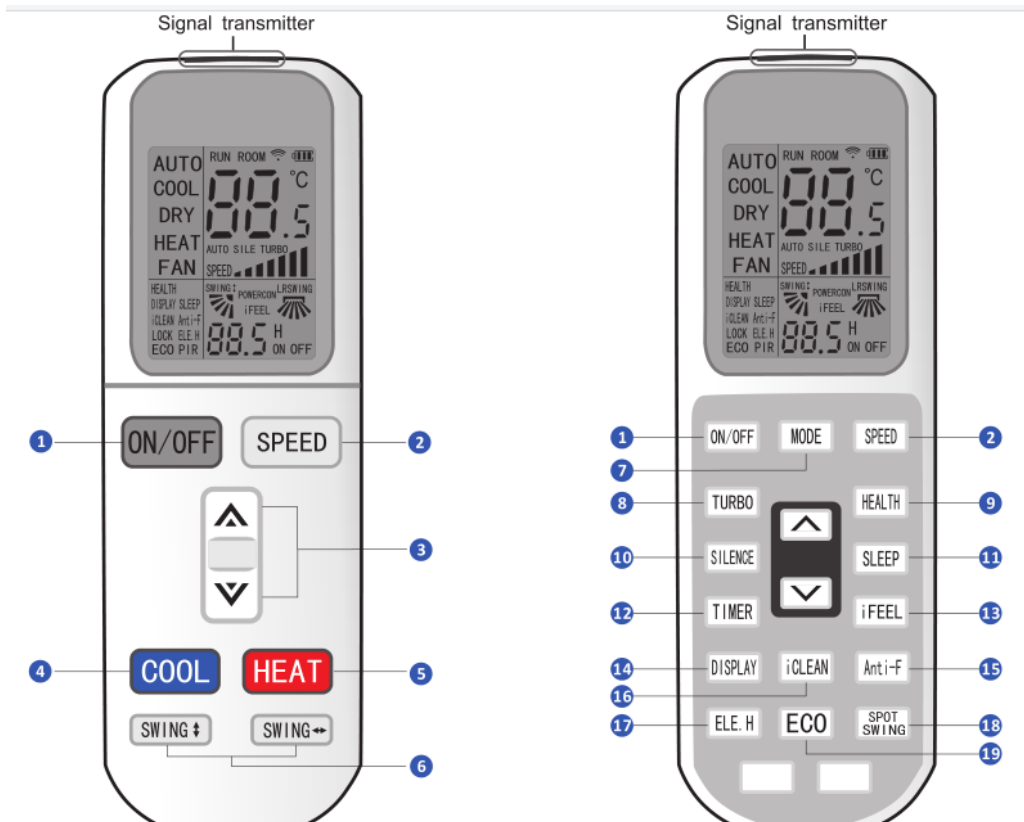
① ON / OFF

② Fan speed setting

High/Med/Low/Auto

③ Temperature-Setting

/Timer Range Setting

④ Cooling Mode

⑤ Heating Mode

⑥ Vertical swing/Horizontal swing

⑦ Mode setting

Auto/cool/heat/dry/fan

⑧ Turbo wind

⑨ Health Function

⑩ Silence Function

⑪ Sleep Function

⑫ Timer on/off

⑬ I Feel Function

⑭ LED Display on/off

⑮ Anti-function Function

⑯ Clean Function

⑰ Electric Heating

⑱ Spot swing

⑲ Economic Function

2.2 YK-K
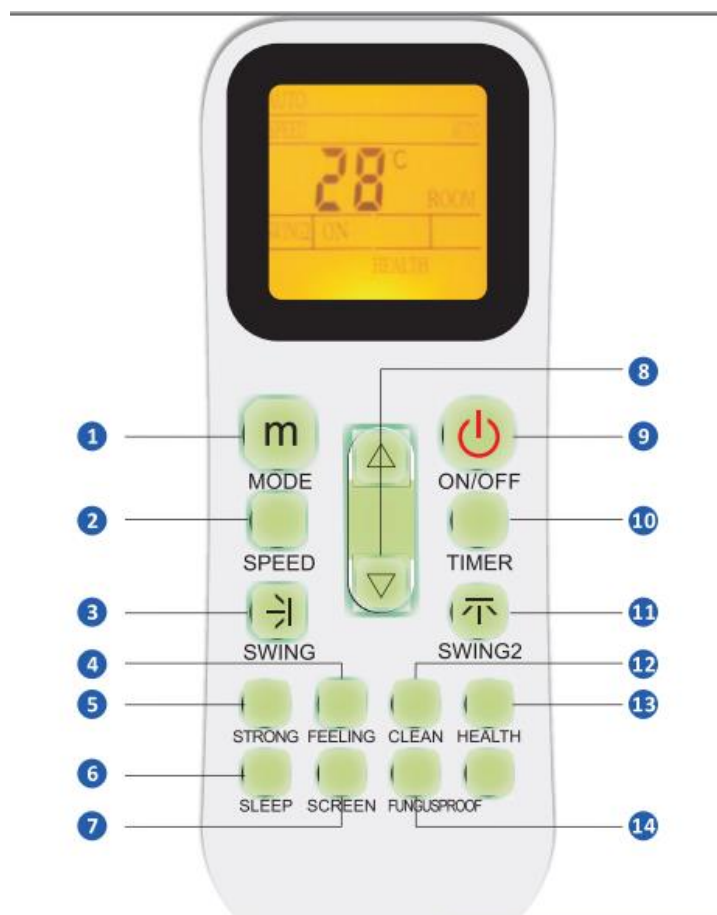
① Mode setting

Auto/cool/heat/dry/fan

② Fan speed setting

High/Med/Low/Auto

③ Vertical swing

/Timer Range Setting

④ Feeling Function

⑤ Strong Wind

⑥ Sleep Function

⑦ LED Display on/off

⑧ Temperature-setting

/Timer Range setting

⑨ ON/OFF

⑩ Timer on/off

⑪ Horizontal swing

⑫ Clean Function

⑬ Health Function

⑭ Fungus-proof Function

1 "ON/OFF" button

Press this button, the unit will start or stop, which can clear the timer or sleeping function of last time.

2 "SPEED" button

Press this button, speed will change as below:

Low → Mid → High → Auto
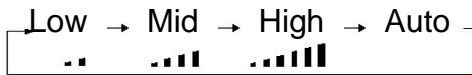
3 " ⋏ / ⋎ " button

* When press ⋏ button, the setting temperature will be increased by 0.5℃.When press ⋎ button, the setting temperature will be decreased by 0.5℃.
* The temperature will be changed quickly by pressing the button continuously and setting temperature range is 16℃ to 32℃.

4 "COOL" button

* Press the"**COOL**" button, you can directly enter cooling mode.

5 "HEAT" button

* Press the "**HEAT**" button, you can directly enter cooling mode.
* Note: cooling only unit has no heating function.

6 "SWING" button (SWING ←→ and SWING ↑↓)

* Up/down (left/right) setting is only valid in this mode; it will not affect louver position in other modes.
* Up/down (left/right) swing has memory function, it can keep primary setting when turn off then turn on or switch from other modes to primary mode.

7. "HEALTH" button

* Press this button; you can turn on or off the health function.

8. "SLEEP" button

* Press **SLEEP** button, the sleeping indicator light of indoor unit flashes on.
* The air-conditioner runs in sleeping mode for 10 hours and quit sleep mode, recover back to former mode.
* The unit will turn off automatically if the timing mode is running out of time.
* Note: press the MODE or ON/OFF button, the remote controller clears sleeping mode away.

9. "iFEEL" button

* Press this button to set "**iFEEL**"function. The LCD shows the actual room temperature when the function set and it shows the setting temperature when the function cancelled.
* This function is invalid at Fan mode.

10. "DISPLAY" button

* In display mode, press button once, switch off"**DISPLAY**", Press"**DISPLAY**"again, LCD will show ambient & setting temperature after flashing 5s. It's convenient for users to check ambient or setting temperature at any time in darkness.

11. "iCLEAN" button

* When remote controller is at the off state, press"iCLEAN" button, the unit runs"iCLEAN"function .

* The purpose of this function is to clean dust on evaporator and dry the inside water of evaporator and to prevent the evaporator going moldy due to water deposition and boasting strange smell.
* After setting "iCLEAN" function, press"iCLEAN"button or "ON/OFF "button to quit .
* The clean function will stop working after about 30 minutes running without any operation.

12. "ELE.H" button (for GREENiliary electric heating IDU)

In heating mode, press this button, GREENiliary electric heating will work.

13. "Anti-FUNGUS" button

* The purpose of this function is to dry the inside of the evaporator and to prevent the evaporator from going mouldy due to water deposition and thus dispersing strange smell.

* To operate the function: under"off"status of the A/C and the remote controller, press "**Anti-UNGUS**"button for one time, the buzzer keep beeping five times again after five times beep, indicating that this function is ready.

* To cancel the function: 1. under "OFF "status of the A/C and the remote controller, press "**Anti-FUNGUS**"button again.

14. "SPOT SWING" button

* Press this button, the horizontal wind direction vanes can swing automatically, when you have the desired vertical wind direction.
* Press "**SPOT SWING**"again, the horizontal wind direction vanes will be stopped depend on you.

15. "ECO" button

* In cooling mode, press this button, the unit will run "**ECO**" economic operation mode which takes the least power consumption.
* After running for 8h, it will automatically quit. You can press "**ECO**" button once again to quit .
* Note: The unit will turn off automatically if the timing mode is running out of time.

16. Two white button: Addressing set

* With the controller off, pressing the two white button simultaneously more than 10 seconds or more to enter address settting. This status displays only temperature and time parameters, temperature display area shows "Serial number" parameters, the range is 0-99. Time display area shows "Set value", the range is 0-255. The initial value is 1.
* By pressing" ⋏ / ⋎ " to set serial number + and -.Parameters within the serial number displays from 0 to 99 in circulation.
By pressing "**ECO**" and"**iCLEAN**" to set value number + and -.Parameters within the value number displays from 0 to 255 in circulation. After setting the two numbers, press the MODE button to confirm sending to ODU.

3. Wired Controller

3.1 XK-02A
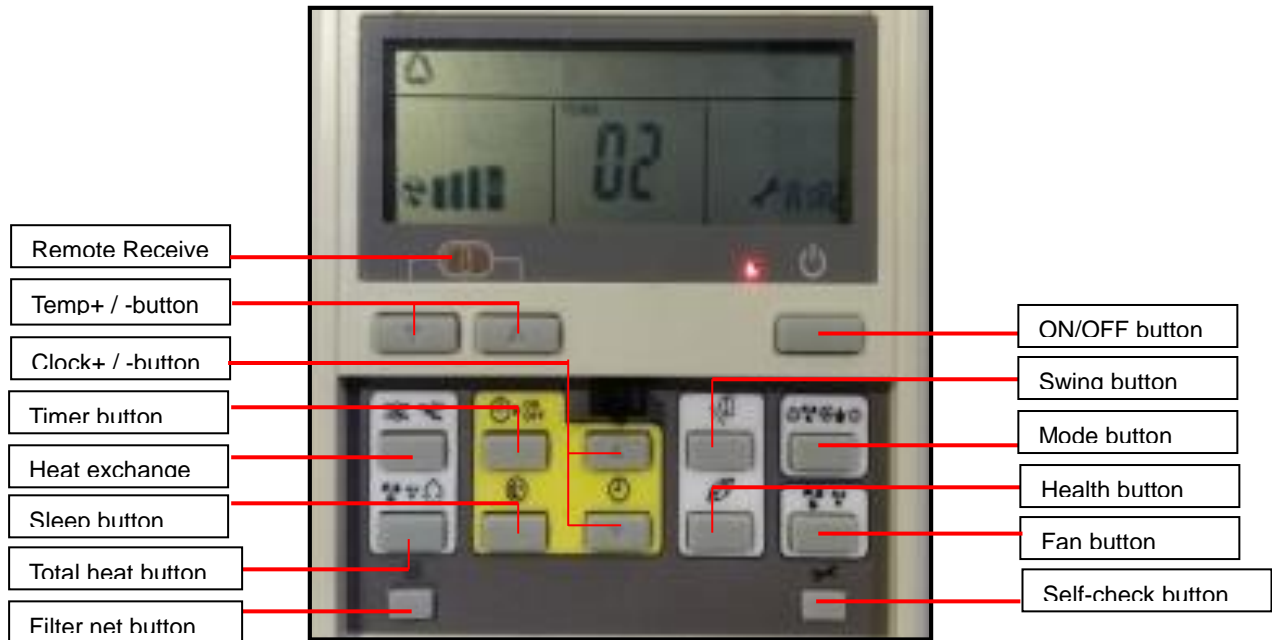
ON/OFF button: Switch the unit ON/off.

Mode button: Select mode , push the button one time, then the operation modes will change in turn as below: Auto-Cooling-Dehumidify-Heating △ → ❄ → ● → ☀

Temp +/- button: Press the button can adjust temperature. Temperature adjustment range: 16~32℃

Fan button: Change the fan speed will change in turn as :Auto-Low-Medium-High-Auto

Swing button: Press this button for the first time when operation,it will start the swing function. Push the button for the second time, cancel the swing function. (The function is available matched with the concerned unit)

Health button: Press this button change to switch mode: Health mode.

Sleep button: Press the button to display sleep symbol and initiate sleep function; press the button again or press button of 【Power】 to cancel sleep function and sleep symbol will disappear.

Timer button: Press the button to set Timer ON/OFF, press the button then "ON" will flicker on the display screen. then press 【Clock +/- button】and to adjust hour that uses 12-hour clock including"A.M." and "P.M." time; press the button again to complete the setting. The "OFF" setting is the same methods.

Remark: When setting functions such as mode, temperature, swing and fan speed, display screen displays all presetting parameters and remains constant; after reaching presetting time, air conditioner will automatically start as per presetting state.

After setting timing ON and OFF function, pressing button of 【Timer】can cancel timing setting.

Notes:

1. Time sequence of timing ON and OFF determines the order of "Timing ON-Timer OFF" and "Timer OFF- Timing ON". If the both are the same or either one is the same as time of current clock, it is invalid to press "Timer" button to confirm presetting time; after it reaches the presetting time, it will implement corresponding timing operation.

2. After setting time of timing ON and OFF, pressing "Timer" button can cancel timing.

3. Enter into time setting state of timing function; if there is no input related to time within consecutive 10 seconds, cancel the operation, return to previous state and go on with current time.

4. Default time of timer ON is 08:00 and default time of timer OFF is 18:00.

Clock +/- button: Normally display the clock set currently (display 12:00 for the first electrifying or resetting). When press the【Timer button】 button for 5 seconds, the time display zone will flicker, then press 【Clock +/- button】and to adjust hour that uses 12-hour clock including"A.M." and "P.M." time, press the【Timer button】again to complete the setting.

Filter Net button: When symbol of [Filter Net button] displays after wired controller receives "Filter" cleaning signal sent by indoor unit, press "Filter Net" button, "Filter Net" will go out and send filter cleaning reset signal to indoor unit; if [Filer] didn't display, it will be ineffective in case of short pressing of filter button.

Self-check button: Press the button to display group number and failure code of this wired controller. (Failure code of wired controller for each unit displays for 3 seconds, then automatically exit after displaying failure state of the whole unit); Continuously press the button for 5 seconds, failure code will be cleared in the normal state.

3.2 XK-05A

Infrared signal receiving

Light sensation

Timing button

In the state of power-on, you can set shutdown countdown time. In the state of power-off, you can set starting-up countdown time.

Fan speed button

In the state of power-on, press "Fan" button to adjust fan speed
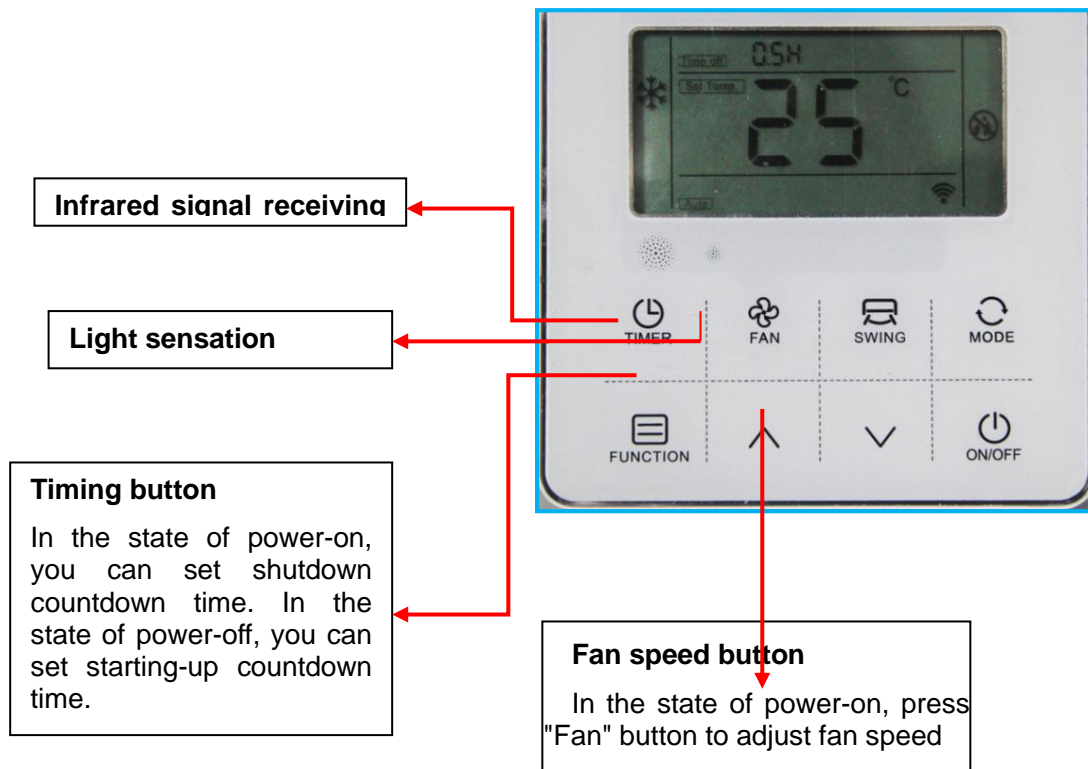
Main functions

8-keytouch button input;

Buzzer prompt tone function

LCD+ white backlight;

Receive thesignalof wireless remote controller.

