Technology leads Intelligent life

# Service Manual

## ARV Outdoor Unit

## ARV 6 All DC Inverter T1

ARV-H250/SR1MV

ARV-H280/SR1MV

ARV-H330/SR1MV

ARV-H400/SR1MV

ARV-H450/SR1MV

ARV-H500/SR1MV

ARV-H560/SR1MV

ARV-H610/SR1MV

**2018.8**

# CONTENT

**Part1 Refrigerant Circuit ..... 4**

1. Cooling Operation..... 5
2. Heating Operation ..... 7
3. Component introduce ..... 10

**Part2 Installation.....11**

1. Preface of installation ..... 12
2. Installation of Outdoor Unit ..... 13
3. Pipes Laying..... 19
4. Welding ..... 28
5. Gas Tightness Test..... 30
6. Vacuum Drying ..... 36
7. Insulation ..... 39
8. Additional refrigerant..... 42
9. Electrical Wiring..... 44

**Part3 Commissioning ..... 46**

1. Preparatory work ..... 47
2. Master unit setting ..... 50
3. Commissioning..... 50
4. Parameter Setting (Main PCB) ..... 58
5. Commissioning Based on Monitoring Software ..... 65
6. IDU Parameter setting by Controller..... 99

35 ..... 99

**Part4 Special Control ..... 107**

1. Special Control ..... 108

**Part5 Trouble shooting.....117**

1. IDU Error code table (No.16).....118
2. ODU Error code table (No.65) ..... 120
3. Indoor unit error code display ..... 127

4. Outdoor unit error code display ..... 129
5. Outdoor unit trouble shooting ..... 133
6. Appendix..... 141

**Part6 Control System ..... 146**

1. Controller Introduction ..... 147
2. Remote controller ..... 149
3. Wired Controller ..... 154
4. Centralized Controller..... 158
5. Centralized Controller Software..... 177
6. BMS-MODBUS Protocol..... 189
7. BMS - BACNET Protocol..... 194
8. Wireless Network Centralized Control System ..... 206

# Part1 Refrigerant Circuit

**1. Cooling Operation** ..... Chyba! Záložka není definována.

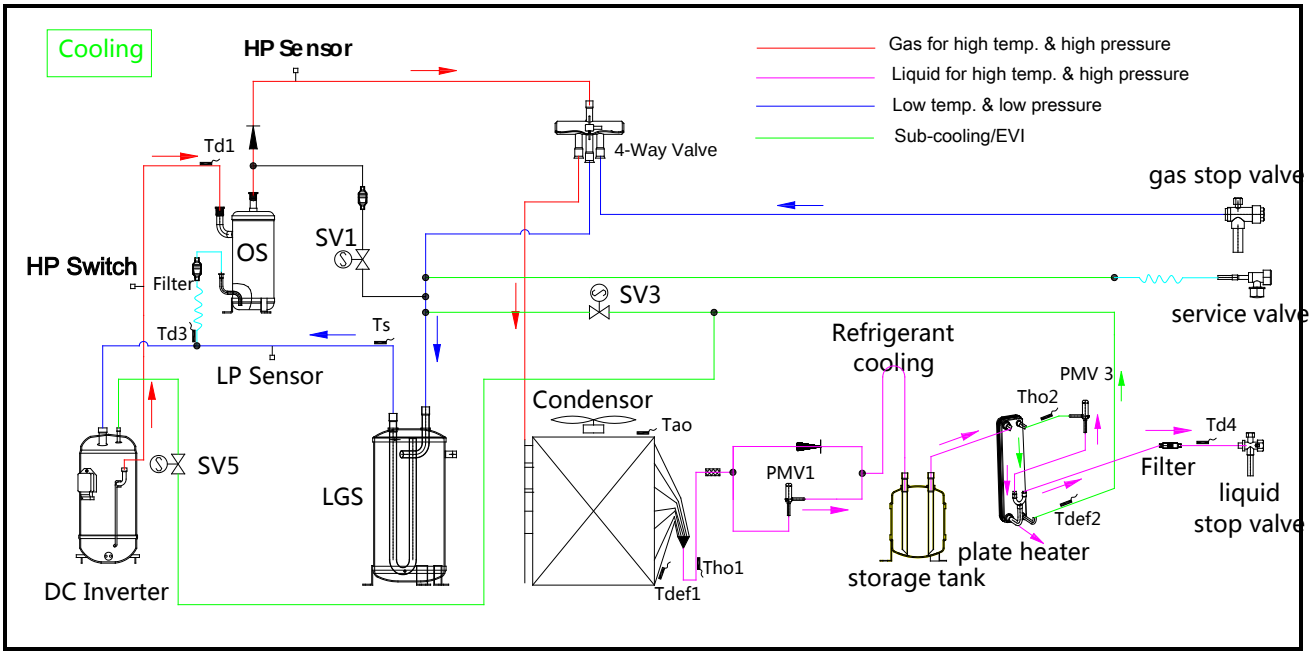
**2. Heating Operation** ..... Chyba! Záložka není definována.

**3. Component introduce** ..... Chyba! Záložka není definována.

# 1. Cooling Operation

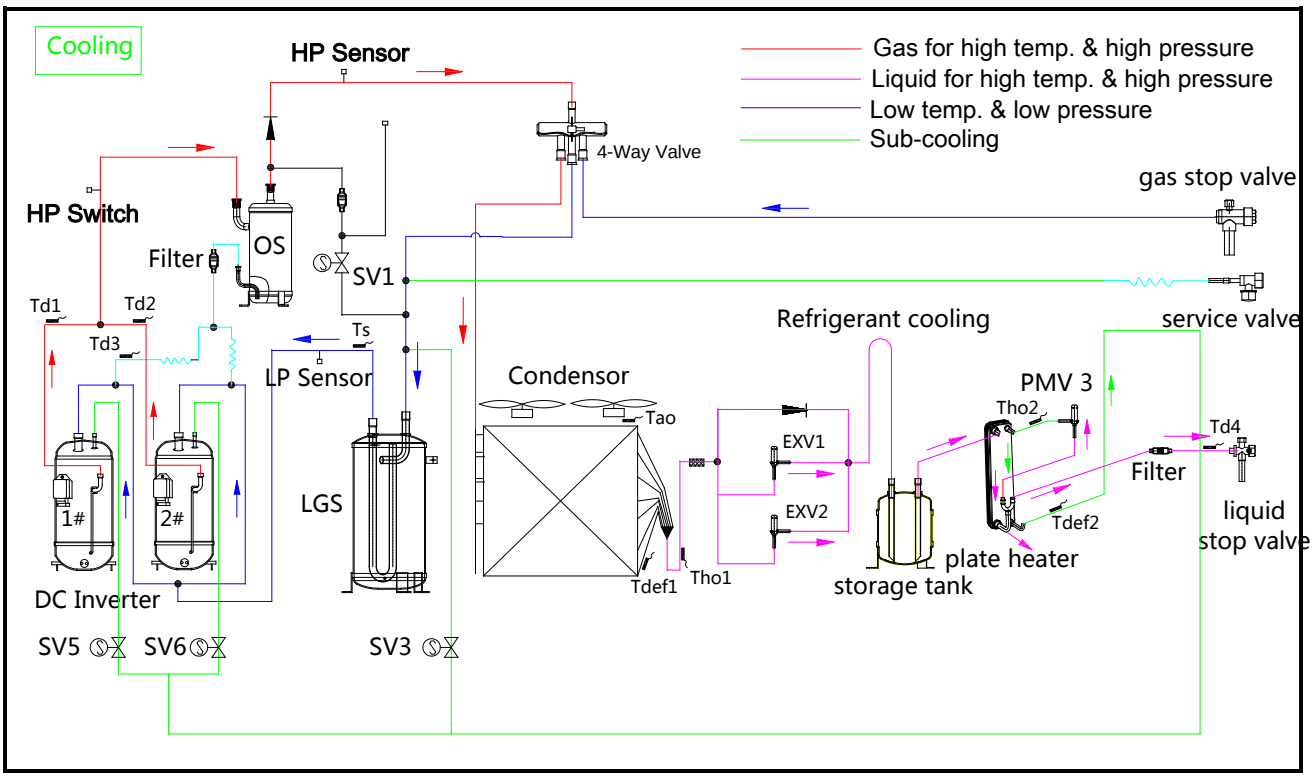
ARV-H250/SR1MV, ARV-H280/SR1MV, ARV-H330/SR1MV

ARV-H400/SR1MV, ARV-H450/SR1MV




| NO. | Component (Sensors) | Full name |
|---|---|---|
| 1 | $T_{ho2}$ | Outlet temperature of PMV3 |
| 2 | $T_{def2}$ | Outlet temperature of sub-cooler |
| 3 | $T_{ao}$ | Environment temperature |
| 4 | $T_s$ | Gas-liquid separator outlet/Suction temperature |
| 5 | $T_{ho1}$ | Condenser outlet temperature |
| 6 | $T_{def1}$ | Defrost temperature |
| 7 | $T_{d1}$ | Discharge of compressor 1# |
| 8 | $T_{d3}$ | Oil temperature |
| 9 | $T_{d4}$ | Liquid piping temperature of ODU |

ARV-H500/SR1MV, ARV-H560/SR1MV, ARV-H610/SR1MV

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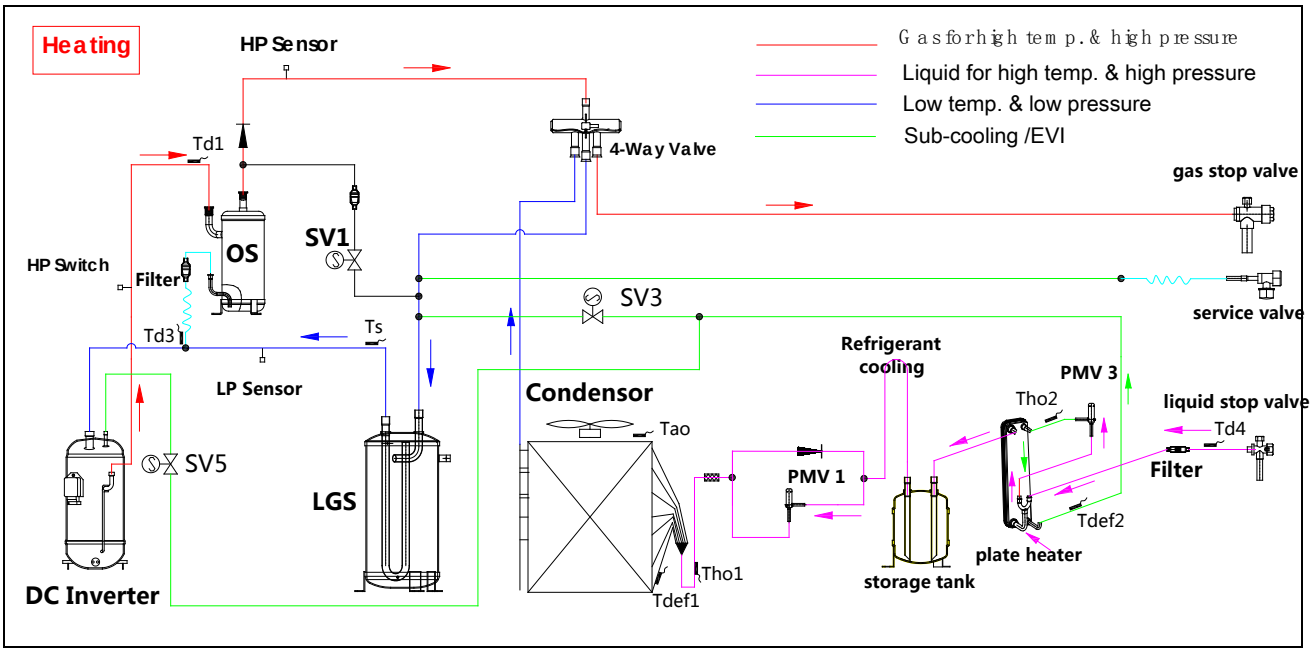
| 6 | $T_{def1}$ | Defrost temperature |
| 7 | $T_{d1}$ | Discharge of compressor 1# |
| 8 | $T_{d3}$ | Oil temperature |
| 9 | $T_{d4}$ | Liquid piping temperature of ODU |
| 10 | $T_{d2}$ | Discharge of compressor 2# |

# 2. Heating Operation

ARV-H250/SR1MV, ARV-H280/SR1MV, ARV-H330/SR1MVARV-H400/SR1MV, ARV-H450/SR1MV

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|---|---|---|
| 1 | $T_{ho2}$ | Outlet temperature of PMV3 |
| 2 | $T_{def2}$ | Outlet temperature of sub-cooler |
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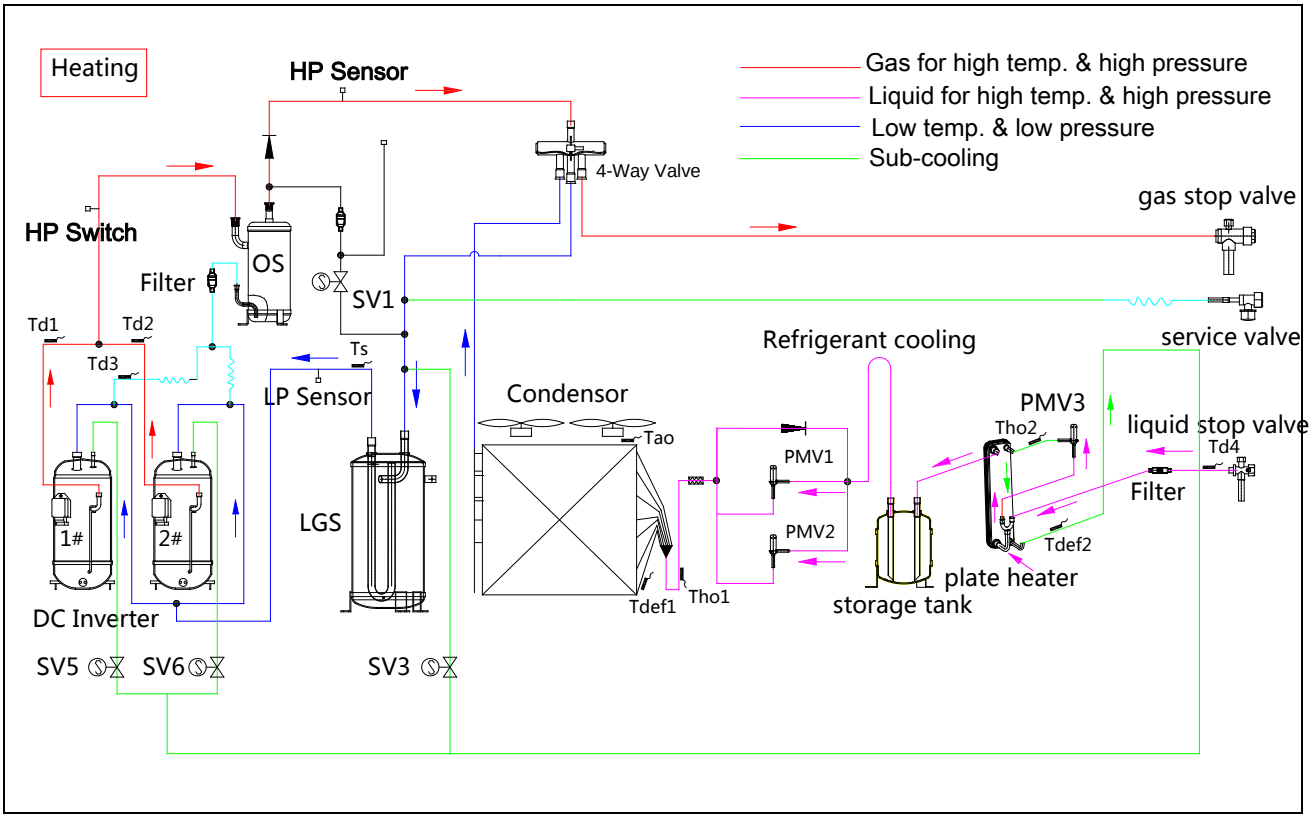
| 9 | $T_{d4}$ | Liquid piping temperature of ODU |

ARV-H500/SR1MV, ARV-H560/SR1MV, ARV-H610/SR1MV




| NO. | Component (Sensors) | Full name |
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| 9 | $T_{d4}$ | Liquid piping temperature of ODU |
| 10 | $T_{d2}$ | Discharge of compressor 2# |

# 3. Component introduce

| Component name | Main function |
|---|---|
| **DC Inverter** | **DC inverter Compressor :**<br>Compressor work frequency range is 20~120 Hz. |
| **HP Switch** | **High Pressure Switch:**<br>When refrigerant high pressure value over the target pressure value , switch valve is disconnected, signal is interrupted ,then stop running to protect the refrigerant system |
| **OS** | **Oil Separator:**<br>To separate refrigeration oil and high pressure refrigerant |
| **Filter** | Filter impurities to avoid blockage of electronic expansion valve |
| **SV1** | **Unload Valve** |
| **SV5/ SV6** | **Enhance vapor injection Valve** |
| **HP sensor** | **High Pressure Sensor:**<br>Detecting refrigerant system high pressure value |
| **4-way valve** | Change the refrigerant flow direction to achieve cooling or heating mode |
| **Plate Heater** | **Sub-cooler:**<br>5.5℃ sub-cooling by plate heat exchanger make sure liquid refrigerant flow into evaporator Instead of gas-liquid refrigerant flow into evaporator , reduce Airflow noise and temperature fluctuation and support long piping length |
| **SV3** | **Sub-cooling Valve** |
| **Refrigerant Cooling** | Well cooled by refrigerant, ensuring the long life time of the PCB |
| **PMV** | **EXV:** throttling and reducing refrigerant pressure |
| **LGS** | **Liquid-gas separator:**<br>To separate gas refrigerant and liquid refrigerant |
| **LP Sensor** | **Low Pressure Sensor:**<br>Detecting refrigerant system low pressure value |

# Part2 Installation

**1. Preface of installation** ..... Chyba! Záložka není definována.

**2. Installation of Outdoor Unit** ..... Chyba! Záložka není definována.

**3. Pipes Laying** ..... Chyba! Záložka není definována.

**4. Welding** ..... Chyba! Záložka není definována.

**5. Gas Tightness Test**..... Chyba! Záložka není definována.

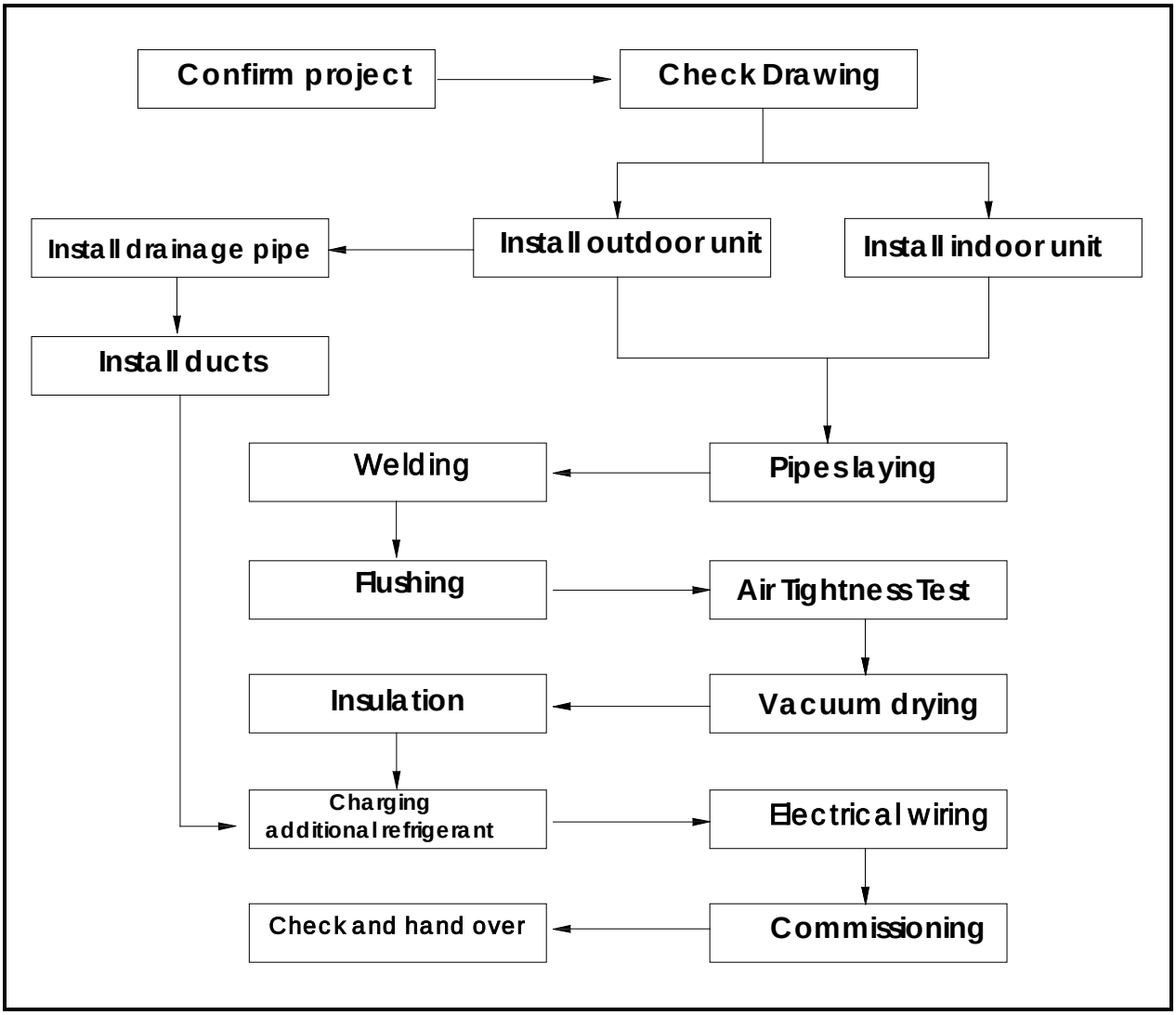
**6. Vacuum Drying** ..... Chyba! Záložka není definována.

**7. Insulation** ..... Chyba! Záložka není definována.

**8. Additional refrigerant** ..... Chyba! Záložka není definována.

**9. Electrical Wiring** ..... Chyba! Záložka není definována.

# 1. Preface of installation




**⚠Caution**

- ✧ The proper design and installation is a critical element of ARV system, installation of piping and electrical works must be carried out by ***suitably qualified, certified professionals*** and in accordance with all applicable legislation.
- ✧ In this service manual, 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

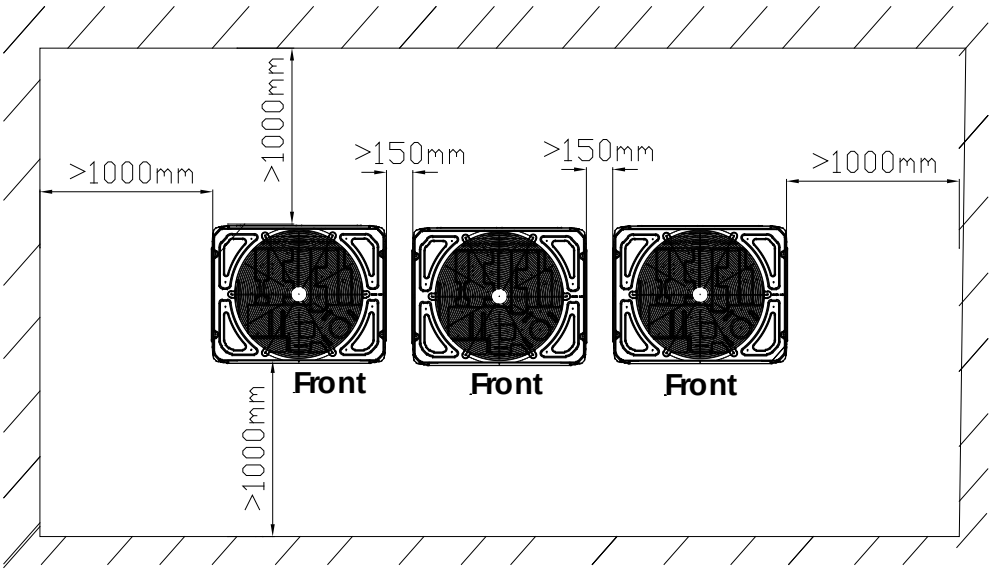
1. Ensure that the outdoor unit is ***installed in a dry, well-ventilated place.***
2. Ensure that the ***noise and exhaust ventilation*** of the outdoor unit ***do not affect the neighbors*** of the property owner or any surrounding ventilation.
3. Ensure that the outdoor unit is ***installed in a cool place*** without direct sunlight exposure or direct radiation of a high-temp heat source.
4. The ***outdoor unit*** should ***be installed*** as ***close*** as possible ***to the indoor unit.***
5. The installation location must be ***far from waste and oil mist***.
6. The ***foundation should be strong enough*** to support the outdoor unit.

## 2.2 Pre tools

| Tape measure | Spanner | Electric hammer |
|---|---|---|
| | | |
| **Screw driver** | **Nut gasket** | **Level meter** |
| | | |

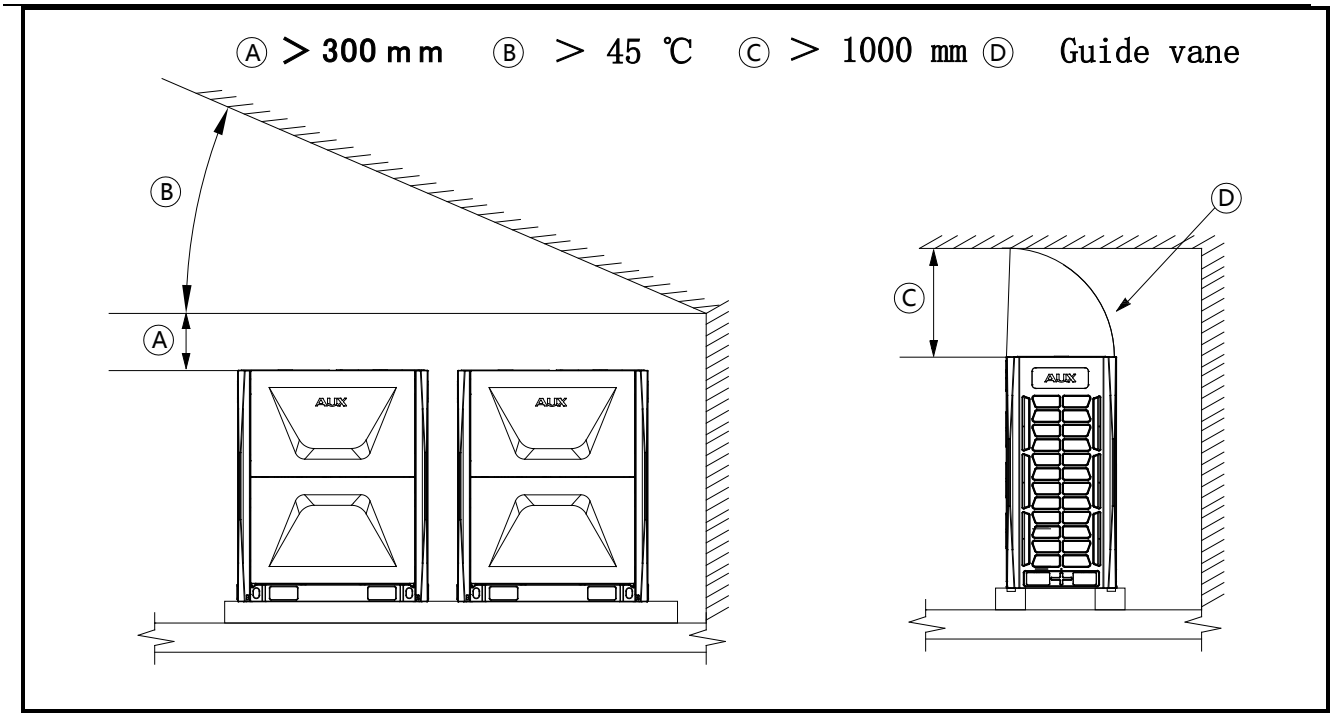
## 2.3 Maintenance and Ventilation Space

2.3.1 Ensure necessary installation and maintenance space.



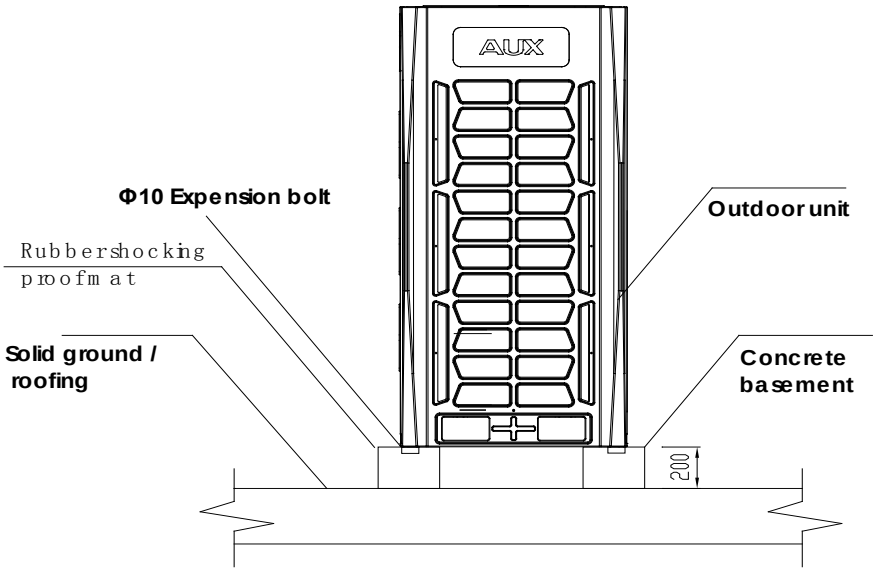

2.3.2 If there are ***two rows of outdoor units***, we ***suggest face to face installation*** for easy maintenance, and avoid air short circuit.

2.3.3 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 added to improve the ventilation.



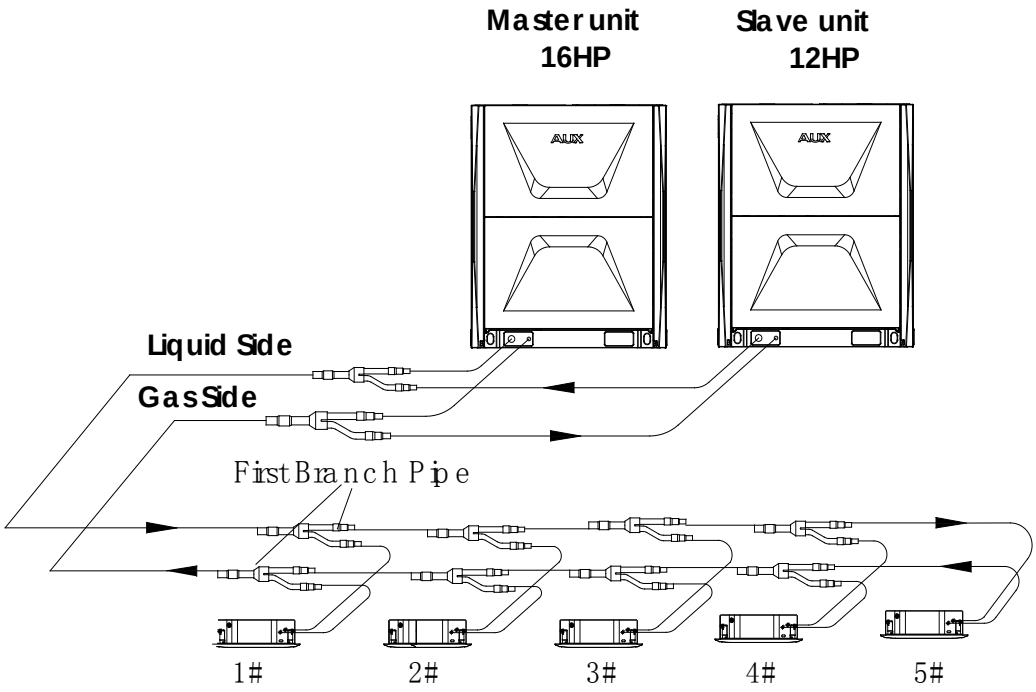

## 2.4 Installation of Outdoor Unit

2.4.1 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.

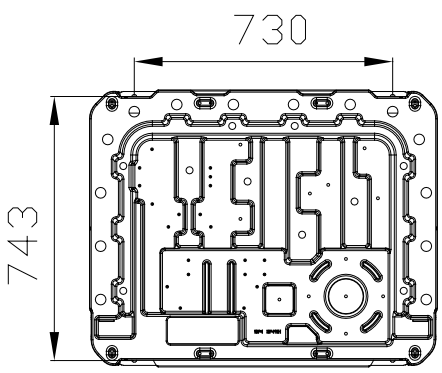



2.4.2 If the system has more than two outdoor units. The ***largest capacity*** unit should ***be set as the master unit***, while the ***others should be set as slave*** units, as shown in the

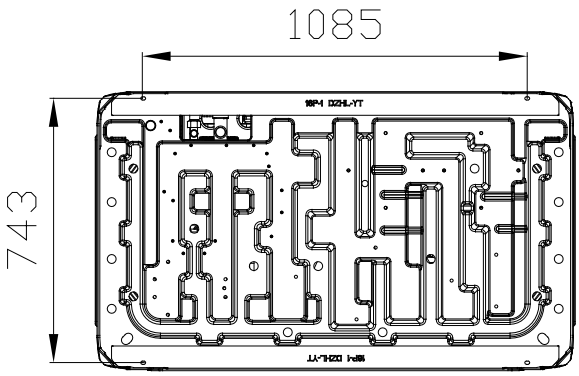
following example.




2.4.3 The installation space for a fixed bolt, please refer to the following drawing.




8HP,10HP,12HP




14HP,16HP,18HP,20HP,22HP

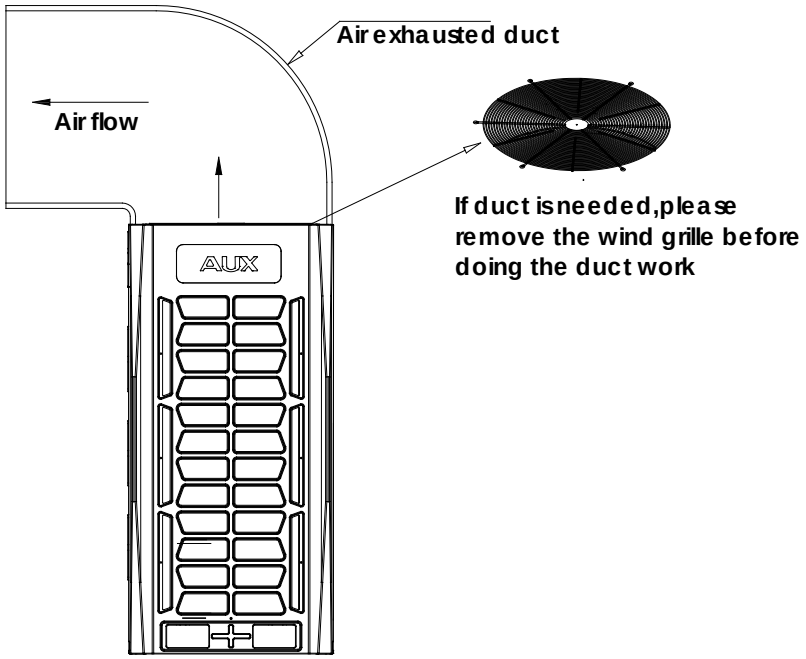
2.4.4 The foundation can be made of ***channel steel or concrete***. ***Reserve*** the space for ***discharging*** the condensate ***water*** from outdoor units.

2.4.5 Install drainage channels to ensure condensed ***water flow out*** smoothly.

2.4.6 ***Don't*** use ***four-square base*** to support outdoor unit.

2.4.7 ***Rubber anti-vibration pads*** are necessary to avoid ***vibration***.

2.4.8 If the outdoor unit need side air flow outlet by a ***duct***, it is necessary to ***remove*** out the wind ***grille***.


Air exhausted duct
Air flow
AUX
If duct is needed,please remove the wind grille before doing the duct work

# 3. Pipes Laying

## 3.1 Pre tools

| Tube expander | Spanner | Expander |
|---|---|---|
| | | |
| Screw driver | Electric hammer | **Pipe bender** |
| | | |
| Mounting bracket hanger | Hoop | Expansive bolt |
| | | |

## 3.2 Selection of copper pipe

3.2.1 Please use ***seamless red copper pipe***.

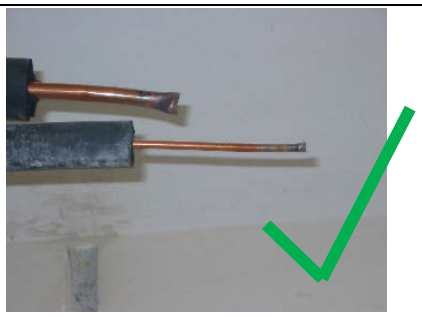
3.2.2 ***Specification*** of refrigerant pipe should be selected according to ***unit requirement***

- Too thick
  - abnormal air exhaust
  - difficult oil return（insufficient air velocity)
  - → blocked compressor
- Too long
  - abnormal air exhaust
  - difficult oil return
  - → blocked compressor

※ ***Thickness of copper tube***

| Specifications | | Thickness (mm) | Weight / length | |
|---|---|---|---|---|
| inch | mm | | 1m =* Kg | 1Kg=* m |
| 1/4 | Φ 6.35 | 0.8 | 0.124 | 8.06 |
| 3/8 | Φ 9.52 | 0.8 | 0.195 | 5.12 |
| 1/2 | Φ 12.7 | 0.9 | 0.297 | 3.36 |
| 5/8 | Φ 15.88 | 1.0 | 0.416 | 2.4 |
| 3/4 | Φ 19.05 | 1.0 | 0.505 | 1.98 |
| 7/8 | Φ 22.22 | 1.2 | 0.706 | 1.41 |
| 1 | Φ 25.4 | 1.2 | 0.813 | 1.23 |
| | Φ 28.6 | 1.2 | 0.92 | 1.08 |
| | Φ 31.8 | 1.2 | 1.11 | 0.9 |
| | Φ 34.9 | 1.3 | 1.223 | 0.817 |
| | Φ 38.1 | 1.4 | 1.438 | 0.695 |
| | Φ 41.3 | 1.5 | 1.671 | 0.598 |
| | Φ 44.5 | 1.5 | 1.823 | 0.554 |

3.2.3 If ***pipes*** will be ***stored*** for a ***long time***, the pipes should be ***charged*** into ***0.2~0.5MPa N2*** and the ***nozzle*** should be ***sealed*** by welding.

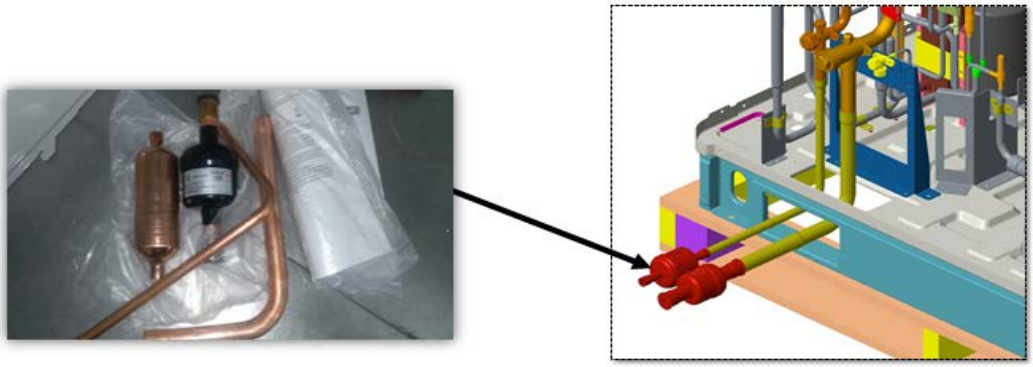


3.2.4 ***Don't let dust*** such as concrete fragment, sand and copper slag ingress ***into the system***;

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

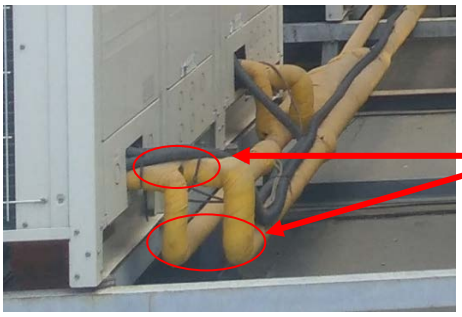
### 3.3 Accessory bag

*Accessory bag in outdoor unit*



### 3.4 Bending of copper tube

3.4.1 ***Do not*** right angle ***bending many times in a short distance***

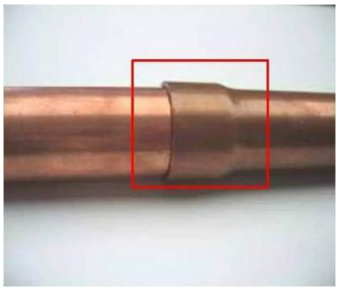
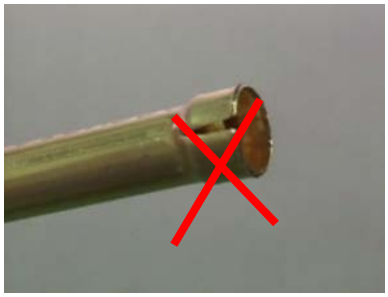


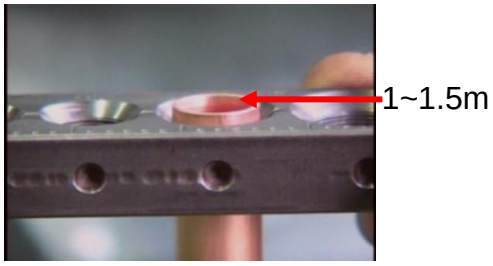
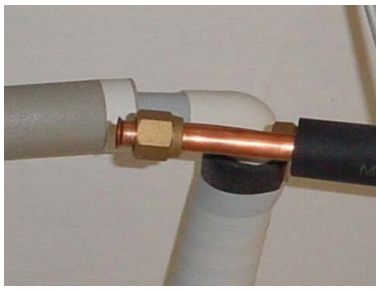

3.4.2 ***Pipe bender must be used*** for pipe bending. The curvature can't be too small, otherwise the pipe may be bent and shrunken, affecting refrigerant flow;

3.4.3 ***Don't repeat bending*** and unbending operation over three times on the same position of pipe (because pipe will be hardened in this way).

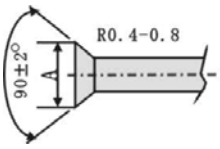
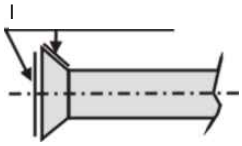
## 3.5 Flaring of copper tube

3.5.1 The ***burr*** of the copper tube ***should be removed*** before the copper tube is expanded

| 3.5.2 It is required to expand the inside diameter at connection area with ***Tube expander*** | | |
|---|---|---|
| |  |  |

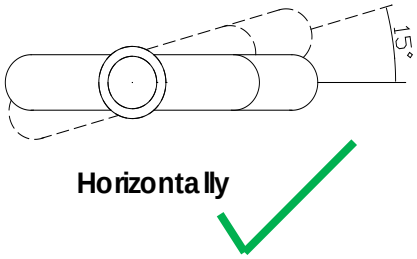
| 3.5.3 The copper pipe connected to the indoor units needs to be expanded by ***Expander*** | |
|---|---|
|   | |
| | |
|  | |

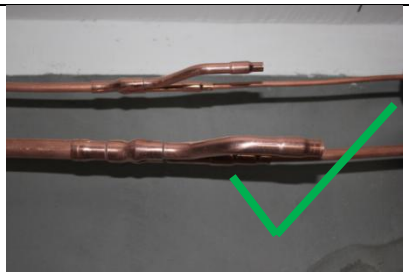
Flare pipe with ***Expander*** as per the dimensions of flaring opening in the following table.

| Diameter of pipe | Tightening torque | Machining dimension of | Shape of flaring | 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 | | |

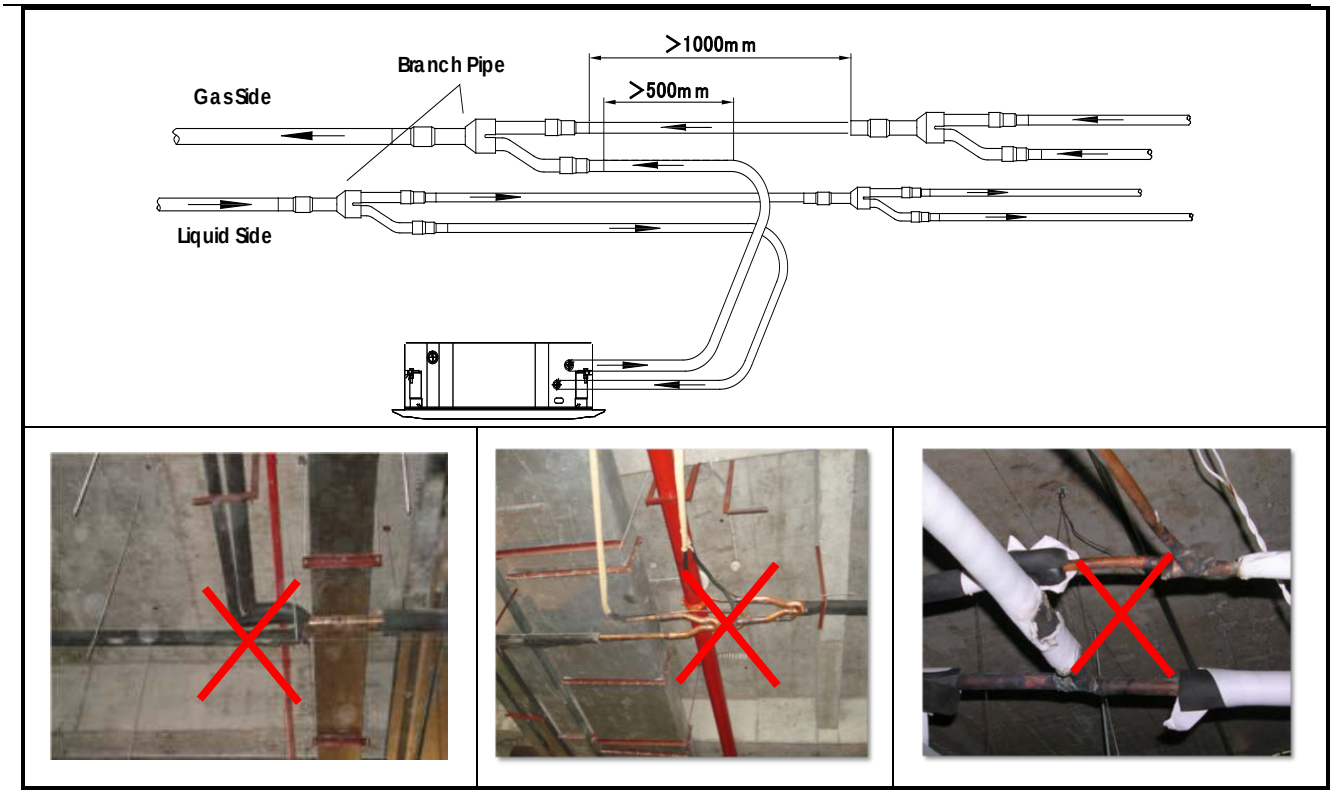
### 3.6 Separation Tube (branch joint)

3.6.1 The ***branch*** joint must be installed ***horizontally*** and the lean ***angel*** should be ≤ 15°to avoid refrigerant distribution unbalance.



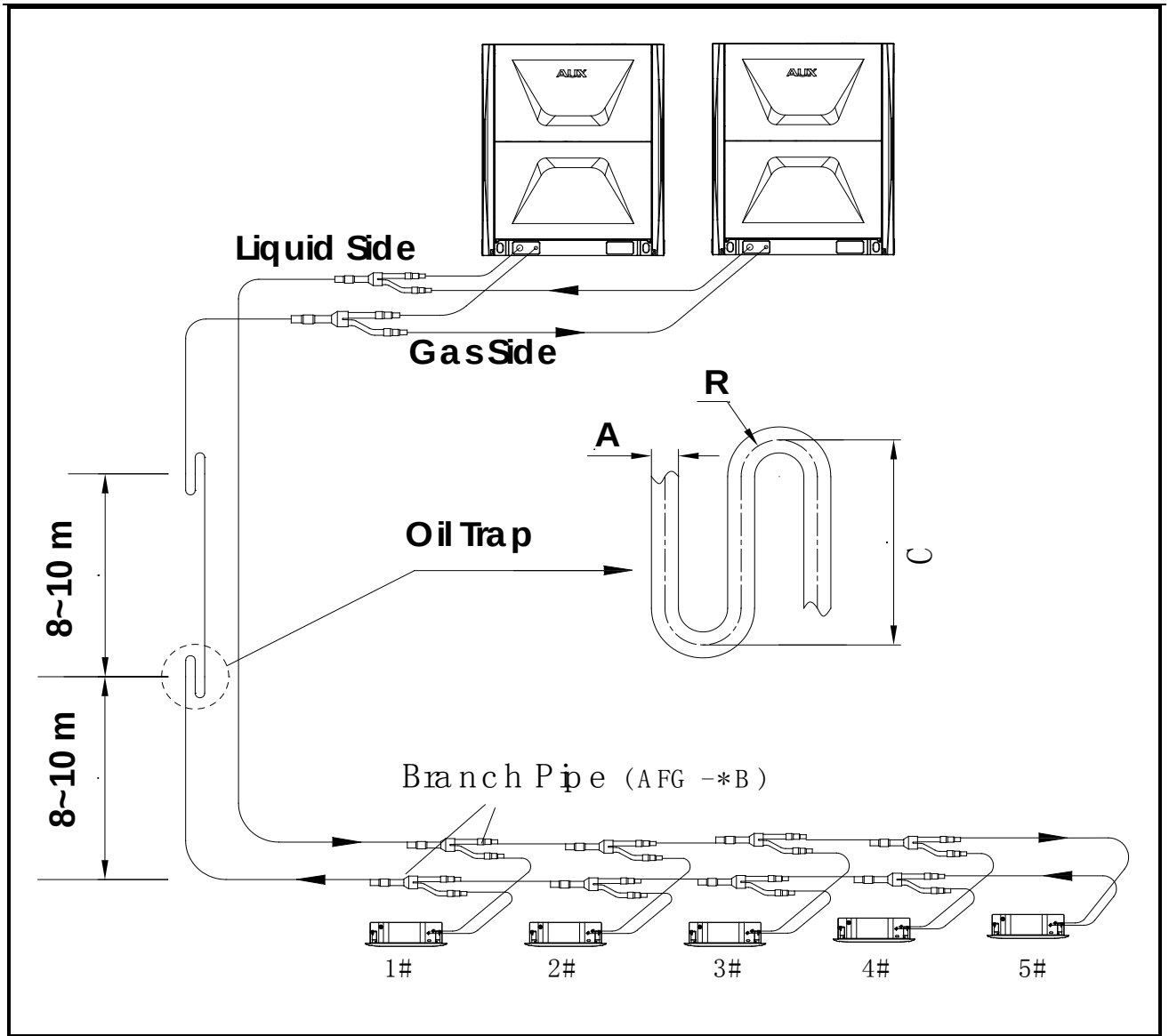



3.6.2 To ensure the refrigerant distribution is balance, pipe length which between two branch joints ≥1000mm, the straight pipe length after the branch pipe ≥500m




## 3.7 Oil Trap

When the Vertical ***height*** between indoor and outdoor units more than ***8 or 10 meters***, ensure the Refrigeration ***oil return to compressor*** smoothly, the ***oil trap is necessary***




| A | | R | C |
|---|---|---|---|
| mm | inch | mm | mm |
| Φ 19.05 | 3/4 | ≥ 31 | ≥ 105 |
| Φ 22.22 | 7/8 | ≥ 31 | ≥ 150 |
| Φ 25.4 | 1 | ≥ 45 | ≥ 150 |
| Φ 28.6 | 9/8 | ≥ 45 | ≥ 150 |
| Φ 34.9 | 11/8 | ≥ 60 | ≥ 250 |

## 3.8 Pipeline fixing

***Refrigerant pipe should be fixed***, when running, refrigerant pipe will sway, expand or shrink, if unfixed, load will concentrate on certain part, result fracture of refrigerant pipe. The pipe should be fixed ***every 1~2m***.

