User Manual for HTFC-26I-02

Industrial Free Cooling Unit for Base Station Shelter

Contents

1 PRODUCTION DESCRIPTION

1.1 Foreword

Thank you for selecting Telca Free Cooling Unit (HTFC) for shelter. This manual was written to be read and observed in all aspects by those responsible for the installation and maintenance of the HTFC. The entire technical document should always be kept near to HTFC. Important information for installation and operation of HTFC is contained in this User Manual.

1.2 Distinguished Advantages and Features

Telca HTFC series provides shelter with intelligent cooling control with low power consumption. It takes full advantage of the natural source of cold by directly having the cold air from outside entered the shelter and discharge hot air to outside to control temperature, humidity and cleanness within required range.

- Non-air-shortcut design, including air supply inlet away from return air inlet which is above the air supply inlet, and air supply inlet with down-guiding louvers to save energy cost.

- Natural convection and forced convection, both helping air conditioners to cool down the shelter and save even more energy cost.

- Unique L type door design, enabling instant access to all parts and convenient maintenance.

- Compact design, saving delivery expense and shelter space.

1.3　Normal Advantages and Features

Except above-mentioned distinguished advantages and features, Telca HTFC series also has the normal advantages and features the same as free cooling units of other brands.

- High reliable centrifugal fan was used, saving energy cost from 30%-90% in different region and climate.

- G4 filter was used in this air inlet unit so as to provide clean cold air supply to the shelter.

- Can be connected with customer network managing system to monitor indoor temperature and humidity, outdoor temperature, working status and alarms.

- Work independently or together with other environmental control unit, such as Air Conditioner in teamwork perfectly.

2   RECEIVING THE FREE COOLING UNIT

Check if the packaging of the free cooling unit is damaged before you unpack it.

2.1 Damaged Packaging

If it's confirmed as damaged packaging, don't unpack it immediately. Please unpack it and inspect every free cooling unit by the witness of the carrier. If any damaged or abnormal units, please file a claim against the carrier. Telca will not assume responsibility for those damaged or abnormal ones.

2.2 Intact Packaging

Take two or three photos of the intact packaging as evidences, one of them must show the serial number list of the free cooling unit clearly. If any damaged or abnormal units, please provide Telca with the packaging photos, serial number list and brief defect description within 15 working days. Telca shall assume responsibility in accordance with warranty terms.

2.3 Every HTFC-26I-02 is delivered with the following accessories

1 x Free Cooling Box

1 x Indoor Temperature Sensor

2 x Filter

2 x Cowl Spare Parts

1 x Exhaust Damper

1 x User Manual

3 HANDLING AND TESTING THE FREE COOLING UNIT

3.1 Handling the Free Cooling Unit

Place the free cooling unit upright in horizontal position, please don't heap them up.

Please do not keep the free cooling units outdoors or at a high temperature/humidity. (70℃, 95%)

3.2 Testing the Free Cooling Unit

Test the functionality before mounting the free cooling unit on the cabinet.

Please refer to the nameplate for proper electrical current requirements, and then connect the grounded power supply, which shall comply with IEC/EN 61000-4-2 & IEC/EN 61000-4-5 standards. Minimum circuit current should be at least 150% of the rated current for the appropriate model. Don't connect other equipment to this circuit in case of overloading.

After power connection, the free cooling unit will be in self-testing mode in 3 minutes and 15 seconds. (See 5.6.3)

3.3 Technical Data

Type	Performance Data
Model Number	HTFC-26I-02
Dimensions mm WxHxD	600x850x340
Maximum air flow	2400 m³/h
Cooling capacity at Δt=7°C	5530kW
Cooling capacity in W/K	790W/K
Fan nominal voltage	48VDC
Fan nominal operating current	3.7A
Fan power consumption at nominal voltage	178W
Filter class	NET+G4
Weight	26KGS

Special voltages are available on requests.

4   INSTALLATION

4.1 Site Observation

Check the site carefully to see if the air conditioners are installed properly: if there're more than one air conditioners, please install them at the same horizontal line, as shown in Fig 4.1.1, try to avoid installation as shown in Fig 4.1.2:
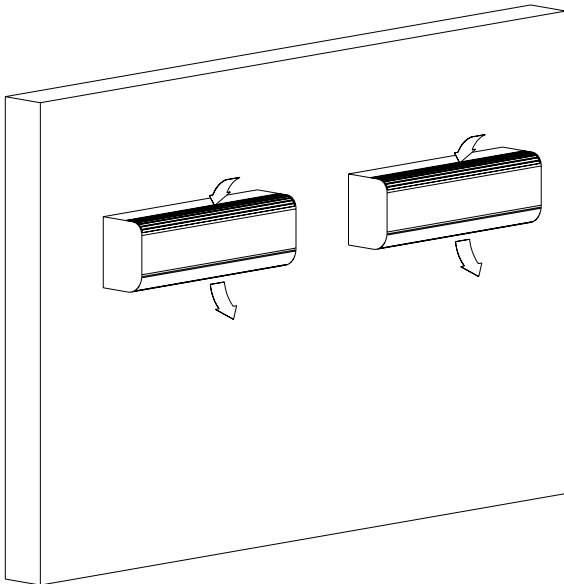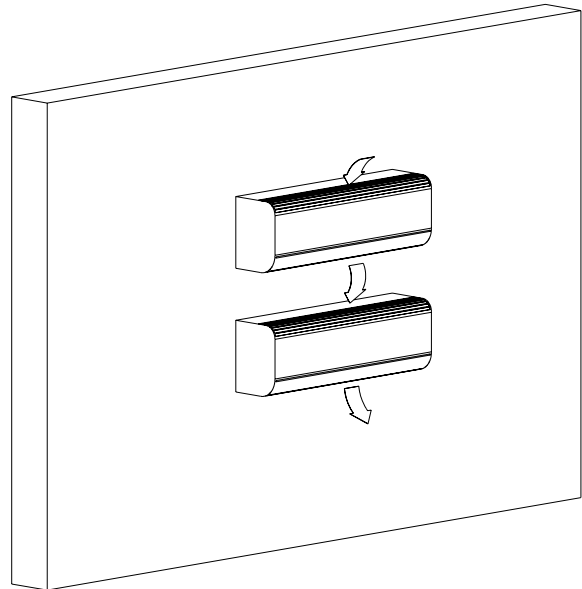

Fig 4.1.1   **Fig 4.1.2**

If air conditioners are already installed like Fig 4.1.2, please find the following solution to it:

1) The ideal solution is to move lower AC to the same horizontal line with upper AC.

2) If container space doesn't allow solution1, then an isolation board should be added between upper AC and lower AC, to prevent upper AC's supply air from being sucked in by lower AC, please refer to Fig 4.1.3:
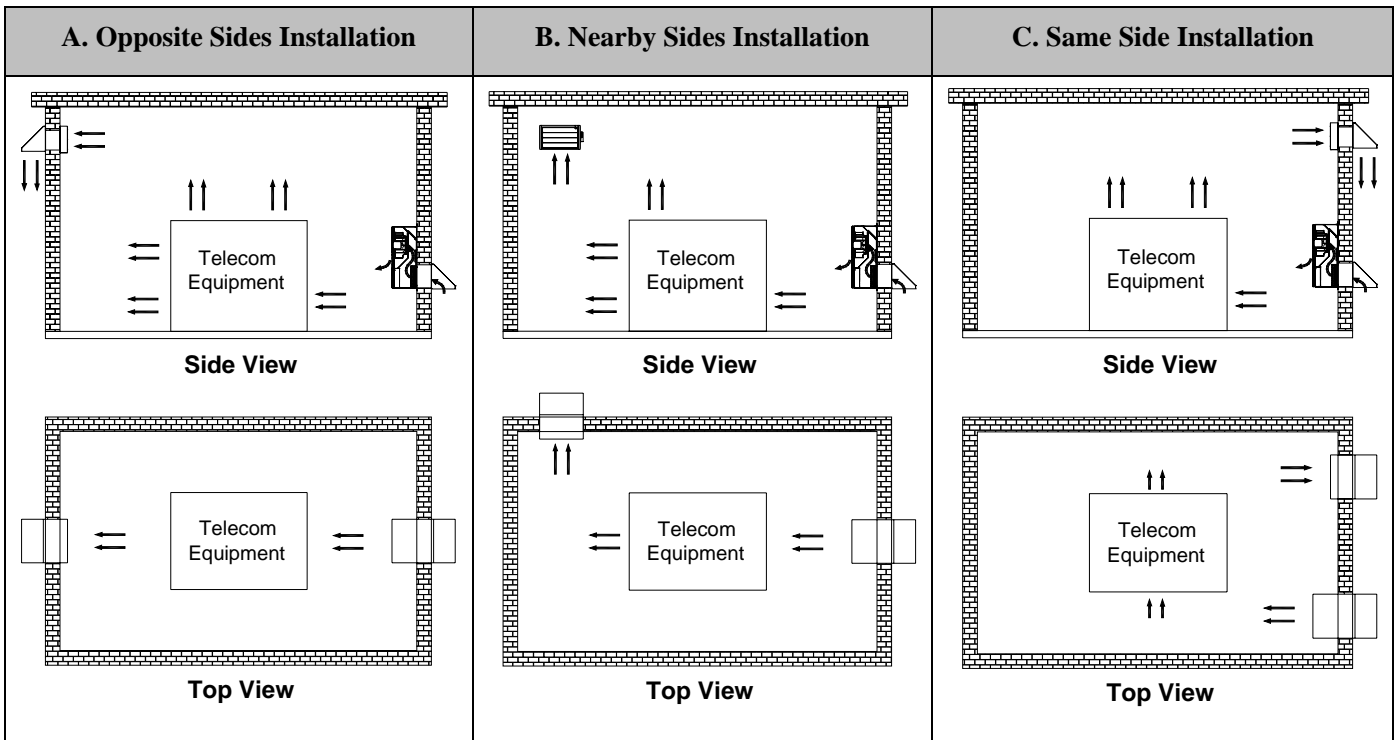