Ambient temperature detection sensor;

Display the failure of main controller;

Technical indicators

Power voltage range: DC 12V;

Working ambient temperature:0℃~50℃；

Working ambient humidity:RH20%~RH90%;

Button: Touch button;

Dimensions(W*H*D):120*120*20mm；
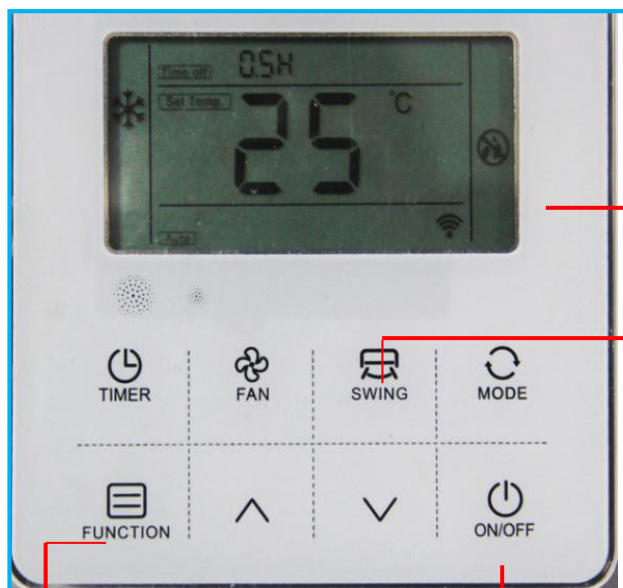
Wire controller display

Swing button

Inthestate of power-on,youcansetup and down swing or left and right swing function (different swing functions for different units)

Adjustment

⌃/ ⌄ button

Increase or decrease the settemperature / humidity;
Select a function;
Adjust the timing time;
Long press both " ⌃/ ⌄ " buttons to open the child lock.

On/Off control

Function buttons

Enter/Cancel function menu;

In function menu, press ⌃ / ⌄ button to select a desired function, and press"Function" button again to confirm.

Similarly, use the same steps to cancel the function operation

4. Centralized Controller

4.1 Button controller CC-01
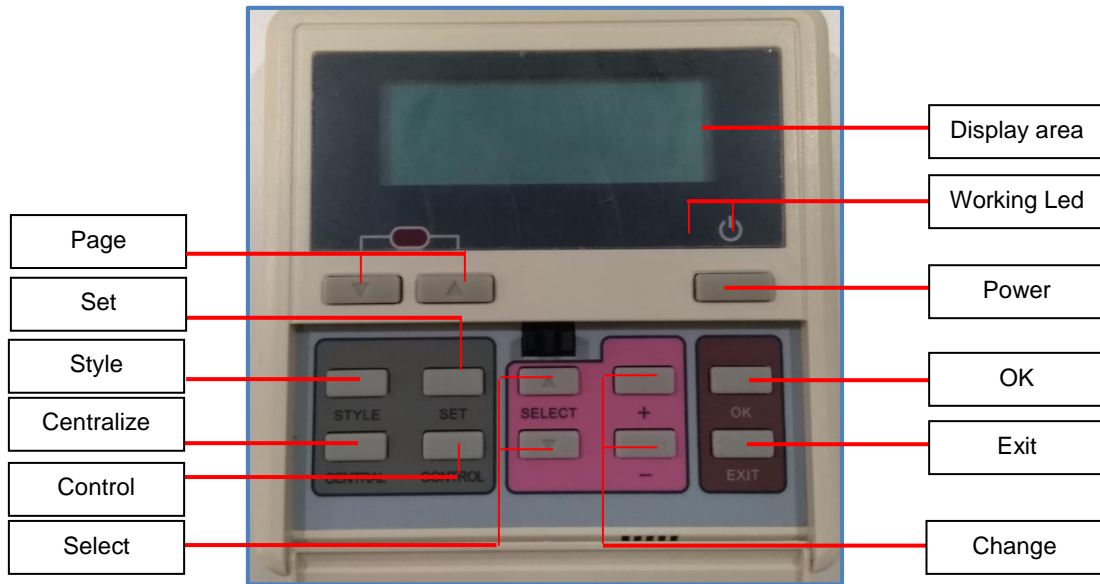
(DCZCC-XK-SYE1)

4.1.1 Wiring Diagram
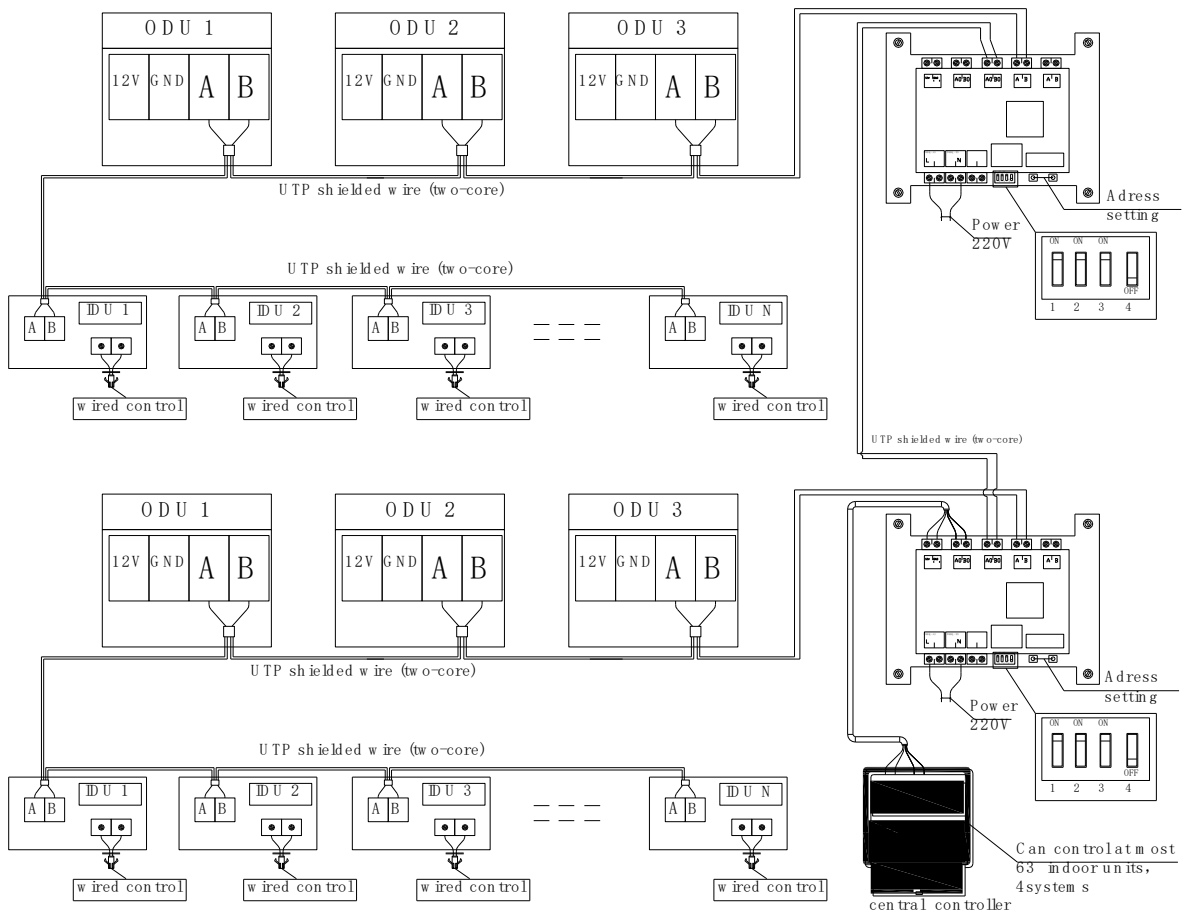
Centralized control schematic diagram

4.1.2 Centralized Controller Adaptor

Centralized controller adaptor is used with centralized controller together.
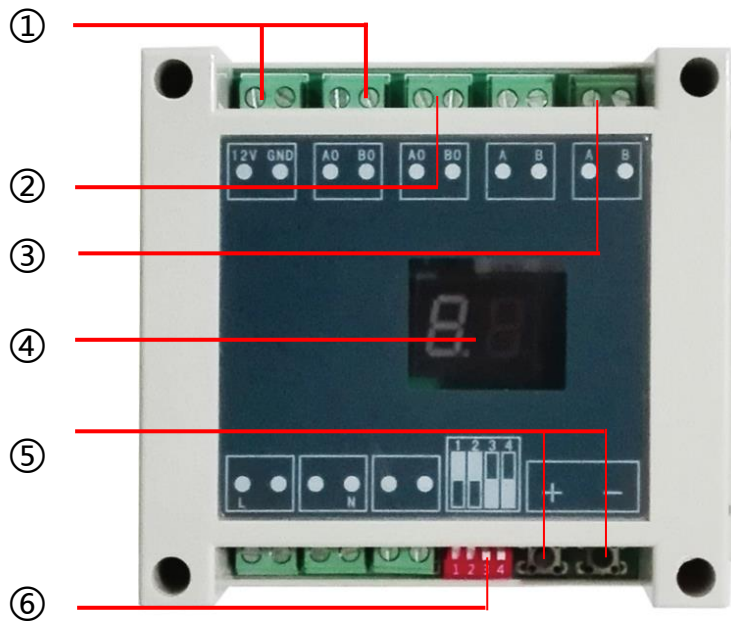
① To Centralized controller/

Supply power to controller (4 core wire)

② To next Gateway (2 core wire)

③ To VRF system communication terminal "A.B" (2 core wire)

④ Display slave address

"01"means the first system."02"means the second system…

⑤ Setting MODBUS-RTU Slave Address (For button controller no need set)

1. Press **"+"** or **"-"** to activate the slave address setting functions;
2. Press **"+"** and **"-"** at the same time for 5 seconds，then the Digital Display will be Flashing every second;
3. Press **"+"** to add the Slave Address，Press **"-"** to decrease the Slave address;
4. After Setting Address finish，wait 5 seconds，then the Digital Display will stop Flashing and display the Slave Address.

⑥ Dip-switch setting**: ON/ON/ON/OFF(For Button)**

4.1.2 Centralized Controllerfunction

1).Operation status of as many as **63 indoor units** can be monitored, including wind speed, set temperature, etc.

2). Mode, air speed and temperature setting are possible for individual/zoned/all indoor units.

3). 3 operation modes are available: Last-in Preferred, Centralized Control and Lock;

4). The malfunctions of the indoor units can be monitored and saved for inquiry;

5). Timed on/off is possible by specifying the exact time or by weekly schedule.

6). Any number of centralized units can be zoned with as many as 63 indoor units set as one zone, so that units in the same zone will carry out the same operation. (As the factory default, a centralized group is considered as a zone)

4.1.3 Operating Instructions

Enter main screen

During the initialization, no key inputs are processed until the end of the preliminary communication.

After the end of the initialization, the centralized controller will display main screen a:

```
2 0 1 1 / 0 1 / 1 8   1 0 : 0 0   T u e   人  ⊕

U n i t

                         W o r k i n g    0 5

     T o t a l      1 0 │ S t a n d b y    0 5
```

Main screen a Note ①

Switching between the main screen a**,** b and c is possible by pressing the "Style" key. The main screen a**,**b and c are collectively called the "the main screens".

Main screen a: displays the statistic data for the operation of the networked units.

Main screen b: displays list of the networked units.

Main screen c: displays the function information of individual units.

```
2 0 1 1 / 0 1 / 1 8  1 0 : 0 0  T u e    ⊕
0 1 0 2 0 3 0 4 0 5    0 7 0 8   1 0 1 1

2 5
```

```
2 0 1 1 / 0 1 / 1 8   1 0 : 0 0   T u e    ⊕
Z o n e   0 1 │ M o d e :   C o o l
U n i t   0 1 │ T e m p :   2 5℃
            │ F a n  :   L o w
```

Main screen b

Note

①When among all units, one or more are turned on, the operation indicator will light, otherwise, it will remain off.

②Reverse displayed numbers indicate the units that are currently on and normally displayed ones indicate those that are off. Numbers that are not displayed indicate the units that are either not exist or communicatively failed. Press "Page" key to view the next page.

③Displays the information of the individual unit whose operation status is indicated by the operation indicator. Press "Page" key to view the information of the next unit.

Quick on/off

◇　When the operation indicator is on under main screen a and b, pressing "Power" key will turn off all units. When the operation indicator is off, pressing "Power" key will turn on all units .

◇　Under main screen c, pressing "Power" key will only switch the operation status of the unit that is currently selected.

Set /change time

Under the main screens, press "Set" key to enter the page " Set Manu":

```
1 . S e t    T i m e

2 . T i m e r    M o d e

3 . Z o n e / U n i t    S e t

4 . L a n g u a g e    S e t
```
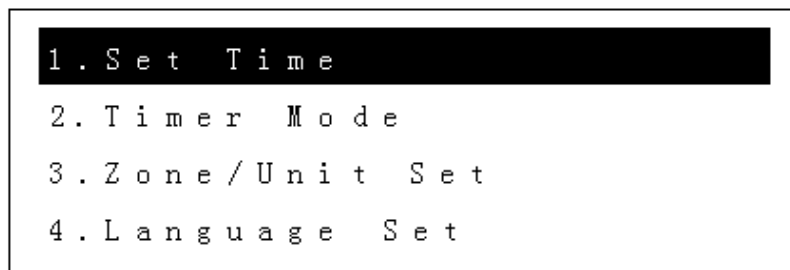
Page "Set Manu"

Select "Set Time" with the "Select" key , then press "Ok" to enter the page " Time Setting ".

```
2 0 1 1 / 0 1 / 1 8    1 0 : 0 0
Y Y / M M / D D    H H : M M
```
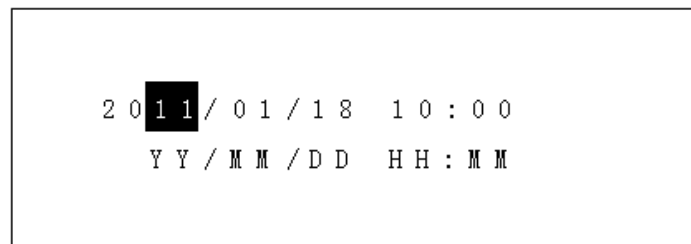
Page "Time setting"

◇ Under "Time Setting" screen, switch between the items using the "Select" key. The reversely displayed item is the selected one. Change it using the "Change" key.

◇ Then, press "Ok" key to make the change effective and return to page " Set Manu" .

◇ If the "Exit" key is pressed during making the change, you will return to the main screen without the change being effective.

◇ Pressing and holding the "Change" key for 2 seconds enables fast changing.

Timer Mode

◇ Under the main screen, press "Set" key to enter the page "Set Manu".Then, select "Timer Mode" using the "Select" key. The timer mode that is currently selected will display on the right of the line. Using the "Change" key to select the desired timer mode. Then press "Ok" key to enter the

corresponding page of timer mode.

◇ Under the page "Set Manu", select "Timer Mode", then select "No Timer" using the "Change" key to deactivate the timer function.

◇ The centralized controller support 3 timer modes: "Current", "Daily" and "Weekly". Only one timer mode can be activated at the same time.

Current/Daily Timing

```
Open    Time1:      08:00
Close   Time1:      17:00
Open    Time 2:     09:00
Close   Time 2:     16:00
```

Current/Daily Timing

◇ Current and daily timer mode each has 4 timers with 2 designated for open and the other 2 for close.

◇ Switch between the timers using the "Select" key. The reversely displayed item is the currently selected one.

◇ Change the time of it using "Change" key. Pressing and holding the "Change" key for 2 seconds enables fast changing.

◇ All timers work at same time.

◇ Current timer works only for the current day, with the timer mode automatically switched to "No Timer". The Daily timer always works.

◇ If two timers are of the same time but different types, the one that is set to close will be executed.

◇ If it is set to open and close the system at the same time, the close order will be executed.

◇ The timers are executed by time order. If the current status of the current unit is the same as the target status set by the timer, the timer will be automatically ignored.