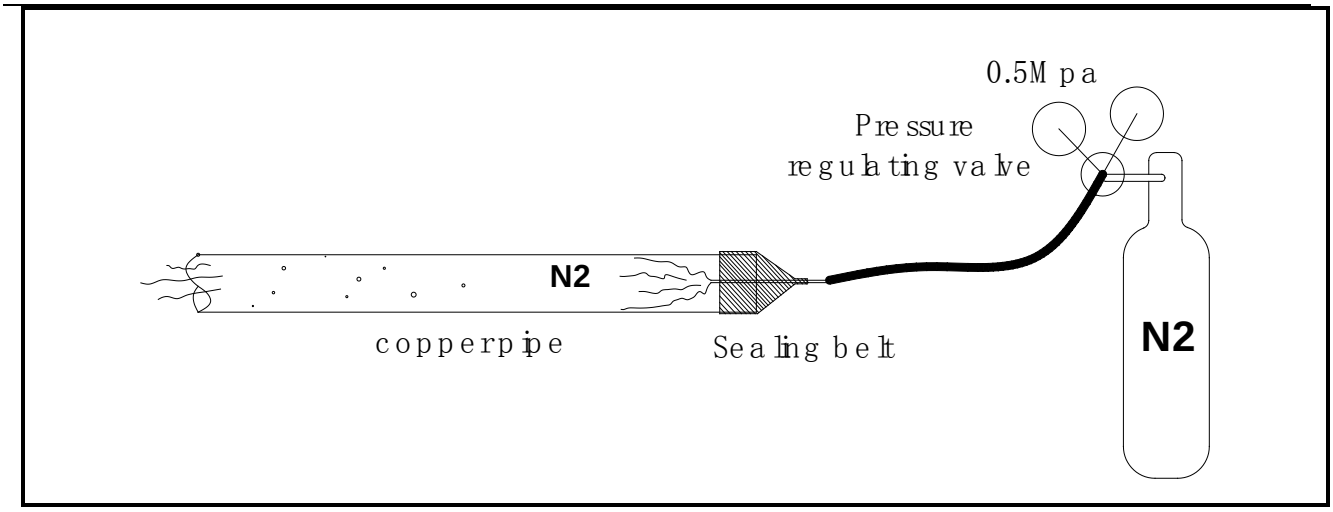
# 4. Welding

## 4.1 Pre tools

| Nitrogen cylinder | Nitrogen pressure regulating valve | Nitrogen pressure gauge |
|---|---|---|
| | | |
| **Welding device** | **Connection hose** | |
| | | |

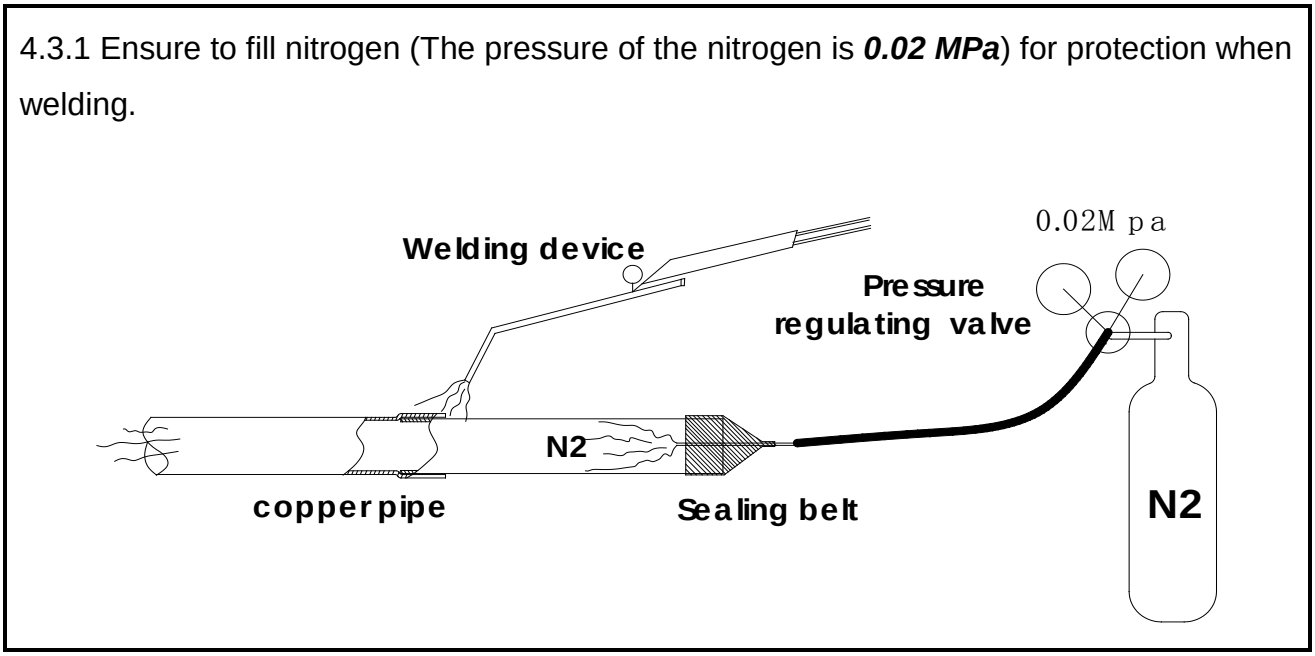
## 4.2 Flushing

***Before*** connection use nitrogen（The pressure of the nitrogen is ***0.5 MPa***） or air to ***remove dust*** and ***moisture*** inside pipe.

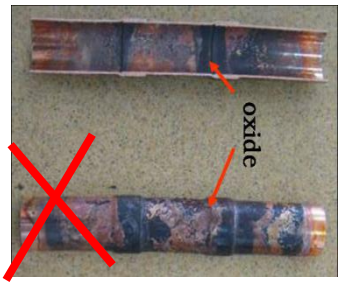



## 4.3 Fill nitrogen and welding

4.3.1 Ensure to fill nitrogen (The pressure of the nitrogen is ***0.02 MPa***) for protection when welding.




4.3.2 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.

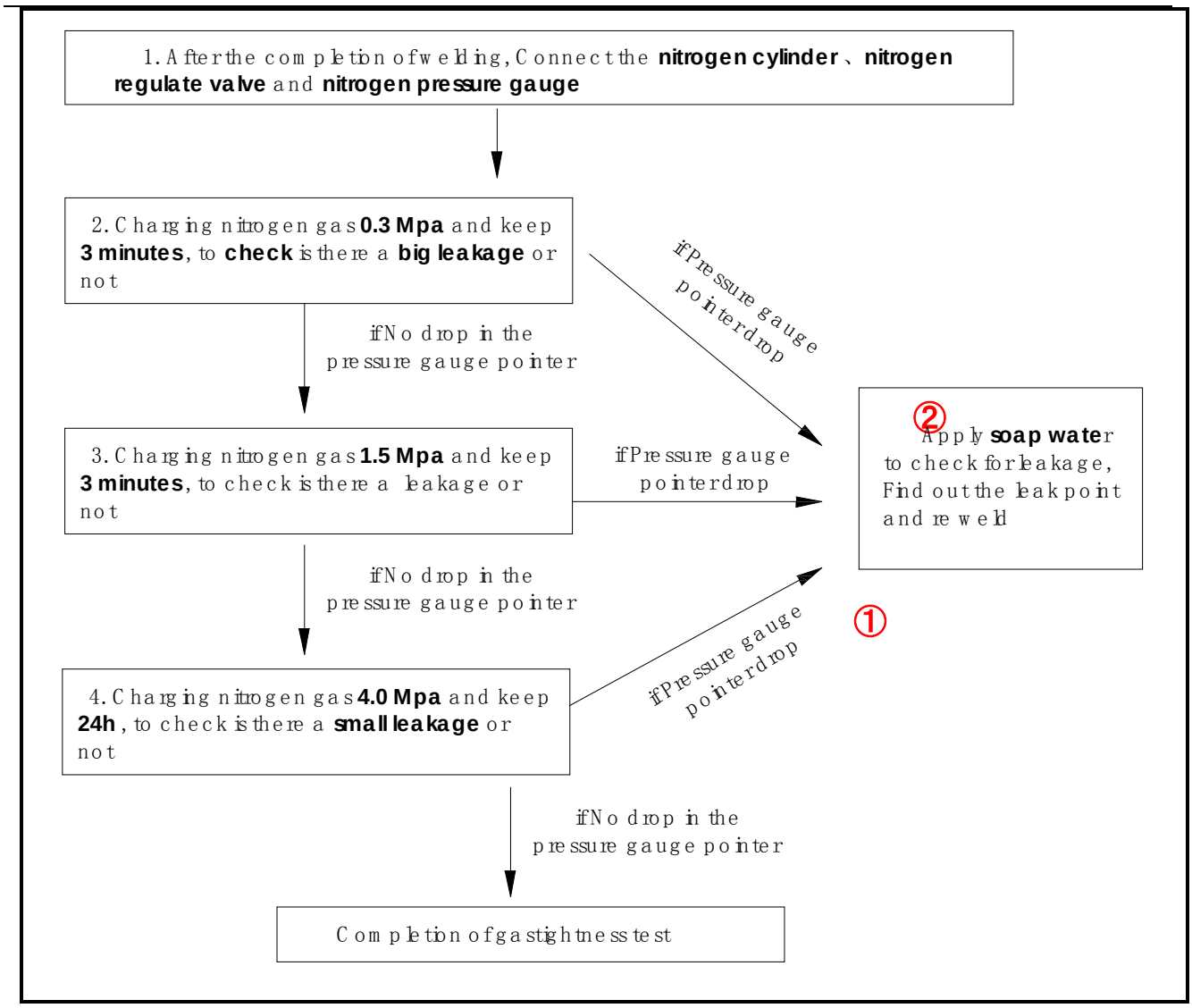
| *Charge N2 to the pipes* | *NO N2 to the pipes* |
|---|---|
| |   *Cause blockage of EXV*<br>*Cause Compressor wear*<br>*Poor cooling/ heating performance* |

4.3.3 If permitted, it's recommended to use ***less indoor units and shorter pipeline***

# 5. Gas Tightness Test

## 5.1 Purpose and Steps

To confirm whether there is leakage in pipe by using nitrogen, and the steps are as follows




## ① 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 ) x 0.01

**Example:**

Pressure is 4.0 MPa and temperature is 25℃ in case of pressurization.

After 24 hours, if the pressure is 3.95MPa and temperature is 20℃, it is deemed qualified.

## ② 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 4.0MPa)

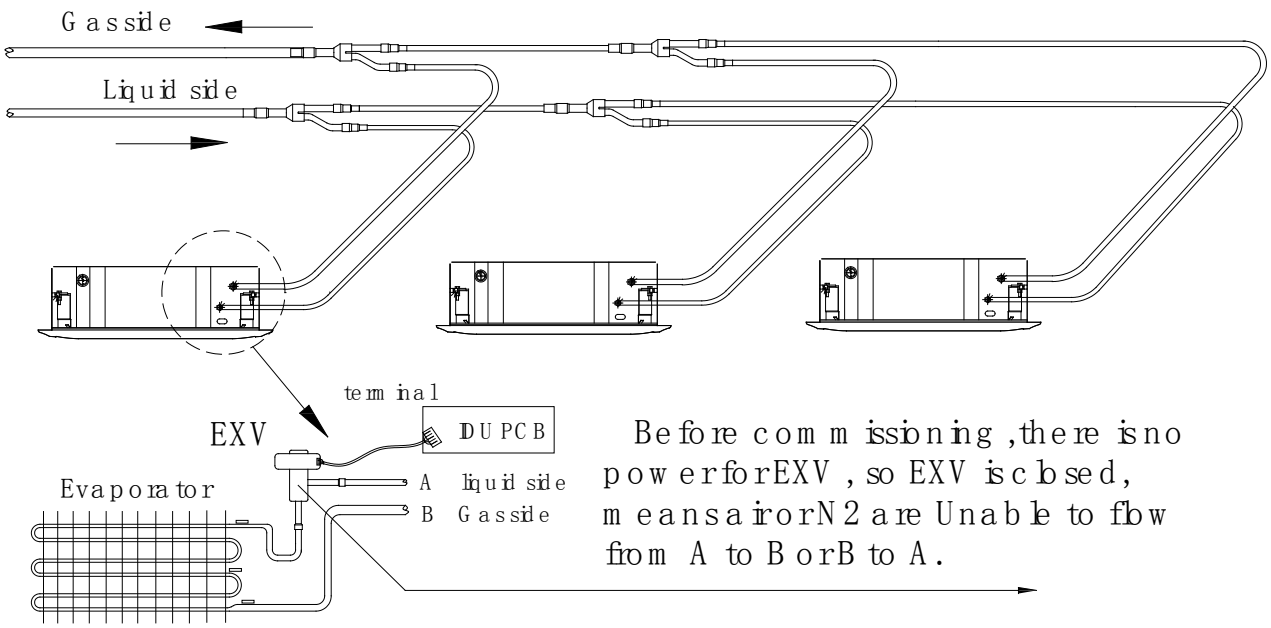
### 5.2 Pre Test tool

| nitrogen cylinder | Nitrogen pressure regulating valve | Nitrogen pressure gauge |
|---|---|---|
| | | |
| Soap water (Use of leakage) | Welding device (Use of leakage) | Connection hose |
| | | |

## 5.3 Caution

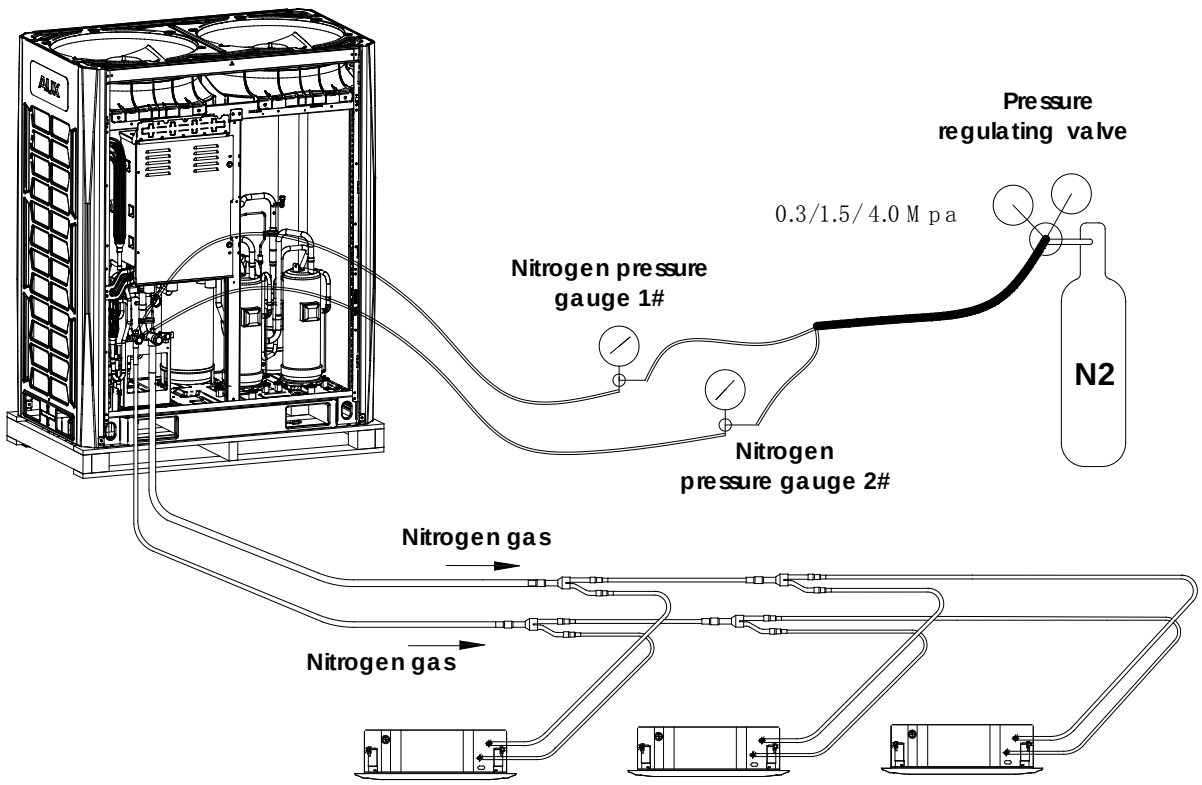
There is no power for indoor unit's EXV before commissioning, so the EXV is closed, the nitrogen gas unable to flow from A to B or B to A

So when charging the nitrogen gas, ***it should be charged from the both (liquid & gas) sides***

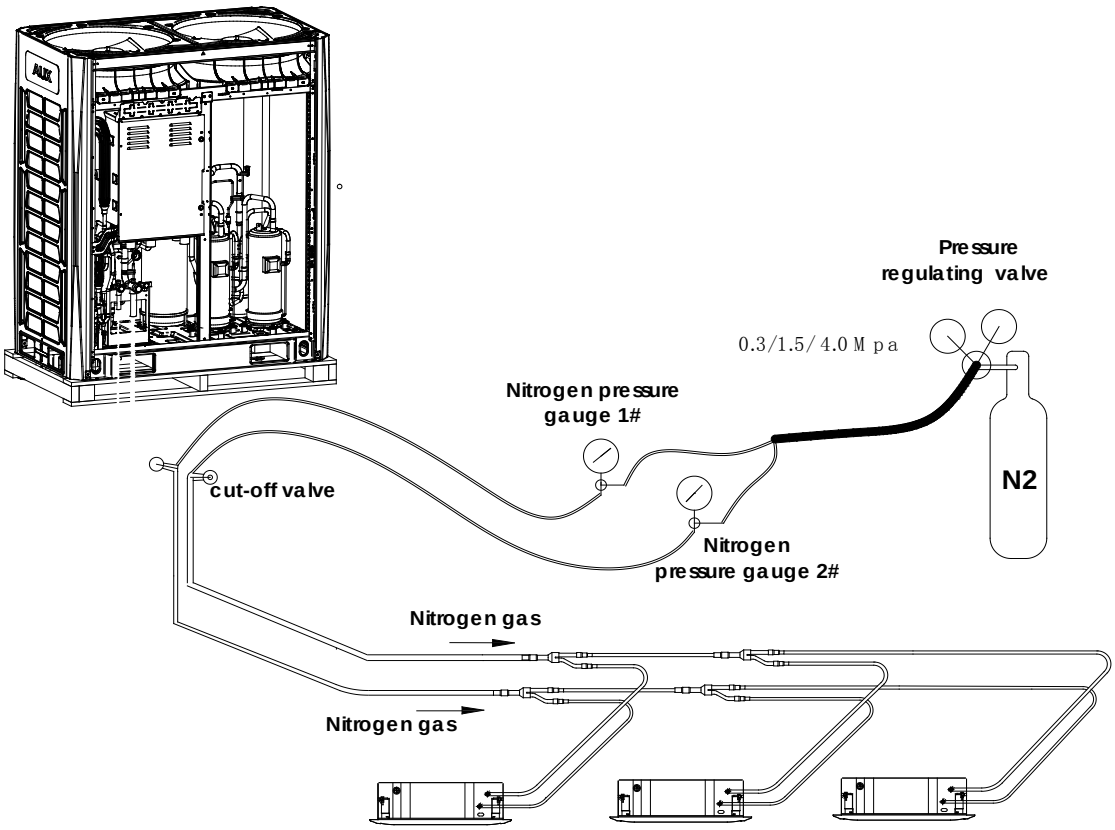


## 5.4 Schematic diagram

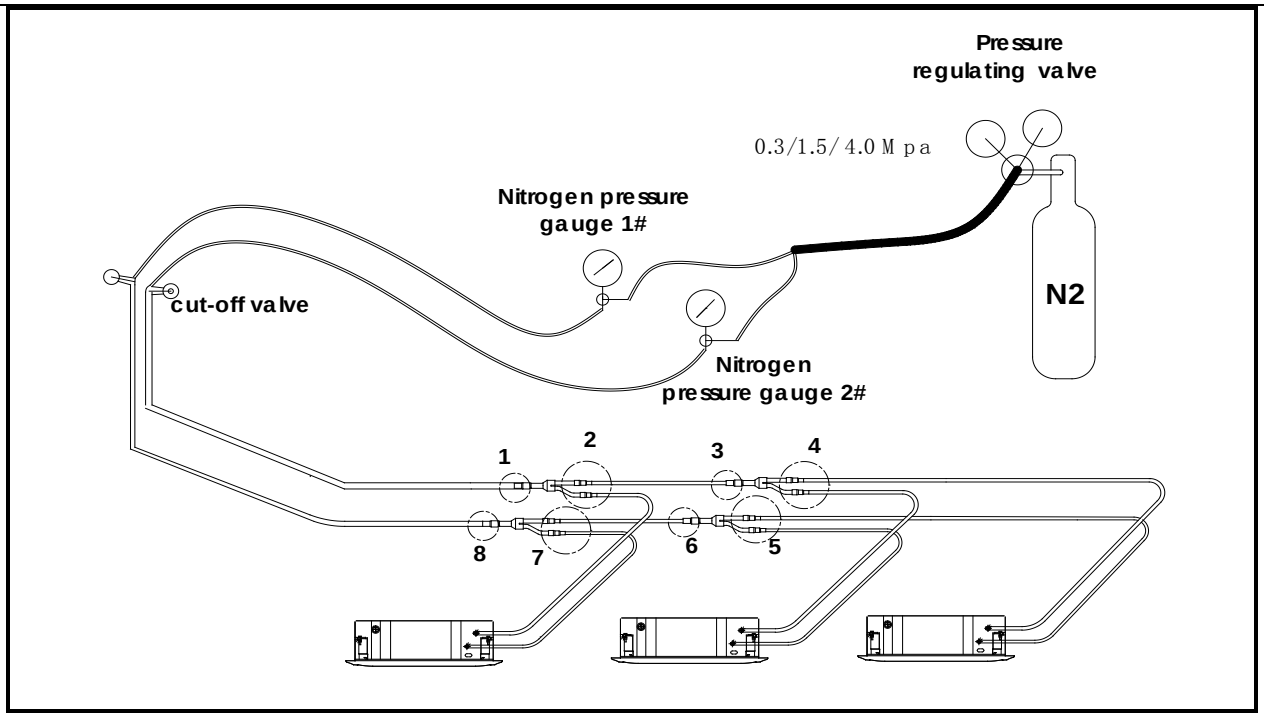
***Nitrogen filling mode 1***: Connect to gas and liquid cut-off valve



***Nitrogen filling mode 2***: Connect to main gas & liquid piping




If pressure gauge point drops, apply soap water (*Focus on inspection of welding points, such as 1~8 below* ) to check for leakage, Find out the leak point and re weld




# 6. Vacuum Drying

## 6.1 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.

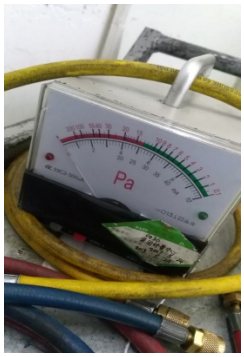
2. After the vacuuming process of R410A refrigerant circulation system is complete, vacuum pump will stop running. As a result of suction in the in the air conditioning system, vacuum pump lubricant will seep back into the system. This situation will also occur if vacuum pump suddenly stops during operation. It will cause different oils mix, leading to system malfunction, therefore it is recommended to use one-way valve to prevent 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.

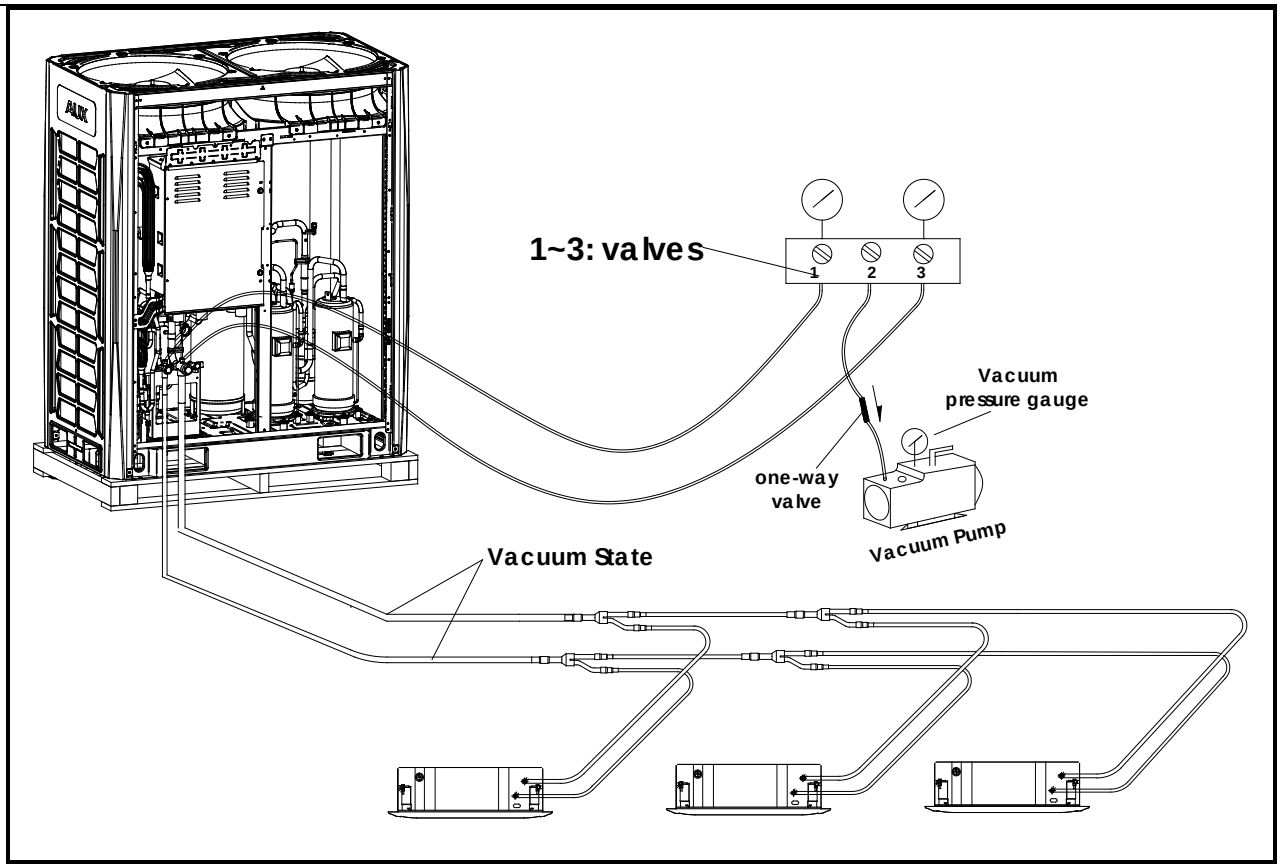
## 6.2 Pre tools

| Vacuum pump (4L/s) | vacuum pressure gauge | Connection hose |
|---|---|---|
| |  | |

## 6.3 Schematic diagram

Gas and liquid stop valve must be closed, 1~3 valves should be opened

Vacuum pump with ***one-way valve*** to ***prevent pump oil*** from flowing backward while the vacuum pump is stopped




## 6.5 Vacuum drying

Connect the pressure gauge to the infusing mouth of gas and liquid pipe

↓

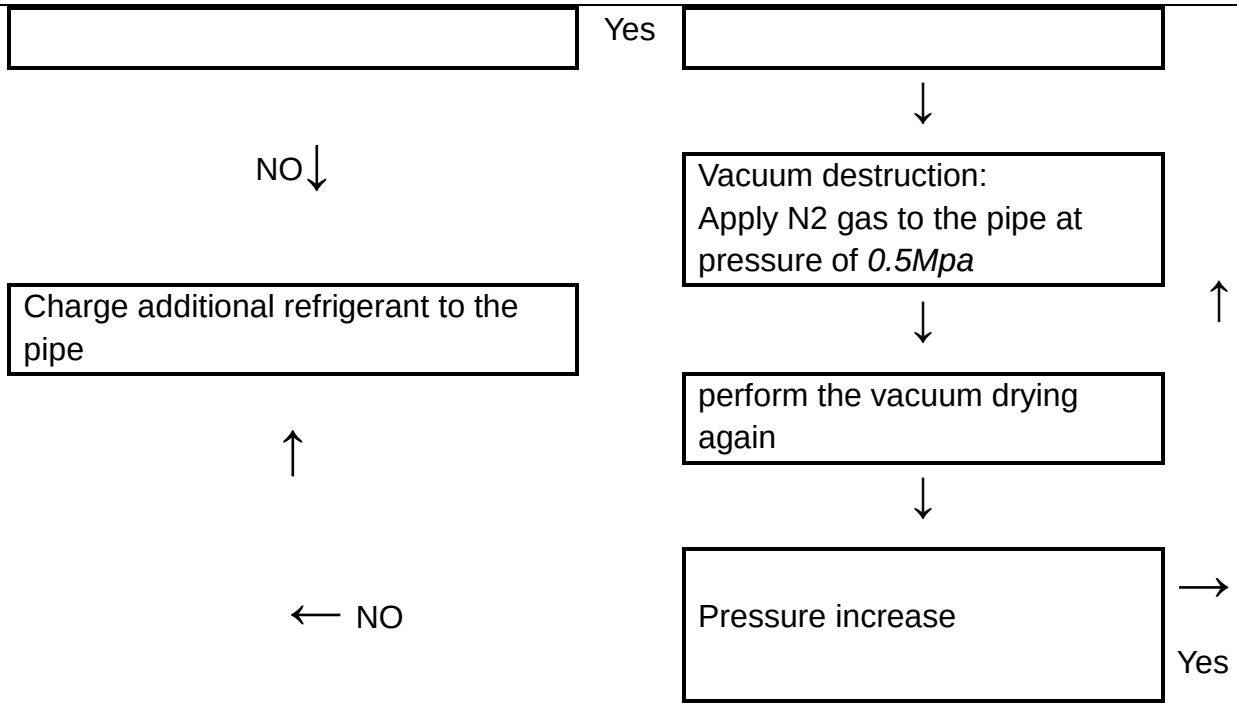
While the vacuum gauge pressure is less than -100.7Kpa,perform the vacuum drying for ***more than 1 hour*** *and closed the valve 2*

↓

After vacuum pump stopped, check whether the pressure is maintained within -100.7Kpa for an hour

↓

Over-100.7Kpa → Check for gas leakage ←




# 7. Insulation

## 7.1 Purpose of Insulation

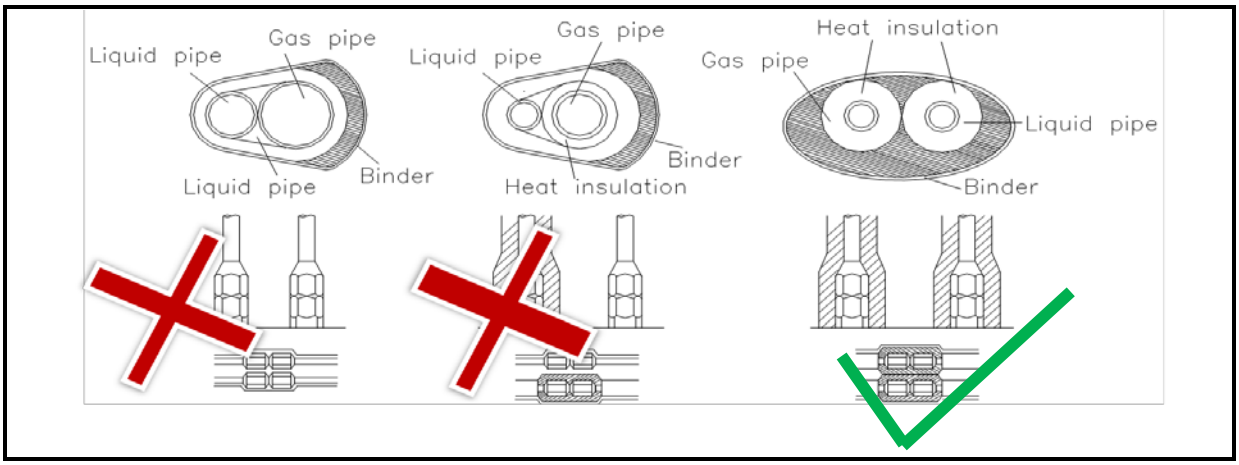
- Prevent condensate water adhere to the gas pipe
- Protect people from hurt of high temp.
- Avoid energy loss

## 7.2 Pre tools

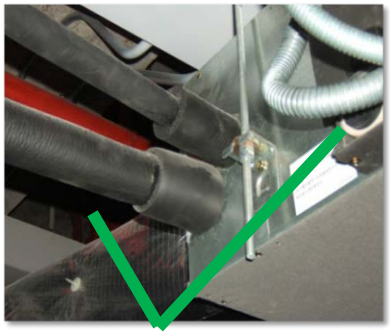
| | | |
|---|---|---|
| Rubber and plastic insulation casing | Cutting knife | Air conditioning bandage |

## 7.3 Caution

### 7.3.1 The insulation of liquid pipe and gas pipe must be separate




### 7.3.2 The insulation work must be done to every part of refrigerant pipes



### 7.3.3 Insulation material

| Pipe diameter | Thickness |
|---|---|
| Φ6.4~15.9mm | ≥15mm |
| Φ15.9~38.1mm | ≥20mm |
| Φ38.1~54.1mm | ≥25mm |

### 7.3.4 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.

### 7.3.5 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.

# 8. Additional refrigerant

## 8.1 Calculate refrigerant charge volume

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 |

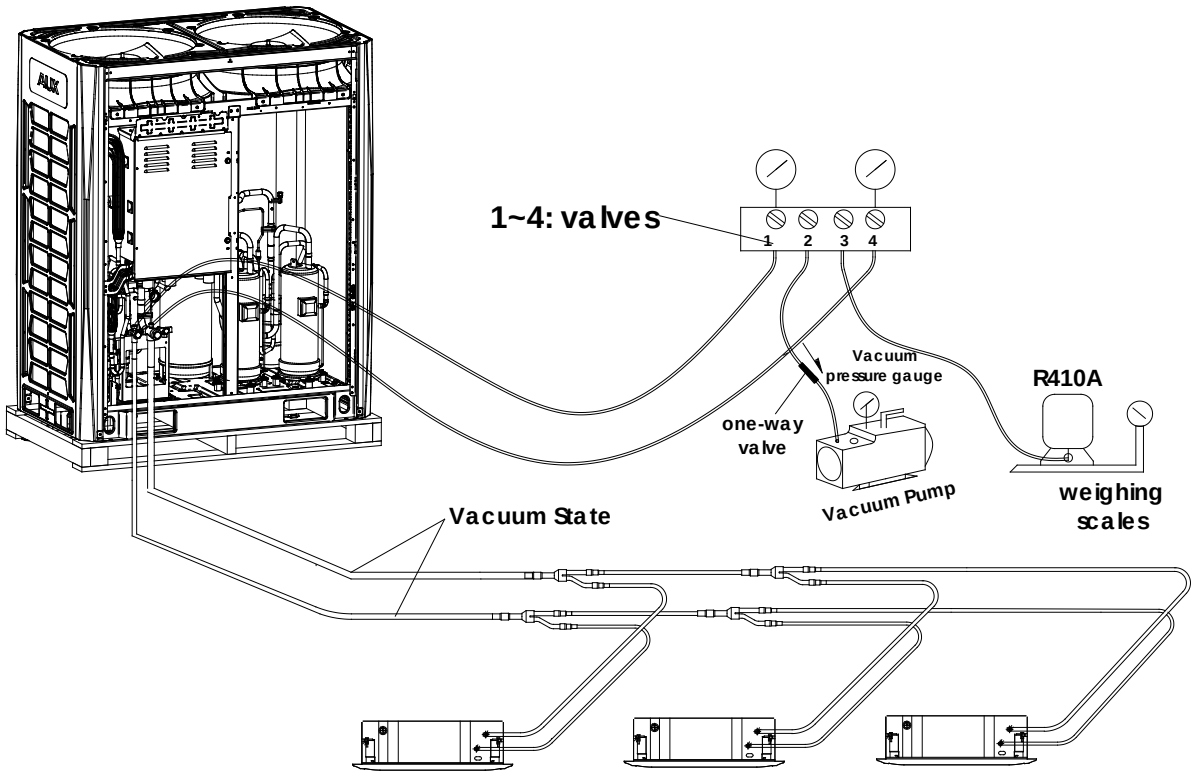
Additional refrigerant charge volume =（L1×0.45）+（L2×0.34）+（L3×0.25）+（L4×0.17）+（L5×0.11）+（L6×0.054）+（L7×0.022）

## 8.2 Pre tools

| Vacuum pump (4L/s) | Connection hose | electronic scale |
|---|---|---|
| | | |
| R410A | | |
| | | |

## 8.3 Schematic diagram

1. 1~4 # valves all are opened
2. 1#, 3#, 4# valves are opened, 2# valve are closed




## 8.4 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.

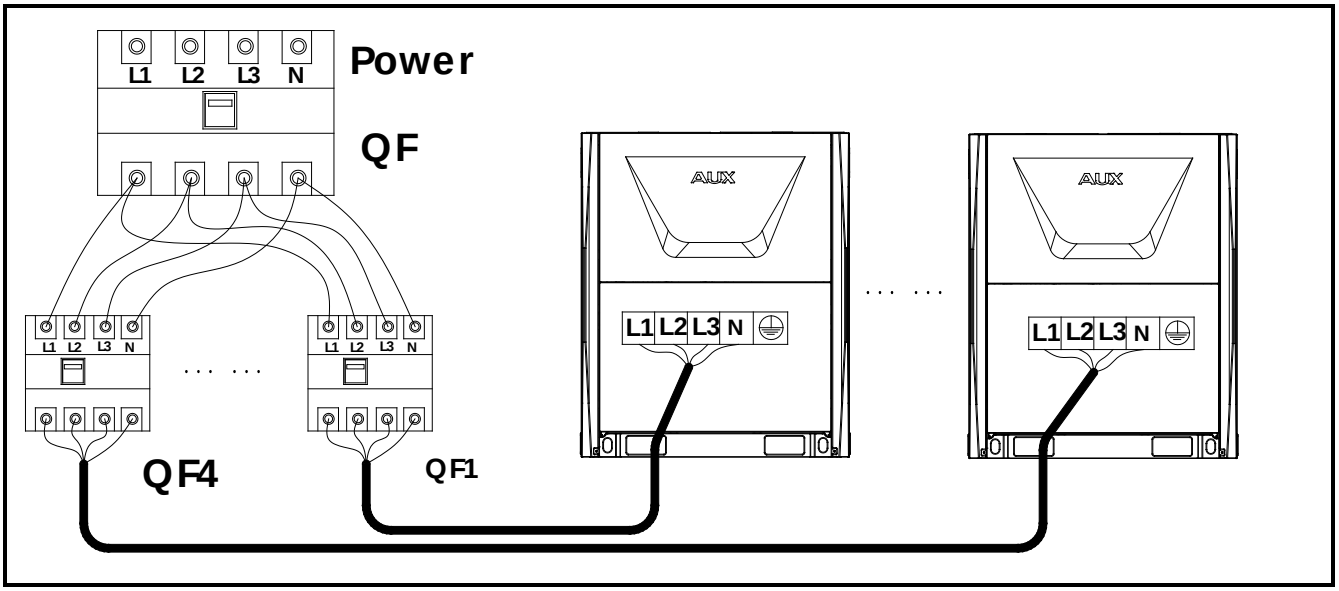
# 9. Electrical Wiring

## 9.1 Wiring Diagram of Indoor Unit and Outdoor Unit

Power line must be properly fixed; 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**

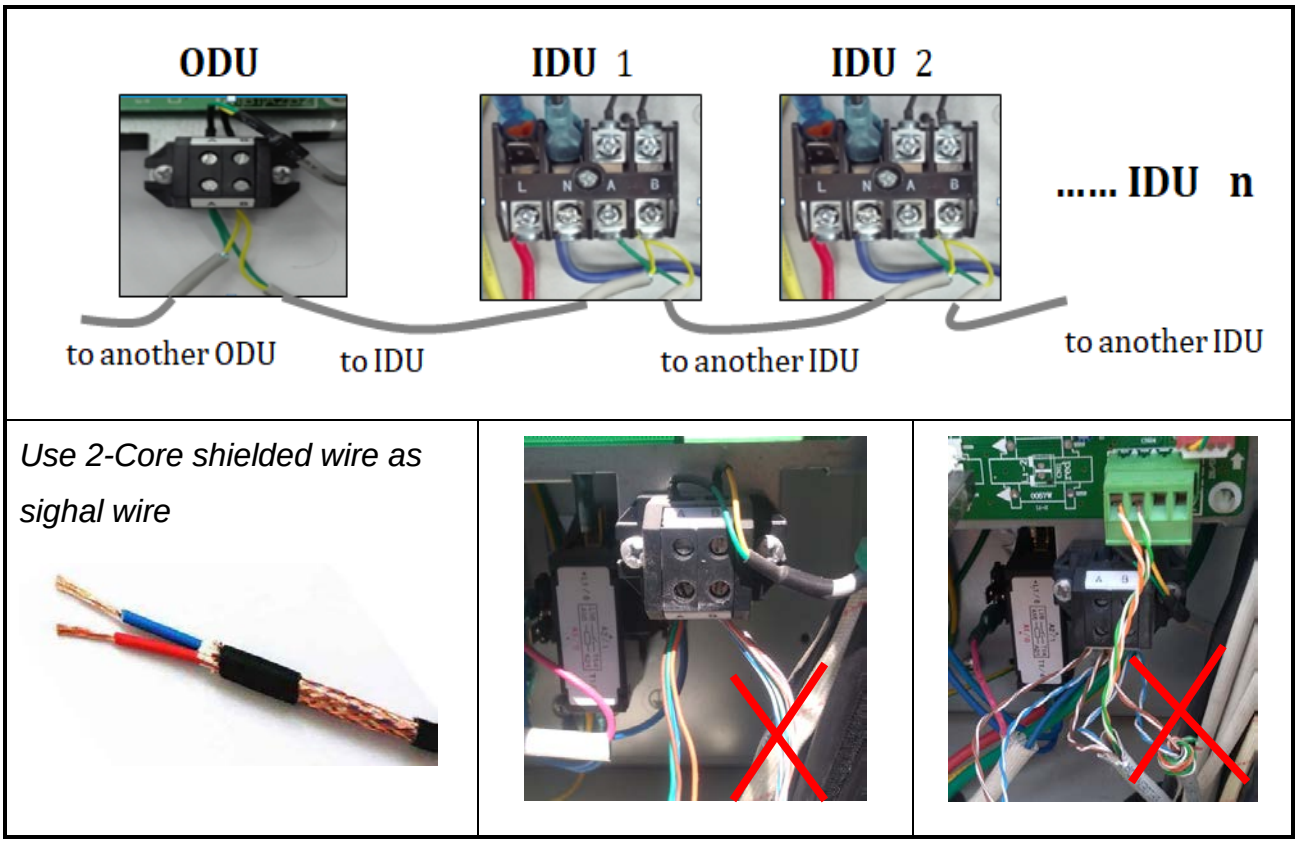



Recommended Specification for Power Line of Outdoor Unit (stand-alone power supply)

| Item / Unit Type | | Power supply | power line ($mm^2$) | breaker (A) | leakage current Operate time | ground wire($mm^2$) |
|---|---|---|---|---|---|---|
| Separate power | ARV-H250/SR1MV | 380~415V 3Ph ~ 50/60Hz | 4 | 32 | 30mA, < 0.1 sec. | 4 |
| | ARV-H280/SR1MV | | 6 | 32 | 30mA, < 0.1 sec. | 6 |
| | ARV-H330/SR1MV | | 6 | 40 | 30mA, < 0.1 sec. | 6 |
| | ARV-H400/SR1MV | | 6 | 50 | 30mA, < 0.1 sec. | 6 |
| | ARV-H450/SR1MV | | 6 | 50 | 30mA, < 0.1 sec. | 6 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | ARV-H500/SR1MV | | 10 | 63 | 30mA, < 0.1 sec. | 10 |
| | ARV-H560/SR1MV | | 10 | 63 | 30mA, < 0.1 sec. | 10 |
| | ARV-H610/SR1MV | | 16 | 63 | 30mA, < 0.1 sec. | 16 |

## 9.2 Communication Wire Connection




## 9.3 Wiring

9.3.1 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***.

9.3.2 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.

9.3.3 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.

# Part3 Commissioning

**1. Preparatory work.....** Chyba! Záložka není definována.

**2. Master unit setting .....** Chyba! Záložka není definována.

**3. Commissioning .....** Chyba! Záložka není definována.

**4. Parameter Setting (Main PCB).....** Chyba! Záložka není definována.

**5. Commissioning Based on Monitoring Software .**Chyba! Záložka není definována.

**6. IDU Parameter setting by Controller** Chyba! Záložka není definována.

# 1. Preparatory work

## 1.1 Inspection and confirmation

- Confirm that ***refrigeration piping and communication*** wire of indoor and outdoor units have been connected to the same refrigeration system in order avoid unnecessary malfunctions.
- Confirm ***power voltage*** is within ±15% rated voltage.
- Confirm that the ***power wire and control wire*** are correctly connected
- 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 6 hours*** to ensure 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.***

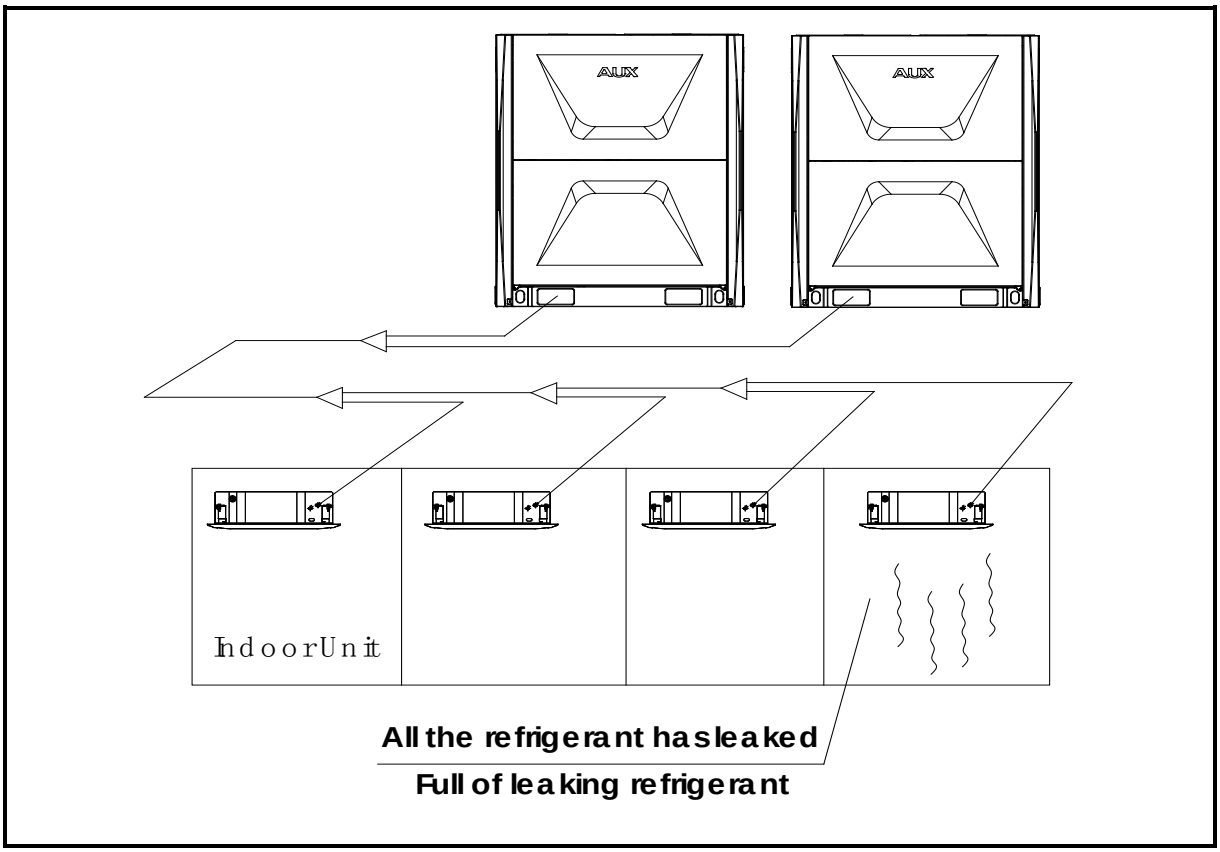
## 1.3 Inspection list of trial run

- Confirm the ***fan*** impeller is rotating according to its intended route and turns smoothly.
- Check for abnormal ***noise*** during operation of refrigerant system and compressor.

- Confirm ***drainage*** is smooth and its lift pump is operational.
- Confirm operating ***current*** is within the allowed range.
- Confirm each ***operating parameter*** is within the range permitted by the equipment.

### 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 any harm to person).

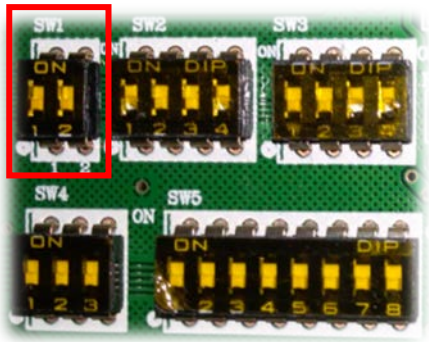



Calculate the critical thickness through following steps, and take necessary actions.

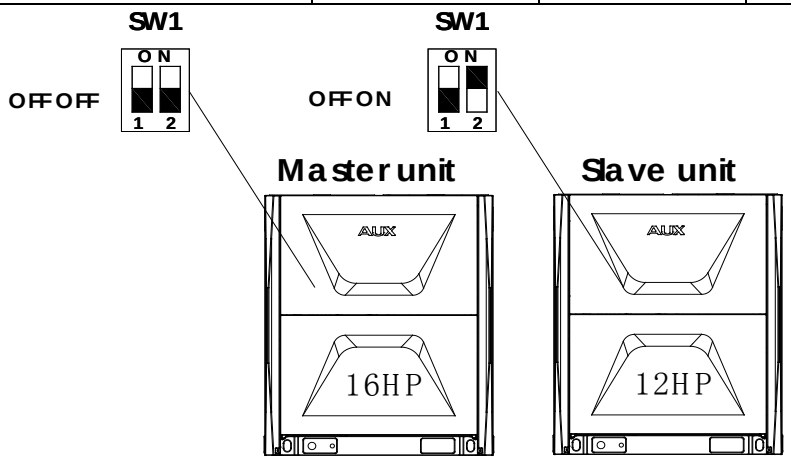
1) Calculate the refrigerant charge volume A, A= factory charge volume + additional charge volume
2) Calculate the indoor area volume (B) (as the minimum volume)

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

## 2. Master unit setting




| 1 | 2 | Definition |
|---|---|---|
| OFF | OFF | Master |
| OFF | ON | Slave 1 |
| ON | OFF | Slave 2 |
| ON | ON | Slave 3 |




## 3. Commissioning

IDU and ODU power on, then the main ***PCB digital tube displays***"d", it means the system is ***waiting for commissioning***

## 3.0 Enter Commissioning

● ***Enter***

Long press ***"Fun"*** button for ***more than 5 s***

● ***Exit***

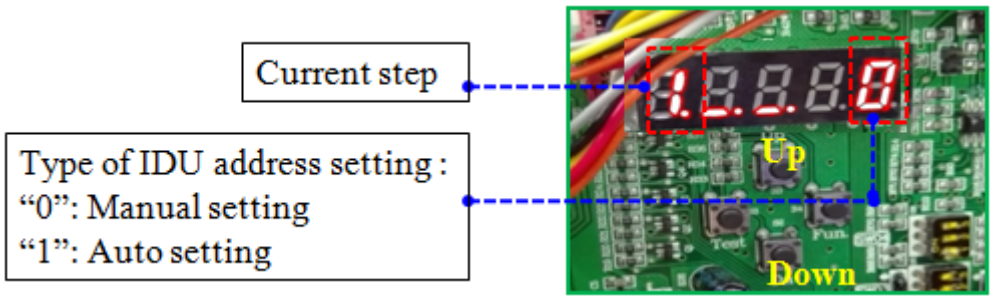
Long press ***"Test"*** button for ***more than 5 s***.

● ***Quick finish***

After completing Step "3", long press ***"Fun" + "Test"*** buttons for ***more than 5 s*** to complete project commissioning in advance

## 3.1 Address Setting

Digital tube will display"1 0"




Press ***"Up"*** or ***"Down"*** buttons ***to choose 0 or 1***

Short press ***"Fun" to confirm***

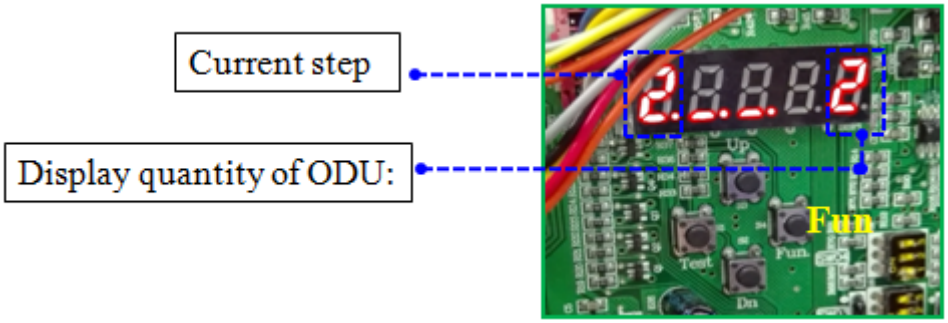
If ***manual addressing*** is chosen, digital tube will ***display***"1 0" (the indoor unit's address should be set by remote controller or wired controller.)

If ***automatic addressing*** is chosen, digital tube will ***display*** "1 1"

About 2 s later, ***enter step 2***.

## 3.2 Quantity of ODU

Digital tube displays "2.....1 "



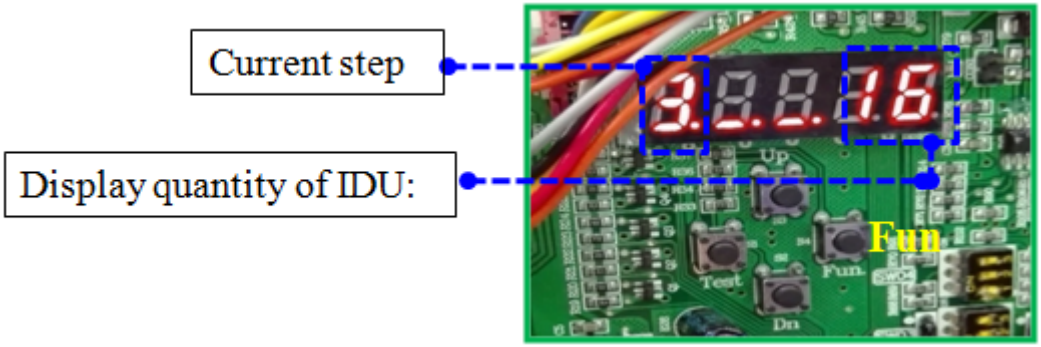

If display ***quantity of ODU is inconsistent***, need to conduct manual check ( DIP address, communication cable and etc. ) and commissioning confirmation again.

If display ***quantity of ODU is consistent***, short press ***"Fun"*** button ***to confirm***, digital tube will ***display*** "2.....1 ",

About 2 s later, ***enter step 3***.

## 3.3 Quantity of IDU

Digital tube displays "3.....16 "



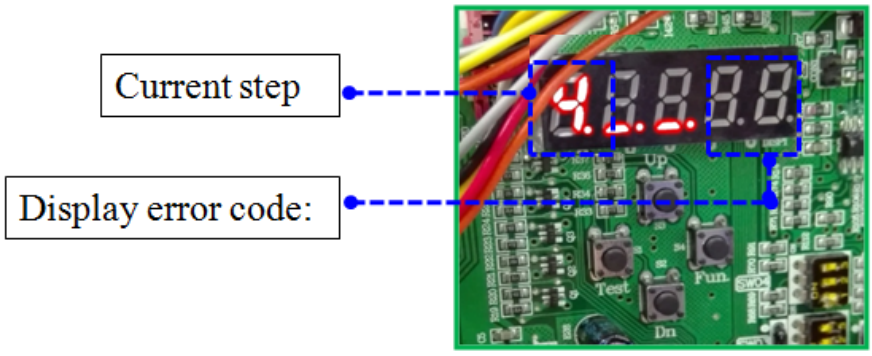

If display ***quantity of IDU is inconsistent***, need to conduct check (power and communication cable of indoor units, and etc.) commissioning confirmation again.