Isolation Board to prevent air shortcut
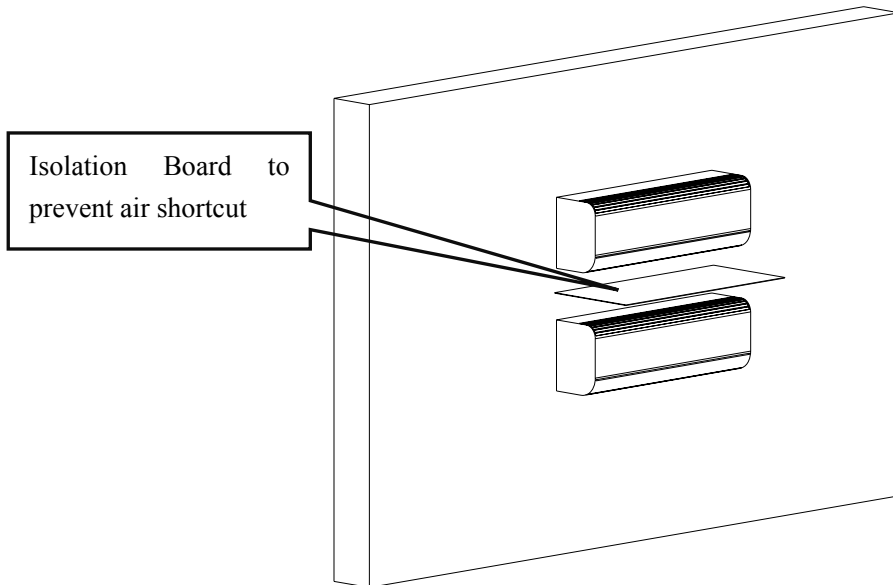
Fig 4.1.3

4.2 FCU Installation Layout

Installation Position

Installation Layout

A. Opposite Sides Installation	B. Nearby Sides Installation	C. Same Side Installation
Side View	Side View	Side View
Top View	Top View	Top View
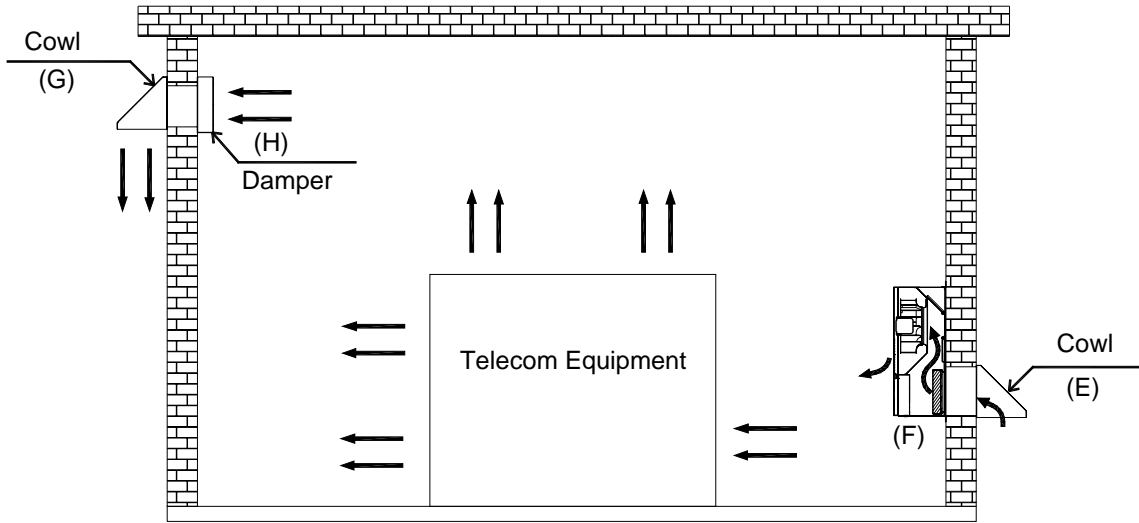
It's better to install the FCU as A or B, better not to install it like C if possible.

Notes:

- *The main unit should be located in the bottom of the shelter and keep the FCU air inlet toward the heat-producing telecom equipments.*

- *The exhaust damper and cowl should be located near the top of the shelter and be kept away from the main unit.*

- *The exhaust damper and cowl should be kept away from the air conditioner to avoid cooling air from discharging to outdoor before cooling down the equipment.*

- *If installed like B or C, keep the air inlet as far as possible from the air outlet.*
- *There should be enough space at the top of main unit to disassemble and clean the filter (>600 mm).*

Installation Procedure

- Make 2 holes for ventilation and 16 holes for screws on the wall, as shown in Fig 4.2.1 and Fig 4.2.2, the cutouts on the side of the base station shelter must be clean.