◇ As exemplified in the above figure, the system is set to open at 8:00AM and close at 16:00 PM.

Weekly Timer

```
1. Open     08:00   S M T W T F S
2. Close    17:00   S M T W T F S
3. Not  Used
4. Not  Used
```

The list of weekly timers

◇　There are 8 weekly timers and the one with the frame shown is currently selected.

◇　"Open" and "Close" indicate the related timer is an open and close timer, respectively."Not Used" indicates that the timer is invalid."SMTWTFS" indicate the day selection with each letter representing Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, respectively. The reversely

displayed letter(s) indicates when the timer will work while the normally displayed one(s) indicates when it won't work.

◇　As exemplified timer 1 is currently selected, timer 1 and timer 2 are activated, other timers are invalid. Thus the timing is as follows: The system is set to open at 8:00 AM and close at 17:00 PM from Monday to Friday each week. No operation on Saturday and Sunday.

◇　Switch between timer 1-8 using "select" key , with the selected one shown with frame. Now press "Ok" key to enter the change page of the corresponding timer and make desired settings.

```
┌─────────────────────────────────────────┐
│  ┌────────────────────────────────────┐  │
│  │ M o d e :          O p e n         │  │
│  └────────────────────────────────────┘  │
│    T i m e :          0 8 : 0 0           │
│                                           │
│    W e e k l y :      S █M█T█W█T█F█ S      │
│                                           │
└─────────────────────────────────────────┘
```

Change weekly timing

◇　The 3 lines are "Mode", "Time" and "Weekly" respectively.

◇　The line with the frame shown is currently selected.

◇　The "Mode" line is to set whether the timer is activated or not and whether it is set to open or close the unit.

◇　The "Time" line is to set the work time of the timer.

◇　The "Weekly" line is to set the days on which the timer is activated with those days indicated reversely.

◇　Switch between the selected item using "Select" key , with the selected one shown with frame.

◇　Press "Change" key to make desired changes.

◇　After making all the changes, press "Exit" key to return to the previous screen. The setting is now finished.

◇　The operation of the other weekly timers are the same as the above. After making the changes, press "Exit" key to return to the main screen.

Zone/Unit Set

Under the main screen, press "Set" key to enter the page "Set Manu". Then, select "Zone/Unit Set" using the "Select" key. Press "Ok" key to enter the page "Zone/Unit setting".

```
┌─────────────────────────────────────────┐
│      Z o n e / U i n t   S e t u p        │
│  ─────────────────────────────────────    │
│                                           │
│      S e l e c t   Z o n e : 0 1          │
│                                           │
└─────────────────────────────────────────┘
```
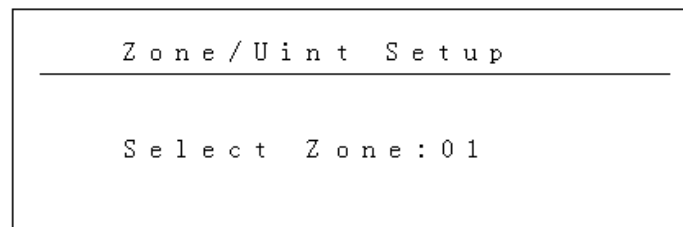
Page "Zone/Unit setting"

Select the number of the zone to set using the "Select" key. Press the "Ok" key to distribute the members.

```
Unit    01      (Page 1\2)
01 02 03 04 05 06 07 08 09 10 11 12
13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32
```

Page "Member Distribution"

◇   Under the page "Member Distribution", select among the different unit numbers. The selected one will flash and the corresponding unit number will be displayed in the first line. Using the "Change" key to decide whether to join the current zone. The reversely displayed numbers belong to the current zone while the normally displayed ones do not belong to the current zone.

◇   Press "Page" keys to display other pages.

◇   After all members are set , press "Ok" key to finish the setting of the current zone.

◇   To set other zones, select the corresponding numbers and repeat the above operation.

Language Set

Under the main screen, press "Set" key to enter the page "Set Manu". Then, select "Language Set" using the "Select" key. Press "Ok" key to enter the page "Language Setting".

```
Language Select:English
```

Page "Language Setting"

Under page "Language Setting", press "Change" key to select the desired language : Chinese or English.

After selecting the desired language, press "Ok" key to activate that language.

Zoned Control

Under the main screens, press "Control" key to enter the page " Set Manu a":

```
Zone/Unit   Control


Control  Mode:  Zone
```

Set Manu a

Under the page "Set Manu a", press "Change" key to select among the 3 control modes: "All", "Zone" and "Unit". After selecting the desired mode, press "Ok" key to enter the submenu.

Pressing "All" mode will directly open the page "Control Setting" and others will open the page "Set Manu b". Select the target code and press "Ok" to enter the page "Control Setting".

```
   Zone/Unit  Control            Range  | On/Off:Work
                                        | Mode:   Cool
   Zone  Number:    01           Zone 01| Temp:   25℃
                                        | Fan :   Low
```

In the page "Control Setting", the items displayed on the left are the control targets and those displayed on the right are the specific controls. Press "Select" key to switch between the different items and change the controls using "Change" key. After changing the setting, press "Ok" key to make the change effective.

Centralized Control and Lock Functions

Under the main screen, press "Centralize" key to switch between the regular, centralized and lock modes.

The upper right icon on the main screen indicates centralize status.

The icon is not displayed in the regular mode and the indoor unit is controlled in "Last-in Preferred" mode.

In the centralized mode, a ⅄ icon will display with the indoor unit run under the settings of the centralized controller, but the remote control and line control work for the open and close of the indoor unit.

In the lock mode, a 🔧 icon will display with the operation status of the centralized controller remain unchanged. The remote control and the line control do not work for the open and close of the indoor unit.

Failure Inquiry Function

Under the main screens, press and hold the "Style" key to enter the "Historical Failures Inquiry" screen.

```
   Fault              (01/20)
   Unit  01
    Recently   :      a3
    Previously:       j4
```

Historical Failure Inquiries

Under the page "Historical Failure Inquiry", press "Select" key to switch between the historical failures of each unit, with units that have no historical failures

For the meaning of the specific trouble code, refer to the technical manual of the unit.

4.2 Touch controller CC-02

Dimension：Front 177*116*12.5mm ； behind：120*60*26mm

4.2.1Interface specification
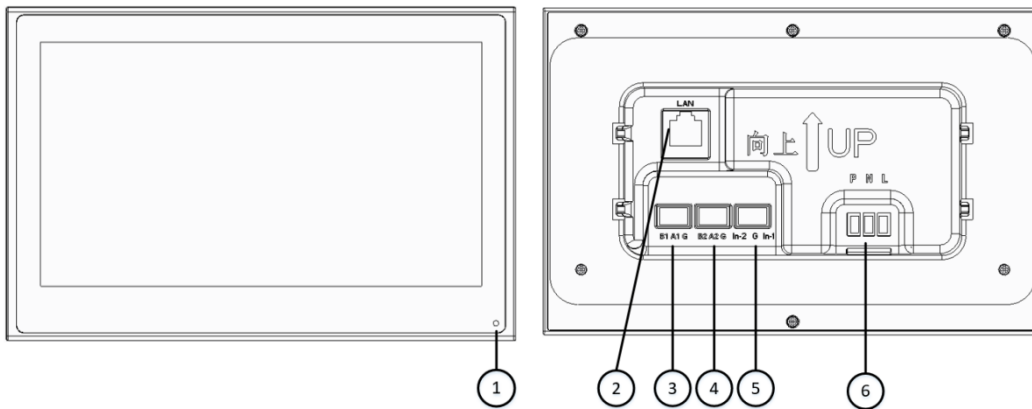
① Indicator light
② RJ45 WAN
③RS485 interface 1:B1- signal line negative pole; A1- signal line positive pole; G- signal ground wire
④RS485 interface 2:B2- signal line positive pole; A2- signal line positive pole; G- signal ground wire
⑤ 2 Way DI fire input interface: IN-1- input port; IN-2- input port; G- signal ground wire
⑥ AC~220V power input: L- FireWire; N- zero line; P- protection ground wire

4.2.2Wiring Diagram

Centralized control schematic diagram
CC-02

4.2.3 Centralized Controller Adaptor

Centralized controller adaptor is used with centralized controller together.

① To VRF system communication terminal "A.B" (2 core wire)

② To next Gateway and or To Centralized controller (2 core wire)

③ Display slave address

    "01"means the first system."02"means the second system…

④ Setting MODBUS-RTU Slave Address

1. Press **"+"** or **"-"** to activate the slave address setting functions;
2. Press **"+"** and **"-"** at the same time for 5 seconds，then the Digital Display will be Flashing every   second;
3. Press **"+"** to add the Slave Address，Press **"-"** to decrease the Slave address;
4. After Setting Address finish，wait 5 seconds，then the Digital Display will stop Flashing and display the Slave Address.

⑤ POWER L/N 220V~

⑥ Dip-switch setting**: OFF/OFF/ON/OFF(For Touvh)**

4.3.3 Centralized Controllerfunction

GREEN touch screen centralized controller is a multifunctionaldevice that can control up to **256 indoor units / 32 systems**within amaximum connection length of 1200meters.Users couldenjoy the flexibility of either controlling multiple units as agroup or controlling each unit individually.

4.3.3.1 Auto scanning indoor units

①Quty. of IDUs （Heating ）

②Quty.of IDUs （Cooling ）

③Quty. of IDUs （other mode ）

④Quty.of IDUs （OFF ）

⑤Quty.of IDUs （Error ）

Vendor mode

Vendor password : 0000

Unit management

Auto scanning machine

Scanning...

Scanned online indoor Unit **5 unit**

Stop
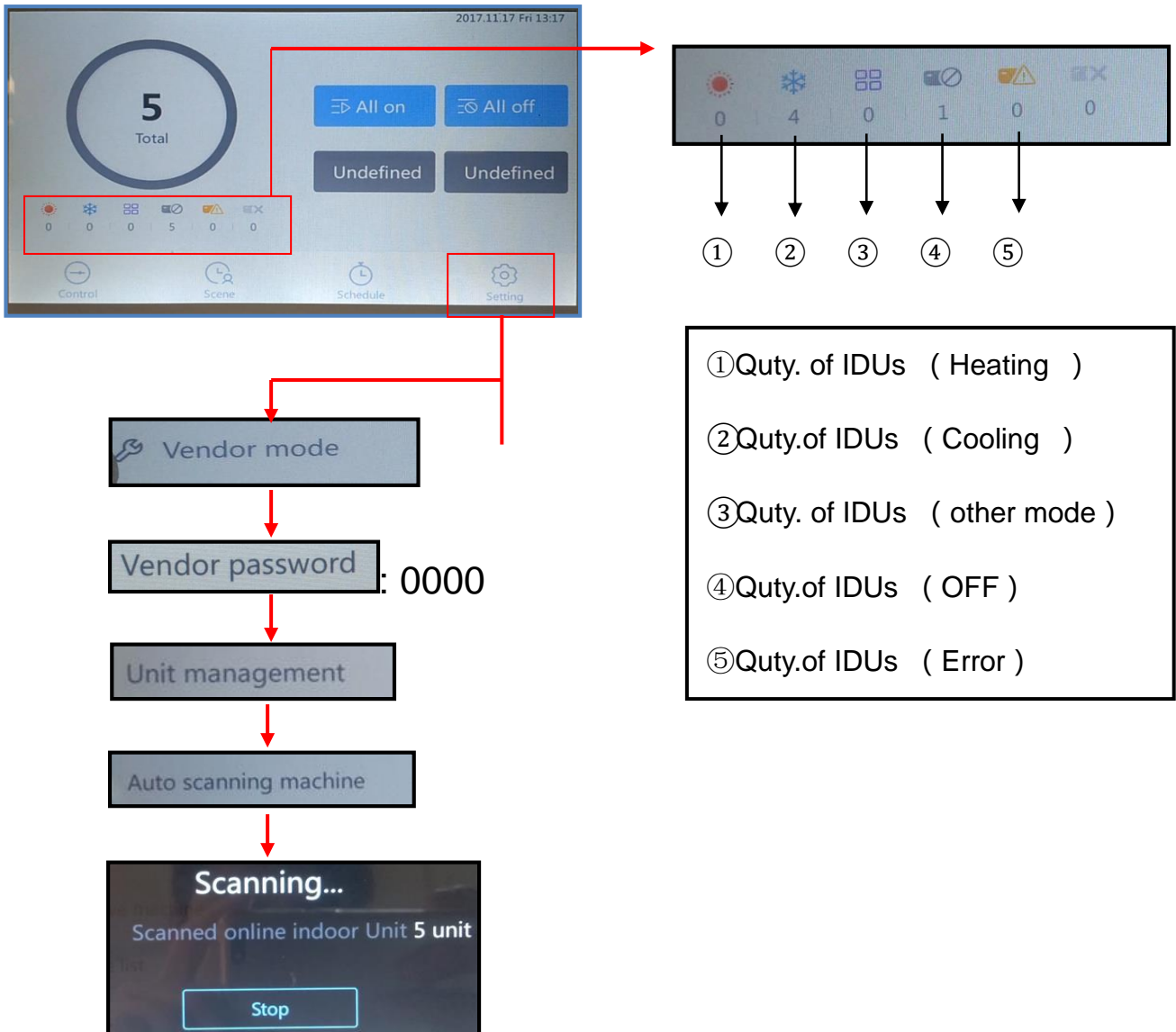
4.3.3.2 Indoor units operation
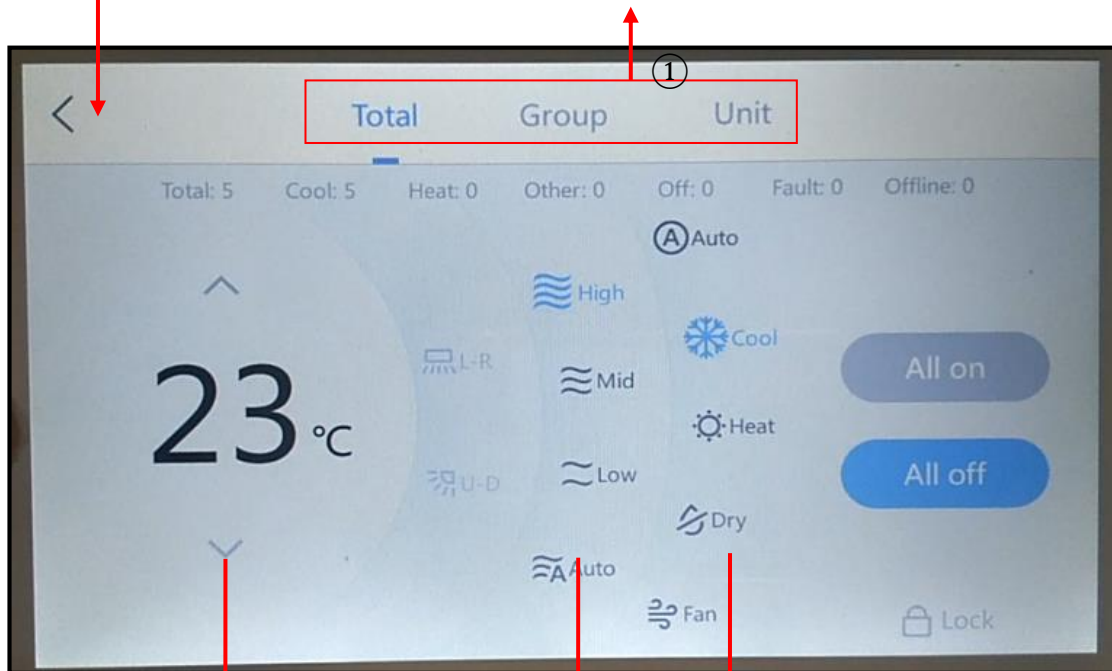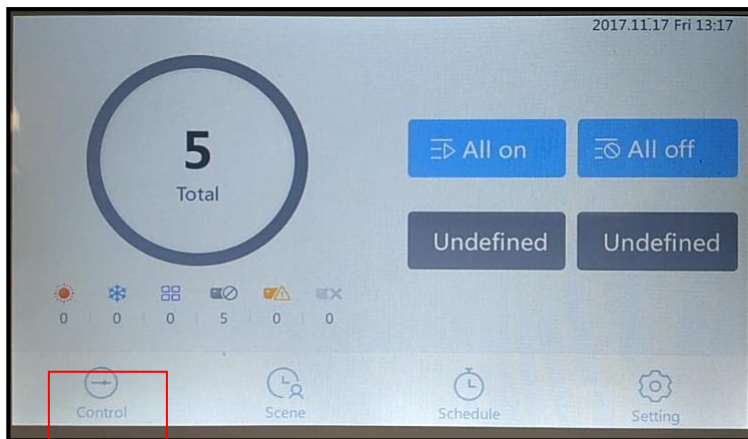
①Control options (Total/Group/Unit)

②Temperature setting

③Fan speed setting (High/Mid/Low/Auto)

④Mode setting (Auto/cool/heat/dry/fan)