If display ***quantity of IDU is consistent***, short press ***"Fun"*** button to confirm. digital tube will ***display*** "3.....16" ,

About 2 s later, ***enter step 4.***

## 3.4 Communication of ODUs

***Automatically detects*** the ***communication*** between ***master main PCB*** and ***drivers*** (fan motor and compressor), after 2 s




If there is ***a faulty***, it will ***display*** "4 03 ", all buttons are invalid, ***need to do Troubleshooting***, if it is ***normal***, it will ***display*** "4 " 

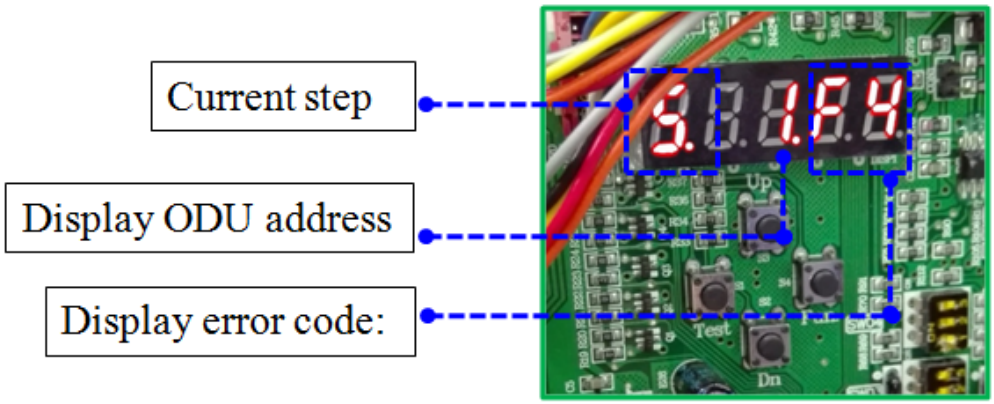
Then ***detects*** indoor and outdoor unit's ***capacity ratio***, if it is ***out of range***, ***display*** "4 03 " ***need to do Troubleshooting***. If ratio is ***normal***, it will ***display*** "4 " 

About 2 s later, ***enter the step 5.***

## 3.5 Components of ODUs

Automatically ***detect components*** of outdoor units,

During detecting, display "5 " 




If ***abnormal***, then corresponding ***failure displays***, for example, "5 1F4 "

It cannot enter the next judgment

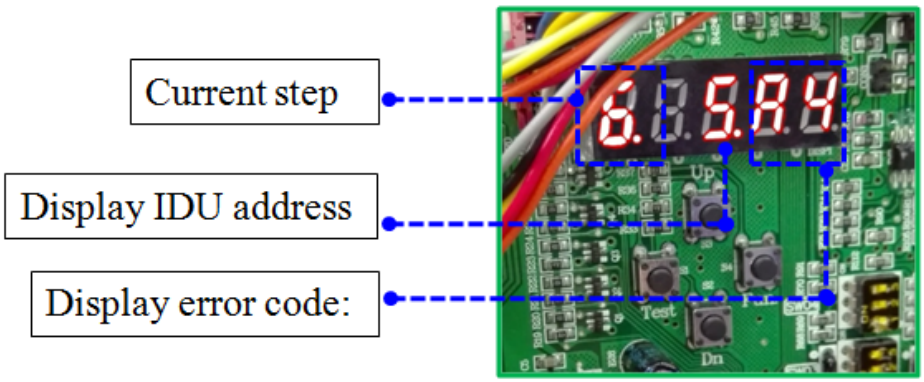
Only ***displays*** the ***fault*** with the ***highest priority***. In case that several modules had faults, displays the fault codes in turn by address order.

If there are ***no*** any ***faults*** or all faults were solved, digital tube displays "5.8.8.8.8."

About 2 s later, ***enter step 6.***

### 3.6 Components of IDUs

During detecting, digital tube displays "6.8.8.8.8."




■ If one of indoor units occur ***a fault***, display "6.8.5.A4" ***need to do Troubleshooting***

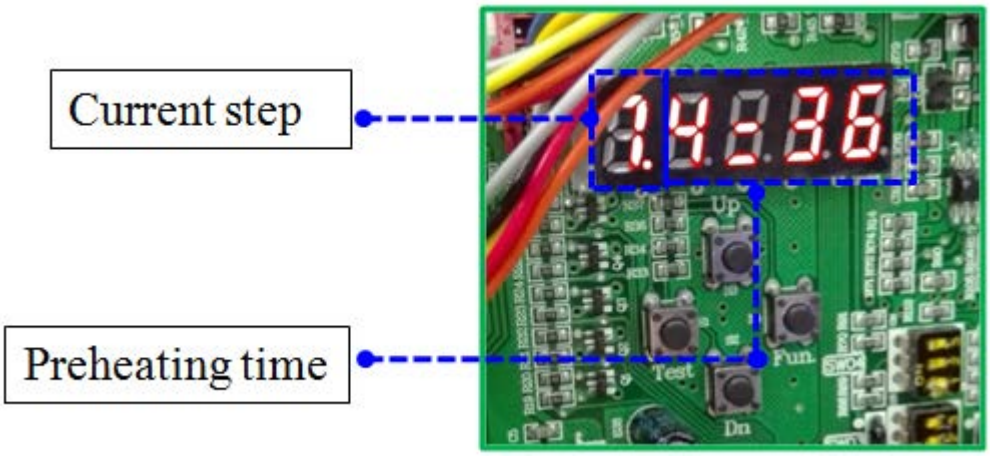
All buttons are invalid

■ If there are ***no*** any ***faults*** or all faults were solved, digital tube displays "6.", About 2 s later, ***enter step 7***

### 3.7 Compressor preheating

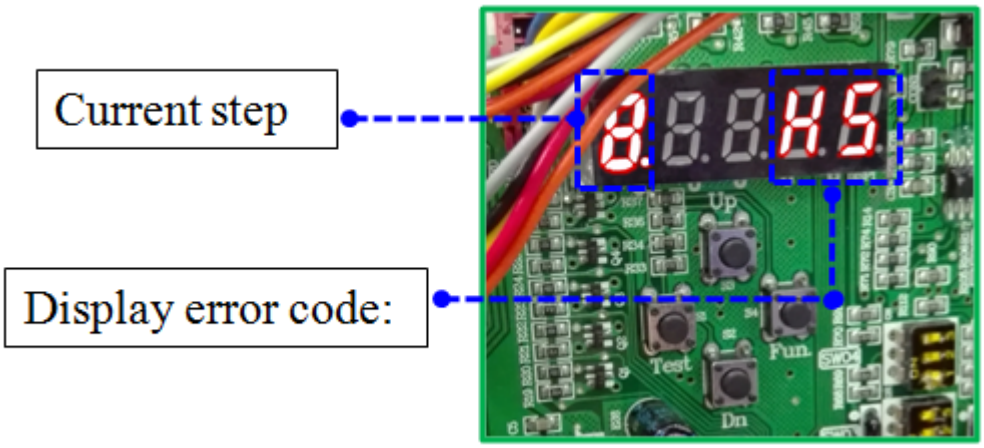
■ If the outdoor unit has been continuously energized for ***more than 6 hours,*** displays "7.", 2 s later, ***enter step 8.***

■ Otherwise display "7.4:36", Short press ***"Fun"*** button, ***can skip waiting*** and ***enter step 8***



## 3.8 Refrigerant judgment

During detecting, display "8.8.8.8.8.8."




■ If any [***module low pressure P s*** ***≤ -25 ℃***, then point out refrigerant lack protection, display "8.8.8.HS."

All buttons are invalid

It required to check is there any leakage, need to do air tightness test , maintenance, vacuuming, add refrigerant and do commissioning again

■ If it is ***normal***, display "8.8.8.8.8.8. ",

About 2 s later, ***enter step 9.***

## 3.9 Status judgment

The status judgment of outdoor unit valve "9.8.8.8.8.8. ", 2sec later, enter the next step.

## 3.10 Start commissioning

Automatically select operating mode according to outdoor environment temperature

If temperature ≥ 20 ℃, running cooling model

If temperature <20 ℃, running heating model

This step, displays "10.8.8.8.8. ", waiting for start commissioning. Press "***Fun***" button to start cooling or heating operation test

## 3.11 Cooling Operation

Display "11.0.0.0.", all indoor units run in ***16 ℃& high speed***

If there is a **fault**, displays' ***Err'*** and fault code, like "Err.F3", ***need to do troubleshooting*** and commissioning again

If there is ***no any fault***, 20min later, displays "11.0.0.0."

After 5s, ***enters normal standby status*** "1.0.0.16" or locking "LoC."

***Project commissioning is finished***

## 3.12 Heating Operation

Display "12.0.0.0." , all indoor units run in ***30 ℃& high speed***

If there is ***no any fault***, 20min later, displays "12.0.0.0.",

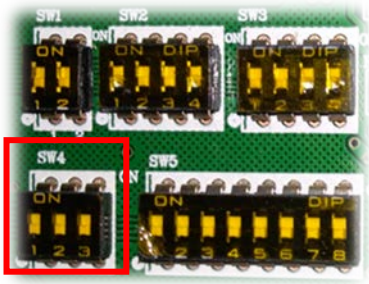
After 5s, ***enters normal standby status*** "1.0.0.16" or locking "LoC.".

***Project commissioning is finished.***

# 4. Parameter Setting (Main PCB)

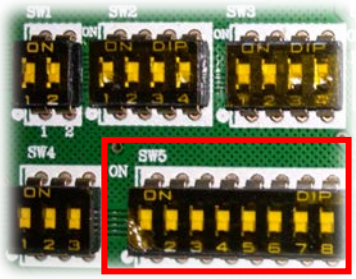
## 4.1 Functions set by switch

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 | / | | |

Function setting-**SW5**



| 1 | 2 | Function |
|---|---|---|
| OFF | OFF | Without quiet mode(Default) |
| OFF | ON | Quiet in night |
| ON | OFF | Quiet mode |
| ON | ON | Strong mode |

| 3 | 4 | Function | 5 | 6 | Function | 7 | 8 |
|---|---|---|---|---|---|---|---|
| OFF | OFF | First-ON (Default) | OFF | OFF | static pressure 0 Pa(Default) | Reserve | |
| OFF | ON | Heating priority | OFF | ON | 20 Pa | | |
| ON | OFF | Cooling priority | ON | OFF | 50 Pa | | |
| 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 to change 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, others the ODU cannot run.

## 4.2 Parameter set by Key button

### 4.2.1 General introduce

After commissioning, the system is standing-by.

**1st step**--- Press ***"Fun"*** key for 2 s, the Main digital tube will displays as below:

1.【Parameter Checking"E" (flash) 】、

2.【Function Setting "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 ***[E]****or* ***[P]*** *or* ***[d]*** *or* ***[r]***

**3st step**---Press ***"Fun"*** to confirm

**Sketch Map:**

| | | | | |
|---|---|---|---|---|
| | ***1st:*** *Press "Fun" 2 s* | ***2st:*** *"Up" or "Down" to choose below* | | ***3st :*** *Press "Fun" to confirm* |
| | | | | |
| Commissioning | Status | Checking | Parameter Checking | Restore to factory setting |

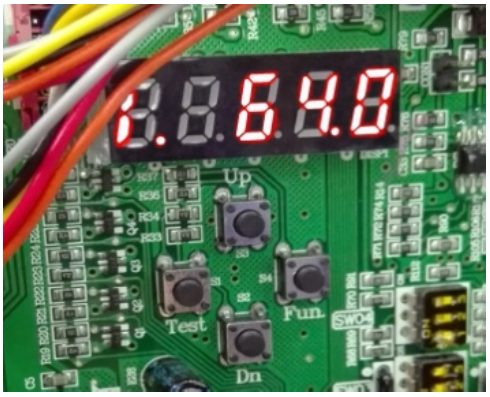
### 4.2.2 [E] Parameter Checking

***Choose*** "E" , press ***"Fun"*** key

1. Press ***"Up"*** or ***"Down"*** key to choose the number of function you want ***(1~15)***
2. Then press ***"Fun"*** to display

For example：Digital tube displays like 1 64.0, means ***frequency of 1# comp is 64 rps***

**Sketch Map:**




1 means :

*Frequency of 1# comp*

64 means:

*1# compressor's running frequency is 64 rps*

To Check other statue information by

Press "***up"/"down***", display from 1~ 15

| No | parameter name | units | No | parameter name | units |
|---|---|---|---|---|---|
| ***1*** | ***Frequency of 1# comp*** | ***rps*** | **9** | ODU environment temp. | 0.1℃ |
| **2** | Frequency 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℃ | | | |

### 4.2.3 [P] Present Function Checking

***Choose*** "P.8888" , and press ***"Fun"*** key

1. Press ***"Up"*** or ***"Down"*** key to choose the number of function you want ***(1/3/4/6)***

   For example：Digital displays like "P.8888 1" (P-light, 1-Flash)

2. Then press ***"Fun"*** to display

   For example: display a parameter like"8881 35", means the present max capacity rate of IDU/ODU (No 1) is ***135%***

| Serial Number | Function Name | Display |
|---|---|---|
| **1** | IDU/ODU capacity rate | ***135 or 200***<br>[135: Rate is135%]<br>[200: Rate is200%] |
| **3** | VER<br>(variable energy-efficiency regulation) | ***0 or 1 or 2***<br>[0：basic mode]<br>[1：high efficiency]<br>[2：turbo mode] |
| **4** | Blow off snow<br>(Auto snow-blowing) | ***0 or 1 or 2 or 3 or 4***<br>[0：without this function]<br>[1：0.5h Cycle time]<br>[2：1h Cycle time]<br>[3：3h Cycle time]<br>[4：10h Cycle time] |
| **6** | Economic locking (26℃) | ***0 or 1***<br>[0：without this function]<br>[1：lock 20/26℃] |

### 4.2.4 [C] Function Setting

***Choose*** "C" , short press ***"Fun"*** key

1. Press ***"Up"*** or ***"Down"*** key to choose the number of function you want ***(1~8)***

   For example：Digital displays "C1" (C-light,1-flash)

2. Then **press *"Fun"*** key **to enter** the setting.

3. Change the setting by pressing ***"Up"*** or ***"Down"*** key

4. Short press ***"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 | C1 | 1 | 135：IDU/ODU≤135%<br>200：IDU/ODU≤200% | 1. Choose the **number [*1*]**<br>2. Short press [**Fun**]<br>3. Choose ***[135] or [200]***<br>***135 is default***，when you change it，it will influence the comfort，please consult our factory first. |
| Clean (Auto dust removal) | | 2 | / | 1. Choose the **number *[2]***<br>2. Short press ***[Fun]***, ***1 time effective*** Then outdoor fan will run immediately |

| | | | | |
|---|---|---|---|---|
| VER (variable energy-efficiency regulation) | | 3 | 0：basic mode<br>1：high efficiency<br>2：turbo mode | 1. Choose ***number [3]***<br>2. Short press ***[Fun]***<br>3. choose ***[0] or [1] or [2]***<br>0 is default, when you change it ,it will influence the comfort or power consumption |
| Blow off snow (Auto snow blowing) | | 4 | 0：No this function<br>1：0.5h (cycle time)<br>2：1h (cycle time)<br>3：3h (cycle time)<br>4：10h (cycle time) | 1. Choose the **number *[4]***<br>2. Short press ***[Fun]***<br>3. Choose ***[0] or [1] or [2] or [3] or [4]***<br>0 is default, when you change it ,the outdoor fan will run to blowing off snow ***automatically and cycle by cycle*** |
| Vacuum Pumping | | 5 | / | 1. Choose the **number *[5]***<br>2. Short press ***[Fun]***, ***1 time effective*** Then ODU will be ready for Vacuum pumping |
| Economic locking (26℃) | | 6 | 0：No this function<br>1：lock 20/26℃ | 1. Choose ***number [6]***<br>2. Short press ***[Fun]***<br>3. choose ***[0] or [1]***<br>0 is default, when you change it , the IDU setting temperature will ***be locked at 20℃ in heating mode*** and ***26℃ in cooling mode*** |
| Refrigerant recycle | | 7 | / | 1. Choose the **number *[7]***<br>2. Short press ***[Fun]***, ***1 time effective*** Then Recycle refrigerant to ODU |

| | | | | |
|---|---|---|---|---|
| Refrigerant charging | | 8 | / | 1. Choose the **number *[8]***<br>2. Short press ***[Fun]***, ***1 time effective***<br>Automatically determine whether the refrigerant is filled up(by detecting pressure)requires |

### 4.2.5 [r] Restore to Factory Setting

***Choose*** "r" , short press ***"Fun"*** key

1. Press ***"Up"*** or ***"Down"*** key to choose the number of function you want ***(1~3)***

***[1]:*** Control parameter be restored to factory default

***[2]:*** Control parameter, running storage parameter are restored to factory default

***[3]:*** Control parameter, running storage parameter, commissioning storage parameter are restored to factory default

2. Press ***"Fun"*** key to confirm

# 5. Commissioning Based on Monitoring Software

## 5.1 General Information

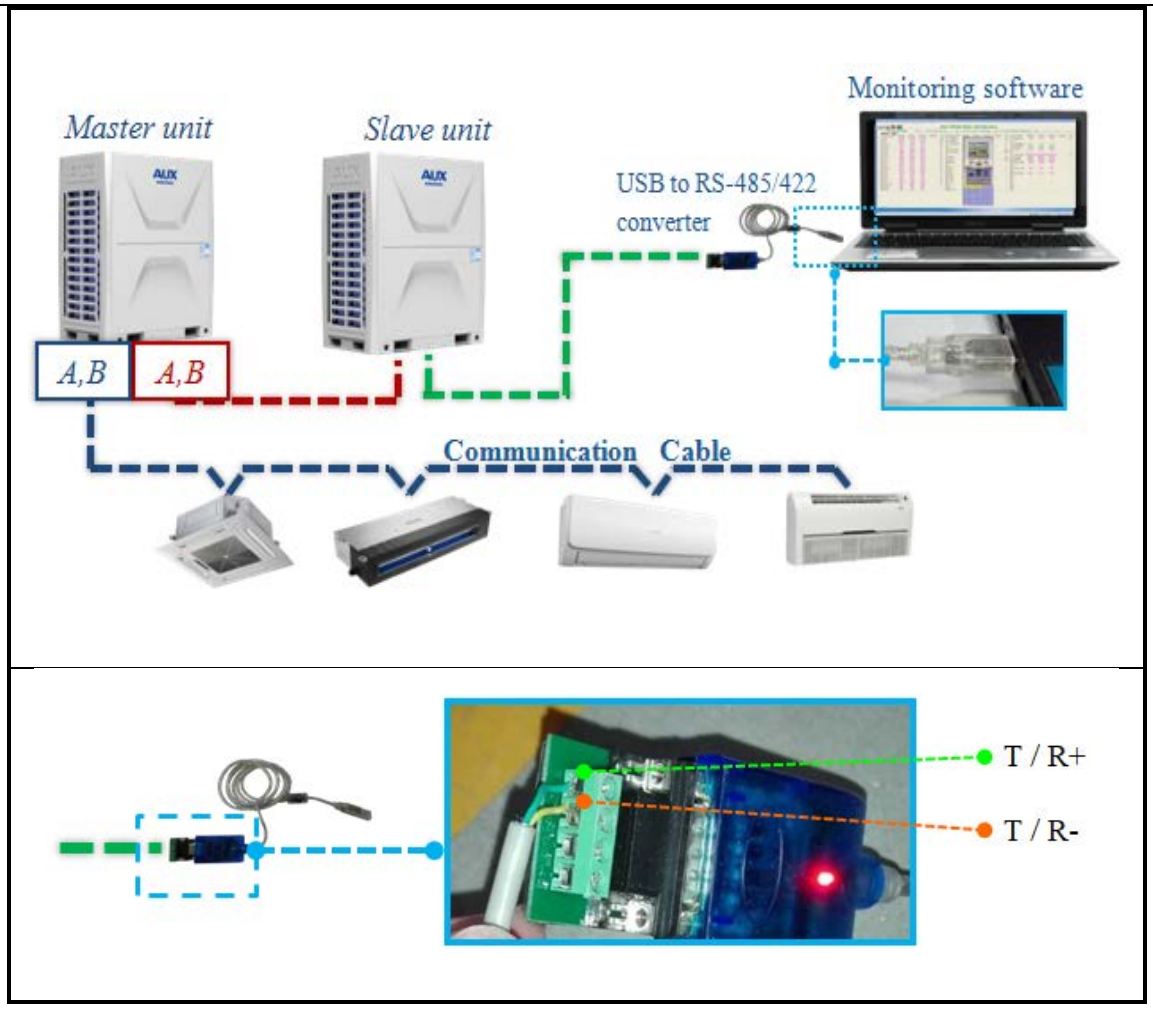
1. Main Function

1.1 Used for ***monitoring*** indoor and outdoor units' ***operation parameters***，check the refrigerant system is normal or not

1.2 ***Control*** indoor units' ***operation state*** (temperature setting, fan speed, ON/OFF, operation mode…)

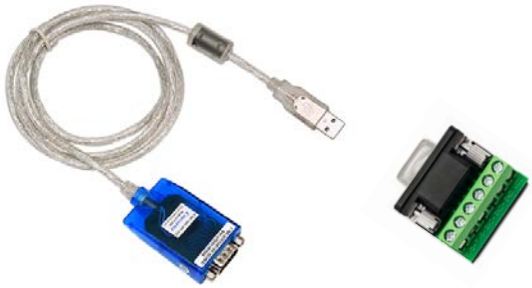
1.3 Operation parameters and curve can ***be saved*** as a *data base file*

2. Installation Diagram

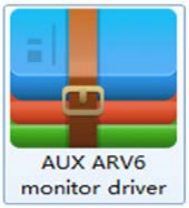



## 5.2 Accessory

1. Hardware

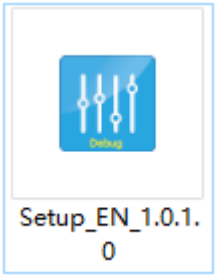
| Laptop | USB to RS485 converter |
|---|---|
| |  |

2. Software

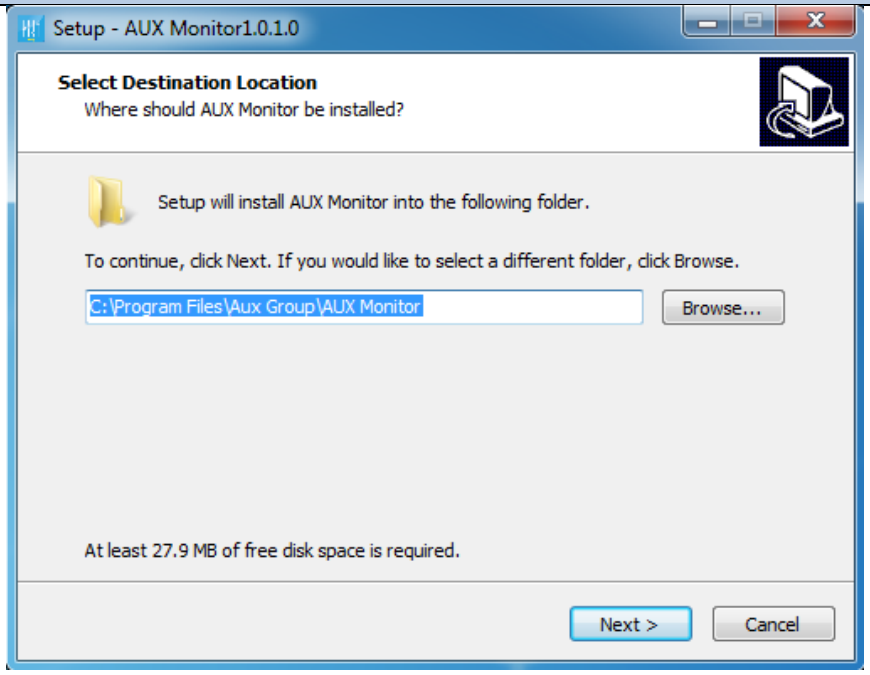
| Monitoring Software | Driver Program |
| --- | --- |
| |   |

## 5.3 Installation of software

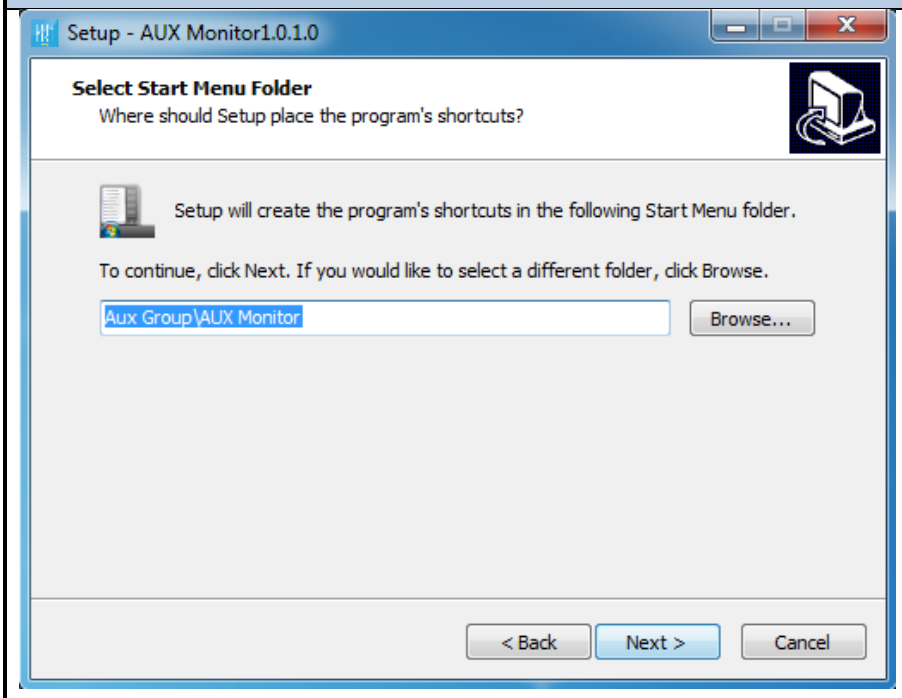
1. Double click



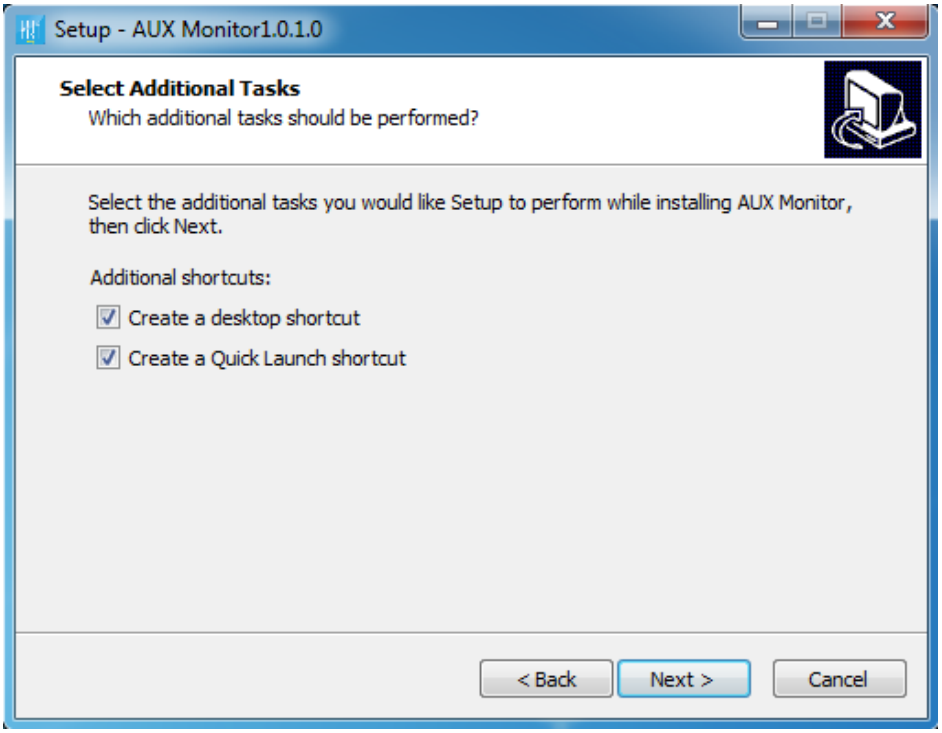

2. Choose the installation path, then click "***Next***"



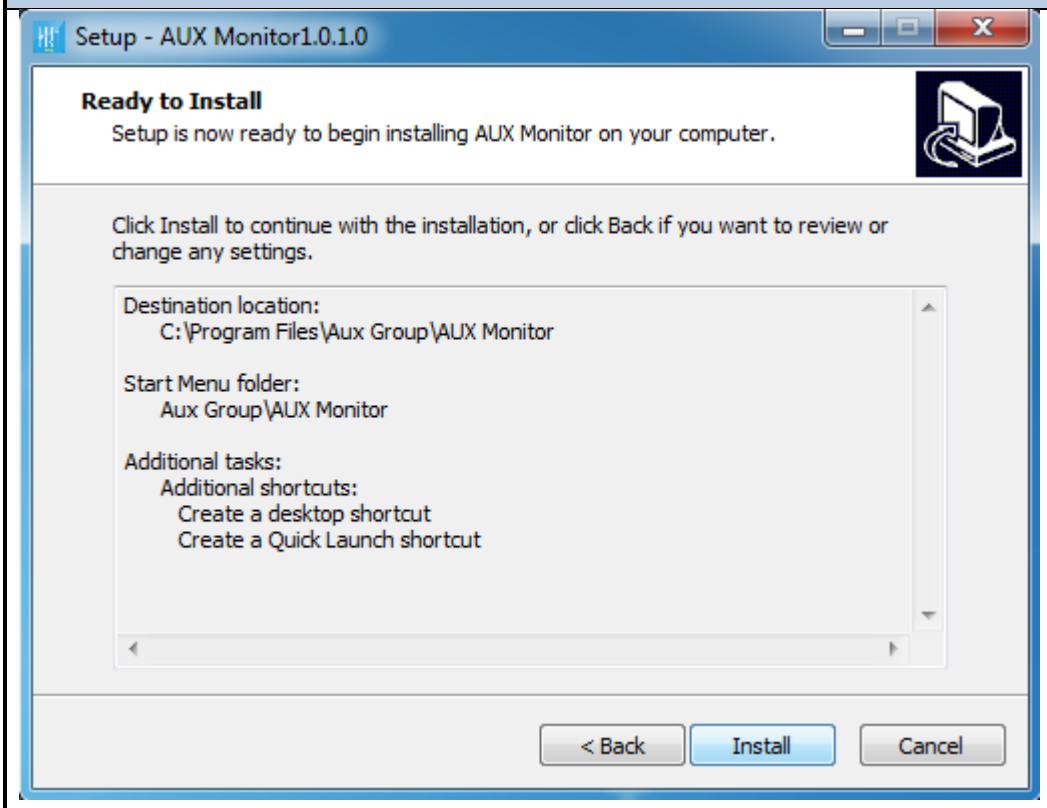

3. Confirm the installation path, then click "***Next***"



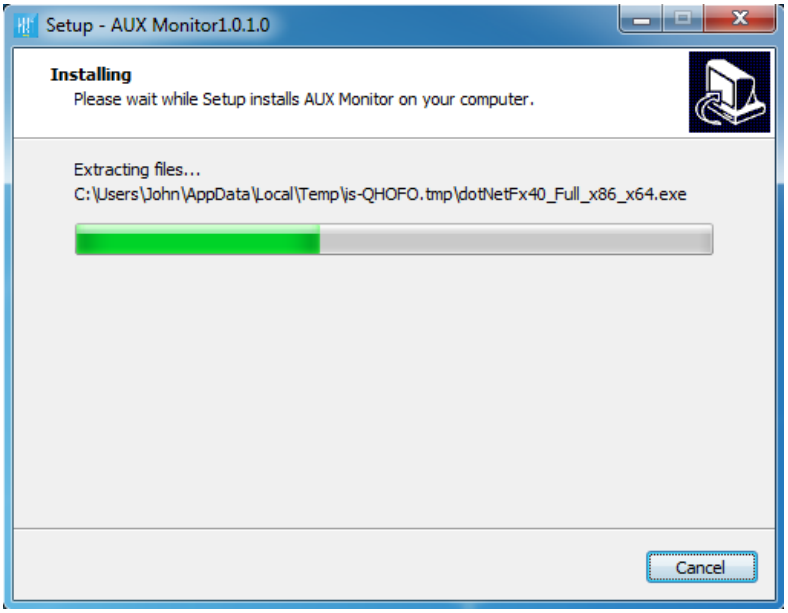

4. Choose "***Create a desktop shortcut***" and "***Create a quick launch shortcut*** ", then click "***Next***"



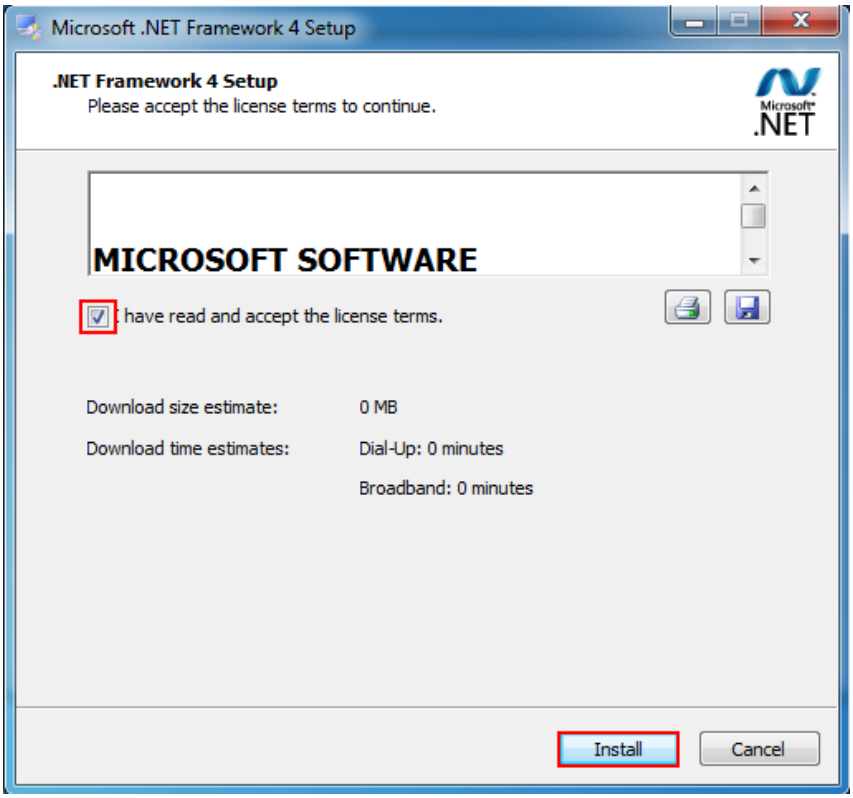

5. Confirm, click "***Install***"



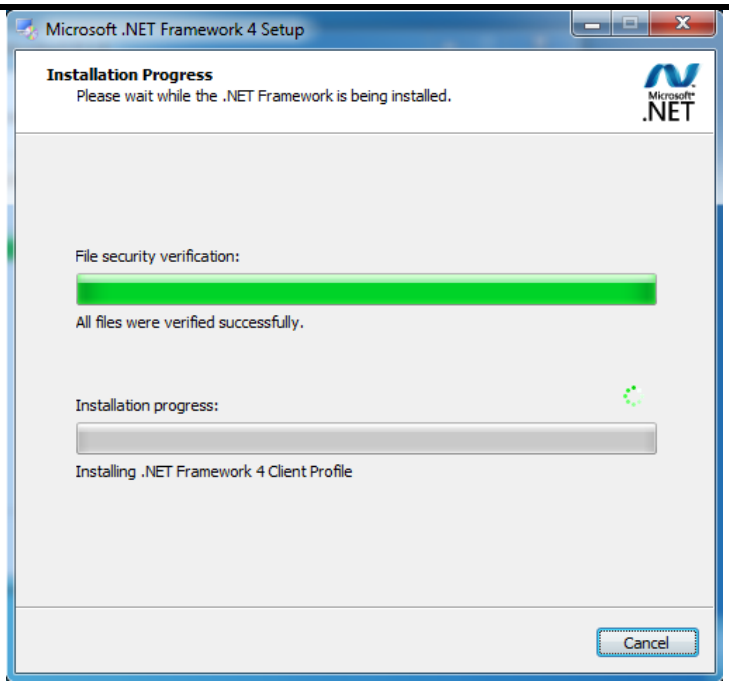

6. Install... waiting



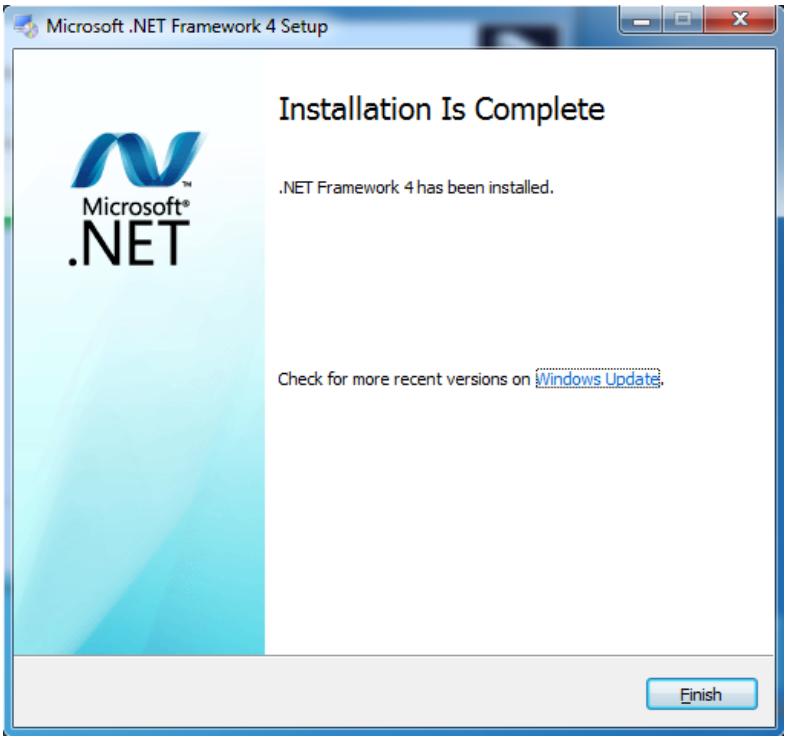

7. Automatic judge install ”Microsoft .net Framework 4.0”or not，If it should be installed，please choose ***“I have read and accept the license terms***.”then colick ”***Install***“




8. Install “Microsoft .net Framework 4.0”，waiting…




9. Finishing



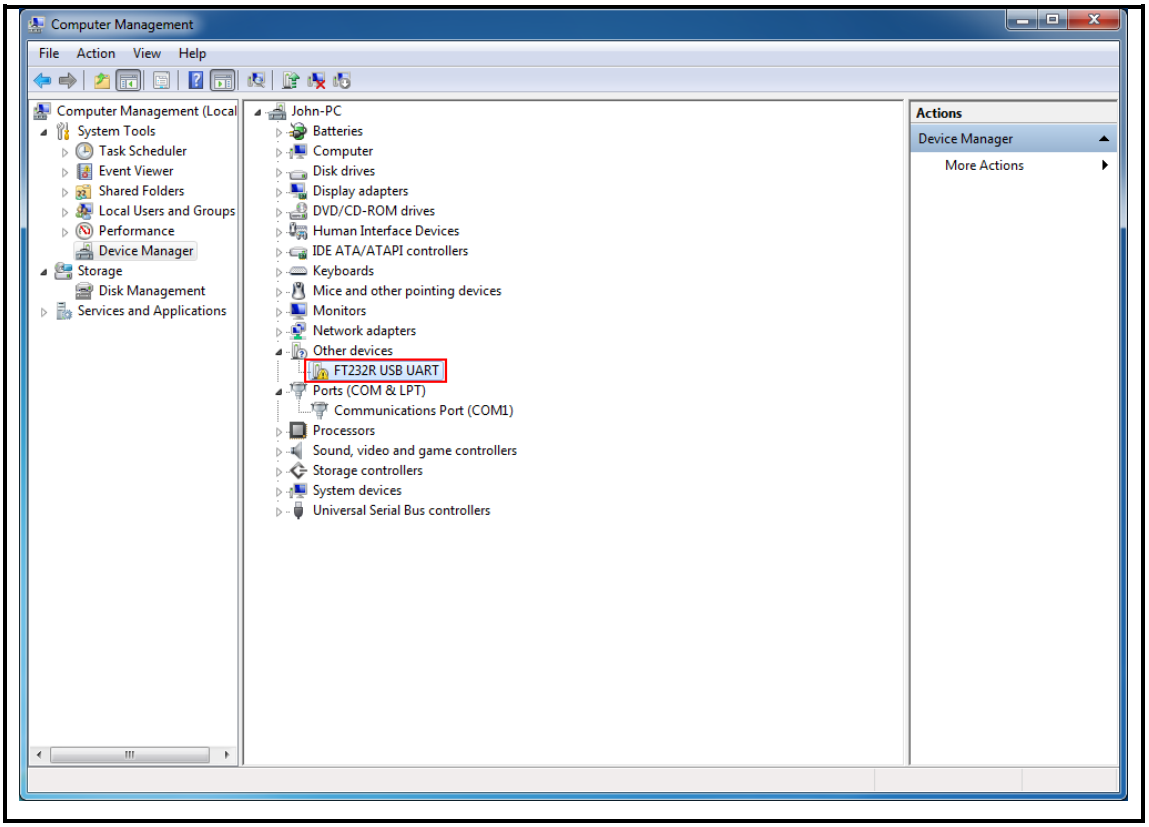

| 10. Finish the installation | Desktop Icon |
|---|---|

| | |
|---|---|
| Setup - AUX Monitor1.0.1.0<br>Completing the AUX Monitor Setup Wizard<br>Setup has finished installing AUX Monitor on your computer. The application may be launched by selecting the installed shortcuts.<br>Click Finish to exit Setup.<br>Finish | AUX<br>Monitor-... |

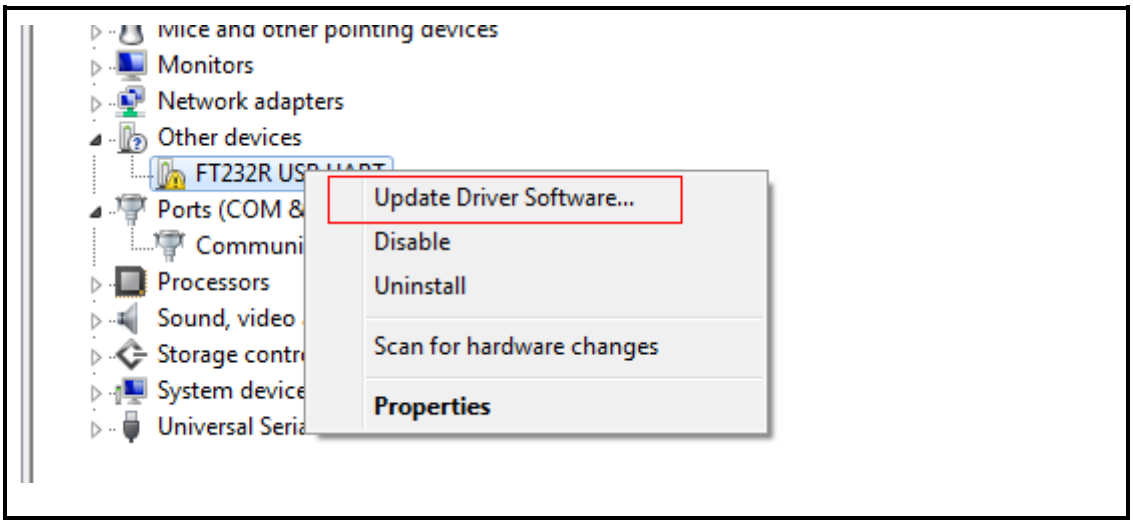
## 5.4 Installation of Driver

1. Installation steps

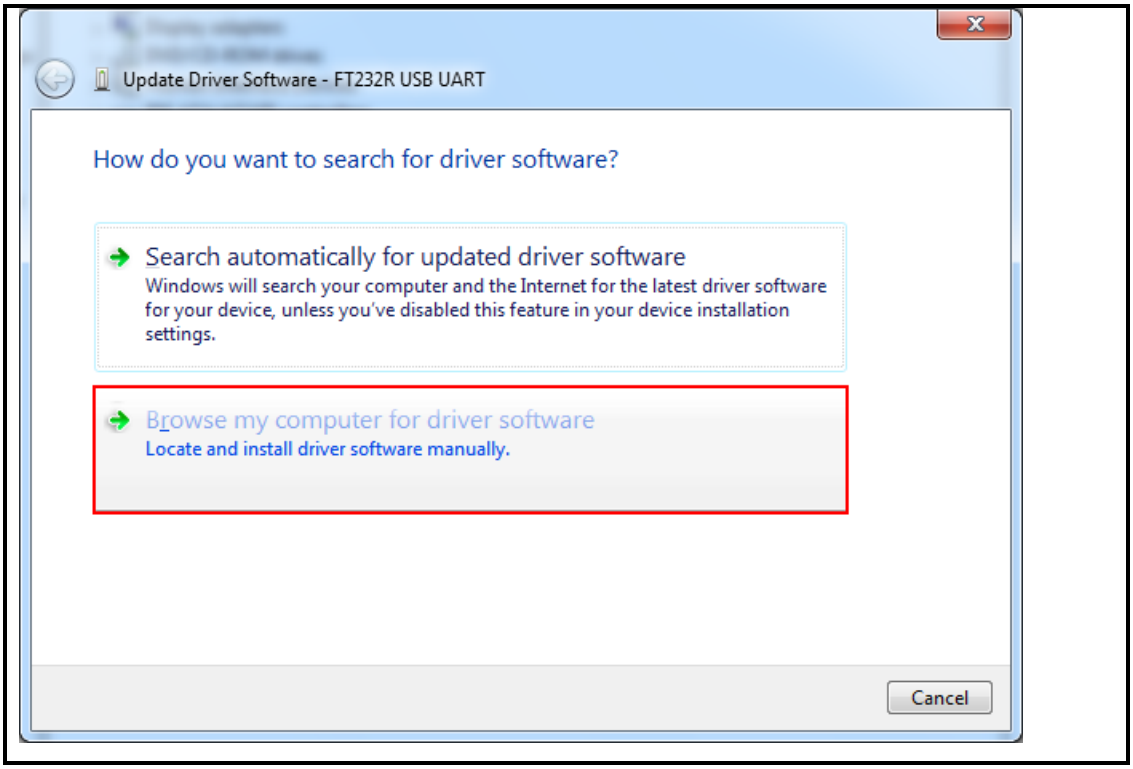
1. After USB to RS485 converter be connect to laptop's "***USB port***", Open Management->Other devices-> "***FT232R_USB_UART***"。



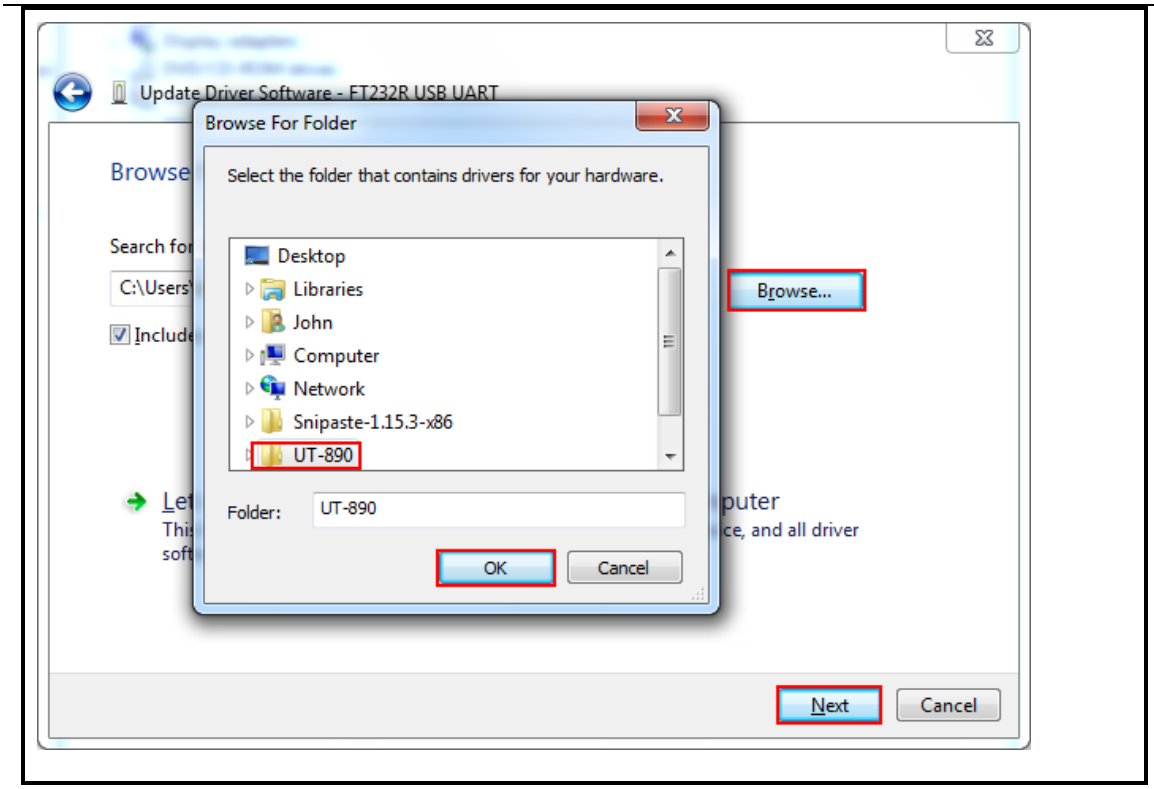

2、Choose"***FT232R_USB_UART***" right click, then choose "***Update Driver Software"***



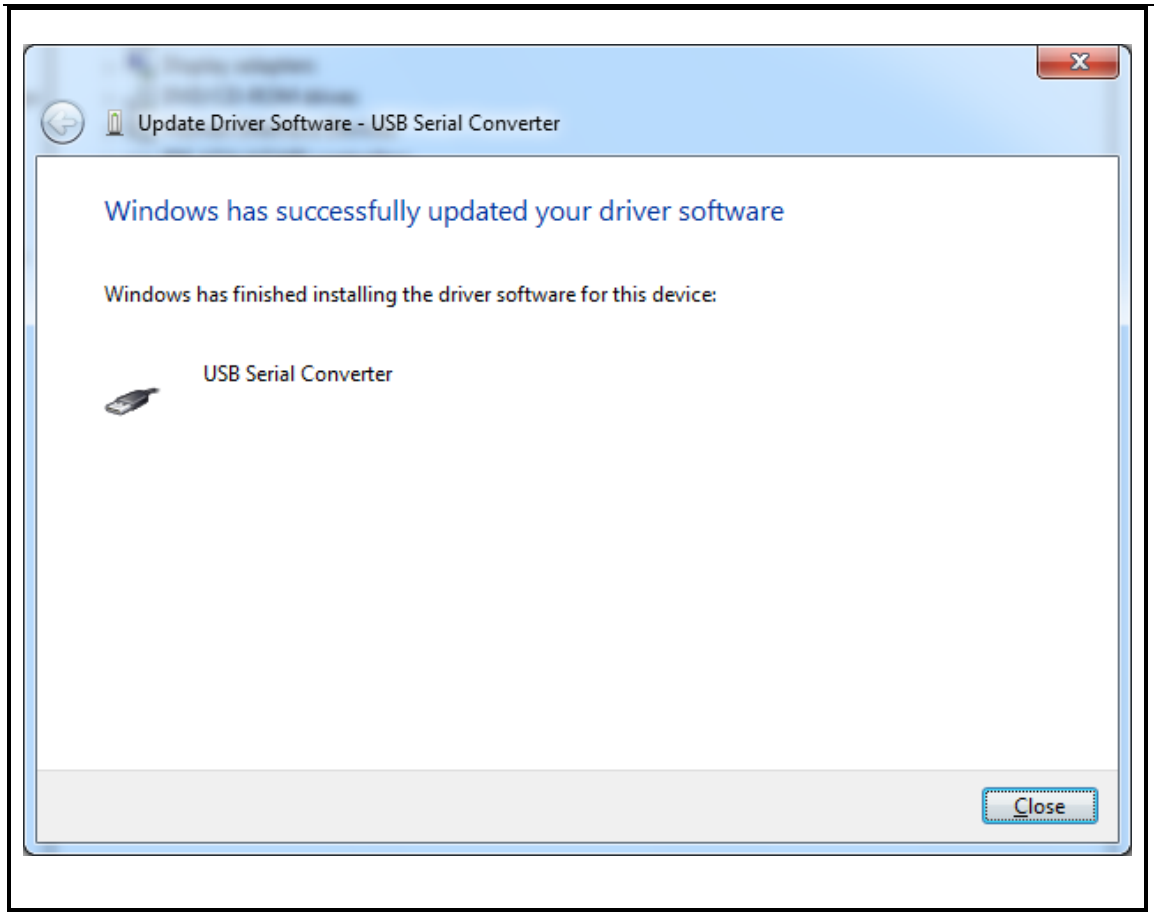
3、Choose and click ”***Browse my compute for driver software***“



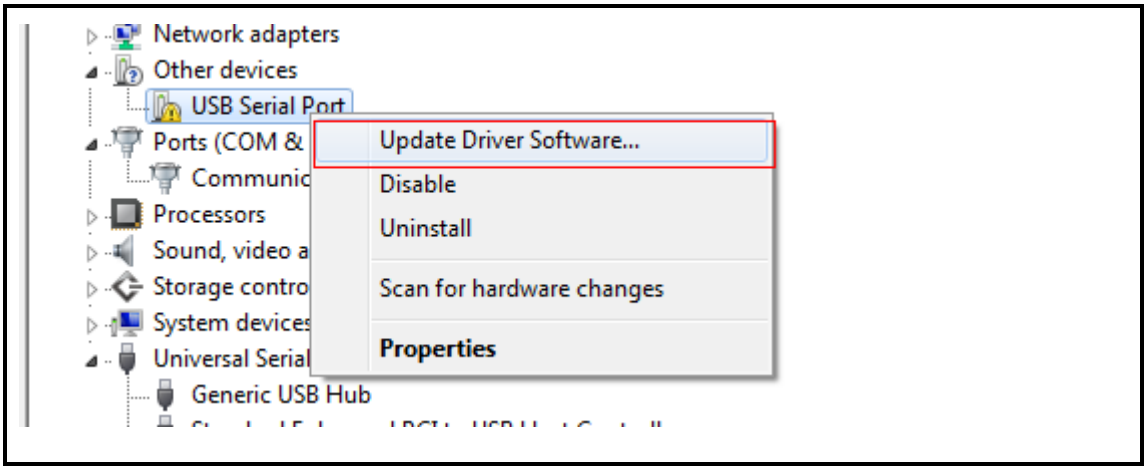

4、Choose the position of the Driver program，Click ”***OK***”, then “***Next***”