- Assemble the cowl as shown in Fig 4.2.3.
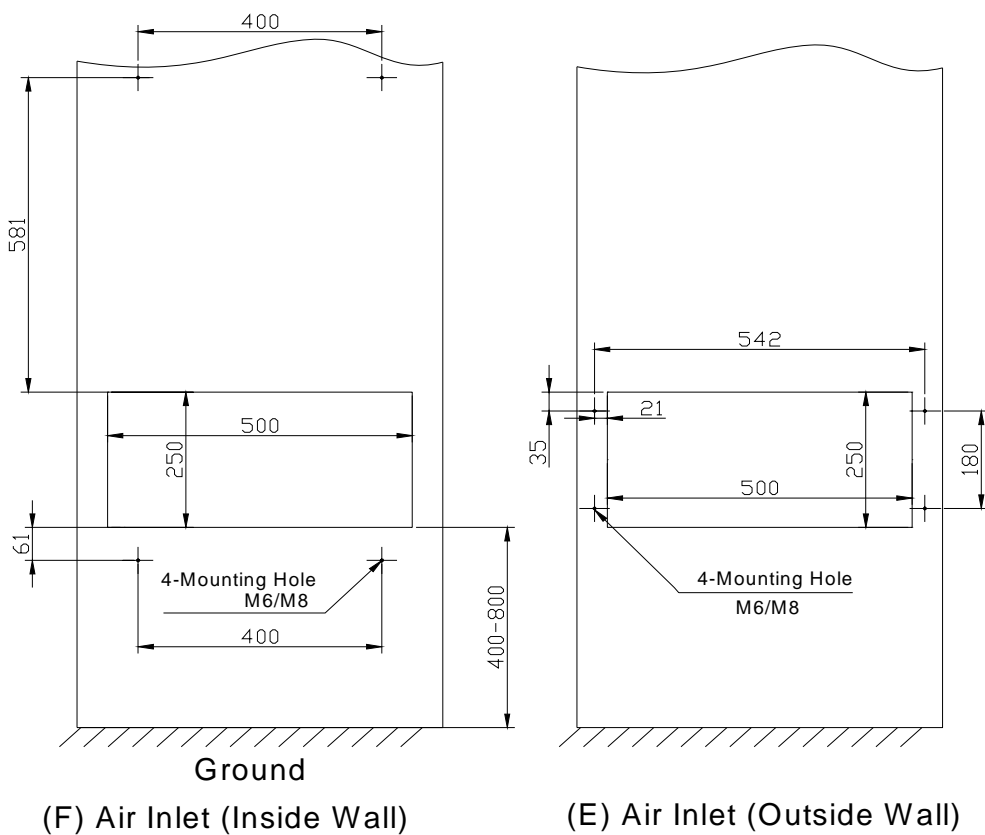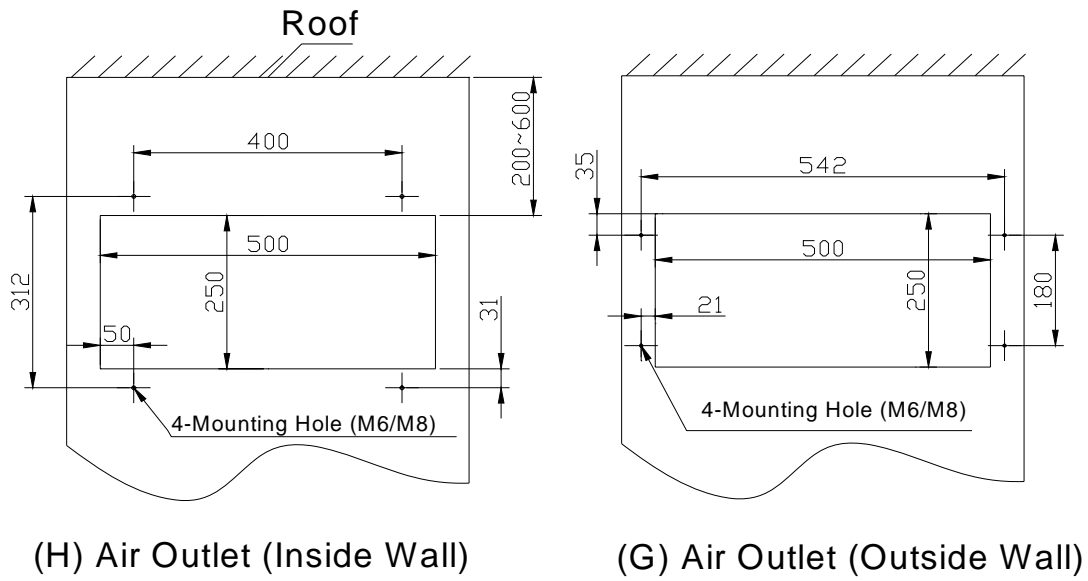
- Screw the units as shown in Fig 4.2.4 and Fig 4.2.5.

Mounting Cutout

(F) Air Inlet (Inside Wall)   (E) Air Inlet (Outside Wall)

Fig 4.2.1

Roof

(H) Air Outlet (Inside Wall)   (G) Air Outlet (Outside Wall)

Fig 4.2.2

Fig 4.2.3

Assemble the Main Unit and Cowl   Assemble the Exhaust Damper and Cowl
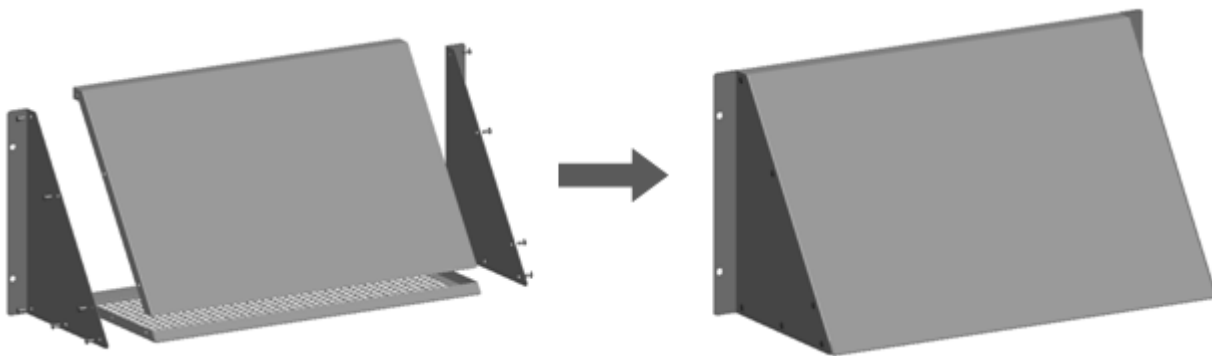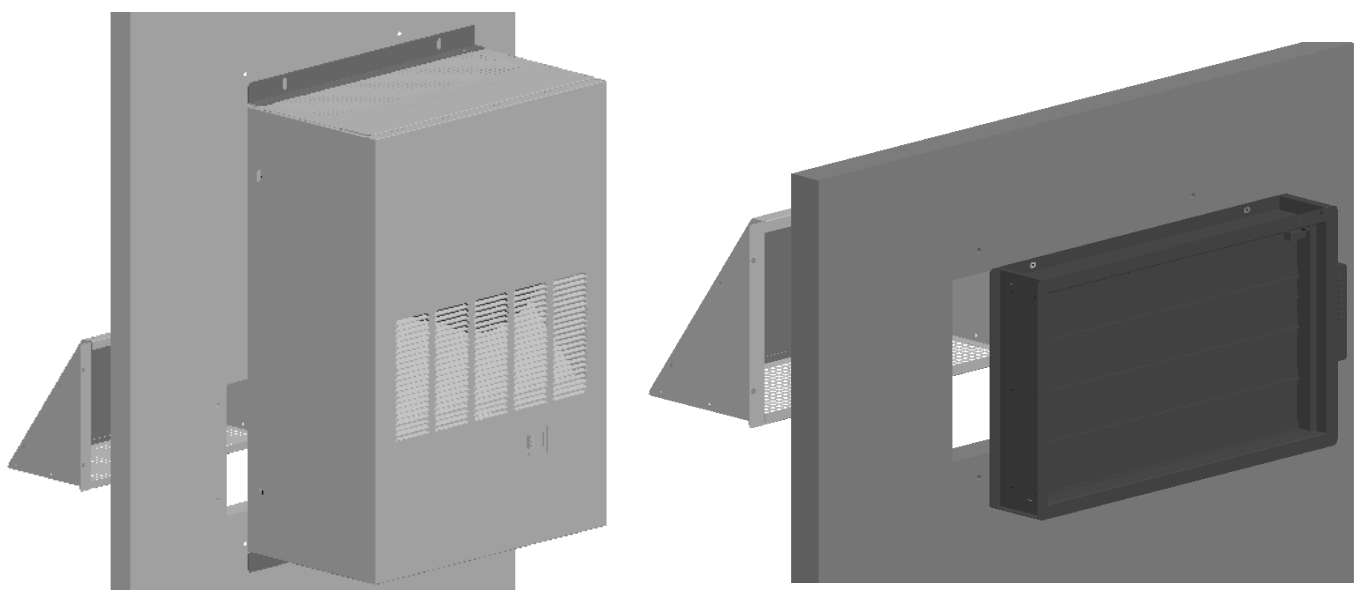
Fig 4.2.4

Self-tapping Screw (For Shelter)   Expansion Bolt (For Brick Wall)
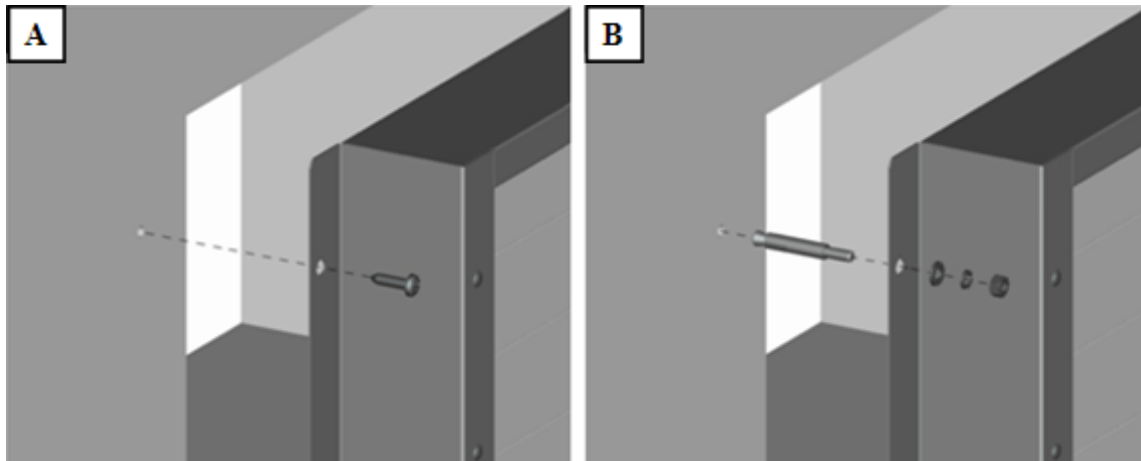
Fig 4.2.5

4.3 Electrical Connection

The connected voltage and frequency must correspond to the values stated on the name plate.