4.3.3.3 Grouping / region setting
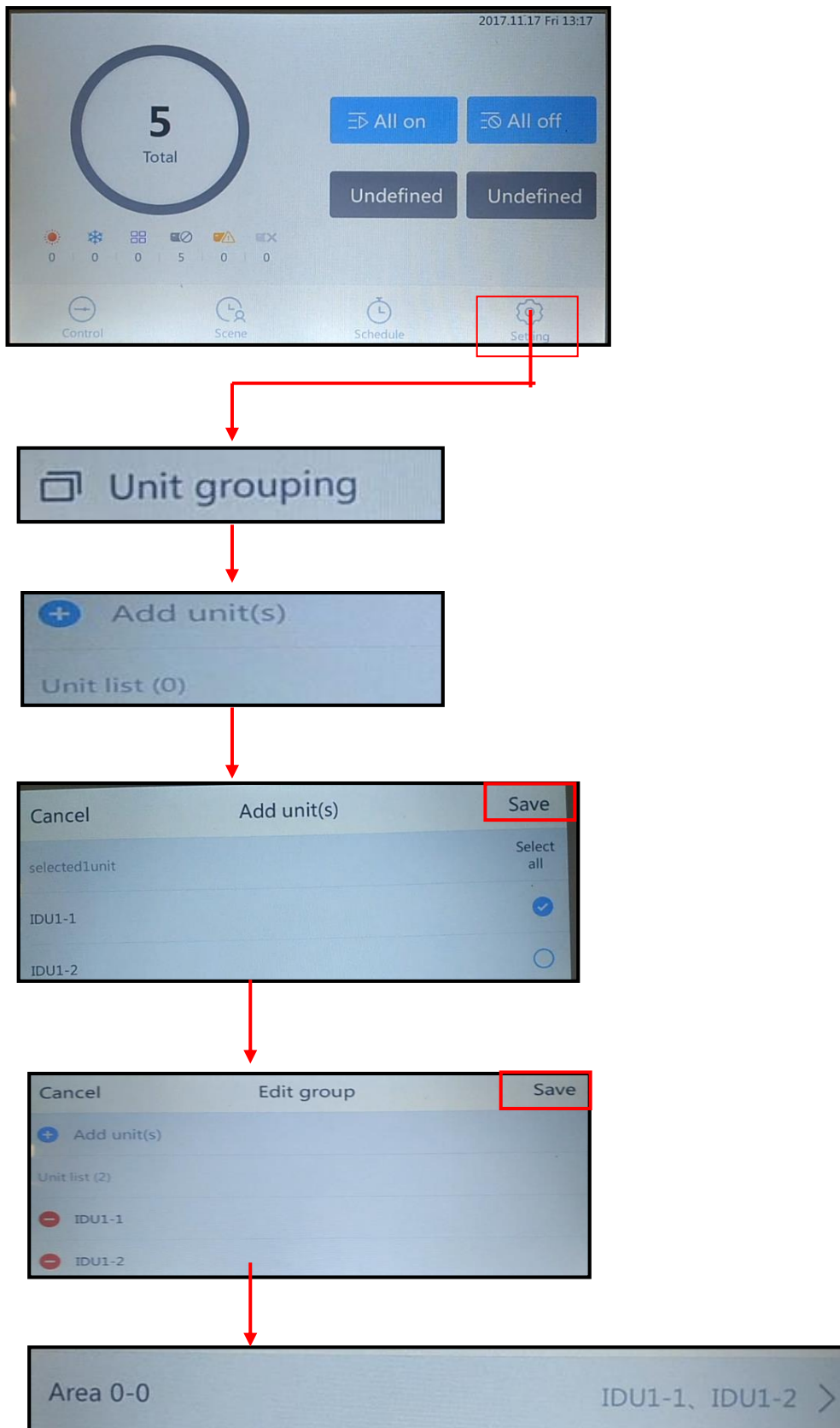
4.3.3.4 Weekly Schedule Control
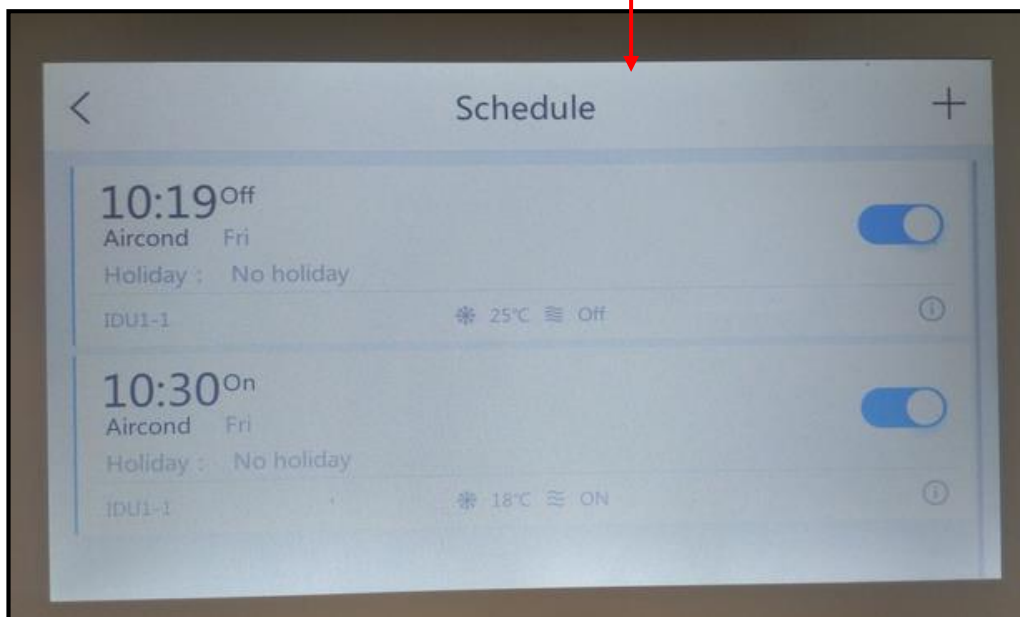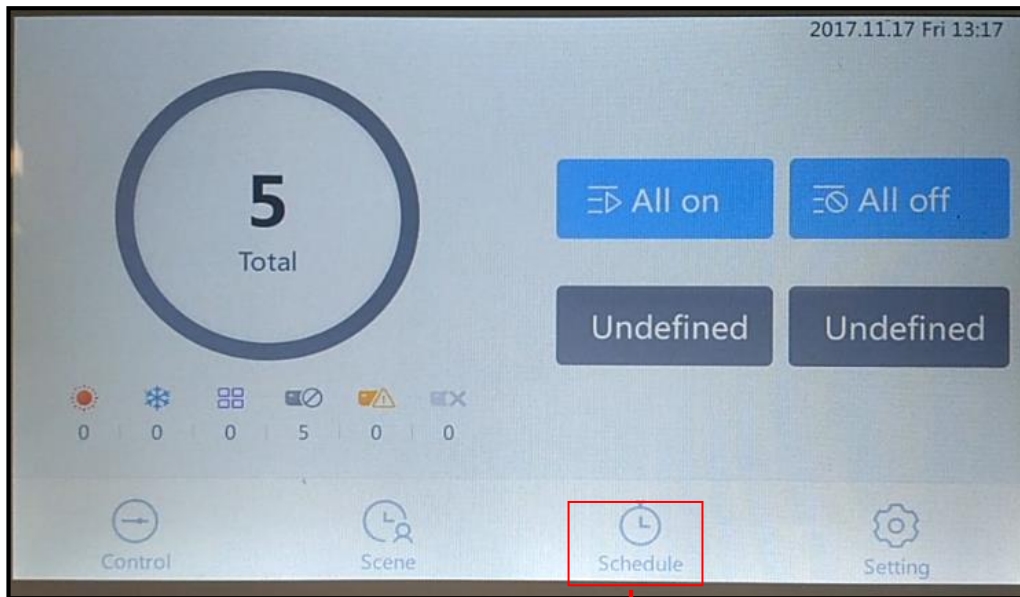
4.3.3.5 Multiple Lock function
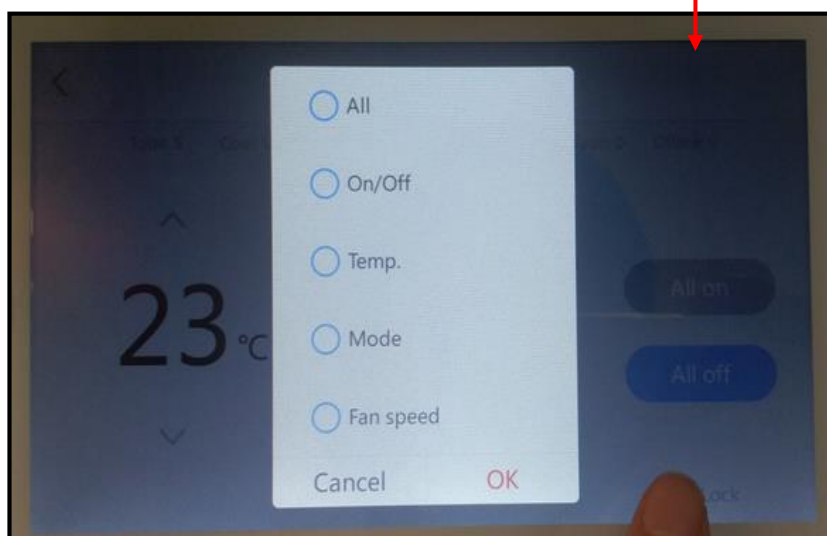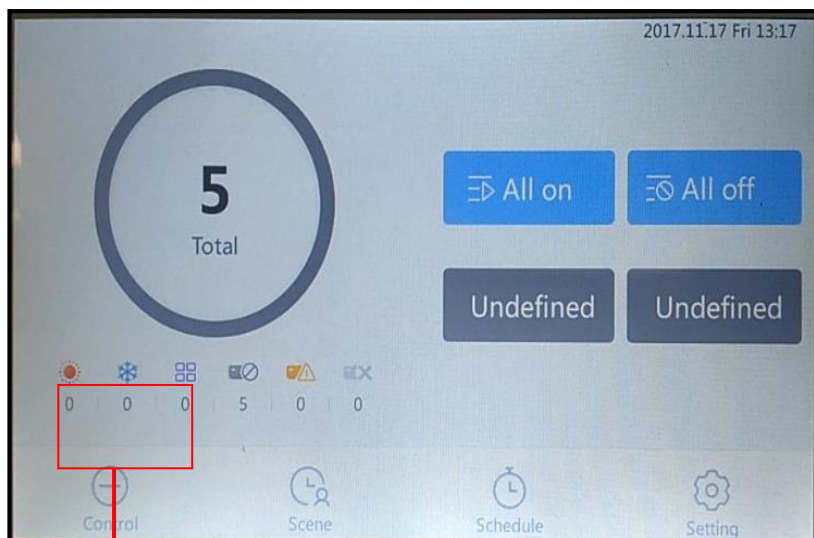
6. Centralized Controller Software

6.1 System overview

Centralized control schematic diagram
At most 64 systems, 1024 indoor units

6.2 Centralized Controller Adaptor

Centralized controller adaptor is used with centralized controller together.

① To VRF system communication terminal "A.B" (2 core wire)

② To next Gateway and or To Centralized controller (2 core wire)

③ Display slave address

   "01"means the first system."02"means the second system…

④ Setting MODBUS-RTU Slave Address

1. Press **"+"** or **"-"** to activate the slave address setting functions;
2. Press **"+"** and **"-"** at the same time for 5 seconds，then the Digital Display will be Flashing every　second;
3. Press **"+"** to add the Slave Address，Press **"-"** to decrease the Slave address;
4. After Setting Address finish，wait 5 seconds，then the Digital Display will stop Flashing and display the Slave Address.

⑤ POWER L/N 220V~

⑥ Dip-switch setting**: OFF/OFF/ON/OFF(For Touvh)**

6.2 Features

Users do not need to arrive the harsh environment of the site, they can monitor the function of units just through computer. These greatly improve convenience of daily management and the efficiency of central air conditioners;

Centralized control can improve the efficiency of air conditioners. It is more energy-efficient and environmental ;

Timely find the fault and save the maintenance cost of air conditioner units, minimize losses ;

Timer function with multi-period week, fully automated schedule planning of unit;

This system is suitable for all DC inverter GRV types of GREEN;

Each GRV unit can access at most 63 indoor sets;

This system can access at most 64 GRV outdoor systems, it need to access repeater to increase RS485 network equipment if the outdoor systems are more than 64. The way of wiring is instructed in Engineering installation and wiring description;

Every GRV unit need to configured a communication adapter plate;

If PC has RS-485 interface,there is no need to configuration RS-232 to RS-485/422 Optically isolator.

6.3 Main components of Centralized Controller System

NO	Main Components	Requirement & Function
1	Host computer	Operation system: Windows XP SP32 and above, Windows 7
2	Adapter plate	Computer and communication protocol and unit end communication protocol are incompatible with each other, must addcommunication adapter plate to make both communicate. Each GRV system matches 1 adapter plate.
3	RS-232 to RS-485/422	The centralized control system RS485 network signal conversion for RS232 serial signal to achieve the interconnection ofcomputers with centralized control system.
4	USB to RS-485/422	The centralized control system RS485 network signal conversion for USB to achieve the interconnection of laptops withcentralized control system.
5	RS-485/422 Repeater	Extend the communication distance and increase the number of RS-485 bus network. The repeater is not required, only when there is more than 30 systems or communication distance is more than 800 meters.

6.4 Softwareinstall and uninstall

1) Run setup.exe in CD to install;

2) If operation system has not installed Windows Install 3.1 and   Windows .NET Framework 3.5,the installation program will install the   two program first; when programs installation is completed, system installation will be continue, the default installation path is D:\Program Files\GREEN Group\GREEN_GRV_Setup.

3) uninstall:select [Control Panel- Add or Remove Programs -GREEN_GRV_Setup]**,**click"Cancel" to uninstall.

6.5 Software introduction Main interface
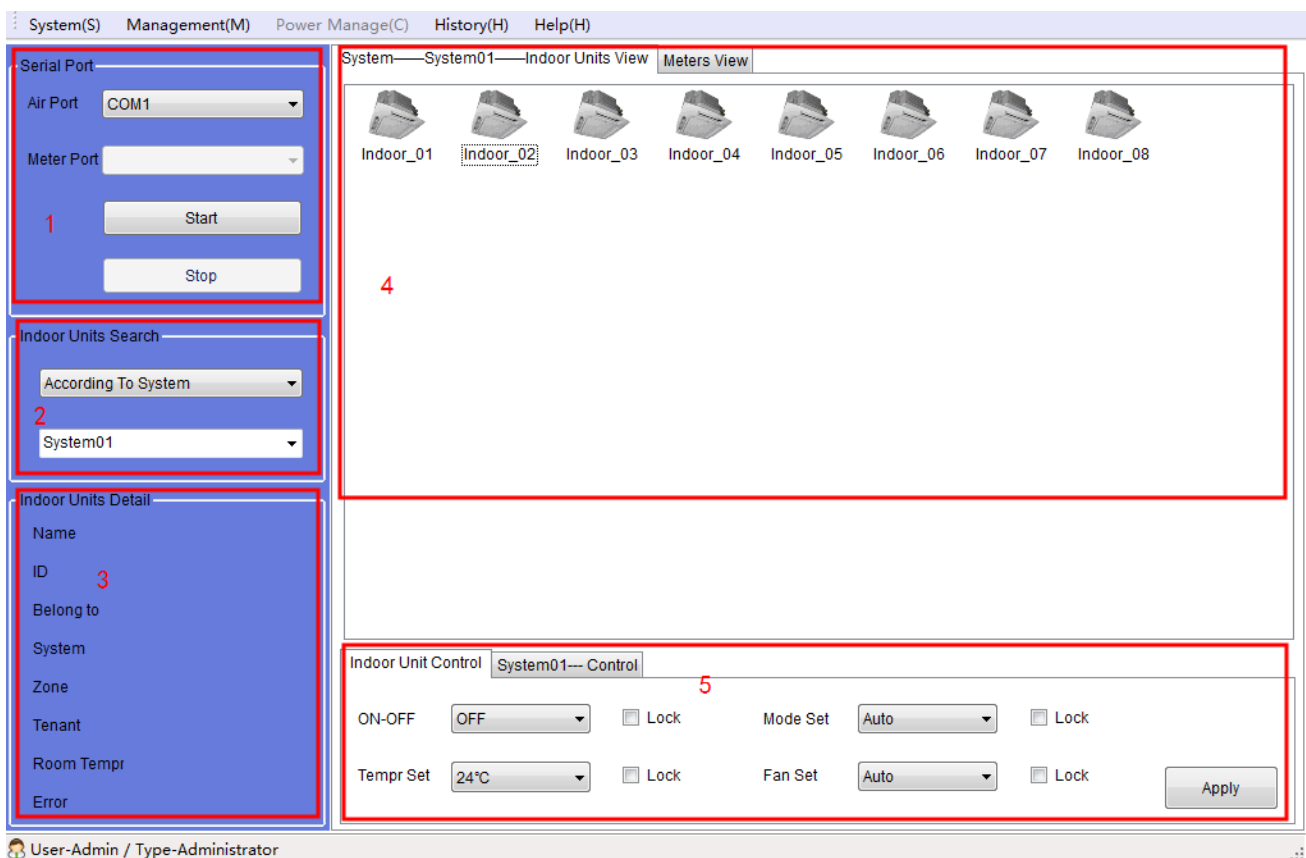
Area 1--Serial setting area, choose the serial and press "Start Working button**,**   system will in operation**,** press "Stop Working" button**,** system will stop working;

Area 2--The inquire area for air conditioner unit, it can be divided into the system inquire and user-defined group inquire**,**   the inquired unit will be displayed in area 4.