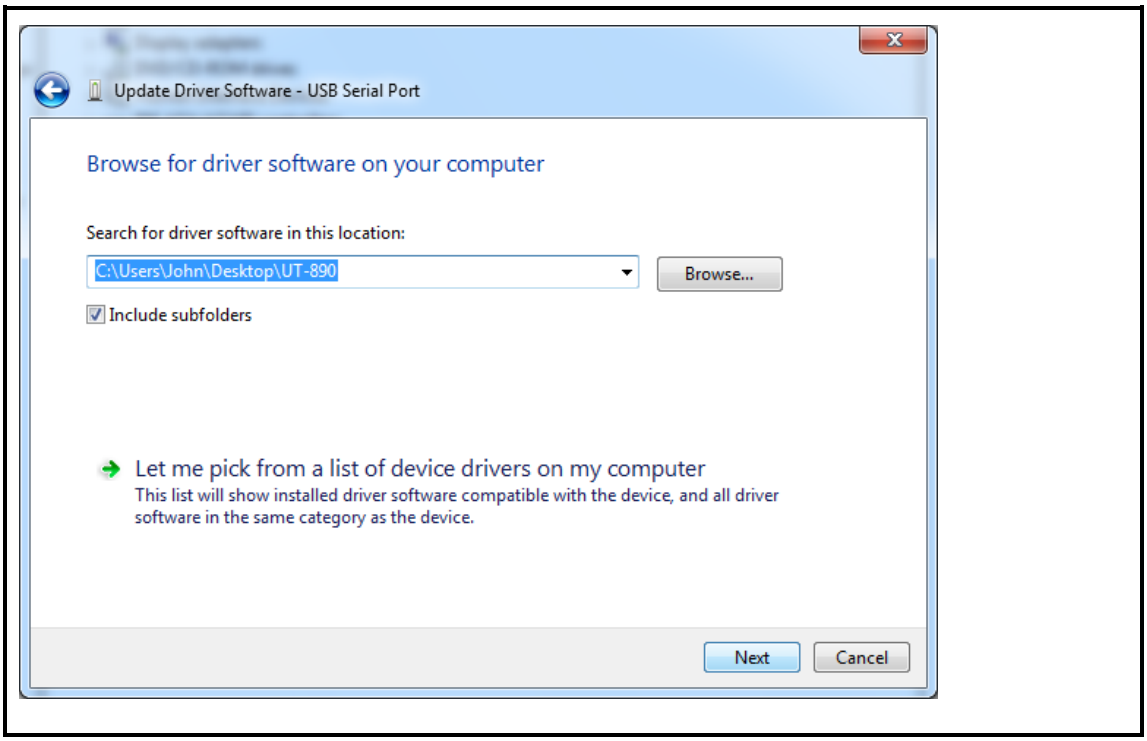

5、Finish installation of the first part



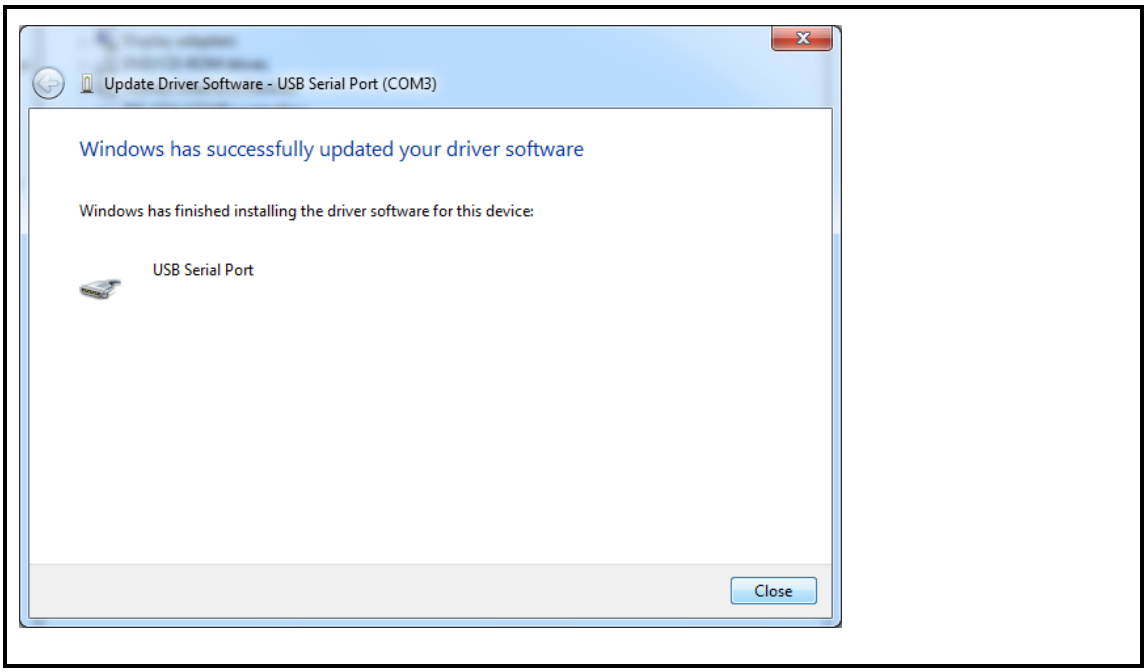

6、Open Management->Other devices-> "***USB Serial Port***" right click, then choose "***Update Driver Software***"



7、Choose the position of the Driver program，Click "***OK***" , then "***Next***"




8、Finishing installation

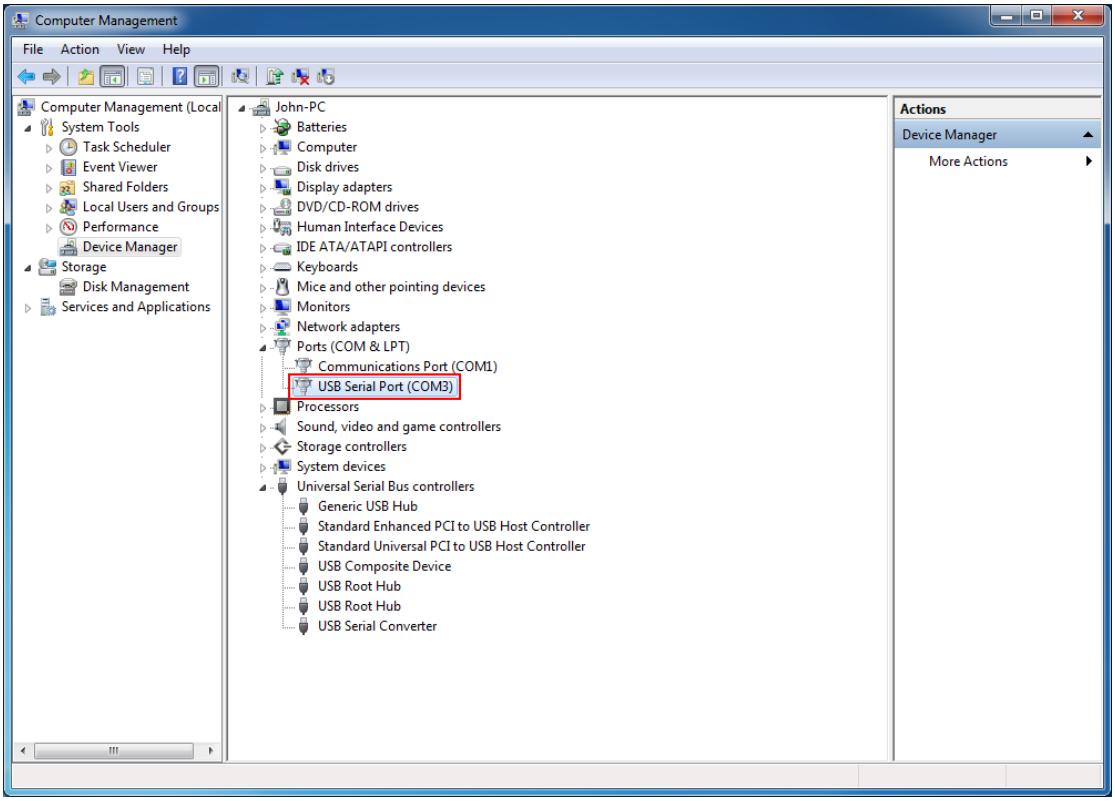


2. Check USB-485 COM

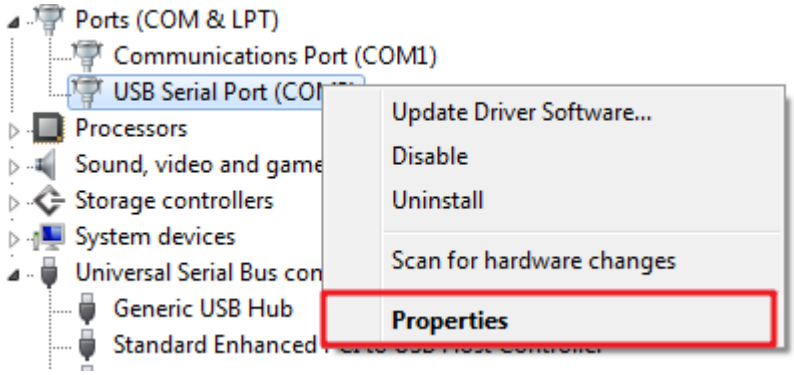
**1. Open the device manager**

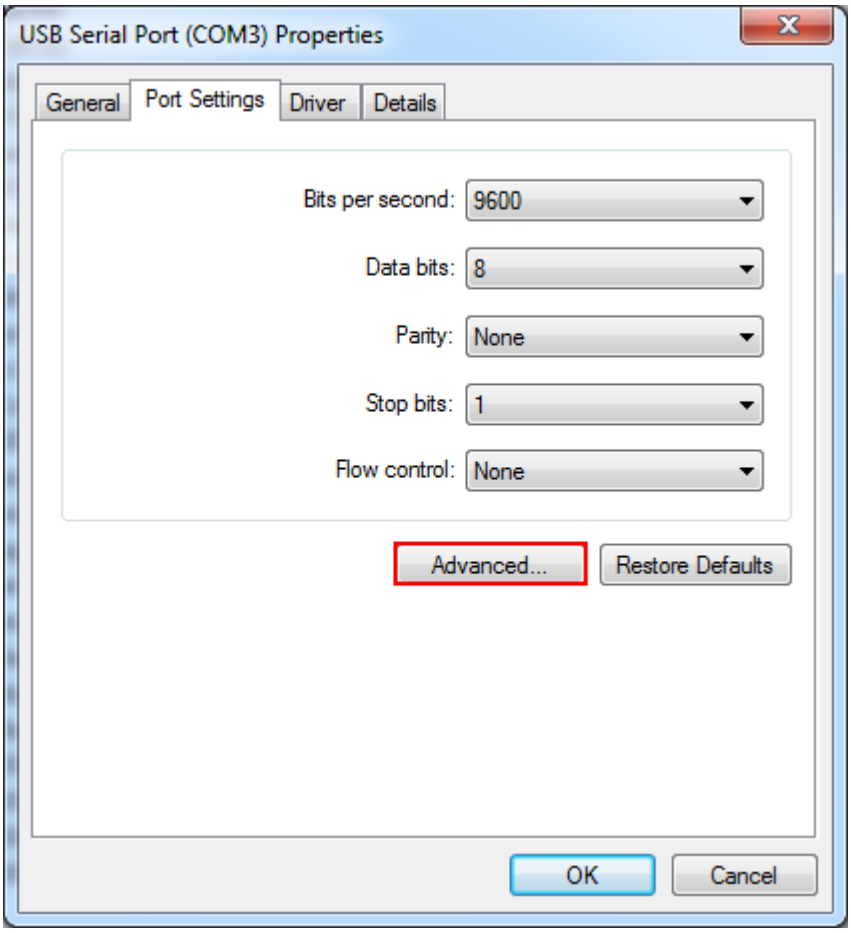
**(*Win 7 path is*:** Control Panel > device manager; ***Win XP path is:*** Control Panel > management tool > Computer Management > device manager. The following Win 7 system is taken as an example**)**

2. Click " *COM*" can check the USB-485 port "USB Serial Port(*COM x* ) "

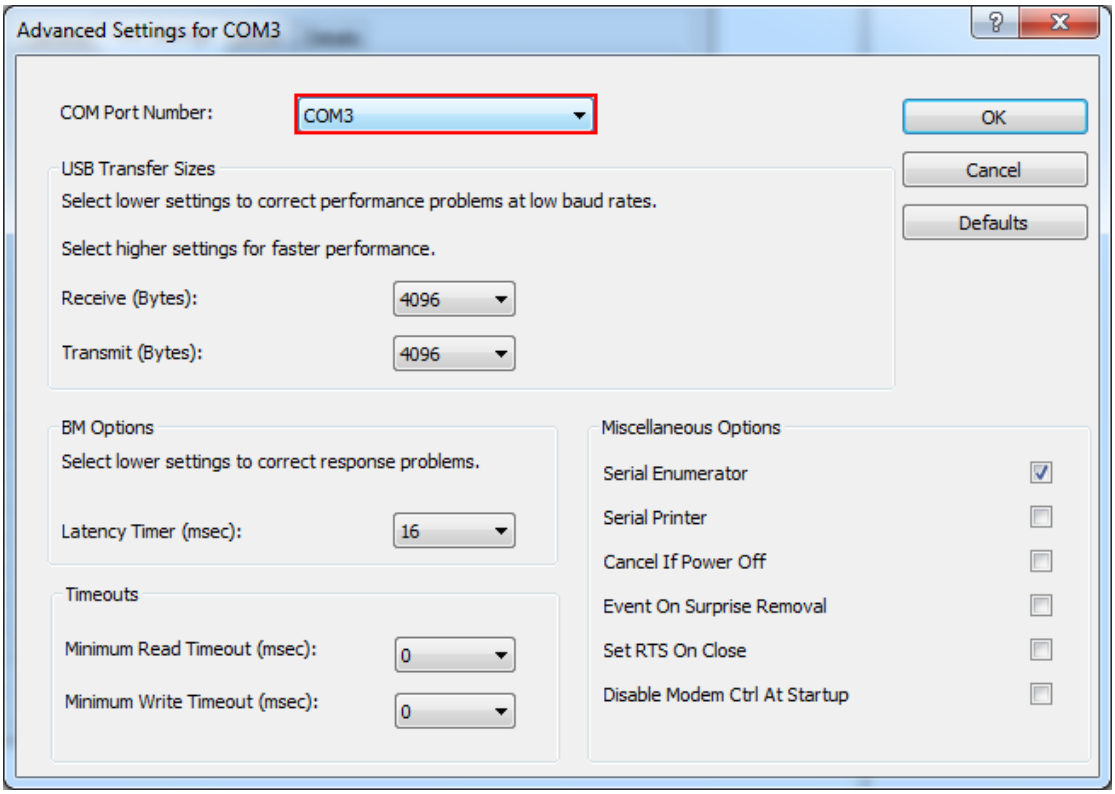


3. Change USB-485 COM

| |
|---|
| 1. Choose the "***USB serial port*** " , Choose "***attribute***" by right mouse button |
|  |
| 2. Click "***port setting***", then choose "***Advanced***" by left mouse button |



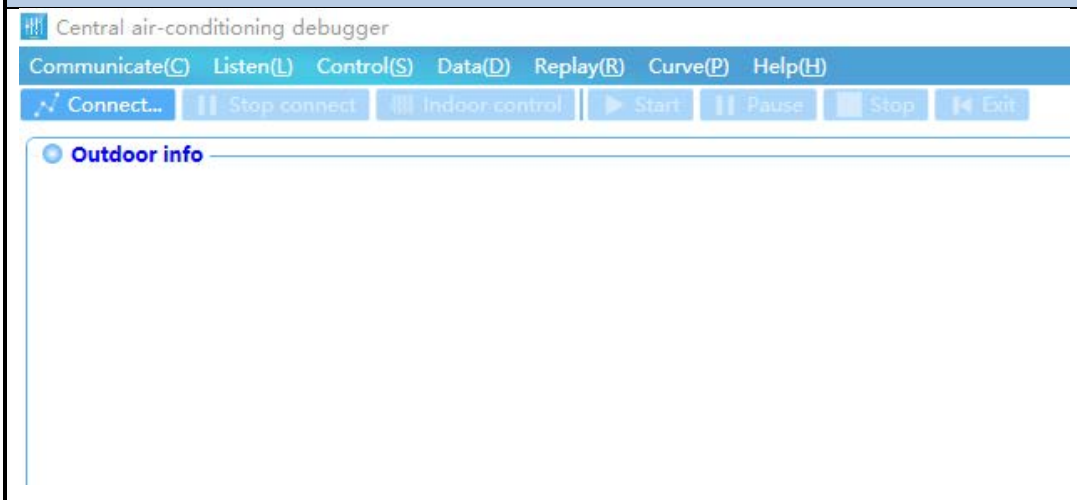

3. Through "***COM port***" choose a "***COM x***", then click "***OK***" to finish change


Advanced Settings for COM3
COM Port Number:
COM3
OK
Cancel
Defaults
USB Transfer Sizes
Select lower settings to correct performance problems at low baud rates.
Select higher settings for faster performance.
Receive (Bytes):
4096
Transmit (Bytes):
4096
BM Options
Select lower settings to correct response problems.
Latency Timer (msec):
16
Timeouts
Minimum Read Timeout (msec):
0
Minimum Write Timeout (msec):
0
Miscellaneous Options
Serial Enumerator
Serial Printer
Cancel If Power Off
Event On Surprise Removal
Set RTS On Close
Disable Modem Ctrl At Startup

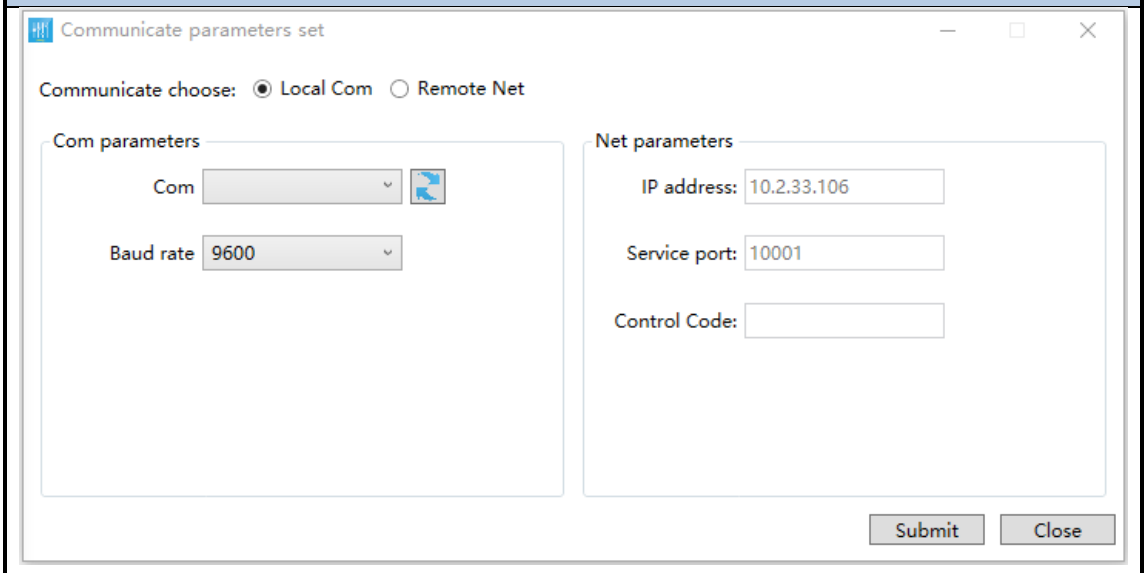
## 5.5 Function

1. Communication Port

1. Click " ***Connect*** " button

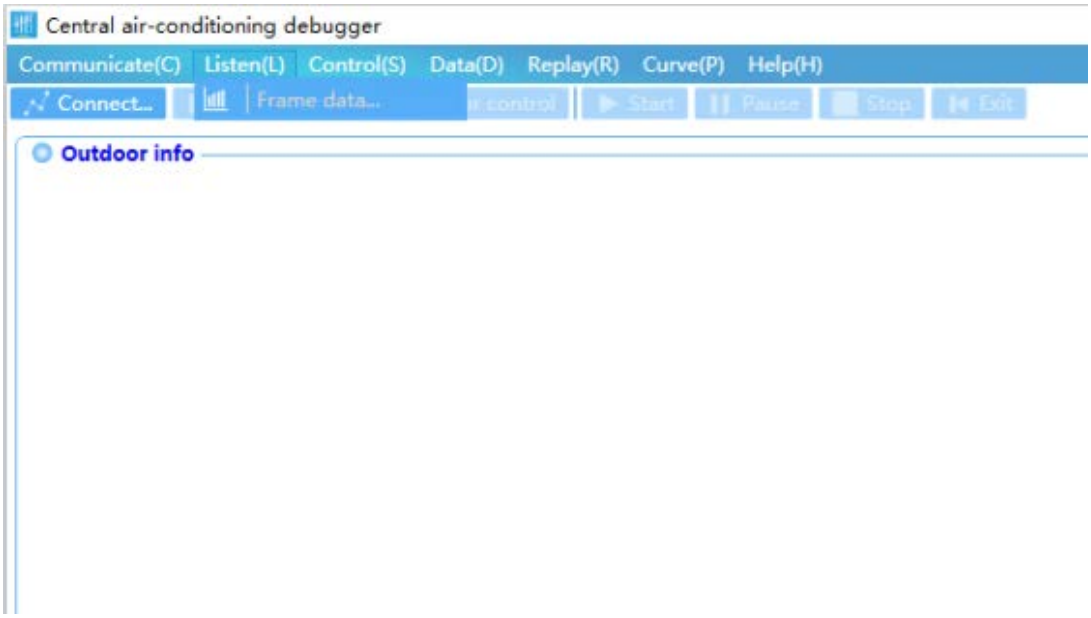


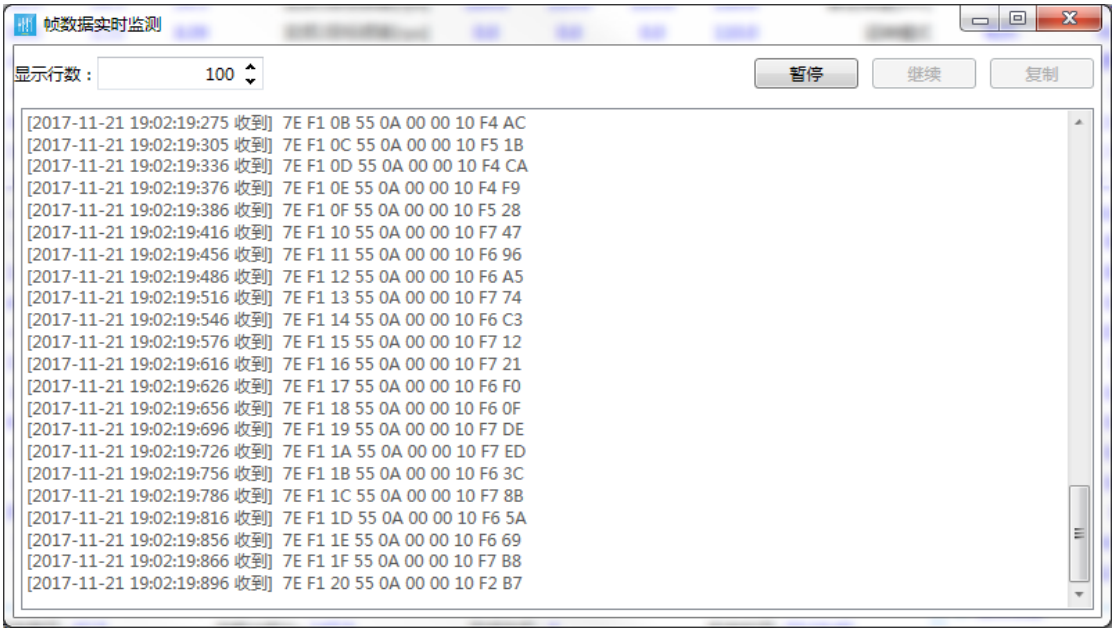

2. Choose " ***Com*** ", then click " ***Submit*** " to start



## 2. Data Frame

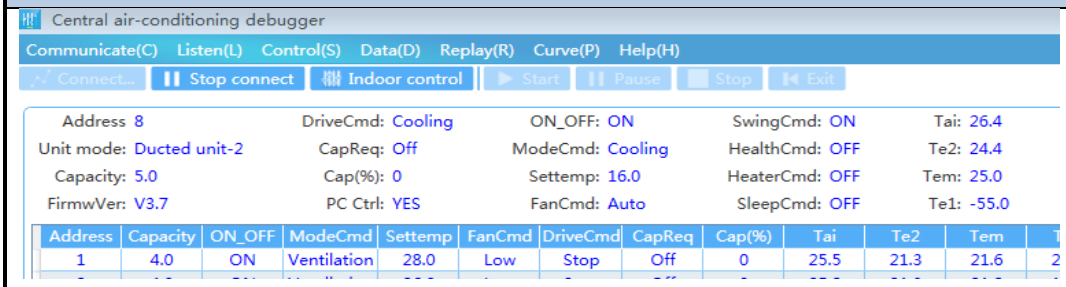
1. Click “ ***Listen(L)*** ” button, Choose” ***Frame date***”



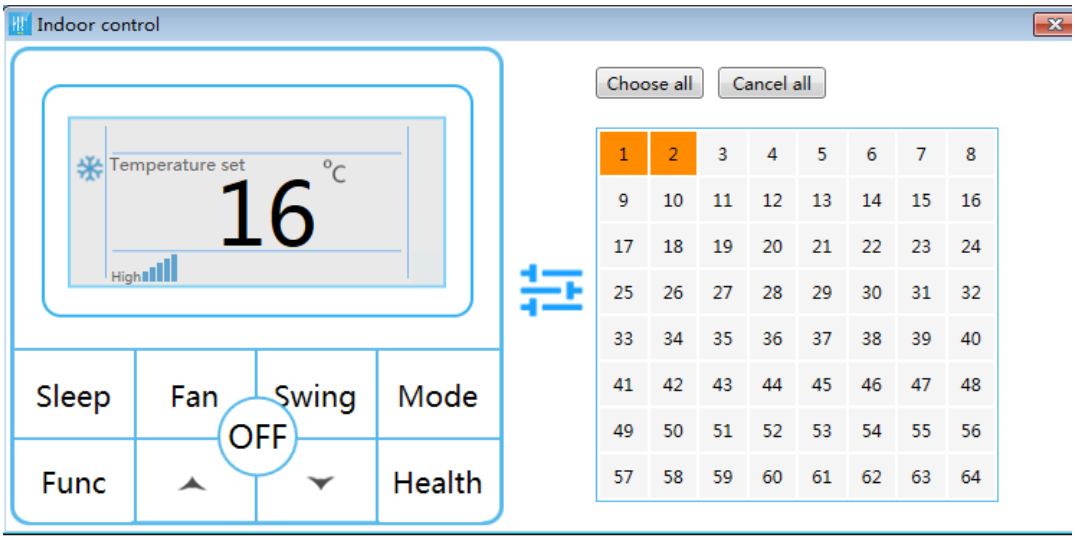



## 3. Control Indoor Unit

Click "***indoor control***" button, Pop-up the following window



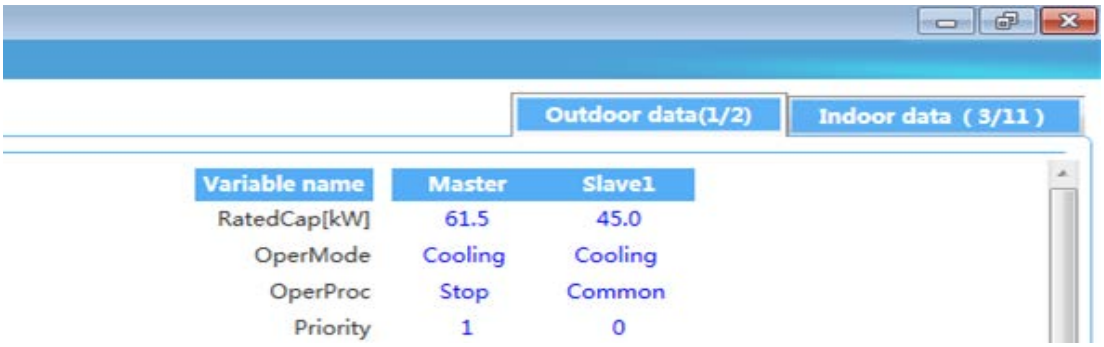

| Wired controller | Indoor units' IP address |
|---|---|



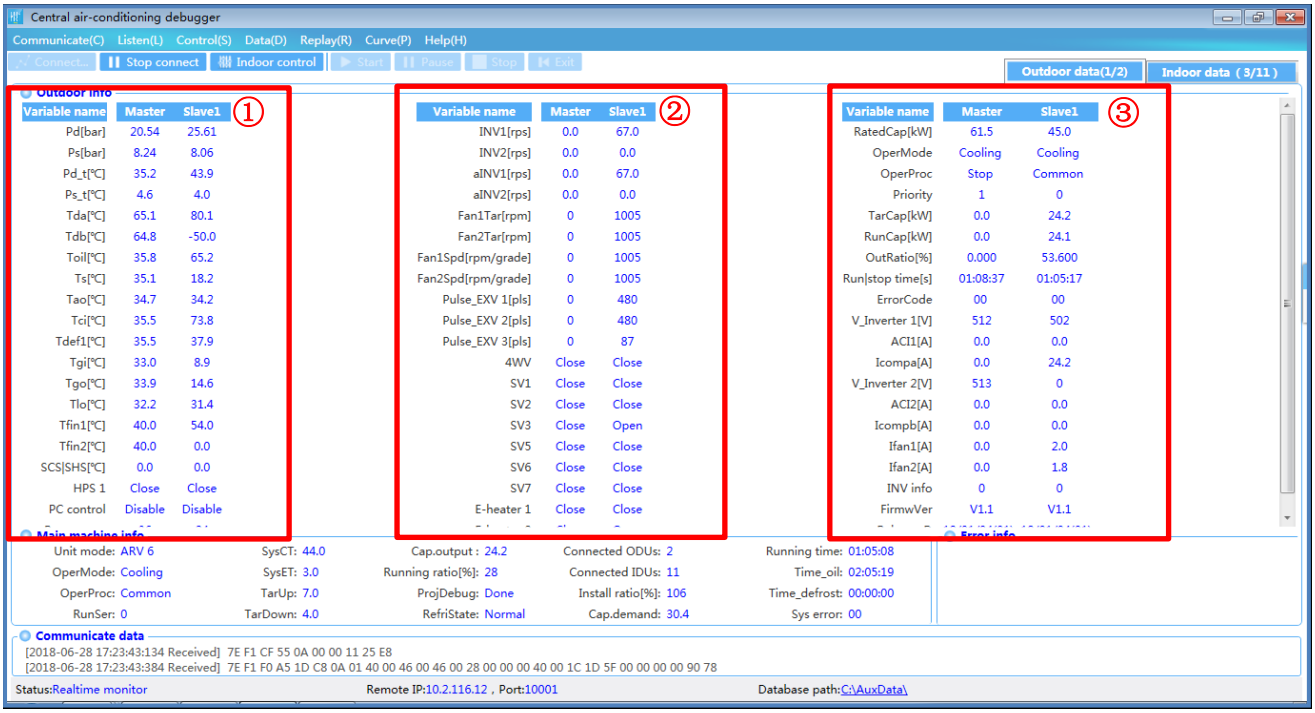
4. Operation Parameter Information

1. "***Outdoor data(1/2)***" means: The system had ***2 ODUs***, ***1 unit was running*** and ***another unit was standby***

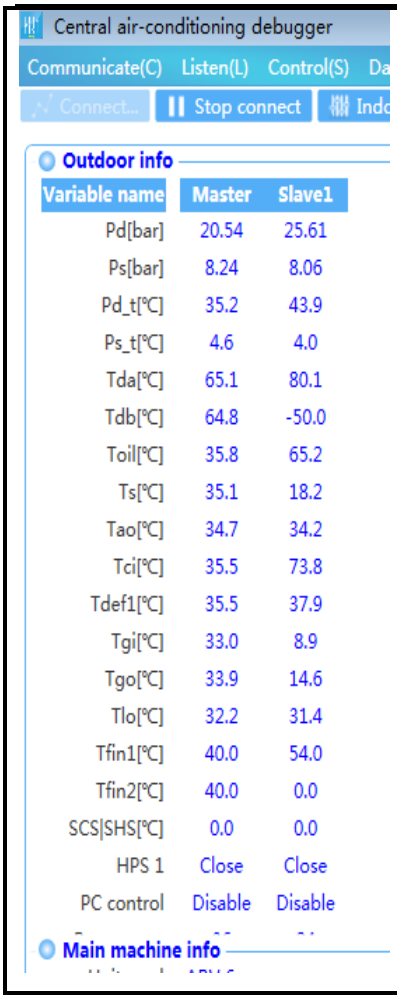
"***Indoor data(3/11)***" means: The system had ***11 IDUs***, ***3 units were running*** and ***8 units were standby***




2. Whole outdoor data interface




| NO. ① | Name | Detailed information | Reference |
|---|---|---|---|
| | $P_d$ [bar] | Discharge pressure ( ***1bar=0.1Mpa*** ) | **< 32bar** |
| | $P_s$ [bar] | Suction pressure ( ***1bar=0.1Mpa*** ) | **< 10bar** |
| | $P_{d_t}$ [℃] | Saturation temp. (***discharge*** pressure) | **/** |
| | $P_{s_t}$ [℃] | Saturation temp. (***suction*** pressure) | **/** |
| | $T_{da}$ [℃] | Discharge temp. (***1# Compressor***) | **< 92℃** |
| | $T_{db}$ [℃] | Discharge temp. (***2# Compressor***) | **< 92℃** |
| | $T_{oil}$ [℃] | Oil temp. | **/** |
| | $T_s$ [℃] | Suction temp. | **< 22℃** |
| | $T_{ao}$ [℃] | Outdoor ambient temp. | **/** |
| | $T_{ci1}$[℃] | Outlet temp. of condenser | **< 45℃** |
| | $T_{def1}$[℃] | Defrost temp. | **< 45℃** |
| | $T_{gi}$[℃] | Outlet temperature of PMV3 | **/** |




| | | |
|---|---|---|
| $T_{go}$[℃] | Outlet temperature of sub-cooler | ***/*** |
| $T_{lo}$[℃] | Liquid piping temperature of ODU | ≤Tci1[℃] |
| $T_{fin1}$[℃] | Temp. of 1# driver module | ***/*** |
| $T_{fin2}$[℃] | Temp. of 2# driver module | ***/*** |
| SCS[℃] | / | ***/*** |
| $H_{PS1}$ | High pressure switch state | **Close** |
| PC control | / | ***/*** |

| NO. ② | Name | Detailed information | Reference |
|---|---|---|---|
| | INV1[rps] | Target frequency ( ***1# Compressor*** ) | ***/*** |

| Variable name | Master | Slave1 |
|---|---|---|
| INV1[rps] | 0.0 | 67.0 |
| INV2[rps] | 0.0 | 0.0 |
| aINV1[rps] | 0.0 | 67.0 |
| aINV2[rps] | 0.0 | 0.0 |
| Fan1Tar[rpm] | 0 | 1005 |
| Fan2Tar[rpm] | 0 | 1005 |
| Fan1Spd[rpm/grade] | 0 | 1005 |
| Fan2Spd[rpm/grade] | 0 | 1005 |
| Pulse_EXV 1[pls] | 0 | 480 |
| Pulse_EXV 2[pls] | 0 | 480 |
| Pulse_EXV 3[pls] | 0 | 87 |
| 4WV | Close | Close |
| SV1 | Close | Close |
| SV2 | Close | Close |
| SV3 | Close | Open |
| SV5 | Close | Close |
| SV6 | Close | Close |
| SV7 | Close | Close |
| E-heater 1 | Close | Close |

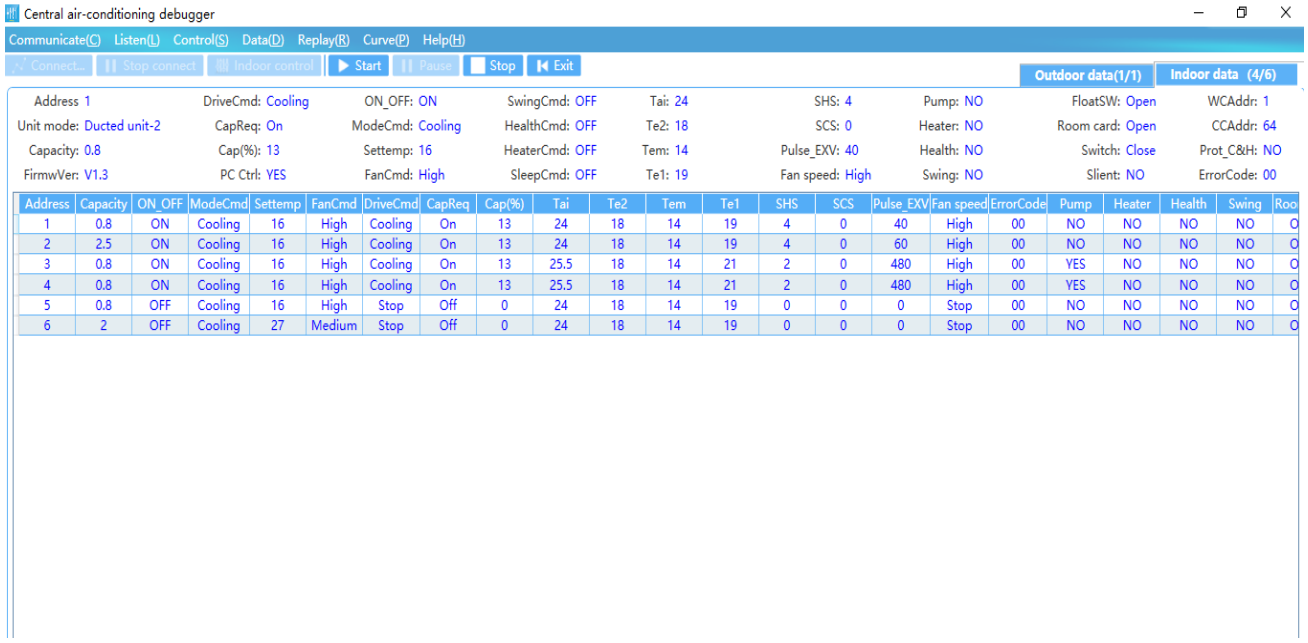
| | | |
|---|---|---|
| INV2[rps] | Target frequency ( ***2# Compressor*** ) | ***/*** |
| aINV1[rps] | Running frequency ( ***1# Compressor*** ) | ***/*** |
| aINV2[rps] | Running frequency ( ***2# Compressor*** ) | / |
| Fan1Tar | Target rpm ( ***1# motor*** ) | / |
| Fan2Tar | Target rpm ( ***2# motor*** ) | / |
| Fan1Spd | Running rpm ( ***1# motor*** ) | / |
| Fan2Spd | Running rpm ( ***2# motor*** ) | / |
| Pluse_EXV1 | Pluse_EXV1 ( **heating** ) | **480(cooling)** |
| Pluse_EXV2 | Pluse_EXV2 (**heating**) | **480(cooling)** |
| Pluse_EXV3 | Pluse_EXV3( **sub-cooling** ) | / |
| 4WV | 4-way valve (**heating**) | **Close(cooling)** |
| SV1 | Unloading valve | / |
| SV2 | / | / |
| SV3 | Sub-cooling valve | **Open(cooling)** |
| SV5 | Vapor injection valve ( ***1# Comp.*** ) | **Open(heating)** |
| SV6 | Vapor injection valve ( ***2# Comp.*** ) | **Open(heating)** |
| SV7 | / | / |
| E-heater1 | Preheating ( ***1# Compressor*** ) | / |
| E-heater1 | Preheating ( ***2# Compressor*** ) | / |

| NO. ③ | Name | Detailed information | Reference |
|---|---|---|---|

| Variable name | Master | Slave1 |
|---|---|---|
| RatedCap[kW] | 61.5 | 45.0 |
| OperMode | Cooling | Cooling |
| OperProc | Stop | Common |
| Priority | 1 | 0 |
| TarCap[kW] | 0.0 | 24.2 |
| RunCap[kW] | 0.0 | 24.1 |
| OutRatio[%] | 0.000 | 53.600 |
| Run\|stop time[s] | 01:08:37 | 01:05:17 |
| ErrorCode | 00 | 00 |
| V_Inverter 1[V] | 512 | 502 |
| ACI1[A] | 0.0 | 0.0 |
| Icompa[A] | 0.0 | 24.2 |
| V_Inverter 2[V] | 513 | 0 |
| ACI2[A] | 0.0 | 0.0 |
| Icompb[A] | 0.0 | 0.0 |
| Ifan1[A] | 0.0 | 2.0 |
| Ifan2[A] | 0.0 | 1.8 |
| INV info | 0 | 0 |
| FirmwVer | V1.1 | V1.1 |

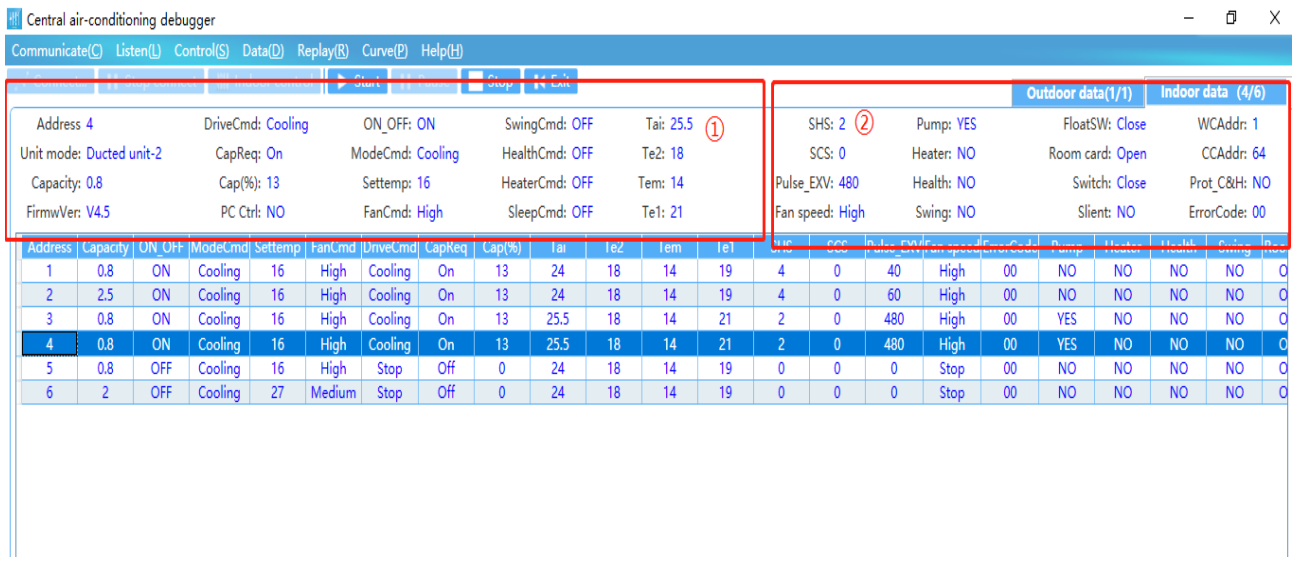
| | | |
|---|---|---|
| Rated Cap [kW] | Outdoor capacity | **Nameplate** |
| Oper Mode | Operating Mode | **/** |
| Oper Proc | Operating process state | **Oil return/Comm** |
| Priority | Priority | 1/0 |
| TarCap | Target output capacity | 0~100 |
| RunCap | Running output capacity | 0~100 |
| OutRatio | Target output capacity/ Outdoor capacity | / |
| Run/Stop | Running time | / |
| Error Code | Error Code | / |
| V_Inverter1 | Busbar voltage ( ***1# Compressor*** ) | 512 |
| ACI1[A] | 1# Drive module current input | |
| Icompa[A] | Current ( ***1# Compressor*** ) | **Nameplate** |
| V_Inverter2 | Busbar voltage ( ***2# Compressor*** ) | 512 |
| ACI2A] | 2# Drive module current input | |
| IcompbA] | Current ( ***2# Compressor*** ) | **Nameplate** |
| Ifan1[A] | Current ( ***1# Fan Motor*** ) | **Nameplate** |
| Ifan2A] | Current ( ***2# Fan Motor*** ) | **Nameplate** |

## 3. Whole Indoor data interface



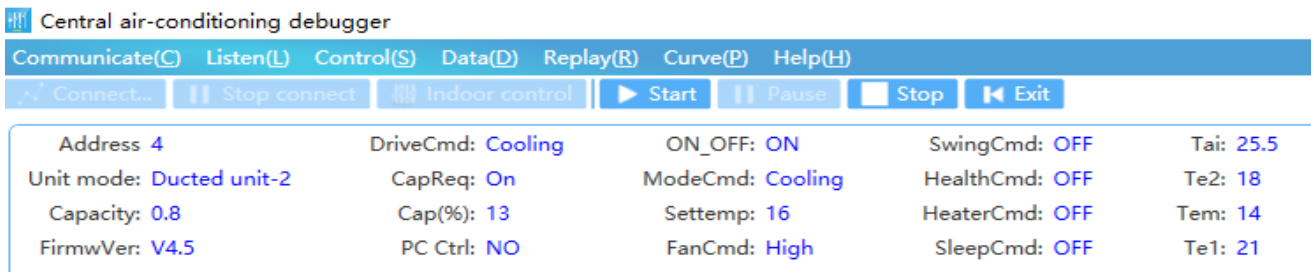

| Address | Capacity | ON_OFF | ModeCmd | Settemp | FanCmd | DriveCmd | CapReq | Cap(%) | Tai | Te2 | Tem | Te1 | SHS | SCS | Pulse_EXV | Fan speed | ErrorCode | Pump | Heater | Health | Swing | Roo |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.8 | ON | Cooling | 16 | High | Cooling | On | 13 | 24 | 18 | 14 | 19 | 4 | 0 | 40 | High | 00 | NO | NO | NO | NO | O |
| 2 | 2.5 | ON | Cooling | 16 | High | Cooling | On | 13 | 24 | 18 | 14 | 19 | 4 | 0 | 60 | High | 00 | NO | NO | NO | NO | O |
| 3 | 0.8 | ON | Cooling | 16 | High | Cooling | On | 13 | 25.5 | 18 | 14 | 21 | 2 | 0 | 480 | High | 00 | YES | NO | NO | NO | O |
| 4 | 0.8 | ON | Cooling | 16 | High | Cooling | On | 13 | 25.5 | 18 | 14 | 21 | 2 | 0 | 480 | High | 00 | YES | NO | NO | NO | O |
| 5 | 0.8 | OFF | Cooling | 16 | High | Stop | Off | 0 | 24 | 18 | 14 | 19 | 0 | 0 | 0 | Stop | 00 | NO | NO | NO | NO | O |
| 6 | 2 | OFF | Cooling | 27 | Medium | Stop | Off | 0 | 24 | 18 | 14 | 19 | 0 | 0 | 0 | Stop | 00 | NO | NO | NO | NO | O |

***Choose a line***(one of the indoor unit), then the ***detailed information*** of this indoor unit ***will be displayed*** above this line ( ① & ② )



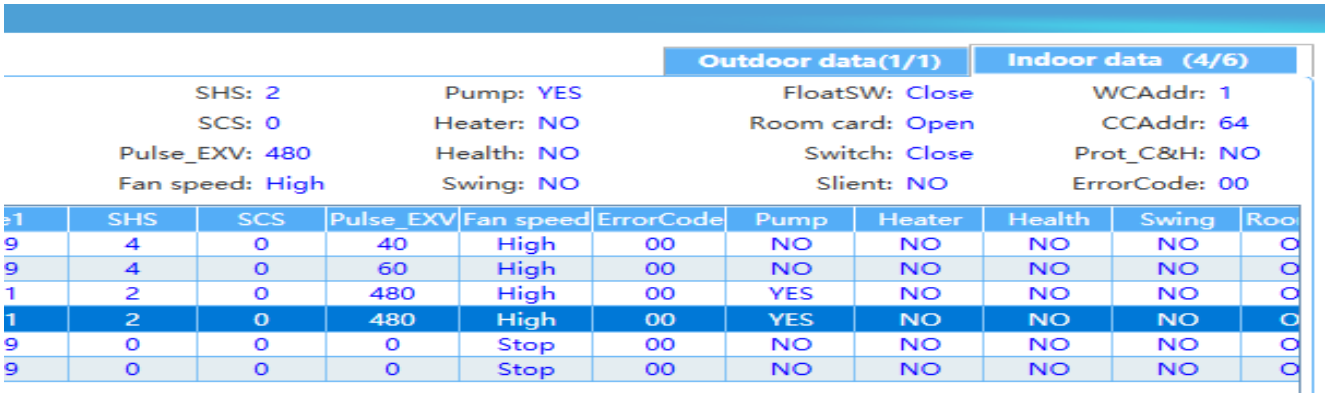

| Address | Capacity | ON_OFF | ModeCmd | Settemp | FanCmd | DriveCmd | CapReq | Cap(%) | Tai | Te2 | Tem | Te1 | SHS | SCS | Pulse_EXV | Fan speed | ErrorCode | Pump | Heater | Health | Swing | Roo |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.8 | ON | Cooling | 16 | High | Cooling | On | 13 | 24 | 18 | 14 | 19 | 4 | 0 | 40 | High | 00 | NO | NO | NO | NO | O |
| 2 | 2.5 | ON | Cooling | 16 | High | Cooling | On | 13 | 24 | 18 | 14 | 19 | 4 | 0 | 60 | High | 00 | NO | NO | NO | NO | O |
| 3 | 0.8 | ON | Cooling | 16 | High | Cooling | On | 13 | 25.5 | 18 | 14 | 21 | 2 | 0 | 480 | High | 00 | YES | NO | NO | NO | O |
| 4 | 0.8 | ON | Cooling | 16 | High | Cooling | On | 13 | 25.5 | 18 | 14 | 21 | 2 | 0 | 480 | High | 00 | YES | NO | NO | NO | O |
| 5 | 0.8 | OFF | Cooling | 16 | High | Stop | Off | 0 | 24 | 18 | 14 | 19 | 0 | 0 | 0 | Stop | 00 | NO | NO | NO | NO | O |
| 6 | 2 | OFF | Cooling | 27 | Medium | Stop | Off | 0 | 24 | 18 | 14 | 19 | 0 | 0 | 0 | Stop | 00 | NO | NO | NO | NO | O |

## NO. ①




| Name | Detailed information | Reference |
|---|---|---|
| Address | Indoor unit IP address | |
| Unit Mode | Type of indoor unit | |
| Capacity | Indoor unit's capacity | **Nameplate** |
| FirmwVer | / | |
| DriveCmd | Drive mode state | |
| CapRed | Demand state | |
| Cap(%) | Capacity ration | |
| PC Ctrl | / | |
| ON_OFF | ON/OFF state | |
| ModeCmd | Setting Mode | |
| Settemp | Setting temperature | |
| FanCmd | Setting fan speed | |
| SwingCmd | Setting swing mode | |
| HealthCmd | Health mode | |
| HeaterCmd | Electric auxiliary heat mode | |
| SleepCmd | Sleep mode | |
| Tai | Room temperature | |
| Te2 | Inlet temperature of evaporator | |
| Tem | Mid temperature of evaporator | |
| Te1 | Outlet temperature of evaporator | |

## NO. ②



Outdoor data(1/1) | Indoor data (4/6)

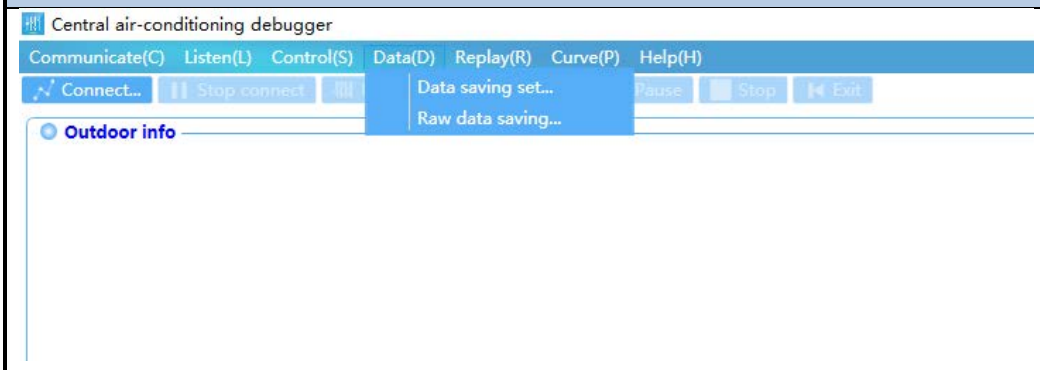
| | | | |
|---|---|---|---|
| SHS: 2 | Pump: YES | FloatSW: Close | WCAddr: 1 |
| SCS: 0 | Heater: NO | Room card: Open | CCAddr: 64 |
| Pulse_EXV: 480 | Health: NO | Switch: Close | Prot_C&H: NO |
| Fan speed: High | Swing: NO | Slient: NO | ErrorCode: 00 |

| 1 | SHS | SCS | Pulse_EXV | Fan speed | ErrorCode | Pump | Heater | Health | Swing | Roo |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 4 | 0 | 40 | High | 00 | NO | NO | NO | NO | O |
| 9 | 4 | 0 | 60 | High | 00 | NO | NO | NO | NO | O |
| 1 | 2 | 0 | 480 | High | 00 | YES | NO | NO | NO | O |
| 1 | 2 | 0 | 480 | High | 00 | YES | NO | NO | NO | O |
| 9 | 0 | 0 | 0 | Stop | 00 | NO | NO | NO | NO | O |
| 9 | 0 | 0 | 0 | Stop | 00 | NO | NO | NO | NO | O |