- The location of the room temperature sensor should be able to correctly measure the room temperature, avoid putting it at the air outlet of air-conditions.

- The temperature sensor of the air conditioner should be installed near the air conditioner air outlet.

Observe the relevant regulations during installation!

Mains connection should be made to the connectors on the FCU (see fig. 4.3.2).

Base Station Chat
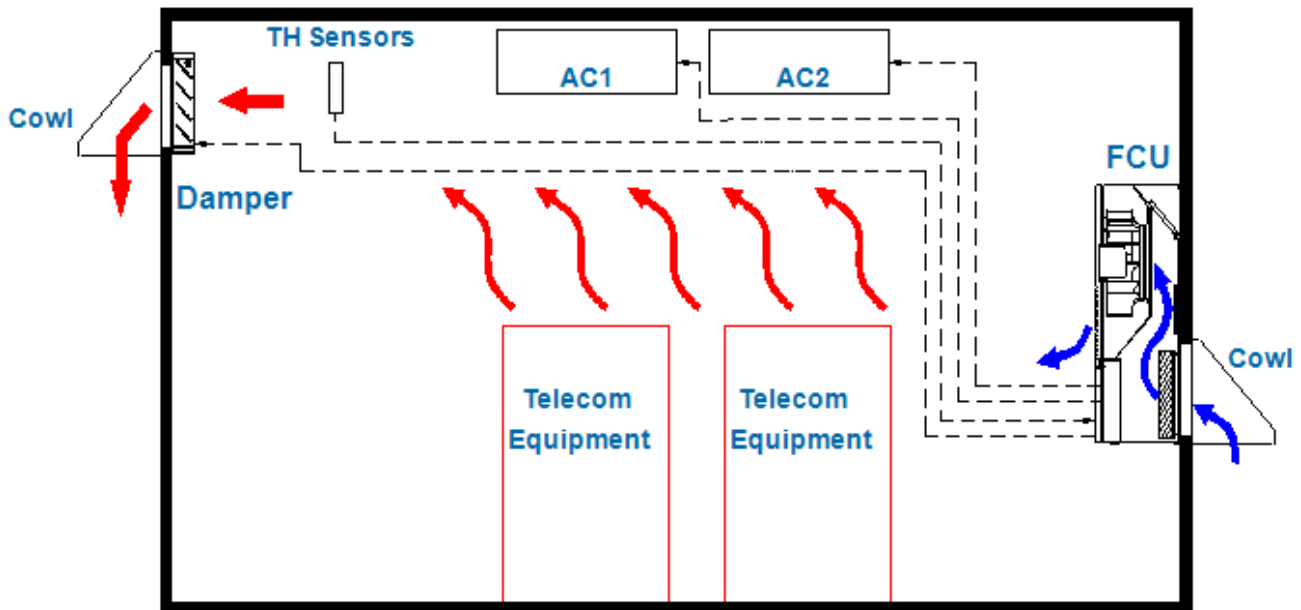
Fig. 4.3.1

Electrical Diagram
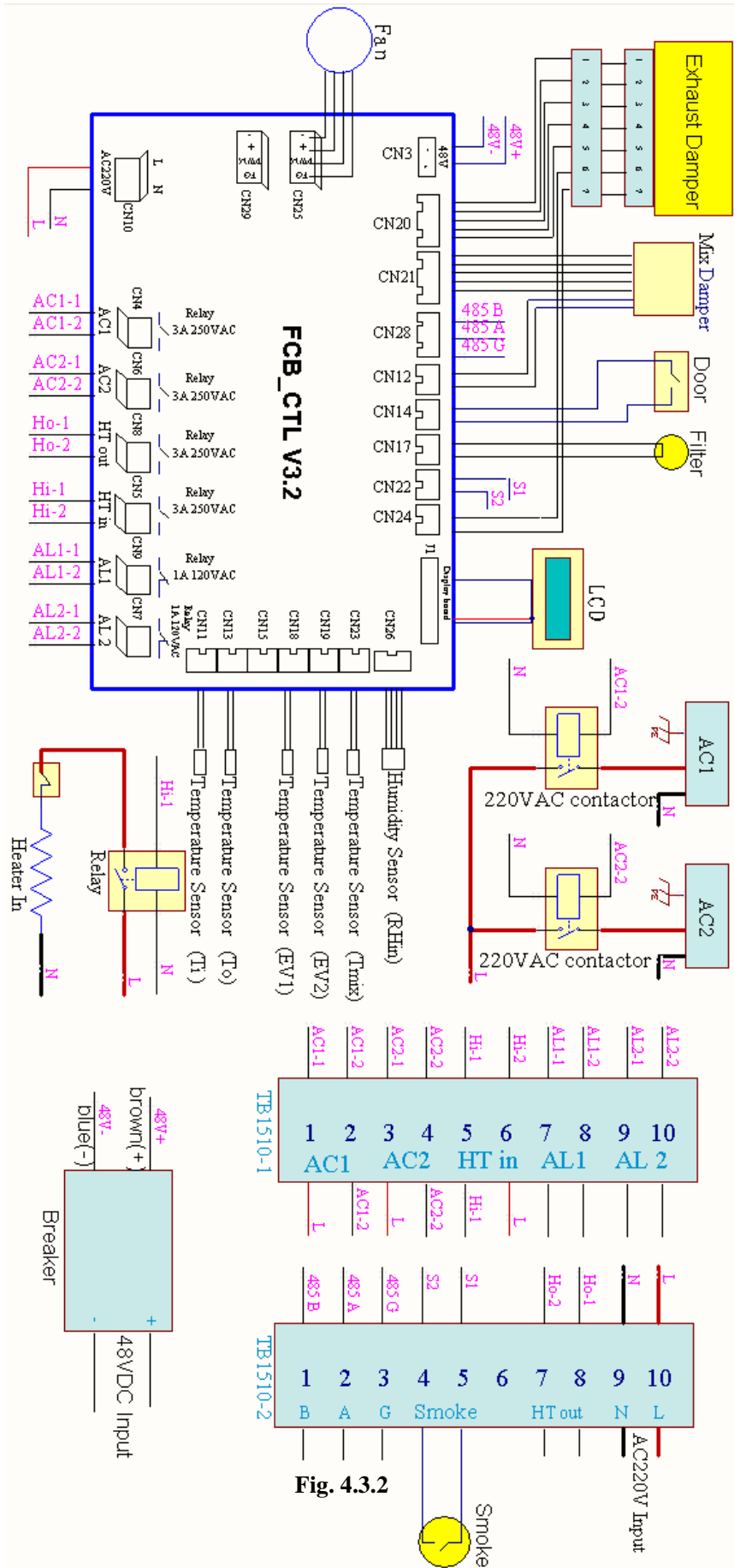
Fig. 4.3.2

5   OPERATION AND CONTROL BEHAVIOR

Mounting and assembling of the FCU is followed by electrical connection. The Free cooling box operates automatically, i.e. after electrical connection, the micro-controller will operate with **Auto Mode**.

5.1 Operation of the Panel

Fig. 5.1 Panel

: Exit   : Enter   : Function   : UP   : Down
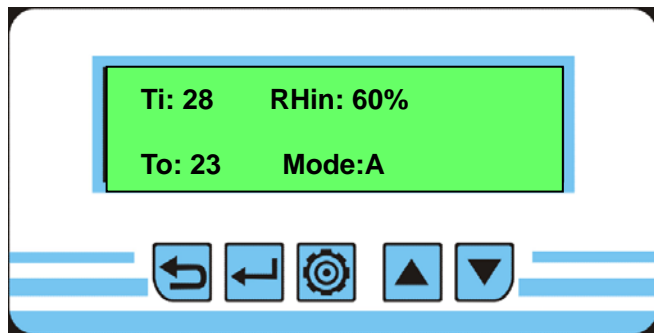
The display terminal consists of a LCD display, normally indicates the indoor temperature, indoor relative humidity, outdoor temperature, and Mix Damper Temperature, press the up button   or the down button   to display the state of operation mode and heater, fans and air conditioner. When there's alarm output, it will display alarm codes.