Area 3--Display area of single air conditioner indoor unit, select one of indoor units in area 4, then the area will display the name, ID (address of indoor unit) , system belonged ,group belonged, current condition, the room temperature of indoor unit , failure etc.

Area 4--Display area of air conditioner group, as shown in above picture, it displayed all the indoor unit in the group System01.

Area 5--Control area of air conditioner, it can control one single air conditioner and some air conditioner group, this will be described in detail later.

5.6 System initial setting

Click"AirconditionConfig" in area 4,it will enter the interface of system initial setting. Initial setting is divided into 3 parts: added/removed outdoor unit system, added/modified/removed air conditioner, add/changed user-defined group.

Aircondition Name	ID	Belong to Gateway	Belong to Zone
Indoor_01_01	1	System01	Zone_1
Indoor_01_02	2	System01	Zone_2
Indoor_01_03	3	System01	Zone_1
Indoor_01_04	4	System01	Zone_1
Indoor_01_05	5	System01	Zone_1
Indoor_01_06	6	System01	Zone_2
Indoor_01_07	7	System01	Zone_2
Indoor_01_08	8	System01	Zone_2
Indoor_01_09	9	System01	Zone_4
Indoor_01_10	10	System01	Zone_3
Indoor_01_11	11	System01	Zone_5
Indoor_01_12	12	System01	Zone_3
Indoor_01_13	13	System01	Zone_1
Indoor_01_14	14	System01	Zone_1
Indoor_01_15	15	System01	Zone_1
Indoor_01_16	16	System01	Zone_1
Indoor_01_17	17	System01	Zone_3
Indoor_01_18	18	System01	Zone_2
Indoor_01_19	19	System01	Zone_4
Indoor_01_20	20	System01	Zone_4
Indoor_01_21	21	System01	Zone_1
Indoor_01_22	22	System01	Zone_1
Indoor_01_23	23	System01	Zone_1
Indoor_01_24	24	System01	Zone_1
Indoor_01_25	25	System01	Zone_3
Indoor_01_26	26	System01	Zone_4

System list: System01, System02, System03. Buttons: Add System, Remove, Add Aircondition, Remove. Tabs: Aircondition View, Aircondition Config. Area labels: 6, 7.

◇ Added/removed outdoor unit system

Area 6 shown in the figure above is the operation area of added/removed outdoor unit system. The quantity of outdoor unit system of the whole project must match with the added one in figure 6, and the centralized control address (the address displayed on communication adapter plate)of every system must correspond with the system serial number.

Note:

If the outdoor unit system deleted, the indoor unit belonged in it will also be delete! Please handle with care.

◇ Added/deleted indoor unit

Area 7 shown in the figure above is the operation area of added/deleted indoor unit. Before added, user need to select one option in area 6 shows that he would add indoor unit in that outdoor system(the added quantity of indoor unit system must match with the actual quantity in the outdoor system).

5.7 Concrete operation:

Click"Add Aircondition"button,the fallowing dialog box will pop up
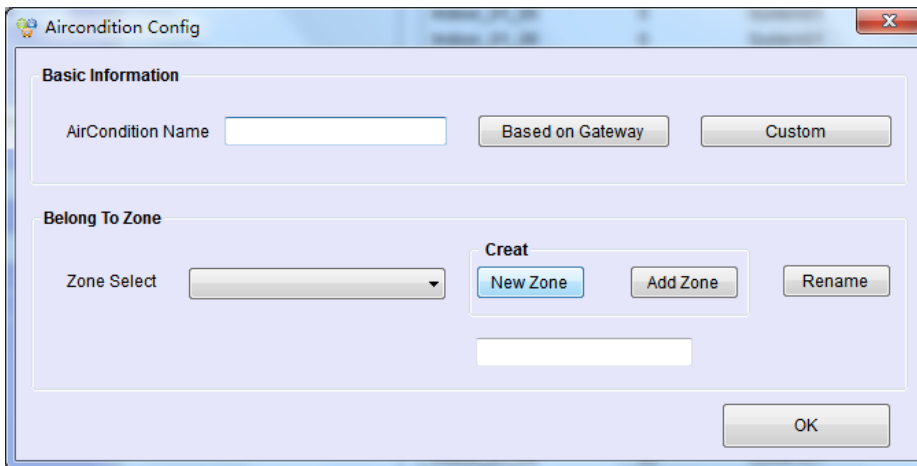
Click Based On Gateway button**,**there will generate a name (the red circle part in the figure below) according to indoor unit address and the system it belongs; click Custom button, user need to set a name by himself.
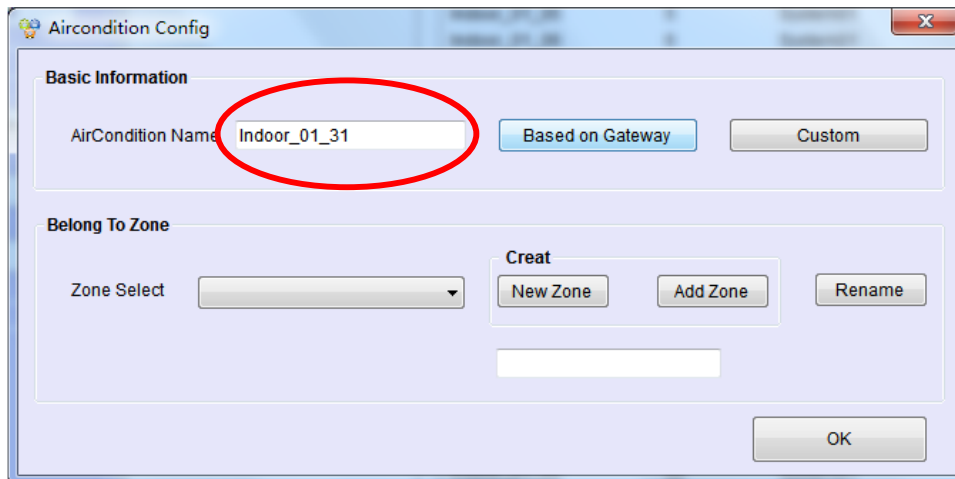
Then is to choose the group the air conditioners belong. User can choose a group defined by himself in Area Select. If there has not user-defined group, user can establish a user-defined group in Create nodule, detail explanation in Added/changed user-defined group. Click "OK" to complete new group addition after the completion of the new group added.。

5.8 Added/changed user-defined group
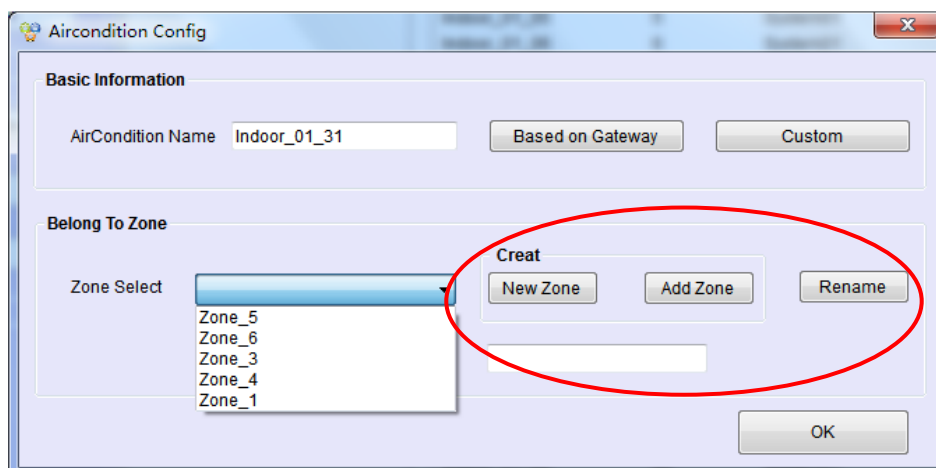
The red circle part in the figure above is the added and changed operation area.

If user need to add new group, first, click New Zone button and input the name of user-defined group, then click Add Zone button, here will show the name inputted just now , establishment complete;

If user need to modify the name of group, select the group in Zone Select , input the new name, then click the Rename button, modification complete when the new name show in Zone Select.;

Note:

Group deletion does not support now, be careful when adding.

5.9 System query operation

System query operation includes system query and user-defined group query. Query ways can be chosen as the figure below:
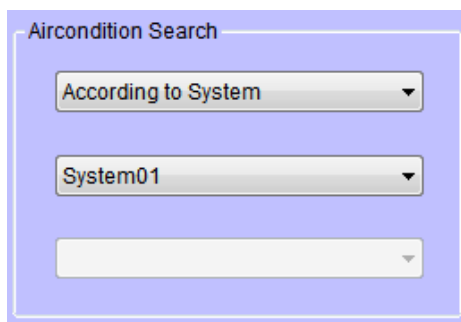
◇ If the chosen group is in According to System, then all the unit condition of the group will be displayed in area 4(area 4 will display the condition of all the indoor unit in System01 as the above picture shows).

◇ If user chooses one of the group in According to Zone, area 4 will display the condition of all the units in it. In addition, user can move the indoor unit to other groups arbitrarily under the state of user-defined group query, its operation as follow figure:
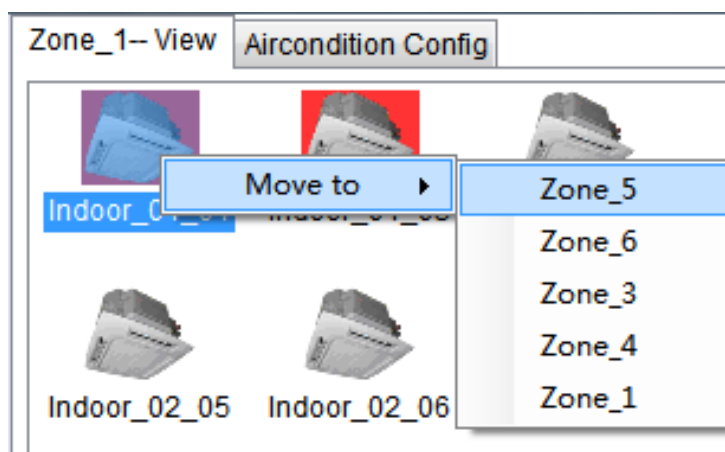
When system is working(click Start Working in area 1), area 4 will display all the working condition if Indoor unit, as shown in the following figure——
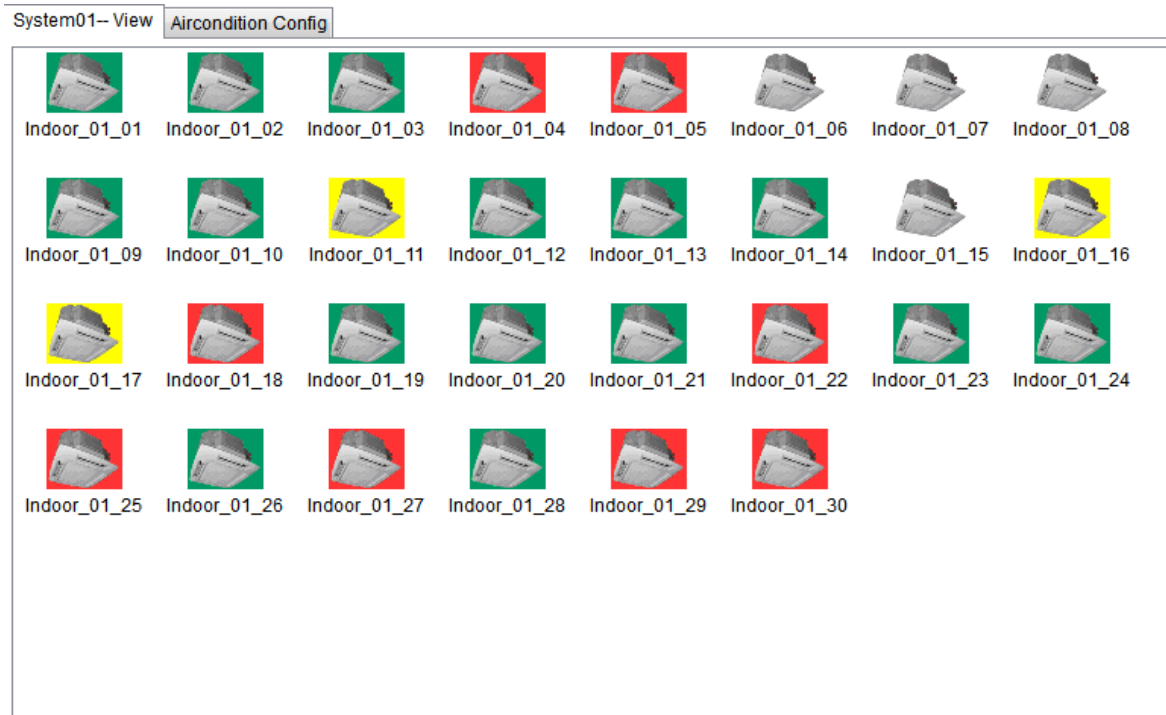
◇ No background is turned off;
◇ Green background is turned on;
◇ Red background is system failure;
◇ Yellow background is communication failure or electrical failure.

5.10 System control operation

System control can be divided into single unit control; group control and weekly group timing control 3 parts. Single unit control achieves the controlling of one indoor unit; group control achieves the controlling of System group and Zone group; weekly group timing control achieves the weekly timing control of Zone group (user-defined group).

1)   Single unit control
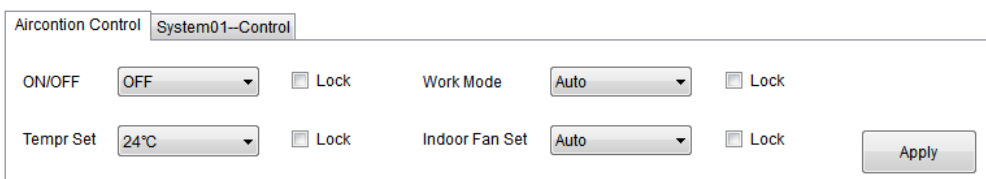
Besides on/off, temperature setting, mode setting, indoor speed setting, single unit control added the lock function (lock the 4 function above). If one function is locked, user cannot use it. For example, if ON/OFF is lock(choose Lock in ON/OFF), user cannot turn on/off the locked unit by remote or wired controller. Indoor unit will executive command when click Apply after setting completed.

2) Group control

Group control achieves the unified control of one group, setting interface is shown as following figure:
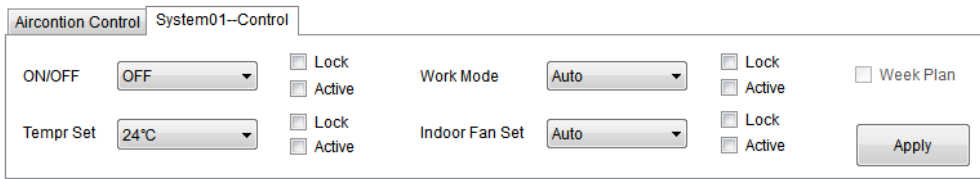
Besides the general control and locking control of single unit control, group control is added the Active function. The matching state of indoor unit will change only when choose Apply function, unselected ones stay unchanged. For example, choose ON and Active, all the indoor units will be turned on, but the temperature, mode, speed will not be changed like the setting of group.

Indoor unit will executive command when click Apply after setting completed.

3) Weekly group timing control

Weekly group time control is one of the control function in user-defined Zone, system group has no this function, setting can be chosen only when the user-defined region is selected in query. Shown as figure below:
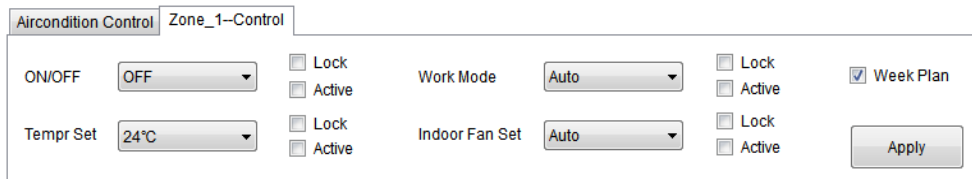
Then setting dialog box will pop out when Week Plan is selected, shown as figure below, After completion of set, click the "OK" button to finish the setting.
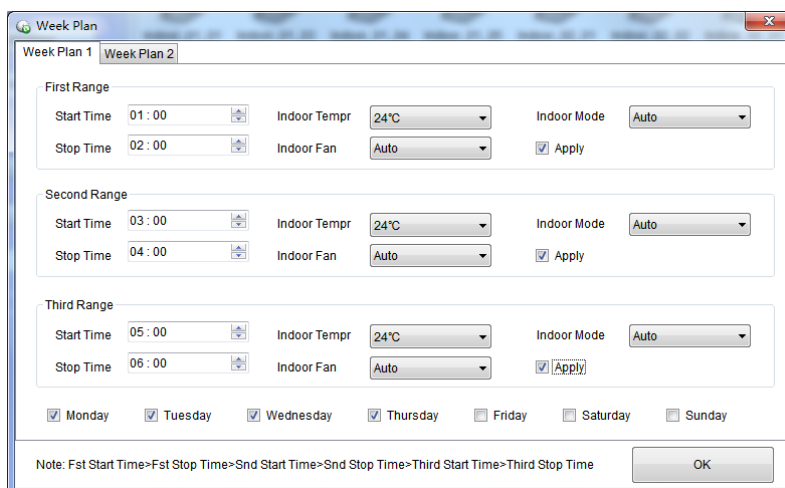
Notes:

◇ All the related intellectual property rights as System patent right, software copyright etc. ownership belongs to Ningbo GREEN Electrical Company Ltd.. Any unit or individual shall not copy, assignment, transact or use related production in other ways without permission. Otherwise Ningbo GREEN

Electrical Company Ltd. will have the right to pursue legal responsibilities.