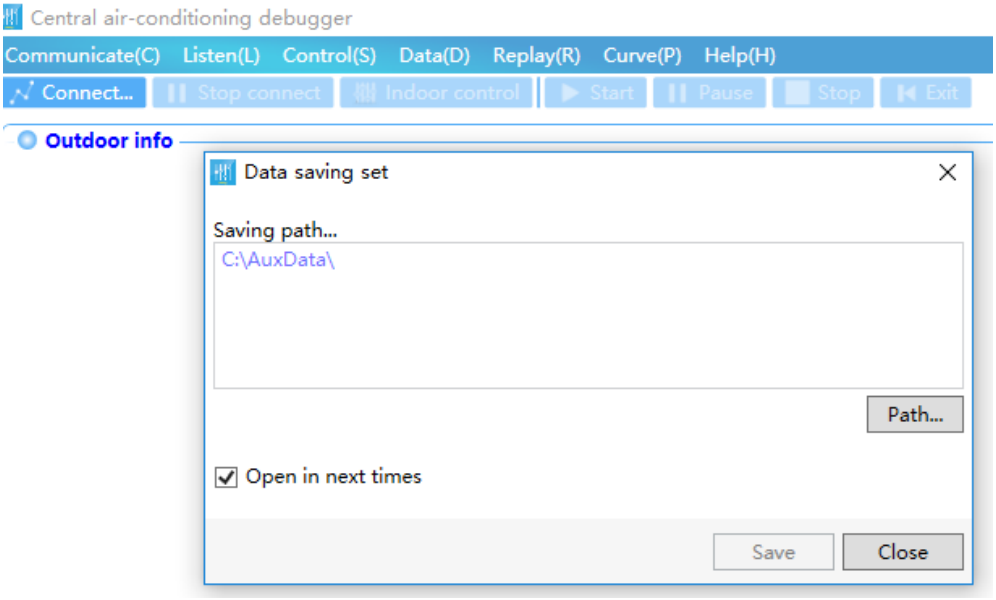
| Name | Detailed information | Reference |
|---|---|---|
| SHS | Super-heat | |
| SCS | Sub-cooled | |
| Pulse_EXV | Pulse_EXV | **100~300** |
| Fan speed | Fan speed state | |
| Pump | Pump | |
| Heater | Electric auxiliary heat | |
| Health | Health | |
| Swing | Swing | |
| FloatSW | Float switch state | |
| Room card | Room card state | |
| Switch | / | |
| Slient | Slient mode | |
| WCAddr | Wired controller address | |
| CCAddr | Central controller address | |
| Prot_C&H | Protect of super-heat state | |
| Error code | Error code | |

5. Operation Parameter Save

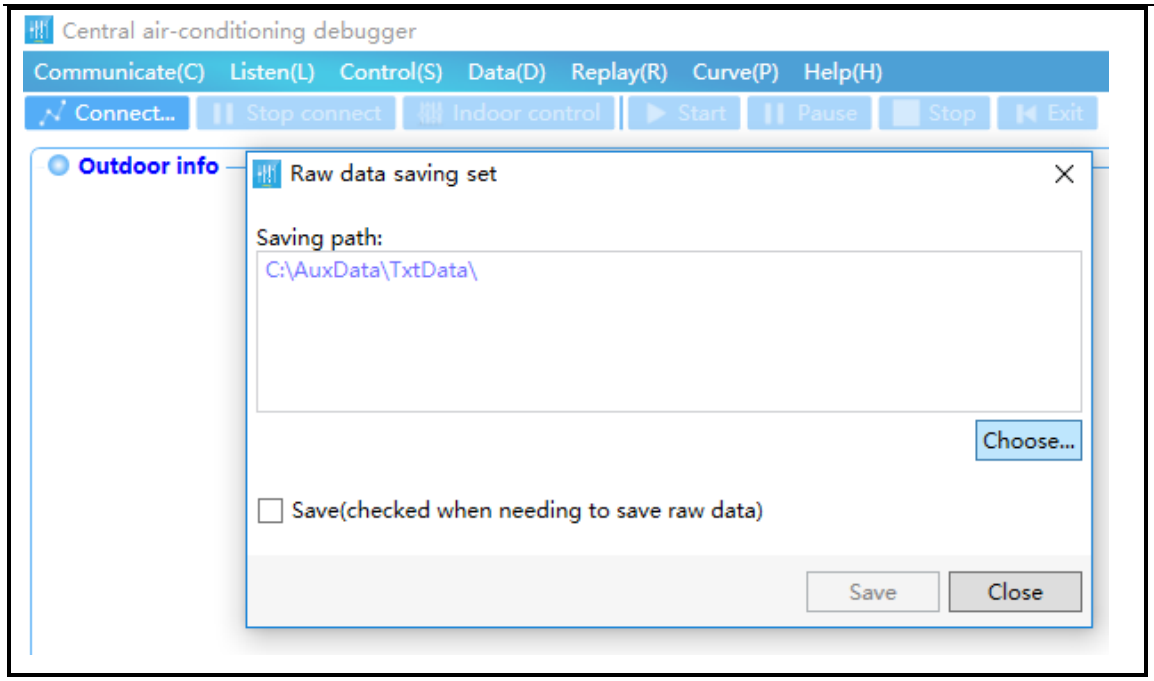
1. Click "***Data***" button




2. Choose "***Data save setting***" button

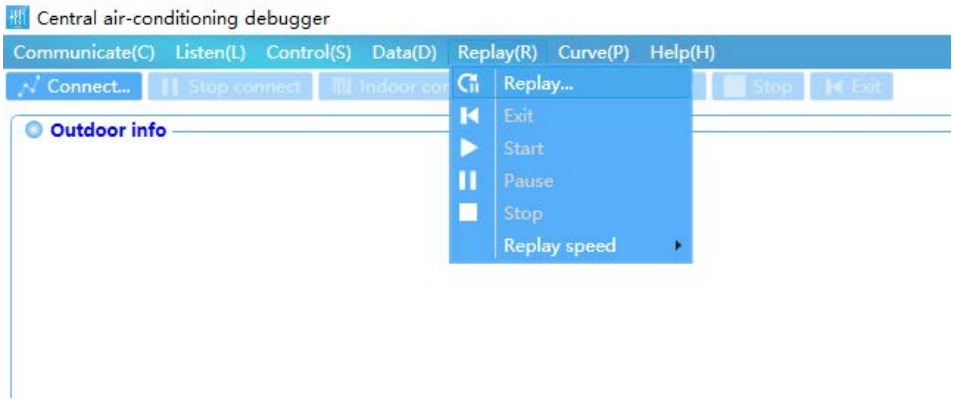



3. Choose "***Raw Data save setting***" button

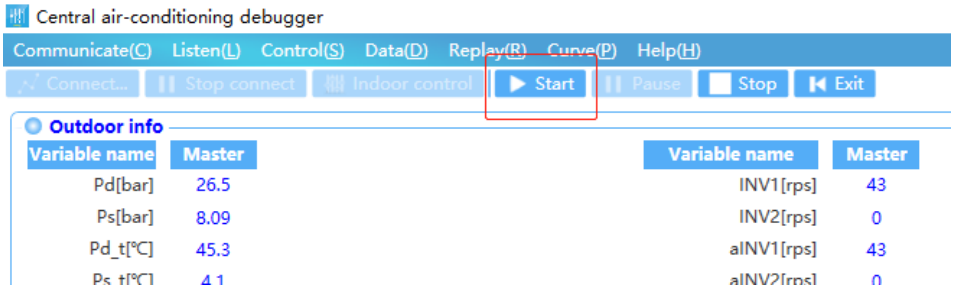



6. Operation Parameter Replay

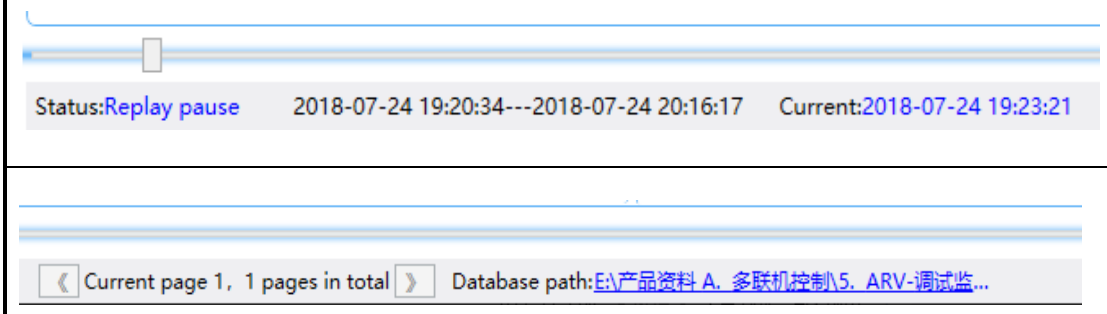
1. Click "***Replay(R)*** " button, choose a data file to replay




2. Click "***Start***" button to replay

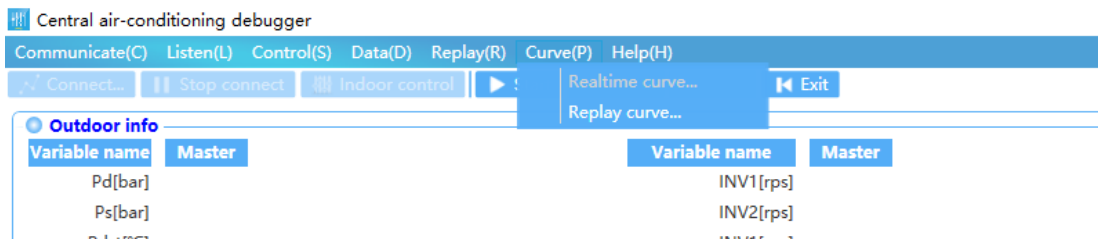



3. Replay progress, replay time, data path were displayed at the bottom.




7. Operation Parameter Curve

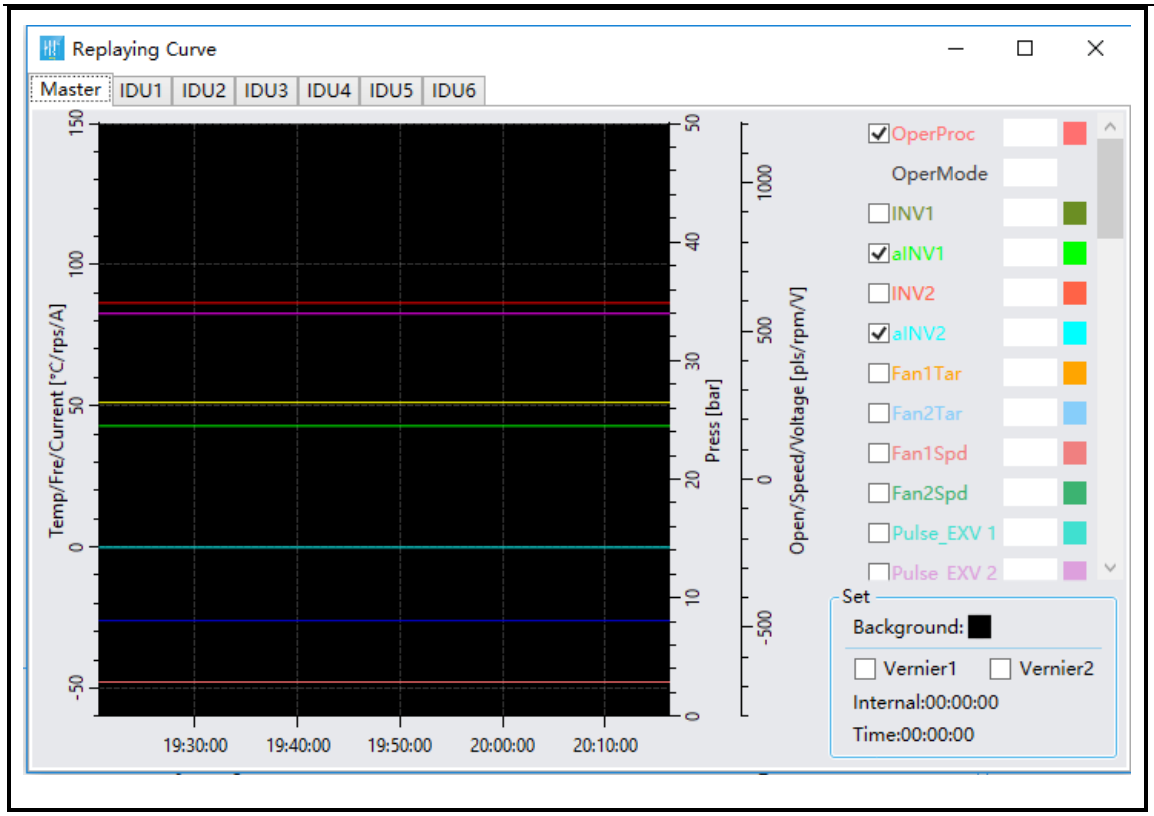
1. Click " ***Curve(P)***" button




2. ***The curve***

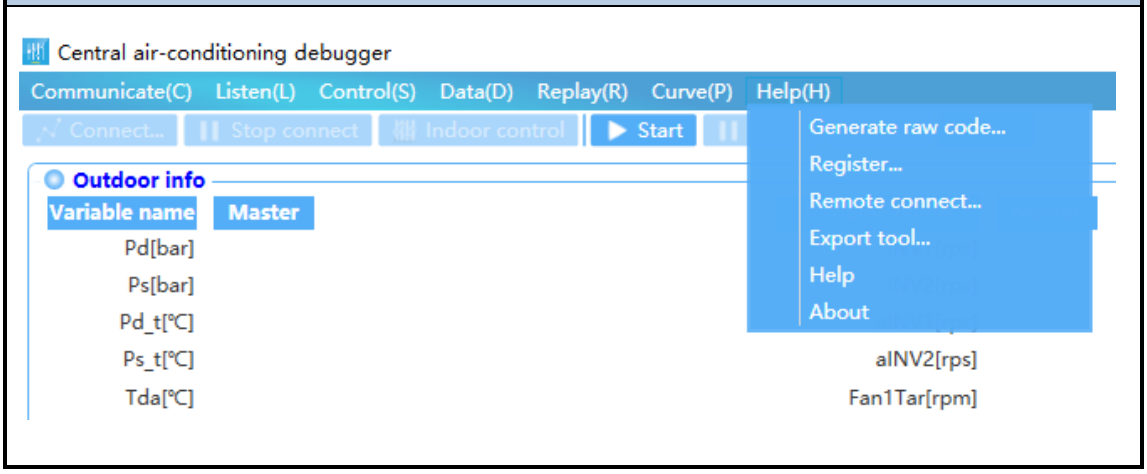
Can show all parameters which changing according the time

Can read the real time parameters within recent 30 min




## 8. Operation Manual

1. Click "***Help(H)*** " button ,then choose "***Help***" to open the operation manual



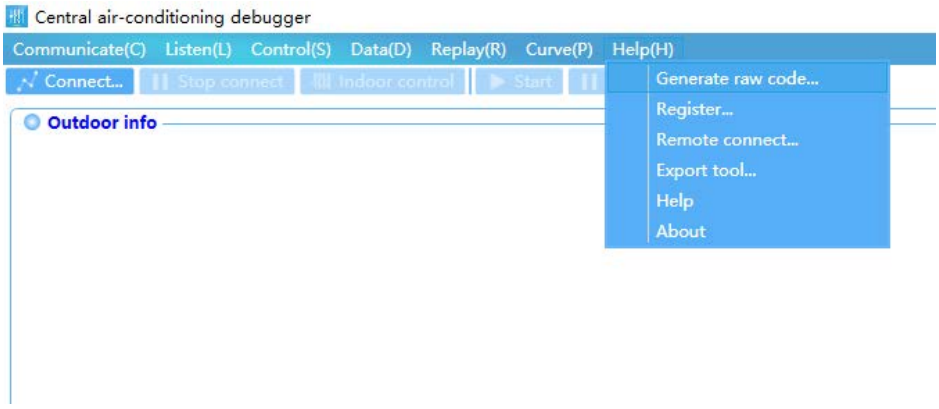
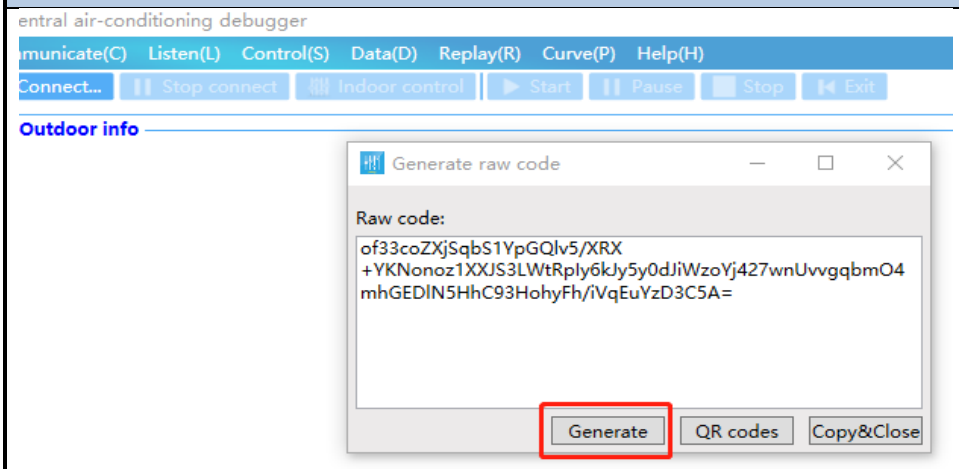
## 5.5 Registration

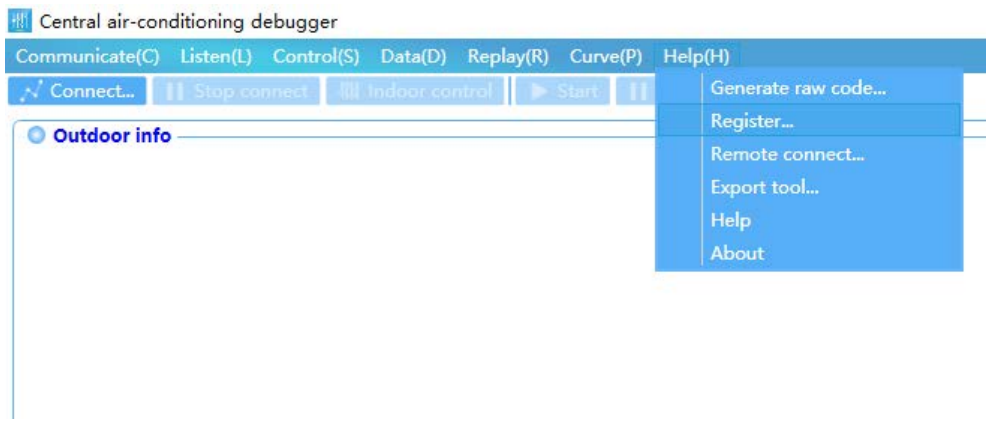
1. Permission Description

The software's default state is the unregistered which can ***read real-time parameter***, ***operation data's save***, ***indoor units' control***, ***operation parameter's curve***

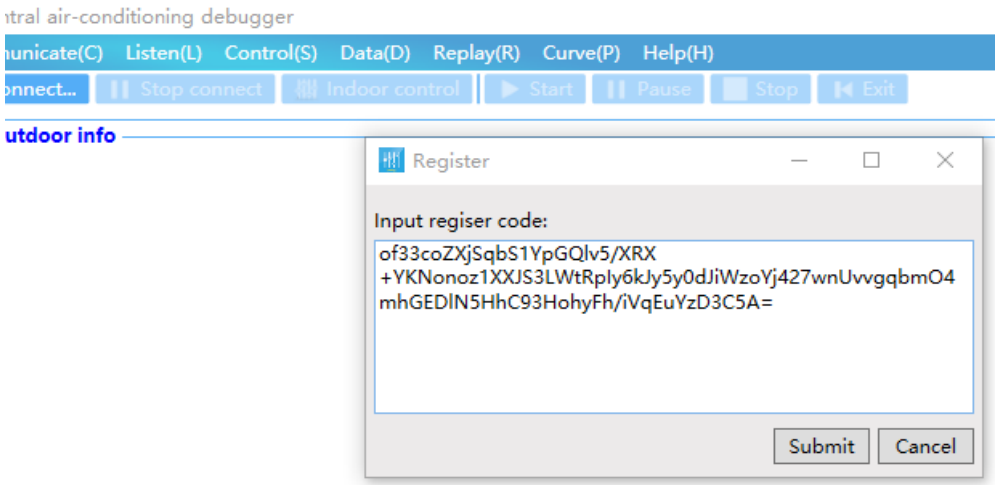
Parameter data ***replay*** function ***need to be registered***, otherwise, cannot replay data

2. Registration Steps

| |
|---|
| 1. Click "***Help(H)*** " button to choose "***Generate raw code***", |
|  |
| 2. Click "***Generate***" |
|  |
| 3. ***Copy raw code***, then ***send to technical*** support engineer |
| 4. Technical support engineer ***provide registration code*** |
| 5. Click "***Help(H)*** " button to choose "***Register***" |




5. Input the Register and finish



# 6. IDU Parameter setting by Controller

## 6.1 Parameter Setting Items

| No. | Parameter Setting Items | Default value | Min. value | Max. value | Remark |
|---|---|---|---|---|---|
| 1 | Communication ID address | 1 | 1 | 64 | |
| 2 | Centralized ID address | 1 | 1 | 64 | |
| 3 | wired controller ID address | 1 | 1 | 16 | |
| 4 | model of indoor unit | 1 | 0 | **35** | 01 :50HZ Low ESP Duct *(Drain Pump)*<br>01 :Mid ESP Duct *(Drain Pump)*<br>02 :High ESP Duct (*Within 60K*)<br>02 :High ESP Duct *(2 Pipes systems, 22.28.45.54kw)*<br>10 :Cassette Unit C7 Type *(09-18K)*<br>10 :DC Cassette Unit E Type *(09-18K)*<br>11 :DC Cassette Unit (*24-48K,MB12*)<br>12 :DC Mid ESP Duct<br>13 :Ceiling & Floor Unit<br>22 :Fresh Air Processor (*1 pipe system, 22.28kw*)<br>23 :AHU<br>24 :Mid ESP duct ( *Optional Drain Pump)*<br>24 :60HZ low ESP duct *( Drain Pump)*<br>24 :DC low ESP duct (*Drain Pump)*<br>24 :AC low ESP duct *(Optional Drain Pump )*<br>26 :DC E type Low ESP Duct<br>28 :One way cassette<br>30 :Two way cassette<br>32 :Wall - Mounted (*L Type* )<br>34 :Fresh Air Processor (*2 Pipe system, 22.28kw*)<br>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<br>1--priority 1<br>2--priority 2<br>3--priority 3 |
| 7 | selection of room silent mode | 0 | 0 | 1 | 0--normal<br>1--silent mode |
| 8 | auto restart function of indoor unit | 1 | 0 | 1 | 0—Available<br>1--not available |
| 9 | room card selection | 0 | 0 | 1 | 0--invalid room card<br>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]<br>1--[heating] [dehumidification][cooling][ventilation]<br>2-- [dehumidification][cooling][ventilation] |
| 12 | installation height of indoor unit | 0 | 0 | 1 | 0-- installation height is lower than 2.7m<br>1--installation height is higher than 2.7m |
| 13 | switching between Celsius degree and Fahrenheit | 0 | 0 | 1 | 0--Celsius degree<br>1--Fahrenheit |
| 14 | display of room temperature | 0 | 0 | 1 | 0-- room temperature not to be displayed<br>1-- room temperature to be displayed |
| 15 | selection of room temperature | 0 | 0 | 1 | 0-- temperature sensor of return air<br>1--temperature sensor of wired controller |

## 6.2 Parameter setting by YK – L

### 6.2.1 Enter the setting interface

① Make 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***

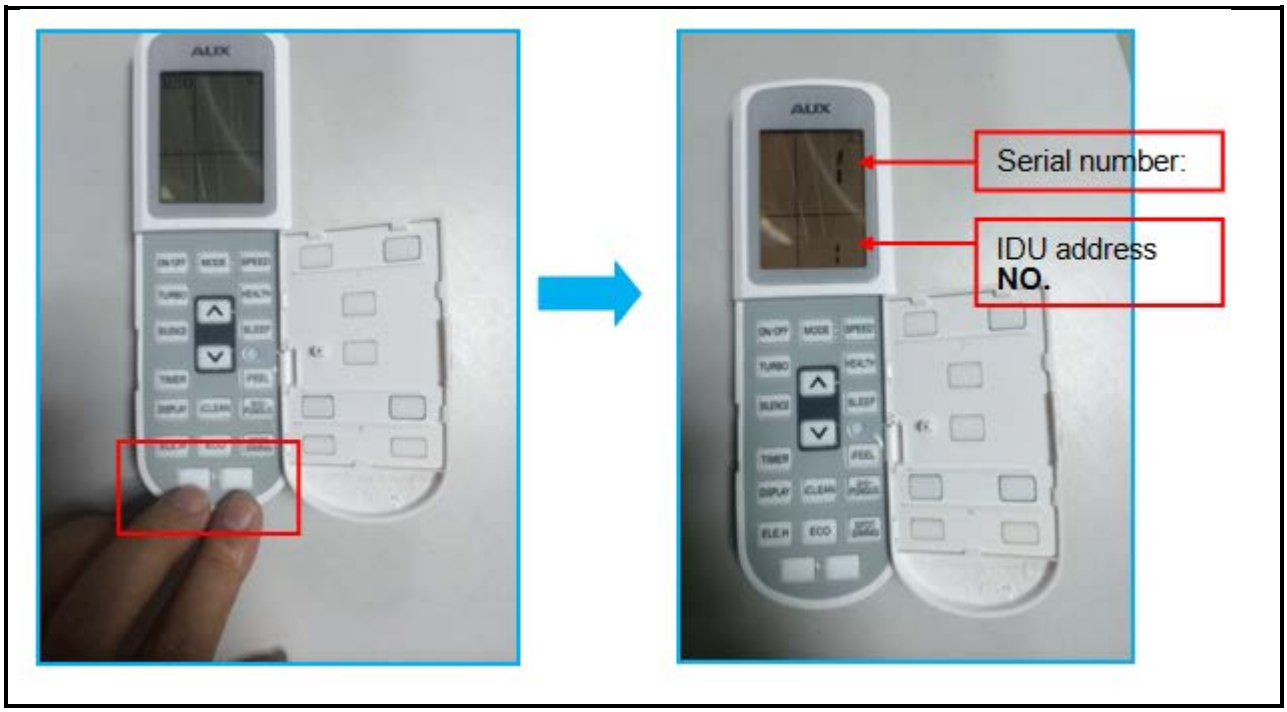
⑤ the below number means：Meaning of parameter correspondence

**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 )***

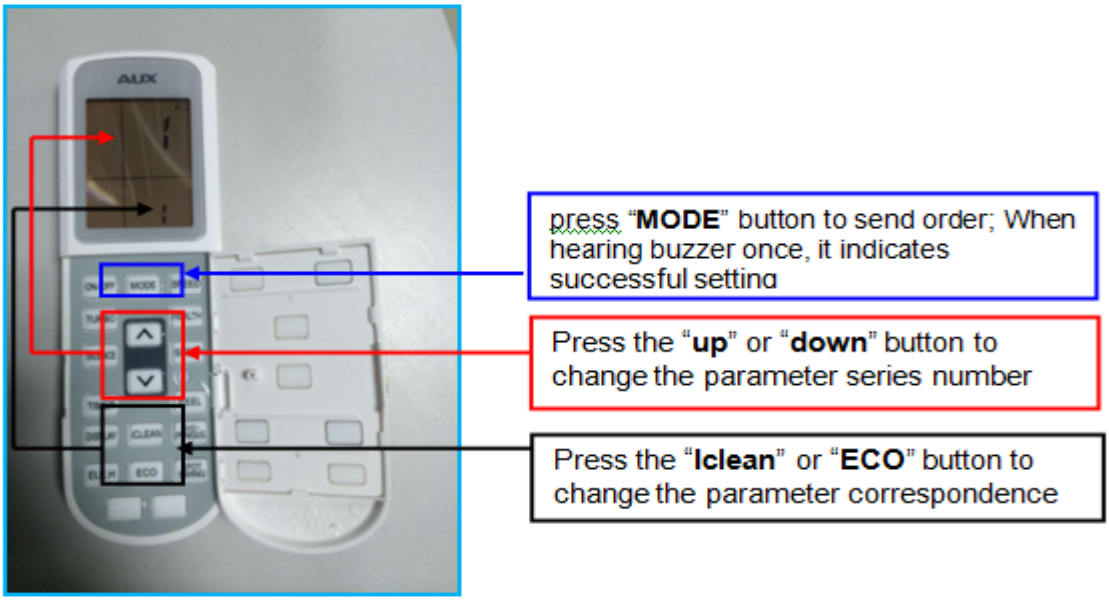


### 6.2.2 Parameter Setting

1. Press the **[∧]** or **[∨]** button to change the parameter series number

2. Press the **[IClean]** or **[ECO]** button to change the parameter correspondence

3. Press the **[MODE]** button to send order (Sent signal to display panels or receivers), Then can hearing buzzer once



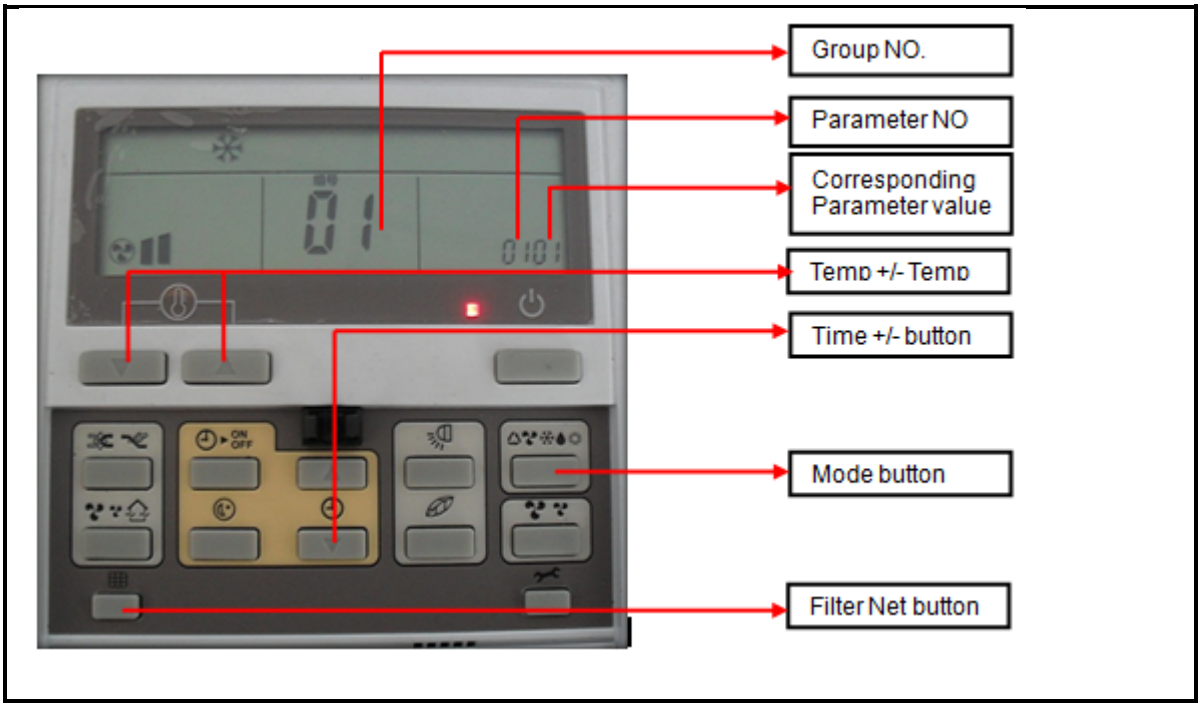
## 6.3 Parameter setting by XK-02A

### 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 "**0101**" means this indoor unit ID a*ddress 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

After press [***Filter Net Button***] for ***5 seconds***, then

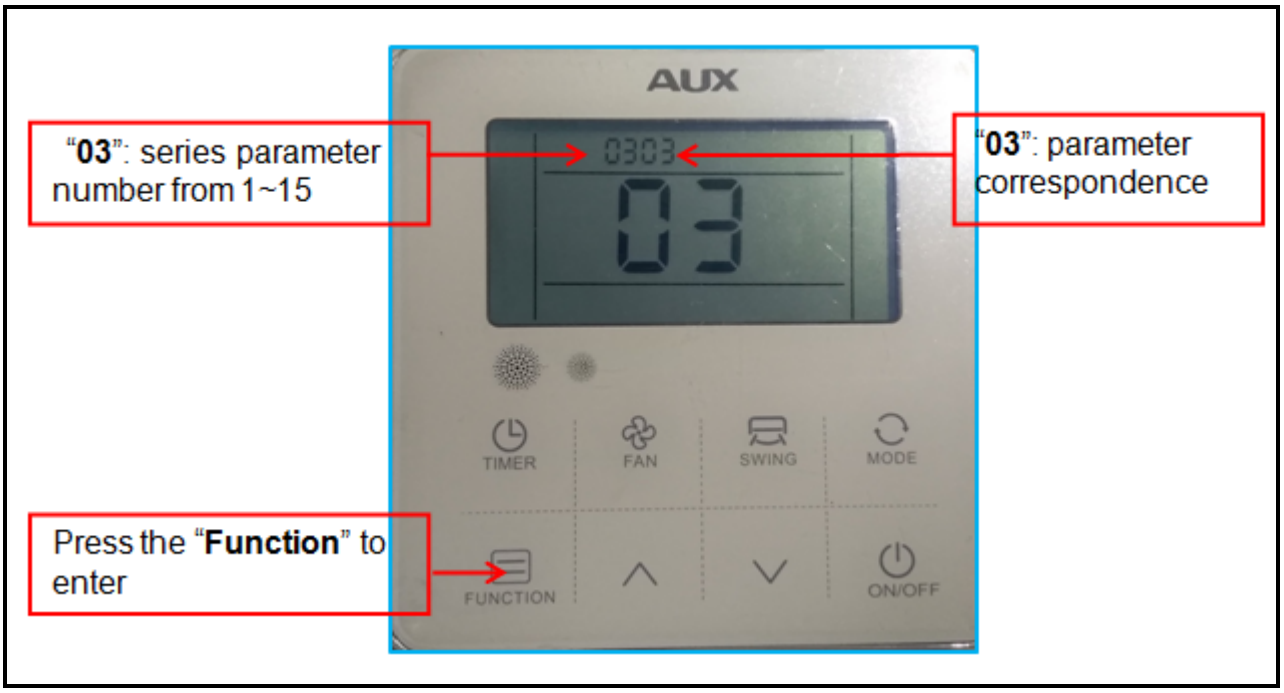
1. Press [***Time +/- button***] to change number of parameters (***1~15***), ***"0101" ~"1501"***
2. Press [***Mode Button***] once, ***"0101"***, ***01 will flash***
3. Press [***Temp +/- button***] to change the value, for example ***"0105"***
4. Press [***Mode Button***] to confirm

## 6.4 Parameter setting by XK-05A

### 6.4.1 Enter the setting interface

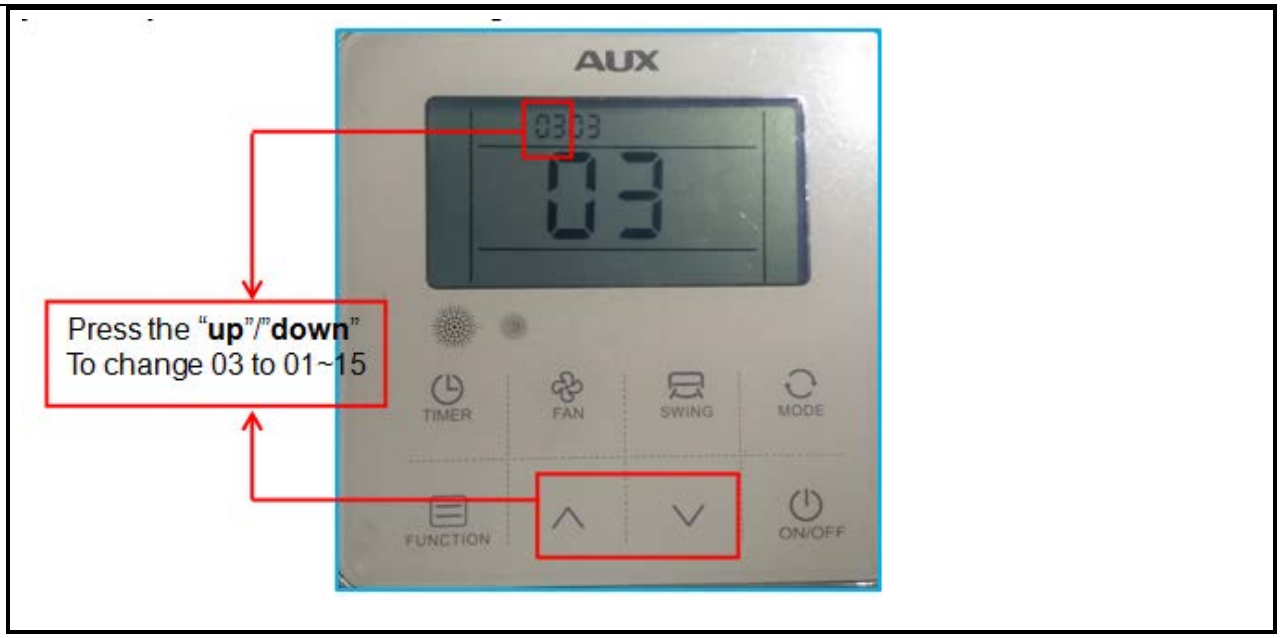
1. Press ***"Function"*** button for ***10s*** to enter the setting interface.

2. ***"0303"*** can check ***"6.1 Parameter Setting Items"*** for number of parameters and corresponding meaning.




### 6.4.2 Change series parameter number

Press ***"up" /"down"*** button to change the number (***1~15***), ***"0101" ~"1501"***

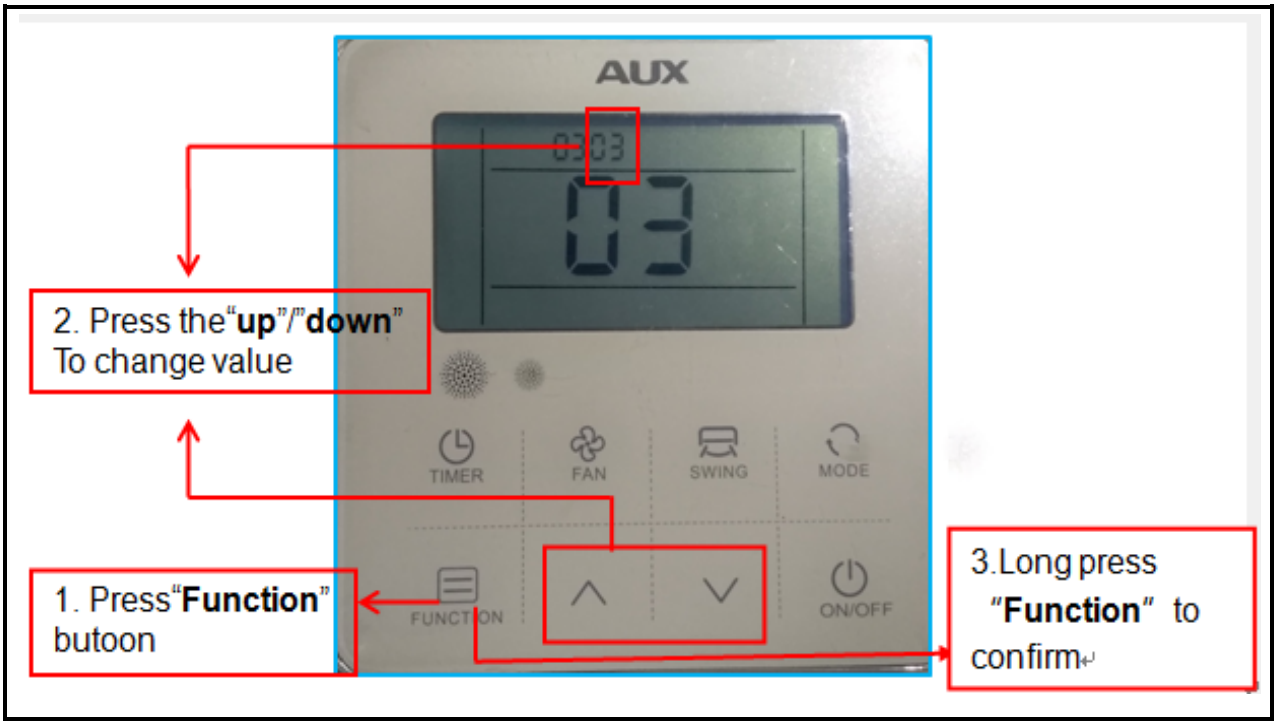



### 6.4.3 Parameter Correspondence Setting

1. Long press ***"Function"*** button for 5s, the second ***"0303" 03*** will flash

2. Press ***"up" /"down"*** button to change the number

3. Press [***Function Button***] to confirm

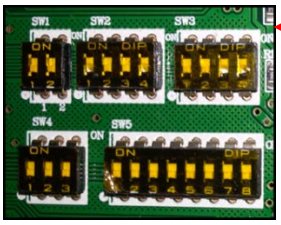
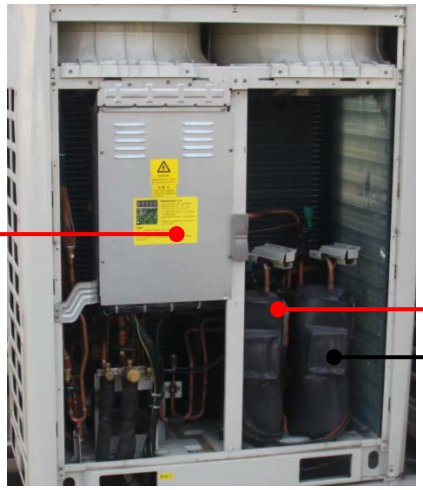
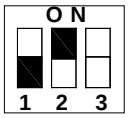


# Part4 Special Control

# 1. Special Control

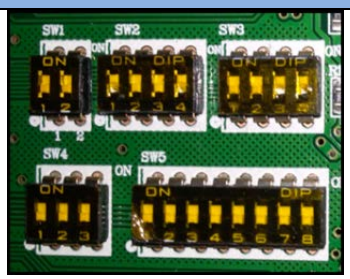
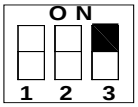
## 1.1 Compressor emergency

1. This function is used for twin compressor models (***18-22HP***)

| Dip Switch in Main PCB | | Compressor Information |
|---|---|---|
|  |  | ***1# Comp. Abnormal***<br>***2# Comp. Normal*** |
| 2. When one of these compressors had a fault<br>***For example : 1 # compressor abnormal*** | | |
| 3. Set emergency function for 1# compressor, as right diagram (***Change according "Part 3 - 4.1 Functions set by switch"***)<br>Then will shields all faults of 1# compressor. | | **1# Compressor emergency**<br>**SW4**<br>**OFF NO**<br>**1 2**<br>  |
| 4. The system will only run 2# compressor | | |

## 1.2 Modular emergency（ODU）

1. This function should be used in **N≥2** (N: A system's quantity of outdoor units)

<table>
<tr><td>Dip Switch in Main PCB<br>  </td><td>
</td></tr>
<tr><td colspan="2">2. When one of these outdoor units had a fault,<br><br>For example : Slave 2 # abnormal</td></tr>
<tr><td>3. Set emergency function for Slave 2 #, as right diagram (Change according “Part 3 - 4.1 Functions set by switch”)<br><br>Then will shields all faults of Slave2#</td><td>Modular emergency<br>SW4<br>NO 3<br> 
</td></tr>
<tr><td colspan="2">4. Close the liquid and gas stop valve of slave 2#</td></tr>
<tr><td colspan="2">5. Other outdoor units operate automatic, the outdoor unit (Slave 2#) which was choose emergency function will keep standby.</td></tr>
</table>

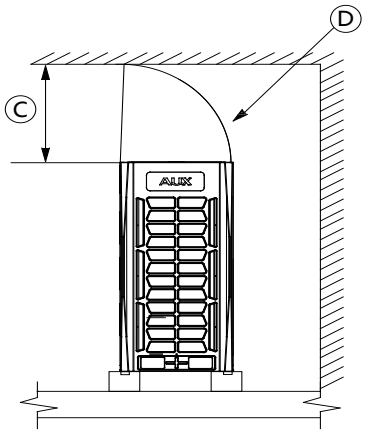
## 1.3 Quiet mode

| |
|---|
| **Quiet in cooling mode** |
| Max frequency of compressor 90HZ |
| Max frequency of fan motor 49HZ(single fan modular) |
| Max frequency of fan motor 58HZ( twin fan modular) |
| **Quiet in heating mode** |
| Max frequency of compressor 100HZ |
| Max frequency of fan motor 49HZ(single fan modular) |
| Max frequency of fan motor 60HZ ( twin fan modular) |

## 1.4 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. |

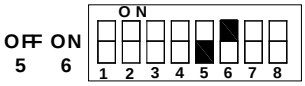
## 1.5 ODU static pressure control

| **If the installation space the same as right diagram** | Ⓒ ＜ 1000 mm<br>Ⓓ Air exhausting device<br>  |
|---|---|
| 1. Air exhausting device is necessary to be added to improve the ventilation | |
| 2. Outdoor unit's static pressure should be set to ***20 or 50 or 80Pa*** according the air exchausting device | |

Before power on, outdoor unit's static pressure can be set to 20/50/80Pa according to project demand *(Change according "**Part 3 - 4.1 Functions set by switch" SW5**)*

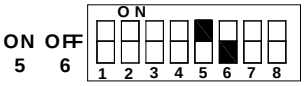
ODU static pressure 20 Pa

SW5



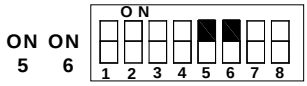

ODU static pressure 50 Pa

SW5




ODU static pressure 80 Pa

SW5




## 1.6 Clean (Auto dust removal)

Outdoor fan motor run as opposite direction for a period of time to blow away the dust *(Choose the function according "**Part 3 – 4.2.4 [C] Function Setting** "-【C……2】 )*

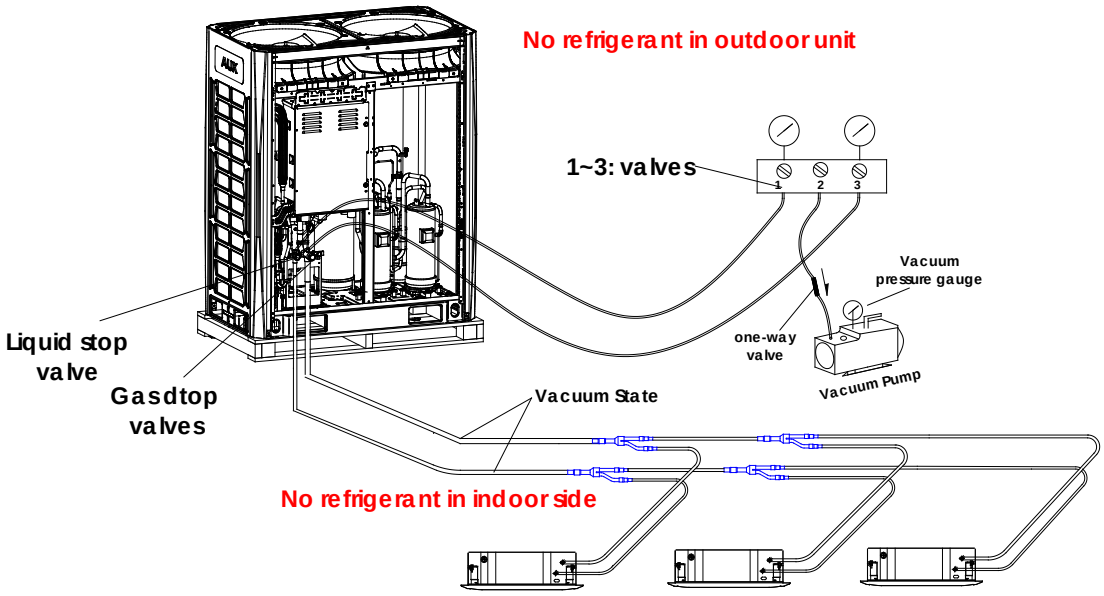
## 1.7 Blow off Snow (Auto snow-blowing)

The fan motor will run for a period of time to blow away the snow *(Choose the function according "**Part 3 – 4.2.4 [C] Function Setting** " -【C…..4】)*

※ System will respond this function only when the outdoor environment temperature [***Tao***] ≤ -5℃

## 1.8 Vacuum Pumping

**For after-sale :**If a system had a refrigerant leakage, should find out the leakage point and re-welding first, and there should be no any refrigerant in the system, so we can choose the **Vacuum pumping function** *(Choose the function according "**Part 3 – 4.2.4 [C] Function Setting** " – 【C….5】)* to do Vacuum




1. Connect the vacuum pump and vacuum pressure gauge as above diagram
2. Through Master unit to set vacuum pumping function
3. Then outdoor units keep standby state and all EXVs keep ON state, the sub-cooling solenoid valve alternating switch for 5 minutes.

### 1.9 Economic locking (26℃)

Through Master unit to set the Economic locking function, *(Choose the function according "**Part 3 – 4.2.4 [C] Function Setting** "-【C……6】 )* All indoor units will run as energy saving mode state:

**Cooling mode:** indoor unit's set temperature **will be keep to 26**℃ ( lowest set temperature )

**Heating mode:** indoor unit's set temperature **will be keep to 20**℃ ( Highest set temperature )

### 1.10 Refrigerant Recycle

**For after-sale:** If one of the system's indoor unit must be replaced due to a refrigerant leakage point was find out in its evaporator

Then we can choose the **Refrigerant recycle function** through master unit *(Choose the function according "**Part 3 – 4.2.4 [C] Function Setting** "-【C……..7】 )* to recycle refrigerant to outdoor units.