5.2 Menu Tree
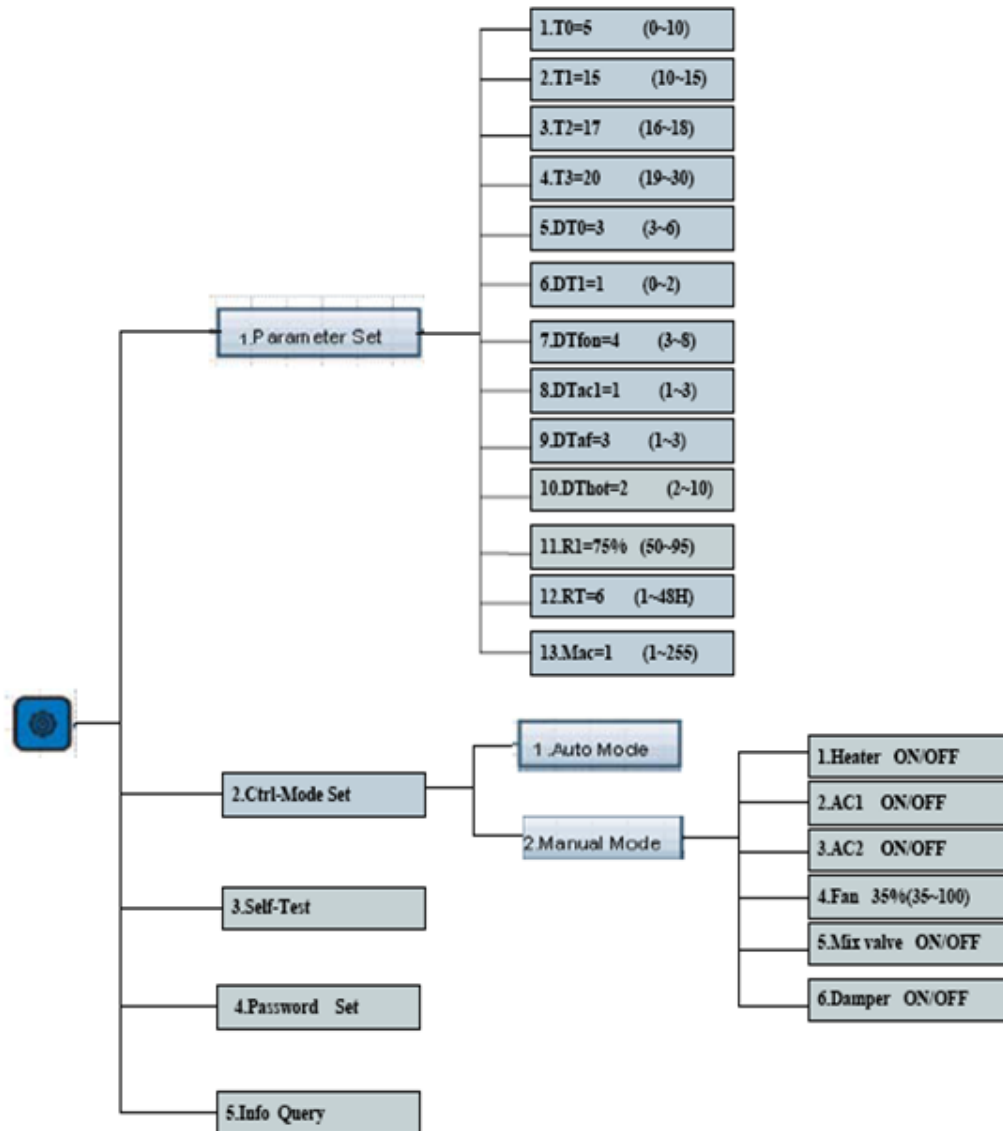
5.3 Modifying Parameter Setting

5.3.1 Press the function button [⚙] to display the password interface, press the up button [▲] or the down button [▼] to change the number, and press the enter button [↵] to confirm the password, and then enter the function menu Parameter Setting.

5.3.2 Press the up button [▲] or the down button [▼] to select the parameter need to be modified, and press the enter button [↵] to confirm.

5.3.3 Press the up button [▲] or the down button [▼] to modify the setting value, and press the enter button [↵] to confirm.

5.3.4 Press the exit button [↩] to return.

5.4 Changing Control Modes

5.4.1 Press the function button [⚙] to display the password interface, press the up button [▲] or the down button [▼] to change the number, and press the enter button[↵] to confirm the password, and then enter the function menu Parameter Setting. And then press the up button [▲] or the down button [▼] to select the Ctrl-mode Setting menu, and press the enter button [↵] to display the operation mode menu.

5.4.2 Press the up button [▲] or the down button [▼] to select the mode, and press the enter button [↵] to confirm.

5.4.3 After selected Manual Mode, press the up button [▲] or the down button [▼] to select parameter, and press the enter button [↵] to confirm, press the up button [▲] or the down button [▼] to change the status of equipments, press the enter button [↵] to confirm, press the exit button [↩] to return.

5.4.4 Press the exit button [↩] to return.

5.5 Information Query

5.5.1 Press the function button ⊚ to display the password interface, press the up button ▲ or the down button ▼ to change the number, and press the enter button ↵ to confirm the password, and then enter the function menu Parameter Setting. Then press the up button ▲ or the down button ▼ to select the Info Query menu, and press the enter button ↵ to display alarm code.

5.5.2 Press the exit button ⮌ to return.

5.6 Self-testing Setting

5.6.1 Press the function button ⊚ to display the password interface, press the up button ▲ or the down button ▼ to change the number, and press the enter button ↵ to confirm the password, then enter the function menu Parameter Setting. Then press the up button ▲ or the down button ▼ to select the Self-Test function, and press the enter button ↵ to confirm.

5.6.2 Press the exit button ⮌ to return.

5.6.3 Self-testing steps:

Steps	Time
LCD display is on	5 seconds
LCD display is off	5 seconds
Mix valve or damper open, fan runs at 50% speed	10 seconds
Mix valve or damper open, fan runs at 70% speed	10 seconds
Mix valve or damper open, fan runs at full speed	10 seconds
AC1 on	30 seconds
AC2 on	30 seconds
External heater is on	30 seconds
Internal heater is on	30 seconds
Alarm1 is on	10 seconds
Alarm2 is on	10 seconds
Sensor testing	30 seconds

5.7 Password Setting

5.7.1 Press the function button [icon] to display the password interface, press the up button [icon] or the down button [icon] to change the number, and press the enter button [icon] to confirm the password, and then enter the function menu Parameter Setting.

5.7.2 Press the press the up button [icon] or the down button [icon] to select Password Setting menu, and press the enter button [icon] to confirm.

5.7.3 Press the Press the press the up button [icon] or the down button [icon] to modify the password, and then press the enter button [icon] to confirm.

5.7.4 Press the exit button [icon] to return.

5.8 Parameter Setting

Parameters	Default Value	Setting Range	Notes
T0	10°C	0°C～10°C	Tempature when output low temperature alarm
T1	15°C	10°C～15°C	Temperature when heater is on
T2	17°C	16°C～18°C	Temperature to shut down heater
T3	20°C	19°C～30°C	Temperature when fan is on
DT0	3°C	3°C～6°C	Temperature difference when fan is on
DT1	2°C	1°C～3°C	Temperature difference when fan is off
DTfon	4°C	3°C～8°C	Temperature corresponding to 35%~100% fan speed
DTac1	1°C	1°C～3°C	Temp difference when AC1 starts
DTaf	3°C	1°C~3°C	Temp difference when AC1 and fan are both working
DThot	2°C	2°C~10°C	Temp difference when high temp alarm occurs
R1	75%RH	50~95%	Indoor relative humidity
RT	6H	1~48H	A/C rotation timer
MAC	1	0~255	

5.9 Control Behavior

Auto Mode

When indoor temp sensor, outdoor temp sensor and mix temp sensor are all working, if indoor and outdoor temp difference exceeds DT0 while 48V power supply, humidity sensor, rain sensor, smoke sensor and the fans are working:

1). When $T_{in}<T0$ (0~10°C), FCB outputs low temperature alarm, external heater is on while ACmain and ACbackup are off, mix valve and exhaust damper are closed , and fan runs at 35% speed.

2). When $T0<T_{in}<T1$(5~15°C, 15°C), FCB outputs low temperature alarm, external heater is on while Acmain and Acbackup are off, mix valve and exhaust damper are closed, fan runs at 35% speed, internal heater starts.

3). When T3(19~26°C, 20°C)$>T_{in}>$T2(16~18°C, 17°C) , Acmain and ACbackup, heater, fan are off, mix valve and exhaust damper are closed, low temperature alarm is cleared.