◇ If system is damaged by suffering a natural force majeure (such as earthquake fire typhoon, etc.), all losses should be responsible for system investors.

◇ The user should use legal copy of Windows XP or Windows 7 and other legal copy of related software and antivirus software, make sure the computer is virus free and the Computer Independent Connecting Billing System is unaffected by other network or external port (USB port etc.), otherwise it is the users' responsibilities if there is any lost or damage.

◇ The user should use authorized computers along with UPS, the UPS should use the standard that it can keep the computer working for at least one hour if the power is suddenly cut off, and during this one hour the administrator would take care of the computer. It is users' responsibilities if any accident or data loss happened because of a sudden power failure.

◇ he user must make sure that the Photoelectric isolating converter is placed in a safe place that the converter is not easily damaged by people, make sure the wiring terminal is not loose leading to poor contact, and make sure the power is NOT easily cut off, otherwise it is the users' responsibilities if there is any lost or damage.

◇ To make sure the system work for a long time, the user should regularly check and repair it, reboot the computer at a fixed time every day, so that the computer could run in a good environment, ensure the reliability of the system, release the computer resource. Here is what users should do, first stop the communications of Billing System, then exit it, reboot the computer, open the software after the computer is rebooted.

7. BMS- MODBUS Protocol

7.1 MODBUS-RTU Parameter

7.1.1 Configuration:Provided to the BMS management

MODBUS STYTLE	MODBUS-RTU
Baudrate	9600
Data-Bit	8
Stop-Bit	1
Check	even
Slave-ID range	1~64
MODBUS CODE	01,02,03,04,05,06
SUPPORT Broadcast	NO

GREEN GRV MODBUS-RTU
ProtocolV1.3

7.1.2 Input Register:There are 14 parameters of each indoor unit can be monitored

Input Register Address	Content	Types	Notes
0	1# Indoor State	signed word	0-OFF / 1-ON / 2-Not Exist or Not Found
1	1# Indoor Type	signed word	Indoor Type (0,1,4,5,8,9,10,14,11,15,18,19-Cassette) (2,6,20,21-ESP Duct)(3,7,13,17-Ceiling & Floor) (12,16-Wall-Mounted) (22-Fresh Air Unit)
2	1# Indoor HP	signed word	Indoor Unit HP
3	1# Indoor Energy	signed word	Indoor Unit Energy
4	1# Indoor Mode	signed word	Control Mode(0-Auto/ 1-Cool/ 2-Dehumi/ 3-Healthy Dehumi/ 4-Heat / 5-Dry / 6-Flow)
5	1# Temperature Set	signed word	16~32℃
6	1# Indoor Fan Speed	signed word	Fan Speed(0-Stop/ 1-High/ 2-Medium/ 3-Low)
7	1# Indoor Error Code	signed word	Error Code
8	1# Indoor Tai	signed word	Display return air temperature
9	1# Indoor Tei	signed word	Display evaporator inlet temperature
10	1# Indoor Tem	signed word	Display evaporatorcentral temperature
11	1# Indoor Teo	signed word	Display evaporator outlet temperature
12	1# Indoor Filter	signed word	0: Disable, 1: Enable
13	1# Reserved	signed word	/

7.1.3 Coil: There are 10 parameters of each indoor unit can be write / set (value is 0/1)

Coil Address	Content	Value/W	Data Type
0	1# Indoor ON/OFF	0	BOOL
1	1# Indoor ON/OFF Lock	0	BOOL
2	1# Indoor Control Mode Lock	0	BOOL
3	1# Indoor Temperature Set Lock	0	BOOL
4	1# Indoor Fan Speed Lock	0	BOOL
5	1# Indoor Up/Down Fixation	0	BOOL
6	1# Indoor Left/Right Fixation	0	BOOL
7	1# Indoor Sleep	0	BOOL
8	1# Indoor Healthy	0	BOOL
9	1# Indoor Filter	0	BOOL

7.1.4 Holding registers: Thereare 4 parameters of each indoor unit can be write / set

Holding Registers address	Content	MIN_ Value	Default Value	MAX_ Value	Data Type	Unit	Remark
0	1# Indoor Control Mode	0	0	6	SIGNED WORD	/	0-Auto/ 1-Cool/ 2-Dry /4-Heat / 6-Fan
1	1# Indoor Temperature Set	16	24	32	SIGNED WORD	℃	16~32
2	1# Indoor Fan Speed	0	0	6	SIGNED WORD	/	1-High/ 2-Medium/ 3-Low/ 5-Auto
3	1# Indoor Reserved	0	0	6	SIGNED WORD	/	/

7.2 Overall structure

Each MODBUS Gateway support 1 GRV system
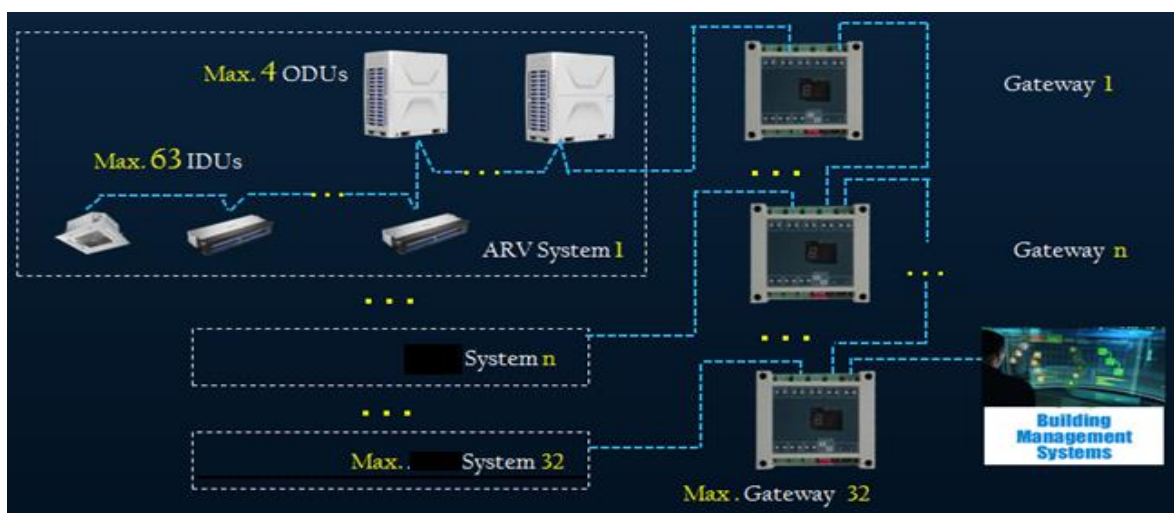
7.3 Hardware Features
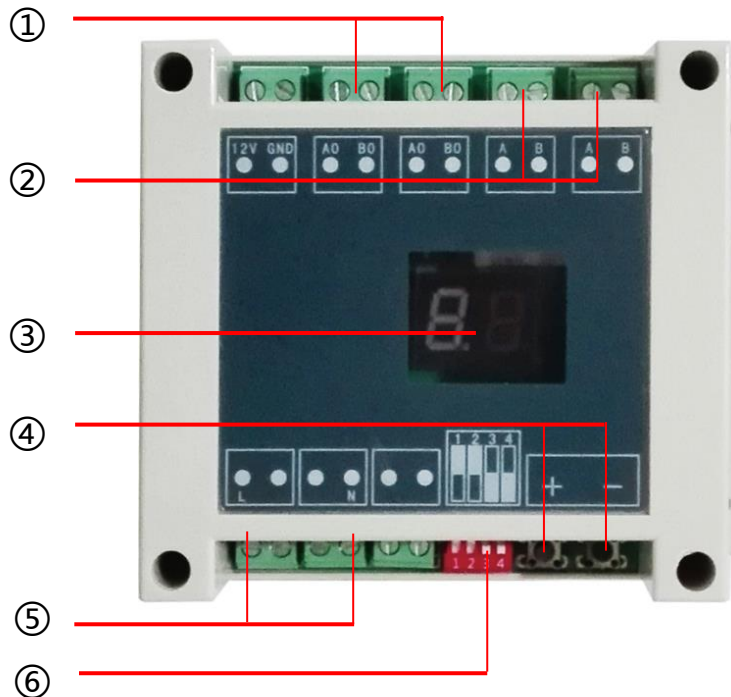
① To VRF system communication terminal "A.B" (2 core wire)

②To next Gateway & to Network work-station (2 core wire)

③Display slave address/

"01"means the first system."02"means the second system…

④ Setting MODBUS-RTU Slave Address/

1. Press **"+"** or **"-"** to activate the slave address setting functions;

2. Press **"+"** and **"-"** at the same time for 5 seconds，then the Digital Display will be Flashing every   second;

3. Press **"+"** to add the Slave Address，Press **"-"** to decrease the Slave address;

4. After Setting Address finish，wait 5 seconds，then the Digital Display will stop Flashing and display the Slave Address.

⑤Power supply 220V

⑥Dip-switch setting**: OFF/OFF/ON/OFF**

7.4 Project Commissioning

7.4.1 Make sure GRV system was commissioning successful

7.4.2 Make sure MODBUS Gateway was connected correct
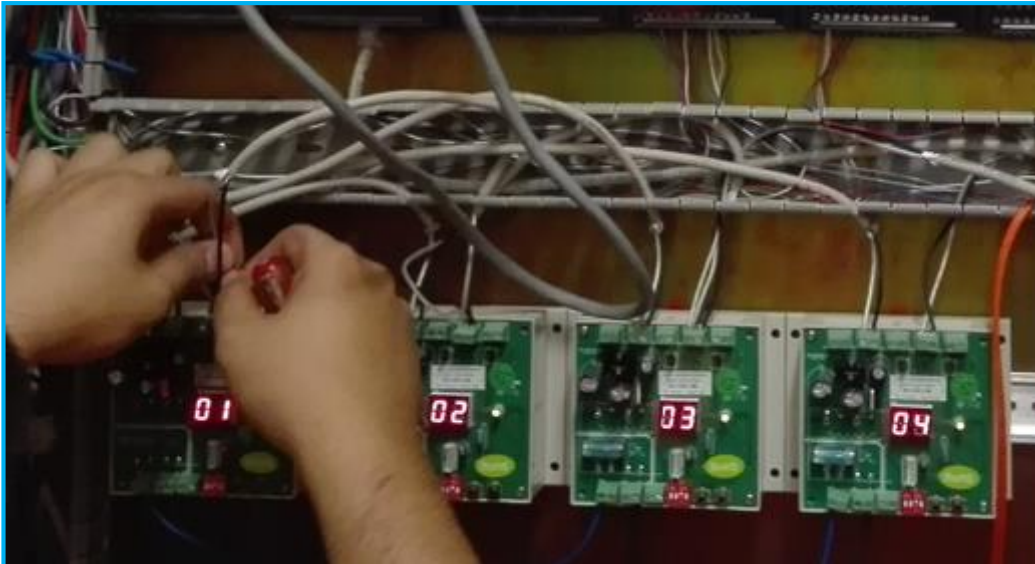
Note:

1. Each Gateway should be set address, For example : 4 systems , address from 01 ~ 04

2. Each Gateway (16422001000001) should be Refresh program(Factory setting)

7.4.3 Check if Gateway is working normal or not,test by a software (MODBUS Poll)
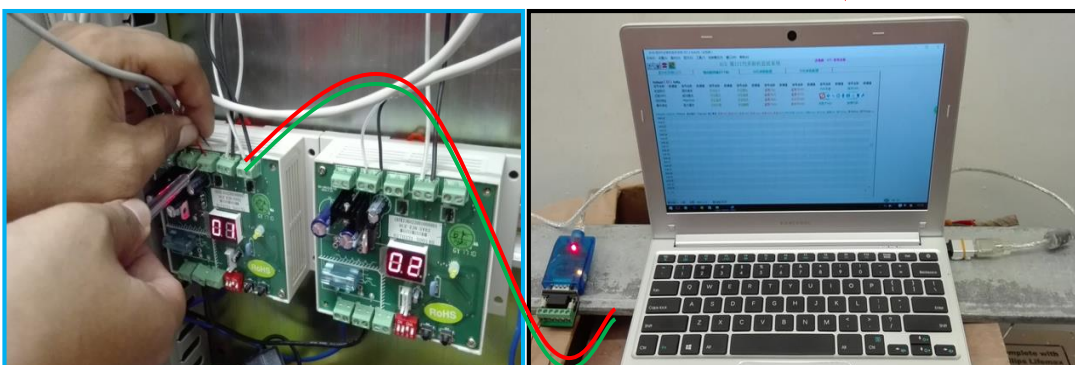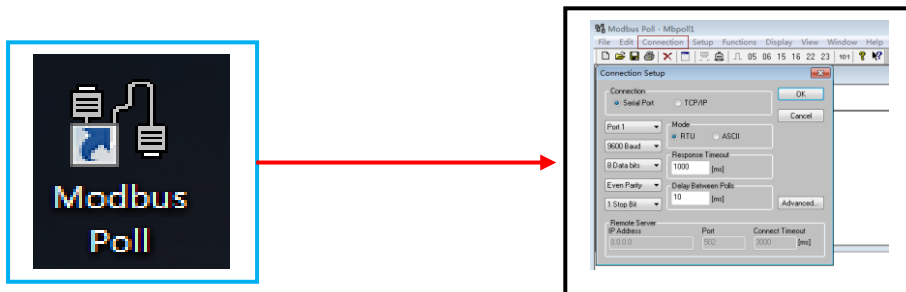
7.4.4 Last, we can deliver the project to the BMS administrator,they will according **"GREEN GRV MODBUS-RTU ProtocolV1.3"**table to do management !

8. BMS- BACNET Protocol

8.1 BACNET ParameterVariable

There are 9 parameters of each indoor unit can be monitored or set.

Idx	Function	Note
1	ON/OFF	Indoor Units' ON/OFF state command and feedback.
2	Mode	Indoor Units' Mode (AUTO/COOL/DEHUMI/FAN/HEAT) command and feedback.
3	Temperature. Set	Indoor Units' ambient temperature command(range：16℃ ~32℃) and feedback.
4	Fan Set	Indoor Units' fan command (High/Medium/Low/Auto) and feedback.
5	Ambient Temperature	Indoor Units' ambient temperature.
6	Error	Indoor and outdoor Units' error.
7	ON/OFF Lock	A type of command used for forbidden users operating ON/OFF command by remote controller and wire controller.
8	Mode Lock	A type of command used for forbidden users operating Mode command by remote controller and wire controller.
9	Temperature. Lock	A type of command used for forbidden users operating Tempr. Set by remote controller and wire controller.

Note：

The **ON/OFF Lock, Mode Lock, Temperature Lock** is inactive after indoor units' Power-Off.