1. After choose this function
2. Outdoor units will run cooling mode
3. Close ***liquid stop valve***
4. When display error code ***F3:*** ( high pressure protect ) or ***F6:*** ( low pressure protect ) in digital tube, it means all refrigerant recycled to outdoor unit
5. Close ***Gas stop valve***
6. long press exit button [***Test***] 5s to exit this function

***Liquid stop valve*** ***Gas stop valve***

*※ If outdoor environment temperature ≤5℃ , the system will not respond to outdoor unit's refrigerant recycle function.*

## 1.11 Refrigerant Charging

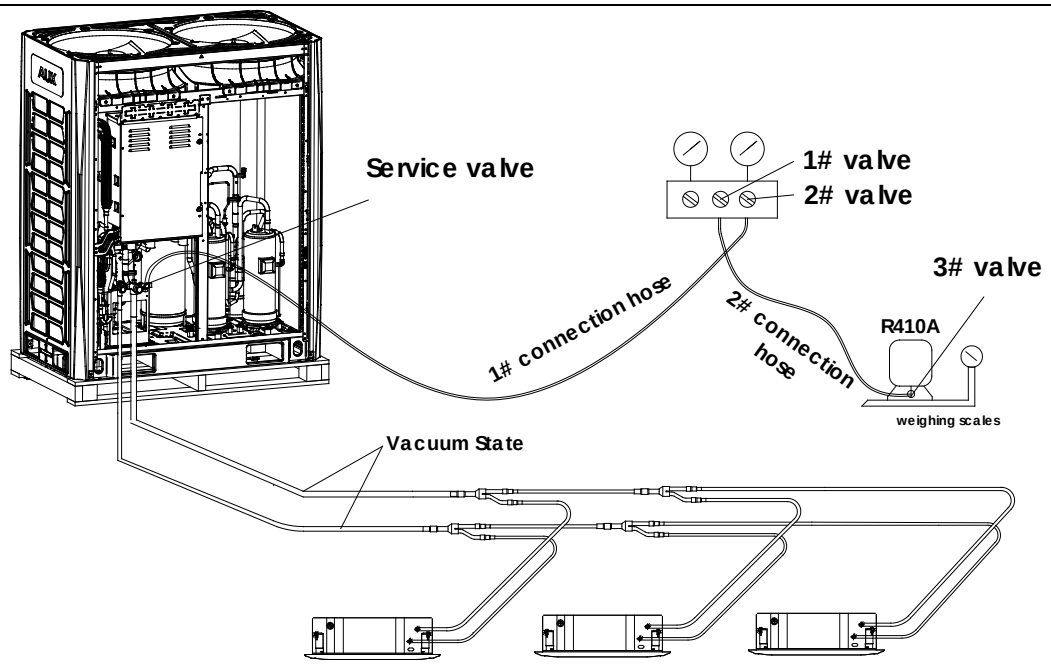
**For after-sale:** If a system lack of refrigerant , then we can choose the **Refrigerant Charging function** through master unit *(Choose the function according "**Part 3 – 4.2.4 [C] Function Setting** "-【C……8】 )* to add refrigerant

1. Choose the **Refrigerant Charging function** in Master unit's main PCB

2. Running cooling mode automatic, according running parameters, main PCB digital tube will display (*Refrigerant state*):

- 【F.....1】: ***Refrigerant is not enough***
- 【F.....2】: Refrigerant is enough
- 【F.....3】: Excess of refrigerant

3. If 【F…..1】was displayed in the tube, press 【**Fun**】to add refrigerant, system will run as following:
   - **Cooling mode**
   - Outdoor units' **output capacity ⩾ 75%**
   - Sub-cooling valve（**EXV3**）**be closed**
4. prepare tools as below diagram in advance




5. Connect ***1# connection hose*** to ***Service valve***

| |
|---|
| 6. Open ***1# valve*** and ***2# valve*** |
| 7. Then gas refrigerant will push out the air which inside of ***1# connection hose*** and ***2 # connection hose*** |
| 8. Open ***3# valve*** |
| 9. When 【F.....2】be displayed, means additional refrigerant will be enough |
| 10. Then 【F……0】will be displayed after 3 min, it means finish, system will stop running automatic , the ***service valve*** must be closed at the same time |
| **Note:**<br>※ System will respond refrigerant charging function only when meet the following 3 conditions at the same time：<br>1. Outdoor temperature ***"Tao"*** should ***15℃≤Tao≤40℃*** ,<br>2. Indoor temperature ***"Tai"*** should ***10℃≤Tai≤32℃*** ,<br>3. The quantity of indoor units which (***capacity ≤1.5HP***) should less than 70% of total quantity of indoor units |

# Part5 Trouble shooting

**1. IDU Fault code table** ..... Chyba! Záložka není definována.

**2. ODU Fault code table** ..... Chyba! Záložka není definována.

**3. Indoor unit error code display** ..... Chyba! Záložka není definována.

**4. Outdoor unit error code display** ..... Chyba! Záložka není definována.

**5. Outdoor unit trouble shooting** ..... Chyba! Záložka není definována.

**6. Appendix** ..... Chyba! Záložka není definována.

# 1. IDU Error code table (No.16)

## 1.1 Temperature sensor failure (4)

| Code | Definition | Possible reason for error code |
|---|---|---|
| **A1** | Indoor ambient temperature | 1. Indoor unit's PCB failure<br>2. The fuse of indoor PCB is broken<br>3. Temperature sensor failure , or exceed test limit |
| **A2** | Evaporator mid temperature sensor | |
| **A3** | Evaporator inlet temperature sensor | |
| **A4** | Evaporator outlet temperature sensor | |

## 1.2 Communication failure (2)

| Code | Definition | Possible reason for error code |
|---|---|---|
| **A9** | The communication between indoor unit and outdoor unit failed | 1. The communication wire between indoor unit and outdoor unit is broken.<br>2. Indoor unit power failure<br>3. Indoor PCB failure |
| **AA** | The communication between indoor unit and wire controller failed | 1. The communication wire between indoor unit and outdoor unit is broken.<br>2. Indoor unit power failure<br>3. Indoor PCB failure<br>4. Wire controller is broken |

## 1.3 Others failure (12)

| Code | Definition | Possible reason for error code |
|---|---|---|
| **A5** | Indoor water pump failure | 1. Water pump no power<br>2. Water pump switch short-circuit or unconnected<br>3. Water pump is broken<br>4. Drain pipe block or up lean<br>5. Indoor PCB is broken |
| **A6** | Failure of indoor PG fan | 1. Fan motor failure<br>2. Fan motor block<br>3. The connection between PCB and fan motor failure<br>4. Indoor fan block |
| **A7** | Failure of reversible synchronous motor | 1. Step motor failure<br>2. The connection between PCB and step motor failure. |
| **A8** | Indoor unit ERRPROM module failure | 1. Indoor unit PCB is broken<br>2. Error module is broken |
| **AC** | More than 2 indoor units' central control system address repeated | The central control address setting incorrect |
| **AE** | Operation mode conflict | The operation mode setting incorrect |
| **AH** | Two or more indoor unit refrigerant system address repeated | System address setting incorrect |
| **AJ** | Indoor unit total capacity exceeded | Stop some indoor units |
| **AF** | The EXV leakage | 1. EXV is blocked<br>2. Evaporator inlet sensor failure.<br>3. Indoor unit's temp. sensor failure |
| **A0** | The EXV open failure | |

# 2. ODU Error code table (No.65)

## 2.1 Communication failure (4)

| Code | Definition | Possible reason for error code |
|---|---|---|
| **J1** | Communication failure between **outdoor units** | 1. The communication wire between outdoor units is disconnect, short circuit or incorrect<br>2. Outdoor unit's main PCB failure<br>3. Outdoor unit's main power failed |
| **J2** | Communication failure between **outdoor** and **indoor units** | 1. The communication wire between indoor unit and outdoor unit disconnect, short circuit or incorrect<br>2. Indoor unit's main power failed<br>3. Indoor unit's PCB failure<br>4. Outdoor unit's main PCB failure |
| **J3** | Communication failure between **main PCB** and **compressor drive module** | 1. The connection between driving module and main PCB failure<br>2. The communication part of outdoor unit control PCB failure<br>3. Compressor driving module failure<br>4. Compressor failure<br>5. Main PCB failure |
| **J4** | Communication failure between **main PCB** and **fan motor drive module** | 1. DC fan motor drive module failure<br>2. DC fan motor failure<br>3. Supply voltage exceed limit<br>4. Main PCB failure |

## 2.2 Pressure sensor failure (2)

| Code | Definition | Possible reason for error code |
|---|---|---|
| **F1** | 【$P_d$】High pressure sensor failure | 1. High pressure sensor failure<br>2. High pressure sensor connection is incorrect<br>3. Outdoor unit's main PCB failure |
| **F4** | 【$P_s$】Low pressure sensor failure | 1. Low pressure sensor failure<br>2. The connection between sensor and outdoor PCB incorrect<br>3. Outdoor unit's main PCB failure |

## 2.3 Pressure abnormal (4)

| Code | Definition | Possible reason for error code |
|---|---|---|
| **F3** | 【$P_d$】High pressure too high | 1. Exhaust pipe or condenser pipe block<br>2. Condenser dirty<br>3. Outdoor unit fan stop or low speed<br>4. Refrigerant overcharge |
| **F6** | 【$P_s$】Low pressure too low | 1. Indoor unit fan stop or low speed<br>2. Evaporator dirty<br>3. Indoor EXV full open in cooling mode (Outdoor EXV full open in heating mode)<br>4. Lack refrigerant<br>5. The pipe between evaporator and suction port block |
| **F8** | Compression ratio too high protection | Compressor failure |
| **F9** | Compression ratio too low protection | Compressor failure |

## 2.4 Temperature sensor failure (10)

| Code | Definition | Possible reason for error code |
|---|---|---|
| C1 | 【$T_{ao}$】ambient temp. | 1.Temperature sensor failure<br>2.Test temperature exceed limit<br>3.Sensor connection is incorrect<br>4.Outdoor unit's main PCB failure |
| C2 | 【$T_{def1}$】Defrosting temp. | |
| C3 | 【$T_{da}$】discharge temp. of 1# comp. | |
| C4 | 【$T_{db}$】discharge temp. of 2# comp. | |
| C6 | 【$T_s$】Suction temp. of compressor | |
| C9 | 【$T_{ho1}$】Condenser outlet temp. | |
| CJ | 【$T_{d3}$】Oil temperature | |
| CC | 【$T_{d4}$】Liquid piping temp. of ODU | |
| CE | 【$T_{ho2}$】Outlet temp. of PMV3 | |
| CF | 【$T_{def2}$】Outlet temp. of sub-cooler | |

## 2.5 Temperature abnormal (3)

| Code | Definition | Possible reason for error code |
|---|---|---|
| FH | Discharge temperature too low | Compressor failure |
| E3 | 【$T_{da}$】1# Compressor discharge temperature too high | 1.System lack of refrigerant<br>2.DC inverter Compressor failure<br>3.Compressor air return filter block<br>4.EXV block<br>5.Gas stop valve was closed<br>6.Liquid stop valve was closed<br>7.dischargr sensor failure<br>8.Outdoor unit PCB failure |
| E4 | 【$T_{db}$】2# Compressor discharge temperature too high | |

## 2.6 1# Comp. and drive failure (11)

| Code | Definition | Possible reason for error code |
|---|---|---|
| 31 | Drive Module IPM protection (F0) | 1. Low supply voltage, excessive current<br>2. Supply voltage exceed limit<br>3. Outdoor fan stop or low speed<br>4. Drive module temp. too high |
| 32 | Drive Module hardware protection | |
| 33 | Drive Module software protection | |
| 34 | Drive module unconnected | 1.The connect of driving module and DC inverter compressor incorrect<br>2.Driving module failure<br>3.Compressor failure |
| 35 | Drive module current overload | 1. Compressor overload<br>2. Compressor coil disconnect<br>3. Inverter driving board failure<br>4. Compressor failure |
| 36 | Drive module DC bus voltage over-voltage or under-voltage failure | 1. Supply voltage below level<br>2. Supply voltage exceed limit<br>3. Drive module failure |
| 37 | Temperature sensor of drive module heat fins failure | Drive module failure |
| 38 | Drive module high temperature limit frequency failure | 1. Driving module failure<br>2. Compressor failure<br>3. Outdoor unit fan stop or low speed |
| 39 | Drive module high temperature shutdown protection | 1. Driving module failure<br>2. Compressor failure<br>3. Temperature sensor failure |
| 3E | Drive module AC Input over current protection | Drive module failure |
| 3F | Drive Module PFC protection (F0) | Drive module failure |

## 2.7 2# Comp. and drive failure (11)

| Code | Definition | Possible reason for error code |
|---|---|---|
| **51** | Drive Module IPM protection (F0) | 1. Low supply voltage, excessive current<br>2. Supply voltage exceed limit<br>3. Outdoor fan stop or low speed<br>4. Drive module temp. too high |
| **52** | Drive Module hardware protection | |
| **53** | Drive Module software protection | |
| **54** | Drive module unconnected | 1.The connect of driving module and DC inverter compressor incorrect<br>2.Driving module failure<br>3.Compressor failure |
| **55** | Drive module current overload | 1. Compressor overload<br>2. Compressor coil disconnect<br>3. Inverter driving board failure<br>4. Compressor failure |
| **56** | Drive module DC bus voltage over-voltage or under-voltage failure | 1. Supply voltage below level<br>2. Supply voltage exceed limit<br>3. Drive module failure |
| **57** | Temperature sensor of drive module heat fins failure | Drive module failure |
| **58** | Drive module high temperature limit frequency failure | 1. Driving module failure<br>2. Compressor failure<br>3. Outdoor unit fan stop or low speed |
| **59** | Drive module high temperature shutdown protection | 1. Driving module failure<br>2. Compressor failure<br>3. Temperature sensor failure |
| **5E** | Drive module AC Input over current protection | Drive module failure |
| **5F** | Drive Module PFC protection (F0) | Drive module failure |

## 2.8 1# Fan motor and drive failure (5)

| Code | Definition | Possible reason for error code |
|---|---|---|
| **3A** | Drive module high temperature | 1. DC fan motor abnormal<br>2. DC fan drive module abnormal |
| **3C** | Drive module over current | |
| **3H** | Drive module start failure or running out of step | |
| **3J** | Drive module over-voltage or under-voltage | |
| **41** | Drive module IPM alarm | |

## 2.9 2# Fan motor and drive failure (5)

| Code | Definition | Possible reason for error code |
|---|---|---|
| **5A** | Drive module high temperature | 1. DC fan motor abnormal<br>2. DC fan drive module abnormal |
| **5C** | Drive module over current | |
| **5H** | Drive module start failure or running out of step | |
| **5J** | Drive module over-voltage or under-voltage | |
| **49** | Drive module IPM alarm | |

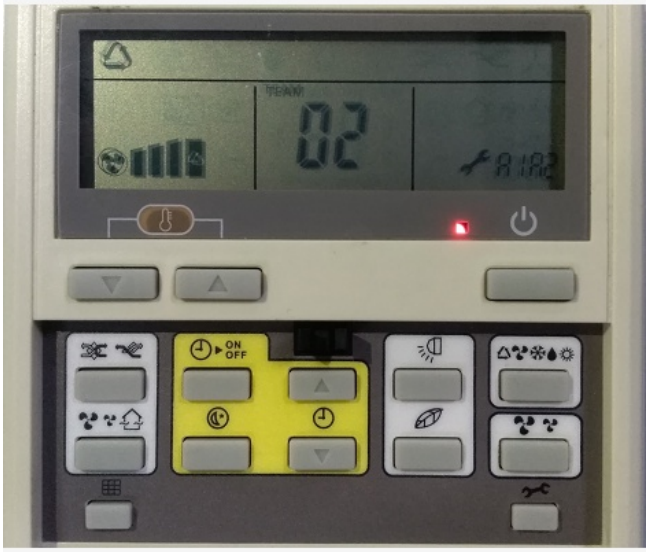
## 2.10 Others failure (10)

| Code | Definition | Possible reason for error code |
|---|---|---|
| H1 (B1) | 【HP1】High pressure switch failure | 1. High pressure exceed high pressure switch limit.<br>2. High pressure switch failure<br>3. High pressure sensor failure<br>4. Instantaneous power-off<br>5. Stop valve closed<br>6. Outdoor unit fan stop<br>7. Outdoor unit air outlet block<br>8. In heating mode indoor unit fan stop<br>9. In heating mode indoor unit EXV block |
| H5 | Refrigerant shortage fault | System leakage |
| HF | Oil shortage fault | Once confirm the unrecoverable |
| HJ | Main power failure | 1. Supply power phase-reversal<br>2. Supply power phase lack<br>3. Outdoor unit PCB failure |
| J5 | Parameter set incorrect | 1. Outdoor unit dial switch incorrect<br>2. Main PCB failure |
| J7 | Outdoor unit main control PCB ERROM module failure | Mail PCB failure |
| JJ | Indoor unit total capacity exceeding | Indoor units' total capacity over 130% of the outdoor units' total capacity |
| 47 | Indoor unit loss failure | 1. Communication wire between indoor units failure<br>2. Indoor PCB failure<br>3. Power supply of indoor units failure |
| E1 | The 4-way valve is fault | |
| E9 | Drive refrigerant cooling pipe low temperature protection | |

# 3. Indoor unit error code display

## 3.1 Error code display by 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.

| | |
|---|---|
|  | Press" " to enter error code check |
| | "***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 "- - - -" |

## 3.2 Error code display by YK-05A

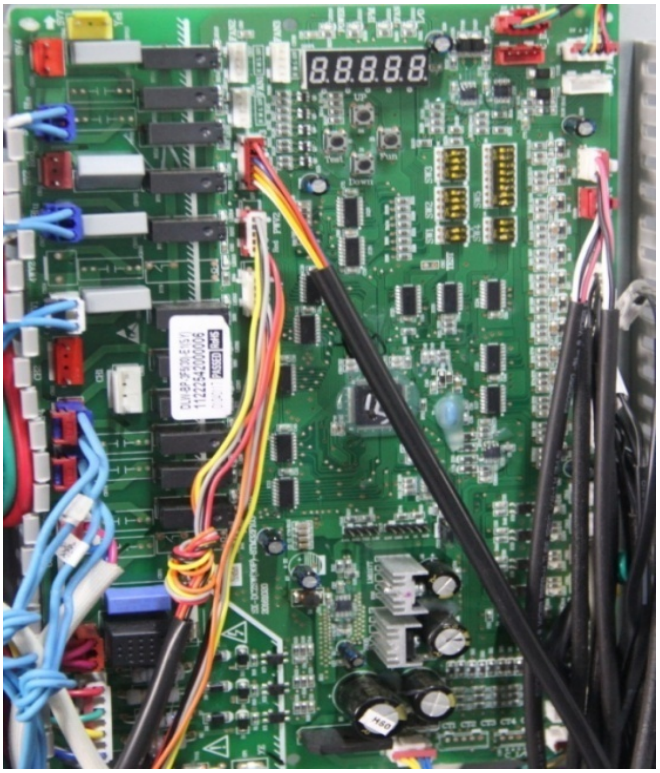
| | |
|---|---|
| | Press ***"Function" & "Up"*** button at the same time to enter the error code check |
| | "***E0A1***"means the first error code ***"A1"*** ,through the ***"2.1 IDU Fault code table"*** to check error code definition, ***"E2A3"*** means the second error code is ***"A3"*** |

## 3.3 Error code display by display panel

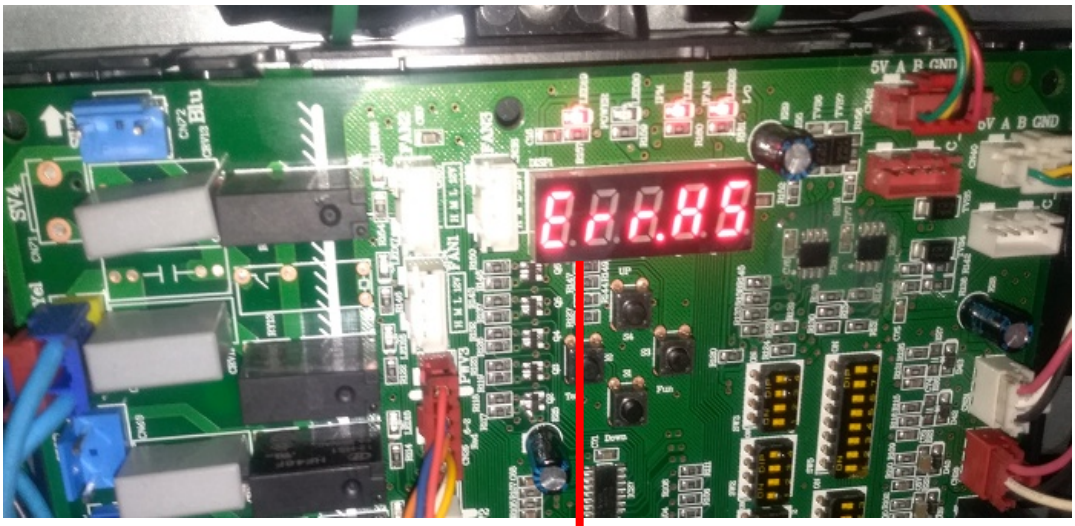
### “E0” error code

# 4. Outdoor unit error code display

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

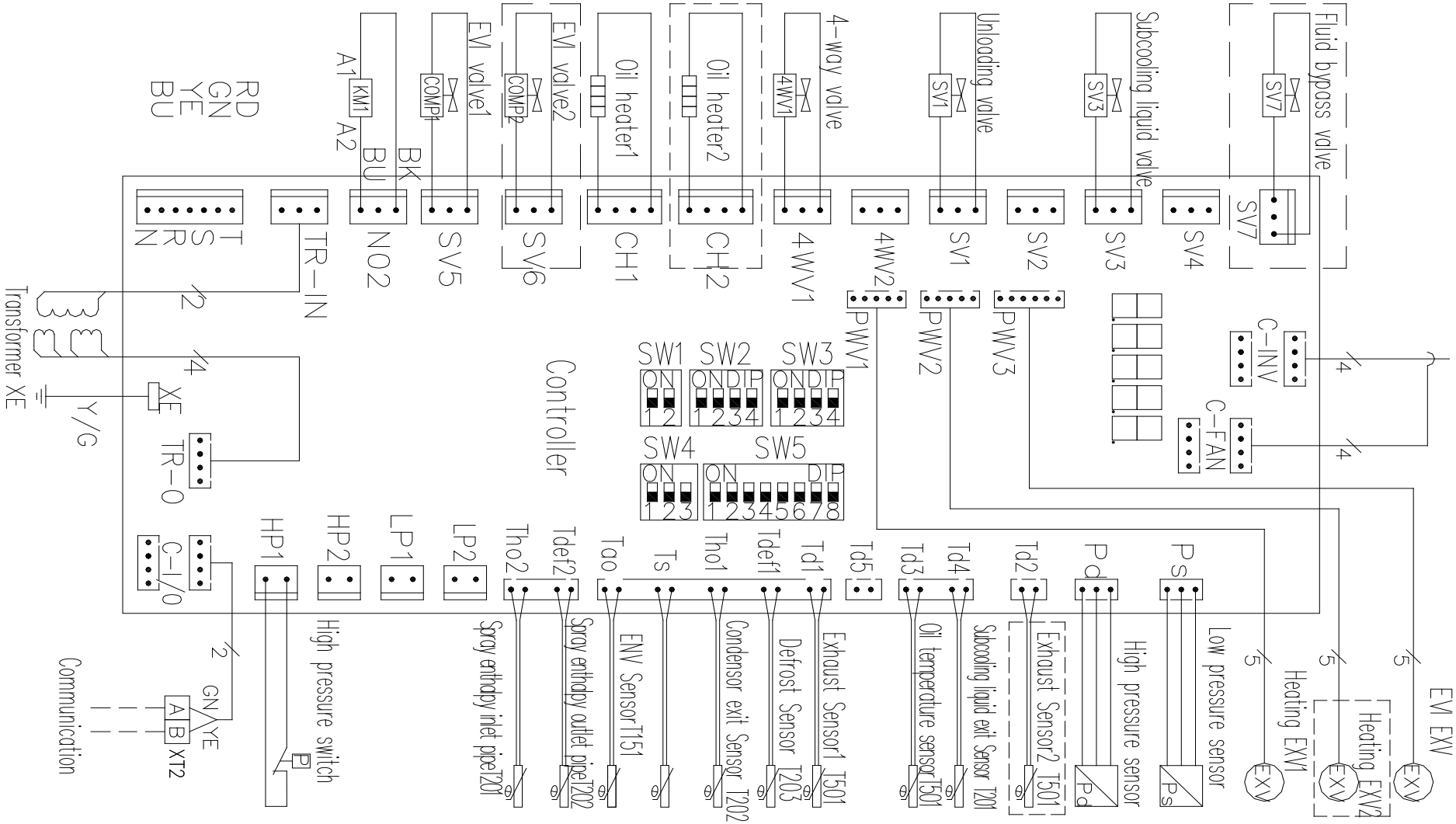
| Outdoor unit control box | Outdoor unit main PCB |
|---|---|
| |  |

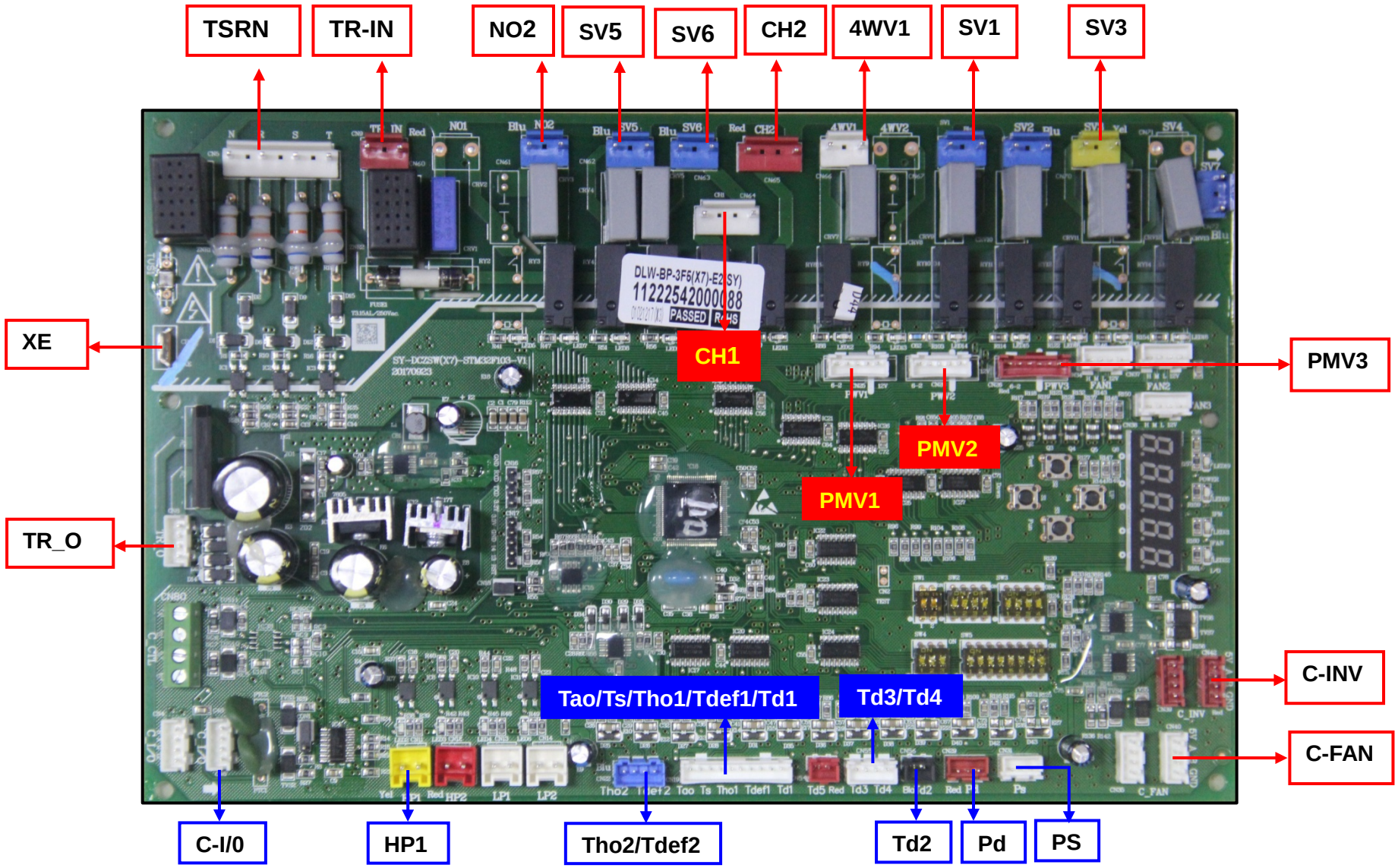
Digital tube in main PCB



Error code ***" H5 "*** , through the ***"2.2 ODU Fault code table"*** to check the definition: system leakage

## Symbol Description




TSRN
TR-IN
NO2
SV5
SV6
CH2
4WV1
SV1
SV3
XE
TR_O
CH1
PMV3
PMV2
PMV1
C-INV
C-FAN
Tao/Ts/Tho1/Tdef1/Td1
Td3/Td4
C-I/0
HP1
Tho2/Tdef2
Td2
Pd
PS

## Definition of ports

| Symbol Abbreviation | Detailed information |
|---|---|
| N R S T | Power input |
| TR_IN | Transform input |
| N02 | AC contact |
| CH1 | 1# Compressor preheating |
| CH2 | 2# Compressor preheating |
| 4WV1 | 4-way valve |
| SV1 | Unloading valve |
| SV5 | 1# Vapor injection valve |
| SV6 | 2# Vapor injection valve |
| SV3 | Sub-cooling 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 |
| $T_{ho2}$ | Outlet temperature of PMV3 |
| $T_{def2}$ | Outlet temperature of sub-cooler |
| $T_{ao}$ | Environment temperature |
| $T_s$ | Gas-liquid separator outlet/Suction temperature |
| $T_{ho1}$ | Condenser outlet temperature |
| $T_{def1}$ | Defrost temperature |
| $T_{d1}$ | Discharge of compressor 1# |
| $T_{d3}$ | Oil temperature |
| $T_{d4}$ | Liquid piping temperature of ODU |
| $T_{ho2}$ | Outlet temperature of PMV3 |
| Pd | High pressure sensor |
| Ps | Low pressure sensor |
| TR_O | Transform output |

| | |
|---|---|
| XE | Ground wire |

# 5. Outdoor unit trouble shooting

## 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. No additional refrigerant?
2. Low pressure is too low?
3. High temperature of IDU air outlet?

Yes → Add refrigerant

NO↓

*Check whether Lack of frozen oil*

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. ODU fan running abnormal?
2. Condenser is dirty block?

Yes → 1. Replace fan or fan motor
2. Clean the condenser

NO↓

*Check whether refrigerant circuit is unblocked*
1. IDU's coil of EXV is abnormal?
2. IDU's EXV is abnormal, through monitoring software to check the EXV's open degree
3. IDU's EXV is dirty block?

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

↓

*Contact the manufacturer's Technician*

## 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

↓

| | | |
|---|---|---|
| Stop valve is OFF? | → | Open |

NO ↓

| | | |
|---|---|---|
| Condenser and evaporator dirty block? | → | Clean |

NO↓

| | | |
|---|---|---|
| Pipe is flattened? | → | Re welding |

NO↓

| | | |
|---|---|---|
| Heating EXV is abnormal? Through check the temperature is same or not which between inlet and outlet piping of the EXV. | → | Replace EXV |

NO↓

| | | |
|---|---|---|
| Pressure sensor is abnormal? | → | Replace sensor |

NO↓

| | | |
|---|---|---|
| System lack of refrigerants? Through check the discharge temperature 、 high pressure value and so on to judge. | → | Add refrigerant |

NO↓

*Contact the manufacturer's Technician*

## 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

↓

4-way valve is abnormal? Through check the inlet temperature of the condenser → Adjust or replace 4-way valve

NO↓

Condenser dirty block? → Clean

NO↓

Pressure sensor is abnormal? → Replace sensor

NO↓

Discharge temperature and Driver modular temperature is too high? →

Yes↓

Lack of refrigerant? → Add refrigerant

NO↓

Lack of frozen oil? → Add frozen oil

NO↓

NO ↓

*Contact the manufacturer's Technician*

## 5.4 HF Error code

HF： *Oil shortage fault*

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

↓

Oil temperature sensor is abnormal? → Replace sensor

NO ↓

Oil return capillary is blocked? → Replace capillary

NO ↓

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

NO ↓

Contact the manufacturer's Technician

## 5.5 HJ Error code

HJ：*Main power failure*

When detect incorrect phase sequence, Then will appear *HJ* Error code, whole system stop running.

↓

Power terminal board wiring loosening? → Tighten the wiring

NO↓

Wrong phase sequence? → Change phase sequence

NO↓

Main PCB is abnormal? → Replace PCB

NO↓

*Contact the manufacturer's Technician*

## 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 whether lack of refrigerant and appear H5 Error code

↓

*Through below steps to check whether the system lack of the refrigerant:*

1. Discharge temperature too high than normal situation? ( Normal discharge temperature about 80℃ )

NO ←

↓

↓

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

NO ←

↓

*Lack of refrigerant:* add refrigerant

↓

Pressure sensor abnormal? → Replace sensor

NO ↓

*Analysis indoor and outdoor running parameter though monitoring software*

*Contact with the manufacturer's Technician*

## 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 whether the system excess refrigerant:*

1. Already add excess refrigerant

NO ←

↓

2. Whether indoor unit's EXV less open degree

Through monitoring software detect

NO ←

↓

Blow off some refrigerant

Condenser dirty block effect heating mode → Clean

NO ↓

| | | |
|---|---|---|
| Evaporator dirty block effect cooling mode | → | Clean |

NO ↓

| | | |
|---|---|---|
| Discharge temperature sensor abnormal | → | Replace |

NO ↓

| |
|---|
| Contact with the manufacturer's Technician |

# 6. Appendix

### Relation between temperature sensor of compressor and resistance

| R25=50KΩ±1% | | | |
|---|---|---|---|
| B25/50=3950K ±1% | | | |
| T [℃] | Rmin [KΩ] | Rnom [KΩ] | Rmax [KΩ] |
| -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 .....** Chyba! Záložka není definována.

**2. Remote controller.....** Chyba! Záložka není definována.

**3. Wired Controller .....** Chyba! Záložka není definována.

**4. Centralized Controller.....** Chyba! Záložka není definována.

**5. Centralized Controller Software .....** Chyba! Záložka není definována.

**6. BMS-MODBUS Protocol.....** Chyba! Záložka není definována.

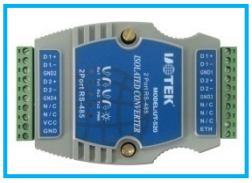
**7. BMS - BACNET Protocol.....** Chyba! Záložka není definována.

**8. Wireless Network Centralized Control System ...**Chyba! Záložka není definována.

# 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 | |
|---|---|
| | |
| MODBUS Gateway | BACNET Gateway |

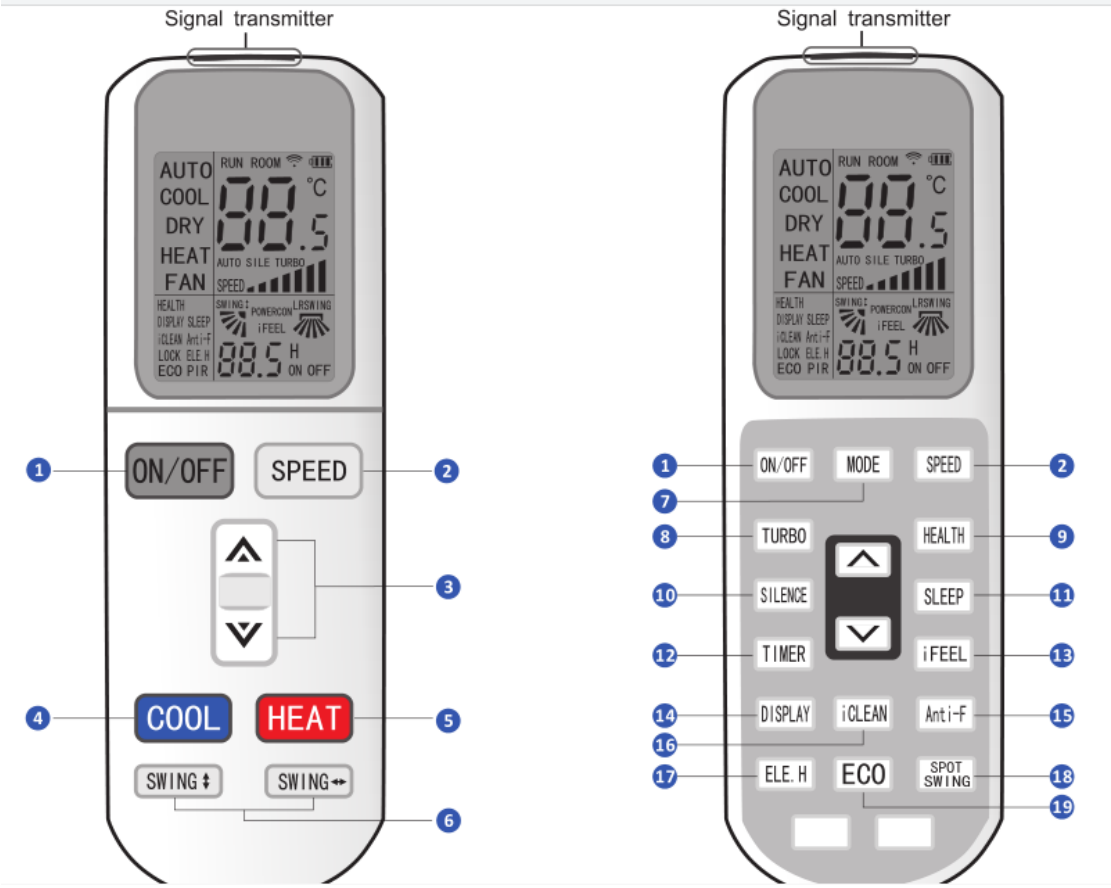
| Wireless Network Control | |
|---|---|
| | |
| WIFI Modular | Software |

## 1.1 Control Component List

| Type | Model | Function Description |
|---|---|---|
| Remote controller | YK-K | 1. General wireless remote controller<br>2. None address setting function |
| | YK-L | 1. Background light.<br>2. Indoor unit's IP address setting function. |
| Wired controller | XK-02A | 1. With a directly connecting 10m display board wire<br>2. Indoor unit's IP address setting function.<br>3. Control Max. 16 indoor units. |
| | XK-05A | 1. Touch screw wired controller<br>2. Indoor unit's IP address setting function.<br>3. Control Max. 16 indoor units. |
| Centralized controller | CC-01 | 1. With weekly timer.<br>2. Control Max. 64 indoor units<br>3. Control Max. 4 systems |
| | CC-02 | 1. Touch screw<br>2. Control Max. 256 indoor units.<br>3. Control Max. 32systems |
| Centralized controller adaptor | DCZ-ZJB-SYE2 | 1. Centralized controller adaptor<br>2. Each system should be connected a adaptor |
| Centralized Control Software | / | 1. Control Max. 4096 indoor units.<br>2. Control 32 systems. |
| Centralized Control Software Adaptor | USB to RS485 | 1. Accessories equipment of centralized controller software. |
| BMS system | MODBUS | 1. Each system connect with a MODBUS gateway<br>2. Control Max. 32 systems |
| | BACNET | 1. Each system connect with a MODBUS gateway<br>2. Control Max. 32 systems |
| Wireless Network Control | WIFI | 1. Each system connect with a WIFI module<br>2. Control all indoor units in the system |

# 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

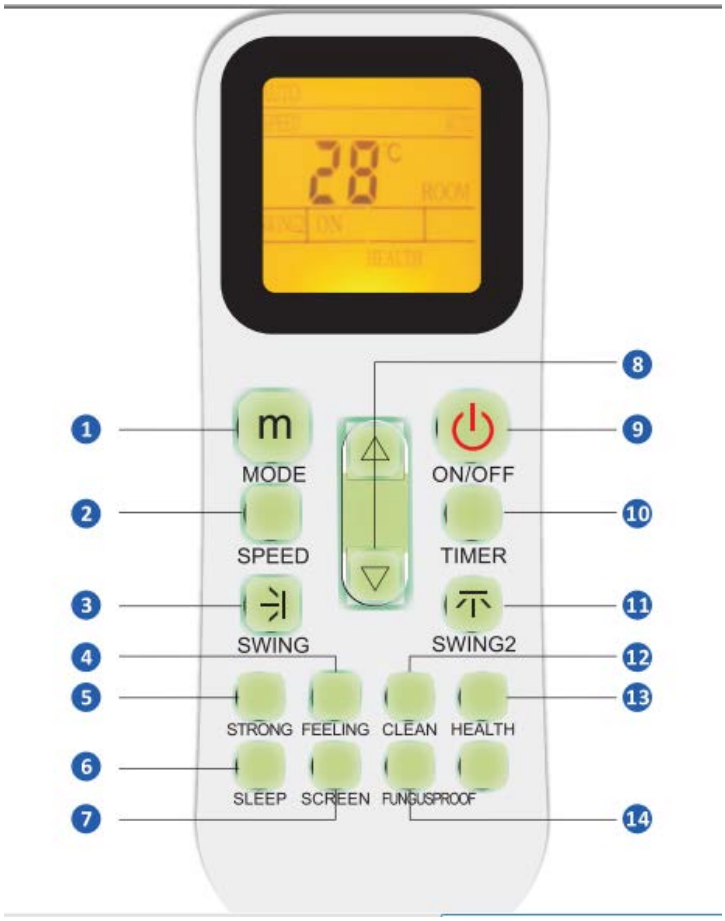
⑯ Clean Function

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 auxiliary electric heating IDU)**

In heating mode, press this button, auxiliary 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.

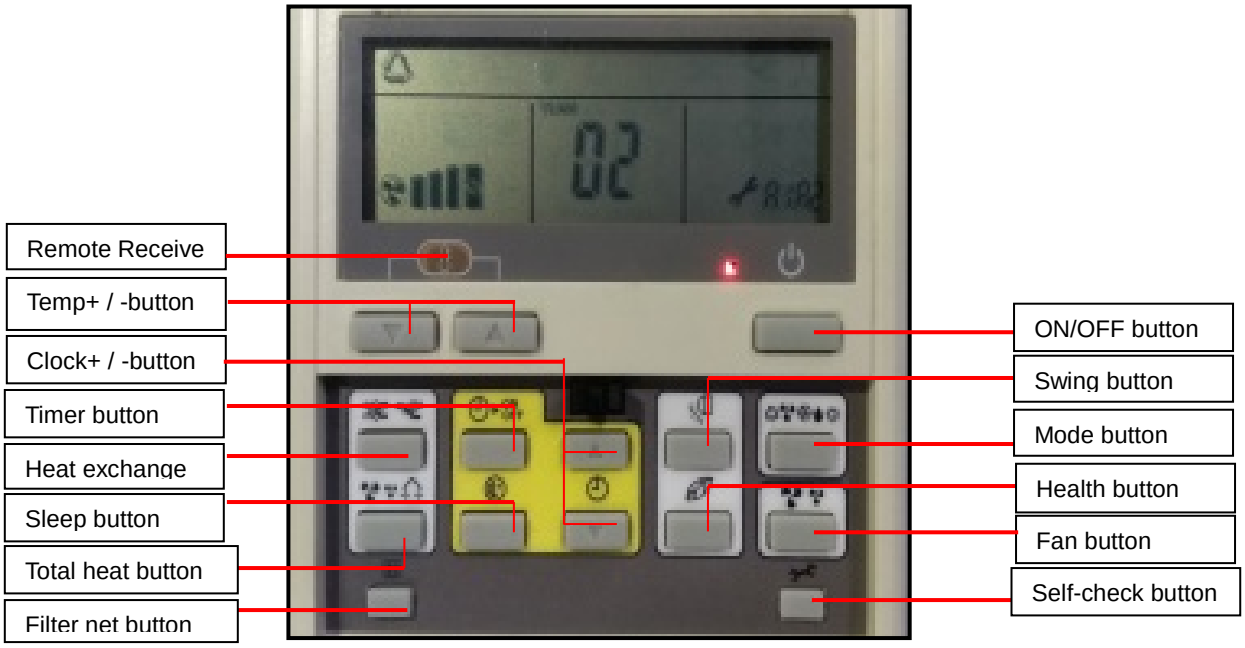
**16. Two white button: Addressing set**

* With the controller off, pressing the two white button simultaneously more than 10 seconds or more to enter address setting. 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**: *Auto-Cooling-Dehumidify-Heating*

**Temp +/- button**: Temperature adjustment range ***16~32*** ℃

**Fan button** : *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**: Health mode

**Sleep button**: Sleep mode

**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:**

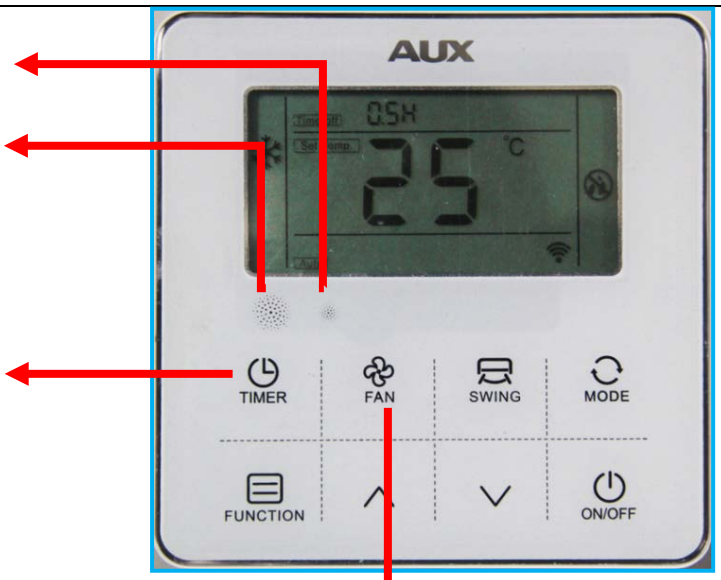
1. Time sequence of timing ON and OFF determines the order of "***Timing ON-Timer OFF***" and "***Timer OFF- Timing ON***". If the both are the same or either one is the same as time of current clock, it is invalid to press "***Timer***" button to confirm presetting time; after it reaches the presetting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

| | |
|---|---|
| Light sensation |  |
| Infrared signal | |
| **Timing button**<br>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**<br>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 the signal of wireless remote controller;

Ambient temperature detection sensor;

Display the failure of main controller;

**Technical indicators**

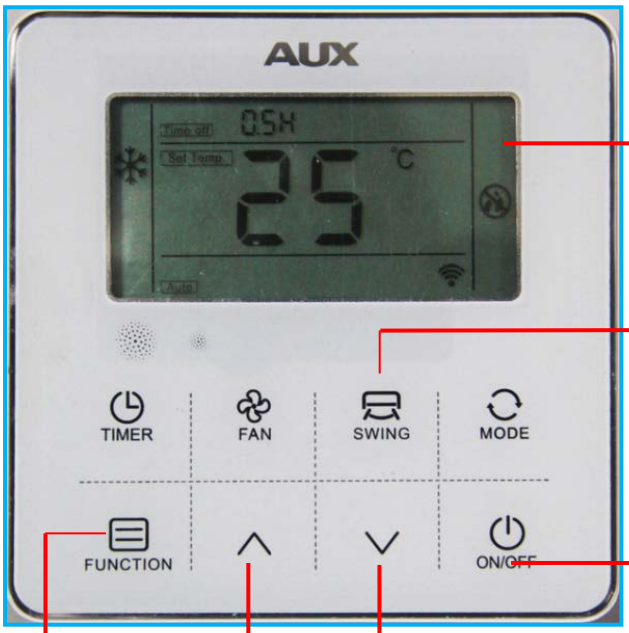
Power voltage range: DC 12V;

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**

In the state of power-on, you can setup and down swing or left and right swing function (different swing functions for different units)

**On/Off control**

**Adjustment [∧] [∨] button**

Increase or decrease the set temperature /humidity;

Long press both **[∧] [∨] button** to open the child lock.

**Function buttons**

Enter/Cancel function menu

Press **[∧] [∨] button** to select a desired function,

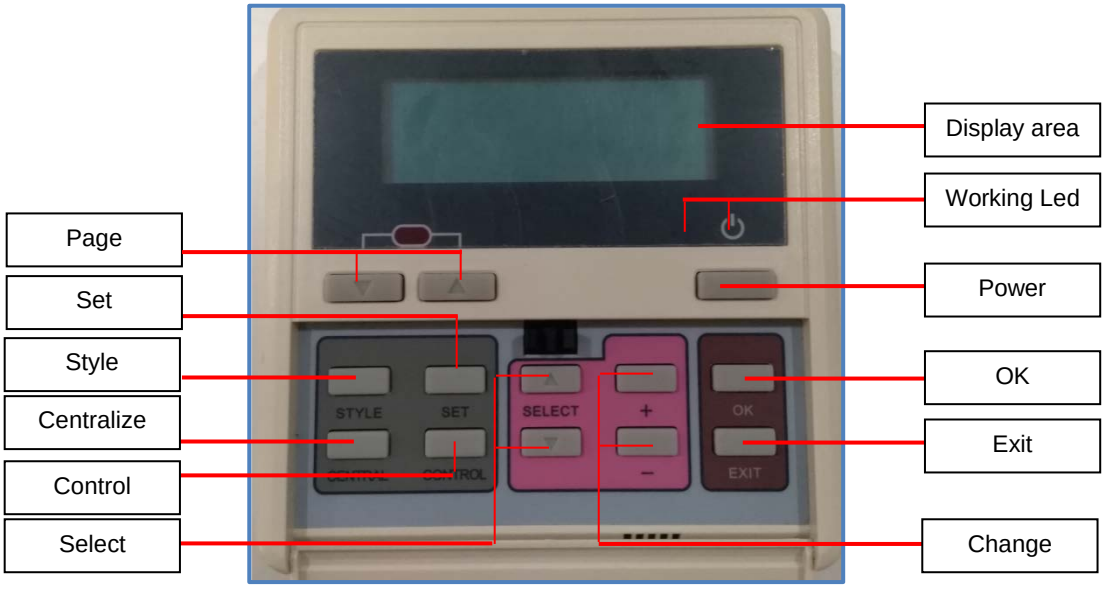
Press "**Function**" button to confirm.

Similarly, use the same steps to cancel the function operation

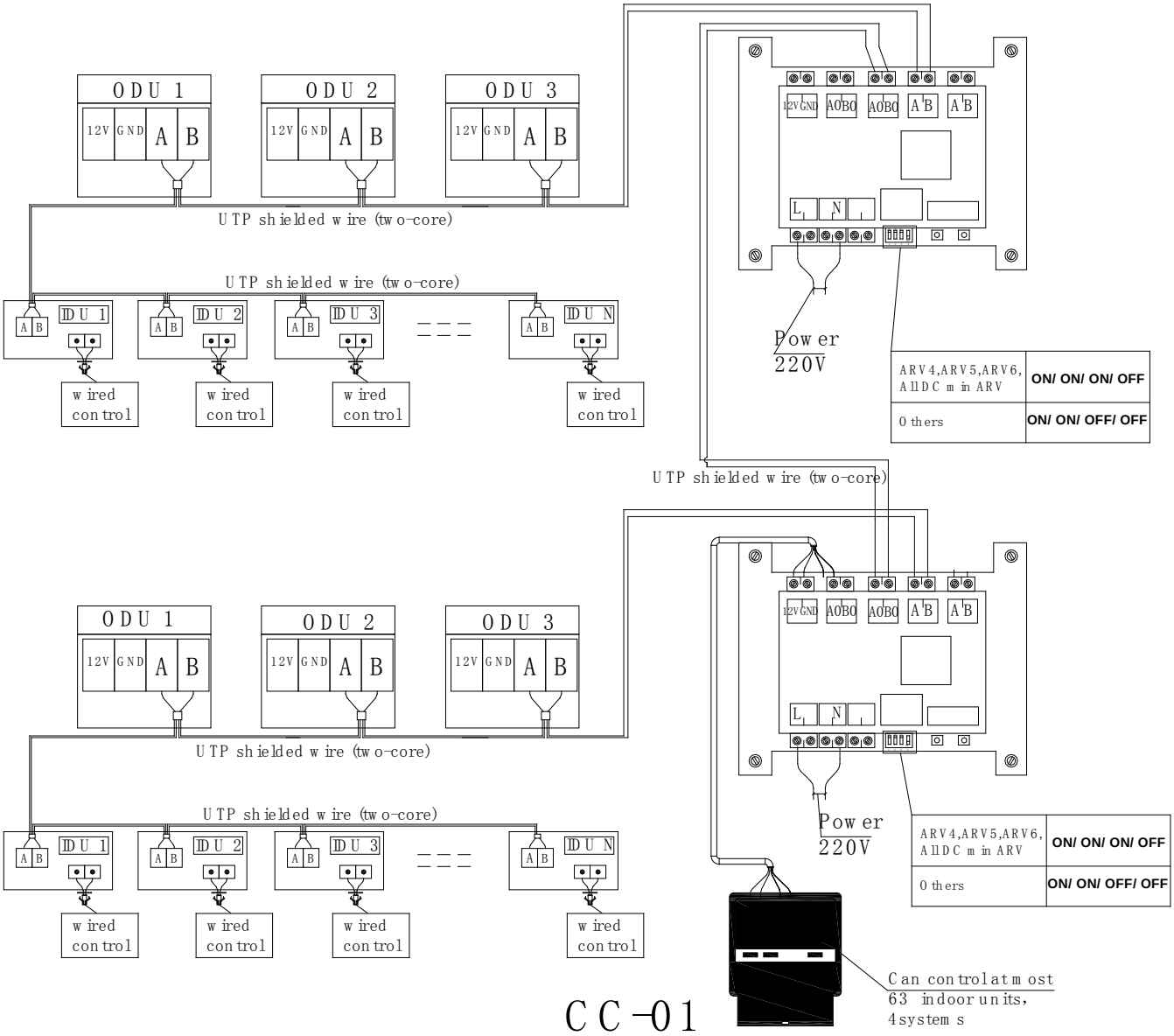
# 4. Centralized Controller

## 4.1 Button controller CC-01

(DCZCC-XK-SYE1)

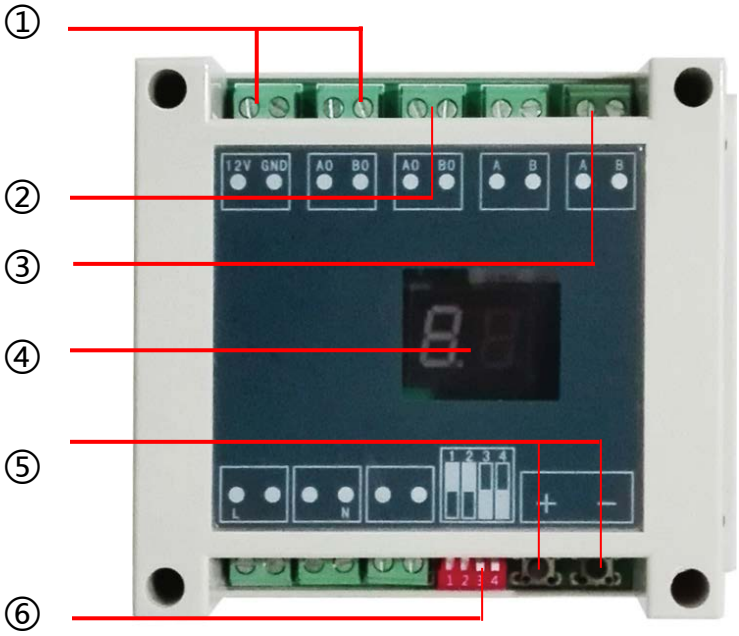


## 4.1.1 Wiring Diagram



### 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)

⑥ **Dip-switch setting:**

| | |
|---|---|
| ARV4,ARV5,ARV6, All DC type Min ARV | **ON/ON/ON/OFF** |
| Others | **ON/ON/OFF/OFF** |

※ Indoor units’ centralized ID address of all systems must be set to 1~63 (max 63)

※ Set according Part 3 Commissioning – 6. IDU parameter setting by controller,

For example: 2-1,2-2,2-3…..2-63, by YK-L remote controller

0201,0202,0203……0263 ,by XK-02A or XK-05A wired controller

### 4.1.3 Centralized Controller function

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)

### 4.1.4 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

```
2011/01/18  10:00  Tue
Unit
                    | Working  05
  Total       10    | Standby  05
```

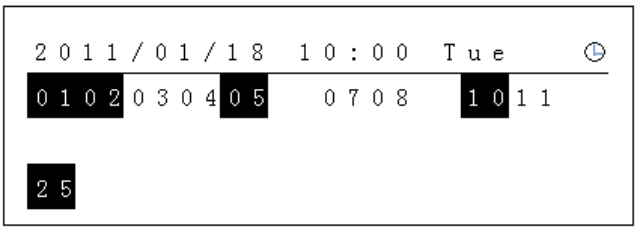
Main screen a note :

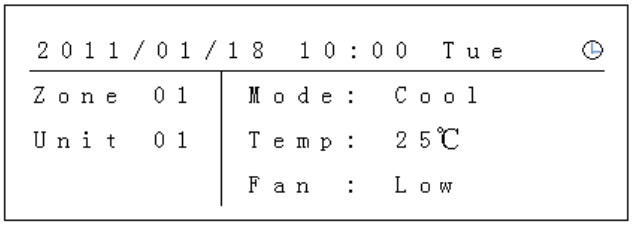
Switching between the main screen a, b and c is possible by pressing the "***Style***" key. The main screen a,b,c are collectively called the "***the main screens***".

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.




Main screen b

**Note**

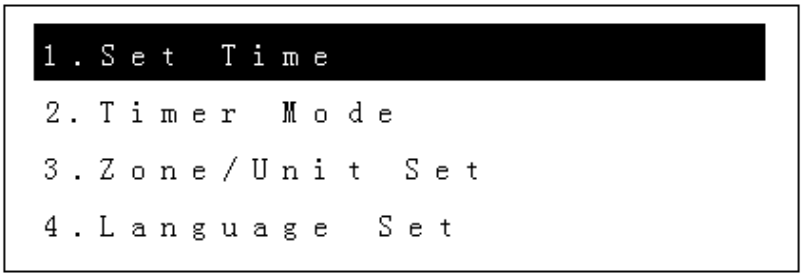
1. When among all units, one or more are turned on, the operation indicator will light, otherwise, it will remain off.
2. Reverse displayed numbers indicate the units that are currently on and normally displayed ones indicate those that are off. Numbers that are not displayed indicate the units that are either not exist or communicatively failed. Press "***Page***" key to view the next page.
3. Displays 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**

1. When the operation indicator is on under main screen a, b, pressing "***Power***" key will turn off all units. When the operation indicator is off, pressing "***Power***" key will turn on all units.
2. Under main screen c, pressing "***Power***" key will only switch the operation status of the unit that is currently selected.