4). T4=T3+DTfon (3~6°C, 4°C), when $T3<T_{in}<$T4, Acmain and ACbackup, heater are off, exhaust damper is totally open, fan speed increases from 35% when $T_{in}=$T3 to 100% when $T_{in}=$T4.

   I). When $T_o<$TO-DTmix (5°C), if Tmix<TO-DTmix, please turn down the mix valve until Tmix$\geq$ TO-DTmix; if Tmix>TO-DTmix+2, please turn up the mix valve until Tmix$\leq$TO-DTmix+2.

   II). When TO$\geq$TO-DTmix (5°C), mix valve will be totally open.

5). T5=T4+DTac1 (1~3°C, 1°C), T6=T4+DTaf (4~6°C, 4°C), when T6$>T_{in}>$T5, ACbackup is off, high temperature alarm is cleared, exhaust damper is totally open.

   I). If Tout>18°C, ACmain is on, fan is off and mix valve is totally open.

   II). If Tout$\leq$18°C, Acmain and ACbackup, heater are off, fan is running at full speed.

      a). When $T_o<$TO-DTmix (5°C), if Tmix<TO-DTmix, please turn down the mix valve until Tmix$\geq$ TO-DTmix; if Tmix>TO-DTmix+2, please turn up the mix valve until Tmix$\leq$TO-DTmix+2.

      b). When TO$\geq$TO-DTmix (5°C), mix valve will be totally open.

6). T7=T6+DThot (2~10°C, 2°C), T7$>T_{in}>$T6, ACmain is on, fan is running at full speed, exhaust damper is totally open, heater and ACbackup are off.

   I). When $T_o<$TO-DTmix (5°C), if Tmix<TO-DTmix, please turn down the mix valve until Tmix$\geq$ TO-DTmix; if Tmix>TO-DTmix+2, please turn up the mix valve until Tmix$\leq$TO-DTmix+2.

   II). When TO$\geq$TO-DTmix (5°C), mix valve will be totally open.

7). When $T_{in}>$T7, FCB outputs high temperature alarm, ACmain and ACbackup are both on, fan runs at full speed, exhaust damper is totally open, heater is off.

   I). When $T_o<$TO-DTmix (5°C), if Tmix<TO-DTmix, please turn down the mix valve until Tmix$\geq$ TO-DTmix; if Tmix>TO-DTmix+2, please turn up the mix valve until Tmix$\leq$TO-DTmix+2.

   II). When TO$\geq$TO-DTmix (5°C), mix valve will be totally open.

When indoor and outdoor temperature difference is below DT1, or any of 48V power supply, humidity sensor, rain sensor, smoke sensor or fan is defective:

1). When Tin<T0 (0~10°C), FCB outputs low temperature alarm, external heater is on while ACmain and ACbackup are off, mix valve and damper are closed , and fan runs at 35% speed.

2). When T0<Tin<T1 (5~15°C, 15°C), FCB outputs low temperature alram, external heater is on while ACmain and ACbackup are off, mix valve and damper are closed, fan runs at 35% speed, internal heater starts.

3). T4=T3 (19~26°C, 20°C) + DTfon, when T4>Tin>T2 (16~18°C, 17°C), ACmain, ACbackup, heater and fan are off, low temperature alarm is cleared.

4). T5=T3+DTfon+DTac1 (1~3°C, 1°C), T6=T3+DTfon+DTaf (4~6°C, 4°C), when T6>Tin> T5, ACmain is on, ACbackup, fan and heater are off, high temperature alarm is cleared.

5). T7=T6+DThot (2~10°C，2°C), when T7>Tin>T6, ACmain is on, ACbackup, fan and heater are off.

6). When Tin>T7, FCB outputs high temperature alarm, fan, ACmain and ACbackup are on, heater is off.

Manual Mode

In Manual Control Mode, heater can be forced to start running; either of the two air conditioners can be forced to start running or stop, or both runs or stop; fan can be forced to start running or stop; fan speed can be chosen when fan is forced running from 35% to 100%, for example, OFF, 35%, 40%, 50%, 100% etc.

5.10 Alarm Inquiry and Display

If any of alarm active, the control board LED will blink, and the display panel LED back-light will blink and show the alarm code.

Alarm Codes and System Messages

Alarm Codes	System Message
E1	Indoor high temperature alarm
E2	Fan failure
E3	Indoor temperature sensor failure
E4	Outdoor temperature sensor failure
E5	AC1 sensor failure
E6	AC2 sensor failure
E7	Humidity sensor failure
E8	AC1 freeze or cooling failure
E9	AC2 freeze or cooling failure
E10	220VAC power failure
E11	Low/high battery voltage

E12	Filter clogging
E13	Mix valve failure
E14	Raining
E15	Tmix sensor failure
E16	Smoke occurs
E17	Door open
E18	Indoor low temperature alarm
E19	Heater failure
E20	Exhaust damper failure

5.11 Alarm Output

5.11.1   Alarm Detection Delay:

In order to avoid false alarms output, all alarms have to wait some time before output:

1) High Temperature Alarm

When $Tin>T7$, alarm is output 1 minute later;

When $Tin<T6$, alarm is cleared.

2) Fan Failure Alarm

When the convolution of the fan is less than 400, alarm is output 1 minute later and will be cleared at once.

3) Indoor Temperature Sensor Failure

Alarm is output 1 minute later and is cleared 1 minute later after replaced by a new one.

4) Outdoor Temperature Sensor Failure

Alarm is output 1 minute later and is cleared 1 minute later after replaced by a new one.

5) Sensors Failure of AC1

Alarm is output 1 minute later and is cleared 1 minute later after replaced by a new one.

6) Sensors Failure of AC2

Alarm is output 1 minute later and is cleared 1 minute later after replaced by a new one.

7) Humidity Sensor Failure

Alarm is output 1 minute later and is cleared 1 minute later after replaced by a new one.

8) AC1 Failure

If AC1 is on for over 3 minutes, alarm will be output when $Tin-EV1<5$; and alarm will be cleared at once when $Tin-EV1>7$.

PS: When AC1 outputs failure alarm, the indoor temperature increases and then AC2 will be on, after AC2 is on, AC1 will be off until FCU is restarted after AC1 is repaired or AC1 is forced starting in Manual Mode. AC1 failure alarm is cleared when Tin-EV1>7.

9) AC2 Failure

If AC2 is on for over 3 minutes, alarm will be output when Tin-EV2<5; and alarm will be cleared at once when Tin-EV2>7.

PS: When AC2 outputs failure alarm, the indoor temperature increases and then AC1 will be on, after AC1 i on, AC will be off until FCU is restarted after AC2 is repaired or AC2 is forced starting in Manual Mode. AC2 failure alarm is cleared when Tin-EV2>7.

10) 220VAC Failure

The alarm is output 1 minute later after the voltage is detected below 150V or above 270V, and is cleared 1 minute later after the voltage comes back to 220VAC.

11) 48VDC Low Voltage or High Voltage Failure Alarm

The alarm is output 1 minute later after the voltage is detected exceeded the range 38~58V and is cleared 1 minute later after the voltage comes back to 48VDC.

12) Filter Clogged Alarm

The alarm is output 1 minute later after filter is detected clogged, and is cleared at once after replaced with new filter.

13) Mix Valve Failure

The alarm is output when door sensor detects the mix valve is closed while it should be open, or when door sensor detects the mix valve is open while it should be closed. Alarm is cleared when door sensor detects mix valve open or close correctly.

14) Raining Alarm

The alarm is output 5 seconds later after detecting raining, and alarm is cleared at once when detecting no raining.

15) Temperature Sensor Failure of Mix Valve

The alarm is output 1 minute later after sensor failure is detected and is cleared at once after replaced with a new one.

16) Indoor Smoke Alarm

The alarm is output 5 seconds later after indoor smoke is detected and is cleared at once when no smoke detected. When the alarm is output, fan, mix valve and exhaust damper are forced closed.

17) Door Alarm

The alarm is output when door is open and is cleared 3 seconds later after the door is closed.

18) Low Temperature Alarm

The alarm is output 1 minute later after detecting Tin<TO (0~10°C), and is cleared at once when detecting Tin>T2.

19) Internal Heater Failure Alarm

The alarm is output when internal heater is on for over 3 minutes and Tmix-Tin<DT0 (3°C, 3~10°C).

20) Exhaust Damper Failure Alarm

The alarm is output when door sensor detects the exhaust damper is closed while it should be open, or when door sensor detects the exhaust damper is open while it should be closed. Alarm is cleared when door sensor detects exhaust damper open or close correctly.