Index	Function	Object Name	Object Type	Unit	Note
1	ON/OFF	Indoor_YY_XX_OnOff	BV		1：ON/ 0：OFF
2	Mode	Indoor_YY_XX_ModeSet	AV		0：Auto Mode 1：Cool Mode 2：Dehumi Mode 3：/ 4：Heat Mode 5：/ 6：Fan Mode
3	Temp. Set	Indoor_YY_XX_TemprSet	AV	℃	Range：16~32
4	Fan Set	Indoor_YY_XX_FanSet	AV		1：High Fan 2：Medium Fan 3：Low Fan 4：/ 5：Auto Fan
5	AmbientTemp.	Indoor_YY_XX_Tai	AV	℃	
6	Error	Indoor_YY_XX_Error	AV		Error Code
7	ON/OFF Lock	Indoor_YY_XX_OnOffLock	BV		1：Lock/0：Unlock
8	Mode Lock	Indoor_YY_XX_ModeLock	BV		1：Lock/0：Unlock
9	Temp. Lock	Indoor_YY_XX_TemprLock	BV		1：Lock/0：Unlock

Note：

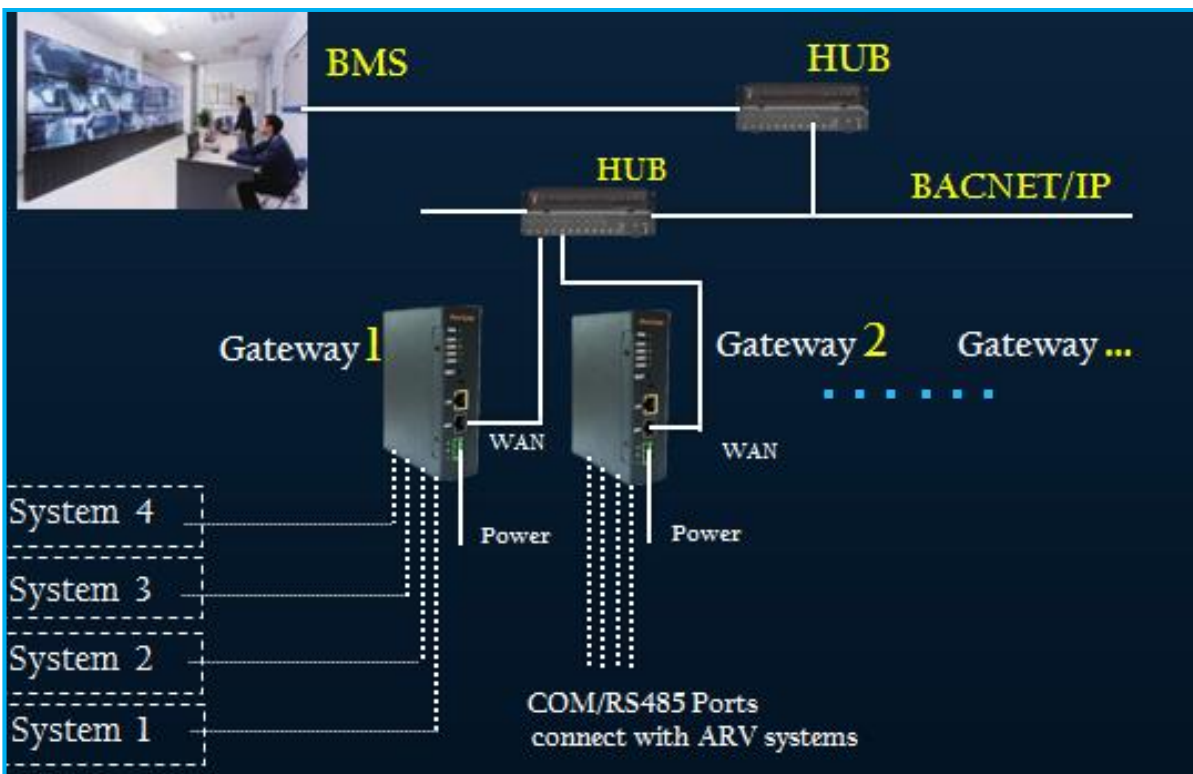**YY：** GRV System Address(Range：01~04);   **XX:** GRV indoor units Address(Range：01~64);

8.2 Overall structure

Each BACNET/IP Gateway has 4 RS-485 ports which can support 4 GRV systems

The COM Ports of GRV BACNET Gateway is connect with the GRV ODU/IDU Network
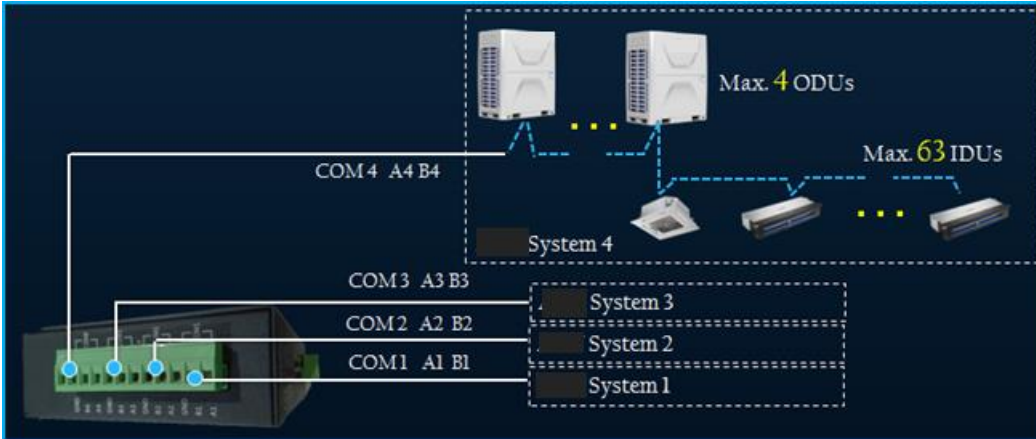
Any client device that support the BACNET/IP Protocol can integrate to BMS system by HUB

8.3 Hardware Features

Power

DC24，7W

Convenient Wiring

LAN(Reserve)、WAN、4　RS485 Ports

Dimension

115×35×135 mm

**Installation Type**

Slide-way Type

8.4 Web Configure

8.4.1 The BACNET Gateway IP and Computer IP should in the same network Segment

1. Power on, connect the RJ45 Port at the computer with the 'WAN' Port at BACNET Gateway.

2. Set the computer IP at Internet Protocol (TCP/IPv4):

      IP Address: 192.168.100.x (x range: 2~252);

      Subnet Mask: 255.255.255.0;

      Default Gateway: 192.168.100.1;

      Click 'OK'.

3. Open the Google Chrome or Firefox explorer, input '192.168.100.126', then the 'login' Page will be shown. Input name: <u>admin</u>, password: <u>admin</u>, click 'Login', then go into the Configure Page.

8.4.2 Configure the Driver Management

1. Go into the 'Driver Management' Page. Click 'Advanced'–'Driver Management':
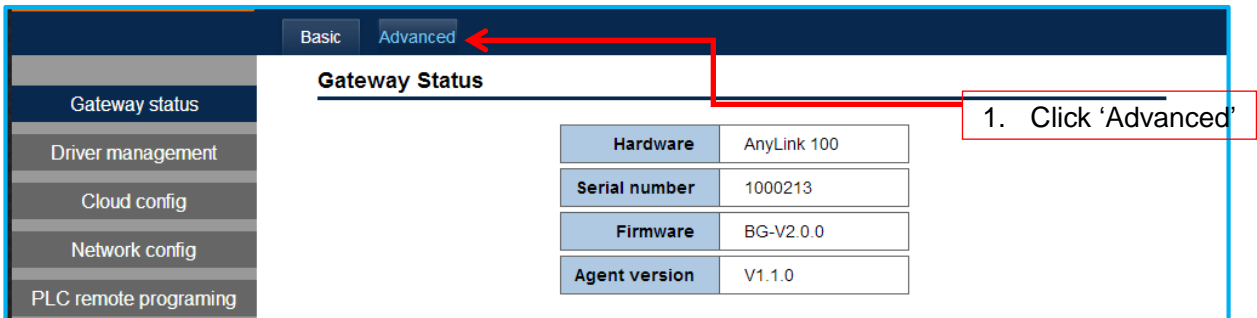
2. Add GRV Driver
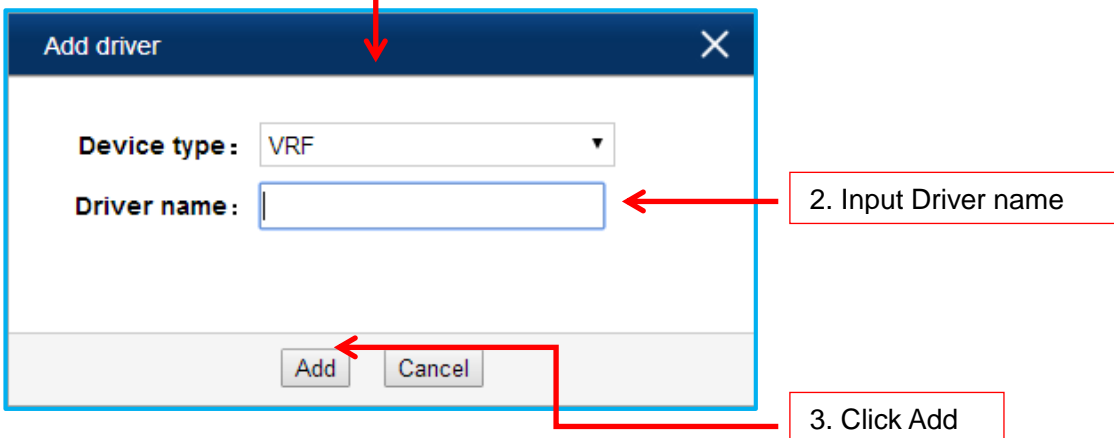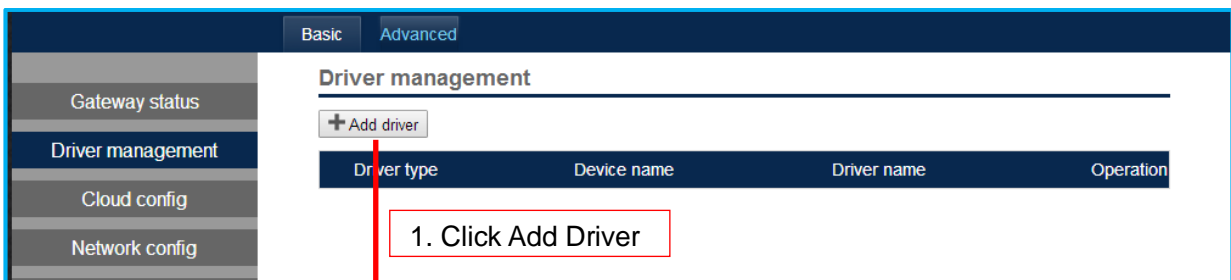
3. When finish these steps, the content is shown as follows.

If you want to remove the driver information, then click .

Before removing the driver information, you should make sure all of the indoor/outdoor information has been removed.

8.4.3 Add GRV System Information
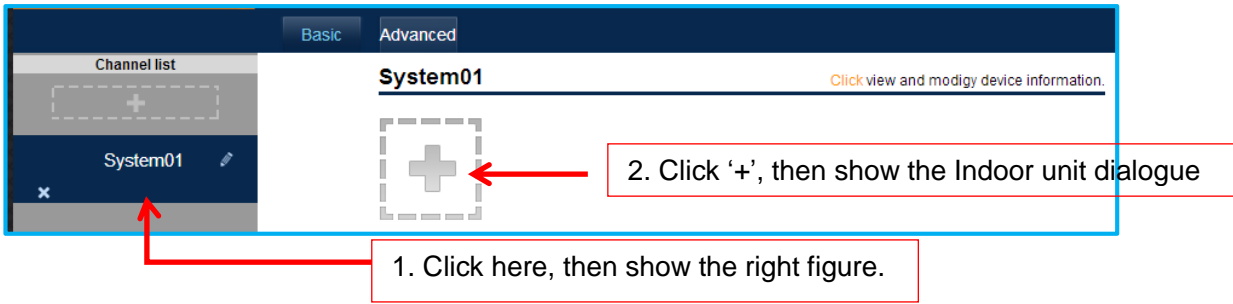
1. Click 'Basic', then click the [+] at channel list to add the GRV system.
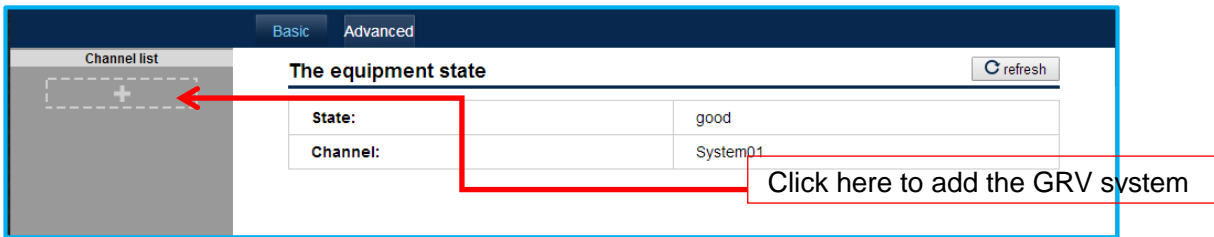
2. A dialogue will be shown
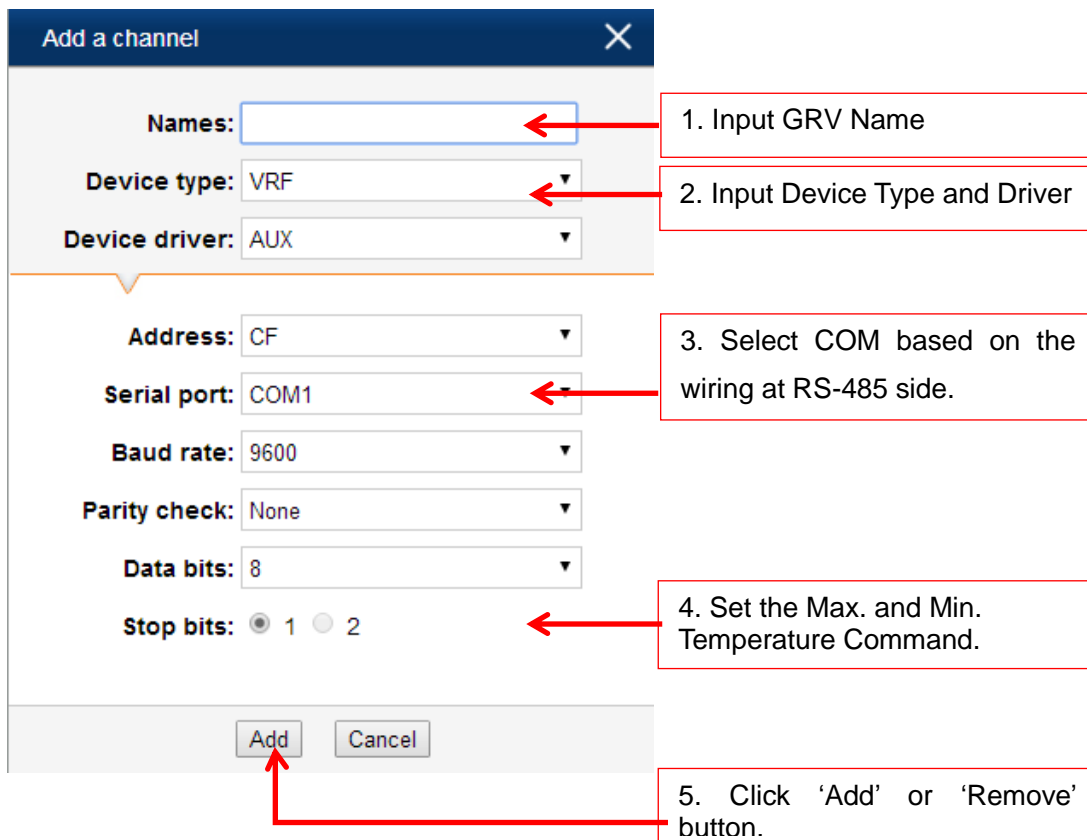
8.4.4 Add indoor units' information

The indoor units are belong to the Outdoor unit. So before Add the indoor unit, we should select the GRV system firast.

1. Select the GRV System.

2. Click '+', then show the Indoor unit dialogue

1. Click here, then show the right figure.

2. Add indoor units as follows.

1. Input name

2. Input indoor units' address.

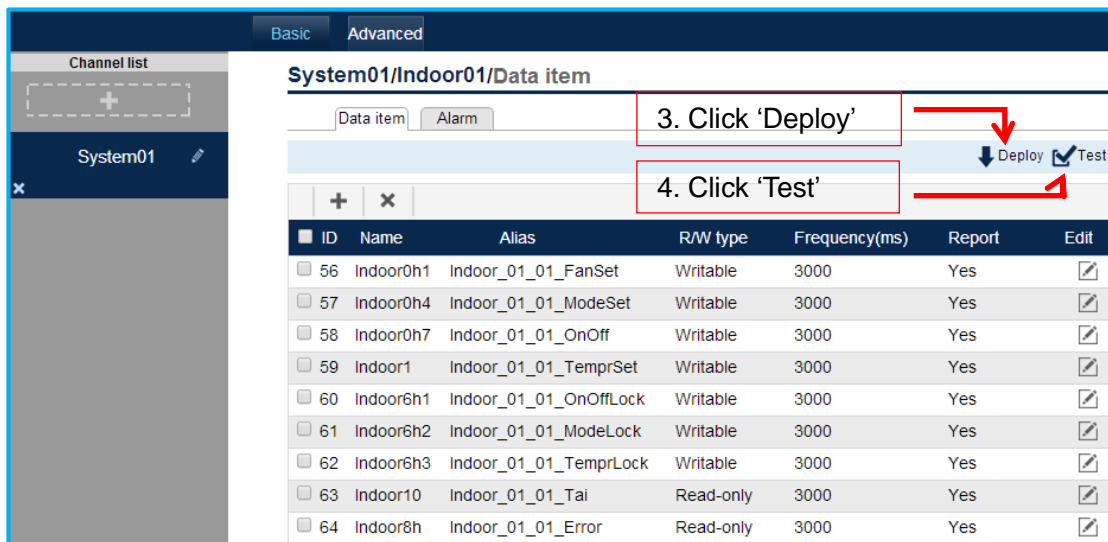3. Click Add
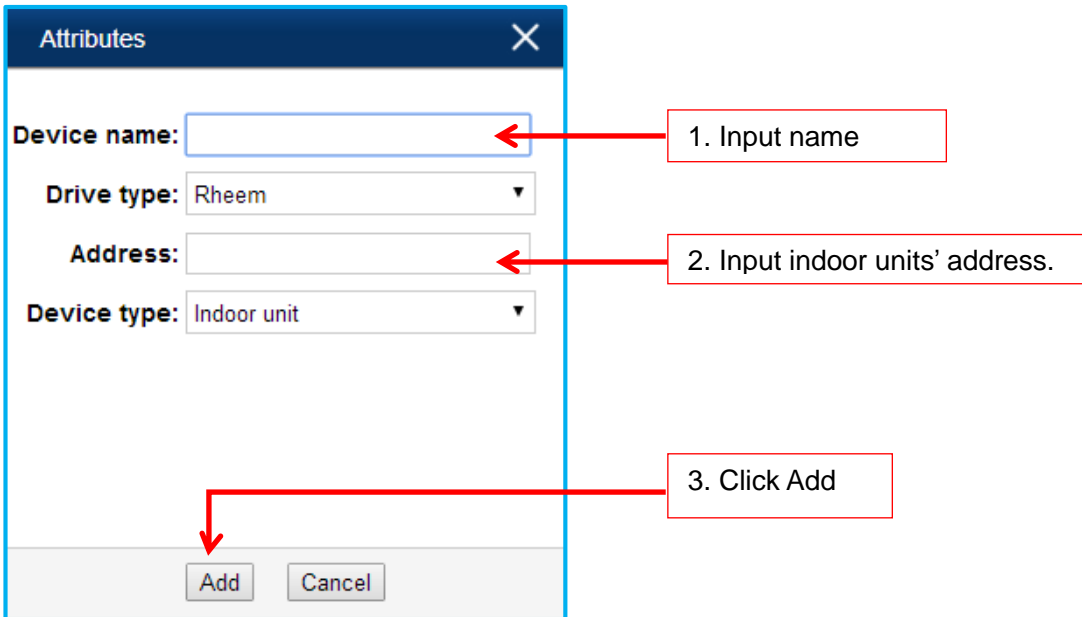
3. After finished, it is shown as follows.