**Set /change time**

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




Page "Set Manu"

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

```
2011/01/18  10:00
YY/MM/DD  HH:MM
```

Page “Time setting”

3. 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.

4. Then, press “***Ok***” key to make the change effective and return to page “ ***Set Manu***” .

5. If the “***Exit***” key is pressed during making the change, you will return to the main screen without the change being effective.

6. Pressing and holding the “***Change***” key for 2 seconds enables fast changing.

**Timer Mode**

1. 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.

2. Under the page “***Set Manu***”, select “***Timer Mode***”, then select “***No Timer***” using the “***Change***” key to ***deactivate*** the timer function.

3. 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   Time2:   09:00
Close  Time2:   16:00
```

Current/Daily Timing

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

***2. Switch*** between the timers using the “***Select***” key. The reversely displayed item is the currently selected one.

3. Change the time of it using “***Change***” key. Pressing and holding the “***Change***” key for 2 seconds enables fast changing.
4. All timers work at ***same*** time.
5. Current timer works only for the current day, with the timer mode automatically ***switched*** to “***No Timer***”. The Daily timer always ***works***.
6. If two timers are of the same time but different types, the one that is set to close will be ***executed***.
7. If it is set to open and close the system at the ***same*** time, the close order will be executed.
8. 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***.
9. 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  SMTWTFS
2. Close   17:00  SMTWTFS
3. Not  Used
4. Not  Used
```

The list of weekly timers

1. There are 8 weekly timers and the one with the frame shown is currently selected.
2. “***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.
3. 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

4. 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.

```
Mode:        Open
Time:        08:00
Weekly:      S M T W T F S
```

**Change weekly timing**

1. The 3 lines are "***Mode***", "***Time***" and "***Weekly***" respectively.
2. The line with the frame shown is currently selected.
3. The "***Mode***" line is to set whether the timer is activated or not and whether it is set to open or close the unit.
4. The "***Time***" line is to set the ***work time*** of the timer.
5. The "***Weekly***" line is to set the days on which the timer is activated with those days indicated reversely.

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

7. Press "***Change***" key to make desired changes.
8. After making all the changes, press "***Exit***" key to ***return*** to the previous screen. The setting is now finished.
9. 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**

1. 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***".

```
Zone/Uint Setup

Select Zone:01
```

Page “Zone/Unit setting”

2. 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”

1. 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.

2. Press “***Page***” keys to display other pages.

3. After all members are set, press “***Ok***” key to finish the setting of the current zone.

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

**Language Set**

1. 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***”

2. Under page “***Language Setting***”, press “***Change***” key to select the desired language : Chinese or English.

3. After selecting the desired language, press “***Ok***” key to activate that language.

## Zoned Control

1. Under the main screens, press "***Control***" key to enter the page "***Set Manu*** ":

```
Zone/Unit   Control
---------------------------
Control Mode:  Zone
```

Set Manu a

1. 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.