5.11.2   Dry Contact Alarm Output:

The unit is permanently controlled by the micro-controller. Occurred faults will be registered immediately and will be passed on via the alarm output.

The dry contact alarm will be triggered, if any alarm active.

Follows are the alarm functions:

Storage conditions: Open contact

Operation: Closed contact

Alarm: Open contact

When FCU outputs alarm, the dry contacts are open. There're two types of alarm:

1) ALARM 1

Alarm 1 will be triggered when any of the following alarms occurs:

- Indoor high temperature E1

- Fan failure E2

- 220VAC power failure E10

- 48VDC abnormal E11

- AC1 failure E8

- AC2 failure E9

- Mix valve temperature sensor failure E15

- Mix valve failure E13

- Exhaust damper failure E20

● Door open E17

● Smoke occurs E16

● Indoor low temperature alarm E18

● Indoor temperature sensor failure E3

2) ALARM 2

Alarm 2 will be triggered when any of the following alarms occurs:

● Outdoor temperature sensor failure E4

● Humidity sensor failure E5

● Temperature sensor failure of AC1 E6

● Temperature sensor failure of AC2 E7

● Filter clogged E12

● Raining E14

● Heater failure E19

5.12 Password Resetting

If you forget the password, you can press the function button and the enter button at the same time for about 15 seconds, then you can see the LCD display "----", the password will be modified to "1111".

5.13   RS485 Connection

5.13.1   Get the converter for converting USB to RS485 and install the driver if you are using Windows 7 or Windows XP.
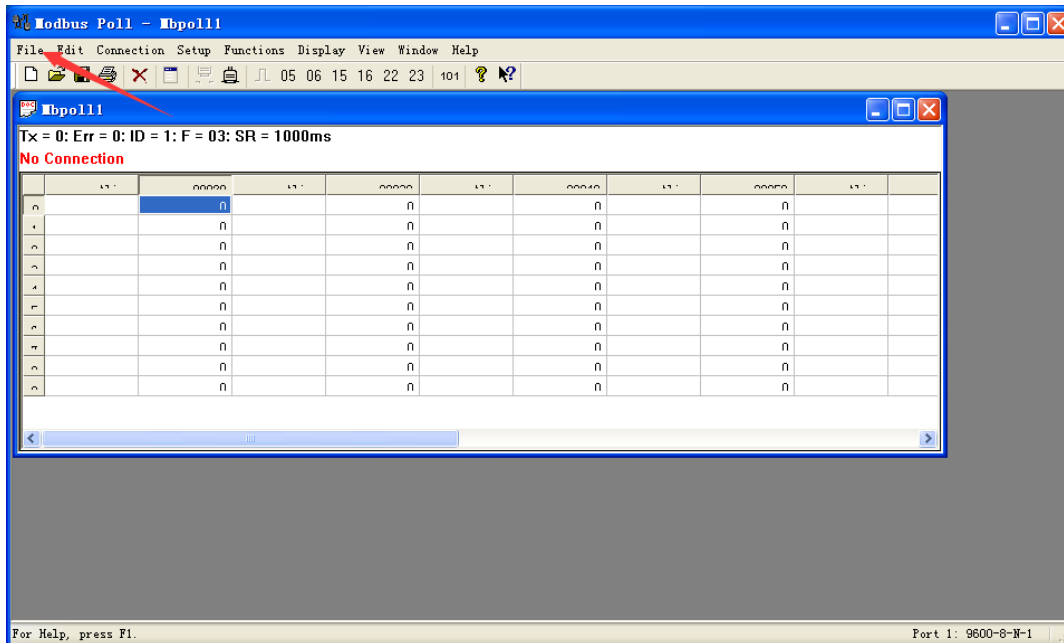
5.13.2   Install the software inside the package named "modbus poll" provided by Hunterhex.
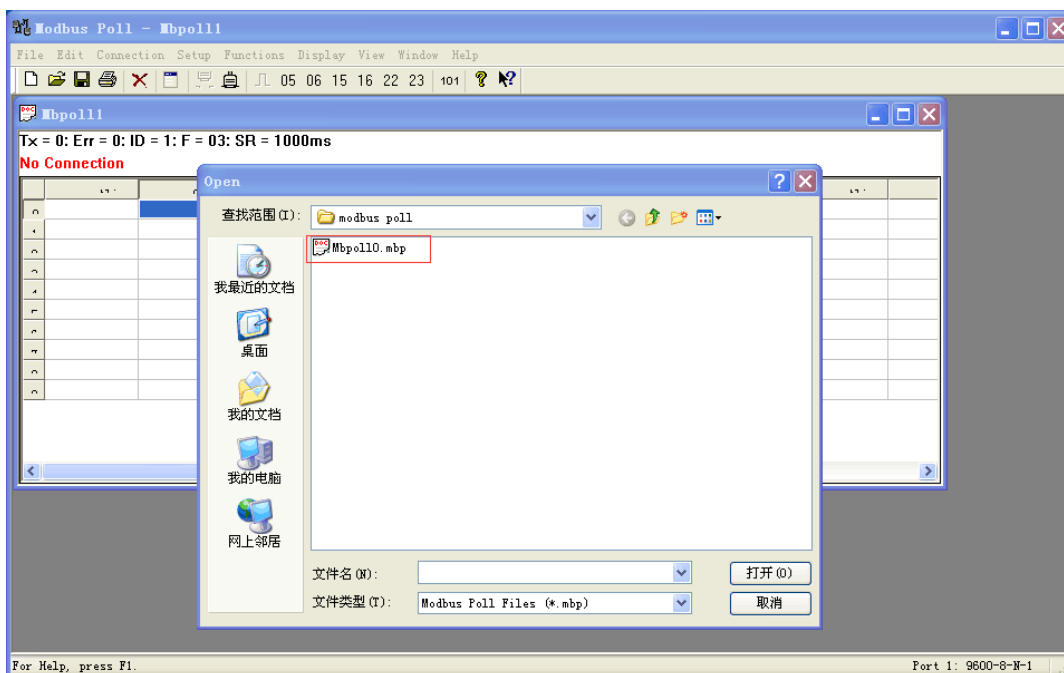

modbus poll.rar

5.13.3   Connect the converter for converting USB to RS485, start "modbus poll" software.

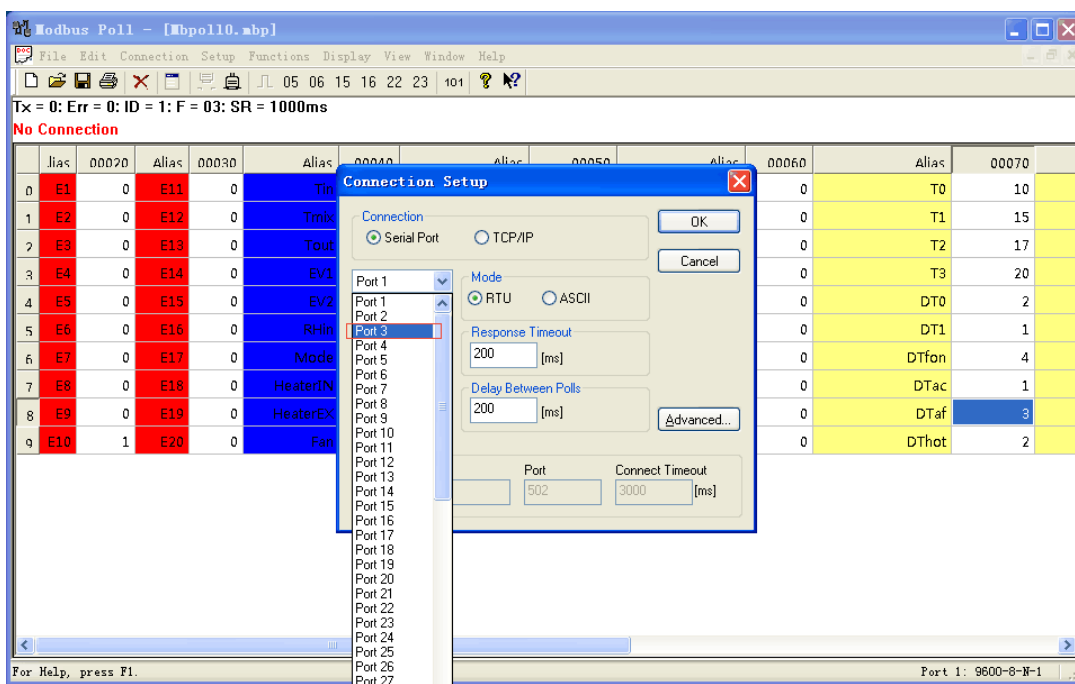### 5.13.4   Click "File", as shown in the following picture:

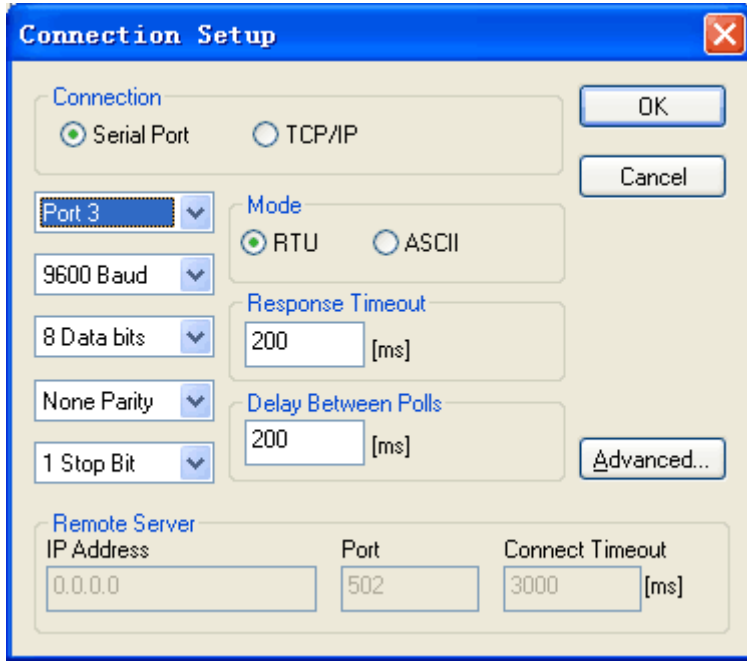### 5.13.5   Open "Mbpo110.mbp" file, as shown in the following picture:

5.13.6 **Right click "Computer", choose "Management", and then choose "Device Manager" to check the interface for converting USB to RS485.**

5.13.7 **Click F3 on the keyboard.**

5.13.8   Set the parameters as shown in the following picture and then click "OK".

5.13.9   Configuration files as follows:

E1~E20: "0" -- no alarm, "1" -- alarm comes into effect

Tin: indoor temperature; Tmix: mix valve temperature; Tout: outdoor temperature

EV1: AC1 outlet temperature; EV2: AC2 outlet temperature

RHin: indoor relative humidity

Mode: "0" -- auto mode; "1" -- manual mode

Heater IN: "0" -- Internal heater is off; "1" -- internal heater is on

Heater EX: "0" -- external heater is off; "1" -- external heater is on

Fan: fan is on

RHF: fan runs for X hours; RMF: fan stops for X minutes

(RHF + RMF: fan runs for X hours and X minutes)

AC1-ON/OF: "0" -- AC1 is off; "1" -- AC1 is on

RUNHAC1-Hour: AC1 is on for X hours; RUNHAC1-Min: AC1 is on for X minutes

(RUNHAC1-Hour + RUNHAC1-Min: AC1 is on for X hours and X minutes)

AC2-ON/OFF："0" -- AC2 is off; "1" -- AC2 is on

RUNHAC2-Hour: AC2 is on for X hours; RUNHAC1-Min: AC2 is on for X minutes

(RUNHAC2-Hour + RUNHAC1-Min: AC2 is on for X hours and X minutes)

MixValve: mix valve open at X%

Damper: damper open at X%

Set-mode: "0" -- auto mode set; "1" -- manual mode set

Set-mode: "1"：

(Manual-Heater: "0" -- internal heater is off; "1" -- internal heater is on；

Manual-AC1: "0" -- AC1 is off; "1" -- AC1 is on;

Manual-AC2: "0" -- AC2 is off; "1" -- AC2 is on;

Manual-Fan: "0" -- fan is off; "1" -- fan runs at 35% speed;

"2" -- fan runs at 40% speed; "3" -- fan runs at 50% speed;

"4" -- fan runs at 60% speed; "5" -- fan runs at 70% speed;

"6" -- fan runs at 80% speed; "7" -- fan runs at 90% speed;

"8" – fan runs at 100% speed;

Manua-MixValve："0" -- mix valve is closed; "1" -- mix valve is open;

Manua-Damper："0" -- mix valve is closed; "1" -- mix valve is open)

T0~MAC: parameters

Password1~ Password4: passwords to enter menu

6   MAINTENANCE

The maintenance-free fan fitted in the unit has sealed ball-bearings and are therefore protected against dust and humidity. The life expectancy is at least 30,000 operating hours. The free cooling box is thus largely maintenance free. All that may be required from time to time is that the component of filter cleaned by compressed air. To disassemble the filter, see fig. 6.1.

Attention!
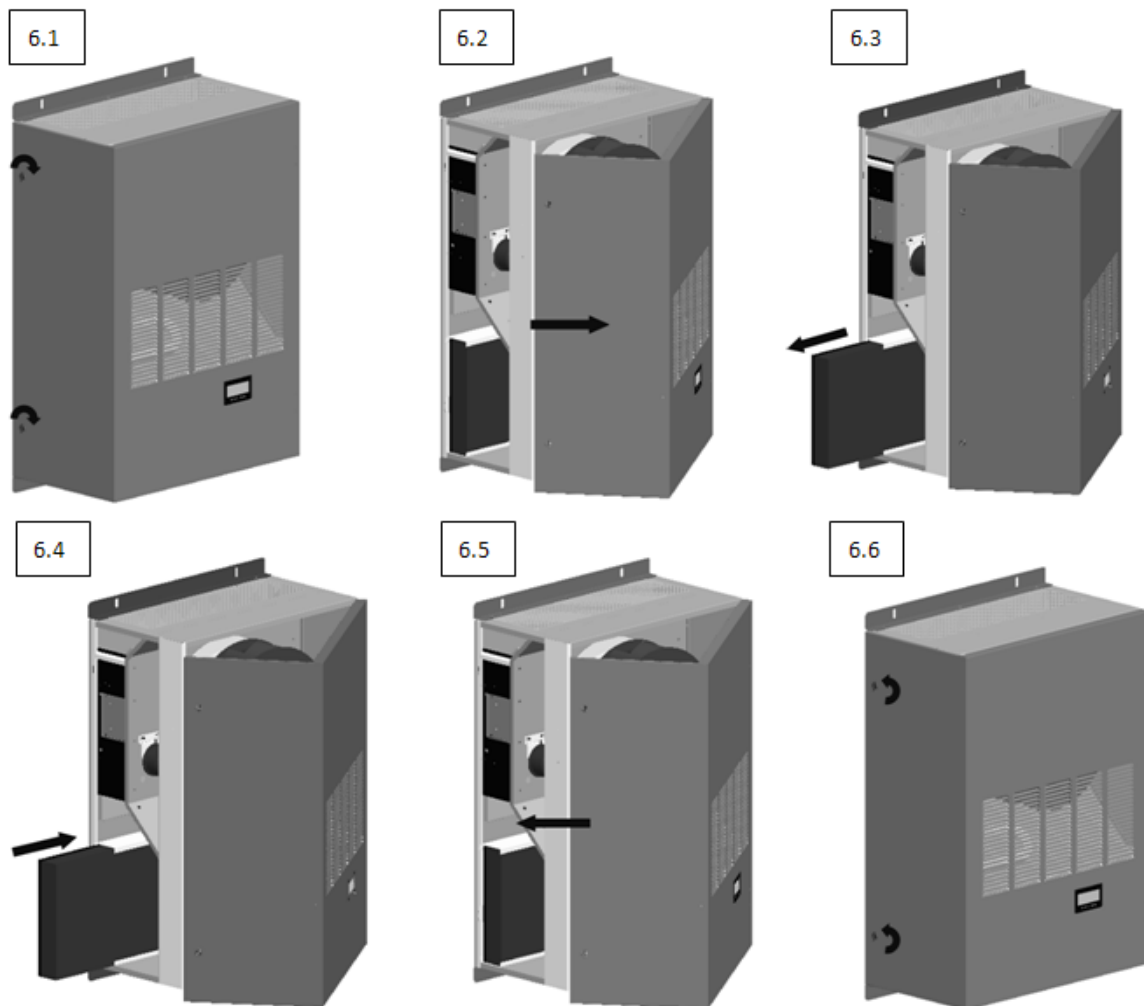
Prior to any maintenance work, the power to the free cooling box must be disconnected.

Fig. 6.1 Filter Maintenance