8.4.5 Download the Indoor units' information

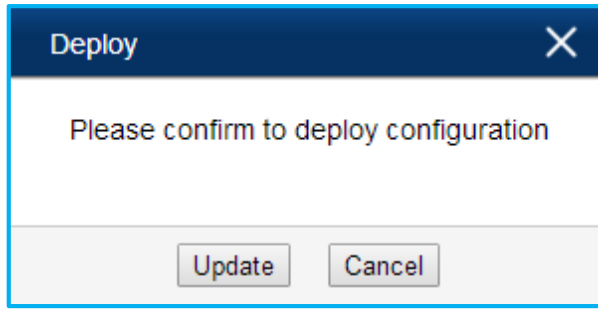After finish adding the indoor units' information, we should download the information to activate the BACNET side.

1. Click the indoor unit's icon, then shown the dialogue as follows;
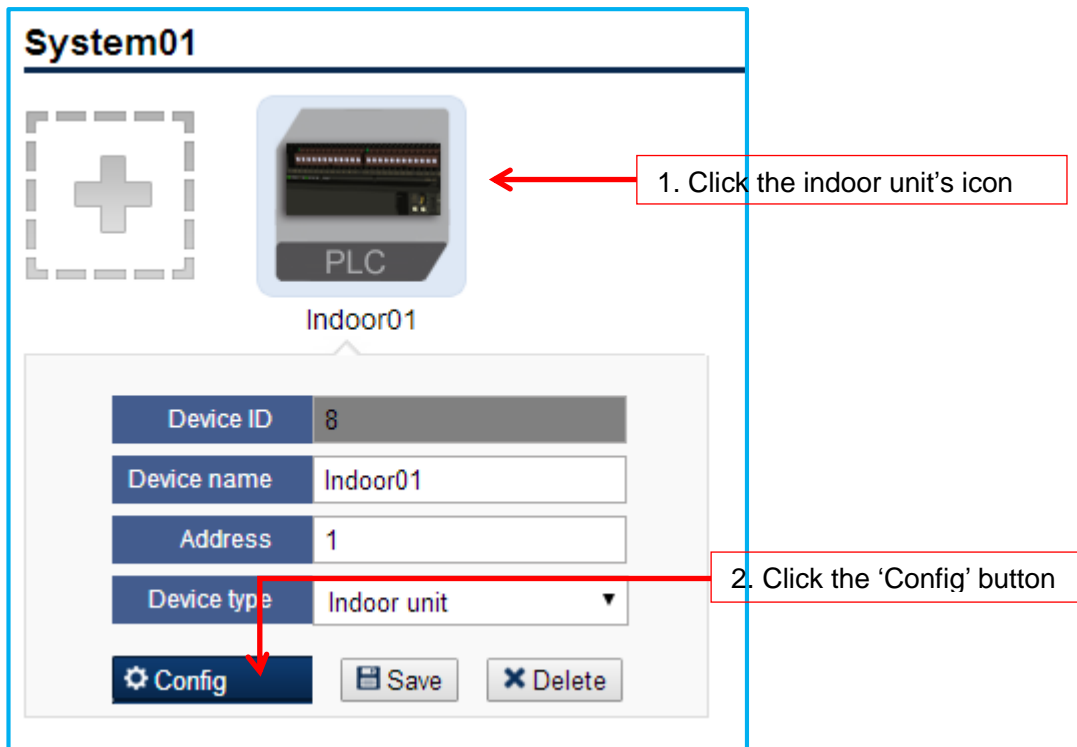
2. Click the 'Config' button, the BACNET information will be shown as follows,

3. Click 'Deploy' button, then shown the dialogue as follows. Click 'Update.

4. After Update, click the 'Test ' Button to make sure all the indoor units' BACNET information is right

名称	别名	设备ID	数据项ID	值	状态
Indoor0h1	Indoor_01_01_FanSet	0	undefined	1	good
Indoor0h4	Indoor_01_01_ModeSet	0	undefined	1	good
Indoor0h7	Indoor_01_01_OnOff	0	undefined	0	good
Indoor1	Indoor_01_01_TemprSe	0	undefined	16	good
Indoor6h1	Indoor_01_01_OnOffLo	0	undefined	0	good
Indoor6h2	Indoor_01_01_ModeLo	0	undefined	0	good
Indoor6h3	Indoor_01_01_TemprLc	0	undefined	0	good
Indoor10	Indoor_01_01_Tai	0	undefined	21.4	good
Indoor8h	Indoor_01_01_Error	0	undefined	0	good

Note, if the indoor unit's state is Bad, it will be shown as follow.

Test

This section displays the acquisition data of the device, which is used to verify that the configured data item is correct.

Name	Alias	Device ID	Data item ID	Value	State
Indoor0h1	Indoor_01_01_FanSet	0	undefined	-1	bad
Indoor0h4	Indoor_01_01_ModeSet	0	undefined	-1	bad
Indoor0h7	Indoor_01_01_OnOff	0	undefined	0	bad
Indoor1	Indoor_01_01_TemprSe	0	undefined	-1	bad
Indoor6h1	Indoor_01_01_OnOffLo	0	undefined	0	bad
Indoor6h2	Indoor_01_01_ModeLo	0	undefined	0	bad
Indoor6h3	Indoor_01_01_TemprLc	0	undefined	0	bad
Indoor10	Indoor_01_01_Tai	0	undefined	-1	bad
Indoor8h	Indoor_01_01_Error	0	undefined	-1	bad

For the bad state, we can solve it by follow steps:

● Check if the indoor unit set in the BACNET Gateway is exist. In other words, the indoor unit's address must match with the exist one, Or the indoor unit setting in the BACNET Gateway doesn't make sense.

● Communication error between the Indoor unit and Outdoor unit side at RS-485 port.

8.4.6 Download the BACNET Gateway Configure

1. Click 'Advanced'–'BACnetConfig', select 'IP', click 'Deploy'.
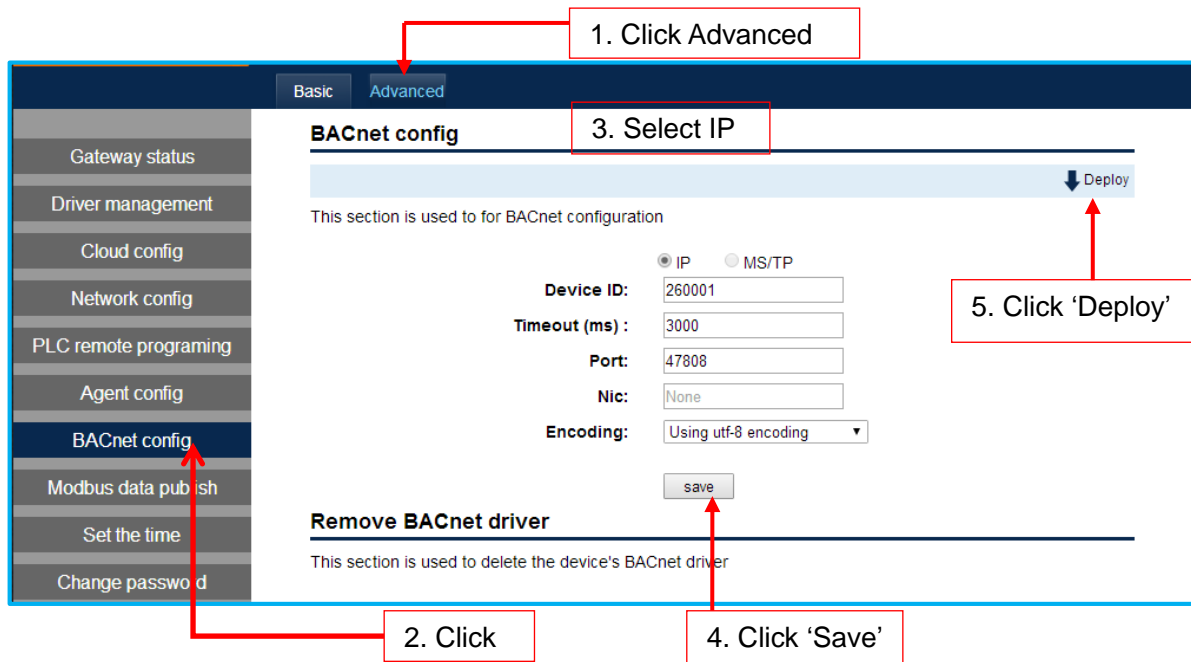
2. After Finished, all configuration success.

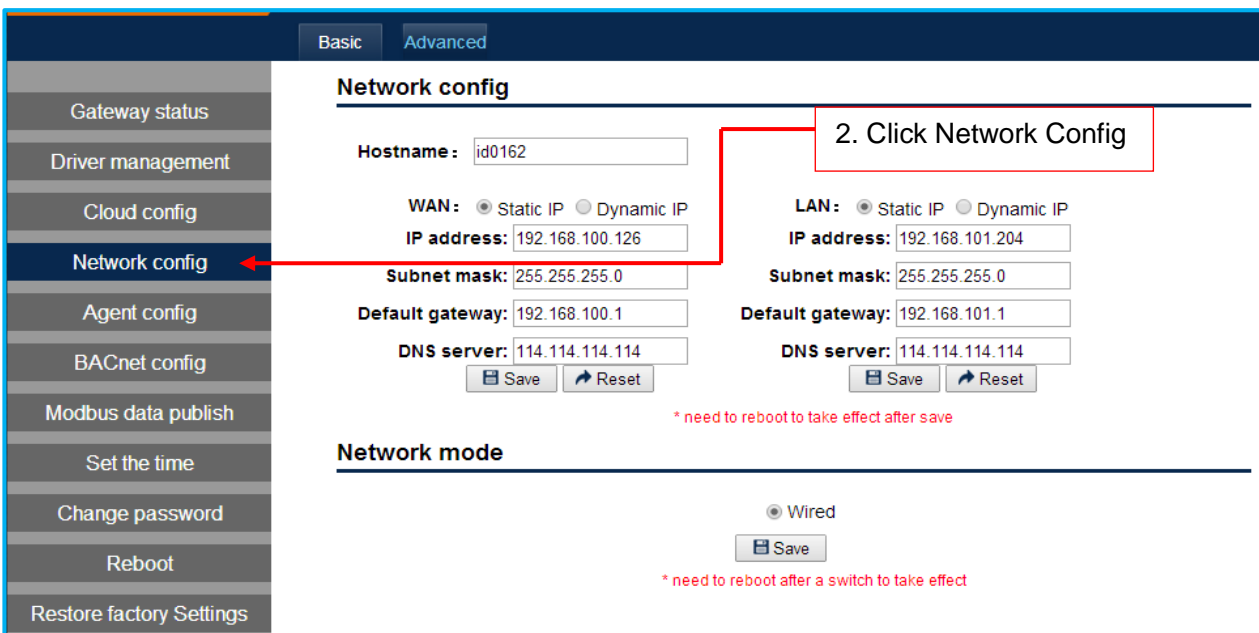### 8.4.7 Set BACnet Gateway WAN IP Address

The last work is set BACnet WAN IP address, so it can be accessed by other BACnet devices.

Suppose the Network Segment is 192.168.1.x, and the BACnet gateway WAN IP Address is Set as 192.168.1.4, the default gateway is 192.168.1.1. It will be set as follows:

a. Click 'Advanced'
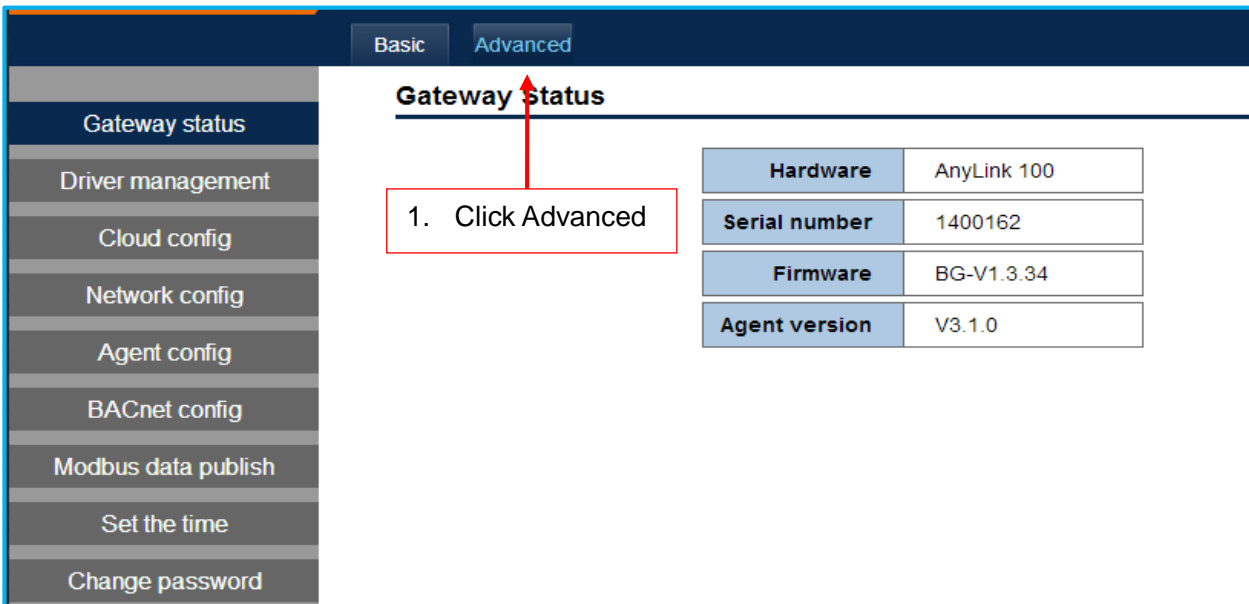
b. Click 'Network Config'

c. Set WAN IP;

'**IP address'**   set as 192.168.1.4;

'**Subnet mask**'   set as   255.255.255.0;

'**Default Gateway'** set as 192.168.1.1;

'**DNS Server'**   should be the same as the DNS server IP in the project;

After finished Setting IP Address above, click 'Save' button.

d.   Restart the BACnet gateway, enable the new IP address

Note:

Now the final IP address is 192.168.1.4. If you want to access the gateway web page, we should use 192.168.1.4 replace of 192.168.100.126.

10. Selection software

10.1 Parts of the GRV selection

No	Steps	Instruction
1	Selecting indoor units	Selecting indoor unit for project according the capacity, air flow volume and room information.
2	Selecting outdoor units	Automatic selection suitable outdoor unit for project according to the capacity of indoor units,the capacity ratio between indoor and outdoor unit, and the temperature of indoor and outdoor unit.
3	Drawing piping diagram	Every outdoor system can draw corresponding piping diagram. The system will auto select branch pipe,gas pipe and liquid pipe according to selected indoor and outdoor unit. The pipe length can be input according to the project diagram if the project need. Ability compensation also can be displayed for the software.
4	Drawing wiring diagram	Every outdoor system can draw wiring diagram. The wiring length can be input according to the project diagram if the project need. Wring includes: power cable, signal cable and so on. Remote controller and wired controller can be chosen according to the customer's demands.
5	Selecting BMS or Centralized Controller	The software can be used to select either BMS or centralized controller and draw connecting wiring diagram.
6	Output the report	The report can be output in 3 kinds of forms, PDF, word and CAD.

10.2. The Result As Below