2. 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
---------------------------
Zone Number:     01
```

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

3. 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

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

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

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

4. 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.

5. 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**

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

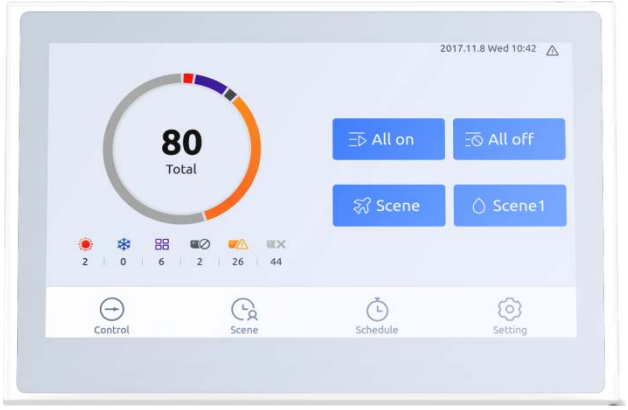
```
Fault                    (01/20)
Unit  01
  Recently    :          a3
  Previously:            j4
```

Historical Failure Inquiries

2. 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

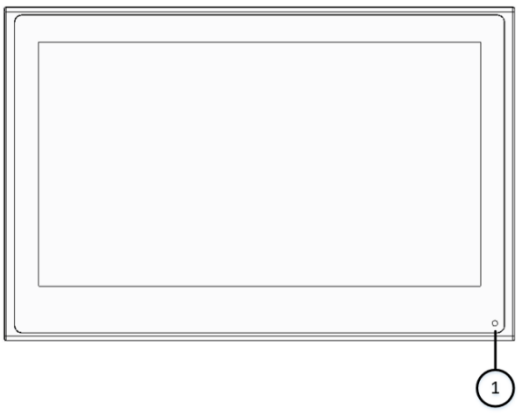
For the meaning of the specific trouble code, refer to the technical manual of the unit.

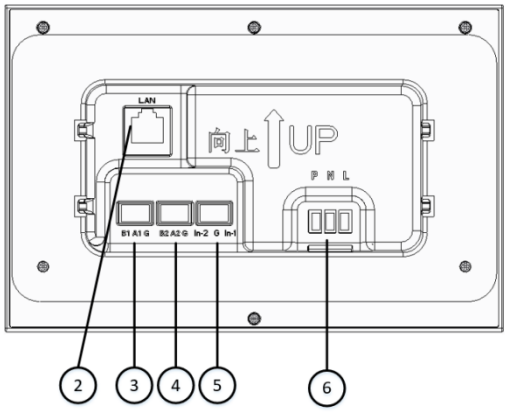
## 4.2 Touch controller CC-02




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

### 4.2.1 Interface specification




① Indicator light

② RJ45 WAN

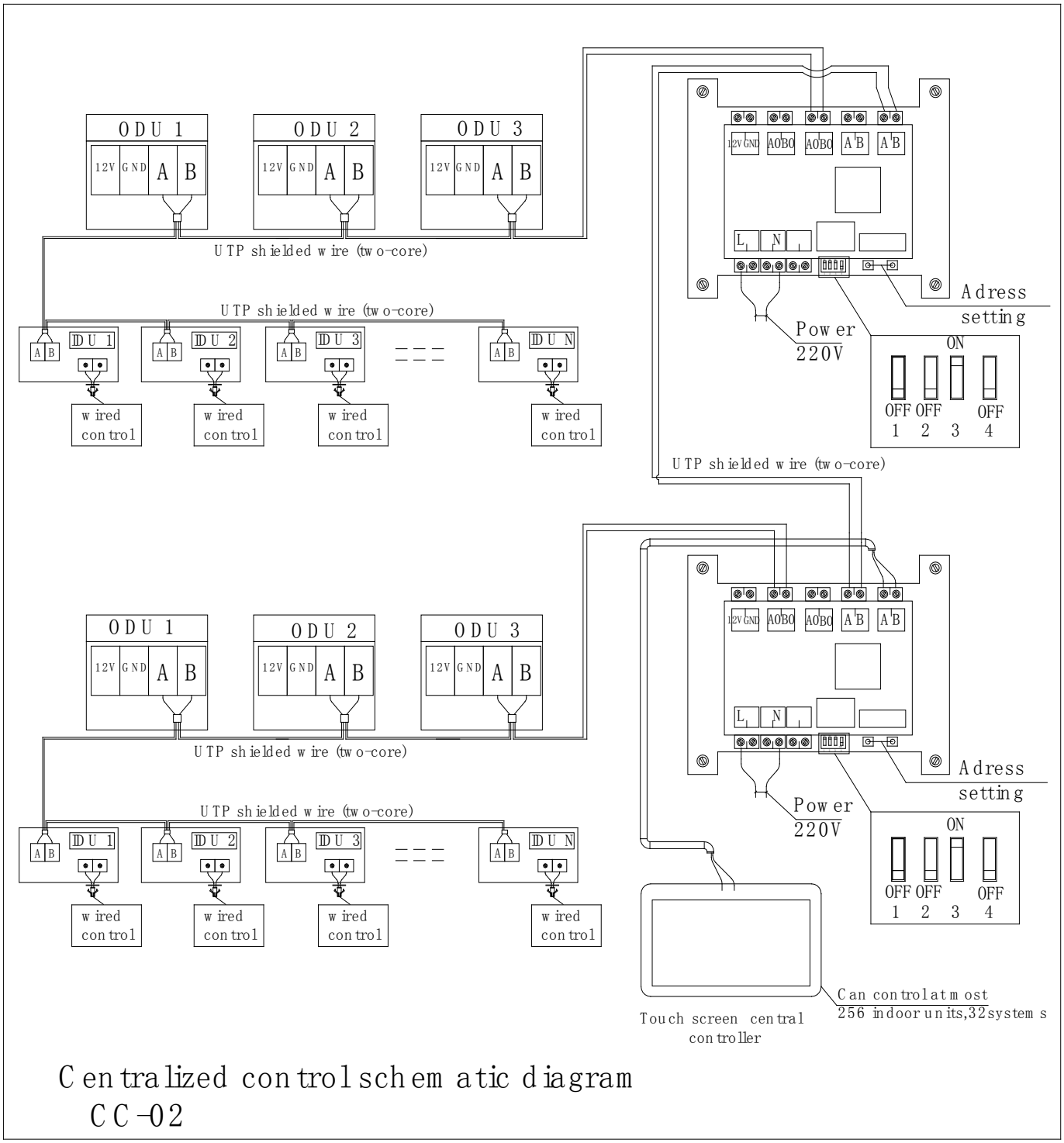
③RS485 interface 1:B1- signal line negative pole; A1- signal line positive pole; G- signal ground wire

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

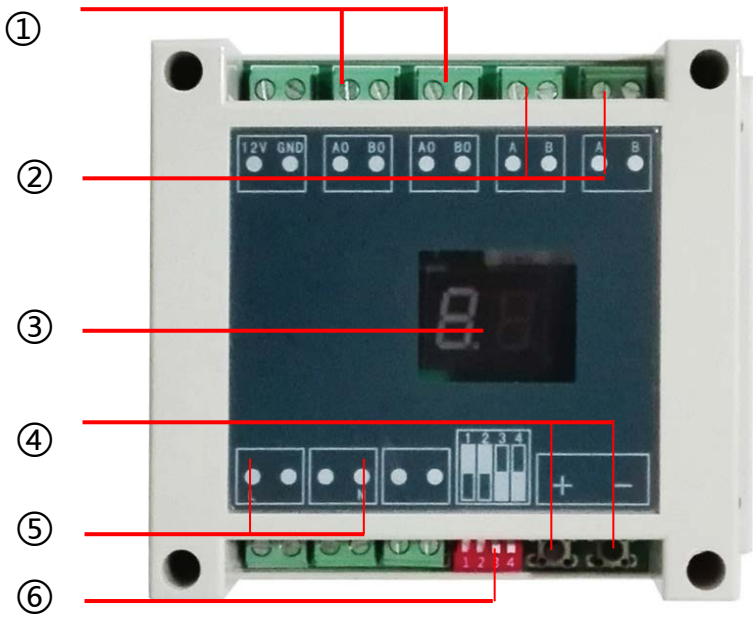
## 4.2.2 Wiring Diagram




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

   4.1 Press **“+”** or **“-”** to activate the slave address setting functions;

   4.2 Press **“+”** and **“-”** at the same time for 5 seconds，then the Digital Display will be Flashing every second;

   4.3 Press **“+”** to add the Slave Address，Press **“-”** to decrease the Slave address;

   4.4 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:**

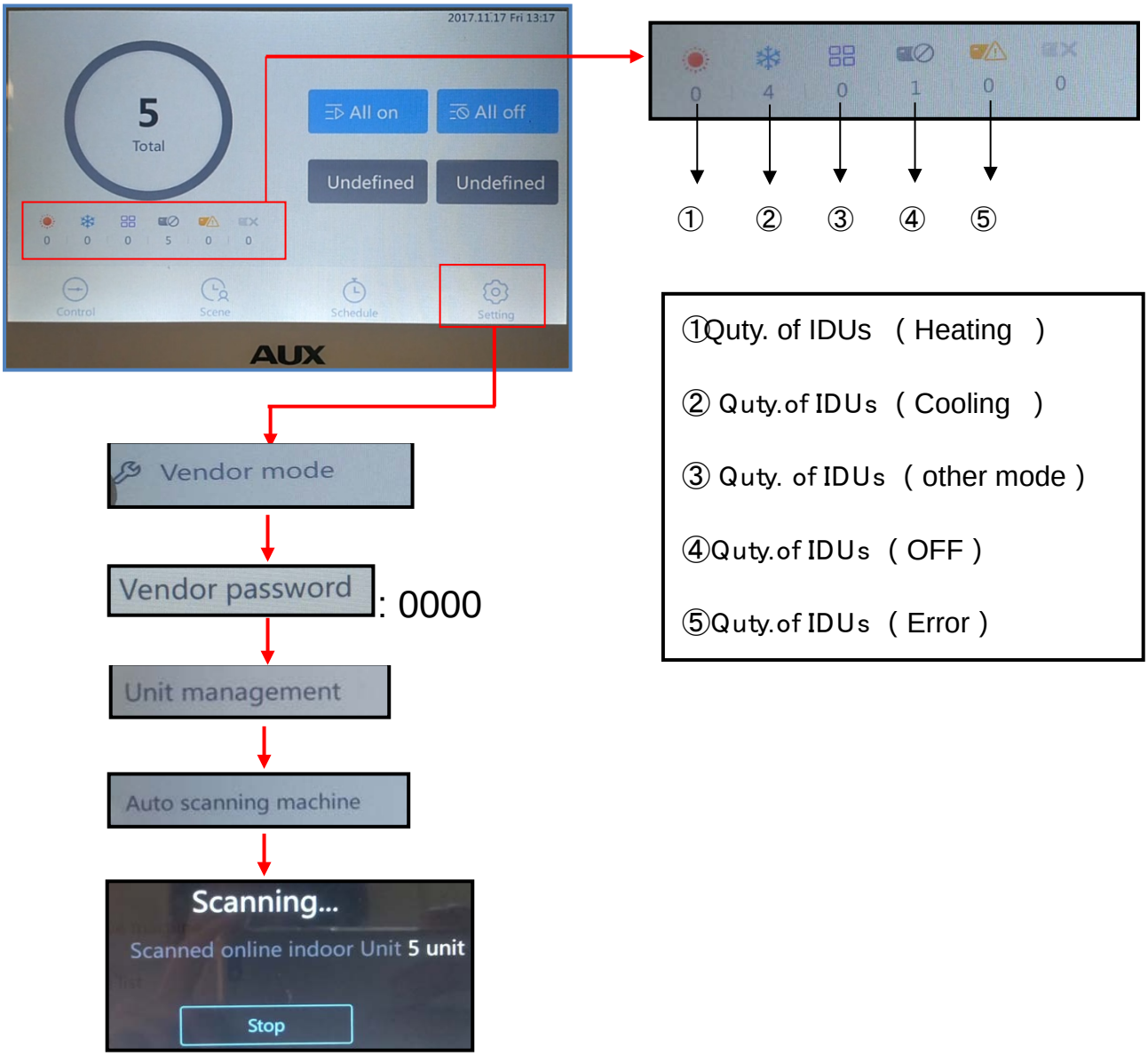
| | |
|---|---|
| ARV4,ARV5,ARV6, All DC type Min ARV | **OFF/OFF/ON/OFF** |
| Others | **OFF/OFF/OFF/OFF** |

※ Indoor units’ centralized ID address of all systems no need to set

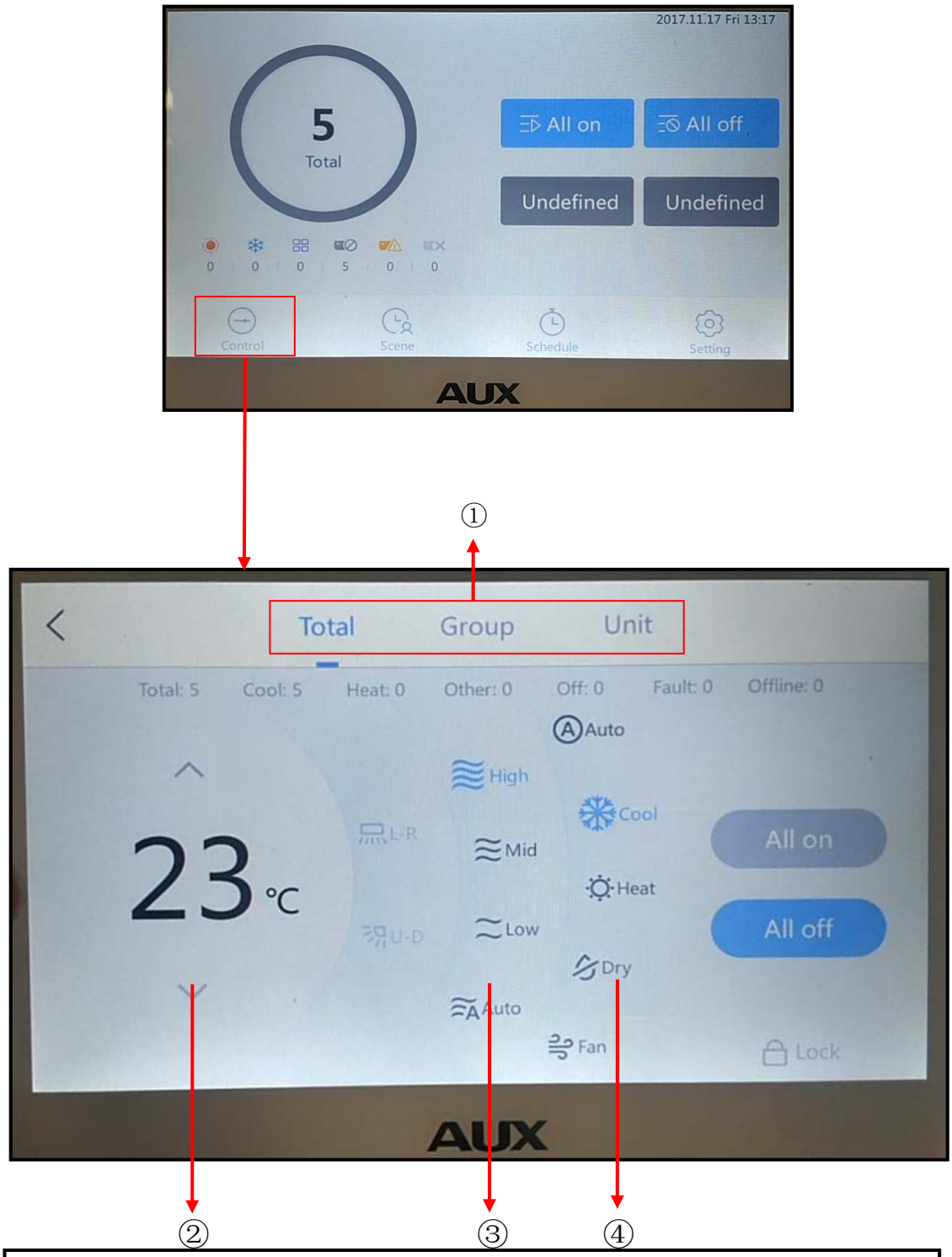
### 4.2.4 Centralized Controller function

AUX touch screen centralized controller is a multifunctional device that can control up to **256 indoor units / 32 systems** within a maximum connection length of ***1200meters***.Users could enjoy the flexibility of either controlling multiple units as a ***group*** or controlling ***each*** unit individually.

4.2.4.1 Auto scanning indoor units



4.2.4.2 Indoor units operation



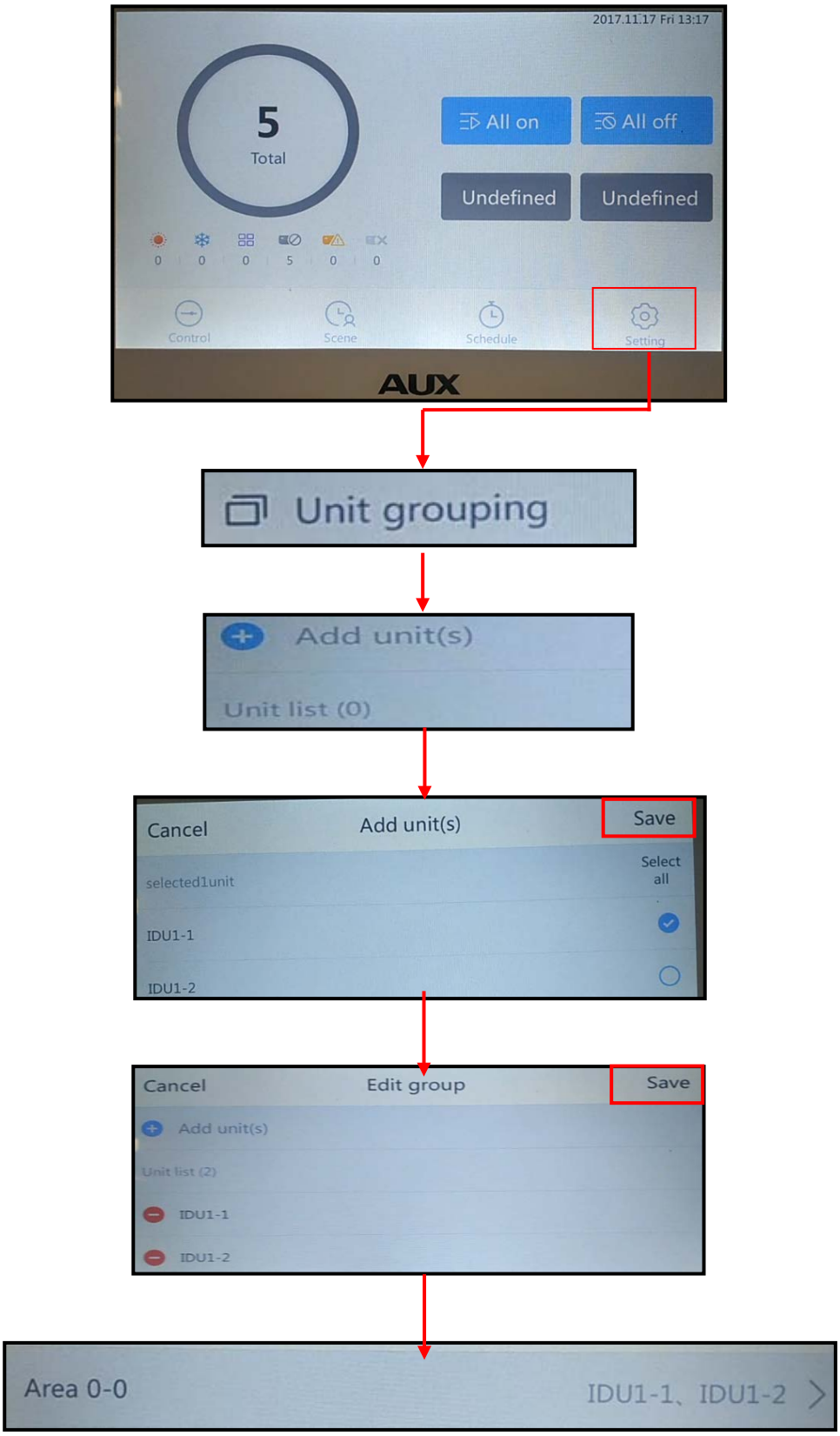

① Control options( Total/Group/Unit)

② Temperature setting

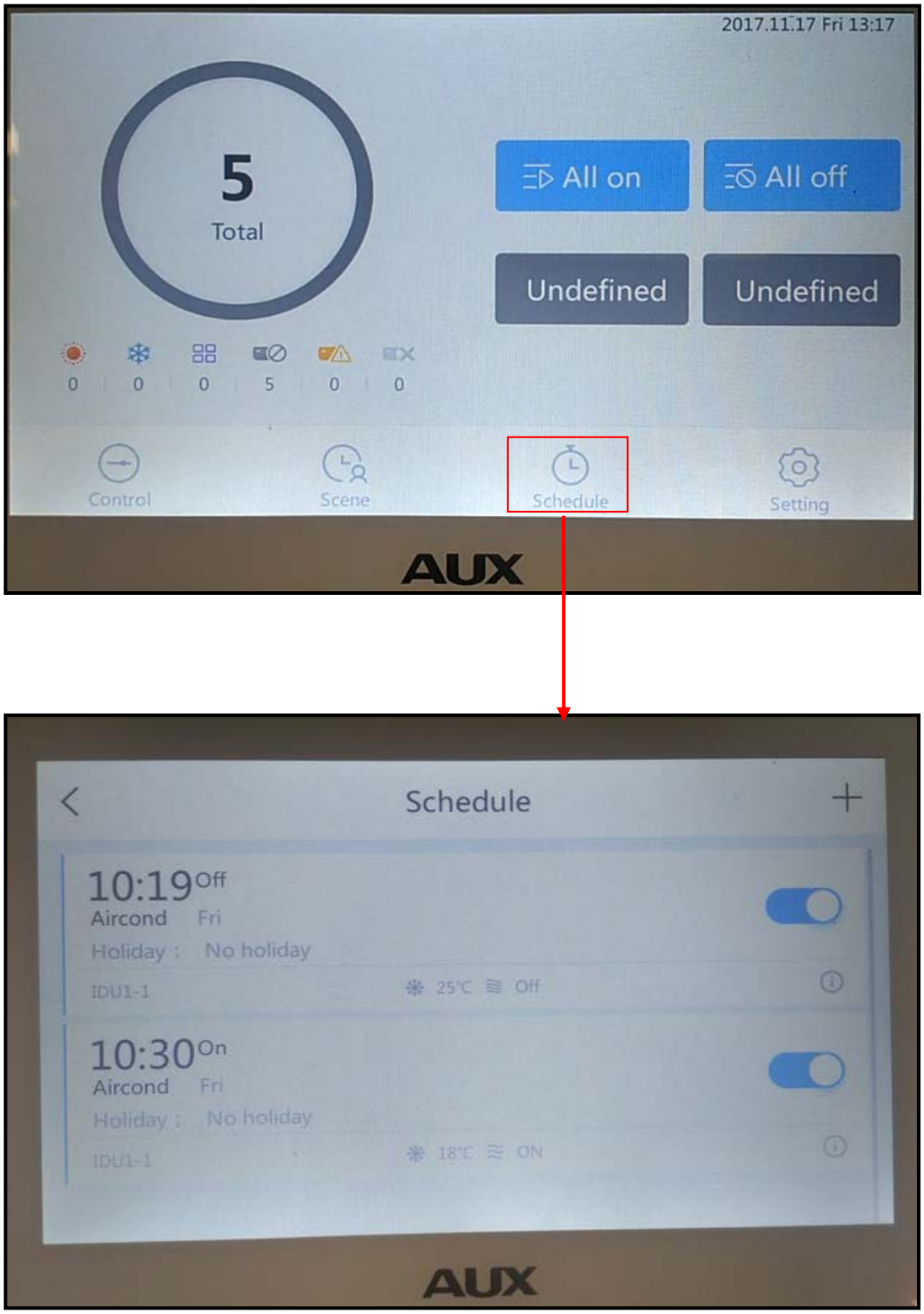
③ Fan speed setting ( High/Mid/Low/Auto )

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

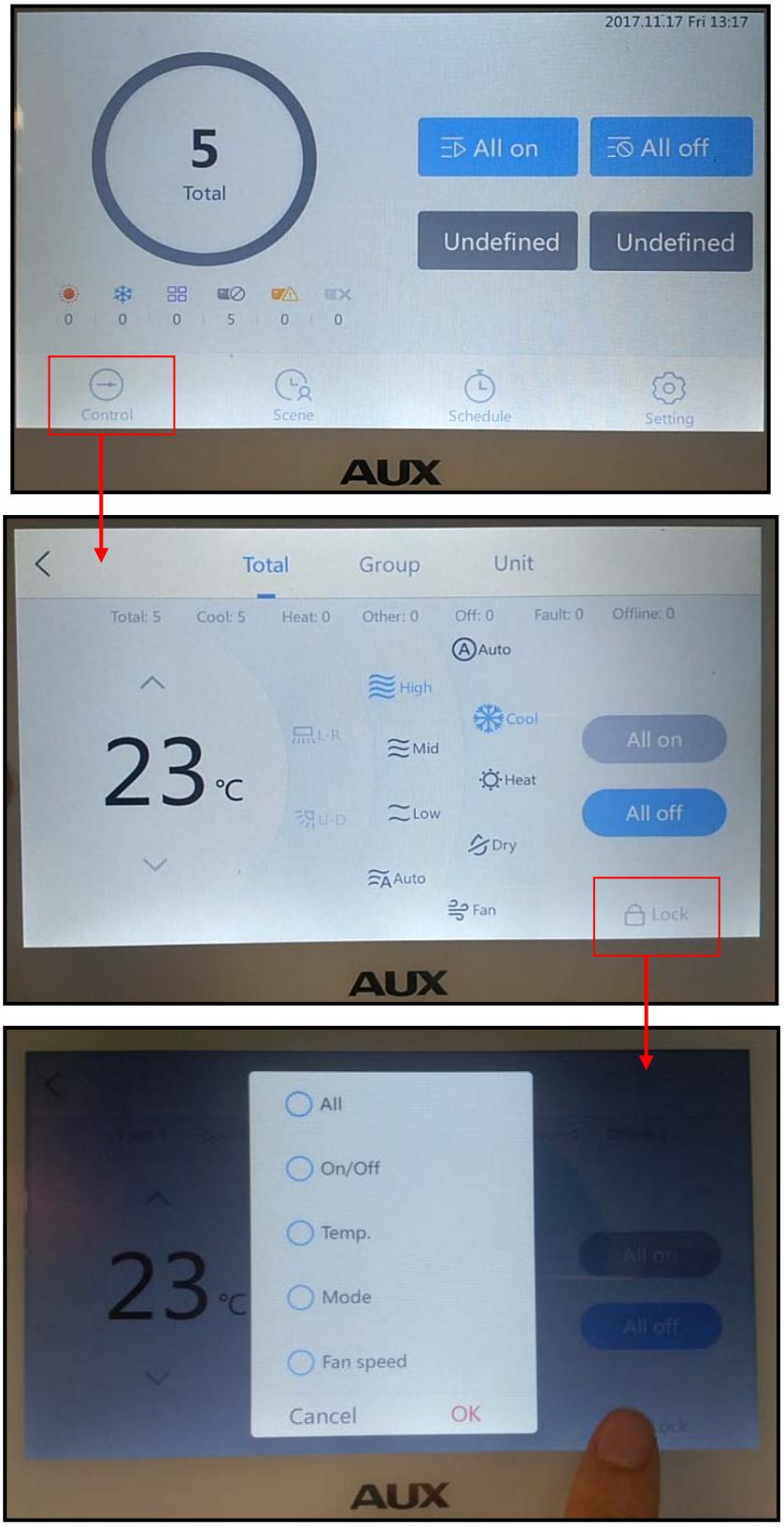
4.2.4.3 Grouping / region setting



4.2.3.4 Weekly Schedule Control

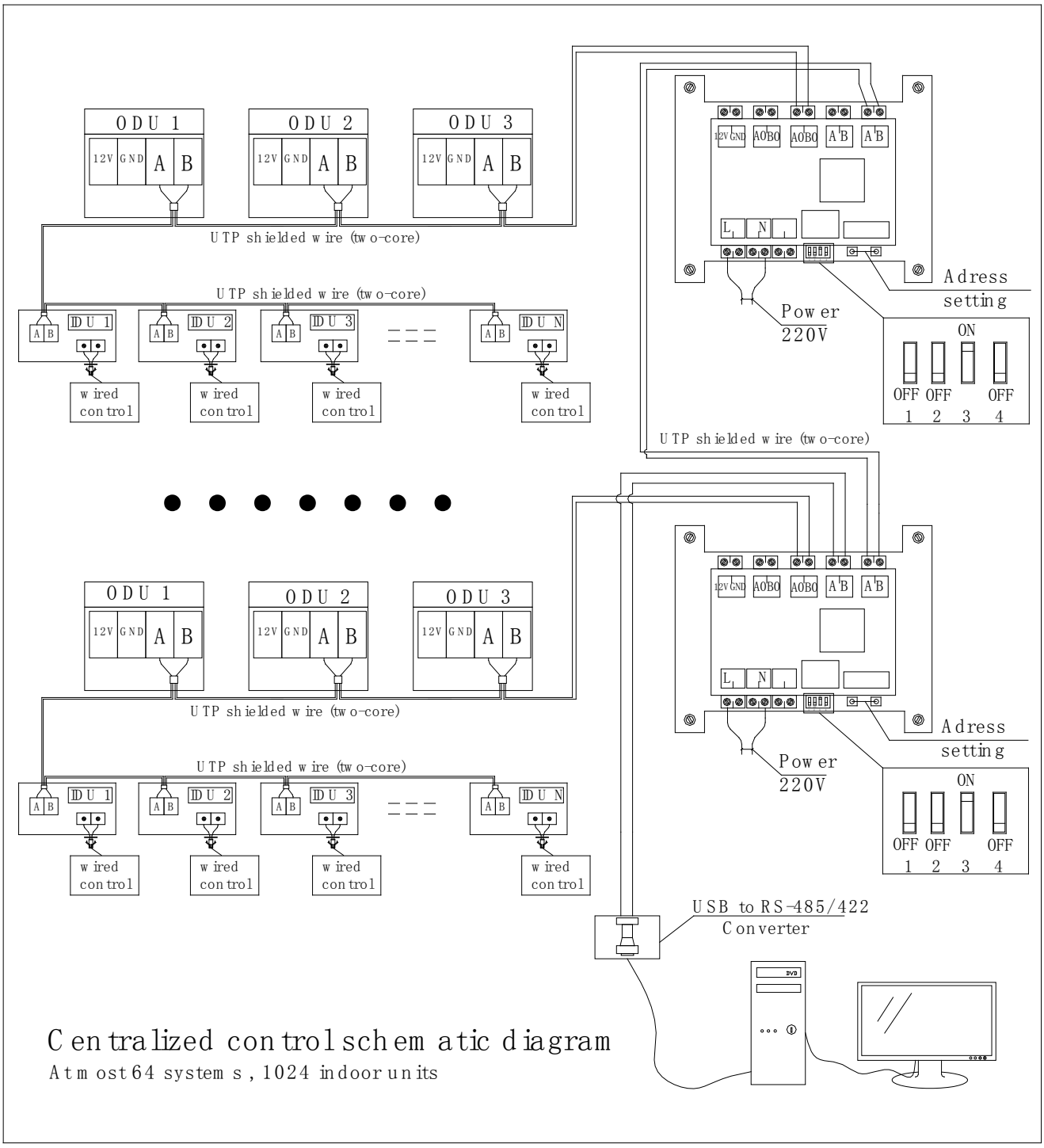


4.2.3.5 Multiple Lock function



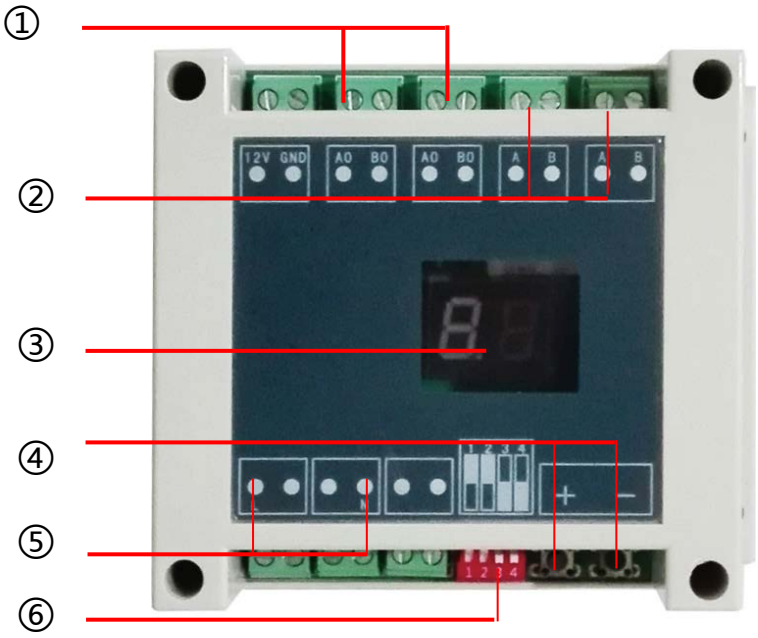
# 5. Centralized Controller Software

## 5.1 System overview



## 5.2 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…

④Setting 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~

**⑥Dip-switch setting:**

| | |
|---|---|
| ARV4,ARV5,ARV6, All DC type Min ARV | **OFF/OFF/ON/OFF** |
| Others | **OFF/OFF/OFF/OFF** |

## 5.3 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 ARV** types of AUX;

Each **ARV** unit can **access** at most **63** indoor sets;

This **system** can access at most **64** ARV 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 ARV 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.

## 5.4 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 add communication adapter plate to *make both communicate*.<br>Each ARV 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 of computers* 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 with centralized control system. |
| 5 | RS-485/422 Repeater | *Extend the communication distance* and *increase* the *number* of RS-485 bus network.<br>The repeater is not required, only when there is more than 30 systems or communication distance is more than 800 meters. |

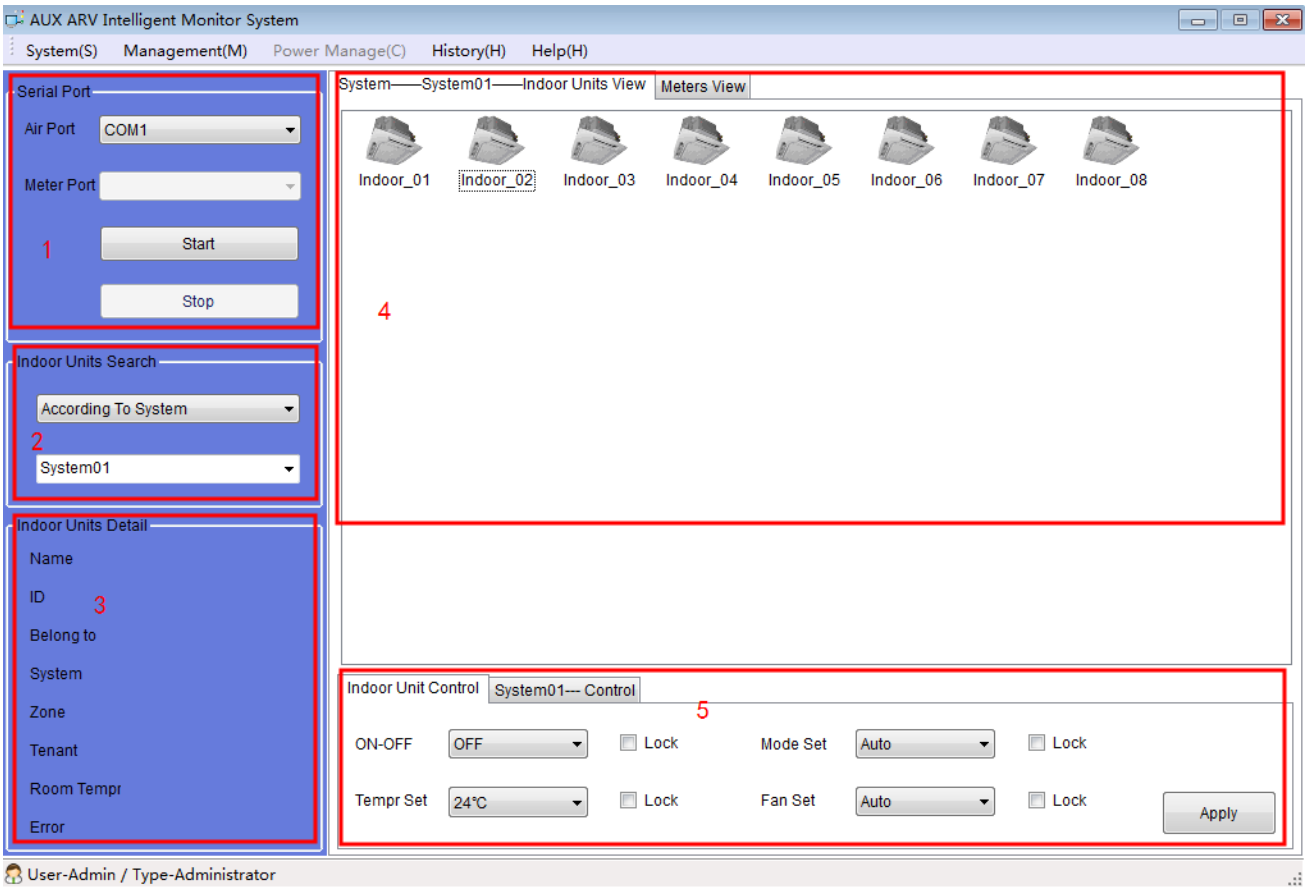
**5.5 Software install and uninstall**

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\Aux Group\AUX_ARV_Setup

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

## 5.6 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.

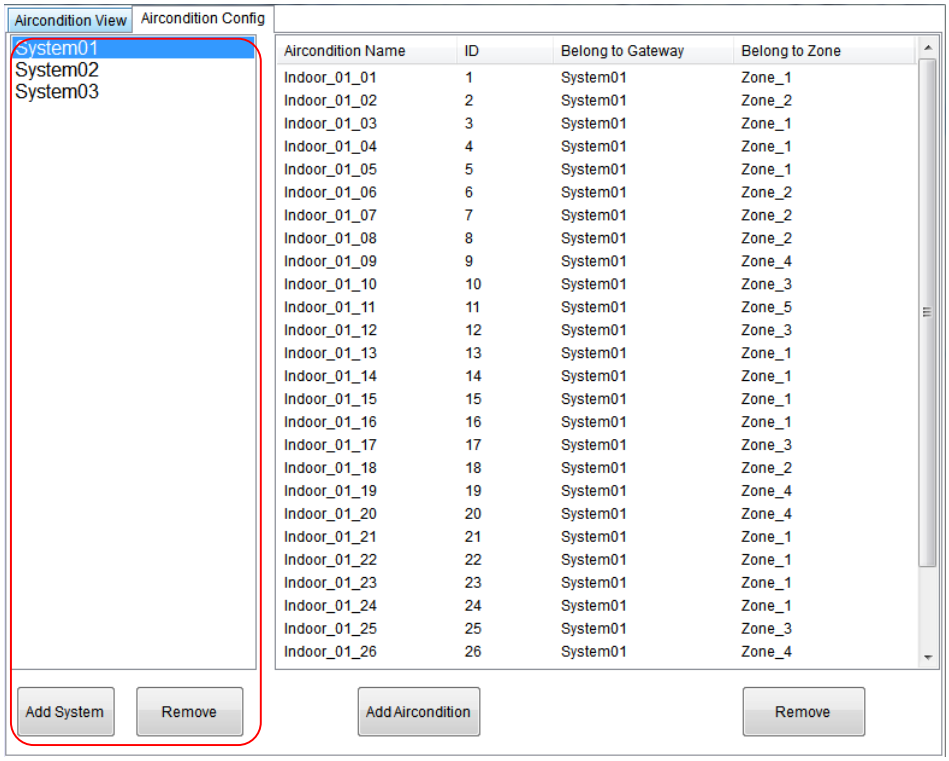
**Area 3**--Display area of single air conditioner ***indoor unit***, select one of indoor units in area 4, then the area will display the name, ID (address of indoor unit) , system belonged ,group belonged, current condition, the room temperature of indoor unit , failure etc.

**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 "***Air condition Config*** " 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.




### 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.

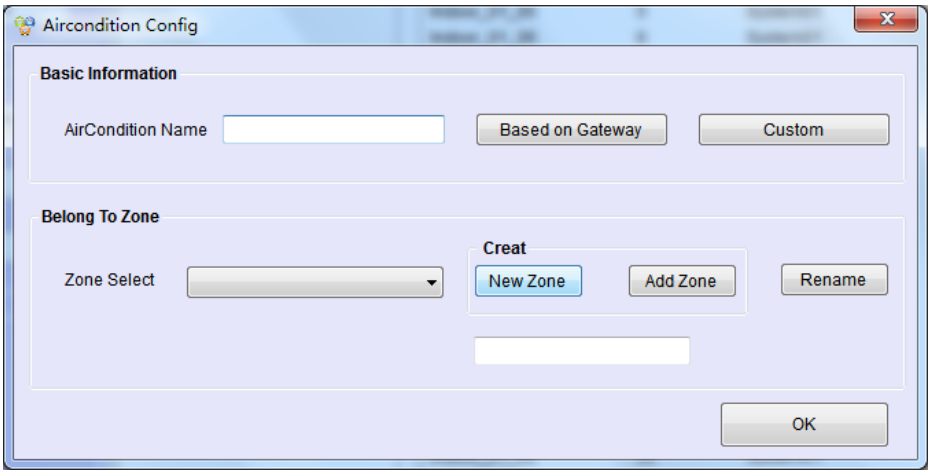
### Added/deleted indoor unit

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

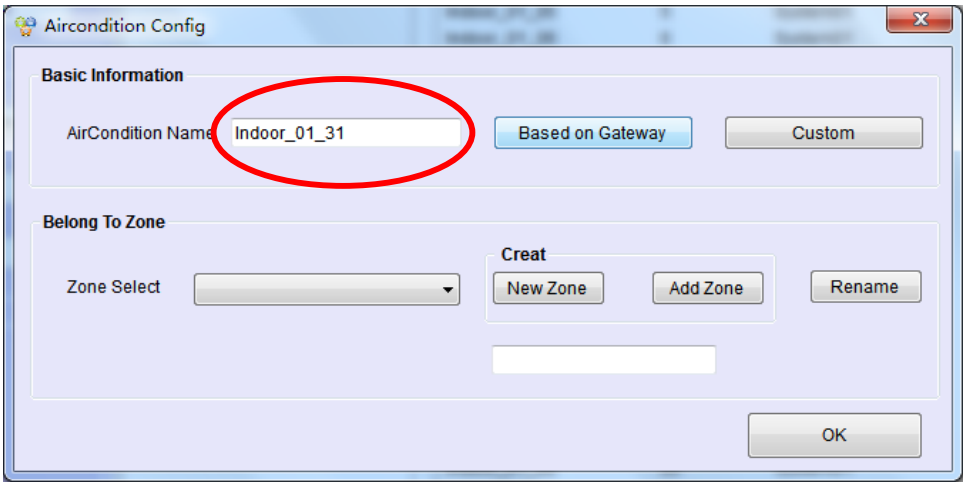
in that outdoor system(the added quantity of indoor unit system must match with the actual quantity in the outdoor system).

### 5.7 Concrete operation

Click "***Add air condition***" button**,** the fallowing dialog box will pop up

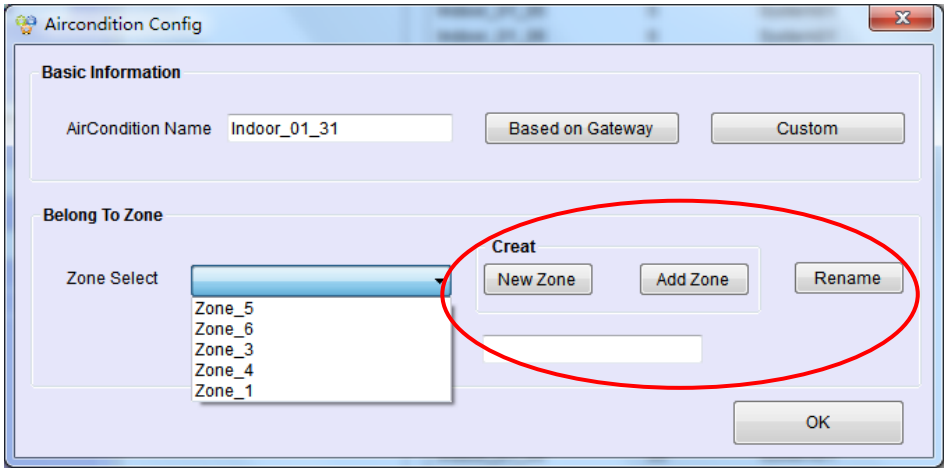



Click Based On Gateway button**,** there will ***generate*** a ***name*** (the red circle part in the figure below) according to indoor unit address and the system it belongs; click Custom button, user need to set a name by himself.




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.

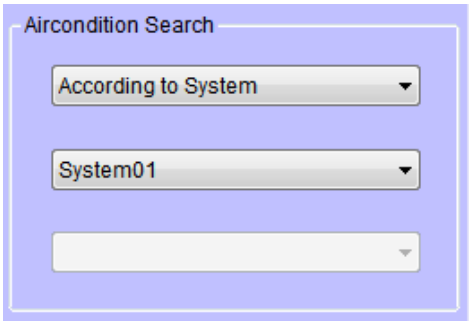
If user need to ***add new group***, first, click New Zone button and input the name of user-defined group, then click Add Zone button, here will show the name inputted just now , establishment complete;

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

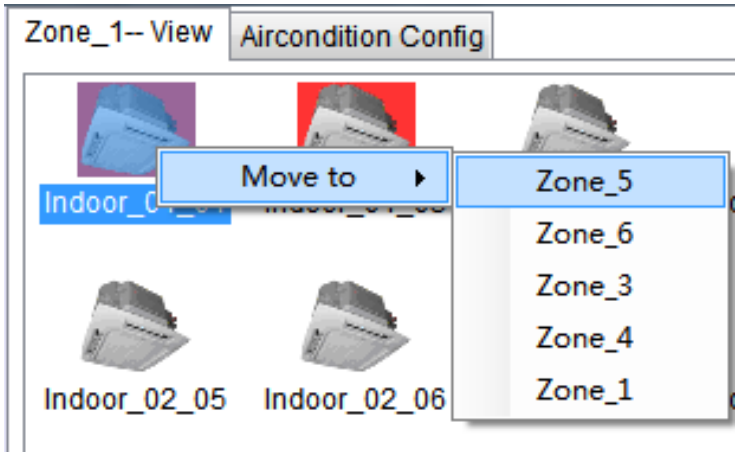
System query operation includes system query and user-defined group query. Query ways can be chosen as the figure below:



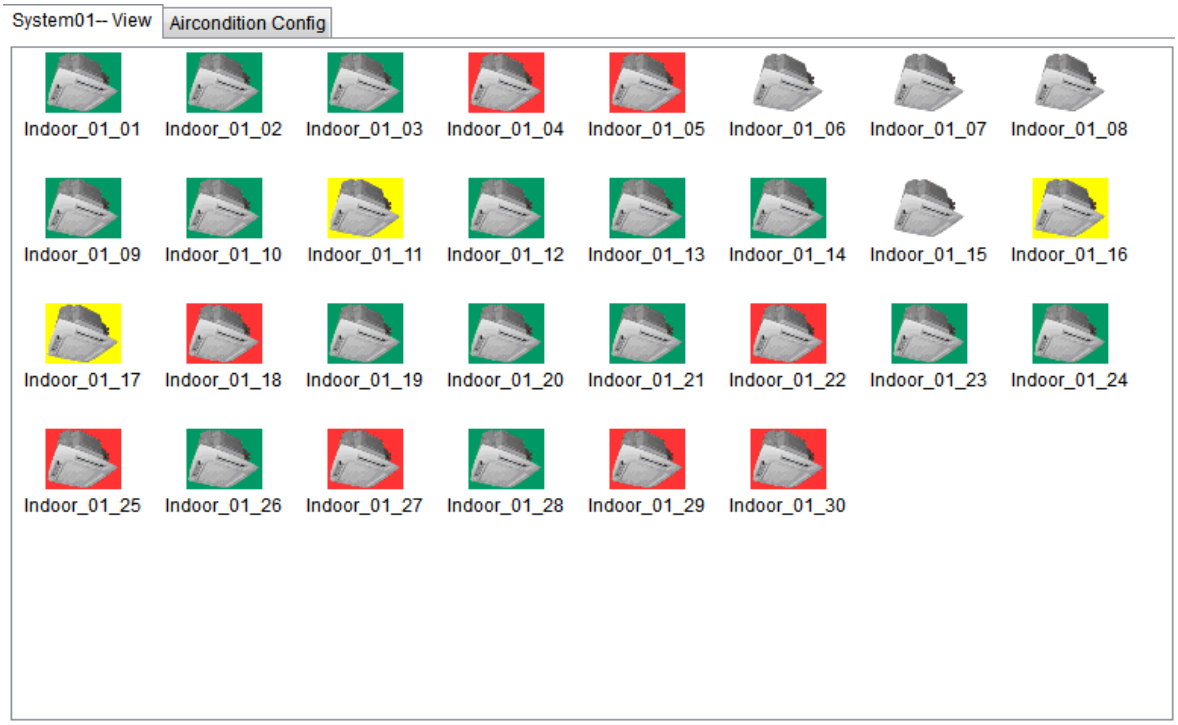

◇ If the chosen group is in According to System, then all the unit condition of the group will be displayed in area 4(area 4 will display the condition of all the indoor unit in System01 as the above picture shows).

◇ 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*;

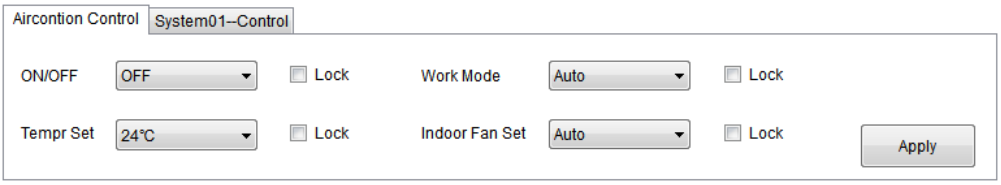
◇ *Red* background is system *failure*;

◇ *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

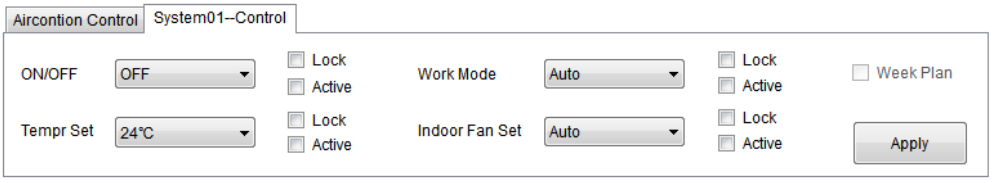



Besides on/off, ***temperature*** setting, ***mode*** setting, ***indoor speed*** setting, single unit control ***added*** the ***lock*** function (lock the 4 function above). If one function is locked, user cannot use it. For example, if ON/OFF is lock( choose Lock in ON/OFF), user cannot turn on/off 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:

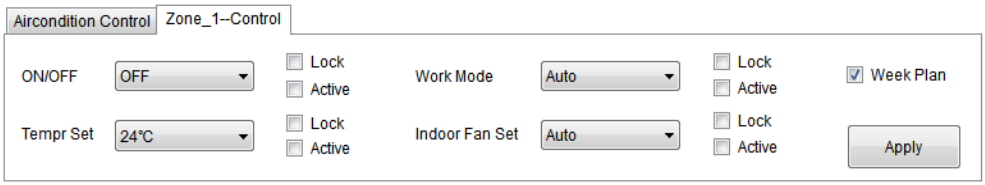



Besides the ***general control*** and ***locking control*** of single unit control, group control is added the Active function. The matching state of indoor unit will change only when choose Apply function, unselected ones stay unchanged. For example, choose ON and Active, all the indoor units will be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

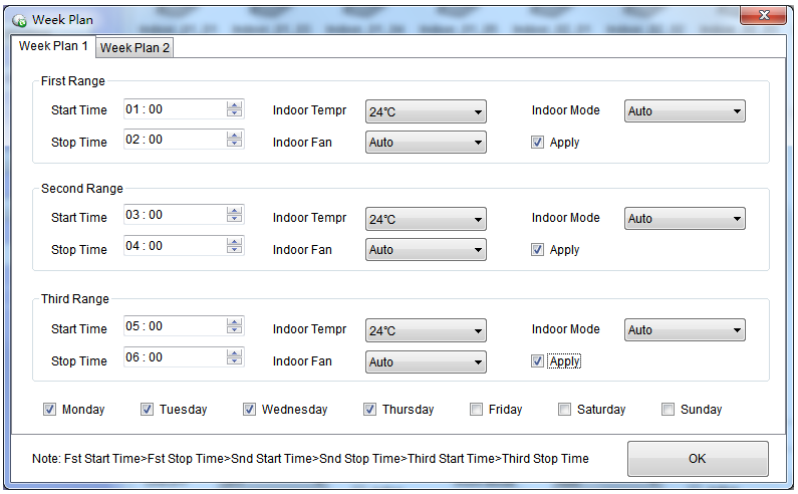
Indoor unit will executive command when click Apply after setting completed.

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:**

1. All the related intellectual property rights as System patent right, software copyright etc. ownership belongs to Ningbo AUX Electrical Company Ltd. Any unit or individual shall not copy, assignment, transact or use related production in other ways without permission. Otherwise Ningbo AUX Electrical Company Ltd. will have the right to pursue legal responsibilities.
2. If system is damaged by suffering a natural force majeure (such as earthquake fire typhoon, etc.), all losses should be responsible for system investors.
3. 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.

3. 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***.

4. The 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.

5. 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***.

# 6. BMS-MODBUS Protocol

## 6.1 MODBUS-RTU Parameter

**6.1.1 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 |

AUX ARV MODBUS-RTU

ProtocolV1.3

AUX ARV
MODBUS-RTU Protoc

**6.1.2 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 evaporator central 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 | / |

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

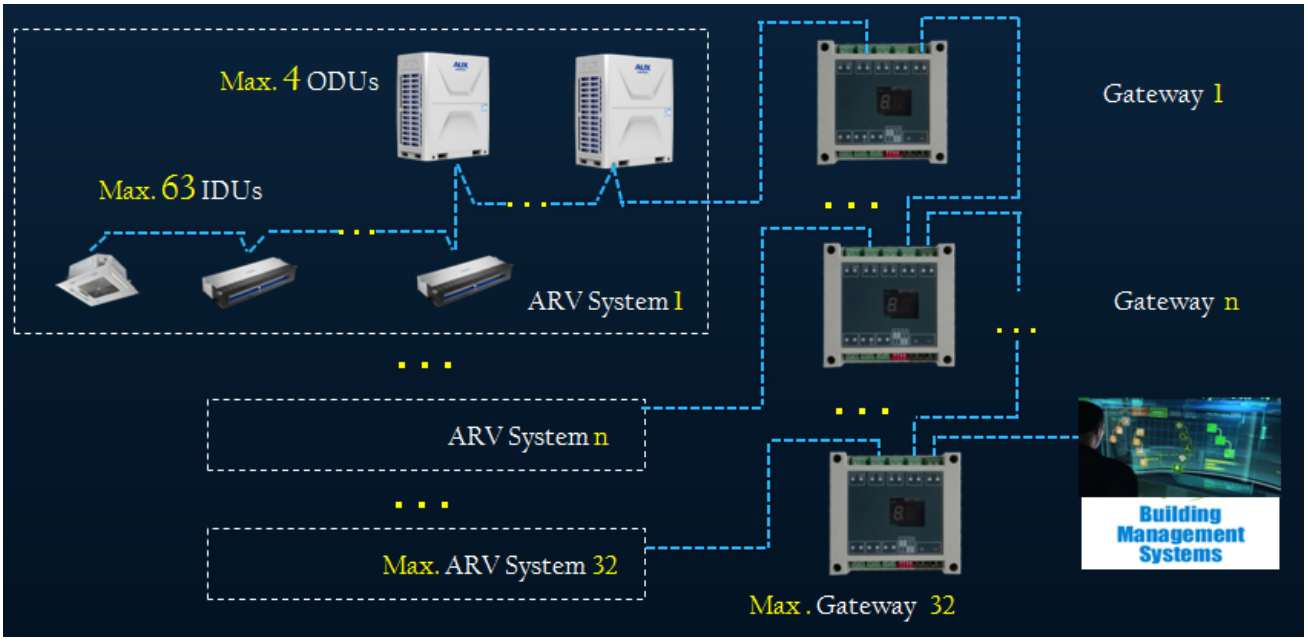
| Coil Address | Content | Value/W | Data Type |
|---|---|---|---|
| 0 | 1# Indoor ON/OFF | 0 | BOOL |
| 1 | 1# Indoor ON/OFF Lock | 0 | BOOL |
| 2 | 1# Indoor Control Mode Lock | 0 | BOOL |
| 3 | 1# Indoor Temperature Set Lock | 0 | BOOL |
| 4 | 1# Indoor Fan Speed Lock | 0 | BOOL |
| 5 | 1# Indoor 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 |

**6.1.4 Holding registers:** There are 4 parameters of each indoor unit can be write / set

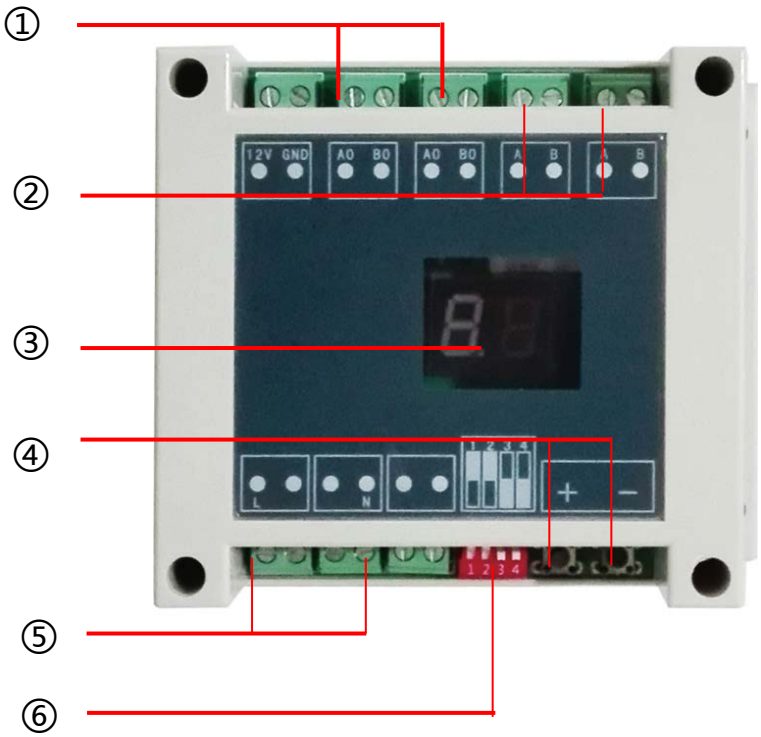
| Holding Registers address | Content | MIN_ Value | Default Value | MAX_ Value | Data Type | Unit | Remark |
|---|---|---|---|---|---|---|---|
| 0 | 1# Indoor Control Mode | 0 | 0 | 6 | SIGNED WORD | / | 0-Auto/ 1-Cool/ 2-Dry /4-Heat / 6-Fan |
| 1 | 1# Indoor Temperature Set | 16 | 24 | 32 | SIGNED 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 | / | / |

## 6.2 Overall structure

Each MODBUS Gateway support 1 ARV system




## 6.3 Hardware Features



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

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

③ Display slave address/ “01”means the first system.”02”means the second system…

④Setting 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.

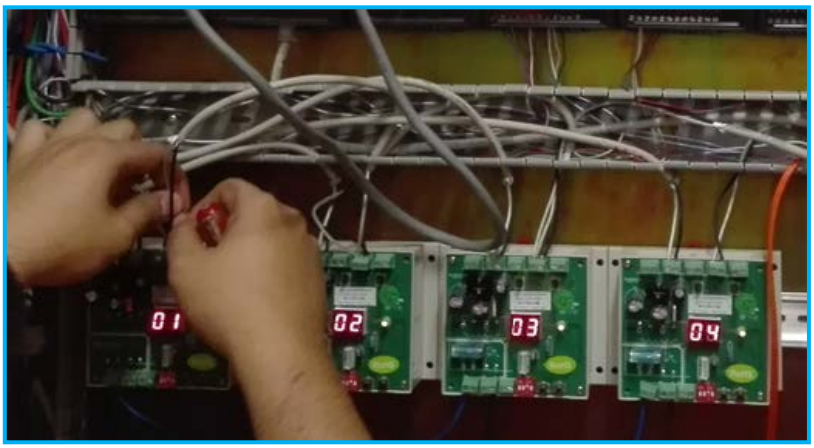
⑤Power supply 220V

⑥ Dip-switch setting: OFF/OFF/ON/OFF

## 6.4 Project Commissioning

6.4.1 Make sure ARV system was ***commissioning*** successful

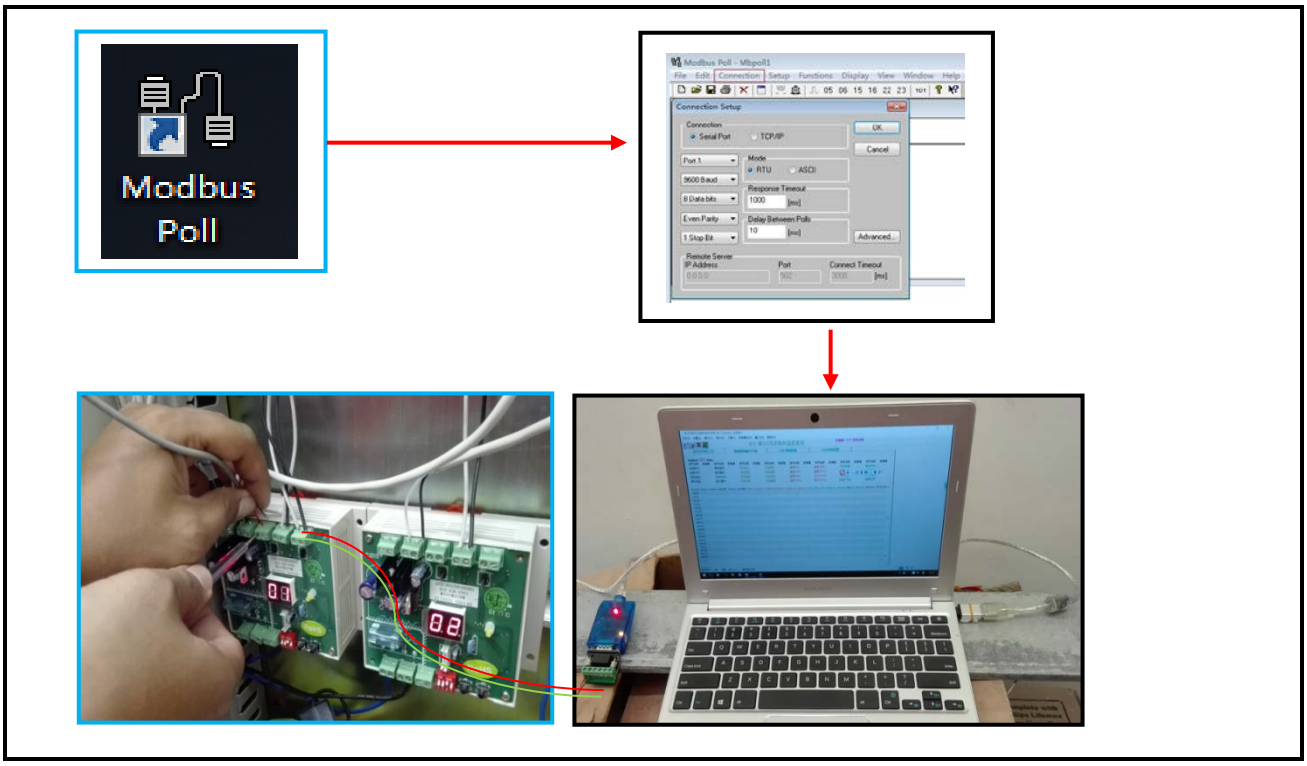
6.4.2 Make sure ***MODBUS Gateway*** was ***connected*** correct




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)

6.4.3 ***Check*** if Gateway is working normal or not, test by a software ( MODBUS Poll)




6.4.4 Last, we can deliver the project to the BMS administrator, they will according **"AUX ARV MODBUS-RTU ProtocolV1.3"**table to do management

## 7. BMS - BACNET Protocol

### 7.1 BACNET Parameter Variable

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) On/Off | BV | | 1：ON<br>0：OFF |
| 2 | Mode | Indoor(YY_XX) Mode Setting | AV | | 0：Auto Mode<br>1：Cool Mode<br>2：Dehumi Mode<br>3：/<br>4：Heat Mode<br>5：/<br>6：Fan Mode |
| 3 | Temp. Set | Indoor(YY_XX) Temp. Set | AV | ℃ | Range： 16~32 |
| 4 | Fan Set | Indoor(YY_XX) Fan Set | AV | | 1：High Fan<br>2：Medium Fan |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | 3：Low Fan<br>4：/<br>5：Auto Fan |
| 5 | Ambient Temp | Indoor(YY_XX) Tai | AV | ℃ | |
| 6 | Error | Indoor(YY_XX) Error | AV | | Error Code |
| 7 | ON/OFF Lock | Indoor(YY_XX) On/Off Lock | BV | | 1：Lock<br>0：Unlock |
| 8 | Mode Lock | Indoor(YY_XX) Mode Lock | BV | | 1：Lock<br>0：Unlock |
| 9 | Temp. Lock | Indoor(YY_XX) Temp Lock | BV | | 1：Lock<br>0：Unlock |

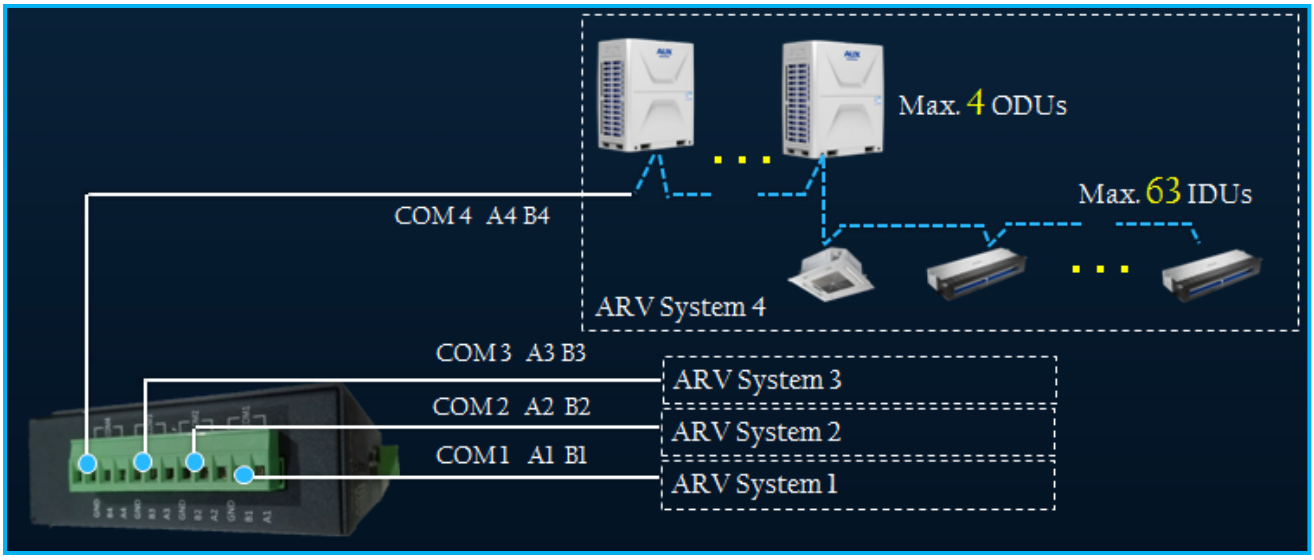
**Note：**

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

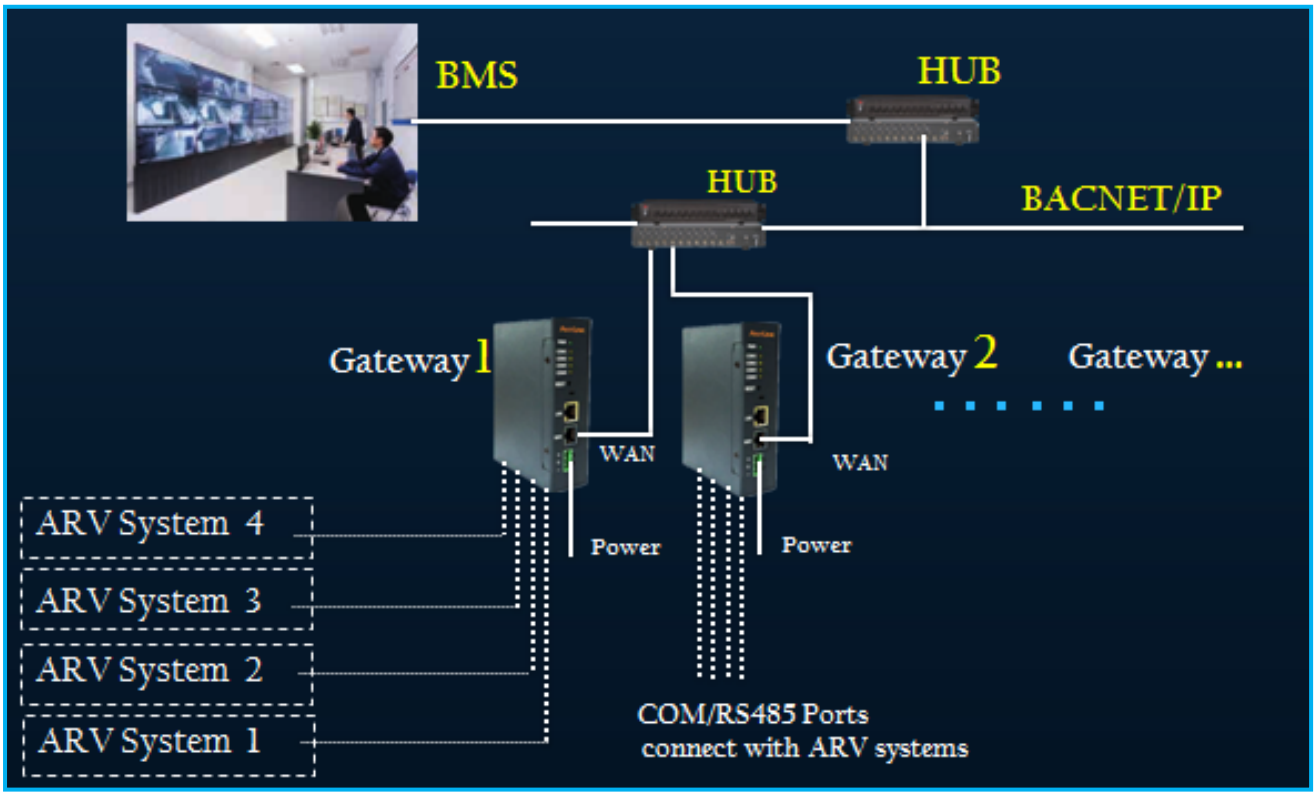
### 7.2 Overall structure

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

The COM Ports of ARV BACNET Gateway is connect with the ARV ODU/IDU Network



Any client device that support the BACNET/IP Protocol can integrate to BMS system by HUB




## 7.3 Hardware Features

Power

DC24，7W

Convenient Wiring

LAN(Reserve)、WAN、4 RS485 Ports

Dimension

115×35×135 mm

Installation Type

Slide-way Type

## 7.4 Web Configure

### 7.4.1 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;

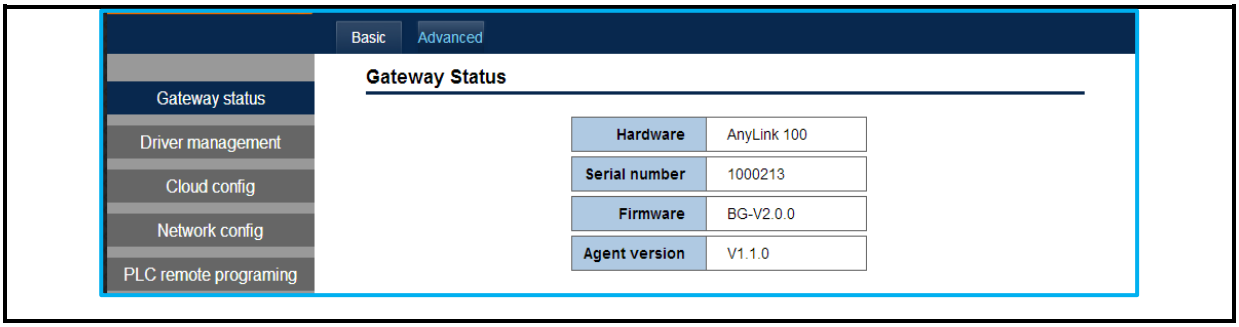
Default Gateway: 192.168.100.1;

Click 'OK'.

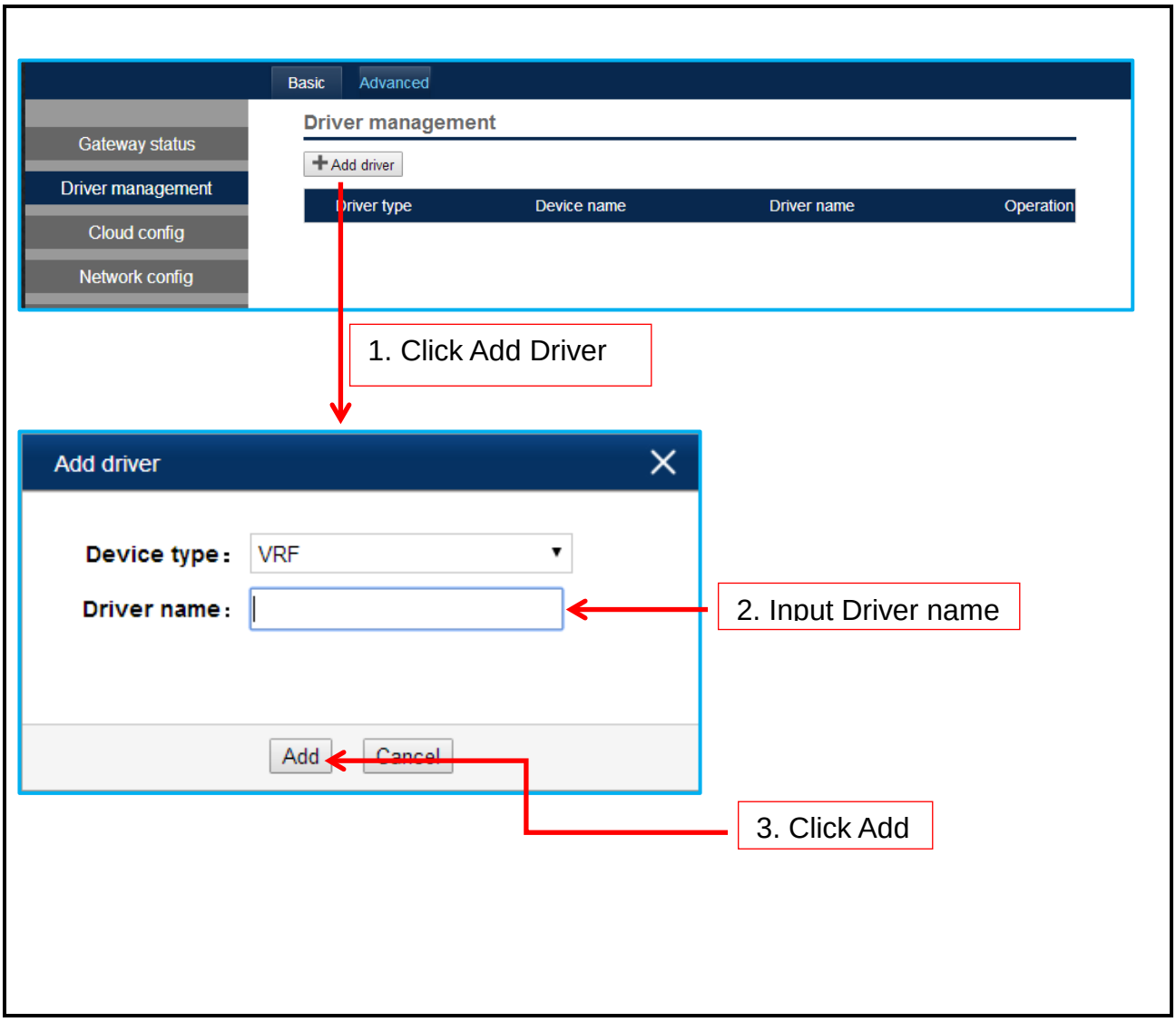
3. Open the Google Chrome or Firefox explorer, input '***192.168.100.126***', then the '***login'*** Page will be shown. Input name: admin, password: admin, click 'Login', then go into the Configure Page.

### 7.4.2 Configure the Driver Management

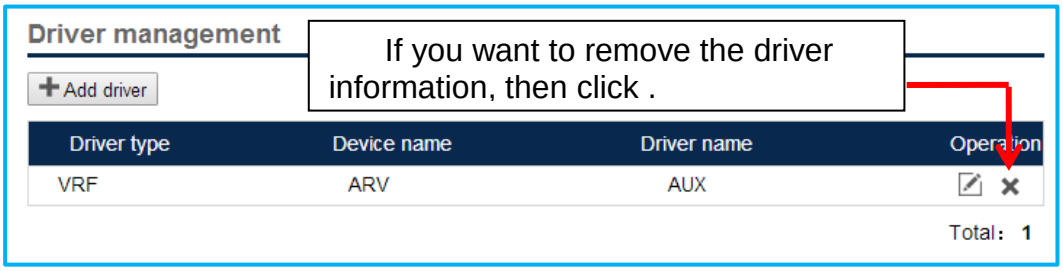
1. Go into the '***Driver Management'*** Page. Click '***Advanced'***–'Driver Management':



2. Add ARV Driver



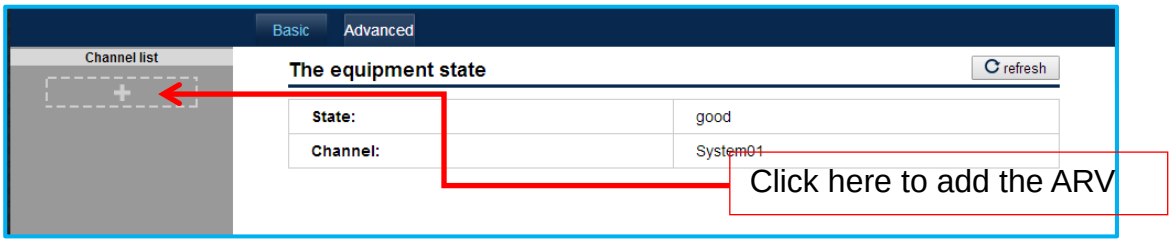

3. When finish these steps, the content is shown as follows.



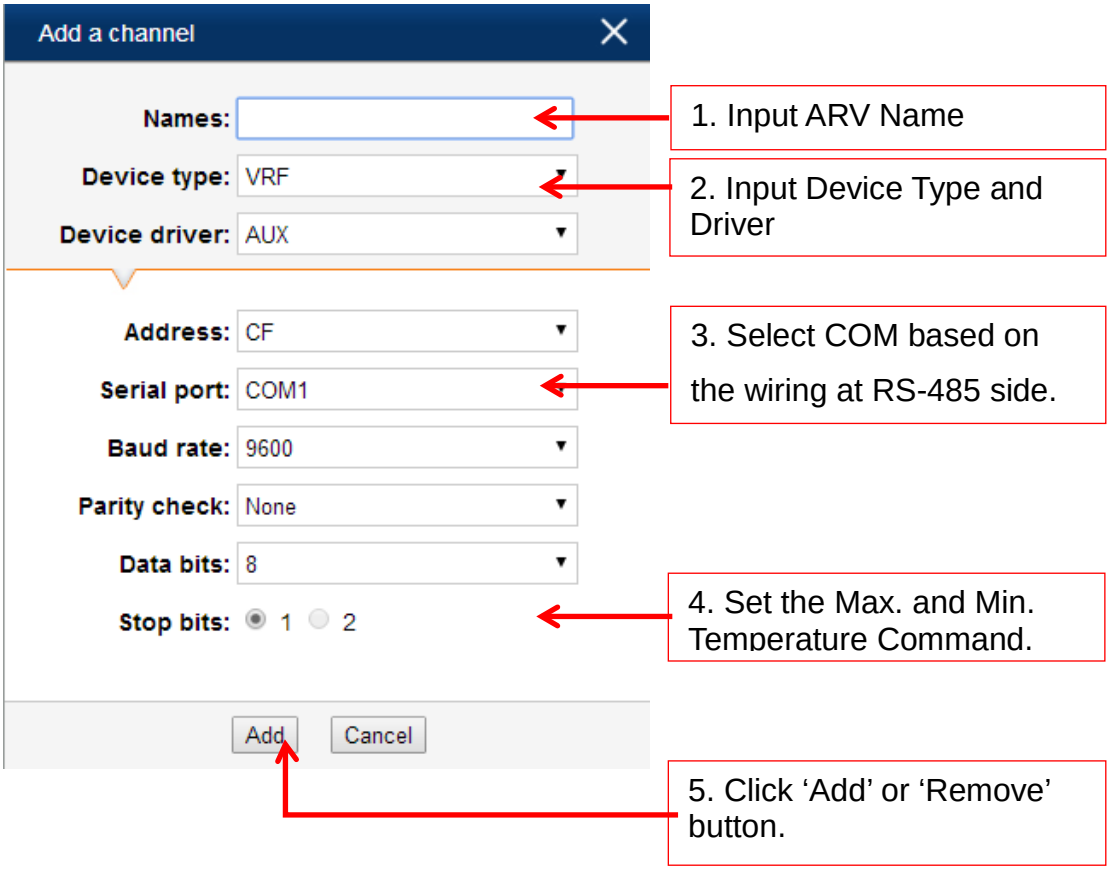

Before removing the driver information, you should make sure all of the indoor/outdoor information has been removed.

### 8.4.3 Add ARV System Information

1. Click 'Basic', then click the at channel list to add the ARV system.



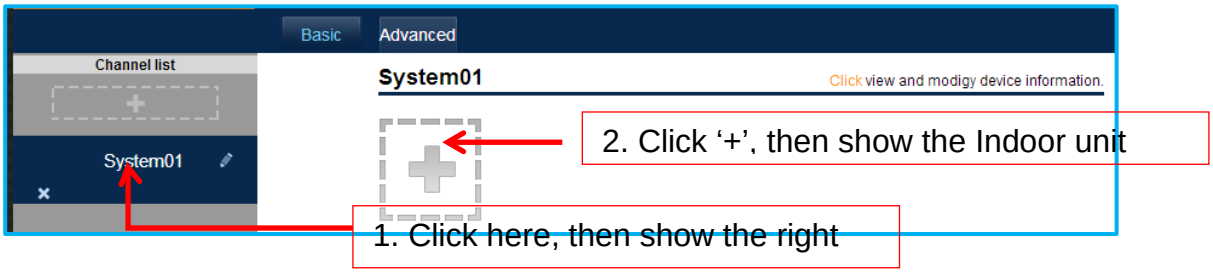

2. A dialogue will be shown



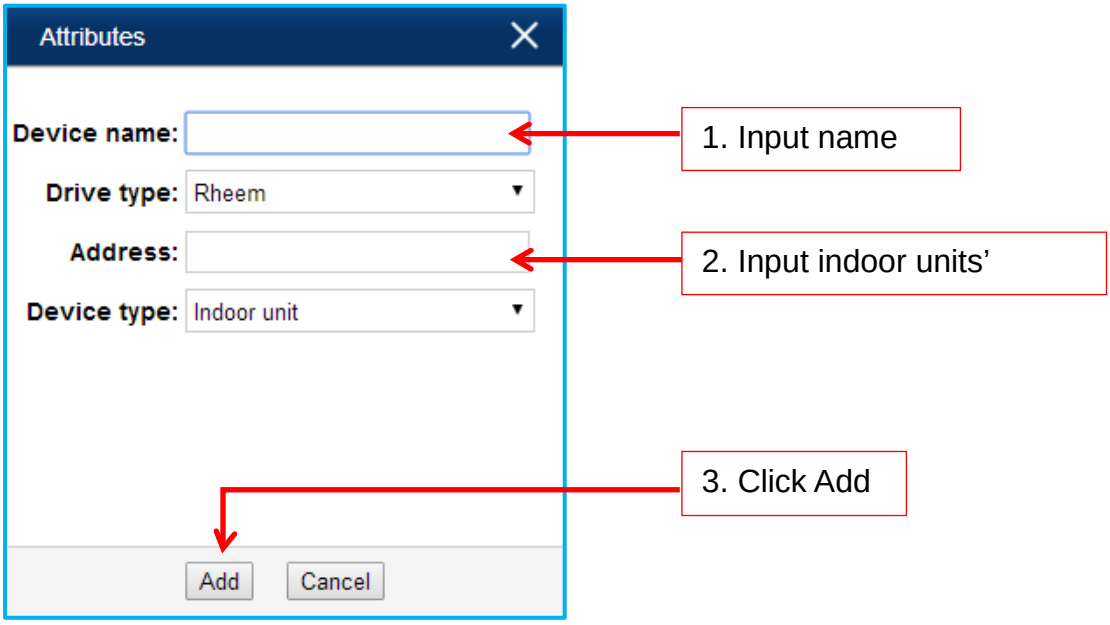
### 7.4.4 Add indoor units' information

We should select the ARV system before Add the indoor unit,

1. Select the ARV System.




2. Add indoor units as follows.

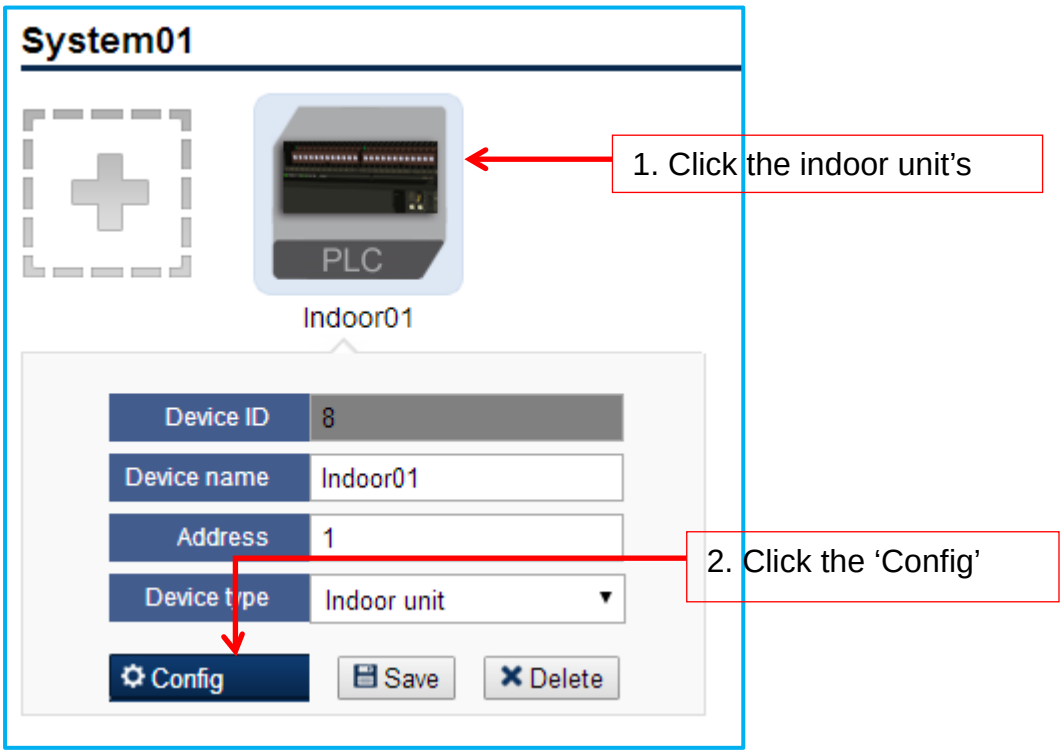



3. After finished, it is shown as follows.

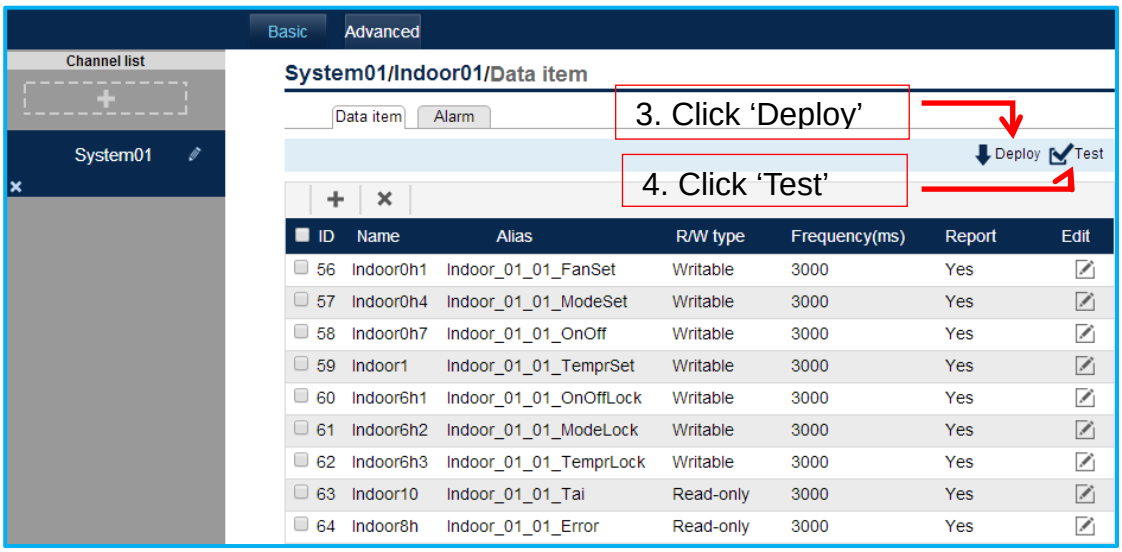
### 7.4.5 Download the Indoor units' information

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

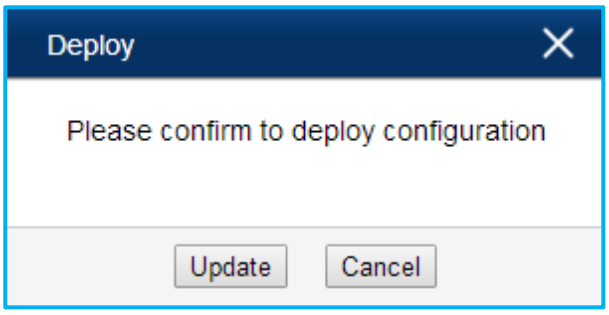
1. Click the indoor unit's icon, then shown the dialogue as follows;




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_ModeSel | 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_ModeLoc | 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.

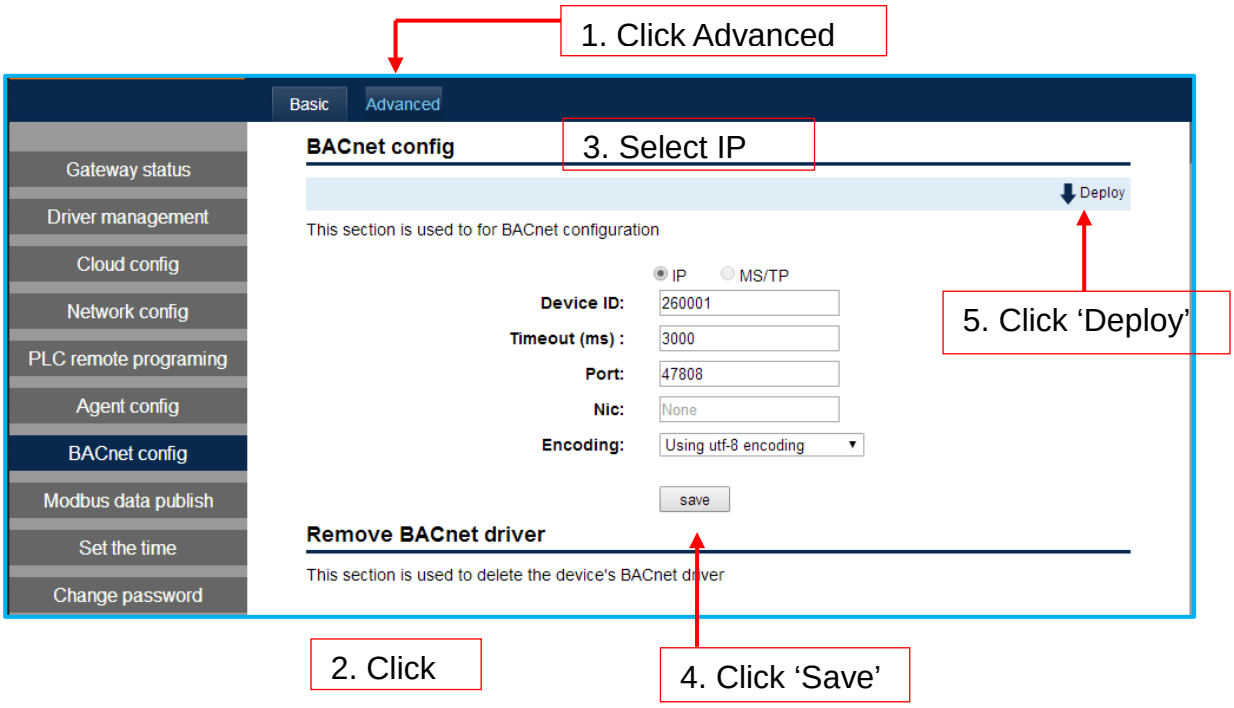
| Name | Alias | Device ID | Data item ID | Value | State |
|---|---|---|---|---|---|
| Indoor0h1 | Indoor_01_01_FanSet | 0 | undefined | -1 | bad |
| Indoor0h4 | Indoor_01_01_ModeSel | 0 | undefined | -1 | bad |
| Indoor0h7 | Indoor_01_01_OnOff | 0 | undefined | 0 | bad |
| Indoor1 | Indoor_01_01_TemprSe | 0 | undefined | -1 | bad |
| Indoor6h1 | Indoor_01_01_OnOffLo | 0 | undefined | 0 | bad |
| Indoor6h2 | Indoor_01_01_ModeLoc | 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.

### 7.4.6 Download the BACNET Gateway Configure

1. Click 'Advanced'–'***BACnetConfig'*** , select '***IP'***, click ***'Deploy'***.



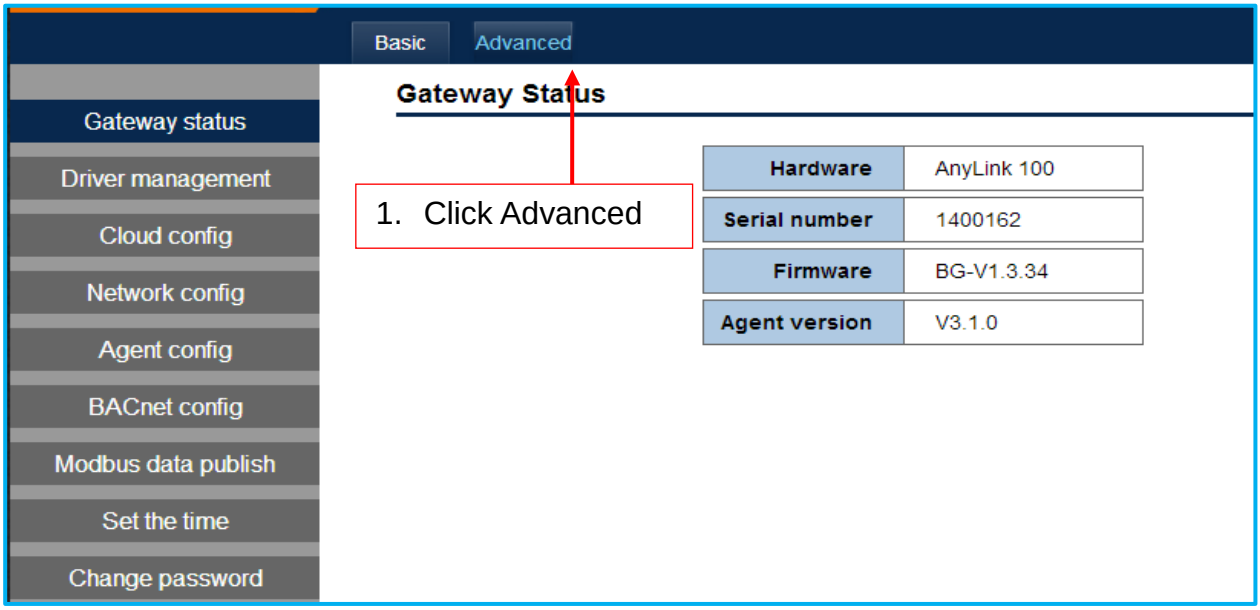

2. After Finished, all configuration success.

### 7.4.7 Set BACnet Gateway WANIP Address

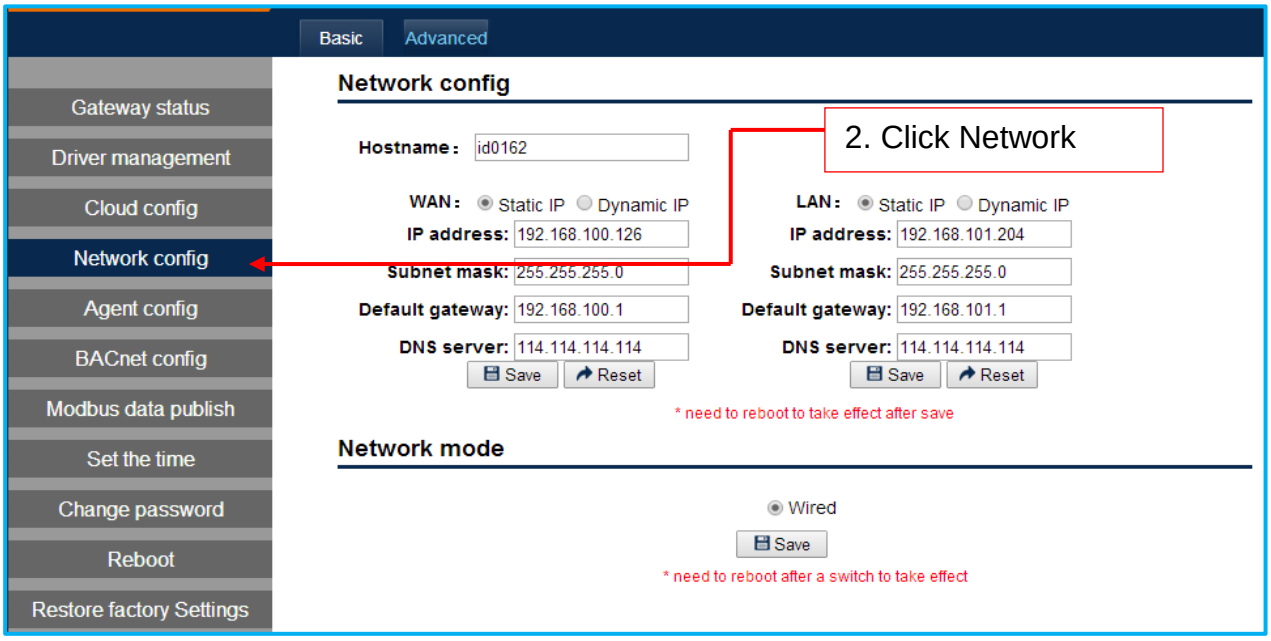
The last work is set BACnet WAN IP address, so it can be accessed by other BACnet devices.

Suppose the Network Segment is 192.168.1.x, and the BACnet gateway WANIP 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;

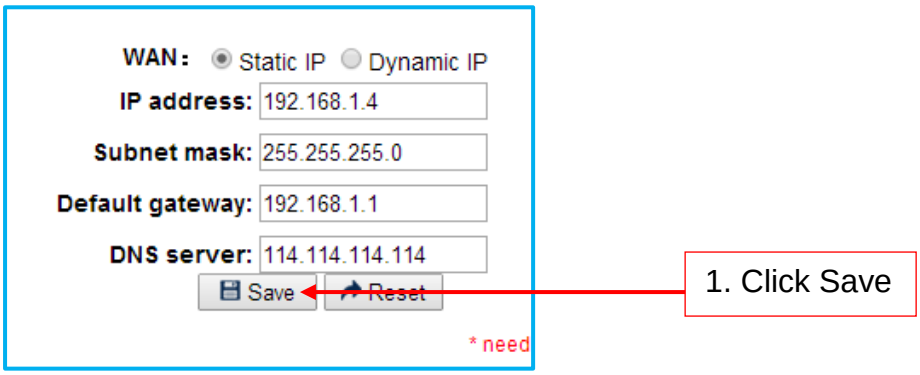
'**IP address'** set as 192.168.1.4;

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

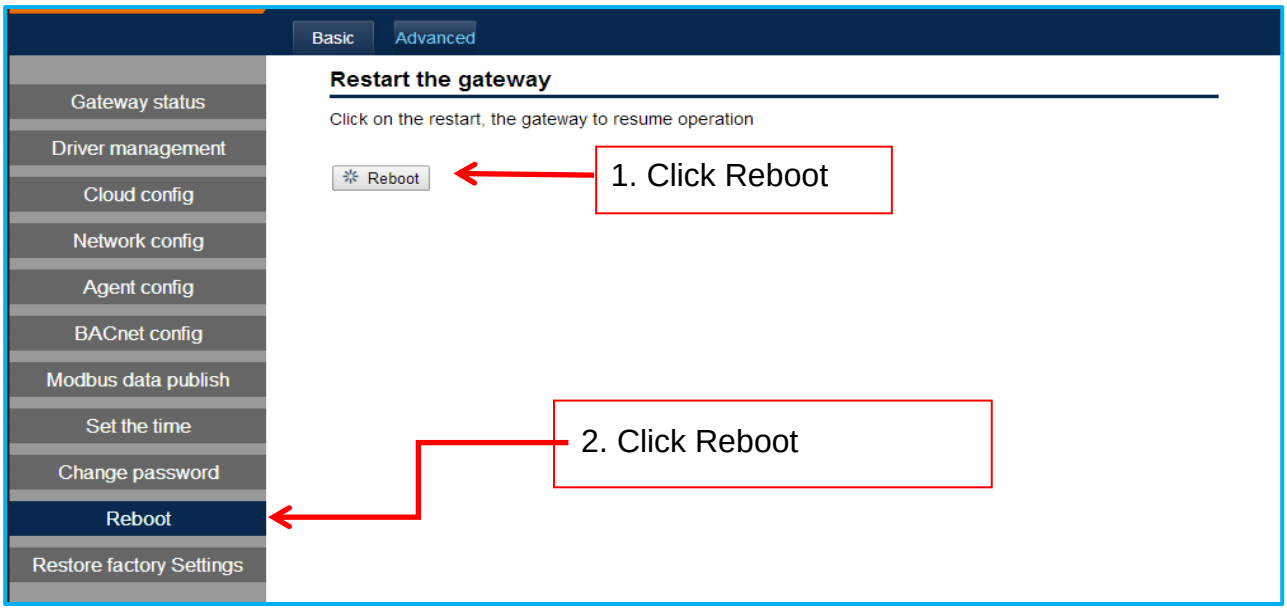
'**Default Gateway'** set as 192.168.1.1;

'**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

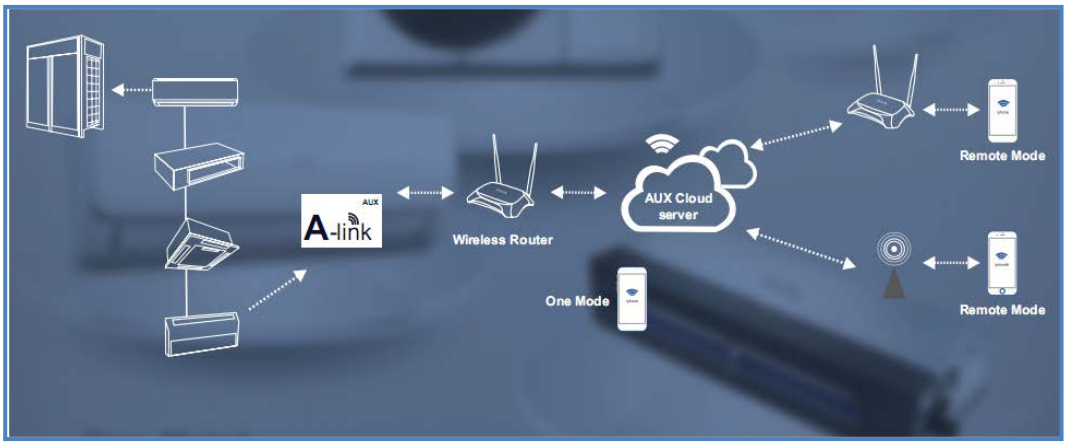



Note:

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.

# 8. Wireless Network Centralized Control System

## 8.1 Overall Structure



## 8.2 Operating Method

1) Install the specialized control software to mobile terminal

- For Android system，install the following specialized software

- For iPhone device

  Pls. download at the following website

  **a)** http://www.logicsolutions.com.cn/store/auxapp.php

  **b)** http://www.logicsolutions.com.cn/store/auxiphone.php

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